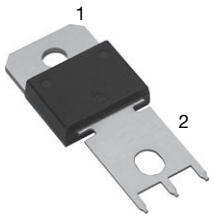
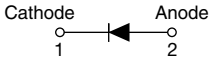
# Fast Soft Recovery Rectifier Diode, 85 A




PowerTab®




## FEATURES

- Glass passivated pellet chip junction
- 150 °C max. operating junction temperature
- Output rectification and freewheeling in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met
- Screw mounting only
- Designed and qualified according to JEDEC®-JESD 47
- PowerTab® package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

## LINKS TO ADDITIONAL RESOURCES

3D Models

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 85 A |
| $V_R$ | 1200 V |
| $V_F$ at $I_F$ | 1.36 V |
| $I_{FSM}$ | 1190 A |
| $t_{rr}$ | 95 ns |
| $T_J$ max. | 150 °C |
| Snap factor | 0.5 |
| Package | PowerTab® |
| Circuit configuration | Single |

## DESCRIPTION

The VS-85EPF12 fast soft recovery rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.

The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions. Available in the new PowerTab package, this new series is suitable for a large range of applications combining excellent die to footprint ratio and sturdiness connectivity for use in high current environments.

## MECHANICAL DATA

**Case:** PowerTab®

Molding compound meets UL 94 V-0 flammability rating

**Terminal:** nickel plated, screwable

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rect. conduction 50 % duty cycle at $T_C$ = 85 °C | 85 | A |
| $I_{F(RMS)}$ | | 160 | |
| $V_{RRM}$ | | 1200 | V |
| $I_{FSM}$ | | 1190 | A |
| $V_F$ | 100 A, $T_J$ = 25 °C | 1.4 | V |
| $t_{rr}$ | 1 A, - 100 A/µs | 95 | ns |
| $T_J$ | Range | -40 to +150 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| TYPE NUMBER | $V_{RRM}$, MAXIMUM PEAK REVERSE VOLTAGE V | $V_{RSM}$, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | $I_{RRM}$ AT 150 °C mA |
| VS-85EPF12-M4 | 1200 | 1300 | 18 |

## ABSOLUTE MAXIMUM RATINGS

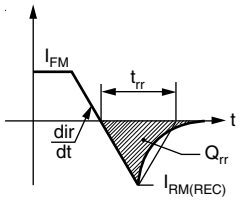
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|
| Maximum average forward current | $I_{F(AV)}$ | $T_C$ = 85 °C, 180° conduction half sine wave | 85 | A |
| Maximum peak one cycle non-repetitive surge current | $I_{FSM}$ | 10 ms sine pulse, rated $V_{RRM}$ applied | 1000 | |
| | | 10 ms sine pulse, no voltage reapplied | 1190 | |
| Maximum $I^2t$ for fusing | $I^2t$ | 10 ms sine pulse, rated $V_{RRM}$ applied | 5000 | $A^2s$ |
| | | 10 ms sine pulse, no voltage reapplied | 7000 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 ms to 10 ms, no voltage reapplied | 70 000 | $A^2\sqrt{s}$ |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop | $V_{FM}$ | 85 A, $T_J$ = 25 °C | | 1.36 | V |
| Forward slope resistance | $r_t$ | $T_J$ = 150 °C | | 4.03 | mΩ |
| Threshold voltage | $V_{F(TO)}$ | | | 0.87 | V |
| Maximum reverse leakage current | $I_{RM}$ | $T_J$ = 25 °C | $V_R$ = Rated $V_{RRM}$ | 0.1 | mA |
| | | $T_J$ = 150 °C | | 18 | |

## RECOVERY CHARACTERISTICS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|
| Reverse recovery time | $t_{rr}$ | $I_F$ at 85 $A_{pk}$ 25 A/µs 25 °C | 480 | ns |
| Reverse recovery current | $I_{rr}$ | | 7.1 | A |
| Reverse recovery charge | $Q_{rr}$ | | 2.1 | µC |
| Snap factor | S | | 0.5 | |




## THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER | | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum junction and storage temperature range | | $T_J$, $T_{Stg}$ | | -40 to +150 | °C |
| Maximum thermal resistance, junction to case | | $R_{thJC}$ | DC operation | 0.35 | °C/W |
| Maximum thermal resistance, junction to ambient | | $R_{thJA}$ | | 40 | |
| Typical thermal resistance, case to heatsink | | $R_{thCS}$ | Mounting surface, smooth and greased | 0.2 | |
| Approximate weight | | | | 6 | g |
| Mounting torque | minimum | | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | | 12 (10) | |
| Marking device | | | Case style PowerTab® | 85EPF12 | |

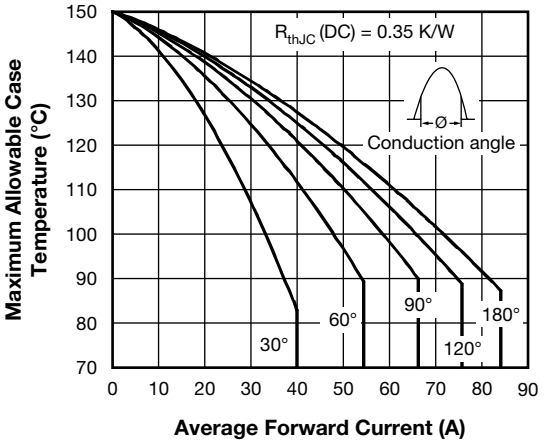



Fig. 1 - Current Rating Characteristics

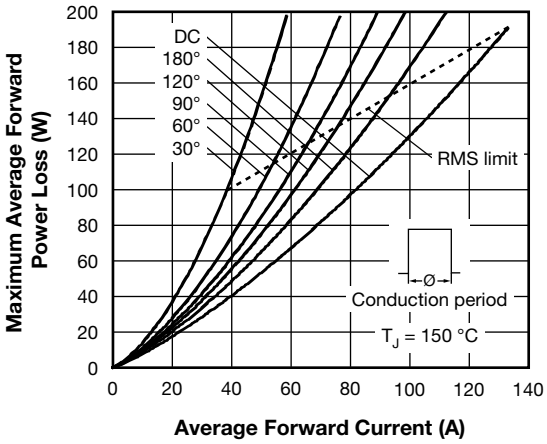



Fig. 4 - Forward Power Loss Characteristics

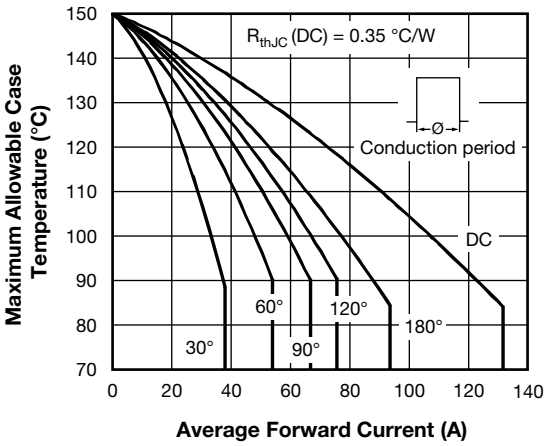



Fig. 2 - Current Rating Characteristics

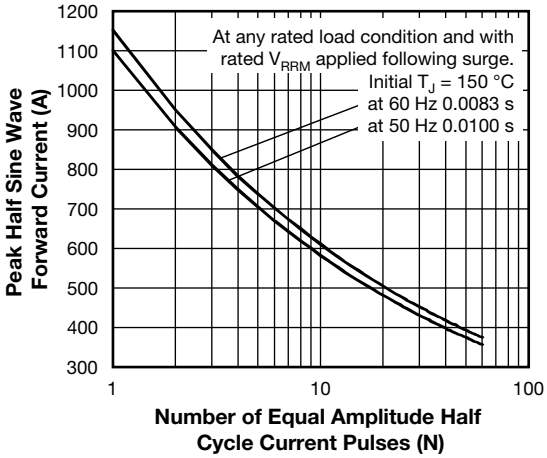



Fig. 5 - Maximum Non-Repetitive Surge Current

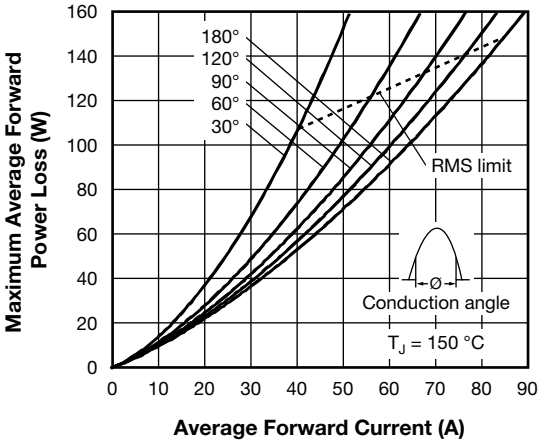



Fig. 3 - Forward Power Loss Characteristics

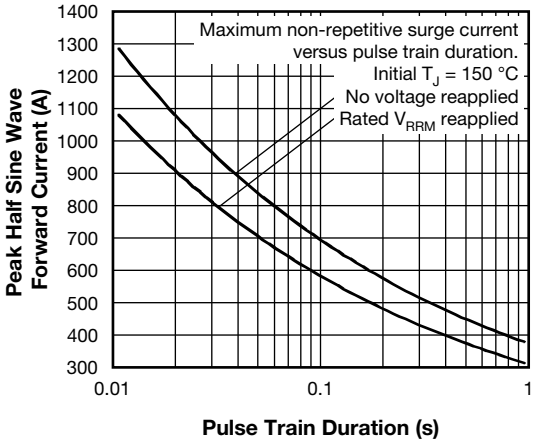



Fig. 6 - Maximum Non-Repetitive Surge Current

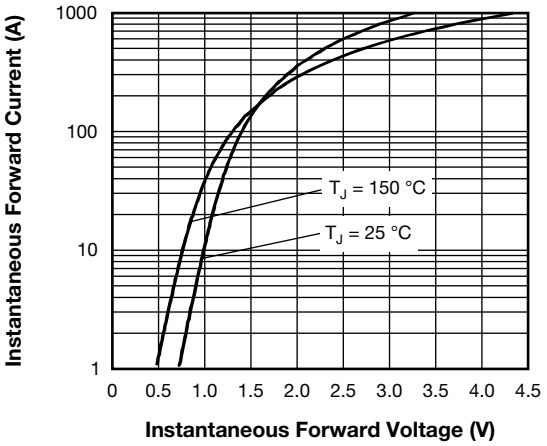



Fig. 7 - Forward Voltage Drop Characteristics

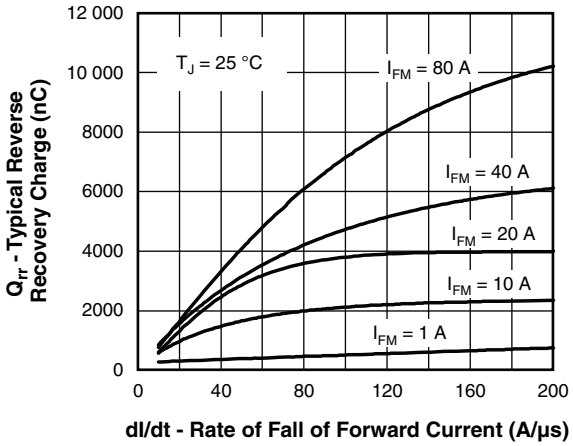



Fig. 10 - Recovery Charge Characteristics, $T_J$ = 25 °C

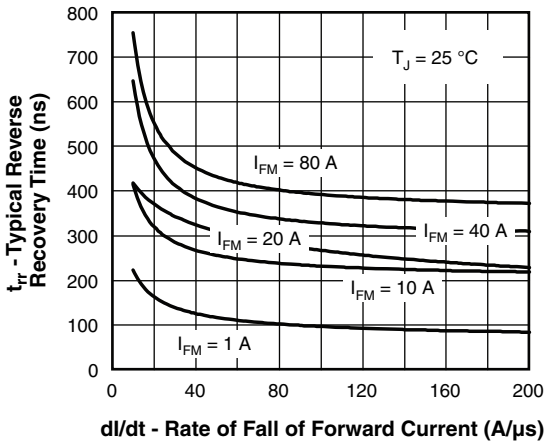



Fig. 8 - Recovery Time Characteristics, $T_J$ = 25 °C

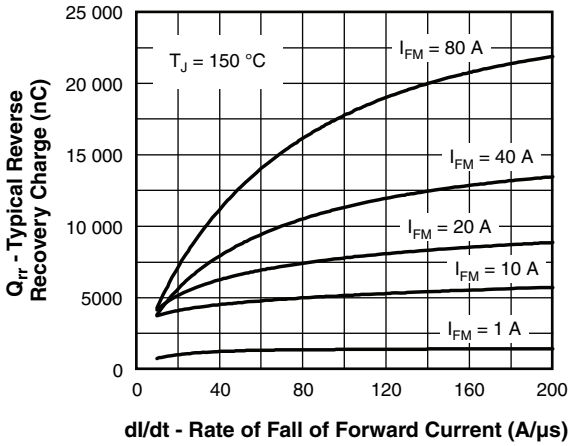



Fig. 11 - Recovery Charge Characteristics, $T_J$ = 150 °C

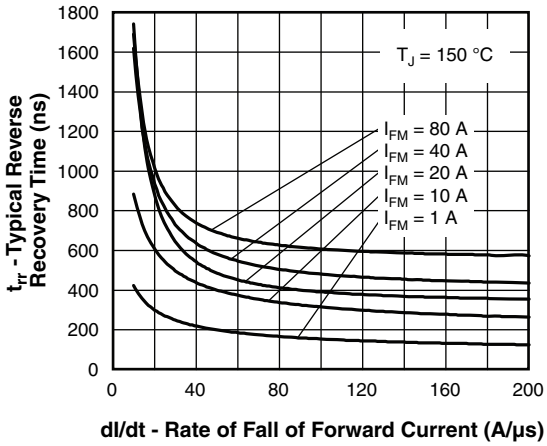



Fig. 9 - Recovery Time Characteristics, $T_J$ = 150 °C

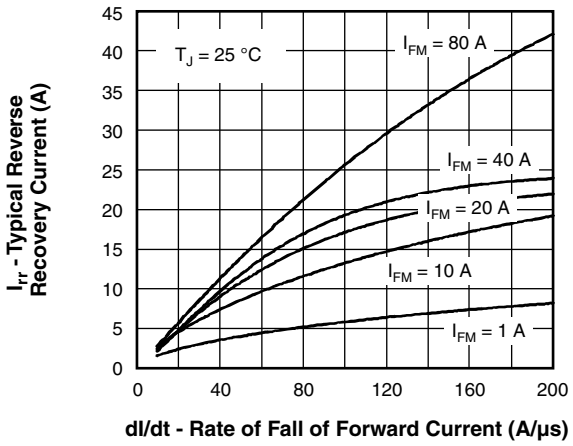



Fig. 12 - Recovery Current Characteristics, $T_J$ = 25 °C

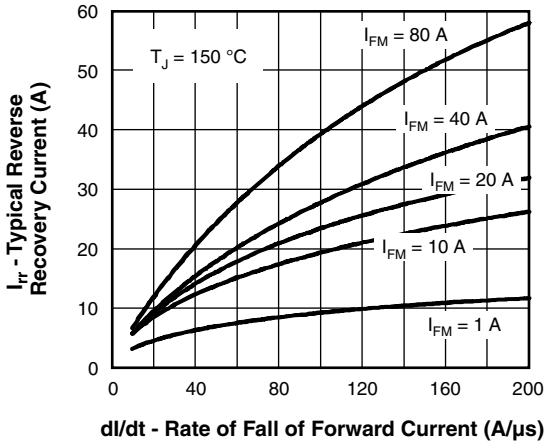



Fig. 13 - Recovery Current Characteristics, $T_J$ = 150 °C

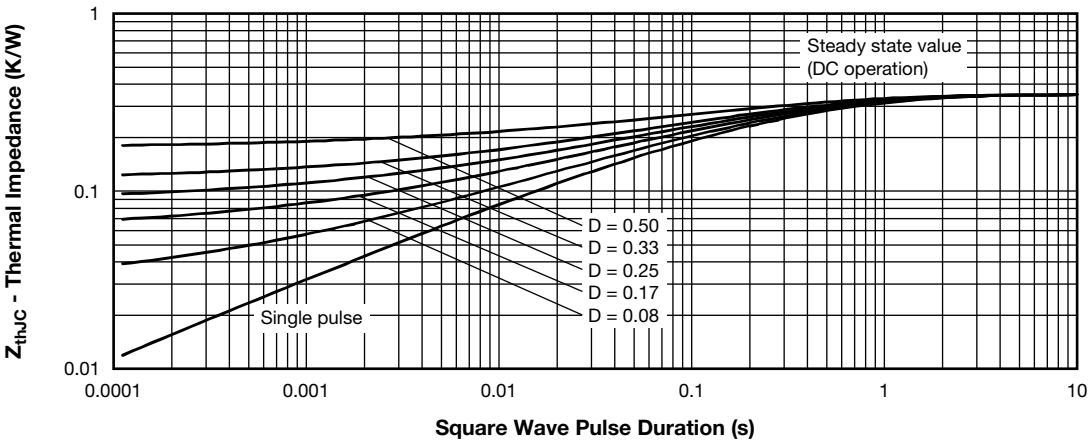
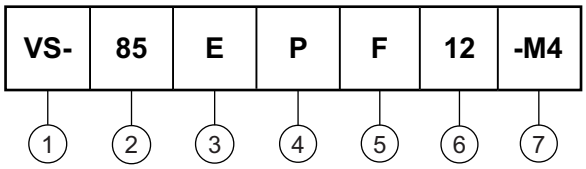



Fig. 14 - Thermal Impedance $Z_{thJC}$ Characteristics

## ORDERING INFORMATION TABLE

Device code




1 - Vishay Semiconductors product

2 - Current rating (85 = 85 A)

3 - Circuit configuration:
E = single diode

4 - Package:
P = PowerTab®

5 - Type of silicon:
F = fast recovery

6 - Voltage code x 100 = $V_{RRM}$ (12 = 1200 V)

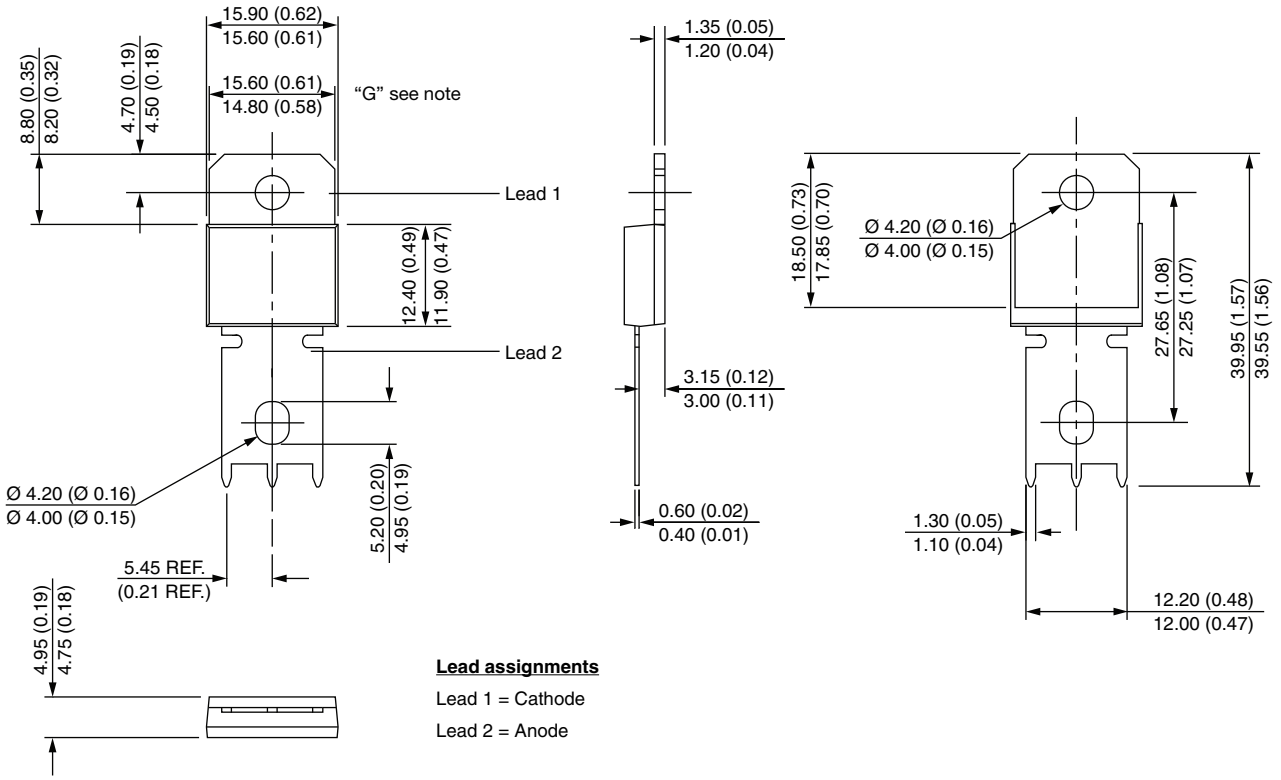
7 - Environmental digit:
-M4 = Halogen-free, RoHS-compliant and terminations lead (Pb)-free

| **ORDERING INFORMATION** (Example) | | |
|---|---|---|
| **PREFERRED P/N** | **BASE QUANTITY** | **PACKAGING DESCRIPTION** |
| VS-85EPF12-M4 | 25/tube | Antistatic plastic tube |

| **LINKS TO RELATED DOCUMENTS** | |
|---|---|
| Dimensions | www.vishay.com/doc?95240 |
| Part marking information | www.vishay.com/doc?95467 |
| SPICE model | www.vishay.com/doc?97277 |
| Application note | www.vishay.com/doc?95179 |

## PowerTab®

**DIMENSIONS** in millimeters (inches)




**Lead assignments**

Lead 1 = Cathode

Lead 2 = Anode

**Note:**
Outline conform to JEDEC® TO-275, except for dimension "G" only

# Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.