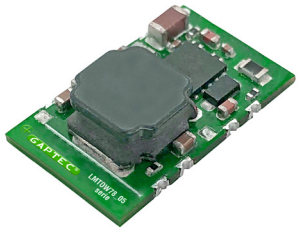
LMTOW78_0.5 series

Wide input, non-isolated & regulated, single output, SMD package



Switching Regulator

- **Short circuit protection (SCP)**
- **SMD package, full SMD technology**
- **Efficiency up to 92%**
- **High voltage input range, up to 72V**
- **Remote ON/OFF control**
- **Operating ambient temperature range: -40°C ~ +105°C**
- **Excellent line/load regulation**
- **RoHS compliance**

The LMTOW78_0.5 series are high efficiency switching regulators. The converters feature high efficiency, low loss and short-circuit protection in a compact SMD package. These products are widely used in applications such as industrial control, instrumentation and electric power.

Common specifications	
Cooling:	Nature convection
Short circuit protection:	Continuous, automatic recovery
Operating temperature range:	-40°C ~ +105°C -40°C ~ +60°C (for 100% load)
Storage temperature range:	-55°C ~ +125°C
Reflow soldering temperature:	260°C, MAX Peak temp. ≤245°C, maximum duration time ≤10s. For actual application, please refer to IPC/JEDEC J-STD-020D.1.
Storage humidity range:	< 95%
Safety standard:	IEC/EN 60950-1, 62368-1
Case material:	Plastic [UL94-V0]
MTBF (MIL-HDBK-217F,+25°C):	> 4,800,000 hours
Package weight:	1.8g
Dimensions:	1.96 x 1.19 x 0.50mm

Output specifications					
Item	Test conditions	Min	Typ	Max	Units
Voltage accuracy				±2	%
Voltage adjustability	input voltage range			±10	%
Line regulation				±1	%
Load regulation				±1	%
Ripple + Noise*	20MHz bandwidth			75	mVpk-pk
Temperature coefficient				±0.02	%/°C
Transient recovery time	Normal Vin, 25% load step change		250		µs
Transient response deviation	Normal Vin, 25% load step change			±3	%
Switching frequency			150~550		KHz

* Measured with a 0.1µF ceramic capacitor & 10µF electrolytic capacitor.

Input specifications					
Item	Test conditions	Min	Typ	Max	Units
Start up time	nominal Vin and constant resistive load		10		ms
Input filter	Capacitors				
Input reflected ripple current*			35		mApk-pk
Surge voltage	100ms			75	VDC
Remote ON/OFF CTRL*	• ON • OFF • OFF Idle current	open circuit short circuit CTRL (pin 10) and GND		1	mA

* Measured through a source indicator L1 (12µH) and a source capacitor C1=10µF at nominal input and full load.
** The remote ON/OFF pin is referenced to GND.

EMC specifications			
EMI	CE*	CISPR32/EN55032	CLASS B
EMI	RE*	CISPR32/EN55032	CLASS B
EMS	ESD	IEC/EN61000-4-2	perf. Criteria A
EMS	RS	IEC/EN61000-4-3	perf. Criteria A
EMS	EFT**	IEC/EN61000-4-4	perf. Criteria A
EMS	Surge**	IEC/EN61000-4-5	perf. Criteria A
EMS	CS	IEC/EN61000-4-6	perf. Criteria A
EMS	PFMF	IEC/EN61000-4-8	perf. Criteria A

* The series can meet EN55032 Class B with an external filter in parallel with the input pins.
** An external filter is required if the module has to meet IEC61000-4-4 & IEC61000-4-5.

Example:
LMTOW78_05-0.5
LM = Series; T = SMT case; O = Open frame; W = Wide input;
05 = 5Vout; 0.5 = 0.5A

Note:
1. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
2. In this datasheet, all the test methods of indications are based on corporate standards.

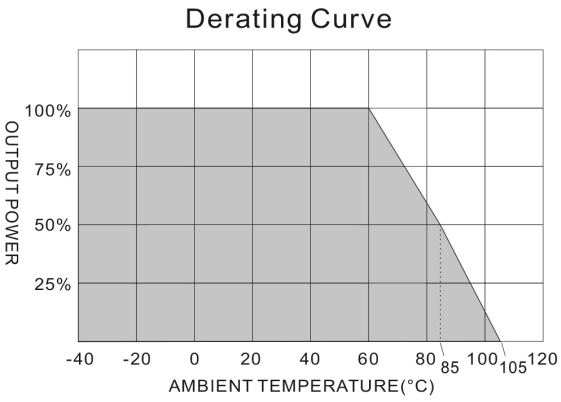
GAPTEC-Electronic GmbH & Co. KG
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Specifications subject to change without notice.

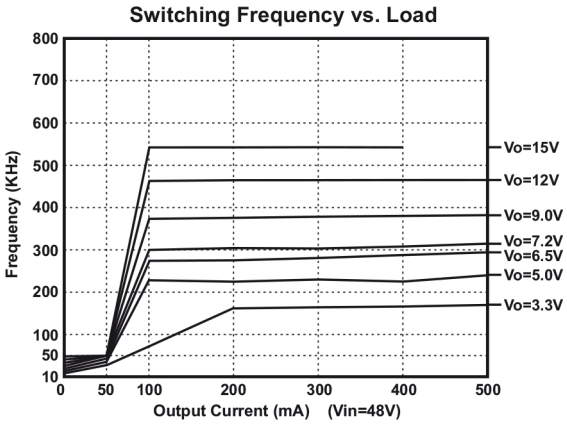
LMTOW78_0.5 series

Wide input, non-isolated & regulated, single output, SMD package

Part Number	Input Voltage [VDC] Nominal	Range	Output Voltage [VDC]	Output Current [mA, Max]	Capacitive load [µF, max]	Efficiency [Vin. max]
LMTOW78_03-0.5	48	9-72	3.3	500	100	70
LMTOW78_05-0.5	48	9-72	5	500	100	74
LMTOW78_06-0.5	48	9-72	6.5	500	100	78
LMTOW78_07-0.5	48	14-72	7.2	500	100	81
LMTOW78_09-0.5	48	14-26	9	500	100	84
LMTOW78_12-0.5	48	17-72	12	500	100	86
LMTOW78_15-0.5	48	21-72	15	400	100	84

Typical characteristics

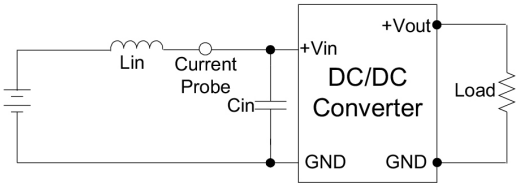




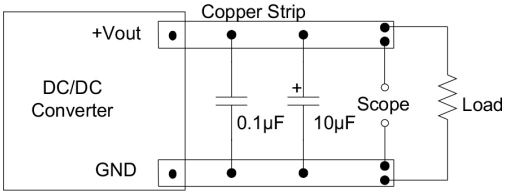
The switching frequency is different according to output voltage models.

Test configurations

Input reflected ripple current test step
Input reflected ripple current is measured though a source inductor Lin (12µH) and a source capacitor Cin (10µF, ESR<1.0Ω at 100KHz) at nominal input and full load.

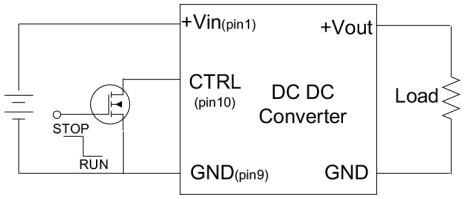


Output ripple & noise measurement test
Use a capacitor Cout (1.0µF) measurement.
The scope measurement bandwidth ist 0-20MHz.

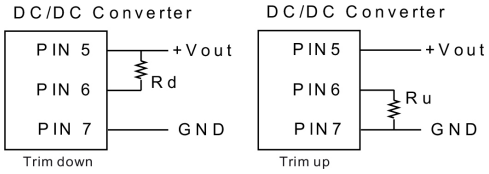


Design configurations

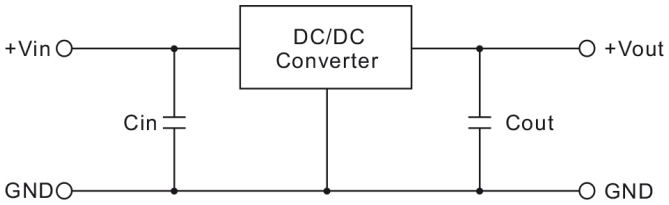
Remote ON/OFF test step
Input filter components (C1, C2, L1, C3, C4) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



Output voltage adjustment
Pin 6 via a resistor to +Vout (pin5), Vo trim down.
Pin 6 via a resistor to GND (pin 7), Vo trim up.



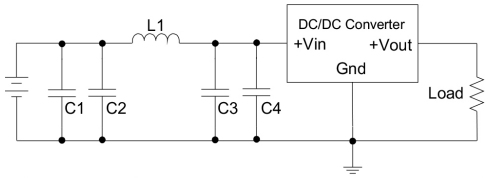
Standard application circuit



Note:
1. Cin is required and must be connected close to the pin terminal of the module. (Cin=10µF).
2. Cout= 10µF (optional)

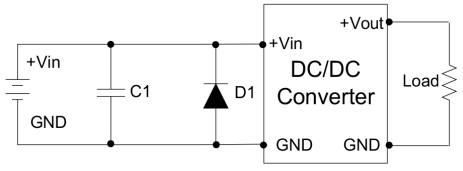
EMC countermeasures

EMI countermeasures
Input filter components (C1, C2, L1, C3, C4) 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.



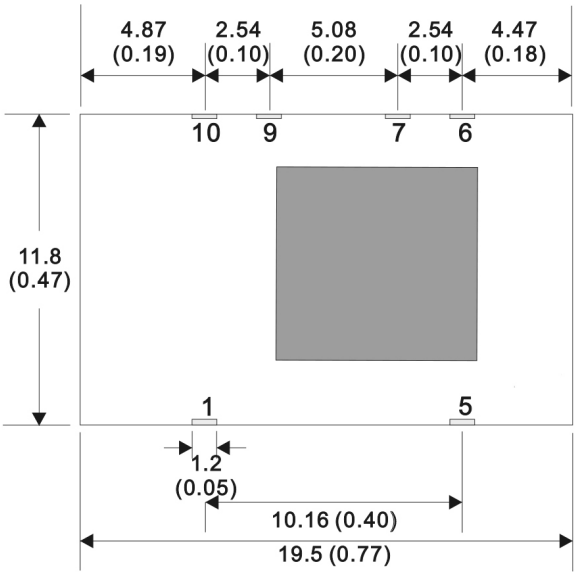
	C1 & C2	L1	C3 & C4
	1206 2.2uF/100V	56uH	1206 2.2uF/100V

EFT & Surge test countermeasures
The filter we suggest: Nippon - chemi - con KY series, 330µF/100V and TVS, 3KW, 70V

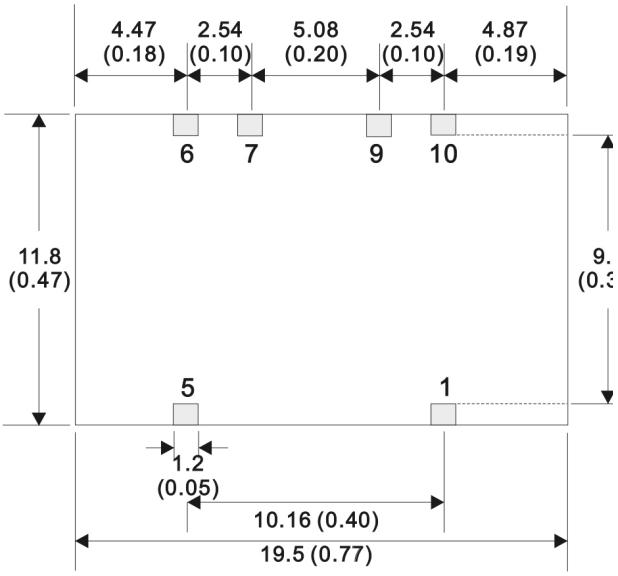


	C1	D1
	330uF/100V	SMDJ70A

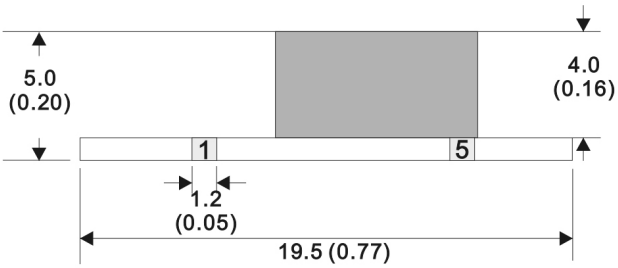
Mechanical dimensions



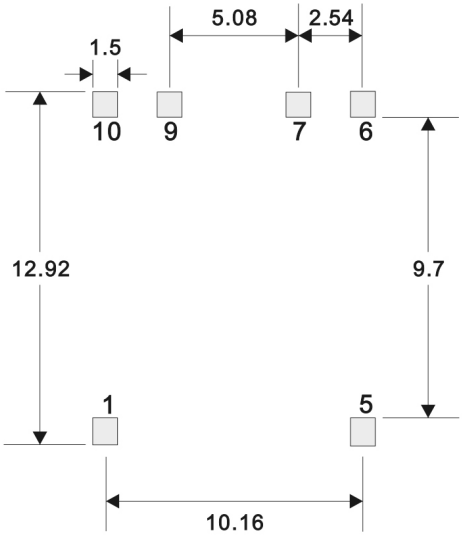
Top view



Bottom view



Side view



Solder Pad Dimension

PIN CONNECTIONS	
PIN NUMBER	SINGLE
1	+ V Input
5	+V Output
6	Trim
7	GND
9	GND
10	CTRL

Notes : All dimensions are typical in millimeters (inches
1. Pin pitch tolerances: ±0.25 (±0.01)
2. Pin profile tolerance: ±0.1 (±0.004)
3. Other tolerances: ±0.5 (±0.02)