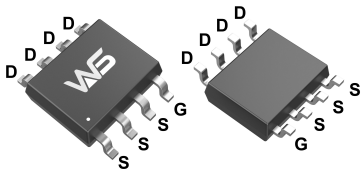
## Features

- 40V/11A,
  $R_{DS(ON)}$= 13mΩ (Max.) @ $V_{GS}$ =10V
  $R_{DS(ON)}$= 16mΩ (Max.) @ $V_{GS}$ =4.5V
- Reliable and Rugged
- Lead Free and Green Devices Available
  (RoHS Compliant)

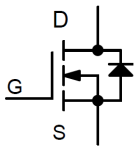
## Pin Description




Top View of SOP-8

## Applications

- Power Management in Desktop Computer or
  DC/DC Converters.




N-Channel MOSFET

## Absolute Maximum Ratings ($T_A$ = 25°C Unless Otherwise Noted)

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings** | | | | |
| $V_{DSS}$ | Drain-Source Voltage | | 40 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | |
| $I_S$ | Diode Continuous Forward Current | $T_A$=25°C | 2 | A |
| $I_D$ | Continuous Drain Current | $T_A$=25°C | 11 | A |
| | | $T_A$=70°C | 8.4 | |
| $I_{DM}$ [a] | Pulsed Drain Current | $T_A$=25°C | 30 | |
| $P_D$ | Maximum Power Dissipation | $T_A$=25°C | 2.08 | W |
| | | $T_A$=70°C | 1.3 | |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | t ≤ 10s | 30 | °C/W |
| | | Steady State | 60 | |
| $R_{\theta JL}$ | Thermal Resistance-Junction to Lead | Steady State | 20 | |
| $I_{AS}$ [b] | Avalanche Current, Single pulse | L=0.1mH | 23 | A |
| $E_{AS}$ [b] | Avalanche Energy, Single pulse | L=0.1mH | 26 | mJ |

Note a：Max. current is limited by bonding wire.
Note b：UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_j$=25°C).

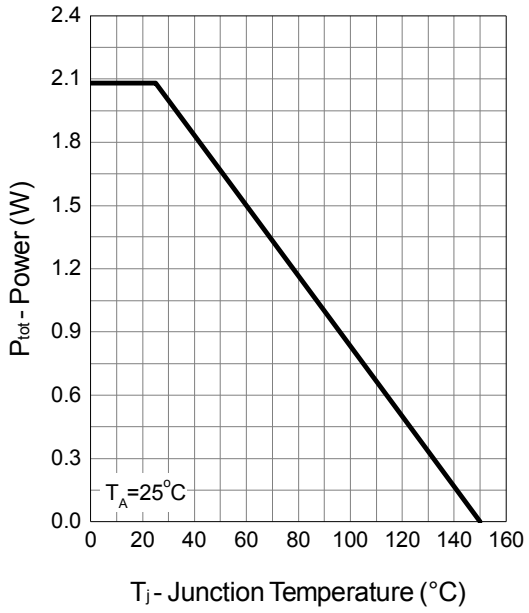
## Electrical Characteristics ($T_A$ = 25°C Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=250μA | 40 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=32V, $V_{GS}$=0V | - | - | 1 | μA |
| | | $T_J$=85°C | - | - | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=250μA | 1.5 | 1.8 | 2.5 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| $R_{DS(ON)}$ [c] | Drain-Source On-state Resistance | $V_{GS}$=10V, $I_{DS}$=7A | - | 10.5 | 13 | mΩ |
| | | $T_J$=125°C | - | 15.75 | - | |
| | | $V_{GS}$=4.5V, $I_{DS}$=5A | - | 12 | 16 | |
| Gfs | Forward Transconductance | $V_{DS}$=5V, $I_{DS}$=15A | - | 31 | - | S |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$ [c] | Diode Forward Voltage | $I_{SD}$=10A, $V_{GS}$=0V | - | 0.9 | 1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $V_{DD}$=20V, $I_{SD}$=10A, $dI_{SD}/dt$=100A/μs | - | 15.2 | - | ns |
| $t_a$ | Charge Time | | - | 9.4 | - | |
| $t_b$ | Discharge Time | | - | 5.8 | - | |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 9.5 | - | nC |
| **Dynamic Characteristics** [d] | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V,F=1MHz | 0.7 | 1.1 | 1.8 | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=20V, Frequency=1.0MHz | - | 1125 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 132 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 70 | - | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}$=20V, $R_L$=20Ω, $I_{DS}$=1A, $V_{GEN}$=10V, $R_G$=1Ω | - | 12.6 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 10 | - | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | - | 23.6 | - | |
| $t_f$ | Turn-off Fall Time | | - | 6 | - | |
| **Gate Charge Characteristics** [d] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=20V, $V_{GS}$=4.5V, $I_{DS}$=7A | - | 9.4 | - | nC |
| $Q_g$ | Total Gate Charge | $V_{DS}$=20V, $V_{GS}$=10V, $I_{DS}$=7A | - | 20 | 28 | |
| $Q_{gth}$ | Threshold Gate Charge | | - | 2 | - | |
| $Q_{gs}$ | Gate-Source Charge | | - | 3.9 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 3 | - | |

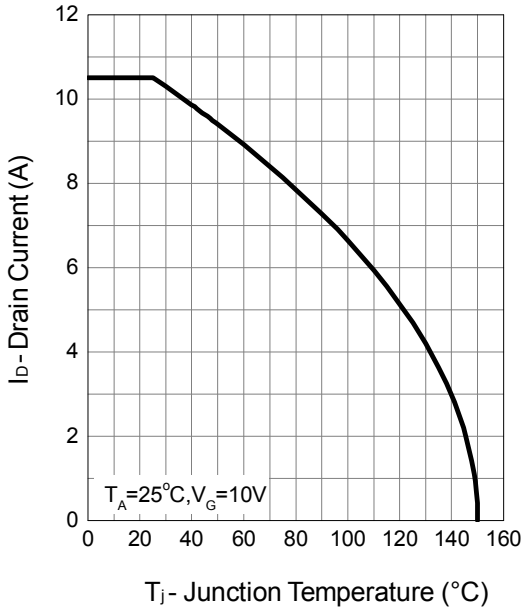
Note c：Pulse test ; pulse width≤300μs, duty cycle≤2%.

# Typical Operating Characteristics

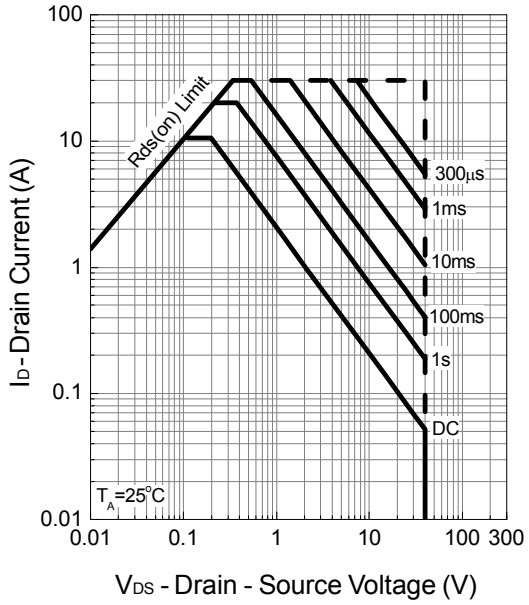
**Power Dissipation**



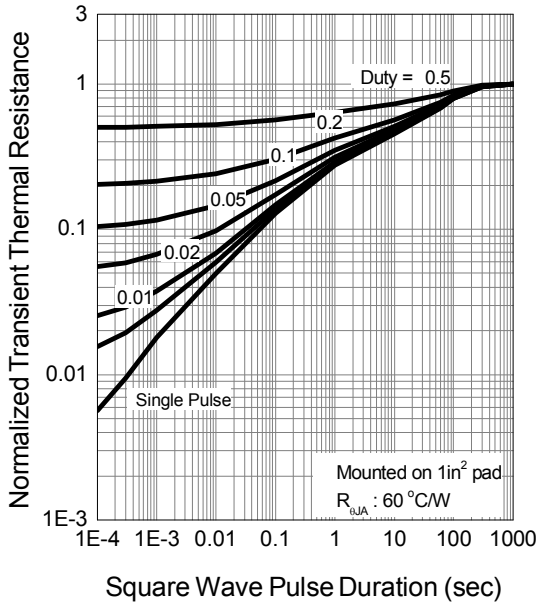

**Drain Current**




**Safe Operation Area**

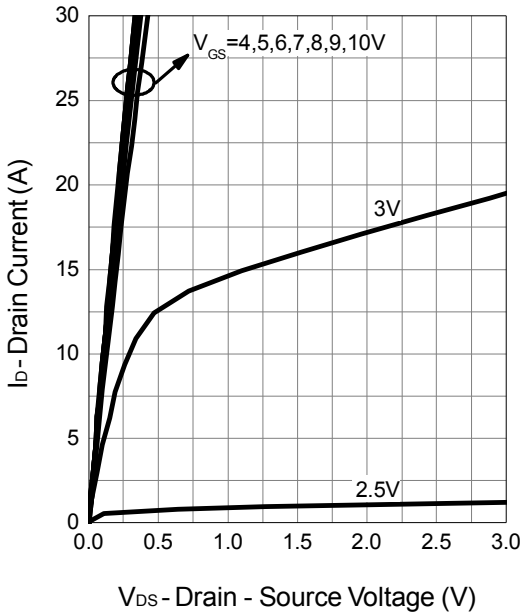



**Thermal Transient Impedance**

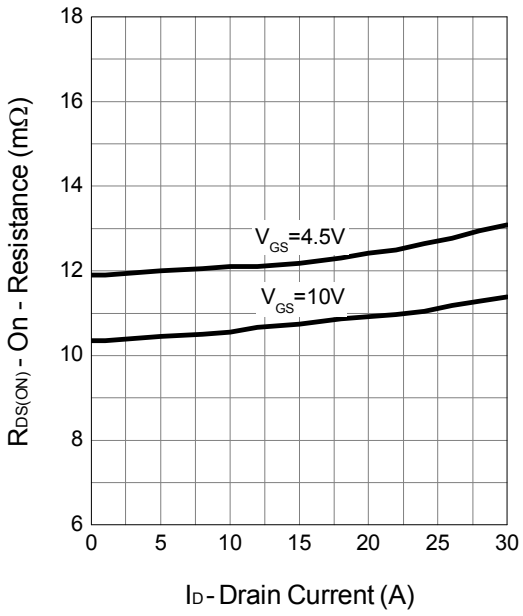


## Typical Operating Characteristics (Cont.)

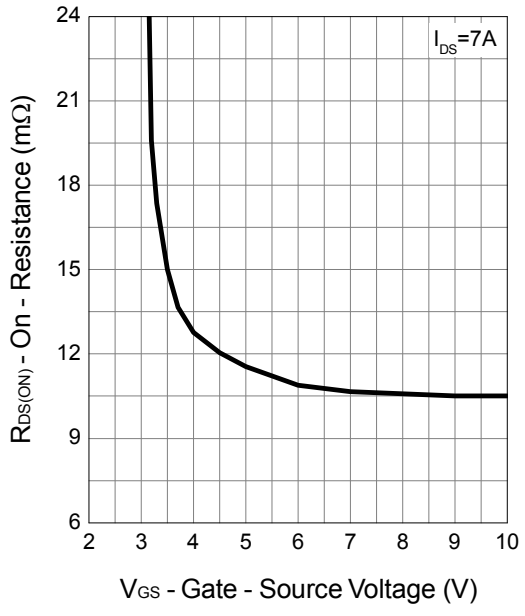
**Output Characteristics**



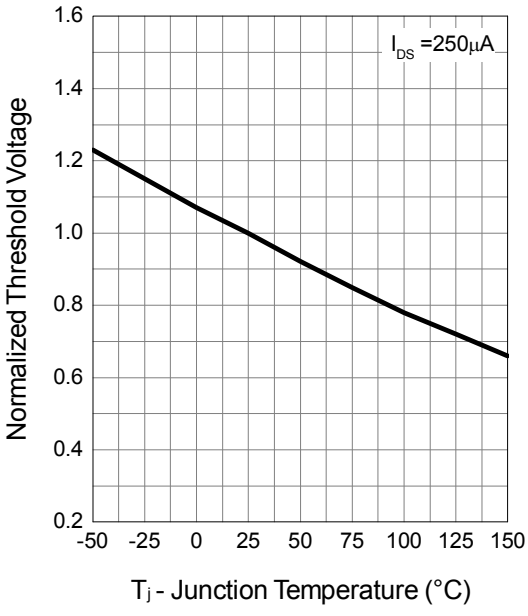

**Drain-Source On Resistance**




**Gate-Source On Resistance**

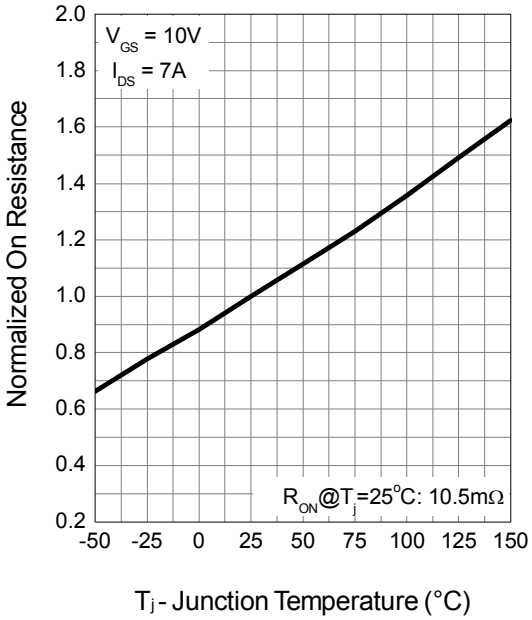



**Gate Threshold Voltage**

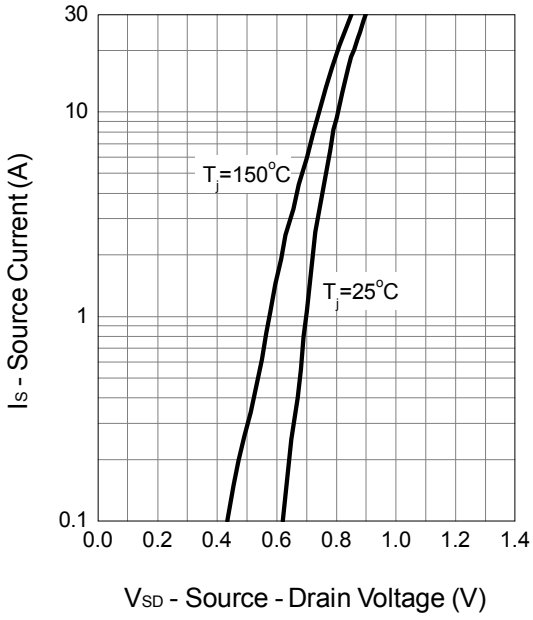


## Typical Operating Characteristics (Cont.)

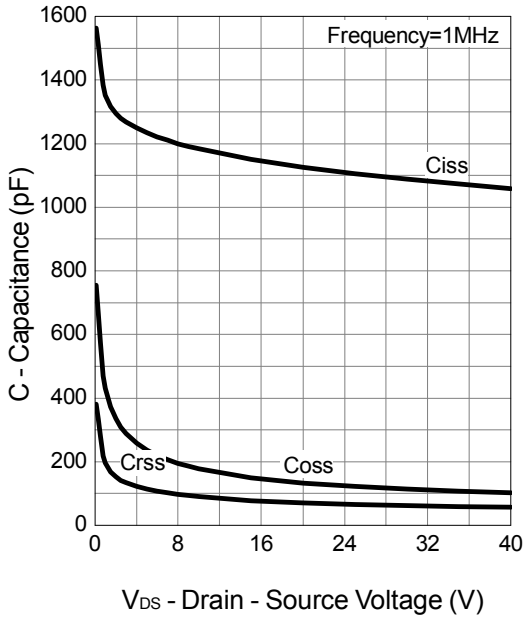
**Drain-Source On Resistance**



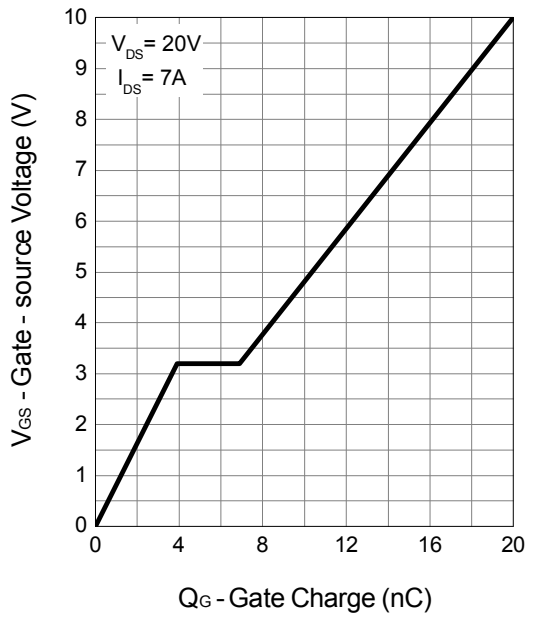

**Source-Drain Diode Forward**



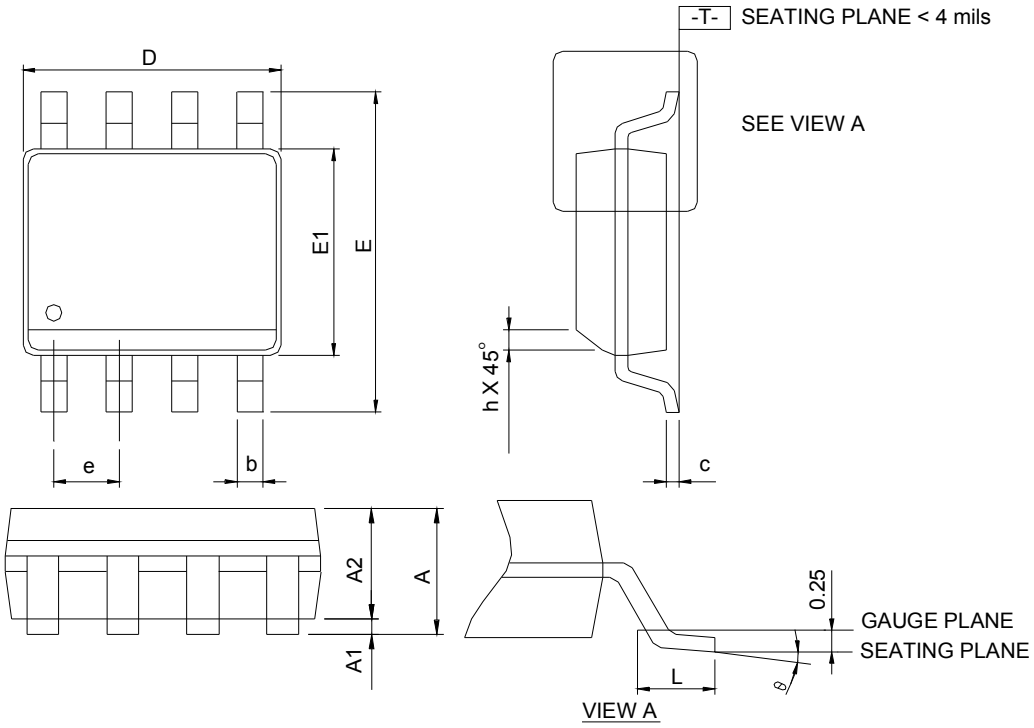

**Capacitance**




**Gate Charge**



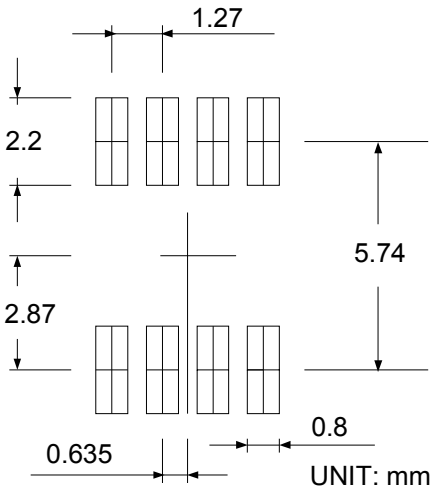
## Package Information:SOP-8




| SYMBOL | SOP-8 | | | |
|---|---|---|---|---|
| | MILLIMETERS | | INCHES | |
| | MIN. | MAX. | MIN. | MAX. |
| A | - | 1.75 | - | 0.069 |
| A1 | 0.10 | 0.25 | 0.004 | 0.010 |
| A2 | 1.25 | - | 0.049 | - |
| b | 0.31 | 0.51 | 0.012 | 0.020 |
| c | 0.17 | 0.25 | 0.007 | 0.010 |
| D | 4.80 | 5.00 | 0.189 | 0.197 |
| E | 5.80 | 6.20 | 0.228 | 0.244 |
| E1 | 3.80 | 4.00 | 0.150 | 0.157 |
| e | 1.27 BSC | | 0.050 BSC | |
| h | 0.25 | 0.50 | 0.010 | 0.020 |
| L | 0.40 | 1.27 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

Note: 1. Follow JEDEC MS-012 AA.
2. Dimension “D” does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
3. Dimension “E” does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

**RECOMMENDED LAND PATTERN**



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