



LC78_1.0R series

Negative/Positive Output

Switching Regulator

- ⊕ SIP3 package style
- ⊕ Operating temperature range: -40°C to +85°C

- ⊕ Up to 93% efficiency
- ⊕ Short circuit protection (SCP) continuous and self recovery

Introducing our new LC78_1.0R series, a compact and efficient non-isolated DC-DC switching regulator designed for reliable voltage conversion in space-sensitive applications. Housed in a practical SIP3 package style, the series offers efficiencies of up to 95% and supports stable operation across a temperature range from -40°C to +85°C.

Integrated short circuit protection with continuous and self-recovery functionality enhances system safety and reliability during fault conditions. With an MTBF of 2,000,000 hours, the LC78_1.0R series provides a dependable solution for compact, energy-efficient, and long-life power designs.



Common specifications	
Short circuit protection	Nominal input voltage, continuous, self recovery
Switching frequency	500kHz (typ.)
Operating temperature	-40°C - +85°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 6.00 x 10.16mm (3-5V) 11.6 x 7.55 x 10.16mm (12V)
Weight	1.3g (typ.) (3-5V) 1.8g (typ.) (12V)
Cooling method	Free air convection

Input specifications					
Item	Operating condition	Min	Typ	Max	Units
Input Current (no-load)	24VDC input 03/05V out		0.2	0.25	mA
	24VDC input 12V out		0.25	0.3	

Output specifications					
Item	Operating condition	Min	Typ	Max	Units
Output voltage accuracy	Full Load, Input Voltage Range		±1.5	±3.0	
Linear regulation	Full Load, Input Voltage Range		±0.2	±0.4	
Load regulation	Nominal Input Voltage, 0% to 100% Load		±1.2	±2.0	
Ripple & noise	20MHz Bandwidth, Nominal Input Voltage, 10% to 100% Load, use the parallel line test		50	60	mVp-p
Ripple & noise	20MHz Bandwidth, Nominal Input Voltage, 0% to 10% Load, use the parallel line test		60	100	mVp-p
Transient response deviation	Nominal input, 25% load step		±60	±200	mv
Temperature Coefficient	Operating ambient temperature -40°C to +85°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. Our company can provide product customization, specific needs can directly contact our technical personnel,
4. All index test methods are based on our company's enterprise standards,
5. The copyright of this product belongs to GAPTEC Electronic.

Example:

LC78_05-1.0R

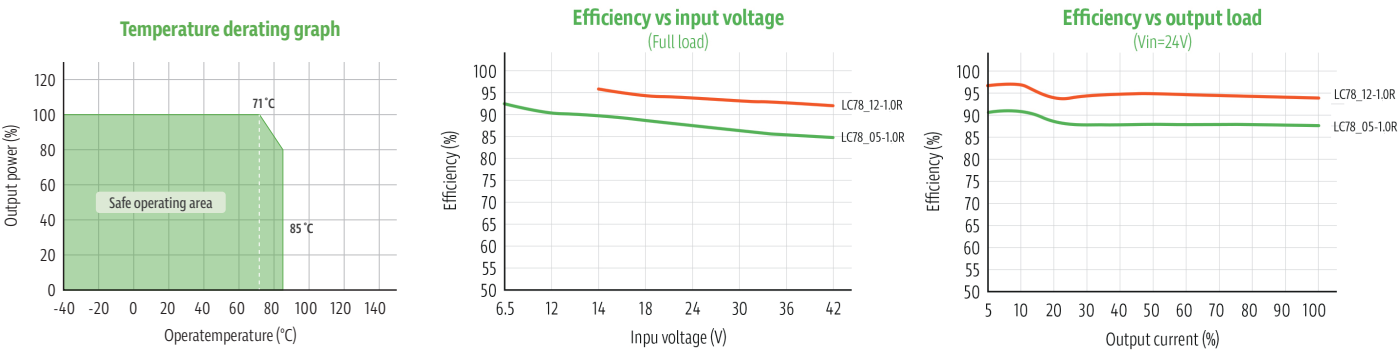
LC = Series; 05 = 5Vout; 1.0 = 1A; R = Revised version

Product Selection Guide

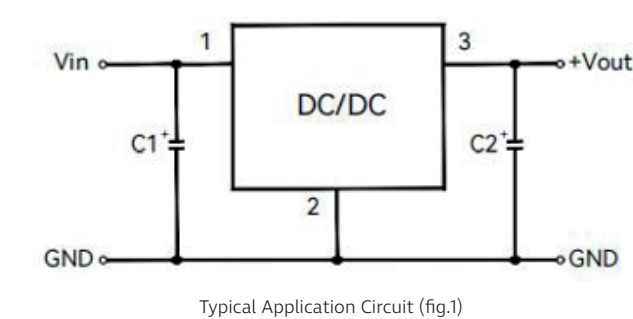
Approval	Part number	Input Voltage Nominal Range (VDC)	Output Voltage (VDC)	Output Current (mA) max.	Full Load Efficiency (% - typ.) (max. Vin)	Capacitive Load (μF) max.
	LC78_03-1.0R	24 (4.5-42)	3.3	1000	89	220
	LC78_05-1.0R	24 (6.5-42)	5	1000	92	220
	LC78_12-1.0R	24 (14-42)	12	1000	95	220

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

Typical characteristics



Design and application circuit reference



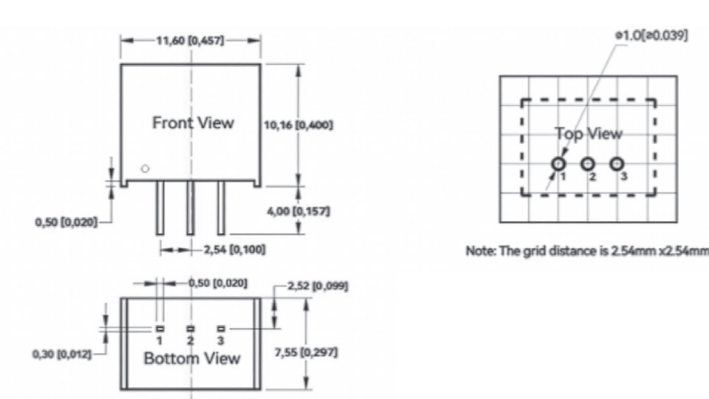
Notes:

1. The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module;
2. Refer to Table 1 for C1 and C2 capacitor values;
3. For certain applications, increased values for C2 or tantalum or low ESR electrolytic capacitors may also be used instead;
4. Converter cannot be used for hot swap and with output in parallel.

Recommended component parameters

Product model	C1	C2
3.3	10uF/50V	22uF/6.3V
5		22uF/10V
12		22uF/25V

Mechanical dimensions



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