

2500 LN series



www.martekpower.com

Single Output DC/DC Converter



DESCRIPTIONS

The 2500LN, single output power modules are 12 to 25 watt DC/DC converters available in a single output configuration providing 2.0 VDC to 15 VDC outputs and are fully compatible to Tyco series LW020 and LW025 providing both positive and negative on/of logic. These 400kHz, switching converters are available 48V inputs with efficiencies up to 87%. Offering pin for pin and full functionality to the Tyco LW series these converters are the only true second source available in the market.

OUTPUT CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|----------------------------|-----|-------|-----|---|
| Output Voltage Set Point | | ±1 | | % Output voltage at nominal line & FL |
| Total Band Error | -2 | | +2 | % Output voltage including line/load regulation setting |
| Line Regulation | | ±0.5 | | % Output voltage measured from min. input line to max. |
| Load Regulation | | ±0.5 | | % Output voltage measured from FL to 10% FL |
| Temperature Coefficient | | ±0.01 | | % per degree C |
| Ripple/Noise | | 60 | 100 | mV p-p measured at 20 MHz bandwidth with ext. 1 µf cap. |
| Output Voltage and Current | | | | Refer to model selection chart |
| Load Transient Response | | ±2 | | % Deviation of output voltage for a 25% load change for 200µS |
| Output Voltage Trim | -10 | | +10 | % Output Voltage |
| Short Circuit Protection | | | | Indefinite, Automatic Recovery |
| Overvoltage Protection | | 135 | | %; Clamp type, (2.0 & 2.5 VDC output set at 3.9 VDC) |

FEATURES

- Pin Compatible to Tyco LW020 and LW025
- Positive and Negative Logic
- Up to 87% Efficiency
- Industry Standard 2.0" X 1.6" X 0.40" Package
- Remote On/Off, Output Over Voltage and Short Circuit Protection

INPUT CHARACTERISTICS

| | Min | Typ | Max | Units/Comments |
|-----------------------------|-----|------|--------|--------------------------------------|
| Input Voltage | 36 | 48 | 75 | VDC |
| Under Voltage Lock out | | 33 | | VDC |
| Over Voltage Shutdown | | 80 | | VDC |
| Full Load Input Current | | | 0.59 A | (0.33 for 2.0VDC model) |
| Input Fuse Requirements | | | 2 | Amps; Slow blow type |
| Efficiency by Model | | | | |
| 2502V0S48LN | | 76 | | %; FL Nominal Line |
| 2502V5S48LN | | 78 | | %; FL Nominal Line |
| 2503V3S48LN | | 80 | | %; FL Nominal Line |
| 2505S48LN | | 84 | | %; FL Nominal Line |
| 2512S48LN | | 86 | | %; FL Nominal Line |
| 2515S48LN | | 87 | | %; FL Nominal Line |
| Switching Frequency | 360 | 400 | 440 | kHz; Factory set |
| Remote Shut Down (Optional) | | | | |
| Positive Logic Off | 0 | | 0.80 | VDC; Referenced to input (-) |
| Positive Logic On | 3.5 | | 0.80 | VDC or open; Referenced to input (-) |
| Negative Logic On | 0 | | | VDC; Referenced to input (-) |
| Negative Logic Off | 3.5 | | | VDC or open; Referenced to input (-) |
| Input - Output Capacitance | | | 1000 | pF |
| Input Filter | | | | LC type |
| Isolation Voltage | | 1500 | | VDC |
| Isolation Resistance | | 100 | | MΩhms |

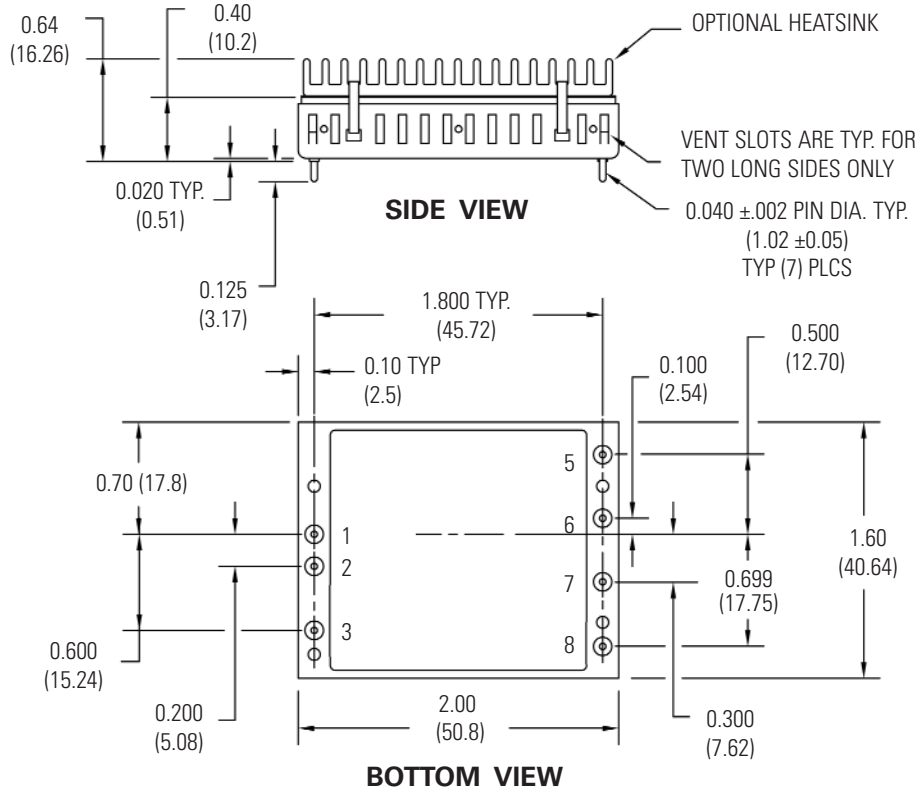
MODEL SELECTION CHART

| | Input Voltage (VDC) | Output Voltage (VDC) | Full Load Output Current(A) |
|-------------|---------------------|----------------------|-----------------------------|
| 2502V0S48LN | 48 | 2.0 | 6.0 |
| 2502V5S48LN | 48 | 2.5 | 6.0 |
| 2503V3S48LN | 48 | 3.3 | 6.0 |
| 2505S48LN | 48 | 5.0 | 5.0 |
| 2512S48LN | 48 | 12.0 | 2.0 |
| 2515S48LN | 48 | 15.0 | 1.66 |

GENERAL CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|-----------------------|-----|-----|--------|----------------------------|
| Operating Temp. Range | -40 | | +105 | °C; measured at baseplate |
| Storage Temp. Range | -55 | | +125 | °C; measured at baseplate |
| Material Flammability | | | | UL94V-0 |
| Altitude: Operating | | | 10,000 | Feet |
| Non-Operating | | | 40,000 | Feet |
| Relative Humidity | 5 | | 95 | % Humidity, non-condensing |
| Weight | | | 22 | Grams |
| Size | | | | 2.0" X1.6" X0.40" |
| Case Material | | | | Black coated aluminum |
| Agency Approvals | | | | UL/CUL1950, TUV, EN60950 |

OUTLINE DRAWING



PIN OUT CHART

| PINS | FUNCTION |
|------|----------|
| 1 | + INPUT |
| 2 | - INPUT |
| 4 | CONTROL |
| 5 | NO PIN |
| 6 | + OUTPUT |
| 7 | - OUTPUT |
| 8 | TRIM |

Notes:

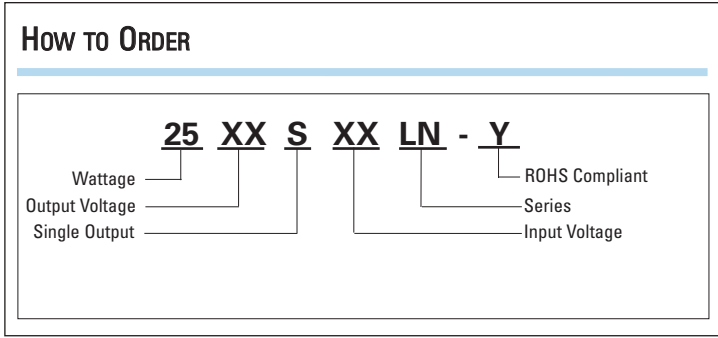
1. Unless otherwise specified dimensions are in inches (mm).

| Tolerances | Inches | mm |
|------------|----------------|--------------|
| | X.XX = ±0.02 | X.X = ±0.5 |
| | X.XXX = ±0.010 | X.XX = ±0.25 |

2. Controlling dimension in inch.

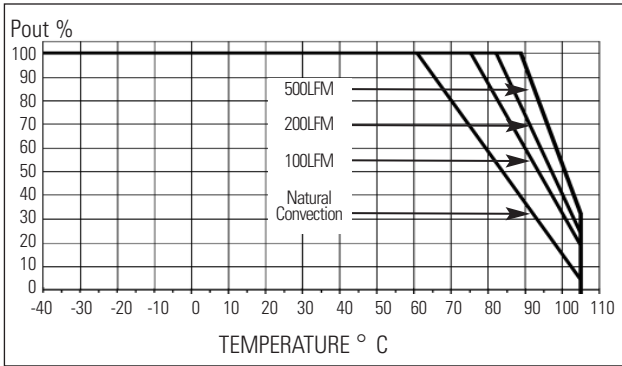
All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified. External, low ESR, 10 microfarad (minimum) capacitor across output is recommended for operation.

How To ORDER

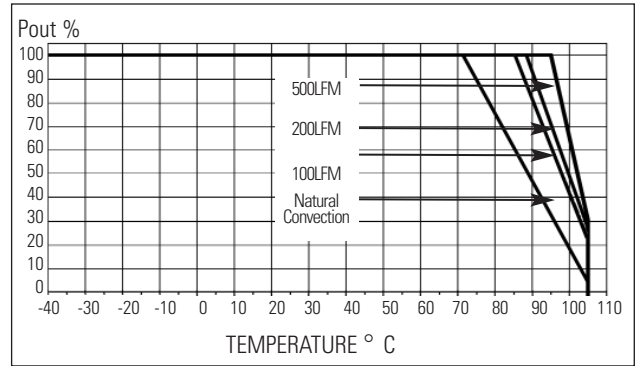


DERATING CURVES

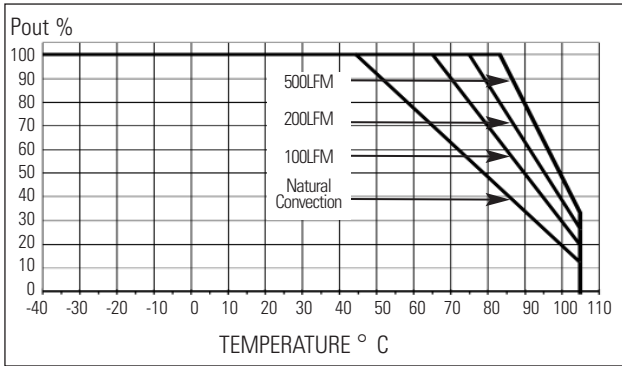
MODEL 2500LN Single 2V & 2.5V (Without heatsink)



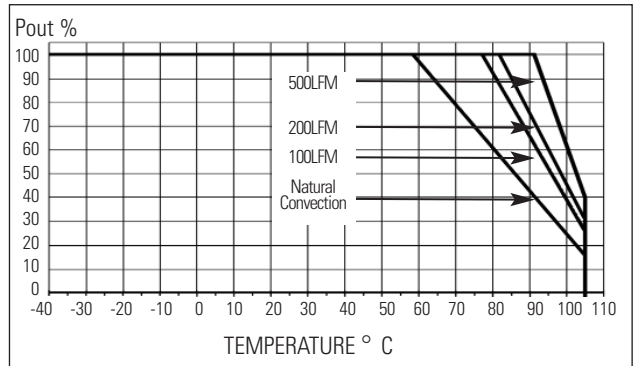
MODEL 2500LN Single 2V & 2.5V (With heatsink)



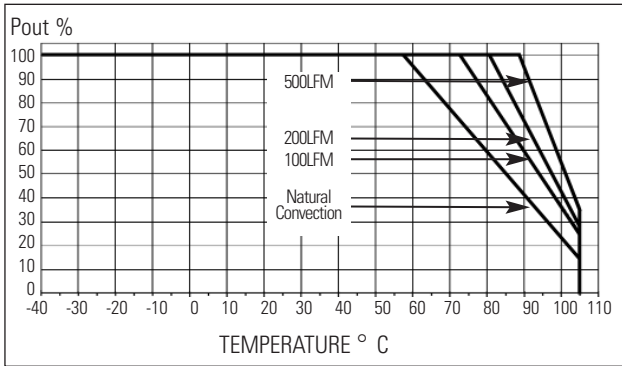
MODEL 2500LN Single 3.3V & 5V (Without heatsink)



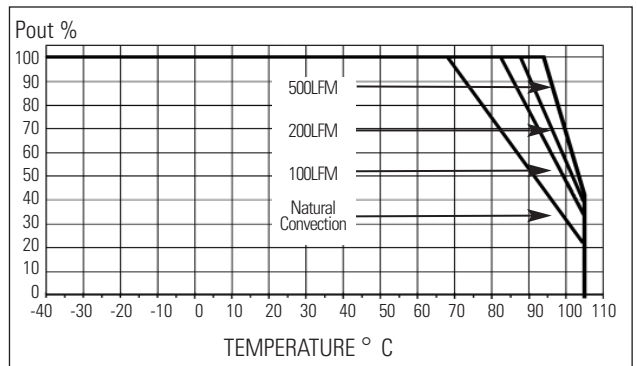
MODEL 2500LN Single 3.3V & 5V (With heatsink)



MODEL 2500LN Single 12V & 15V (Without heatsink)



MODEL 2500LN Single 12V & 15V (With heatsink)



OUTPUT VOLTAGE ADJUSTMENT (2500LN SINGLE SERIES)

Output voltage trim allows the user to increase or decrease the output voltage set point of a module. This is accomplished by connecting an external resistor between the TRIM pin and either the Vo(+) or Vo(-) pins. With an external resistor between the TRIM and Vo(+) pins (Radj-down), the output voltage set point (Vo, adj) decreases. With an external resistor between the TRIM pin and Vo(-) pin (Radj-up), Vo, adj increases.

The following equations determine the required external resistor value to obtain an output voltage change of $\Delta\%$:

$$\text{Radj-down} = \left[\frac{A - C}{\Delta\%} - (A + B) \right] \text{K}\Omega$$

$$\text{Radj-up} = \left[\frac{C}{\Delta\%} - B \right] \text{K}\Omega$$

EXAMPLE

| Device | A | B | C | - 5% Vo Radj-down | + 5% Vo Radj-up |
|--------|-------|-------|------|-------------------|------------------|
| +5Vo | 4.02 | 16.90 | 2.01 | 19.3 K Ω | 23.3 K Ω |
| +12Vo | 15.40 | 15.40 | 1.58 | 245.6 K Ω | 16.0 K Ω |
| +15Vo | 21.50 | 16.90 | 1.76 | 356.3 K Ω | 18.2 K Ω |
| +3.3Vo | 14.0 | 51.10 | 5.19 | 110.9 K Ω | 52.8 K Ω |
| +2.5Vo | 14.0 | 51.10 | 7.02 | 75.3 K Ω | 88.9 K Ω |
| +2.0Vo | 14.0 | 51.10 | 8.75 | 39.9 K Ω | 123.9 K Ω |

NOTE:
 THE ADJUSTED OUTPUT VOLTAGE CANNOT EXCEED +/- 10%
 OF THE NOMINAL OUTPUT VOLTAGE.
 TRIM FUNCTION MATCHES THAT OF TYCO™ LW020 SERIES.

2500 LN series



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Dual Output DC/DC Converter



DESCRIPTIONS

The 2500LN, dual output power modules are 25 watt DC/DC converters available in a dual output configuration providing 5.0 VDC to 15 VDC outputs and are fully compatible to Tyco series LW020 and LW025 providing both positive and negative on/of logic. These 400kHz, switching converters are available 48V inputs with efficiencies up to 87%. Offering pin for pin and full functionality to the Tyco LW series these converters are the only true second source available in the market.

OUTPUT CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|----------------------------|-----|-------|-----|---|
| Output Voltage Set Point | | ±1 | | % Output voltage at nominal line & FL |
| Total Band Error | -3 | | +3 | % Output voltage including line/load regulation setting |
| Line Regulation | | ±0.5 | | % Output voltage measured from min. input line to max. |
| Load Regulation | | ±1.0 | | % Output voltage measured from FL to 10% FL |
| Temperature Coefficient | | ±0.01 | | % per degree C |
| Ripple/Noise | | 60 | 100 | mV p-p measured at 20 MHz bandwidth with ext. 1 µf cap. |
| Output Voltage and Current | | | | Refer to model selection chart |
| Load Transient Response | | ±2 | | % Deviation of output voltage for a 25% load change for 200µS |
| Output Voltage Trim | -10 | | +10 | % Output Voltage |
| Short Circuit Protection | | | | Indefinite, Automatic Recovery |
| Overvoltage Protection | | 135 | | %; Clamp type |

FEATURES

- Pin Compatible to Tyco LW020 and LW025
- Positive and Negative Logic
- Up to 87% Efficiency
- Industry Standard 2.0" X 1.6" X 0.40" Package
- Remote On/Off, Output Over Voltage and Short Circuit Protection

INPUT CHARACTERISTICS

| | Min | Typ | Max | Units/Comments |
|-----------------------------|------|-----|------|-------------------------------------|
| Input Voltage | 36 | 48 | 75 | VDC |
| Under Voltage Lock out | | 33 | | VDC |
| Over Voltage Shutdown | | 80 | | VDC |
| Input Fuse Requirements | | | 2 | Amps; Slow blow type |
| Efficiency by Model | | | | |
| 2505D48LN | | 84 | | %; FL Nominal Line |
| 2512D48LN | | 86 | | %; FL Nominal Line |
| 2515D48LN | | 87 | | %; FL Nominal Line |
| Switching Frequency | 360 | 400 | 440 | kHz; Factory set |
| Remote Shut Down (Optional) | | | | |
| Positive Logic Off | 0 | | 0.80 | VDC;Referenced to input (-) |
| Positive Logic On | 3.5 | | | DC or open;Referenced to input (-) |
| Negative Logic On | 0 | | 0.80 | VDC;Referenced to input (-) |
| Negative Logic Off | 3.5 | | | VDC or open;Referenced to input (-) |
| Input - Output Capacitance | | | 1000 | pF |
| Input Filter | | | | LC type |
| Isolation Voltage | 1500 | | | VDC |
| Isolation Resistance | 100 | | | MOhms |

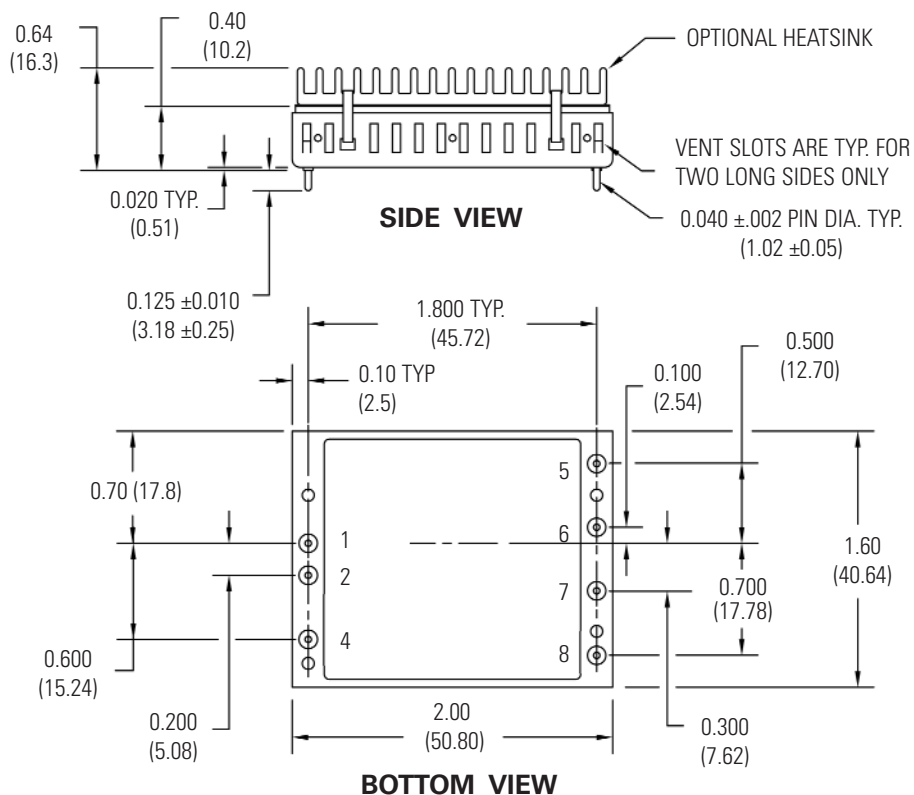
MODEL SELECTION CHART

| | Input Voltage (VDC) | Max Input Current (A) | Output Voltage (VDC) | Full Load Output Current(A) |
|-----------|---------------------|-----------------------|----------------------|-----------------------------|
| 2505D48LN | 48 | 0.62 | ±5.0 | ± 2.5 |
| 2512D48LN | 48 | 0.58 | ±12.0 | ± 1.0 |
| 2515D48LN | 48 | 0.59 | ±15.0 | ± 0.83 |

GENERAL CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|-----------------------|-----|-----|--------|----------------------------|
| Operating Temp. Range | -40 | | +105 | °C; measured at baseplate |
| Storage Temp. Range | -55 | | +125 | °C; measured at baseplate |
| Material Flammability | | | | UL94V-0 |
| MTBF | 5 | | | million hrs, at 40°C |
| Altitude: Operating | | | 10,000 | Feet |
| | | | 40,000 | Feet |
| Relative Humidity | 5 | | 95 | % Humidity, non-condensing |
| Weight | | | 22 | Grams |
| Size | | | | 2.0" X1.6 X0.4" |
| Case Material | | | | Black coated aluminum |
| Agency Approvals | | | | UL/CUL1950, TUV, EN60950 |

OUTLINE DRAWING



PIN OUT CHART

| PINS | FUNCTION |
|------|--------------------|
| 1 | + V _{IN} |
| 2 | - V _{IN} |
| 4 | CONTROL |
| 5 | + V _{OUT} |
| 6 | COMMON |
| 7 | - V _{OUT} |
| 8 | TRIM |

Notes:

1. Unless otherwise specified dimensions are in inches (mm).

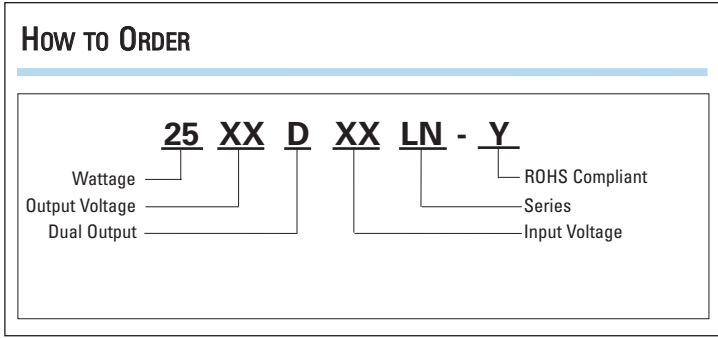
| Tolerances | Inches | mm |
|------------|----------------|--------------|
| | X.XX = ±0.02 | X.X = ±0.5 |
| | X.XXX = ±0.010 | X.XX = ±0.25 |

2. Controlling dimension in inch.

3. Case is vented on 2" long sides only.

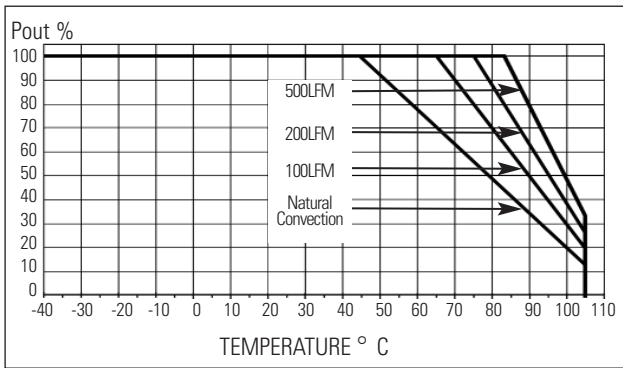
All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified. External, low ESR, 10 microfarad (minimum) capacitor across input is recommended for operation.

How To ORDER

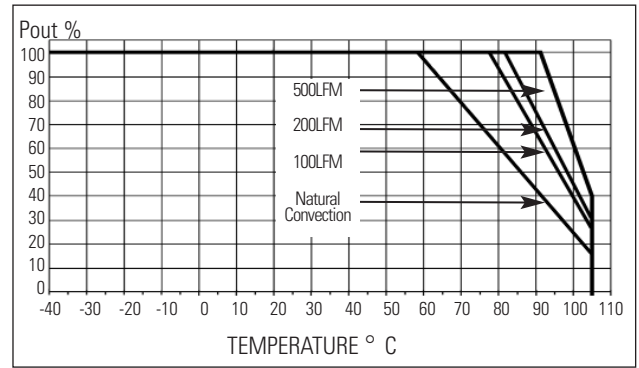


DERATING CURVES

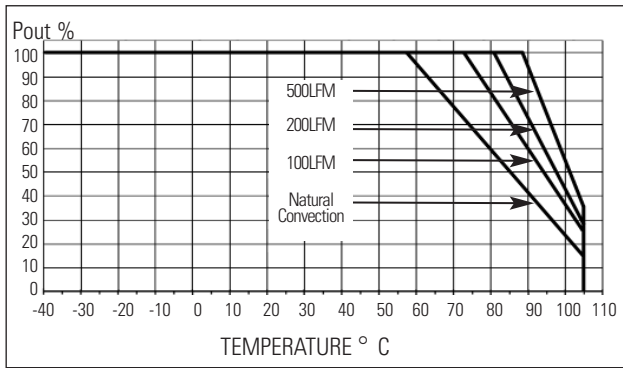
MODEL 2500LN Dual ±5V (Without heatsink)



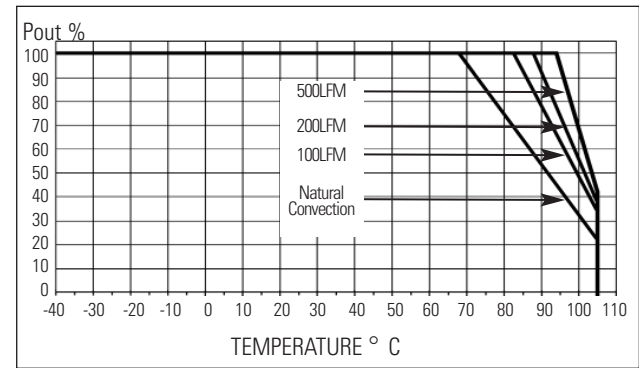
MODEL 2500LN-H Dual ±5V (With heatsink)



MODEL 2500LN Dual ±12 & ±15V (Without heatsink)



MODEL 2500LN-H Dual ±12 & ±15V (With heatsink)



OUTPUT VOLTAGE ADJUSTMENT (2500LN DUAL SERIES)

Output voltage trim allows the user to increase or decrease the output voltage set point of a module. This is accomplished by connecting an external resistor between the TRIM pin and either the Vo(+) or Vo(-) pins. With an external resistor between the TRIM and Vo(+) pins (Radj-down), the output voltage set point (Vo, adj) decreases. With an external resistor between the TRIM pin and Vo(-) pin (Radj-up), Vo, adj increases.

The following equations determine the required external resistor value to obtain an output voltage change of $\Delta\%$:

$$\text{Radj-down} = \left[\frac{A - C}{\Delta\%} - (A + B) \right] \text{K}\Omega$$

$$\text{Radj-up} = \left[\frac{C}{\Delta\%} - B \right] \text{K}\Omega$$

EXAMPLE

| Device | A | B | C | - 5% Vo Radj-down | + 5% Vo Radj-up |
|--------|-------|-------|------|-------------------|------------------|
| +5Vo | 4.75 | 3.65 | 1.19 | 62.8 K Ω | 20.15 K Ω |
| +12Vo | 15.40 | 14.70 | 1.60 | 245.9 K Ω | 17.3 K Ω |
| +15Vo | 16.90 | 14.70 | 1.41 | 278.2 K Ω | 13.5 K Ω |

NOTE:
 THE ADJUSTED OUTPUT VOLTAGE CANNOT EXCEED +/- 10%
 OF THE NOMINAL OUTPUT VOLTAGE.
 TRIM FUNCTION MATCHES THAT OF TYCO™ LW020 SERIES.