CUI INC
a bel group

SERIES: P78-2000-S | DESCRIPTION: NON-ISOLATED SWITCHING REGULATOR

FEATURES

- 2 A of output current
- high efficiency up to 95%
- EN 62368-1 certified
- no-load input current as low as 0.1 mA
- wide temperature range: -40°C ~ +85°C
- output short circuit protection
- pin-out compatible with linear regulators

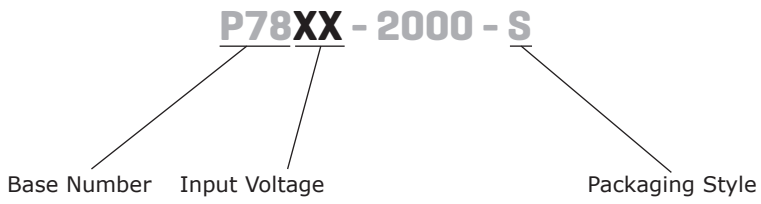
RoHS CE

MODEL

MODEL	input voltage typ (Vdc)	input voltage range (Vdc)	output voltage (Vdc)	output current max (mA)	output power max (W)	ripple and noise[1,2] max (mVp-p)	efficiency typ (%)
P7803-2000-S	24	6~36	3.3	2000	6.6	75	87
P7805-2000-S	24	8~36	5	2000	10	75	90
P7809-2000-S	24	13~36	9	2000	18	75	93
P7812-2000-S	24	16~36	12	2000	24	75	94
P7815-2000-S	24	18~36	15	2000	30	75	95

Notes: 1. Ripple and noise are measured at 20 MHz BW by "parallel cable" method with 1 µF ceramic and 10 µF electrolytic capacitors on the output.
2. 20~100% load ripple & noise ≤ 100 mVp-p. 0~20% load ripple & noise ≤ 180 mVp-p

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	3.3 Vdc output 5.0 Vdc output	6 8	24 24	36 36	Vdc Vdc
no load input current	input voltage range		0.1	1	mA
filter	capacitance filter				

OUTPUT

parameter	conditions/description	min	typ	max	units
capacitive load	3.3 V model 5 V model 9 V model 12 & 15 V models			1800 1000 680 470	µF µF µF µF
line regulation	input voltage range, full load		±0.4	±0.8	%
load regulation	from 10% to 100% load		±0.5	±1.5	%
voltage accuracy	100% load, input voltage range P7803-2000-S all other models		 ±2 ±2	 ±4 ±3	 % %
switching frequency	100% load, nominal input		400		kHz
transient recovery time	25% load step change		0.2	1	mS
transient response deviation	25% load step change		50	150	mV
temperature coefficient	-40°C ~ 85°C			±0.03	%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, automatic recovery				

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
safety approvals	EN62368-1				
conducted emissions	CISPR32/EN55032 class B (see fig. 4-② for recommended circuit)				
radiated emissions	CISPR32/EN55032 class B (see fig. 4-② for recommended circuit)				
ESD	IEC/EN 61000-4-2, contact ± 6kV, perf. Criteria B				
radiated immunity	IEC/EN 61000-4-3, 10V/m, perf. Criteria A				
EFT/burst	IEC/EN 61000-4-4, ± 1kV (see fig. 4-① for recommended circuit), perf. Criteria B				
surge	IEC/EN 61000-4-5, line to line ± 1kV (see fig. 4-① for recommended circuit), perf. Criteria B				
conducted immunity	IEC/EN 61000-4-6, 3 Vr.ms, perf. Criteria A				
MTBF	as per MIL-HDBK-217F @ 25°C	2,000			K 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
storage humidity	non-condensing	5		95	%

SOLDERABILITY

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

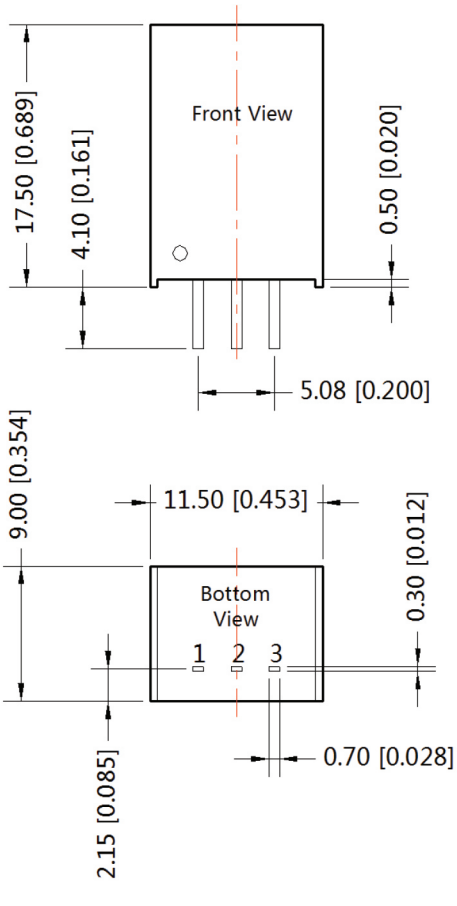
MECHANICAL

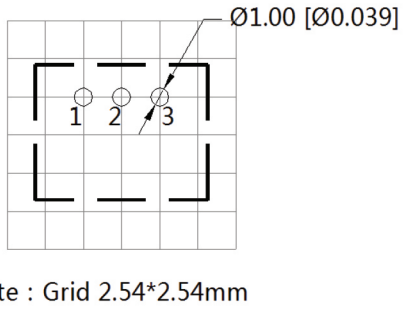
parameter	conditions/description	min	typ	max	units
dimensions	11.50 x 9.00 x 17.50 (0.457 x 0.297 x 0.400 inch)				mm
case material	Black flame-retardant and heat-resistant plastic (UL94-V0)				
weight			3.8		g

MECHANICAL DRAWING

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

PIN CONNECTIONS	
Pin	Function
1	+Vin
2	GND
3	+Vo



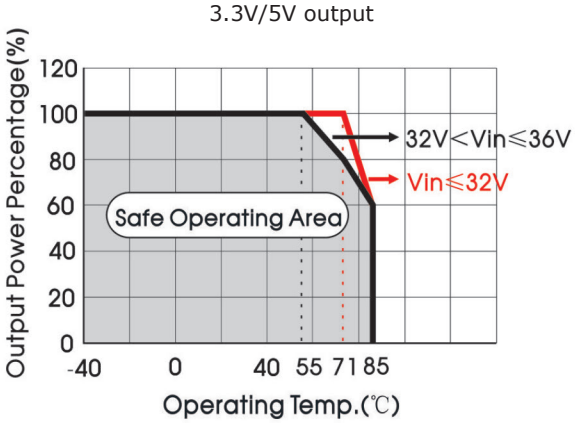


Note : Grid 2.54*2.54mm

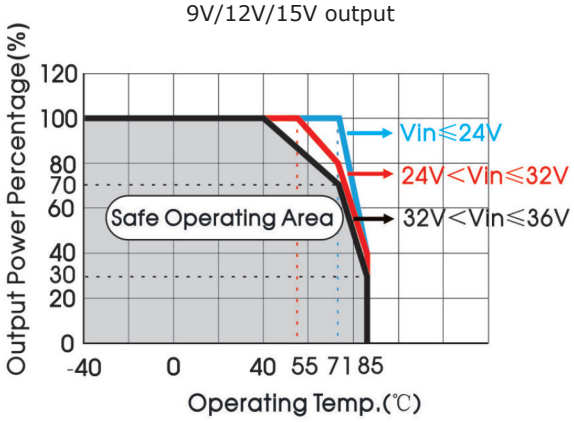
DERATING CURVES

Figure 1

Temperature Derating Curve
3.3V/5V output

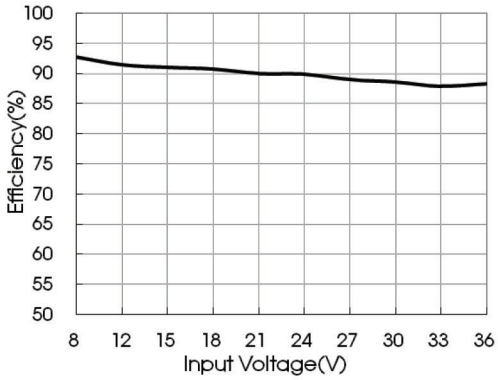


Temperature Derating Curve
9V/12V/15V output

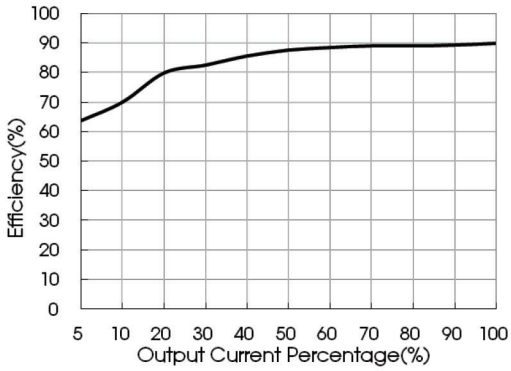


EFFICIENCY CURVES

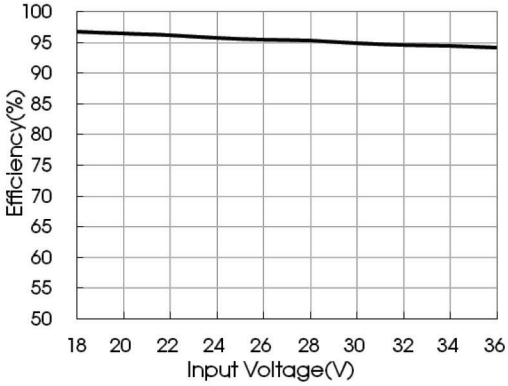
P7805-2000-S Efficiency Curve
Efficiency vs. Input Voltage
(at full load)



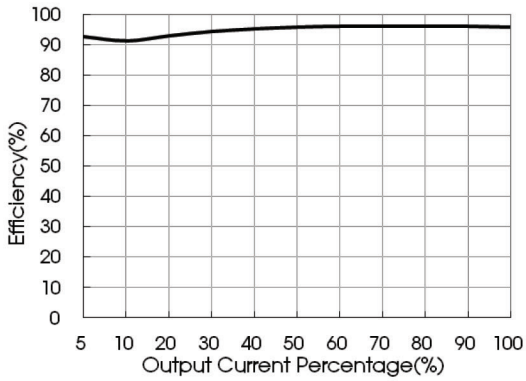
P7805-2000-S Efficiency Curve
Efficiency vs. Output Load
(Vin = 24 V)



P7815-2000-S Efficiency Curve
Efficiency vs. Input Voltage
(at full load)



P7815-2000-S Efficiency Curve
Efficiency vs. Output Load
(Vin = 24 V)



TYPICAL APPLICATION CIRCUIT

Figure 2

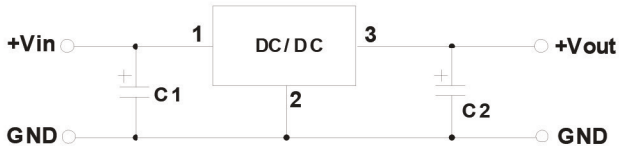


Table 1

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
P7803-2000-S	22μF/50V	22μF/10V
P7805-2000-S	22μF/50V	22μF/10V
P7809-2000-S	22μF/50V	22μF/16V
P7812-2000-S	22μF/50V	22μF/25V
P7815-2000-S	22μF/50V	22μF/25V

Note:
1. C1 and C2 are required and should be connected close to the pin terminal of the module.
2. The capacitance of C1 and C2 refer to Sheet 1.
3. To reduce the output ripple furtherly, C2 can be increased properly if required, tantalum capacitor and aluminum electrolytic capacitor of low ESR may also suffice.
4. Cannot be used in parallel to enlarge the power for output and hot swap.

EMC RECOMMENDED CIRCUIT

Figure 3

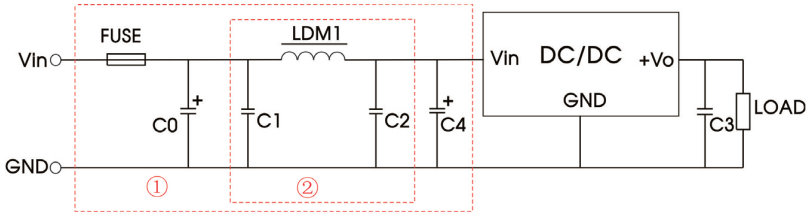


Table 2

Recommended external circuit components	
FUSE	choose according to practical input current
C0	100μF /100V
LDM1	22μH
C4	680μF /50V
C1/C2	10μF /50V
C3	22μF/25V

Note: Part ① in the Fig. 4 is for EMS test, part ② is for EMI filtering; parts ① and ② can be added based on actual requirement.

REVISION HISTORY

rev.	description	date
1.0	initial release	01/22/2020
1.01	logo update	02/21/2020

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

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