

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

**FEATURES**

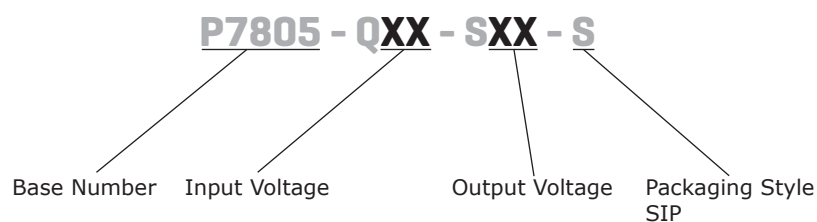
- up to 500 mA current output
- operating temperature range (-40~85°C)
- pin comparable to LM78 linear regulators
- wider input range
- suited for negative output applications
- low ripple and noise
- efficiency up to 96%



MODEL	input voltage		output voltage (Vdc)	output current max (mA)	output power max (W)	ripple and noise <sup>1</sup> max (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)					
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.  
2. \* Discontinued model

**PART NUMBER KEY**



## 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 $\mu$ F)				

## OUTPUT

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

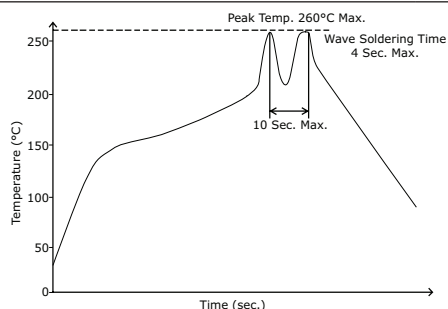
parameter	conditions/description	min	typ	max	units
conducted emissions	CISPR22/EN55022 class B (external circuit required, see figure 1-b)				
radiated emissions	CISPR22/EN55022 class B (external circuit required, see figure 1-b)				
ESD	IEC/EN 61000-4-2 class B, contact $\pm 4$ kV				
radiated immunity	IEC/EN 61000-4-3 class A, 10V/m				
EFT/burst	IEC/EN 61000-4-4 class B, $\pm 2$ kV (external circuit required, see figure 1-a)				
surge	IEC/EN 61000-4-5 class B, $\pm 2$ kV (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

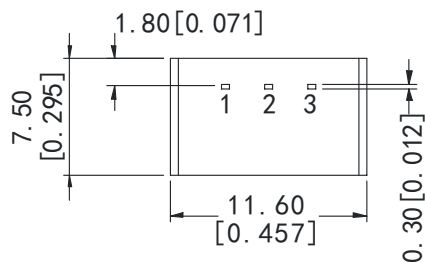
## MECHANICAL DRAWING

units: mm [inches]  
 tolerance:  $\pm 0.25$  [ $\pm 0.010$ ]  
 pin section tolerance:  $\pm 0.10$  mm [ $\pm 0.004$ ]

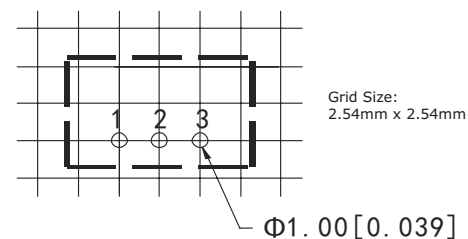
PIN CONNECTIONS		
Pin	Positive Output	Negative Output
1	+Vin	+Vin
2	GND	-Vout
3	+Vout	GND



Front View

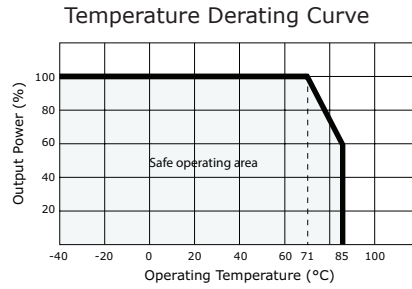


Bottom View



PCB Layout  
Top View

## DERATING CURVES



## 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

Efficiency and Output Voltage Ripple Test



Start-up and Load Transient Response Test

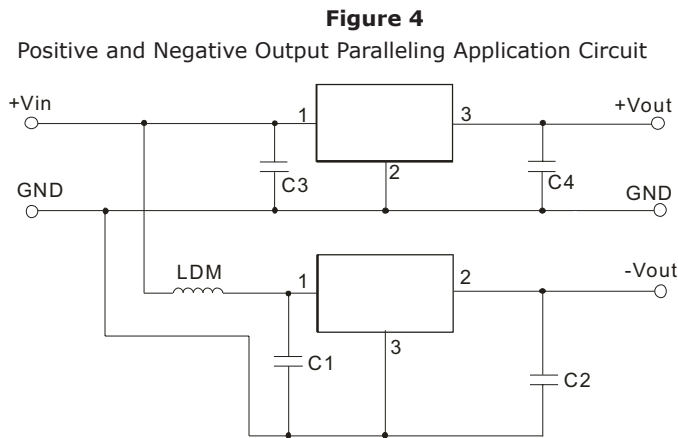
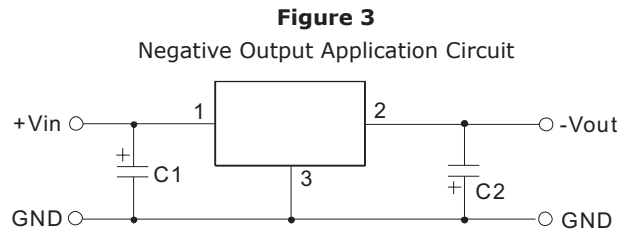
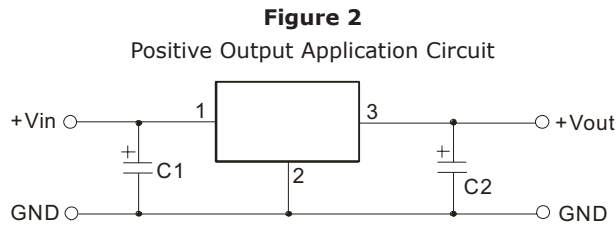


## OUTPUT RIPPLE REDUCTION



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

## TYPICAL APPLICATION CIRCUIT



External Capacitor Table

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

- Note:
- When the products used as negative output and the input-voltage under ( $V_{in-min}+2V$ ), 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.
  - The capacitance of C1, C2, see external circuit table, can be increased if required, and tantalum or low ESR electrolytic capacitors may also suffice.
  - When the products used as the circuit like figure 4, an inductor named as LDM up to 10 $\mu$ H is recommended in the circuit to reduce the mutual interference.
  - For models  $\leq 3.3 V_{OUT}$ , 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.
  - Cannot use in parallel for output and hot swap for input.

- Note:
- Max. capacitive load tested at input voltage range and full load.
  - All specifications measured at:  $T_a=25^\circ\text{C}$ , 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
1.02	company logo updated	04/14/2021
1.03	discontinued models P7805-Q24-S15-S, P7805-Q24-S3-S, P7805-Q24-S9-S	10/04/2023
1.14	discontinued models P7805-Q12-S1R5-S, P7805-Q12-S1R8-S, P7805-Q12-S2-S	01/12/2024
1.15	discontinued models P7805-Q24-S12-S & P7805-Q24-S6-S	04/05/2024

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



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