

SMD SERIES

DC/DC Converter

2 WATT
Regulated
Single Output
SMD 12 PIN Package



Wide 4:1 Input Range
3000 Vdc Isolation
Remote on/off control
Short Circuit Protection: Indefinite (Automatic Recovery)
Temperature Range (°C): -40 ~ +75 (For 100% Load)
Tube / Reel Contains



All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified.

Input Voltage

Wide Input Range		4:1
Input Voltage Range	Vdc	see product
Start up Time (Nominal Vin and constant resistive load)	mS, typ	30
Input Current No load	mA, max.	see product
Input Current Full Load (typ.)	mA, typ.	see product
Input Filter		Capacitor
Input Reflected Ripple Current	mA, pk-pk	20
Under Voltage lockout	Vdc	12V Models - Module ON/OFF 4.1 / 3.5Vdc typ. 24V Models - Module ON/OFF 8.5 / 7.0Vdc typ.

Output Voltage

Output Voltage Accuracy	%	±1.0
Output Voltage	Vdc	see product
Output Current Min. Load	mA, min.	see product
Output Current Full Load	mA, max.	see product
Line Regulation	%, max.	±0.2
Load Regulation (from 0% to 100% Load)	%, max.	±0.5
Ripple and Noise (20 MHz Bandwidth)	mVpp, max.	100
Short Circuit Protection		Indefinite (Automatic Recovery)
Temperature Coefficient	% / °C	±0.02
Capacitive Load	µF, max.	see product
Transient Recovery Time	µs, typ.	500
Transient Response Deviation	%, max.	±3

REMARKS:

"Input Reflected Ripple Current": Measured with a simulated source inductance of 12µH and a source capacitor Cin (47µF, ESR<1.0Ω at 100KHz).

REMARKS:

"Ripple & Noise": Measured with a 10µF electrolytic capacitor and 0.1µF ceramic capacitor.

"Capacitive Load": Tested with minimal Vin and constant resistive load.

"Transient Recovery Time" and "Transient Response Deviation": Tested by normal Vin and 100%-25%, 25% load step change.

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General Specification

Efficiency @FL	%	see product
I/O Isolation Voltage(60sec), Input/Output	Vdc	3000
I/O Isolation Capacitance	pF	25
I/O Isolation Resistance	Ohm, min.	1G
Switching Frequency	kHz	100
Humidity	%, rel H	95
MTBF Reliability Calculated (MIL-HDBK-217F) at 25°C	Mhrs	>0.89
Remote on/off control		ON: Open or high impedance OFF: 2-4mA input current (via 1k) OFF stand by input current (nominal Vin): 3.0mA,
Safety Standard (designed to meet)		UL/cUL 60950-1, 62368-1 IEC/EN 60950-1, 62368-1
Operating Temperature	°C	-40 ~ +75 (For 100% Load)
Storage Temperature	°C	-55 ~ +125
Cooling		Natural Convection
Lead-free reflow solder process		IPC/JEDEC J-STD-020D.1
Reflow temperature peak		245
Moisture Sensitivity Level		Level 1
Vibration		MIL-STD-810F
Case Base Material		Non-conductive Black plastic (UL94V-0 rated)
Pin Material		Φ 0.5 mm C5191R-H Solder-coated
Weight	g	2.0
Dimension	mm	14.65 x 14.40 x 8.95
Dimension	inch	0.58 x 0.56 x 0.35
Certification		CE
Packing Unit	pcs.	30 Tube / 200 Reel

REMARKS:

"Cooling": 'Nature Convection' is usually about 30-65 LFM but it's not equal to still air (0 LFM).

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EMC Characteristics

Conducted Emissions	EN 55032	CLASS A
ESD	IEC61000-4-2	Perf. Criteria A
RS	IEC61000-4-3	Perf. Criteria A
EFT	IEC61000-4-4	Perf. Criteria A
Surge	IEC61000-4-5	Perf. Criteria A
CS	IEC61000-4-6	Perf. Criteria A
PFMF	IEC61000-4-8	Perf. Criteria A
Radiated Emissions	EN 55032	CLASS A

Special Characteristics

Stress rating: Input Surge Voltage (100ms)	12 Models: 25 24 Models: 50	Vdc, max.
Soldering Temperature (1.5mm from case 10sec. max)	260	°C, max.

REMARKS:

"EFT"/"Surge": An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

REMARKS:

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

Product Overview

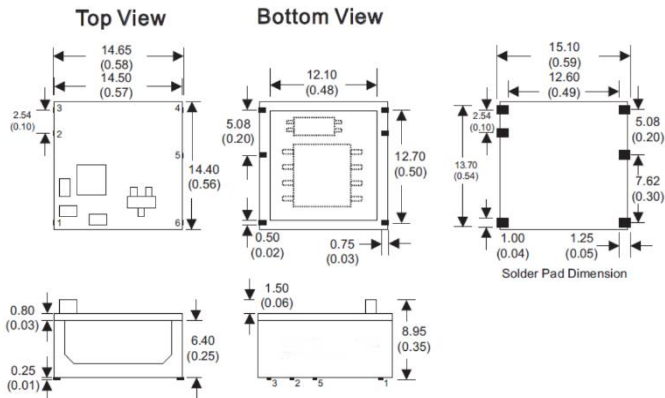
ART CODE	Input Voltage Range	Input Current No load	Input Current Full Load	Output Voltage	Output Current Min. Load	Output Current Full Load	Efficiency @FL	Capacitive Load
	Vdc	mA, max.	mA, typ.	Vdc	mA, min.	mA, max.	%	µF, max.
P10SMD-1205E4:1	12 (4.5-18)	50	214	5	0	400	78	1000
P10SMD-1212E4:1	12 (4.5-18)	50	211	12	0	166.7	79	220
P10SMD-1215E4:1	12 (4.5-18)	50	206	15	0	133.3	81	100
P10SMD-2405E4:1	24 (9-36)	30	107	5	0	400	78	1000
P10SMD-2412E4:1	24 (9-36)	30	105	12	0	166.7	79	220
P10SMD-2415E4:1	24 (9-36)	30	103	15	0	133.3	81	100
P10SMD-1205E4:1-R	12 (4.5-18)	50	214	5	0	400	78	1000
P10SMD-1212E4:1-R	12 (4.5-18)	50	211	12	0	166.7	79	220
P10SMD-1215E4:1-R	12 (4.5-18)	50	206	15	0	133.3	81	100
P10SMD-2405E4:1-R	24 (9-36)	30	107	5	0	400	78	1000
P10SMD-2412E4:1-R	24 (9-36)	30	105	12	0	166.7	79	220
P10SMD-2415E4:1-R	24 (9-36)	30	103	15	0	133.3	81	100

*P10SMD-xxxx4:1-R = Reel Contains(200pcs)

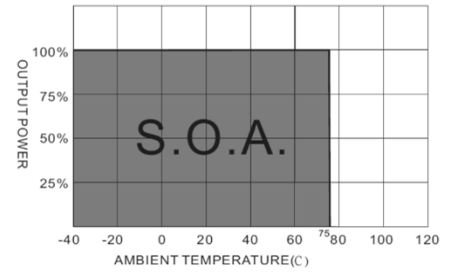
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Technical Drawings

PIN Connections / Derating Curve



PIN	SINGLE
1	+V Input
2	-V Input
3	Remote on/off
4	+V Output
5	N.C.
6	-V Output

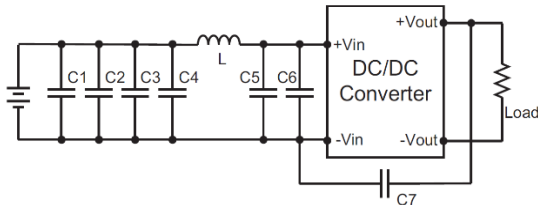


All dimensions are typical in millimeters (inches)
 Pin pitch and length tolerance: ± 0.25 (± 0.014)

Application Notes

EMI Filter

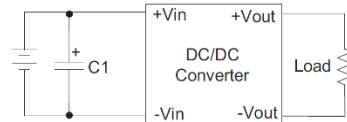
Input filter components (C1,L,C2) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module and all leads should be minimized to decrease radiated noise.



	C1	C2-C6	L	C7
12 Model	1206, 10 μ F/50V		2.2 μ H	1808, 100pF/3KV
24 Model	1206, 10 μ F/50V	1206, 10 μ F/50V	47 μ H	1808, 100pF/3KV

EFT/Surge Filter

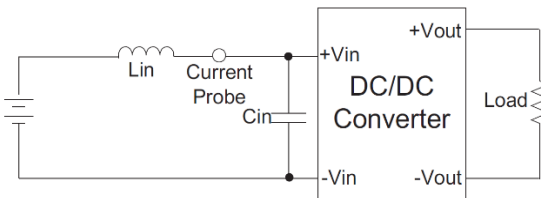
Input filter components (C1) is used to help meet IEC61000-4-4 and IEC61000-4-5



	C1
12 Models	330 μ F, 100V
24 Models	330 μ F, 100V

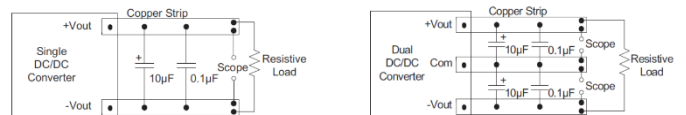
Input Reflected Ripple Current Test Step

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 Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

Use a 10 μ F electrolytic capacitor and 0.1 μ F ceramic capacitor. The Scope measurement bandwidth is 20MHz.



Remote ON / OFF Test Step

Input current (2-4mA) via 1K Ω to Pin3 , converter OFF. open or high impedance , converter ON.

