CUI INC®

SERIES: P7805-S | DESCRIPTION: NON-ISOLATED SWITCHING REGULATOR

FEATURES

- up to 500 mA current output
- operating temperature range (-40~85°C)
- pin comparable to LM78 linear regulators
- wider input range
- suited for negative output applications
- low ripple and noise
- efficiency up to 96%

RoHS

MODEL

MODEL	input voltage		output voltage	output current	output power	ripple and noise[1]	efficiency
	typ (Vdc)	range (Vdc)	(Vdc)	max (mA)	max (W)	max (mVp-p)	typ (%)
P7805-Q12-S1R5-S	12	4.75~28	1.5	500	0.75	30	77
	12	4.75~25	-1.5	-400	0.6	35	66
P7805-Q12-S1R8-S	12	4.75~28	1.8	500	0.90	30	81
	12	4.75~25	-1.8	-400	0.72	35	70
P7805-Q12-S2-S	12	4.75~28	2.5	500	1.25	30	87
	12	4.75~25	-2.5	-400	1.0	35	73
P7805-Q24-S3-S	24	4.75~28	3.3	500	1.65	30	91
	12	4.75~25	-3.3	-400	1.32	35	78
P7805-Q24-S5-S	24	6.5~32	5.0	500	2.5	30	94
	12	6.5~27	-5.0	-400	2	35	83
P7805-Q24-S6-S	24	8~32	6.5	500	3.25	30	94
	12	6.5~25	-6.5	-300	1.95	35	84
P7805-Q24-S9-S	24	11~32	9.0	500	4.5	30	95
	12	7.0~23	-9.0	-200	1.8	35	86
P7805-Q24-S12-S	24	15~32	12	500	6.0	30	95
	12	7.0~20	-12	-200	2.4	35	87
P7805-Q24-S15-S	24	18~32	15	500	7.5	30	96
	12	7~17	-15	-200	3.0	35	87

Notes: 1. ripple and noise are measured at 20 MHz BW

PART NUMBER KEY

P7805 - QXX - SXX - S

- P7805 - Base Number
- QXX - Input Voltage
- SXX - Output Voltage
- S - Packaging Style: SIP

INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	-1.5, -1.8, -2.5, -3.3 V output	4.75	12	25	Vdc
	1.5, 1.8, 2.5, V output	4.75	12	28	Vdc
	3.3 V output	4.75	24	28	Vdc
	-5.0 V output	6.5	12	27	Vdc
	5.0 V output	6.5	24	32	Vdc
	-6.5 V output	6.5	12	25	Vdc
	6.5 V output	8	24	32	Vdc
	-9.0 V output	7	12	23	Vdc
	9.0 V output	11	24	32	Vdc
	-12 V output	7	12	20	Vdc
	12 V output	15	24	32	Vdc
	-15 V output	7	12	17	Vdc
	15 V output	18	24	32	Vdc
no-load input power	input voltage range		0.12	0.256	W
reverse polarity input	forbidden				
filter	capacitance filter (1 µF)				

OUTPUT

parameter	conditions/description	min	typ	max	units
capacitive load	for positive output applications			1,000	µF
	for negative output applications			470	µF
line regulation	input voltage range		±0.2	±0.4	%
load regulation	from 10% to 100% load		±0.4	±0.6	%
voltage accuracy	100% load, input voltage range		±2	±3	%
switching frequency	100% load, input voltage range	280	330	450	kHz
temperature coefficient	-40°C ~ 85°C			±0.02	%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, automatic recovery				
short circuit input power	input voltage range		0.5	1.8	W
over temperature protection	internal IC junction			150	°C

SAFETY AND COMPLIANCE

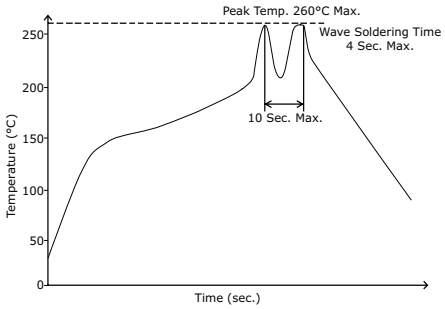
parameter	conditions/description	min	typ	max	units
conducted emissions	CISPR22/EN55022 class B (external circuit required, see figure 1-b)				
radiated emissions	CISPR22/EN55022 class B (external circuit required, see figure 1-b)				
ESD	IEC/EN 61000-4-2 class B, contact ± 4kV				
radiated immunity	IEC/EN 61000-4-3 class A, 10V/m				
EFT/burst	IEC/EN 61000-4-4 class B, ± 2kV (external circuit required, see figure 1-a)				
surge	IEC/EN 61000-4-5 class B, ± 2kV (external circuit required, see figure 1-a)				
conducted immunity	IEC/EN 61000-4-6 class A, 3 Vr.ms				
voltage dips & interruptions	IEC/EN 61000-4-29 class B, 0%-70%				
MTBF	as per MIL-HDBK-217F @ 25°C	2,000,000			hours
RoHS	2011/65/EU				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		85	°C
storage temperature		-55		125	°C
case temperature	operating temperature curve range			100	°C
storage humidity	non-condensing			95	%

SOLDERABILITY

parameter	conditions/description	min	typ	max	units
hand soldering	1.5mm from case for 10 seconds			300	°C
wave soldering	see wave soldering profile			260	°C



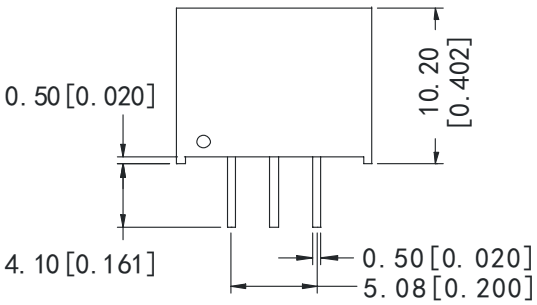
MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	11.60 x 7.50 x 10.20 (0.457 x 0.295 x 0.402 inch)				mm
case material	plastic (UL94-V0)				
weight			2.0		g

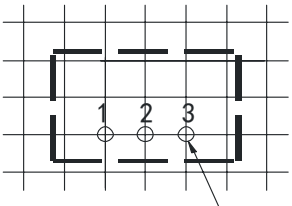
MECHANICAL DRAWING

units: mm [inches]
tolerance: ±0.25 [±0.010]
pin section tolerance: ±0.10 mm [±0.004]

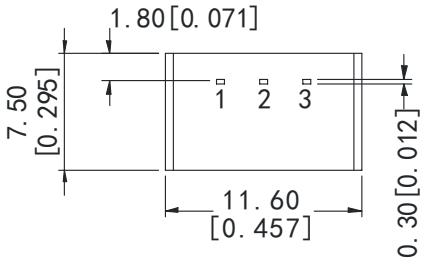
PIN CONNECTIONS		
Pin	Positive Output	Negative Output
1	+Vin	+Vin
2	GND	-Vout
3	+Vout	GND



Front View



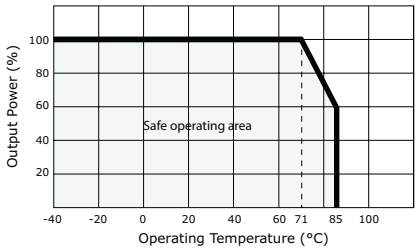
PCB Layout
Top View



Bottom View

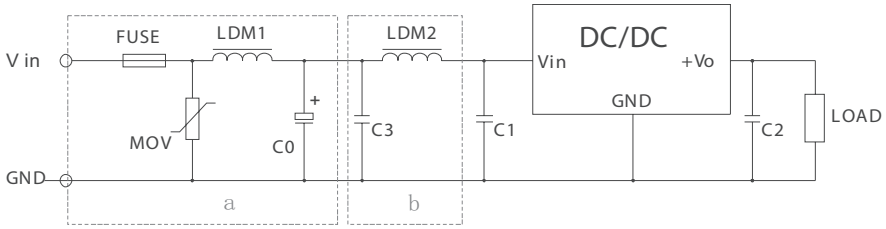
DERATING CURVES

Temperature Derating Curve



EMC RECOMMENDED CIRCUIT

Figure 1

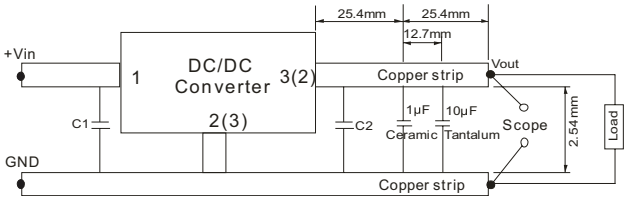


Recommended external circuit components	
FUSE	choose according to practical input current
MOV	S10K35
LDM1	82µH
LDM2	12µH
C0	680µF/50V
C3	4.7µF/50V

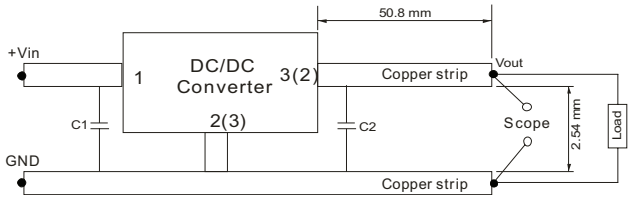
Note: See External Capacitor Table on page 5 for C1 & C2 values.

TEST CONFIGURATION

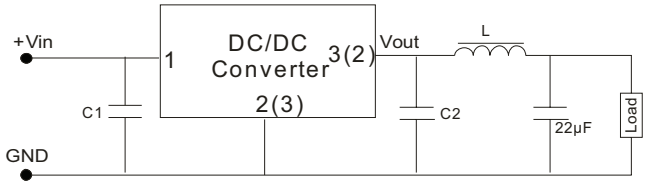
Effeciency and Output Voltage Ripple Test



Start-up and Load Transient Response Test



OUTPUT RIPPLE REDUCTION



Note: To reduce ripple, it is recommended to add a LC filter in output port. (L: Recommended parameter 10µH ~ 47 µH)

TYPICAL APPLICATION CIRCUIT

Figure 2
Positive Output Application Circuit

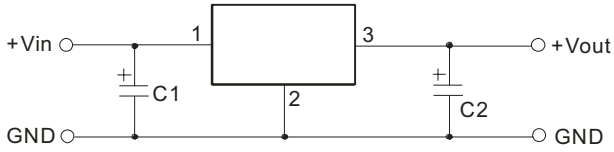


Figure 3
Negative Output Application Circuit

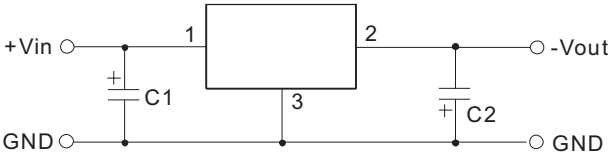
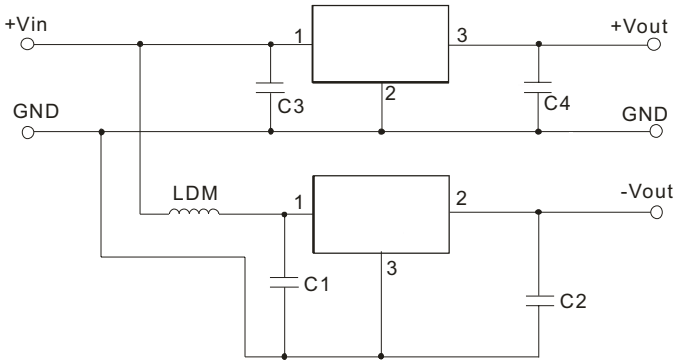


Figure 4
Positive and Negative Output Paralleling Application Circuit



External Capacitor Table

Part Number	C1, C3 (ceramic capacitor)	C2, C4 (ceramic capacitor)
P7805-Q24-S1R5-S	10μF/50V	10μF/6.3V
P7805-Q24-S1R8-S	10μF/50V	10μF/6.3V
P7805-Q24-S2-S	10μF/50V	10μF/6.3V
P7805-Q24-S3-S	10μF/50V	10μF/6.3V
P7805-Q24-S5-S	10μF/50V	10μF/10V
P7805-Q24-S6-S	10μF/50V	10μF/16V
P7805-Q24-S9-S	10μF/50V	10μF/16V
P7805-Q24-S12-S	10μF/50V	10μF/25V
P7805-Q24-S15-S	10μF/50V	10μF/25V

Note:
1. When the products used as negative output and the input-voltage under (Vin-min+2V), C1 and C2 must be added in the circuit, and they should be placed as near as the products' footprints. Others apply to the application-environment.
2. The capacitance of C1, C2, see external circuit table, can be increased if required, and tantalum or low ESR electrolytic capacitors may also suffice.
3. When the products used as the circuit like figure 4, an inductor named as LDM up to 10μH is recommended in the circuit to reduce the mutual interference.
4. For models ≤ 3.3 V_{OUT}, if the input voltage of the model's negative output is less than 4.85 V, a dummy load of not less than 5 mA needs to be added to the output.
5. Cannot use in parallel for output and hot swap for input.

Note:
1. Max. capacitive load tested at input voltage range and full load.
2. All specifications measured at: Ta=25°C, humidity<75%, nominal input voltage and rated output load, unless otherwise specified.

REVISION HISTORY

rev.	description	date
1.0	initial release	03/20/2013
1.01	updated EMC circuit recommendations	02/19/2015

The revision history provided is for informational purposes only and is believed to be accurate.

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