LCN78_0.5R series

Negative/Positive Output

Switching Regulator

- SIP3 package style
- Operating temperature range: -40°C to +100°C
- Up to 96% efficiency
- Short Circuit Protection (SCP) (continuous, self recovery)
- MTBF: 2,000,000 hours

Introducing our new LCN78_0.5R series switching regulators, combining high efficiency with a compact SIP3 package for easy integration into space-conscious designs. With efficiencies of up to 96%, the series helps minimize power losses and heat generation, making it an efficient alternative for a wide range of power conversion applications. Designed for reliable operation even under demanding environmental conditions, the LCN78_0.5R series supports a wide operating temperature range from -40°C to +100°C. Integrated continuous short-circuit protection with automatic recovery provides additional system security and allows the converter to resume normal operation once the fault condition has been removed. With an impressive MTBF of 2,000,000 hours, the LCN78_0.5R series offers a combination of compact design, high efficiency and long-term reliability.

Common specifications

Short circuit protection	Nominal input voltage, continuous, self recovery
Switching frequency	500kHz (typ.)
Operating temperature	-40°C - +100°C (with derating)
Storage temperature	-55°C - +125°C
Soldering Profile	Wave soldering 260°C (±5°C); time: 5 - 10s Manual welding 360°C (±10°C); time: 3 - 5s
Relative humidity	5-95% RH (non-condensing)
MTBF (MIL-HDBK-217F@25°C)	2,000,000 hours
Reverse polarity input	Avoid
Input filter	Capacitance filter
Case material	Black flame-retardant and heat-resistant plastic (UL94V-0)
Package dimensions	11.6 x 7.55 x 10.16mm
Weight	1.8g (typ.)
Cooling method	Free air convection

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input Under-Voltage Lockout	DC-DC ON DC-DC OFF		13.4 10.2		VDC
Input Current (no-load)	Nominal 24VDC input voltage		0.3	1	mA

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy	Full load, input voltage range		±1.0	±3.0	%
Linear regulation	Full load, input voltage range		±0.2	±1.0	%
Load regulation	Nominal input voltage, 0% to 100% load		±0.2	±3.0	%
Ripple & noise	20MHz bandwidth, nominal input voltage, 0% to 100% load, use the parallel line test		1		%Vout
Temperature coefficient	Operating ambient temperature -40°C to +100°C			±0.03	%/°C

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. For specific needs please contact our technical team directly.
4. All index test methods are based on our company's standards.
5. The copyright and the right of final interpretation of the product belong to GAPTEC Electronic.

Example:
LCN78_12-0.5R
LCN = Series; 12 = 12Vout; 0.5 = 0.5A; R = Revised version

Product Selection Guide

Approval	Part number	Input Voltage Nominal Range (VDC)	Output Voltage (VDC)	Output Current (mA) max.	Full Load Efficiency (%) typ. max. Vin	Capacitive Load (µF) max.
	LCN78_12-0.5R	24 (15-42)	12	500	96	560
	LCN78_12-0.5R	24 (15-28)	-12	-500	87	560

Note: For input voltage exceeding 36 VDC, an input electrolytic capacitor of 22uF/100V is required to prevent the module from being damaged by voltage spikes.

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

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

Typical characteristics

Temperature derating graph

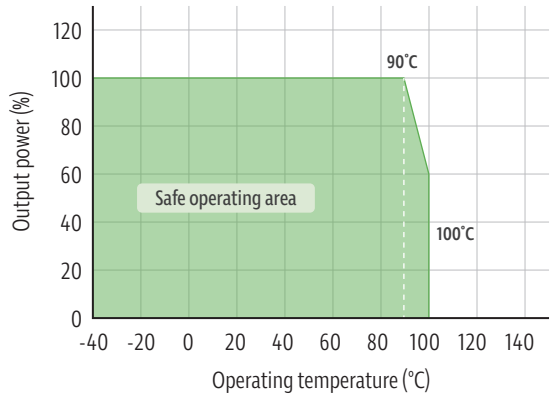
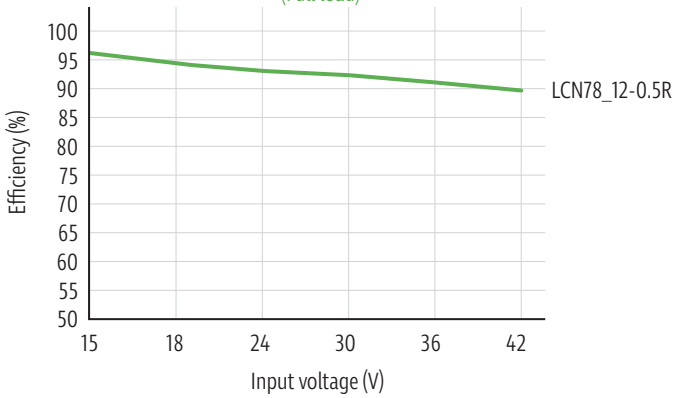


Fig.1

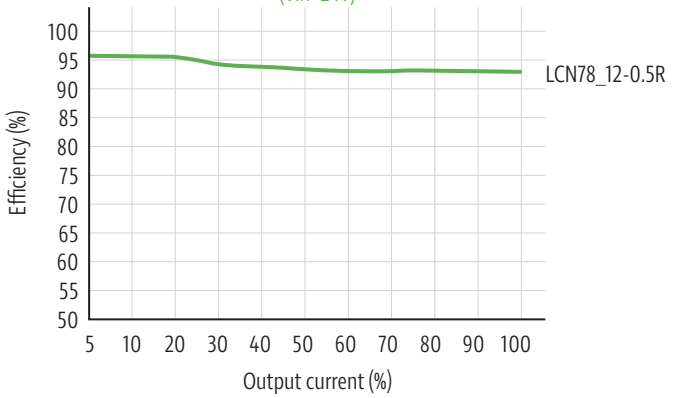
Efficiency vs input voltage

(Full load)

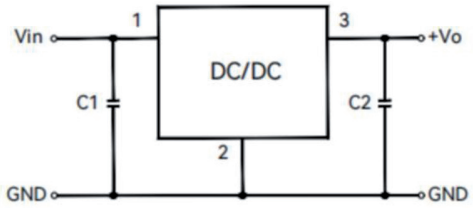


Efficiency vs output load

(Vin=24V)



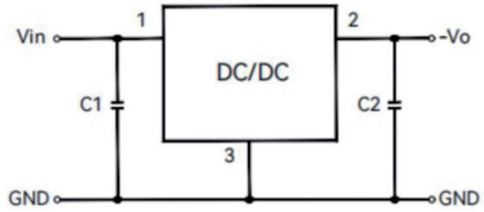
Design and application circuit reference



Positive output application circuit (fig.2)

Recommended component parameters

Product Model	C1	C2
LCN78_12-0.5R	10uF/50V	22uF/25V



Negative output application circuit (fig.3)

Recommended component parameters

Product Model	C1	C2
LCN78_12-0.5R	10uF/50V	22uF/25V

EMC recommended compliance circuit

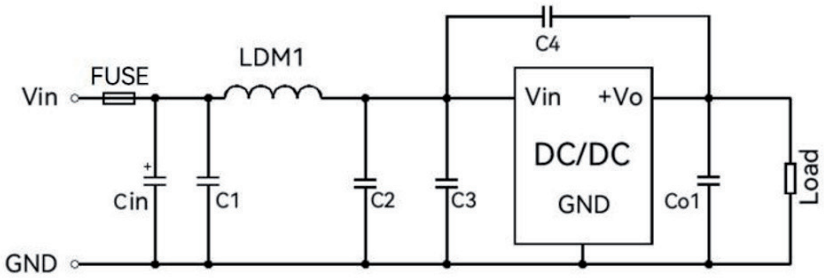
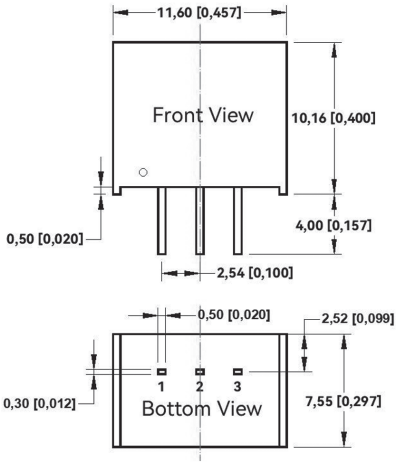


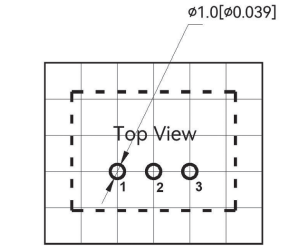
Fig.4

Recommended component parameters

Part No.	Vin: 24V
FUSE	Selected fuse value according to actual input current
LDM1	10uH
Cin	330uF/50V
C1/C2	10uF/50V
C3	1uF/50V
C4	1nF
Co1	22uF/25V

Mechanical dimensions





Note: The grid distance is 2.54mm x2.54mm

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

Pin Definition Table

Pin	Function
1	Vin
2	GND
3	+Vo