



LMT078_0.5R series

Single Positive Output

Switching Regulator

- ⊕ Ultra-thin surface mount package ($\leq 3.5\text{mm}$)
- ⊕ Operating temperature range: -40°C to $+85^{\circ}\text{C}$

- ⊕ Up to 95% efficiency
- ⊕ Short circuit protection (SCP)
- ⊕ MSL level 1
- ⊕ MTBF 2,000,000 hours

Introducing our new ultra-thin surface-mount LMT078_0.5R series, engineered for space-critical applications without compromising performance. With a profile of max. 3.5 mm, this compact module operates reliably across a wide temperature range from -40°C to $+85^{\circ}\text{C}$. Delivering up to 95% efficiency, it maximizes energy usage while minimizing heat generation. Built-in short circuit protection (SCP) safeguards your system, and with an MSL rating of level 1, the device offers unlimited floor life under standard conditions. Designed for long-term dependability, it boasts an impressive MTBF of 2,000,000 hours - making it an ideal choice for high-reliability environments.



Common specifications	
Short circuit protection	Nominal input voltage continuous, self-recovery
Switching frequency	500kHz (typ.)
Operating temperature	-40°C - $+85^{\circ}\text{C}$ (with derating)
Storage temperature	-55°C - $+125^{\circ}\text{C}$
Reflow soldering temperature	Peak temperature $T_c \leq 245^{\circ}\text{C}$, maximum 60s above 217°C
Relative humidity	5%~95% (non-condensing)
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1, Level 1
MTBF (MIL-HDBK-217F@ 25°C)	2,000,000 hours
Dimensions	12.50 x 13.50 x 3.50 mm
Weight	0.92g (typ.)
Cooling Method	Natural air cooling

Input specifications					
Item	Operating condition	Min	Typ	Max	Units
No-load input current			0.2	1.5	mA
Reverse polarity at input	Forbidden				
Input filter	Capacitive filtering				
Ctrl (Remote ON/OFF) *	Module on Ctrl pin open or pulled high (TTL3.2-8VDC) Module off Ctrl pin connect to GND or pulled low (0-0.8VDC)				
Ctrl (Remote ON/OFF) *	Input current when off		30	100	μA

Note: *The Ctrl pin voltage is referenced to input GND.

Output specifications						
Item	Operating condition	Min	Typ	Max	Units	
Voltage accuracy (full load, input voltage range)	3.3VDC output other models		± 2 ± 2	± 4 ± 3	%	
Linear regulation	Full load, input voltage range		± 0.2	± 0.4	%	
Load regulation (Nominal input voltage, 10%-100% load)	3.3/5VDC output other models		± 0.6 ± 0.3		%	
Ripple & noise (20MHz bandwidth, nominal input voltage)	3.3VDC output, 20%-100% load other models, 10%-100% load		20 50	50 100	mVp-p	
Transient recovery time	25% load step change, nominal input voltage		0.2	1	ms	
Transient response deviation	25% load step change, nominal input voltage		± 50	± 200	mv	
Temperature drift coefficient	Operating temperature -40 - $+85^{\circ}\text{C}$	--	--	± 0.03	%/ $^{\circ}\text{C}$	

Example:

LMT078_05-0.5R

LM = Series; T = SMT case; O = Open frame; 05 = 5Vout; 0.5 = 0.5A; R = Revised

- The maximum capacitive load is tested in the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at $T_a = 25^{\circ}\text{C}$, humidity $< 75\%RH$, nominal input voltage and output rated load;
- All index test methods in this manual are based on our corporate standards;
- Product specifications are subject to change without notice.

EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (see Figure 3-② for recommended circuit)			
EMI	RE	CISPR32/EN55032 CLASS B (see Figure 3-② for recommended circuit)			
EMS	ESD	IEC/EN61000-4-2	Contact $\pm 4\text{kV}$	Perf. Criteria	B
EMS	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria	A
EMS	EFT	IEC/EN61000-4-4	$\pm 1\text{kV}$ (see Figure 3-③ for recommended circuit)	Perf. Criteria	B
EMS	Surge	IEC/EN61000-4-5	line to line $\pm 1\text{kV}$ (see Figure 3-④ for recommended circuit)	Perf. Criteria	B
EMS	CS	IEC/EN61000-4-6	3 Vr.m.s	Perf. Criteria	A

LMT078_0.5R series

Single Positive/Negative Output

Product Selection Guide

Approval	Part number	Input Voltage Nominal Range (VDC)	Output Voltage (VDC)	Output Current (mA) max.	Full Load Efficiency (%/typ.)	Capacitive Load (µF) max.
	LMT078_03-0.5R	24 (4.75-36)	3.3	500	92	680
	LMT078_05-0.5R	24 (6.5-36)	5	500	93	680
	LMT078_09-0.5R	24 (12-36)	9	500	93	680
	LMT078_12-0.5R	24 (15-36)	12	500	94	680
	LMT078_15-0.5R	24 (19-36)	15	500	95	680

Product characteristic curve

Temperature derating graph

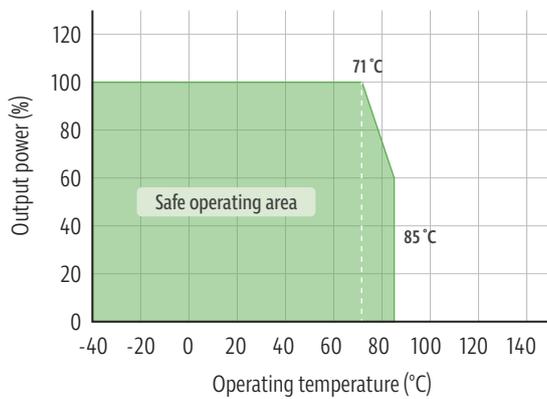
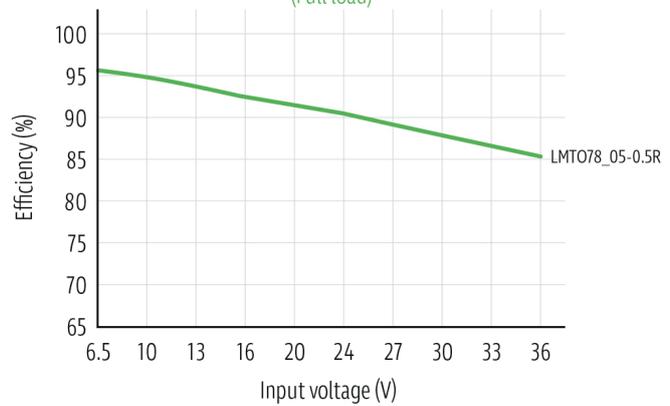
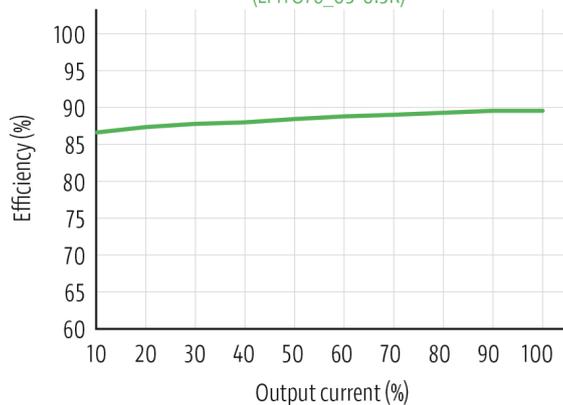


Fig.1

Efficiency vs input voltage (Full load)



Efficiency vs output load (LMT078_05-0.5R)



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Single Positive/Negative Output

Design and application circuit reference

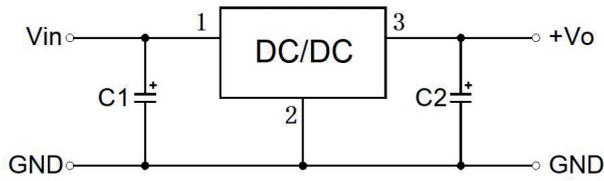


Figure 2

Recommended component parameters

Vout (VDC)	Cin (uF)	Cost (uF)
3.3	10uF/50V	22uF/10V
5	10uF/50V	22uF/16V
9/12/15	10uF/50V	22uF/25V

EMI Recommended component parameters

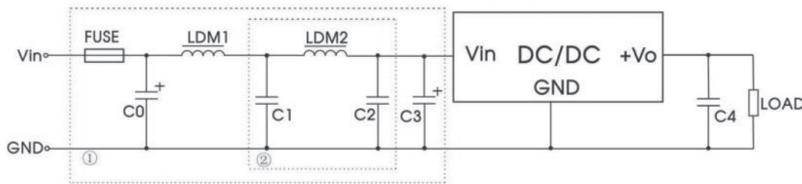


Figure 3

Recommended component parameters

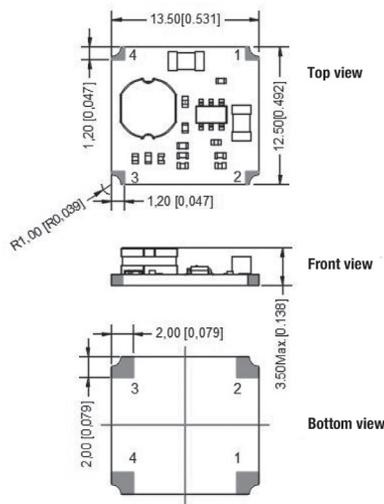
Model	Vin: 24V
FUSE	It is selected according to the customer's actual input current
C0/C3	330uF/50V
LDM1	82uH
C4	Refer to the C2 parameters in the preceding table
C1/C2	10uF/50V
LDM2	22uH

Note: Part (1) in Figure 3 is for EMS testing; Part (2) is for EMI filtering, which can be selected according to your needs

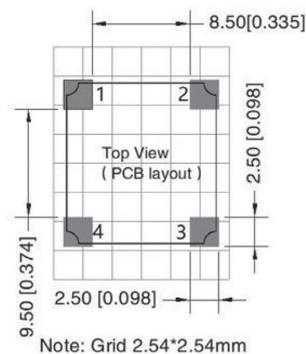
Application Circuit Description:

- In general, depending on the use environment of the product, the external capacitors C1 and C2 should be connected, and the capacitors should be located close to the pin end of the product;
- The capacitance values of C1 and C2 refer to Table 1 and can be increased as needed, and tantalum capacitors and electrolytic capacitors with low ESR can also be used;
- This product does not support hot swapping, and the output terminal cannot be used in parallel;
- If the output ripple needs to be further reduced, an „LC“ filter network can be connected to the output, and the L recommended value is 10uH-47uH

Mechanical dimensions



Note:
Unit: mm [inch]
General tolerance: ±0.3 [±0.012]



Note: Grid 2.54*2.54mm

Pin Definition Table

Pins	Single output
1	+Vin
2	GND
3	+Vo
4	Remote On/Off