## 30V P-Channel MOSFETs

### 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 | 15.5mΩ | -10A |

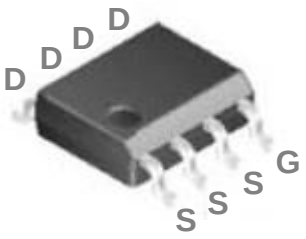
### Features

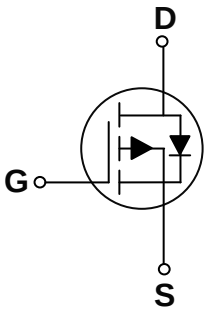
- *-30V,-10A, RDS(ON) =15.5mΩ@VGS = -10V*
- *Fast switching*
- *Green Device Available*
- *Suit for -4.5V Gate Drive Applications*

### Applications

- *MB / VGA / Vcore*
- *POL Applications*
- *Load Switch*
- *LED Application*

### SOP-8 Pin Configuration




### Absolute Maximum Ratings (Tc=25℃ 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℃) | -10 | A |
| | Drain Current – Continuous ($T_C$=100℃) | -6.3 | A |
| $I_{DM}$ | Drain Current – Pulsed[1] | -40 | A |
| $P_D$ | Power Dissipation ($T_C$=25℃) | 2.5 | W |
| | Power Dissipation – Derate above 25℃ | 0.02 | W/℃ |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

### Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 50 | ℃/W |

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### Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

#### Off Characteristics

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

#### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=-10V , $I_D$=-8A | --- | 12.4 | 15.5 | mΩ |
| | | $V_{GS}$=-4.5V , $I_D$=-6A | --- | 19.2 | 25 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =-250uA | -1.0 | -1.6 | -2.5 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 4 | --- | mV/℃ |
| gfs | Forward Transconductance | $V_{DS}$=-10V , $I_D$=-8A | --- | 10.5 | --- | S |

#### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge[2,3] | $V_{DS}$=-15V , $V_{GS}$=-4.5V , $I_D$=-8A | --- | 14.6 | 21 | nC |
| $Q_{gs}$ | Gate-Source Charge[2,3] | | --- | 4.1 | 6 | |
| $Q_{gd}$ | Gate-Drain Charge[2,3] | | --- | 6.3 | 9 | |
| $T_{d(on)}$ | Turn-On Delay Time[2,3] | $V_{DD}$=-15V , $V_{GS}$=-10V , $R_G$=6Ω , $I_D$=-1A | --- | 9 | 17 | ns |
| $T_r$ | Rise Time[2,3] | | --- | 21.8 | 41 | |
| $T_{d(off)}$ | Turn-Off Delay Time[2,3] | | --- | 59.8 | 114 | |
| $T_f$ | Fall Time[2,3] | | --- | 14.4 | 27 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-15V , $V_{GS}$=0V , F=1MHz | --- | 1730 | 2510 | pF |
| $C_{oss}$ | Output Capacitance | | --- | 180 | 260 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 125 | 180 | |

#### 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 | --- | --- | -10 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | -40 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=-1A , $T_J$=25℃ | --- | --- | -1 | V |

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦300us , duty cycle ≦2%.
3. Essentially independent of operating temperature.

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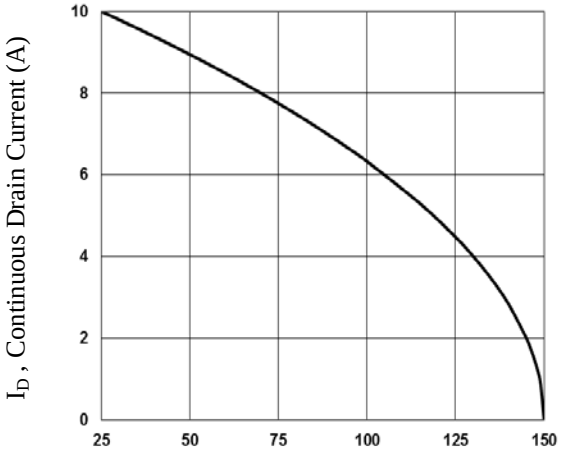



Fig.1 Continuous Drain Current vs. $T_C$

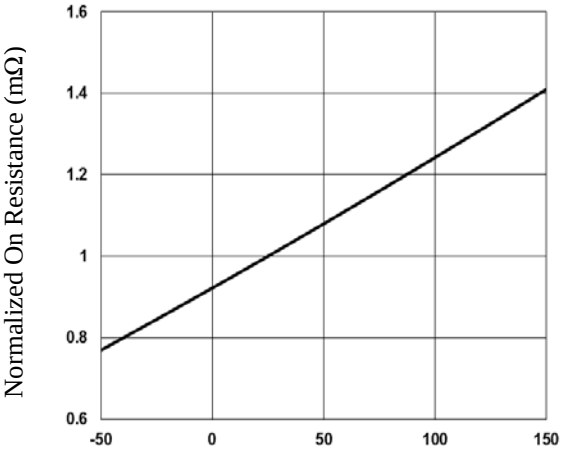



Fig.2 Normalized RDSON vs. $T_J$

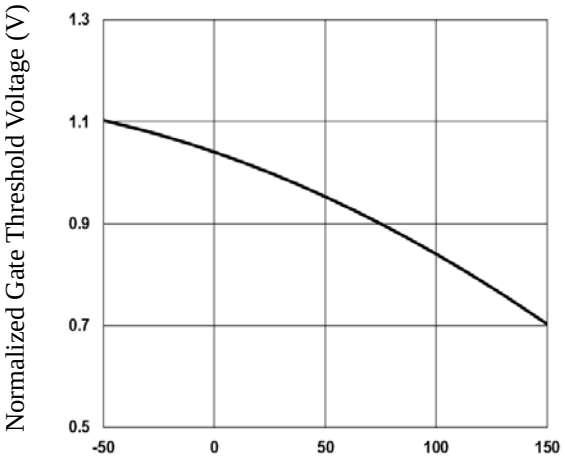



Fig.3 Normalized $V_{th}$ vs. $T_J$

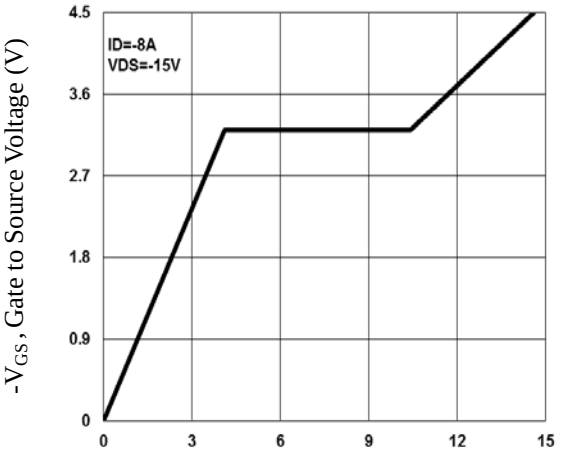



Fig.4 Gate Charge Waveform

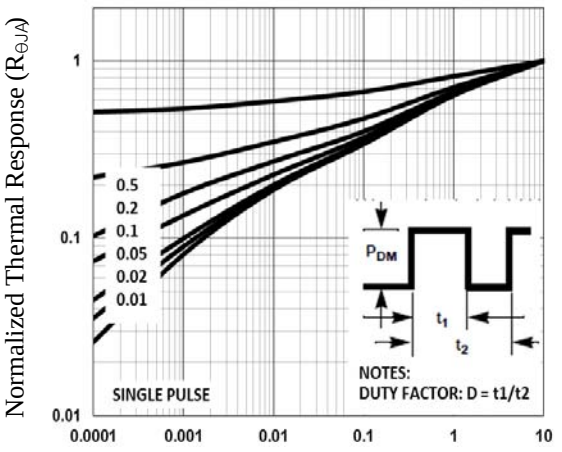



Fig.5 Normalized Transient Impedance

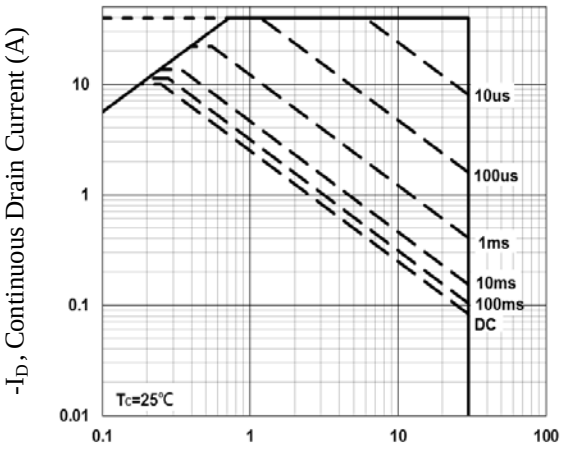



Fig.6 Maximum Safe Operation Area

## 30V P-Channel MOSFETs

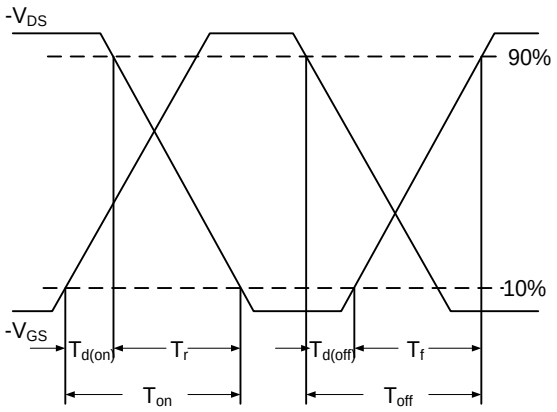



Fig.7 Switching Time Waveform

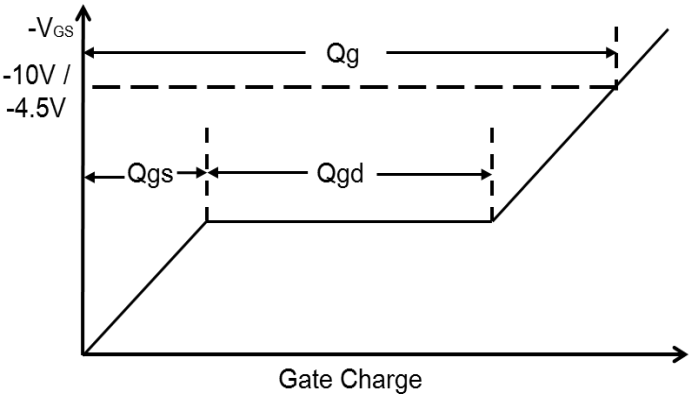
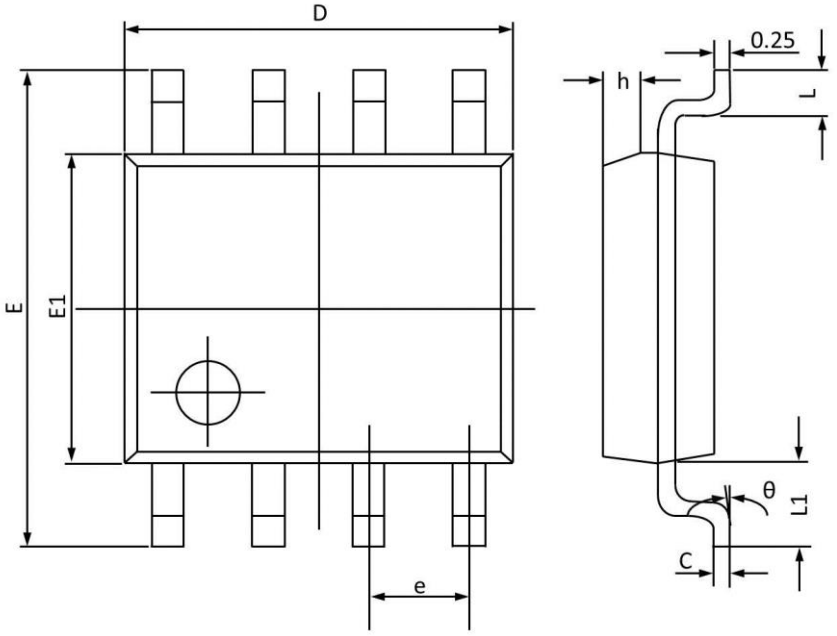
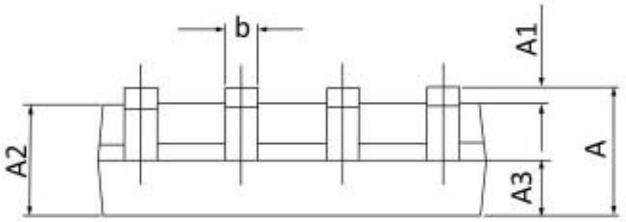



Fig.8 Gate Charge Waveform

**30V P-Channel MOSFETs**

# SOP-8 PACKAGE INFORMATION




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.068 |
| A1 | 0.100 | 0.250 | 0.004 | 0.009 |
| A2 | 1.300 | 1.500 | 0.052 | 0.059 |
| A3 | 0.600 | 0.700 | 0.024 | 0.027 |
| b | 0.390 | 0.480 | 0.016 | 0.018 |
| c | 0.210 | 0.260 | 0.009 | 0.010 |
| D | 4.700 | 5.100 | 0.186 | 0.200 |
| E | 5.800 | 6.200 | 0.229 | 0.244 |
| E1 | 3.700 | 4.100 | 0.146 | 0.161 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| h | 0.250 | 0.500 | 0.010 | 0.019 |
| L | 0.500 | 0.800 | 0.019 | 0.031 |
| L1 | 1.050(BSC) | | 0.041(BSC) | |
| θ | 0° | 8° | 0° | 8° |