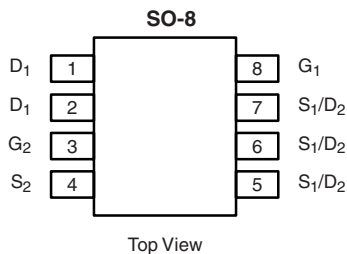


## Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

| PRODUCT SUMMARY |                     |                                  |                                 |                       |
|-----------------|---------------------|----------------------------------|---------------------------------|-----------------------|
|                 | V <sub>DS</sub> (V) | R <sub>DS(on)</sub> (Ω)          | I <sub>D</sub> (A) <sup>a</sup> | Q <sub>g</sub> (Typ.) |
| Channel-1       | 30                  | 0.021 at V <sub>GS</sub> = 10 V  | 8.4                             | 6.7                   |
|                 |                     | 0.027 at V <sub>GS</sub> = 4.5 V | 7.4                             |                       |
| Channel-2       |                     | 0.020 at V <sub>GS</sub> = 10 V  | 8 <sup>d</sup>                  | 7.0                   |
|                 |                     | 0.025 at V <sub>GS</sub> = 4.5 V | 8 <sup>d</sup>                  |                       |

| SCHOTTKY PRODUCT SUMMARY |  |                    |
|--------------------------|--|--------------------|
| V <sub>DS</sub> (V)      | V <sub>SD</sub> (V)<br>Diode Forward Voltage | I <sub>F</sub> (A) |
| 30                       | 0.50 V at 1.0 A                              | 2.0                |



Ordering Information: Si4914BDY-T1-E3 (Lead (Pb)-free)  
Si4914BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)

### FEATURES

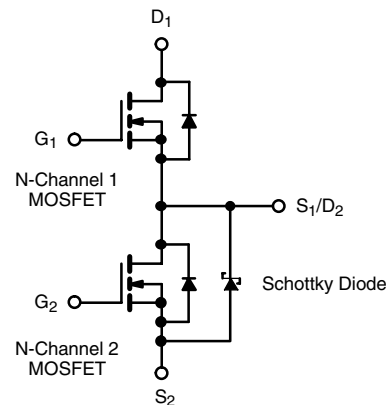
- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT<sup>®</sup> Plus Integrated Schottky
- 100 % R<sub>g</sub> and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### APPLICATIONS

- Notebook PC  
- System Power dc-to-dc



| ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted |                                   |                        |                     |                     |     |
|---|-----------------------------------|------------------------|---------------------|---------------------|-----|
| Parameter   | Symbol                            | Channel-1              | Channel-2           | Unit                |     |
| Drain-Source Voltage  | V <sub>DS</sub>                   | 30                     |                     | V                   |     |
| Gate-Source Voltage   | V <sub>GS</sub>                   | 20                     |                     |                     |     |
| Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a, b</sup>      | I <sub>D</sub>                    | T <sub>C</sub> = 25 °C | 8.4                 | 8 <sup>d</sup>      | A   |
|   |                                   | T <sub>C</sub> = 70 °C | 6.7                 | 7.4                 |     |
|   |                                   | T <sub>A</sub> = 25 °C | 6.7 <sup>b, c</sup> | 7.4 <sup>b, c</sup> |     |
|   |                                   | T <sub>A</sub> = 70 °C | 5.3 <sup>b, c</sup> | 5.7 <sup>b, c</sup> |     |
| Pulsed Drain Current (10 μs Pulse Width)                                | I <sub>DM</sub>                   | 40                     | 40                  | A                   |     |
| Continuous Source-Drain Diode Current                                   | I <sub>S</sub>                    | T <sub>C</sub> = 25 °C | 2.4                 |                     | 2.8 |
|   |                                   | T <sub>A</sub> = 25 °C | 1.0 <sup>b, c</sup> | 1.1 <sup>b, c</sup> |     |
| PulseD Source-Drain Current   | I <sub>SM</sub>                   | 40                     | 40                  | A                   |     |
| Single-Pulse Avalanche Current  | I <sub>AS</sub>                   | 15                     |                     |                     |     |
| Single-Pulse Avalanche Energy   | E <sub>AS</sub>                   | 11.2                   |                     | mJ                  |     |
| Maximum Power Dissipation <sup>a, b</sup>                               | P <sub>D</sub>                    | T <sub>C</sub> = 25 °C | 2.7                 | 3.1                 | W   |
|   |                                   | T <sub>C</sub> = 70 °C | 1.7                 | 2.0                 |     |
|   |                                   | T <sub>A</sub> = 25 °C | 1.7 <sup>b, c</sup> | 2.0 <sup>b, c</sup> |     |
|   |                                   | T <sub>A</sub> = 70 °C | 1.1 <sup>b, c</sup> | 1.2 <sup>b, c</sup> |     |
| Operating Junction and Storage Temperature Range                        | T <sub>J</sub> , T <sub>stg</sub> | - 55 to 150            |                     | °C                  |     |

Notes:

- Based on T<sub>C</sub> = 25 °C.
- Surface Mounted on 1" x 1" FR4 board.
- t = 10 s.
- Package limited.

**THERMAL RESISTANCE RATINGS**

| Parameter                                |               | Symbol     | Channel-1 |      | Channel-2 |      | Unit |
|--|---------------|------------|-----------|------|-----------|------|------|
|  |               |            | Typ.      | Max. | Typ.      | Max. |      |
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 10$ s | $R_{thJA}$ | 59        | 70   | 52        | 62.5 | °C/W |
| Maximum Junction-to-Foot (Drain)         | Steady State  | $R_{thJF}$ | 36        | 45   | 32        | 40   |      |

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

b. Maximum under Steady State conditions is 120 °C/W for Channel 1 and 115 °C/W for Channel 2.

**MOSFET SPECIFICATIONS**  $T_J = 25$  °C, unless otherwise noted

| Parameter                                     | Symbol                  | Test Conditions   | Min. | Typ. <sup>a</sup> | Max.   | Unit  |          |
|---|-------------------------|---|------|-------------------|--------|-------|----------|
| <b>Static</b>                                 |                         |   |      |                   |        |       |          |
| Drain-Source Breakdown Voltage                | $V_{DS}$                | $V_{GS} = 0$ V, $I_D = 250$ $\mu$ A                         | Ch-1 | 30                |        | V     |          |
|   |                         |   | Ch-2 | 30                |        |       |          |
| $V_{DS}$ Temperature Coefficient              | $\Delta V_{DS}/T_J$     | $I_D = 250$ $\mu$ A   | Ch-1 |                   | 35     | mV/°C |          |
| $V_{GS(th)}$ Temperature Coefficient          | $\Delta V_{GS(th)}/T_J$ |   | Ch-1 |                   | - 6.2  |       |          |
| Gate Threshold Voltage                        | $V_{GS(th)}$            | $V_{DS} = V_{GS}$ , $I_D = 250$ $\mu$ A                     | Ch-1 | 1.2               |        | 2.7   | V        |
|   |                         |   | Ch-2 | 1.2               |        | 2.7   |          |
| Gate-Body Leakage                             | $I_{GSS}$               | $V_{DS} = 0$ V, $V_{GS} = 20$ V                             | Ch-1 |                   |        | 100   | nA       |
|   |                         |   | Ch-2 |                   |        | 100   |          |
| Zero Gate Voltage Drain Current               | $I_{DSS}$               | $V_{DS} = 30$ V, $V_{GS} = 0$ V                             | Ch-1 |                   |        | 1     | $\mu$ A  |
|   |                         |   | Ch-2 |                   |        | 100   |          |
|   |                         | $V_{DS} = 30$ V, $V_{GS} = 0$ V, $T_J = 85$ °C              | Ch-1 |                   |        | 15    |          |
|   |                         |   | Ch-2 |                   |        | 10000 |          |
| On-State Drain Current <sup>b</sup>           | $I_{D(on)}$             | $V_{DS} = 5$ V, $V_{GS} = 10$ V                             | Ch-1 | 20                |        | A     |          |
|   |                         |   | Ch-2 | 20                |        |       |          |
| Drain-Source On-State Resistance <sup>b</sup> | $R_{DS(on)}$            | $V_{GS} = 10$ V, $I_D = 8$ A                                | Ch-1 |                   | 0.0165 | 0.021 | $\Omega$ |
|   |                         | $V_{GS} = 10$ V, $I_D = 8$ A                                | Ch-2 |                   | 0.0155 | 0.020 |          |
|   |                         | $V_{GS} = 4.5$ V, $I_D = 6$ A                               | Ch-1 |                   | 0.0215 | 0.027 |          |
|   |                         | $V_{GS} = 4.5$ V, $I_D = 6$ A                               | Ch-2 |                   | 0.020  | 0.025 |          |
| Forward Transconductance <sup>b</sup>         | $g_{fs}$                | $V_{DS} = 15$ V, $I_D = 8$ A                                | Ch-1 |                   | 29     | S     |          |
|   |                         | $V_{DS} = 15$ V, $I_D = 8$ A                                | Ch-2 |                   | 33     |       |          |
| Diode Forward Voltage <sup>b</sup>            | $V_{SD}$                | $I_S = 1.7$ A, $V_{GS} = 0$ V                               | Ch-1 |                   | 0.77   | 1.1   | V        |
|   |                         | $I_S = 1$ A, $V_{GS} = 0$ V                                 | Ch-2 |                   | 0.46   | 0.5   |          |
| <b>Dynamic<sup>a</sup></b>                    |                         |   |      |                   |        |       |          |
| Total Gate Charge                             | $Q_g$                   | Channel-1<br>$V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 8$ A | Ch-1 |                   | 6.7    | 10.5  | nC       |
|   |                         |   | Ch-2 |                   | 7.0    | 11.0  |          |
| Gate-Source Charge                            | $Q_{gs}$                | Channel-2<br>$V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 8$ A | Ch-1 |                   | 2.8    |       |          |
|   |                         |   | Ch-2 |                   | 2.8    |       |          |
| Gate-Drain Charge                             | $Q_{gd}$                | Channel-1<br>$V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 8$ A | Ch-1 |                   | 2.0    |       |          |
|   |                         |   | Ch-2 |                   | 2.0    |       |          |
| Gate Resistance                               | $R_g$                   |   | Ch-1 |                   | 2.9    | 6.0   |          |
|   |                         |   | Ch-2 |                   | 2.0    | 4.0   |          |



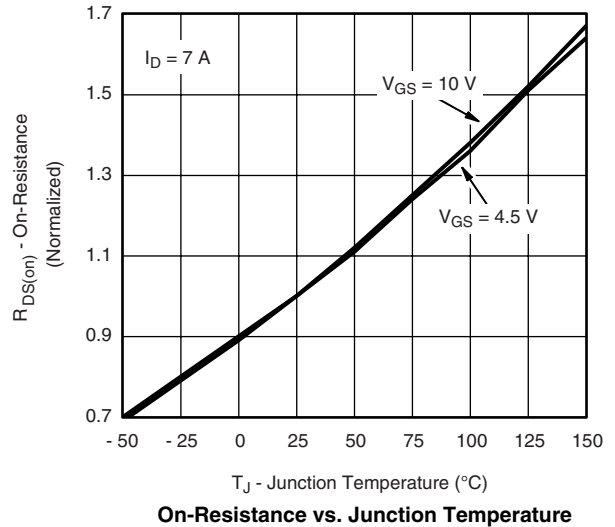
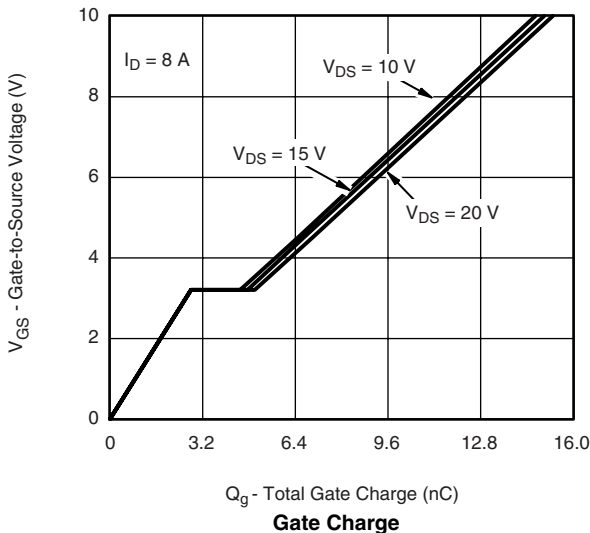
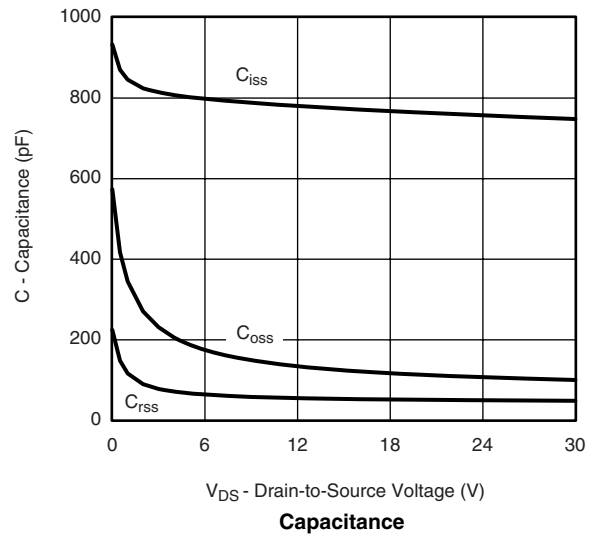
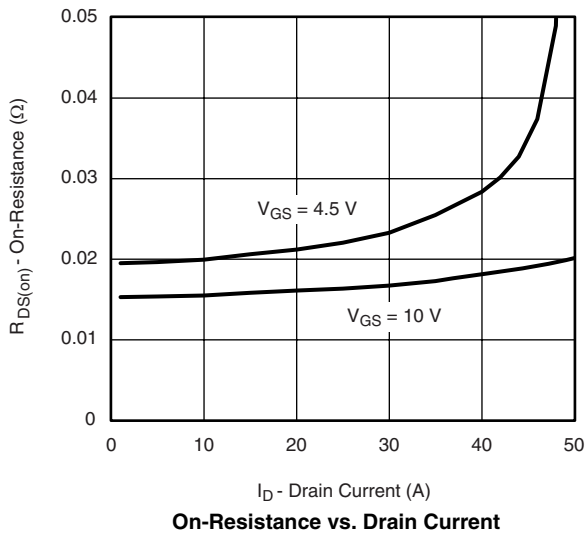
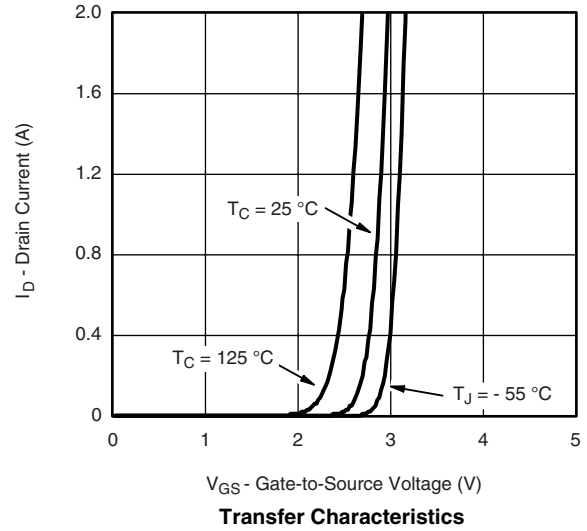
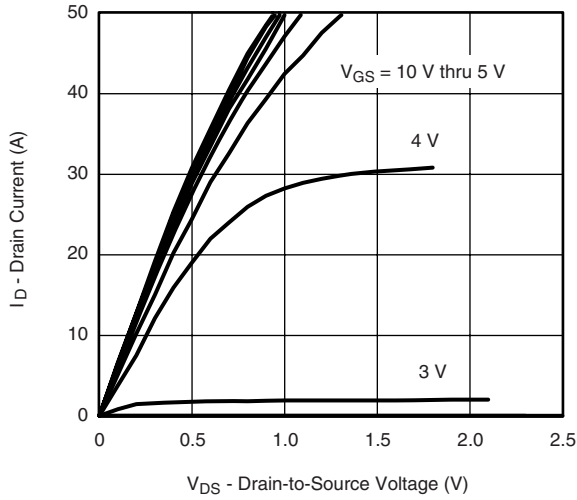
| <b>MOSFET SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted |              |   |      |                   |      |      |
|--|--------------|---|------|-------------------|------|------|
| Parameter  | Symbol       | Test Conditions   | Min. | Typ. <sup>a</sup> | Max. | Unit |
| <b>Dynamic<sup>a</sup></b>   |              |   |      |                   |      |      |
| Turn-On Delay Time   | $t_{d(on)}$  | Channel-1<br>$V_{DD} = 15\text{ V}$ , $R_L = 3\ \Omega$<br>$I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$ | Ch-1 | 9                 | 18   | ns   |
|  |              |   | Ch-2 | 10                | 20   |      |
| Rise Time  | $t_r$        | Channel-2<br>$V_{DD} = 15\text{ V}$ , $R_L = 3\ \Omega$<br>$I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$ | Ch-1 | 10                | 20   |      |
|  |              |   | Ch-2 | 9                 | 18   |      |
| Turn-Off Delay Time  | $t_{d(off)}$ | Channel-1<br>$V_{DD} = 15\text{ V}$ , $R_L = 3\ \Omega$<br>$I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$ | Ch-1 | 16                | 32   |      |
|  |              |   | Ch-2 | 16                | 32   |      |
| Fall Time  | $t_f$        | Channel-2<br>$V_{DD} = 15\text{ V}$ , $R_L = 3\ \Omega$<br>$I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$ | Ch-1 | 9                 | 18   |      |
|  |              |   | Ch-2 | 8                 | 16   |      |
| Source-Drain Reverse Recovery Time   | $t_{rr}$     | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-1 | 35                | 55   | ns   |
|  |              | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-2 | 21                | 35   |      |
| Body Diode Reverse Recovery Charge   | $Q_{rr}$     | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-1 | 40                |      | nC   |
|  |              | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-2 | 11                |      |      |
| Reverse Recovery Fall Time   | $t_a$        | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-1 | 19                |      | ns   |
|  |              | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-2 | 11                |      |      |
| Reverse Recovery Rise Time   | $t_b$        | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-1 | 16                |      | ns   |
|  |              | $I_F = 2.2\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$   | Ch-2 | 10                |      |      |

Notes:

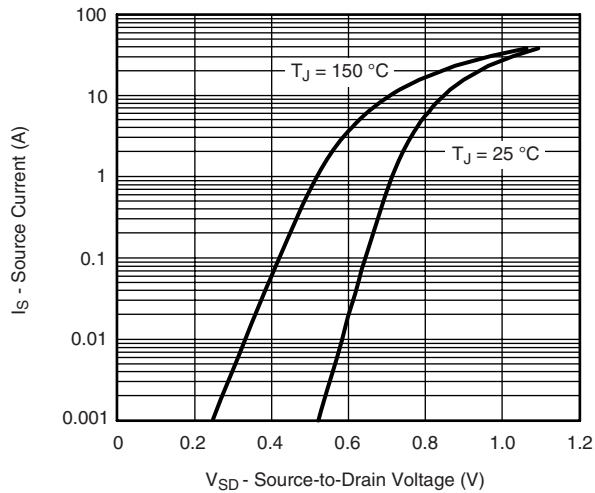
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

*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.*

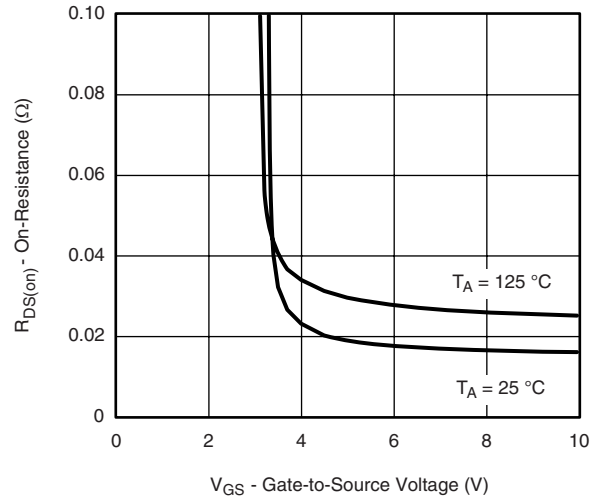
## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



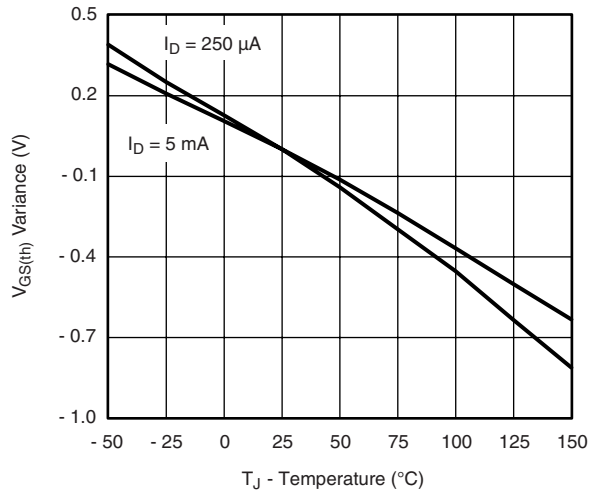
## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



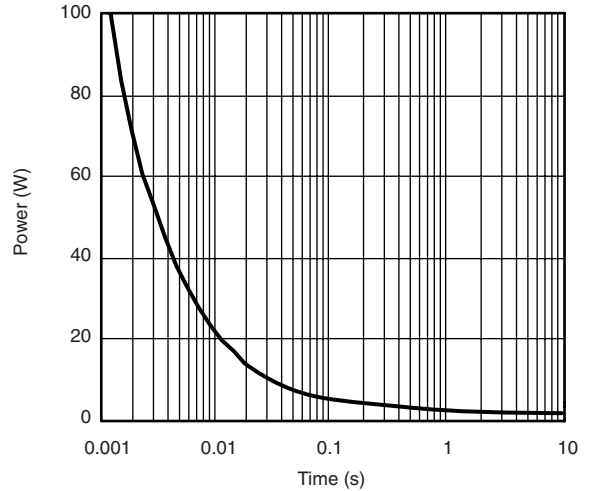
Source-Drain Diode Forward Voltage



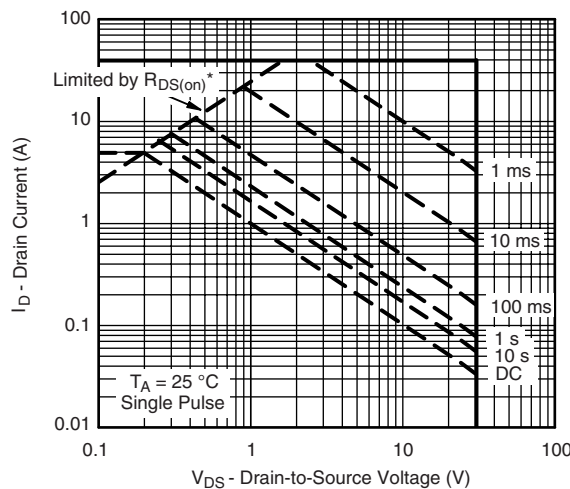
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



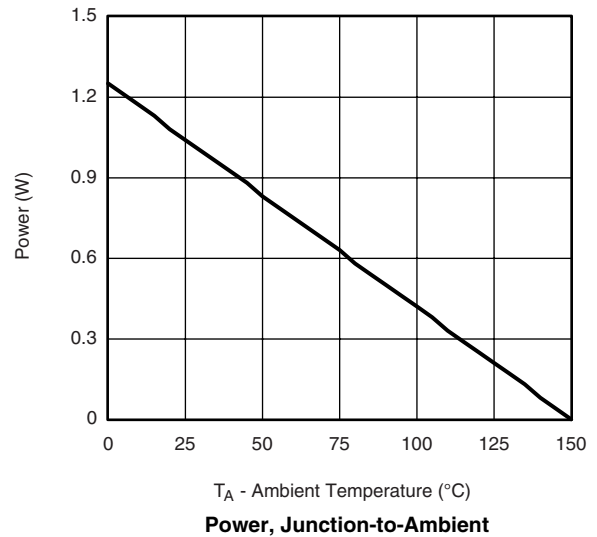
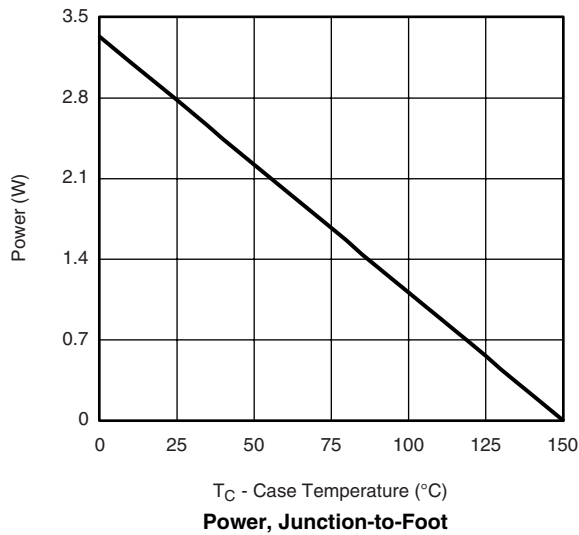
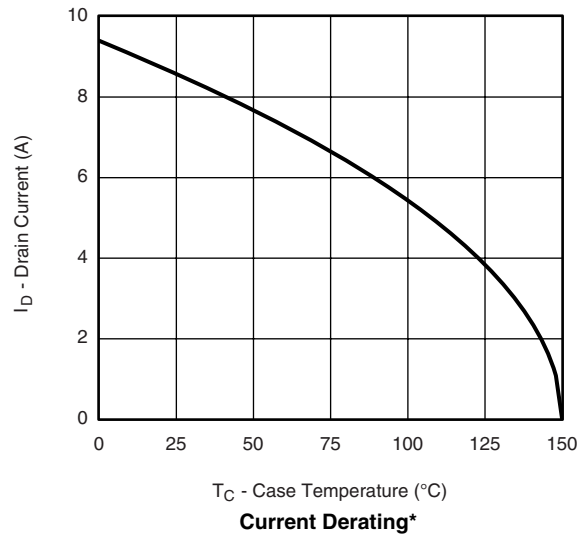
Single Pulse Power, Junction-to-Ambient



\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

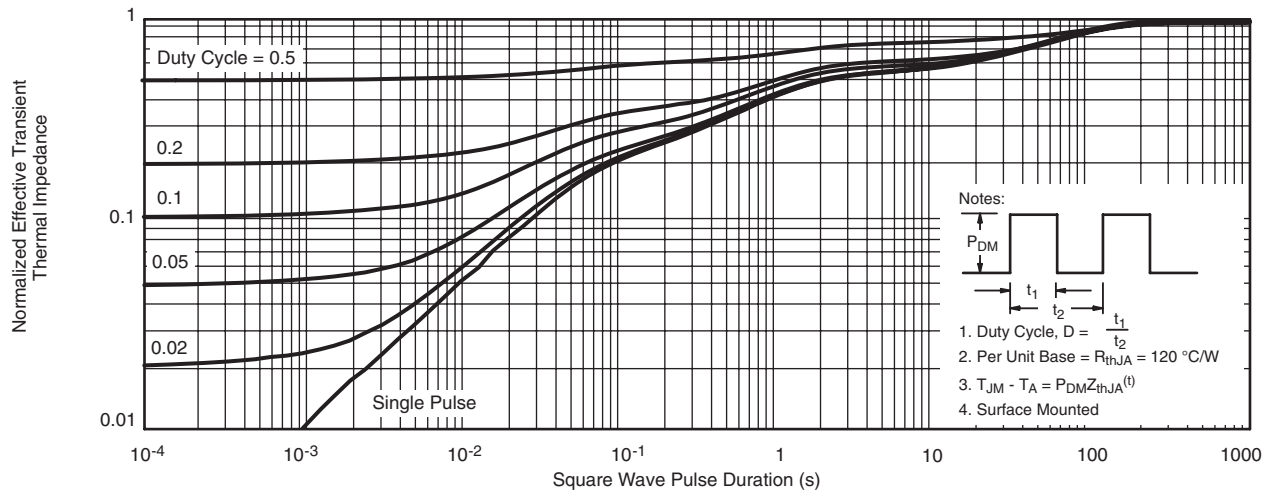
Safe Operating Area

**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

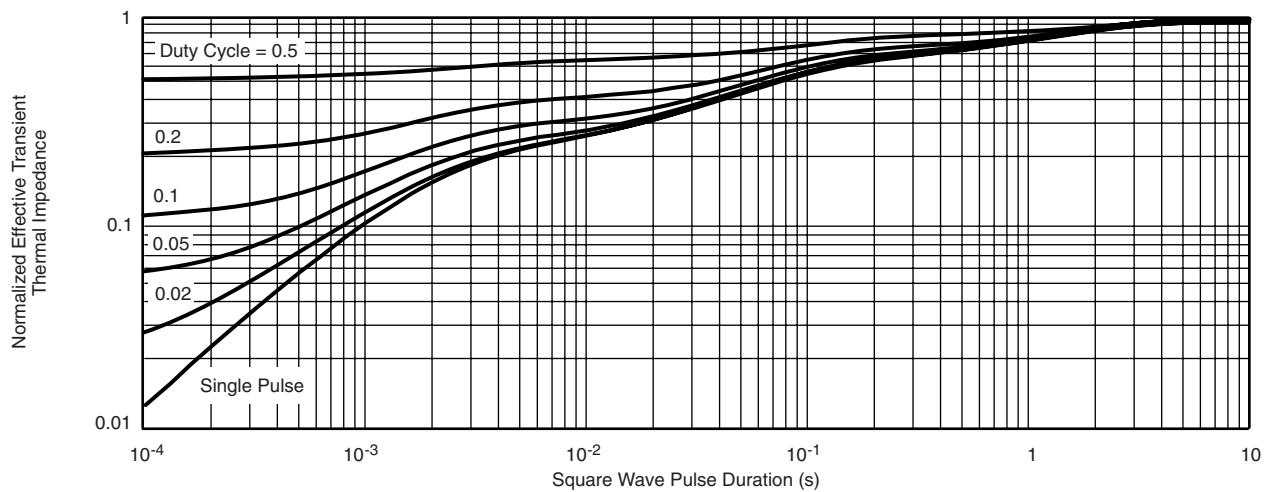


\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

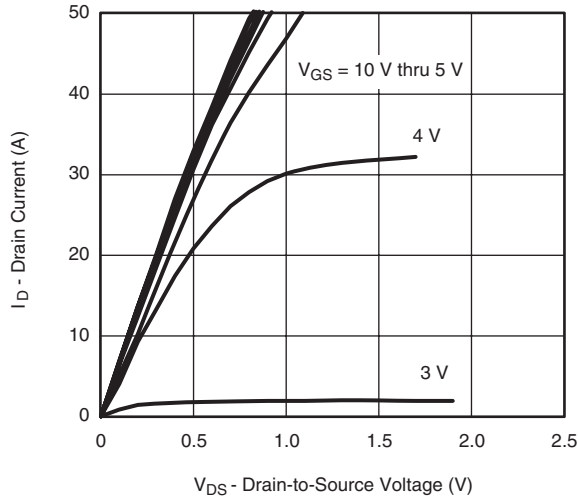


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

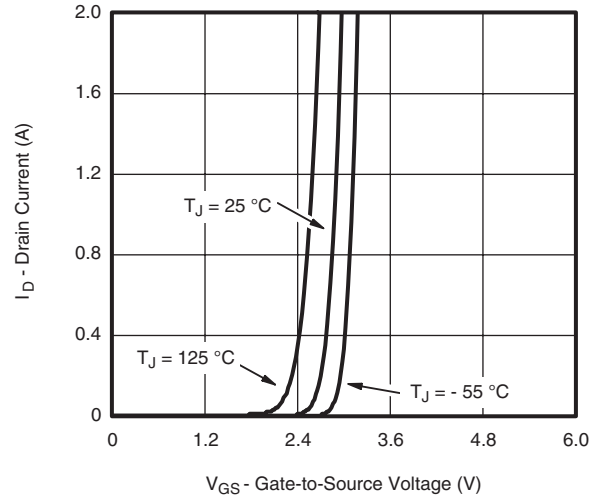


**Normalized Thermal Transient Impedance, Junction-to-Foot**

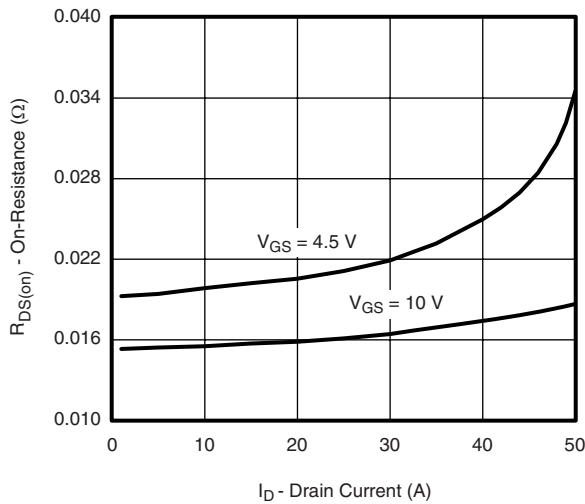
## CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



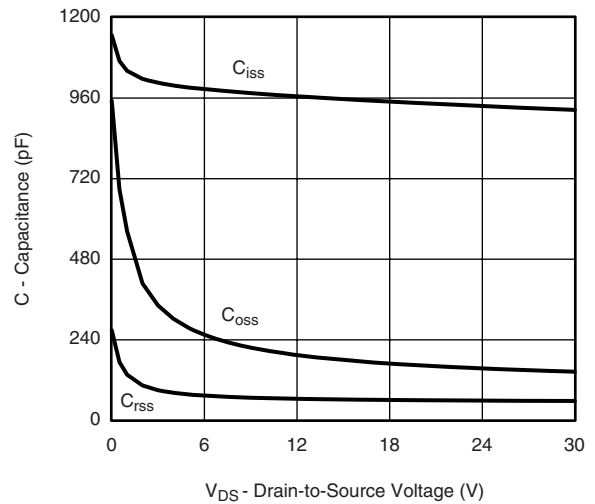
**Output Characteristics**



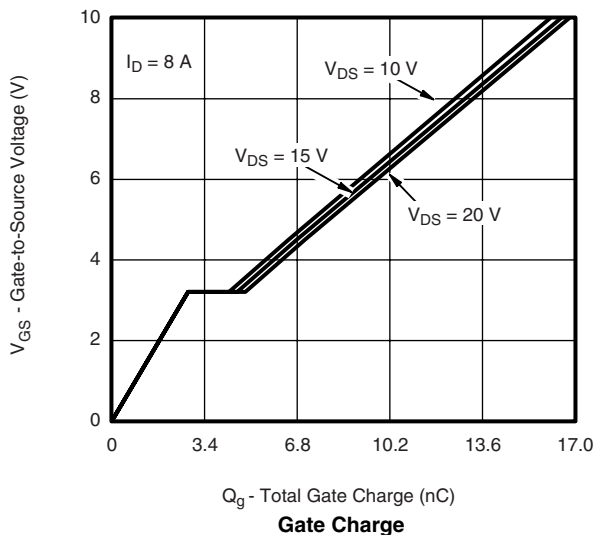
**Transfer Characteristics**



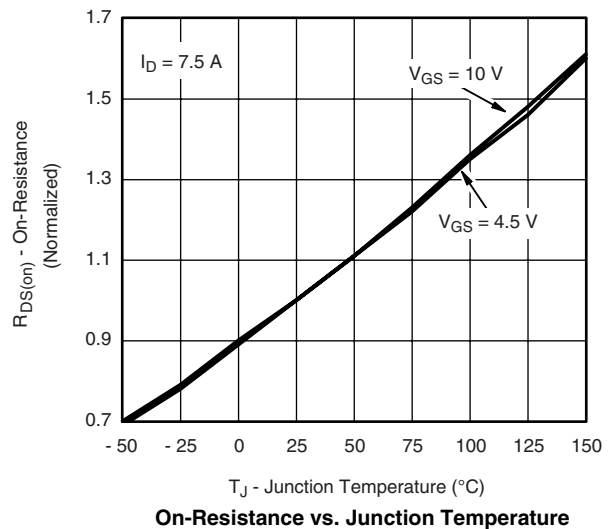
**On-Resistance vs. Drain Current**



**Capacitance**



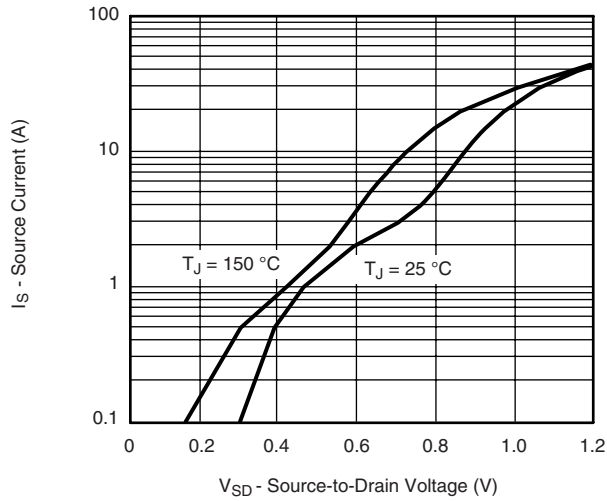
**Gate Charge**



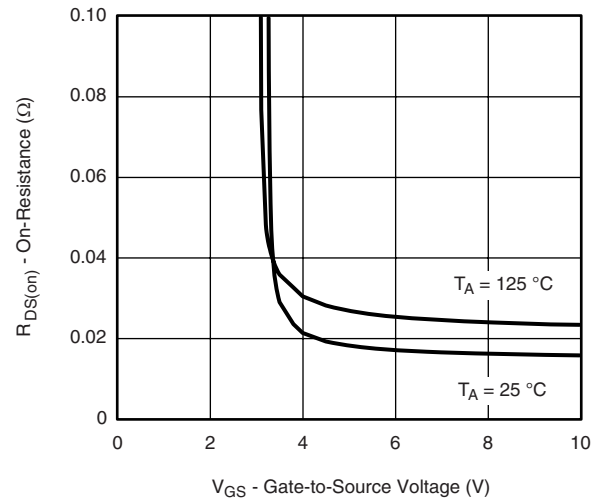
**On-Resistance vs. Junction Temperature**



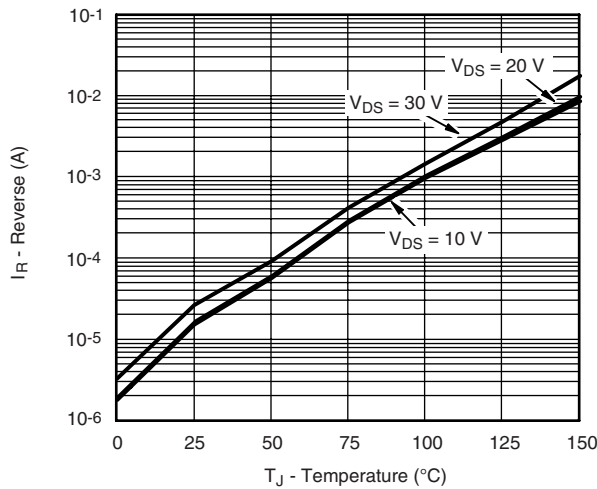
## CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



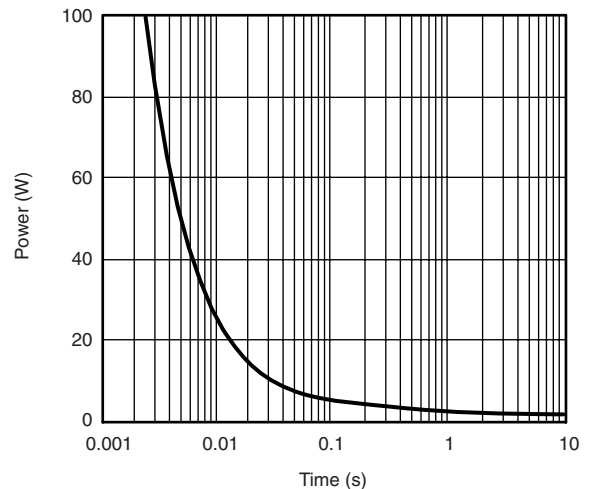
Source-Drain Diode Forward Voltage



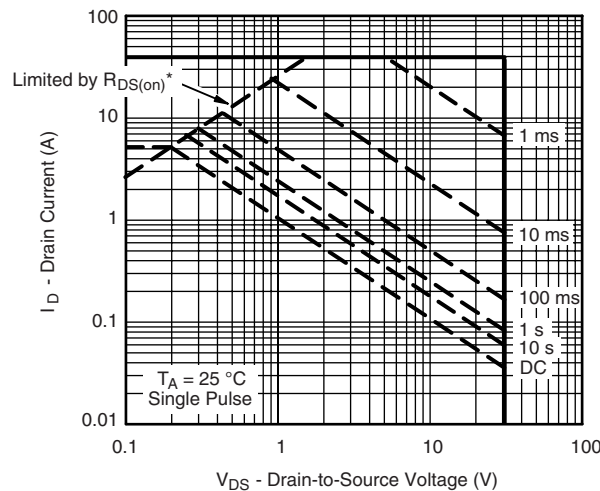
On-Resistance vs. Gate-to-Source Voltage



Reverse Current Schottky



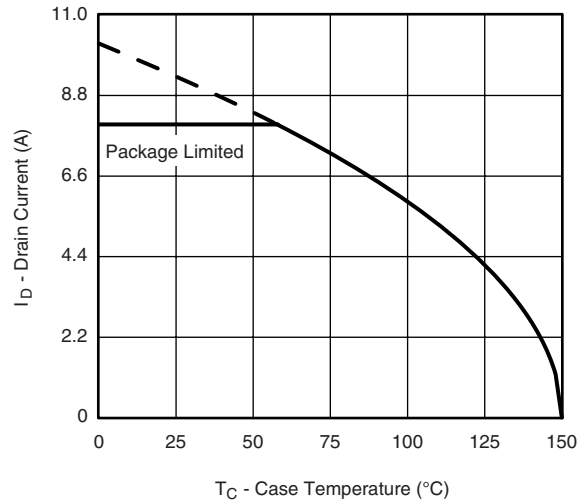
Single Pulse Power, Junction-to-Ambient



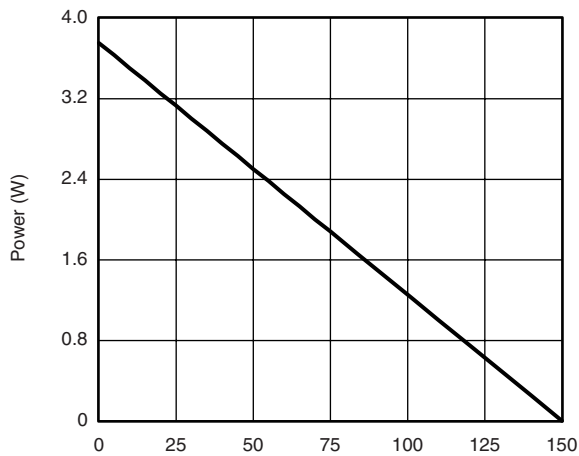
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

Safe Operating Area

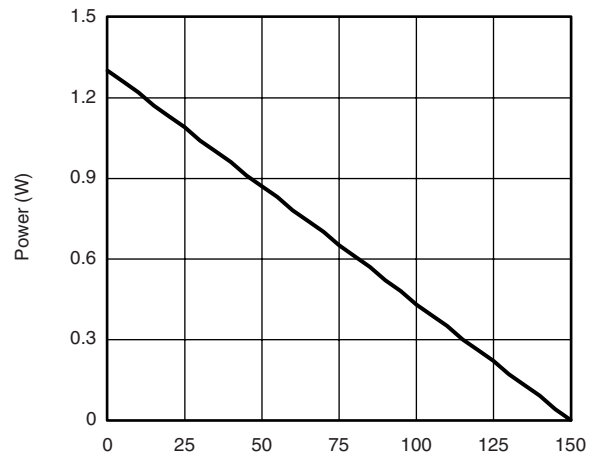
**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Current Derating\***



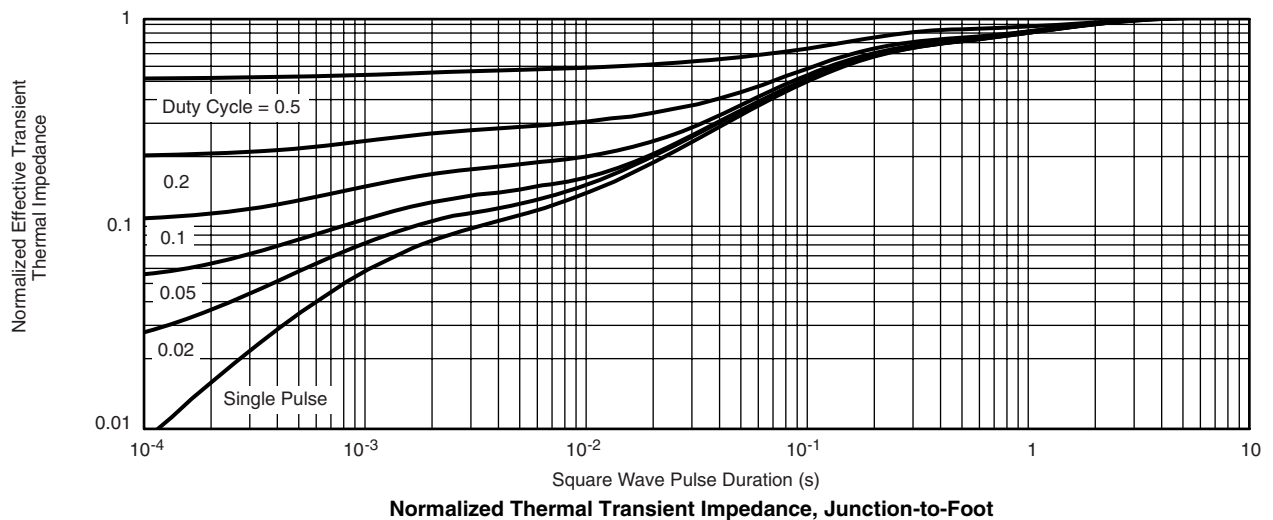
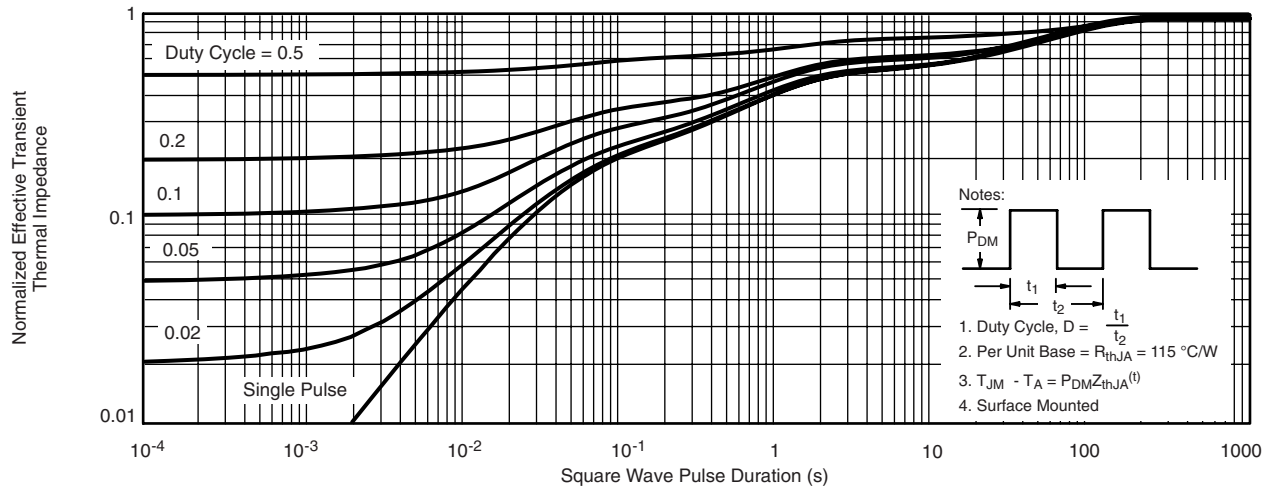
**Power, Junction-to-Foot**



**Power, Junction-to-Ambient**

\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



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?69654](http://www.vishay.com/ppg?69654).

## SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



| DIM                            | MILLIMETERS |      | INCHES    |       |
|--------------------------------|-------------|------|-----------|-------|
|                                | Min         | Max  | Min       | Max   |
| A                              | 1.35        | 1.75 | 0.053     | 0.069 |
| A <sub>1</sub>                 | 0.10        | 0.20 | 0.004     | 0.008 |
| B                              | 0.35        | 0.51 | 0.014     | 0.020 |
| C                              | 0.19        | 0.25 | 0.0075    | 0.010 |
| D                              | 4.80        | 5.00 | 0.189     | 0.196 |
| E                              | 3.80        | 4.00 | 0.150     | 0.157 |
| e                              | 1.27 BSC    |      | 0.050 BSC |       |
| H                              | 5.80        | 6.20 | 0.228     | 0.244 |
| h                              | 0.25        | 0.50 | 0.010     | 0.020 |
| L                              | 0.50        | 0.93 | 0.020     | 0.037 |
| q                              | 0°          | 8°   | 0°        | 8°    |
| S                              | 0.44        | 0.64 | 0.018     | 0.026 |
| ECN: C-06527-Rev. I, 11-Sep-06 |             |      |           |       |
| DWG: 5498                      |             |      |           |       |

## RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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