



LMS78_2.0R series

Negative/Positive Output

Switching Regulator

- ⊕ SIP3 package type
- ⊕ Operating temperature range: -40°C to +85°C
- ⊕ Up to 95% efficiency
- ⊕ No-load input current as low as 0.1mA
- ⊕ Short circuit protection (SCP)
- ⊕ MTBF: 2,000,000 hours

Introducing our new LMS78_2.0R series — a highly efficient, compact DC-DC converter line designed in a slim SIP3 package for easy integration into space-constrained designs. Operating reliably across a temperature range from -40°C to +85°C and delivering efficiency levels of up to 95%, this series ensures exceptional performance with minimal energy loss.

With an ultra-low no-load input current of just 0.1 mA, it is ideal for power-sensitive and standby-mode applications. Built-in short-circuit protection enhances system reliability, while an MTBF of 2,000,000 hours underscores the long-term durability of the design. The LMS78_2.0R series offers a powerful, modern alternative for high-efficiency, low-profile power regulation.



Common specifications

Short circuit protection	Nominal input voltage; continuous, self recovery
Switching frequency	400kHz (typ.)
Operating temperature	-40°C - +85°C (with derating)
Storage temperature	-55°C - +125°C
Pin welding resistance temperature	300°C welding time: 10s (max.)
Relative humidity	5-95%RH (non-condensing)
MTBF (MIL-HDBK-217F@25°C)	2,000,000 hours
Reverse polarity input	Forbidden
Input filter	Capacitor filter
Case material	Black flame-retardant and heat-resistant plastic (UL94V-0)
Package dimensions	11.50 x 9.00 x 17.50
Weight	3.8g (typ.)
Cooling method	Free air convection

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input current (no-load)	Positive Output		0.1	1	mA
	Negative output			1	
	• -3.3V/-5V output			2	
	• -9V/-12V/-15V output				

Example:

LMS78_05-2.0R

LM = Series; S = SIP Case; 05 = 5Vout; 2.0 = 2.0A; R = Revised version

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output Voltage Accuracy (Full Load, Input Voltage Range)	LMS78_03-2.0R		±2	±4	%
	Others		±2	±3	
Linear Regulation	Full Load, Input Voltage Range		±0.2	±0.5	%
Load Regulation	Nominal Input Voltage, 10% to 100% Load		±0.5	±1.5	%
Ripple & Noise (20MHz Bandwidth, Nominal Input Voltage, 100% Load)	Positive output		30	75	mVp-p
	Negative output		-	150	
Instantaneous Recovery Time	Nominal input, 25% load step (25%-50%-25%, 50%-75%-50% step)		0.2	1	ms
Transient Response Deviation*	Positive output		±50	±150	mv
	Negative output		±100	±150	
Temperature Drift Coefficient	Operating Temperature -40 to +85°C			±0.03	%/°C

Note: * Nominal input, 25% load step (25% - 50% - 25%, 50% - 75% - 50% step)

1. Maximum capacitive loads are tested in the input voltage range and under full load conditions;
2. Unless otherwise specified, the parameters in this datasheet were measured at 25°C, humidity 40%-75%, input nominal voltage and output pure resistance mode under full load;
3. All index test methods are based on our company's standards;

EMC specifications

EMI	CE	CISPR32/EN55032	CLASS B (the recommended circuit is shown in fig.3-②)	CLASS B	
EMI	RE	CISPR32/EN55032	CLASS B (the recommended circuit is shown in fig.3-②)	CLASS B	
EMS	ESD	IEC/EN61000-4-2	Contact ±6kV	Perf. criteria	B
EMS	RS	IEC/EN61000-4-3	10V/m	Perf. criteria	A
EMS	EFT	IEC/EN61000-4-4	±1kV (The recommended circuit is shown in fig.3-①)	Perf. criteria	B
EMS	Surge	IEC/EN61000-4-5	line to line ±1kV (the recommended circuit is shown in fig.3-①)	Perf. criteria	B
EMS	CS	IEC/EN61000-4-6	3Vr.m.s	Perf. criteria	A

Product Selection Guide

Approval	Part number	Input Voltage Nominal Range (VDC)	Output Voltage (VDC)	Output Current (mA) max./min.	Full Load Efficiency (max.Vin)	Capacitive Load (μF) max.
	LMS78_03-2.0R	24 (6-36) 12 (8-31)	3.3 -3.3	2000/0 1000/0	87 85	1800 1000
	LMS78_05-2.0R	24 (8-36) 12 (8-35)	5 -5	2000/0 1000/0	90 86	1000 680
	LMS78_09-2.0R	24 (13-36) 12 (8-26)	9 -9	2000/0 800/0	93 86	680 330
	LMS78_12-2.0R	24 (16-36) 12 (8-23)	12 -12	2000/0 600/0	94 87	470 220
	LMS78_15-2.0R	24 (18-36) 12 (8-20)	15 -15	2000/0 600/0	95 87	470 220

Product characteristic curve

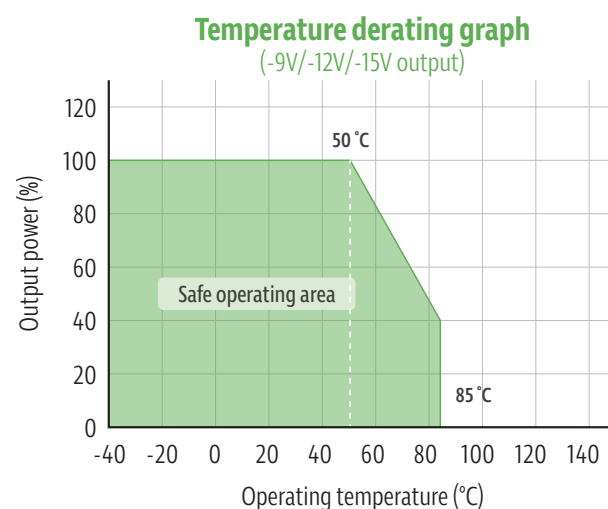
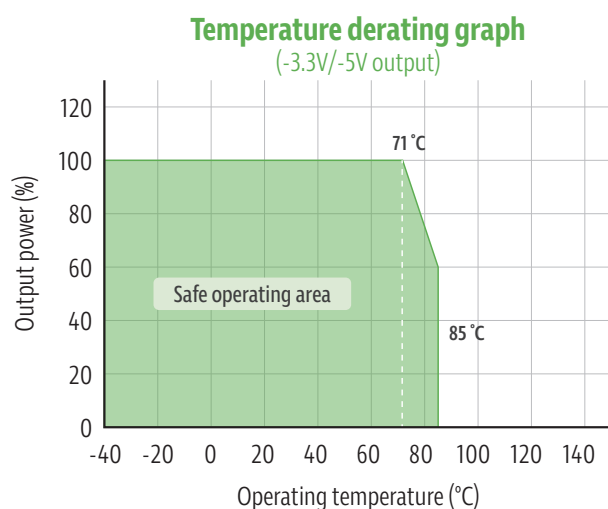
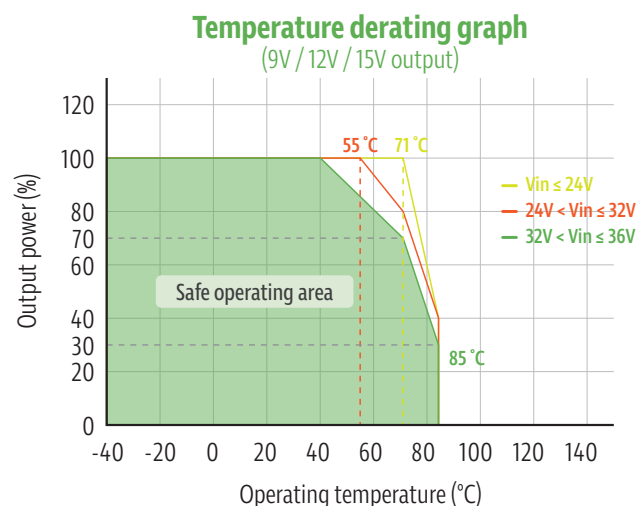
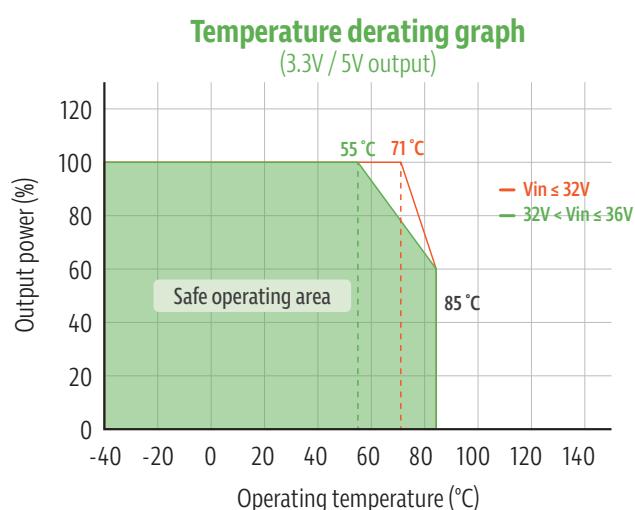
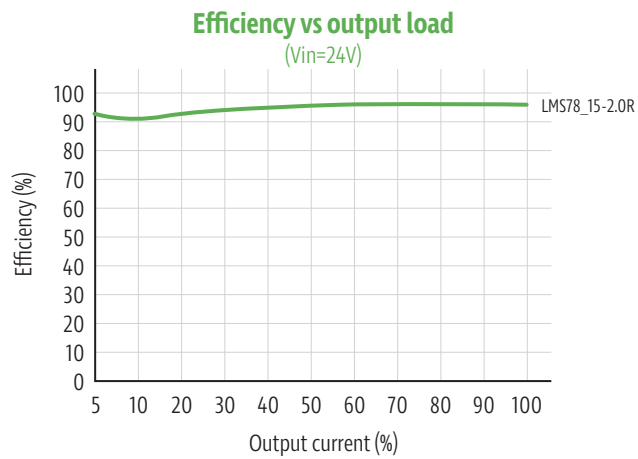
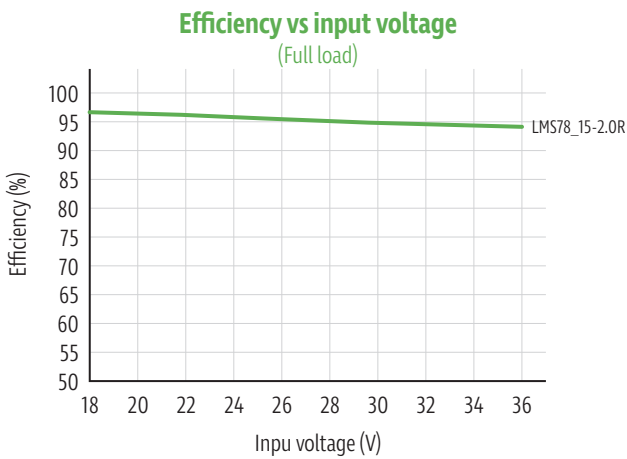
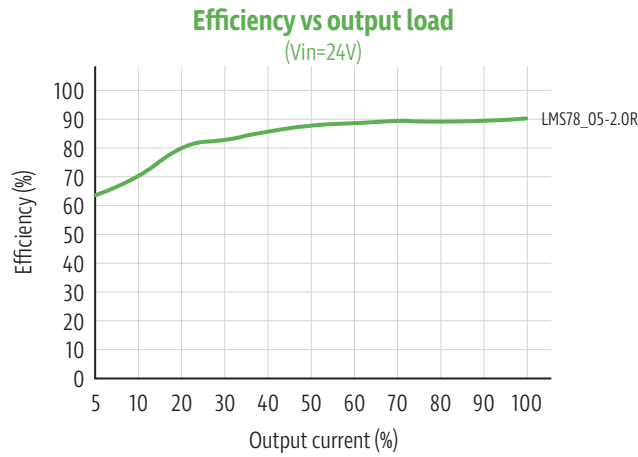
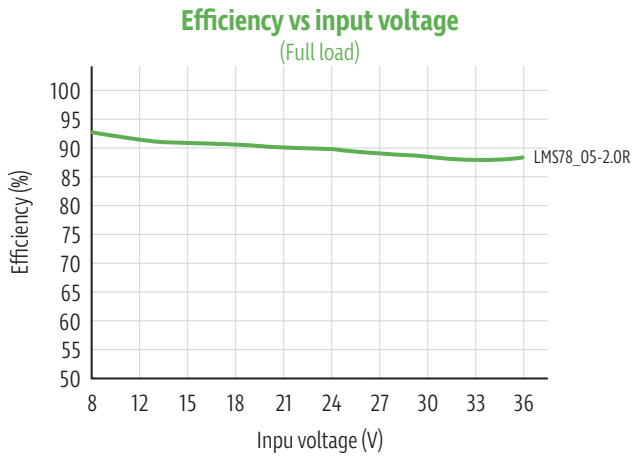


Figure 1

Product characteristic curve



Design and application circuit reference

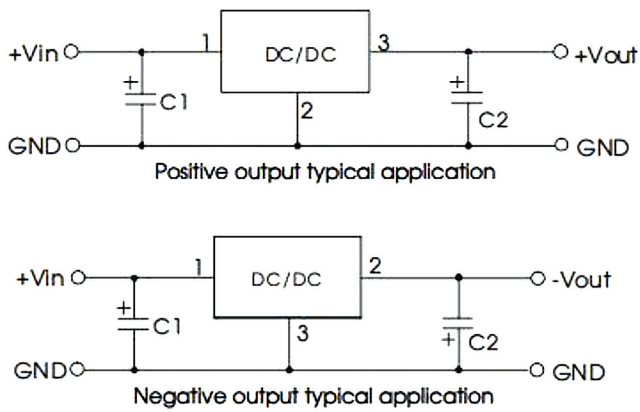


Figure 2

Recommended component parameters

Product Model	C1 (Ceramic Capacitor)	C2 (Ceramic Capacitor)
3.3	22uF/50V	22uF/10V
5	22uF/50V	22uF/10V
9	22uF/50V	22uF/16V
12	22uF/50V	22uF/25V
15	22uF/50V	22uF/25V

LMS78_2.0R series

Negative/Positive Output

EMC recommended circuit

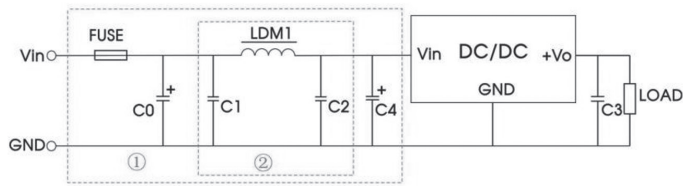


Figure 3

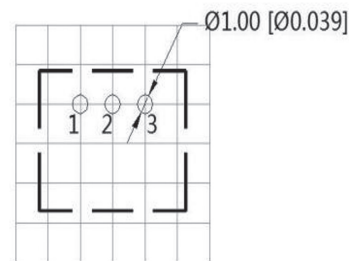
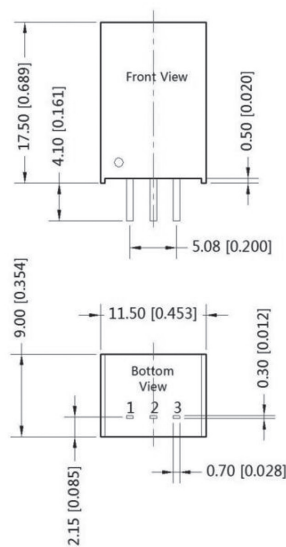
Note: Part ① in the Fig. 4 is for EMS test; Part ② is for EMI filtering; Part ① and Part ② can be added based on actual requirement.

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

EMI Recommended component parameters

Vin (VDC)	24VDC
FUSE	Choose according to actual input current
C0	100 μ F/50V
LDM1	22 μ H
C4	680 μ F/50V
C1/C2	10 μ F/50V
C3	22 μ F/50V

Mechanical dimensions



Note : Grid 2.54*2.54mm

Pin Definition Table

Pin	Positive output	Negative output
1	Vin	Vin
2	GND	-Vo
3	+Vo	GND

Note:
Unit: mm [inch]
Pin section tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]