
SSDI
SOLID STATE DEVICES, INC.
EST. 1967
SPACE PRODUCTS SPECIALIST
for overcoming sourcing issues / meeting mission specific requirements

Space Products Overview

Standard Products

Mainly Procured through Distribution

SSDI's Vital Role in Supplying Space Products

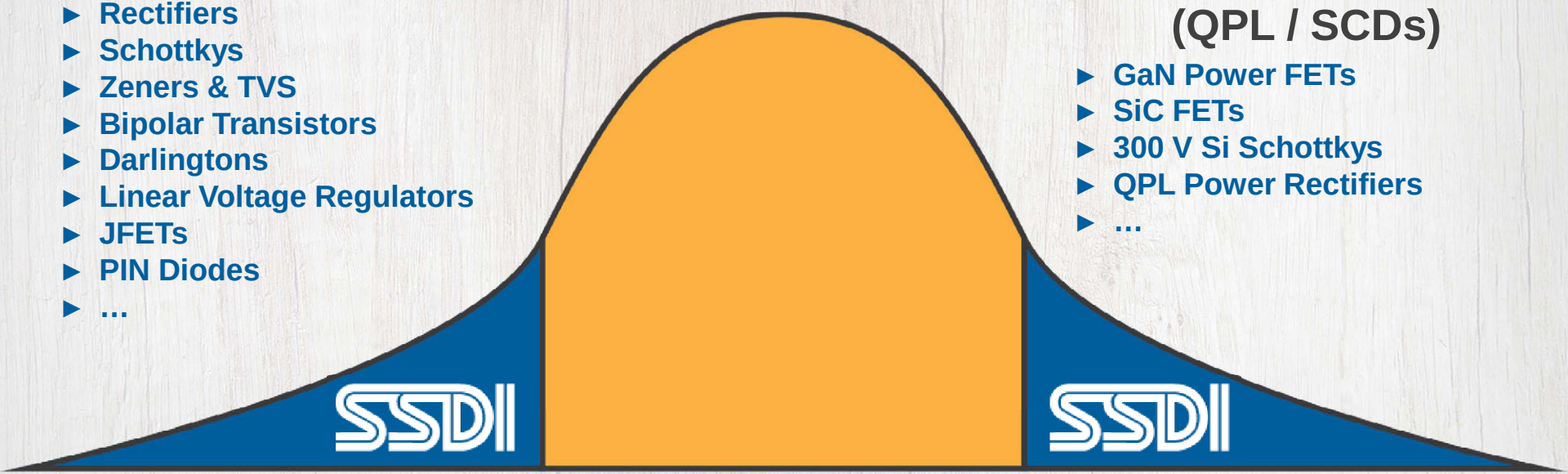
Domestically Manufactured Hermetic Products

End of Life / DMS Solutions

- Rectifiers
- Schottkys
- Zeners & TVS
- Bipolar Transistors
- Darlingtons
- Linear Voltage Regulators
- JFETs
- PIN Diodes
- …

New, Innovative Solutions (QPL / SCDs)

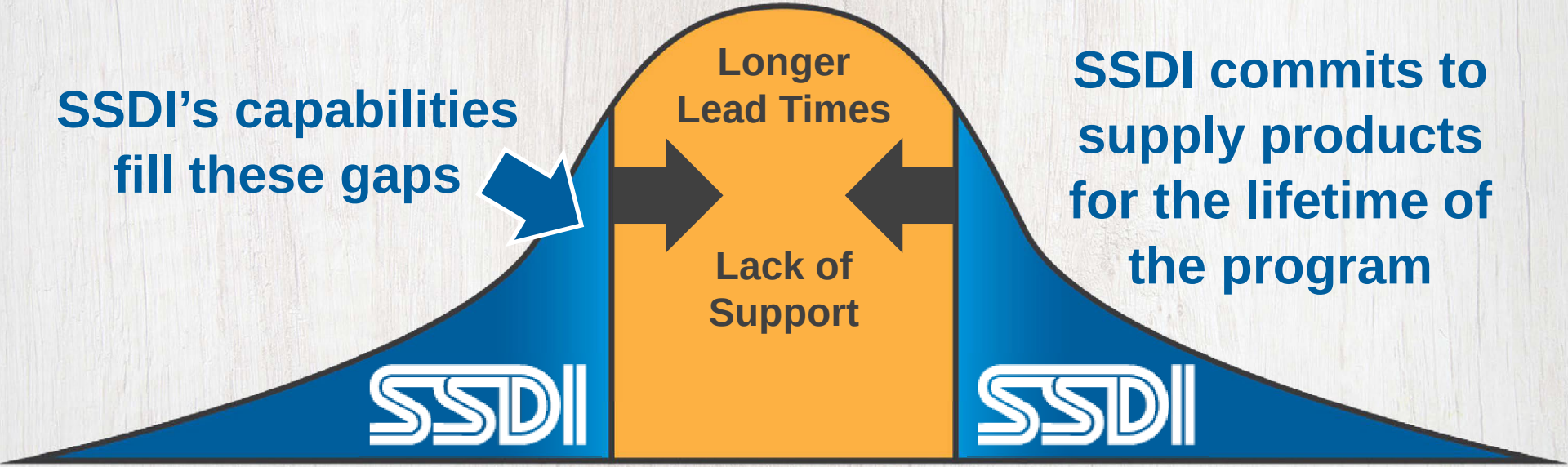
- GaN Power FETs
- SiC FETs
- 300 V Si Schottkys
- QPL Power Rectifiers
- …



Space Products Market Trend

Growing List of Discontinued Products

SSDI's capabilities fill these gaps



SSDI commits to supply products for the lifetime of the program

How SSDI Supports the Demand for Hermetic Space Products

- **High Density:** offer packaging flexibility
- **High Performance:** offer enhanced performance and target key electrical characteristics based on the mission requirements
- **High Reliability:** build to SCDs to modify / expand screening to match mission requirements

High Reliability:
Space Level Screening / Processes

Wafer Fab & Manufacturing Facilities in La Mirada, CA for over 50 years

- **JANS certified**
- **ISO 9001 / AS9100 certified**

MIL-PRF-19500

SEMICONDUCTOR DEVICES

IS HEREBY AWARDED TO

Solid State Devices Inc.
14701 Firestone Blvd
La Mirada, CA 90638

THIS CERTIFICATION IS VALID UNTIL TERMINATED BY WRITTEN NOTIFICATION FROM DLA LAND AND MARITIME. REFERENCE DLA LAND AND MARITIME LETTER VQ(VQE-16-030033) FOR DETAILS PERTAINING TO THIS CERTIFICATION.

Todd Lewis
Director, Engineering and
Technical Support Directorate
DLA Land and Maritime

PERRY JOHNSON REGISTRARS, INC.

Certificate of Registration

Perry Johnson Registrars, Inc. has audited the Quality Management System of

Solid State Devices, Inc.
14701 Firestone Boulevard, LaMirada, CA 90638 United States

(Hereinafter called the Organization) and hereby declares that Organization is in conformance with

ISO 9001:2015 and AS9100D

This Registration is in respect to the following scope:

Design and Manufacture of Aerospace Semiconductor Components, Assemblies, Modules, and Sub Systems

This Registration is granted subject to the system rules governing the Registration referred to above, and the Organization hereby covenants with the Assessment body duly to observe and comply with the said rules.

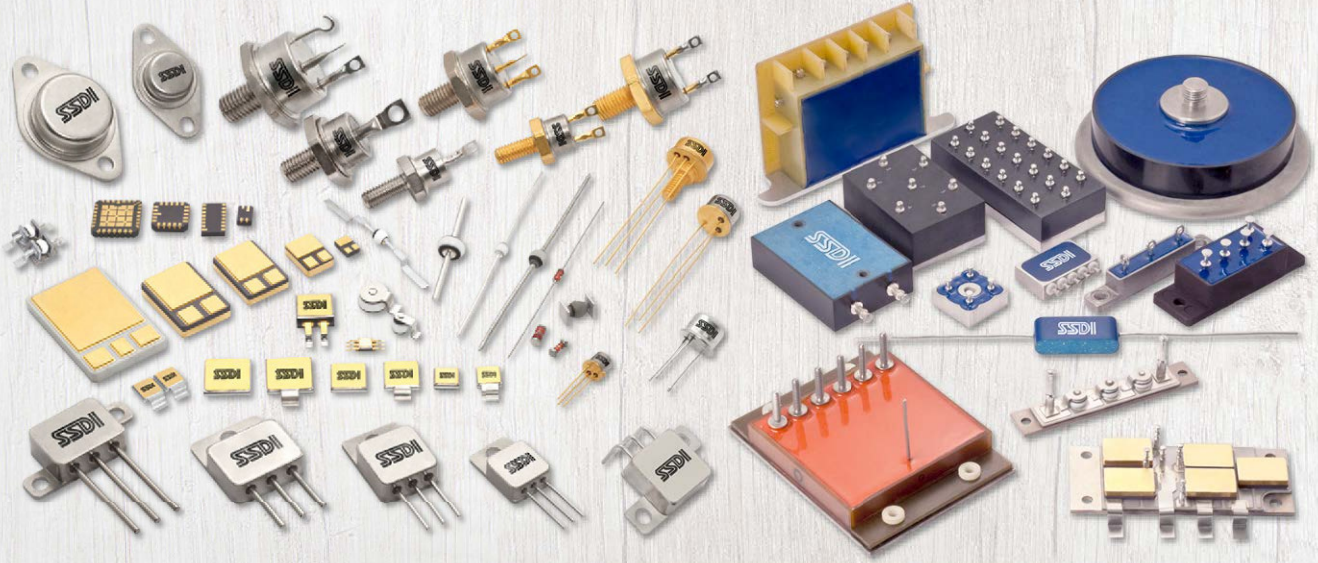
Perry Johnson, President

ANAB

The validity of this certificate is dependent upon ongoing surveillance.

High Density: Packaging Flexibility

- **Wide range of package options**
- **Special packaging / modifications to meet program specifications**
- **In-house machine shop / custom tooling**



SED20HE25: Modified Lead Option

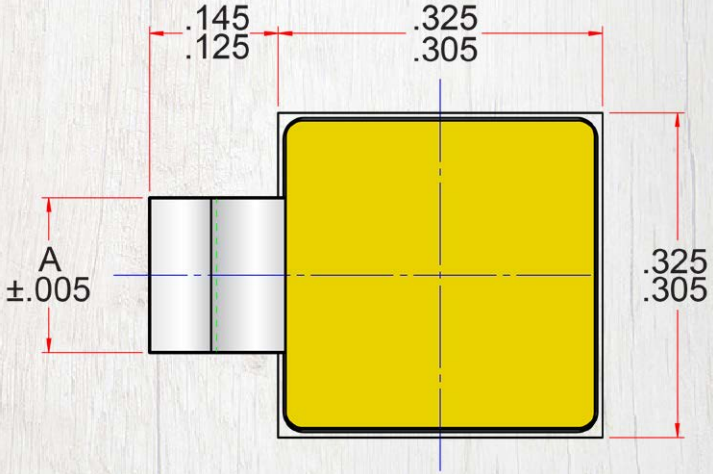
BACKGROUND

- Replacement for competitor's product for spacecraft application
- SSDI provided cost effective commercial level sample and read & record data
- Sample did not fit the custom DBC interposer made for the competitor's product

SOLUTIONS

- SSDI added a narrower lead width option (A = 0.100" or 0.150") to fit the designer's pad layout

Sedpack 1



JANS1N5811: Weldable Solid Silver Leads

6 A, 50 – 150 V Power Rectifiers

FEATURES

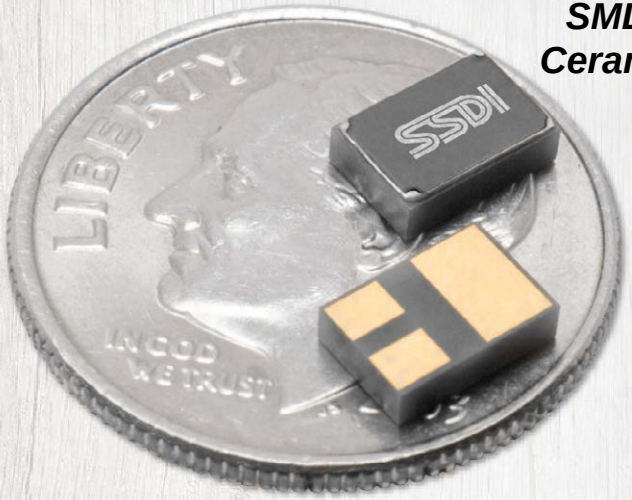
- Industry's only 1N5807 – 1N5811 with solid silver leads:
  - Ideal for welding / eliminates plating issues
  - Leads can be formed / flattened to facilitate welding
- Rugged void-free ceramic frit glass construction:
  - High temperature Category I eutectic metallurgical bond
  - Excellent liquid-to-liquid cryogenic thermal shock performance

APPLICATION

- Solar array bypass / blocking diodes for photovoltaic (PV) panels

SFT5096AS.22C: Ceramic Lid Option

1 A, 550 V PNP Transistor



SMD.22C
Ceramic Lid

BACKGROUND

- **High voltage application for satellite on-board equipment**
- **Concerned about standard kovar lid exposed to high electrical field**

SOLUTION

- **Ceramic lid offered to reduce the risk of arcing**
  - Testing demonstrated isolation better than 2 nA @ 1200 V between any of the pads (1, 2, or 3) and the seal ring / lid

High Performance:
New, Innovative Solutions

- SCDs – mission specific solutions
- Enhanced performance
  - High current
  - High voltage
- Product Development

- 300 V Hermetic Silicon Schottkys
- HV GaN FETs
- SiC FETs
- QPL Rectifiers
  - 1N7068
  - 1N8257
  - 1N5811
  - 1N6519

SED20HE300: High Voltage Schottkys

BACKGROUND

Sedpack 1

- Power supply / converter application (push-pull mode) for satellite
- 10 A, 200 V Schottky failed initial testing for this particular circuit

SOLUTIONS

- SED20HE250 – SED20HE300 (20 A, 250 - 300 V Schottky)
  - SSDI provided samples (250 V), read & record data, and created SCD
  - OEM approved samples and added new part number to their SCD
- SSDI's 300 V hermetic silicon Schottkys
  - Highest voltage rating in the industry
  - Allows for higher guard band

SMD.22

Sedpack 1

CT Sedpack:
Hot Case / Isolated

SDR20MF

20 A, 600 – 1000 V Fast Recovery Controlled Avalanche Rectifier

FEATURES:

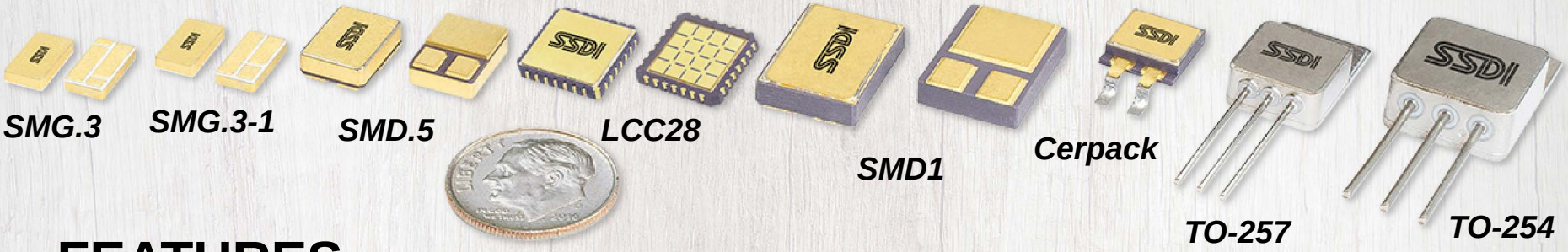
- High current / high voltage capabilities
- Repetitive high reverse energy rated (> 500 µJ at $I_{PK\ MAX}$ = 200 mA)

APPLICATIONS:

- Building block for EPC board for TWTA in satellite applications
- Control board for military surveillance drone

Hermetic GaN FETs

Up to 1000 V



FEATURES

- Exceptionally low $R_{DS(ON)}$
- Low Q_G simplifies gate drive circuit
- Low thermal resistance
- Hermetically sealed packaging - new chip-scale package, SMG.3
- TX, TXV, and S level screening available

Hermetic GaN Power FETs

Enhancement Mode

SGF90N04
55 – 90 A, 40 V, ≤ 7 mΩ

SGF48N10
48 A, 100 V, ≤ 10 mΩ

SGF48N20
48 A, 200 V, ≤ 16 mΩ

SGF06N35
6 A, 350 V, 65 mΩ

Cascode
Normally Off / Low Voltage Si MOSFET

SGF43E70
43 A, 700 V, 45 mΩ

SGF46E70
46 A, 700 V, 41 mΩ

SGF15E100
15 A, 1000 V, 190 mΩ

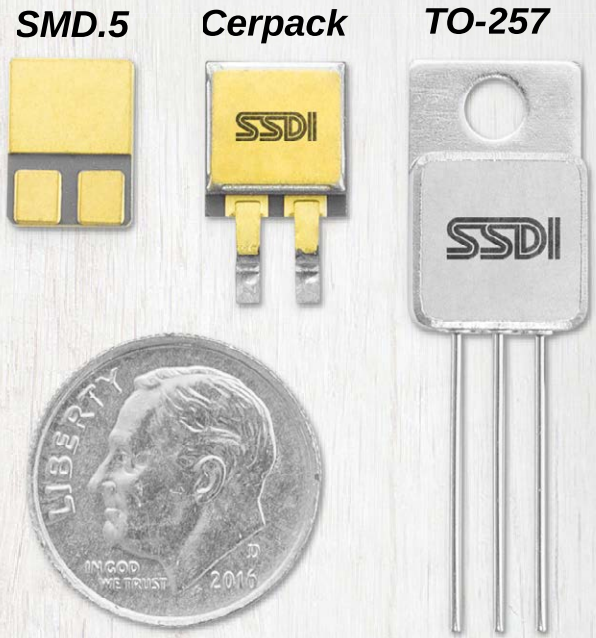
SFC35N120: 1200 V SiC FETs

Features

- 26 – 30 A
- Fast switching: < 30 ns typical
- Low RDS(ON): 96 mΩ max (@ 20 A, 25°C)
- Low gate charge: 65 nC max
- Easy to parallel, simple to drive

Applications

- High voltage DC-DC converters
- PFC boost converters



30043-1N6627 Outperforms Competitor's QPL 1N6627

- **30043-1N6627 exhibited better t_{RR} performance at high temperatures than competitor's QPL 1N6627**
- **Proposed adding high temp t_{RR} screening to SCD to ensure specific mission requirements** (not specified in MIL-PRF-19500/590)

APPLICATIONS:

- **Power processing unit for satellite**
- **High efficiency switching at high temperature**

SPD6631: Space Level Equivalent

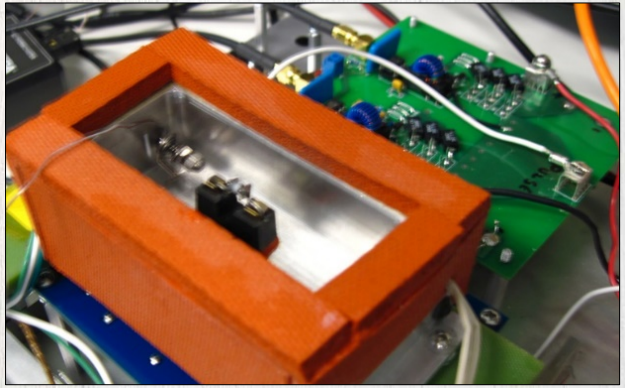
Test Set Developed for High Temperature Performance

BACKGROUND

- Lower switching power losses than competitors' QPL parts (1N6631)
- Limited t_{RR} requirements (/590) unable to predict unacceptable power losses of QPL parts at higher temperatures
- Power processing unit for electric propulsion

SOLUTION

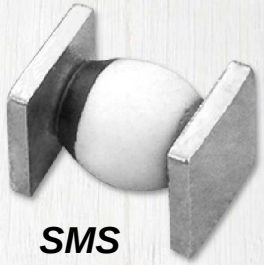
- SSDI partnered with customer to develop a test set (reverse recovery energy) that emulated the customer's application to ensure high temperature performance



ST1.5KS170SMS

BACKGROUND

- **Request for lightning protection application in spacecraft:**
  - 1500 W Space level, surface mount TVS
  - 150 V (working voltage), 170 V (nominal voltage)
  - Clamping voltage: initially 210 V max @ 3.3 A
- **Design required tighter clamping voltage**
  - < 186 V @ 3.3 A



SMS

SOLUTION

- **SSDI determined that the initially developed product can deliver the new requirement**
- **SSDI developed application specific test set for non-standard pulse width Vclamp measurements and re-screened inventory**

Thank you for your time and consideration!

For additional information contact:

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