DC-DC Power Converters & Accessories
Qualified for Space

www.vptpower.com
Power
Your Space Mission Today

VPT: The Voice of Experience in Space
VPT powers the world’s space and aerospace systems with small size, light weight, power conversion solutions. VPT offers high reliability DC-DC converters, EMI filters, and custom engineering services for the rapid development of critical power systems.

For decades, space organizations including NASA, ESA, Lockheed Martin, Orbital, and others have relied on VPT to power vital space programs. VPT’s proven solutions are currently in flight on launch vehicles as well as LEO, MEO, GEO, and deep space programs.

Quality: MIL-PRF-38534 Class H & Class K
VPT space modules are qualified to the Defense Logistics Agency (DLA) standard of MIL-PRF-38534 Class H and Class K and are available on DLA Standard Microcircuit Drawings (SMDs). VPT modules are characterized to VPT’s DLA-approved Radiation Hardness Assurance (RHA) plan and compliant to MIL-PRF-38534, Appendix G, to levels P or R.

Choice: Build An Efficient Power System
Launch vehicles, deep space probes, and everything in between have varying requirements in terms of radiation hardness, SEE, and other specifications. VPT offers a breadth of products, in varying screening levels, to ensure that you can select the right mix to power your mission cost-effectively.

Choose from products in the hi-rel radiation tolerant series or full radiation hardened/TOR compliant series to best meet your power system needs.

Customizable: Work with Us to Create Your Optimal Solution
VPT understands the unique specifications often required in space systems. We’ve provided custom modules and full custom power solutions to industry leading space organizations for years. Rely on VPT for:
- Semi-custom versions of standard products
- Full custom versions of modules
- Entire custom power systems

Availability: Fast Module Delivery
Lead times can mean mission success or failure. Get your program off the ground immediately with engineering models delivered quickly from VPT. Standard flight models, delivered with the industry’s shortest lead times, ensure your important development milestones are met.

Awards: Customers Recognize VPT
At VPT it is simple: we say what we do and we do what we say. Space customers appreciate this, and have granted VPT multiple awards for excellent service and on-time product delivery for critical space programs.

On the cover: VPT powers GPS III and the SpaceX Falcon 9 launch vehicle. Inside: VPT provides reliable power for Pluto New Horizons and ExoMars Rover.
Engineered for space: TID of up to 100 krad(Si), SEE of up to 85 MeV·cm²/mg, complete documentation available

Qualified: to MIL-PRF-38534 Class H and K, on DLA SMDs

Pin for pin compatibility for pre-existing designs: no redesign necessary

MIL-HDBK-1547 and TOR compliant for maximum reliability

Save space and cost: small size and light weight

**Space Programs Powered by VPT**

- AISAT • Astro-H, JAXA • Atlas V Expendable Launch Vehicle • Canadian SCISAT • CUBE Satellite • Cygnus Spacecraft • Delta Rocket • Disaster Monitoring Satellite (DMS) System • Dubai Sat II
- EnMap (Environmental Mapping and Analysis) satellite • ExoMars European-American Lander Exploration Program • FAINSAT Satellite Intelligence • GLONASS Navigation Satellite, Russia • GPSIIF, USAF • GPS IR-M, USAF • GPSIII, USAF • ICESat • International Space Station • Joint Polar Satellite System (JPSS), NOAA/NASA • Lunar CRater Observation and Sensing Satellite (LCROSS) • Lunar Reconnaissance Orbiter (LRO) • LUNA-RESURS Lander, Russia • Mercury Messenger, NASA • NEMO- Naval Earth Map Observer, USN • Operationally Responsive Space (ORS) • Phobos-Grunt, Russia • NOVASAR • Polar NOx, NASA • Pluto New Horizons, NASA • Proba V Satellite, ESA • SeaLaunch • Solar Dynamics Observatory (SDO), NASA • Space Launch System, NASA • Space Shuttle Experiments, NASA • SpaceX Falcon 9 • SpaceX Dragon Capsule • TACSAT 2, US Air Force Research Laboratory • TET-1 German Microsatellite • United Launch Alliance (ULA) Programs • Venus Express Satellite, ESA • WFCA, NASA • WMO Satellites • X-33 • X37

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Products described in this catalog are subject to all export license restrictions and regulations which may include but are not limited to ITAR (International Traffic in Arms Regulations) and the Export Administration and Foreign Assets Control Regulations. Further restrictions may apply. Contact VPT sales for details.

Call: 425.353.3010 | E-mail: vptsales@vptpower.com | [www.vptpower.com](http://www.vptpower.com)
### Overview of VPT Products Available For Powering Space Systems

<table>
<thead>
<tr>
<th>Product Series</th>
<th>Available to MIL-PRF-38534</th>
<th>Total Dose</th>
<th>ELDRS</th>
<th>Single Event Effects (SEE)</th>
<th>Compliant to MIL-HDBK-1547 &amp; Aerospace TOR</th>
<th>Technology</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVR Series DC-DC Converters and EMI Filters</td>
<td>Class H</td>
<td>Class K</td>
<td>100 krad (Si)</td>
<td>Yes</td>
<td>85 MeV-cm²/mg standard</td>
<td>Yes</td>
<td>Thick-film hybrid</td>
</tr>
<tr>
<td>SV Series DC-DC Converters</td>
<td>Class H</td>
<td>Class K</td>
<td>30 krad (Si)</td>
<td>with 2x margin</td>
<td>Yes</td>
<td>44 MeV-cm²/mg standard</td>
<td>N/A</td>
</tr>
<tr>
<td>DV Series DC-DC Converters and EMI Filters*</td>
<td>Class H</td>
<td>Class K</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Thick-film hybrid</td>
</tr>
</tbody>
</table>

* For a complete listing of our DV Series products, see our other short form catalog: “DC-DC Power Converters & Accessories for Military/Avionics Applications.”

### DC-DC Power Converters for Space—Isolated

<table>
<thead>
<tr>
<th>Max Output Power (W)</th>
<th>Model Series</th>
<th>Input DC Voltage (V)</th>
<th>Output DC Voltage (V)</th>
<th>Total Dose</th>
<th>Single Event Effects (SEE)</th>
<th>Compliant to MIL-HDBK-1547 &amp; Aerospace TOR</th>
<th>DLA SMD#</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation Hardened: SVR Series of DC-DC Power Converters</td>
<td>15</td>
<td>SVRHf2800S/D</td>
<td>18 – 37.5</td>
<td>Single 3.3, 5, 12, 15 Dual ±5, ±12, ±15</td>
<td>100 krad (Si) with ELDRS</td>
<td>85 MeV-cm²/mg</td>
<td>Yes</td>
<td>In DLA Review</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>SVRTR2800S/D</td>
<td>18 – 37.5</td>
<td>Single 3.3, 5, 12, 15 Dual ±5, ±12, ±15</td>
<td>100 krad (Si) with ELDRS</td>
<td>85 MeV-cm²/mg</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>SVRFL2800S/D</td>
<td>18 – 37.5</td>
<td>Single 3.3, 5, 12, 15 Dual ±5, ±12, ±15</td>
<td>100 krad (Si) with ELDRS</td>
<td>85 MeV-cm²/mg</td>
<td>Yes</td>
<td>In DLA Review</td>
</tr>
<tr>
<td>Radiation Tolerant: SV Series of DC-DC Power Converters</td>
<td>6</td>
<td>SVSAs2800S/D</td>
<td>15 – 50</td>
<td>Single 3.3, 5, 5.2, 12, 15 Dual ±5, ±12, ±15</td>
<td>30 krad (Si) with 2x margin &amp; ELDRS</td>
<td>44 MeV-cm²/mg</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>SVHF2800S/D</td>
<td>15 – 50</td>
<td>Single 2.5, 3.3, 5, 12, 15 Dual ±5, ±12, ±15</td>
<td>30 krad (Si) with ELDRS</td>
<td>44 MeV-cm²/mg</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>SVTR2800S/D</td>
<td>15 – 50</td>
<td>Single 3.3, 5, 12, 15 Dual ±5, ±12, ±15</td>
<td>30 krad (Si) with 2x margin &amp; ELDRS</td>
<td>44 MeV-cm²/mg</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>SVRFL2800S/D</td>
<td>16 – 40</td>
<td>Single 3.3, 5, 12, 15 Dual ±5, ±12, ±15</td>
<td>30 krad (Si) with 2x margin &amp; ELDRS</td>
<td>44 MeV-cm²/mg</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

### Point of Load DC-DC Power Converters for Space—Non-Isolated

<table>
<thead>
<tr>
<th>Max Output Current (A)</th>
<th>Model Series</th>
<th>Input DC Voltage (V)</th>
<th>Output DC Voltage (%Vout)</th>
<th>Total Dose</th>
<th>Single Event Effects (SEE)</th>
<th>Compliant to MIL-HDBK-1547 &amp; Aerospace TOR</th>
<th>DLA SMD#</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation Hardened: SVR and SV Series of Point Load DC-DC Power Converters</td>
<td>8</td>
<td>SVRGA0508S</td>
<td>3.6 to 7.0</td>
<td>-1.5 to +1.5</td>
<td>100 krad (Si) with ELDRS</td>
<td>85 MeV-cm²/mg</td>
<td>Yes</td>
<td>5962R13217</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>SVGA0510S</td>
<td>3.5 to 7.0</td>
<td>-1.5 to +1.5</td>
<td>100 krad (Si) with ELDRS</td>
<td>85 MeV-cm²/mg</td>
<td>N/A</td>
<td>5962R12219</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>SVGA0515S</td>
<td>3.5 to 7.0</td>
<td>-1.5 to +1.5</td>
<td>100 krad (Si) with ELDRS</td>
<td>85 MeV-cm²/mg</td>
<td>N/A</td>
<td>5962R12219</td>
</tr>
</tbody>
</table>

### EMI Filters for Space

<table>
<thead>
<tr>
<th>Max Output Current (A)</th>
<th>Model Series</th>
<th>Input DC Voltage (V)</th>
<th>Total Dose</th>
<th>Single Event Effects (SEE) Rating</th>
<th>Compliant to MIL-HDBK-1547 &amp; Aerospace TOR Deratings</th>
<th>DLA Drawing #</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation Immune: SVR Series of EMI Filters</td>
<td>2</td>
<td>SVRMH28</td>
<td>18 – 37.5</td>
<td>Immune</td>
<td>Immune</td>
<td>Yes</td>
<td>In qualification</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>SVRM28</td>
<td>18 – 37.5</td>
<td>Immune</td>
<td>Immune</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>SVRME28</td>
<td>18 – 37.5</td>
<td>Immune</td>
<td>Immune</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviation key**
- DD = Displacement Damage
- DLA = Defense Logistics Agency
- ELDRS = Enhanced Low Dose Rate Sensitivity
- LET = Linear Energy Transfer
- RHA = Radiation Hardness Assurance
- RLAT = Radiation Lot Acceptance Testing
- SEE = Single Event Effects
- TID = Total Ionizing Dose
- TOR = Aerospace Corp’s Technical Operating Report
- WCA = Worst Case Analysis
VPT Facilities and Certifications

Quality-Focused Design, Development, and Manufacturing

VPT integrates the industry’s highest quality design standards with MIL-PRF-38534 certified manufacturing.

VPT employs a comprehensive Quality Assurance System (QAS) to ensure that all products are designed, developed, manufactured, tested, stored, and delivered in compliance with all specified requirements. Concurrent engineering and process controls ensure that products are delivered defect-free.

The VPT quality process extends from design conception all the way through manufacturing and delivery. These procedures include:

- Process capability
- Quality management methodology
- Supplier quality control
- Component and raw material standardization and minimization
- Process control
- Capability studies
- Design assurance

This proven system provides for the detection and resolution of any issues prior to manufacturing.

VPT’s Quality Assurance Manual (QA1-001) and System includes more than 300 specific quality and process procedures. These procedures detail VPT’s configuration and documentation/software/record control, responsibilities and authorities, contract review, self-auditing, calibration, cleanroom and facility control, ESD control, testing, processes, manufacturing, qualification, training, and all other aspects of each requirement and function performed. When pertaining to quality, every requirement and procedure is documented and every action is recorded.

Certifications

View all certifications on VPT’s website at www.vptpower.com.

<table>
<thead>
<tr>
<th>Certification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIL-PRF-38534 Certified Facility</td>
<td>Certified to Class H &amp; K</td>
</tr>
<tr>
<td>MIL-PRF-38534, Appendix G, Radiation Hardness Assurance (RHA) Plan Approved by Defense Logistics Agency (DLA)</td>
<td>Products certified to RHA Plan per MIL-PRF-38534 Appendix G, levels P and R</td>
</tr>
<tr>
<td>DLA MIL-PRF-38534 Qualified Manufacturers List (QML-38534)</td>
<td>For compliance to build and ship products qualified to MIL-PRF-38534 Class K, Class H, Class E</td>
</tr>
<tr>
<td>DLA Qualified Product Database (QPDSS-38534)</td>
<td>For compliance to build and ship products qualified to MIL-PRF-38534 Class K, Class H, Class E</td>
</tr>
<tr>
<td>MIL-STD-883 Lab Suitability</td>
<td>Manufacturing facility at Delta Electronics, Inc., Taiwan</td>
</tr>
<tr>
<td>ISO 9001:2008</td>
<td>All sites certified</td>
</tr>
<tr>
<td>Standard Microcircuit Drawings</td>
<td>Issued by the DLA qualifying VPT products to MIL-PRF-38534 Class H and Class K</td>
</tr>
</tbody>
</table>

For a complete overview of VPT’s quality processes for hybrid DC-DC converters and EMI filters, download the application note at www.vptpower.com.
VPT Facilities and Certifications

Technology and ITAR Control Program
VPT’s technology and ITAR [International Traffic in Arms Regulations] control program, ITR-001, defines the policies and internal controls of VPT to ensure that no transfer of defense-related technology or assistance subject to control under U.S. export control laws and regulations takes place beyond what is authorized and approved by the U.S. Government. VPT is committed to compliance with all aspects of U.S. laws and regulations governing the export of ITAR-controlled Defense Articles, Defense Services and Technical Data. VPT is registered with the United States Department of State. Please contact your sales representative or the VPT Inc. Sales Department to request further information about the VPT technology and ITAR control program.

Other Programs
Counterfeit Electronic Parts Control Program.
VPT implements an extensive counterfeit electronics parts control procedure, QC1-016, which documents and describes the methods used to identify and control counterfeit electronic parts in order prevent them from entering VPT inventory and VPT products. This program is modeled after the requirements of SAE AS5553.

Contamination Control, FOE, and FOC Program.
VPT implements, controls, and assures cleanliness and performs contamination and FOC (Foreign Object Control) and FOE (Foreign Object Elimination) in accordance with qualified processes as listed in procedures GNL-003 and QA2-001.

Prohibited Materials. See VPT’s Quality Assurance Application Note AN001 at www.vptpower.com for details on prohibited materials restrictions, pure tin finishes, lead, RoHS, WEEE, REACH, and SVCC.
Radiation Hardness Assurance

VPT’s Approach to Design for Radiation Environments in Space

VPT takes a conservative approach to radiation design to ensure our products perform flawlessly during the rigors of space travel.

VPT’s DLA approved Radiation Hardness Assurance (RHA) plan documents VPT’s processes and procedures for guaranteeing the performance of VPT products under various environmental conditions in space, including TID, SEE, and ELDRS.

<table>
<thead>
<tr>
<th>Test Definition</th>
<th>VPT’s Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Ionizing Dose (TID). A measure of the energy absorbed in the semiconductor components from the naturally occurring sources of radiation (protons, electrons, photons). This results in the slow degradation of semiconductor performance specifications. TID is tested by exposing components to gamma radiation from a Cobalt-60 source.</td>
<td>SV Series: Designed for 30 krad(Si). Sensitive semiconductor components undergo RLAT to 60 krad(Si) per MIL-STD-883 Method 1019 (2x margin). Converters are characterized to 60 krad(Si) (2x margin).&lt;br&gt;SVR Series: Designed for 100 krad(Si). Sensitive semiconductor components undergo RLAT to 100 krad(Si) per MIL-STD-883 Method 1019. Converters are characterized to 100 krad(Si).</td>
</tr>
<tr>
<td>Enhanced Low Dose Rate Sensitivity (ELDRS): Many linear-bipolar integrated circuits show enhanced parameter degradation when exposed at low dose rates close to those seen in a space environment as compared to the high dose rates (50-300 rad(Si)/s) that components were traditionally tested at for TID degradation. MIL-STD-883 Method 1019 gives guidance for characterizing components for ELDRS. Components that exhibit ELDRS are tested for TID at a rate below 0.01 rad(Si)/s.</td>
<td>SV Series: All bipolar linear ICs are characterized for ELDRS per MIL-STD-883 Method 1019. Any components that show ELDRS undergo RLAT at low dose rate to at least 60 krad(Si) per condition D of MIL-STD-883 Method 1019.&lt;br&gt;SVR Series: All bipolar linear ICs are verified to be ELDRS free in accordance with MIL-STD-883 test method 1019 section 3.13</td>
</tr>
<tr>
<td>Single Event Effects (SEE). Single high energy protons and heavy ions can deposit sufficient energy in a semiconductor component, causing a range of effects. SEEs include single event latchups (SELs), single event gate ruptures (SEGRs), single event transients (SETs), single event functional interrupts (SEFIs) and single event burnouts (SEBs).</td>
<td>SV Series: Converters are characterized for no destructive events under heavy ion exposure to LET = 44 MeV-cm²/mg, including: SEB, SEL, SEGR and SEFI. Converters are also characterized for cross section and magnitude of output transients (SET).&lt;br&gt;SVR Series: Converters are characterized for catastrophic events (SEI, SEB, SEGR) as well as functional interrupts (SEFI) under heavy ion exposure to LET = 85 MeV-cm²/mg. Converters are also characterized for cross section and magnitude of output transients (SET) for at least 3 different LET levels.</td>
</tr>
<tr>
<td>Displacement Damage (DD) is caused by protons and neutrons. Particles displace atoms in the bulk silicon crystal structure. Leads to a darkening of optics and gradual degradation of performance. DD is tested at the component level with a neutron source.</td>
<td>SV Series: Optoisolators are not used.&lt;br&gt;SVR Series: Optoisolators are not used. Sensitive semiconductor components undergo RLAT for DD performance to 1x10¹⁶ n/cm².</td>
</tr>
<tr>
<td>Radiation Lot Acceptance Testing (RLAT): Semiconductor wafer lots are exposed to TID or neutron radiation on a sample basis. If the parameter degradation for the tested samples is within the predetermined acceptance limits, then the lot can be used in radiation hardened converters.</td>
<td>SV Series: Sensitive semiconductor components undergo RLAT for TID and DD.</td>
</tr>
</tbody>
</table>
**SVRHF Series**

**Rad Hard & TOR Compliant DC-DC Converters**

### Features
- Single outputs of 3.3, 5, 12, 15 V
- Dual outputs of ±5, ±12, ±15 V
- Wide input voltage range of 18 to 37.5 V
- High input transient voltage: 50 V for 1 second
- Very low output noise
- Radiation immune magnetic feedback circuit: no use of optoisolators
- Protection features: short circuit/current limit/undervoltage lockout
- Full performance over -55 °C to +125 °C military temperature range
- Fixed frequency: 450 kHz
- Hermetic hybrid technology

### Electrical Performance
- **Output Voltage**
  - Min: 18 V
  - Typ: 28 V
  - Max: 37.5 V
- **Output Power**
  - Min: 0 W
  - Typ: 15 W
  - Max: 28 W
- **Efficiency**
  - Min: 67%
  - Typ: 72%
  - Max: 81%
- **Input Ripple**
  - Full Load, 20 Hz to 10 MHz
  - Min: 4.92 V
  - Typ: 5.07 V
  - Max: 5.75 V
- **Load Regulation**
  - No Load to Full
  - Min: 11 V
  - Typ: 30 V
  - Max: 60 V
- **Line Regulation**
  - Min: 0.1 V
  - Typ: 10 V
  - Max: 15 V
- **Cross Regulation**
  - Min: 0.1 V
  - Typ: 10 V
  - Max: 15 V

### Space Level Characterizations
- Electrical performance at Tcase = -55 °C to +125 °C, Vin = +28 V ±5%, full load, unless otherwise specified.
- Available compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVRHF Series hybrid converter level
- Worst case analysis, stress, radiation and reliability reports available

### Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Available compliant to MIL-HDBK-1547 / Aerospace TOR component level screening
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001
- Meets MIL-STD-461 Revisions C - F EMC requirements when used with a VPT EMI filter

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**For complete data, see data sheet at www.vptpower.com.**

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1) Transient time one second. 2) Derate linearly to 0 at 135 °C.
3) 50% of the total power or current can be drawn from any one of the two outputs.
4) Half load at +Vout and half load at -Vout.
Rad Hard & TOR Compliant DC-DC Converters

**SVRTR Series**

### Features
- Qualified: DLA SMD# 5964R13209, 5964R13210
- Single outputs of 3.3, 5, 12, 15 V
- Dual outputs of ±12, ±15 V
- Wide input voltage range of 18 to 37.5 V
- High input transient voltage: 50 V for 1 second
- Very low output noise
- Output voltage trim up +10%
- Radiation immune magnetic feedback circuit: no use of optoisolators
- Protection features: short circuit/current limit, undervoltage lockout
- Full performance over -55 °C to +125 °C
- Fixed frequency: 525 kHz
- Hermetic hybrid technology

### Space Level Characterizations
- Performed according to VPT's DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level R
- Guaranteed TID performance to 100 krad(Si) including ELDRS
- SEE performance to 85 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVRTR Series hybrid converter level
- Worst case analysis, stress, radiation and reliability reports available

### Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Available compliant to MIL-HDBK-1547 / Aerospace TOR component level screening
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001
- Meets MIL-STD-461 Revisions C - F EMC requirements when used with a VPT EMI filter

### Electrical Performance

#### SVRTR2805S
- Output Power: 28 W
- Input Voltage: 18 – 37.5 V
- Output Voltage: 3.3, 5, 12, 15 V

#### SVRTR2815D
- Output Power: 15 W
- Input Voltage: 18 – 37.5 V
- Output Voltage: 3.3, 5, 12, 15 V

### Characterizations

#### Single Output Version
- Electrical performance at Tcase = -55 °C to +125 °C, Vin = +28 V ±5%, full load, unless otherwise specified.

#### Dual Output Version
- Electrical performance at Tcase = -55 °C to +125 °C, Vin = +28 V ±5%, full load, unless otherwise specified.

### Additional Information
- For complete data, see data sheet at www.vptpower.com.
- Call: 425.353.3010 | E-mail: vptsales@vptpower.com | www.vptpower.com
## SVRFL Series

**Rad Hard & TOR Compliant DC-DC Converters**

### Features
- Single outputs of 3.3, 5, 12, 15 V
- Dual outputs of ±5, ±12, ±15 V
- Wide input voltage range of 18 to 37.5 V
- High input transient voltage: 50 V for 1 second
- Parallel up to 5 units with current sharing
- Output voltage trim up +10% or down –20%
- Very low output noise
- Radiation immune magnetic feedback circuit: no use of optoisolators
- Protection features: short circuit/current limit
- Full performance over –55 °C to +125 °C
- Fixed frequency: 500 kHz
- Hermetic hybrid technology

### Space Level Characterizations
- Performed according to VPT’s DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level R
- Guaranteed TID performance to 100 krad(Si) including ELDRS
- SEE performance to 85 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVRFL Series hybrid converter level
- Worst case analysis, stress, radiation and reliability reports available

### Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Available compliant to MIL-HDBK-1547 / Aerospace TOR component level screening
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001
- Meets MIL-STD-461 Revisions C - F EMC requirements when used with a VPT EMI filter

### Single Output Version

**Electrical performance at Tcase = –55 °C to +125 °C, Vin = +28 V ±5%, full load, unless otherwise specified.**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVRFL283R3S</th>
<th>SVRFL2805S</th>
<th>SVRFL2812S</th>
<th>SVRFL2815S</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous Transient 1</td>
<td>18</td>
<td>28</td>
<td>37.5</td>
<td>50</td>
<td>Vdc</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Full Load</td>
<td>3.25</td>
<td>3.3</td>
<td>4.9</td>
<td>5</td>
<td>mVpp</td>
</tr>
<tr>
<td>Output Power</td>
<td></td>
<td>66</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>W</td>
</tr>
<tr>
<td>Efficiency</td>
<td></td>
<td>68</td>
<td>73</td>
<td>72</td>
<td>78</td>
<td>%mApp</td>
</tr>
<tr>
<td>Input Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>200</td>
<td>200</td>
<td>79</td>
<td>86</td>
<td>mVpp</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>120</td>
<td>120</td>
<td>80</td>
<td>100</td>
<td>mVpp</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>No Load to Full</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>120</td>
<td>mV</td>
</tr>
<tr>
<td>Line Regulation</td>
<td></td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>mV</td>
</tr>
</tbody>
</table>

### Dual Output Version

**Electrical performance at Tcase = –55 °C to +125 °C, Vin = +28 V ±5%, full load, unless otherwise specified.**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVRFL2805D</th>
<th>SVRFL2812D</th>
<th>SVRFL2815D</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous Transient 1</td>
<td>18</td>
<td>28</td>
<td>37.5</td>
<td>50</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>+Vout, -Vout</td>
<td>4.9</td>
<td>5.0</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Output Power</td>
<td>Total Either output</td>
<td>100</td>
<td>60</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>Efficiency</td>
<td></td>
<td>73</td>
<td>80</td>
<td>80</td>
<td>86</td>
</tr>
<tr>
<td>Input Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>200</td>
<td>200</td>
<td>81</td>
<td>87</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>120</td>
<td>200</td>
<td>120</td>
<td>200</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>No Load to Full</td>
<td>100</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>+Vout, -Vout</td>
<td>20</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Cross Regulation</td>
<td></td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
</tr>
</tbody>
</table>

1) Transient time one second. 2) Derate linearly to 0 at 135 °C. 3) Up to 60% of the total power or current can be drawn from any one of the two outputs. 4) Half load at +Vout and half load at –Vout.

For complete data, see data sheet at www.vptpower.com.
SVRGA Series
Rad Hard Point of Load DC-DC Converters

Features
- Qualified: DLA SMD# 5962R13217
- Regulated and non-isolated
- Operates from 5 V input
- Adjustable output voltage from 0.8 V to 3.4 V
- High efficiency: 91%
- High power density, > 64 W/in³
- Very low output noise
- No use of optoisolators
- Output inhibit control
- Short circuit protection
- Full performance over -55 °C to +125 °C military temperature range
- Fixed frequency: 250 kHz
- Hermetic hybrid technology

Space Level Characterizations
- Performed according to VPT’s DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level R
- Guaranteed TID performance to 100 krad(Si) including ELDRS
- SEE performance to 85 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVRGA Series hybrid converter level.
- Worst case analysis, stress, radiation and reliability reports available

Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Available compliant to MIL-HDBK-1547 / Aerospace TOR component level screening
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001

[ SINGLE OUTPUT VERSION ]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVRGA0508S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Vout = 0.8 V to 2.5 V</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>Vout = 2.6 V to 3.3 V</td>
<td>4.4</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Full Load</td>
<td>-1.5</td>
</tr>
<tr>
<td>Output Power 1,2</td>
<td>Vin: 15 – 50 V</td>
<td>0</td>
</tr>
<tr>
<td>Efficiency 1</td>
<td>Vout = 2.5 V, Iout = 8 A</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Vout = 3.3 V, Iout = 6 A</td>
<td>88</td>
</tr>
<tr>
<td>Output Ripple 3</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>35</td>
</tr>
</tbody>
</table>

1) Depending on output voltage.
2) Derate linearly to 0 at 135 °C.
3) With 220 μF capacitor from Vout to ground.

Electrical performance at Tcase = -55 °C to +125 °C, Vin = +5 V ±1%, full load, unless otherwise specified.

For complete data, see data sheet at www.vptpower.com.
SVGA Series
Rad Hard Point of Load DC-DC Converters

Features
- Qualified: DLA SMD# 5962R12219
- Regulated and non-isolated
- Operates from 5 V input
- Adjustable output voltage from 0.8 V to 3.4 V
- High efficiency: Up to 94%
- High power density, >100 W/in³
- Very low output noise
- No use of optoisolators
- Output inhibit control
- Short circuit protection
- Full performance over -55 °C to +125 °C military temperature range
- Fixed frequency: 250 kHz
- Hermetic hybrid technology

Space Level Characterizations
- All characterizations are performed according to VPT’s DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level R
- Guaranteed TID performance to 100 krad(Si) including ELDRS
- SEE performance to 85 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVGA Series hybrid converter level.
- Worst case analysis, stress, radiation and reliability reports available

Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001

[ SINGLE OUTPUT VERSION ]

Electrical performance at Tcase = -55 °C to +125 °C, Vin = +5 V ±1%, full load, unless otherwise specified.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVGA0510S</th>
<th>SVGA0515S</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Vout = 0.8 V to 2.5 V</td>
<td>3.6</td>
<td>7.0</td>
<td>Min</td>
</tr>
<tr>
<td></td>
<td>Vout = 2.6 V to 3.3 V</td>
<td>4.1</td>
<td>7.0</td>
<td>Typ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.6</td>
<td>4.2</td>
<td>Max</td>
</tr>
<tr>
<td>Output Voltage</td>
<td></td>
<td>1.5</td>
<td>1.5</td>
<td>Min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1.5</td>
<td>-1.5</td>
<td>Typ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5</td>
<td>1.5</td>
<td>Max</td>
</tr>
<tr>
<td>Efficiency ¹²</td>
<td>Vout = 3.3 V</td>
<td>88</td>
<td>93</td>
<td>Min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>87</td>
<td>91</td>
<td>Typ</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>60</td>
<td>100</td>
<td>Max</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
<td>180</td>
<td>mVpp</td>
</tr>
</tbody>
</table>

1) Depending on output voltage.
2) Derate linearly to 0 at 135 °C.

For complete data, see data sheet at www.vptpower.com.
SVSA Series
Radiation Tolerant DC-DC Converters

Features
- Qualified: DLA SMD# 5964-11219, 5964-11216
- Single outputs of 3.3, 5, 5.2, 12, 15 V
- Dual outputs of ±5, ±12, ±15 V
- Wide input voltage range of 15 to 50 V
- High input transient voltage: 80 V for 1 second
- Very low output noise
- Radiation immune magnetic feedback circuit: no use of optoisolators
- Protection features: short circuit/current limit, undervoltage lockout
- Full performance over -55 °C to +125 °C military temperature range
- Fixed frequency: 450 kHz
- Hermetic hybrid technology

Space Level Characterizations
- Performed according to VPT’s DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level P.
- Guaranteed TID performance to 30 krad(Si) with 2x margin including ELDRS
- SEE performance to 44 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVSA Series hybrid converter level.
- Worst case analysis, stress, radiation and reliability reports available

Compliances
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001
- MIL-STD-704A input voltage requirements
- Meets MIL-STD-461 Revisions C - F EMC requirements when used with a VPT EMI filter

[ SINGLE OUTPUT VERSION ]
Electrical performance at Tcase = -55 °C to +125 °C, Vin = +28 V ±5%, full load, unless otherwise specified.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVSA283S3S</th>
<th>SVSA2805S</th>
<th>SVSA283S2S</th>
<th>SVSA2812S</th>
<th>SVSA2815S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous</td>
<td>Min</td>
<td>Typ</td>
<td>Max</td>
<td>Min</td>
<td>Typ</td>
</tr>
<tr>
<td></td>
<td>Transient 1</td>
<td>15</td>
<td>28</td>
<td>50</td>
<td>80</td>
<td>15</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Full Load</td>
<td>3.25</td>
<td>3.3</td>
<td>3.35</td>
<td>4.925</td>
<td>5.075</td>
</tr>
<tr>
<td>Output Power 2</td>
<td>Vin: 15 – 50 V</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Vin: 28 V, Full Load</td>
<td>62</td>
<td>65</td>
<td>65</td>
<td>68</td>
<td>65</td>
</tr>
<tr>
<td>Input Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>25</td>
<td>50</td>
<td>30</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>30</td>
<td>30</td>
<td>10</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>No Load to Full</td>
<td>50</td>
<td>50</td>
<td>15</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>Vin: 15 – 50 V</td>
<td>15</td>
<td>15</td>
<td>2</td>
<td>15</td>
<td>2</td>
</tr>
</tbody>
</table>

[ DUAL OUTPUT VERSION ]
Electrical performance at Tcase = -55 °C to +125 °C, Vin = +28 V ±5%, full load, unless otherwise specified.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVSA2805D</th>
<th>SVSA2812D</th>
<th>SVSA2815D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous</td>
<td>Min</td>
<td>Typ</td>
<td>Max</td>
</tr>
<tr>
<td></td>
<td>Transient 1</td>
<td>15</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Full Load</td>
<td>4.925</td>
<td>5.075</td>
<td>5.122</td>
</tr>
<tr>
<td>Output Power 2, 3</td>
<td>Vin: 15 – 50 V</td>
<td>0</td>
<td>0</td>
<td>3.5</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Vin: 28 V, Full Load</td>
<td>66</td>
<td>71</td>
<td>72</td>
</tr>
<tr>
<td>Input Ripple 4</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>30</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>No Load to Full</td>
<td>45</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>Vin: 16 – 40 V</td>
<td>2</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Cross Regulation</td>
<td>+Load 70%, -Load 30%</td>
<td>220</td>
<td>450</td>
<td>220</td>
</tr>
</tbody>
</table>

1) Transient time one second. 2) Derate linearly to 0 at 139 °C. 3) Up to 70% of the total power or current can be drawn from any one of the two outputs. 4) Half load at +Vout and half load at -Vout.

For complete data, see data sheet at www.vptpower.com.

Call: 425.353.3010 | E-mail: vptsales@vptpower.com | www.vptpower.com
**Radiation Tolerant DC-DC Converters**

**Features**
- Qualified: DLA SMD# 5964-11218, 5964-11215
- Single outputs of 2.5, 3.3, 5, 12, 15 V
- Dual outputs of ±5, ±12, ±15 V
- Wide input voltage range of 15 to 50 V
- High input transient voltage: 80 V for 1 second
- Very low output noise
- Radiation immune magnetic feedback circuit: no use of optoisolators
- Protection features: short circuit/current limit, undervoltage lockout
- Full performance over -55 °C to +125 °C military temperature range
- Fixed frequency: 450 kHz
- Hermetic hybrid technology

**Space Level Characterizations**
- Performed according to VPT’s DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level P
- Guaranteed TID performance to 30 krad(Si) with 2x margin including ELDRS
- SEE performance to 44 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVHF Series hybrid converter level
- Worst case analysis, stress, radiation and reliability reports available

**Compliances**
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001
- MIL-STD-704 input voltage requirements
- Meets MIL-STD-461 Revisions C - F EMC requirements when used with a VPT EMI filter

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**[SINGLE OUTPUT VERSION]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVHF280RSS</th>
<th>SVHF282RS3</th>
<th>SVHF2805SS</th>
<th>SVHF2812S</th>
<th>SVHF2815S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous Transient 1</td>
<td>15 28 50 80</td>
<td>15 28 50 80</td>
<td>15 28 50 80</td>
<td>15 28 50 80</td>
<td>15 28 50 80</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Full Load 2</td>
<td>2.463 2.5 2.538 3.25</td>
<td>3.3 3.35 4.925</td>
<td>5.0 5.075 11.82</td>
<td>12.0 12.18</td>
<td>12.18</td>
</tr>
<tr>
<td>Output Power 2</td>
<td>Vin: 15 – 50 V</td>
<td>0 8 0</td>
<td>10 0</td>
<td>15 0</td>
<td>15 0</td>
<td>20 0</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Vin: 28 V, Full Load</td>
<td>57 64</td>
<td>65 71</td>
<td>72 77</td>
<td>77 84</td>
<td>78 85</td>
</tr>
<tr>
<td>Input Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>25 80</td>
<td>25 80</td>
<td>30 80</td>
<td>40 80</td>
<td>40 80</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>10 40</td>
<td>10 40</td>
<td>15 40</td>
<td>10 40</td>
<td>10 40</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>No Load to Full</td>
<td>20 50</td>
<td>20 50</td>
<td>25 50</td>
<td>10 50</td>
<td>10 50</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>Vin: 15 – 50 V</td>
<td>2 20</td>
<td>2 20</td>
<td>2 20</td>
<td>2 20</td>
<td>2 20</td>
</tr>
</tbody>
</table>

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**[DUAL OUTPUT VERSION]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVHF2805D</th>
<th>SVHF2812D</th>
<th>SVHF2815D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous Transient 1</td>
<td>15 28 50 80</td>
<td>15 28 50 80</td>
<td>15 28 50 80</td>
</tr>
<tr>
<td>Output Voltage 4</td>
<td>Full Load</td>
<td>+Vout</td>
<td>-Vout</td>
<td>4.925 4.75 5.0 5.075 5.25 11.82 12.0 12.18 12.48 14.775 15.0 15.225 15.6</td>
</tr>
<tr>
<td>Output Power 2, 3</td>
<td>Vin: 15 – 50 V</td>
<td>Either output</td>
<td>+Vout</td>
<td>0 0</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Vin: 28 V, Full Load</td>
<td>73 78</td>
<td>78 84</td>
<td>79 85</td>
</tr>
<tr>
<td>Input Ripple 4</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>35 60</td>
<td>45 90</td>
<td>40 90</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>35 60</td>
<td>30 50</td>
<td>30 60</td>
</tr>
<tr>
<td>Cross Regulation</td>
<td>+Load 70%, -Load 30%</td>
<td>+Load 30%, -Load 70%</td>
<td>370 500</td>
<td>400 500</td>
</tr>
</tbody>
</table>

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For complete data, see data sheet at www.vptpower.com.

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### SVTR Series

#### Features
- Qualified: DLA SMD# 5964-11220, 5964-11223
- Single outputs of 3.3, 5, 12, 15 V
- Dual outputs of ±5, ±12, ±15 V
- Wide input voltage range of 15 to 50 V
- High input transient voltage: 80 V for 1 second
- Output Voltage Trim Up +10%
- High Power Density: > 40 W/in²
- Very low output noise
- Radiation immune magnetic feedback circuit: no use of optoisolators
- Protection features: short circuit/current limit, undervoltage lockout
- Full performance over -55 °C to +125 °C military temperature range
- Fixed frequency: 500 kHz
- Hermetic hybrid technology

#### Space Level Characterizations
- Performed according to VPT’s DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level P
- Guaranteed TID performance to 30 krad(Si) with 2x margin including ELDRS
- SEE performance to 44 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVTR Series hybrid converter level
- Worst case analysis, stress, radiation and reliability reports available

#### Compliances
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001
- MIL-STD-704A input voltage requirements
- Meets MIL-STD-461 Revisions C - F EMC requirements when used with a VPT EMI filter

#### Design Details

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVTR2805R</th>
<th>SVTR2805S</th>
<th>SVTR2812S</th>
<th>SVTR2815S</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Voltage</td>
<td>Continuous</td>
<td>15</td>
<td>28</td>
<td>50</td>
<td>80</td>
<td>Vdc</td>
</tr>
<tr>
<td></td>
<td>Transient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Full Load</td>
<td>3.2</td>
<td>3.3</td>
<td>3.4</td>
<td>4.875</td>
<td>mVpp</td>
</tr>
<tr>
<td>Output Power</td>
<td>Vout: 15 – 50 V</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>30</td>
<td>W</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Vout: 28 V, Full Load</td>
<td>65</td>
<td>70</td>
<td>72</td>
<td>78</td>
<td>%</td>
</tr>
<tr>
<td>Input Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>20</td>
<td>50</td>
<td>30</td>
<td>50</td>
<td>mApp</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>25</td>
<td>50</td>
<td>20</td>
<td>50</td>
<td>mVpp</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>No Load to Full</td>
<td>2</td>
<td>50</td>
<td>2</td>
<td>50</td>
<td>mV</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>Vout: 15 – 50 V</td>
<td>2</td>
<td>20</td>
<td>2</td>
<td>20</td>
<td>mV</td>
</tr>
</tbody>
</table>

1) Transient time one second. 2) Derate linearly to 0 at 135 °C.
3) Up to 70% of the total power or current can be drawn from any one of the two outputs.
4) Half load at +Vout and half load at –Vout.

For complete data, see data sheet at www.vptpower.com.

Call: 425.353.3010  |  E-mail: vptsales@vptpower.com  |  www.vptpower.com
Radiation Tolerant DC-DC Converters

**Features**
- Qualified: DLA SMD# 5964-11220, 5964-11223
- Single outputs of 3.3, 5, 12, 15 V
- Dual outputs of ±5, ±12, ±15 V
- Wide input voltage range of 16 to 40 V
- High input transient voltage: 50 V for 1 second
- High power density of > 80 W/in²
- Parallel up to 5 units with current sharing
- Output Voltage Trim Up +10% or Down –20%
- Very low output noise
- Protection features: short circuit/current limit, undervoltage lockout
- Full performance over -55 °C to +125 °C military temperature range
- Fixed frequency: 525 kHz
- Hermetic hybrid technology

**Space Level Characterizations**
- All characterizations are performed according to VPT’s DLA approved RHA plan per MIL-PRF-38534, Appendix G, Level P
- Guaranteed TID performance to 30 krad(Si) with 2x margin including ELDRS
- SEE performance to 44 MeV-cm²/mg. Transients fully characterized for cross section and magnitude
- Guaranteed performance through the use of hardened semiconductor components, RLAT testing on non-hardened components, and analysis
- Characterization is performed at both the component level and at the SVTR Series hybrid converter level.
- Worst case analysis, stress, radiation and reliability reports available

**Compliances**
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- MIL-STD-704A input voltage requirements
- Meets MIL-STD-461 Revisions C - F EMC requirements when used with a VPT EMI filter

---

**[ SINGLE OUTPUT VERSION ]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVFL2800S</th>
<th>SVFL2805S</th>
<th>SVFL2812S</th>
<th>SVFL2815S</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous Transient 1</td>
<td>16</td>
<td>28</td>
<td>40</td>
<td>50</td>
<td>Vdc</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Full Load</td>
<td>3.25</td>
<td>3.3</td>
<td>3.35</td>
<td>3.5</td>
<td>28 V, Full Load</td>
</tr>
<tr>
<td>Output Power</td>
<td>VIn: 15 – 50 V</td>
<td>0</td>
<td>66</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Efficiency</td>
<td>VIn: 28 V, Full Load</td>
<td>67</td>
<td>72</td>
<td>77</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td>Input Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>25</td>
<td>80</td>
<td>35</td>
<td>80</td>
<td>30</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>Full Load, 20 Hz to 10 MHz</td>
<td>15</td>
<td>80</td>
<td>15</td>
<td>80</td>
<td>25</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>No Load to Full</td>
<td>2</td>
<td>80</td>
<td>2</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>VIn: 15 – 50 V</td>
<td>2</td>
<td>20</td>
<td>2</td>
<td>20</td>
<td>2</td>
</tr>
</tbody>
</table>

**[ DUAL OUTPUT VERSION ]**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVFL2805D</th>
<th>SVFL2812D</th>
<th>SVFL2815D</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous Transient 1</td>
<td>16</td>
<td>28</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>±Vout</td>
<td>4.925</td>
<td>5.0</td>
<td>5.075</td>
<td>5.12</td>
</tr>
<tr>
<td>Output Power</td>
<td>±Vout</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Efficiency</td>
<td>VIn: 28 V, Full Load</td>
<td>73</td>
<td>79</td>
<td>79</td>
<td>85</td>
</tr>
<tr>
<td>Input Ripple</td>
<td>±Vout</td>
<td>30</td>
<td>80</td>
<td>35</td>
<td>80</td>
</tr>
<tr>
<td>Output Ripple</td>
<td>±Vout</td>
<td>15</td>
<td>80</td>
<td>25</td>
<td>80</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>±Vout</td>
<td>10</td>
<td>100</td>
<td>2</td>
<td>120</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>±Vout</td>
<td>2</td>
<td>20</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Cross Regulation</td>
<td>±Load 70%, ±Load 30%</td>
<td>260</td>
<td>450</td>
<td>220</td>
<td>450</td>
</tr>
</tbody>
</table>

For complete data, see data sheet at www.vptpower.com.
SVRMH28 Series
Radiation Immune EMI Filter

Features
- Filters conducted emissions of two SVRHF or one SVRTR Series DC-DC converters
- 55 dB Minimum Attenuation at 500 kHz
- High input transient voltage: 50 Volts for 1 sec
- Provides MIL-STD-461C/D/E/F EMI compliance for conducted emissions and susceptibility
- Hermetic hybrid technology

Space Level Characterizations
- Fully passive design is immune to degradation from radiation
- MIL-PRF-38534 element evaluated components
- Worst case analysis, stress, radiation and reliability reports available

Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Available compliant to MIL-HDBK-1547 / Aerospace TOR component level screening
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001

Parameter | Conditions | SVRMH28 | Units
--- | --- | --- | ---
Input Voltage | Continuous, Transient, 1 sec | 0 | 28 | 37.5 | 50 | Vdc
Output Current | Continuous | 0 | 2 | A
Noise Rejection | f = 500 kHz | 55 | dB

For complete data, see data sheet at www.vptpower.com.

SVRMC28 Series
Radiation Immune EMI Filter

Features
- Qualified: DLA Drawing# 13010
- Filters conducted emissions of two SVRTR or one SVRFL Series DC-DC converter
- 40 dB Minimum Attenuation at 500 kHz
- High input transient voltage: 50 Volts for 1 sec
- Provides MIL-STD-461C/D/E/F EMI compliance for conducted emissions and susceptibility
- Hermetic hybrid technology

Space Level Characterizations
- Fully passive design is immune to degradation from radiation
- MIL-PRF-38534 element evaluated components
- Worst case analysis, stress, radiation and reliability reports available

Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Available compliant to MIL-HDBK-1547 / Aerospace TOR component level screening
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001

Parameter | Conditions | SVRMC28 | Units
--- | --- | --- | ---
Input Voltage | Continuous, Transient, 1 sec | 0 | 28 | 37.5 | 50 | Vdc
Output Current | Continuous | 0 | 4 | A
Noise Rejection | f = 500 kHz | 40 | dB

For complete data, see data sheet at www.vptpower.com.
**SVRME28 Series**  
Radiation Immune EMI Filter

### Features
- Qualified: DLA Drawing# 13009
- Filters conducted emissions of two SVRFL Series DC-DC converters.
- 40 dB Minimum Attenuation at 500 kHz
- High input transient voltage: 50 Volts for 1 sec
- Provides MIL-STD-461C/D/E/F EMI compliance for conducted emissions and susceptibility
- Hermetic hybrid technology

### Space Level Characterizations
- Fully passive design is immune to degradation from radiation
- MIL-PRF-38534 element evaluated components
- Worst case analysis, stress, radiation and reliability reports available

### Compliances
- Fully compliant to MIL-HDBK-1547 / Aerospace TOR deratings
- Available compliant to MIL-HDBK-1547 / Aerospace TOR component level screening
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001

### Parameter Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>SVRME28</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Continuous</td>
<td>Min   0</td>
<td>Typ  28</td>
</tr>
<tr>
<td></td>
<td>Transient, 1 sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Current</td>
<td>Continuous</td>
<td>Min   0</td>
<td>Typ  10.0</td>
</tr>
<tr>
<td>Noise Rejection</td>
<td>f = 500 kHz</td>
<td>Min   40</td>
<td>Typ  40</td>
</tr>
</tbody>
</table>

For complete data, see data sheet at www.vptpower.com.

---

**DV Series EMI Filters**  
EMI Filters Qualified for Space

### Features
- Qualified on DLA Drawings
- Variety of output power levels available
- Wide input voltage ranges of 0 – 50 V per MIL-STD-704A
- Input transient voltage protection to 80 V per MIL-STD-704A
- 40 to 55 dB minimum attenuation
- Provides MIL-STD-461C/D/E/F EMI compliance for conducted emissions and susceptibility
- Hermetic hybrid technology

### Space Level Characterizations
- Fully passive design is immune to degradation from radiation
- MIL-PRF-38534 element evaluated components

### Compliances
- Qualified to MIL-PRF-38534 Class H and Class K
- 100% tested per MIL-STD-883 as referenced to MIL-PRF-38534
- ISO-9001

### Output Current Table

<table>
<thead>
<tr>
<th>Output Current</th>
<th>Model Series</th>
<th>DLA Drawing #</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8 A</td>
<td>DVMSA28</td>
<td>11016</td>
</tr>
<tr>
<td>1 A</td>
<td>DVMA28</td>
<td>06004</td>
</tr>
<tr>
<td>2 A</td>
<td>DVMH28</td>
<td>06005</td>
</tr>
<tr>
<td>4 A</td>
<td>DVMC28</td>
<td>06203</td>
</tr>
<tr>
<td>7 A</td>
<td>DVMD28</td>
<td>06024</td>
</tr>
<tr>
<td>15 A</td>
<td>DVME28</td>
<td>07004</td>
</tr>
</tbody>
</table>
### Standard Space DC-DC Converter Part Numbering

Example: SVRFL2805S/K

<table>
<thead>
<tr>
<th>Product Series</th>
<th>Input Voltage (Nominal)</th>
<th>Output Voltage</th>
<th>Number of Outputs</th>
<th>Package Option</th>
<th>Screening Code</th>
<th>Additional Screening Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV(xx) or SVR(xx)</td>
<td>28</td>
<td>2R5 3R3 05 5R2 12 15</td>
<td>S Single D Dual</td>
<td>F Flanged</td>
<td>/EM Engineering Model /H+ Class H + PIND /K Class K</td>
<td>YYYY</td>
</tr>
</tbody>
</table>

1) Outputs with decimal points (3.3 V etc.) are represented by an “R” in the decimal point location (example: 3R3).
2) Not used for standard, non-flanged package.
3) See environmental screening table for details.
4) Contact sales for customer specific additional screening codes.

### Standard Space Point of Load DC-DC Converter Part Numbering

Example: SVRGA0508S

<table>
<thead>
<tr>
<th>Product Series</th>
<th>Input Voltage (Nominal)</th>
<th>Max Current Rating</th>
<th>Number of Outputs</th>
<th>Screening Code</th>
<th>Additional Screening Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV(xx) or SVR(xx)</td>
<td>5</td>
<td>8 10 15</td>
<td>S Single</td>
<td>/EM Engineering Model /H+ Class H /K Class K</td>
<td>YYYY</td>
</tr>
</tbody>
</table>

1) See environmental screening table for details.
2) Contact sales for customer specific additional screening codes.

### Standard Space EMI Filter Part Numbering

Example: SVRMC28F/K

<table>
<thead>
<tr>
<th>Product Series</th>
<th>Input Voltage (Nominal)</th>
<th>Package Option</th>
<th>Screening Code</th>
<th>Additional Screening Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV(xx) or SVR(xx)</td>
<td>28</td>
<td>F Flanged</td>
<td>/EM Engineering Model /H+ Class H /K Class K</td>
<td>YYYY</td>
</tr>
</tbody>
</table>

1) Not used for standard, non-flanged package.
2) See environmental screening table for details.
3) Contact sales for customer specific additional screening codes.
VPT’s converters and EMI filters are available with targeted screening grades to satisfy a wide range of requirements. Additional custom environmental screening may be performed to meet individual customer needs. Please contact a sales representative concerning different environmental screenings.

Environmental Screening [100% tested per MIL-STD-883 as referenced to MIL-PRF-38534]

**DC-DC Converters – Isolated & Point of Load Converters – Non-Isolated**

<table>
<thead>
<tr>
<th>Test</th>
<th>MIL-STD-883 Test Method, Condition</th>
<th>/H+ (Class H + PIND)</th>
<th>/K (Class K)</th>
<th>/EM (Engineering Model) Non-QML&lt;sup&gt;1,4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Destructive Bond Pull</td>
<td>TM2023</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Cycling</td>
<td>TM1010, Condition C -65 °C to 150 °C, Ambient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant Acceleration</td>
<td>TM2001, 3000 g, Y1 Direction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIND&lt;sup&gt;7&lt;/sup&gt;</td>
<td>TM2020, Condition A</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Burn-In Electrical</td>
<td>25 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burn-In</td>
<td>TM1015, 320 hrs, 125 °C, Case Typ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM1015, 160 hrs, 125 °C, Case Typ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 hrs, 125 °C, Case Typ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Electrical</td>
<td>MIL-PRF-38534, Group A Subgroups 1 – 6 -55 °C, 25 °C, 125 °C&lt;sup&gt;3&lt;/sup&gt;</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MIL-PRF-38534, Group A Subgroups 1 and 4 25 °C</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hermeticity (Seal)</td>
<td>TM1014, Fine Leak, Condition A2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM1014, Gross Leak, Condition C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gross Leak, Dip (1 x 10&lt;sup&gt;-3&lt;/sup&gt;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiography&lt;sup&gt;8&lt;/sup&gt;</td>
<td>TM2012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Visual</td>
<td>TM2009</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Contact sales for more information concerning additional environmental screening and testing options desired.
2) VPT Inc. reserves the right to ship higher screened or SMD products to meet lower screened orders at our sole discretion unless specifically forbidden by customer contract.
3) 100% R&R testing with all test data included in product shipment.
4) Not required per MIL-PRF-38534. Test is performed for additional product quality assurance.
5) Non-QML products may not meet all requirements of MIL-PRF-38534.
6) Engineering models utilize only the screening specified and are not considered compliant for flight use.
7) PIND test Certificate of Compliance included in product shipment.
8) Radiographic test Certificate of Compliance and film(s) or data CD included in product shipment.
Environmental Screening

Environmental Screening [100% tested per MIL-STD-883 as referenced to MIL-PRF-38534]

EMI Filters

<table>
<thead>
<tr>
<th>Test</th>
<th>MIL-STD-883 Test Method, Condition</th>
<th>/H+ (Class H + PIND)</th>
<th>/K (Class K)</th>
<th>/EM (Engineering Model) Non-QML&lt;sup&gt;5,6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Cycling</td>
<td>TM1010, Condition C -65 °C to 150 °C, Ambient</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Constant Acceleration</td>
<td>TM2001, 3000 g, Y1 Direction</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PIND&lt;sup&gt;7&lt;/sup&gt;</td>
<td>TM2020, Condition A</td>
<td>●&lt;sup&gt;7&lt;/sup&gt;</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Pre Burn-In Electrical</td>
<td>25 °C</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Burn-In</td>
<td>TM1015, 320 hrs, 125 °C, Case Typ</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>TM1015, 160 hrs, 125 °C, Case Typ</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>24 hrs, 125 °C, Case Typ</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Final Electrical</td>
<td>MIL-PRF-38534, Group A Subgroups 1 – 6 -65 °C, 25 °C, 125 °C&lt;sup&gt;5&lt;/sup&gt;</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>MIL-PRF-38534, Group A Subgroups 1 and 4 25 °C</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Hermeticity (Seal)</td>
<td>TM1014, Fine Leak, Condition A2</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>TM1014, Gross Leak, Condition C</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Gross Leak, Dip (1 x 10&lt;sup&gt;-3&lt;/sup&gt;)</td>
<td>●</td>
<td></td>
<td>●</td>
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<tr>
<td>Radiography&lt;sup&gt;8&lt;/sup&gt;</td>
<td>TM2012</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>External Visual</td>
<td>TM2009</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
</tbody>
</table>

1) Contact sales for more information concerning additional environmental screening and testing options desired.
2) VPT Inc. reserves the right to ship higher screened or SMD products to meet lower screened orders at our sole discretion unless specifically forbidden by customer contract.
3) 100% R&R testing with all test data included in product shipment.
4) Not required per MILPRF-38534. Test is performed for additional product quality assurance.
5) Non-QML products may not meet all requirements of MIL-PRF-38534.
6) Engineering models utilize only the screening specified and are not considered compliant for flight use.
7) PIND test Certificate of Compliance included in product shipment.
8) Radiographic test Certificate of Compliance and film(s) or data CD included in product shipment.
Custom Solutions for Space

Save Time, Cost, and Risk When You Choose VPT

VPT is your partner for quality-driven design and assembly of custom space power modules and systems.

As a global leader in high reliability power solutions, we combine experienced power system design, standard power modules, and space quality standards to deliver your system quickly, expertly, and cost-effectively.

VPT offers custom turnkey design, prototype, and production services for:

- Semi-custom mini mods
- Custom power modules
- Complete custom power systems

For your project, VPT provides:

<table>
<thead>
<tr>
<th>Service Features</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time-proven heritage</td>
<td>Deep experience in the design and delivery of custom space systems</td>
</tr>
<tr>
<td>Expert design engineers</td>
<td>A dedicated team with exclusive experience in the intricacies and requirements of space power systems</td>
</tr>
<tr>
<td>Extensive portfolio of technical capabilities</td>
<td>Electrical design, mechanical design, packaging, assembly, and testing for space environments</td>
</tr>
<tr>
<td>Documented design process</td>
<td>Includes reporting for a smooth project and successful outcome</td>
</tr>
<tr>
<td>Top flight quality system</td>
<td>Adhering to standards controlled by MIL-PRF-38534 Class K and ISO 9001</td>
</tr>
<tr>
<td>ISO 9001:2008</td>
<td>All sites certified</td>
</tr>
<tr>
<td>Standard Microcircuit Drawings</td>
<td>Issued by the DLA qualifying VPT products to MIL-PRF-38534 Class H and Class K</td>
</tr>
</tbody>
</table>

If you’re short on time, resources, or internal expertise for your space power system project, consider VPT as your source for a custom power system. We’ll work with you to design and deliver your custom space power system on time, within budget, and to your exact specifications.

For further information on specific technical capabilities and our design approach, visit our website at [www.vptpower.com](http://www.vptpower.com).
# VPT Product Matrix

VPT offers several lines of DC-DC converters and EMI filters to suit your application. For complete details, visit [www.vptpower.com](http://www.vptpower.com).

<table>
<thead>
<tr>
<th>Output Power or Current</th>
<th>Hi-Rel COTS Series</th>
<th>Military/Avionics Series</th>
<th>Rad Tolerant for Space Series</th>
<th>Rad Hard for Space Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC-DC Converters—Isolated</td>
<td>To +100 °C Metal or potted package Rugged Screening</td>
<td>To +125 °C Hermetic hybrid MIL-PRF-38534 Class H Most Products On DLA SMDs</td>
<td>To +125 °C TID 30 krad(Si) SEE 44 MeV-cm²/mg MIL-PRF-38534 Class K On DLA SMDs</td>
<td>To +125 °C TID 100 krad(Si) SEE 85 MeV-cm²/mg Available TOR Compliance MIL-PRF-38534 Class K On DLA SMDs</td>
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<tr>
<td>0 – 6 W</td>
<td>VPT5-2800S VPT5-2800D</td>
<td>DVCH2800S DVCH2800D DVSA2800S DVSA2800D</td>
<td>SVSA2800S SVSA2800D</td>
<td>SVRF2800S SVRF2800D</td>
</tr>
<tr>
<td>7 – 20 W</td>
<td>VPT15-2800S VPT15-2800D</td>
<td>DVSB2800D DVGF+2800DT DVHV2800S DVHV2800D DVHF+2800DT DVAB2800D DVHEF2800DT DVHF2800S DVHF2800D</td>
<td>SVHF2800S SVHF2800D</td>
<td>SVRF2800S SVRF2800D</td>
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<tr>
<td>20 – 50 W</td>
<td>VPT30-2800S VPT30-2800D VPT30-2800T DVST2800T</td>
<td>DVWR2800T DVTR2800T DVTR2800S DVTR2800D DVHE2800S DVETR2800S DVETR2800D</td>
<td>SVTR2800S SVTR2800D</td>
<td>SVRTR2800S SVRTR2800D</td>
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<tr>
<td>50 – 120 W</td>
<td>VPT100-2800S VPT100+2800S VPT100+2800D</td>
<td>DVFL2800S DVFL2800D</td>
<td>SVFL2800S SVFL2800D</td>
<td>SVRF2800S SVRF2800D</td>
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<tr>
<td>120 – 200 W</td>
<td>DV200-2800S DV200-2800D DV200-270S DV200-270D</td>
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</table>

Point of Load DC-DC Converters—Non-Isolated

<table>
<thead>
<tr>
<th>0 – 5 A</th>
<th>DVPL0503S DVPL0505S</th>
<th>DVPL0503S DVPL0505S</th>
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</thead>
<tbody>
<tr>
<td>6 – 10 A</td>
<td>DVPL0610S</td>
<td>DVPL0610S</td>
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<tr>
<td>11 – 20 A</td>
<td>DVPL0620S</td>
<td>DVPL0620S</td>
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</table>

EMI Filters

<table>
<thead>
<tr>
<th>0 – 5 A</th>
<th>VPTF1 VPTF3</th>
<th>DVMSA28 DVMA28 DVMC28 DV704A</th>
<th>SVRMH SVRM</th>
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</thead>
<tbody>
<tr>
<td>5 – 10 A</td>
<td>VPTF10 VPTc10 VPT10</td>
<td>DVMD28</td>
<td>SVRME</td>
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<tr>
<td>10 – 20 A</td>
<td>VPTF20 DVMN28</td>
<td>DVME28</td>
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</table>

Visit [www.vptpower.com](http://www.vptpower.com) for the latest in:

- New Products
- Full Product Datasheets
- Technical Video Labs
- Product Catalogs
- Application Notes
- SMD Cross Reference

Call: 425.353.3010 | E-mail: vptsales@vptpower.com | [www.vptpower.com](http://www.vptpower.com)