DC - DC

Features

- 2:1/4:1 Wide Input Range
- One Sixteenth Brick
- Approved to UKCA, CE, RoHS & REACH
- IEC/EN/UL 62368-1 & EN 50155 Safety Approved
- Efficiency up to 91%
- Single Output 3.3~24V DC

Image for Illustration Purpose
Models may vary

Ideal Power's 28STBSxxxxxx-50 50W Sixteenth Brick DC/DC Converters Series are certified to UKCA, CE, RoHS, REACH & EN 62368-1/IEC 62368-1/UL 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

28STB	-	018	033	-	S	-	P	-	B	50
Series Name		Input Voltage (VDC)	Output Voltage (VDC)		Pin Out		Remote On/Off Options		Shape	W
Supreme Series **Sixteenth Brick**		**012 :** 9-18 **018 :** 9-36 **024:** 18-36 **036 :** 18-75 **048:** 36-75	**033 : 3.3** **050 :** 5 **120:** 12 **150 :** 15 **240:** 24		**S:** Dosa		**N:** Negative logic. **P:** Positive logic.		**B:** Base Plate **F:** No Flange	50 100

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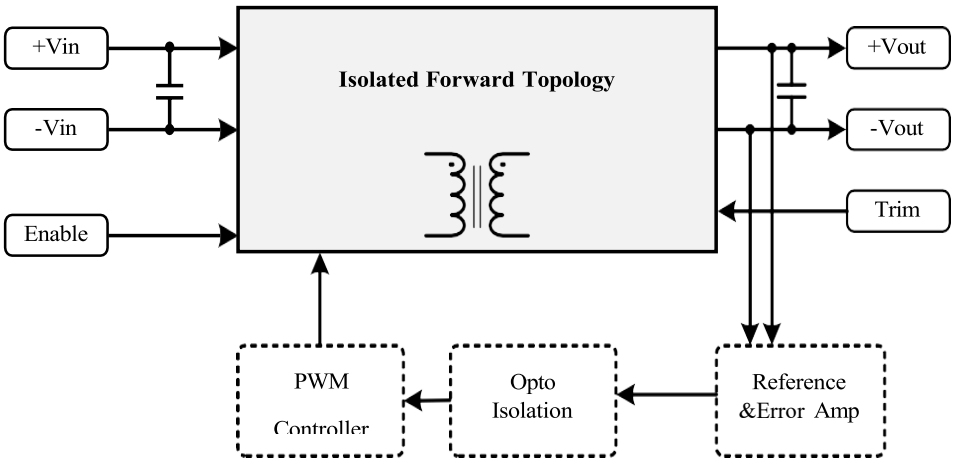
Models

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.(%)
28STB018033-S-□-□50	9-36	18	3.16	3.3	15.1	50	88
28STB018050-S-□-□50	9-36	18	3.09	5	10.0	50	90
28STB018120-S-□-□50	9-36	18	3.12	12	4.2	50	89
28STB018240-S-□-□50	9-36	18	3.12	24	2.1	50	89
28STB024033-S-□-□50	18-36	24	2.34	3.3	15.1	50	89
28STB024050-S-□-□50	18-36	24	2.29	5	10.0	50	91
28STB024120-S-□-□50	18-36	24	2.31	12	4.2	50	90
28STB036033-S-□-□50	18-75	36	1.58	3.3	15.1	50	88
28STB036050-S-□-□50	18-75	36	1.54	5	10.0	50	90
28STB036120-S-□-□50	18-75	36	1.56	12	4.2	50	89
28STB036240-S-□-□50	18-75	36	1.56	24	2.1	50	89
28STB048033-S-□-□50	36-75	48	1.17	3.3	15.1	50	89
28STB048050-S-□-□50	36-75	48	1.14	5	10.0	50	91
28STB048120-S-□-□50	36-75	48	1.16	12	4.2	50	90

Description

Supreme series - Quarter Brick converter is composed of Isolated, board-mountable, fixed switching frequency DC-DC converters that use synchronous rectification to achieve extremely high-power conversion efficiency. These DC-DC 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	28STB012 models (100ms Max)	--	--	50	VDC
	28STB018 models (100ms Max)	--	--	50	
	28STB024 models (100ms Max)	--	--	50	
	28STB036 models (100ms Max)	--	--	80	
	28STB048 models (100ms Max)	--	--	80	
Operating Input Voltage Ranges	28STB012 models	9	12	18	VDC
	28STB018 models	9	18	36	
	28STB024 models	18	24	36	
	28STB036 models	18	36	75	
	28STB048 models	36	48	75	
Under-Voltage Lockout Start-up Voltage	28STB012 models	--	8.5	9	VDC
	28STB018 models	--	8.5	9	
	28STB024 models	--	17.5	18	
	28STB036 models	--	17.5	18	
	28STB048 models	--	35.5	36	
Under-Voltage Lockout Shutdown Voltage	28STB012 models	7	8	--	VDC
	28STB018 models	7	8	--	
	28STB024 models	16	17	--	
	28STB036 models	16	17	--	
	28STB048 models	32	34	--	
Enable Function Input	Positive logic ON OFF		Open or 8 ~ 20 Short or 0 ~ 1.2		VDC
	Negative logic ON OFF		Short or 0 ~ 1.2 Open or 8 ~ 20		VDC
Input Filter	All models		Built-in PI Filter		

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 10μF MLCC Output Capacitor	--	1.5	--	%Vpk-pk
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 Voltage	VNOM 10% Load	--	±10	--	%
Over Voltage Protection	VNOM 10% Load	--	120	--	%
Output Power Protection	VNOM	--	120	--	%

General Specifications & Environmental Data

Parameter	Notes and Conditions		Min.	Typ.	Max.	Unit
Switching Frequency	VNOM	2:1 wide	270	300	330	kHz
		4:1 wide	220	260	300	
Storage Temperature Range	All models		-55	--	125	˚C
Operating Case Temperature	All models		-45	--	105	
Over temperature Protection	All models, auto. Recovery		--	110	--	
Isolation Voltage (Input to Output)	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		--	1.6	--	M HR
Thermal shock	Environmental Engineering Experimental Tests		MIL-STD-810F			
Vibration			MIL-STD-810F			
Drop			MIL-STD-810F			
Weight	Shape-B (Base Plate) Shape-F (No Flange Base Plate)		34(1.23) 33(1.2)			g (oz.)
Dimensions	Shape-B (Base Plate) Shape-F (No Flange Base Plate)		1.49x1.46x0.52” (37.8x37.2x13.2mm) 1.48x1.08x0.52” (37.5x27.4x13.2mm)			
Case Material	Aluminum - Six-Sided Continuous Shield					
Potting Material	Silicone					

Standards

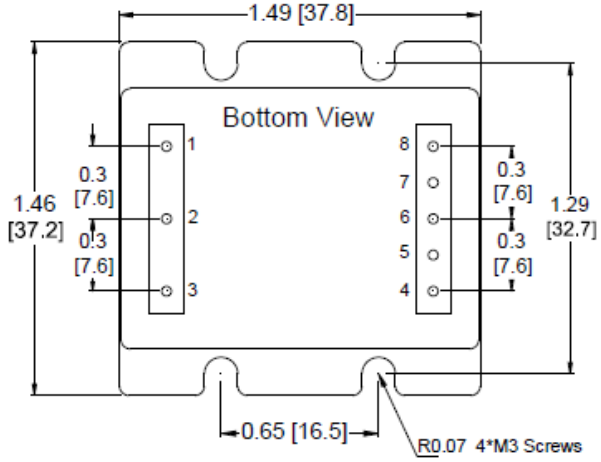
Parameter	Standard	Test Conditions	Performance Criteria
Environmental Compliance	Reach; RoHS		PASS
EMI	EN55022		Class A / Class B
ESD	EN61000-4-2	±4 kV Air Discharge ±4 kV Contact Discharge	Crit. A
Radiated Immunity	EN61000-4-3	Level 2, 3 V/m	Crit. A
Fast Transient	EN61000-4-4	±2 kV Applied	Crit. A
Surge	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.

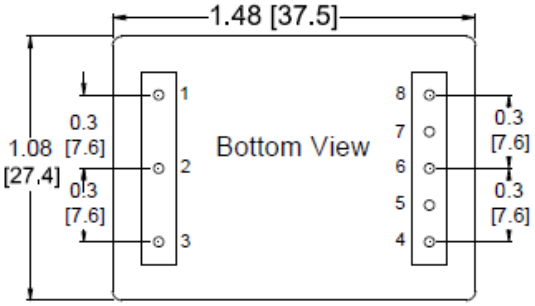
Modules could meet EN55022 Class A and Class B standard with external components.

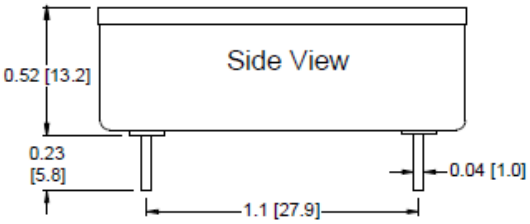
Mechanical Drawings & Pin Assignment

Shape – B (Base Plate)



Shape – F (No Flange Base Plate)





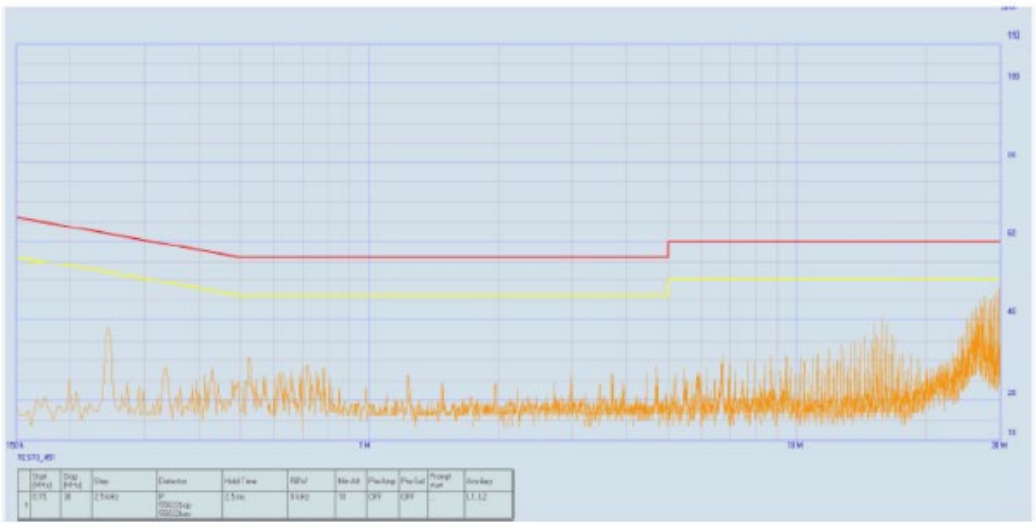
Pin Assignments:

Pin#	Dosa
1	-Vin
2	Enable
3	+Vin
4	+Vout
5	+Sense
6	Adjust
7	-Sense
8	-Vout

Note:
Pin Pitch tolerance: ±0.01 [0.25]
Pin Dimensions: .XX±0.02 [.X±0.5mm]
Pin Material: Copper Alloy
Pin Plating: Gold
Dimensions in inches [mm]
Tolerances: .XX±0.02 [.X±0.5mm]
.XXX±0.001 [.X±0.025mm]

Conducted EMI

Input terminal value (typ.) 28STB036050-S-P-B50@Vin = 36VDC, Iout =10A



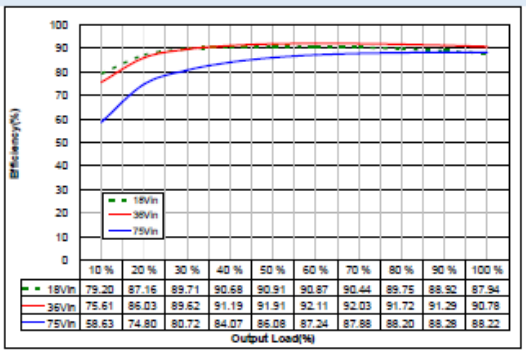
The fundamental switching frequency of the module is 260 kHz.

DC - DC

Characteristic Curves

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

The figures of 28STB036050-S-P-B50



	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
18Vin	79.20	87.16	89.71	90.68	90.91	90.87	90.44	89.75	88.92	87.94
36Vin	75.61	86.03	89.62	91.19	91.91	92.11	92.03	91.72	91.29	90.78
75Vin	58.63	74.80	80.72	84.07	86.08	87.24	87.88	88.20	88.28	88.22

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

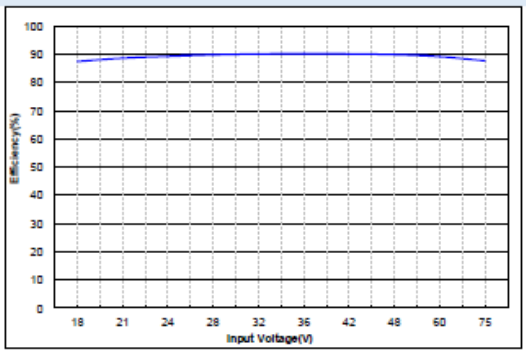


Figure 2 : Efficiency VS. Input Voltages at 100% rated power

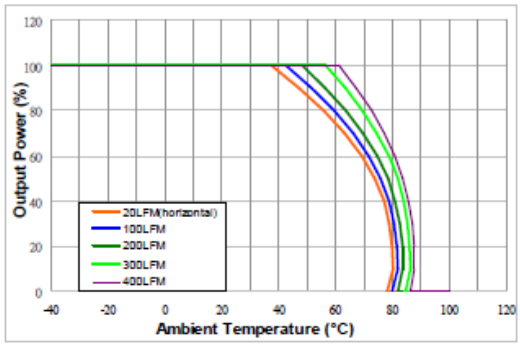


Figure 3 : Ambient Temperature VS. Output Power Derating Curves(Note: 20LFM = Free Air)

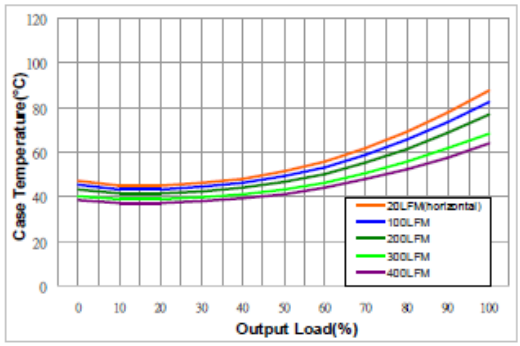


Figure 4 : Case Temperature VS. Output rated Power (Note: 20LFM = Free Air)

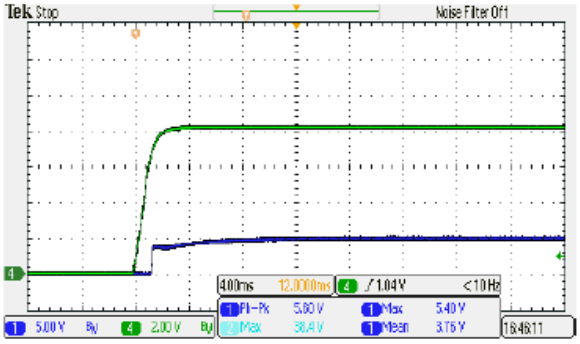


Figure 5 : CH1 = Vout, CH3 = Nominal Input Typical Start-up waveform at Full load.

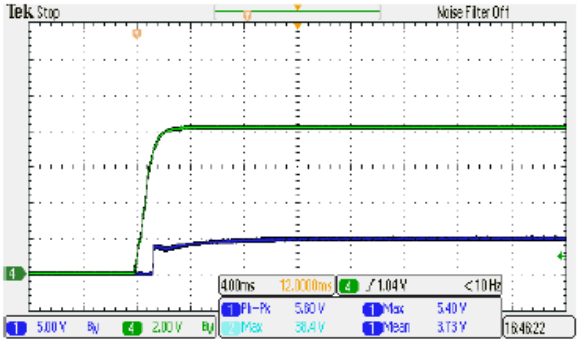


Figure 6 : CH1 = Vout, CH3 = Enable Pin Typical Start-up waveform. Input voltage pre-applied

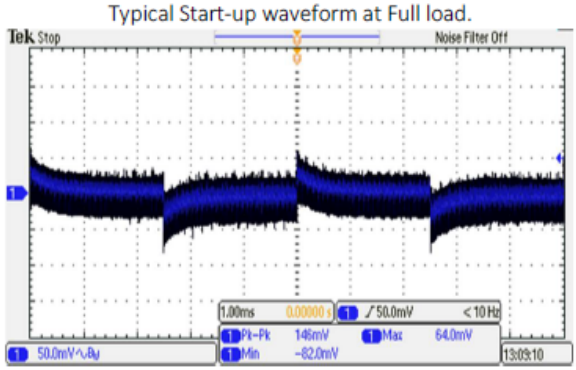


Figure 7 : Transient Response at Output step load (Vin: Typical ,50~75% of output current; Δlo/Δt =1A/μS)

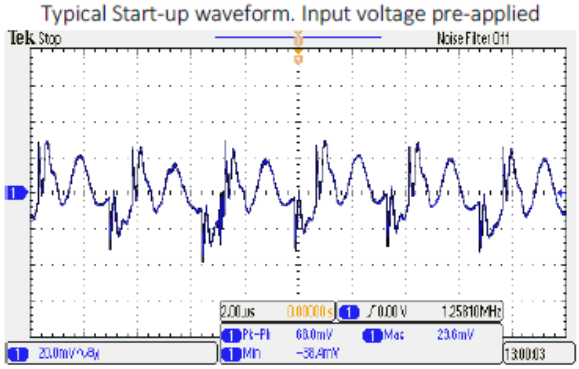


Figure 8 : Output Voltage Ripple & Noise at full load. (Vin: Typical, With Output Capacitor to add 1uF MLCC)

Trimming Output Voltage – Single 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.

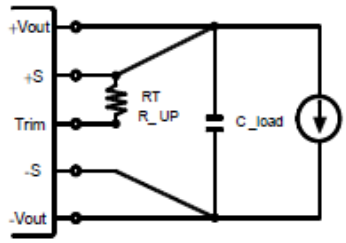


Figure 1. Trim Connections To increase Output Voltages Using Fixed Resistors

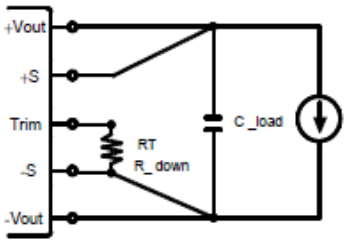


Figure 2. Trim Connections To Decrease Output Voltages Using Fixed Resistors

	Trim up resistor value(KΩ)									
Vout	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
3.3	72.9	33.1	19.8	13.1	9.1	6.5	4.6	3.2	2.1	1.2
5	113.1	52.0	31.6	21.5	15.3	11.3	8.4	6.2	4.5	3.1
12	267.2	121.6	73.1	48.8	34.2	24.5	17.6	12.4	8.4	5.1
15	340.4	156.2	94.8	64.1	45.7	33.4	24.6	18.0	12.9	8.8
24	527.7	240.3	144.6	96.7	67.9	48.8	35.1	24.8	16.9	10.5

	Trim down resistor value(KΩ)									
Vout	-1%	-2%	-3%	-4%	-5%	-6%	-7%	-8%	-9%	-10%
3.3	81.9	36.7	21.6	14.1	9.6	6.6	4.4	2.8	1.5	0.5
5	115.2	51.8	30.7	20.1	13.8	9.5	6.5	4.3	2.5	1.1
12	297.6	133.7	79.1	51.8	35.4	24.4	16.6	10.8	6.2	2.6
15	346.1	155.3	91.7	59.9	40.8	28.1	19.0	12.2	6.9	2.7
24	665.3	302.7	181.8	121.3	85.1	60.9	43.6	30.7	20.6	12.5

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.

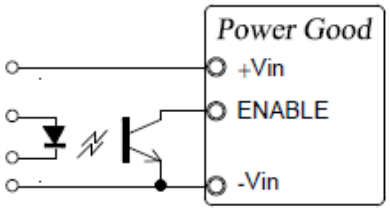


Figure 3. Driving the Enable Control pin

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 particular load and layout conditions. See Figure 4.

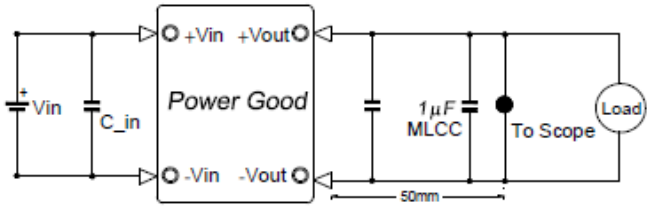


Figure 4. Measuring Output Ripple/Noise(20MHz bandwidth)

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