

Series 1680

12 – 30 Watt Hybrid

For demanding industrial applications not requiring military specifications

Features

- Hermetic packaging protects against harsh environments
- Built-in EMI filter limits conducted emissions and reduces transient susceptibility
- Short circuit proof – inherent dual mode overcurrent protection
- Fixed frequency operation offers low ripple and fast load transient response
- User programmable soft start for Vout ramp
- Sync input
- Power on/off – ground INH to shut output: low quiescent current
- Precision RF feedback – no optical devices used
- Parallelable – for higher output prime or redundant power applications

Specifications

INPUT: 24 VDC nominal
Range: 18 to 50 VDC
Operates through input transients of up to 80 V

ISOLATION:

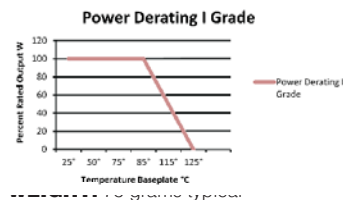
Input to case: 100 MOhms at 500 VDC
Input to output: 100 MOhms at 500 VDC
Output to case: 10 MOhms at 100 VDC

ENVIRONMENT:

Storage temperature: -55°C to +150°C
Mechanical Shock: 50 G's, 11 mSec 1/2 sine pulse, 3X each axis
Random Vibration: 30 G's 50 – 2000Hz, 6dB/octave ramp, .6 PSD, 32g RMS overall

DERATING:

Full Power Output at $T_{case} = +85^{\circ}C$
Linearly derates to 50% at $T_{case} = +115^{\circ}C$

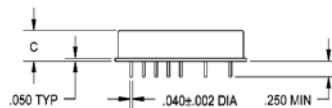


| SINGLE OUTPUT DEVICES | | 1680-S02 (12W) | | | 1680-S02.5 (15W) | | | 1680-S03.3 (20W) | | | 1680-S05 (30W) | | |
|-----------------------|--|----------------|------|-------|------------------|------|-------|------------------|------|-------|----------------|------|------|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| Output voltage | — | +1.9 | +2.0 | +2.1 | +2.4 | +2.5 | +2.6 | +3.2 | +3.3 | +3.4 | +4.9 | +5.0 | +5.1 |
| Output current | $V_{in min} - V_{in max}$ | — | — | 6.06A | — | — | 6.06A | — | — | 6.06A | — | — | 6A |
| Efficiency | $P_{out} = \text{max rated load}$ | 56% | 59% | — | 61% | 64% | — | 66% | 69% | — | 71% | 74% | — |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in min} - V_{in max}$ | — | 10mV | 30mV | — | 10mV | 30mV | — | 10mV | 30mV | — | 10mV | 50mV |
| Load regulation | $P_{out} = 10\%$ to F.L. | — | 10mV | 30mV | — | 10mV | 30mV | — | 10mV | 30mV | — | 10mV | 50mV |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 25 | 50 | — | 30 | 60 | — | 30 | 65 | — | 40 | 85 |

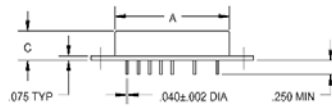
| SINGLE OUTPUT DEVICES | | 1680-S05.2 (30W) | | | 1680-S12 (30W) | | | 1680-S15 (30W) | | | 1680-S28 (30W) | | |
|-----------------------|--|------------------|------|-------|----------------|-------|-------|----------------|-------|-------|----------------|-------|-------|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| Output voltage | — | +5.1 | +5.2 | +5.3 | +11.9 | +12.0 | +12.1 | +14.9 | +15.0 | +15.1 | +27.8 | +28.0 | +28.2 |
| Output current | $V_{in min} - V_{in max}$ | — | — | 5.76A | — | — | 2.5A | — | — | 2A | — | — | 1.07A |
| Efficiency | $P_{out} = \text{max rated load}$ | 71% | 74% | — | 78% | 82% | — | 75% | 80% | — | 78% | 82% | — |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in min} - V_{in max}$ | — | 10mV | 50mV | — | 20mV | 100mV | — | 25mV | 125mV | — | 50mV | 250mV |
| Load regulation | $P_{out} = 10\%$ to F.L. | — | 10mV | 50mV | — | 20mV | 100mV | — | 25mV | 125mV | — | 50mV | 250mV |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 40 | 85 | — | 60 | 150 | — | 75 | 180 | — | 150 | 350 |

| Model No. | Case Style | Pin Count | Mounting |
|-----------|------------|-----------|---|
| 1680 | 2 | 12 | Solder Sealed Flangeless PCB Mount |
| 1680 | F | 12 | Solder Sealed PCB Mount with Flange |
| 1680 | WF | 12 | Seam Weld Chassis Mount with Flange |
| 1680 | PB | 10 | Solder Sealed Flangeless PCB Stud Mount |

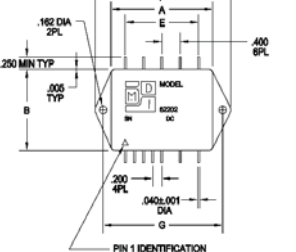
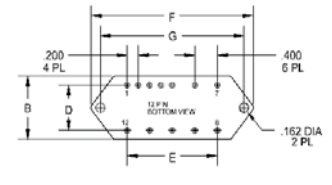
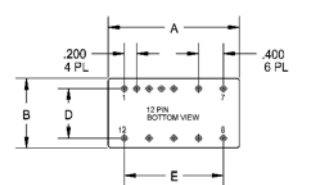
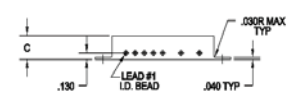
CASE STYLE 2
Solder Sealed
Flangeless PCB Mount



CASE STYLE 3
Solder Sealed
PCB Mount with Flange



CASE STYLE 8
Seam Welded
Chassis Mount with Flange



Case Dimensions

Units: inches | millimeters

TOLERANCES: ALL DIMENSIONS ±0.01 EXCEPT F= MAX. C = +0.01/-0.02; DRAWINGS IN INCHES.

| Case Style | | A | B | C | D | E | F | G |
|------------|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 2 | | 2.200 55.880 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | — — | — — |
| 3 | F | 2.200 55.880 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | 2.960 75.184 | 2.610 66.294 |
| 8 | WF | 2.225 56.515 | 1.710 43.434 | 0.495 12.573 | — — | 1.600 40.640 | 2.960 75.184 | 2.610 66.294 |
| 10 | PB | 2.225 56.515 | 1.350 34.290 | 0.495 12.573 | 1.000 25.400 | 1.600 40.640 | — — | — — |



Series 1680

DC – DC Converters

INDUSTRIAL GRADE

| DUAL OUTPUT DEVICES | | 1680-D3.3/5 (14.9W) | | | 1680-D05 (30W) | | | 1680-D12 (30W) | | | 1680-D15 (30W) | | |
|------------------------------|--|---------------------|------|------|----------------|-------|-------|----------------|-------|--------|----------------|-------|--------|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| Output voltage | — | +3.2 | +3.3 | +3.4 | +4.9 | +5.0 | +5.1 | +11.9 | +12.0 | +12.1 | +14.9 | +15.0 | +15.1 |
| | | +4.9 | +5.0 | +5.1 | -4.9 | -5.0 | -5.1 | -11.9 | -12.0 | -12.1 | -14.9 | -15.0 | -15.1 |
| Output current* | $V_{in\ min} - V_{in\ max}$ | 300mA | — | 3A | ±150mA | — | ±3A | ±95mA | — | ±1.25A | ±76mA | — | ±1A |
| | | 100mA | — | 1A | — | — | — | — | — | — | — | — | — |
| Efficiency | $P_{out} = \text{max rated load}$ | 63% | 66% | — | 72% | 76% | — | 78% | 82% | — | 79% | 83% | — |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in\ min} - V_{in\ max}$ | — | 10mV | 30mV | — | ±10mV | ±50mV | — | ±20mV | ±100mV | — | ±25mV | ±125mV |
| | | — | 10mV | 50mV | — | — | — | — | — | — | — | — | — |
| Load regulation ¹ | $P_{out} = 10\% \text{ to F.L.}$ | — | 10mV | 30mV | — | ±10mV | ±50mV | — | ±20mV | ±100mV | — | ±25mV | ±125mV |
| | | — | 10mV | 50mV | — | — | — | — | — | — | — | — | — |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 30 | 65 | — | 40 | 85 | — | 60 | 150 | — | 75 | 180 |
| | | — | 25 | 50 | — | — | — | — | — | — | — | — | — |

24 Volts DC Input



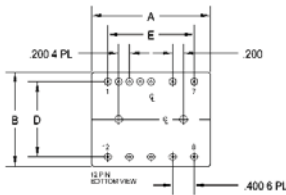
Notes: *Up to 90% full power available from either output if rated output power is not exceeded; ¹balanced load conditions.

| TRIPLE OUTPUT DEVICES | | 1680-T3.3/5 (12.5W) | | | 1680-T3.3/12 (17.5W) | | | 1680-T3.3/15 (17.5W) | | | 1680-T05 (12.5W) | | | 1680-T12 (17.5W) | | | 1680-T15 (17.5W) | | |
|-----------------------|--|---------------------|------|--------|----------------------|-------|--------|----------------------|-------|--------|------------------|------|--------|------------------|-------|--------|------------------|-------|--------|
| PARAMETER | CONDITION | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| Output voltage | $+I_{out} = -I_{out}$ | +3.2 | +3.3 | +3.4 | +3.2 | +3.3 | +3.4 | +3.2 | +3.3 | +3.4 | +4.9 | +5.0 | +5.1 | +4.9 | +5.0 | +5.1 | +4.9 | +5.0 | +5.1 |
| | | +4.9 | +5.0 | +5.1 | +11.9 | +12.0 | +12.1 | +14.9 | +15.0 | +15.1 | +4.9 | +5.0 | +5.1 | +11.9 | +12.0 | +12.1 | +14.9 | +15.0 | +15.1 |
| Output current | $V_{in\ min} - V_{in\ max}$ | 300mA | — | 3A | 300mA | — | 3A | 300mA | — | 3A | 90mA | — | 2A | 90mA | — | 2A | 90mA | — | 2A |
| | | ±40mA | — | ±250mA | ±40mA | — | ±312mA | ±32mA | — | ±250mA | ±40mA | — | ±250mA | ±40mA | — | ±312mA | ±32mA | — | ±250mA |
| Efficiency | $P_{out} = \text{max rated load}$ | 66% | 69% | — | 66% | 69% | — | 66% | 69% | — | 66% | 69% | — | 71% | 74% | — | 71% | 74% | — |
| Line regulation | $P_{out} = \text{max rated load}$ $V_{in\ min} - V_{in\ max}$ | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV |
| | | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV |
| Load regulation | $P_{out} = 10\% \text{ to F.L.}$ | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV | — | 10mV | 50mV |
| | | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV | — | 25mV | 50mV |
| Output ripple | F.L. BW 2 MHz mV _{pp} | — | 30 | 65 | — | 30 | 65 | — | 30 | 65 | — | 40 | 85 | — | 40 | 85 | — | 40 | 85 |
| | | — | — | 50 | — | — | 50 | — | — | 50 | — | — | 50 | — | — | 50 | — | — | 50 |

CASE STYLE 10

Solder Sealed

Flangeless PCB Stud Mount



| 1680-SXX output < 24 VDC | | 1680-SXX output ≥ 24 VDC | | 1680-DXX | | 1680-TXX | |
|--------------------------|-----------------------|--------------------------|------------------------|-------------------|------------------------|-------------------|------------------------|
| Pin 1 N/C | Pin 7 + Input | Pin 1 N/C | Pin 7 + Input | Pin 1 N/C | Pin 7 + Input | Pin 1 N/C | Pin 7 + Input |
| Pin 2 Inhibit Not | Pin 8 Main Output | Pin 2 Inhibit Not | Pin 8 + Remote Sense | Pin 2 Inhibit Not | Pin 8 + Remote Sense | Pin 2 Inhibit Not | Pin 8 Main Output |
| Pin 3 Soft Start | Pin 9 Main Output Ret | Pin 3 Soft Start | Pin 9 - Remote Sense | Pin 3 Soft Start | Pin 9 - Remote Sense | Pin 3 Soft Start | Pin 9 Main Output Ret |
| Pin 4 Sync | Pin 10 + Remote Sense | Pin 4 Sync | Pin 10 Main Output | Pin 4 Sync | Pin 10 + Dual Output | Pin 4 Sync | Pin 10 + Dual Output |
| Pin 5 N/C | Pin 11 Adjust | Pin 5 Adjust | Pin 11 N/C | Pin 5 Adjust | Pin 11 Dual Output Ret | Pin 5 N/C | Pin 11 Dual Output Ret |
| Pin 6 Input Ret | Pin 12 - Remote Sense | Pin 6 Input Ret | Pin 12 Main Output Ret | Pin 6 Input Ret | Pin 12 - Dual Output | Pin 6 Input Ret | Pin 12 - Dual Output |



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