## 60V N-channel Power MOSFET

| | |
|---|---|
| $V_{DSS}$ | 60V |
| $I_D$ | 107A |
| $R_{DS(ON)_Typ.}$ @$V_{GS}$=10V | 3.3mΩ |

DESCRIPTION：

·Low On-Resistance

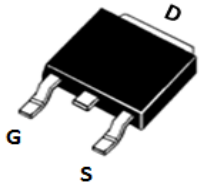
·Excellent FoM (figure of merit)

·100% UIS & Rg tested

·Green molding compound

·Moisture sensitivity: level 1 per J-STD-020

·UL flammability classification rating 94V-0




TO-252

TYPICAL APPLICATIONS：

·Load Switch

·Motor drives

·High frequency switching, synchronous rectification

MAXIMUM RATINGS (at $T_C$ = 25 °C, unless otherwise specified)

| Characteristic | Condition | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current(VGS = 10V) | Tc=25℃<br>Tc=100℃ | $I_D$ | 107<br>67 | A |
| Pulsed Drain Current (1) | | $I_{DM}$ | 402 | A |
| Single Pulsed Avalanche Energy (2) | | $E_{AS}$ | 292 | mJ |
| Single Pulse Avalanche Current | L= 0.3mH | $I_{AS}$ | 42 | A |
| Power dissipation | Tc=25℃<br>Tc=100℃ | $P_D$ | 76<br>30 | W |
| Junction & Storage temperature Range | | $T_J$, $T_{STG}$ | -55~+150 | ℃ |

Notes： 1. This current is calculated on single pulse with 10μs Single Pulse.
2. Defined by design, not subject to production test, EAS condition: TJ=25°C, VDD=30V, VGS=10V, L=1.0mH.

THERMAL CHARACTERISTICS

| Characteristic | Condition | Symbol | Value | Unit |
|---|---|---|---|---|
| Thermal resistance, | Junction to Ambient<br>Junction to Case | $R_{\theta JA}$<br>$R_{\theta JC}$ | 38<br>1.7 | ℃/W |

ELECTRICAL CHARATERISTICS (at $T_J$ = 25 °C, unless otherwise specified)

| Characteristic | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage<br>VGS = 0V, ID = 250uA | $V_{(BR)DSS}$ | 60 | | | V |
| Zero Gate Voltage Drain Current<br>VDS = 60V, VGS = 0 V, $T_J$=25℃<br>VDS = 60V, VGS = 0 V, $T_J$=125℃ | $I_{DSS}$ | | | 1.0<br>100 | uA |
| Gate-Source Leakage Current<br>VGS = ±20V, VDS = 0V | $I_{GSS}$ | | | ±100 | nA |
| Gate-Source threshold voltage<br>VDS = VGS, ID = 250uA | $V_{GS(th)}$ | 2.0 | 3.0 | 4.0 | V |
| Drain-Source On-State Resistance<br>VGS = 10V, ID = 20A | $R_{DS(on)}$ | | 3.3 | 3.9 | mΩ |
| Forward Transconductance<br>VDS = 5.0V, ID = 20A | gfs | | 33 | | S |
| Diode Forward Voltage<br>VGS = 0V, $I_S$ =2.0A | $V_{SD}$ | | 0.7 | 1.2 | V |
| Gate Resistance<br>f=1MHz | $R_g$ | | 1.2 | | Ω |
| Input capacitance<br>f=1MHz, VDS=30V, VGS=0 V | $C_{iss}$ | | 2717 | | pF |
| Output capacitance<br>f=1MHz, VDS=30V, VGS=0 V | $C_{oss}$ | | 1089 | | pF |
| Reverse transfer capacitance<br>f=1MHz, VDS=30V, VGS=0 V | $C_{rss}$ | | 48 | | pF |
| Turn-on delay time<br>VDD=30 V, VGS= 10V, ID=20A, $R_{GEN}$=3Ω | td (ON) | | 7.7 | | ns |
| Rise time<br>VDD=30 V, VGS= 10V, ID=20A, $R_{GEN}$=3Ω | tr | | 17 | | ns |
| Turn-off delay time<br>VDD=30 V, VGS= 10V, ID=20A, $R_{GEN}$=3Ω | td (OFF) | | 26 | | ns |
| Fall time<br>VDD=30 V, VGS= 10V, ID=20A, $R_{GEN}$=3Ω | tf | | 14 | | ns |
| Total Gate Charge<br>VDS= 30V, ID= 20A, VGS= 10V<br>VDS= 30V, ID= 20A,VGS= 6.0V | $Q_G$ | | 46<br>29 | | nC |
| Gate to Source Charge<br>VDS= 30V, ID= 20A,VGS= 10V | $Q_{GS}$ | | 10.7 | | nC |
| Gate to Drain Charge<br>VDS= 30V, ID= 20A,VGS= 10V | $Q_{GD}$ | | 11.7 | | nC |
| Gate Plateau Voltage<br>VDS= 30V, ID= 20A,VGS= 10V | Vplateau | | 4.4 | | V |
| Maximum Continuous Body Diode Forward Current | IS | | 45 | | A |
| Revers Recovery Time<br>IF=20A, di/dt = 100A/us | Trr | | 64 | | ns |
| Revers Recovery Charge<br>IF=20A, di/dt = 100A/us | Qrr | | | 89 | nC |

## Typical Performance Characteristics

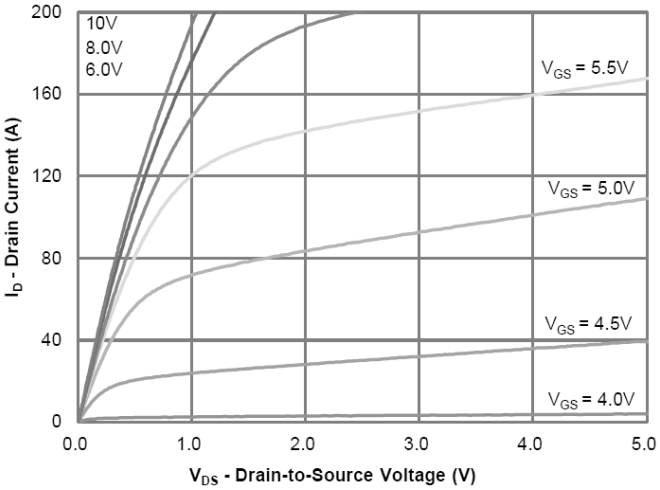



Figure 1. Output Characteristics

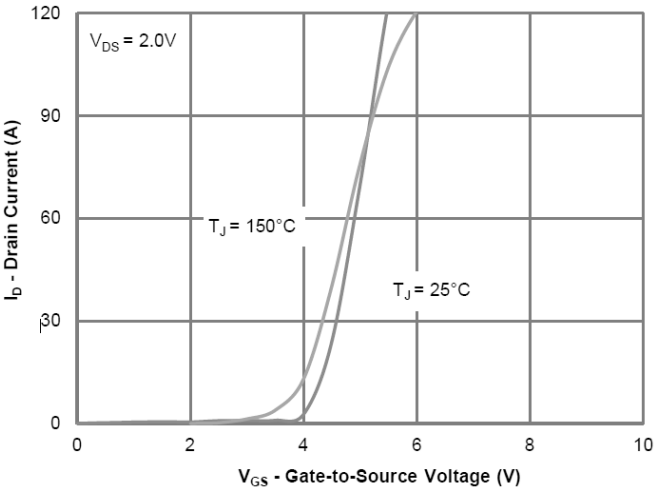



Figure 2. Transfer Characteristics

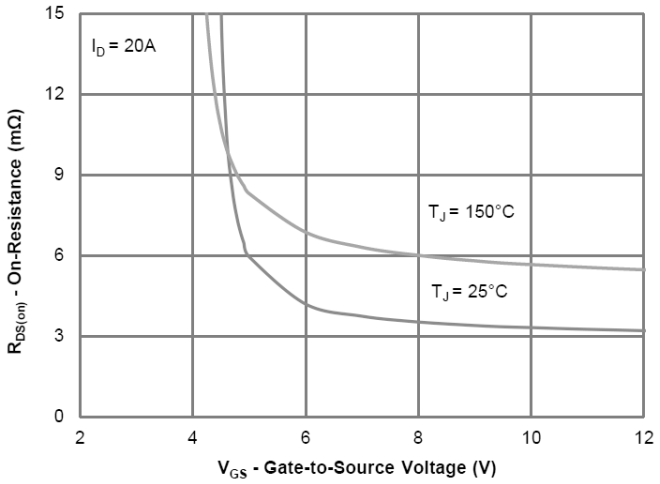



Figure 3. On-Resistance vs. Gate-Source Voltage

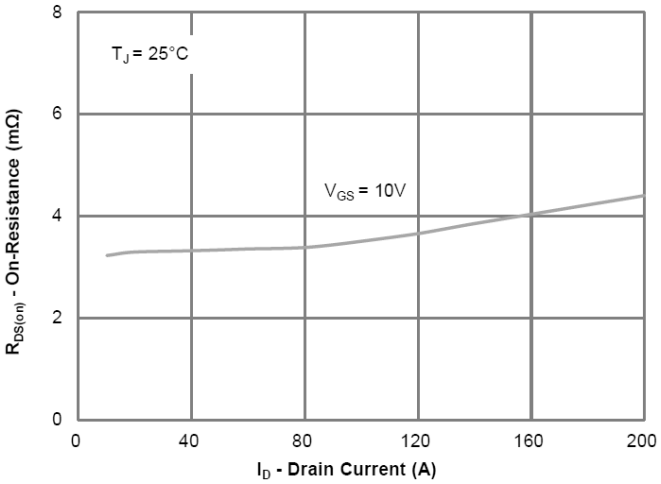



Figure4. On-Resistance vs. Drain Current and Gate Voltage

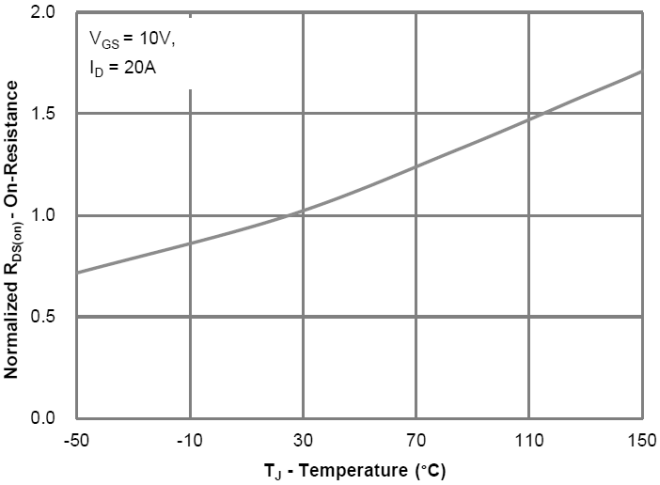



Figure 5. On-Resistance vs. Junction Temperature

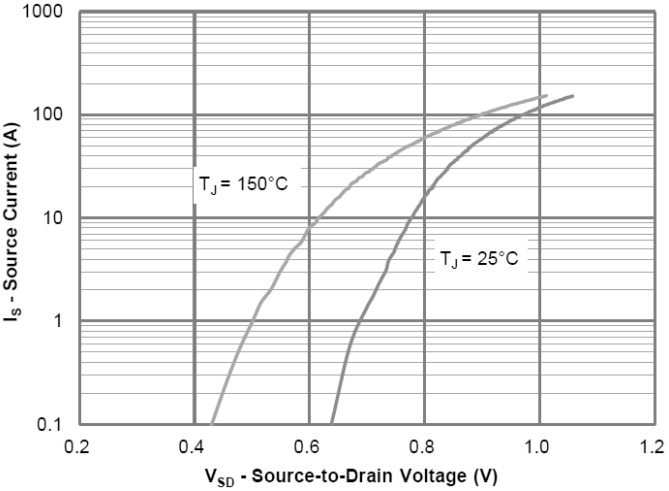



Figure 6. Source-Drain Diode Forward Voltage

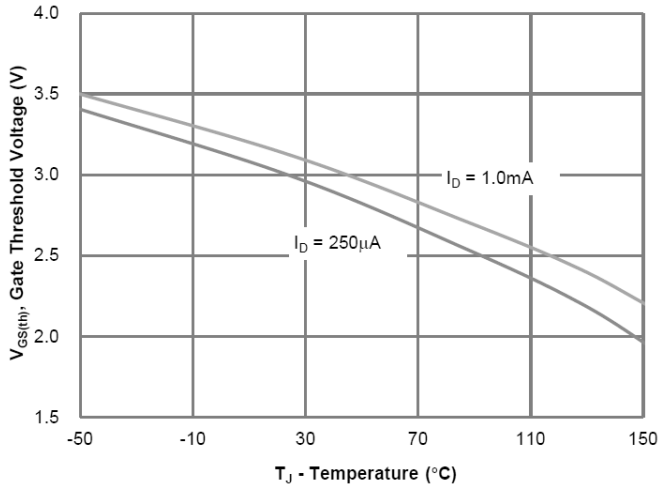



Figure 7. Gate Threshold Variation vs. Junction Temperature

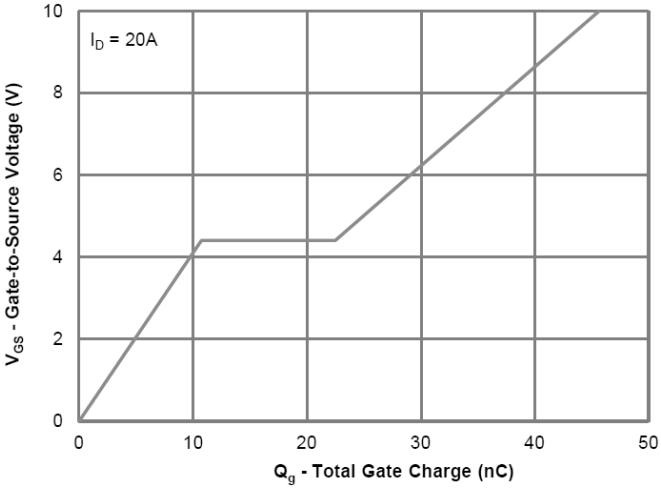



Figure8. Gate Charge Characteristics

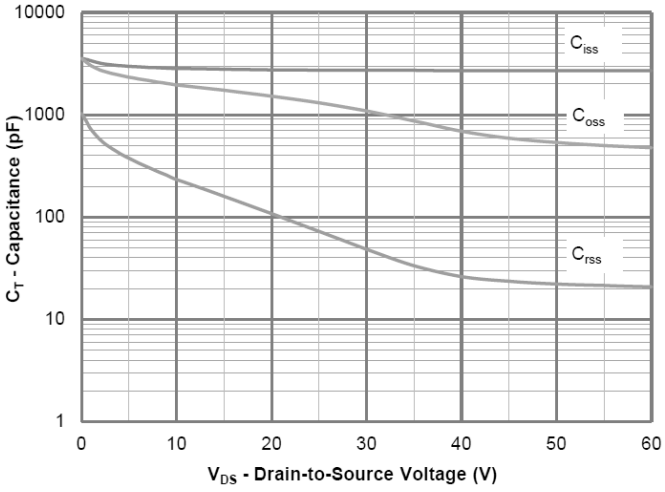



Figure 9. Capacitance Characteristics

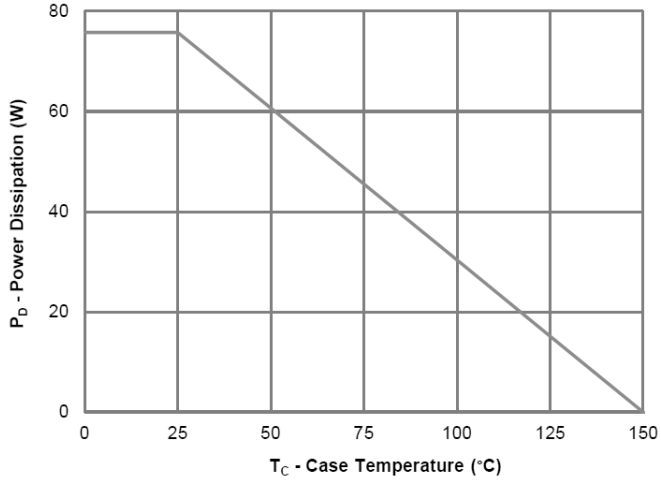



Figure 10. Power Derating

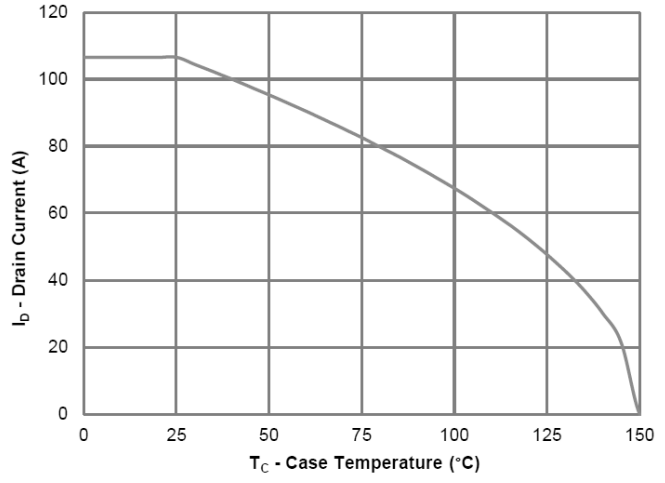



Figure 11. Current Derating

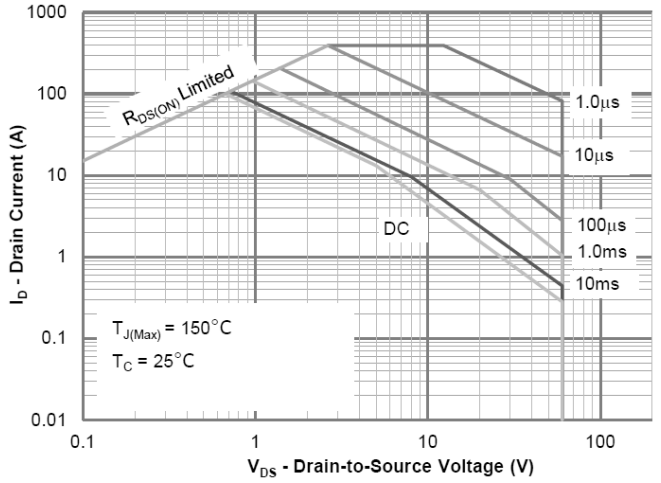



Figure 12. Safe Operating Area

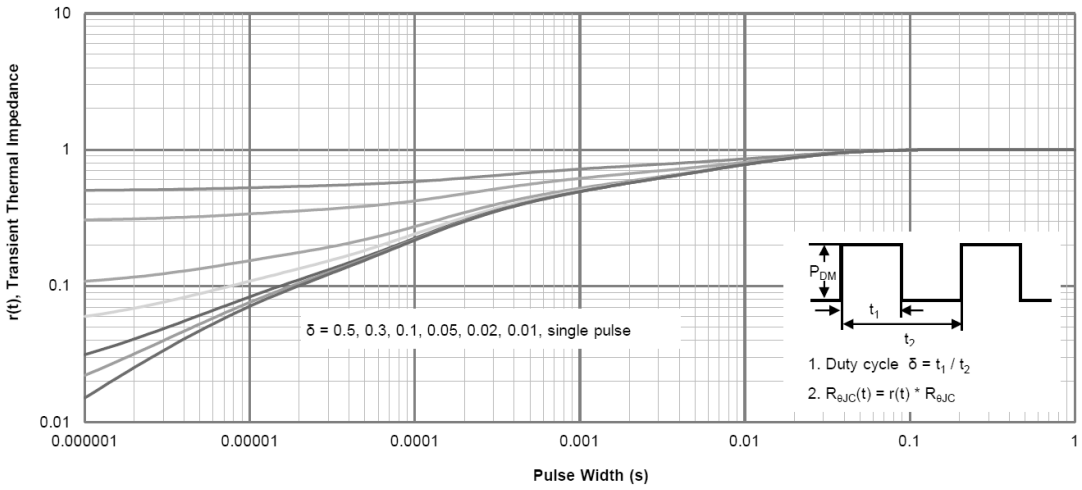
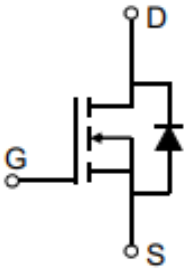
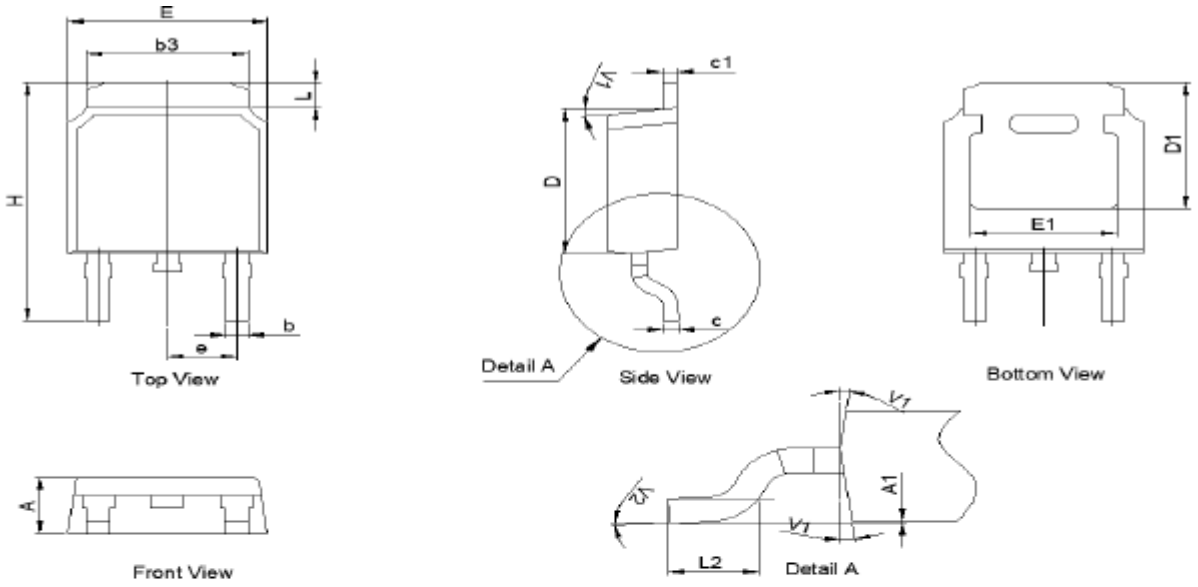



Figure 13. Normalized Maximum Transient Thermal Impedance

·Circuit diagram



·Package outlines : Dimensions in (mm)




NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

| DIM. | MILLIMETER | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 2.20 | 2.30 | 2.40 |
| A1 | 0 | - | 0.13 |
| b | 0.62 | 0.76 | 0.90 |
| c | 0.40 | 0.50 | 0.61 |
| c1 | 0.46 | 0.50 | 0.58 |
| D | 5.90 | 6.10 | 6.30 |
| D1 | 5.05 | -- | -- |
| E | 6.35 | 6.60 | 6.80 |
| E1 | 4.32 | -- | -- |
| b3 | 5.21 | 5.38 | 5.55 |
| e | 2.29 BSC | | |
| H | 9.40 | 10.00 | 10.40 |
| L | 0.89 | -- | 1.27 |
| L2 | 1.40 | | 1.78 |
| V1 | 7° REF | | |
| V2 | 0° | - | 6° |

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