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NORWOOD, MASSACHUSETTS 02062-5015 USA
www.intronicspower.com

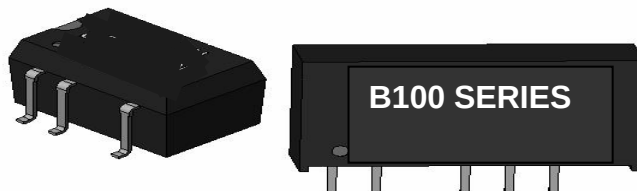
B100 SERIES

1WATT

DC-DC CONVERTERS

FEATURE

- * Industry Standard SIP and SMD Packages
- * Efficiency up to 82%
- * 1000VDC Isolation
- * Low Cost
- * Unregulated Outputs
- * Low Ripple and Noise



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		%	CASE
				NO LOAD	FULL LOAD	EFF.	
B101	5 VDC	5 VDC	200 mA	40 mA	250mA	80	Miniature
B102	5 VDC	12 VDC	84 mA	40 mA	252mA	80	Miniature
B103	5 VDC	15 VDC	67 mA	40 mA	250mA	80	Miniature
B108	5 VDC	±12 VDC	42 mA	40 mA	255mA	79	Miniature
B109	5 VDC	±15 VDC	33 mA	40 mA	251mA	79	Miniature
B107	5 VDC	±5 VDC	100 mA	40 mA	267mA	75	Miniature
B111	12 VDC	5 VDC	200 mA	15 mA	103mA	81	Miniature
B112	12 VDC	12 VDC	84 mA	15 mA	102mA	82	Miniature
B113	12 VDC	15 VDC	67 mA	15 mA	102mA	82	Miniature
B118	12 VDC	±12 VDC	42 mA	15 mA	104mA	81	Miniature
B119	12 VDC	±15 VDC	33 mA	15 mA	101mA	82	Miniature
B117	12 VDC	±5 VDC	100 mA	15 mA	107mA	78	Miniature

NOTE : 1. Nominal Input Voltage 5 or 12 VDC

SPECIFICATIONS

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

INPUT SPECIFICATIONS :

Input Voltage Range.....10%

Input FilterCapacitive

OUTPUT SPECIFICATIONS :

Voltage Accuracy.....±3.0% max.

Ripple and Noise, 20MHz BW....SIP Models.....75mV p-p max.
SMD Models.....120mV p-p max.

Temperature Coefficient.....±0.05%/C max.

Short Circuit Protection.....Momentary 1sec. max.

Line Regulation, Note1.....±1.2% max.

Load Regulation, Note2.....±10% max.

GENERAL SPECIFICATIONS :

Efficiency.....See Table

Isolation Voltage.....1000 VDC min.

Isolation Resistance10⁹ Ohms min.

Switching Frequency100KHz typ.

Operating Ambient Temperature Range.....-40°C to +85°C

De-rating, Above 85°C Linearly to Zero power at 100°C

Case temperature (Note5).....+100°C max.

Cooling.....Natural Convection

Storage Temperature Range -55°C to +125°C

Dimensions:

SIP Models.....0.77 x 0.24 x 0.40inches(19.5 x 6.1 x 10.2mm)

SMD Models(Single).....0.5 x 0.31 x 0.27inches(12.7 x 8.0 x 6.8mm)

SMD Models(Dual).....0.6 x 0.31 x 0.27inches(15.24 x 8.0 x 6.8mm)

Case Material.....SIP Models.....Non-conductive black plastic

SMD Models.....Epoxy molding compound

Weight.....1.8g

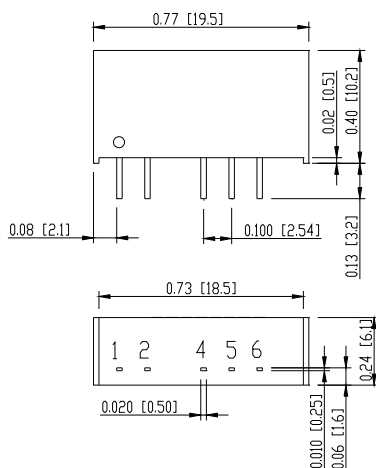
NOTE :

1. Line regulation is per 1.0% change in input voltage
2. Load regulation is for load change from 100% to 20%
3. The output noise is measured with 0.33uF ceramic capacitor.
4. Suffix "S" to the model number with SMD packages
5. Maximum case temperature under any operating condition should not be exceeded 100°C.

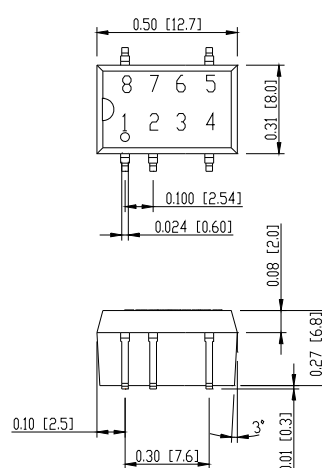
Dimensions:

All Dimensions in Inches(mm)
Tolerance Inches Millimeters
X XX±0.01 X XX±0.25
X XXX±0.005 X XXX±0.13
Pin ±0.002 ±0.05

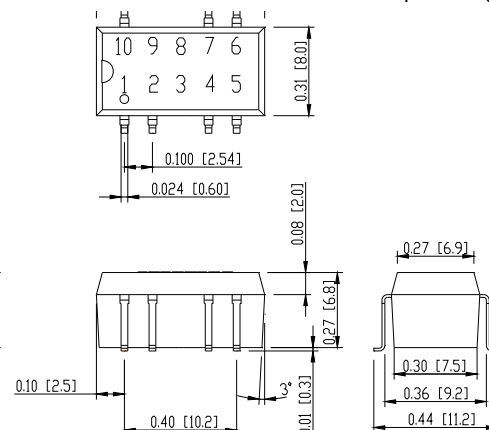
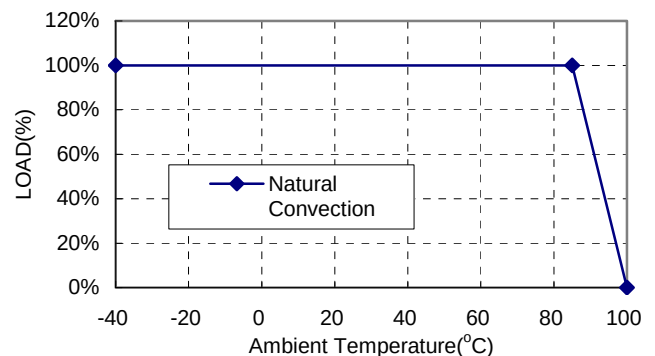
SIP PACKAGES



SMD PACKAGES



Typical Derating curve for Natural Convection



PIN CONNECTION		
Pin	Single Output	Dual Output
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No Pin	Common
6	+Vout	+Vout

NA:Not Available for Electrical Connection

PIN CONNECTION		
Pin	Single Output	
1	-Vin	
2	+Vin	
3	No Pin	
4	-Vout	
5	+Vout	
6	No Pin	
7	No Pin	
8	NA	

PIN CONNECTION		
Pin	Dual Output	
1	-Vin	
2	+Vin	
3	No Pin	
4	Common	
5	-Vout	
6	NA	
7	+Vout	
8	No Pin	
9	No Pin	
10	NA	

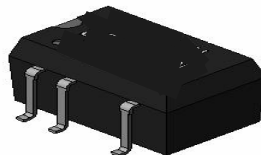
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SMD Models.....Epoxy molding compound

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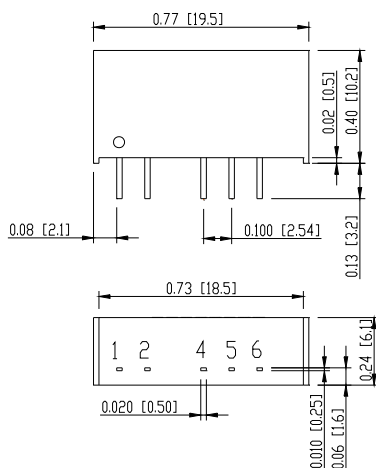
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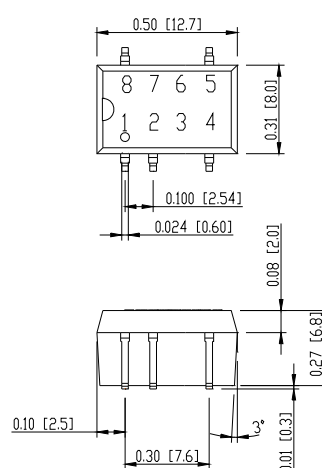
SIP PACKAGES



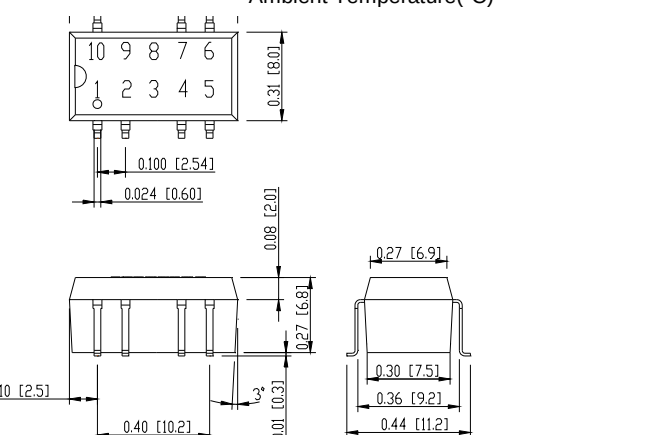
PIN CONNECTION		
Pin	Single Output	Dual Output
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No Pin	Common
6	+Vout	+Vout

NA:Not Available for Electrical Connection

SMD PACKAGES

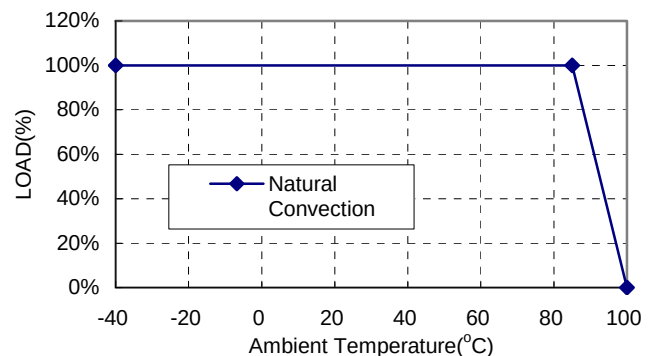


PIN CONNECTION	
Pin	Single Output
1	-Vin
2	+Vin
3	No Pin
4	-Vout
5	+Vout
6	No Pin
7	No Pin
8	NA



PIN CONNECTION	
Pin	Dual Output
1	-Vin
2	+Vin
3	No Pin
4	Common
5	-Vout
6	NA
7	+Vout
8	No Pin
9	No Pin
10	NA

Typical Derating curve for Natural Convection





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B200 Series

FIXED INPUT ISOLATED & UNREGULATED
1W OUTPUT 6000VDC ISOLATION
SINGLE OUTPUT DIP PACKAGE

RoHS multi-country patent protection

FEATURES

- Efficiency to 76%
- Positive Voltage Output
- Small Footprint
- DIP Package
- Industry Standard Pin out
- No Heat sink Required
- 6KVDC Isolation
- Temperature Range: -40°C~+85°C
- No External Component Required
- RoHS Compliance

APPLICATIONS

The B200 Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation $\leq \pm 10\%$);
- 2) Where isolation is necessary between input and output (isolation voltage = 6000VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits.

These products don't apply to:

- 1) Where the input supply voltage is unfixed (variation $\geq \pm 10\%$), otherwise our company's WRA series is recommended;
- 2) Circuits in which the output voltage regulation is demanding, otherwise our company's IB Series or WRB Series are recommended.

PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (% Typ)	Package Style
	Voltage (VDC)		Voltage (VDC)	Current (mA)			
	Nominal	Range		Max	Min		
B201	5	4.5~5.5	5	200	20	70	DIP
B205			9	111	12	70	DIP
B202			12	84	9	72	DIP
B203			15	67	7	72	DIP
B211	12	10.8~13.2	5	200	20	70	DIP
B215			9	111	12	74	DIP
B212			12	84	9	76	DIP
B213			15	67	7	76	DIP

COMMON SPECIFICATIONS

Short circuit protection	1 second
Temperature rise at full load	25°C MAX, 15°C TYP
Cooling	Free air convection
Operating temperature range	-40°C~+85°C
Storage temperature range	-55°C ~+125°C
Lead temperature*	300°C (1.5mm from case for 10 seconds)
Storage humidity range	$\leq 95\%$
Case material	Plastic (UL94-V0)
MTBF	>3,500,000 hours

*Lead temperature 1.5mm from case for 10 seconds.

ISOLATION SPECIFICATIONS

Item	Test conditions	Min	Typ	Max	Units
Isolation voltage	Flash tested for 1 minute	6000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

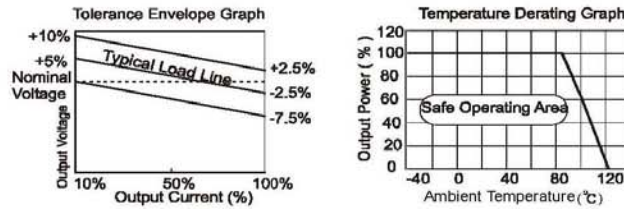
OUTPUT SPECIFICATIONS

Item	Test conditions	MIN	TYP	MAX	Units
Out put power	See below product program	0.1		1	W
Line regulation**	Nominal voltage $\pm 1\%$			± 1.2	%
Load regulation	10% to 100% (5V output)			15	%
Load regulation	10% to 100% (12V output)			10	%
Output voltage accuracy	100% full load	See tolerance envelope graph			
Temperature drift	100% full load			0.03	%/°C
Output ripple	20MHz Bandwidth		150	250	mVp-p
Noise	20MHz Bandwidth		250	300	mVp-p
Switching frequency	Full load, nominal input(5V)		250		KHz
	Full load, nominal input(12V)		50		

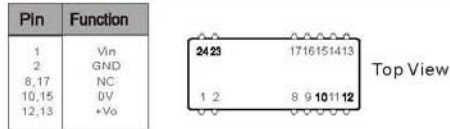
Note: 1.All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

2. See below recommended circuits for more details.

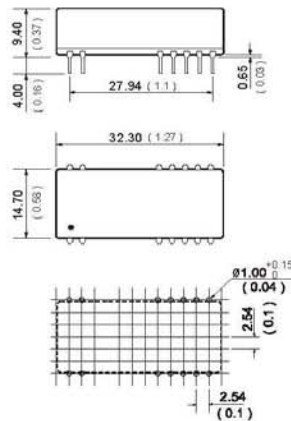
TYPICAL CHARACTERISTICS



PIN CONNECTIONS



OUTLINE DIMENSIONS & RECOMMENDED FOOTPRINT DETAILS



Note: All Pins on a 2.54mm pitch; all Pin diameters are 0.50mm; Unit: mm(inch).

APPLICATION NOTE

Requirement on output load

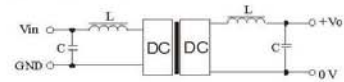
To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of dc/dc converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load is **not less than 10%** of the full load, and that this product should never be operated under no load!

Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against over-current and short-circuits. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

Filtering

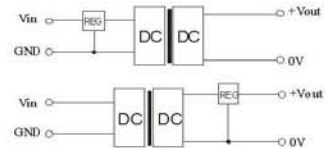
In some circuits which are sensitive to noise and ripple, a filtering capacitor may be added to the DC/DC output end and input end to reduce the noise and ripple. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees the external capacitor table. To get an extremely low ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, which may produce a more significant filtering effect. It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference (see Figure 1).



(Figure 1)

Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage stabilizer with overheat protection that is connected to the input or output end in series (see Figure 2).



(Figure 2)

EXTERNAL CAPACITOR TABLE

V _{in}	External capacitor	V _{out}	External capacitor
5VDC	4.7uF	5VDC	4.7uF
12VDC	2.2uF	9VDC	2.2uF
24VDC	1uF	12VDC	1uF
—	—	15VDC	0.47uF

It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.

DC 100 SERIES

1 WATT SINGLE
OUTPUT
DC-DC CONVERTERS



FEATURES

- Ultra-Miniature Package
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation
- Industry Standard DIP Pin Out

INPUT SPECIFICATIONS

Input Voltage: 5, 12, 24V

Input Range: $\pm 5\%$

Input Filter: Capacitor

OUTPUT SPECIFICATIONS

Output Voltage: 5, 12, 15

Voltage Accuracy: $\pm 3\%$

Line Regulation: $\pm 0.25\%$

Load Regulation: 1%

Temperature Coefficient: $+ .03\%/^{\circ}\text{C}$

Ripple and Noise: $<1\%$ mVp-p

(20 MHz Bandwidth) See Note (1)

Short Circuit Protection: Continuous

GENERAL SPECIFICATIONS

Efficiency: 70% to 80%

Isolation Voltage: 1000 Vdc

Operating Temperature: -40°C to 85°C

Storage Temperature: -55°C to 125°C

Case Type: Non-Conductive Plastic

Size: .787" x .393" x .256"

20 X 10 X 6.5 mm

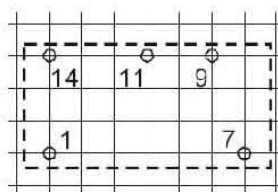
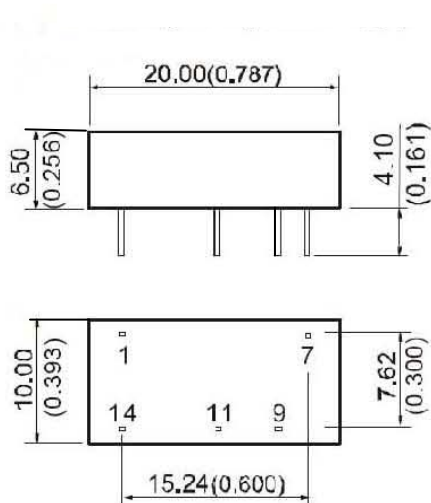
Note (1): With a 10uF tantalum capacitor
across Output.



LEAD FREE

MODEL NUMBER		INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-101-1	SINGLE	5V	5V	150mA
DC-102-1		5V	12V	83mA
DC-103-1		5V	15V	67mA
DC-111-1		12V	5V	150mA
DC-112-1		12V	12V	83mA
DC-113-1		12V	15V	67mA
DC-121-1		24V	5V	150mA
DC-122-1		24V	12V	83mA
DC-123-1		24V	15V	67mA

NOTE: FOOT PRINT HAS CHANGED
FROM 16 PIN DIP TO 14 PIN DIP



FOOTPRINT DETAILS

Pin	FUNCTION
1	GND
7	NC
9	+Vo
11	0V
14	Vin

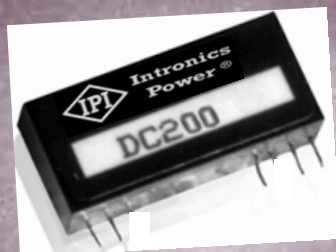
NC: No Connection



**Intronics
Power®**

DC 200 SERIES

1 and 2 WATT DUAL
OUTPUT DC – DC
CONVERTERS



- 5 Pin SIP Package
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation

INPUT SPECIFICATIONS

Input Voltage: 5, 12, 24V

Input Range: $\pm 10\%$

Input Filter: Capacitor

OUTPUT SPECIFICATIONS

Output Voltage: 5, 9, 12, 15, ± 12 , ± 15

Voltage Accuracy: $\pm 3\%$

Line Regulation: $\pm 1\%$

Load Regulation: $\pm 1\%$

Temperature Coefficient: $\pm .02\%/^{\circ}\text{C}$

Ripple and Noise: 1% pp

(20 MHz Bandwidth) See Note (2)

Short Circuit Protection: Short Term

GENERAL SPECIFICATIONS

Efficiency: 68% to 75%

Isolation Voltage: 500 Vdc

Operating Temperature: -40°C to 85°C

Storage Temperature: -55°C to 125°C

Case Type: Non-Conductive Plastic

Size 1.083 x .374 x .472

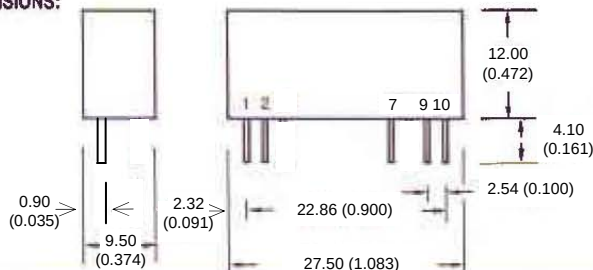
27.5 x 9.5 x 12.0 mm

Note (1): 9 volt output units are unregulated.

Note (2): With a 10uf tantalum capacitor across each output.

MODEL NUMBER		INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-201-1	1 WATT	5V	$\pm 5\text{V}$	$\pm 100\text{mA}$
DC-202-1		5V	$\pm 12\text{V}$	$\pm 42\text{mA}$
DC-203-1		5V	$\pm 15\text{V}$	$\pm 33\text{mA}$
DC-211-1		12V	$\pm 5\text{V}$	$\pm 100\text{mA}$
DC-212-1		12V	$\pm 12\text{V}$	$\pm 42\text{mA}$
DC-213-1		12V	$\pm 15\text{V}$	$\pm 33\text{mA}$
DC-221-1		24V	$\pm 5\text{V}$	$\pm 100\text{mA}$
DC-222-1		24V	$\pm 12\text{V}$	$\pm 42\text{mA}$
DC-223-1		24V	$\pm 15\text{V}$	$\pm 33\text{mA}$
DC-208-1	2 WATT	5V	$\pm 12\text{V}$	$\pm 84\text{mA}$
DC-209-1		5V	$\pm 15\text{V}$	$\pm 67\text{mA}$
DC-218-1		12V	$\pm 12\text{V}$	$\pm 84\text{mA}$
DC-219-1		12V	$\pm 15\text{V}$	$\pm 67\text{mA}$
DC-228-1		24V	$\pm 12\text{V}$	$\pm 84\text{mA}$
DC-229-1		24V	$\pm 15\text{V}$	$\pm 67\text{mA}$
DC-206-1		5V	9V Note (1)	$\pm 100\text{mA}$
DC-216-1		12V	9V Note (1)	$\pm 100\text{mA}$

DIMENSIONS:



PIN CONNECTIONS:

PIN	FUNCTION
1	Vin
2	GND
7	+Vo
9	-Vo
10	0V



LEAD FREE

NOTE: FOOT PRINT HAS CHANGED
FROM 7 PIN SIP TO 5 PIN SIP

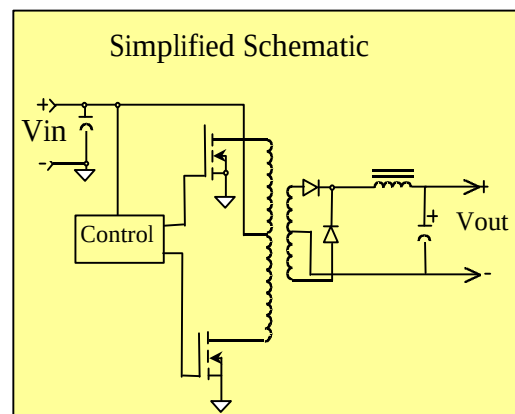
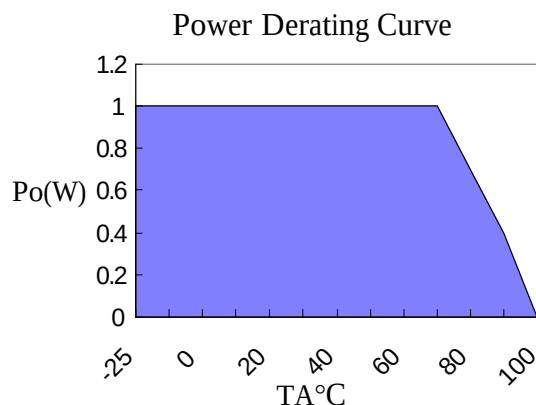
**0.5 -1.0 watt DC300D 14pins DIP /DC300S 7pins SIP package
DC300D /DC300S Series**

Feature:

- Low Cost
- Miniature SIP/DIP Package
- 1000Vdc Input/Output Isolation
- Single and Dual Outputs
- No External Components required
- Low Profile and Compact Size

Specifications: At 25°C

Input Specifications:	General Specifications:
Input Voltage Range: $\pm 5\%$	Isolation Voltage: 1,000Vdc
Input Filter: Internal Capacitor	Efficiency: see table
Output Specifications:	Switching Frequency: 100Khz typical
Output Voltage & Current: see table	Isolation Resistance: 1000M ohm
Voltage Accuracy: $\pm 5\%$ max	Environmental Specifications:
Output Voltage Balance(Dual Outputs): $\pm 3\%$	Operating Temperature: -25 to + 71°C
Line Regulation(full load): $\pm 10\%$ max	Storage Temperature: -40 to +105°C
Load Regulation at full load to 1/4 load): $\pm 15\%$ max	Cooling: Free air convection
Temperature Coefficient: $\pm 0.05\%/^{\circ}\text{C}$ max	Derating: See Derating Curve
Ripple & Noise(20Mhz BW): 1% p-p max	Humidity Non-Condensing: 20 to 95% RH
Short Circuit Protection: Momentary	Physical Specifications:
	Case Material: Non-conductive plastic case
	Weight: 2.4grams typical



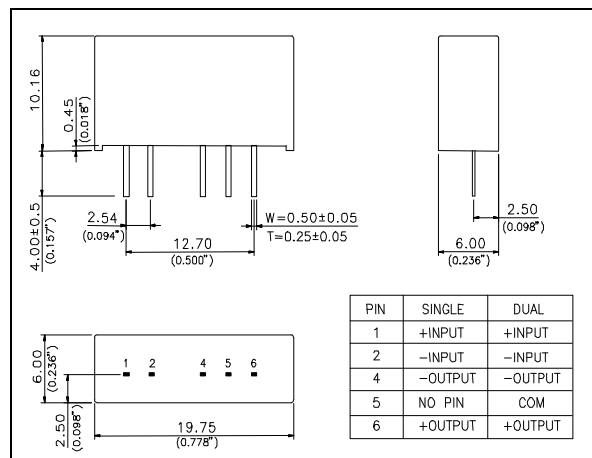
**0.5 - 1.0 watt DC300D 14pins DIP / DC300S 7pins SIP package
DC300D / DC300S Series**

Model Selection Table:

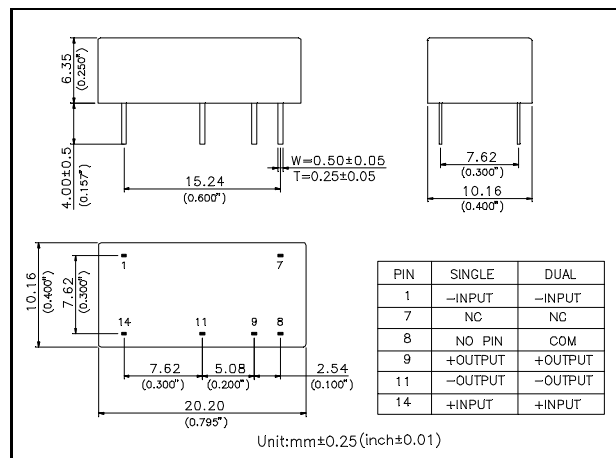
Model no.	Voltage (Vdc)	Input		Output		Efficiency Typical① %	Package
		Current(mA)		Voltage (Vdc)	Current (mA)		
		No-Load	Full-Load				
DC301S	5	30	285	5	200	70	S
DC306S	5	30	265	9	110	75	S
DC302S	5	30	265	12	75	75	S
DC303S	5	30	265	15	60	75	S
DC311S	12	20	120	5	200	70	S
DC316S	12	20	110	9	110	75	S
DC312S	12	20	110	12	80	75	S
DC313S	12	20	110	15	68	75	S
DC307S	5	50	285	±5	±100	70	S
DC305S	5	50	265	±9	±56	75	S
DC308S	5	50	265	±12	±42	75	S
DC309S	5	60	265	±15	±34	75	S
DC317S	12	25	120	±5	±100	70	S
DC315S	12	25	110	±9	±56	75	S
DC318S	12	20	110	±12	±42	75	S
DC319S	12	20	110	±15	±34	75	D
DC307D	5	50	285	±5	±100	70	D
DC305D	5	50	265	±9	±56	75	D
DC308D	5	50	265	±12	±42	75	D
DC309D	5	60	265	±15	±34	75	D
DC317D	12	25	120	±5	±100	70	D
DC315D	12	25	110	±9	±56	75	D
DC318D	12	20	110	±12	±42	75	D
DC319D	12	20	110	±15	±34	75	D

①Efficiency is specified at nominal input voltage and full load.

DC300S Series:



DC300D Series:





DC 500 SERIES

1.5 WATT
SINGLE & DUAL OUTPUT
DC-DC CONVERTERS



FEATURES

- DIP and SMD Package Options
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation

INPUT SPECIFICATIONS

Input Voltage: 5, 12, 24, 48V

Input Filter: Capacitor

Continuous short circuit protection

OUTPUT SPECIFICATIONS

Output Voltage: 5, 12, 15V

Voltage Accuracy: $\pm 4\%$

Line Regulation: $\pm 0.3\%$

Load Regulation (Max): $\pm 0.5\%$

Temperature Coefficient: $+ .02\%/^{\circ}\text{C}$

Ripple and Noise: $<1\%$ mVp-p

(20 MHz Bandwidth) See Note (1)

Short Circuit Protection: Continuous

GENERAL SPECIFICATIONS

Efficiency: 50%

Isolation Voltage: 500 VDC

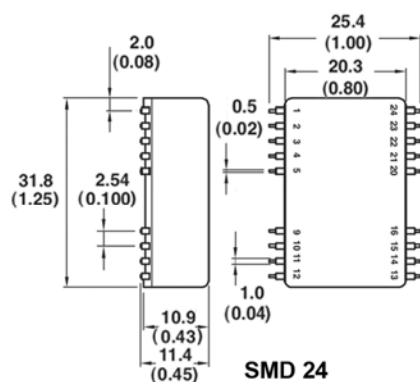
Operating Temperature: -25°C to 71°C

Storage Temperature: -40°C to 100°C

Case Type: Non Conductive Plastic
DIP or SMD

Note (1): With a 10uf tantalum capacitor across Output.

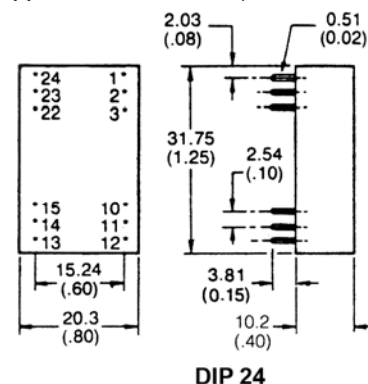
MODEL NUMBER		INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-501	SINGLE	5V	5V	300mA
DC-502		5V	12V	125mA
DC-503		5V	15V	100mA
DC-511		12V	5V	300mA
DC-512		12V	12V	125mA
DC-513		12V	15V	100mA
DC-521		24V	5V	300mA
DC-522		24V	12V	125mA
DC-523		24V	15V	100mA
DC-531		48V	5V	300mA
DC-532		48V	12V	125mA
DC-533		48V	15V	100mA
DC-507	DUAL	See DC-607		
DC-508		5V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-509		5V	$\pm 15\text{V}$	$\pm 100\text{mA}$
DC-518		12V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-519		12V	$\pm 15\text{V}$	$\pm 100\text{mA}$
DC-528		24V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-529		24V	$\pm 15\text{V}$	$\pm 100\text{mA}$
DC-538		48V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-539		48V	$\pm 15\text{V}$	$\pm 100\text{mA}$



PIN CONNECTIONS:

PIN	SINGLE		DUAL	
	DIP	SMD	DIP	SMD
1 & 24	+ INPUT		+INPUT	
2 & 23	NC		- OUTPUT	
3 & 22	NC		COMMON	
10 & 15	- OUTPUT		COMMON	
11 & 14	+ OUTPUT		+ OUTPUT	
12 & 13	-INPUT		- INPUT	
4	NO PIN	NC	NO PIN	NC
5	NO PIN	NC	NO PIN	NC
9	NO PIN	NC	NO PIN	NC
16	NO PIN	NC	NO PIN	NC
20 & 21	NO PIN	NC	NO PIN	NC

NC: No Connection



DC 600 SERIES

3.0 WATT
SINGLE & DUAL OUTPUT
DC-DC CONVERTERS

FEATURES

- DIP and SMD Package Options
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation

INPUT SPECIFICATIONS

Input Voltage: 5, 12, 24, 48V

Input Filter: Capacitor

Continuous short circuit protection

OUTPUT SPECIFICATIONS

Output Voltage: 3.3, 5, 12, 15V

Voltage Accuracy: $\pm 3\%$

Line Regulation: $\pm 0.5\%$

Load Regulation (Max): $\pm 1\%$

Temperature Coefficient: $+ .05\%/^{\circ}\text{C}$

Ripple and Noise: $<1\%$ mVp-p

(20 MHz Bandwidth) See Note (1)

Short Circuit Protection: Continuous

GENERAL SPECIFICATIONS

Efficiency: 70% to 80%

Isolation Voltage: 500 VDC

Operating Temperature: -25°C to 71°C

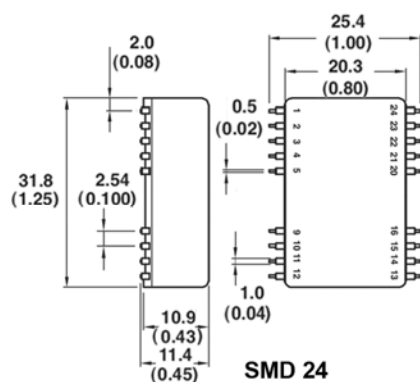
Storage Temperature: -40°C to 100°C

Case Type: Non Conductive Plastic
DIP or SMD

Note (1): With a 10uf tantalum capacitor across Output.



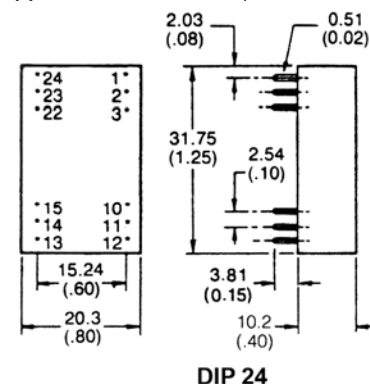
MODEL NUMBER		INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-601	SINGLE	4.5-6.0V	5V	600mA
DC-602		4.5-6.0V	12V	250mA
DC-603		4.5-6.0V	15V	200mA
DC-604		4.5-6.0V	3.3V	600mA
DC-611		9-18V	5V	600mA
DC-612		9-18V	12V	250mA
DC-613		9-18V	15V	200mA
DC-614		9-18V	3.3V	600mA
DC-621		18-36V	5V	600mA
DC-622		18-36V	12V	250mA
DC-623		18-36V	15V	200mA
DC-624		18-36V	3.3V	600mA
DC-631		36-72V	5V	600mA
DC-632		36-72V	12V	250mA
DC-633		36-72V	15V	200mA
DC-634		36-72V	3.3V	600mA
DC-607	DUAL	4.5-6.0V	$\pm 5\text{V}$	$\pm 300\text{mA}$
DC-608		4.5-6.0V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-609		4.5-6.0V	$\pm 15\text{V}$	$\pm 100\text{mA}$
DC-617		9-18V	$\pm 5\text{V}$	$\pm 300\text{mA}$
DC-618		9-18V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-619		9-18V	$\pm 15\text{V}$	$\pm 100\text{mA}$
DC-627		18-36V	$\pm 5\text{V}$	$\pm 300\text{mA}$
DC-628		18-36V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-629		18-36V	$\pm 15\text{V}$	$\pm 100\text{mA}$
DC-637		36-72V	$\pm 5\text{V}$	$\pm 300\text{mA}$
DC-638		36-72V	$\pm 12\text{V}$	$\pm 125\text{mA}$
DC-639		36-72V	$\pm 15\text{V}$	$\pm 100\text{mA}$



PIN CONNECTIONS:

PIN	SINGLE		DUAL	
	DIP	SMD	DIP	SMD
1 & 24	+ INPUT		+INPUT	
2 & 23	NC		- OUTPUT	
3 & 22	NC		COMMON	
10 & 15	- OUTPUT		COMMON	
11 & 14	+ OUTPUT		+ OUTPUT	
12 & 13	-INPUT		- INPUT	
4	NO PIN	NC	NO PIN	NC
5	NO PIN	NC	NO PIN	NC
9	NO PIN	NC	NO PIN	NC
16	NO PIN	NC	NO PIN	NC
20 & 21	NO PIN	NC	NO PIN	NC

NC: No Connection





**Intronics
Power®**

DC 600-I SERIES 30 WATT HIGH ISOLATION DC – DC CONVERTERS



FEATURES

- ✦ Full 2:1 for Telecommunication Applications
- ✦ 2000 VDC Isolation
- ✦ Short circuit & Overvoltage Protected
- ✦ Full regulated
- ✦ Low Output Ripple and Noise
- ✦ High Reliability
- ✦ Input / output Isolation

INPUT/OUTPUT SPECIFICATIONS

Input Filter: PI Network

Output voltage Accurse $\pm 3\%$

Line Regulation (Full Load) $\pm 1\%$ max

Load Regulation $\pm 1\%$ max

Temperature Coefficient $\pm .05\%$ °C

Ripple and Noise: 1% pp
(20 uHz Bandwidth)

Minimum Load: 10% of Full Load

Short Circuit Protection: Foldback

GENERAL SPECIFICATIONS

Efficiency 60% to 75%

Isolation Voltage : 2000 Vdc

Isolation Resistance : 1000 Mohm

Operating Temperature -25°C to 70°C

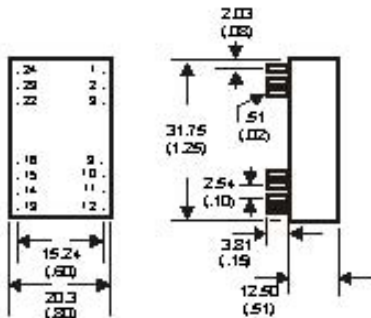
Storage Temperature : -40°C to 105°C

Case Type : Non-Conductive Plastic

Size : 1.25" X .8" X .5"

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)
DC-601-I	4.5V - 6V	5V	500 mA
DC-602-I	4.5V - 6V	12V	250 mA
DC-603-I	4.5V - 6V	15V	200 mA
DC-611-I	9V - 18V	5V	500 mA
DC-612-I	9V - 18V	12V	250 mA
DC-613-I	9V - 18V	15V	200 mA
DC-621-I	18V - 36V	5V	500 mA
DC-622-I	18V - 36V	12V	250 mA
DC-623-I	18V - 36V	15V	250 mA
DC-631-I	36V - 72V	5V	500 mA
DC-632-I	36V - 72V	12V	250 mA
DC-633-I	36V - 72V	15V	200 mA

Dimensions: Bottom View



PIN CONNECTION

PIN	FUNCTION
1 & 2	+ VIN
23 & 24	- VIN
11 & 12	+ VOUT
9 & 10	- VOUT
3	ENABLE

DC 800

S E R I E S

10 WATT 2:1 INPUT DC-DC CONVERTERS



(Replaces DC-1300 Series)

Features

- 10W Isolated Output
- Efficiency to 87%
- 2:1 Input Range
- Regulated Outputs
- Fixed Switching Frequency
- Input Under Voltage Protection
- Over Current Protection
- Remote ON/OFF
- Continuous Short Circuit Protection
- Conductive EMI Meets EN55022 Class A
- Without Tantalum Capacitors Inside
- CE Mark Meets 2004/108/EC
- Safety Meets UL60950-1, EN60950-1, and IEC60950-1

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	Capacitor Load max.
			MIN.	MAX.	NO LOAD	FULL LOAD		
DC- 800	4.7-9 VDC	3.3 VDC	0 mA	2500 mA	120 mA	1988 mA	83	2470uF
DC- 801		5 VDC	0 mA	2000 mA	120 mA	2353 mA	85	2000uF
DC- 802		12 VDC	0 mA	833 mA	50 mA	2326 mA	87	940uF
DC- 803		15 VDC	0 mA	666 mA	50 mA	2326 mA	87	690uF
DC- 807		±5 VDC	0 mA	±1000 mA	50 mA	2381 mA	84	1000uF
DC- 808		±12 VDC	0 mA	±416 mA	50 mA	2326 mA	87	440uF
DC- 809		±15 VDC	0 mA	±333 mA	50 mA	2326 mA	87	330uF
DC- 810	9-18 VDC	3.3 VDC	0 mA	2500 mA	30 mA	838 mA	82	2470uF
DC- 811		5 VDC	0 mA	2000 mA	30 mA	980 mA	85	2000uF
DC- 812		12 VDC	0 mA	833 mA	30 mA	957 mA	87	940uF
DC- 813		15 VDC	0 mA	666 mA	35 mA	956 mA	87	690uF
DC- 817		±5 VDC	0 mA	±1000mA	45 mA	980mA	85	1000uF
DC- 818		±12 VDC	0 mA	±416mA	45 mA	957mA	87	440uF
DC- 819		±15 VDC	0 mA	±333mA	45 mA	957mA	87	330uF
DC- 820	18-36 VDC	3.3 VDC	0 mA	2500 mA	20 mA	419 mA	82	2470uF
DC- 821		5 VDC	0 mA	2000 mA	20 mA	490 mA	85	2000uF
DC- 822		12 VDC	0 mA	833 mA	20 mA	478 mA	87	940uF
DC- 823		15 VDC	0 mA	666 mA	20 mA	478 mA	87	690uF
DC- 827		±5 VDC	0 mA	±1000mA	30 mA	490 mA	85	1000uF
DC- 828		±12 VDC	0 mA	±416mA	25 mA	478 mA	87	440uF
DC- 829		±15 VDC	0 mA	±333mA	25 mA	478 mA	87	330uF
DC- 830	36-75 VDC	3.3 VDC	0 mA	2500 mA	20 mA	212 mA	81	2470uF
DC- 831		5 VDC	0 mA	2000 mA	20 mA	245 mA	85	2000uF
DC- 832		12 VDC	0 mA	833 mA	20 mA	239 mA	87	940uF
DC- 833		15 VDC	0 mA	666 mA	20 mA	239 mA	87	690uF
DC- 837		±5 VDC	0 mA	±1000mA	20 mA	245 mA	85	1000uF
DC- 838		±12 VDC	0 mA	±416mA	20 mA	239 mA	87	440uF
DC- 839		±15 VDC	0 mA	±333mA	20 mA	239 mA	87	330uF



**Intronics
Power®**

DC 900 SERIES

7.5 WATT SINGLE OUTPUT
DC-DC CONVERTERS

FEATURES

- 2:1 Input Range for Battery and Telecommunication Applications
- High Efficiency
- Low Profile Case
- Fully Regulated and Isolated
- Overvoltage Protection
- Continuous Short Circuit Protection
- Six-sided Shielding

INPUT SPECIFICATIONS

Input Voltage: 12, 24, 48V

Input Range: 2:1

Input Filter: LC

OUTPUT SPECIFICATIONS

Output Voltage: 5, 12, 15

Voltage Accuracy: $\pm 1\%$

Line Regulation: 0.5%

(Full Load)

Load Regulation: 1.0%

(Full Load to 1/4 Full Load)

Transient Recovery: 200 μ s to 1% Final Value

(Full Load to 1/2 Full Load)

Temperature Coefficient: $\pm .02\%/^{\circ}\text{C}$

Ripple and Noise: 1% pp

(20 MHz Bandwidth) See Note (1)

Short Circuit Protection: Foldback

Overvoltage Protection: Clamp

GENERAL SPECIFICATIONS

Efficiency: 75% to 86%

Isolation Voltage: 500 Vdc

Operating Temperature: -25°C to 71°C

Storage Temperature: -40°C to 105°C

Case Type: Six-sided Continuous Metal Case
With Non-Conductive Base

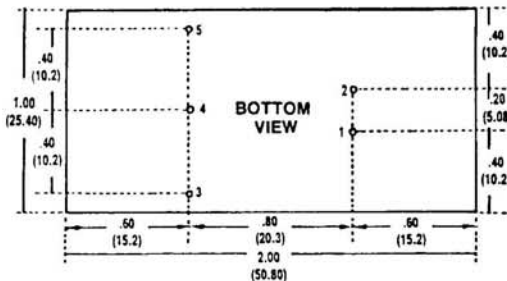
Size: 2" x 1" x .4"

Note (1): With a 10 μ f tantalum capacitor across output.

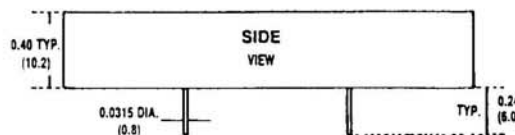


MODEL NUMBER		INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-911	SINGLE	9.5-18V	5V	1500mA
DC-912		9.5-18V	12V	625mA
DC-913		9.5-18V	15V	500mA
DC-921		18-36V	5V	1500mA
DC-922		18-36V	12V	625mA
DC-923		18-36V	15V	500mA
DC-931		36-72V	5V	1500mA
DC-932		36-72V	12V	625mA
DC-933		36-72V	15V	500mA

DIMENSIONS:



PIN CONNECTIONS:



PIN	SINGLE OUTPUT
1	+ INPUT
2	- INPUT
3	+ OUTPUT
4	NC
5	- OUTPUT



**Intronics
Power®**

DC1300 Series

10 Watt, 3.3V Output
DC-DC Converters

Features

Full 2:1 input range
Low profile 0.4" high
Short Ckt & Overvoltage protected
Fully regulated
Low output ripple & noise
High reliability
Input/output isolation

Input / Output Specifications

Input filter: Pi Network
Logic Input Reference: to minus input
Logic compatibility: TTL or CMOS
Remote ON/OFF
Output voltage accuracy: $V_1 \pm 3\%$
Line regulation(at Full Load): $\pm .5\%$ max.
Load regulation (1/2 to Full): $\pm 1\%$ max.
Temp. coef.: $\pm .02\%/degree\ C$
Trans. Recovery: 200 μ s max. to 1% final value
Ripple & noise (20Mhz BW): 50mV
Short circuit protection: foldback

General Specifications

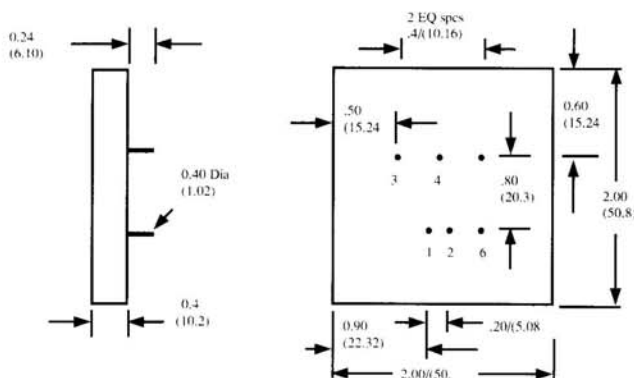
Efficiency: up to 81 %
Isolation voltage: 500 Vdc
Isolation Resistance: 1000 M Ω
Operating temp.: -25 to +71 °C
Storage temp.: -55 to +125 °C
EMI/RFI: Six-sided continuous metal shielding
Case Material: Black coated Cu w/ non-conductive bottom
Size: 2" x 2" x .4"

External Output Trimming

Output may optionally be externally trimmed ($\pm 5\%$) with a fixed resistor or a trimpot.



Model Number	Input Voltage (Vdc)	Output Voltage (Vdc)	Output Current (mA)	Input Current	
				No Load	Full Load
DC1300	4.5-6	3.3	3000	10	2470
DC1310	9-18	3.3	3000	10	1030
DC1320	18-36	3.3	3000	10	500
DC1330	36-72	3.3	3000	10	245



PIN	Function	
1	+ Vin (input)	+ Vin (input)
2	- Vin (input)	- Vin (input)
3	+Vout (output)	+ Vout (output)
4	Trim	Common
5	- Vout (output)	- Vout (output)
6	Remote ON/OFF	

Due to ongoing product improvement, specifications are subject to change.

H100W

S E R I E S

66-100 WATT 4:1 INPUT DC-DC CONVERTERS SINGLE OUTPUT



Features

- 66-100W Isolated Output
- Efficiency to 89%
- 250KHz Switching Frequency
- 4 : 1 Input Range
- Regulated Outputs
- Continuous Short Circuit Protection
- Five-Sided Metal Case
- Half-Brick Size Meet Industrial Standard
- CE Mark Meets 2004/108/EC
- UL60950-1 Approval

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
H100W-24S33	9-36 VDC	3.3VDC	0mA	20 A	35mA	3333mA	82.5	20000uF
H100W-24S5	9-36 VDC	5.0VDC	0mA	20 A	35mA	4931mA	84.5	20000uF
H100W-24S12	9-36 VDC	12 VDC	0mA	8.3 A	35mA	4854mA	85.5	8300uF
H100W-24S15	9-36 VDC	15 VDC	0mA	6.7 A	35mA	4813mA	87	6700uF
H100W-24S24	9-36 VDC	24 VDC	0mA	4.17 A	35mA	4766mA	87.5	1800uF
H100W-24S48	9-36 VDC	48 VDC	0mA	2.08 A	35mA	5042mA	82.5	470uF
H100W-48S33	18-75VDC	3.3VDC	0mA	20 A	30mA	1667mA	82.5	20000uF
H100W-48S5	18-75VDC	5.0VDC	0mA	20 A	30mA	2422mA	86	20000uF
H100W-48S12	18-75VDC	12 VDC	0mA	8.3 A	30mA	2371mA	87.5	8300uF
H100W-48S15	18-75VDC	15 VDC	0mA	6.7 A	30mA	2379mA	88	6700uF
H100W-48S24	18-75VDC	24 VDC	0mA	4.17 A	30mA	2343mA	89	2200uF
H100W-48S48	18-75VDC	48 VDC	0mA	2.08 A	30mA	2462mA	84.5	470uF

NOTE: 1. Nominal Input Voltage 24 or 48 VDC

Specifications

INPUT SPECIFICATIONS:

Input Voltage Range.....	24V.....9-36V
	48V.....18-75V
Input Surge Voltage (100ms max.)	24V 50Vdc max.
	48V100Vdc max.
Undervoltage lockout	24Vin power up.....8.8V
	24Vinpower down8.0V
	48Vin power up.....17V
	48Vinpower down16V
Positive Logic Remote ON/OFF ^{4,5}	
Input Filter	PI Type

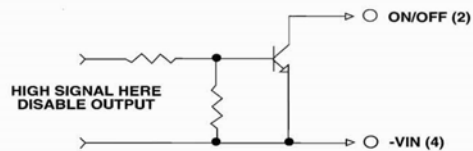
OUTPUT SPECIFICATIONS:

Voltage Accuracy :	±1.5% max.
Transient Response :25% Step Load Change.....	<500µ sec.
External Trim Adj. Range	±10%
Ripple & Noise, 20MHz BW	
3.3V & 5V	40mV RMS, max./100mV pk-pk, max.
12V & 15V	60mV RMS, max./150mV pk-pk, max.
24V	100mV RMS, max./240mV pk-pk, max.
48V	200mV RMS, max./480mV pk-pk, max.
Temperature Coefficient.....	±0.03%/°C
Short Circuit Protection.....	Continuous
Line Regulation ¹	±0.2% max.
Load Regulation ²	±0.2% max.
Over Voltage Protection trip Range, % Vo nom.....	115-140%
Current Limit	110% ~140% Nominal Output
Start up time	25ms Typ.

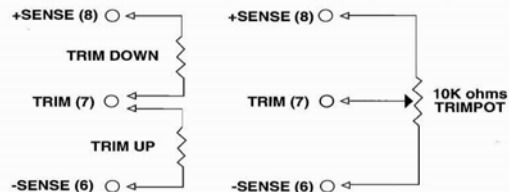
GENERAL SPECIFICATIONS:

Efficiency.....	See Table
Isolation Voltage	Input/Output.....1500VDC min.
	Input/Case.....1500VDC min.
	Output/Case.....1500VDC min.
Isolation Resistance	10 ⁹ ohm min.
Isolation Capacitance	1500pF typ.
Switching Frequency	250KHz, Typ.
Operating Case Temperature	-40°C to 100°C
Storage Temperature	-55°C to +105°C
Thermal Shutdown, Case Temp.	105°C Typ.
Humidity	95% RH max. Non Condensing
MTBF	MIL-STD-217F, GB, 25°C, Full Load700Khrs Typ.
Dimensions	2.28x2.40x0.50 inches (57.9x61.0x12.7 mm)
Case Material.....	Aluminum
Weight.....	.95g

Remote On/Off Control



External Output Trim



PIN CONNECTION

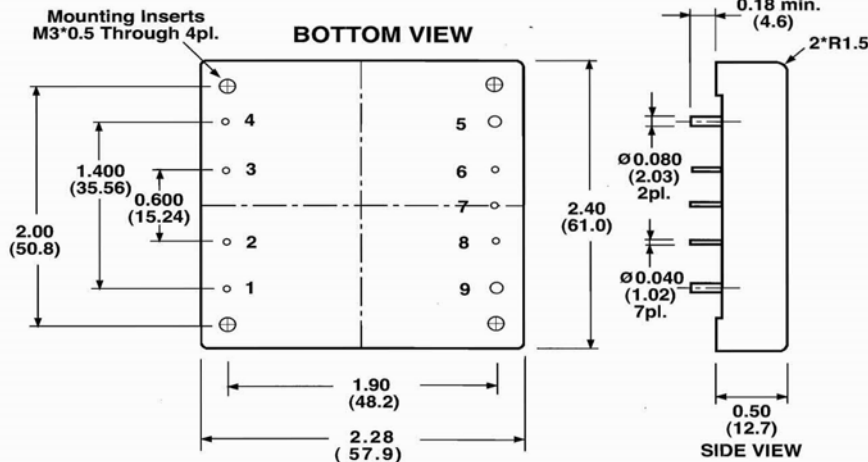
Pin	Function
1	+V Input
2	ON/OFF
3	CASE
4	-V Input
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

NOTE:

1. Measured From High Line to Low Line
2. Measured From Full Load to Zero Load
3. Output Ripple and Noise measured with 10uF tantalum and 1uF Ceramic capacitor across output
4. Logic Compatibility Open Collector ref to -Input
Module ON > 3.5Vdc or Open Circuit
Module OFF < 1.8Vdc
5. Suffix "N" to the Model Number with Negative Logic Remote ON/OFF
Module ON < 1.8Vdc
Module OFF > 3.5Vdc or Open Circuit
6. Suffix "-C" to the Model Number with Clear Mounting Insert (3.2mm DIA.)
7. Require a 47uF Aluminum Capacitor Connected Between +Vout and -Vout for 48Vout Models

CASE HB

All Dimensions In Inches(mm)
Tolerance Inches: x.xx= ±0.02, x.xxx= ±0.010
Millimeters: x.x= ±0.5, x.xx= ±0.25



All Specifications Typical At Nominal Line, Full Load and 25°C Unless Otherwise Noted.

Q & H SERIES DC/DC MODULES

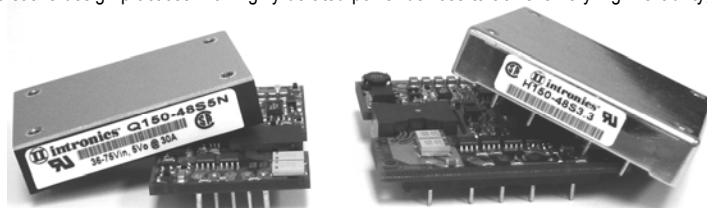
Applications

- Servers, Switches and Data Storage
- Networking Gear
- Wireless Communications
- Data Communications
- Distributed Power Architecture
- Telecommunications
- Semiconductor Test Equipment
- Industrial / Medical

The Q and H Families of high power, high density DC/DC converters offer power levels of up to 150 Watt in Industry-Standard Quarter-brick and Half-brick Pinouts. With a wide input voltage range and outputs, ranging from 1.5 to 24 Volts, these converters provide versatility without sacrificing the board space. All models feature an input filter, input undervoltage lockout, overtemperature protection, output current limiting and short circuit protection. Various packaging techniques offer versatility for multitude of applications and requirements. The use of patented design concepts facilitates maximum power delivered with the highest efficiency of up to 93%. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

Specifications & Features Summary

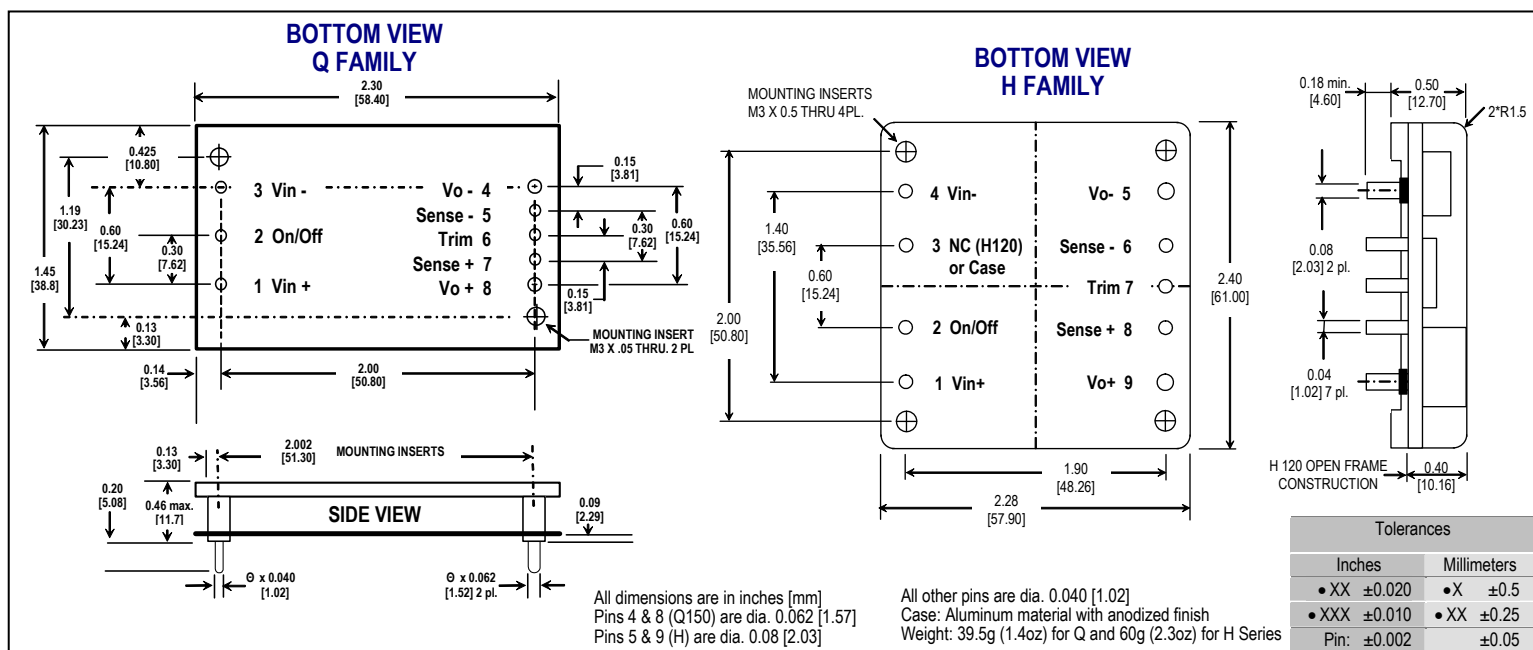
- No minimum load required
- -40°C to +85°C ambient operation
- Output adjustment +/-10% range
- 1500V, 10MΩ input-to-output isolation
- Unique Flat Transformer Technology
- Complimentary Circuits
- Over Temperature protection
- Output remote sense feature
- Input undervoltage lockout
- Output current limit and short circuit protection
- High power density up to 90W/inch³
- MTBF of up to 1,600,000 hours @ 50°C (Bellcore)
- Remote On/Off pin control (Negative Logic available)
- Meets Basic Insulation requirements of EN60950 (Open Frame Q and H Families)
- UL 60950 recognized, TUV EN60950 and CSA C22.2 No. 60950-00 Certified (Approvals Pending)
- Meets conducted limits of FCC Class B and CEI IEC61204-3 Class B with external filter



Approval Pending

Model	Input Voltage Range (Vin)	I in No Load	I in Full Load	Vo (V)	Io (A)	Eff Typ (%)	Case	Pinout	Regulation Line/Load (%)	Ripple/Noise Typ. (mVp-p)
Q150-48S1.5	36 - 75	0.100	1.80	1.5	45	85	Q150	QS	±0.2 / ±0.2	100
Q150-48S1.8	36 - 75	0.100	2.20	1.8	45	86	Q150	QS	±0.1 / ±0.1	100
Q150-48S2.5	36 - 75	0.100	2.80	2.5	40	87	Q150	QS	±0.1 / ±0.1	100
Q150-48S3.3	36 - 75	0.100	3.20	3.3	35	89	Q150	QS	±0.1 / ±0.1	100
Q150-48S5	36 - 75	0.100	4.00	5	30	91	Q150	QS	±0.1 / ±0.1	100
Q150-48S12	36 - 75	0.100	4.10	12	12	93	Q150	QS	±0.1 / ±0.1	100
H75-12S2.5	9 - 18	0.050	4.11	2.5	15.0	76	H	HS	±0.2 / ±0.2	75
H75-12S3.3	9 - 18	0.050	5.29	3.3	15.0	78	H	HS	±0.2 / ±0.2	75
H75-12S5	9 - 18	0.050	7.72	5	15.0	81	H	HS	±0.2 / ±0.2	75
H75-12S12	9 - 18	0.050	7.44	12	6.3	84	H	HS	±0.2 / ±0.2	100
H75-12S15	9 - 18	0.050	7.44	15	5.0	84	H	HS	±0.2 / ±0.2	100
H75-12S24	9 - 18	0.050	7.44	24	3.1	84	H	HS	±0.2 / ±0.2	240
H100-24S2.5	18 - 36	0.050	2.71	2.5	20.0	77	H	HS	±0.2 / ±0.2	50
H100-24S3.3	18 - 36	0.050	3.48	3.3	20.0	79	H	HS	±0.2 / ±0.2	50
H100-24S5	18 - 36	0.050	5.02	5	20.0	83	H	HS	±0.2 / ±0.2	50
H100-24S12	18 - 36	0.050	4.88	12	8.3	85	H	HS	±0.2 / ±0.2	100
H100-24S15	18 - 36	0.050	4.93	15	6.7	85	H	HS	±0.2 / ±0.2	100
H100-48S24	36 - 75	0.050	2.46	24	4.2	85	H	HS	±0.2 / ±0.2	240
H150-48S1.5	36 - 75	0.100	1.10	1.5	30.0	85	H120	HS	±1.0 / ±1.0	100
H150-48S1.8	36 - 75	0.100	1.30	1.8	30.0	86	H120	HS	±1.0 / ±1.0	100
H150-48S2.5	36 - 75	0.100	1.80	2.5	30.0	75	H120	HS	±1.0 / ±1.0	100
H150-48S3.3	36 - 75	0.100	3.10	3.3	30.0	79	H120	HS	±1.0 / ±1.0	100
H150-48S5	36 - 75	0.100	2.30	5	30.0	83	H120	HS	±1.0 / ±1.0	100
H150-48S12	36 - 75	0.100	2.20	12	12.5	85	H120	HS	±1.0 / ±1.0	100
H150-48S-15	36-75	0.100	3.60	15	10	85	H120	H5	±1.0 / ±1.0	100

NOTE: ADD SUFFIX "N" FOR NEGATIVE LOGIC VERSIONS Typical at Ta = +25 °C under nominal line voltage and 75% load conditions, unless noted. The information contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to specification sheet for performance characteristics and application guidelines.



DC 1500

S E R I E S

15 WATT 2:1 INPUT DC-DC CONVERTERS



Features

- 15W Isolated Output
- Efficiency to 90%
- 2:1 Input Range
- Regulated Outputs
- Fixed Switching Frequency
- Input Under Voltage Protection
- Over Current Protection
- Remote ON/OFF
- Continuous Short Circuit Protection
- Without Tantalum Capacitors Inside
- CE Mark Meets 2004/108/EC
- Safety Meets UL60950-1, EN60950-1, and IEC60950-1

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT MIN.	OUTPUT CURRENT MAX.	INPUT CURRENT NO LOAD	INPUT CURRENT FULL LOAD	% EFF.	Capacitor Load max.
DC-1510	9-18 VDC	3.3 VDC	0 mA	4000 mA	90 mA	1280 mA	85	4000uF
DC-1511		5 VDC	0 mA	3000 mA	85 mA	1453 mA	88	3000uF
DC-1512		12 VDC	0 mA	1250 mA	70 mA	1420 mA	88	1330uF
DC-1513		15 VDC	0 mA	1000 mA	70 mA	1420 mA	88	1000uF
DC-1517		±5 VDC	0 mA	±1500mA	45 mA	1470mA	85	1470uF
DC-1518		±12 VDC	0 mA	±625mA	45 mA	1436mA	87	660uF
DC-1519		±15 VDC	0 mA	±500mA	45 mA	1420mA	88	550uF
DC-1520	18-36 VDC	3.3 VDC	0 mA	4000 mA	50 mA	640 mA	86	4000uF
DC-1521		5 VDC	0 mA	3000 mA	50 mA	718 mA	89	3000uF
DC-1522		12 VDC	0 mA	1250 mA	20 mA	695 mA	90	1330uF
DC-1523		15 VDC	0 mA	1000 mA	20 mA	695 mA	90	1000uF
DC-1527		±5 VDC	0 mA	±1500mA	25 mA	726 mA	86	1470uF
DC-1528		±12 VDC	0 mA	±625mA	25 mA	710 mA	88	660uF
DC-1529		±15 VDC	0 mA	±500mA	25 mA	702 mA	89	550uF
DC-1530	36-75 VDC	3.3 VDC	0 mA	4000 mA	25 mA	320 mA	86	4000uF
DC-1531		5 VDC	0 mA	3000 mA	30 mA	359 mA	88	3000uF
DC-1532		12 VDC	0 mA	1250 mA	20 mA	347 mA	90	1330uF
DC-1533		15 VDC	0 mA	1000 mA	20 mA	351 mA	90	1000uF
DC-1537		±5 VDC	0 mA	±1500mA	20 mA	363 mA	86	1470uF
DC-1538		±12 VDC	0 mA	±625mA	20 mA	355 mA	88	660uF
DC-1539		±15 VDC	0 mA	±500mA	20 mA	351 mA	89	550uF

Specifications

INPUT SPECIFICATIONS:

Input Voltage Range	12V.....9-18V
	24V.....18-36V
	48V.....36-75V
Under voltage lockout	12Vin power up: 8.4V, power down: 8V
	24Vin power up: 17V, power down: 16V
	48Vin power up: 34V, power down: 32V
Input Surge Voltage (100ms max.)	12S / 12D.....25Vdc max.
	24S / 24D.....50Vdc max.
	48S / 48D.....100Vdc max.
Input Filter	Standard.....PI Type
	SMD.....LC Type
Positive Logic Remote on/off Control:	
Logic Compatibility	CMOS or Open Collector TTL
Module ON	>+5.5V to 75VDC or Open Circuit
Module OFF	<1.2VDC

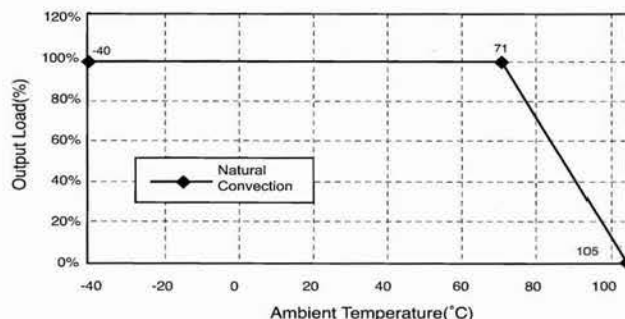
OUTPUT SPECIFICATIONS:

Voltage Accuracy	±1.5% max.
Voltage Balance (Dual)	±2.0% max.
Transient Response: 25% Step Load Change	<500u sec.
Ripple and Noise, 20MHz BW ³	50mV p-p max.
	SMD.....120mV p-p max.
Temperature Coefficient	±0.03%/°C max.
Short Circuit Protection	Continuous
Line Regulation ¹	Single.....DIP±0.2% max., SMD±0.3% max.
	Dual.....±0.5% max.
Load Regulation ²	Single.....DIP±0.2% max., SMD±0.5% max.
	Dual.....±1.0% max.
Cross Regulation (Dual output) Load cross variation 10%/100%	±5% max.
Over Voltage Protection	Zener or TVS Clamp
External Trim Adj. Range (single output models only)	±10%
Current Limit	110% - 140% Nominal Output
Start up time	20ms. max.

GENERAL SPECIFICATIONS:

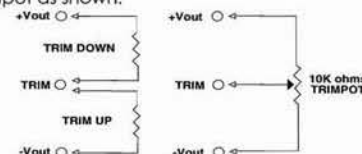
Efficiency	See Table
Isolation Voltage	1500 VDC min.
Isolation Resistance	10 ⁹ Ohms min.
Isolation Capacitance	1000pF typ.
Switching Frequency	350kHz typ.
Operating Ambient Temperature Range	-40°C to +85°C
Derating, Above 71°C	Linearly to Zero Power at +105°C
Case Temperature ⁴	105°C
Cooling	Natural Convection
Storage Temperature Range	-55°C to +125°C
Humidity	95% RH max. Non condensing
MTBF	MIL-STD-217-F, GB, 25°C, Full Load.....1200k hrs typ.
Dimensions	DIP.....1.00x1.00x0.4 inches (25.4x25.4x10.2mm)
	SMD.....1.00x1.00x0.36 inches (25.4 x 25.4 x 9.2mm)
Case Material	Black Coated Copper with Non-Conductive Base
Weight	18.4g

DC-1500 Series Derating Curve



External Output Trimming

Output may optionally be externally trimmed (±10%) with a fixed resistor or an external trimpot as shown.



NOTE:

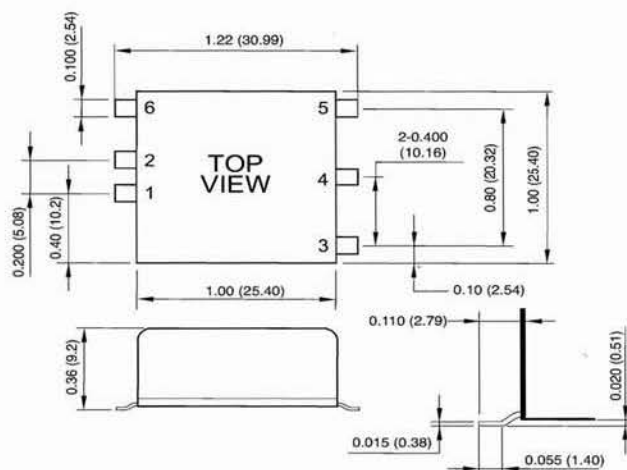
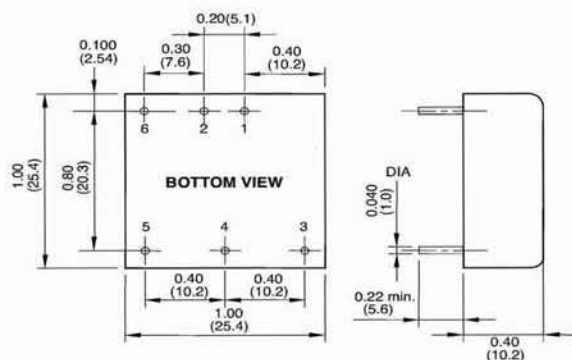
1. Measured From High Line to Low Line
2. Measured From Full Load to min. Load
3. The output ripple and noise is measured with 10uF tantalum and 1uF Ceramic capacitor across output.
4. Maximum case temperature under any operating condition should not be exceeded 105°C.
5. Suffix "S" to the Model Number with SMD packages.

PIN CONNECTION

Pin	DIP Function	
	Single	Dual
1	+Input	+Input
2	- Input	- Input
3	+V Output	+V Output
4	Trim	Common
5	-V Output	-V Output
6	Remote	Remote

SIZE

All Dimensions in Inches(mm)
Tolerance Inches: .xx= ±0.04, .xxx= ±0.010
Millimeters: .x= ±1.0, .xx= ±0.25





**Intronics
Power®**



DC1600 Series 15 Watt Triple Output DC-DC Converters

Features

Full 2:1 / 4:1 input range
Low profile 0.4" high
Short Ckt & Overvoltage protected
Fully regulated
Low output ripple & noise
High reliability
Input/output isolation

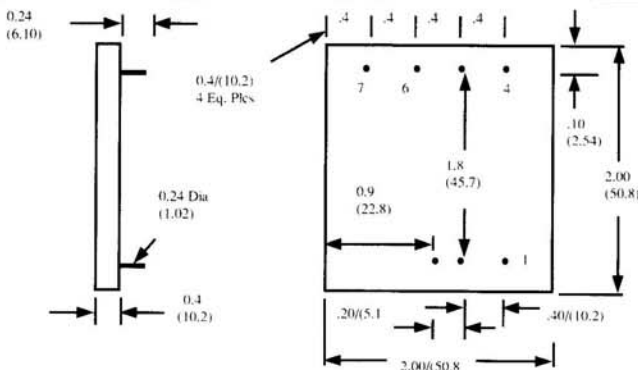
Input/Output Specifications

Input filter: Pi Network
Undervoltage Shutoff: 8Vdc
Output voltage accuracy: +/- 3%
Line regulation: +/- 1% max.
Load regulation: +/- 2% max.
Temp. coef.: +/- .05%/degree C
Ripple & noise: 1% pp max.
(20MHz BW)
Min. Load: 10% of Full Load
Short circuit protection: foldback

General Specifications

Efficiency: up to 81%
Isolation voltage: 500 Vdc
Isolation Resistance: 1000 Mohms
Operating temp.: -25 to +71 °C
Storage temp.: -55 to +125 °C
Case type: Six-sided continuous metal
shielding
Size: 2" x 2" x .4"

Model No.	Input Voltage (Vdc)	Output Voltage (Vdc)	Output Current (mA)
DC1618	9-18	5 / ±12	1500 / ±310
DC1619	9-18	5 / ±15	1500 / ±250
DC1617	9-18	+5 / +12 / -5	1500 / 310 / 500
DC1628	18-36	5 / ±12	1500 / ±310
DC1629	18-36	5 / ±15	1500 / ±250
DC1627	18-36	+5 / +12 / -5	1500 / 310 / 500
DC1638	36-72	5 / ±12	1500 / ±310
DC1639	36-72	5 / ±15	1500 / ±250
DC1637	36-72	+5 / +12 / -5	1500 / 310 / 500
DC1658	9-36	5 / ±12	1500 / ±310
DC1659	9-36	5 / ±15	1500 / ±250
DC1657	9-36	+5 / +12 / -5	1500 / 310 / 500
DC1668	20-72	5 / ±12	1500 / ±310
DC1669	20-72	5 / ±15	1500 / ±250
DC1667	20-72	+5 / +12 / -5	1500 / 310 / 500



Due to ongoing product improvement, specifications are subject to change.

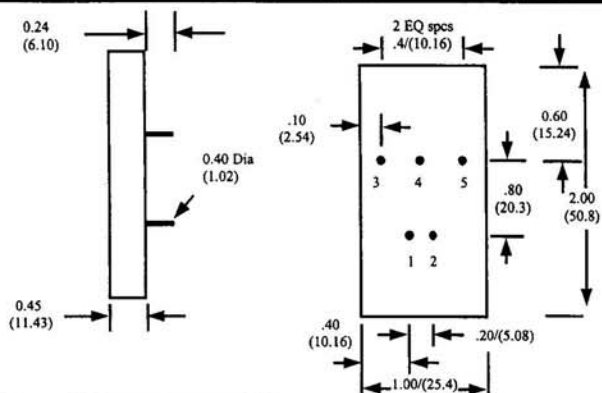
PIN	Function
1	Remote ON/OFF
2	- Vin (input)
3	+ Vin (input)
4	- Output (V3 output)
5	Common (Gnd)
6	+5V output (V1)
7	+ Output (V2 output)



**Intronics
Power®**



Model No.	Input Voltage (Vdc)	Output Voltage (Vdc)	Output Current (mA)
DC-1711	9-18	5	3000
DC-1712	9-18	12	1250
DC-1713	9-18	15	1000
DC-1717	9-18	± 5	± 1500
DC-1718	9-18	± 12	± 625
DC-1719	9-18	± 15	± 500
DC-1721	18-36	5	3000
DC-1722	18-36	12	1250
DC-1723	18-36	15	1000
DC-1727	18-36	± 5	± 1500
DC-1728	18-36	± 12	± 625
DC-1729	18-36	± 15	± 500
DC-1731	36-72	5	3000
DC-1732	36-72	12	1250
DC-1733	36-72	15	1000
DC-1735	36-72	2.5	6000
DC-1737	36-72	± 5	± 1500
DC-1738	36-72	± 12	± 625
DC-1739	36-72	± 15	± 500



DC-1700 Series

15 Watt Single & Dual Output
DC-DC Converters

Features

Full 2:1 Input Range
Low Profile 0.4" High Package
Short Circuit & Over-voltage Protected
Fully Regulated
Low Output Ripple & Noise
High Reliability

Input/Output Specifications

Input Filter: π (Pi) Network

Output Voltage Accuracy: V1: $\pm 1\%$

V2: $\pm 2.5\%$

Line Regulation (at full load): $\pm .5\%$ max. (single)
 $\pm 1\%$ max. (dual)

Load Regulation: $\pm .5\%$ max.

(1/4 to full load) $\pm 2\%$ max.

Temperature Coefficient: $\pm .05\%/^{\circ}\text{C}$

Ripple & Noise (20Mhz BW): 1% pp max.

Minimum Load: 10% of Full Load

Short circuit protection: foldback

General Specifications

Efficiency: up to 81%

Isolation voltage: 500 Vdc

Isolation Resistance: 1000M ohms

Operating Temperature: -25° to $+71^{\circ}\text{C}$

Storage Temperature: -55° to $+125^{\circ}\text{C}$

Case Type: 6-sided Continuous Metal Shielding

Size: 2" x 1" x .45"

PIN	Function	
	Single	Dual
1	+ Vin (input)	+ Vin (input)
2	- Vin (input)	- Vin (input)
3	+Vout (output)	+ Vout (output)
4	N/C	Common
5	- Vout (output)	- Vout (output)



DC 1800 ***SERIES*** 25 - 30WATT 2:1 INPUT DC-DC CONVERTERS



FEATURES

- * 25-30W Isolated Output
- * 2" X 2" Six-Sided Shield Metal Case
- * 2:1 Input Range
- * Regulated Outputs
- * Efficiency to 88%
- * Remote On/Off Control
- * UL60950-1 Approval
- * Safety Meets IEC/EN/UL 62368-1



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
DC 1811	9-18 VDC	5 VDC	0 mA	5000 mA	30 mA	2675 mA	84	5000uF
DC 1812	9-18 VDC	12 VDC	0 mA	2500 mA	30 mA	3050 mA	88	2500uF
DC 1813	9-18 VDC	15 VDC	0 mA	2000 mA	30 mA	3050 mA	88	2000uF
DC 1821	9-18 VDC	±5 VDC	±0 mA	±2500 mA	35 mA	2675 mA	83	2500uF
DC 1822	9-18 VDC	±12 VDC	±0 mA	±1250 mA	35 mA	3050 mA	88	1250uF
DC 1823	9-18 VDC	±15 VDC	±0 mA	±1000 mA	35 mA	3050 mA	87	1000uF
DC 1831	9-18 VDC	5/±12 VDC	500/±100 mA	3500/±310 mA	35 mA	2640 mA	81	3500/310uF
DC 1832	9-18 VDC	5/±15 VDC	500/±100 mA	3500/±250 mA	35 mA	2640 mA	82	3500/250uF
DC 1833	9-18 VDC	3.3 VDC	0 mA	5000 mA	30 mA	1860 mA	80	5000uF
DC 1818	18-36 VDC	5 VDC	0 mA	5000 mA	30 mA	1336 mA	83	5000uF
DC 1819	18-36 VDC	12 VDC	0 mA	2500 mA	30 mA	1525 mA	87	2500uF
DC 1828	18-36 VDC	15 VDC	0 mA	2000 mA	30 mA	1525 mA	87	2000uF
DC 1829	18-36 VDC	±5 VDC	±0 mA	±2500 mA	30 mA	1336 mA	82	2500uF
DC 1838	18-36 VDC	±12 VDC	±0 mA	±1250 mA	30 mA	1470 mA	87	1250uF
DC 1839	18-36 VDC	±15 VDC	±0 mA	±1000 mA	30 mA	1470 mA	86	1000uF
DC 1810	18-36 VDC	5/±12 VDC	500/±100 mA	3500/±310 mA	30 mA	1320 mA	82	3500/310uF
DC 1820	18-36 VDC	5/±15 VDC	500/±100 mA	3500/±250 mA	30 mA	1320 mA	82	3500/250uF
DC 1830	18-36 VDC	3.3 VDC	0 mA	5000 mA	30 mA	920 mA	79	5000uF

NOTE: 1. Nominal Input Voltage 12, 24 or 48VDC

SPECIFICATIONS

All Specifications Typical at Nominal Line, Full Load, and 25°C Unless Otherwise Noted

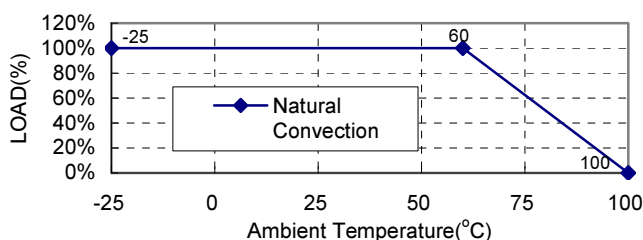
INPUT SPECIFICATIONS:

Input Voltage Range	12V	9 – 18V
	24V	18 – 36V
	48V	36 – 72V
Input Surge Voltage (100ms max.)	12V	25Vdc max.
	24V	50Vdc max.
	48V	100Vdc max.
Input Filter	Pi Type	

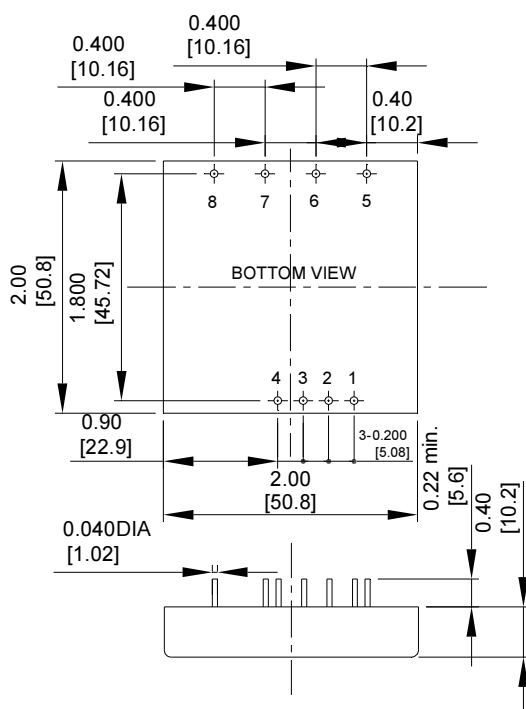
OUTPUT SPECIFICATIONS:

Voltage Accuracy	
Single Output	±2.0% max.
Dual +Output	±2.0% max.
Dual – Output	±3.0% max.
Triple, 5V	±2.0% max.
12V/15V	±5.0% max.
Voltage Balance (Dual)	±1.0% max.
Transient Response	
Single 25% Step Load Change	<500us
Dual FL-1/2L±1% Error Band	<500us
External Trim Adj. Range	±10%
Ripple and Noise, 20MHz BW	10mV RMS. max., 75mV p-p max.
Temperature Coefficient	±0.02%/°C max.
Short Circuit Protection	Continuous
Line Regulation Single/Dual (note1)	±0.5% max.
Triple	±1.0% max.
Load Regulation Single/Dual (note2)	±1.0% max.
Triple	±5.0% max.
Start up Time	900ms typ.

Typical Derating curve for Natural Convection



Case C Dimensions:



PIN CONNECTION			
Pin	Single	Dual	Triple
1	Remote On/Off Control		
2	No Pin	No Pin	No Pin
3	-V Input	-V Input	-V Input
4	+V Input	+V Input	+V Input
5	Trim	Trim	-Aux. Out
6	-V Output	-V Output	Common
7	+V Output	Common	+5Vout
8	No Pin	+V Output	+Aux. Out

NOTE: Pin Size is 0.04±0.004 Inch (1.0±0.1 mm) DIA
All Dimensions in Inches(mm)
Tolerances: Inches: X.XX= ±0.04, X.XXX= ±0.010
Millimeters: X.X= ±1.0, X.XX= ±0.25

GENERAL SPECIFICATIONS:

Efficiency	See Table
Isolation Voltage	500 VDC min.
Isolation Resistance	10 ⁹ Ohms min.
Isolation Capacitance	500pF typ.
Switching Frequency	300KHz typ.
Case Grounding	Connected to Output Common
Operating Ambient Temperature Range	-25°C to +71°C
De-rating, Above 60°C	Linearly to Zero Power at 100°C
Case Temperature (note3)	100°C max.
Cooling	Natural Convection
Storage Temperature Range	-55°C to +105°C
Humidity	95% RH max. Non Condensing
MTBF	MIL-HDBK-217F, GB, 25°C, Full Load 900Khrs typ.
EMI/RFI	Six-Sided Continuous Shield
Dimensions	2.00×2.00×0.40 inches (50.8×50.8×10.2 mm)
Case Material	Black Coated Copper with Non-Conductive Base
Weight	65g

NOTE:

1. Measured from high line to low line.
2. Measured from full load to 1/4 full load.
3. Maximum case temperature under any operating condition should not be exceeded 100°C.

TRIPLE OUTPUT LOADING TABLE (1)

Output (Pin No.)	Voltage	Amperes	
		Min. (2)	Nom.
7	+5	0.50	3.5
8 & 5	+12 & -12	0.10	0.31
8 & 5	+15 & -15	0.10	0.25

NOTE:

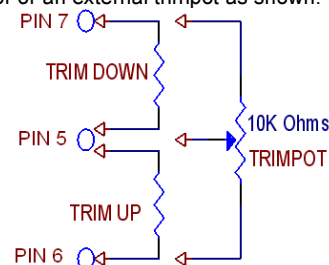
1. Maximum total power from all outputs is limited to 25 watts but no output should be allowed to exceed its maximum current
2. Minimum current on each output is required to maintain specified regulation

Remote On/Off Control

Logic Compatibility	CMOS or Open Collector TTL
Ec-On	>+5.5 VDC to 75Vdc or Open Circuit
Ec-Off	0 to <1.8 VDC
Shutdown Idle Current	10mA
Control Common	Referenced to Input Minus

EXTERNAL OUTPUT TRIM

Output may optionally be externally trimmed (±10%) with a fixed resistor or an external trimpot as shown.





**Intronics
Power®**



SERIES DCI HIGH-ISOLATION DC POWER CONVERTERS

Meets UL544 Leakage

8 Models; 5, 12, 24 or 28 VDC Input, ± 12 or ± 15 V, 60 mA DC Output

Very High Input/Output Isolation:

8000 VDC, $10^{11} \Omega$ || 5 pF typical

Excellent Regulation: 0.05% Line, 0.05% Load

Short-Circuit Current Limiting to 150% of Rated Current

No Heat Sink Required—No Derating over -25°C to $+71^{\circ}\text{C}$

APPLICATIONS

Medical monitors such as EKG, EEG, and EMG.

Isolated power for optical or transformer isolation amplifiers.

Industrial applications requiring high isolation voltage or low capacitance.

Compatible with Intronics isolation amplifiers.

Series DCI modules are DC-to-DC regulated power converters that combine exceptionally high input/output isolation with high-grade dynamic performance. They feature a typical input-to-output impedance of $10^{11} \Omega$ in parallel with 5 pF and a breakdown voltage of 8000 VDC for complete isolation of the output circuits from the DC bus when high common-mode load voltages must be used. The three models offer a choice of operation from 5 VDC logic power, 12 VDC, or 28 VDC system buses or batteries and deliver floating analog power at ± 15 VDC, tightly regulated to 0.05% for line or load variations. No cooling means other than free-air convection is required over the full operating temperature range of -25°C to $+71^{\circ}\text{C}$. The output is short-circuit protected by automatic current-limiting to 150% of rated current. Restarting is automatic after removal of the short.

CHARACTERISTICS

(Typical @ 25°C unless otherwise noted.)

DCI	MODELS			
	5/12/60 5/15/60	12/12/60 12/15/60	24/12/60 24/15/60	28/12/60 28/15/60
Input Voltage for Rated Operation	5 ± 0.5 VDC	12 ± 0.5 VDC	24 ± 2.4 VDC	28 ± 2.8 VDC
Input Current				
No Load	125 mA	50 mA	25 mA	20 mA
Full Load	670 mA	275 mA	150 mA	120 mA
Input Capacitance	5 pF	5 pF	5 pF	5 pF
Input/Output Isolation (typical)				
Impedance	$10^{11} \Omega$ 5 pF	$10^{11} \Omega$ 5 pF	$10^{11} \Omega$ 5 pF	$10^{11} \Omega$ 5 pF
Voltage	8000 VDC	8000 VDC	8000 VDC	8000 VDC
Reflected Input Ripple	$1\% V_{IN}$	$1\% V_{IN}$	$1\% V_{IN}$	$1\% V_{IN}$
Output Voltage	± 12 VDC or ± 15 VDC, $\pm 2\%$			
Output Current @ Full Load	± 60 mADC	± 60 mADC	± 60 mADC	± 60 mADC
Regulation				
Line	.05%	.05%	.05%	.05%
Load	.05%	.05%	.05%	.05%
vs. Temperature	.01%/°C	.01%/°C	.01%/°C	.01%/°C
Output Ripple p-p	11 mV typ., 35 mV max.	11 mV typ., 35 mV max.	11 mV typ., 35 mV max.	11 mV typ., 35 mV max.
Case Material	Phenolic	Phenolic	Phenolic	Phenolic
Settling Time to 0.1% no load-full load	50 μsec	50 μsec	50 μsec	50 μsec
Short-Circuit				
Current	90 mA	90 mA	90 mA	90 mA
Duration	8 hours min.	8 hours min.	8 hours min.	8 hours min.
Temperature Range	-25°C to $+71^{\circ}\text{C}$ / -25°C to $+110^{\circ}\text{C}$			
Operating/Storage				
Nominal Weight	4 1/4 oz. (120 g)	4 1/4 oz. (120 g)	4 1/4 oz. (120 g)	4 1/4 oz. (120 g)
Mating Socket	S133	S133	S133	S133

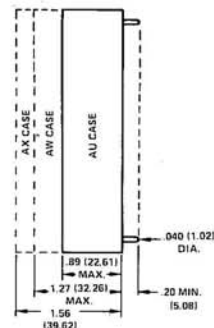
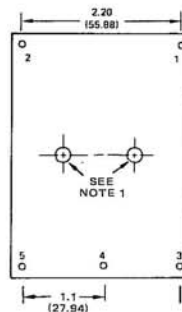
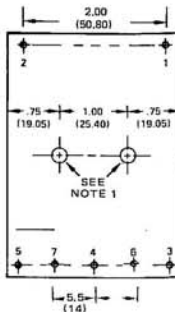
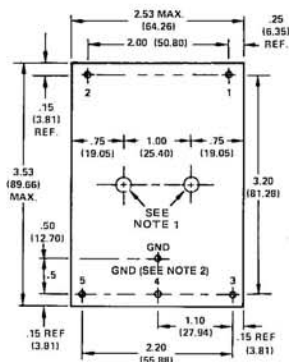
*Option "T": Output trimmed at factory to $\pm 1\%$.

Intronics manufactures a complete line of isolation amplifiers.
Consult factory for data sheets.

DIMENSIONS & PINOUTS

Dimensions shown in inches and (mm)

SM, SME, EPM, DCW



EPM, SME, SM:
SINGLE & DUAL OUTPUT
SUPPLIES
DCW:
SINGLE OUTPUT SUPPLIES

BOTTOM VIEW
SME, SM:
TRIPLE OUTPUT

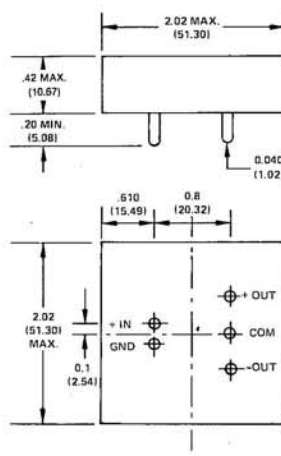
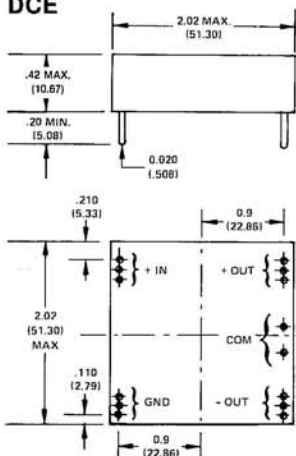
1. EPM, SME, SM
SINGLE & DUAL OUTPUT
SUPPLIES, OPTION D
2. DCW:
DUAL OUTPUT SUPPLIES

SIDE VIEW

PIN	SM, SME SINGLE OUTPUT	SM, SME, EPM DUAL OUTPUT	DCW (8) SINGLE OUTPUT	DCW (8) DUAL OUTPUT	SM, SME TRIPLE OUTPUT
1	AC	AC	+VDC IN	+VDC IN	AC
2	AC	AC	-VDC IN	-VDC IN	AC
3	COM (3)	-VDC OUT	+VDC OUT	+VDC OUT	COM
4	N.C. (3)	COM	N.C. (4)	-VDC OUT	-15 VDC
5	VDC OUT	+VDC OUT	-VDC OUT	-VDC OUT	+15 VDC
6	N/A	N/A	N/A	N/A	+5 VDC
7	N/A	N/A	N/A	N/A	COM

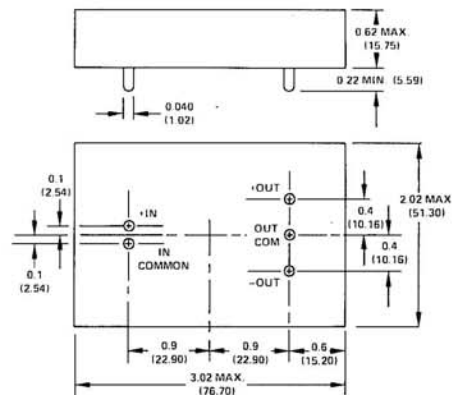
- NOTES
1. TWO MOUNTING INSERTS 4-40 x .10 DP min.
 2. ELECTROSTATIC INTERWINDING SHIELD GROUND (OPTION I ONLY).
 3. FOR "D" OPTION PIN 4 IS COMMON AND PIN 3 IS NC.
 4. TTL SHUT DOWN ON DCW 4000, 1700, 1500.
 5. OUTPUT LOW CONNECTED TO CASE.

DCE



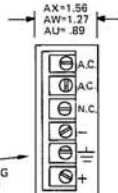
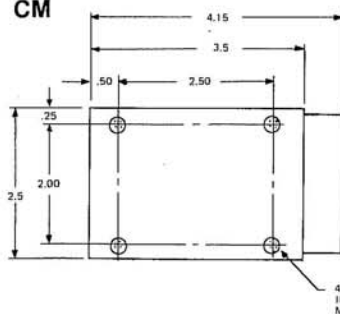
BOTTOM VIEW

DCI



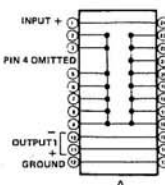
OPTION A

CM

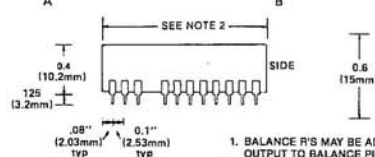
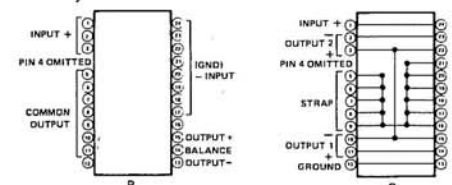


4x40 NC28 THD
INSERT 4 THDS
MIN. (4 PLACES)

TOPVIEW



DCR, DCU



1. BALANCE R'S MAY BE ADDED FROM EACH OUTPUT TO BALANCE PIN.
2. LENGTH FOR CASE A AND B IS 1.10 (27). LENGTH FOR CASE C IS 1.25 (31).



DCR

S E R I E S

3 WATT

DC-DC CONVERTERS



Features

- 3W Isolated Output
- DIP-24 / SMD Package
- Regulated Outputs
- Efficiency to 61%
- LC Input Filter
- Low Ripple and Noise

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF.	CASE
				NO LOAD	FULL LOAD		
DCR-5/5	5 VDC	5 VDC	600 mA	120 mA	984 mA	61	DIP-24
DCR-5/12		12 VDC	250 mA				
DCR-5/15		15 VDC	200 mA				
DCR-5/12-12		±12 VDC	±125 mA				
DCR-5/15-15		±15 VDC	±100 mA				
DCR-12/5	12 VDC	5 VDC	600 mA	60 mA	410 mA	61	DIP-24
DCR-12/12		12 VDC	250 mA				
DCR-12/15		15 VDC	200 mA				
DCR-12/12-12		±12 VDC	±125 mA				
DCR-12/15-15		±15 VDC	±100 mA				
DCR-24/5	24 VDC	5 VDC	600 mA	40 mA	205 mA	61	DIP-24
DCR-24/12		12 VDC	250 mA				
DCR-24/15		15 VDC	200 mA				
DCR-24/12-12		±12 VDC	±125 mA				
DCR-24/15-15		±15 VDC	±100 mA				
DCR-28/5	28 VDC	5 VDC	600 mA	35 mA	176 mA	61	DIP-24
DCR-28/12		12 VDC	250 mA				
DCR-28/15		15 VDC	200 mA				
DCR-28/12-12		±12 VDC	±125 mA				
DCR-28/15-15		±15 VDC	±100 mA				
DCR-48/5	48 VDC	5 VDC	600 mA	20 mA	102 mA	61	DIP-24
DCR-48/12		12 VDC	250 mA				
DCR-48/15		15 VDC	200 mA				
DCR-48/12-12		±12 VDC	±125 mA				
DCR-48/15-15		±15 VDC	±100 mA				

Specifications

INPUT SPECIFICATIONS:

Input Voltage Range..... $\pm 10\%$
Input Filter.....LC Type

OUTPUT SPECIFICATIONS:

Voltage Accuracy..... $\pm 3.0\%$ max.
Temperature Coefficient..... $\pm 0.02\% / ^\circ\text{C}$
Ripple and Noise, 20MHz BW.....50mV p-p max.
Short Circuit Protection.....Indefinite & Current Limit
Line Regulation¹, Single/Dual..... $\pm 0.3\%$ max.
Load Regulation², Single..... $\pm 0.5\%$ max.
Dual..... $\pm 1.0\%$ max.

GENERAL SPECIFICATIONS:

Efficiency.....See Table
Isolation Capacitance.....150pF Typ.
Isolation Resistance..... 10^9 ohms
Switching Frequency.....80KHz, Typ.
Operating Ambient Temperature Range -25°C to $+71^\circ\text{C}$
De-rating, Above 71°C Linearly to Zero power at 100°C
Case Temperature⁴..... 100°C max.
Cooling Natural Convection
Storage Temperature Range..... -40°C to $+100^\circ\text{C}$
DimensionsDIP.....1.25 x 0.80 x 0.40 inches (31.8 x 20.3 x 10.2mm)
SMD.....1.25 x 0.80 x 0.45 inches (31.8 x 20.3 x 11.4mm)
Weight.....17.2g

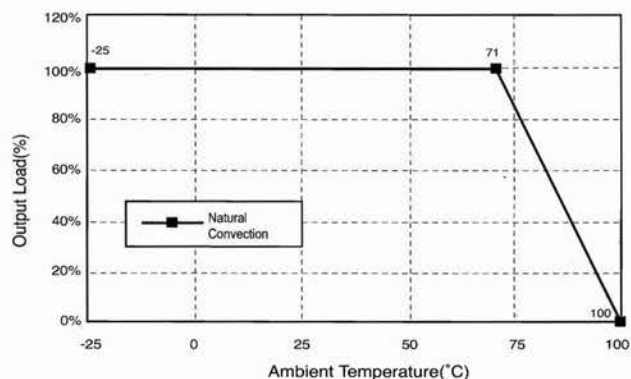
ISOLATION VOLTAGE:

500 VDC min.....Standard Models

CASE MATERIAL:

Standard Models.....Black Coated Copper with
Non-Conductive Base

DCR Series Derating Curve



NOTE:

1. Measured From High Line to Low Line
2. Measured From Full Load to 10% Load
3. Suffix "S" to the Model Number with SMD packages
4. Maximum case temperature under any operating condition should not be exceeded 100°C

PIN CONNECTION

500 VDC

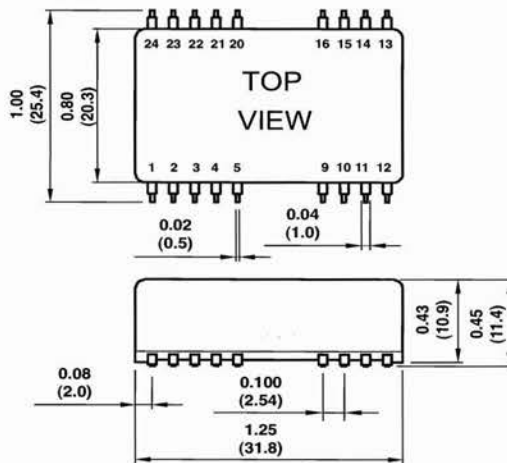
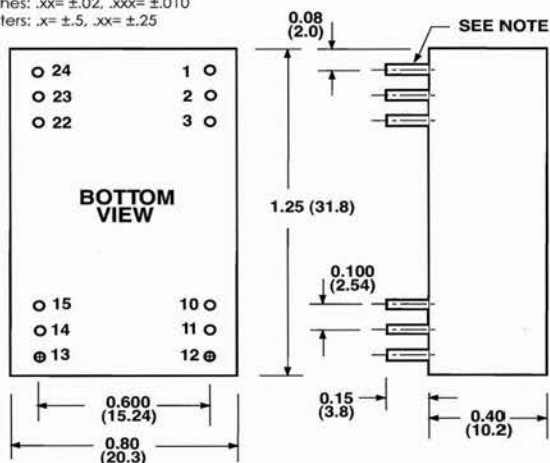
Pin	Single Output		Dual Output	
	DIP	SMD	DIP	SMD
1, 24	+V Input		+V Input	
2, 23	NC		-V Output	
3, 22	NC		Common	
4, 5	NP	NC	NP	NC
9	NP	NC	NP	NC
10, 15	-V Output		Common	
11, 14	+V Output		+V Output	
12, 13	-V Input		-V Input	
16	NP	NC	NP	NC
20, 21	NP	NC	NP	NC

*NC-NO CONNECTION WITH PIN

*NP-No PIN

CASE A

NOTE: Pin Size is 0.02" Inch (0.5mm) DIA ± 0.05
All Dimensions in Inches (mm)
Tolerance Inches: .xx = ± 0.02 , .xxx = ± 0.010
Millimeters: .xx = ± 0.5 , .xxx = ± 0.25



U3 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

The U3 Family of high efficiency DC/DC converters offer power levels of up to 3 Watt, which exceeds that of other sub-bricks with the same package, while also providing Ultra-Wide Input Voltage Range. With a 4:1 input voltage range and single & multi-outputs, these converters provide versatility without sacrificing the board space. All models feature an input filter, continuous short circuit protection and regulated outputs. The fully enclosed, encapsulated construction facilitates maximum power delivered with the highest efficiency of up to 80%. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

Specifications & Features Summary

- Regulated Outputs
- -25°C to +71°C ambient operation
- Continuous Short-circuit protection
- up to 3KV, 10MΩ input-to-output isolation
- Pi Input Filter
- 4:1 Input Range
- THROUGH-HOLE PACKAGES ONLY
- 5-sided metal shield High Isolation versions
- 200KHz Switching Frequency
- No airflow or heatsink required
- Voltage Accuracy $\pm 2\%$

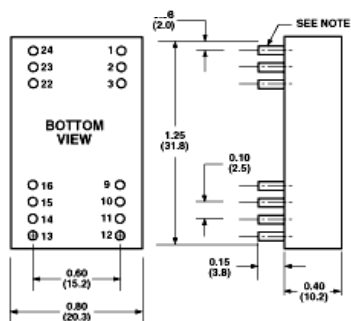


Model Num	V _{in}	V _{out}	I _{out}	I _{No Load}	I _{Full Load}	Eff	Case
U3-12S5	9-36 VDC	5.0 VDC	600.0 mA	15.0 mA	174 mA	72%	T
U3-12S12	9-36 VDC	12.0 VDC	250.0 mA	15.0 mA	165 mA	76%	T
U3-12S15	9-36 VDC	15.0 VDC	200.0 mA	15.0 mA	165 mA	76%	T
U3-12D5	9-36 VDC	± 5.0 VDC	± 300.0 mA	25.0 mA	179 mA	70%	T
U3-12D12	9-36 VDC	± 12.0 VDC	± 125.0 mA	25.0 mA	174 mA	72%	T
U3-12D15	9-36 VDC	± 15.0 VDC	± 100.0 mA	25.0 mA	174 mA	72%	T
U3-12S3.3	9-36 VDC	3.3 VDC	600.0 mA	15.0 mA	117 mA	70%	T
U3-48S5	18-72 VDC	5.0 VDC	600.0 mA	7.5 mA	87 mA	72%	T
U3-48S12	18-72 VDC	12.0 VDC	250.0 mA	7.5 mA	78 mA	80%	T
U3-48S15	18-72 VDC	15.0 VDC	200.0 mA	7.5 mA	78 mA	80%	T
U3-48D5	18-72 VDC	± 5.0 VDC	± 300.0 mA	12.0 mA	88 mA	71%	T
U3-48D12	18-72 VDC	± 12.0 VDC	± 125.0 mA	12.0 mA	87 mA	72%	T
U3-48D15	18-72 VDC	± 15.0 VDC	± 100.0 mA	12.0 mA	87 mA	72%	T
U3-48S3.3	18-72 VDC	3.3 VDC	600.0 mA	7.5 mA	58 mA	70%	T

SPECIFICATIONS	
Input Specifications	
Input Voltage Range	24V-----9-36V 48V-----18-72V
Input Filter	Pi Type
Output Specifications	
Voltage Accuracy	$\pm 2.0\%$ max.
Voltage Balance(Dual)	$\pm 1.0\%$ / max.
Temperature Coefficient	$\pm 0.05\%$ / °C
Ripple and Noise, 20MHz BW, Single & $\pm 5V_o$	100mV p-p max.
Dual	1% p-p max.
Short Circuit Protection	Continuous
Line Regulation, Single/Dual ¹	$\pm 0.5\%$
Load Regulation, Single ²	$\pm 0.5\%$
Dual ³	$\pm 1.0\%$
Efficiency	See Table
Isolation Resistance	10 ⁹ ohms
Switching Frequency	100KHz, min
Operating Temperature Range	-25°C to +71°C
Case Temperature (Plastic case)	95°C max.
(Copper case)	100°C max.
Cooling	Free-Air Convection
Storage Temperature Range	-40°C to +100°C
Dimensions	1.25X0.8X0.4 Inches (31.8X20.3X10.2mm)
Isolation Voltage 500VDC (Standard Models)	
1,500VDC min (Add suffix "HM")	Suffix "HM" Models
3K VDC min ⁴ (Add Suffix "H")	Suffix "M" Models
Case Material	
Standard Models	Non-Conductive Black Plastic
Suffix "HM" Models	Black Coated Copper with Non-Conductive Base
Notes	
1.	Measured From High Line to Low Line
2.	Measured From Full Load to 10% Load
3.	Measured From Full Load to 1/4 Load
4.	Non-Conductive Black Plastic Only

Mechanical Outline and Pinouts for U3 Family DC/DC Converters

NOTE: Pin Size is 0.02" Inch (0.5mm) DIA or .020 x .014 Inch
All Dimensions in Inches (mm)



PIN CONNECTION					
500 VDC			(1.5K & 3K) VDC		
Pin	Single Output	Dual Output	Pin	Single Output	Dual Output
1	+V Input	+V Input	1	NP	NP
2	NC	-V Output	2	-V Input	-V Input
3	NC	Common	3	-V Input	-V Input
9	NP	NP	9	NC	Common
10	-V Output	Common	10	NC	NC
11	+V Output	+V Output	11	NC	-V Output
12	-V Input	-V Input	12	NP	NP
13	-V Input	-V Input	13	NP	NP
14	+V Output	+V Output	14	+V Output	+V Output
15	-V Output	Common	15	NC	NC
16	NP	NP	16	-V Output	Common
22	NC	Common	22	+V Input	+V Input
23	NC	-V Output	23	+V Input	+V Input
24	+V Input	+V Input	24	NP	NP

*NP-NO PIN

*NC-NO CONNECTION WITH PIN

*TP-TEST POINT

*GO-GROUND

Typical at Ta= +25 °C under nominal input voltages of 24V and 48VDC, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

Consult factory for hundreds of other available input/output voltage configurations.

U6 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Networking Gear
- Wireless Communications
- Data Communications
- Distributed Power Architecture
- Telecommunications
- Semiconductor Test Equipment
- Industrial / Medical

The U6 Family of high efficiency DC/DC converters offer power levels of up to 6 Watt, which exceeds that of other 24 PIN DIPs with the same package, while also providing Surface Mount Processable construction and Ultra-Wide (4:1) Input Voltage Range. With single and multi-outputs, these converters provide versatility without sacrificing the board space. All models feature an input filter, continuous short circuit protection and regulated outputs. The fully enclosed, encapsulated construction facilitates maximum power delivered with the highest efficiency of up to 80%. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

Specifications & Features Summary

- Regulated Outputs
- -25°C to +71°C ambient operation
- Continuous Short-circuit protection
- Standard 1500V, 10M Ω input-to-output isolation
- Optional 3000V, 10M Ω input-to-output isolation
- Pi Input Filter
- Optional 5-sided metal shield
- 4:1 Input Range
- **THROUGH-HOLE PACKAGES AVAILABLE** (add suffix "T" to the part number)



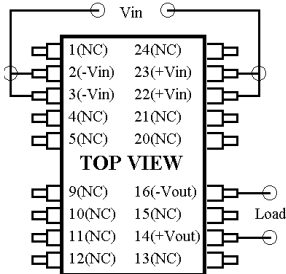
Model Number	Vin Range	Output		Input Current		Eff (%)	Regulation Line/Load	Output Ripple/Noise
		Voltage	Current	No Load	Full Load			
U6-12S5	9-36Vdc	5VDC	1000mA	15mA	267mA	78	$\pm 0.5/0.5\%$	100mVp-p max.
U6-12S12		12VDC	470mA	15mA	294mA	80	$\pm 0.5/0.5\%$	1% p-p max.
U6-12S15		15VDC	400mA	15mA	313mA	80	$\pm 0.5/0.5\%$	1% p-p max.
U6-12D5		± 5 VDC	± 500 mA	25mA	267mA	78	$\pm 0.5/1.0\%$	1% p-p max.
U6-12D12		± 12 VDC	± 230 mA	25mA	288mA	80	$\pm 0.5/1.0\%$	1% p-p max.
U6-12D15		± 15 VDC	± 190 mA	25mA	297mA	80	$\pm 0.5/1.0\%$	1% p-p max.
U6-12S3.3	18-78Vdc	3.3VDC	1000mA	15mA	191mA	72	$\pm 0.5/0.5\%$	100mVp-p max.
U6-48S5		5VDC	1000mA	7.5mA	134mA	78	$\pm 0.5/0.5\%$	100mVp-p max.
U6-48S12		12VDC	470mA	7.5mA	149mA	79	$\pm 0.5/0.5\%$	1% p-p max.
U6-48S15		15VDC	400mA	7.5mA	157mA	80	$\pm 0.5/0.5\%$	1% p-p max.
U6-48D5		± 5 VDC	± 500 mA	12mA	135mA	77	$\pm 0.5/1.0\%$	1% p-p max.
U6-48D12		± 12 VDC	± 230 mA	12mA	146mA	79	$\pm 0.5/1.0\%$	1% p-p max.
U6-48D15		± 15 VDC	± 190 mA	12mA	149mA	80	$\pm 0.5/1.0\%$	1% p-p max.
U6-48S3.3		3.3VDC	1000mA	7.5mA	100mA	70	$\pm 0.5/0.5\%$	100mVp-p max.

SPECIFICATIONS	
Input Specifications	
Input Voltage Range	24V-----9-36V 48V-----18-72V
Input Filter	Pi Type
Output Specifications	
Voltage Accuracy	+/-2.0% max.
Voltage Balance(Dual)	+/-1.0% / max.
Temperature Coefficient	+/-0.05% / °C
Ripple and Noise, 20MHz BW	3.3V/5V-----100mV p-p max. 12V/15V-----1% p-p max.
Short Circuit Protection	Continuous
Line Regulation ¹ , Single/Dual	+/-0.5% max.
Load Regulation, Single ²	+/-0.5% max.
Dual ³	+/-1.0% max.
General Specifications	
Efficiency	See Table
Isolation Resistance	10 ⁹ ohms
Switching Frequency	200KHz, min
Operating Temperature Range	-25°C to +71°C
Case Temperature(Plastic case)	95°C max.
(Copper case)	100°C max.
Cooling	Free-Air Convection
Storage Temperature Range	-40°C to +100°C
Dimensions	1.25X0.8X0.4 Inches (31.8X20.3X10.2mm)
Isolation Voltage	
1.5KVDC min	Standard Models
3 KVDC min ⁴	Suffix "H" Models
Case Material	
Standard Models	Non-Conductive Black Plastic
Suffix "M" Models	Black Coated Copper with Non-Conductive Base
Notes	
1.	Measured From High Line to Low Line
2.	Measured From Full Load to 10% Load
3.	Measured From Full Load to 1/4 Load
4.	Non-Conductive Black Plastic Only
5.	Suffix "HM" 1.5k VDC Instead of 3k VDC Isolation

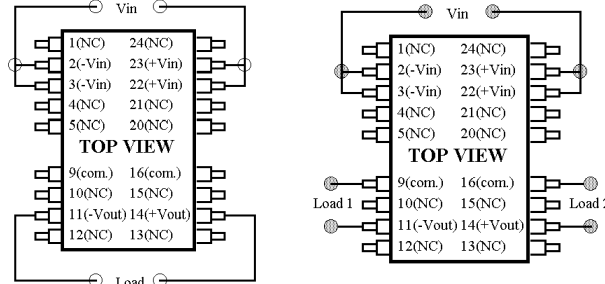
Typical at Ta= +25 °C under nominal input voltages of 24V and 48VDC, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

Consult factory for hundreds of other available input/output voltage configurations.

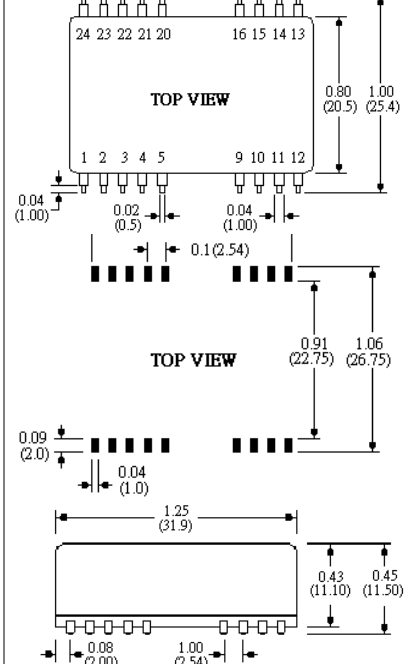
Single Output Typical Connection



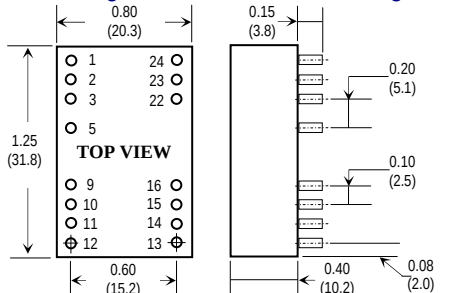
Dual Output Typical Connections



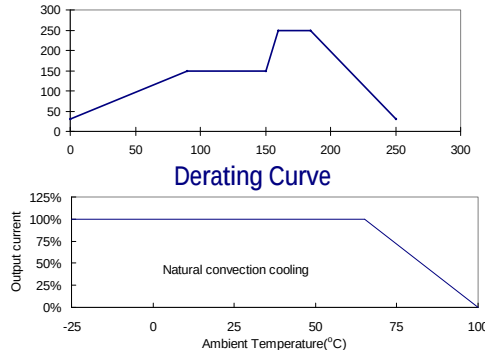
Recommended Land Pattern



Through-Hole Mechanical Drawing



Recommended Reflow Profile



Basic operation and functions

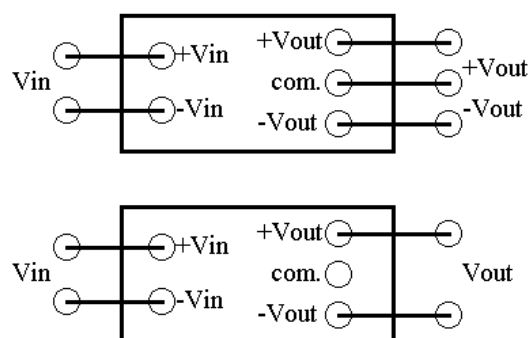
U10 series is single and dual output DC/DC converters provide from 6.6 watts up to 10watts of output power in an industry standard 1"x2" size package. The U10 series features 4:1 input voltage range, high efficiency, fixed switching frequency 300KHz, continuous short circuit protection, six-side continuous shield and 500VDC isolation.

Input (Vi+ , Vi-)

Input power Vin+ must be connected to Positive input voltage(Vi+); Input power Vin- must be connected to Negative voltage(Vi-).

Output (Vo+ , Vo-)

Output power Vout+ must be connected to Positive output voltage (Vo+); Output power Vout- must be connected to Negative output voltage (Vo-).



Protection Features

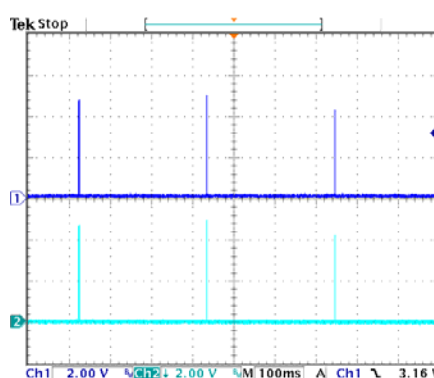
Input under voltage lockout(UVLO)

Input under voltage lockout(UVLO) is standard with the U10 unit. The unit will shut down when the input voltage drops below a threshold, and the unit will turn on when the input voltage goes to the upper threshold. The hysteresis voltage of the unit voltage protection is 0.4V(tpical), normally from the 8V to 7.6V range.

Output over current protection(OCP) and output short protection

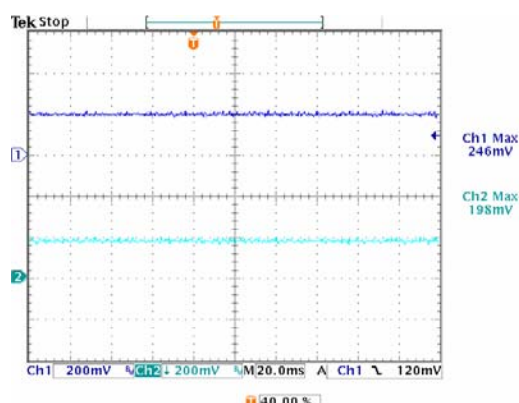
The unit will auto recovery current limit when the over current or short circuit condition exists.

Once the OCP happens, the unit has auto recovery current limit and output voltage above 6V. The attempted restart will continue indefinitely until the over current or short circuit condition is removed.



CH1:+Vout/OCP Ch2:-Vout/OCP

When output short happens, the output voltage drops below 0.2V.



CH1: +Vout/short Ch2: -Vout/short

Characterization

General information

The U10 unit has many operational characterized aspects, including efficiency, start up , overshoot, output ripple & noise, hold time, dynamic response to load and input ripple current.

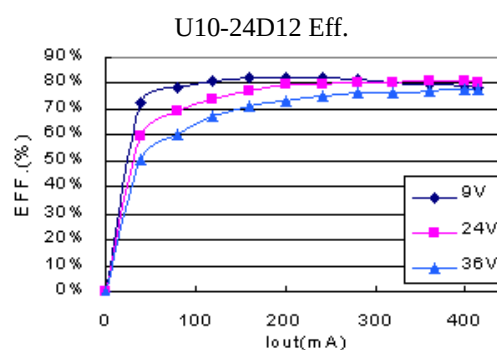
The following pages contain specific plots or waveforms associated with the unit. Additional comments for specific data are provided below. And all test function at 24Vinput.

Efficiency

Efficiency vs load current is given below. The ambient temperature is

25°C, airfolw is 20LFM(0.1m/s), and

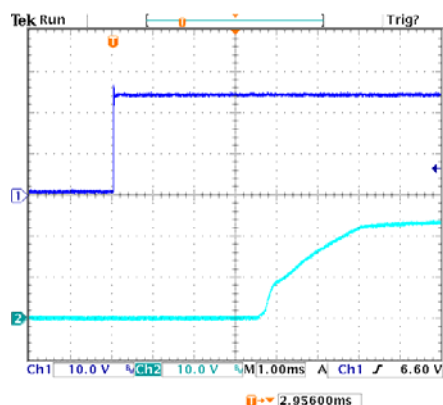
the input voltage is 9V, 24V and 36V conditions.



- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

Start up

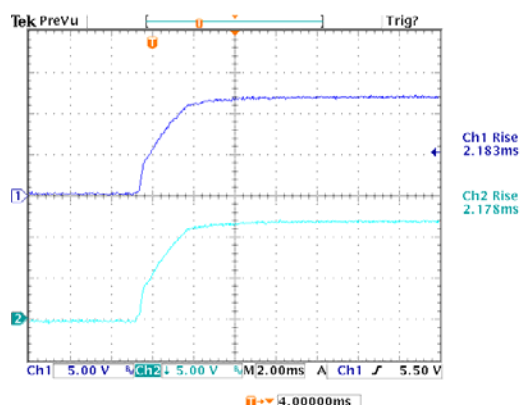
The input start-up from power supply.



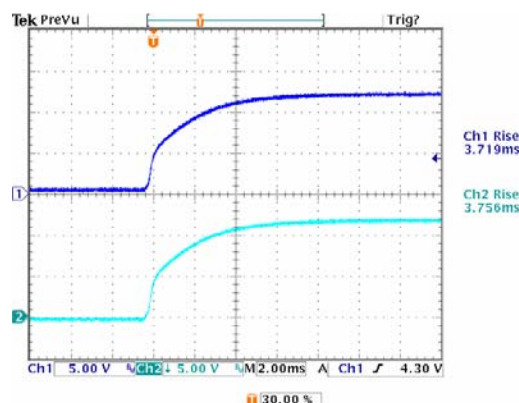
CH1:Vin=24V CH2:Vout=24V / FL
 Start up delay time:5.84ms

Overshoot and rise time

The input start-up from power supply.
 The output voltage waveform measured at minimum load and full load current.



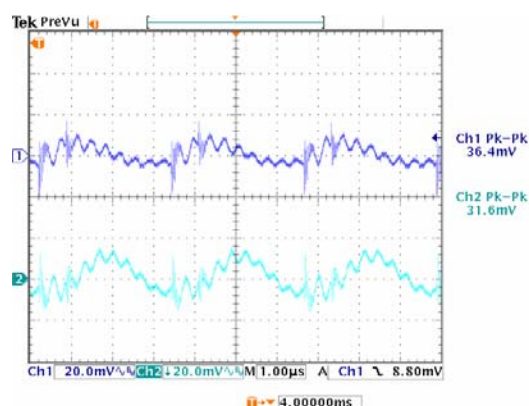
CH1:+Vout/FL Ch2:-Vout/FL
 Overshoot:zero %
 Rise time:2.183ms / 2.178ms



CH1:+Vout/NL Ch2:-Vout/NL
 Overshoot:zero %
 Rise time:3.719ms / 3.756ms

Output Ripple and Noise

The output voltage waveform measured at minimum load and full load current, with a 0.1uF ceramic capacitor across to close unit.

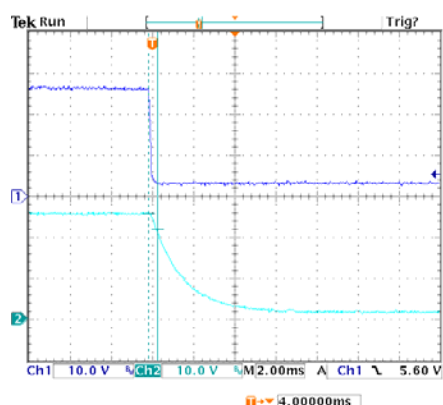


CH1:+Vout/FL Ch2:-Vout/FL
 Ripple:36.4mVp-p / 31.6mVp-p

Hold time

The hold time is measure from the power supply end or on/off pin is off to when Vout drop down to 90% output.

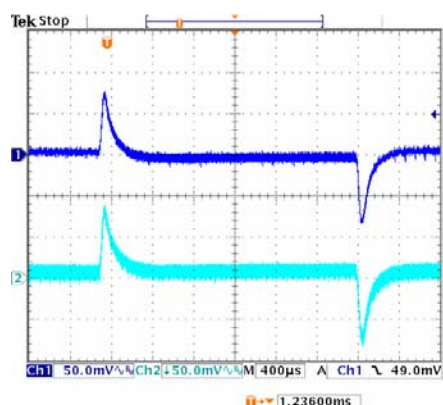
- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical



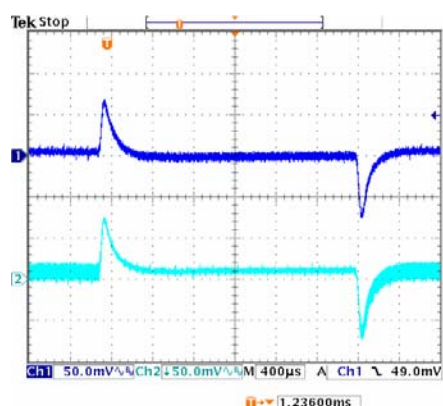
CH1:Vin Ch2:Vout/FL
 Hold time:440us

Dynamic response

Output voltage dynamic response at $V_{in}=24V$ and different load condition. Output with a 0.1uF ceramic capacitor.

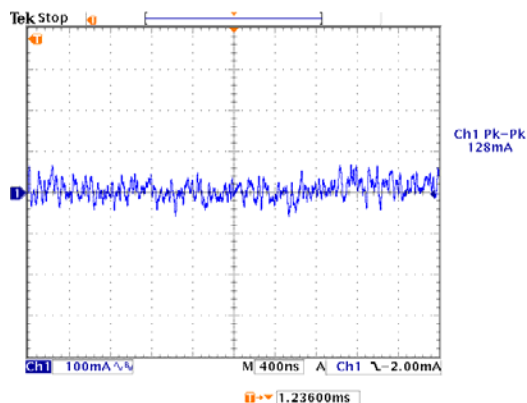


CH1:Vout Ch2:Iout, 0.1A/us
 Load change 50%-100%-50%



CH1:Vout Ch2:Iout, 0.1A/us
 Load change 25%-75%-25%

Input ripple current



U10 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

The U10 Families of high efficiency DC/DC converters offer power levels of up to 10 Watt, which exceeds that of other bricks with the same Industry-Standard Pinouts, while providing much smaller footprints. With a ultra- wide input voltage range and single and multi-outputs, ranging from 3.3 to ± 15 Volts, these converters provide versatility without sacrificing the board space. All models feature an input filter, input undervoltage lockout, output current limiting and short circuit protection. The fully enclosed, encapsulated construction achieves very efficient heat transfer with no hot spots. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

Model Num	V _{in}	V _{out}	I _{out}	I _{No Load}	I _{Full Load}	Eff	Case
U10-12S5	9-36 VDC	5.0 VDC	2000.0 mA	15.0 mA	534.0 mA	78%	U
U10-12S12	9-36 VDC	12.0 VDC	830.0 mA	15.0 mA	520.0 mA	80%	U
U10-12S15	9-36 VDC	15.0 VDC	666.0 mA	15.0 mA	520.0 mA	80%	U
U10-12D12	9-36 VDC	± 12.0 VDC	± 415.0 mA	20.0 mA	520.0 mA	80%	U
U10-12D15	9-36 VDC	± 15.0 VDC	± 333.0 mA	20.0 mA	520.0 mA	80%	U
U10-12D5	9-36 VDC	± 5.0 VDC	± 1000.0 mA	20.0 mA	520.0 mA	80%	U
U10-12S3.3	9-36 VDC	3.3 VDC	2000.0 mA	15.0 mA	362.0 mA	76%	U
U10-48S5	18-72 VDC	5.0 VDC	2000.0 mA	10.0 mA	260.0 mA	80%	U
U10-48S12	18-72 VDC	12.0 VDC	830.0 mA	10.0 mA	257.0 mA	81%	U
U10-48S15	18-72 VDC	15.0 VDC	666.0 mA	10.0 mA	257.0 mA	81%	U
U10-48D12	18-72 VDC	± 12.0 VDC	± 415.0 mA	15.0 mA	257.0 mA	81%	U
U10-48D15	18-72 VDC	± 15.0 VDC	± 333.0 mA	15.0 mA	253.0 mA	82%	U
U10-48D5	18-72 VDC	± 5.0 VDC	± 1000.0 mA	15.0 mA	253.0 mA	82%	U
U10-48S3.3	18-72 VDC	3.3 VDC	2000.0 mA	10.0 mA	181.0 mA	76%	U



cULus
Approval Pending

Typical at Ta= +25 °C under nominal line voltage and 75% load conditions, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

Consult factory for hundreds of other available input/output voltage configurations.

Input Specifications

Input Voltage Range	12V-----9-36V 48V-----18-72V
Input Filter	PI Type

Output Specifications

Voltage Accuracy Single Output	+/-1.0% max.
Voltage Accuracy Dual+Output	+/-1.0% max.
Voltage Accuracy Dual-Output	+/-1.0% max.
Voltage Balance Dual Output at Full Load	+/-1.0% max.
Transient Response	
Single 25% Step Load Change	<500u sec.
Dual FL. 1/2 +/- 1% Error Band	<500u sec.
Ripple and Noise. 20MHz BW	75mV p-p max.
Temperature Coefficient	+/-0.02% /°C max.
Short Circuit Protection	Continuous
Line Regulation ¹ Single Dual/Output	+/-0.2% max.
Load Regulation ² Single Dual/Output	+/-1.0% max

General Specifications

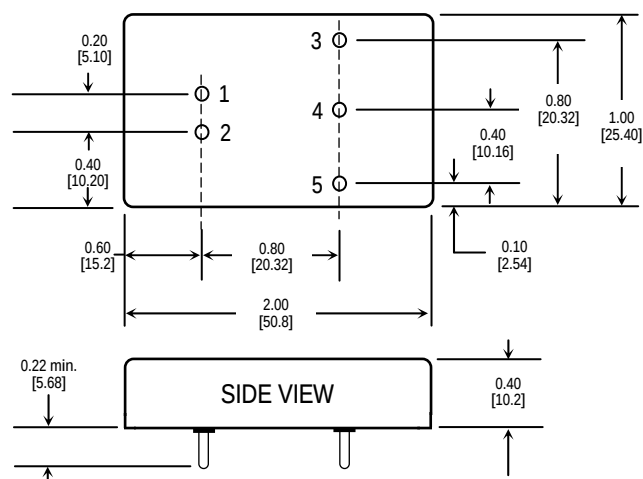
Efficiency	See Table
Isolation Voltage	500VDC
Isolation Resistance	10 ⁹ ohms
Switching Frequency	200KHz min.
Operating Temperature Range	-25°C to +71°C
Case Temperature	100°C max.
Cooling	Free-Air Convection
Storage Temperature Range	-40°C to +100°C
EMI / RFI	Six sided Continuous Shield
Dimensions	2X1X0.4 Inches

Case Material	Black Coated Copper with Non-Conductive Base
Notes	
1.	Measured From High Line to Low Line
2.	Measured From Full Load to 1/4 Load

Specifications & Features Summary

- 500V, 10M Ω input-to-output isolation
- No airflow or heatsink required
- Enclosed six-sided metal shield construction for low EMI/RFI
- Efficiency up to 82%
- 4:1 Input Range
- PI Input Filter
- Continuous Short Circuit Protection
- Meets EN55022 Class A, Conducted
- Delivers up to 10W in 2"x1" package with Industry-Standard Pinouts

BOTTOM VIEW U10 FAMILY



Pin #	U10 S(ingle)	U10 D(ual)
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Pin	Common
5	Vout -	Vout -

Tolerances
Inches
• XX ± 0.040
• XXX ± 0.010

All dimensions are in inches [mm]
All pins are dia. 0.040 [1.02]
Pin material: Gold plated Brass



Basic operation and functions

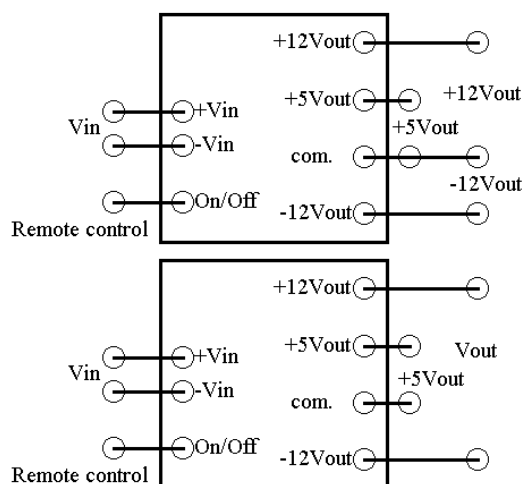
U15 series is single, dual and triple output DC/DC converters provide from 9.9 watts up to 15 watts of output power in an industry standard 2"x2" size package. The U15 series features 4:1 input voltage range, high efficiency, fixed switching frequency at 300KHz, continuous short circuit protection, six-side continuous shield and 500VDC isolation.

Input (Vi+ , Vi-)

Input power Vin+ must be connected to Positive input voltage(+Vin) ; Input power Vin- must be connected to Negative voltage(-Vin).

Output (Vo+ , Vo-)

Output power Vout+ must be connected to Positive output voltage (+Vout) ; Output power Vout- must be Negative output voltage (-Vout).



On / Off

The output allows the user to switch the module on and off electronically by remote on/off feature. This is only Positive logic remote control options available. The remote must use the CMOS or open collector TTL to control on/off pin.

Logic compatibility	CMOS or open collector TTL
Ec-on	>+5.5Vdc or open circuit
Ec-off	<1.8Vdc
Shutdown idle current	10mA
Control common	Referenced to input minus

Protection Features

Input under voltage lockout (UVLO)

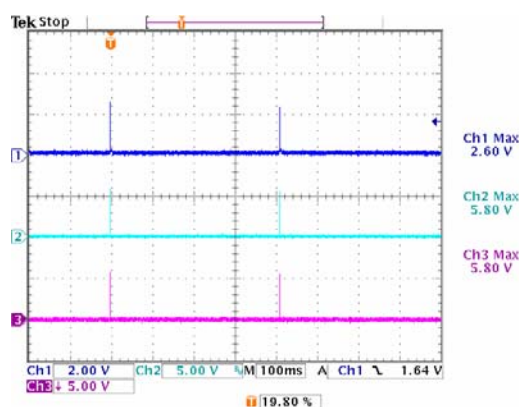
The unit will shut down when the input voltage drops below a threshold, and the unit will turn on when the input voltage goes to the upper threshold.

The hysteresis voltage of the unit voltage protection is 1.0V(typ.), normally from the 7.5V to 8.5V range at input voltage is 24V.

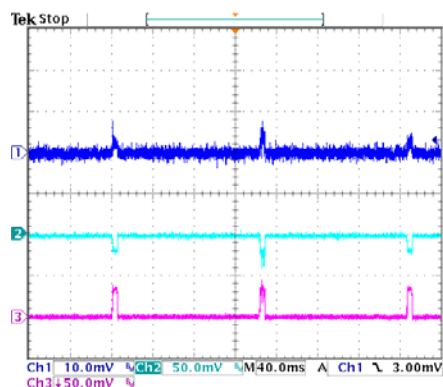
Output over current protection (OCP) and output short protection

The unit will auto recovery current limit when the over current or short circuit condition exists.

Once the OCP happens, the unit has auto recovery current limit . The attempted restart will continue indefinitely until the over current or short circuit condition is removed.



CH1:+5Vout/OCP Ch2:-12Vout/OCP
CH3:-12Vout/OCP



CH1: +5Vout/short Ch2: -12Vout/short
CH3: -12Vout/short

Characterization

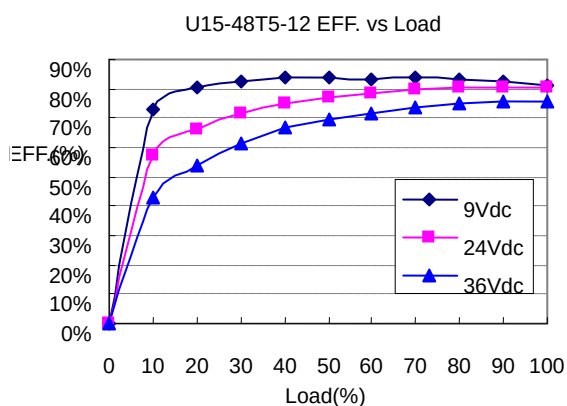
General information

The U15 unit has many operational characterized aspects, including efficiency, start up, overshoot, output ripple & noise, dynamic response to load and input ripple current.

The following pages contain specific plots or waveforms associated with the unit. Additional comments for specific data are provided below.

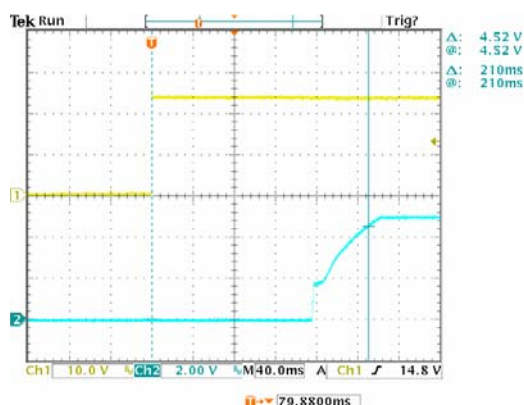
Efficiency

Efficiency vs. load current is given below. The ambient temperature is 25C, airflow is 20LFM(0.1m/s), and the input voltage is 9V, 24V and 36V conditions.



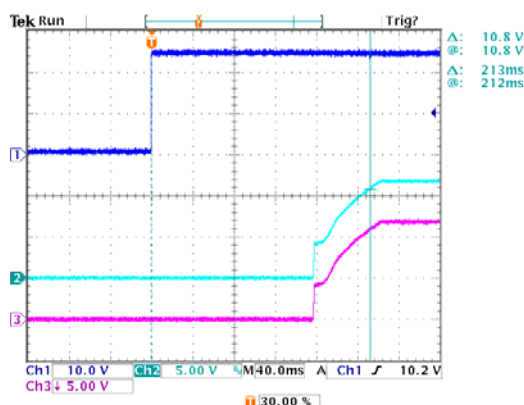
Start up

The input start-up from power supply.



CH1: 24Vin CH2: 5Vout/FL

Start up delay time: 210ms

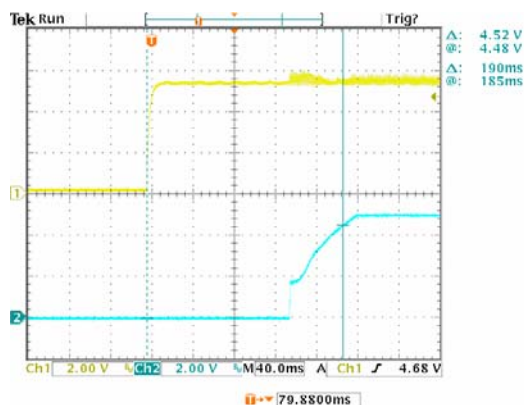


CH1: 24Vin CH2: +12Vout/FL

CH3: -12Vout/FL

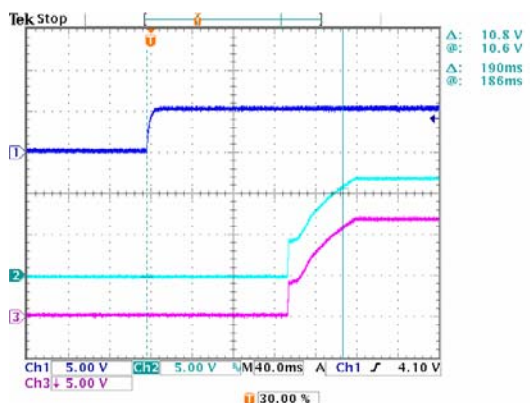
Start up delay time: 213ms

The input start-up from remote on/off control and input voltage is 24V.



CH1: Remote CH2: 5Vout/FL

Start up delay time: 190ms

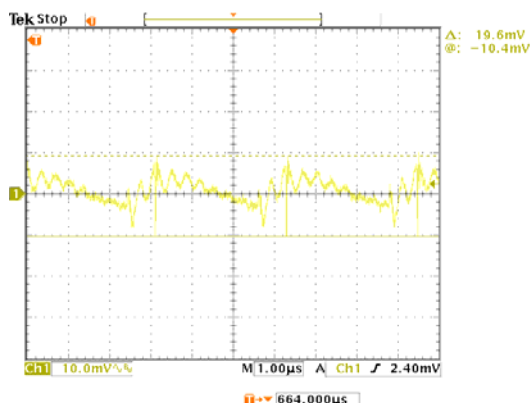


CH1: Remote CH2: +12Vout/FL
CH3: -12Vout/FL

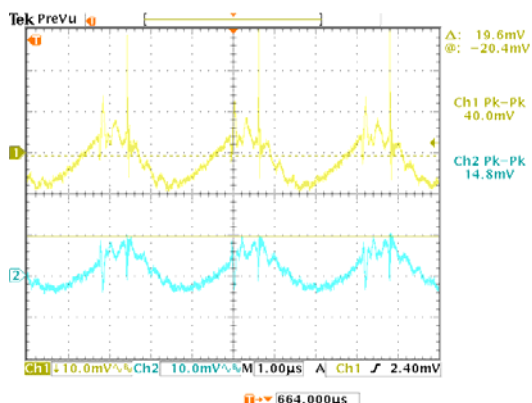
Start up delay time: 190ms

Output Ripple and Noise

The output voltage waveform measured at minimum load and full load current, with a 0.1uF ceramic capacitor across to close unit.



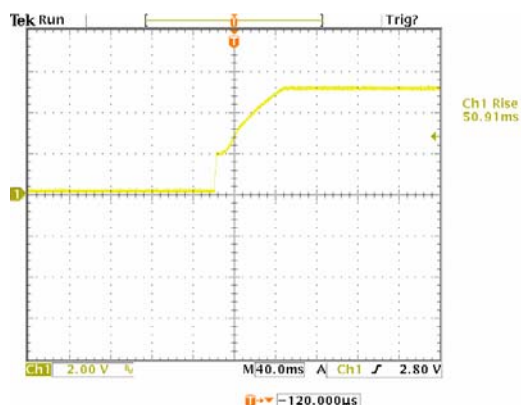
CH1: +5Vout/FL
Ripple: 19.6mVp-p



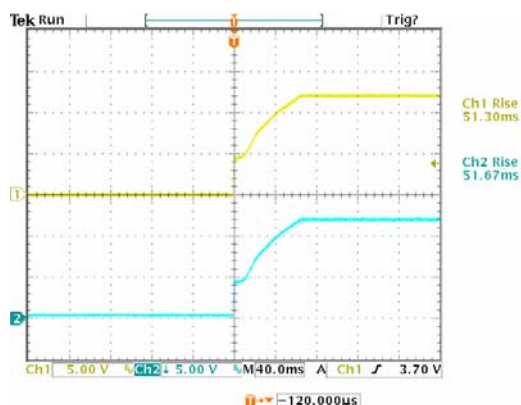
CH1: +12Vout/FL CH2: -12Vout/FL
Ripple: 40.0mVp-p / 14.8mVp-p

Overshoot and rise time

The input start-up from power supply. The output voltage waveform measured at full load current.



CH1: +5Vout/FL Overshoot: zero %
Rise time: 50.91ms



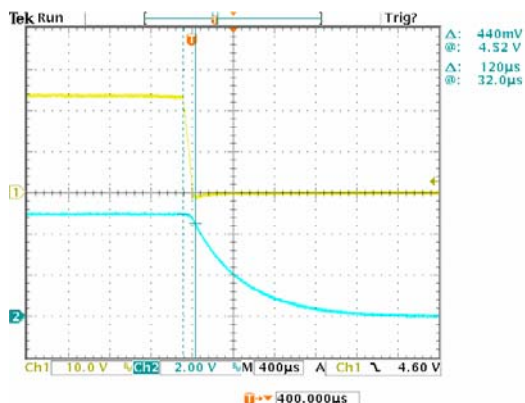
CH1: +12Vout/FL Ch2: -12Vout/FL
Overshoot: zero %
Rise time: 51.30ms / 51.67ms



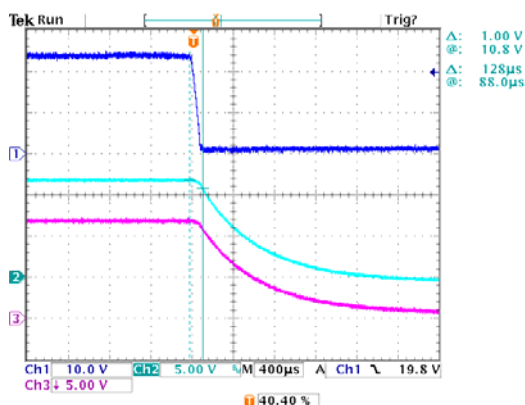
- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

Hold time

The hold time is measure from the power supply end to when Vout drop down to 90% output.



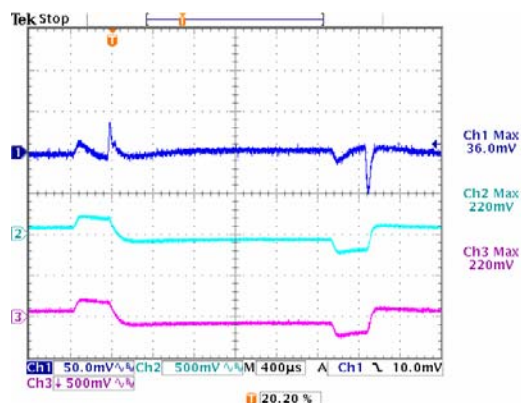
CH1: 24Vin Ch2: +5Vout/FL
Hold time: 120us



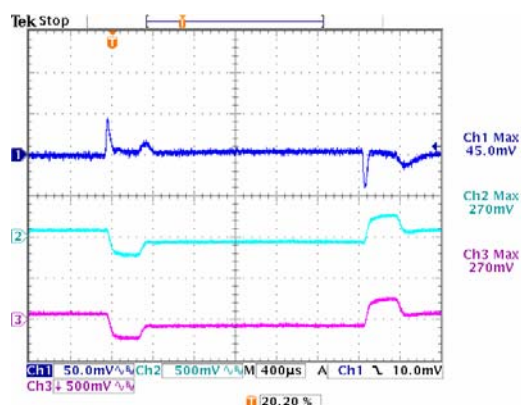
CH1: 24Vin CH2: +12Vout/FL
CH3: -12Vout/FL
Hold time: 128us

Dynamic response

Output voltage dynamic response at 24Vin and different load condition. Output with a 0.1uF ceramic capacitor.

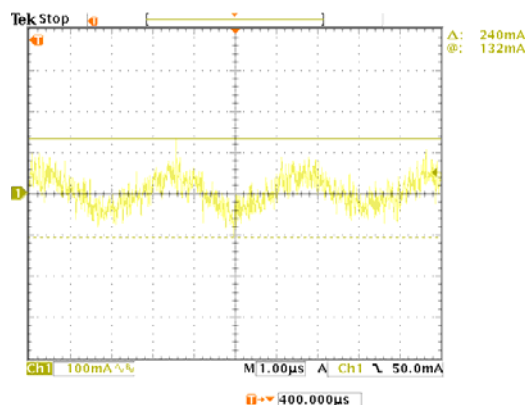


CH1: +5Vout Ch2: +12Vout
CH3: -12Vout Iout: 0.1A/us
Load change 50%-100%-50%



CH1: +5Vout Ch2: +12Vout
CH3: -12Vout Iout: 0.1A/us
Load change 25%-75%-25%

Input ripple current



input ripple current: 240mAp-p

U15 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

The U15 Family of high efficiency DC/DC converters offer power levels of up to 15 Watt. With ultra-wide input voltage range and single and multi-outputs, these converters provide versatility without sacrificing the board space. All models feature an input Pi filter and continuous short circuit protection. The fully enclosed, encapsulated construction achieves very efficient heat transfer with no hot spots. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

Specifications & Features Summary

- 500Vdc minimum, 10M Ω input-to-output isolation
- No airflow or heatsink required
- Enclosed six-sided metal shield construction for low EMI/RFI
- Efficiency to 82%
- 4:1 Input Range
- Pi Input Filter
- Continuous Short Circuit Protection
- Remote On/Off Control
- Delivers up to 15W in 2"x2" package with Industry-Standard Pinouts



Approval Pending

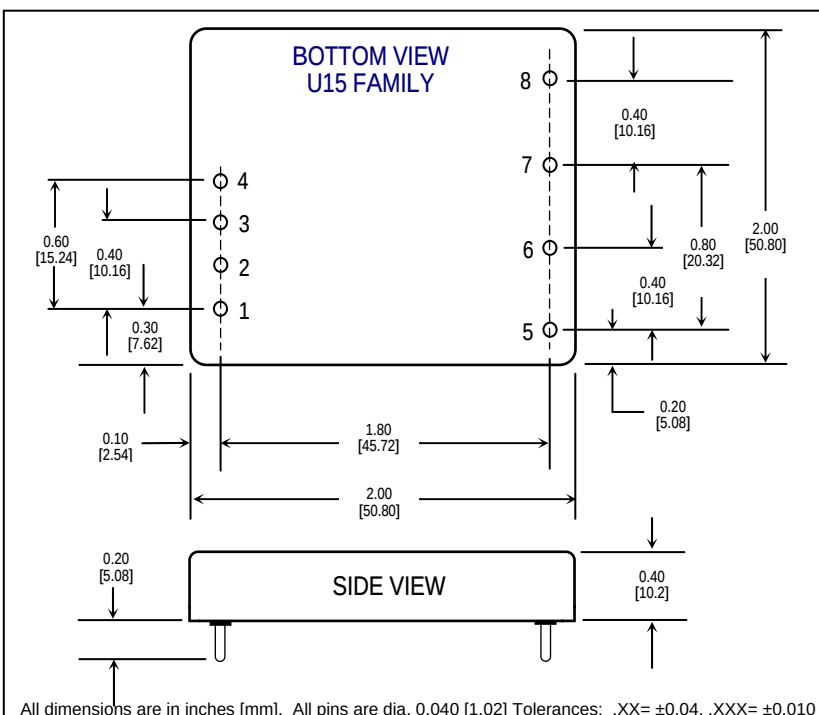


Model Num	V _{in}	V _{out}	I _{out}	I _{no Load}	I _{Full Load}	Eff	Case
U15-12S5	9-36 VDC	5.0 VDC	3.0A	15.0 mA	810.0 mA	77%	W2530
U15-12S12	9-36 VDC	12.0 VDC	1.25A	15.0 mA	780.0 mA	80%	W2530
U15-12S15	9-36 VDC	15.0 VDC	1.0A	15.0 mA	780.0 mA	80%	W2530
U15-12D5	9-36 VDC	±5.0 VDC	±1.5A	20.0 mA	810.0 mA	77%	W2530
U15-12D12	9-36 VDC	±12.0 VDC	±0.625A	20.0 mA	780.0 mA	80%	W2530
U15-12D15	9-36 VDC	±15.0 VDC	±0.5A	20.0 mA	780.0 mA	80%	W2530
U15-12T5-12	9-36 VDC	±12.0/5.0 VDC	±0.31A/1.5A	20.0 mA	780.0 mA	80%	W2530
U15-12T5-15	9-36 VDC	±15.0/5.0 VDC	±0.25A/1.5A	20.0 mA	780.0 mA	80%	W2530
U15-12S3.3	9-36 VDC	3.3 VDC	3.0A	15.0 mA	545.0 mA	76%	W2530
U15-48S5	18-72 VDC	5.0 VDC	3.0A	10.0 mA	410.0 mA	77%	W2530
U15-48S12	18-72 VDC	12.0 VDC	1.25A	10.0 mA	390.0 mA	80%	W2530
U15-48S15	18-72 VDC	15.0 VDC	1.0A	10.0 mA	390.0 mA	80%	W2530
U15-48D5	18-72 VDC	±5.0 VDC	±1.5A	15.0 mA	400.0 mA	79%	W2530
U15-48D12	18-72 VDC	±12.0 VDC	±0.625A	15.0 mA	380.0 mA	82%	W2530
U15-48D15	18-72 VDC	±15.0 VDC	±0.5A	15.0 mA	380.0 mA	82%	W2530
U15-48T5-12	18-72 VDC	±12.0/5.0 VDC	±0.31A/1.5A	15.0 mA	380.0 mA	82%	W2530
U15-48T5-15	18-72 VDC	±15.0/5.0 VDC	±0.25A/1.5A	15.0 mA	380.0 mA	82%	W2530
U15-48S3.3	18-72 VDC	3.3 VDC	3.0A	10.0 mA	270.0 mA	76%	W2530

Typical at Ta= +25 °C under nominal line voltage and 75% load conditions, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

The output voltage can be trimmed (±10%) using an external resistor. To trim the output up (down) connect a resistor between pins 5 and 6 (7). A 10K Ω trim pot can also be used to make the output variable. Connect the wiper to pin 5 and make the other connections to pins 6 and 7.

Consult factory for hundreds of other input / output voltage configurations



REMOTE ON/OFF CONTROL

Logic Compatibility	CMOS or Open Collector TTL
EC-On	>+5.5Vdc or Open Circuit
EC-Off	<1.8Vdc
Shutdown Idle Current	10mA
Input Resistance	100K ohms (Ein 0 Vdc to 9 Vdc)
Control Common	Referenced to Input Minus

Triple Output Loading Table (1)						
Pin #	S(ingle)	D(ual)	T(riple)	Voltage	Amperes	
					Min. (2)	Nom.
1	On/Off	On/Off	On/Off			
2	No Pin	No Pin	No Pin			
3	Vin -	Vin -	Vin -			
4	Vin +	Vin +	Vin +			
5	Trim	Trim	- Aux. Out	+12(15) or -12(15)	0.10	0.31(0.25)
6	Vout -	Vout -	Common			
7	Vout +	Common	+5Vout	+5	0.25	1.5
8	No Pin	Vout +	+ Aux. Out	+12(15) or -12(15)	0.10	0.31(0.25)

Maximum total power from all outputs is limited to 15 watts, but no output should be allowed to exceed its maximum current. Minimum current on each output is required to maintain specified regulation.

U20 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

The U20 Families of high efficiency DC/DC converters offer power levels of up to 20 Watt, which exceeds that of other bricks with the same Industry-Standard Pinouts, while providing much smaller footprints. With a ultra- wide input voltage range and single and multi-outputs, ranging from 3.3 to ± 15 Volts, these converters provide versatility without sacrificing the board space. All models feature an input filter, input undervoltage lockout, output current limiting and short circuit protection. The fully enclosed, encapsulated construction achieves very efficient heat transfer with no hot spots. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

Model Number	V _{in}	V _{out}	I _{out}	I _{No Load}	I _{Full Load}	Eff	Case
U20-12S5	9-36 VDC	5.0 VDC	4000.0 mA	15.0 mA	1029.0 mA	81%	U
U20-12S12	9-36 VDC	12.0 VDC	1670.0 mA	15.0 mA	1006.0 mA	83%	U
U20-12S15	9-36 VDC	15.0 VDC	1330.0 mA	15.0 mA	1004.0 mA	83%	U
U20-12D12	9-36 VDC	± 12.0 VDC	± 833.0 mA	20.0 mA	1004.0 mA	83%	U
U20-12D15	9-36 VDC	± 15.0 VDC	± 666.0 mA	20.0 mA	1004.0 mA	83%	U
U20-12D5	9-36 VDC	± 5.0 VDC	± 2000.0 mA	20.0 mA	1004.0 mA	83%	U
U20-12S3.3	9-36 VDC	3.3 VDC	4000.0 mA	15.0 mA	705.0 mA	78%	U
U20-48S5	18-72 VDC	5.0 VDC	4000.0 mA	10.0 mA	508.0 mA	82%	U
U20-48S12	18-72 VDC	12.0 VDC	1670.0 mA	10.0 mA	497.0 mA	84%	U
U20-48S15	18-72 VDC	15.0 VDC	1330.0 mA	10.0 mA	496.0 mA	84%	U
U20-48D12	18-72 VDC	± 12.0 VDC	± 833.0 mA	15.0 mA	496.0 mA	84%	U
U20-48D15	18-72 VDC	± 15.0 VDC	± 666.0 mA	15.0 mA	496.0 mA	84%	U
U20-48D5	18-72 VDC	± 5.0 VDC	± 2000.0 mA	15.0 mA	496.0 mA	84%	U
U20-48S3.3	18-72 VDC	3.3 VDC	4000.0 mA	10.0 mA	353.0 mA	78%	U

Typical at Ta= +25 °C under nominal line voltage and 75% load conditions, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

Consult factory for hundreds of other available input/output voltage configurations.



Approval Pending



Specifications & Features Summary

- 1500V, 10M Ω input-to-output isolation
- No airflow or heatsink required
- Enclosed six-sided metal shield construction for low EMI/RFI
- Efficiency 84%
- 4:1 Input Range
- Pi Input Filter
- Continuous Short Circuit Protection
- Meets EN55022 Class A, Conducted
- Remote On/Off Control
- Delivers up to 20W in 2"x1.6" package with Industry-Standard Pinouts

Input Specifications

Input Voltage Range	12V Nominal: 9-36Vin 48V Nominal: 18-72Vin
Input Filter	Pi Type
Positive Logic Remote ON/OFF Control	See Note 3

Output Specifications

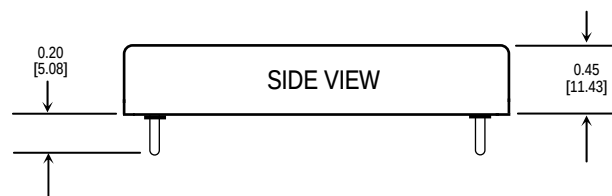
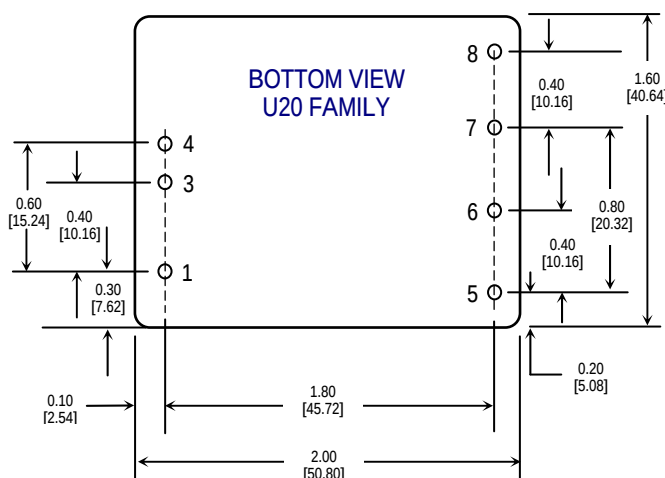
Voltage Accuracy Single Output	+/-1.0% max.
Voltage Accuracy Dual + Output	+/-1.0% max.
Voltage Accuracy Dual - Output	+/-2.0% max.
Voltage Balance, Dual Output at Full Load	+/-1.0% max.
Transient Response	
Single 25% Step Load Change	<500u sec.
Dual FL, 1/2L +/- 1% Error Band	<500u sec.
External Trim Adj. Range	+/-10%
Ripple and Noise 20MHz BW	20mV RMS, max. 75mV p-p. max.
Temperature Coefficient	+/-0.02% / °C max.
Short Circuit Protection	Continuous
Line Regulation ¹ , Single Dual / Output	+/-0.5% max.
Load Regulation ² , Single Dual / Output	+/-0.5% max.

General Specifications

Efficiency	See Table
Isolation Capacitance	1500 VDC min.
Isolation Resistance	10 ⁸ ohms min.
Switching Frequency	300KHz, typ
Operating Temperature Range	-25°C to +71°C
Derating, Above 60°C	Linearly to Zero Power at +100°C
Case Temperature	100°C max.
Storage Temperature Range	-55°C to +105°C
EMI / RFI	Six sided Continuous Shield
Dimensions	2X1.6X0.45 inches (50.8 X 40.64 X 11.43 mm)
Case Material	Black Coated Copper with Non-Conductive Base

Notes

1	Measured From High Line to Low Line
2	Measured From Full Load to 1/4 Load
3	Remote On/Off Control : ON > +5.5VDC or Open Circuit OFF < 1.8VDC Control Common---Referenced to input minus



Pin #	U20 S(ingle)	U20 D(ual)
1	On/Off	On/Off
3	Vin -	Vin -
4	Vin +	Vin +
5	Trim	Trim
6	Vout -	Vout -
7	Vout +	Common
8	No Pin	Vout +

Tolerances
Inches
• XX ± 0.040
• XXX ± 0.010

All dimensions are in inches [mm]
All pins are dia. 0.040 [1.02]
Pin material: Gold plated Brass

W3 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

The W5 Family of high efficiency DC/DC converters offer power levels of up to 3 Watt, which exceeds that of other sub-bricks with the same package, while also providing Surface Mount Processable construction. With a wide input voltage range and single and multi-outputs, these converters provide versatility without sacrificing the board space. All models feature an input filter, continuous short circuit protection and regulated outputs. The fully enclosed, encapsulated construction facilitates maximum power delivered with the highest efficiency of up to 83%. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

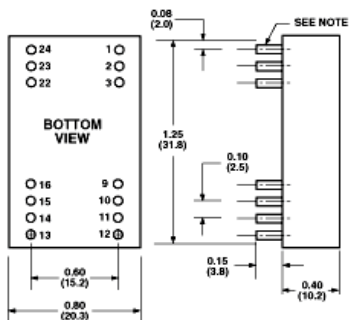
Specifications & Features Summary

- Regulated Outputs
- -25°C to +71°C ambient operation
- Continuous Short-circuit protection
- up to 3KV, 10MΩ input-to-output isolation
- Pi Input Filter
- 2:1 Input Range
- **THROUGH-HOLE PACKAGES AVAILABLE** (add suffix "T" to the part number)
- 5-sided metal shield
- 100KHz Switching Frequency
- No airflow or heatsink required
- Voltage Accuracy ± 2%
- Delivers up to 5W in 1"x1.25"x0.45" package with Industry-Standard SMD Pinouts



Model Num	V _{in}	V _{out}	I _{out}	I _{No Load}	I _{Full Load}	Eff	Case	SPECIFICATIONS	
W3-12S5	9-18 VDC	5.0 VDC	600.0 mA	7.5 mA	545.0 mA	76%	T	Input Specifications	
W3-12S12	9-18 VDC	12.0 VDC	250.0 mA	7.5 mA	585.0 mA	80%	T	Input Voltage Range	12V-----9-18V
W3-12S15	9-18 VDC	15.0 VDC	200.0 mA	7.5 mA	625.0 mA	80%	T		24V-----18-36V
W3-12D12	9-18 VDC	±12.0 VDC	±125.0 mA	12.0 mA	575.0 mA	80%	T		48V-----36-72V
W3-12D15	9-18 VDC	±15.0 VDC	±100.0 mA	12.0 mA	590.0 mA	80%	T	Input Filter	Pi Type
W3-12D5	9-18 VDC	±5.0 VDC	±300.0 mA	12.0 mA	545.0 mA	76%	T	Output Specifications	
W3-12S3.3	9-18 VDC	3.3 VDC	600.0 mA	7.5 mA	393.0 mA	70%	T	Voltage Accuracy	+/-2.0% max.
W3-24S5	18-36 VDC	5.0 VDC	600.0 mA	5.0 mA	265.0 mA	78%	T	Voltage Balance(Dual)	+/-1.0% / max.
W3-24S12	18-36 VDC	12.0 VDC	250.0 mA	5.0 mA	285.0 mA	82%	T	Temperature Coefficient	+/-0.05% / °C
W3-24S15	18-36 VDC	15.0 VDC	200.0 mA	5.0 mA	305.0 mA	82%	T		3.3V / 5V-----100mV p-p max.
W3-24D12	18-36 VDC	±12.0 VDC	±125.0 mA	7.5 mA	285.0 mA	81%	T		12V / 15V-----1% p-p max.
W3-24D15	18-36 VDC	±15.0 VDC	±100.0 mA	7.5 mA	295.0 mA	81%	T	Short Circuit Protection	Continuous
W3-24D5	18-36 VDC	±5.0 VDC	±300.0 mA	7.5 mA	265.0 mA	78%	T	Line Regulation, Single/Dual ¹	+/-0.5%
W3-24S3.3	18-36 VDC	3.3 VDC	600.0 mA	5.0 mA	197.0 mA	70%	T	Load Regulation, Single ²	+/-0.5%
W3-48S5	36-72 VDC	5.0 VDC	600.0 mA	2.0 mA	133.0 mA	78%	T	Dual ³	+/-1.0%
W3-48S12	36-72 VDC	12.0 VDC	250.0 mA	2.0 mA	145.0 mA	81%	T		
W3-48S15	36-72 VDC	15.0 VDC	200.0 mA	2.0 mA	154.0 mA	81%	T	Efficiency	
W3-48D12	36-72 VDC	±12.0 VDC	±125.0 mA	3.0 mA	142.0 mA	81%	T	Isolation Resistance	10 ⁹ ohms
W3-48D15	36-72 VDC	±15.0 VDC	±100.0 mA	3.0 mA	147.0 mA	81%	T	Switching Frequency	100KHz, min
W3-48D5	36-72 VDC	±5.0 VDC	±300.0 mA	3.0 mA	133.0 mA	78%	T	Operating Temperature Range	-25°C to +71°C
W3-48S3.3	36-72 VDC	3.3 VDC	600.0 mA	2.0 mA	98.0 mA	70%	T	Case Temperature(Plastic case)	95°C max.

NOTE: Pin Size is 0.02" Inch (0.5mm) DIA or .020 x .014 Inch
 All Dimensions In Inches (mm)



PIN CONNECTION					
500 VDC			(1.5K & 3K) VDC		
Pin	Single Output	Dual Output	Pin	Single Output	Dual Output
1	+V Input	+V Input	1	NP	NP
2	NC	-V Output	2	-V Input	-V Input
3	NC	Common	3	-V Input	-V Input
9	NP	NP	9	NP	Common
10	-V Output	Common	10	NC	NC
11	+V Output	+V Output	11	NC	-V Output
12	-V Input	-V Input	12	NP	NP
13	-V Input	-V Input	13	NP	NP
14	+V Output	+V Output	14	+V Output	+V Output
15	-V Output	Common	15	NC	NC
16	NP	NP	16	-V Output	Common
22	NC	Common	22	+V Input	+V Input
23	NC	-V Output	23	+V Input	+V Input
24	+V Input	+V Input	24	NP	NP

*NP-NO PIN *TP-TEST POINT
 *NC-NO CONNECTION WITH PIN *GO-GROUND

Isolation Voltage	
500VDC min	Standard Models
3K VDC min ⁴	Suffix"H" Models
Case Material	
Standard Models	Non-Conductive Black Plastic
Suffix"M" Models ⁵	Black Coated Copper with Non-Conductive Base
Notes	
1.	Measured From High Line to Low Line
2.	Measured From Full Load to 10% Load
3.	Measured From Full Load to 1/4 Load
4.	Non-Conductive Black Plastic Only
5.	Suffix"HM" 1.5K VDC Instead of 3K VDC Isolation

Typical at Ta= +25 °C under nominal input voltages of 12V, 24V and 48VDC, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication.

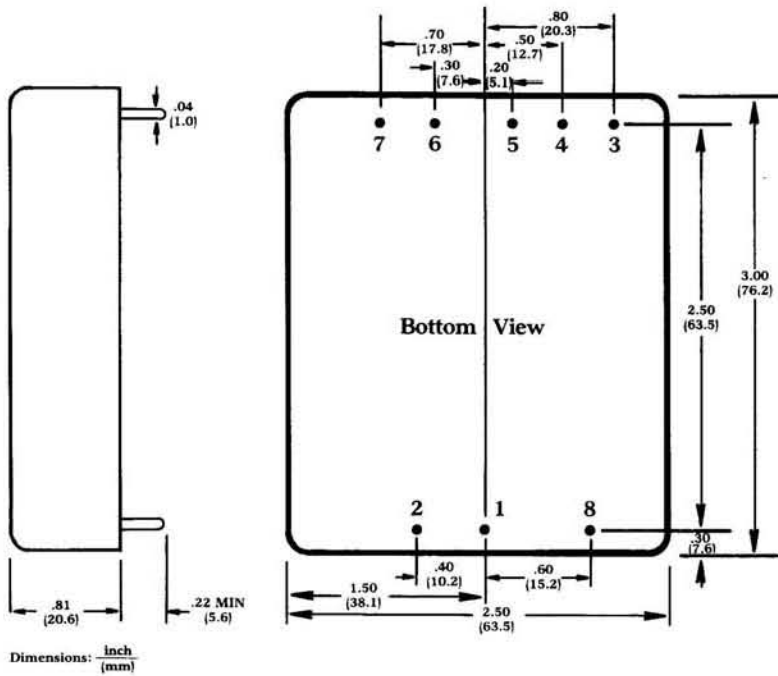
Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

Consult factory for hundreds of other available input/output voltage configurations.

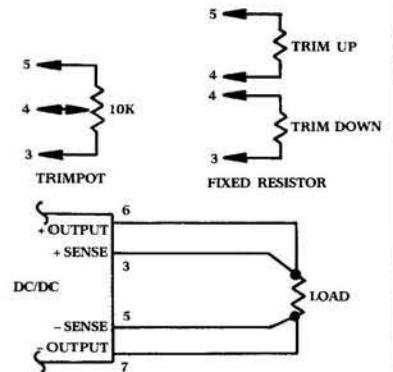
MECHANICAL OUTLINES AND CONNECTIONS

DC700 Series

PIN	FUNCTION
1	+ INPUT
2	- INPUT
3	+ SENSE
4	TRIM
5	- SENSE
6	+ OUTPUT
7	- OUTPUT
8	ON/OFF

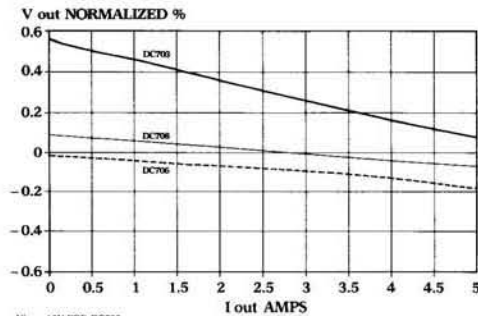


CONNECTIONS FOR OUTPUT TRIM

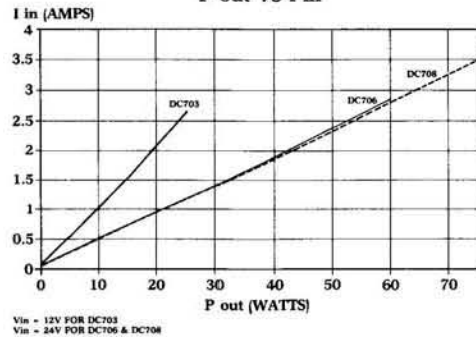


PERFORMANCE CURVES

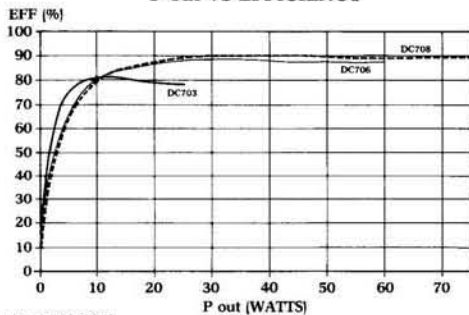
DC700 SERIES
OUTPUT REGULATION



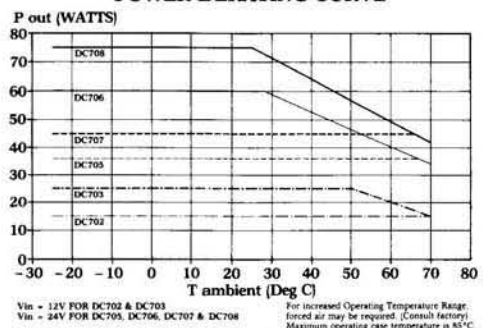
DC700 SERIES
P out VS I in



DC700 SERIES
P out VS EFFICIENCY



DC700 SERIES
POWER DERATING CURVE





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W7 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Networking Gear
- Wireless Communications
- Data Communications
- Distributed Power Architecture
- Telecommunications
- Semiconductor Test Equipment
- Industrial / Medical

The W7 Family of high efficiency DC/DC converters offer power levels of up to 7 Watt, which exceeds that of other sub-bricks with the same package, while also providing Surface Mount Processable construction. With a wide input voltage range and single and multi-outputs, these converters provide versatility without sacrificing the board space. All models feature an input filter, continuous short circuit protection and regulated outputs. The fully enclosed, encapsulated construction facilitates maximum power delivered with the highest efficiency of up to 83%. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

Specifications & Features Summary

- No minimum load required
- Regulated Outputs
- -25°C to +71°C ambient operation
- Continuous Short-circuit protection
- 1500V, 10M Ω input-to-output isolation
- Pi Input Filter
- Voltage Accuracy $\pm 2\%$
- 2:1 Input Range
- 5-sided metal shield
- 270 – 330KHz Switching Frequency
- Input Undervoltage Lockout
- Output Overvoltage Protection
- Output Current Limiting
- No airflow or heatsink required
- Delivers up to 7.5W in 1"x1.25"x0.45" package with Industry-Standard SMD Pinouts
- **THROUGH-HOLE PACKAGES AVAILABLE (add suffix "T" to the part number)**

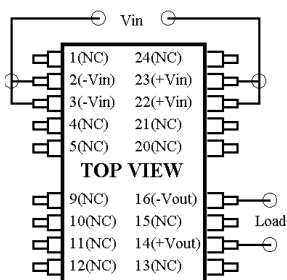


Model Number	Vin Range	Output		Input Current		Eff (%)	Regulation Line/Load	Startup delay Typ (ms)	Overshoot Typ (%)	Rise time Typ (ms)	Hold Time Typ (us)	Recovery Typ (us)	Dynamic Response	Output Ripple/Noise
		Voltage	Current	No Load	Full Load									
W7-12S5	9-18Vdc	5VDC	1500mA	25mA	801mA	78	$\pm 0.2/1.1\%$	0.4	5	0.2	100	300	2 %	50mVp-p
W7-12S12		12VDC	625mA	25mA	762mA	82	$\pm 0.2/0.2\%$	2.2	2	2	100	300	2 %	50mVp-p
W7-12S15		15VDC	500mA	25mA	762mA	82	$\pm 0.2/0.1\%$	2.5	2	2.3	100	300	2 %	50mVp-p
W7-12D5		± 5 VDC	± 750 mA	30mA	791mA	79	$\pm 0.2/0.5\%$	1.7	4	1.5	100	300	2 %	60mVp-p
W7-12D12		± 12 VDC	± 310 mA	30mA	753mA	83	$\pm 0.2/0.1\%$	5	2	4.5	100	300	2 %	60mVp-p
W7-12D15		± 15 VDC	± 250 mA	30mA	753mA	83	$\pm 0.2/0.1\%$	10	2	6	100	300	2 %	60mVp-p
W7-12S3.3	18-36Vdc	3.3VDC	1500mA	25mA	557mA	74	$\pm 0.2/1.1\%$	0.5	10	0.4	100	300	2 %	50mVp-p
W7-24S5		5VDC	1500mA	20mA	396mA	79	$\pm 0.2/1.1\%$	15	5	0.2	100	300	2 %	50mVp-p
W7-24S12		12VDC	625mA	20mA	381mA	82	$\pm 0.2/0.2\%$	20	2	2	100	300	2 %	50mVp-p
W7-24S15		15VDC	500mA	20mA	381mA	82	$\pm 0.2/0.1\%$	20	2	2.3	100	300	2 %	50mVp-p
W7-24D5		± 5 VDC	± 750 mA	25mA	386mA	81	$\pm 0.2/0.5\%$	20	4	1.5	100	300	2 %	60mVp-p
W7-24D12		± 12 VDC	± 310 mA	25mA	377mA	83	$\pm 0.2/0.1\%$	20	2	4.5	100	300	2 %	60mVp-p
W7-24D15	36-72Vdc	± 15 VDC	± 250 mA	25mA	377mA	83	$\pm 0.2/0.1\%$	25	2	6	100	300	2 %	60mVp-p
W7-24S3.3		3.3VDC	1500mA	20mA	271mA	76	$\pm 0.2/1.1\%$	20	10	0.4	100	300	2 %	50mVp-p
W7-48S5		5VDC	1500mA	10mA	195mA	80	$\pm 0.2/1.1\%$	15	5	0.2	200	300	2 %	50mVp-p
W7-48S12		12VDC	625mA	10mA	190mA	82	$\pm 0.2/0.2\%$	20	2	2	200	300	2 %	50mVp-p
W7-48S15		15VDC	500mA	10mA	190mA	82	$\pm 0.2/0.1\%$	20	2	2.3	200	300	2 %	50mVp-p
W7-48D5		± 5 VDC	± 750 mA	15mA	193mA	81	$\pm 0.2/0.5\%$	20	4	1.5	200	300	2 %	60mVp-p
W7-48D12	36-72Vdc	± 12 VDC	± 310 mA	15mA	188mA	83	$\pm 0.2/0.1\%$	20	2	4.5	200	300	2 %	60mVp-p
W7-48D15		± 15 VDC	± 250 mA	15mA	188mA	83	$\pm 0.2/0.1\%$	25	2	6	200	300	2 %	60mVp-p
W7-48S3.3		3.3VDC	1500mA	10mA	136mA	76	$\pm 0.2/1.1\%$	20	10	0.4	200	300	2 %	50mVp-p

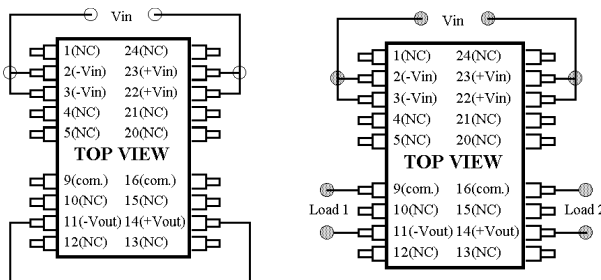
Typical at Ta = +25 °C under nominal input voltages of 12V, 24V and 48VDC, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

Consult factory for hundreds of other available input/output voltage configurations.

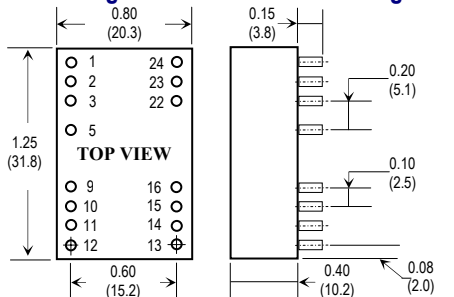
Single Output Typical Connection



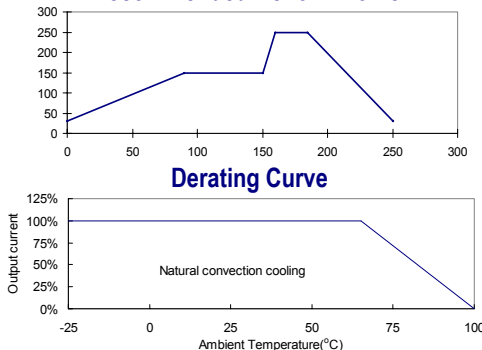
Dual Output Typical Connections



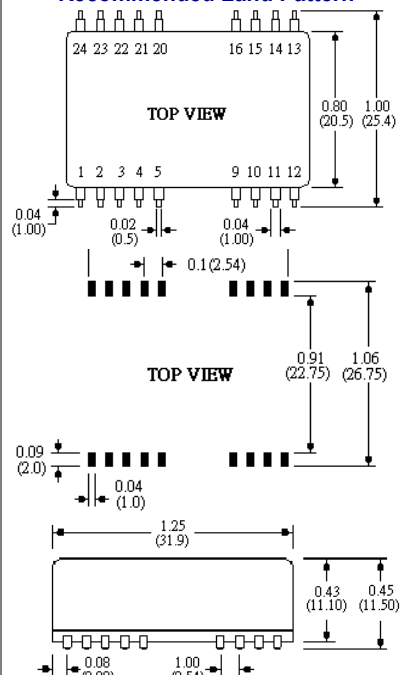
Through-Hole Mechanical Drawing



Recommended Reflow Profile



Recommended Land Pattern



W15C

S E R I E S

15 WATT 2:1 INPUT DC-DC CONVERTERS



Features

- 15W Isolated Output
- Efficiency to 90%
- 2:1 Input Range
- Regulated Outputs
- Fixed Switching Frequency
- Input Under Voltage Protection
- Over Current Protection
- Conductive EMI Meets EN55022 Class A
- Continuous Short Circuit Protection
- Without Tantalum Capacitors Inside
- CE Mark Meets 2004/108/EC
- Safety Meets UL60950-1, EN60950-1, and IEC60950-1

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT MIN.	OUTPUT CURRENT MAX.	INPUT CURRENT NO LOAD	INPUT CURRENT FULL LOAD	% EFF.	Capacitor Load max.
W15C-12S33	9-18 VDC	3.3 VDC	0 mA	4000 mA	90 mA	1280 mA	85	4000uF
W15C-12S5		5 VDC	0 mA	3000 mA	85 mA	1453 mA	88	3000uF
W15C-12S12		12 VDC	0 mA	1250 mA	70 mA	1420 mA	88	1330uF
W15C-12S15		15 VDC	0 mA	1000 mA	70 mA	1420 mA	88	1000uF
W15C-12D5		±5 VDC	0 mA	±1500mA	45 mA	1470mA	85	1470uF
W15C-12D12		±12 VDC	0 mA	±625mA	45 mA	1436mA	87	660uF
W15C-12D15		±15 VDC	0 mA	±500mA	45 mA	1420mA	88	550uF
W15C-24S33	18-36 VDC	3.3 VDC	0 mA	4000 mA	50 mA	640 mA	86	4000uF
W15C-24S5		5 VDC	0 mA	3000 mA	50 mA	718 mA	89	3000uF
W15C-24S12		12 VDC	0 mA	1250 mA	20 mA	695 mA	90	1330uF
W15C-24S15		15 VDC	0 mA	1000 mA	20 mA	695 mA	90	1000uF
W15C-24D5		±5 VDC	0 mA	±1500mA	25 mA	726 mA	86	1470uF
W15C-24D12		±12 VDC	0 mA	±625mA	25 mA	710 mA	88	660uF
W15C-24D15		±15 VDC	0 mA	±500mA	25 mA	702 mA	89	550uF
W15C-48S33	36-75 VDC	3.3 VDC	0 mA	4000 mA	25 mA	320 mA	86	4000uF
W15C-48S5		5 VDC	0 mA	3000 mA	30 mA	359 mA	88	3000uF
W15C-48S12		12 VDC	0 mA	1250 mA	20 mA	347 mA	90	1330uF
W15C-48S15		15 VDC	0 mA	1000 mA	20 mA	351 mA	90	1000uF
W15C-48D5		±5 VDC	0 mA	±1500mA	20 mA	363 mA	86	1470uF
W15C-48D12		±12 VDC	0 mA	±625mA	20 mA	355 mA	88	660uF
W15C-48D15		±15 VDC	0 mA	±500mA	20 mA	351 mA	89	550uF

Specifications

INPUT SPECIFICATIONS:

Input Voltage Range.....	12V.....	9-18V
	24V.....	18-36V
	48V.....	36-75V
Under voltage lockout	12Vin power up: 8.4V,	power down: 8V
	24Vin power up: 17V,	power down: 16V
	48Vin power up: 34V,	power down: 32V
Input Surge Voltage (100mS max.).....	12Vin	25Vdc max.
	24Vin	50Vdc max.
	48Vin	100Vdc max.
Input Filter		PI Type

OUTPUT SPECIFICATIONS:

Voltage Accuracy	±1.5% max.	
Voltage Balance (Dual)	±2.0% max.	
Transient Response: 25% Step Load Change	<500u sec.	
Ripple and Noise, 20MHz BW (Measured with 0.1uF MLCC) ...	100mV p-p max.	
Temperature Coefficient	±0.03%/°C max.	
Short Circuit Protection	Continuous	
Line Regulation ¹	Single	±0.2% max.
	Dual	±0.5% max.
Load Regulation ²	Single	±0.2% max.
	Dual	±1.0% max.
Cross Regulation (Dual output) Load cross variation 10%/100%	±5% max.	
Over Voltage Protection	Zener or TVS Clamp	
Current Limit	110% - 140% Nominal Output	
Start up time	20ms. max.	

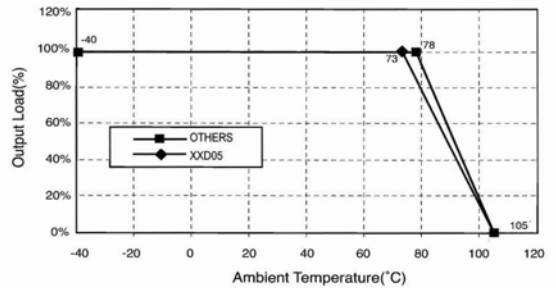
OPTION:

- Suffix "T" to the Model Number With Remote Positive On/Off Control:
Logic Compatibility ...CMOS or Open Collector TTL, Referenced to -Vin
Module On >5.5VDC to 75VDC or Open Circuit
Module Off <1.2VDC
- Suffix "A" to the Model Number with Output Voltage Adjustable
External Trim Adj. Range ±10%, Single Output Models Only

GENERAL SPECIFICATIONS:

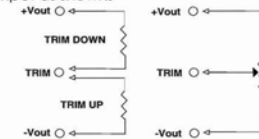
Efficiency	See Table
Isolation Voltage	1500 VDC min.
Isolation Resistance	10 ⁹ Ohms min.
Isolation Capacitance	1000pF typ.
Switching Frequency	350KHz typ.
EMI/RFI	Conductive EMI Meets EN55022 Class A
Case Grounding	Connect Case to -Vin with Decoupling Y Cap
Operating Ambient Temperature Range	-40°C to +85°C
Derating, Above 78°C	Linearly to Zero Power at +105°C
Case Temperature ³	105°C
Cooling	Natural Convection
Storage Temperature Range	-55°C to +125°C
Humidity	95% RH max. Non condensing
MTBF	MIL-STD-217-F, GB, 25°C, Full Load 1200K hrs typ.
Dimensions	2.00x1.00x0.4 inches (50.8x25.4x10.2mm)
Case Material	Black Coated Copper with Non-Conductive Base
Weight	35g

Derating curve



External Output Trimming

Output may optionally be externally trimmed (±10%) with a fixed resistor or an external trimpot as shown.



NOTE:

- Measured From High Line to Low Line
- Measured From Full Load to min. Load
- Maximum case temperature under any operating condition should Not be exceeded 105°C.

PIN CONNECTION

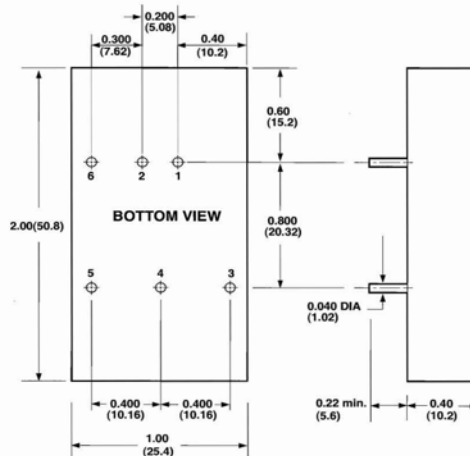
Pin	Function
1	+Input
2	-Input
3	+Output
4	Common/NP/Trim(Optional)
5	-V Output
6	NP/Remote(Optional)

*NP-NO PIN ON SINGLE OUTPUT

CASE B

All Dimensions in Inches(mm)

Tolerances Inches: x.xx= ±0.04, x.xxx= ±0.010
Millimeters: x.x= ±1, x.xxx= ±0.25



All Specifications Typical At Nominal Line, Full Load and 25°C Unless Otherwise Noted.

W30 Series DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

The W30 Family of high efficiency DC/DC converters offer power levels of up to 30 Watts, exceeding that of other products with the same Industry-Standard Pinouts, while providing much smaller footprints. With a wide input voltage range and single outputs, ranging from 1.5 to 15 Volts, these converters provide versatility without sacrificing the board space. All models feature an input filter and microcontroller-based protection features. The open frame construction allows very efficient heat transfer with no hot spots. All converters combine creative design practices with highly derated power devices to achieve superior efficiencies (up to 94%), reliability, high performance and low cost solution to systems designers.

Specifications & Features Summary

- No minimum load required
- On/Off pin control
- -40°C to +85°C ambient operation
- Output adjustment +/-10% range
- 1500V, 10MΩ input-to-output isolation
- Output overcurrent protection
- Input Under voltage protection
- Input Over voltage protection
- Synchronous rectification topology
- MTBF of up to 1,000,000 hours @ 50°C (Bellcore)
- Over Voltage protection
- Over Temperature protection
- Please add suffix "A" or "B", depending on Pinout
- Please add suffix "N" for Negative Logic
- Delivers up to 30W in 1" x 2" package with Industry-Standard Pinouts
- UL 60950 pending, TUV EN60950 and CSA C22.2 No. (Pending)



Model	Input Voltage Range (Vin)	Iin No Load	Iin Full Load (A)	Output Voltage (Vo)	Output Current (Io) A	Eff (Typ) %	Regulation Line/Load (%)	Ripple / Noise (mV) pk-pk
W30-12S1.5	9-18	0.030	2.0	1.5	10.0	83	±0.2 / ±0.2	15
W30-12S1.8	9-18	0.035	2.38	1.8	10.0	84	±0.3 / ±0.2	15
W30-12S2.5	9-18	0.040	3.26	2.5	10.0	85	±0.2 / ±0.2	15
W30-12S3.3	9-18	0.040	3.26	3.3	8.0	90	±0.2 / ±0.2	20
W30-12S5	9-18	0.050	3.66	5.0	6.0	91	±0.2 / ±0.2	20
W30-12S12	9-18	0.050	3.58	12.0	2.5	93	±0.2 / ±0.2	50
W30-12S15	9-18	0.050	3.54	15.0	2.0	94	±0.2 / ±0.2	50
U30-12S1.5	9-36	0.030	2.05	1.5	10.0	81	±0.2 / ±0.2	15
U30-12S1.8	9-36	0.035	2.44	1.8	10.0	82	±0.3 / ±0.2	15
U30-12S2.5	9-36	0.040	3.30	2.5	10.0	84	±0.2 / ±0.2	15
U30-12S3.3	9-36	0.040	3.35	3.3	8.0	88	±0.2 / ±0.2	20
U30-12S5	9-36	0.050	3.75	5.0	6.0	89	±0.2 / ±0.2	20
U30-12S12	9-36	0.050	3.70	12.0	2.5	90	±0.2 / ±0.2	50
U30-12S15	9-36	0.050	3.66	15.0	2.0	91	±0.2 / ±0.2	50
W30-24S1.5	18-36	0.025	1.00	1.5	10.0	83	±0.2 / ±0.2	15
W30-24S1.8	18-36	0.028	1.19	1.8	10.0	84	±0.3 / ±0.2	15
W30-24S2.5	18-36	0.032	1.63	2.5	10.0	85	±0.2 / ±0.2	15
W30-24S3.3	18-36	0.035	1.63	3.3	8.0	90	±0.2 / ±0.2	20
W30-24S5	18-36	0.040	1.83	5.0	6.0	91	±0.2 / ±0.2	20
W30-24S12	18-36	0.050	1.81	12.0	2.5	92	±0.2 / ±0.2	50
W30-24S15	18-36	0.050	1.79	15.0	2.0	93	±0.2 / ±0.2	50
W30-48S1.5	36-75	0.025	.490	1.5	10.0	85	±0.2 / ±0.2	15
W30-48S1.8	36-75	0.028	.581	1.8	10.0	86	±0.3 / ±0.2	15
W30-48S2.5	36-75	0.032	.789	2.5	10.0	88	±0.2 / ±0.2	15
W30-48S3.3	36-75	0.035	.808	3.3	8.0	91	±0.2 / ±0.2	20
W30-48S5	36-75	0.040	.905	5.0	6.0	92	±0.2 / ±0.2	20
W30-48S12	36-75	0.050	.896	12.0	6.0	93	±0.2 / ±0.2	50
W30-48S15	36-75	0.050	.886	15.0	6.0	94	±0.2 / ±0.2	50

FOR POTTED UNITS AND OTHER AVAILABLE VOLTAGES
AND FEATURES PLEASE CONSULT THE FACTORY

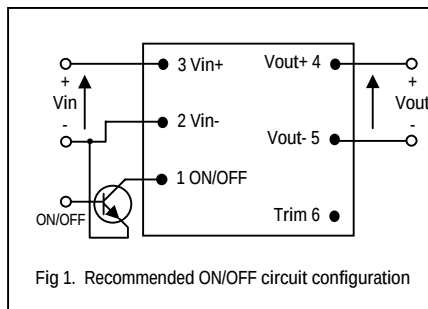


Fig 1. Recommended ON/OFF circuit configuration

Remote Sense

The unit does NOT have remote sense pins.

Output Trim (Pin 6)

Permits the user to adjust the output voltage up or down to achieve the custom voltage or to make the output voltage margining.

The unit's output voltage can be adjusted up 10% or down 10% relative to the rated output voltage by adding an external resistor between pin 6 and one of the output pins (pin 4 and 5).

To increase the output voltage, a trim resistor should be connected between pin 6 (Trim) and pin 5 (Vout-).

To decrease the output voltage, a trim resistor should be connected between pin 6 (Trim) and pin 4 (Vout+).

PARAMETER	NOTES	MIN	TYP	MAX	UNIT
Absolute maximum rating					
Input voltage		0		75	V
Operating ambient temperature	(see thermal charts)	-40		85	°C
Storage temperature		-55		125	°C
Humidity				95	%
Input characteristics					
Operating input voltage range	9-18V, 9-36V, 18-36V, 36-75V	xx	xx	xx	V
Turn on voltage threshold		17/35			V
Turn off voltage threshold				16/34	V
Transient withstand	Transient duration: 100ms			100	V
Maximum input current	100% load, 18Vin			1.830	A
Off converter input current				10	mA
Output characteristics					
Output voltage setpoint accuracy				1.0	%Vo
Output voltage line regulation	Vin = 9-18, 9-36, 18-36, 36-75V			±0.2	%
Output voltage load regulation	0%-100% Load			±0.2	%
Output voltage trim range				±10	%
Output voltage ripple / noise	20Mhz bandwidth, 100% Load, 12/24/48 Vin See pinout A notes on charts			35	mV (pk-pk)
Output over power protection		110	120	140	%
Over-voltage protection		120		135	%Vo
Temperature coefficient				±0.02	%/°C
Capacitive Load				10000	μF
Output characteristics					
Startup time	5% to 95% of the Vo			1	ms
Transient recovery time	50% load change			250	μs
Transient peak deviation	50% load change			4	%Vo
Isolation characteristics					
Isolation (primary to secondary)	1 minute		1500		VDC
Isolation resistance	1500VDC, Primary to secondary	10			MΩ
Isolation capacitance	Primary to secondary			1000	pF
Feature Characteristics					
Switching frequency	(≤2.5V = 300) (>3.3V=400)	300		400	KHz
ON/OFF control (Positive logic)	All Models				
Converter On		3.5			V
Converter Off				0.8	V
ON/OFF control (Negative logic)	All Models				
Converter On		3.5			V
Converter Off				0.8	V
Over Temperature Protection	Maximum component level			130	°C
Calculated MTBF	Bellcore @ 50°C > 1,000,000 hrs				Hrs

Basic Operations and Functions

W30 Family is a high efficiency, isolated DC/DC converter. Neither heat sink nor airflow is required when the unit operates at ambient temperature of 25°C. The unit has basic control, output adjustment and protection functions.

Input (Pin 2, Pin 3)

Input power Vin(+) must be connected to Positive input pin 3; Input power Vin(-) must be connected to Negative input pin2.

Output (Pin 4, Pin 5)

Output power Vout(+) must be connected to Positive output pin 4; Output power Vout(-) must be connected to Negative output pin6.

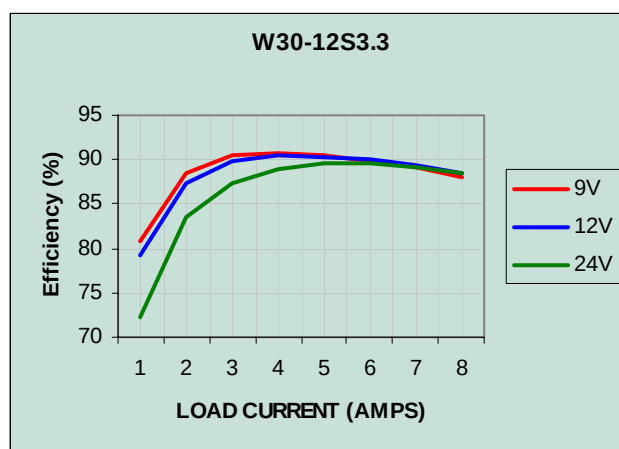
ON/OFF (Pin 1)

Permits the user to maintain unit On/Off, in order to properly sequence different power supplies and reduce power consumption during the standby condition. There are two ON/OFF control options: positive logic (W30-SX) and negative logic (W30-SXN). Both are referenced to Vin-.

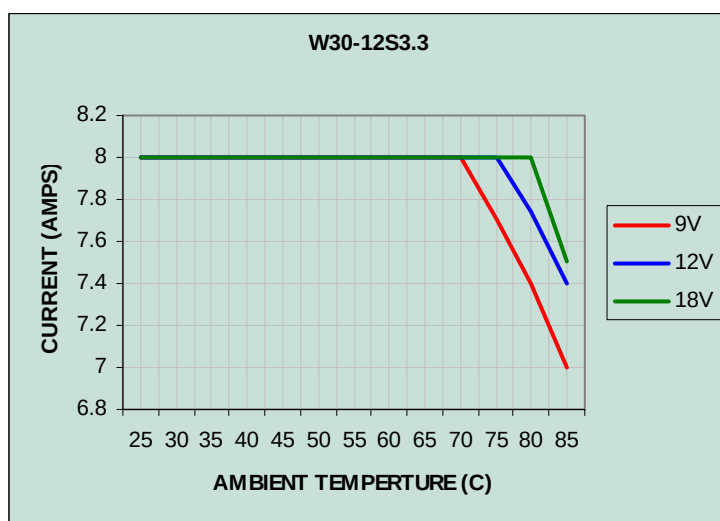
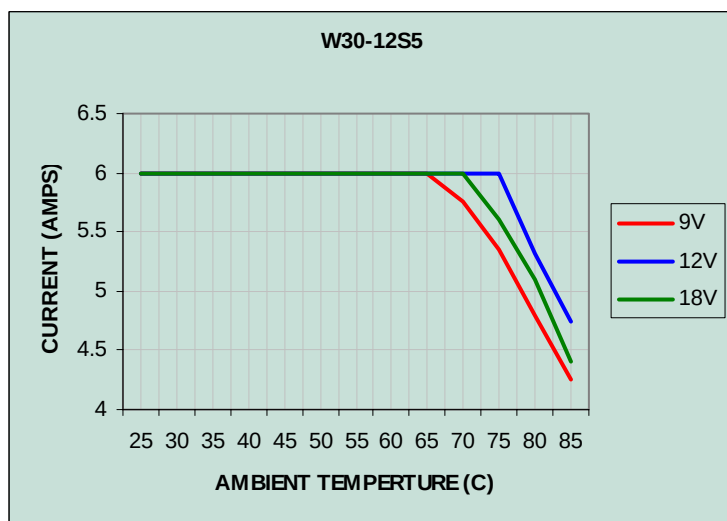
Pin 1 is the "Enable" pin, connecting a TTL compatible pin. A TTL control signal to this pin, according to the specification, turns the unit on or off.

The positive logic unit turns on when the pin is at logic high or open, and turns off at logic low. The negative logic unit turns on when the pin is at logic low, and turns off at logic high state. Typical ON/OFF connection is shown in Fig 1.

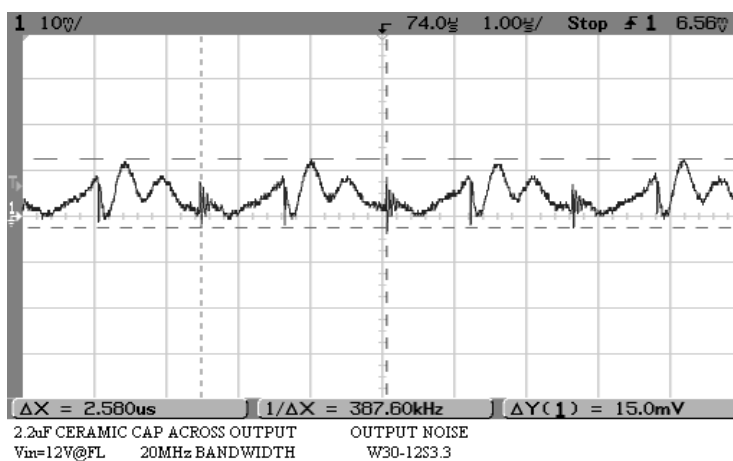
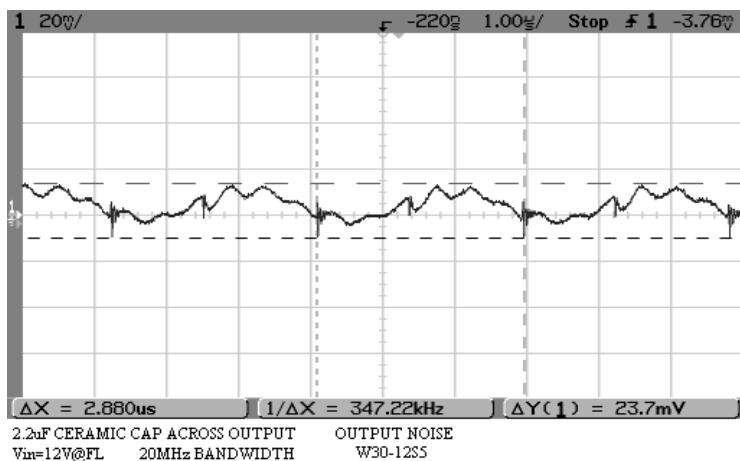
W30-12 EFFICIENCY CHARTS



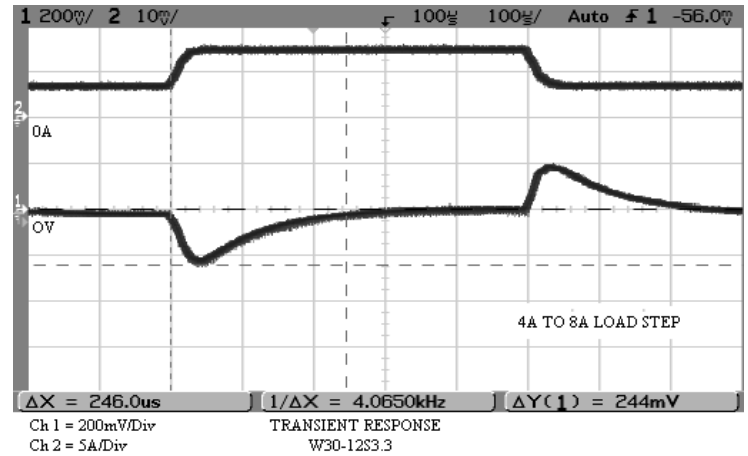
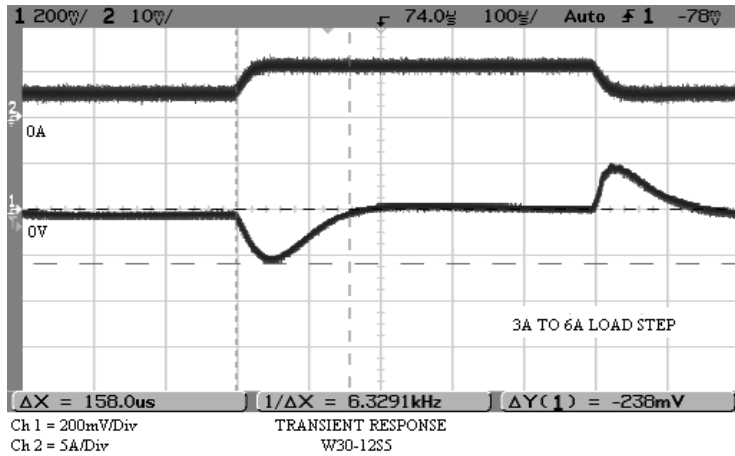
W30-12 DERATING CHARTS



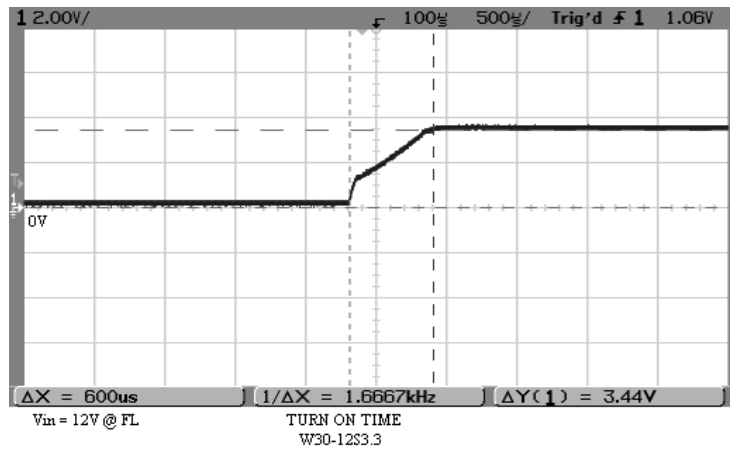
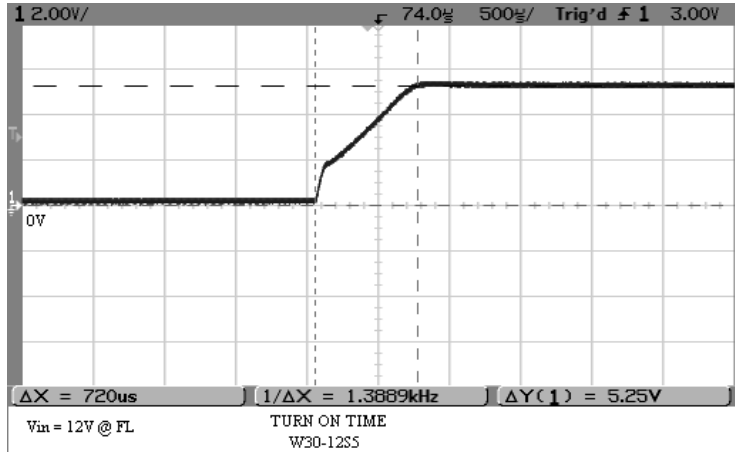
W30-12 OUTPUT NOISE



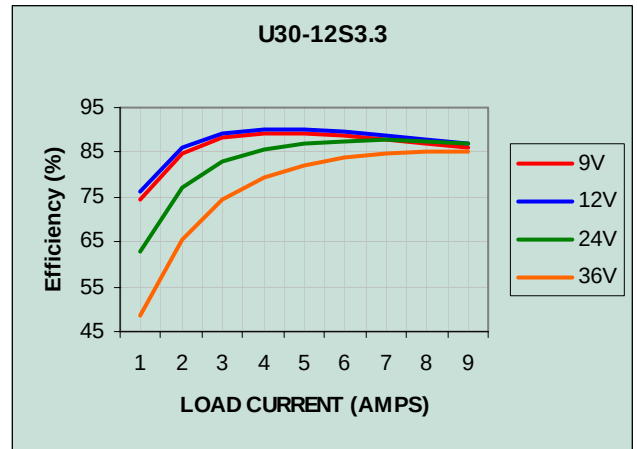
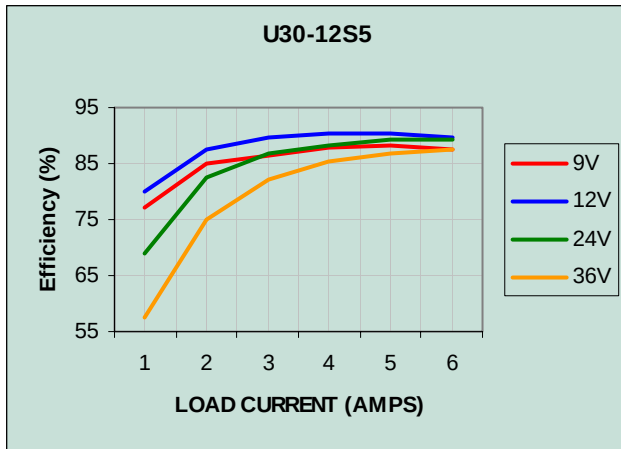
W30-12 TRANSIENT RESPONSE



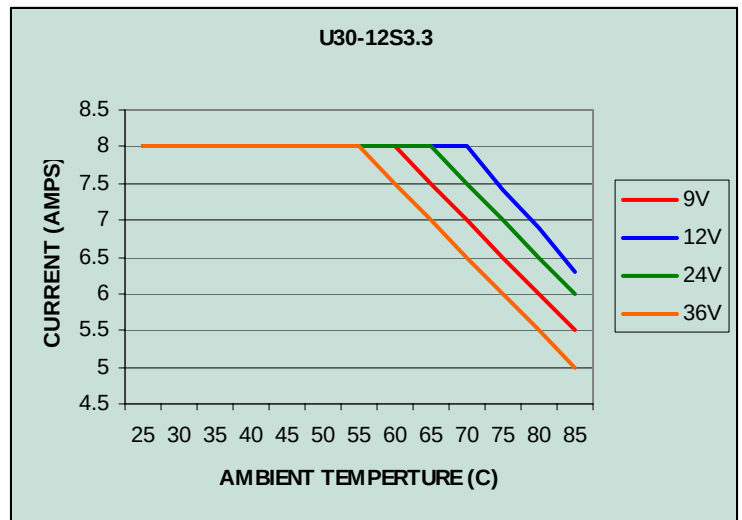
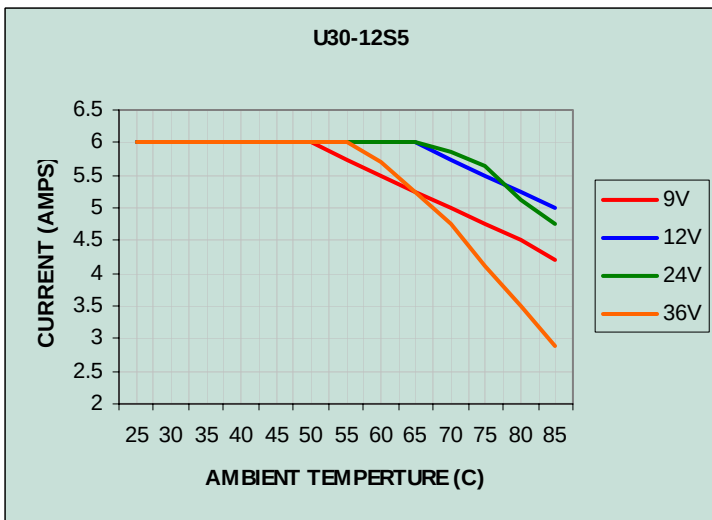
W30-12 TURN ON TIME



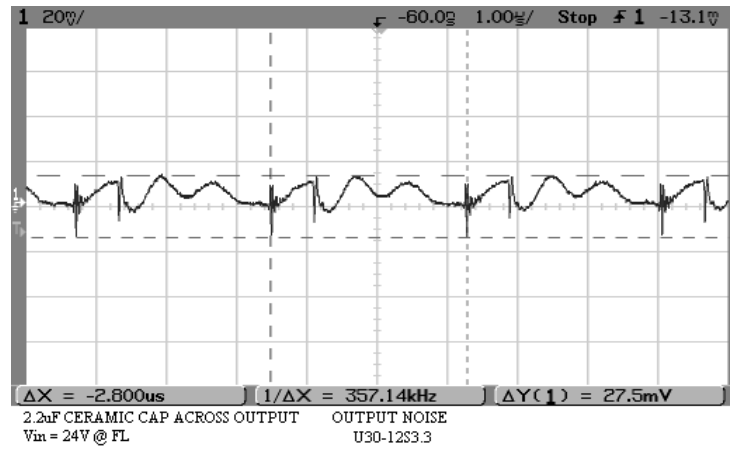
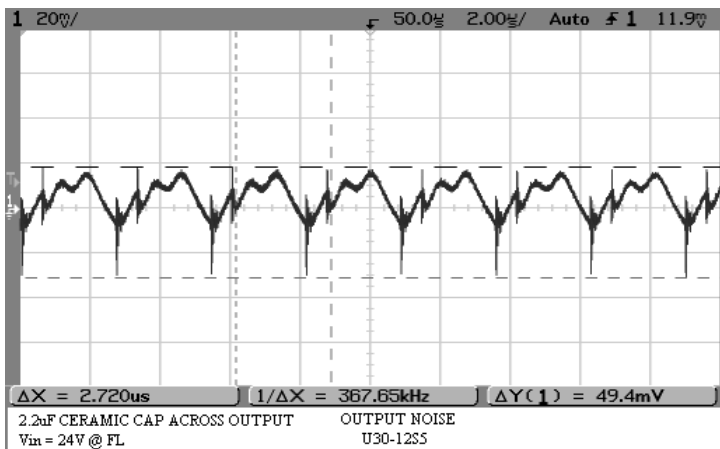
U30-12 EFFICIENCY CHARTS



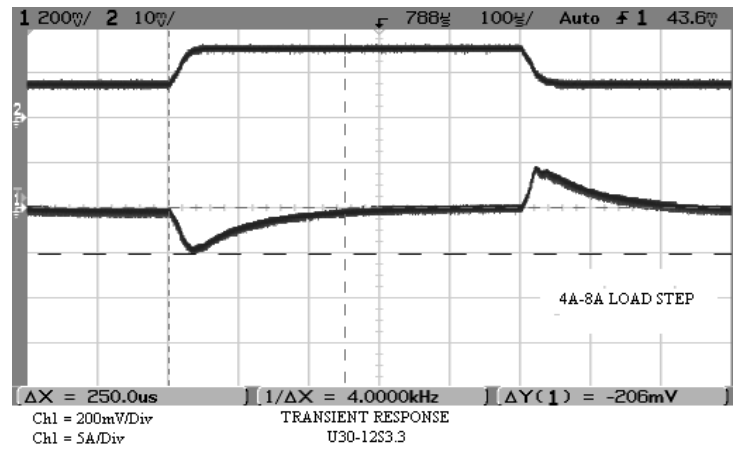
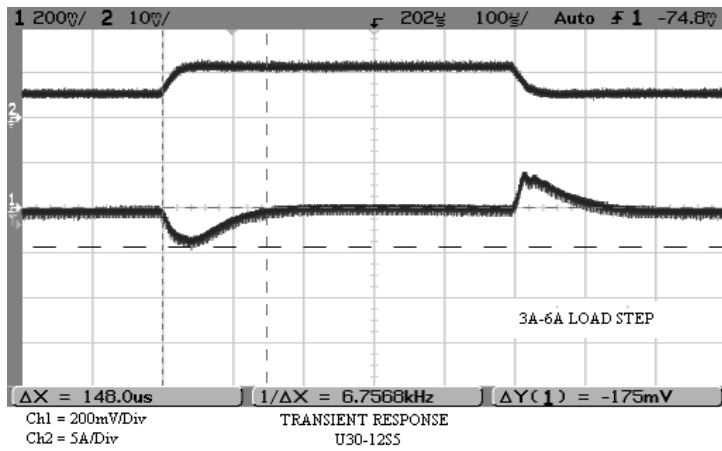
U30-12 DERATING CHARTS



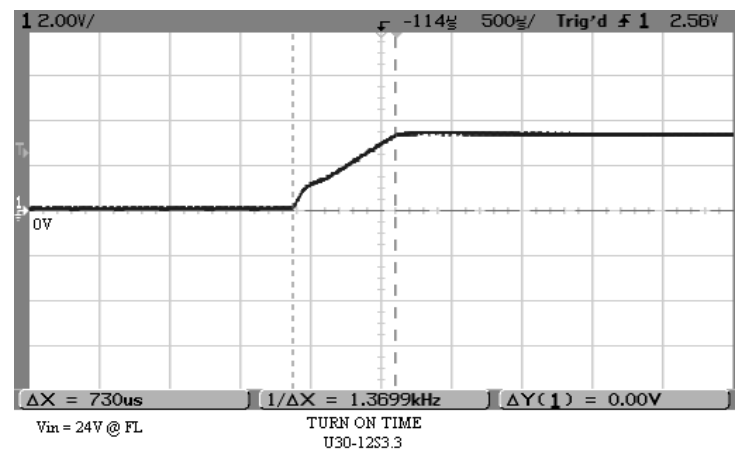
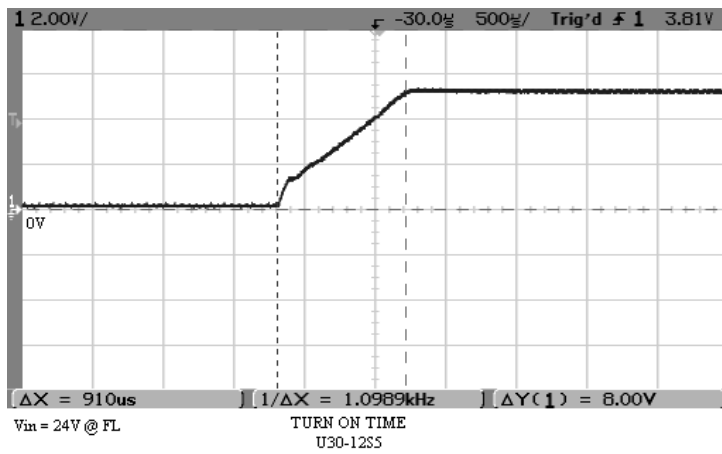
U30-12 OUTPUT NOISE



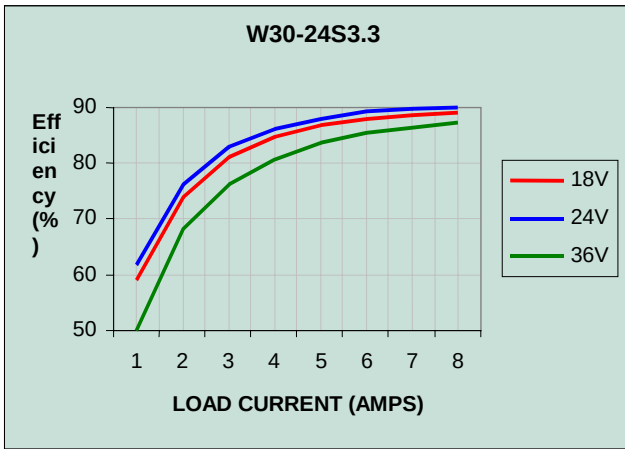
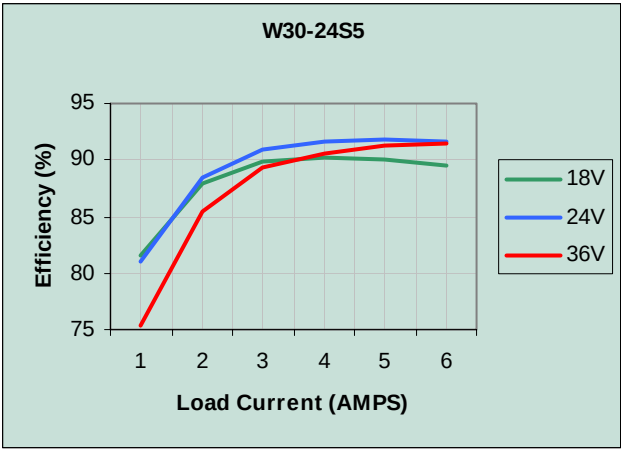
U30-12 TRANSIENT RESPONSE



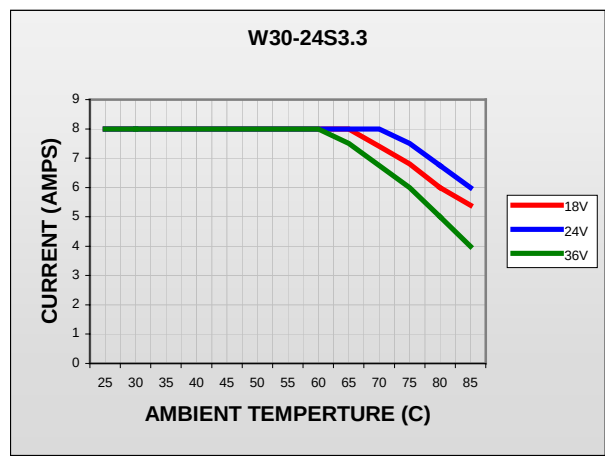
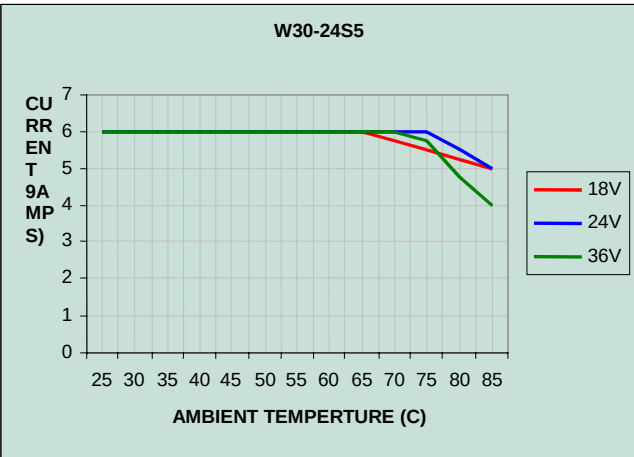
U30-12 TURN ON TIME



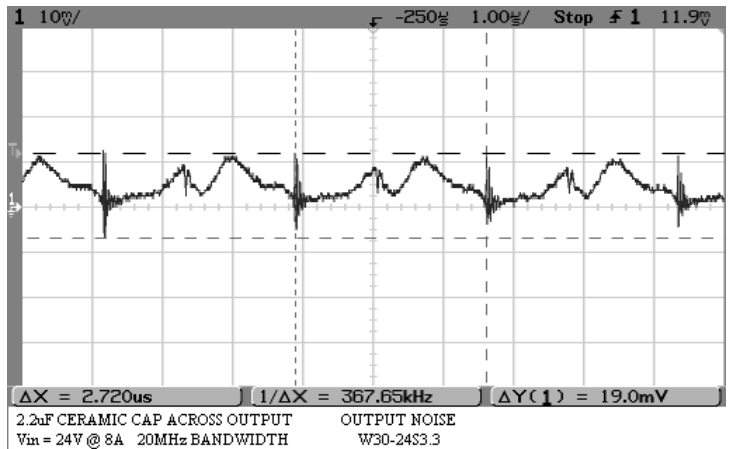
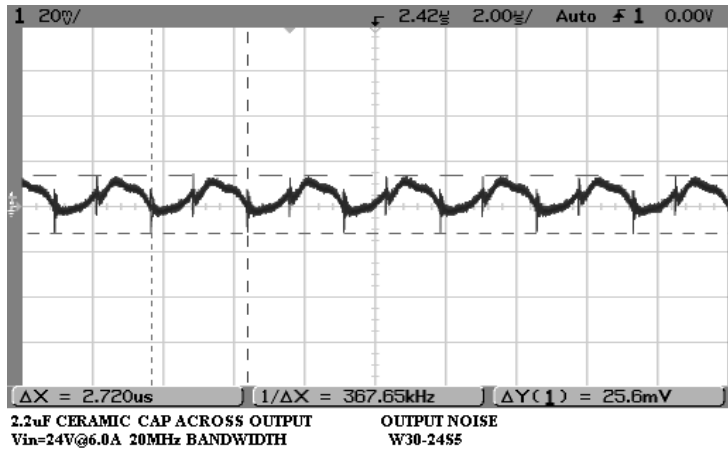
W30-24 EFFICIENCY CHARTS



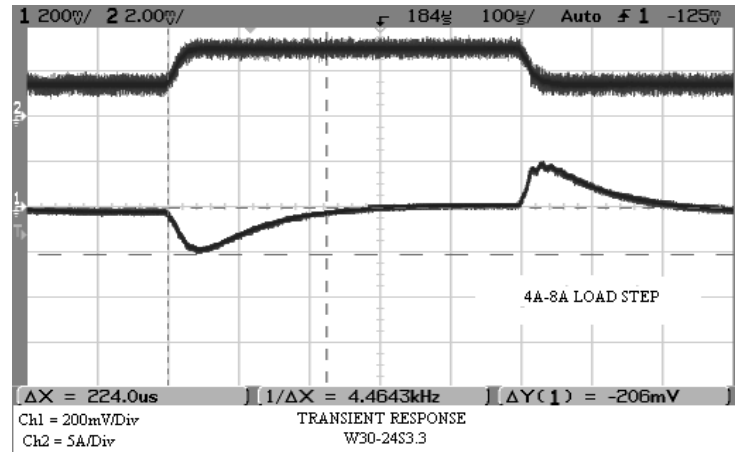
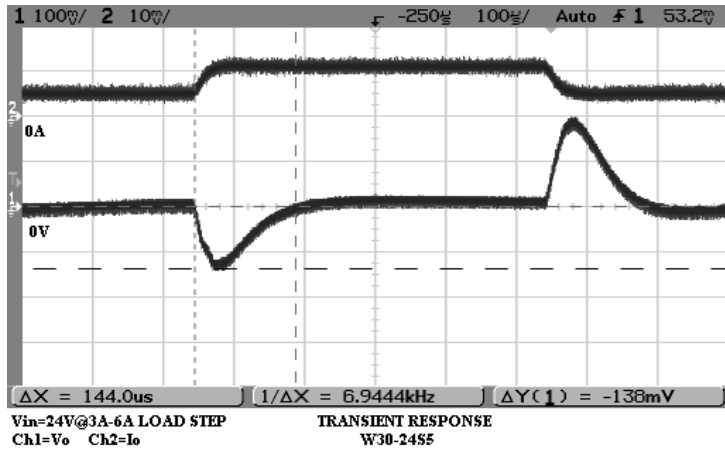
W30-24 DERATING CHARTS



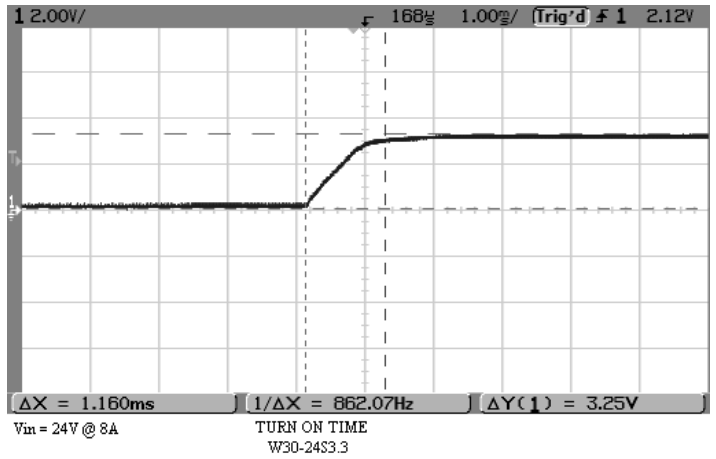
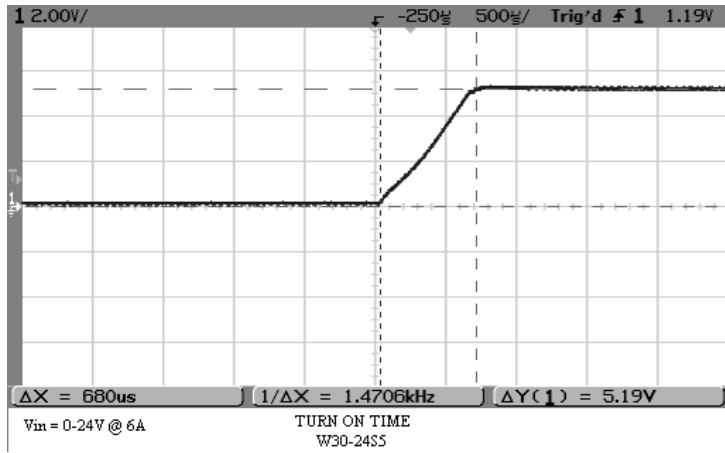
W30-24 OUTPUT NOISE



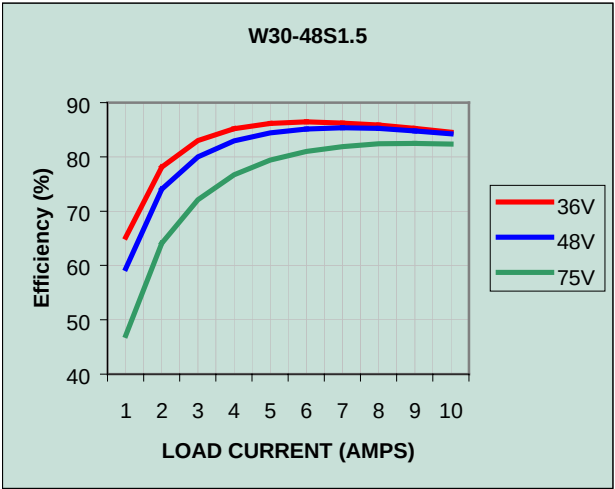
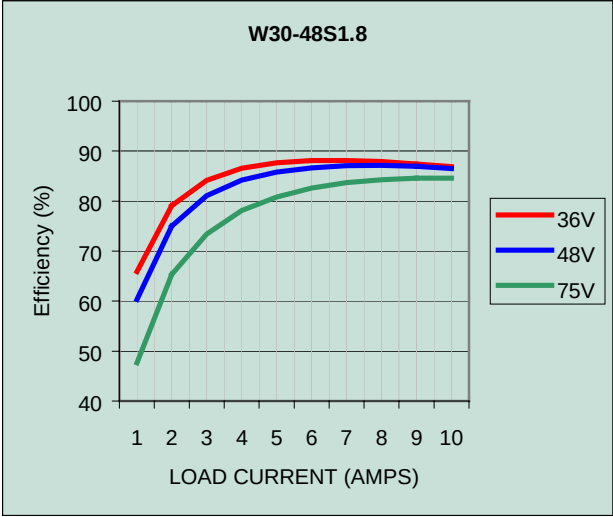
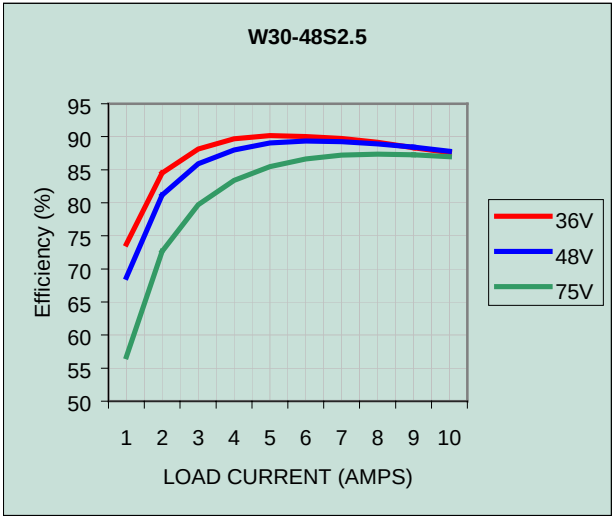
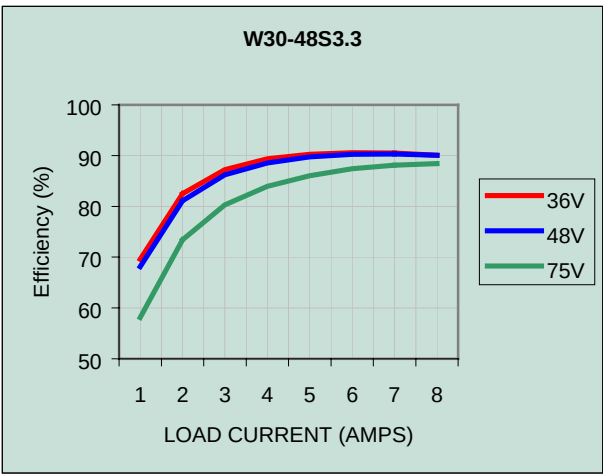
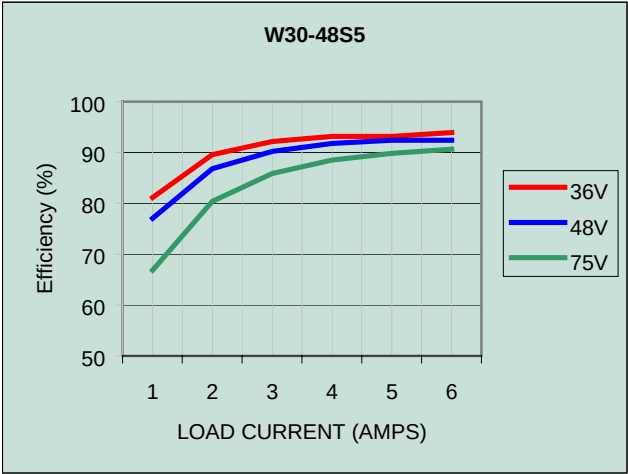
W30-24 TRANSIENT RESPONSE



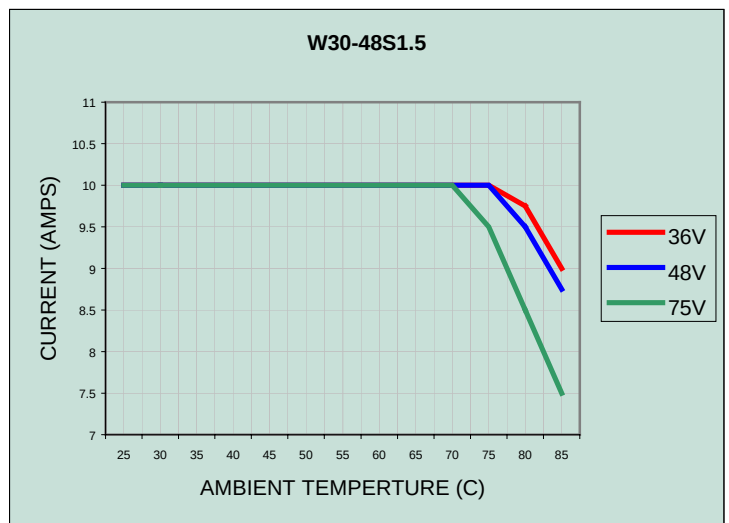
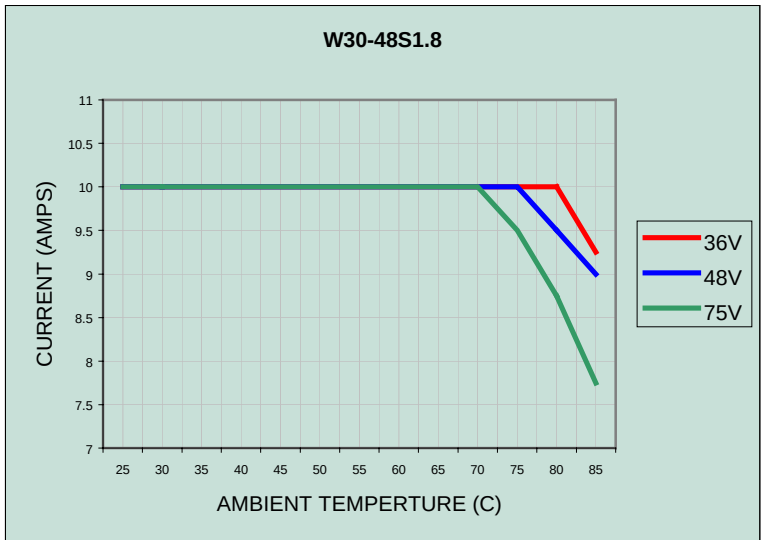
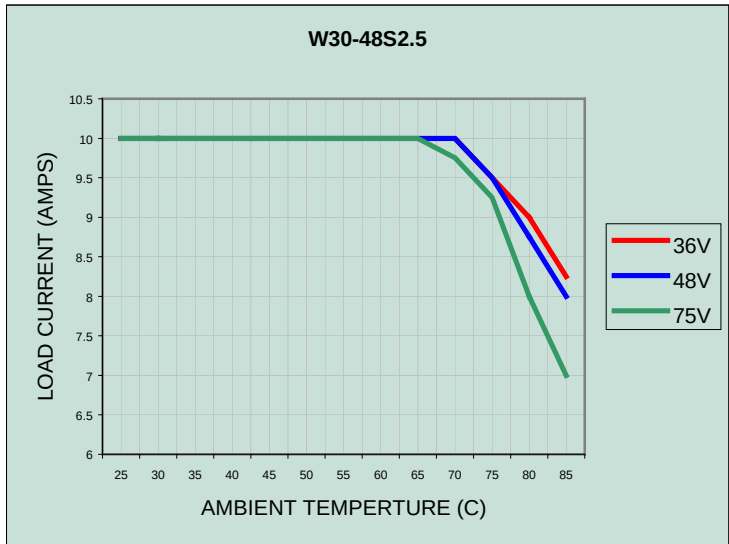
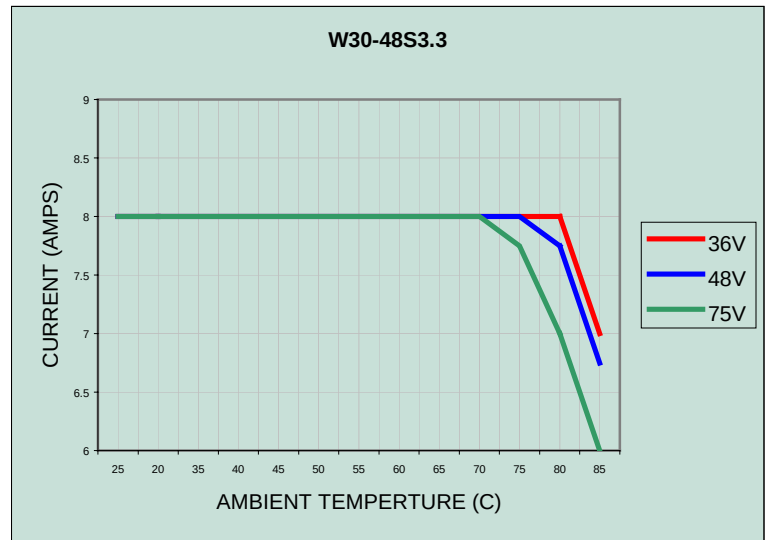
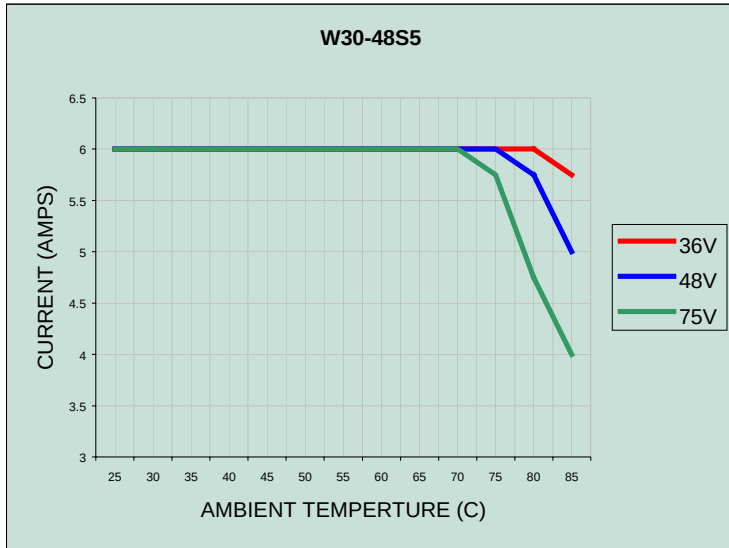
W30-24 TURN ON TIME



W30-48 EFFICIENCY CHARTS



W30-48 DERATING CHARTS (STILL AIR)



Note 1)

Units tested horizontally in a sealed enclosure (6"x6"x3"), within an environmental chamber.

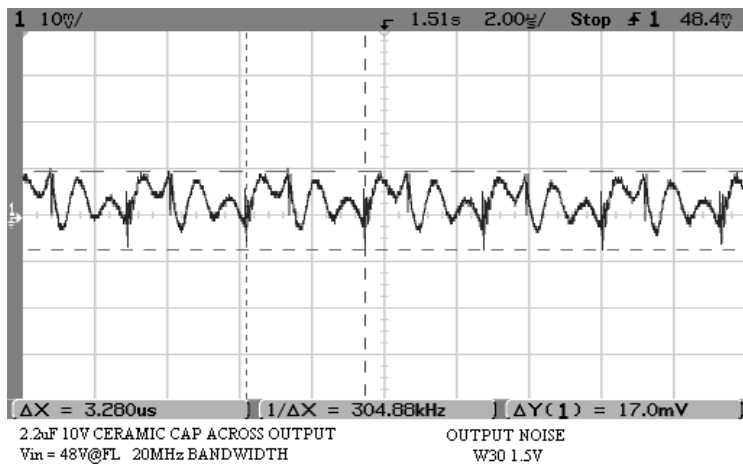
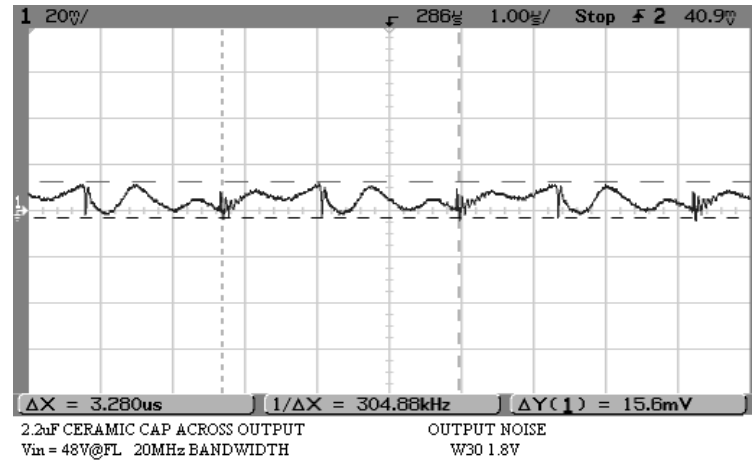
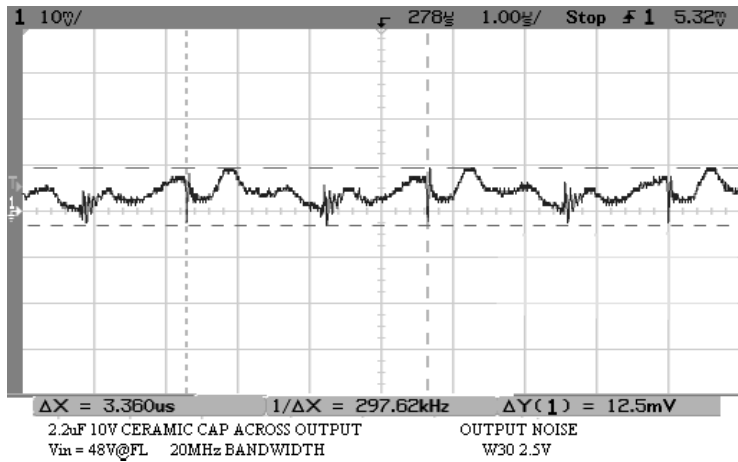
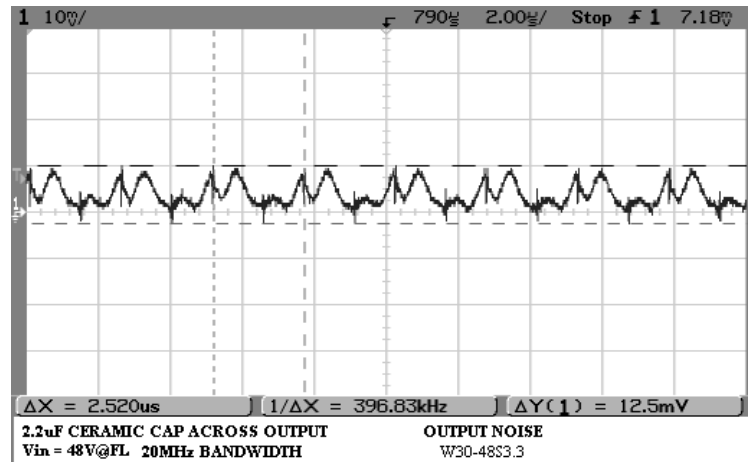
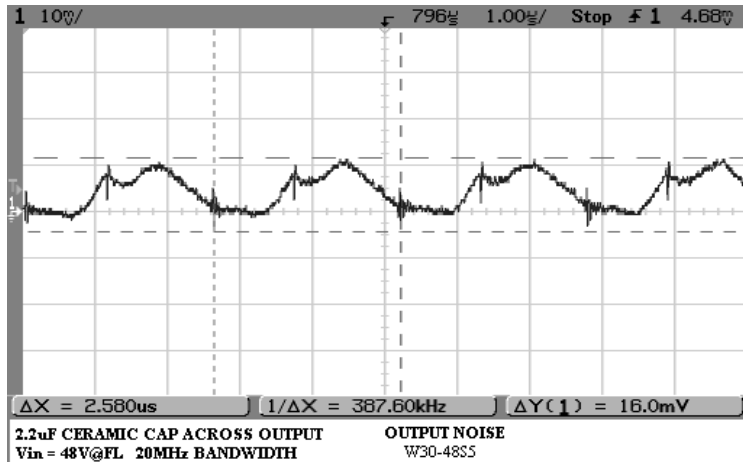
Note 2)

Ambient temperature measured within sealed enclosure.

Note 3)

Derating occurs when a maximum temperature of 120°C is measured at the thermal switch.

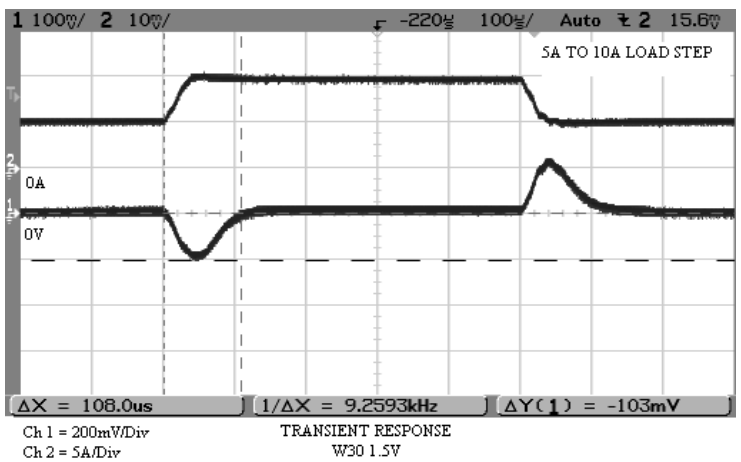
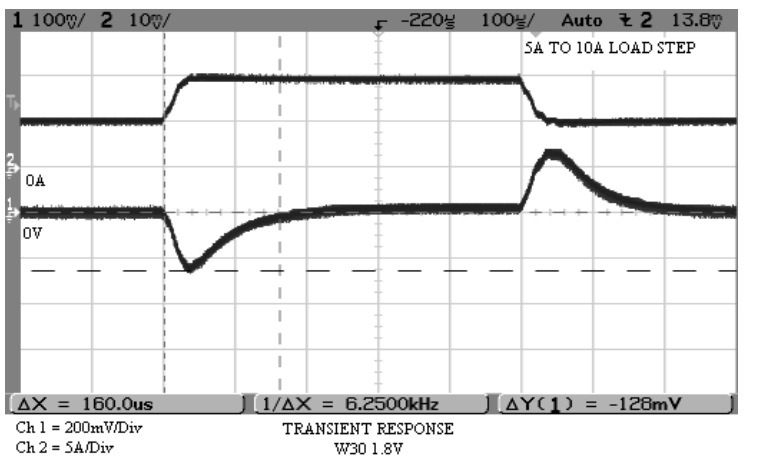
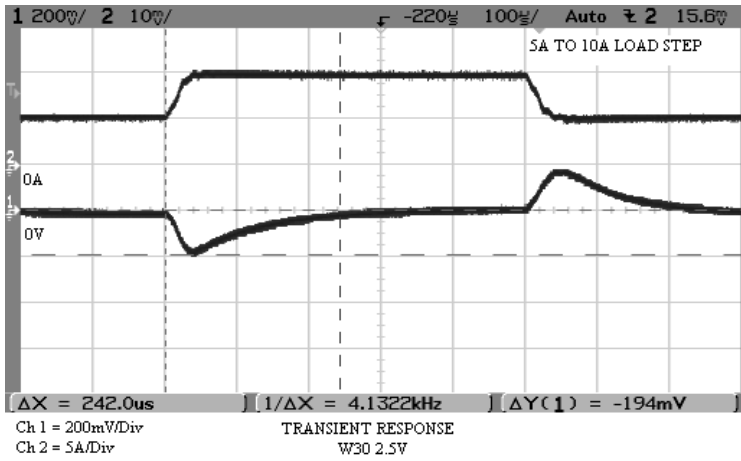
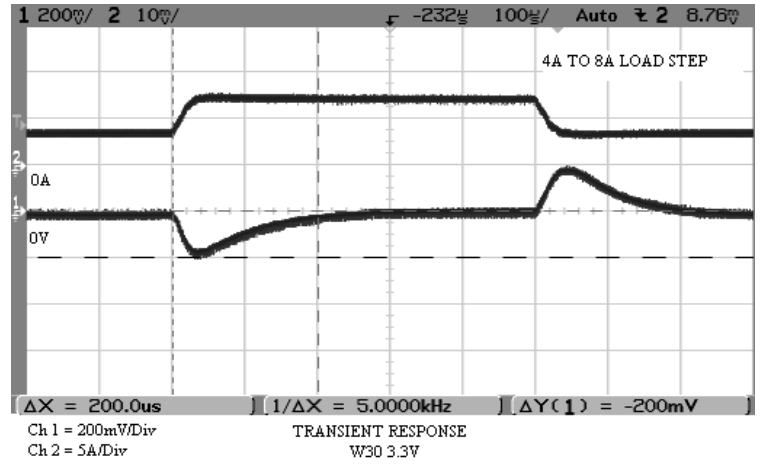
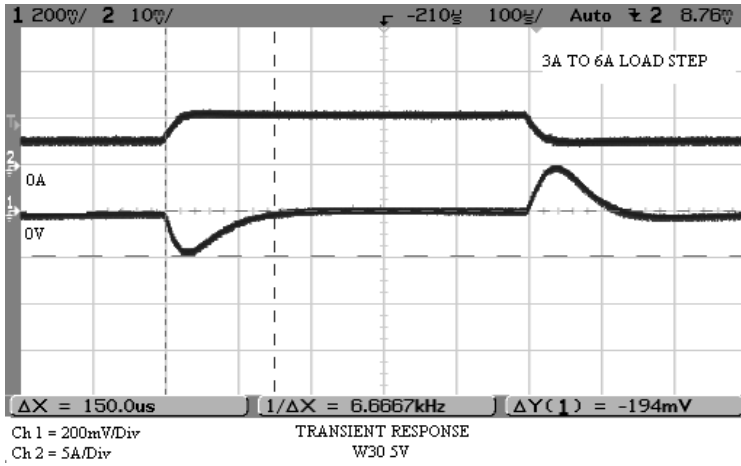
W30-48 OUTPUT NOISE (PINOUT B)



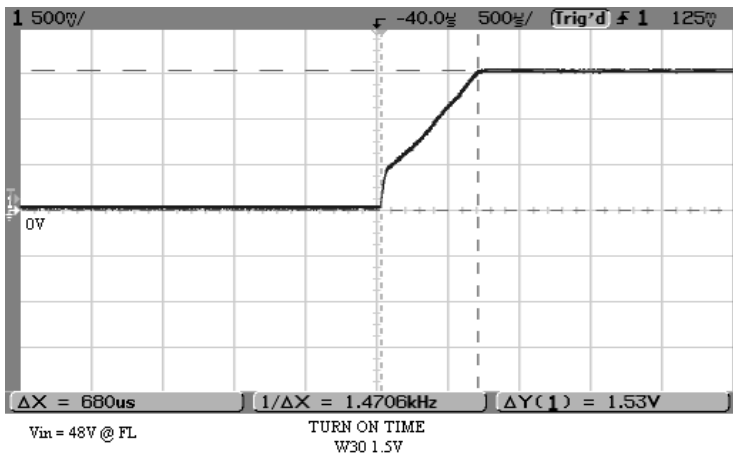
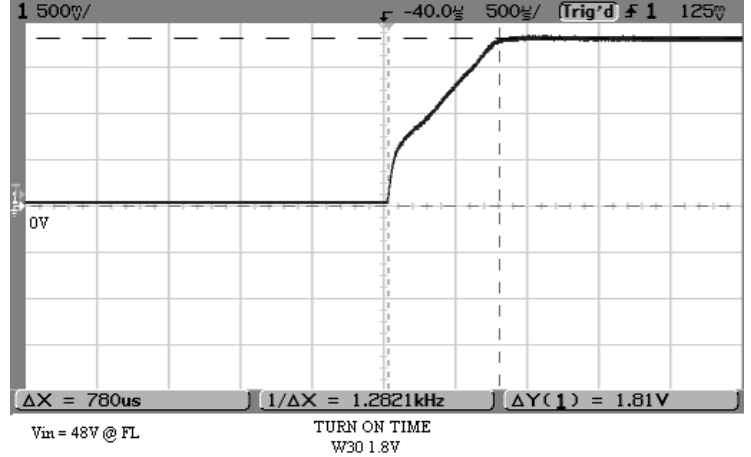
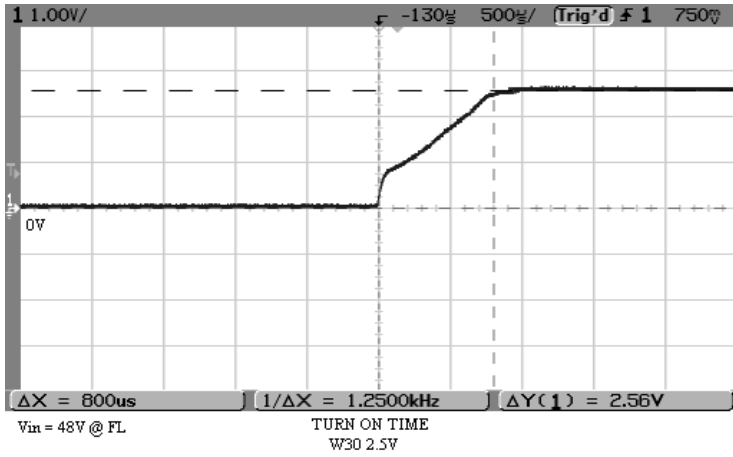
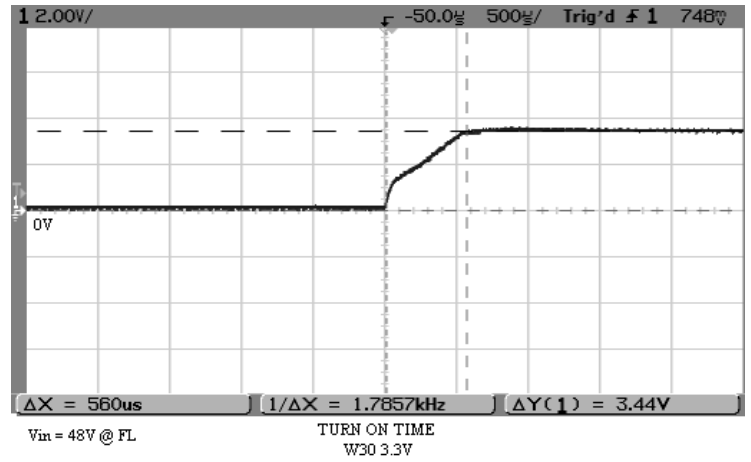
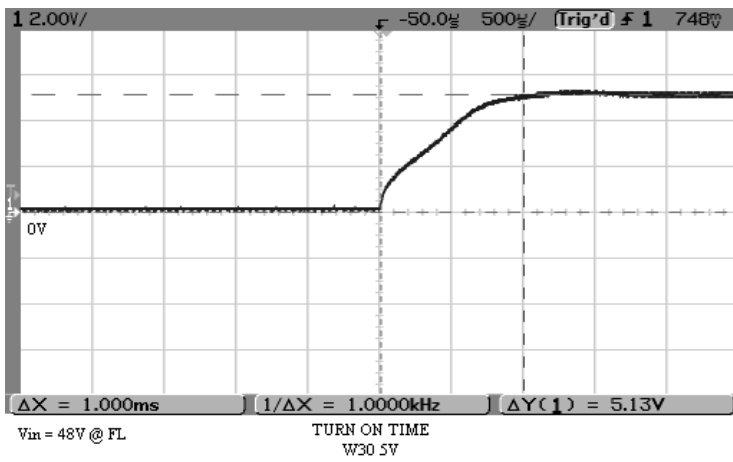
Note 1)

With Pinout A 10uf tantalum caps across each output is recommended

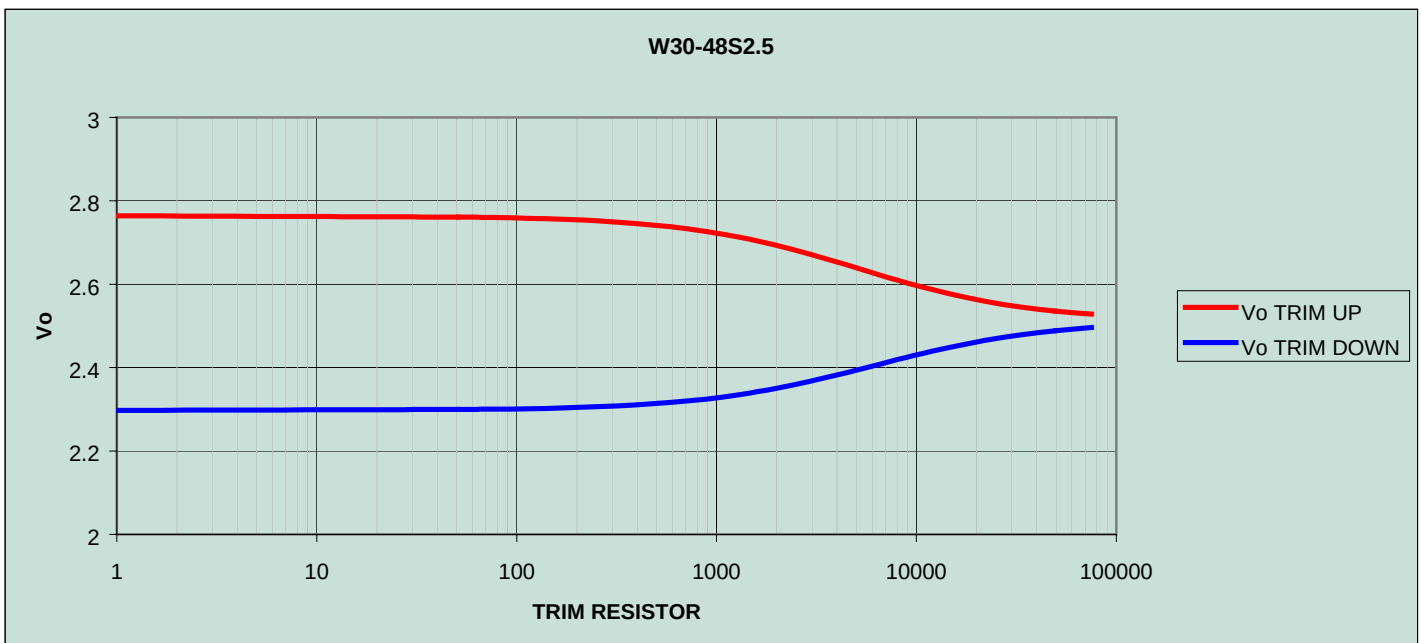
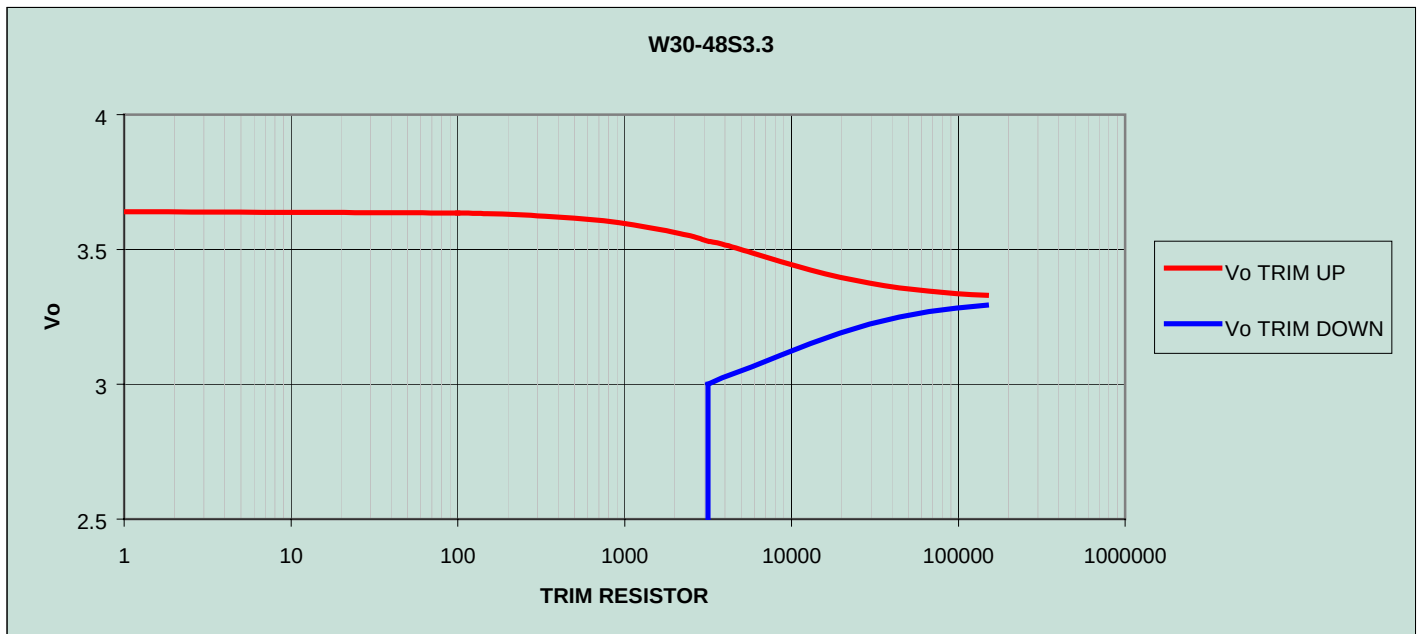
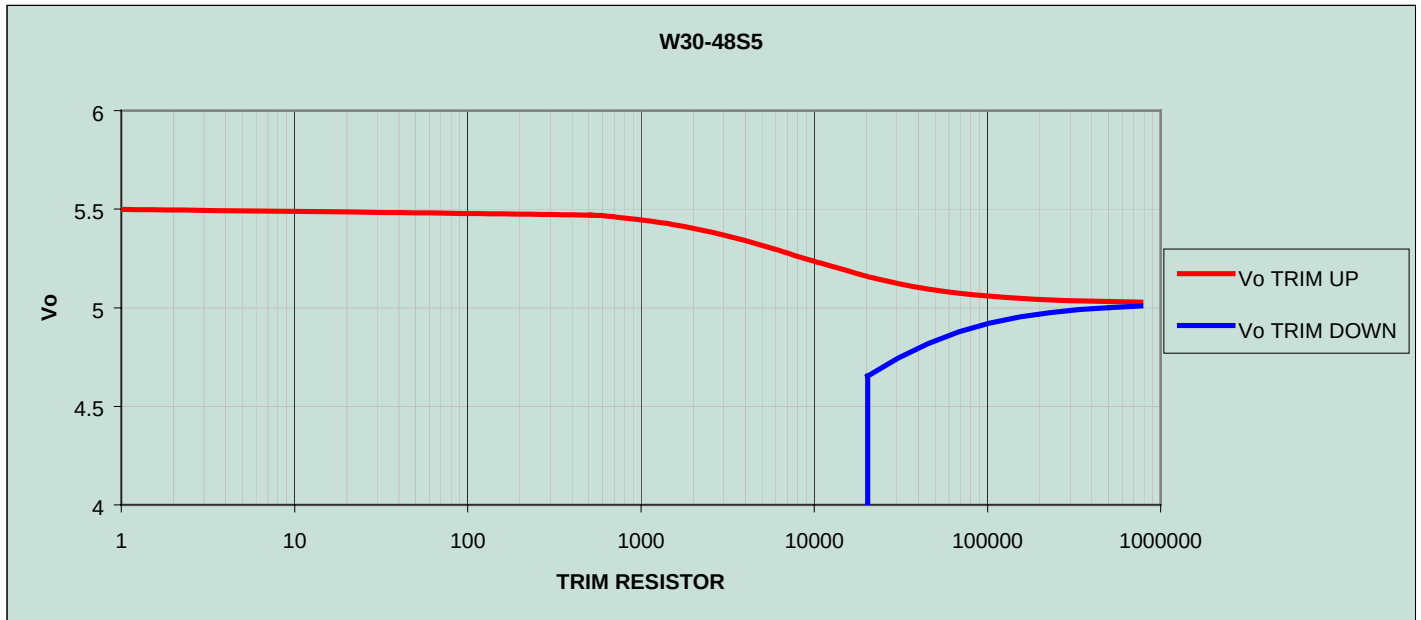
W30-48 TRANSIENT RESPONSE



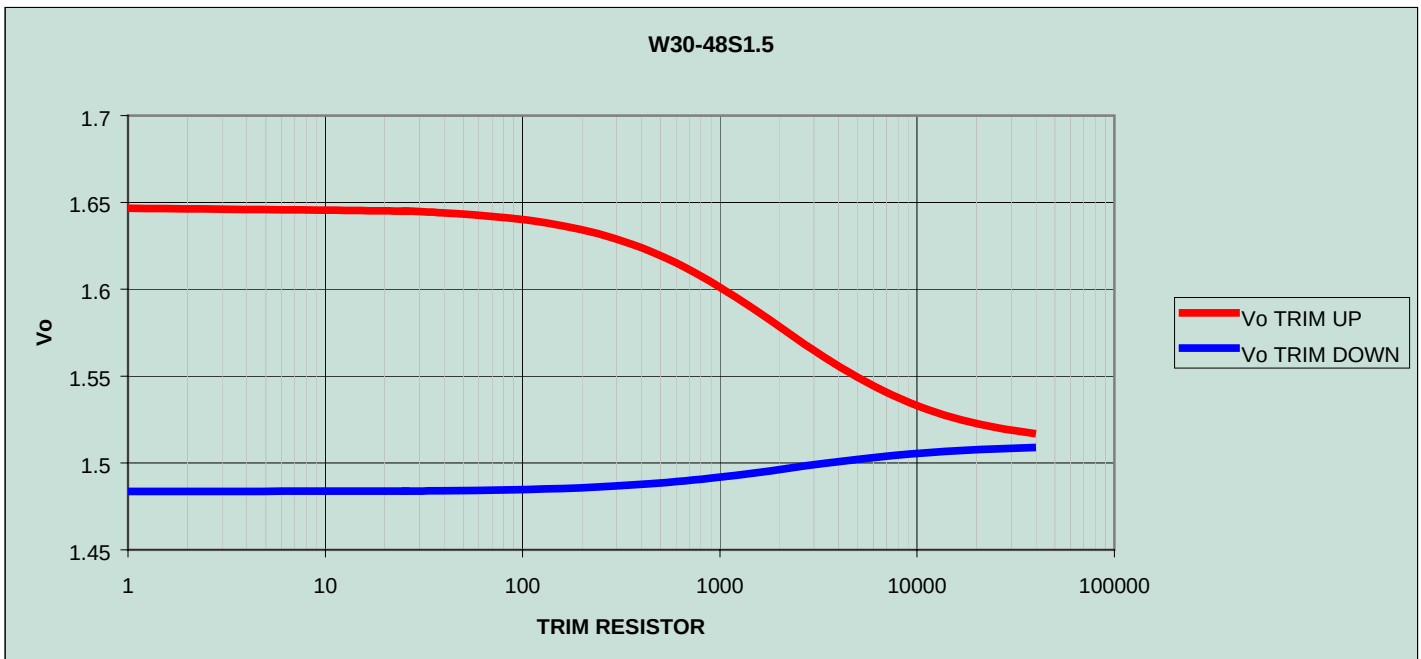
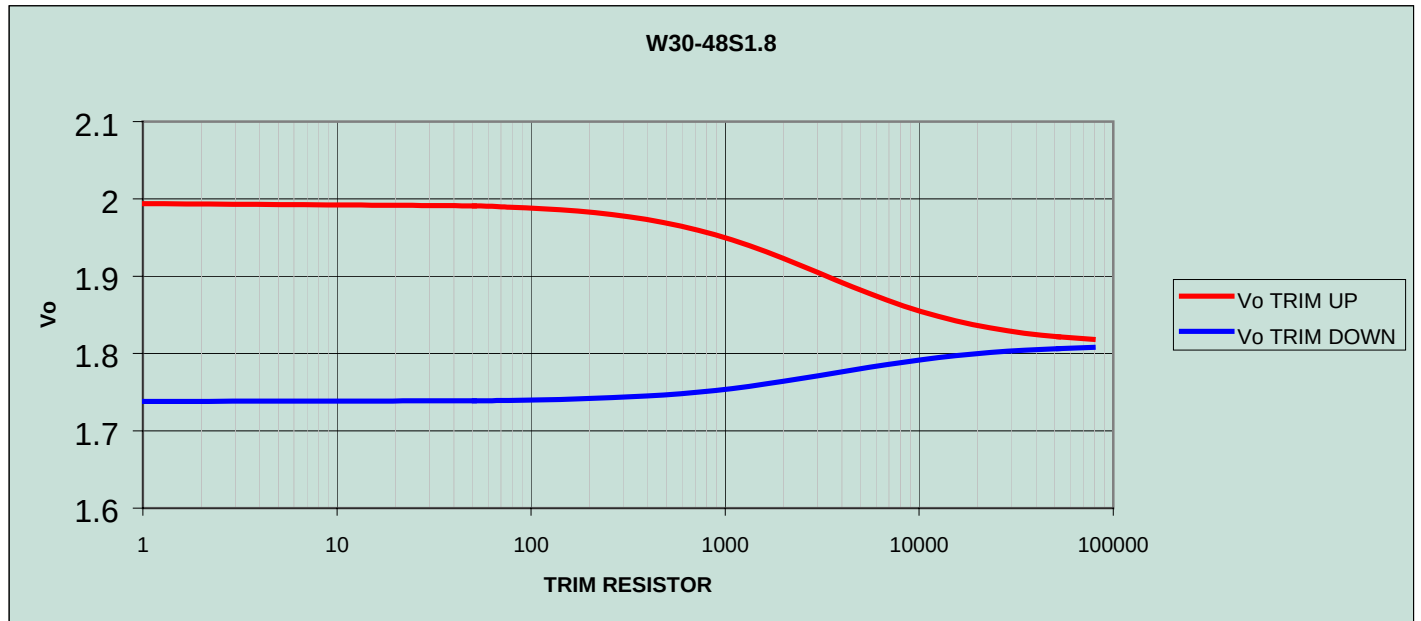
W30-48 TURN ON TIME



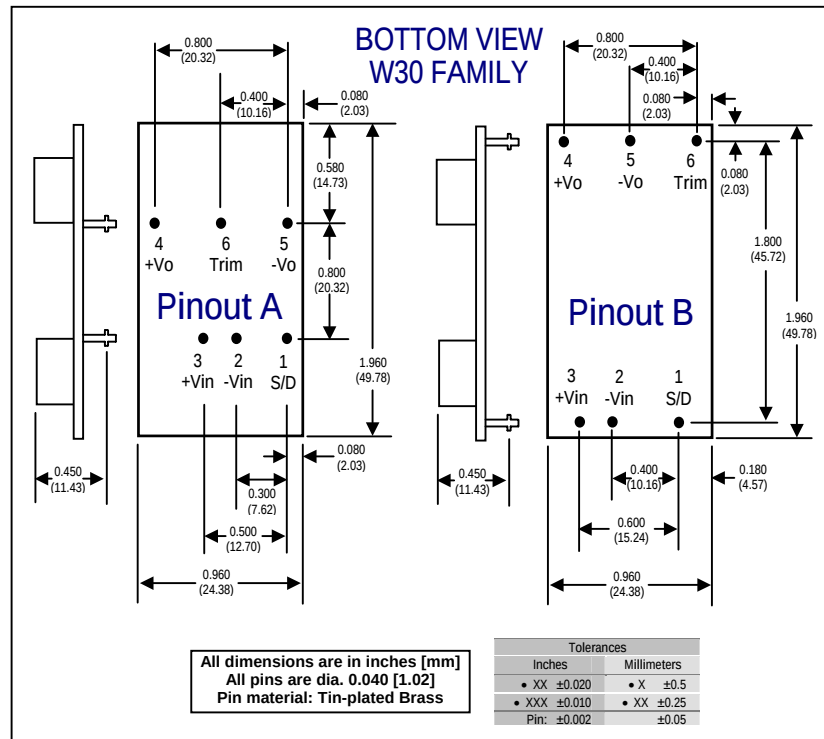
W30-48 TRIM CHARTS



W30-48 TRIM CHARTS CONTINUED



W30 PINOUTS



Basic operation and functions

W2530 series is single, dual and triple output DC/DC converters provide from 16.5 watts up to 30 watts of output power in an industry standard 2"x2" size package. The W2530 series features 2:1 input voltage range, high efficiency, fixed switching frequency 300KHz, continuous short circuit protection, six-side continuous shield and 500VDC isolation.

remote control options available, Positive logic and Negative logic. The remote must use the CMOS or open collector TTL to control on/off pin.

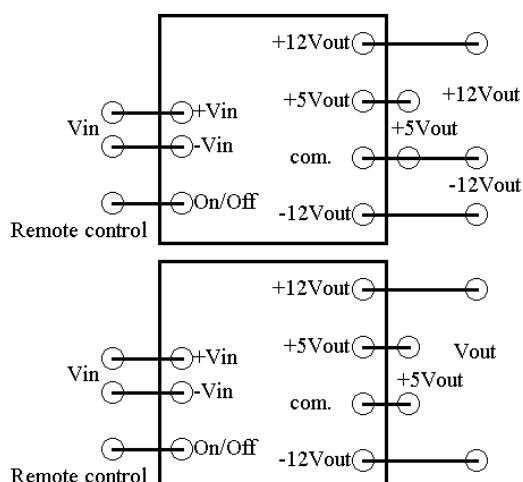
Logic compatibility	CMOS or open collector TTL
Ec-on	>+5.5Vdc or open circuit
Ec-off	<1.8Vdc
Shutdown idle current	10mA
Control common	Referenced to input minus

Input (Vi+ , Vi-)

Input power Vin+ must be connected to Positive input voltage(Vi+) ; Input power Vin- must be connected to Negative voltage(Vi-).

Output (Vo+ , Vo-)

Output power Vout+ must be connected to Positive output voltage (Vo+) ; Output power Vout- must be Negative output voltage (Vo-).



On /Off

The output allows the user to switch the module on and off electronically by remote on/off feature. There are two



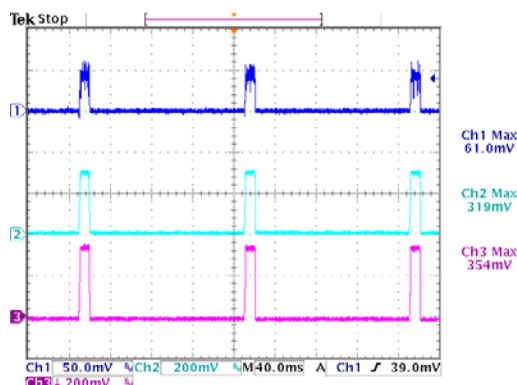
- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

Protection Features

Input under voltage lockout(UVLO)

Input under voltage lockout(IUV) is standard with the W2530 unit. The unit will shut down when the input voltage drops below a threshold, and the unit will turn on when the input voltage goes to the upper threshold.

The hysteresis voltage of the unit voltage protection is 0.5V, normally from the 8V to 7.5V range.

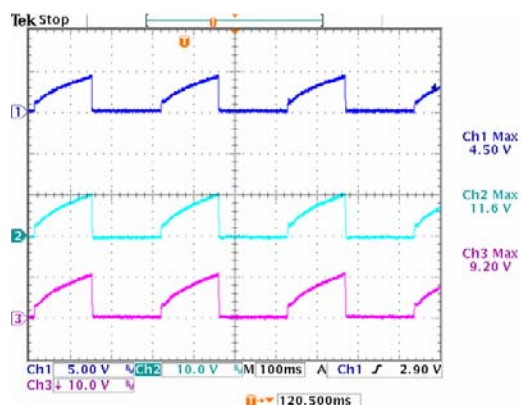


CH1:+5Vout/short Ch2:-12Vout/short
CH3:-12Vout/short

Output over current protection(OCP) and output short protection

The unit will auto recovery current limit when the over current or short circuit condition exists.

Once the OCP happens, the unit has auto recovery current limit . The attempted restart will continue indefinitely until the over current or short circuit condition is removed. When OCP happens, the output voltage drops below 0V.



CH1:+5Vout/OCP Ch2:-12Vout/OCP
CH3:-12Vout/OCP

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Characterization

General information

The W2530 unit has many operational characterized aspects, including efficiency, start up , overshoot, output ripple & noise, dynamic response to load and input ripple current.

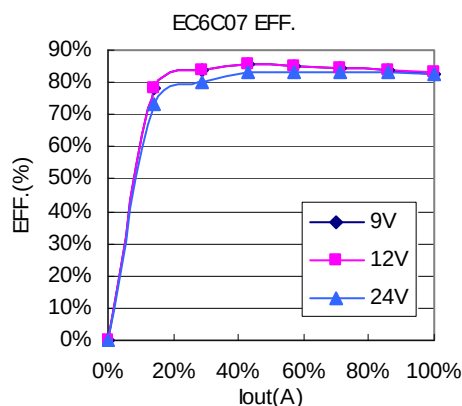
The following pages contain specific plots or waveforms associated with the unit. Additional comments for specific data are provided below.

Efficiency

Efficiency vs load current is given below.

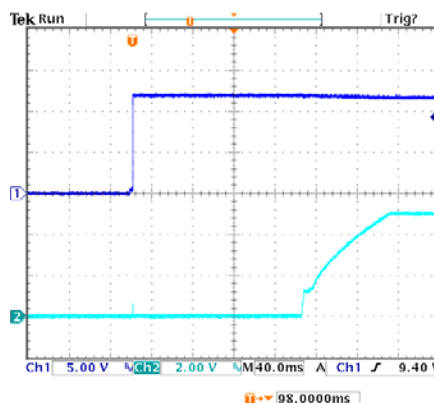
The ambient temperature is 25°C,

airflow is 20LFM(0.1m/s), and the input voltage is 9V, 24V and 36V conditions.



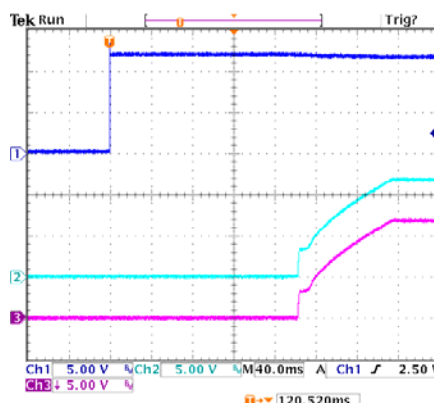
Start up

The input start-up from power supply.



CH1:12Vin CH2:5Vout/FL

Start up delay time:235ms



CH1:12Vin CH2:+12Vout/FL

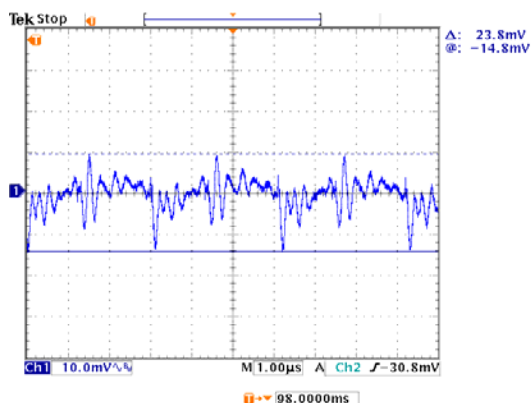
CH3:-12Vout/FL

Start up delay time:235ms

Output Ripple and Noise

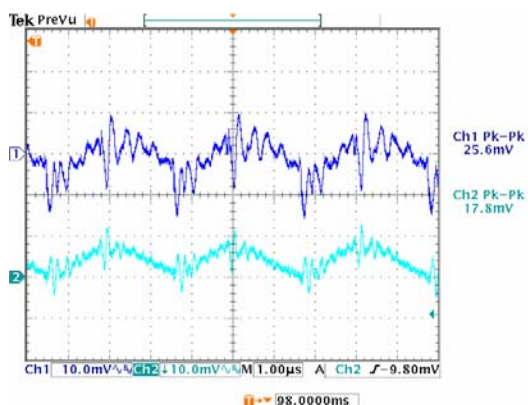
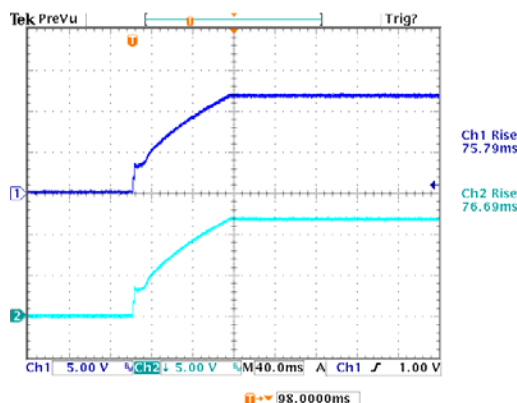
The output voltage waveform measured at minimum load and full load current, with a 0.1uF ceramic capacitor across to close unit.

- Servers, Switches and Data Storage
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CH1: +5Vout/FL
 Ripple: 23.8mVp-p

CH1: +5Vout/FL
 Overshoot: zero %
 Rise time: 79.72ms

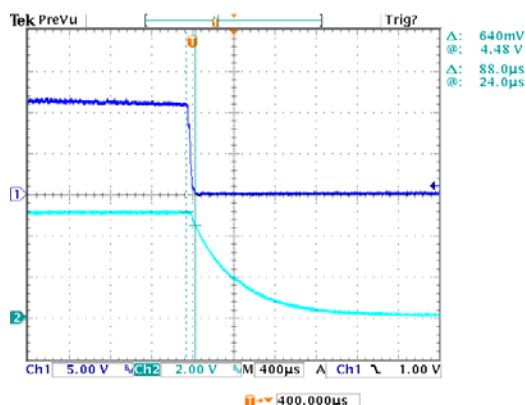


CH1: +12Vout/FL CH2: -12Vout/FL
 Ripple: 25.6mVp-p / 17.8mVp-p

CH1: +12Vout/FL CH2: -12Vout/FL
 Overshoot: zero %
 Rise time: 75.79ms / 76.69ms

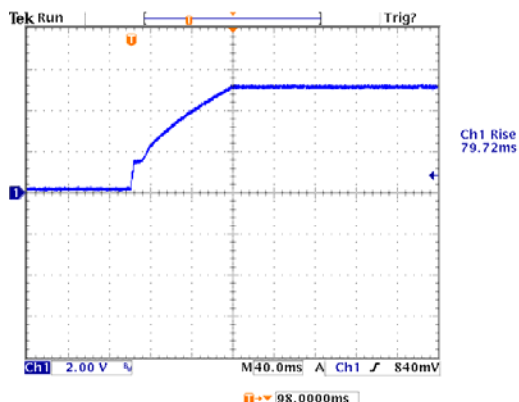
Hold time

The hold time is measure from the power supply end or on/off pin is off to when Vout drop down to 90% output.



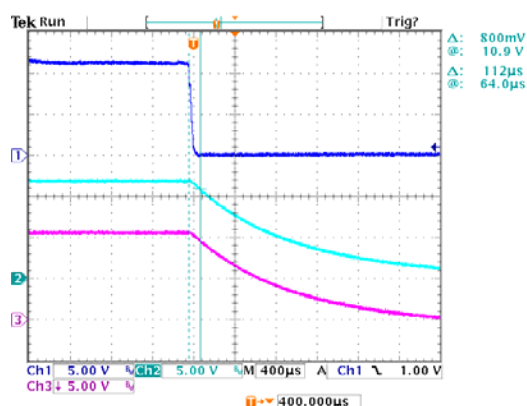
Overshoot and rise time

The input start-up from power supply.
 The output voltage waveform measured at minimum load and full load current.

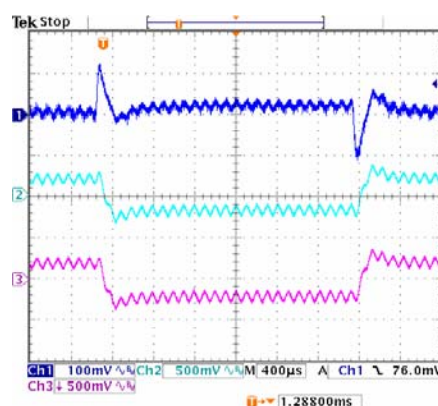


CH1: Vin CH2: +5Vout/FL
 Hold time: 88.0us

- Servers, Switches and Data Storage
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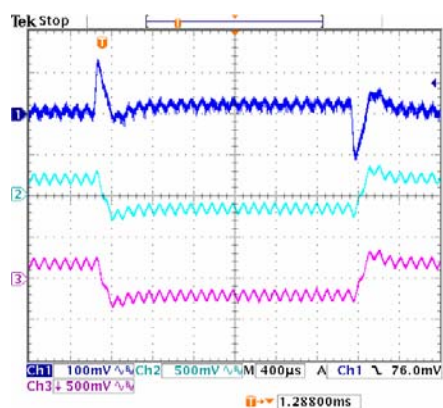
CH1:Vin CH2:+12Vout/FL
 Ch3:-12Vout/FL
 Hold time:64.0us



CH1:+5Vout Ch2:+12Vout
 CH3:-12Vout Iout:0.1A/us
 Load change 25%-75%-25%

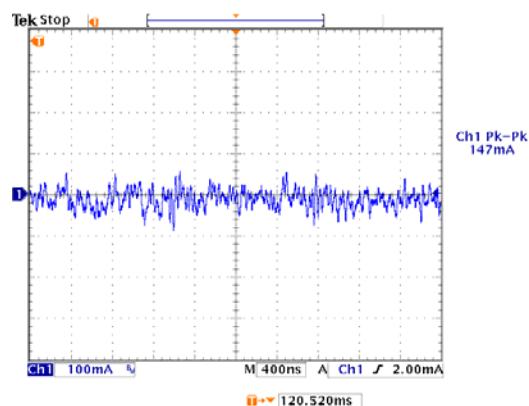
Dynamic response

Output voltage dynamic response at
 12Vin and different load condition.
 Output with a 0.1uF ceramic capacitor.



CH1:+5Vout Ch2:+12Vout
 CH3:-12Vout Iout:0.1A/us
 Load change 50%-100%-50%

Input ripple current



input ripple current:147mA_{p-p}

W2530 SERIES DC/DC MODULES

Applications

- Servers, Switches and Data Storage
- Wireless Communications
- Distributed Power Architecture
- Semiconductor Test Equipment
- Networking Gear
- Data Communications
- Telecommunications
- Industrial / Medical

The W2530 Family of high efficiency DC/DC converters offer power levels of up to 30 Watt, which exceeds that of other bricks with the same Industry-Standard Pinouts, while providing smaller footprints. With a wide input voltage range and single and multi-outputs, these converters provide versatility without sacrificing the board space. All models feature an input Pi filter and short circuit protection. The fully enclosed, encapsulated construction achieves very efficient heat transfer with no hot spots. All converters combine creative design practices with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers.

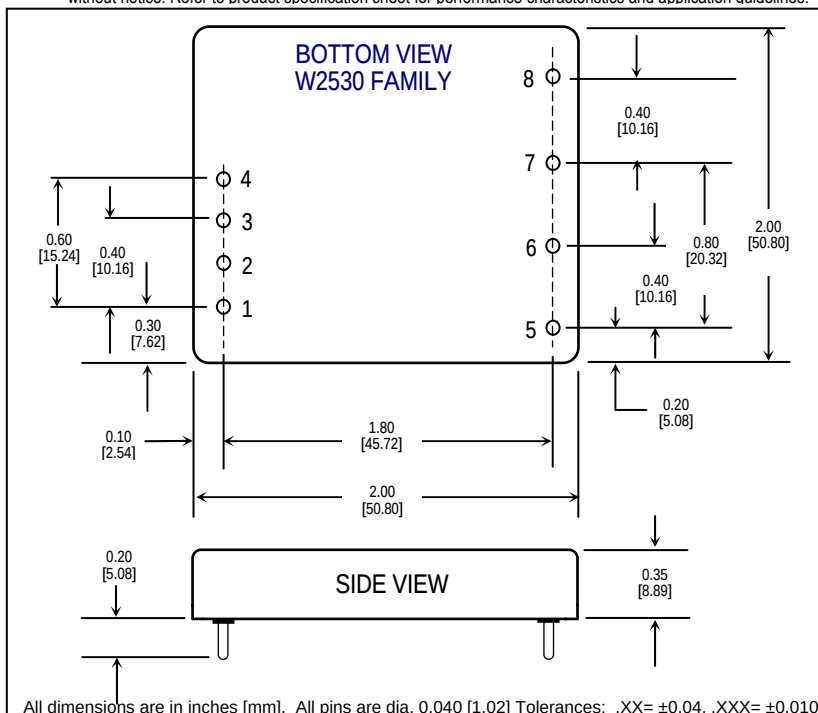
Specifications & Features Summary

- 500V, 10M Ω input-to-output isolation
- No airflow or heatsink required
- Enclosed six-sided metal shield construction for low EMI/RFI
- Efficiency to 85%
- 2:1 Input Range
- PI Input Filter
- Continuous Short Circuit Protection
- Remote On/Off Control
- Delivers up to 30W in 2"x2" package with Industry-Standard Pinouts



Model Num	V _{in}	V _{out}	I _{out}	I _{No Load}	I _{Full Load}	Eff	Case
W2530-12S5	9-18 VDC	5.0 VDC	5.0A	30.0 mA	2675.0 mA	78%	W2530
W2530-12S12	9-18 VDC	12.0 VDC	2.5A	30.0 mA	3050.0 mA	82%	W2530
W2530-12S15	9-18 VDC	15.0 VDC	2.0A	30.0 mA	3050.0 mA	82%	W2530
W2530-12D5	9-18 VDC	±5.0 VDC	±2.5A	35.0 mA	2675.0 mA	78%	W2530
W2530-12D12	9-18 VDC	±12.0 VDC	±1.25A	35.0 mA	3050.0 mA	82%	W2530
W2530-12D15	9-18 VDC	±15.0 VDC	±1.0A	35.0 mA	3050.0 mA	82%	W2530
W2530-12T5-12	9-18 VDC	±12.0/5.0 VDC	±0.31A/3.5A	35.0 mA	2640.0 mA	79%	W2530
W2530-12T5-15	9-18 VDC	±15.0/5.0 VDC	±0.25A/3.5A	35.0 mA	2640.0 mA	79%	W2530
W2530-12S3.3	9-18 VDC	3.3 VDC	5.0A	30.0 mA	1860.0 mA	74%	W2530
W2530-24S5	18-36 VDC	5.0 VDC	5.0A	30.0 mA	1336.0 mA	79%	W2530
W2530-24S12	18-36 VDC	12.0 VDC	2.5A	30.0 mA	1525.0 mA	82%	W2530
W2530-24S15	18-36 VDC	15.0 VDC	2.0A	30.0 mA	1525.0 mA	82%	W2530
W2530-24D5	18-36 VDC	±5.0 VDC	±2.5A	30.0 mA	1336.0 mA	79%	W2530
W2530-24D12	18-36 VDC	±12.0 VDC	±1.25A	30.0 mA	1470.0 mA	85%	W2530
W2530-24D15	18-36 VDC	±15.0 VDC	±1.0A	30.0 mA	1470.0 mA	85%	W2530
W2530-24T5-12	18-36 VDC	±12.0/5.0 VDC	±0.31A/3.5A	30.0 mA	1320.0 mA	80%	W2530
W2530-24T5-15	18-36 VDC	±15.0/5.0 VDC	±0.25A/3.5A	30.0 mA	1320.0 mA	80%	W2530
W2530-24S3.3	18-36 VDC	3.3 VDC	5.0A	30.0 mA	920.0 mA	75%	W2530
W2530-48S5	36-72 VDC	5.0 VDC	5.0A	20.0 mA	660.0 mA	79%	W2530
W2530-48S12	36-72 VDC	12.0 VDC	2.5A	20.0 mA	765.0 mA	82%	W2530
W2530-48S15	36-72 VDC	15.0 VDC	2.0A	20.0 mA	765.0 mA	82%	W2530
W2530-48D5	36-72 VDC	±5.0 VDC	±2.5A	25.0 mA	660.0 mA	79%	W2530
W2530-48D12	36-72 VDC	±12.0 VDC	±1.25A	25.0 mA	735.0 mA	85%	W2530
W2530-48D15	36-72 VDC	±15.0 VDC	±1.0A	25.0 mA	735.0 mA	85%	W2530
W2530-48T5-12	36-72 VDC	±12.0/5.0 VDC	±0.31A/3.5A	25.0 mA	655.0 mA	80%	W2530
W2530-48T5-15	36-72 VDC	±15.0/5.0 VDC	±0.25A/3.5A	25.0 mA	655.0 mA	80%	W2530
W2530-48S3.3	36-72 VDC	3.3 VDC	5.0A	20.0 mA	460.0 mA	75%	W2530

Typical at Ta= +25 °C under nominal line voltage and 75% load conditions, unless noted. The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.



SPECIFICATIONS	
Input Specifications	
Input Voltage Range	12V-----9-18V 24V-----18-36V 48V-----36-72V
Input Filter	PI Type
Output Specifications	
Voltage Accuracy	
Single Output	+/-2.0% max.
Dual+Output	+/-2.0% max.
-Output	+/-3.0% max.
Triple, 5V	+/-2.0% max.
12V / 15V	+/-5.0% max.
Voltage Balance(Dual)	+/-1.0% max.
Transient Response:	
Single, 25% Step Load Change	<500u sec.
Dual, FL-1/2L +/- 1% Error Band	<500u sec.
External Trim Adj. Range	+/-10%
Ripple and Noise, 20MHz BW	10mV RMS. Max. 75mV p-p max.
Temperature Coefficient	+/-0.02% / °C
Short Circuit Protection	Continuous
Line Regulation, Single/Dual	+/-0.5% max.
Triple	+/-1.0% max.
Load Regulation, Single/Dual	+/-1.0% max.
Triple	+/-5.0% max.
General Specifications	
Efficiency	Up to 85%
Isolation Voltage	500 VDC min
Isolation Resistance	10 ⁹ ohms
Switching Frequency	300KHz. min
Case Grounding	Capacity Coupled to Input
Operating Temperature Range	-25°C to +71°C
Case Temperature	100°C max.
Cooling	Free-Air Convection
Storage Temperature Range	-55°C to +105°C
EMI / RFI	Six Sided Continuous Shield
Dimensions	2X2X0.4 Inches (50.8X50.8X10.2mm)
Case Material	Black Coated Copper w/Non-Conductive Base
Notes:	
1.	Measured From High Line to Low Line
2.	Measured From Full Load to 1/4 Load

The output voltage can be trimmed (±10%) using an external resistor. To trim the output up (down) connect a resistor between pins 5 and 6 (7). A 10K Ω trim pot can also be used to make the output variable. Connect the wiper to pin 5 and make the other connections to pins 6 and 7.

REMOTE ON/OFF CONTROL

Logic Compatibility	CMOS or Open Collector TTL
EC-On	>+5.5Vdc or Open Circuit
EC-Off	<1.8Vdc
Shutdown Idle Current	10mA
Input Resistance	100K ohms (Ein 0 Vdc to 9 Vdc)
Control Common	Referenced to Input Minus

Full output power is available at ambient temperatures of -25C to +60C with no airflow. Above +60C output power linearly derates to 0% at +100C.

Consult factory for hundreds of other input / output voltage configurations

				Triple Output Loading Table (1)		
				Voltage	Amperes	
Pin #	S(ingle)	D(ual)	T(riple)		Min. (2)	Nom.
1	On/Off	On/Off	On/Off			
2	No Pin	No Pin	No Pin			
3	Vin -	Vin -	Vin -			
4	Vin +	Vin +	Vin +			
5	Trim	- Aux. Out	- Aux. Out	+12(15) or -12(15)	0.10	0.31(0.25)
6	Vout -	Vout -	Common			
7	Vout +	Common	+5Vout	+5	0.50	
8	No Pin	Vout +	+ Aux. Out	+12(15) or -12(15)	0.10	0.31(0.25)