12.5-30 Watt Hybrid

Features
- Rad Hard: TID > 100kRad(Si)
- 2:1 margin: Operates beyond 200kRad TID
- No SEE: LET > 82MeV*cm^2/mg
- Proton Resistant: No optocouplers used
- Specifically designed for 100 VDC satellite bus
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- "Inhibit-not" function
- Power on soft start
- "Inhibit-not" function
- Fully isolated design
- No external filter caps required
- Built-in test capability
- Power on soft start
- "Inhibit-not" function
- Highly resistant to radiation

Specifications

**INPUT: 100 VDC nominal**
- Range: 80 to 120 VDC continuous

**ISOLATION:**
- Input to case: 500 VDC
- Input to output: 500 VDC
- Output to case: 100 VDC

**ENVIRONMENT:**
- Storage temperature: -55°C to +150°C
- Shock: 50 G's
- Acceleration: 50 G's
- Vibration: 30 G's
- Grades EU, L, R & S:
  - Full Power Output at Tcase = +85°C
  - Linearly derates to zero at Tcase = +115°C
- Grades LE, RE & SE:
  - Full Power Output at Tcase = +125°C
  - Linearly derates to zero at Tcase = +135°C
- Grades L & LE:
  - TID up to 45kRad(Si)
  - No SEE up to 60MeV*cm^2/mg
- WEIGHT: 75 grams typical

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**CASE DIMENSIONS**

Unit: inches | millimeters

<table>
<thead>
<tr>
<th>Case Style</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 F</td>
<td>2.200</td>
<td>55.880</td>
<td>1.350</td>
<td>34.290</td>
<td>0.495</td>
<td>12.573</td>
<td>1.000</td>
</tr>
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<td>3 I</td>
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<td>12.573</td>
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<tr>
<td>5 IF</td>
<td>2.225</td>
<td>56.515</td>
<td>1.350</td>
<td>34.290</td>
<td>0.495</td>
<td>12.573</td>
<td>1.000</td>
</tr>
<tr>
<td>8 WF</td>
<td>2.225</td>
<td>56.515</td>
<td>1.710</td>
<td>43.434</td>
<td>0.495</td>
<td>12.573</td>
<td>—</td>
</tr>
<tr>
<td>10 PB</td>
<td>2.225</td>
<td>56.515</td>
<td>1.350</td>
<td>34.290</td>
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<td>1.000</td>
</tr>
</tbody>
</table>
## DC-DC CONVERTERS

### PROTON RAD HARD 100K+™ SERIES

#### 9680

**MAGNETICALLY ISOLATED**

**100 VDC**

<table>
<thead>
<tr>
<th>DUAL OUTPUT DEVICES</th>
<th>9680-005 (30W)</th>
<th>9680-D12 (30W)</th>
<th>9680-D15 (30W)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARAMETER</strong></td>
<td><strong>CONDITION</strong></td>
<td><strong>MIN TYP MAX</strong></td>
<td><strong>MIN TYP MAX</strong></td>
</tr>
<tr>
<td>Output voltage</td>
<td>±IOUT = -IOUT</td>
<td>+4.9 +5.0 +5.1</td>
<td>+11.9 +12.0 +12.1</td>
</tr>
<tr>
<td>Output current</td>
<td>VIN_max — VIN_min</td>
<td>±150mA — ±250mA</td>
<td>±85mA — ±1.25A</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Pout = max rated load</td>
<td>72% 76% — 82% 86%</td>
<td>78% 82% — 89% 93%</td>
</tr>
<tr>
<td>Line regulation</td>
<td>Pout = max rated load</td>
<td>VIN_max — VIN_min</td>
<td>±10mA ±50mA</td>
</tr>
<tr>
<td>Load regulation</td>
<td>Pout = 10% to FL</td>
<td>VIN_max — VIN_min</td>
<td>±10mA ±50mA</td>
</tr>
<tr>
<td>Output ripple</td>
<td>F.L. BW 2 MHz</td>
<td>mV_pp</td>
<td>— 40 85</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>TRIPLE OUTPUT DEVICES</th>
<th>9680-T3.3/5 (12.5W)</th>
<th>9680-T3.3/12 (17.5W)</th>
<th>9680-T3.5/15 (17.5W)</th>
<th>9680-T5/3 (12.5W)</th>
<th>9680-T12 (17.5W)</th>
<th>9680-T15 (17.5W)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARAMETER</strong></td>
<td><strong>CONDITION</strong></td>
<td><strong>MIN TYP MAX</strong></td>
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<td><strong>MIN TYP MAX</strong></td>
</tr>
<tr>
<td>Output voltage</td>
<td>±IOUT = -IOUT</td>
<td>+3.2 +3.3 +3.4</td>
<td>+3.2 +3.3 +3.4</td>
<td>+4.9 +5.0 +5.1</td>
<td>+4.9 +5.0 +5.1</td>
<td>+4.9 +5.0 +5.1</td>
</tr>
<tr>
<td>Output current</td>
<td>VIN_max — VIN_min</td>
<td>±300mA — ±3A</td>
<td>±300mA — ±3A</td>
<td>±30mA — ±3A</td>
<td>±30mA — ±3A</td>
<td>±30mA — ±3A</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Pout = max rated load</td>
<td>66% 69% — 69% 69%</td>
<td>66% 69% — 69% 69%</td>
<td>66% 69% — 71% 74%</td>
<td>71% 74% — 71% 74%</td>
<td></td>
</tr>
<tr>
<td>Line regulation</td>
<td>Pout = max rated load</td>
<td>VIN_max — VIN_min</td>
<td>±25mA ±50mA</td>
<td>±50mA ±25mA</td>
<td>±50mA ±25mA</td>
<td>±50mA ±25mA</td>
</tr>
<tr>
<td>Load regulation</td>
<td>Pout = 10% to FL</td>
<td>VIN_max — VIN_min</td>
<td>±30mA ±250mA</td>
<td>±25mA ±250mA</td>
<td>±25mA ±250mA</td>
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</tr>
<tr>
<td>Output ripple</td>
<td>F.L. BW 2 MHz</td>
<td>mV_pp</td>
<td>— 30 65</td>
<td>— 30 65</td>
<td>— 40 85</td>
<td>— 40 85</td>
</tr>
</tbody>
</table>

### CASES

- **CASE STYLE 6**
- **CASE STYLE 12**

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**9680-SXX output <24 VDC**

- Pin 1 bit
- Pin 2 inhibit not
- Pin 3 soft start
- Pin 4 sync
- Pin 5 N/C
- Pin 6 input ret

**9680-SXX output ≥24 VDC**

- Pin 1 bit
- Pin 2 inhibit not
- Pin 3 soft start
- Pin 4 sync
- Pin 5 N/C
- Pin 6 input ret

**9680-DXX**

- Pin 1 bit
- Pin 2 inhibit not
- Pin 3 soft start
- Pin 4 sync
- Pin 5 N/C
- Pin 6 input ret

**9680-TXX**

- Pin 1 bit
- Pin 2 inhibit not
- Pin 3 soft start
- Pin 4 sync
- Pin 5 N/C
- Pin 6 input ret

Please specify GRADE LEVEL for your application. EU grade units will be shipped if no option is specified.

**EU Engineering Units**

- 100 K+™, +125°C military/aerospace
- 100 K+™, +85°C military/aerospace

**RE Engineering Units**

- 100 K+™, +125°C military/aerospace
- 100 K+™, +85°C military/aerospace

**SE Engineering Units**

- 100 K+™, +125°C space
- 100 K+™, +85°C space

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