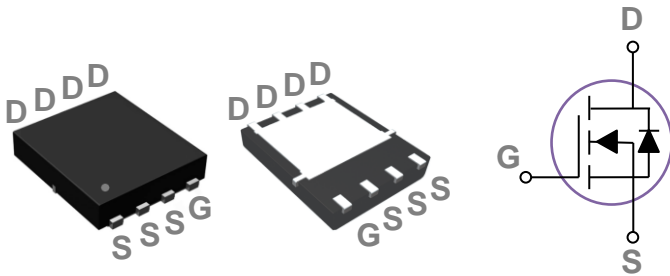


General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS 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.

| | | |
|-------|-------|-----|
| BVDSS | RDSON | ID |
| 150V | 19mΩ | 65A |

PPAK5X6 Pin Configuration



Features

- 150V,65A, $R_{DS(ON)} = 19m\Omega$ @ $V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

Applications

- Motor Drive
- Power Tools
- LED Lighting
- Quick Charger

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

| Symbol | Parameter | Rating | Units |
|-----------|--|------------|---------------|
| V_{DS} | Drain-Source Voltage | 150 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_C=25^\circ C$) | 65 | A |
| | Drain Current – Continuous ($T_C=100^\circ C$) | 41 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 260 | A |
| EAS | Single Pulse Avalanche Energy ² | 153 | mJ |
| IAS | Single Pulse Avalanche Current ² | 17.5 | A |
| P_D | Power Dissipation ($T_C=25^\circ C$) | 192 | W |
| | Power Dissipation – Derate above $25^\circ C$ | 1.54 | W/ $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 62 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 0.65 | $^\circ C/W$ |

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------|--------------------------------|--|------|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 150 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =120V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | μA |
| | | V _{DS} =120V, V _{GS} =0V, T _J =85°C | --- | --- | 10 | μA |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |

On Characteristics

| | | | | | | |
|---------------------|--|--|-----|----|-----|----|
| R _{DS(ON)} | Static Drain-Source On-Resistance ³ | V _{GS} =10V, I _D =25A | --- | 16 | 19 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250μA | 2 | 3 | 4 | V |
| g _{fs} | Forward Transconductance | V _{DS} =10V, I _D =3A | --- | 11 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|---------------------|-------------------------------------|---|-----|------|------|----|
| Q _g | Total Gate Charge ^{3, 4} | V _{DS} =75V, V _{GS} =10V, I _D =30A | --- | 39 | 60 | nC |
| Q _{gs} | Gate-Source Charge ^{3, 4} | | --- | 9.5 | 15 | |
| Q _{gd} | Gate-Drain Charge ^{3, 4} | | --- | 15 | 23 | |
| T _{d(on)} | Turn-On Delay Time ^{3, 4} | V _{DD} =75V, V _{GS} =10V, R _G =6Ω I _D =30A | --- | 15 | 23 | ns |
| T _r | Rise Time ^{3, 4} | | --- | 28 | 42 | |
| T _{d(off)} | Turn-Off Delay Time ^{3, 4} | | --- | 45 | 68 | |
| T _f | Fall Time ^{3, 4} | | --- | 32 | 48 | |
| C _{iss} | Input Capacitance | V _{DS} =75V, V _{GS} =0V, F=1MHz | --- | 2300 | 3450 | pF |
| C _{oss} | Output Capacitance | | --- | 220 | 330 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 10 | 15 | |
| R _g | Gate Resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | --- | 1.5 | --- | Ω |

Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--------------------------------------|---|------|------|------|------|
| I _S | Continuous Source Current | V _G =V _D =0V, Force Current | --- | --- | 65 | A |
| I _{SM} | Pulsed Source Current | | --- | --- | 130 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1 | V |
| t _{rr} | Reverse Recovery Time ³ | V _R =100V, I _S =10A | --- | 90 | --- | ns |
| Q _{rr} | Reverse Recovery Charge ³ | di/dt=100A/μs, T _J =25°C | --- | 355 | --- | nC |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, V_{GS}=10V, L=1mH, I_{AS}=17.5A., R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

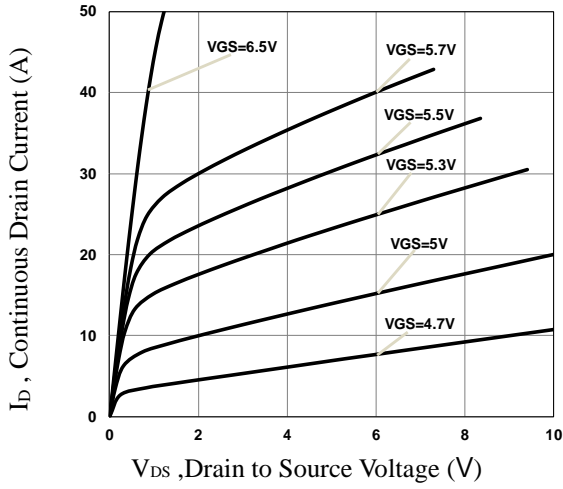


Fig.1 Typical Output Characteristics

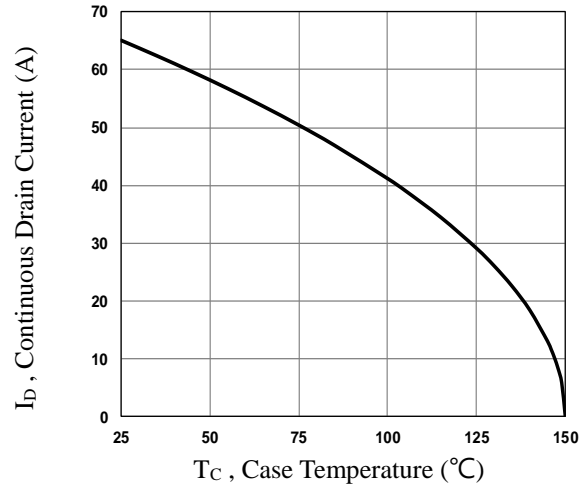


Fig.2 Continuous Drain Current vs. T_c

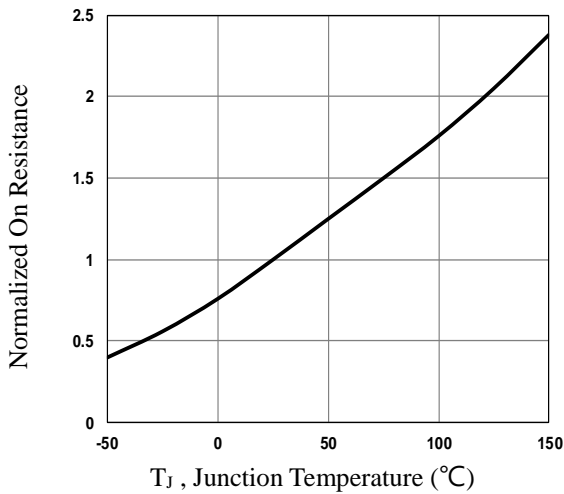


Fig.3 Normalized R_{DS(on)} vs. T_j

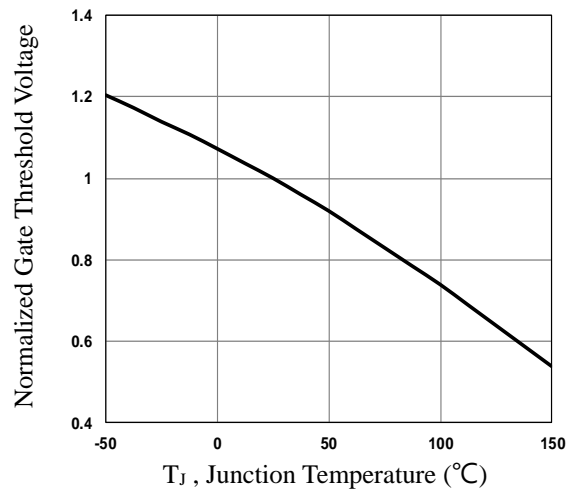


Fig.4 Normalized V_{th} vs. T_j

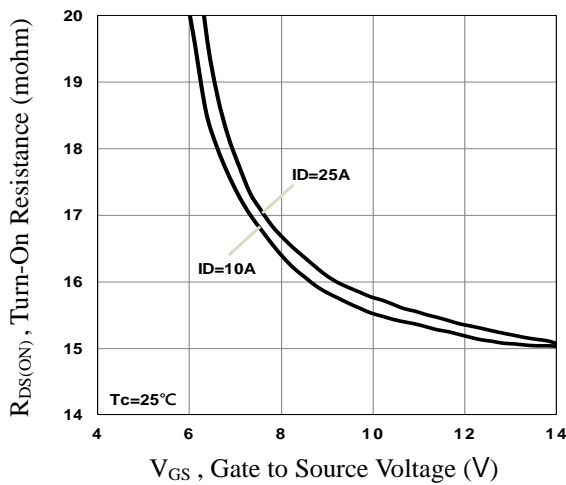


Fig.5 Turn-On Resistance vs. V_{GS}

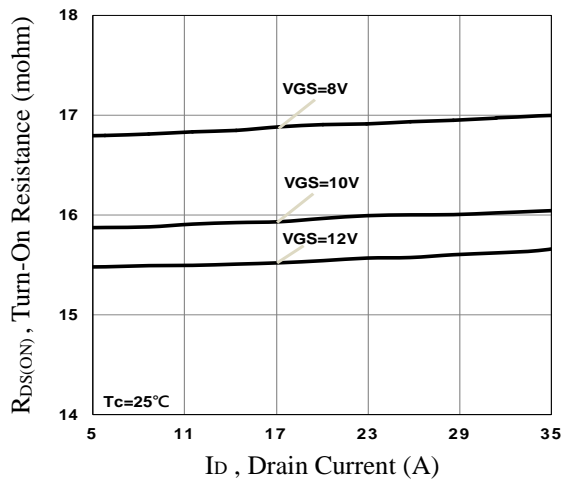


Fig.6 Turn-On Resistance vs. I_D

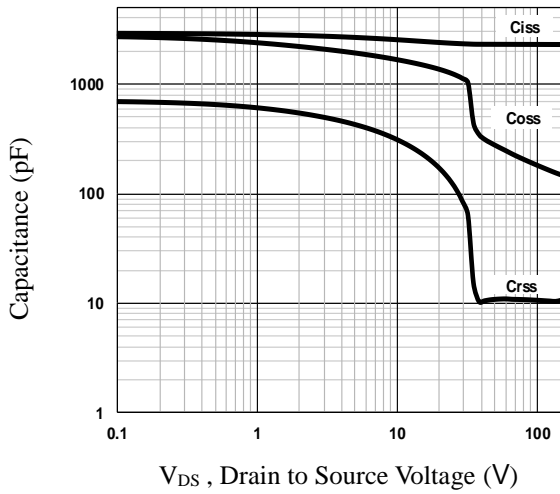


Fig.7 Capacitance Characteristics

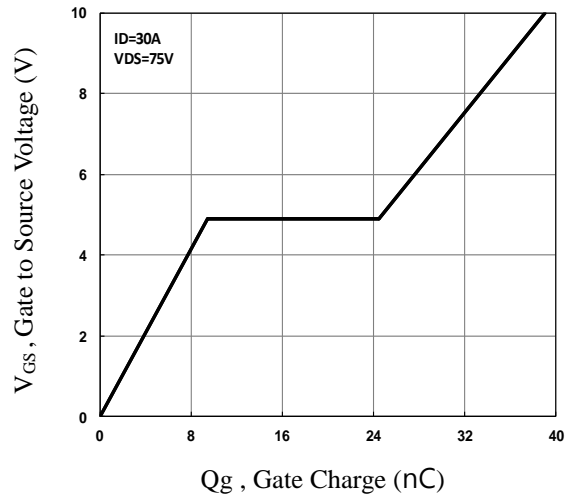


Fig.8 Gate Charge Characteristics

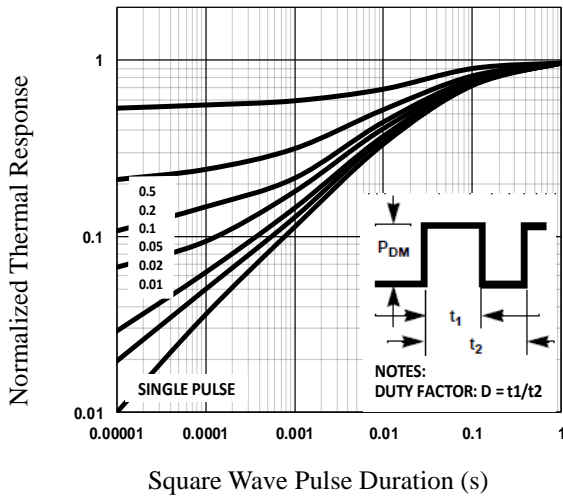


Fig.9 Normalized Transient Impedance

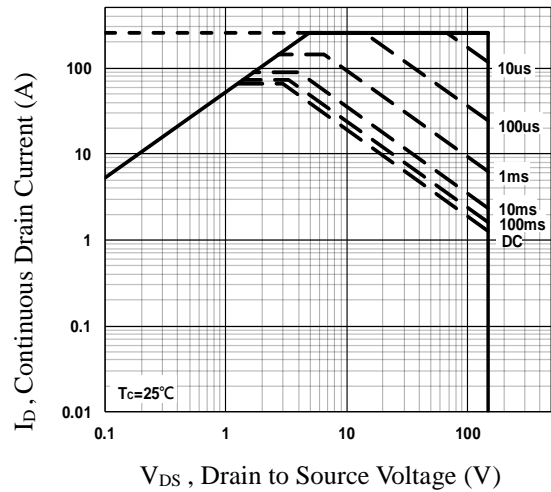


Fig.10 Maximum Safe Operation Area

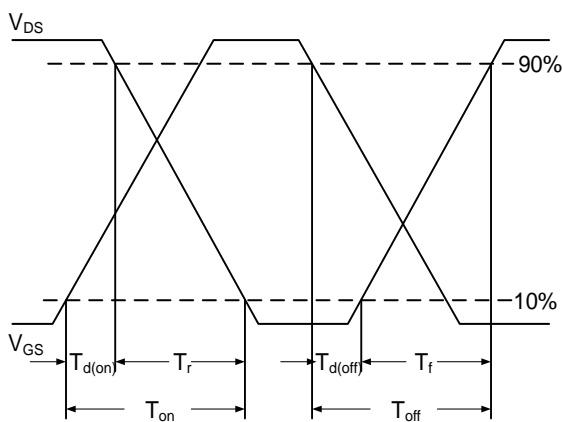


Fig.11 Switching Time Waveform

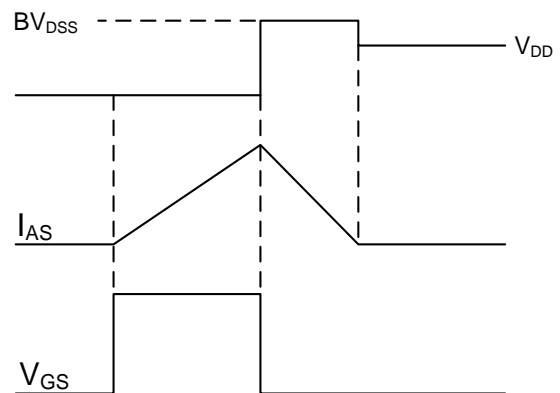


Fig.12 EAS Waveform

PPAK5x6 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | MAX | MIN | MAX | MIN |
| A | 1.200 | 0.850 | 0.047 | 0.031 |
| b | 0.510 | 0.330 | 0.020 | 0.013 |
| C | 0.300 | 0.200 | 0.012 | 0.008 |
| D1 | 5.400 | 4.800 | 0.212 | 0.189 |
| D2 | 4.310 | 3.610 | 0.170 | 0.142 |
| E | 6.300 | 5.850 | 0.248 | 0.230 |
| E1 | 5.960 | 5.450 | 0.235 | 0.215 |
| E2 | 3.920 | 3.300 | 0.154 | 0.130 |
| e | 1.27BSC | | 0.05BSC | |
| H | 0.650 | 0.380 | 0.026 | 0.015 |
| K | --- | 1.100 | --- | 0.043 |
| L | 0.710 | 0.380 | 0.028 | 0.015 |
| L1 | 0.250 | 0.050 | 0.009 | 0.002 |
| theta | 12° | 0° | 12° | 0° |