

Dual N-Channel Advanced Power MOSFET

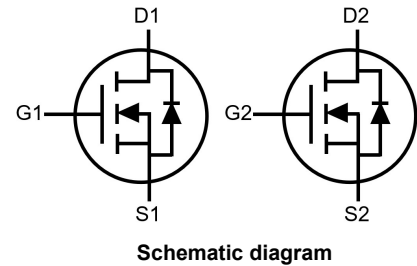
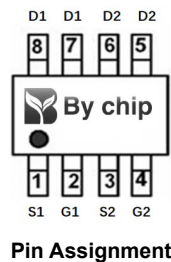
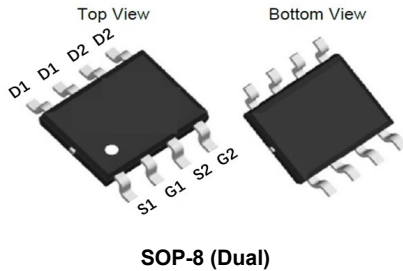
Features

- $V_{DS} = 60V$, $I_D = 5A$
 $R_{DS(ON)} < 30\text{ m}\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)} < 36\text{ m}\Omega$ @ $V_{GS} = 4.5V$

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!



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Max. | Units |
|-----------------|---|---------------------------|---------------------------|
| V_{DSS} | Drain-Source Voltage | 60 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current | $T_A = 25^\circ\text{C}$ | 5 |
| | | $T_A = 100^\circ\text{C}$ | 3.3 |
| I_{DM} | Pulsed Drain Current ^{note1} | 20 | A |
| EAS | Single Pulsed Avalanche Energy ^{note2} | 20 | mJ |
| P_D | Power Dissipation | $T_A = 25^\circ\text{C}$ | 1.74 |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 72 | $^\circ\text{C}/\text{W}$ |
| T_J, T_{STG} | Operating and Storage Temperature Range | -55 to +150 | $^\circ\text{C}$ |

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

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|--|------|------|-----------|------------|
| Off Characteristics | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 60 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=60V, V_{GS} = 0V,$ | - | - | 1.0 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS} = \pm 20V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance <small>note3</small> | $V_{GS}=10V, I_D=5A$ | - | | 30 | m Ω |
| | | $V_{GS}=4.5V, I_D=3A$ | - | | 36 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$ | - | 853 | - | pF |
| C_{oss} | Output Capacitance | | - | 60 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 29 | - | pF |
| Q_g | Total Gate Charge | $V_{DD}=30V, I_D=2.5A,$ $V_{GS}=10V$ | - | 20 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 3 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 4.5 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}=30V, I_D=5A,$ $R_{GEN}=1.8\Omega, V_{GS}=10V$ | - | 6 | - | ns |
| t_r | Turn-on Rise Time | | - | 6 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 19 | - | ns |
| t_f | Turn-off Fall Time | | - | 2.5 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 5 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 20 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S=5A$ | - | - | 1.2 | V |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=5A, di/dt=100A/\mu s$ | - | 13 | - | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | | - | 9 | - | nC |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

 2. EAS condition :Starting $T_J=25^\circ\text{C}, V_{DD}=30V, V_{GS}=10V, L=0.5mH, R_g=25\Omega, I_{AS}=9A$

 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

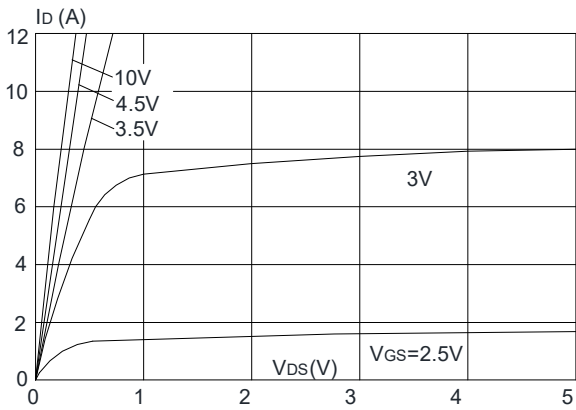


Figure 2: Typical Transfer Characteristics

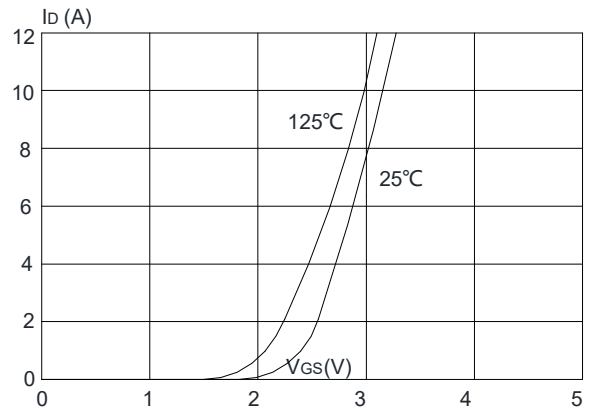


Figure 3: On-resistance vs. Drain Current

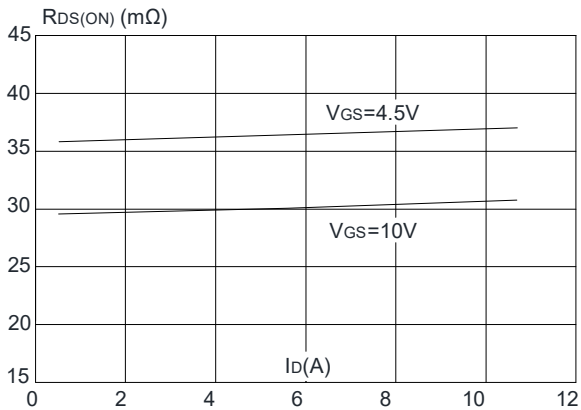


Figure 4: Body Diode Characteristics

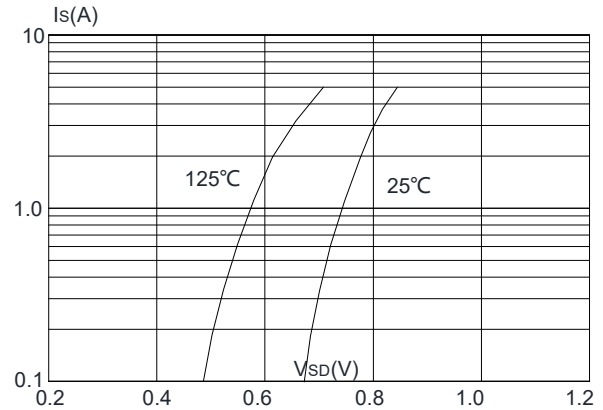


Figure 5: Gate Charge Characteristics

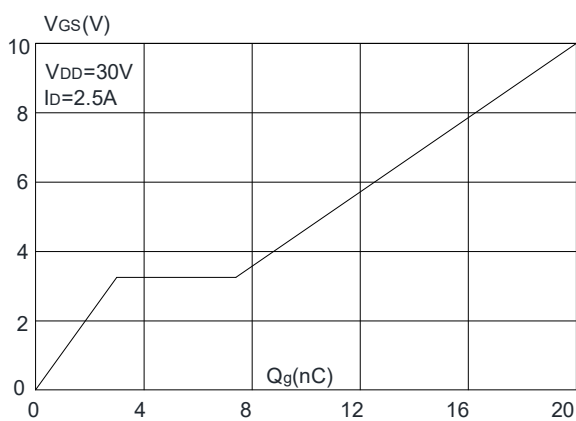


Figure 6: Capacitance Characteristics

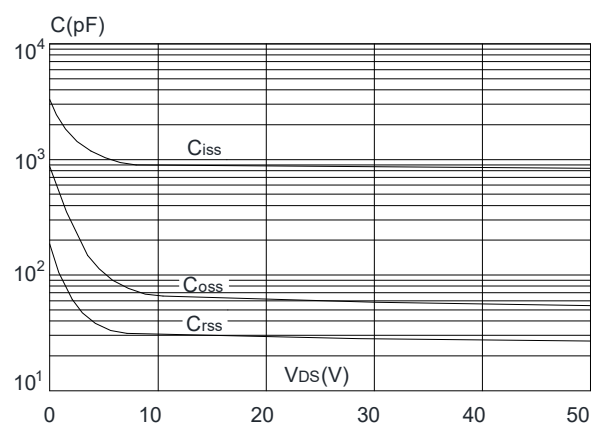


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

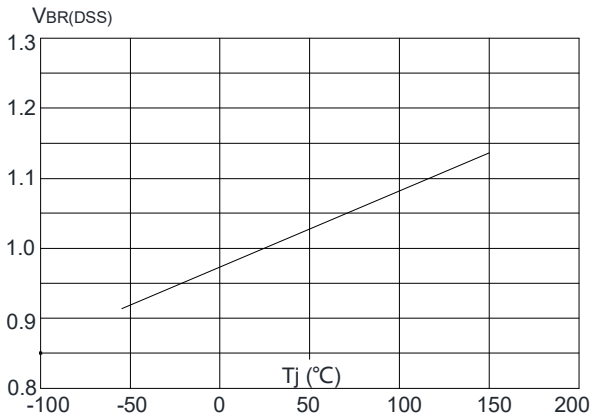


Figure 8: Normalized on Resistance vs. Junction Temperature

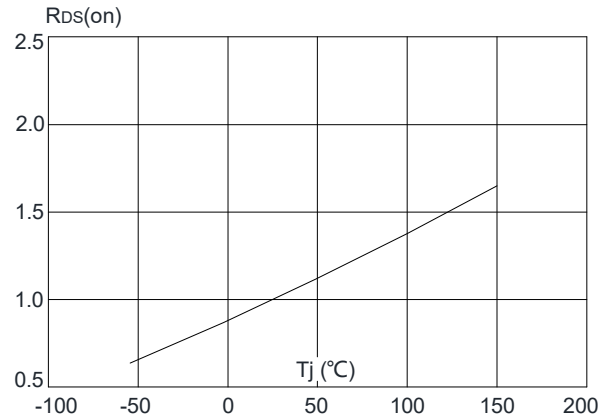


Figure 9: Maximum Safe Operating Area

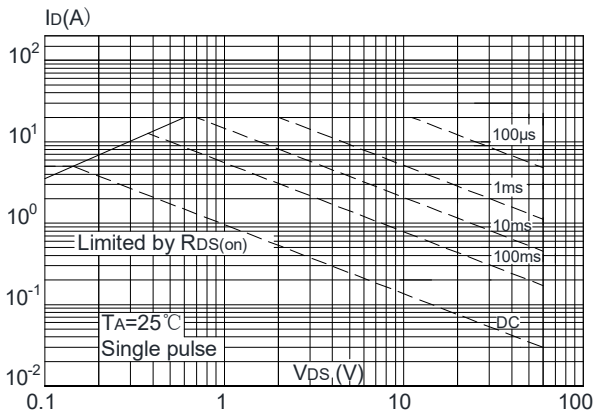


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

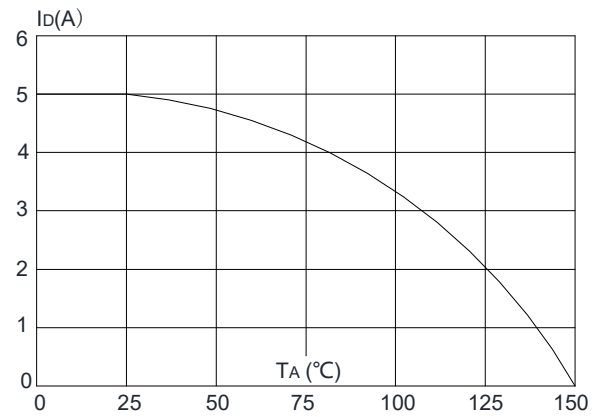
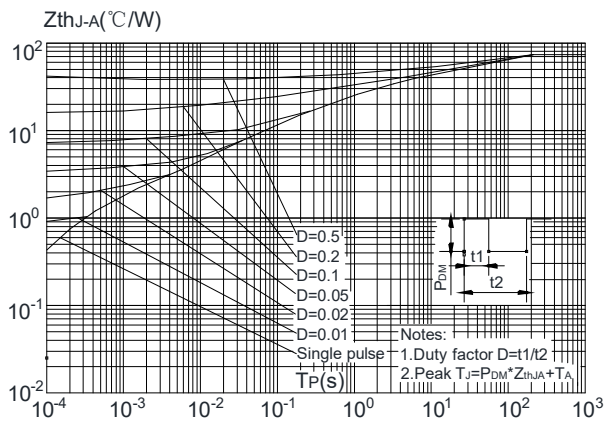


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

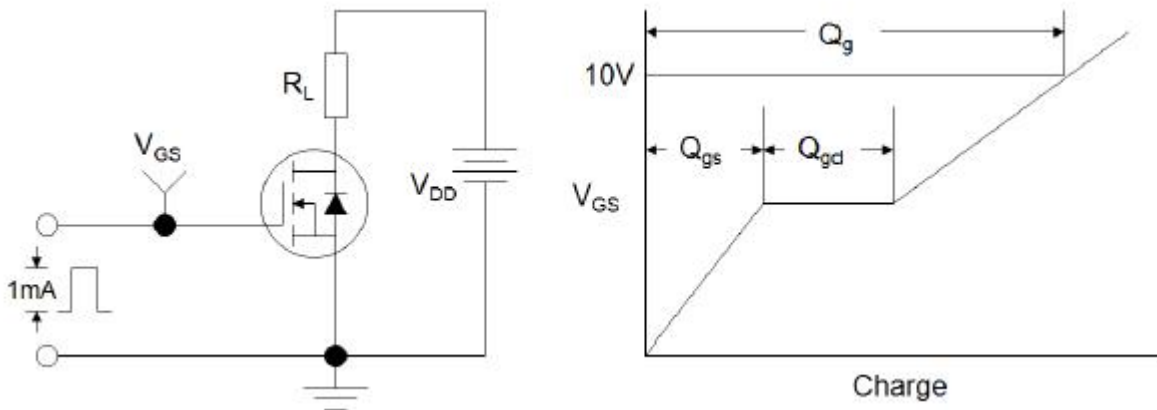


Figure1:Gate Charge Test Circuit & Waveform

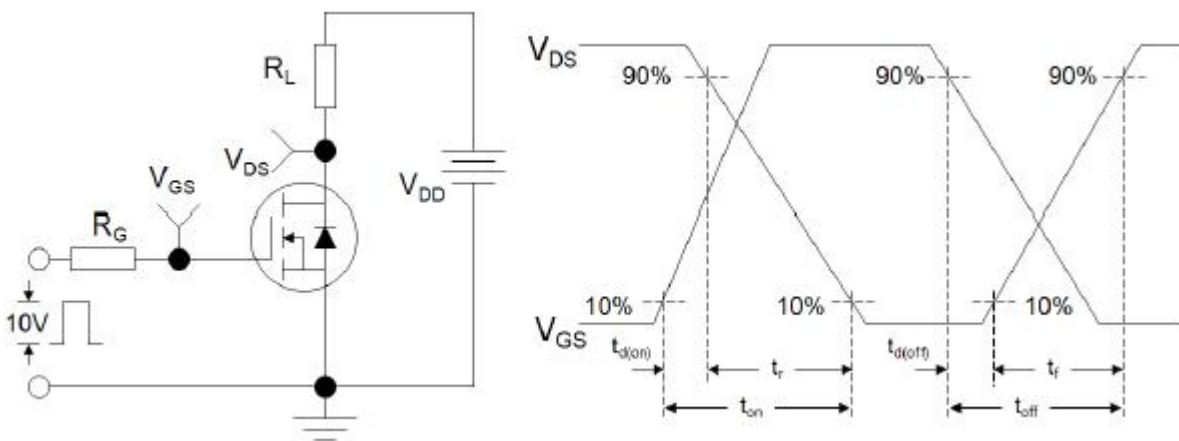


Figure 2: Resistive Switching Test Circuit & Waveforms

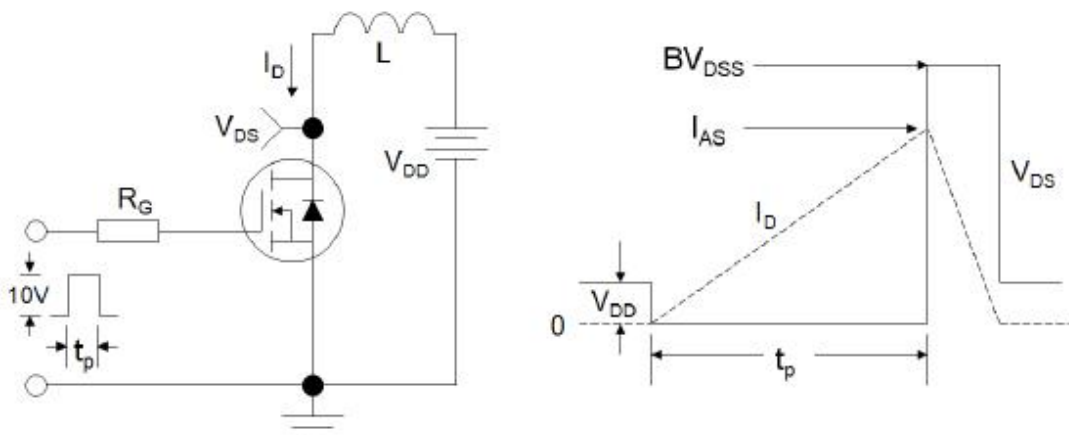


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms