

N-Channel Enhancement Mode MOSFET

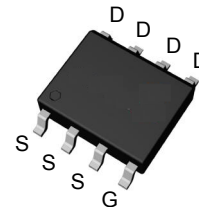
Features

- 30V/20A,
 $R_{DS(ON)} = 5.9m\Omega(\text{max.}) @ V_{GS} = 10V$
 $R_{DS(ON)} = 7.9m\Omega(\text{max.}) @ V_{GS} = 4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

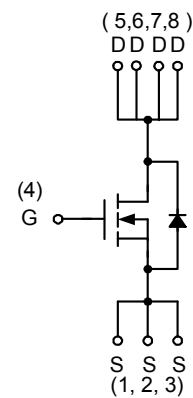
Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

Pin Description



Top View of SOP-8



N-Channel MOSFET

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Rating | Unit |
|-----------------------|---|------------------------|------------------|
| V_{DSS} | Drain-Source Voltage | 30 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | |
| I_D^a | Continuous Drain Current ($V_{GS}=10V$) | $T_A=25^\circ\text{C}$ | 20 |
| | | $T_A=70^\circ\text{C}$ | 15.8 |
| I_{DM}^a | 300 μs Pulsed Drain Current ($V_{GS}=10V$) | 80 | A |
| I_S^a | Diode Continuous Forward Current | 5 | |
| I_{AS}^b | Avalanche Current (Single Pulse) | 25 | |
| E_{AS}^b | Single Pulse Avalanche Energy ($L=0.1\text{mH}$) | 31 | mJ |
| T_J | Maximum Junction Temperature | 150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | |
| P_D^a | Maximum Power Dissipation | $T_A=25^\circ\text{C}$ | 4.2 |
| | | $T_A=70^\circ\text{C}$ | 2.6 |
| $R_{\theta JA}^{a,c}$ | Thermal Resistance-Junction to Ambient | $t \leq 10\text{s}$ | 30 |
| | | Steady State | 65 |
| $R_{\theta JL}$ | Thermal Resistance-Junction to Lead | Steady State | 20 |

Note a : Surface Mounted on 1in² pad area, $t \leq 10\text{sec}$.

Note b : UIS tested and pulse width limited by maximum junction temperature 150 $^\circ\text{C}$ (initial temperature $T_J=25^\circ\text{C}$).

Note c : Maximum under Steady State conditions is 75 $^\circ\text{C/W}$.

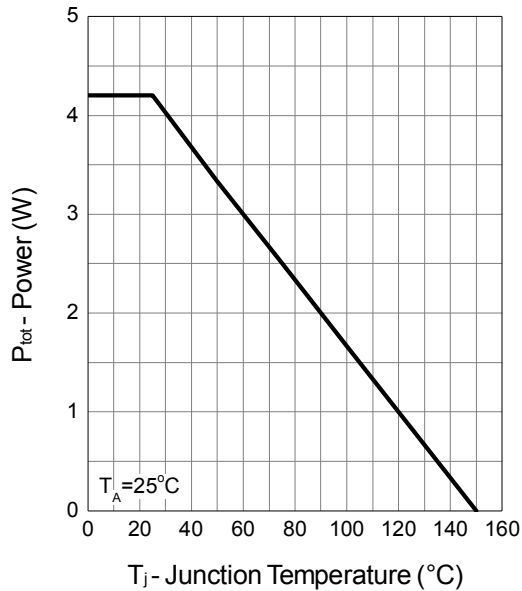
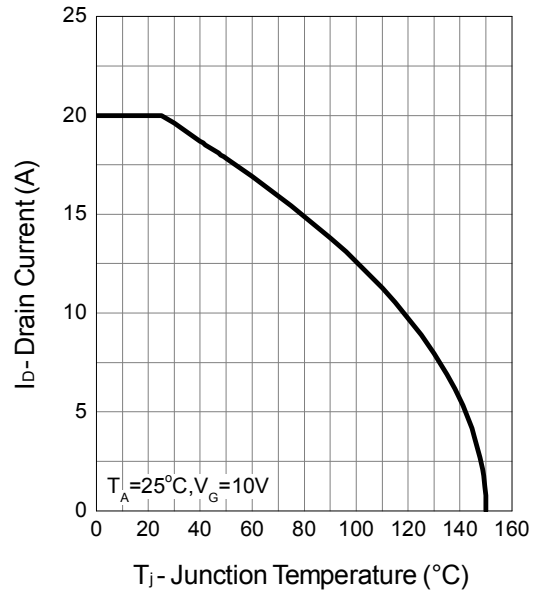
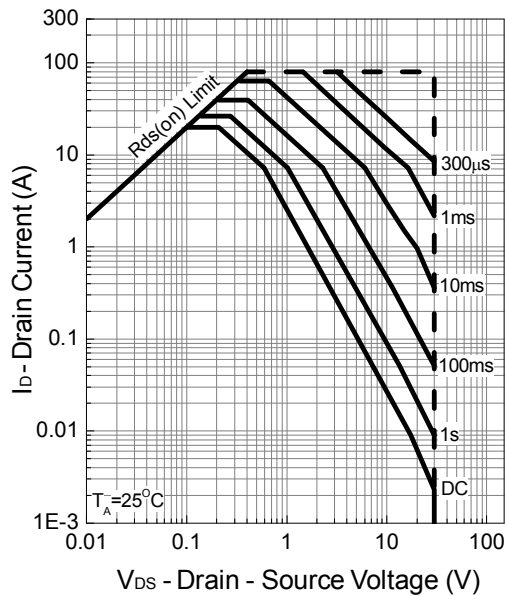
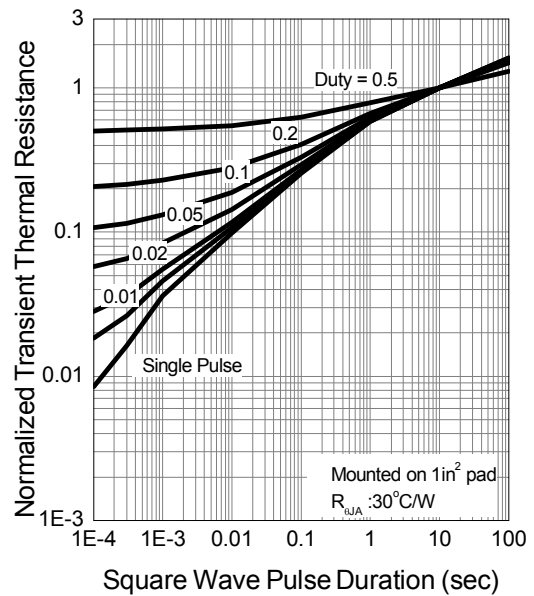
Electrical Characteristics ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--|----------------------------------|---|------|------|-----------|------------|
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=24V, V_{GS}=0V$ | - | - | 1 | μA |
| | | $T_J=85^\circ C$ | - | - | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 1.3 | 1.8 | 2.5 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| $R_{DS(ON)}^a$ | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=20A$ | - | 4.5 | 5.9 | m Ω |
| | | $V_{GS}=4.5V, I_{DS}=14A$ | - | 6.1 | 7.9 | |
| Diode Characteristics | | | | | | |
| V_{SD}^a | Diode Forward Voltage | $I_{SD}=5A, V_{GS}=0V$ | - | 0.8 | 1.1 | V |
| t_{rr}^b | Reverse Recovery Time | $I_{SD}=20A, dI_{SD}/dt=100A/\mu s$ | - | 10 | - | ns |
| Q_{rr}^b | Reverse Recovery Charge | | - | 3 | - | nC |
| Dynamic Characteristics^b | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | - | 2.4 | - | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz | - | 1700 | - | pF |
| C_{oss} | Output Capacitance | | - | 265 | - | |
| C_{riss} | Reverse Transfer Capacitance | | - | 165 | - | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$ | - | 14 | 26 | ns |
| t_r | Turn-on Rise Time | | - | 10 | 19 | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | - | 44 | 80 | |
| t_f | Turn-off Fall Time | | - | 12 | 23 | |
| Gate Charge Characteristics^b | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=20A$ | - | 28.3 | 39.6 | nC |
| | Total Gate Charge | $V_{DS}=15V, V_{GS}=4.5V,$ $I_{DS}=20A$ | - | 12.9 | - | |
| Q_{gs} | Gate-Source Charge | $V_{DS}=15V, V_{GS}=4.5V,$ $I_{DS}=20A$ | - | 4.22 | - | |
| Q_{gd} | Gate-Drain Charge | $V_{DS}=15V, V_{GS}=4.5V,$ $I_{DS}=20A$ | - | 7.3 | - | |

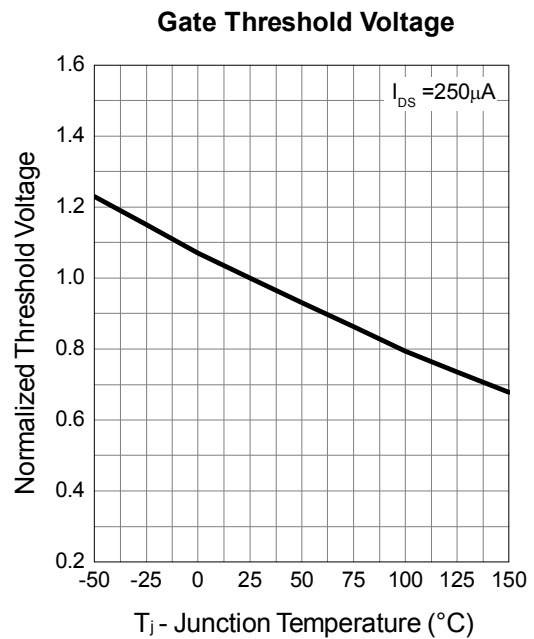
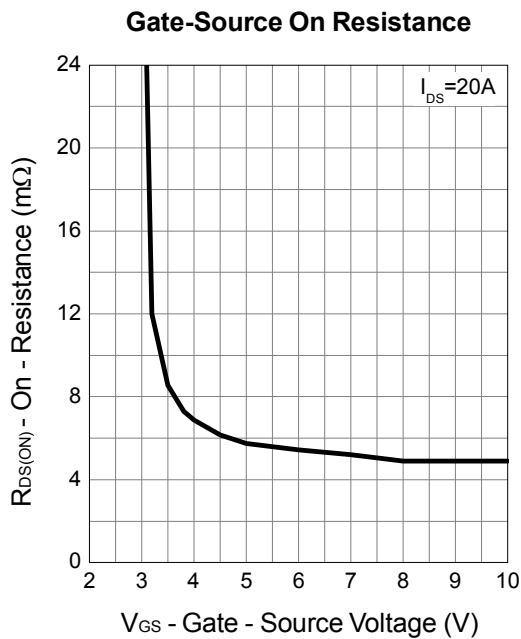
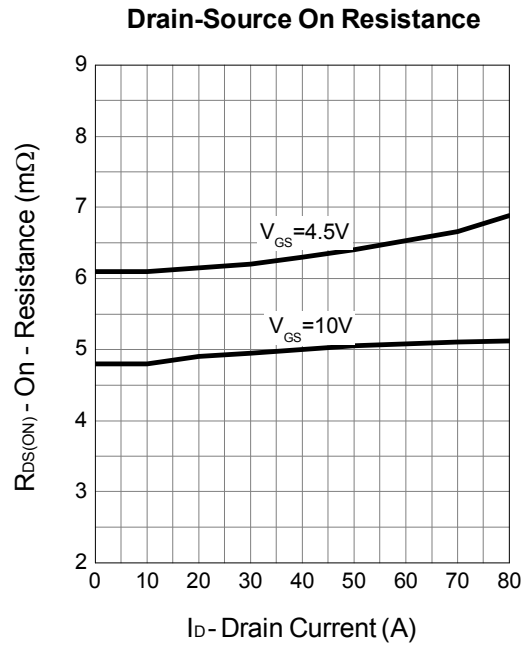
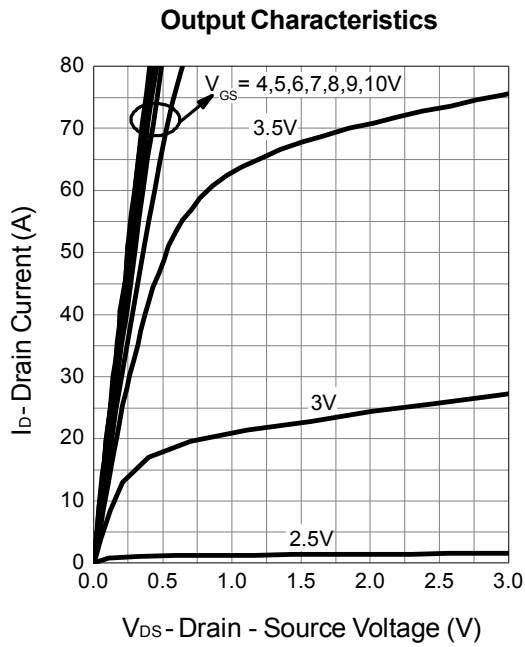
Note a : Pulse test ; pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$.

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

Typical Operating Characteristics

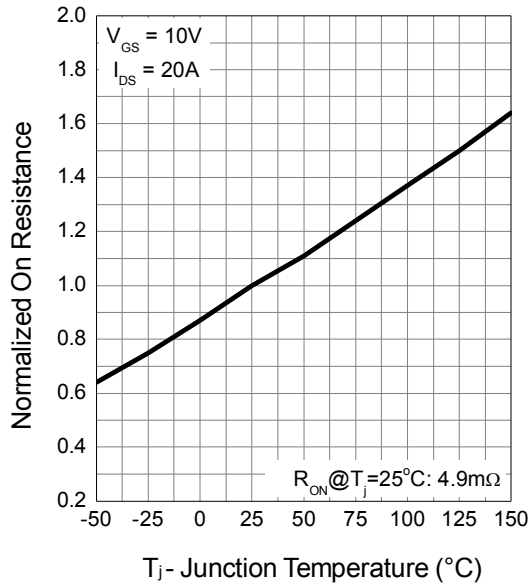
Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


Typical Operating Characteristics (Cont.)

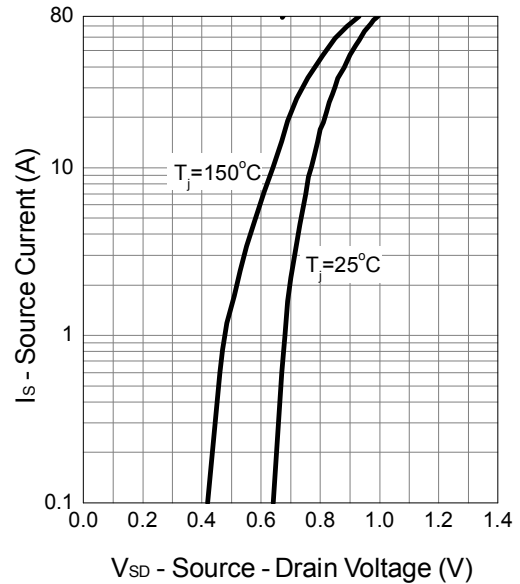


Typical Operating Characteristics (Cont.)

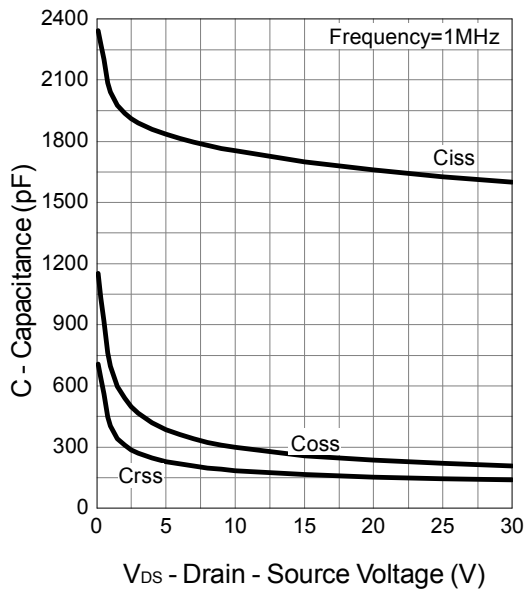
Drain-Source On Resistance



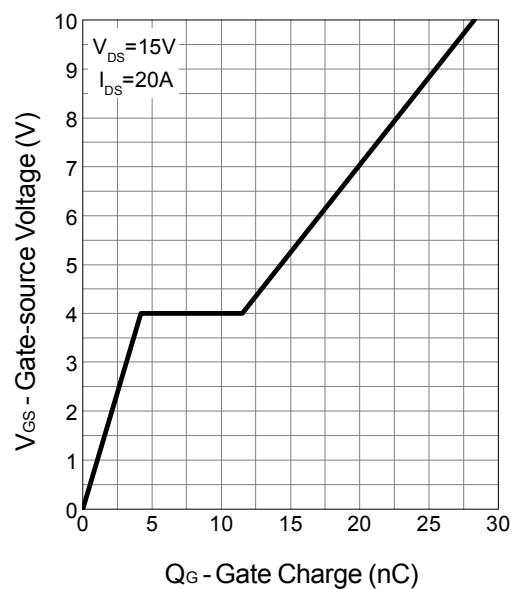
Source-Drain Diode Forward



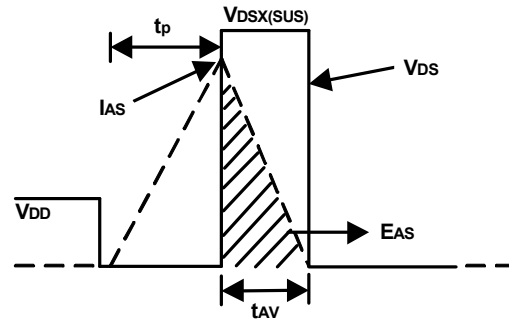
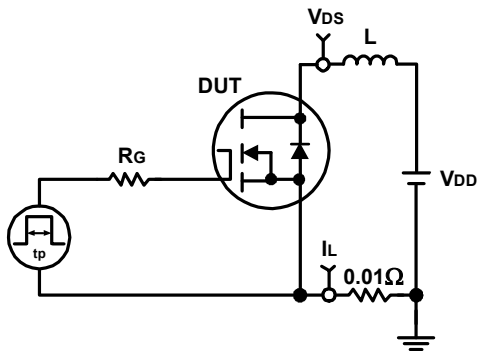
Capacitance



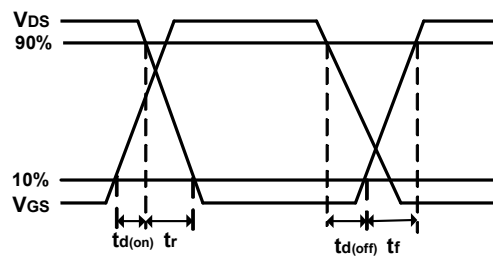
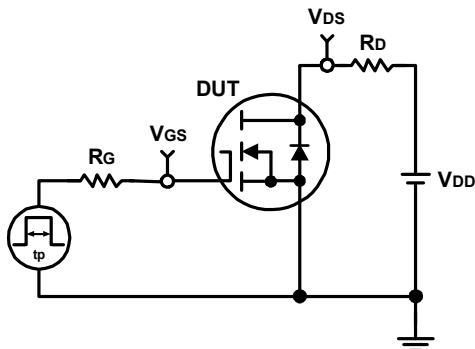
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



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