

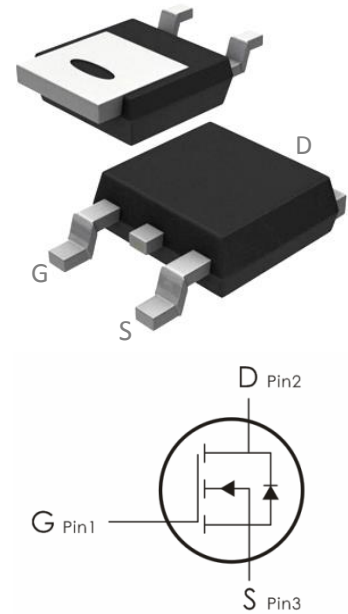
Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=60V, I_D=20A, R_{DS(ON)} < 36m\ \Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.



Absolute Maximum Ratings: ($T_C=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Ratings | Units |
|----------------|---|-------------|------------------|
| V_{DS} | Drain-Source Voltage | 60 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current- $T_C=25^\circ\text{C}$ | 20 | A |
| | Continuous Drain Current- $T_C=100^\circ\text{C}$ | 13 | |
| I_{DM} | Pulsed Drain Current ^{note1} | 80 | |
| E_{AS} | Single Pulse Avalanche Energy ^{note2} | 40 | mJ |
| P_D | Power Dissipation, $T_C=25^\circ\text{C}$ | 31 | W |
| T_J, T_{STG} | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ\text{C}$ |

Thermal Characteristics:

| Symbol | Parameter | Max | Units |
|-----------------|--------------------------------------|-----|---------------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 4 | $^\circ\text{C}/\text{W}$ |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|--|---|-----|------|-----------|-------------|
| Off Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\ \mu A$ | 60 | --- | --- | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{GS}=0V, V_{DS}=60V$ | --- | --- | 1 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0A$ | --- | --- | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | GATE-Source Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\ \mu A$ | 1 | 1.6 | 3 | V |
| $R_{DS(on)}$ | Drain-Source On Resistance ^{note3} | $V_{GS}=10V, I_D=10A$ | --- | 26 | 36 | $m\ \Omega$ |
| | | $V_{GS}=4.5V, I_D=5A$ | --- | 36 | 45 | $m\ \Omega$ |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=25V, V_{GS}=0V, f=1MHz$ | --- | 1150 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 55 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 45.3 | --- | |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DS}=30V, I_D=15A,$ $V_{GS}=10V, R_{GEN}=1.8\ \Omega$ | --- | 7.6 | --- | ns |
| t_r | Rise Time | | --- | 20 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 15 | --- | ns |
| t_f | Fall Time | | --- | 24 | --- | ns |
| Q_g | Total Gate Charge | $V_{GS}=10V, V_{DS}=30V,$ $I_D=10A$ | --- | 20.3 | --- | nC |
| Q_{gs} | Gate-Source Charge | | --- | 3.7 | --- | nC |
| Q_{gd} | Gate-Drain "Miller" Charge | | --- | 5.3 | --- | nC |
| Drain-Source Diode Characteristics | | | | | | |
| V_{SD} | Source-Drain Diode Forward Voltage | $V_{GS}=0V, I_S=20A$ | --- | --- | 1.2 | V |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | --- | --- | 20 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | --- | --- | 80 | A |

| | | | | | | |
|------------|-------------------------|--------------------------|-----|----|-----|----|
| trr | Reverse Recovery Time | IF =10A, di/dt = 100A/μs | --- | 29 | --- | Ns |
| qrr | Reverse Recovery Charge | | --- | 43 | --- | nc |

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : $T_J=25^{\circ}\text{C}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

Typical Characteristics: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

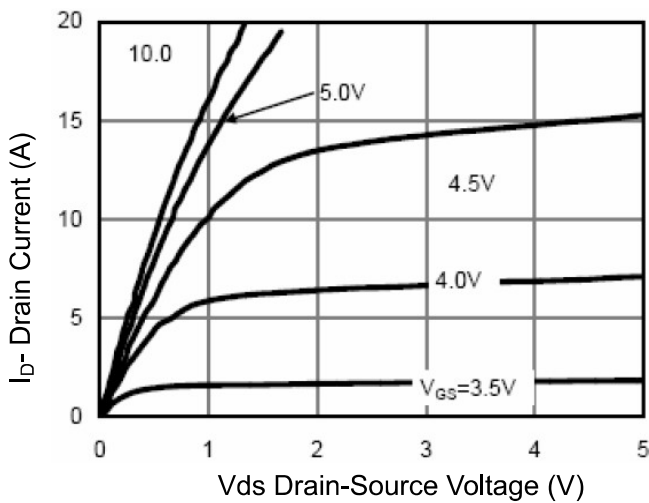


Figure 1 Output Characteristics

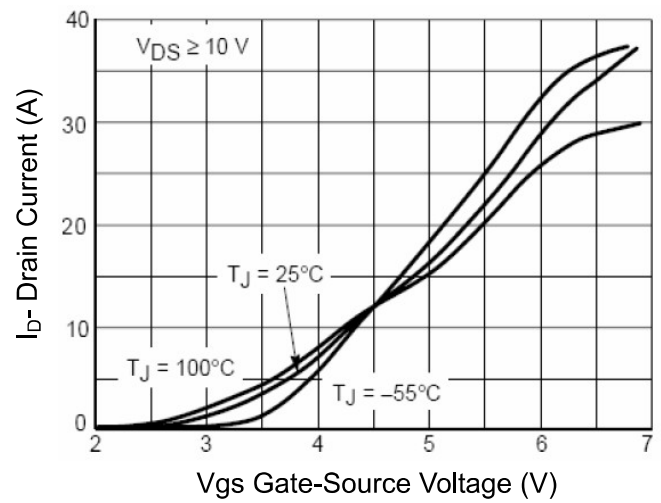


Figure 2 Transfer Characteristics

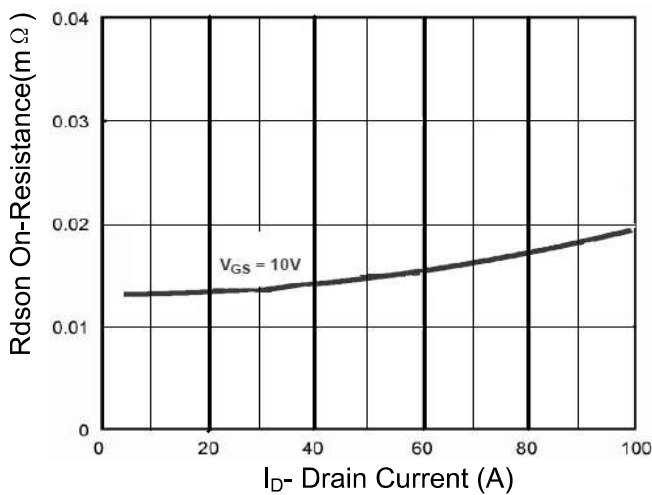


Figure 3 Rdson- Drain Current

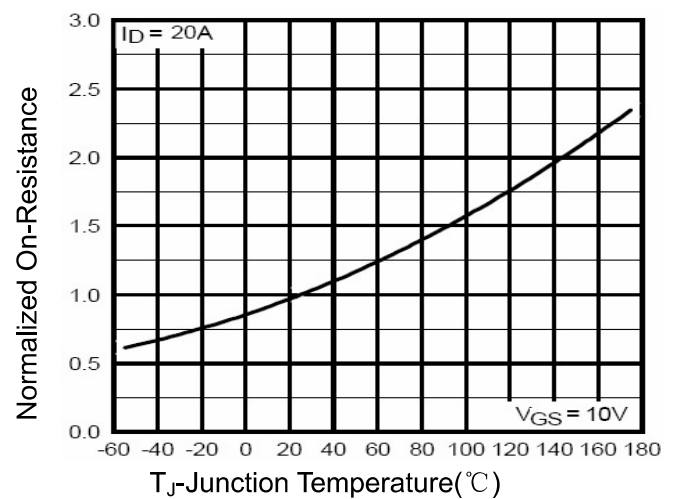


Figure 4 Rdson-Junction Temperature

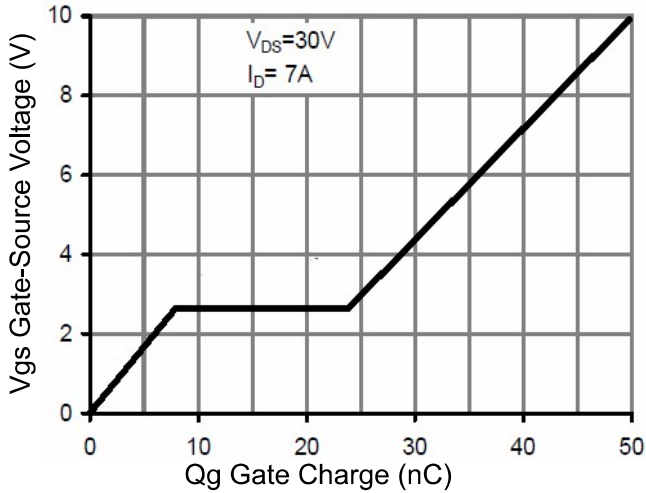


Figure 5 Gate Chare

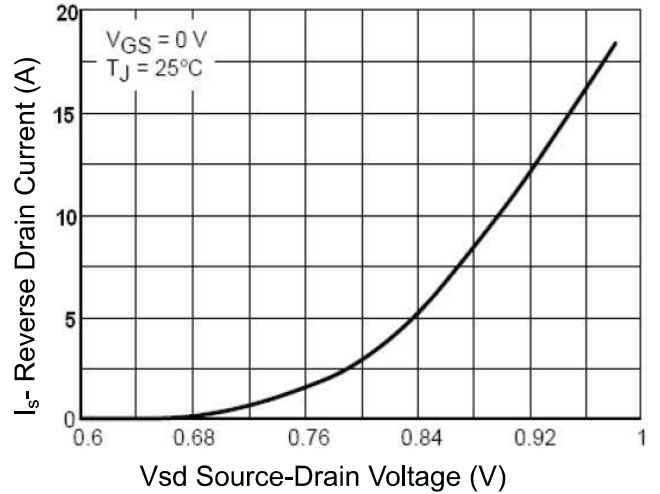


Figure 6 Source- Drain Diode Forward

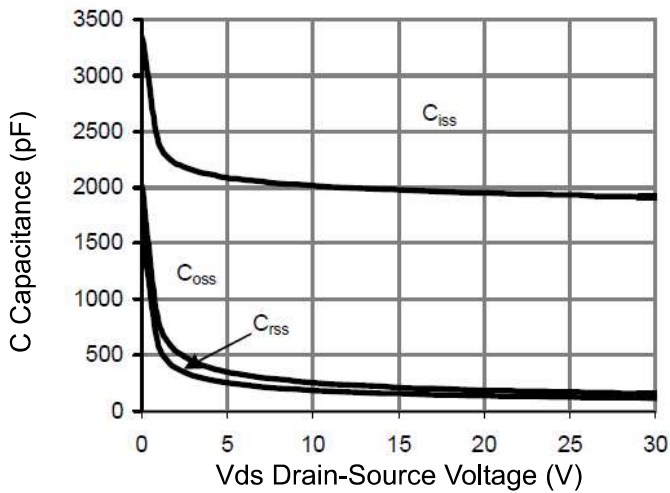


Figure 7 Capacitance vs Vds

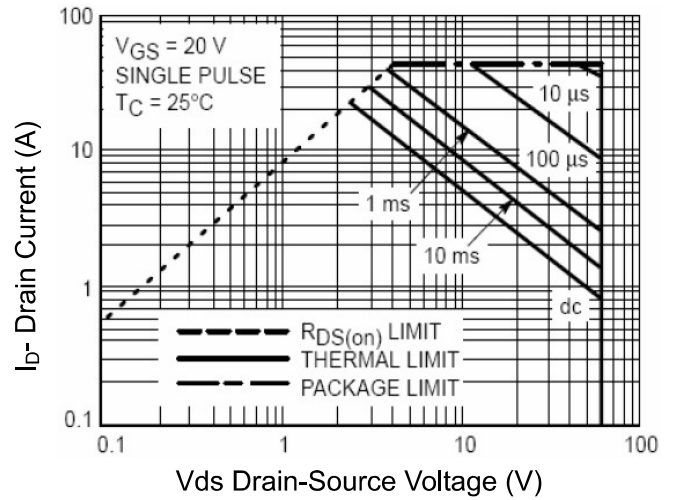


Figure 8 Safe Operation Area

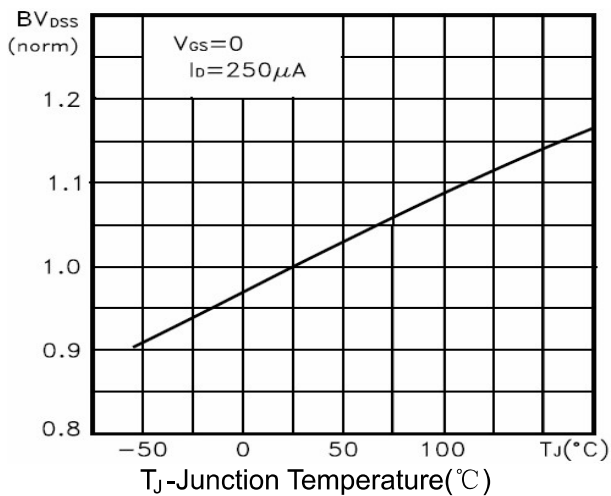


Figure 9 BV vs Junction Temperature

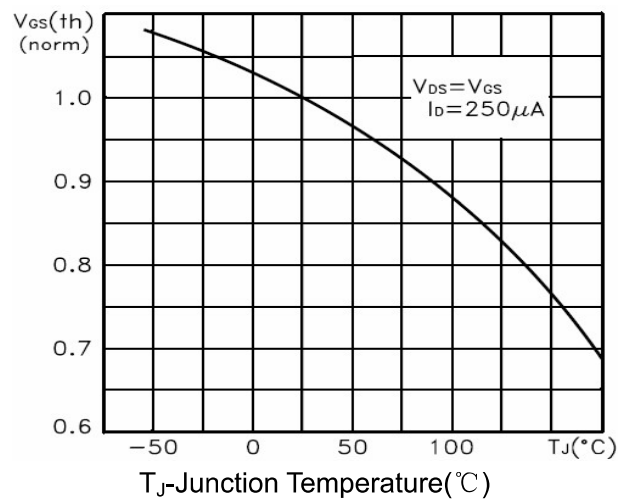


Figure 10 V_{GS(th)} vs Junction Temperature

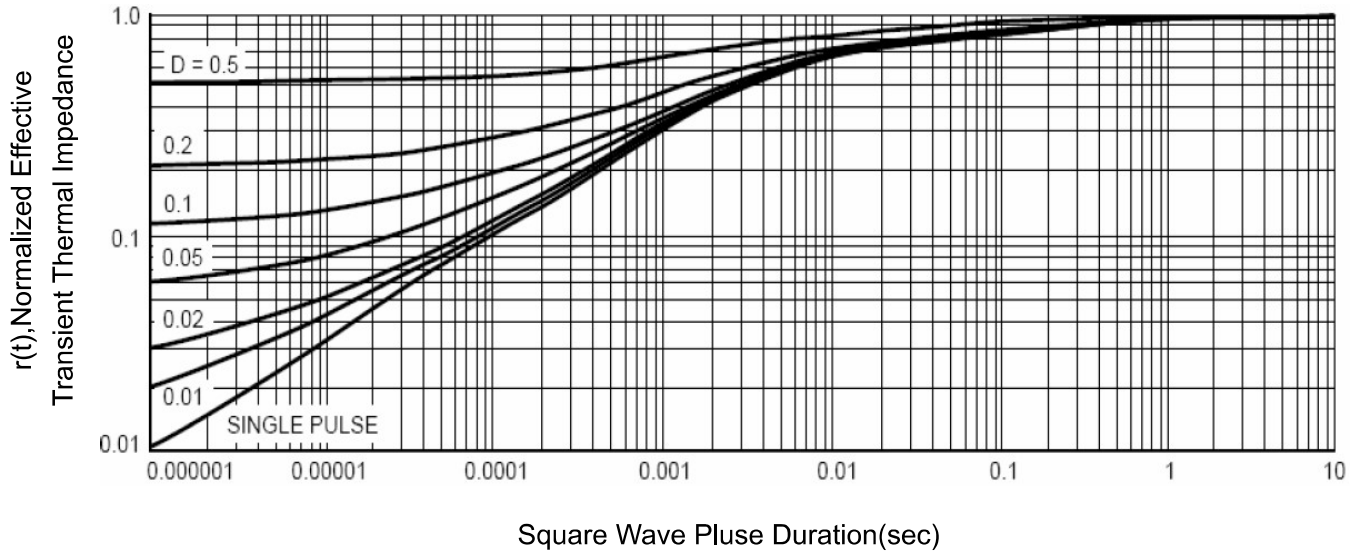


Figure 11 Normalized Maximum Transient Thermal Impedance



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