

N-Channel Enhancement Mode Power MOSFET

Features

- $V_{DS} = 20V$, $I_D = 12A$
 $R_{DS(ON)} < 6 m\Omega$ @ $V_{GS} = 4.5V$
 $R_{DS(ON)} < 8 m\Omega$ @ $V_{GS} = 2.5V$

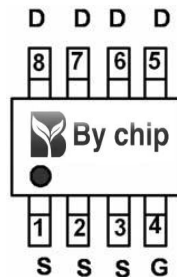
General Features

- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free and Green Available

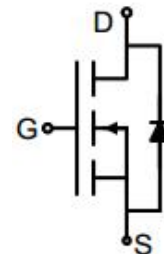
100% UIS TESTED!
 100% ΔV_{ds} TESTED!



SOP-8



pin assignment



Schematic diagram

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|--------------------|------------|------------|
| Drain-Source Voltage | V_{DS} | 20 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Drain Current-Continuous | I_D | 12 | A |
| Drain Current-Continuous($T_A = 100^\circ C$) | $I_D(100^\circ C)$ | 8 | A |
| Pulsed Drain Current | I_{DM} | 40 | A |
| Maximum Power Dissipation | P_D | 2.5 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ |

Thermal Characteristic

| | | | |
|---|-----------------|----|--------------|
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | $R_{\theta JA}$ | 50 | $^\circ C/W$ |
|---|-----------------|----|--------------|

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

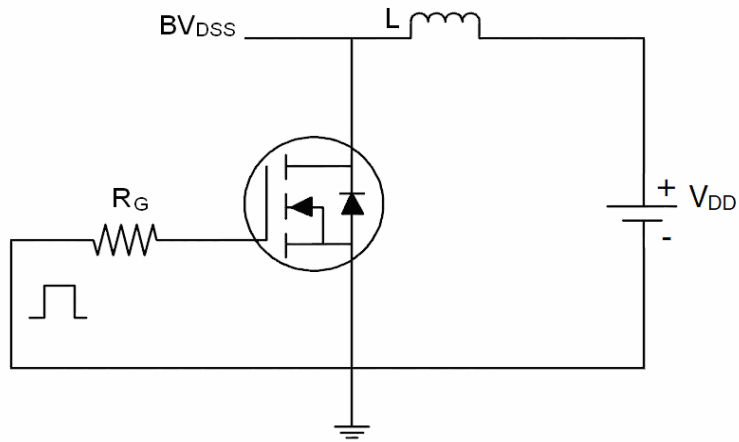
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|--|-----|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 20 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=20V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 12V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.5 | | 2.0 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=6A$ | - | | 6 | m Ω |
| | | $V_{GS}=2.5V, I_D=5A$ | | | 8 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=10V, I_D=6A$ | 20 | - | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=10V, V_{GS}=0V,$ $F=1.0\text{MHz}$ | - | 2000 | - | PF |
| Output Capacitance | C_{oss} | | - | 402 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 170 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=10V, I_D=6A$ $V_{GS}=4.5V, R_{GEN}=1\Omega$ | - | 25 | - | nS |
| Turn-on Rise Time | t_r | | - | 15 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 25 | - | nS |
| Turn-Off Fall Time | t_f | | - | 15 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=10V, I_D=6A,$ $V_{GS}=10V$ | - | 42 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 10.8 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 9.2 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=6A$ | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | 12 | A |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

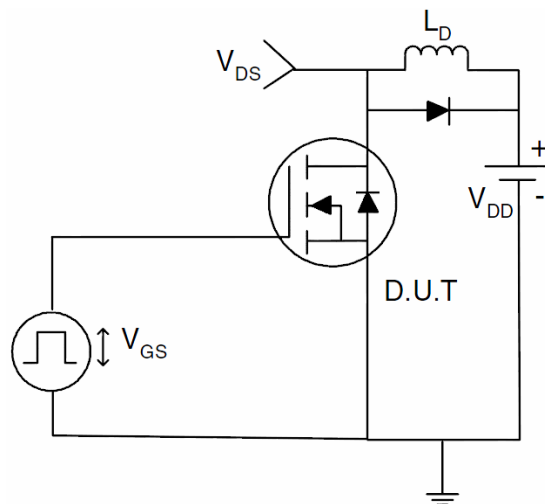
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

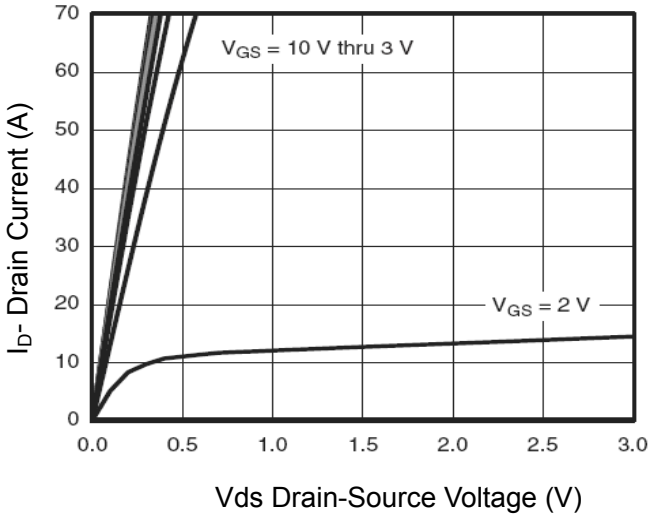


Figure 1 Output Characteristics

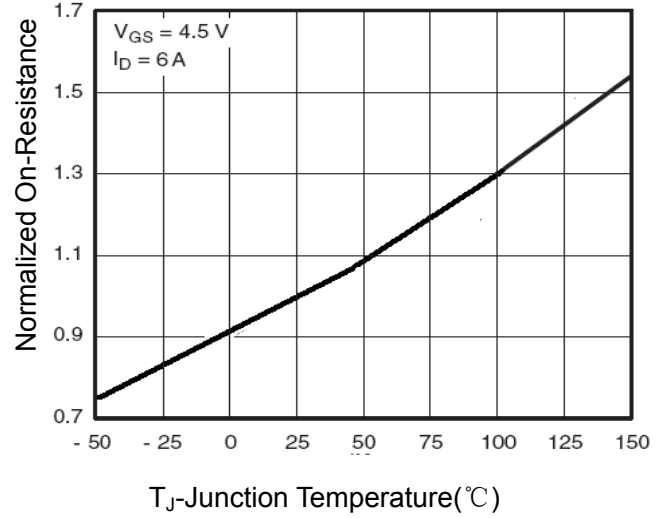


Figure 4 R_{dson} -Junction Temperature

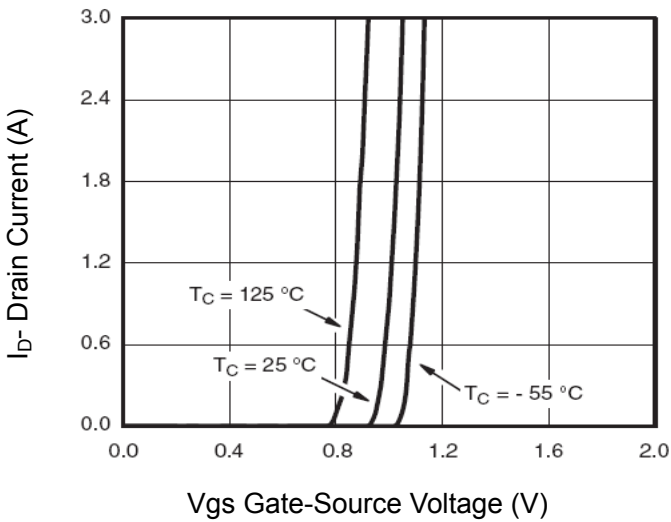


Figure 2 Transfer Characteristics

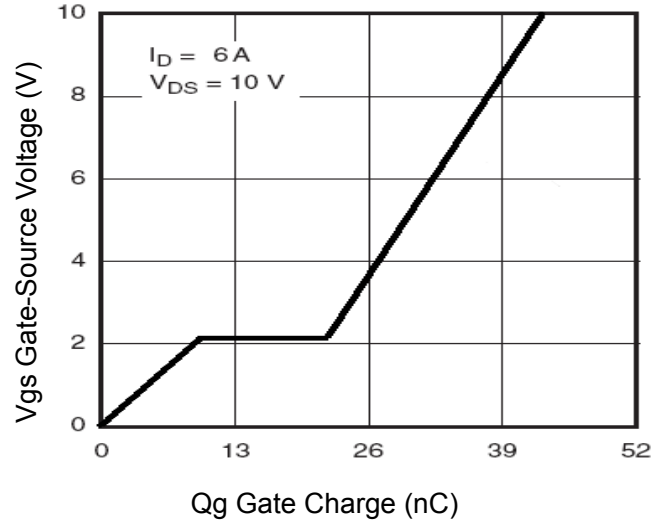


Figure 5 Gate Charge

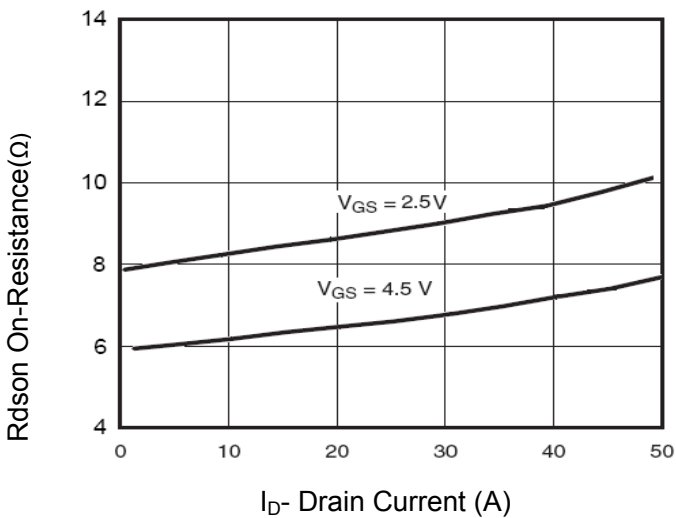


Figure 3 R_{dson} - Drain Current

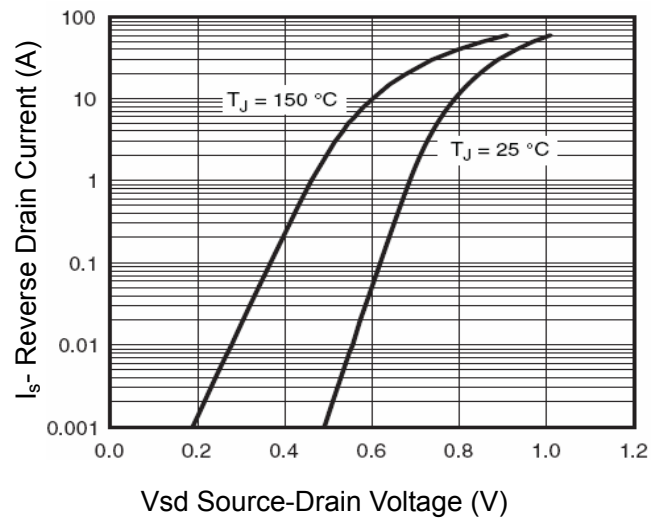


Figure 6 Source- Drain Diode Forward

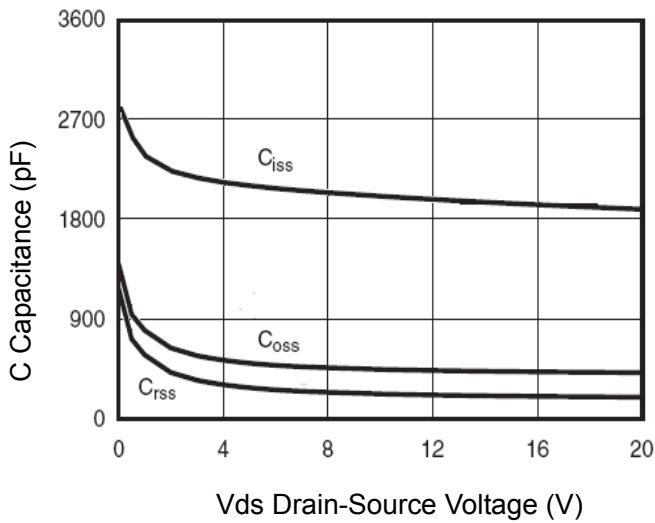


Figure 7 Capacitance vs Vds

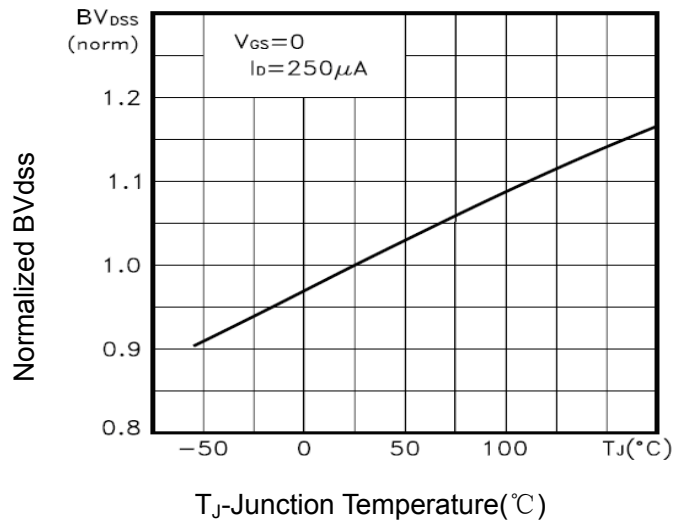


Figure 9 BV_{DSS} vs Junction Temperature

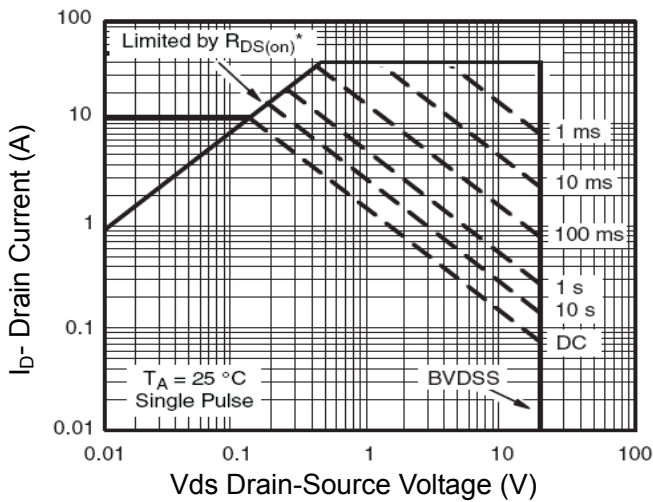


Figure 8 Safe Operation Area

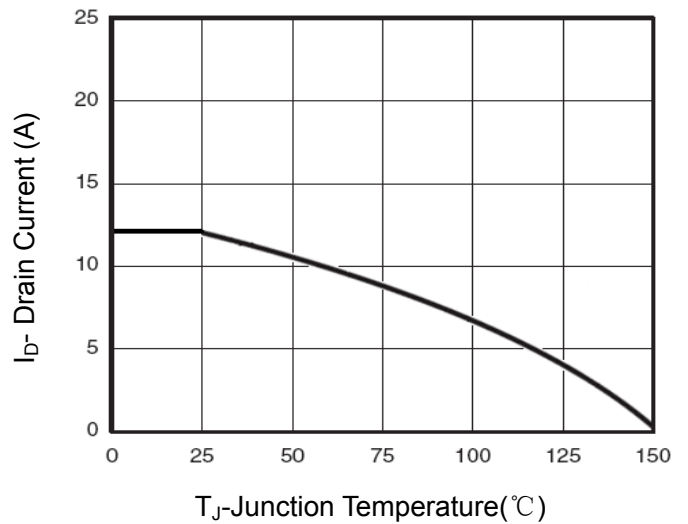


Figure 10 Current vs Junction Temperature

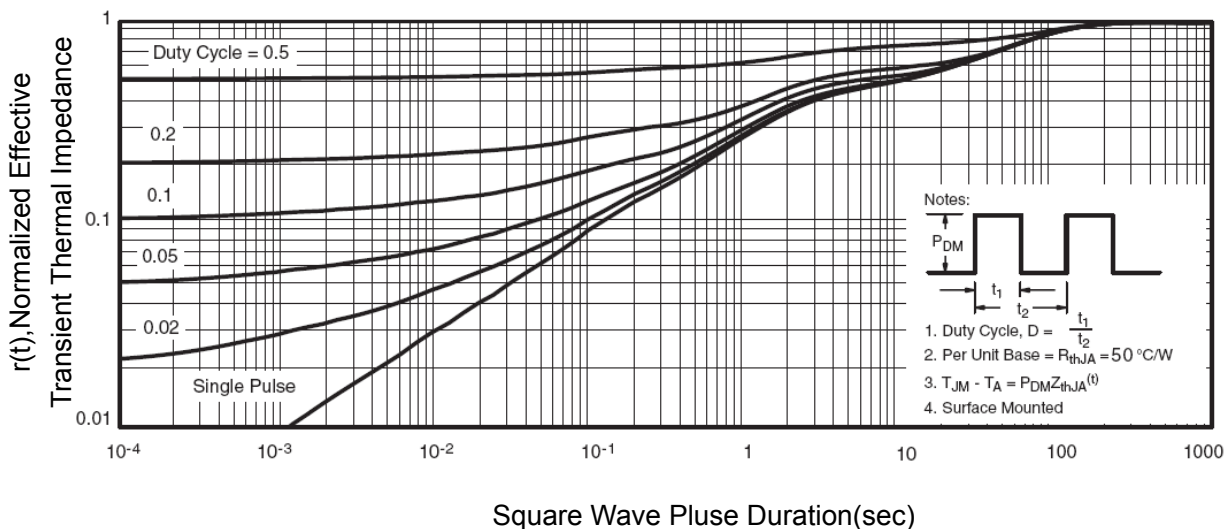


Figure 11 Normalized Maximum Transient Thermal Impedance