CUI INC
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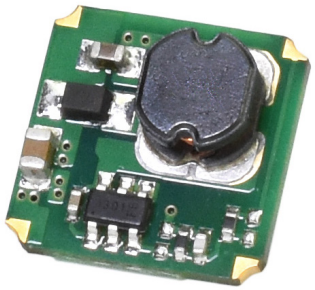
# **SERIES:** PXO78-500-M | **DESCRIPTION:** NON-ISOLATED DC SWITCHING REGULATOR

## FEATURES

- ultra-thin SMD package
- open frame
- efficiency up to 95%
- no-load input current as low as 0.2 mA
- -40°C ~ 85°C temperature range
- designed to meet EN/UKCA 62368
- output short circuit protection



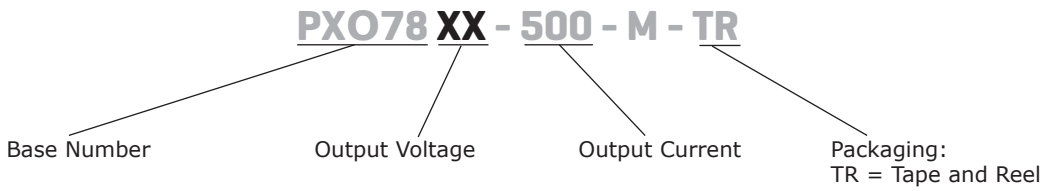
RoHS

## MODEL

| MODEL | input voltage[1] typ (Vdc) | input voltage[1] range (Vdc) | output voltage (Vdc) | output current max (mA) | output power max (W) | ripple & noise[2] max (mVp-p) | efficiency[3] typ (%) |
|---|---|---|---|---|---|---|---|
| PXO7803-500-M-TR | 24 | 4.75~36 | 3.3 | 500 | 1.65 | 100 | 85 |
| PXO7805-500-M-TR | 24 | 6.5~36 | 5 | 500 | 2.5 | 100 | 90 |
| PXO7806-500-M-TR | 24 | 8~36 | 6.5 | 500 | 3.25 | 100 | 91 |
| PXO7809-500-M-TR | 24 | 12~36 | 9 | 500 | 4.5 | 100 | 93 |
| PXO7812-500-M-TR | 24 | 15~36 | 12 | 500 | 6.0 | 100 | 94 |
| PXO7815-500-M-TR | 24 | 19~36 | 15 | 500 | 7.5 | 100 | 95 |

Notes:
1. For input voltages higher than 30 Vdc, a 22 µF / 50 V input capacitor is required.
2. Tested at nominal input, 30~100% load for 3.3 Vdc model, 20 MHz bandwidth.
   At loads below 30%, the max ripple and noise of the 3.3 Vdc output will be 200 mVp-p, and a load below 20% for the other outputs the levels increase to 250 mVp-p..
3. Measured at min Vin, full load.
4. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.

## PART NUMBER KEY



## INPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| operating input voltage | | | 24 | 36 | Vdc |
| input reverse polarity protection | no | | | | |
| no-load input current | | | 0.2 | 1.5 | mA |
| filter | capacitor filter | | | | |

## OUTPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| maximum capacitive load | | | | 680 | µF |
| voltage accuracy | at full load, input voltage range<br>3.3 Vdc output model<br>all other models | | <br>±2<br>±2 | <br>±4<br>±3 | <br>%<br>% |
| line regulation | at full load, input voltage range | | ±0.3 | ±0.5 | % |
| load regulation | at nominal input, 10~100% load | | ±0.6 | ±1 | % |
| switching frequency | at nominal input voltage, full load | | 700 | | kHz |
| transient recovery time | at nominal input voltage, 25% load step change | | 0.2 | 1 | ms |
| transient response deviation | at nominal input voltage, 25% load step change | | ±50 | ±250 | mV |
| temperature coefficient | at full load | | ±0.02 | | %/°C |

## PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| short circuit protection | continuous, auto recovery | | | | |

## SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| safety approvals | designed to meet 62368: EN/IEC/UKCA | | | | |
| 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 ±4kV, perf. Criteria B | | | | |
| radiated immunity | IEC/EN 61000-4-3 10V/m, perf. Criteria B | | | | |
| EFT/burst | IEC/EN 61000-4-4 100kHz±1kV (see Fig. 4-1 for recommended circuit), perf. Criteria B | | | | |
| surge | IEC/EN 61000-4-5 ±1kV (see Fig. 4-1 for recommended circuit), perf. Criteria B | | | | |
| conducted immunity | IEC/EN 61000-4-6 3Vr.m.s, perf. Criteria B | | | | |
| MTBF | as per MIL-HDBK-217F, 25°C | 2,000 000 | | | hours |
| RoHS | yes | | | | |

## 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 |
|---|---|---|---|---|---|
| reflow soldering | Peak temp. ≤245°C, maximum duration time ≤60s over 217°C. Please refer to IPC/JEDEC J-STD-020D.1 | | | 260 | °C |

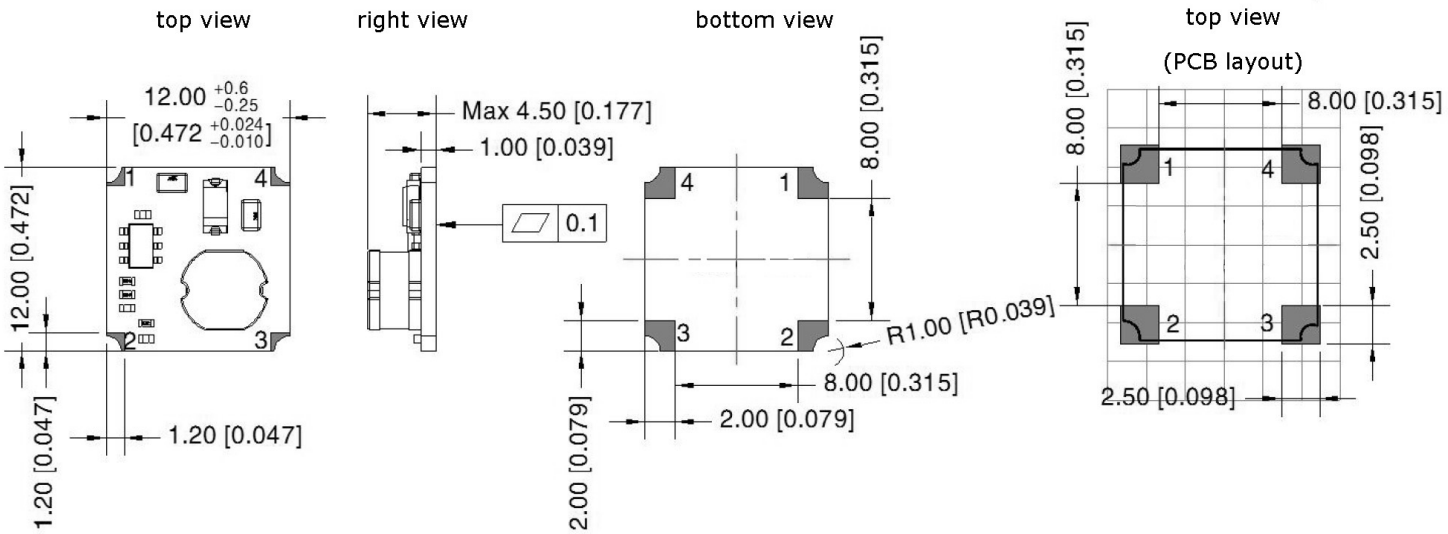
## MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| dimensions | 12 x 12 x 4.5 [0.472 x 0.472 x 0.177 inch] | | | | mm |
| weight | | | 0.75 | | g |
| cooling method | natural convection | | | | |

## MECHANICAL DRAWING

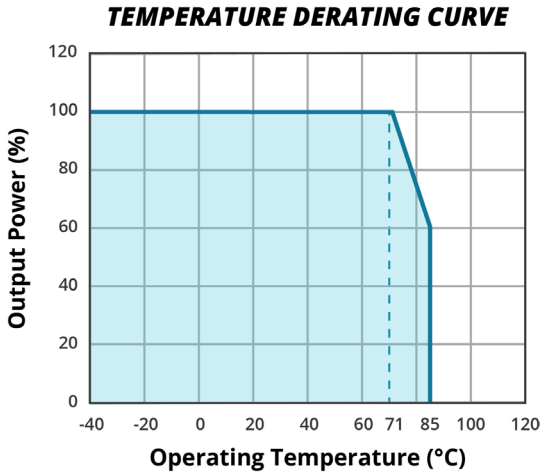
units: mm [inch]
tolerance: ±0.25[±0.010]

| PIN-OUT | |
|---|---|
| PIN | FUNCTION |
| 1 | +Vin |
| 2 | NC |
| 3 | +Vo |
| 4 | GND |

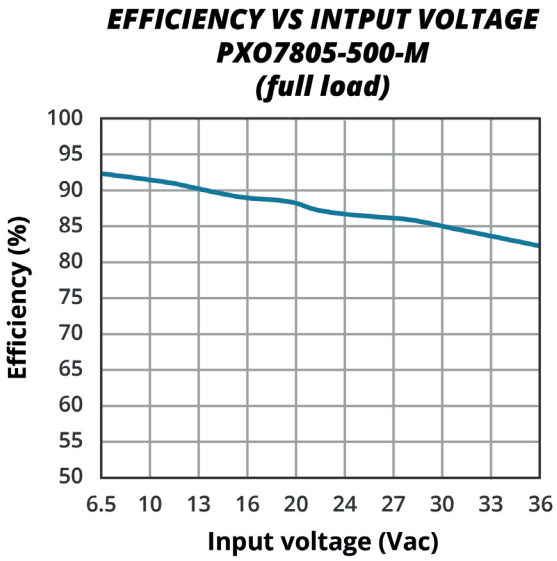


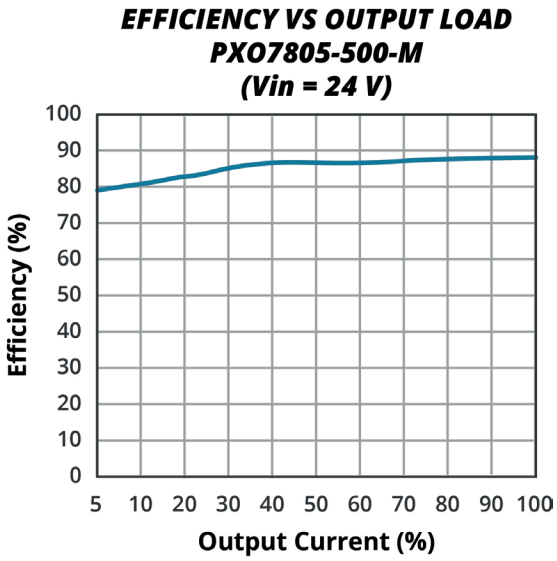
## DERATING CURVE

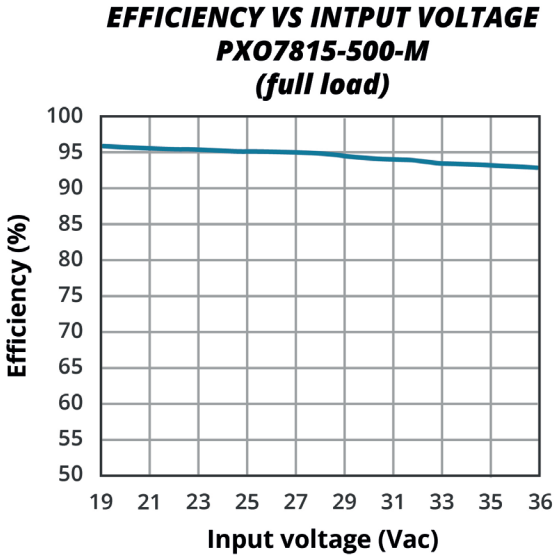
**Figure 1**

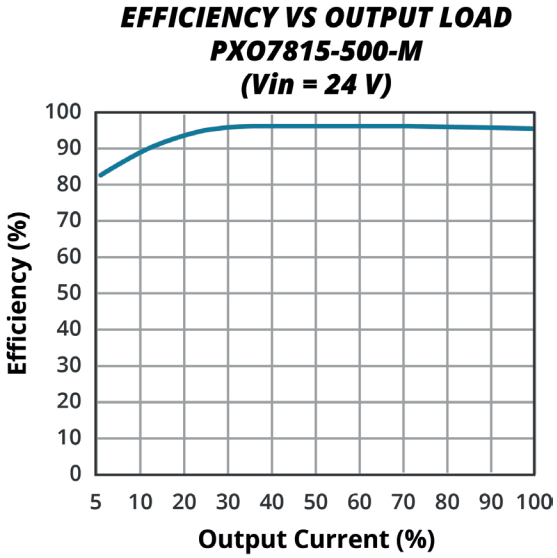



## EFFICIENCY CURVES



## TYPICAL APPLICATION CIRCUIT

**Figure 2**

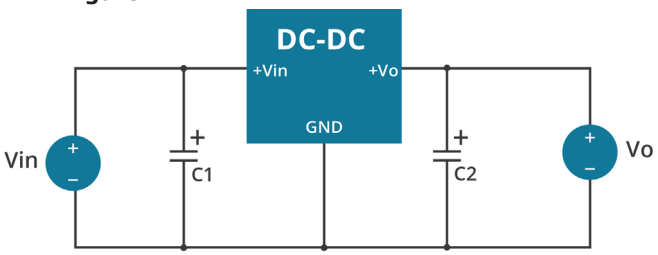


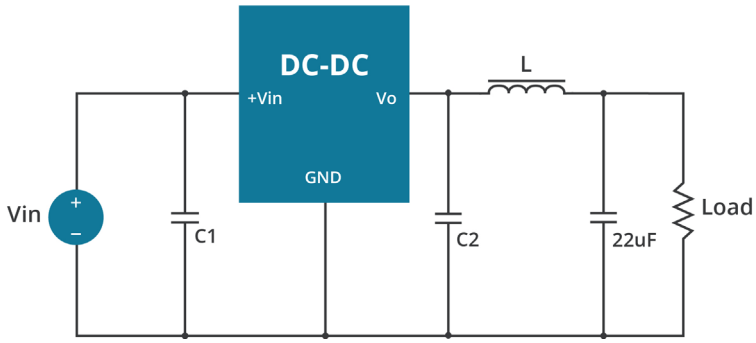

**Table 1**

| External Capacitor Table | | |
|---|---|---|
| Model Number | C1 (ceramic capacitor) | C2 (ceramic capacitor) |
| PXO7803-500-M-TR | 10 µF/50 V | 22 µF/10 V |
| PXO7805-500-M-TR | 10 µF/50 V | 22 µF/10 V |
| PXO7806-500-M-TR | 10 µF/50 V | 22 µF/16 V |
| PXO7809-500-M-TR | 10 µF/50 V | 22 µF/16 V |
| PXO7812-500-M-TR | 10 µF/50 V | 22 µF/25 V |
| PXO7815-500-M-TR | 10 µF/50 V | 22 µF/25 V |

Note:
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. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead.
3. Converter cannot be used for hot swap or with output in parallel.
4. To further reduce the output ripple and noise, we suggested the use of a "LC" filter at the output terminals, with an inductor value (L) of 10µH-47µH.

**Figure 3**

External "LC" output filter circuit diagram




## EMC RECOMMENDED CIRCUIT

**Figure 4**

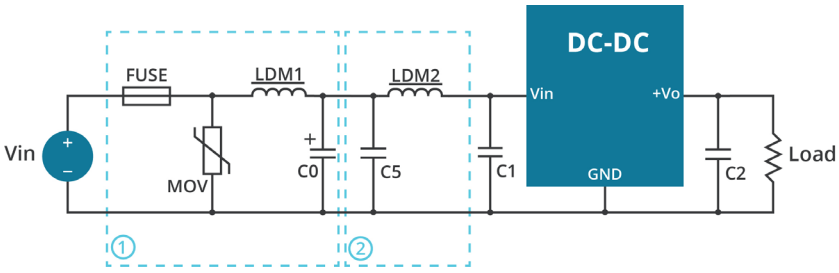



**Table 2**

| Recommended external circuit components | |
|---|---|
| FUSE | choose according to actual input current |
| MOV | S20K30 |
| LDM1 | 82 µH |
| C0 | 680 µF/50 V |
| C1 / C2 | see Table 1 |
| C5 | 4.7 µF/50 V |
| LDM2 | 22 µH |

Note: For EMC tests we use Part ① in Fig. 4 for immunity and part ② for emissions test. Selecting based on needs.

## REVISION HISTORY

| rev. | description | date |
|---|---|---|
| 1.0 | initial release | 08/30/2022 |

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

CUI INC
a bel group

**Headquarters**
20050 SW 112th Ave.
Tualatin, OR 97062
**800.275.4899**

Fax 503.612.2383
**cui**.com
techsupport@cui.com