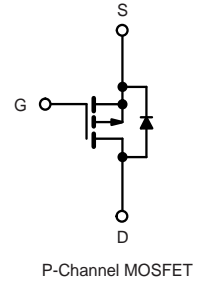
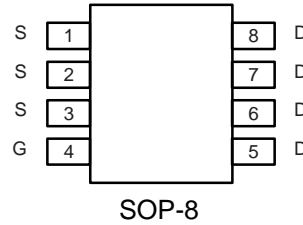


### PRODUCT SUMMARY

- $V_{DS} (V) = -40V$
- $R_{DS(ON)} < 18m\Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 29m\Omega$  ( $V_{GS} = -4.5V$ )

### APPLICATIONS

- Load Switch
- POL



### ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted

| Parameter  | Symbol         | Limit                            | Unit                   |
|--|----------------|----------------------------------|------------------------|
| Drain-Source Voltage   | $V_{DS}$       | - 40                             | V                      |
| Gate-Source Voltage  | $V_{GS}$       | $\pm 20$                         |                        |
| Continuous Drain Current ( $T_J = 150\text{ }^\circ\text{C}$ ) | $I_D$          | $T_C = 25\text{ }^\circ\text{C}$ | - 16.1                 |
|  |                | $T_C = 70\text{ }^\circ\text{C}$ | - 12.9                 |
|  |                | $T_A = 25\text{ }^\circ\text{C}$ | - 10.2 <sup>b, c</sup> |
|  |                | $T_A = 70\text{ }^\circ\text{C}$ | - 8.2 <sup>b, c</sup>  |
| Pulsed Drain Current   | $I_{DM}$       | - 50                             | A                      |
| Continuous Source-Drain Diode Current                          | $I_S$          | $T_C = 25\text{ }^\circ\text{C}$ |                        |
|  |                | $T_A = 25\text{ }^\circ\text{C}$ | - 2.1 <sup>b, c</sup>  |
| Single Pulse Avalanche Current                                 | $I_{AS}$       | - 28                             | mJ                     |
| Single Pulse Avalanche Energy                                  | $E_{AS}$       | 39                               |                        |
| Maximum Power Dissipation                                      | $P_D$          | $T_C = 25\text{ }^\circ\text{C}$ | 6.3                    |
|  |                | $T_C = 70\text{ }^\circ\text{C}$ | 4                      |
|  |                | $T_A = 25\text{ }^\circ\text{C}$ | 2.5 <sup>b, c</sup>    |
|  |                | $T_A = 70\text{ }^\circ\text{C}$ | 1.6 <sup>b, c</sup>    |
| Operating Junction and Storage Temperature Range               | $T_J, T_{stg}$ | - 55 to 150                      | $^\circ\text{C}$       |

### THERMAL RESISTANCE RATINGS

| Parameter                                   | Symbol     | Typical | Maximum | Unit               |
|---|------------|---------|---------|--------------------|
| Maximum Junction-to-Ambient <sup>b, d</sup> | $R_{thJA}$ | 37      | 50      | $^\circ\text{C/W}$ |
| Maximum Junction-to-Foot (Drain)            | $R_{thJF}$ | 16      | 20      |                    |

Notes:

- Based on  $T_C = 25\text{ }^\circ\text{C}$ .
- Surface mounted on 1" x 1" FR4 board.
- $t = 10\text{ s}$ .
- Maximum under steady state conditions is  $85\text{ }^\circ\text{C/W}$ .

**SPECIFICATIONS**  $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted

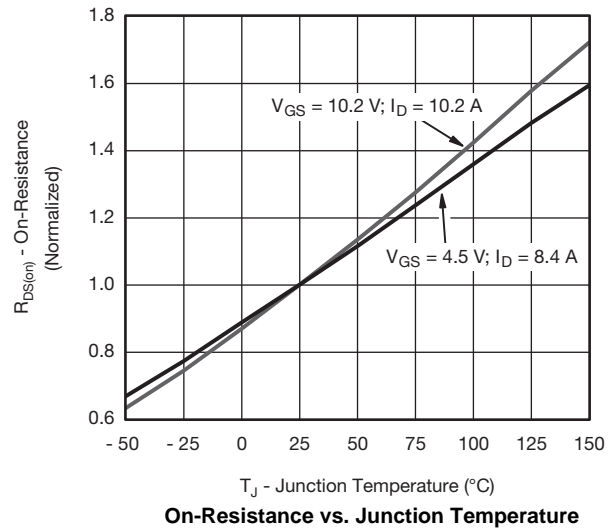
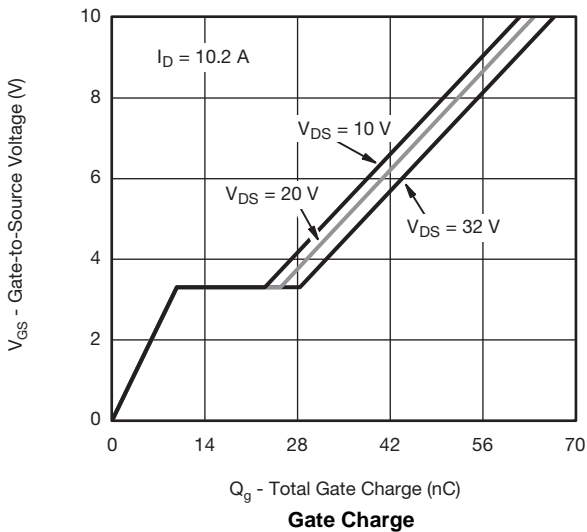
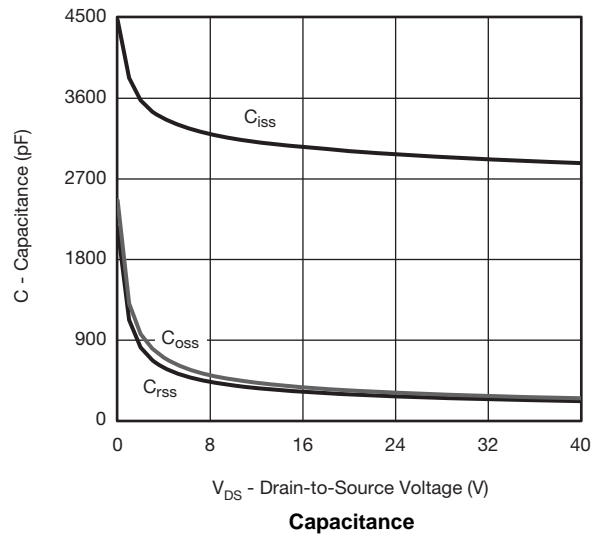
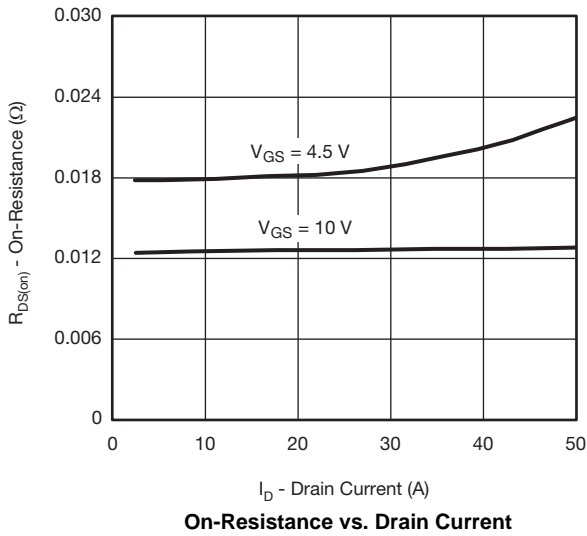
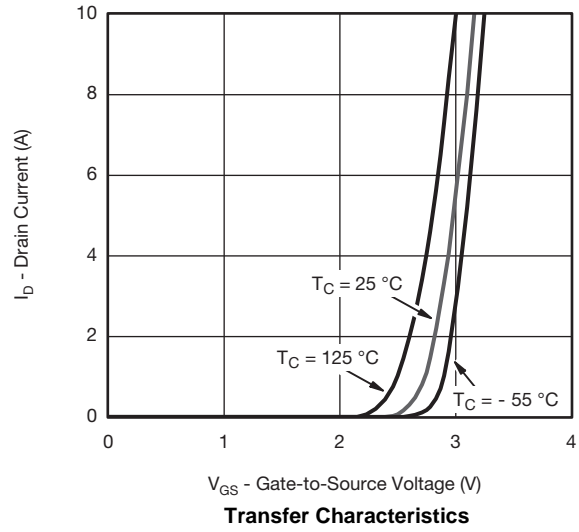
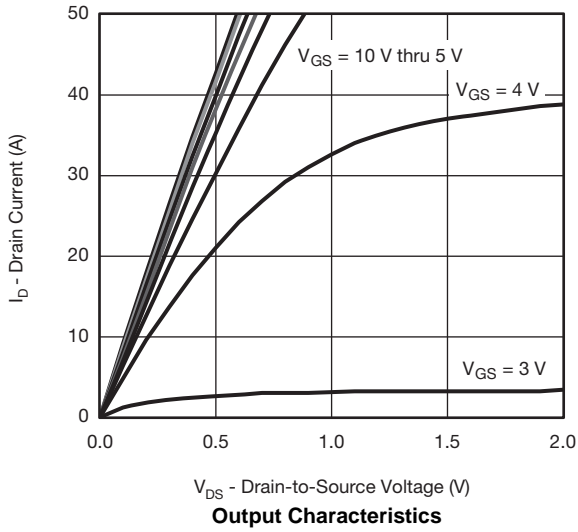
| Parameter                                      | Symbol                  | Test Conditions   | Min.  | Typ.  | Max.      | Unit                 |
|--|-------------------------|---|-------|-------|-----------|----------------------|
| <b>Static</b>                                  |                         |   |       |       |           |                      |
| Drain-Source Breakdown Voltage                 | $V_{DS}$                | $V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$  | - 40  |       |           | V                    |
| $V_{DS}$ Temperature Coefficient               | $\Delta V_{DS}/T_J$     | $I_D = -250\text{ }\mu\text{A}$   |       | - 36  |           | mV/ $^\circ\text{C}$ |
| $V_{GS(th)}$ Temperature Coefficient           | $\Delta V_{GS(th)}/T_J$ |   | 5     |       |           |                      |
| Gate-Source Threshold Voltage                  | $V_{GS(th)}$            | $V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$  | - 1.2 |       | - 2.5     | V                    |
| Gate-Source Leakage                            | $I_{GSS}$               | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$   |       |       | $\pm 100$ | nA                   |
| Zero Gate Voltage Drain Current                | $I_{DSS}$               | $V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}$  |       |       | - 1       | $\mu\text{A}$        |
|  |                         | $V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$  |       |       | - 5       |                      |
| On-State Drain Current <sup>a</sup>            | $I_{D(on)}$             | $V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$  | - 25  |       |           | A                    |
| Drain-Source On-State Resistance <sup>a</sup>  | $R_{DS(on)}$            | $V_{GS} = -10\text{ V}, I_D = -10.2\text{ A}$   |       |       | 18        | m $\Omega$           |
|  |                         | $V_{GS} = -4.5\text{ V}, I_D = -8.4\text{ A}$   |       |       | 29        |                      |
| Forward Transconductance <sup>a</sup>          | $g_{fs}$                | $V_{DS} = -15\text{ V}, I_D = -10.2\text{ A}$   |       | 37    |           | S                    |
| <b>Dynamic<sup>b</sup></b>                     |                         |   |       |       |           |                      |
| Input Capacitance                              | $C_{iss}$               | $V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$  |       | 3007  |           | $\mu\text{F}$        |
| Output Capacitance                             | $C_{oss}$               |   |       | 335   |           |                      |
| Reverse Transfer Capacitance                   | $C_{rss}$               |   |       | 291   |           |                      |
| Total Gate Charge                              | $Q_g$                   | $V_{DS} = -20\text{ V}, V_{GS} = -10\text{ V}, I_D = -10.2\text{ A}$  |       | 64    | 95        | nC                   |
|  |                         | $V_{DS} = -20\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -10.2\text{ A}$   |       | 33    | 50        |                      |
| Gate-Source Charge                             | $Q_{gs}$                |   |       | 9.8   |           |                      |
| Gate-Drain Charge                              | $Q_{gd}$                |   |       | 15.7  |           |                      |
| Gate Resistance                                | $R_g$                   | $f = 1\text{ MHz}$  | 0.4   | 2     | 4         | $\Omega$             |
| Turn-On Delay Time                             | $t_{d(on)}$             | $V_{DD} = -20\text{ V}, R_L = 2.4\text{ }\Omega$<br>$I_D \cong -8.2\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$ |       | 57    | 86        | ns                   |
| Rise Time                                      | $t_r$                   |   |       | 50    | 75        |                      |
| Turn-Off Delay Time                            | $t_{d(off)}$            |   |       | 40    | 60        |                      |
| Fall Time                                      | $t_f$                   |   |       | 17    | 26        |                      |
| Turn-On Delay Time                             | $t_{d(on)}$             | $V_{DD} = -20\text{ V}, R_L = 2.4\text{ }\Omega$<br>$I_D \cong -8.2\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$  |       | 13    | 20        |                      |
| Rise Time                                      | $t_r$                   |   |       | 11    | 20        |                      |
| Turn-Off Delay Time                            | $t_{d(off)}$            |   |       | 45    | 68        |                      |
| Fall Time                                      | $t_f$                   |   |       | 9     | 18        |                      |
| <b>Drain-Source Body Diode Characteristics</b> |                         |   |       |       |           |                      |
| Continuous Source-Drain Diode Current          | $I_S$                   | $T_C = 25\text{ }^\circ\text{C}$  |       |       | - 5.3     | A                    |
| Pulse Diode Forward Current                    | $I_{SM}$                |   |       |       | - 50      |                      |
| Body Diode Voltage                             | $V_{SD}$                | $I_S = -8.2\text{ A}, V_{GS} = 0\text{ V}$  |       | - 0.8 | - 1.2     | V                    |
| Body Diode Reverse Recovery Time               | $t_{rr}$                | $I_F = -8.2\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$                                       |       | 36    | 54        | ns                   |
| Body Diode Reverse Recovery Charge             | $Q_{rr}$                |   |       | 41    | 62        | nC                   |
| Reverse Recovery Fall Time                     | $t_a$                   |   |       | 20    |           | ns                   |
| Reverse Recovery Rise Time                     | $t_b$                   |   |       | 16    |           |                      |

Notes:

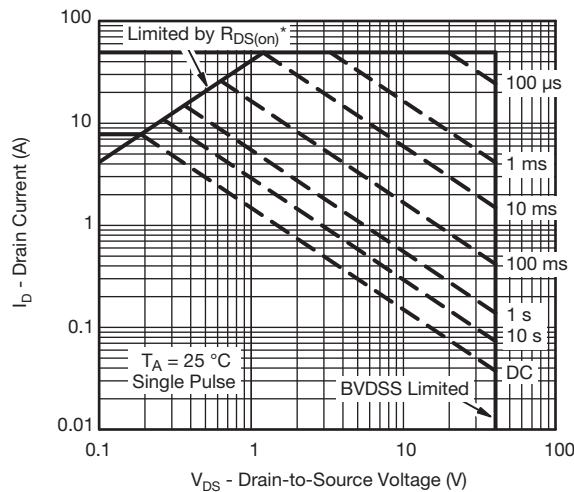
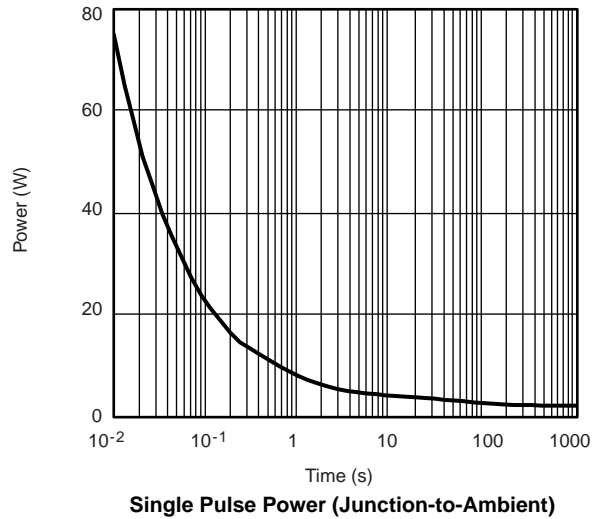
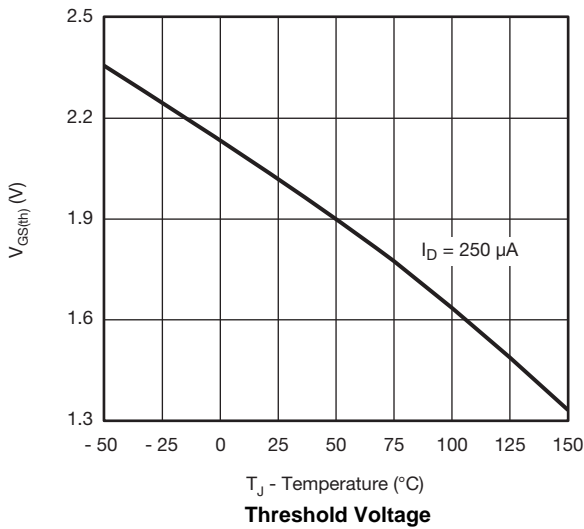
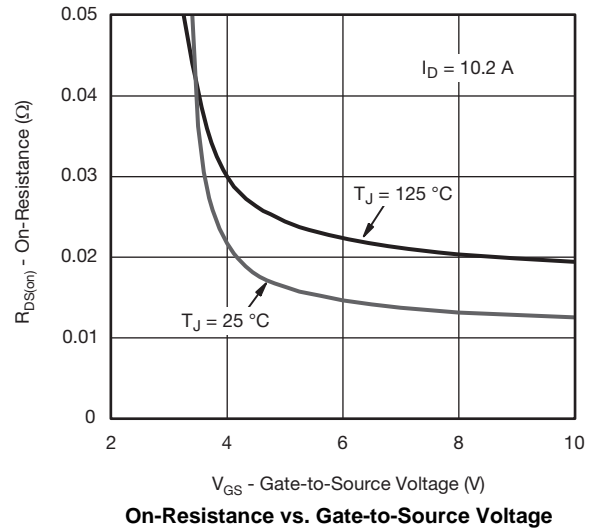
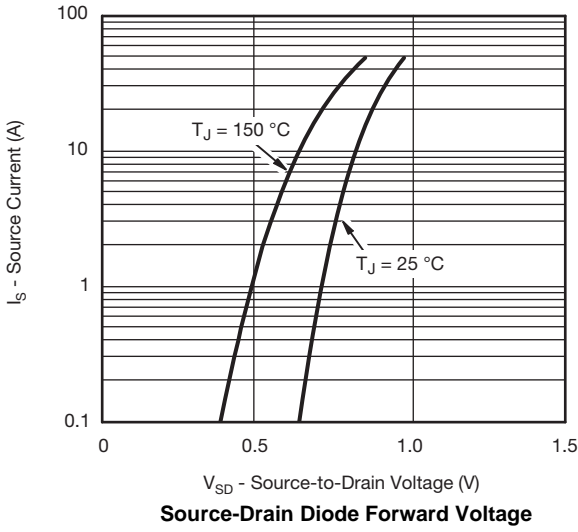
 a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

b. Guaranteed by design, not subject to production testing.

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

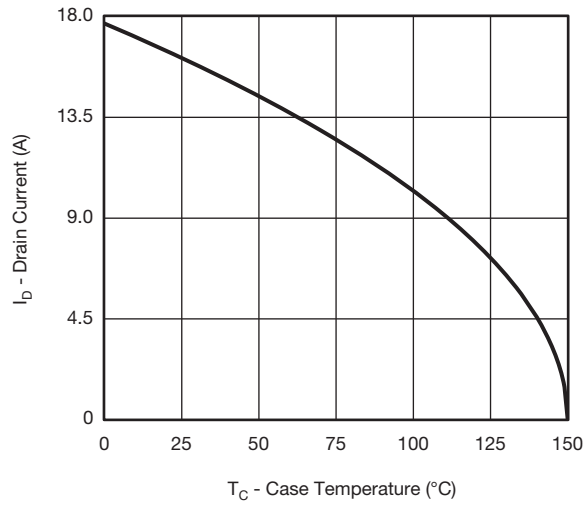


**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

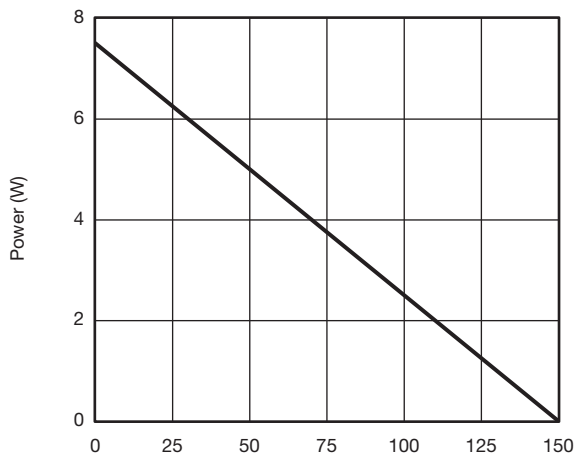


\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

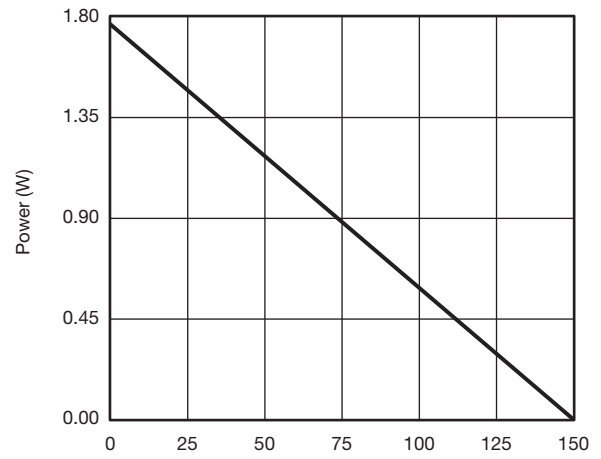
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Current Derating\***



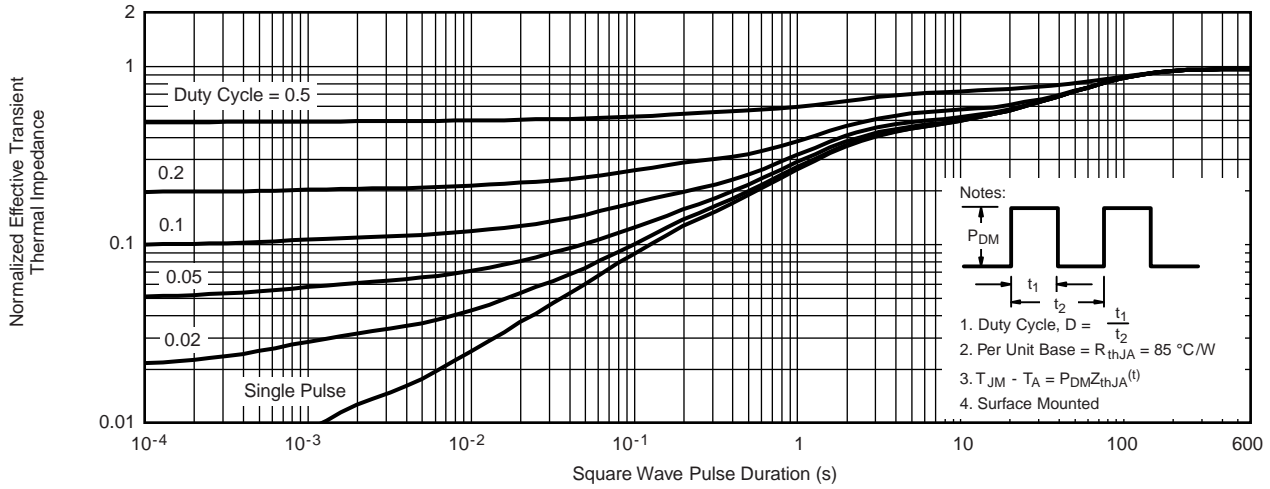
**Power, Junction-to-Foot**



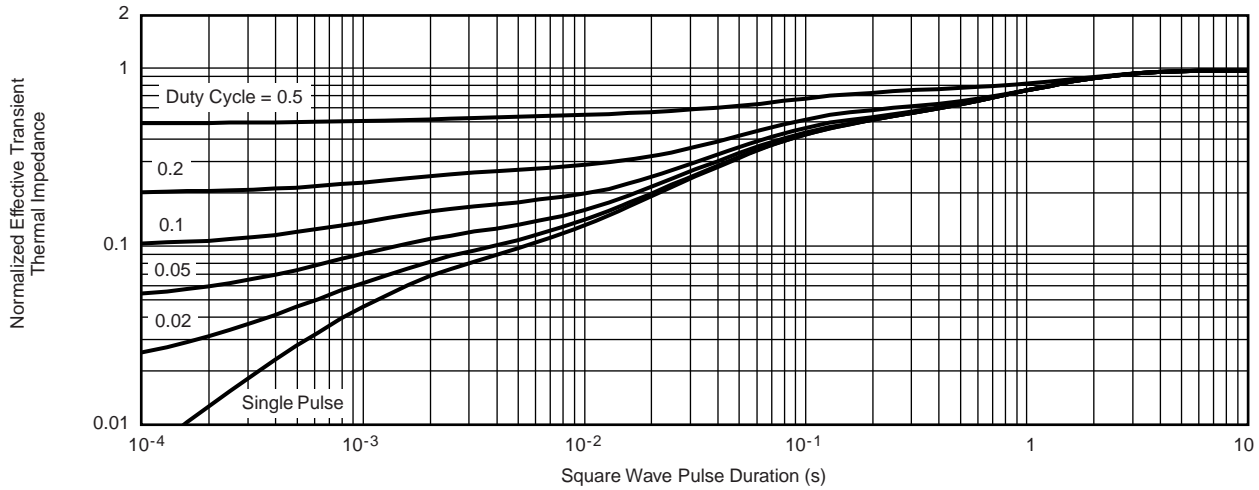
**Power, Junction-to-Ambient**

\* 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.

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

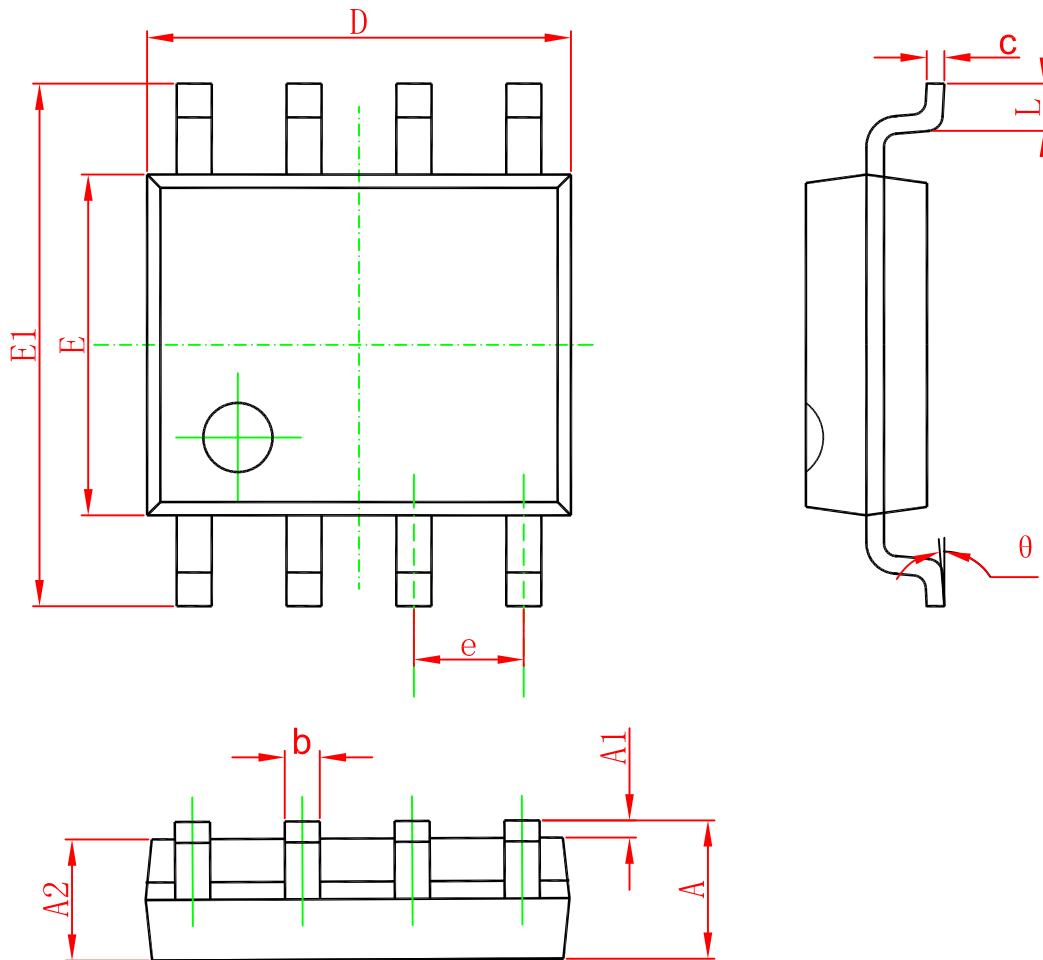


**Normalized Thermal Transient Impedance, Junction-to-Ambient**



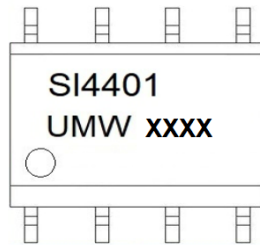
**Normalized Thermal Transient Impedance, Junction-to-Foot**

SOP-8



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.006                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.200 |
| E      | 3.800                     | 4.000 | 0.150                | 0.157 |
| E1     | 5.800                     | 6.200 | 0.228                | 0.244 |
| e      | 1.270(BSC)                |       | 0.050(BSC)           |       |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

### Marking



### Ordering information

| Order code    | Package | Baseqty | Deliverymode  |
|---------------|---------|---------|---------------|
| UMW SI4401BDY | SOP-8   | 3000    | Tape and reel |



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[DMN1006UCA6-7](#) [DMN16M9UCA6-7](#) [STF5N65M6](#) [IRF40H233XTMA1](#) [IPSA70R950CEAKMA1](#) [IPSA70R2K0CEAKMA1](#) [STU5N65M6](#)  
[C3M0021120D](#)