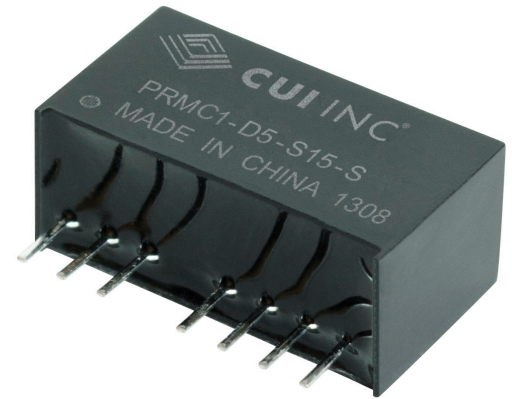


SERIES: PRMC1-S | **DESCRIPTION:** DC-DC CONVERTER

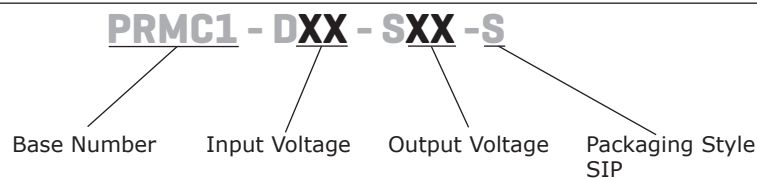
FEATURES

- 1 W isolated output
- smaller package
- single regulated output
- 3,000 Vdc isolation
- continuous short circuit, over current protection
- temperature range (-40~105°C)
- high efficiency at light load
- efficiency up to 82%



MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple and noise ¹ max (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
PRMC1-D5-S5-S	5	4.5~9	5	10	200	1	75	72
PRMC1-D5-S12-S	5	4.5~9	12	4	83	1	75	77
PRMC1-D5-S15-S	5	4.5~9	15	3	67	1	75	77
PRMC1-D12-S5-S	12	9~18	5	10	200	1	75	76
PRMC1-D12-S12-S	12	9~18	12	4	83	1	75	80
PRMC1-D12-S15-S	12	9~18	15	3	67	1	75	81
PRMC1-D24-S5-S	24	18~36	5	10	200	1	75	76
PRMC1-D24-S12-S	24	18~36	12	4	83	1	75	81
PRMC1-D24-S15-S	24	18~36	15	3	67	1	75	81
PRMC1-D24-S24-S	24	18~36	24	6	42	1	75	82
PRMC1-D48-S5-S	48	36~75	5	10	200	1	75	76
PRMC1-D48-S12-S	48	36~75	12	4	83	1	75	81
PRMC1-D48-S15-S	48	36~75	15	3	67	1	75	81

Notes: 1. ripple and noise are measured at 20 MHz BW by "parallel cable" method

PART NUMBER KEY


INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	5 V input models	4.5	5	9	Vdc
	12 V input models	9	12	18	Vdc
	24 V input models	18	24	36	Vdc
	48 V input models	36	48	75	Vdc
start-up voltage	5 V input models	3.5	4	4.5	Vdc
	12 V input models	4.5	8	9	Vdc
	24 V input models	11	16	18	Vdc
	48 V input models	24	33	36	Vdc
surge voltage	for maximum of 1 second				
	5 V input models	-0.7		12	Vdc
	12 V input models	-0.7		25	Vdc
	24 V input models	-0.7		50	Vdc
	48 V input models	-0.7		100	Vdc
filter	capacitance filter				

OUTPUT

parameter	conditions/description	min	typ	max	units
line regulation	full load, input voltage from low to high		±0.2	±0.5	%
load regulation	5% to 100% load		±0.4	±0.75	%
voltage accuracy	5% to 100% load		±1	±3	%
no-load output voltage accuracy	5V output models		±1.5	±5	%
	all other models		±1.5	±3	%
switching frequency	100% load, nominal input voltage		180		KHz
transient recovery time	25% load step change		0.5	1	ms
transient response deviation	25% load step change		±3	±5	%
temperature coefficient	100% load		±0.02	±0.03	%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, automatic recovery				
over current protection		120			%

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	for 1 minute at 1 mA max.	3,000			Vdc
isolation resistance	at 500 Vdc	1,000			MΩ
conducted emissions	CISPR22/EN55022, class B, (external circuit required, see Figure 1-b)				
radiated emissions	CISPR22/EN55022, class B, (external circuit required, see Figure 1-b)				
ESD ¹	IEC/EN61000-4-2, class B, contact ± 4kV/ air ± 8kV				
radiated immunity	IEC/EN61000-4-3, class A, 10V/m				
EFT/burst	IEC/EN61000-4-4, class B, ± 2kV (external circuit required, see Figure 1-a)				
surge	IEC/EN61000-4-5, class B, ± 2kV (external circuit required, see Figure 1-a)				
conducted immunity	IEC/EN61000-4-6, class A, 3 Vr.m.s				
voltage dips and interruptions	IEC/EN61000-4-29, class B, 0%-70%				
MTBF	as per MIL-HDBK-217F @ 25°C	1,000,000			hours
RoHS compliant	yes				

Note: 1. 24V input models can only meet ESD contact ±2kV with external circuit 1-c hooked up. 24V input models can meet ESD contact ±4kV with external circuit 1-a, 1-b, and 1-c hooked up.

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		105	°C
storage temperature		-55		125	°C
storage humidity	non-condensing			95	%
temperature rise	at full load, Ta=25°C		25		°C

SOLDERABILITY

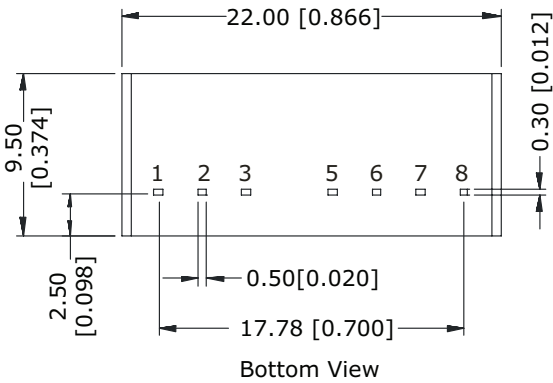
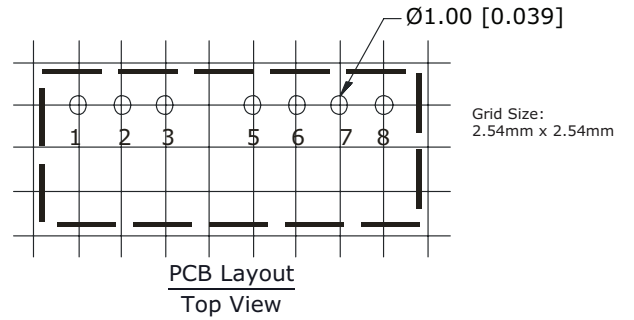
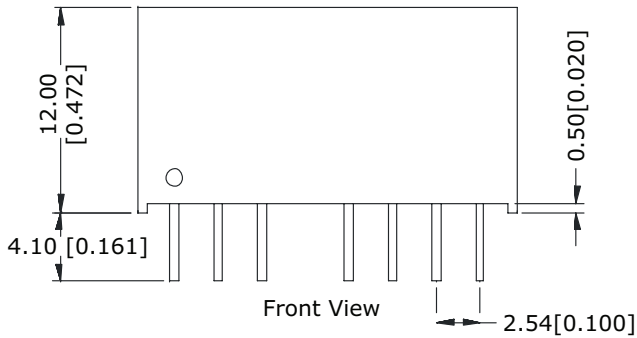
parameter	conditions/description	min	typ	max	units
hand soldering	1.5 mm from case for 10 seconds			300	°C
wave soldering	see wave soldering profile			260	°C

MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	22.00 x 9.50 x 12.00 (0.866 x 0.374 x 0.472 inch)				mm
case material	plastic (UL94-V0)				
weight			4.92		g

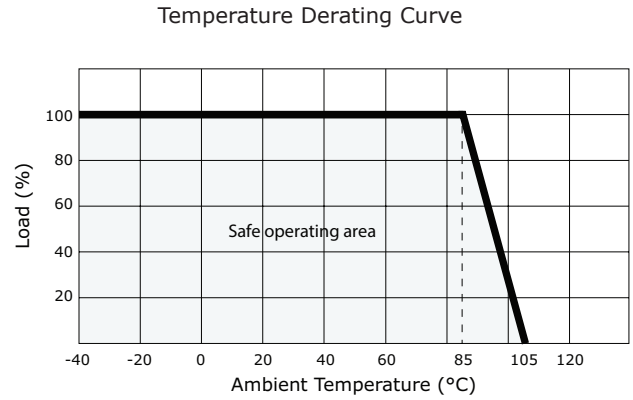
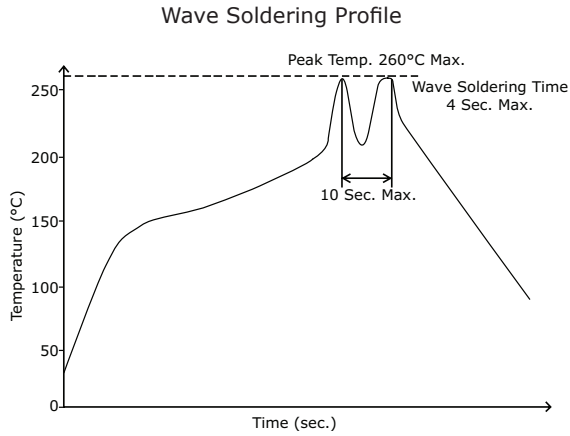
MECHANICAL DRAWING

units: mm[inch]
 tolerance: ±0.25[±0.010]
 pin section tolerance: ±0.10[±0.004]



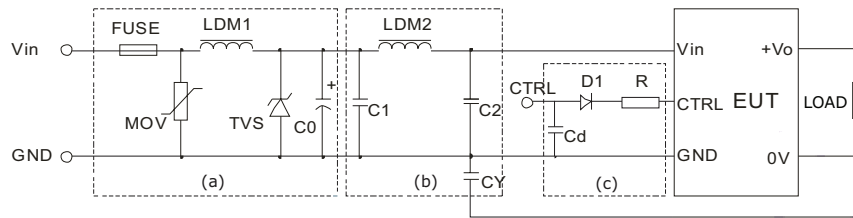
PIN CONNECTIONS	
PIN	Function
1	GND
2	Vin
3	CTRL
5	NC
6	+Vo
7	0V
8	CS

DERATING CURVES



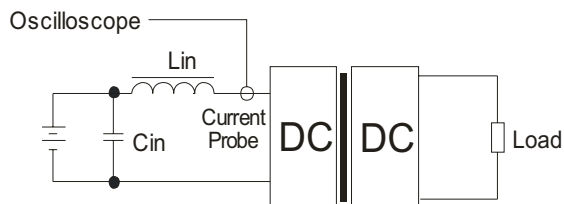
EMC RECOMMENDED CIRCUIT

Figure 1



Recommended external circuit components				
Vin (Vdc)	5	12	24	48
FUSE	choose according to practical input current			
MOV	TBD	--	10D560	10D101
LDM1	TBD	--	56μH	56μH
TVS	TBD	SMCJ28A	SMCJ48A	SMCJ90A
C0	TBD	680μF/25V	120μF/50V	120μF/100V
C1	TBD	4.7μF/50V	4.7μF/50V	4.7μF/100V
LDM2	TBD	12μH	12μH	12μH
C2	TBD	4.7μF/50V	4.7μF/50V	4.7μF/100V
CY	TBD	1nF	1nF	1nF
D1	TBD	RB160M-60/1A	RB160M-60/1A	RB160M-60/1A
R	Follows: $R = \frac{V_C - V_D - 1.0}{I_C} - 300$			
Cd	47nF/50V	47nF/50V	47nF/50V	47nF/50V

TEST CONFIGURATION



External components	
Lin	4.7μH
Cin	220μF, ESR < 1.0Ω at 100 KHz

Note: Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.

APPLICATION NOTES

1. Output load requirement

To ensure this module can operate efficiently and reliably, the minimum output load may not be less than 5% of the full load during operation. If the actual output power is low, connect a resistor at the output end in parallel to increase the load.

2. Recommended circuit

This series has been tested according to the following recommended testing circuit before leaving the factory. This series should be tested under load (see Figure 2). If you want to further decrease the input/output ripple, you can increase the capacitance accordingly or choose capacitors with low ESR. However, the capacitance of the output filter capacitor must be appropriate. If the capacitance is too high, a startup problem might arise. For every channel of the output, to ensure safe and reliable operation, the maximum capacitance must be less than the maximum capacitive load (see Table 1).

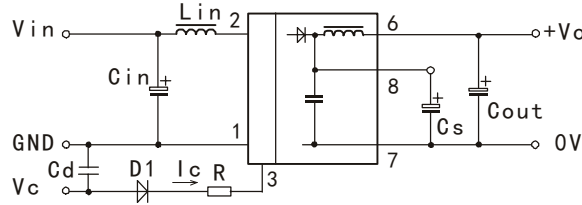


Figure 2

Table 1

Vin (Vdc)	Cin (μF)	Lin (μH)	Cs (μF)	Cout (μF)
5	100	4.7-120	10-22	47
12	100	4.7-120	10-22	47
24	10	4.7-120	10-22	47
48	10	4.7-120	10-22	47

3. CTRL Terminal

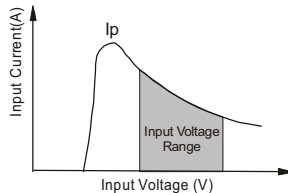
When open or applied high impedance, the converter will turn on. When it's pulled high, the converter will shutdown. The input current should be between 5-10mA. Exceeding the maximum 20mA will cause permanent damage to the converter. The value for R can be derived as follows:

$$R = \frac{V_c - V_D - 1.0}{I_c} - 300$$

4. Input Current

When it is used in an unregulated condition, make sure that the input fluctuations and ripple voltage do not exceed the module standard. Refer to Figure 3 for the startup current of this dc-dc module.

Figure 3



Vin (Vdc)	Ip (mA)
5	470
12	180
24	110
48	42

Note: 1. Minimum load shouldn't be less than 5%, otherwise ripple may increase dramatically. Operation under minimum load will not damage the converter, however, they may not meet all specifications listed.
 2. Maximum capacitive load is tested at input voltage range and full load.
 3. All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

REVISION HISTORY

rev.	description	date
1.0	initial release	03/20/2013

The revision history provided is for informational purposes only and is believed to be accurate.



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