

General Description

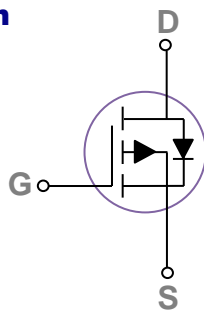
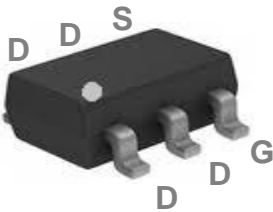
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

| | | |
|-------|-------|-----|
| BVDSS | RDSON | ID |
| -30V | 32mΩ | -8A |

Features

- -30V, -8A, $R_{DS(ON)} = 32m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

SOT23-6 Pin Configuration



Applications

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Rating | Units |
|-----------|--|------------|---------------------|
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_C=25^\circ\text{C}$) | -8 | A |
| | Drain Current – Continuous ($T_C=100^\circ\text{C}$) | -5.1 | A |
| | Drain Current – Continuous ($T_A=25^\circ\text{C}$) | -5.5 | A |
| | Drain Current – Continuous ($T_A=70^\circ\text{C}$) | -4.4 | A |
| I_{DM} | Drain Current – Pulsed ¹ | -32 | A |
| EAS | Single Pulse Avalanche Energy ² | 39.2 | mJ |
| IAS | Single Pulse Avalanche Current ² | 28 | A |
| P_D | Power Dissipation ($T_C=25^\circ\text{C}$) | 1.56 | W |
| | Power Dissipation – Derate above 25°C | 0.012 | W/ $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 80 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 38 | $^\circ\text{C/W}$ |

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|------------------------------------|---|------|-------|-----------|--------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | -30 | --- | --- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | BV_{DSS} Temperature Coefficient | Reference to 25°C , $I_D=-1\text{mA}$ | --- | -0.03 | --- | $V/^\circ\text{C}$ |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | -1 | μA |
| | | $V_{DS}=-24V, V_{GS}=0V, T_J=125^\circ\text{C}$ | --- | --- | -10 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |

On Characteristics

| | | | | | | |
|---------------------|--------------------------------------|--------------------------------|------|------|------|---------------------|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=-10V, I_D=-4A$ | --- | 27 | 32 | $m\Omega$ |
| | | $V_{GS}=-4.5V, I_D=-2A$ | --- | 38 | 46 | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=-250\mu A$ | -1.2 | -1.6 | -2.2 | V |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 4 | --- | $mV/^\circ\text{C}$ |
| g_{fs} | Forward Transconductance | $V_{DS}=-10V, I_D=-3A$ | --- | 9 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|--------------|-------------------------------------|--|-----|------|------|----|
| Q_g | Total Gate Charge ^{2, 3} | $V_{DS}=-15V, V_{GS}=-10V, I_D=-5A$ | --- | 17.8 | 35 | nC |
| Q_{gs} | Gate-Source Charge ^{2, 3} | | --- | 3.3 | 6 | |
| Q_{gd} | Gate-Drain Charge ^{2, 3} | | --- | 2.3 | 5 | |
| $T_{d(on)}$ | Turn-On Delay Time ^{2, 3} | $V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega$ $I_D=-1A$ | --- | 4.6 | 9 | ns |
| T_r | Rise Time ^{2, 3} | | --- | 14 | 26 | |
| $T_{d(off)}$ | Turn-Off Delay Time ^{2, 3} | | --- | 34 | 58 | |
| T_f | Fall Time ^{2, 3} | | --- | 18 | 35 | |
| C_{iss} | Input Capacitance | $V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$ | --- | 757 | 1280 | pF |
| C_{oss} | Output Capacitance | | --- | 122 | 210 | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 88 | 175 | |

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 | --- | --- | -8 | A |
| I_{SM} | Pulsed Source Current | | --- | --- | -16 | A |
| V_{SD} | Diode Forward Voltage | $V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$ | --- | --- | -1 | V |

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.

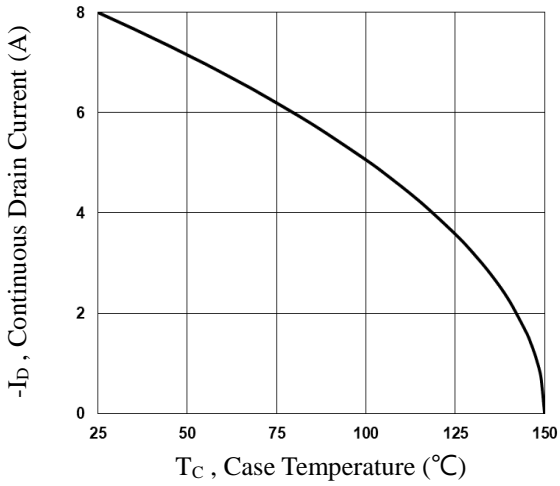


Fig.1 Continuous Drain Current vs. T_c

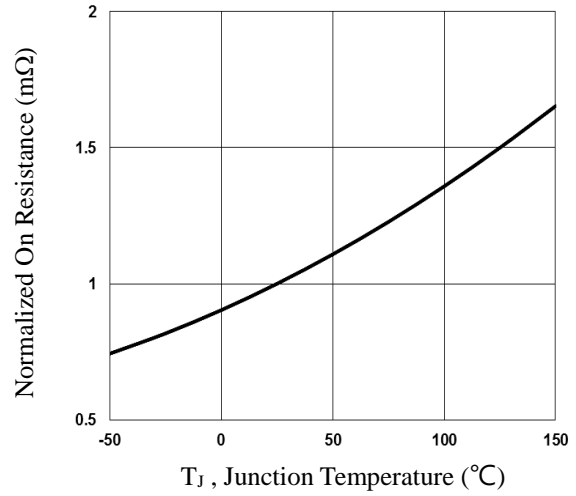


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

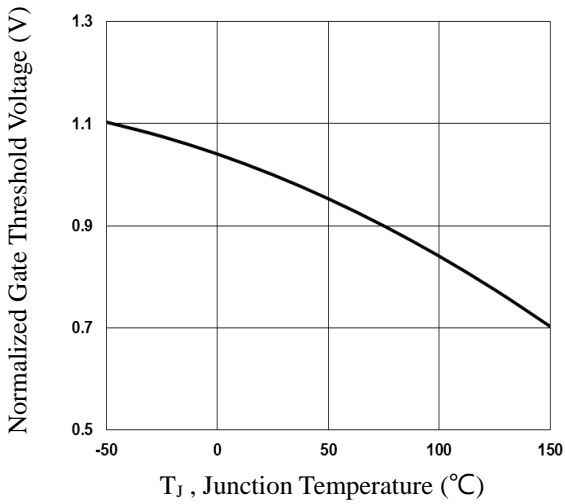


Fig.3 Normalized V_{th} vs. T_j

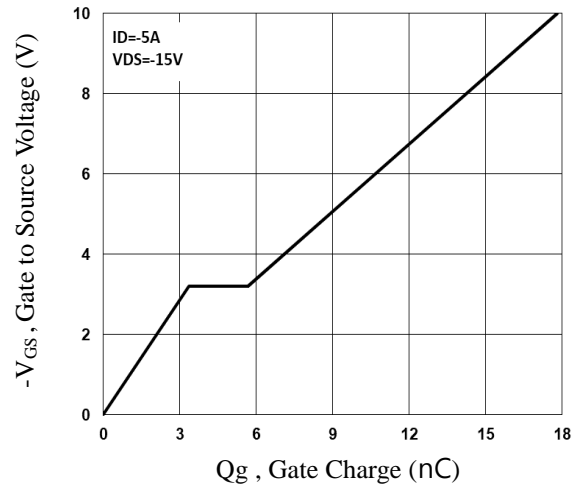


Fig.4 Gate Charge Waveform

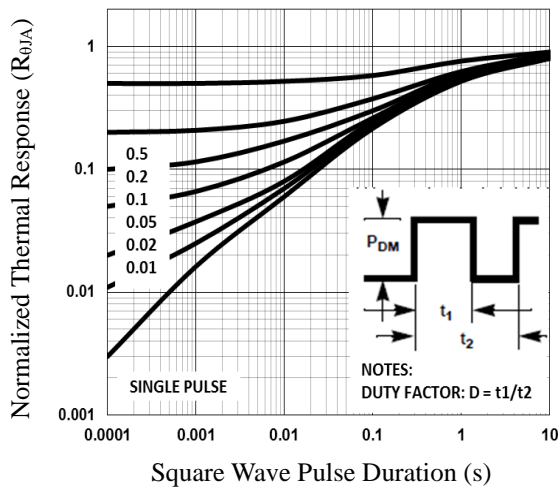


Fig.5 Normalized Transient Impedance

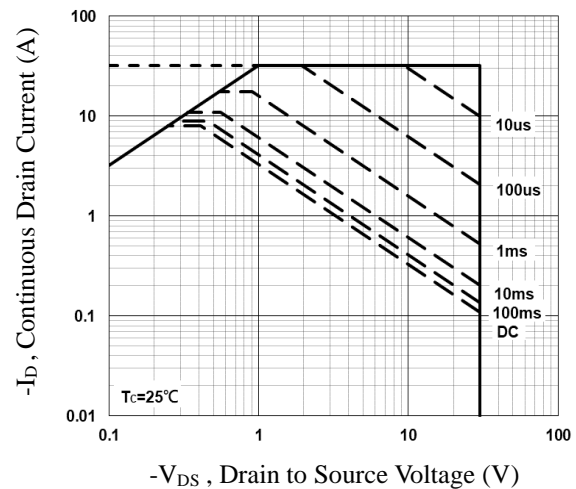


Fig.6 Maximum Safe Operation Area

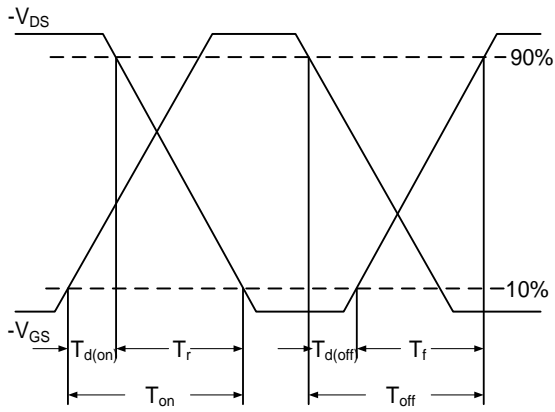


Fig.7 Switching Time Waveform

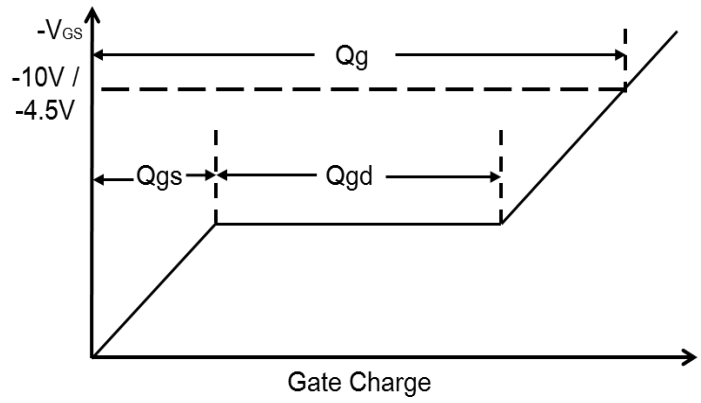
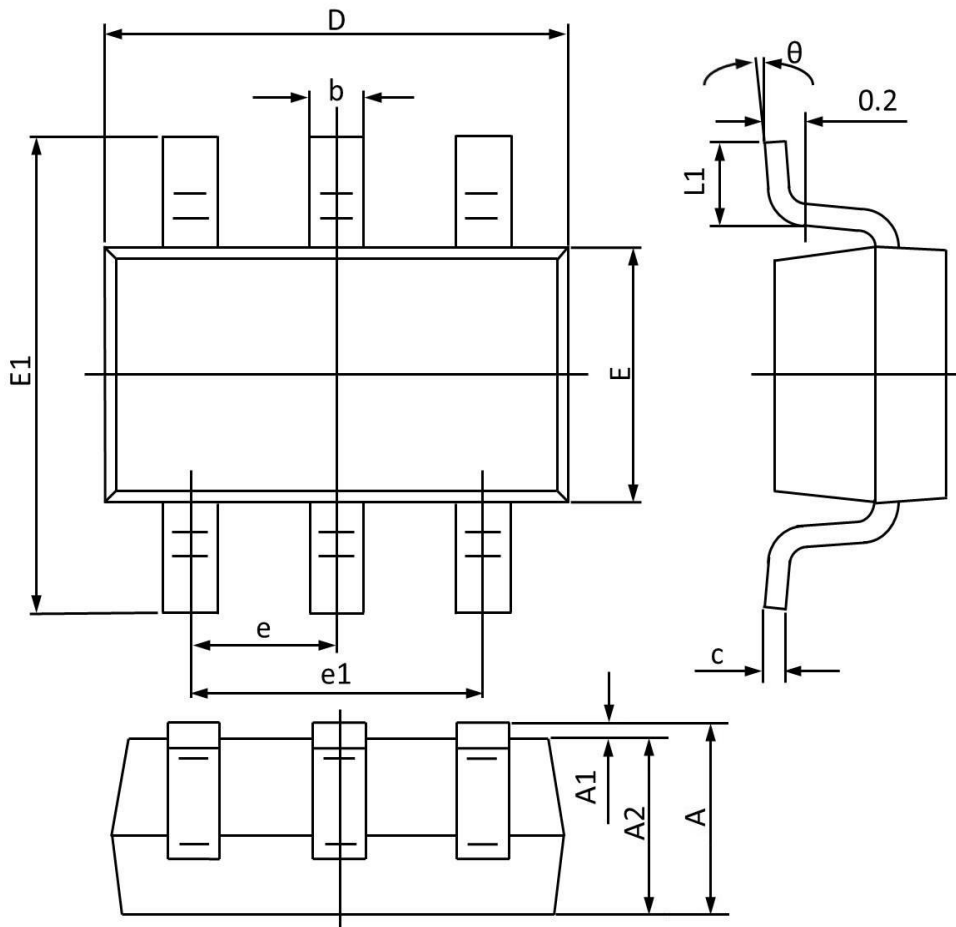


Fig.8 Gate Charge Waveform

SOT23-6 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | MAX | MIN | MAX | MIN |
| A | 1.450 | - | 0.057 | - |
| A1 | 0.100 | 0.000 | 0.004 | 0.000 |
| A2 | 1.300 | 1.050 | 0.051 | 0.041 |
| b | 0.500 | 0.300 | 0.020 | 0.012 |
| c | 0.200 | 0.100 | 0.008 | 0.004 |
| D | 3.100 | 2.700 | 0.122 | 0.106 |
| E | 1.800 | 1.400 | 0.071 | 0.055 |
| E1 | 3.000 | 2.600 | 0.118 | 0.102 |
| e | 0.95BSC | | 0.037BSC | |
| e1 | 2.000 | 1.800 | 0.079 | 0.071 |
| L1 | 0.600 | 0.300 | 0.024 | 0.012 |
| θ | 10° | 0° | 10° | 0° |