STB Series
50W / Sixteenth Brick DC/DC

Applications

Railway | Industry | Military

Automation | Semiconductor | Network / Telecom

Boat | Aviation | Medical

Automobile | Charger

3 Years Warranty

Features

1/16 Brick	**2:1 / 4:1** Wide input range	**6-Sided** METAL CASE	**DOSA** Pin out	**2250 VDC** Insulation	**PI FILTER** Built-in	**MLCC** No life-span constrained	**91 %** High efficiency
ON / OFF REMOTE	**UVLO**	**OCP**	**OVP**	**OTP**			

Model Number Structure

STB 018 033 - S - P - B 50

Series Name	Input Voltage (VDC)	Output Voltage (VDC)	Pin out	Remote Control Option	Shape	Watt
Supreme series **S**ixteenth **B**rick	**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	**P** : Positive logic **N** : Negative logic	**B** : Base Plate **F** : No Flange	**50**

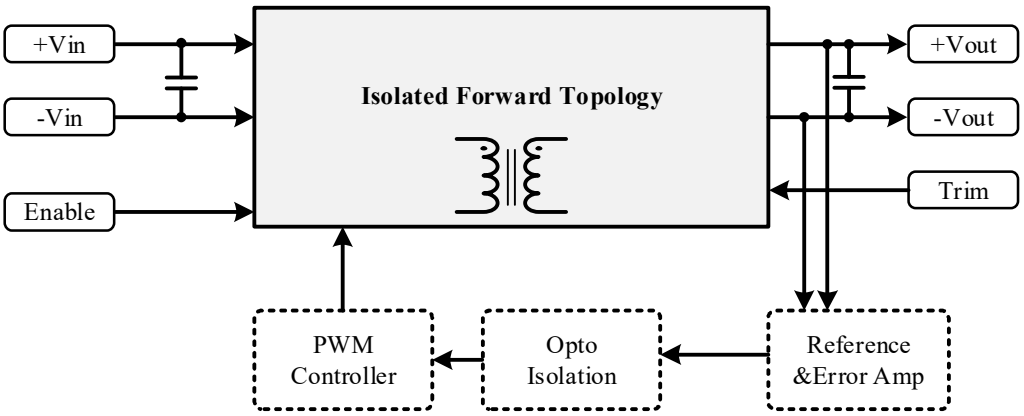
Model Selection Guide

Typical @ Ta=+25 ℃ under nominal line voltage conditions unless noted

Model	Input			Output			Efficiency
	Voltage (V)		Current (A)	Voltage	Current	Power	
	Range	Nominal	Full load	(V)	(A)	(W)	Typ.(%)
STB018033-S-□-□50	9-36	18	3.16	3.3	15.1	50	88
STB018050-S-□-□50	9-36	18	3.09	5	10.0	50	90
STB018120-S-□-□50	9-36	18	3.12	12	4.2	50	89
STB018240-S-□-□50	9-36	18	3.12	24	2.1	50	89
STB024033-S-□-□50	18-36	24	2.34	3.3	15.1	50	89
STB024050-S-□-□50	18-36	24	2.29	5	10.0	50	91
STB024120-S-□-□50	18-36	24	2.31	12	4.2	50	90
STB036033-S-□-□50	18-75	36	1.58	3.3	15.1	50	88
STB036050-S-□-□50	18-75	36	1.54	5	10.0	50	90
STB036120-S-□-□50	18-75	36	1.56	12	4.2	50	89
STB036240-S-□-□50	18-75	36	1.56	24	2.1	50	89
STB048033-S-□-□50	36-75	48	1.17	3.3	15.1	50	89
STB048050-S-□-□50	36-75	48	1.14	5	10.0	50	91
STB048120-S-□-□50	36-75	48	1.16	12	4.2	50	90

Description

Supreme series - Sixteenth 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.



STB Single Series Block Diagram

Electrical Specifications

(Typical @ Ta=+25°C under nominal line voltage conditions unless noted.)

Input Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Transient Input Voltage Ranges	STB012 models (100ms Max)			50	VDC
	STB018 models (100ms Max)			50	
	STB024 models (100ms Max)			50	
	STB036 models (100ms Max)			80	
	STB048 models (100ms Max)			80	
Operating Input Voltage Ranges	STB012 models	9	12	18	VDC
	STB018 models	9	18	36	
	STB024 models	18	24	36	
	STB036 models	18	36	75	
	STB048 models	36	48	75	
Under-Voltage Lockout Start up Voltage	STB012 models		8.5	9	VDC
	STB018 models		8.5	9	
	STB024 models		17.5	18	
	STB036 models		17.5	18	
	STB048 models		35.5	36	
Under-Voltage Lockout Shutdown Voltage	STB012 models	7	8		VDC
	STB018 models	7	8		
	STB024 models	16	17		
	STB036 models	16	17		
	STB048 models	32	34		
Enable Function Input	Positive logic ON	Open or 8 ~ 20			VDC
	Positive logic OFF	Short or 0 ~ 1.2			
	Negative logic ON	Short or 0 ~ 1.2			VDC
	Negative logic OFF	Open or 8 ~ 20			
Input Filter	All models	Built-in PI Filter			

Output Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	V_{NOM} 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		$\%V_{pk-pk}$
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	V_{NOM} 10% Load		±10		%
Over Voltage Protection	V_{NOM} 10% Load		120		%
Output Power Protection	V_{NOM}		120		%

General Specifications & Environmental Specifications

Parameter	Notes and Conditions		Min.	Typ.	Max.	Unit
Switching Frequency	V_{NOM}	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	˚C
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)		1.49” x 1.46” x 0.52” (37.8 x 37.2 x 13.2mm) 1.48” x 1.08” x 0.52” (37.5 x 27.4 x 13.2mm)			
Case Material	Six-Sided Continuous Shield		Aluminum			
Potting Material			Silicone			

Standards Compliance

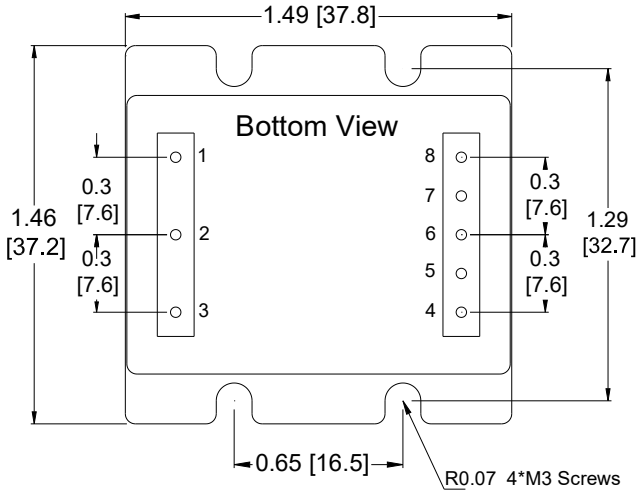
Parameter	Standard	Test Conditions	Performance Criteria
Environmental Compliance	Reach; RoHS		PASS
EMI	EN55022		Class A / Class B
ESD	EN61000-4-2	±4 kV Air Discharge ±4 kV Contact Discharge	Crit. A
Radiated Immunity	EN61000-4-3	Level 2, 3 V/m	Crit. A
Fast Transient	EN61000-4-4	±2 kV Applied	Crit. A
Surge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

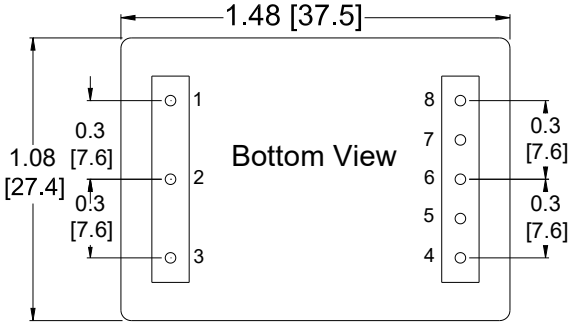
Modules could meet EN55022 Class A and Class B standard with external components.

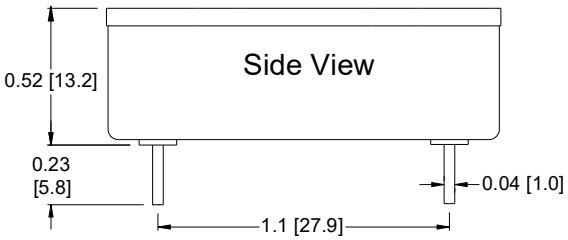
Mechanical Dimensions & Pin Assignments

Shape – B (Base Plate)



Shape – F (No Flange Base Plate)





Pin Assignments:

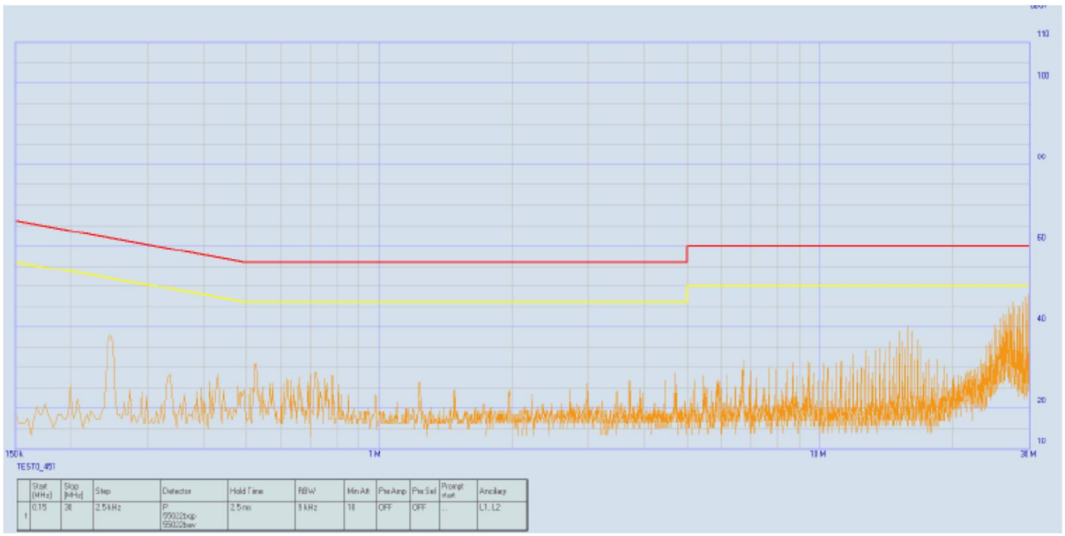
Pin#	Dosa
1	-Vin
2	Enable
3	+Vin
4	+Vout
5	+Sense
6	Adjust
7	-Sense
8	-Vout

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.) STB036050-S-P-B50@Vin = 36VDC, Iout =10A

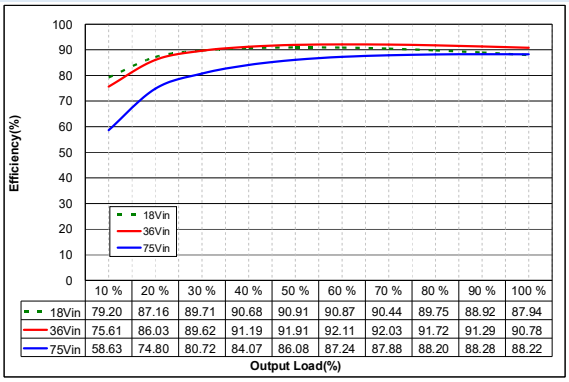


The fundamental switching frequency of the module is 260 kHz.

Characteristic Curves

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

The figures of STB036050-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.

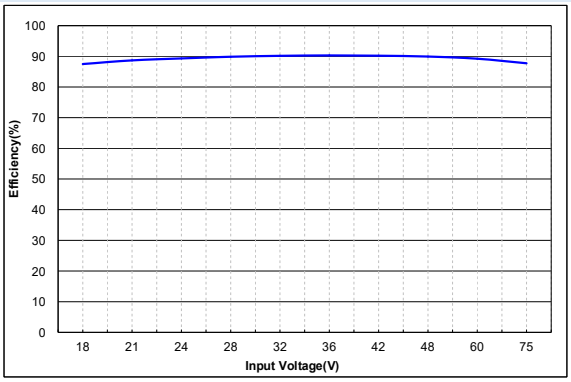


Figure 2 : Efficiency VS. Input Voltages at 100% rated power

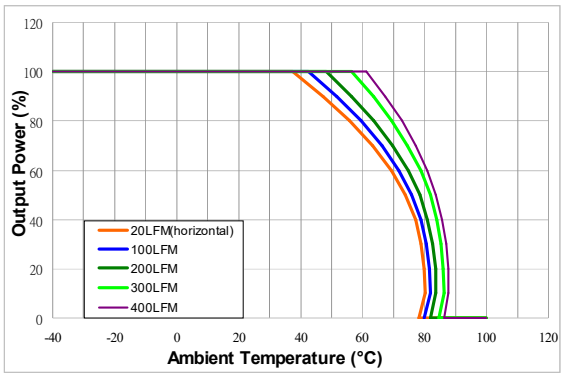


Figure 3 : Ambient Temperature VS. Output Power Derating Curves(Note: 20LFM = Free Air)

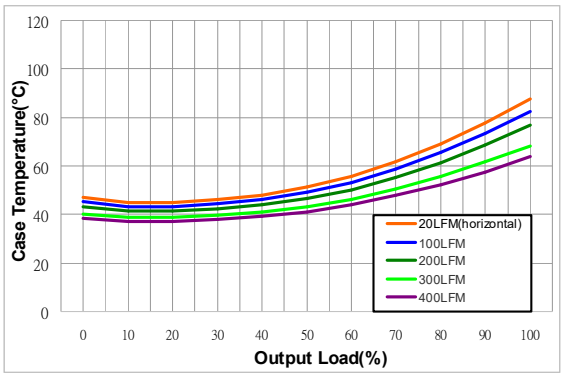


Figure 4 : Case Temperature VS. Output rated Power (Note: 20LFM = Free Air)

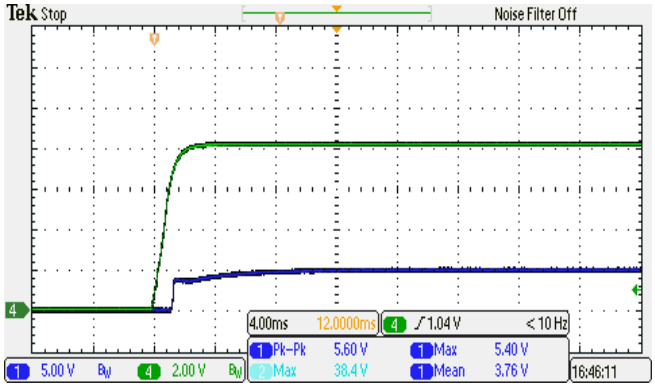


Figure 5 : CH1 = Vout, CH3 = Nominal Input Typical Start-up waveform at Full load.

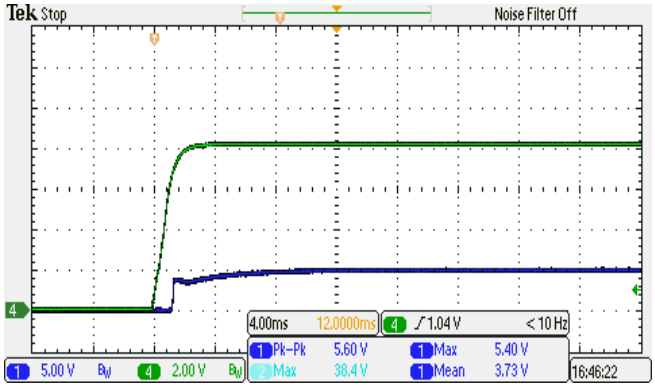


Figure 6 : CH1 = Vout, CH3 = Enable Pin Typical Start-up waveform. Input voltage pre-applied

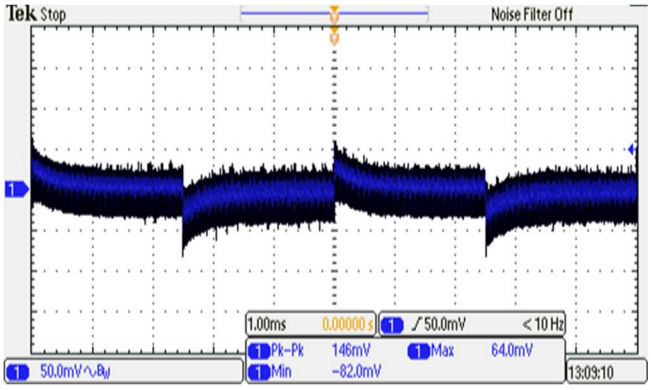


Figure 7 : Transient Response at Output step load (Vin: Typical ,50~75% of output current; ΔIo/Δt =1A/μS)

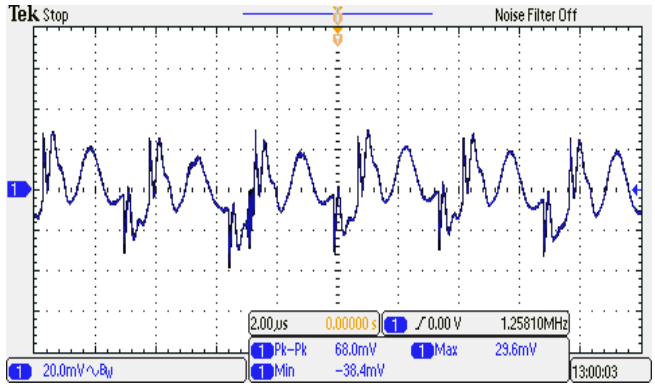


Figure 8 : Output Voltage Ripple & Noise at full load. (Vin: Typical, With Output Capacitor to add 1uF MLCC)

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.

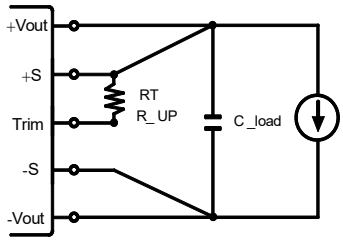


Figure 1. Trim Connections To increase Output Voltages Using Fixed Resistors

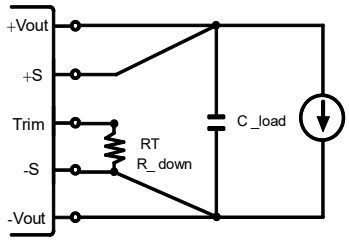


Figure 2. Trim Connections To Decrease Output Voltages Using Fixed Resistors

	Trim up resistor value(KΩ)									
Vout	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
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.

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.

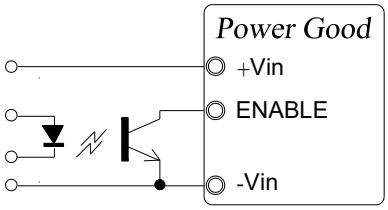


Figure 3. Driving the Enable Control pin

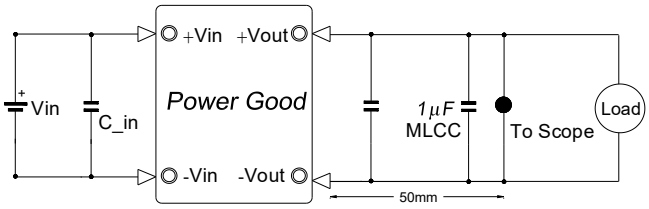


Figure 4. Measuring Output Ripple/Noise(20MHz bandwidth)

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