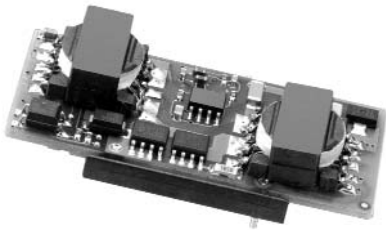


2000 SN series



www.martekpower.com

Single Output DC/DC Converter



DESCRIPTIONS

The 2000SN, single output power modules are 9 to 20 watt DC/DC converters featuring a 2 - 1 input range and available in a single output configuration providing 1.5 VDC to 5.0 VDC outputs in a compact, industry standard 1.0" X 2.0" X 0.375" package. These 400kHz, synchronized rectified, switching converters are available in 48 VDC inputs and achieve up to 90% efficiency. Advanced surface mount construction allows these converters to achieve outstanding thermal performance eliminating the need for thermal potting compounds and thereby enhancing manufacturing efficiency to reduce costs.

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% load |
| Temperature Coefficient | | ±0.02 | | % per degree C |
| Ripple/Noise | | 75 | | mV p-p measured at 20 MHz bandwidth with ext. 1 µf cap. |
| Output Voltage and Current | | | | Refer to model selection chart |
| Current Limit Set Point | 110 | | 140 | % of FL output current |
| Turn On Time | | 10 | | mS from time load is applied |
| Load Transient Response | | ±4 | | % Deviation of Vout voltage for a 25% load change for 250µS |
| Short Circuit Protection | | | | Indefinite, Automatic Recovery |
| Output Voltage Trim | -10 | | +10 | % of nominal output voltage |
| Overvoltage Protection | 3.9 | | 6.2 | Clamp type, non-latching. 5VDC output set at 6.2 VDC, all others set at 3.9VDC |

FEATURES

- Up to 90% Efficiency
- Single Output, 20 watt converter
- 36-72 VDC Input
- Industry Standard 1.0" X 2.0" X 0.375" Package
- Remote On/Off, Output Voltage Trim, Output Over Voltage and Short Circuit Protection

INPUT CHARACTERISTICS

| | Min | Typ | Max | Units/Comments |
|------------------------------|------|------|------|----------------------------------|
| Input Voltage | 36 | 48 | 75 | VDC |
| Input Surge Limit | 15 | | 100 | VDC for 100mS |
| Under Voltage Lock out | | | | |
| Converter On | | | 35.5 | VDC |
| Converter Off | 32.5 | | | VDC |
| Minimum Input Current | 0 | | | mA |
| Full Load Input Current | | | | |
| 5 & 3.3 VDC Vo Model | | | 0.63 | A |
| 2.5 VDC & Lower Output Model | | | 0.36 | A |
| Input Fuse Requirements | | | 2 | Amps; Slow blow type |
| Efficiency by Model | | | | |
| 2005S48SN | 88 | 90 | | %; FL Nominal Line |
| 2003V3S48SN | 86 | 88 | | %; FL Nominal Line |
| 2002V5S48SN | 85 | 87 | | %; FL Nominal Line |
| 2002V0S48SN | 83 | 83 | | %; FL Nominal Line |
| 2001V8S48SN | 82 | 84 | | %; FL Nominal Line |
| 2001V5S48SN | 80 | 83 | | %; FL Nominal Line |
| Switching Frequency | 360 | 400 | 440 | kHz; Factory set |
| Remote Shut Down (Optional) | | | | |
| Off | 0 | | 0.80 | VDC; Referenced to input |
| On | 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 |

Martek Power reserves the right to change specifications without notice.

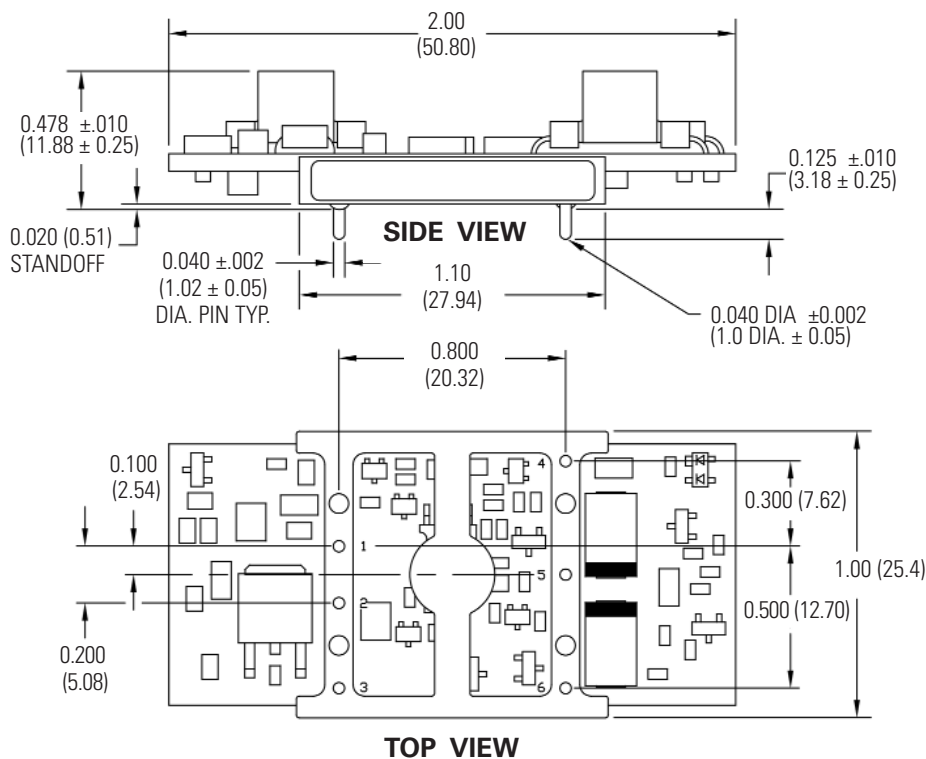
MODEL SELECTION CHART

| | Input Voltage (VDC) | Output Voltage (VDC) | Full Load Output Current(A) | Output Power (W) |
|-------------|---------------------|----------------------|-----------------------------|------------------|
| 2005S48SN | 48 | 5.0 | 4.00 | 20.0 |
| 2003V3S48SN | 48 | 3.3 | 4.50 | 14.9 |
| 2002V5S48SN | 48 | 2.5 | 4.50 | 11.3 |
| 2002V0S48SN | 48 | 2.0 | 5.00 | 10.0 |
| 2001V8S48SN | 48 | 1.8 | 5.50 | 9.9 |
| 2001V5S48SN | 48 | 1.5 | 6.00 | 9.0 |

GENERAL CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|-----------------------|---------|-----|--------|----------------------------|
| Operating Temp. Range | | | | See Derating Curves |
| Storage Temp. Range | -40 | | +105 | °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 |
| MTBF | 580,000 | | | Hours |
| Weight | | | 13 | Grams |
| Size | | | | 1.0" X 2.0" X 0.375" |
| Case Material | | | | Open frame construction |
| Agency Approvals | | | | UL/CUL1950, TUV, EN60950 |

OUTLINE DRAWING



PIN OUT CHART

| Pins | FUNCTION |
|------|-----------------|
| 1 | + INPUT |
| 2 | - INPUT |
| 3 | *ON/OFF CONTROL |
| 4 | + OUTPUT |
| 5 | *TRIM |
| 6 | - OUTPUT |

* = Optional feature

Notes:

- Pins 3 & 5 are only installed if an option is specified, no pin otherwise.
- 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 |

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

How To ORDER

20 0 XXX S / XX SN

Wattage ———
 Output Voltage (e.g. 2.5 VDC is written as 2V5)
 Single Output ———

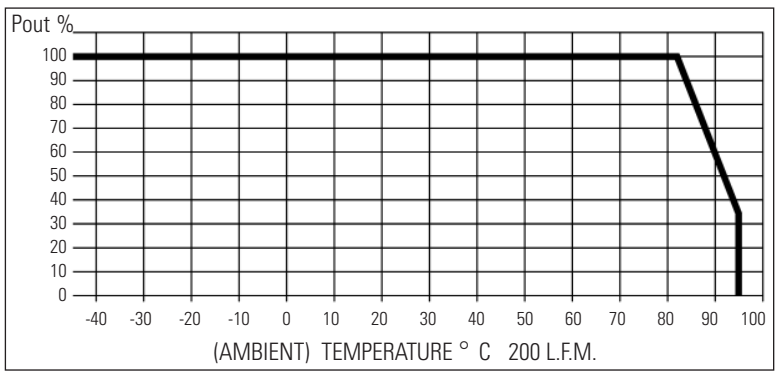
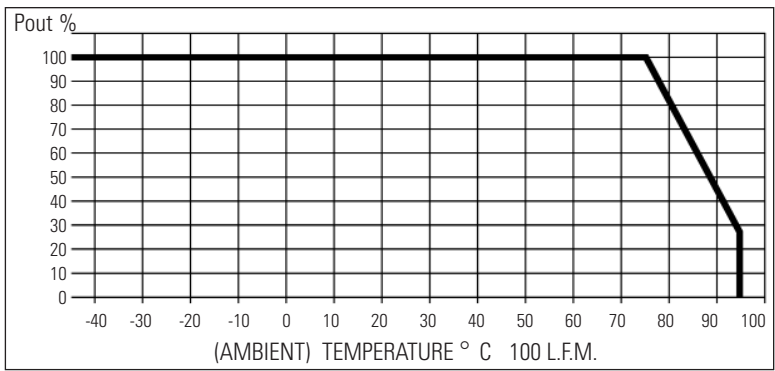
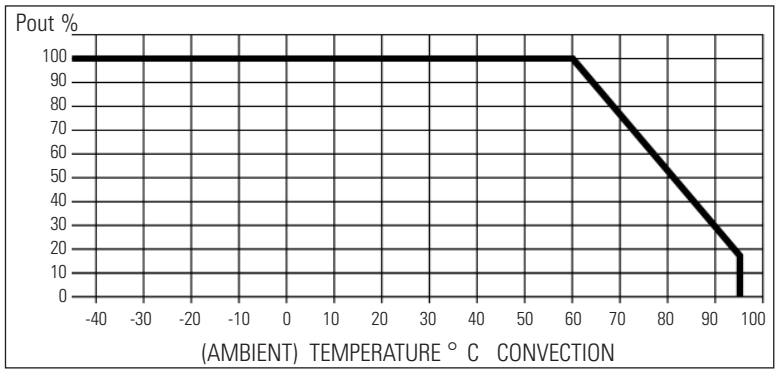
Hi-Density, Non-Encap
 Input Voltage

R Option: Additional pin to add the toggle remote on/off feature to the converter. To order please add a "-R" at the end of the part number (positive logic).

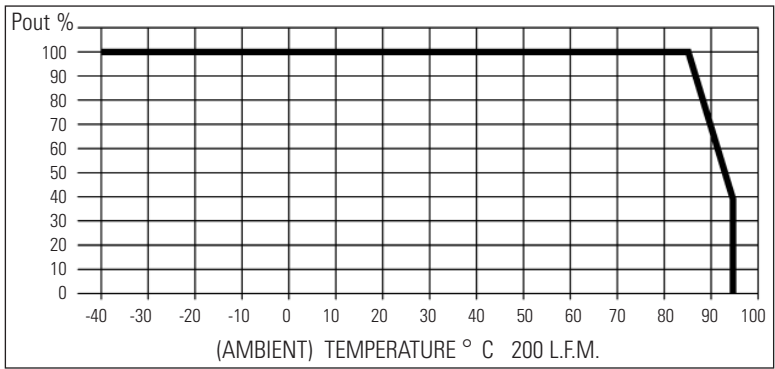
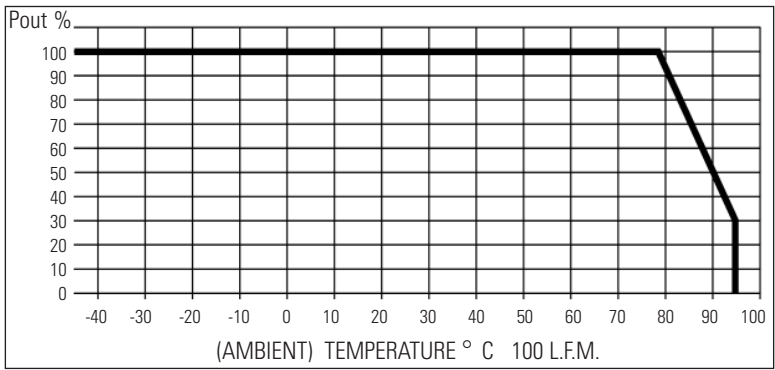
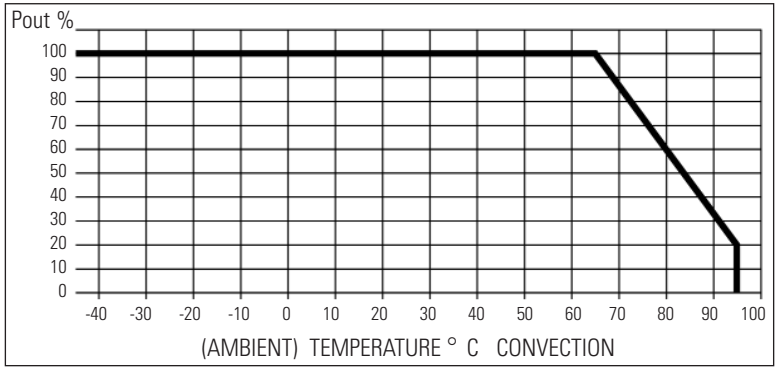
T Option: Output voltage trim feature allows output voltage to be adjusted +/-10% by use of additional external resistor. To order please add a "-T" at the end of the part number (requires additional pin).

RT Option: To order both remote on/off and output voltage trim please add a "-RT" at the end of the part number (positive logic).

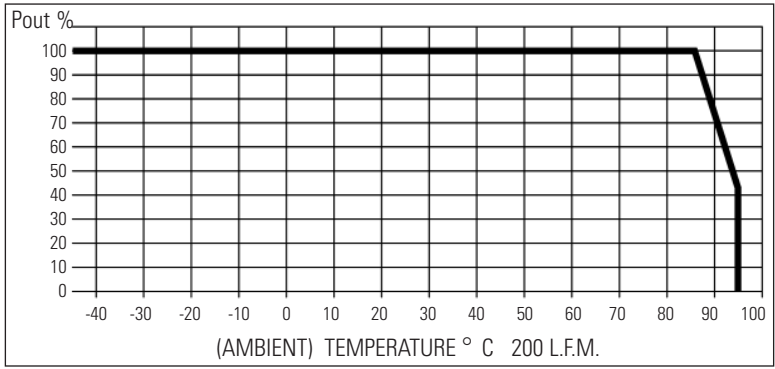
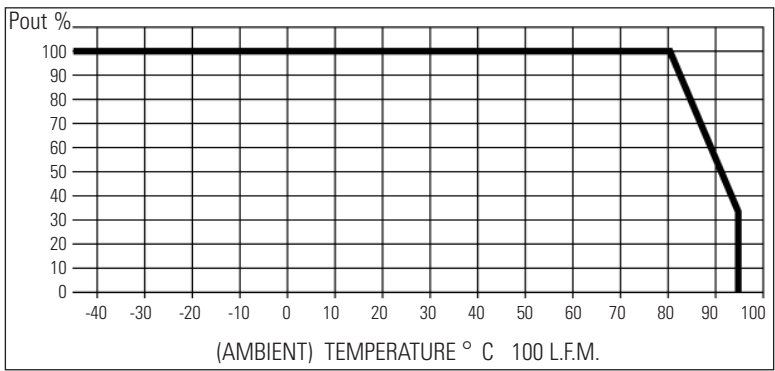
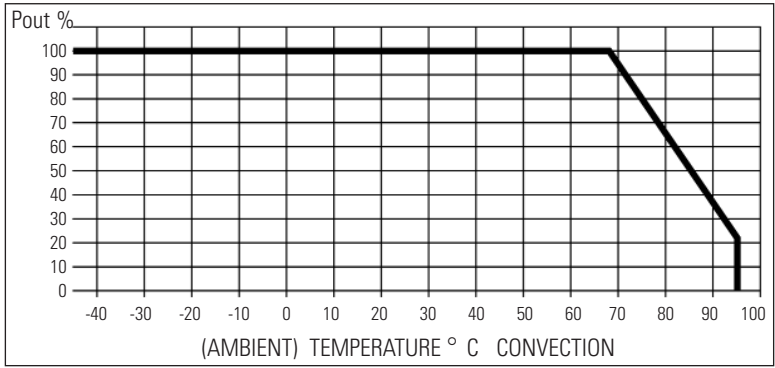
DERATING CURVES FOR 2005S48SN MODEL



DERATING CURVES FOR 2003V3S48SN MODEL



DERATING CURVES FOR 2002V5S48SN MODEL



OUTPUT VOLTAGE ADJUSTMENT (2000SN SERIES)

The converter's output voltage may be trimmed to $\pm 10\%$ of the nominal output voltage.

TRIM UP

Trim output voltage up by connecting an external resistor between Pins 5 and 6. Use the following equation. Reference Table 1 for variable A.

$$\text{Radj-up} = \frac{A}{\Delta \%} - B \Omega$$

Example:

If we want to trim 5% up for 3.3V output units, where $A = 1251$, $B = 10,000$, $\Delta \% = 0.05$

$$\text{Radj-up} = \frac{1251}{0.05} - 10000 \Omega = 15 \text{ k}\Omega$$

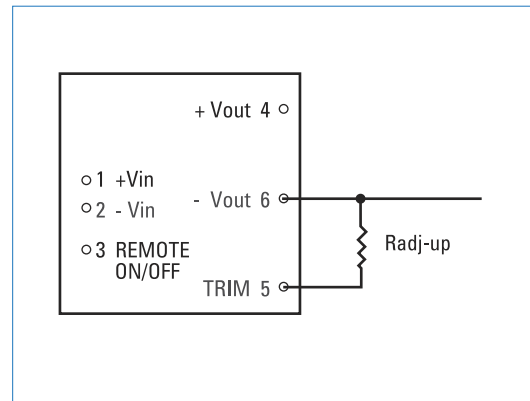


Table 1.

| Output Voltage | A | B |
|----------------|------|-------|
| 1.5V | 351 | 150 |
| 1.8V | 624 | 1270 |
| 2V | 762 | 2320 |
| 2.5V | 1012 | 6040 |
| 3.3V | 1251 | 10000 |
| 5V | 1000 | 6490 |

TRIM DOWN

Trim output voltage down by connecting an external resistor between Pins 4 and 5. Use the following equation. Reference Table 2 for variable C and D.

$$\text{Radj-down} = \frac{C}{\Delta \%} - D \Omega$$

Example:

If we want to trim 5% down for 5V output units, where $C = 1000$, $D = 8490$, $\Delta \% = 0.05$

$$\text{Radj-down} = \frac{1000}{0.05} - 8490 \Omega = 11.5 \text{ k}\Omega$$

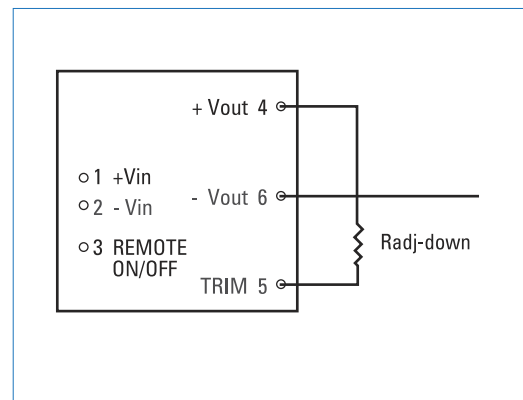


Table 2.

| Output Voltage | C | D |
|----------------|------|-------|
| 1.5V | 74.8 | 576 |
| 1.8V | 282 | 2176 |
| 2V | 468 | 3550 |
| 2.5V | 1038 | 8090 |
| 3.3V | 2089 | 13340 |
| 5V | 1000 | 8490 |