

30V_{DS}/±20V_{GS} N-Channel MOSFET

General Description

These N-Channel enhancement mode power field effect transistors are using SGT technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

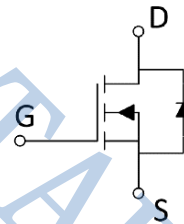
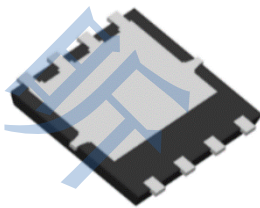
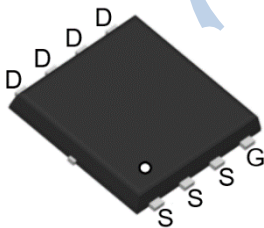
| | |
|---------------------------------|--------------------|
| BVDSS | 30V |
| R_{DS(ON)}(10V) | 5.3mΩ (TYP) |
| R_{DS(ON)}(4.5V) | 8.0mΩ (TYP) |
| I_D | 65A |

100% UIS TESTED!

100% ΔV_{ds} TESTED!



PDFN5060



Absolute maximum ratings (T_A=25°C)

| Symbol | Parameter | Value | Unit |
|-----------------------------------|---|---------|------|
| V _{DS} | Drain-Source Voltage | 30 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D | Continuous Drain Current (T _C =25°C) | 65 | A |
| | Continuous Drain Current (T _C =100°C) | 45 | A |
| I _{DM} | Pulsed Drain Current | 170 | A |
| I _{AS} | Avalanche Current (L=0.1mH) | 27 | A |
| E _{AS} | Single Pulsed Avalanche Energy | 36 | mJ |
| P _D | Maximum Power Dissipation (T _C =25°C) | 52 | W |
| | Maximum Power Dissipation (T _C =100°C) | 20.8 | W |
| T _J , T _{STG} | Operating, Storage Temperature Range | -55~150 | °C |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|---|------|------|------|
| R _{θJC} | Thermal Resistance, Junction-to-Case | 2.4 | --- | °C/W |
| R _{θJA} | Thermal Resistance, Junction-to-Ambient | 63 | --- | °C/W |

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

Static State Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|----------------------------------|-------------------------------|------|------|-----------|------------|
| B_{VDSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | --- | --- | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=30V, V_{GS}=0V$ | --- | --- | 1 | μA |
| I_{GSS} | Gate -Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.2 | 1.6 | 2.0 | V |
| $R_{DS(on)}$ | Drain-Source On-stage Resistance | $V_{GS}=10V, I_D=10A$ | --- | 5.3 | 6.5 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | --- | 8.0 | 9.5 | |

Dynamic Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|------------------------------|--|------|------|------|----------|
| C_{iss} | Input capacitance | $V_{DS}=15V$ $V_{GS}=0V$ $f=1MHz$ | --- | 738 | --- | pF |
| C_{oss} | Output capacitance | | --- | 187 | --- | |
| C_{riss} | Reverse transfer capacitance | | --- | 18 | --- | |
| R_g | Gate Resistance | $f=1MHz$ | --- | 4.3 | --- | Ω |
| Q_g | Total Gate Charge | $V_{DS}=15V$ $V_{GS}=10V$ $I_D=10A$ | --- | 11 | --- | nC |
| Q_{gs} | Gate Source Charge | | --- | 2.6 | --- | |
| Q_{gd} | Gate Drain Charge | | --- | 1.5 | --- | |
| $t_{d(on)}$ | Turn-on delay Time | $V_{DS}=15V$ $V_{GS}=10V$ $R_G=3\Omega$ $I_D=10A$ | --- | 5.7 | --- | ns |
| t_r | Rise time | | --- | 3.2 | --- | |
| $t_{d(off)}$ | Turn-off delay Time | | --- | 17.5 | --- | |
| t_f | Fall time | | --- | 4.5 | --- | |
| V_{SD} | Diode Forward Voltage | $V_{GS}=0V, I_{SD}=10A$ | --- | 0.7 | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_D=10A$ $d_i/d_t=100A/\mu s$ | --- | 13 | --- | ns |
| Q_{rr} | Reverse Recovery Charge | | --- | 19 | --- | nC |

Note:

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 3.Essentially independent of operating temperature.

Electrical Characteristics Diagrams

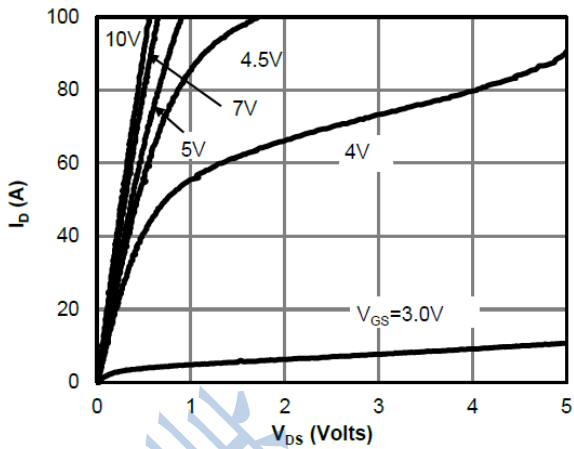


Figure 1. On-Region Characteristics

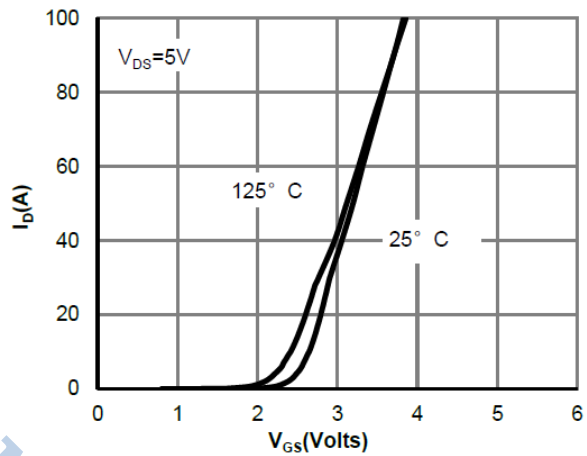


Figure 2. Transfer Characteristics

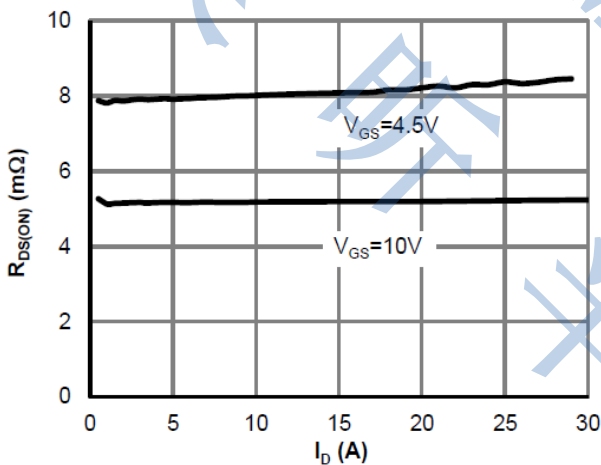


Figure 3. $R_{DS(on)}$ vs. I_D and Gate Voltage

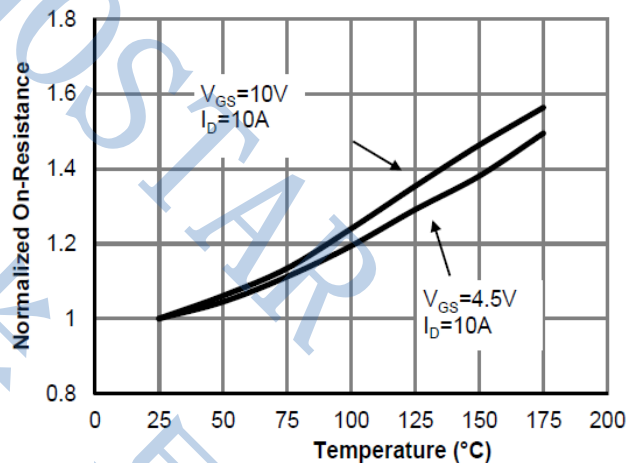


Figure 4. $R_{DS(on)}$ vs. Junction Temperature

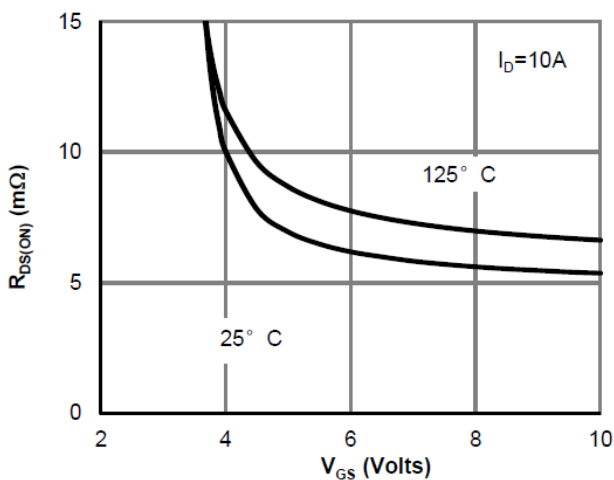


Figure 5. $R_{DS(on)}$ vs. Gate Voltage

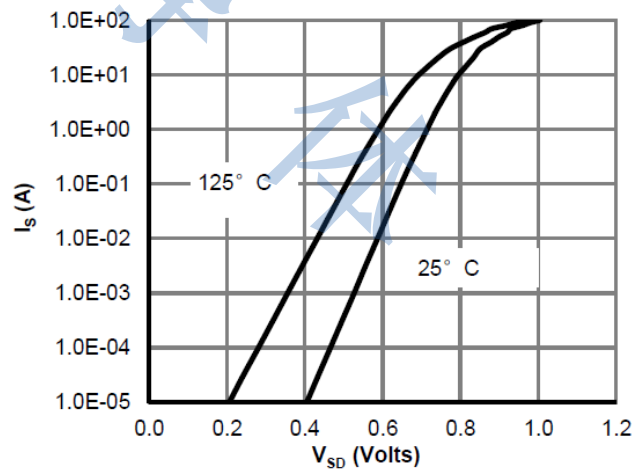


Figure 6. Body-Diode Characteristics

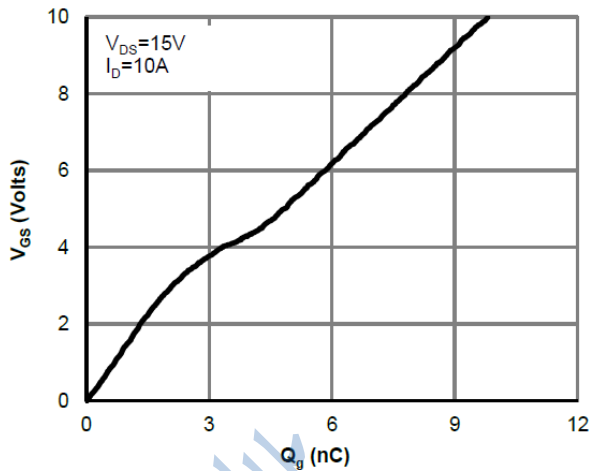


Figure 7. Gate-Charge Characteristics

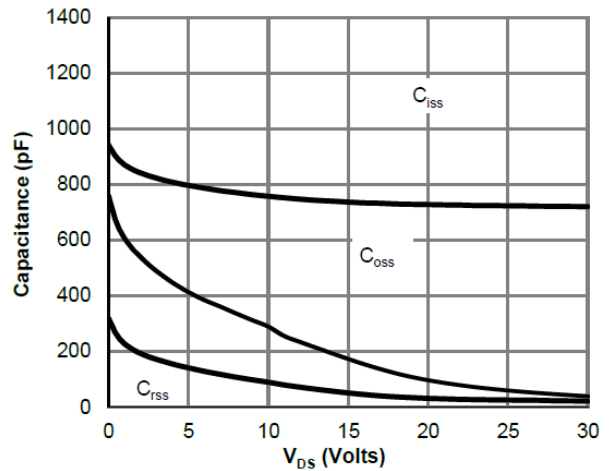


Figure 8. Capacitance Characteristics

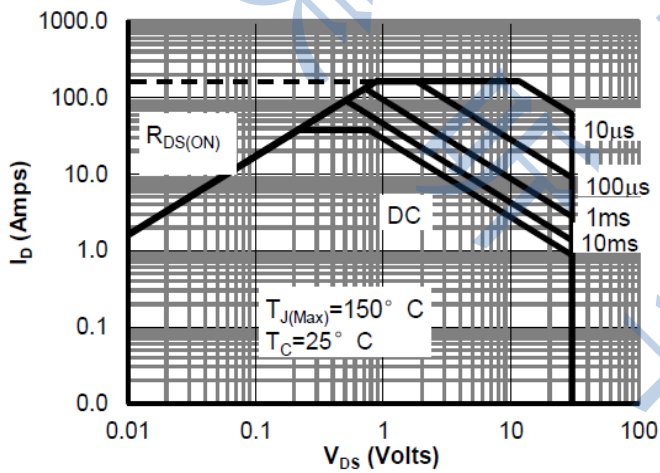


Figure 9. Safe Operating Area

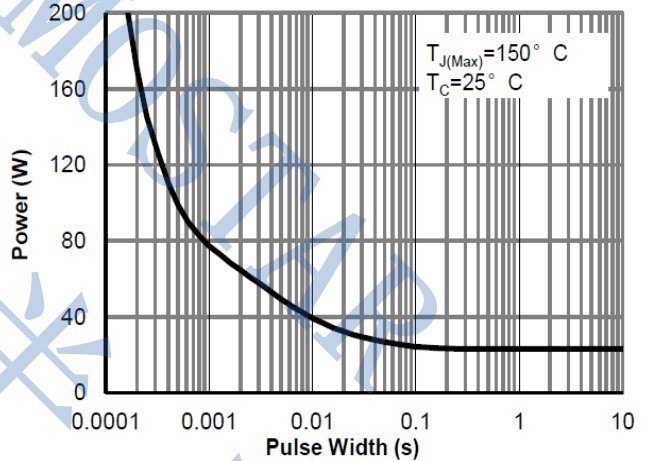
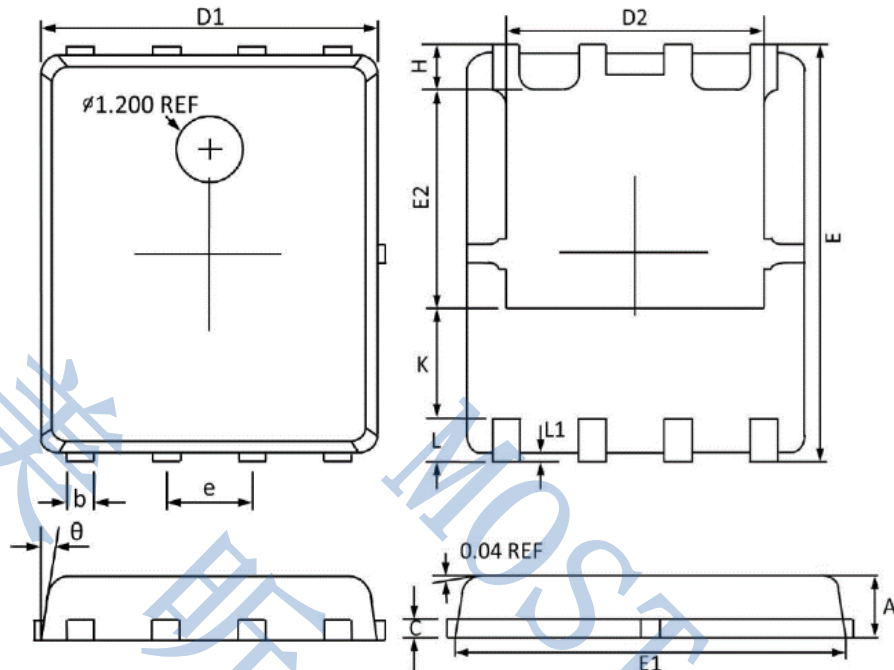


Figure 10. Single Pulse Power Rating
Junction-to-Ambient

PDFN5060 PACKAGE INFORMATION


| Symbol | Dimensions In Millimeters(mm) | |
|----------|-------------------------------|-------|
| | MIN | MAX |
| A | 0.800 | 1.100 |
| b | 0.330 | 0.510 |
| C | 0.200 | 0.300 |
| D1 | 4.800 | 5.100 |
| D2 | 3.610 | 4.100 |
| E | 5.900 | 6.200 |
| E1 | 5.700 | 5.900 |
| E2 | 3.350 | 3.780 |
| e | 1.27BSC | |
| H | 0.410 | 0.700 |
| K | 1.100 | 1.500 |
| L | 0.510 | 0.710 |
| L1 | 0.060 | 0.200 |
| θ | 0° | 12° |