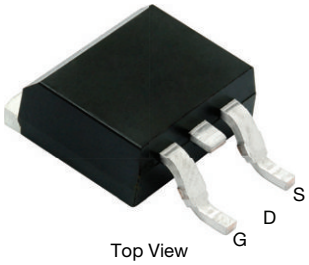
# N-Channel 200 V (D-S) 175 °C MOSFET

| PRODUCT SUMMARY | | | |
|---|---|---|---|
| $V_{DS}$ (V) | $R_{DS(on)}$ (Ω) MAX. | $I_D$ (A) | $Q_g$ (TYP.) |
| 200 | 0.017 at $V_{GS}$ = 10 V | 90 | 64 nC |
| | 0.018 at $V_{GS}$ = 7.5 V | 88 | |

TO-263




Top View

**Ordering Information:**
SUM90140E-GE3 (lead (Pb)-free and halogen-free)

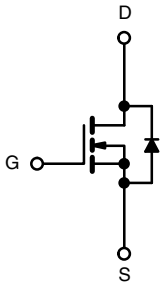
## FEATURES

- ThunderFET® power MOSFET
- Maximum 175 °C junction temperature
- 100 % $R_g$ and UIS tested
- Material categorization:
  for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

## APPLICATIONS

- Power supplies:
  - Uninterruptible power supplies
  - AC/DC switch-mode power supplies
  - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier




N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25 °C, unless otherwise noted) | | | | |
|---|---|---|---|---|
| PARAMETER | | SYMBOL | LIMIT | UNIT |
| Drain-Source Voltage | | $V_{DS}$ | 200 | V |
| Gate-Source Voltage | | $V_{GS}$ | ± 20 | |
| Continuous Drain Current ($T_J$ = 150 °C) | $T_C$ = 25 °C | $I_D$ | 90 | A |
| | $T_C$ = 70 °C | | 75 | |
| Pulsed Drain Current (t = 100 µs) | | $I_{DM}$ | 240 | |
| Avalanche Current | L = 0.1 mH | $I_{AS}$ | 60 | |
| Single Avalanche Energy [a] | | $E_{AS}$ | 180 | mJ |
| Maximum Power Dissipation [a] | $T_C$ = 25 °C | $P_D$ | 375 [b] | W |
| | $T_C$ = 125 °C | | 125 [b] | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to +175 | °C |

| THERMAL RESISTANCE RATINGS | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | LIMIT | UNIT |
| Junction-to-Ambient (PCB Mount) [c] | $R_{thJA}$ | 40 | °C/W |
| Junction-to-Case (Drain) | $R_{thJC}$ | 0.4 | |

**Notes**
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR4 material).


For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

| **SPECIFICATIONS** ($T_J$ = 25 °C, unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{DS}$ | $V_{GS}$ = 0 V, $I_D$ = 250 µA | 200 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | 2 | - | 4 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V | - | - | ± 250 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 200 V, $V_{GS}$ = 0 V | - | - | 1 | µA |
| | | $V_{DS}$ = 200 V, $V_{GS}$ = 0 V, $T_J$ = 125 °C | - | - | 150 | |
| | | $V_{DS}$ = 200 V, $V_{GS}$ = 0 V, $T_J$ = 175 °C | - | - | 5 | mA |
| On-State Drain Current [a] | $I_{D(on)}$ | $V_{DS}$ ≥ 10 V, $V_{GS}$ = 10 V | 90 | - | - | A |
| Drain-Source On-State Resistance [a] | $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 30 A | - | 0.0138 | 0.0170 | Ω |
| | | $V_{GS}$ = 7.5 V, $I_D$ = 30 A | - | 0.0141 | 0.0180 | |
| Forward Transconductance [a] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 30 A | - | 75 | - | S |
| **Dynamic [b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 100 V, f = 1 MHz | - | 4132 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 246 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 21 | - | |
| Total Gate Charge [c] | $Q_g$ | $V_{DS}$ = 100 V, $V_{GS}$ = 10 V, $I_D$ = 60 A | - | 64 | 96 | nC |
| Gate-Source Charge [c] | $Q_{gs}$ | | - | 16.7 | - | |
| Gate-Drain Charge [c] | $Q_{gd}$ | | - | 16.9 | - | |
| Gate Resistance | $R_g$ | f = 1 MHz | 1.5 | 3 | 5 | Ω |
| Turn-On Delay Time [c] | $t_{d(on)}$ | $V_{DD}$ = 100 V, $R_L$ = 1.66 Ω<br>$I_D$ ≅ 60 A, $V_{GEN}$ = 10 V, $R_g$ = 1 Ω | - | 13 | 26 | ns |
| Rise Time [c] | $t_r$ | | - | 112 | 200 | |
| Turn-Off Delay Time [c] | $t_{d(off)}$ | | - | 35 | 70 | |
| Fall Time [c] | $t_f$ | | - | 80 | 150 | |
| **Drain-Source Body Diode Ratings and Characteristics [b]** ($T_C$ = 25 °C) | | | | | | |
| Pulsed Current (t = 100 µs) | $I_{SM}$ | | - | - | 240 | A |
| Forward Voltage [a] | $V_{SD}$ | $I_F$ = 10 A, $V_{GS}$ = 0 V | - | 0.8 | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 30 A, di/dt = 100 A/µs | - | 160 | 320 | ns |
| Peak Reverse Recovery Charge | $I_{RM(REC)}$ | | - | 11 | 20 | A |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 0.9 | 1.8 | µC |

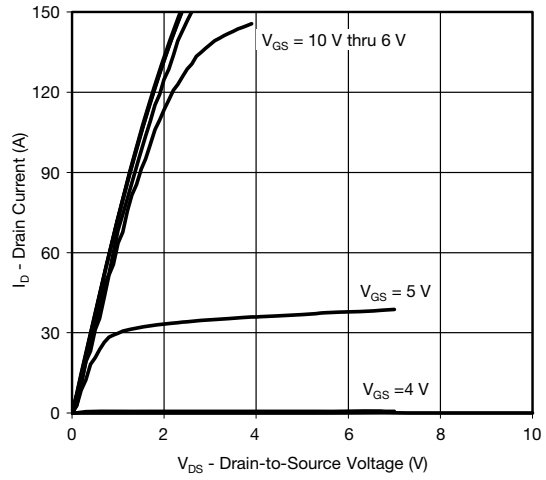
**Notes**

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

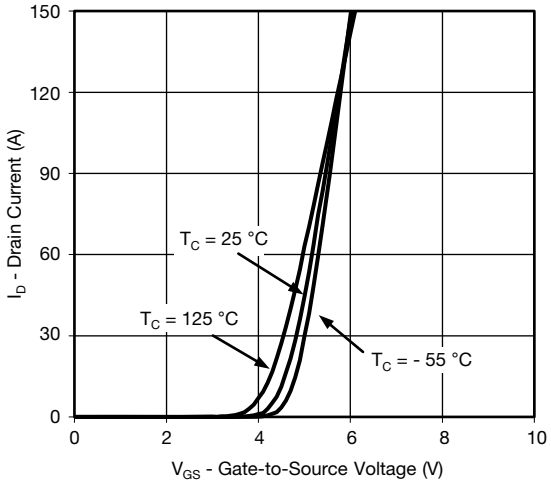
*Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*


For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

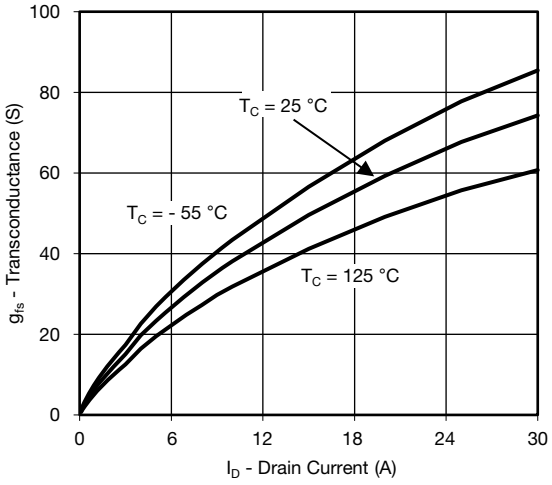
## TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise noted)



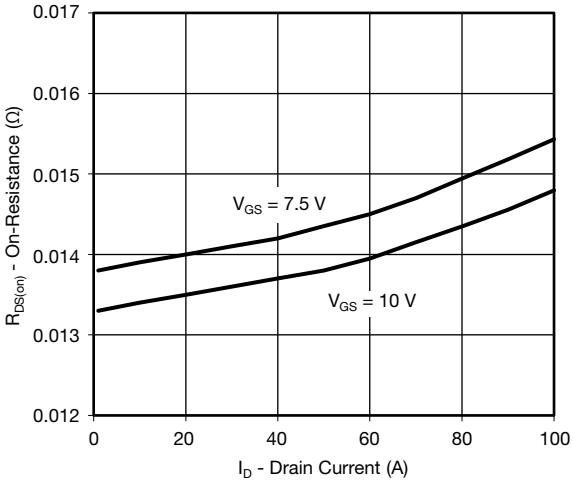

**Output Characteristics**



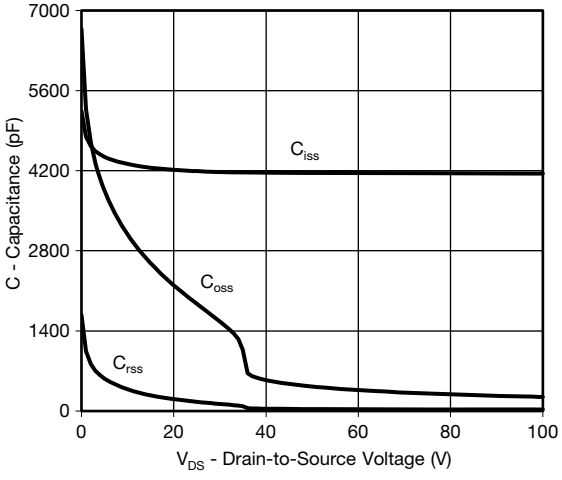

**Transfer Characteristics**



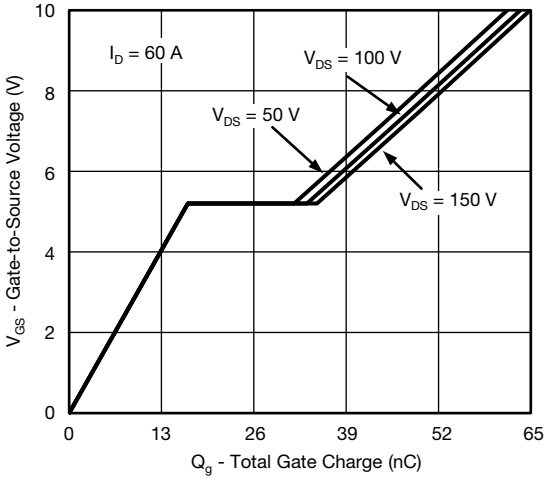

**Transconductance**




**On-Resistance vs. Drain Current**



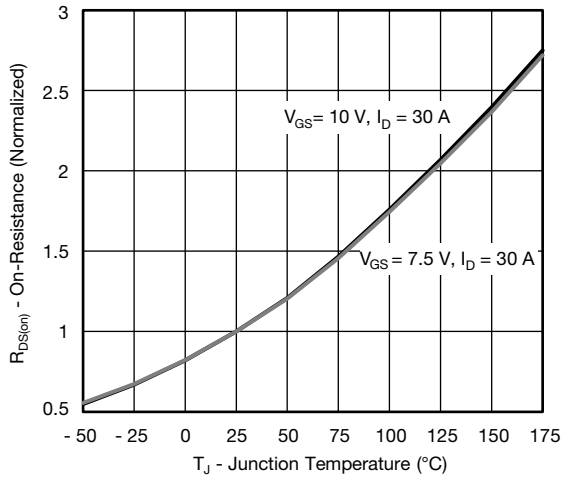

**Capacitance**



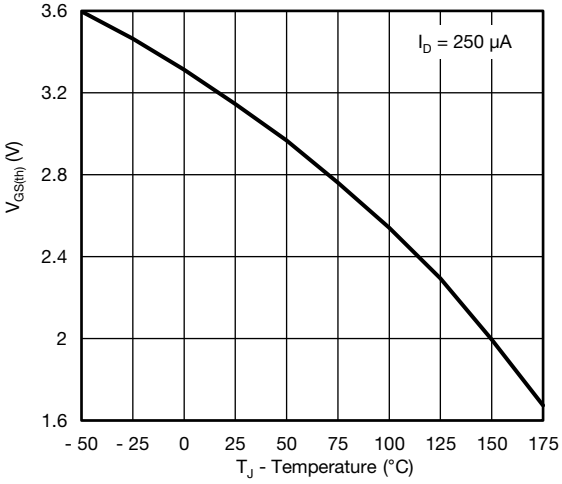

**Gate Charge**


For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

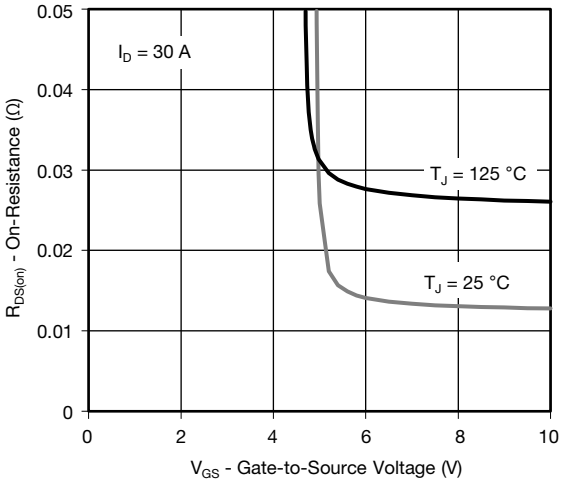
## TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise noted)



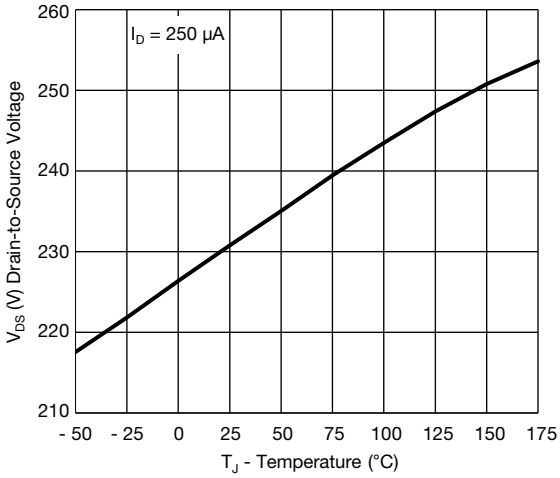

**On-Resistance vs. Junction Temperature**



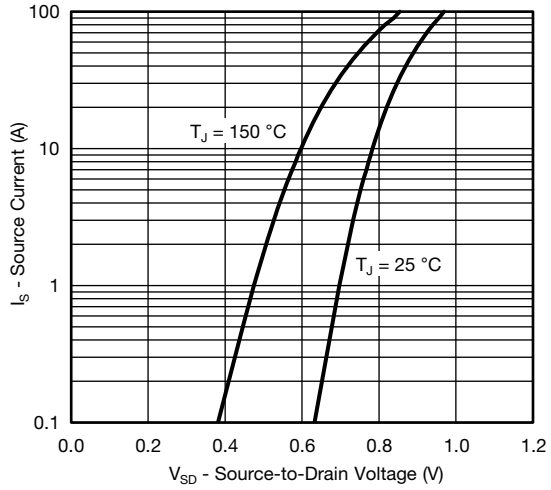

**Threshold Voltage**



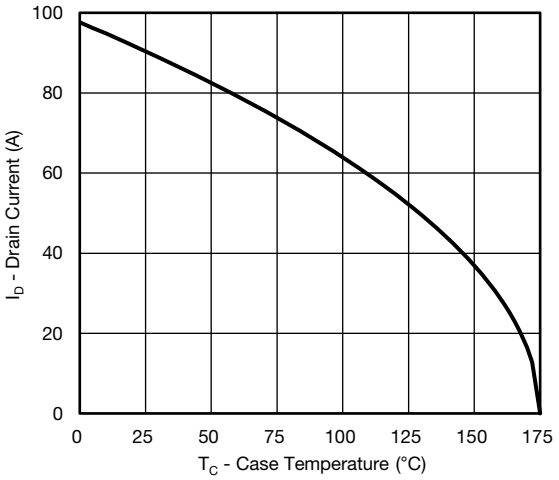

**On-Resistance vs. Gate-to-Source Voltage**




**Drain Source Breakdown vs. Junction Temperature**



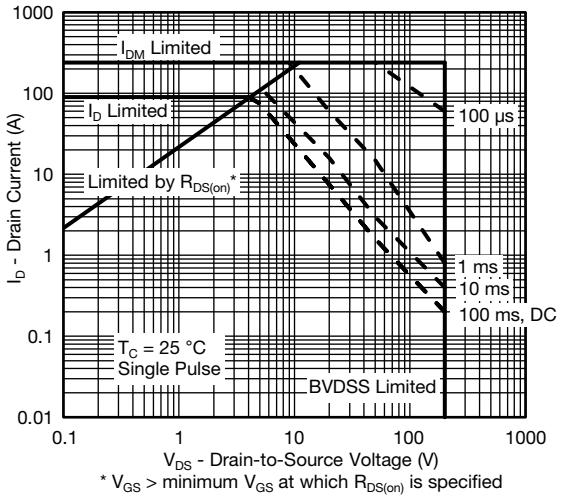

**Source Drain Diode Forward Voltage**



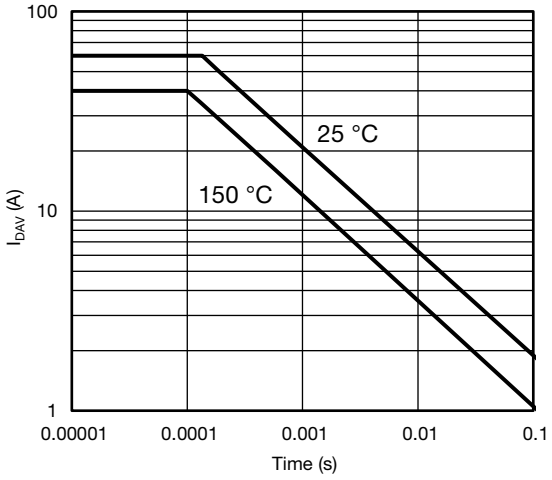

**Current De-rating**


For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

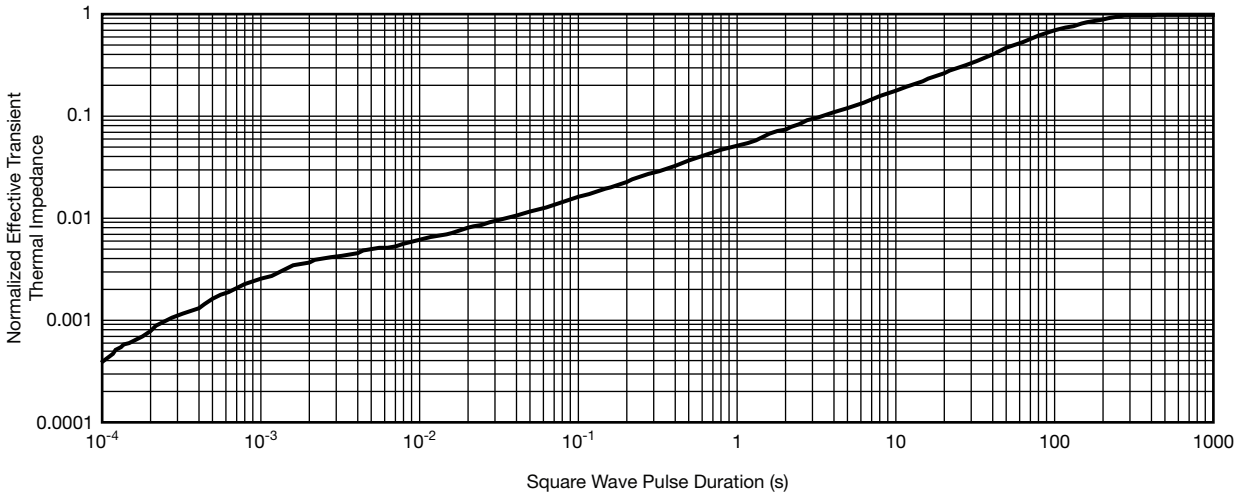
**THERMAL RATINGS** ($T_A$ = 25 °C, unless otherwise noted)




**Safe Operating Area**



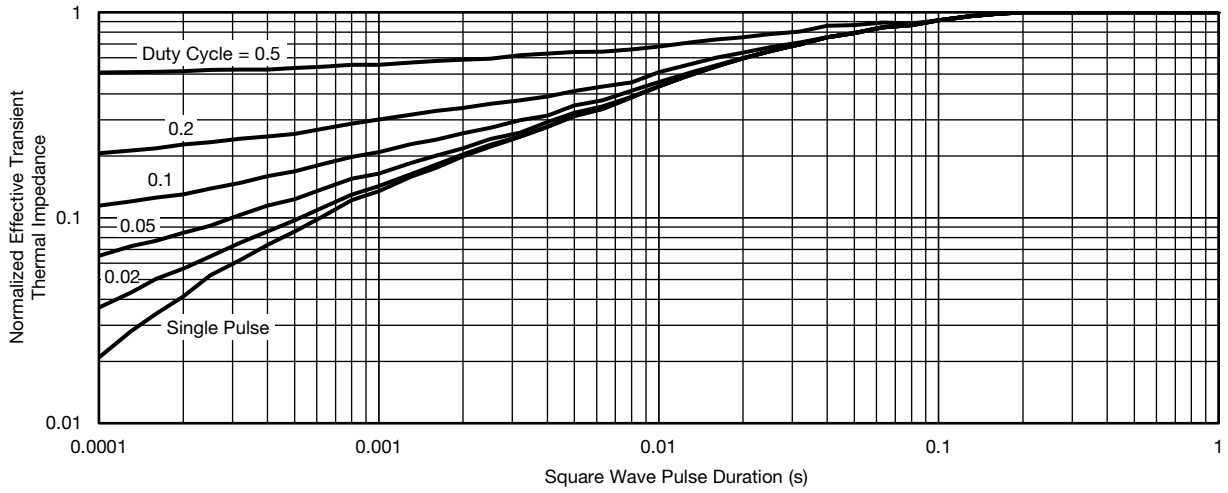

**Single Pulse Avalanche Current Capability vs. Time**




**Normalized Thermal Transient Impedance, Junction-to-Ambient**


For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

**THERMAL RATINGS** ($T_A$ = 25 °C, unless otherwise noted)




**Normalized Thermal Transient Impedance, Junction-to-Case**

**Note**

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Case (25 °C)

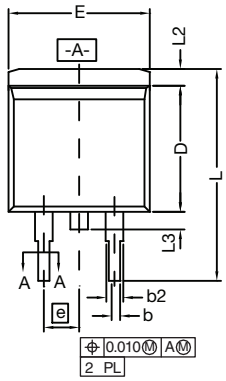
  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

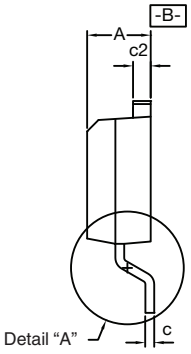
*Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?79035.*

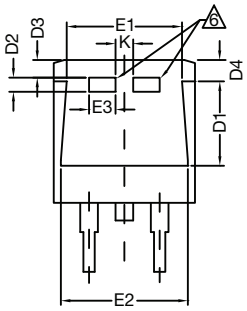

For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

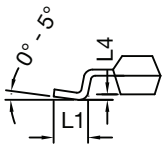
# TO-263 (D²PAK): 3-LEAD

## VERSION 1: FACILITY CODE = T

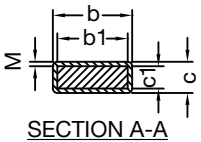



DETAIL A (ROTATED 90°)




SECTION A-A

| DIM. | | INCHES | | MILLIMETERS | |
|---|---|---|---|---|---|
| | | MIN. | MAX. | MIN. | MAX. |
| A | | 0.160 | 0.190 | 4.064 | 4.826 |
| b | | 0.020 | 0.039 | 0.508 | 0.990 |
| b1 | | 0.020 | 0.035 | 0.508 | 0.889 |
| b2 | | 0.045 | 0.055 | 1.143 | 1.397 |
| c* | Thin lead | 0.013 | 0.018 | 0.330 | 0.457 |
| | Thick lead | 0.023 | 0.028 | 0.584 | 0.711 |
| c1 | Thin lead | 0.013 | 0.017 | 0.330 | 0.431 |
| | Thick lead | 0.023 | 0.027 | 0.584 | 0.685 |
| c2 | | 0.045 | 0.055 | 1.143 | 1.397 |
| D | | 0.340 | 0.380 | 8.636 | 9.652 |
| D1 | | 0.220 | 0.240 | 5.588 | 6.096 |
| D2 | | 0.038 | 0.042 | 0.965 | 1.067 |
| D3 | | 0.045 | 0.055 | 1.143 | 1.397 |
| D4 | | 0.044 | 0.052 | 1.118 | 1.321 |
| E | | 0.380 | 0.410 | 9.652 | 10.414 |
| E1 | | 0.245 | - | 6.223 | - |
| E2 | | 0.355 | 0.375 | 9.017 | 9.525 |
| E3 | | 0.072 | 0.078 | 1.829 | 1.981 |
| e | | 0.100 BSC | | 2.54 BSC | |
| K | | 0.045 | 0.055 | 1.143 | 1.397 |
| L | | 0.575 | 0.625 | 14.605 | 15.875 |
| L1 | | 0.090 | 0.110 | 2.286 | 2.794 |
| L2 | | 0.040 | 0.055 | 1.016 | 1.397 |
| L3 | | 0.050 | 0.070 | 1.270 | 1.778 |
| L4 | | 0.010 BSC | | 0.254 BSC | |
| M | | - | 0.002 | - | 0.050 |

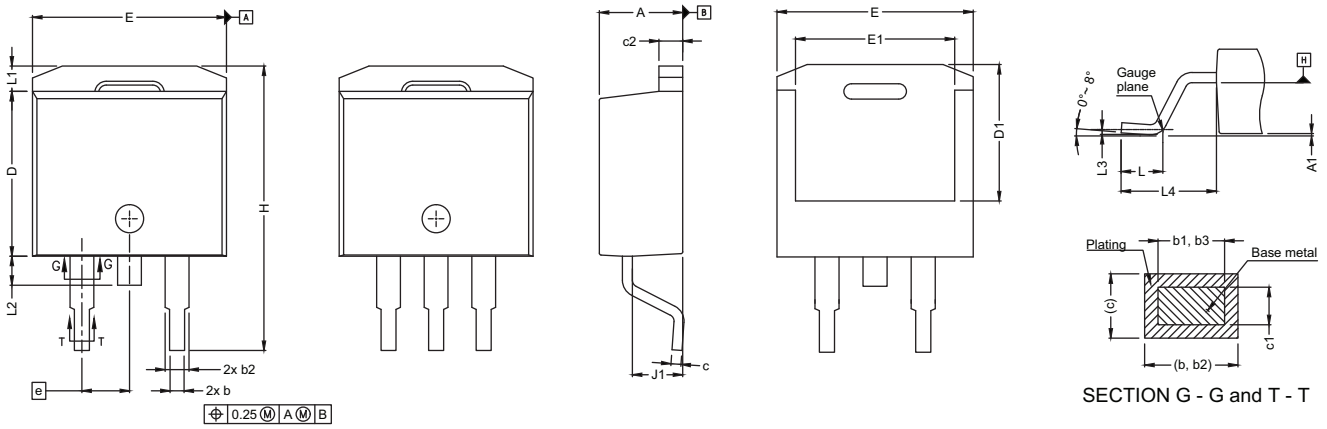
**Notes**

1. Plane B includes maximum features of heat sink tab and plastic.
2. No more than 25 % of L1 can fall above seating plane by max. 8 mils.
3. Pin-to-pin coplanarity max. 4 mils.
4. *: Thin lead is for SUB, SYB.
   Thick lead is for SUM, SYM, SQM.
5. Use inches as the primary measurement.
6. This feature is for thick lead.

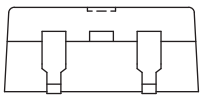


THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

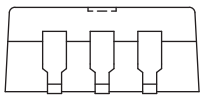
## VERSION 2: FACILITY CODE = N




SECTION G - G and T - T



OPTION 1
2 leads



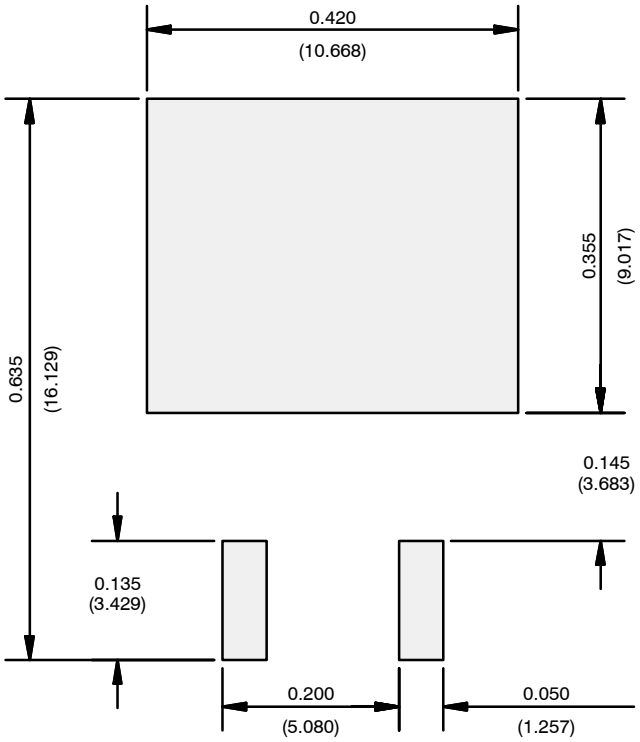
OPTION 2
3 leads

| DIM. | MIN. | MAX. |
|---|---|---|
| A | 4.36 | 4.56 |
| A1 | 0 | 0.25 |
| b | 0.70 | 0.90 |
| b1 | 0.51 | 0.89 |
| b2 | 1.20 | 1.46 |
| b3 | 1.17 | 1.37 |
| c | 0.38 | 0.694 |
| c1 | 0.38 | 0.534 |
| c2 | 1.19 | 1.34 |
| D | 8.60 | 9.00 |
| D1 | 6.9 | 7.5 |
| E | 10.15 | 10.55 |
| E1 | 8.1 | 8.7 |
| e | 2.54 BSC | |
| H | 15.0 | 15.6 |
| L | 1.9 | 2.5 |
| L1 | - | 1.65 |
| L2 | - | 1.78 |
| L3 | 0.25 typ. | |
| L4 | 4.78 | 5.28 |
| J1 | 2.56 | 2.96 |
| ECN: S24-1080-Rev. L, 28-Oct-2024<br>DWG: 5843 | | |



THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

## RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead




Recommended Minimum Pads
Dimensions in Inches/(mm)

Return to Index

# 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.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.

*© 2026 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED*



THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ENTEGRECİ

Bu belge www.entegreci.com üzerinden sunulmaktadır.

# Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

### Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

**www.entegreci.com**

### Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

**Kategorilere göz atın**

### Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

**Üreticileri görün**

### Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

**Teklif isteyin**

**www.entegreci.com** | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.