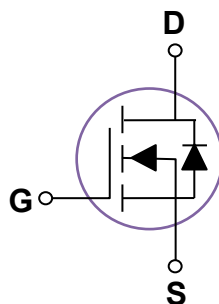
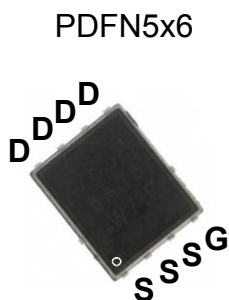


General Description

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. These devices are well suited for high efficiency fast switching applications.

Features

| | |
|---------------------------------|---------------------|
| V_{DS} | 45V |
| I_D (at $V_{GS}=10V$) | 140A |
| $R_{DS(ON)}$ (at $V_{GS}=10V$) | 1.6m Ω (Typ) |


Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

| Parameter | Symbol | Maximum | Units | |
|--|-------------------|------------|------------|---|
| Drain-Source Voltage | V_{DS} | 45 | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | V | |
| Drain Current-Continuous | TC=25 $^\circ C$ | I_D | 140 | A |
| | TC=100 $^\circ C$ | I_D | 90 | A |
| Drain Current – Pulsed | I_{DM} | 400 | A | |
| Maximum Power Dissipation | P_D | 73 | W | |
| Single pulse avalanche energy | E_{AS} | 529 | mJ | |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ | |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Unit |
|--|-----------------|-----|-----|----------------|
| Thermal Resistance junction-case | $R_{\theta JC}$ | | 1.3 | $^\circ C / W$ |
| Thermal Resistance junction-to-Ambient | $R_{\theta JA}$ | | 62 | $^\circ C / W$ |

Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Condition | Min | Typ | Max | Unit | |
|---|----------------------------------|---|-----|------|------|------|----|
| STATIC PARAMETERS | | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 45 | | | V | |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =40V, V _{GS} =0V | | | 1 | μA | |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.8 | 3.0 | V | |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =10V, I _D =40A | | 1.6 | 2.2 | mΩ | |
| | | V _{GS} =4.5V, I _D =20A | | 2.3 | 3.5 | mΩ | |
| gfs | Forward Transconductance | V _{DS} =10V, I _D =40A | | 60 | | S | |
| DYNAMIC PARAMETERS | | | | | | | |
| C _{ISS} | Input Capacitance | V _{DS} =20V, V _{GS} =0V, F=1.0MHz | | 4000 | | pF | |
| C _{OSS} | Output Capacitance | | | | 150 | | pF |
| C _{RSS} | Reverse Transfer Capacitance | | | | 2.5 | | pF |
| SWITCHING PARAMETERS | | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =20V, I _D =40A, V _{GS} =10V, R _G =3Ω | | 15 | | nS | |
| t _r | Turn-on Rise Time | | | 25 | | nS | |
| t _{d(off)} | Turn-Off Delay Time | | | 68 | | nS | |
| t _f | Turn-Off Fall Time | | | 26 | | nS | |
| Q _g | Total Gate Charge | V _{DS} =20V, I _D =40A, V _{GS} =10V | | 62 | | nC | |
| Q _{gs} | Gate-Source Charge | | | 12 | | nC | |
| Q _{gd} | Gate-Drain Charge | | | 10 | | nC | |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _{SD} =1A | | 0.72 | 1.3 | V | |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | | 2 | | Ω | |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | | |
| I _S | Continuous Source Current | V _G =V _D =0V, Force Current | | | 140 | A | |
| I _{SM} | Pulsed Source Current | | | | 280 | A | |
| t _{rr} | Reverse Recovery Time | V _{GS} =0V, I _S =40A, | | 48 | | nS | |
| Q _{rr} | Reverse Recovery Charge | di/dt=100A/μs T _J =25°C | | 55 | | nC | |

Note:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=46A, Starting T_J=25°C
3. The data tested by pulsed, pulse width ≦ 300us, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

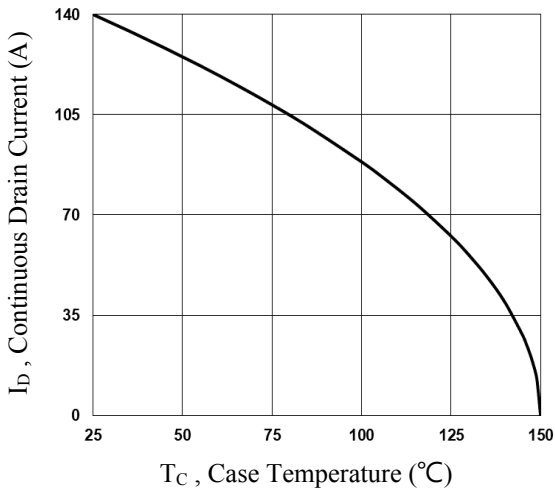


Fig.1 Continuous Drain Current vs. T_c

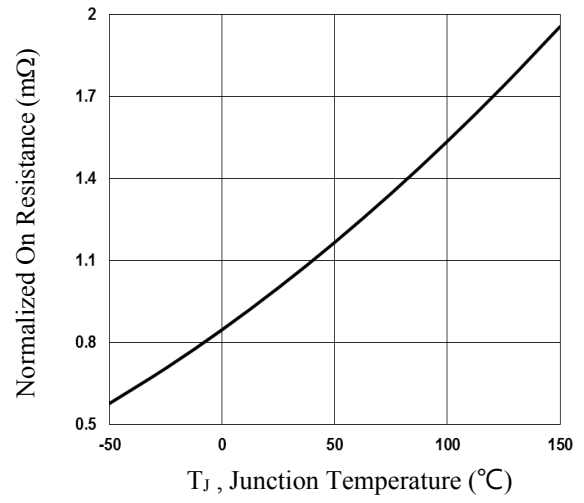


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

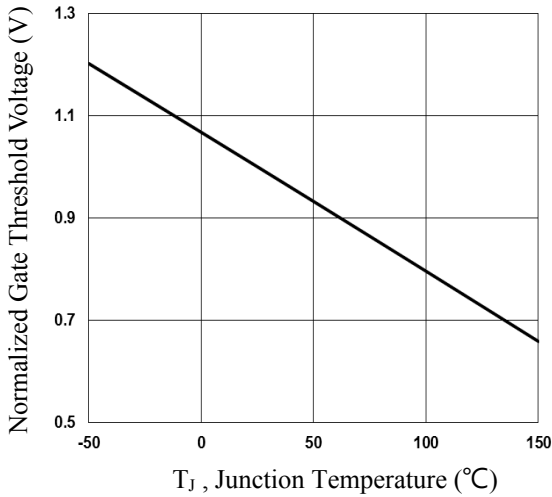


Fig.3 Normalized V_{th} vs. T_j

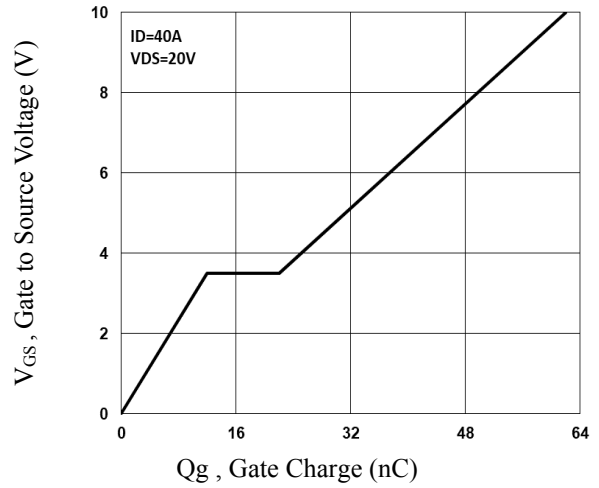


Fig.4 Gate Charge Characteristics

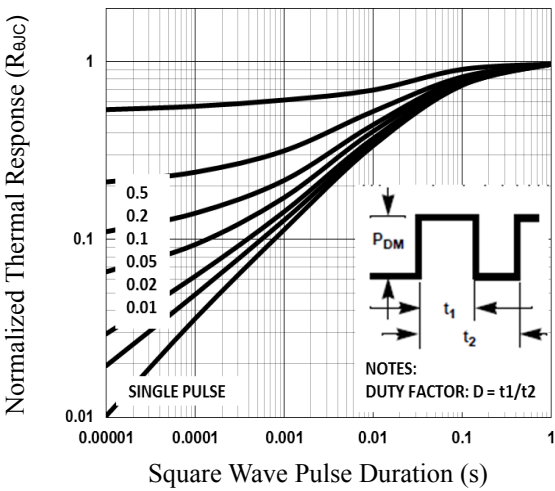


Fig.5 Normalized Transient Impedance

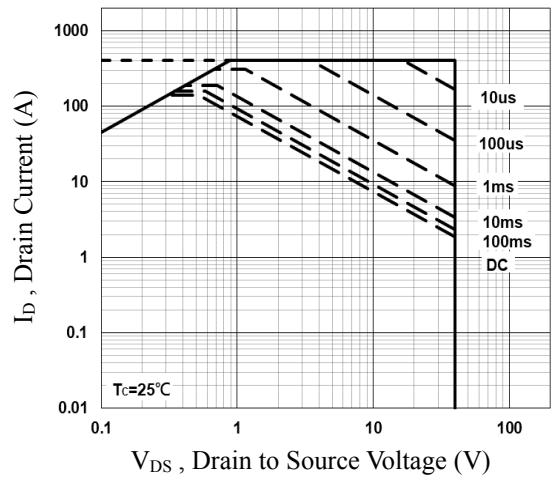


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

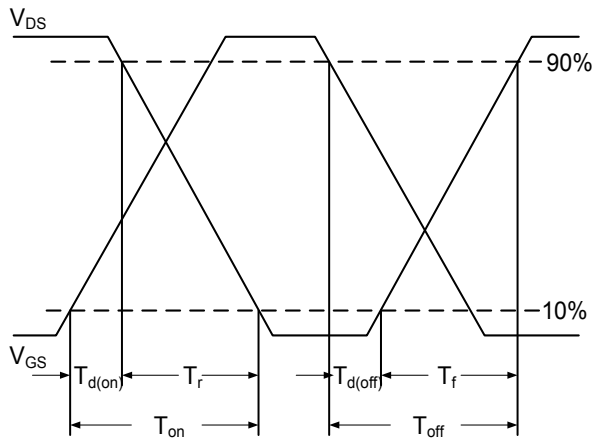


Fig.7 Switching Time Waveform

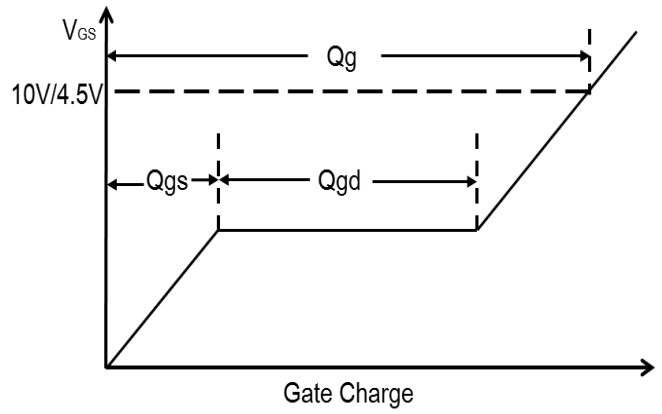
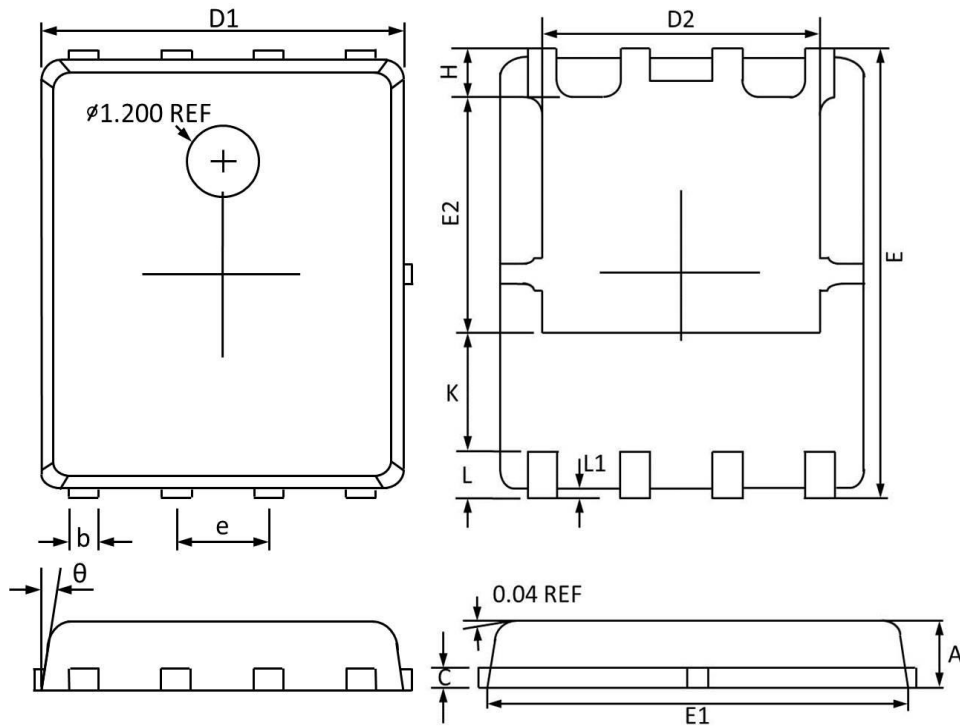


Fig.8 Gate Charge Waveform

PDFN5x6 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | MAX | MIN | MAX | MIN |
| A | 1.100 | 0.800 | 0.043 | 0.031 |
| b | 0.510 | 0.330 | 0.020 | 0.013 |
| C | 0.300 | 0.200 | 0.012 | 0.008 |
| D1 | 5.100 | 4.800 | 0.201 | 0.189 |
| D2 | 4.100 | 3.610 | 0.161 | 0.142 |
| E | 6.200 | 5.900 | 0.244 | 0.232 |
| E1 | 5.900 | 5.700 | 0.232 | 0.224 |
| E2 | 3.780 | 3.350 | 0.149 | 0.132 |
| e | 1.27BSC | | 0.05BSC | |
| H | 0.700 | 0.410 | 0.028 | 0.016 |
| K | 1.500 | 1.100 | 0.059 | 0.043 |
| L | 0.710 | 0.510 | 0.028 | 0.020 |
| L1 | 0.200 | 0.060 | 0.008 | 0.002 |
| θ | 12° | 0° | 12° | 0° |