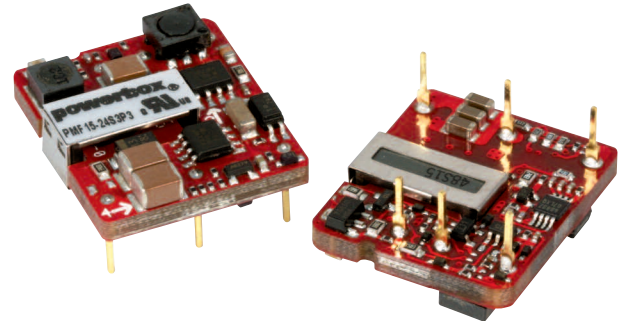


Industrial Line – T150F Series

15W 2:1 SINGLE OUTPUT HIGH PERFORMANCE DC/DC CONVERTER

Features

- Single output up to 4A
- Small size and low profile
- High efficiency up to 87%
- 2:1 ultra wide input voltage range
- Fixed switching frequency
- Input to output isolation (basic insulation)
- Surface-mount or through-hole
- Cost efficient open frame design
- International safety standard approval
- RoHS compliant



Specifications

INPUT

| | | |
|----------------------------|---|----------|
| Voltage range | 24V nominal input | 18-36VDC |
| | 48V nominal input | 36-75VDC |
| Voltage variation dv/dt | 5V/ms, max (complies with EST300 132 part 4.4). | |
| Input surge voltage | 24V input | 50VDC |
| 100mS max | 48V input | 100VDC |
| Reflected ripple current | 30mA p-p typ, 12uH source impedance (π filter with 220 μ F & 33 μ F). | |
| Start up time | Power up 30mS max. Remote ON/OFF 30mS max. Nominal Vin and constant resistive load. | |
| Start-up voltage | 24V input | 17VDC |
| | 48V input | 33VDC |
| Shutdown voltage | 24V input | 14.5VDC |
| | 48VDC | 30.5VDC |
| Remote ON/OFF ⁷ | Positive logic (option): DC/DC ON: Open or 3V < Vr < 15V DC/DC OFF: Short or 0.7V < Vr < 1.2V Negative logic (standard): DC/DC ON: Short or 0.7V < Vr < 1.2V DC/DC OFF: Open or 3V < Vr < 15V Input current of remote control pin: -0.5mA to +1mA, nominal Vin. Remote off state input current: 20mA, nominal Vin. | |

OUTPUT

| | | |
|--|--|------------|
| Power | 15W max. | |
| Voltage accuracy | $\pm 1\%$. | |
| Min load | 0%. | |
| Voltage adjustability ⁶ | $\pm 10\%$. | |
| Line regulation | $\pm 0.2\%$, LL to HL at full load. | |
| Load regulation | $\pm 0.2\%$, no load to full load. | |
| Ripple and noise 20MHz BW | See table. 5Vm 3,3V. 15V, 12V. (Measured with a 1 μ F M/C and a 10 μ F T/C) | |
| Temperature coefficient | $\pm 0.02\%/^{\circ}\text{C}$ max. | |
| Transient response | 300 μ S, $\Delta I_o/\Delta t=0.1\text{A}/7\mu\text{s}$. | |
| Over voltage protection (voltage clamped) | 3.3V output | 3.7-5.4V |
| | 5V output | 5.6-7.0V |
| | 12V output | 13.5-19.6V |
| | 15V output | 16.8-20.5V |
| Overload protection | 110-140%. | |
| Short circuit protection | Hiccup, automatic recovery. | |

ENVIRONMENTAL

| | |
|-----------------------|--|
| Operating temperature | -40°C to +85°C (with derating). |
| Storage temperature | -55°C to +125°C. |
| Thermal shock | MIL-STD-810F. |
| Vibration | 10-55Hz, 10G, 30 minutes along x, y and z. |
| Relative humidity | 5-95% RH. |

GENERAL

| | | |
|-----------------------|--|-------------|
| Efficiency | See table. | |
| Isolation voltage | 2250VDC min, input to output. | |
| Isolation resistance | 10Mohms, min. | |
| Isolation capacitance | 1000pF, typ. | |
| Switching frequency | 5V, 3.3V: | 270KHz typ. |
| | 15V, 12V: | 470KHz typ. |
| Dimensions | 27.94 x 23.88 x 8.5 mm. | |
| Weight | 10.5g. | |
| MTBF ¹ | Bellcore TR-NWT-000332: 2.200 x 10 ⁶ hrs. MIL-HDBK-217F: 1.314 x 10 ⁶ hrs | |

STANDARDS

| | | |
|------------------------------|-----------------------------------|--------------------|
| Safety standards | IEC60950-1, UL60950-1, EN60950-1. | |
| EMC | | |
| EMI ⁹ | EN55022, Class A. | |
| Radiated immunity | EN61000-4-2, Criteria A | 10V/m. |
| Fast transient ¹⁰ | EN61000-4-4, Criteria B | $\pm 2\text{kV}$. |
| Surge ¹⁰ | EN61000-4-5, Criteria A | $\pm 1\text{kV}$. |
| Conducted immunity | EN61000-4-6, Criteria A | 10 Vr.m.s. |

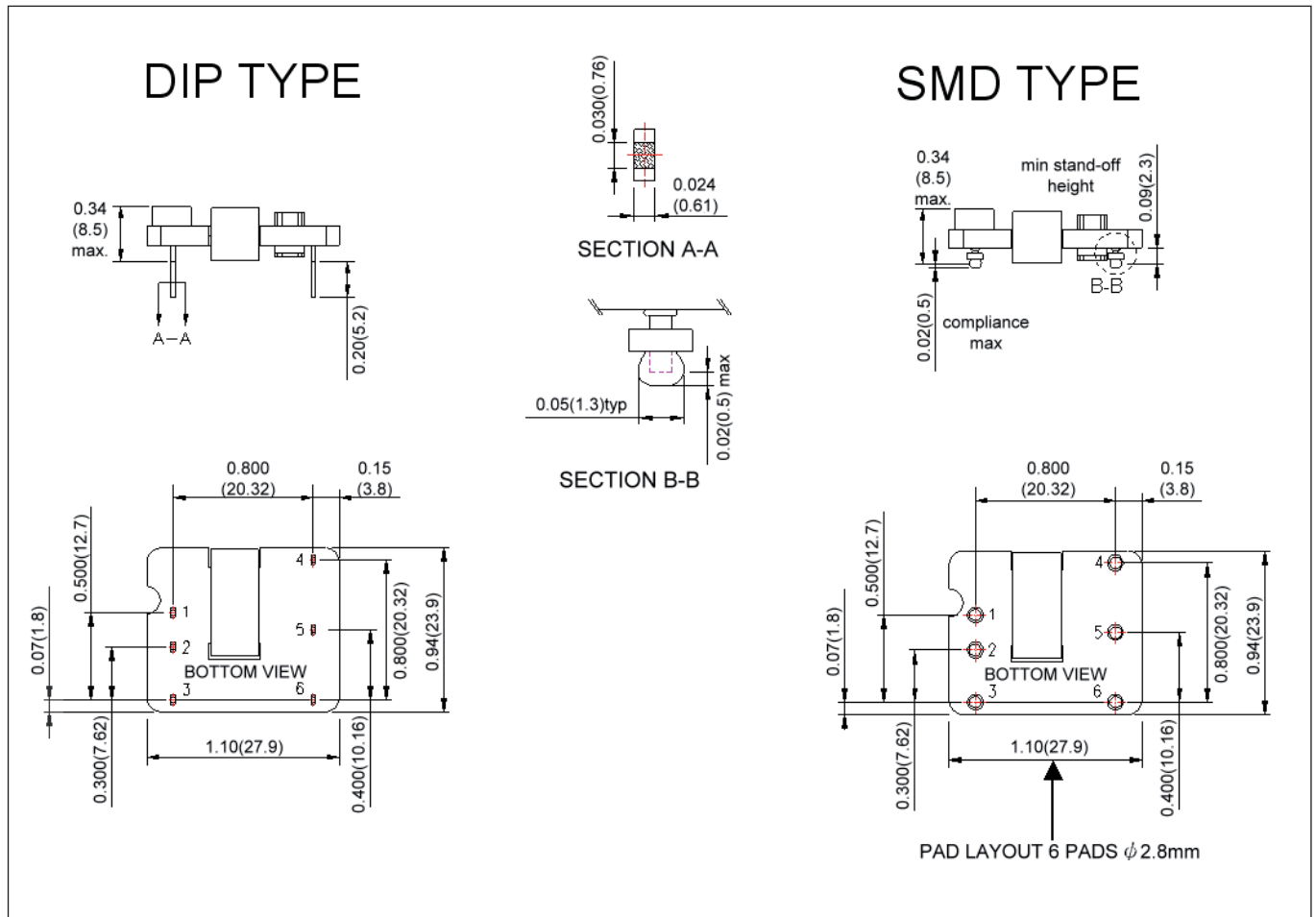
Industrial Line – T150F Series

15W 2:1 SINGLE OUTPUT HIGH PERFORMANCE DC/DC CONVERTER

| MODEL NUMBER | INPUT RANGE | OUTPUT VOLTAGE | OUPUT CURRENT | | OUTPUT ⁴ RIPPLE & NOISE | INPUT CURRENT | | EFF ⁵ | CAPACITOR ⁶ LOAD ⁴ MAX |
|--------------|-------------|----------------|---------------|-----------|------------------------------------|----------------------|------------------------|------------------|--|
| | | | MIN LOAD | FULL LOAD | | NO LOAD ² | FULL LOAD ² | | |
| PMF15-24S3P3 | 18 - 36 VDC | 3.3 VDC | 0mA | 3500mA | 75mVp-p | 20mA | 594mA | 85 | 1000µF |
| PMF15-24S05 | 18 - 36 VDC | 5 VDC | 0mA | 3000mA | 75mVp-p | 20mA | 762mA | 86 | 1000µF |
| PMF15-24S12 | 18 - 36 VDC | 12 VDC | 0mA | 1250mA | 100mVp-p | 15mA | 762mA | 86 | 330µF |
| PMF15-24S15 | 18 - 36 VDC | 15 VDC | 0mA | 1000mA | 100mVp-p | 15mA | 753mA | 87 | 220µF |
| PMF15-48S3P3 | 36 - 75 VDC | 3.3 VDC | 0mA | 3500mA | 75mVp-p | 15mA | 297mA | 85 | 1000µF |
| PMF15-48S05 | 36 - 75 VDC | 5 VDC | 0mA | 3000mA | 75mVp-p | 15mA | 381mA | 86 | 1000µF |
| PMF15-48S12 | 36 - 75 VDC | 12 VDC | 0mA | 1250mA | 100mVp-p | 10mA | 377mA | 87 | 330µF |
| PMF15-48S15 | 36 - 75 VDC | 15 VDC | 0mA | 1000mA | 100mVp-p | 10mA | 372mA | 88 | 220µF |

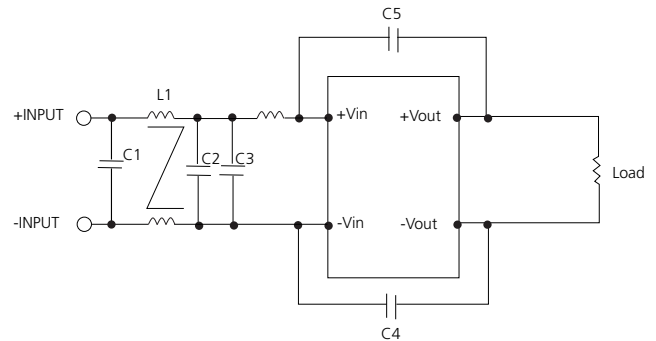
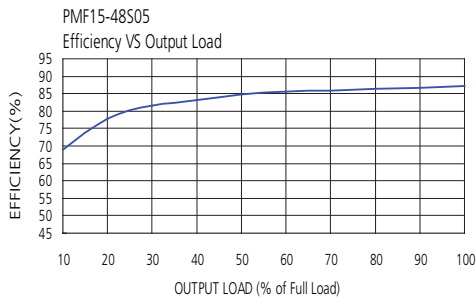
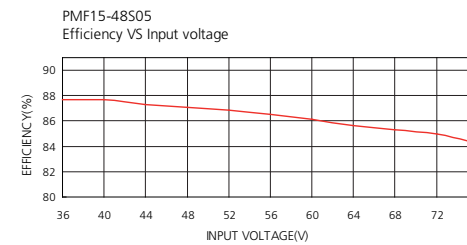
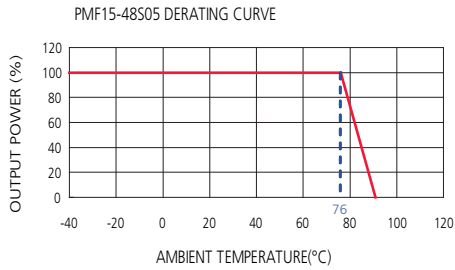
Notes:

1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C. MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment)
2. Maximum value at nominal input voltage and full load.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the TRIM pin and either the +VOUT pin or the -VOUT pin.
7. The ON/OFF control pin voltage is reference to -Vin. The order number please see product standard table.
8. The power module operate in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation.
9. The T150F meets EN55022 class A and class B only with external components connected before the input pin to the converter.
10. An external filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Powerbox suggest: Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.



Industrial Line – T150F Series

15W 2:1 SINGLE OUTPUT HIGH PERFORMANCE DC/DC CONVERTER



Recommended Filter for EN55022 Class B Compliance

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

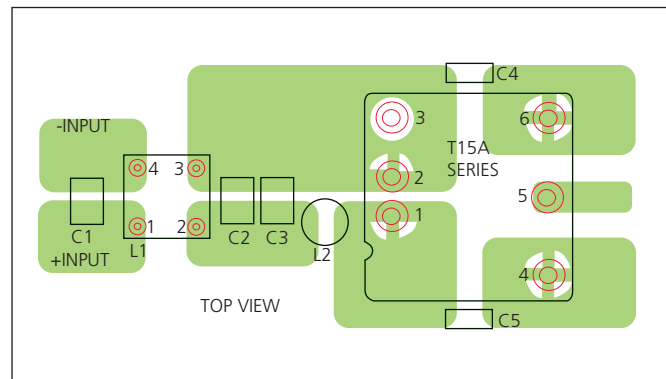
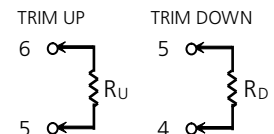
| | C1 & C2 | C3 | C4 & C5 | L1 | L2 |
|-------------|-------------------------|-------------------------|------------------------|-------------------------------------|------------------------------------|
| PMF15-15xxx | 6.8μF/50V 1812 MLCC | 6.8μF/50V 1812 MLCC | 470pF/3KV 1808 MLCC | 145μH Common Choke PMT-051 | 10μH SMD Inductor PMT-047 |
| PMF15-48xxx | 2.2μF/100V 1812 MLCC | 2.2μF/100V 1812 MLCC | 470pF/3KV 1808 MLCC | 145μH Common Choke PMT-051 | 18μH SMD Inductor PMT-046 |

PIN CONNECTION

| | |
|---|--------|
| 1 | +INPUT |
| 2 | -INPUT |
| 3 | ON/OFF |
| 4 | +VOUT |
| 5 | TRIM |
| 6 | -VOUT |

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.



Recommended EN55022 Class B Filter Circuit Layout

PRODUCT STANDARD TABLE

| OPTION | SUFFIX |
|---|--------|
| Negative remote ON/OFF with DIP (standard) | |
| Negative remote ON/OFF with SMT | -A |
| Positive remote ON/OFF with DIP | -B |
| Positive remote ON/OFF with SMT | -C |
| DIP type without ON/OFF pin | -D |
| SMT type without ON/OFF pin | -E |
| DIP type, negative remote ON/OFF without TRIM pin | -F |
| SMT type, negative remote ON/OFF without TRIM pin | -G |
| DIP type without ON/OFF & TRIM pin | -H |
| SMT type without ON/OFF & TRIM pin | -I |
| DIP type, positive remote ON/OFF without TRIM pin | -J |
| SMT type, positive remote ON/OFF without TRIM pin | -K |

Specifications are subject to change without notice.