

50 Watt

2x1 Inch Package B1 2:1 Input Range - Metal Case



- o Pi Input Filter
- o Efficiency up to 92%
- o Remote On/Off Control
- o Continuous Short Circuit Protection
- o Over Current Protection
- o Over Voltage Protection
- o Soft Start
- o Built-in EMC filter meets EN55022 Class A without external components



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD (µF)
			MIN. LOAD	FULL LOAD	NO LOAD	FULL LOAD		
50B1RS12W3.3M	9-18 VDC	3.3 VDC	0 mA	10000 mA	110 mA	3056 mA	90	26000
50B1RS12W5M		5 VDC			200 mA	4682 mA		89
50B1RS12W12M		12 VDC		60 mA	3300			
50B1RS12W15M		15 VDC		60 mA	2200			
50B1RS24W3.3M	18-36 VDC	3.3 VDC		10000 mA	70 mA		1511 mA	
50B1RS24W5M		5 VDC			90 mA	2290 mA	91	17000
50B1RS24W12M		12 VDC		40 mA	3300			
50B1RS24W15M		15 VDC		40 mA	2200			
50B1RS48W3.3M	36-75 VDC	3.3 VDC		10000 mA	50 mA			756 mA
50B1RS48W5M		5 VDC			60 mA	1132 mA	17000	
50B1RS48W12M		12 VDC		40 mA	1145 mA	3300		
50B1RS48W15M		15 VDC		40 mA	1170 mA	2200		

SPECIFICATIONS

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

INPUT SPECIFICATIONS

Input Voltage Range		2:1
Under Voltage Lockout	Module ON/OFF 12 V Module ON/OFF 24 V Module ON/OFF 48 V	8.6 VDC/7.9 VDC 17.8 VDC/16 VDC 34 VDC/29 VDC
Start up Time (Nominal Vin and constant resistive load)		50 mS
Input Filter		Pi Type
Maximum Input Current (No-Load)		see table
Input Current (Full-Load)		see table
Input Reflected Ripple Current ¹⁾		20 mA p-p
Remote ON/OFF (CTRL) ²⁾	ON: 3 - 12 VDC or open Circuit OFF: 0 - 1.2 VDC or Short Circuit Pin2 and Pin3 OFF idle Current: 5 mA	

OUTPUT SPECIFICATIONS

Voltage Accuracy		±1%
Voltage Adjustability (Trim)		±10% max.
Maximum Output Current		see table
Over Voltage Protection (Zener Diode Clamp)	3.3 VDC 5 VDC 12 VDC 15 VDC	3.9 V 6.2 V 15 V 18 V
Over Load Protection		120% to 140% of Output Current
Ripple and Noise ³⁾		100 mV p-p max.
Temperature Coefficient		±0.02%/°C
Capacitive Load ⁴⁾		see table
Transient Recovery Time ⁵⁾		250 µs
Transient Response Deviation ⁵⁾		±3% max.
Short Circuit Protection		Indefinite (hiccup) (Automatic Recovery)
Line Regulation		±0.5% max.
Load Regulation	Io=0% to 100%	±0.5% max.

NOTE:

1. Measured Input reflected ripple current with a simulated source inductance of 12 µH and a source capacitor Cin (47 µF, ESR<1.0 Ohm at 100 kHz).
2. The Remote ON/OFF Control Pin is referenced to -Vin (Pin2).
3. Measured with a 1.0 µF ceramic capacitor.
4. Tested by minimal Vin and constant resistive load.
5. Tested by normal Vin and 25% Load step change (75%-50%-25% of Io).

ABSOLUTE SPECIFICATIONS

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.		
Input Surge Voltage (100 mS)	12 V 24 V 48 V	25 VDC max. 50 VDC max. 100 VDC max.
Soldering Temperature (1.5 mm from case 10 sec. max.)		+260°C max.

NOTE:

Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

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GENERAL SPECIFICATION		
Efficiency		see table
Isolation Voltage (60 sec)	Input / Output Case/Input & Output	1600 VDC 1600 VDC
Isolation Resistance		1000 MOhms min.
Isolation Capacitance		2000 pF
Switching Frequency	12 V 24V, 48 V	230 kHz 270 kHz
Operating Ambient Temperature		-40°C to +95°C (see Derating Curve) -40°C to +50°C (for 100% Load)
Case Temperature		+110°C max.
Thermal Impedance (Mounting at FR4 (5.9 x 2.75 Inch) PCB)	Without Heat-sink With Heat-sink	9.5°C/W min. 8.5°C/W min.
Storage Temperature Range		-40°C to +125°C
Over Temperature Protection (Case)		+115°C
Cooling ⁶⁾		Nature Convection
Humidity		95% rel H
Safety Standard (designed to meet)		IEC/EN 60950-1
EMC Characteristics (CE pending)	Radiated Emissions	EN55022 Class A
	Conducted Emissions	EN55022 Class A
	ESD	IEC61000-4-2 Perf. Criteria A
	RS	IEC61000-4-3 Perf. Criteria A
	EFT ⁷⁾	IEC61000-4-4 Perf. Criteria A
	Surge ⁷⁾	IEC61000-4-5 Perf. Criteria A
	CS	IEC61000-4-6 Perf. Criteria A
	PFMF	IEC61000-4-8 Perf. Criteria A
Reliability Calculated MTBF (MIL-HDBK-217F)		>200 khrs
Dimensions		50.8 x 25.4 x 11.5 mm (2.00 x 1.00 x 0.45 Inches)
Case Material		Copper
Base Material		Non-conductive Black Plastic (UL94V-0 rated)
Pin Material		Ø1.0 mm Brass Solder-coated
Potting Material		Epoxy (UL94V-0 rated)
Weight		45.0 g

NOTE:

6. "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).

7. An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5.

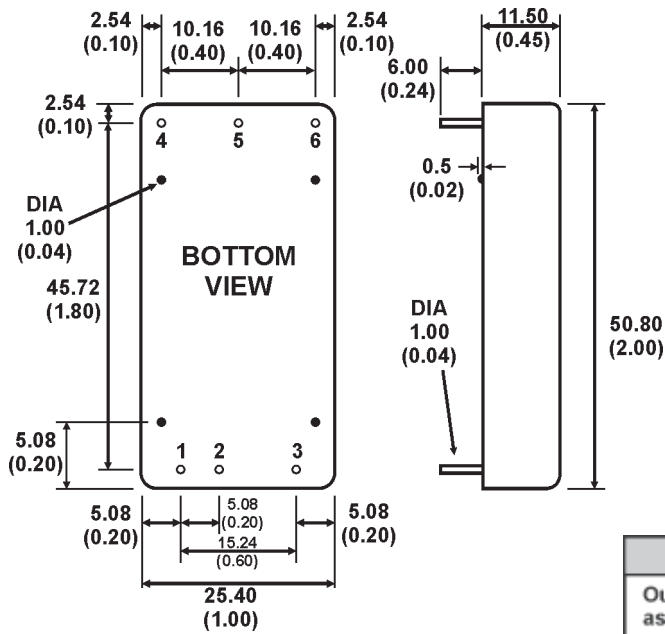
The filter capacitor M+R suggest: Nippon chemi-con KY series, 220µF/100V.

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MECHANICAL SPECIFICATIONS

Case "B1"



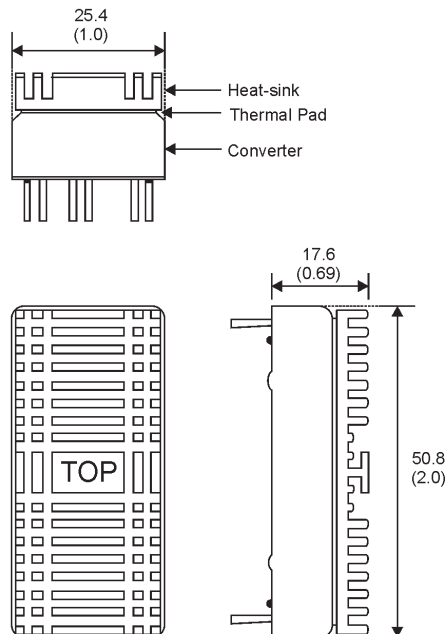
PIN CONNECTIONS	
PIN	SINGLE
1	+INPUT
2	-INPUT
3	REMOTE CTRL.
4	+OUTPUT
5	-OUTPUT
6	TRIM

- All Dimensions in mm (Inches)
 Tolerance:
 1. Pin Diameter: 1.0 ±0.05 (0.04 ±0.002)
 2. Pin Pitch Tolerance: ±0.35 (±0.014)
 3. Case Tolerance: ±0.5 (±0.02)
 4. Stand-off Tolerance: ±0.1 (±0.004)

External Output Trimming

Output can be externally trimmed by using the method as below.

With Heat-sink



Order code: add Suffix „HS“ (contain: heat-sink, thermal pad)
 Material: Aluminum
 Finish: Anodic treatment (black)
 Weight: 11 g (0.39 oz) (without converter)

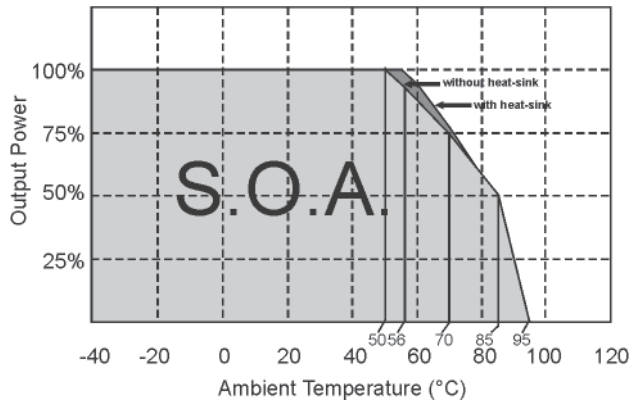
NOTE:
 1. Converters will be supplied with heat-sinks already mounted.

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APPLICATION NOTES & DIAGRAMS

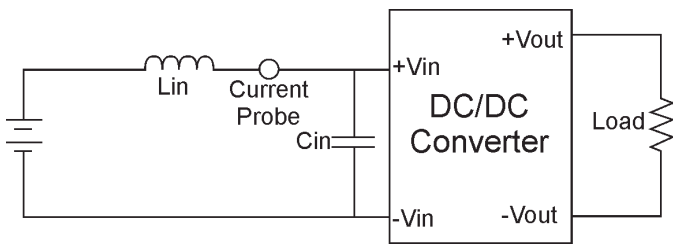
Derating Curve



TEST CONFIGURATIONS

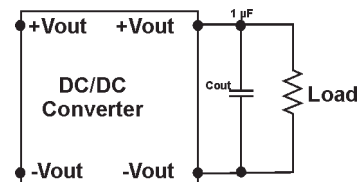
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} (12 μ H) and a source capacitor C_{in} (47 μ F, ESR<1.0 Ohm at 100 kHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

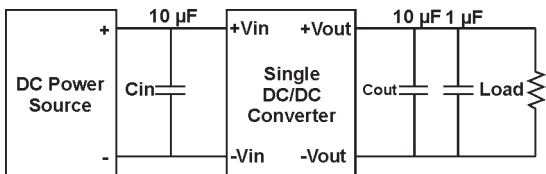
Use a 1.0 μ F ceramic disk capacitor at the output.



DESIGN & FEATURE CONFIGURATIONS

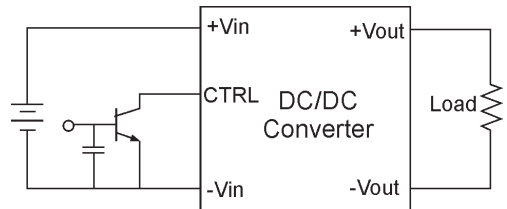
Output Ripple & Noise Reduction

To reduce ripple and noise, it is recommended to use a 1 μ F ceramic disk capacitor and a 10 μ F electrolytic capacitor at the output.



CTRL Module ON/OFF

Positive logic turns ON the module during high logic and OFF during low logic. Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. The switch can be an open collector or open drain. For positive logic if the ctrl feature is not used, please leave the ctrl pin floating.



Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

Over Current Protection

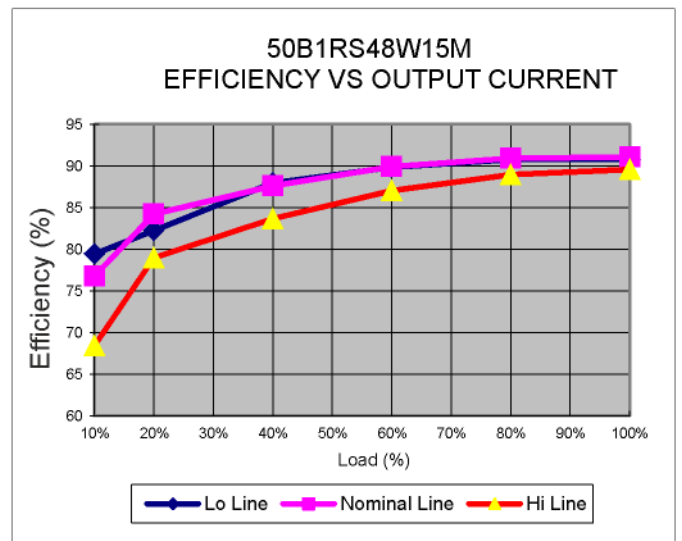
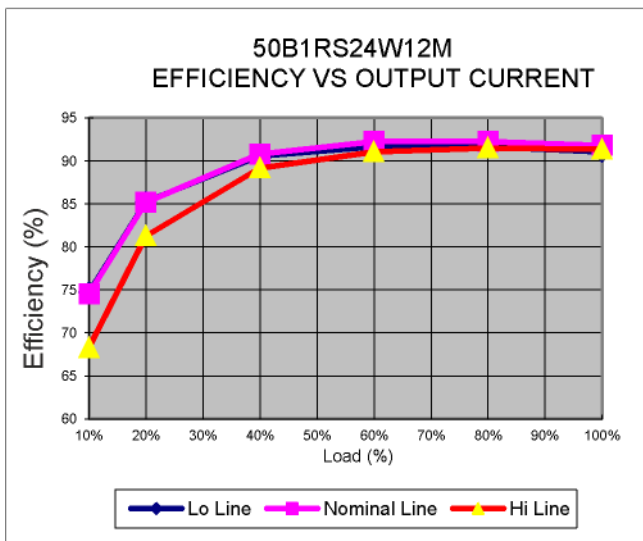
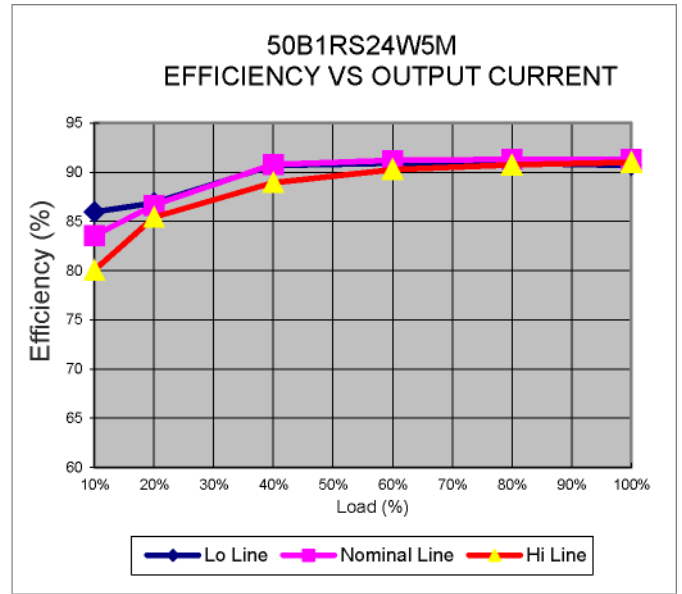
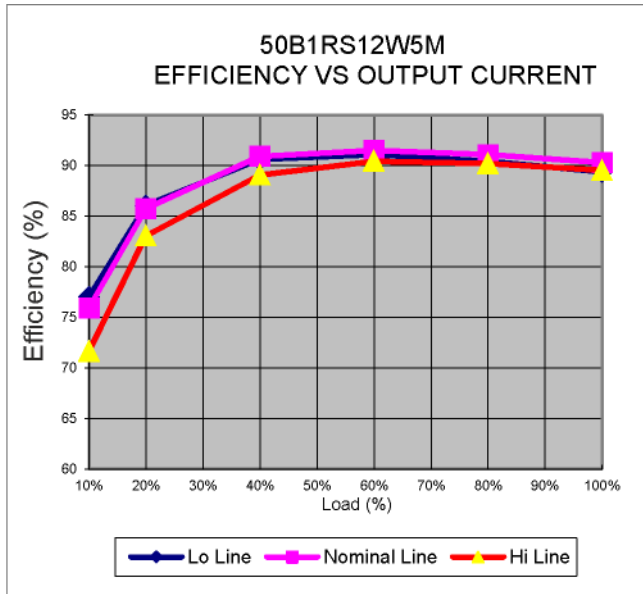
The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup).

The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

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ELECTRICAL CHARACTERISTIC CURVER



NOTICE:
The information in this document has been carefully checked. However, no responsibility is assumed for inaccuracies! Specifications can be changed without notice. The latest and most complete information can be found on our website.