LMTO78_0.5R1 series

Single Output - Non-Isolated & Regulated

Switching Regulator

- Open frame switching regulator
- Up to 95% efficiency
- Non isolated, no heatsinks are needed
- Short circuit protection (SCP)
- Operating temperature: -40°C to +85°C
- No-load input current as low as 0.2mA

Introducing our new open frame LMTO78_0.5R1 switching regulator series. Engineered for space-conscious and energy-efficient applications, this non-isolated DC-DC converter delivers up to 95% efficiency without the need for external heatsinks. With a wide operating temperature range from -40°C to +85°C, it ensures stable performance even in demanding environments. Designed with short circuit protection (SCP) and an ultra-low no-load input current of just 0.2mA, this compact open frame regulator offers high reliability and minimal energy loss - making it ideal for modern electronics where efficiency matters most.

Common specifications

Short circuit protection	Continuous, automatic recovery
Switching frequency	1.2 MHz
Operating temperature	-40°C - +85°C (with derating)
Storage temperature	-55°C - +125°C
Humidity	95% (non condensing)
Cooling	Free air convection
Weight	0.75 g
MTBF (MIL-HDBK-217F@25°C)	2,000,000 hours
Dimensions	12 x 12 x 4.5mm

Input specifications

Item	Operating condition	Min	Typ	Max	Units
No-load input current			0.2	2	mA
Reverse polarity at input	Avoid/not protected				
Input filter	Capacitance filter				

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Voltage tolerance (Full load, input voltage range)	3.3 VDC output others		±2 ±2	±4 ±3	%
Line regulation	Full load, input voltage range			0.5	%
Load regulation	10% to 100% full load			1.0	%
Ripple & noise (without output capacitor)	BW = DC to 20MHz			100	mVp-p
Temperature coefficient	Full load		±0.02		%/°C
Transient response setting time	50% load step change		250		us

Example:
LMTO78_05-0.5R1
LMT = Series; O = Open frame; 05 = 5Vout; 0.5 = 0.5A; R1 = Revised

EMC specifications

EMC	EMI	CE	CISPR32/EN55032 CLASS B (see Fig. 1 for recommended circuit)		
EMC	EMI	RE	CISPR32/EN55032 CLASS B (see Fig. 1 for recommended circuit)		
EMC	EMS	ESD	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B
EMC	EMS	RS	IEC/EN 61000-4-3	10V/m	perf. Criteria B
EMC	EMS	EFT	IEC/EN 61000-4-4	±1kV	perf. Criteria B
EMC	EMS	Surge	IEC/EN 61000-4-5	line to line ±1kV	perf. Criteria B
		CS	IEC/EN 61000-4-6	3Vr.m.s	perf. Criteria B

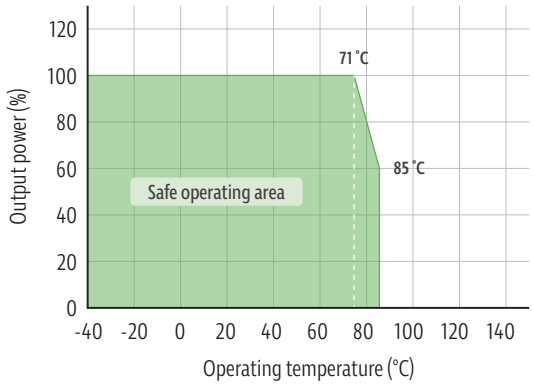
Product Selection Guide

Approval	Part number	Input Voltage Range (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%) min. Vin	Efficiency (%) max. Vin	Capacitive Load (µF) max.
	LMTO78_03-0.5R1	4.75-36	3.3	500	85	76	680
	LMTO78_05-0.5R1	6.5-36	5	500	90	81	680
	LMTO78_06-0.5R1	8-36	6.5	500	91	83	680
	LMTO78_09-0.5R1	12-36	9	500	93	87	680
	LMTO78_12-0.5R1	15-36	12	500	94	88	680
	LMTO78_15-0.5R1	19-36	15	500	95	90	680

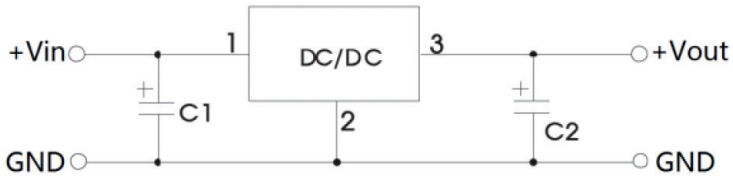
Note: For input voltage exceeding 30 VDC, an input electrolytic capacitor of 22uF/50V is required to prevent the module from being damaged by voltage

Product characteristic curve

Temperature derating graph



Design and application circuit recommended



Vout	C1	C2
3.3	10µF/50V	22µF/10V
5		22µF/10V
6.5		22µF/16V
9		22µF/16V
12		22µF/25V
15		22µF/25V

Recommended EMC Circuit

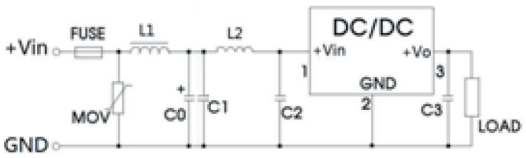
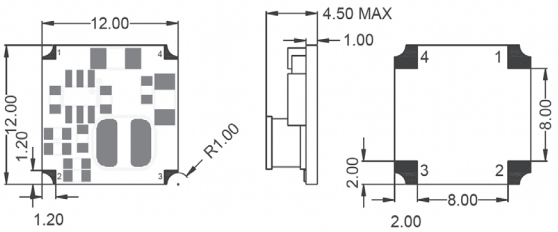


Fig 1

FUSE	Select fuse value according to actual input current
MOV	S20K471K
L1	82µH
C0	680µF /50V
L2	22µH
C1	4.7µF /50V
C2, C3	Recommended Test Circuit

Mechanical dimensions



PIN Connection

PIN	1	2	3	4
FUNCTION	+Vin	NC	+Vout	GND