

**DESCRIPTION: Wide Input Non-Isolated & Regulated Single Output**

TP78LXX-1 series switching regulators are ideal replacement for TP78xx linear regulators and LDOs. The efficiency of up to 97% means that very little energy is wasted as heat so there is no need for any heat sinks with their additional space and mounting costs. They are widely used in industrial control, instrumentation, and electric power applications.

**FEATURES**

ROHS Compliant	Wide input non-isolated, regulated single output	Efficiency up to 97%
Short circuit protection, Thermal shutdown	Temperature range: -40°C ~ +85°C	Low ripple noise
SIP package	No heat sink required	Industry standard pinout

**SELECTION GUIDE**

Part Number	Input Voltage (VDC)		Output		Efficiency (%)	
	Nominal	Range	Voltage (VDC)	Current (mA)	Vin (Min)	Vin(Max)
TP78L1.5-1	12	4.75~26	1.5	1000	80	71
TP78L1.8-1	12	4.75~26	1.8	1000	83	74
TP78L2.5-1	12	4.75~28	2.5	1000	88	80
TP78L3.3-1	24	4.75~28	3.3	1000	90	83
TP78L5.0-1	24	6.5~32	5.0	1000	93	88
TP78L6.5-1	24	9.0~32	6.5	1000	94	90
TP78L9.0-1	24	12~32	9.0	1000	95	92
TP78L12-1	24	16~32	12	1000	96	94
TP78L15-1	24	20~32	15	1000	97	94

The above part number with "L" Suffix are 90° bent pins power converters, for example TP78L1.5-1L.

**OUTPUT CHARACTERISTICS**

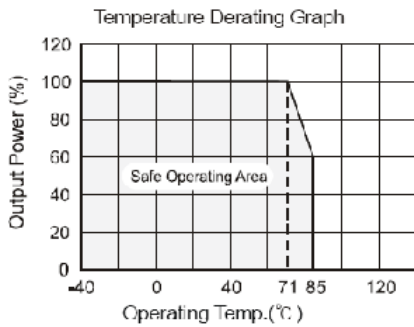
Parameter	Conditions	Min	Typ.	Max.	Units
Output voltage accuracy	100% full load		±2	±3	
Line regulation	Vin=min. to max, at full load		±0.2	±0.4	%
Load regulation	10% to 100% load		±0.4	±0.6	
Ripple & Noise	20MHz bandwidth		25	35	mvp-p
Short circuit input power			0.5	1.8	W
Short circuit protection			Continuous, automatic recovery		
Thermal shutdown	Internal IC junction		150		°C
Switching frequency	100% full load	280	330	450	KHz
Output current limit	Vin= min. to max.(at full load) Vout:1.5V~3.3V			3000	mA
Output current limit	Vin= min. to max.(at full load) Vout:5V~15V			2000	mA
Quiescent current			5	8	mA
Temperature coefficient	-40°C~+85°C ambient			±0.02	%/°C
Max capacitance load				1000	µF

All specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified.

**COMMON SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Storage humidity				95	
Operating temperature	Power derating (above 71°C)	-40		85	°C
Operating case temp				100	
Storage temperature		-55		125	
Lead temperature	1.5mm from case for 10 seconds			300	
Cooling		Free air convection			
Case material		Plastic (UL94-V0)			
MTBF	25°C (MIL-HDBK-217F)	2000			k hours
Weight			3.7		g

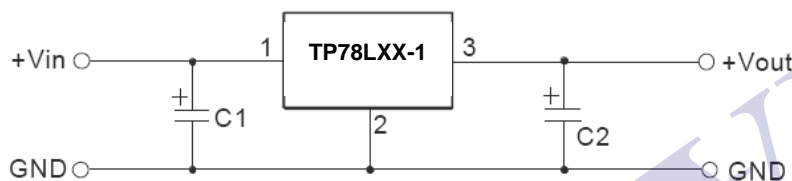
**TEMPERATURE DERATING GRAPHS**



**EXTERNAL CAPACITOR TABLE**

Part Number	C1(Ceramic Capacitor)	C2(Ceramic Capacitor)
TP78L1.5-1	10 $\mu$ F/50V	22 $\mu$ F/6.3V
TP78L1.8-1	10 $\mu$ F/50V	22 $\mu$ F/6.3V
TP78L2.5-1	10 $\mu$ F/50V	22 $\mu$ F/6.3V
TP78L3.3-1	10 $\mu$ F/50V	22 $\mu$ F/6.3V
TP78L5.0-1	10 $\mu$ F/50V	22 $\mu$ F/16V
TP78L6.5-1	10 $\mu$ F/50V	10 $\mu$ F/16V
TP78L9.0-1	10 $\mu$ F/50V	10 $\mu$ F/16V
TP78L12-1	10 $\mu$ F/50V	10 $\mu$ F/25V
TP78L15-1	10 $\mu$ F/50V	10 $\mu$ F/25V

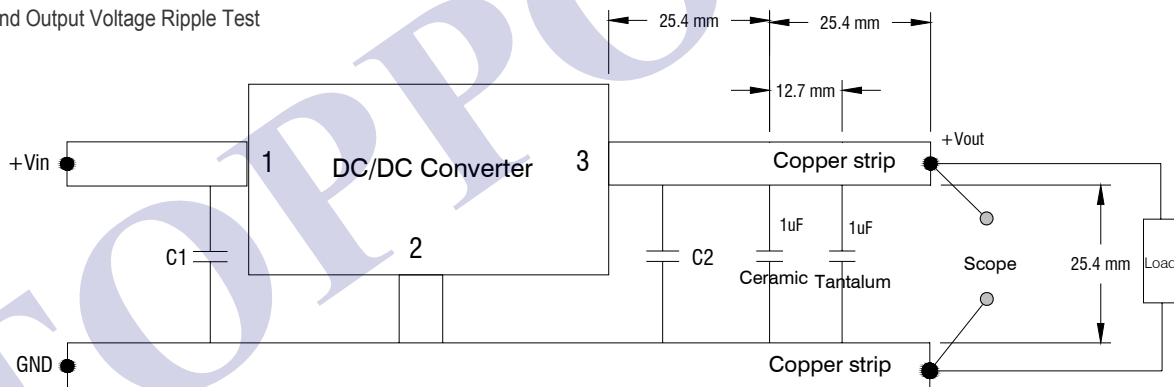
**STANDARD APPLICATION CIRCUIT**



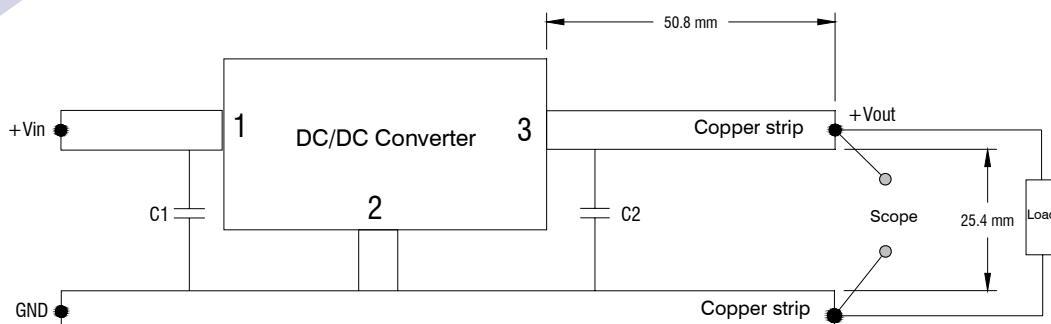
- Note:
1. C1 and C2 are required and should be fitted close to the converter pins.
  2. The capacitance of C1,C2 sees external capacitor table, it can be increased properly if required, and tantalum or low ESR electrolytic capacitors may also suffice.
  3. No parallel connection or plug and play.

**TEST CONFIGURATIONS (TA=25°C)**

1. Efficiency and Output Voltage Ripple Test

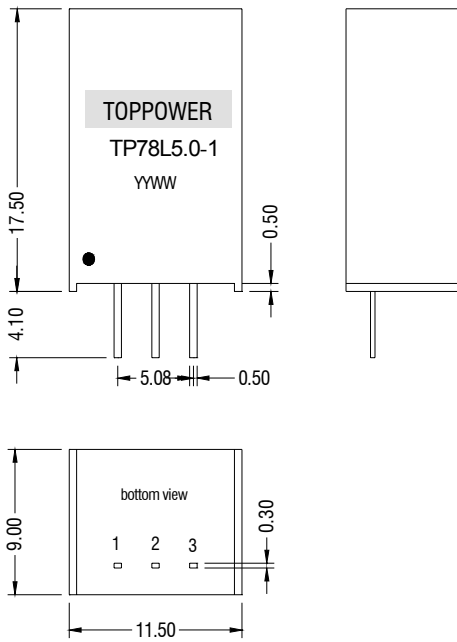


2. Start-up and Load Transient Response Test



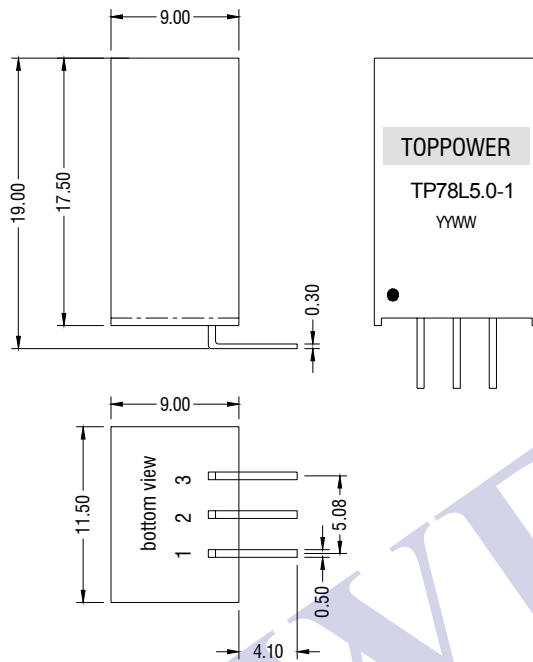
**MECHANICAL DIMENSIONS**

**SIP Package**



All dimensions in mm  $\pm 0.25$ . All pins on a 2.54mm pitch.

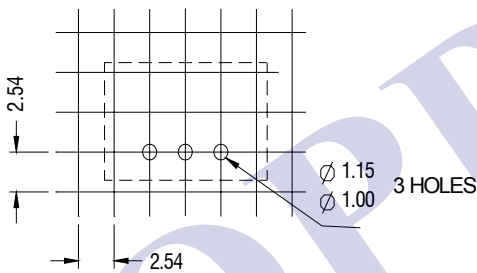
**90° bent pins power converters(part number with "L" Suffix)**



**PIN CONNECTIONS**

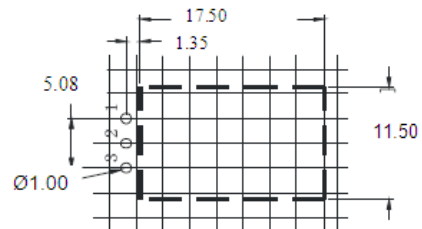
Pin	Function
1	+Vin
2	GND
3	+Vout

**RECOMMENDED FOOTPRINT DETAILS**



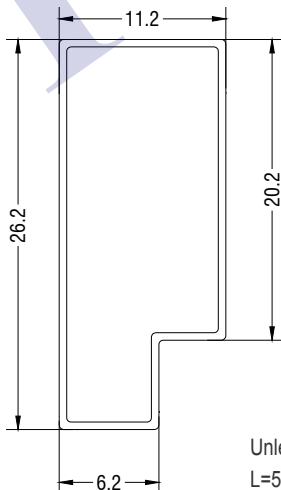
Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.

**90° bent pins power converters(part number with "L" Suffix)**

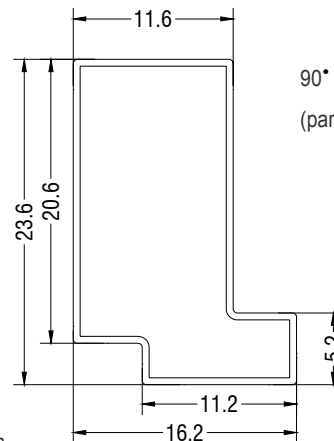


Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.

**TUBE OUTLINE DIMENSIONS**



Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.  
 L=520mm  $\pm 2$ mm Packaging quantity:44PCS  
 L=220mm  $\pm 2$ mm Packaging quantity:17PCS



90° bent pins power converters  
(part number with "L" Suffix)