GAPTEC®
GREEN TECHNOLOGY

2TC12W4_3RP Series

2W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

DC-DC Converter 2 Watt

- Wide (4:1) input range
- Operating temperature: -40°C ~ +75°C
- 3000VDC isolation
- Full SMD technology
- Remote on/off control
- MTBF>1,000,000 hours
- Short circuit protection (SCP)
- Industry standard pinout
- Under voltage lockout

The 2TC12W4_3RP Series is specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:
1) Where the voltage of the input power supply is wide range (voltage range ≤2:1);
2) Where isolation is necessary between input and output (Isolation Voltage ≤3000VDC);
3) Where the regulation of the output voltage and the output ripple noise are demanded.

SHORT CIRCUIT PROTECTED SCP

100% RoHS compliant 6/6

Common specifications

Short circuit protection:	Continuous, automatic recovery
Cooling:	Free air convection
Operation temperature range:	-40°C – +75°C
Storage temperature range:	-55°C – +125°C
Temperature rise at full load:	15°C TYP
Lead-free reflow solder process:	IPC/JEDEC J-STD-020D.1
Reflow temperature:	peak 245°C MAX (10 sec.)
Vibration:	MIL-STD-810F
Storage humidity range:	< 95%
MTBF (MIL-HDBK-217F @25°C):	>890,000 hours
Base material:	UL94V-0 rated
Dimensions (WxLxH):	14.65x14.4x8.95mm
Weight:	2g

Input specifications

Item	Test condition	Min	Typ	Max	Units
Start up time	Nominal Vin and constant resistive load		30		ms
Input filter	Capacitor				
Input surge voltage	Capacitor				
Input reflected ripple current*	• 12V • 24V				mA pk-pk
Remote on/off	ON: open or high impedance OFF: 2-4mA input current (via 1K) OFF stand by input current, 3.0mA max.				
Under voltage lockout	12V: module on/off 24V: module on/off		4.1/3.5 8.5/7		VDC VDC

* simulated source inductance of 12μH and a source capacitor Cin (47μF, ESR<1.0Ω at 100KHz

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute	3000			VDC
Isolation resistance		1000			MΩ
Isolation capacity		25			pF

Example:
2TC12W4_1205S3RP
2= 2Watt; TC12= SMT12; W4= Wide Input; 12Vin; 5Vout; S= Single Output; 3= 3kVDC; R= Regulated Output; P= Short Circuit Protection

Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage accuracy				±1	%
Line regulation				±0.2	%
Load regulation				±0.5	%
Cross regulation*				±5	%
Temperature drift	Refer to recommended circuit			±0.02	%/°C
Ripple & Noise*	20MHz Bandwidth			100	mVp-p
Transient recovery time	Vin=Typ., 25% load step change		500		μS
Transient response deviation	Vin=Typ., 25% load step change			±3	%
Switching frequency	100% load, nominal input voltage	100			KHz

* One load is 25-100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
** Measured with a 10μF electrolytic capacitor and 1.0μF ceramic capacitor.

EMC specifications

CE*	EN55032	CLASS A
RE*	EN55032	CLASS A
ESD	IEC/EN61000-4-2	perf. Criteria A
RS	IEC/EN61000-4-3	perf. Criteria A
EFT**	IEC/EN61000-4-4	perf. Criteria A
Surge**	IEC/EN61000-4-5	perf. Criteria A
CS	IEC/EN61000-4-6	perf. Criteria A
PFMF	IEC/EN61000-4-8	perf. Criteria A

* Input filter components are required to help meet conducted emissions and radiated emissions class A
** An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

Note:
1. All specifications are measured at nominal input voltage, constant resistive load between Min. and Max. Output current, and probe bandwidth should be under 20MHz, Ta = +25°C.
2. When Load is lower than Min. output current or under no-load, it will not damage the devices; however, it may not meets all specifications.
3. In this datasheet, all the test methods of indications are based on corporate standards.
4. Only typical models listed, other models may be different, please contact our technical person for more details.

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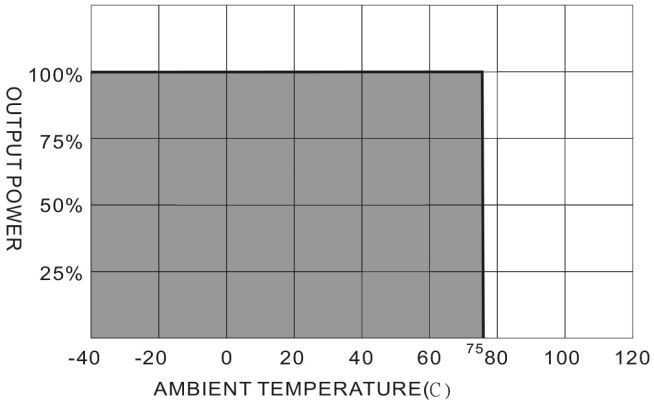
2TC12W4_3RP Series

2W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

Part Number	Input Voltage [VDC] Nominal	Range	Input Current [mA, max]	Output Voltage [VDC]	Output Current [mA, max]	Capacitor load [µF, max]	Efficiency [%, Typ.]
2TC12W4_1205S3RP	12	4.5-18		5	400		78
2TC12W4_1212S3RP	12	4.5-18		12	167		79
2TC12W4_1215S3RP	12	4.5-18		15	134		81
2TC12W4_2405S3RP	24	9-36		5	400		78
2TC12W4_2412S3RP	24	9-36		12	167		79
2TC12W4_2415S3RP	24	9-36		15	134		81
2TC12W4_1212D3RP	12	4.5-18		±12	±83		79
2TC12W4_1215D3RP	12	4.5-18		±15	±67		81
2TC12W4_2412D3RP	24	9-36		±12	±83		79
2TC12W4_2415D3RP	24	9-36		±15	±67		81

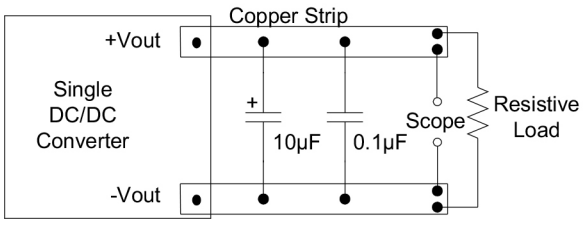
Typical characteristics

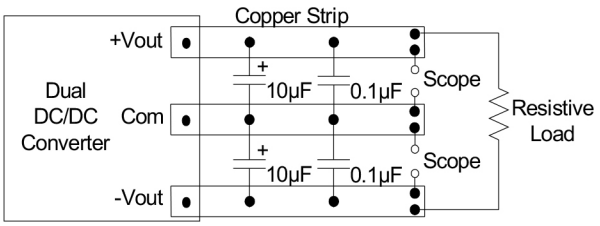
Derating curve



Output ripple & noise measurement test

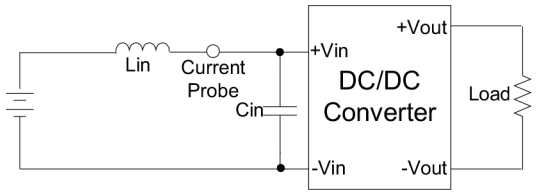
Use a 10µF electrolytic capacitor and 0.1µF ceramic capacitor.
The Scope measurement bandwidth is 20MHz.





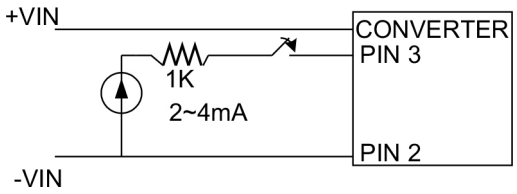
Input reflected ripple current test step

Input relected ripple current is measured through a source inductor Lin (12μH) and a source capacitor Cin (47μF, ESR<1.0Ω at 100KHz) at nominal input and full load.



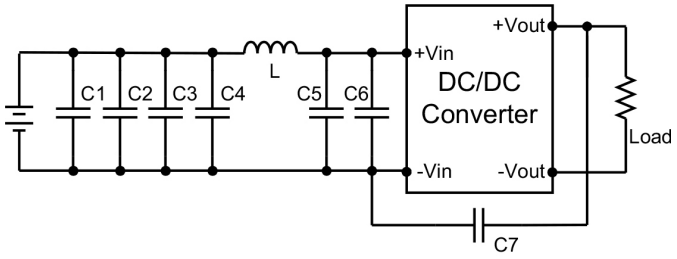
Remote on/off test step

Input current (2~4mA) via 1KΩ to Pin3, converter OFF.
Open or high maintenance, converter ON.



EMI filter (conducted emissions)

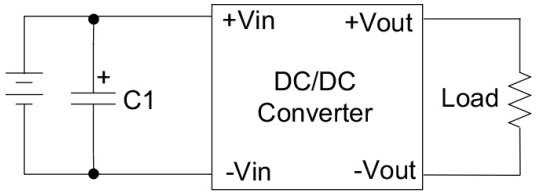
Input filter components (C1~C7,L) are used to meet EMI test criterial A. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	C2~C6	L	C7
2TC12W4_12xxS3RP	1206, 10uF/50V		2.2uH	1808, 100pF/3KV
2TC12W4_24xxS3RP	1206, 10uF/50V	1206, 10uF/50V	47uH	1808, 100pF/3KV

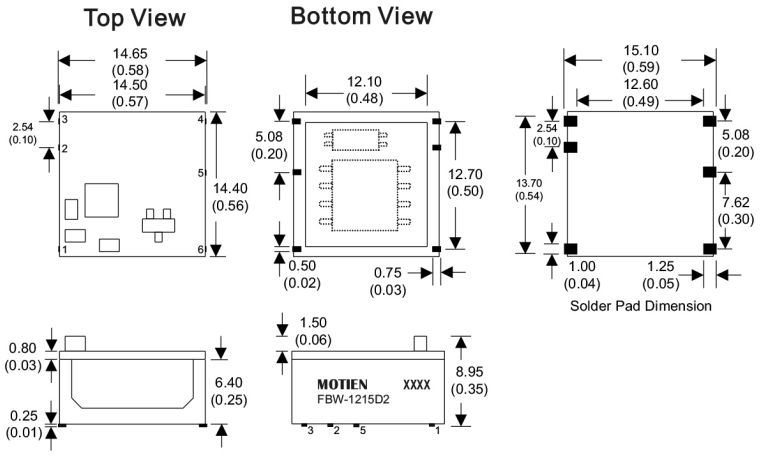
EFT/Surge filter

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



	C1
2TC12W4_12xxS3RP	330μF,100V
2TC12W4_24xxS3RP	330μF,100V

Mechanical dimensions



PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	+V Input	+V Input
2	-V Input	-V Input
3	Remote On/Off	Remote On/Off
4	+V Output	+V Output
5	N.C.	Common
6	-V Output	-V Output

Notes : All dimensions are typical in millimeters (inches).
1. Not marked Tolerances: ±0.25 (±0.01)
2. N.C = No Connection