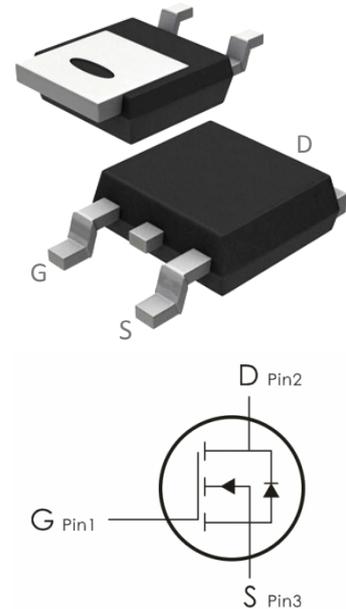


Description:

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) $V_{DS}=60V, I_D=55A, R_{DS(ON)}<12m\ \Omega @V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.



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

| Symbol | Parameter | Ratings | Units |
|----------------|--|-------------|------------|
| V_{DS} | Drain-Source Voltage | 60 | V |
| V_{GS} | Gate-Source Voltage | ± 25 | V |
| I_D | Continuous Drain Current $T_C=25^\circ C$ | 55 | A |
| | Continuous Drain Current $T_C=100^\circ C$ | 36 | |
| E_{AS} | Single Pulse Avalanche Energy ^{note2} | 59 | mJ |
| I_{DM} | Pulsed Drain Current ^{note1} | 220 | A |
| P_D | Power Dissipation $T_C=25^\circ C$ | 63 | W |
| T_J, T_{STG} | Operating and Storage Junction Temperature Range | -55 to +175 | $^\circ C$ |

Thermal Characteristics:

| Symbol | Parameter | Max | Units |
|-----------------|--------------------------------------|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 2.4 | $^\circ C/W$ |

Package Marking and Ordering Information:

| Part NO. | Marking | Package |
|-----------|---------|---------|
| DE012NG-H | E012N | TO-252 |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|--|---|-----|------|-----------|---------------|
| Off Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\ \mu\text{A}$ | 60 | --- | --- | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{GS}=0V, V_{DS}=60V$ | --- | --- | 1 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 25V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | GATE-Source Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$ | 2 | 3 | 4 | V |
| $R_{DS(on)}$ | Drain-Source On Resistance ^{note3} | $V_{GS}=10V, I_D=30A$ | --- | 8 | 12 | m Ω |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHz}$ | --- | 2045 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 170 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 151 | --- | |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{GS}=10V, V_{DS}=30V,$ $R_L=1.5\Omega, R_{GEN}=3\Omega$ | --- | 10 | --- | ns |
| t_r | Rise Time | | --- | 8 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 18 | --- | ns |
| t_f | Fall Time | | --- | 5 | --- | ns |
| Q_g | Total Gate Charge | $V_{GS}=10V, V_{DS}=30V,$ $I_D=20A$ | --- | 16 | --- | nC |
| Q_{gs} | Gate-Source Charge | | --- | 5.6 | --- | nC |
| Q_{gd} | Gate-Drain "Miller" Charge | | --- | 3.6 | --- | nC |
| Drain-Source Diode Characteristics | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | --- | --- | 55 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | --- | --- | 220 | A |
| V_{SD} | Source-Drain Diode Forward Voltage | $V_{GS}=0V, I_S=30A$ | --- | --- | 1.2 | V |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=20A, dI/dt=50A/\mu\text{s}$ | --- | 18 | --- | ns |

| | | | | | | |
|------------|-----------------------------------|---------------------------|-----|----|-----|----|
| Qrr | Body Diode Revrse Recovery Charge | $I_r=20A, di/t=50A/\mu s$ | --- | 58 | --- | nc |
|------------|-----------------------------------|---------------------------|-----|----|-----|----|

Notes:

1. Reptive Rating: Pulse Width Limited by Maximu Junction Temperature
2. EAS conditon : $T_J=25^\circ C, V_D=30V, G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=15.3A$
3. Pulse Tst: Pulse Width $\leq 30\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics: ($T_A=25^\circ C$ unless otherwise noted)

Figure 1: Output Characteristics

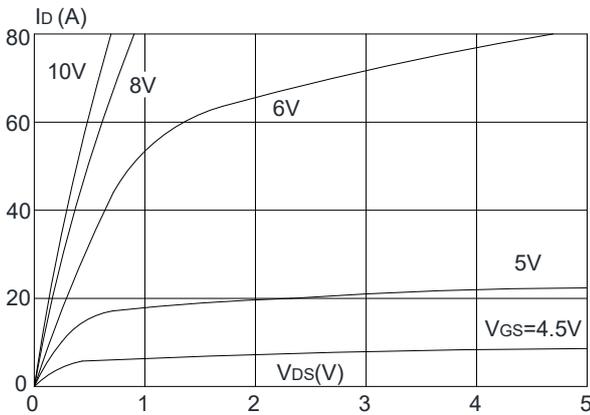


Figure 2: Typical Transfer Characteristics

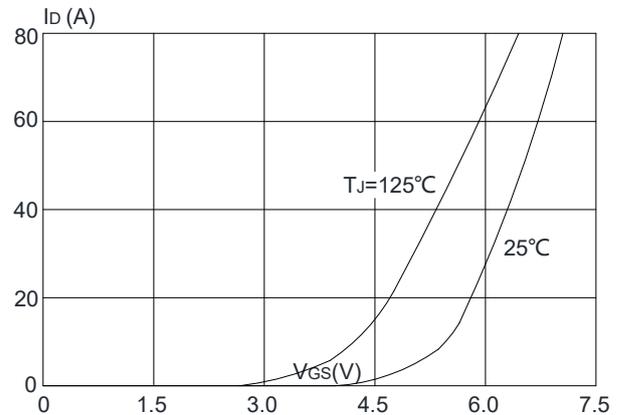


Figure 3: On-resistance vs. Drain Current

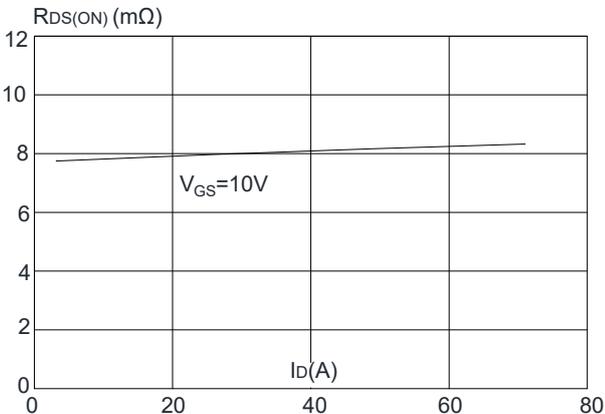


Figure 4: Body Diode Characteristics

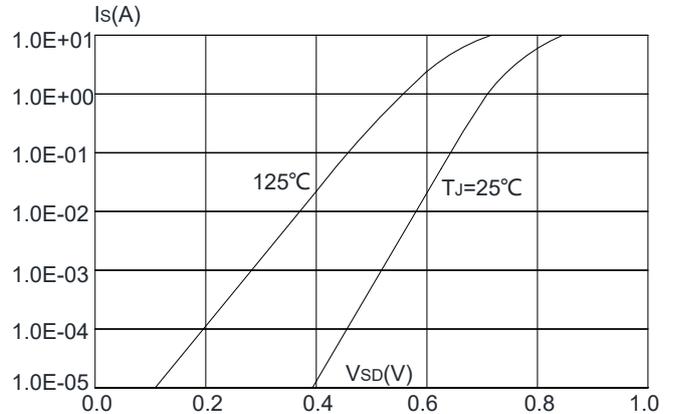


Figure 5: Gate Charge Characteristics

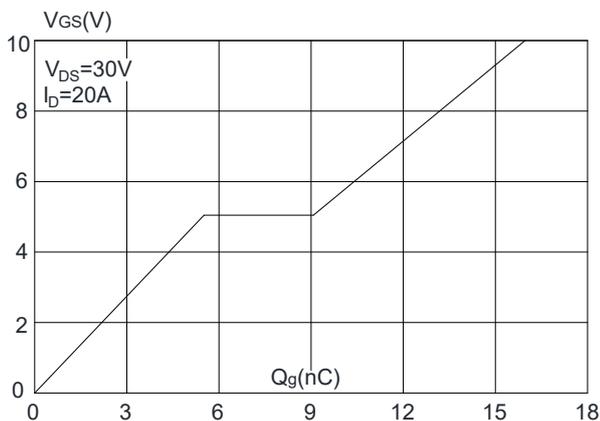


Figure 6: Capacitance Characteristics

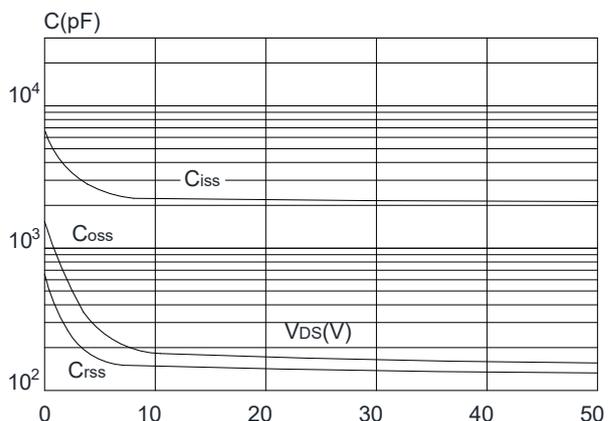


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

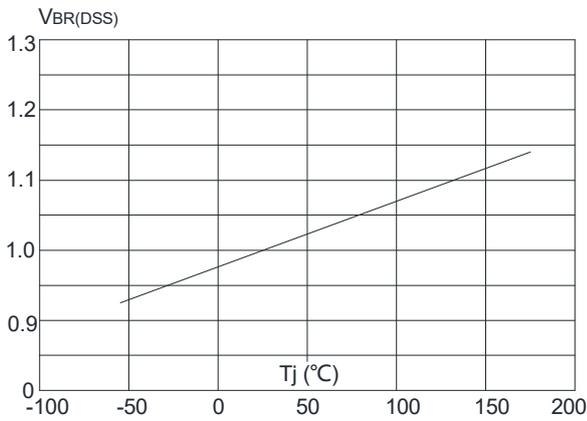


Figure 8: Normalized on Resistance vs. Junction Temperature

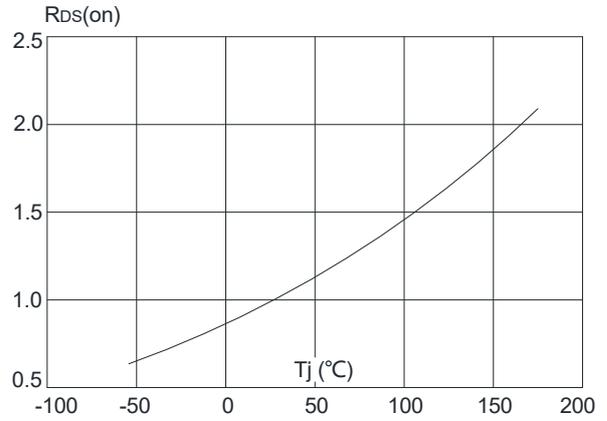


Figure 9: Maximum Safe Operating Area

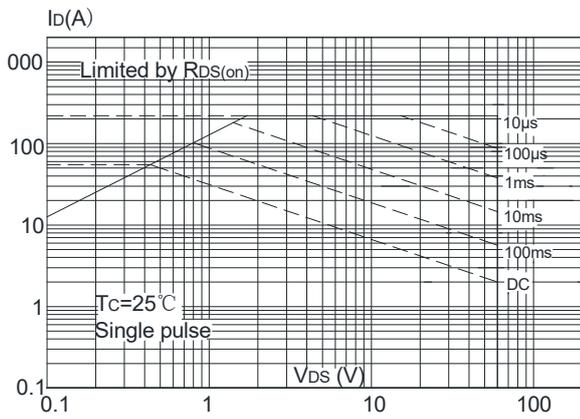


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

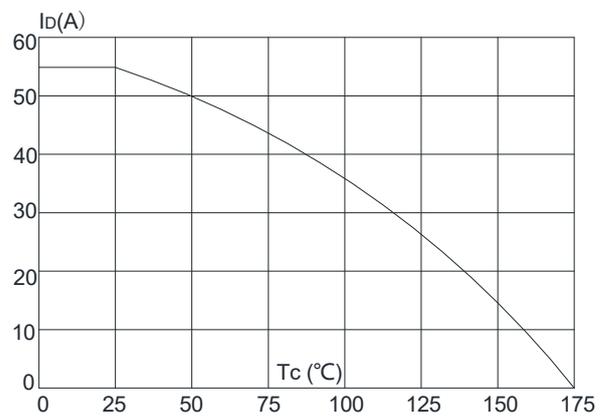


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

