Features

2:1/4:1 Wide Input Range

Operating Temperature Range: -45°C~105°C

Approved to CE, RoHS & REACH

Safety Standards to IEC/EN 62368-1/EN 50155

Efficiency up to 91%

EMC Class A & B

Single output 9~425V DC

28SHBxy-x-x-B300-IP Series

DC/DC PCB Mount Power Supply

Ideal Power's 28SHBxy-x-x-B300-IP 300W Half Brick DC/DC Converters Series are certified to UKCA, CE, RoHS, REACH & EN 62368-1/IEC 62368-1/EN 50155 Standards and comply with Efficiency Regulations. These are primarily used in ITE, Audio & Video, Railway Industries, and customised solutions are available upon request.

Part Number Structure

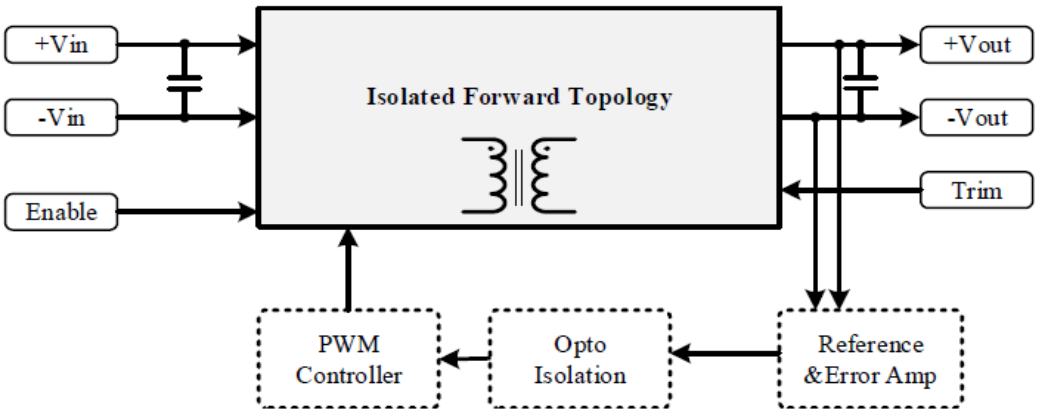
28SHB	-	110	120	-	S	-	P	-	B	300
Series Name		Input Voltage (VDC)	Output Voltage (VDC)		Pin out		Remote control option		Shape	Watt
Supreme series **H**alf **B**rick		**018** : 9-36 **024** : 18-36 **036** : 18-75 **110** : 40-180 **300** : 180-425	**050** : 5 **120** : 12 **240** : 24 **280** : 28 **480** : 48		**S :** Dosa **V :** Vicor		**P:** Positive logic **N:** Negative logic		**B:** Base Plate	200 300

Models

Model	Input Voltage (V) Range	Input Voltage (V) Nominal	Input Current (A) Full load	Output Voltage (V)	Output Current (A)	Output Power (W)	Efficiency Typ.(%)
28SHB018050-☐-☐-B200-IP	9-36	18	12.63	5	40	200	88
28SHB018120-☐-☐-B200-IP	9-36	18	12.63	12	16.67	200	88
28SHB018240-☐-☐-B200-IP	9-36	18	12.63	24	8.33	200	88
28SHB018280-☐-☐-B200-IP	9-36	18	12.63	28	7.14	200	88
28SHB018480-☐-☐-B200-IP	9-36	18	12.48	48	4.17	200	89
28SHB018120-☐-☐-B300-IP	9-36	18	19.16	12	25	300	87
28SHB018240-☐-☐-B300-IP	9-36	18	19.16	24	12.5	300	87
28SHB018280-☐-☐-B300-IP	9-36	18	19.16	28	10.71	300	87
28SHB018480-☐-☐-B300-IP	9-36	18	18.73	48	6.25	300	89
28SHB024050-☐-☐-B200-IP	18-36	24	9.26	5	40	200	90
28SHB024120-☐-☐-B200-IP	18-36	24	9.16	12	16.67	200	91
28SHB024240-☐-☐-B200-IP	18-36	24	9.06	24	8.33	200	92
28SHB024280-☐-☐-B200-IP	18-36	24	9.06	28	7.14	200	92
28SHB024480-☐-☐-B200-IP	18-36	24	9.06	48	4.17	200	92
28SHB024120-☐-☐-B300-IP	18-36	24	13.74	12	25	300	91
28SHB024240-☐-☐-B300-IP	18-36	24	13.74	24	12.5	300	91
28SHB024280-☐-☐-B300-IP	18-36	24	13.74	28	10.71	300	91
28SHB024480-☐-☐-B300-IP	18-36	24	13.74	48	6.25	300	91
28SHB036050-☐-☐-B200-IP	18-75	36	6.31	5	40	200	88
28SHB036120-☐-☐-B200-IP	18-75	36	6.17	12	16.67	200	90
28SHB036240-☐-☐-B200-IP	18-75	36	6.17	24	8.33	200	90
28SHB036280-☐-☐-B200-IP	18-75	36	6.17	28	7.14	200	90
28SHB036480-☐-☐-B200-IP	18-75	36	6.17	48	4.17	200	90
28SHB036120-☐-☐-B300-IP	18-75	36	9.36	12	25	300	89
28SHB036240-☐-☐-B300-IP	18-75	36	9.36	24	12.5	300	89
28SHB036280-☐-☐-B300-IP	18-75	36	9.36	28	10.71	300	89
28SHB036480-☐-☐-B300-IP	18-75	36	9.36	48	6.25	300	89
28SHB110050-☐-☐-B200-IP	40-180	110	2.07	5	40	200	88
28SHB110120-☐-☐-B200-IP	40-180	110	2.04	12	16.67	200	89
28SHB110240-☐-☐-B200-IP	40-180	110	2.04	24	8.33	200	89
28SHB110280-☐-☐-B200-IP	40-180	110	2.04	28	7.14	200	89
28SHB110480-☐-☐-B200-IP	40-180	110	2.04	48	4.17	200	89
28SHB110120-☐-☐-B300-IP	40-180	110	3.06	12	25	300	89
28SHB110240-☐-☐-B300-IP	40-180	110	3.06	24	12.5	300	89
28SHB110280-☐-☐-B300-IP	40-180	110	3.06	28	10.71	300	89
28SHB110480-☐-☐-B300-IP	40-180	110	3.06	48	6.25	300	89
28SHB300-IP050-☐-☐-B200-IP	180-425	300	0.74	5	40	200	90
28SHB300-IP120-☐-☐-B200-IP	180-425	300	0.74	12	16.67	200	90
28SHB300-IP240-☐-☐-B200-IP	180-425	300	0.74	24	8.33	200	90
28SHB300-IP280-☐-☐-B200-IP	180-425	300	0.74	28	7.14	200	90
28SHB300-IP480-☐-☐-B200-IP	180-425	300	0.74	48	4.17	200	90
28SHB300-IP120-☐-☐-B300-IP	180-425	300	1.11	12	25	300	90
28SHB300-IP240-☐-☐-B300-IP	180-425	300	1.10	24	12.5	300	91
28SHB300-IP280-☐-☐-B300-IP	180-425	300	1.11	28	10.71	300	90

Description

deal Power Supreme series - Half Brick converter is composed of Isolated, board-mountable, fixed switching frequency DCDC converters that use synchronous rectification to achieve extremely high-power conversion efficiency. These DCDC converter modules use advanced power processing, control, and packaging technologies to enhance the performance, flexibility, reliability, and cost effectiveness of mature power components. Each module is six-sided metal case enclosed to provide protection from the harsh environments seen in many industrial and transportation applications.



Input Data

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Transient Input Voltage Ranges	28SHB018 models (100ms Max) 28SHB024 models (100ms Max) 28SHB036 models (100ms Max) 28SHB110 models (100ms Max) 28SHB300-IP models (100ms Max)	--	--	50 50 100 250 500	VDC
Operating Input Voltage Ranges	28SHB018 models 28SHB024 models 28SHB036 models 28SHB110 models 28SHB300-IP models	9 18 18 40 180	18 24 36 110 300	36 36 75 180 425	VDC
Over-Voltage Lockout Turn OFF Threshold	28SHB018 models 28SHB024 models 28SHB036 models 28SHB110 models 28SHB300-IP models	--	--	48 48 85 195 470	
Over-Voltage Lockout Turn ON Threshold	28SHB018 models 28SHB024 models 28SHB036 models 28SHB110 models 28SHB300-IP models	36 36 75 180 425	--	--	
Under-Voltage Lockout Start up Voltage	28SHB018 models 28SHB024 models 28SHB036 models 28SHB110 models 28SHB300-IP models	--	--	9 18 18 40 180	VDC
Under-Voltage Lockout Shutdown Voltage	28SHB018 models 28SHB024 models 28SHB036 models 28SHB110 models 28SHB300-IP models	--	8 17 17 38 175	--	VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 8mA				
Enable Function Input	Positive logic ON Positive logic OFF	Open Short or 0 ~ 1.2			VDC
	Negative logic ON Negative logic OFF	Short or 0 ~ 1.2 open			VDC

Output Data

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	VNOM 50% Load	--	--	±1.5	%
Line Regulation	Low Line to High Line	--	--	±0.3	%
Load Regulation	10% to 100% Load	--	--	±0.5	%
Output Ripple & Noise Voltage	Bandwidth 20MHz and with 1μF MLCC Output Capacitor	--	1.5	--	%Vpk-
Temperature Coefficient	--	--	--	+0.04	% /˚C
Transient Recovery Time	25% load step change	--	800	--	μSec
Transient Peak Deviation	ΔIo/Δt=2.5A/us	--	+2	--	%Vo
Start-Up Time	When use Enable Function	--	20	--	mSec.
Trimming Output Protection	VNOM 10% Load	--	+10	--	%
Output power protection	VNOM 10% Load	--	120	--	%
Over Voltage Protection	VNOM	--	120	--	%

General Specifications & Environmental Data

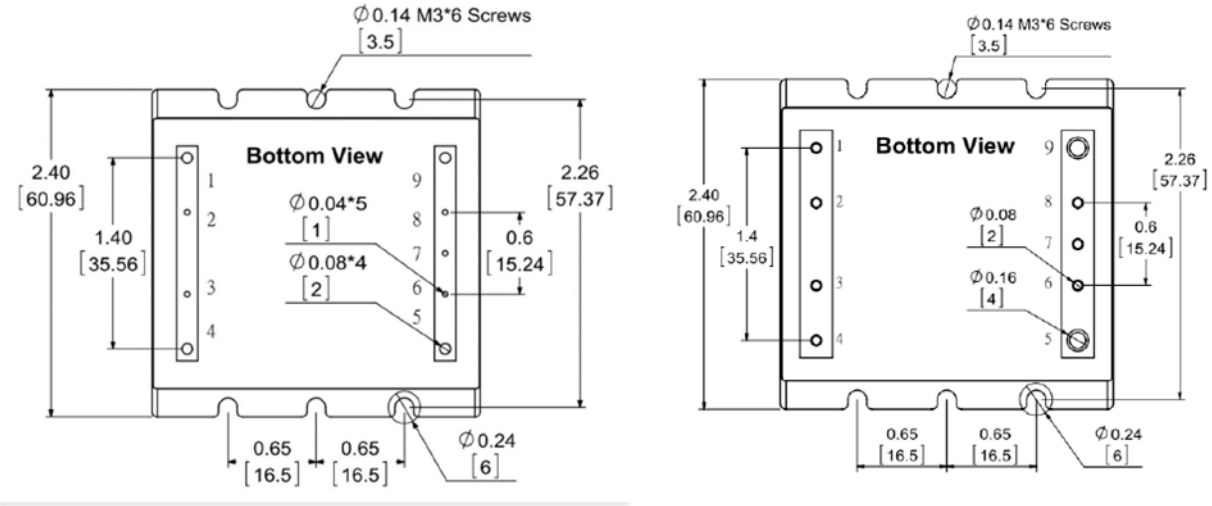
Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Switching frequency	V_{NOM}	--	250	--	kHz
Storage temperature range	All models	-60	--	125	C
Operating case temperature	All models	-45	--	105	m
Over temperature protection	All models, Auto. Recovery	--	110	--	C
Isolation Voltage Input to Output Input to Output to case	All models, 1 Minute	2250	--	--	VDC
Isolation Resistance Input to Output	All models, 500VDC, At 70%RH	100	--	--	MΩ
Isolation Capacitance Input to Output	All models	--	1500	--	pF
Humidity (non condensing)	All models	--	--	95	%
Calculated MTBF	BellCore-TR-332@ 50˚C G.B	--	1.5	--	M HR
Thermal shock	Environmental Engineering Experimental Tests	MIL-STD-810F			
Vibration		MIL-STD-810F			
Drop		MIL-STD-810F			
Weight	Shape-B	117(4.13)			G (oz)
Dimensions	Shape-B	2.42” x 2.40” x 0.59” (61.4 x 61.0 x 15.0mm)			
Case Material	Aluminium				
Potting material	Silicone				

Standards Compliance

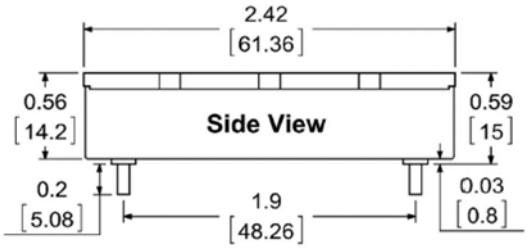
Parameter	Standard	Test conditions	Performance criteria
Environmental Compliance	Reach; RoHS	--	Pass
EMI	EN55032	--	Class A / Class B
ESD	EN61000-4-2	±4 kV Air Discharge ±4 kV Contact Discharge	Crit. A
Radiated Immunity	EN61000-4-3	Level 2, 3 V/m	Crit. A
Fast Transient	EN61000-4-4	±2 kV Applied	Crit. A
Surge	EN61000-4-5	±2 kV Applied	Crit. A
Conducted Immunity	EN61000-4-6	Level 2, 3 V rms	Crit. A

It is recommended to protect the input by fuses or other protection devices.
Modules could meet EN55032 Class A and Class B standard with external components.
The information and specifications contained in this data sheet are believed to be correct at time of publication. All specifications are subject to change without notice. No rights under any patent accompany the sale of any such products or information contained herein.

Conducted EMI

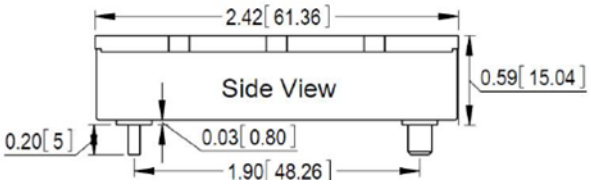


Shape – B (Base Plate with DOSA pinout)



Note:
Pin Material: Copper Alloy
Pin Plating: Gold
Dimensions in inches [mm]
Tolerances: .XX±0.02 [.X±0.5mm]

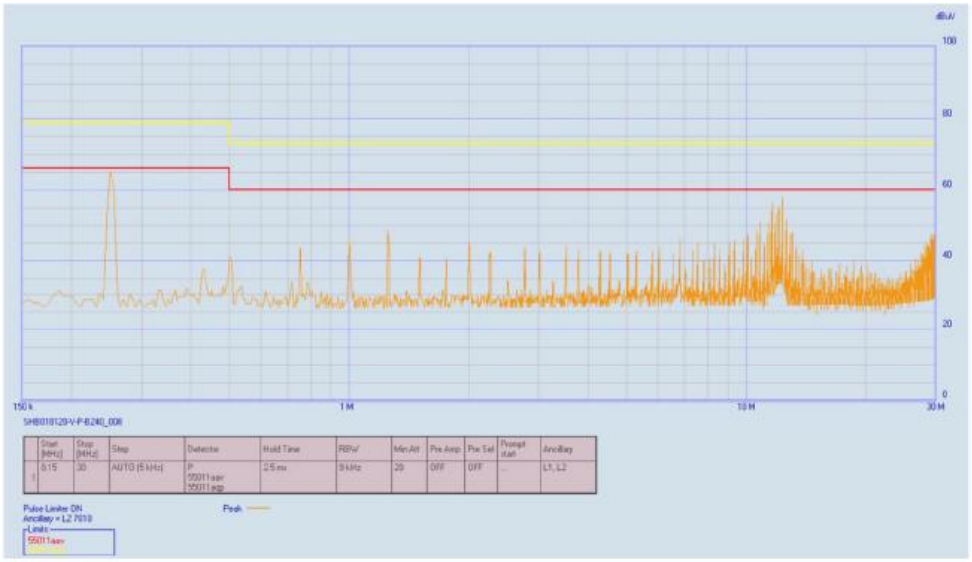
Shape – B (Base Plate with Vicor pinout)



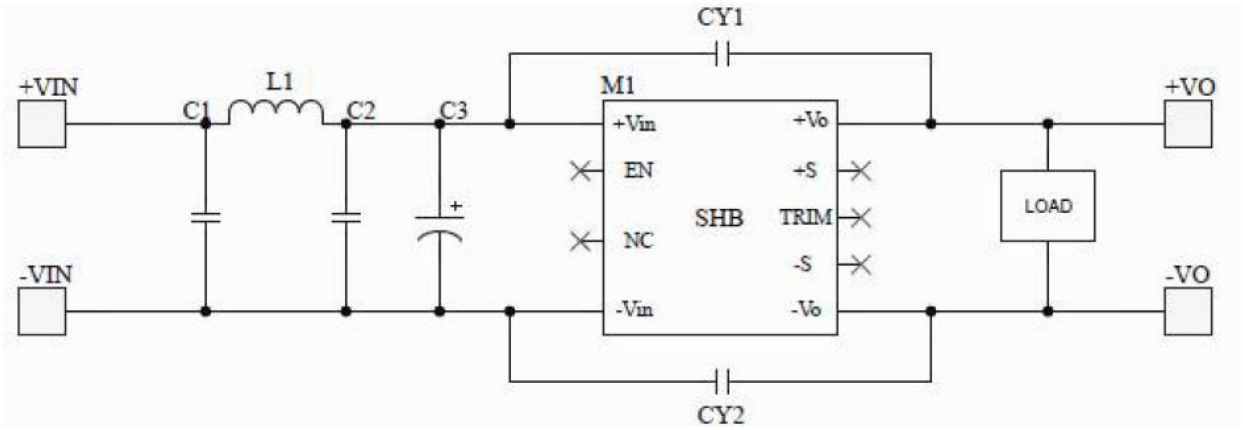
Pin#	Function
1	-Vin
2	NC
3	Enable
4	+Vin
5	+Vout
6	+Sense
7	Trim
8	-Sense
9	-Vout

Conducted EMI

Input terminal value (typ.) 28SHBS110120-V-P-B100-IP @Vin = 110VDC, Iout = 8.3A



Recommended Circuit Diagram for conducted EMI Class A



Characteristic curves

Testing conditions are at typical input, Ta=+25°C, full load (horizontal mount) Unless otherwise indicated

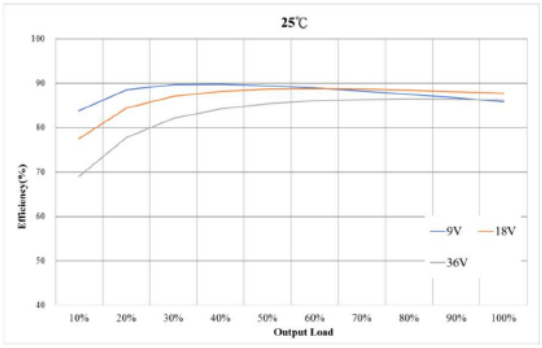


Figure 1 : Efficiency at Minimum, Nominal and Maximum Input Voltages VS. Output Load.

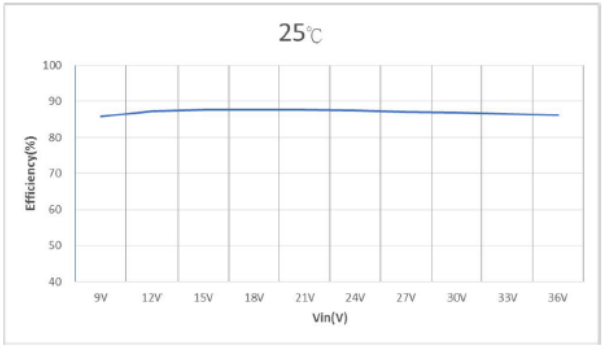


Figure 2 : Efficiency VS. Input Voltages at 100% rated power

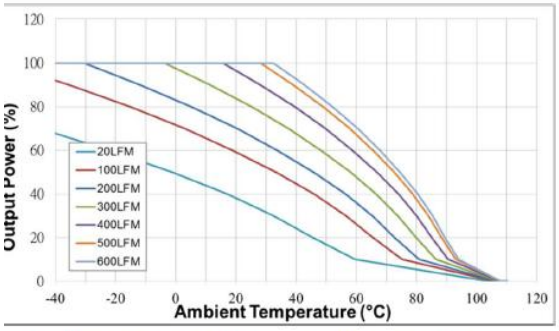


Figure 3 : Ambient Temperature VS. Output Power Derating Curves (Note:20LFM=Free Air)

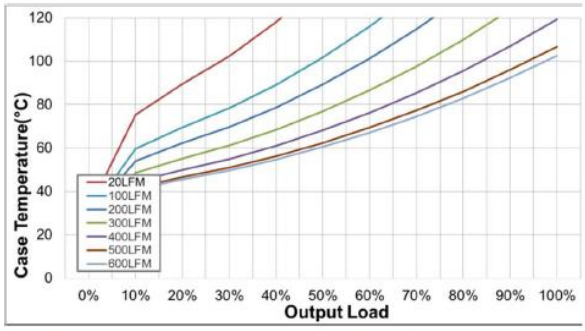


Figure 4 : Case Temperature VS. Output rated Power (Note:20LFM=Free Air)

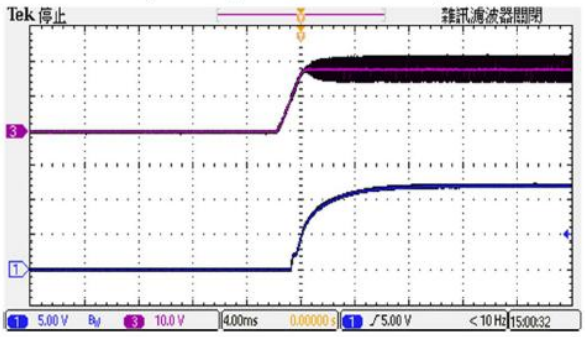


Figure 5 : CH1 = Vout, CH3 = Nominal Input Typical Start-up waveform at Full load.

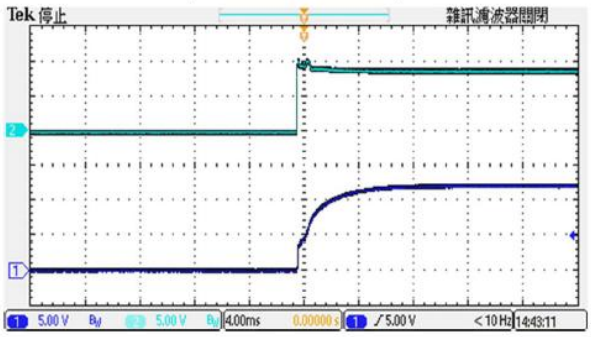


Figure 6 : CH1 = Vout, CH3 = Enable Pin Typical Start-up waveform. Input voltage pre-applied

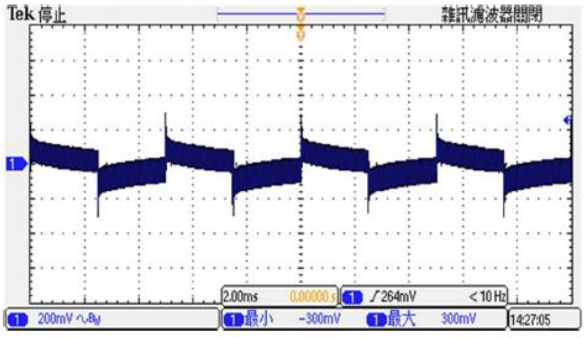


Figure 7 : Transient Response at Output step load (Vin: Typical ,50~75% of output current; ΔIo/Δt =1A/μS)

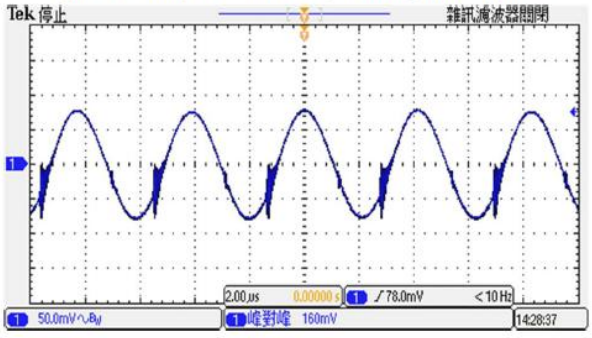


Figure 8 : Output Voltage Ripple & Noise at full load. (Vin: Typical, With Output Capacitor to add 1μF MLCC)

Trimming Output Voltage - For Single Output Models

Only the single output converters have a trim function. That allows users to adjust the output voltage from +10% to –10%, please refer to the trim table that follow for details. Adjustments to the output voltage can be used with a simple fixed resistor as shown in Figures 1 and 2. A single fixed resistor can increase or decrease the output voltage depending on its connection.

Note:

※ Trim adjustments higher than the specified range can have an adverse effect on the converter's performance and are not recommended.
※ If the trim function is not used, leave the trim pin open.

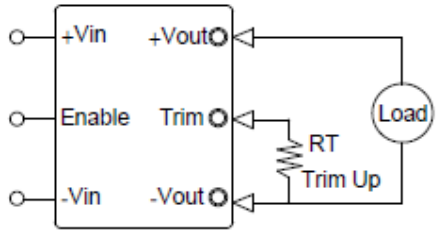


Figure 1. Trim Connections To increase Output Voltages Using Fixed Resistors

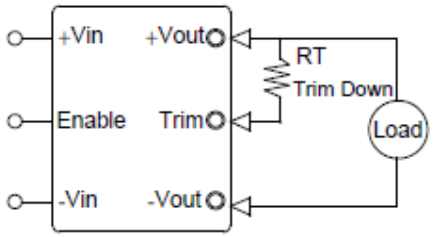


Figure 2. Trim Connections To Decrease Output Voltages Using Fixed Resistors

Trim up resistor value(KΩ)										
Vout	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
5	109	50	30	20	14	10	7	5	3.3	2
12	258	115	67	44	29	20	13	7.8	3.8	0.6
24	514	232	137	90	62	43	30	20	12	5.5
28	602	271	161	105	72	50	34	22	13	5.9
48	1039	464	273	177	120	81	54	34	18	5

Trim down resistor value(KΩ)										
Vout	-1%	-2%	-3%	-4%	-5%	-6%	-7%	-8%	-9%	-10%
5	137	62	37	25	17	12	9	6	4	2.2
12	358	162	96	63	44	31	21	14	8.9	4.5
24	769	352	213	143	102	74	54	39	28	18
28	860	392	236	158	111	80	57	41	28	17
48	1413	638	380	251	173	121	85	57	35	18

Enable Control Function

The primary-side, Enable Control function can be specified to operate with either positive or negative polarity. Positive-polarity devices are enabled when the enable pin is left open or is pulled high. See "Enable Function Input. Positive-polarity devices are disabled when the enable pin is pulled low (under +1.0V with respect to –input). Negative-polarity devices are off when the enable pin is high/open and on when the enable pin is pulled low. See Figure 3.

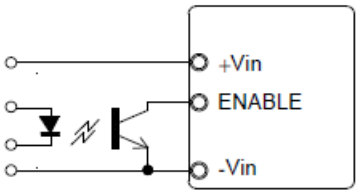


Figure 3. Driving the Enable Control pin

Output Ripple Noise

The two copper strips simulate real-world PCB impedances between the converter and its load. Scope measurements should be made using BNC connectors or the probe ground should be less than 1/2 inch and soldered directly to the fixture.
All external capacitors should have appropriate voltage ratings and be located as close to the converter as possible.
Temperature variations for all relevant parameters should be taken into consideration. The most effective combination of external I/O capacitors will be a function of line voltage and source impedance, as well as load and layout conditions.
See Figure 4

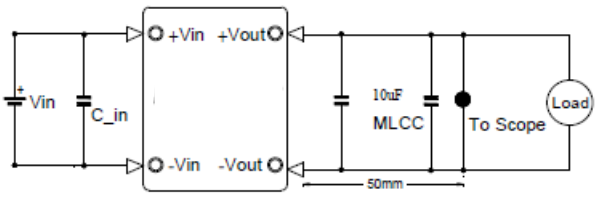


Figure 4. Measuring Output Ripple/Noise(20MHz bandwidth)