32.5–80 Watt Hybrid

Features
- Rad Hard: TID > 100kRad(Si)
- 2:1 margin: Operates beyond 200kRad TID
- No SEE: LET > 82MeV·cm²/mg
- Proton Resistant: No optocouplers used
- Specifically engineered for 50 VDC satellite bus
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- "Inhibit-not" function
- Short circuit and overvoltage protection
- Built-in EMI input filter meets 200 kHz operation for low ripple and fast response time
- Built-in test capability
- Capability of external sync for switching frequencies
- Full Power Output at Tcase = +125°C
- Linearly derates to zero at Tcase = +135°C
- 2:1 margin: Operates beyond 200kRad
- Rad Hard: TID > 100kRad(Si)
- Full Power Output at Tcase = +85°C
- Linearly derates to zero at Tcase = +115°C
- Linearity ensures correct operation
- "Inhibit-not" function
- Full Power Output at Tcase = +125°C
- Linearly derates to zero at Tcase = +135°C
- TID up to 45kRad(Si)
- No SEE up to 60MeV·cm²/mg
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- "Inhibit-not" function
- Short circuit and overvoltage protection
- Built-in EMI input filter meets 200 kHz operation for low ripple and fast response time
- Built-in test capability

Specifications
- **INPUT:** 50 VDC nominal
- **Range:** 30 to 75 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: 500 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
- **WEIGHT:** 160 grams typical

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Case Style</th>
<th>Pin Count</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>7031</td>
<td>4</td>
<td>12</td>
<td>Solder Sealed PCB Mount with Flange</td>
</tr>
<tr>
<td>7031 LF</td>
<td>7</td>
<td>12</td>
<td>Seam Weld PCB Mount with Flange</td>
</tr>
<tr>
<td>7031 ZF</td>
<td>9</td>
<td>12</td>
<td>Seam Weld Chassis Mount with Flange</td>
</tr>
<tr>
<td>7031 PD</td>
<td>11</td>
<td>12</td>
<td>Solder Sealed Flangeless PCB Stud Mount</td>
</tr>
</tbody>
</table>

**Case Dimensions**

<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>4</td>
<td>2.040</td>
<td>51.816</td>
<td>2.610</td>
<td>66.294</td>
<td>0.495</td>
<td>12.573</td>
<td>2.300</td>
</tr>
<tr>
<td>7</td>
<td>2.040</td>
<td>51.816</td>
<td>2.610</td>
<td>66.294</td>
<td>0.495</td>
<td>12.573</td>
<td>2.300</td>
</tr>
<tr>
<td>9</td>
<td>2.040</td>
<td>51.816</td>
<td>3.010</td>
<td>76.454</td>
<td>0.495</td>
<td>12.573</td>
<td>—</td>
</tr>
<tr>
<td>11</td>
<td>2.040</td>
<td>51.816</td>
<td>2.610</td>
<td>66.294</td>
<td>0.495</td>
<td>12.573</td>
<td>2.300</td>
</tr>
</tbody>
</table>

**TOLERANCES:** ALL DIMENSIONS ±0.01 EXCEPT F = MAX, C = ±0.01/0.02; DRAWINGS IN INCHES.
## DC-DC CONVERTERS
### PROTON RAD HARD 100K+™ SERIES 7031

**DUAL OUTPUT DEVICES**  
7031-D05 (75W)  
7031-D12 (74.4W)  
7031-D15 (75W)  
7031-D20 (76W)  

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITION</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage</td>
<td>$V_{+} - V_{-}$</td>
<td>+4.9</td>
<td>+5.0</td>
<td>+5.1</td>
<td>+11.9</td>
<td>+12.0</td>
<td>+12.1</td>
<td>+14.9</td>
<td>+15.0</td>
<td>+15.1</td>
<td>+19.9</td>
<td>+20.0</td>
<td>+20.1</td>
</tr>
<tr>
<td>Output current</td>
<td>$V_{+} - V_{-}$</td>
<td>$\pm266\text{mA}$</td>
<td>$\pm7.5\text{A}$</td>
<td>$\pm158\text{mA}$</td>
<td>$\pm3.1\text{A}$</td>
<td>$\pm127\text{mA}$</td>
<td>$\pm2.5\text{A}$</td>
<td>$\pm190\text{mA}$</td>
<td>$\pm1.9\text{A}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>$P_{in} = \text{max rated load}$</td>
<td>72%</td>
<td>75%</td>
<td>—</td>
<td>77%</td>
<td>81%</td>
<td>—</td>
<td>78%</td>
<td>82%</td>
<td>—</td>
<td>78%</td>
<td>83%</td>
<td>—</td>
</tr>
<tr>
<td>Line regulation</td>
<td>$V_{+} - V_{-}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm20\text{mV}$</td>
<td>$\pm100\text{mV}$</td>
<td>$\pm25\text{mV}$</td>
<td>$\pm125\text{mV}$</td>
<td>$\pm25\text{mV}$</td>
<td>$\pm125\text{mV}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load regulation</td>
<td>$P_{in} = 10%$ to FL.</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm20\text{mV}$</td>
<td>$\pm100\text{mV}$</td>
<td>$\pm25\text{mV}$</td>
<td>$\pm125\text{mV}$</td>
<td>$\pm25\text{mV}$</td>
<td>$\pm125\text{mV}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output ripple</td>
<td>F.L. BW 2 MHz mVpp</td>
<td>$\pm40$</td>
<td>85</td>
<td>$\pm60$</td>
<td>150</td>
<td>$\pm75$</td>
<td>180</td>
<td>$\pm75$</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TRIPLE OUTPUT DEVICES**  
7031-T3.35 (22.25W)  
7031-T3.3/12 (42.75W)  
7031-T3.75/15 (47.25W)  
7031-T05 (32.5W)  
7031-T12 (43W)  
7031-T15 (47.5W)  

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITION</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage</td>
<td>$V_{+} - V_{-}$</td>
<td>$\pm3.2$</td>
<td>$\pm3.3$</td>
<td>$\pm3.4$</td>
<td>$\pm3.2$</td>
<td>$\pm3.3$</td>
<td>$\pm3.4$</td>
<td>$\pm4.9$</td>
<td>$\pm5.0$</td>
<td>$\pm5.1$</td>
<td>$\pm4.9$</td>
<td>$\pm5.0$</td>
<td>$\pm5.1$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output current</td>
<td>$V_{+} - V_{-}$</td>
<td>$\pm40\text{mA}$</td>
<td>$\pm750\text{mA}$</td>
<td>$\pm40\text{mA}$</td>
<td>$\pm750\text{mA}$</td>
<td>$\pm32\text{mA}$</td>
<td>$\pm750\text{mA}$</td>
<td>$\pm40\text{mA}$</td>
<td>$\pm750\text{mA}$</td>
<td>$\pm32\text{mA}$</td>
<td>$\pm750\text{mA}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>$P_{in} = \text{max rated load}$</td>
<td>65%</td>
<td>66%</td>
<td>—</td>
<td>65%</td>
<td>66%</td>
<td>—</td>
<td>65%</td>
<td>66%</td>
<td>—</td>
<td>70%</td>
<td>73%</td>
<td>—</td>
<td>70%</td>
<td>73%</td>
<td>—</td>
</tr>
<tr>
<td>Line regulation</td>
<td>$V_{+} - V_{-}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load regulation</td>
<td>$P_{in} = 10%$ to FL.</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td>$\pm10\text{mV}$</td>
<td>$\pm50\text{mV}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output ripple</td>
<td>F.L. BW 2 MHz mVpp</td>
<td>$\pm30$</td>
<td>65</td>
<td>$\pm30$</td>
<td>65</td>
<td>$\pm30$</td>
<td>65</td>
<td>$\pm40$</td>
<td>85</td>
<td>$\pm40$</td>
<td>85</td>
<td>$\pm40$</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

### MAGNETICALLY ISOLATED

**50 VDC**

---

**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
  - **SE 100 K+™**, +125°C space
- **R 100 K+™**, +85°C military/aerospace
- **S 100 K+™**, +85°C space

---

**L 45 K, +85°C military/aerospace**

---

Revised 2015-09-17

---