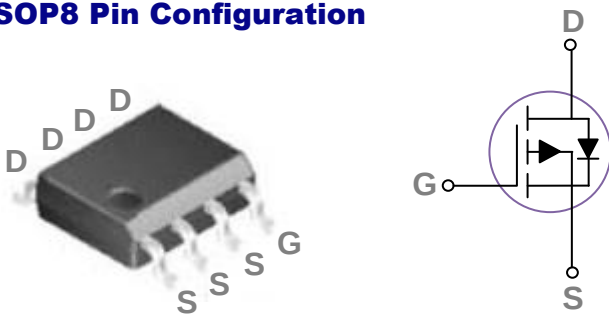


## General Description

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.

## SOP8 Pin Configuration



| BVDSS | RDS(on) | ID  |
|-------|---------|-----|
| -30V  | 20mΩ    | -8A |

## Features

- -30V, -8A,  $R_{DS(ON)} = 20m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

## Applications

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

## 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                                    | $\pm 20$   | 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                   |
| $I_{DM}$  | Drain Current – Pulsed <sup>1</sup>                    | -32        | A                   |
| $P_D$     | Power Dissipation ( $T_C=25^\circ\text{C}$ )           | 2.1        | W                   |
|           | Power Dissipation – Derate above $25^\circ\text{C}$    | 0.017      | 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 | ---  | 60   | $^\circ\text{C/W}$ |

**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 $25^{\circ}\text{C}$ , $I_D=-1mA$          | ---  | -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        | $\mu A$              |
|                              |                                    | $V_{DS}=-24V$ , $V_{GS}=0V$ , $T_J=125^{\circ}\text{C}$ | ---  | ---   | -10       | $\mu A$              |
| $I_{GSS}$                    | Gate-Source Leakage Current        | $V_{GS}=\pm 20V$ , $V_{DS}=0V$                          | ---  | ---   | $\pm 100$ | nA                   |

**On Characteristics**

|                     |                                      |                                   |      |      |      |                       |
|---------------------|--------------------------------------|-----------------------------------|------|------|------|-----------------------|
| $R_{DS(ON)}$        | Static Drain-Source On-Resistance    | $V_{GS}=-10V$ , $I_D=-8A$         | ---  | 16.5 | 20   | $m\Omega$             |
|                     |                                      | $V_{GS}=-4.5V$ , $I_D=-5A$        | ---  | 25.6 | 32   | $m\Omega$             |
| $V_{GS(th)}$        | Gate Threshold Voltage               | $V_{GS}=V_{DS}$ , $I_D=-250\mu A$ | -1.0 | -1.6 | -2.5 | V                     |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient |                                   | ---  | 4    | ---  | $mV/^{\circ}\text{C}$ |
| gfs                 | Forward Transconductance             | $V_{DS}=-10V$ , $I_D=-3A$         | ---  | 6.8  | ---  | S                     |

**Dynamic and switching Characteristics**

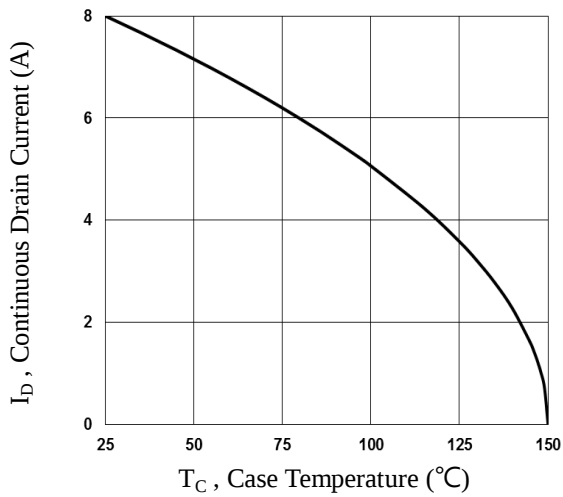
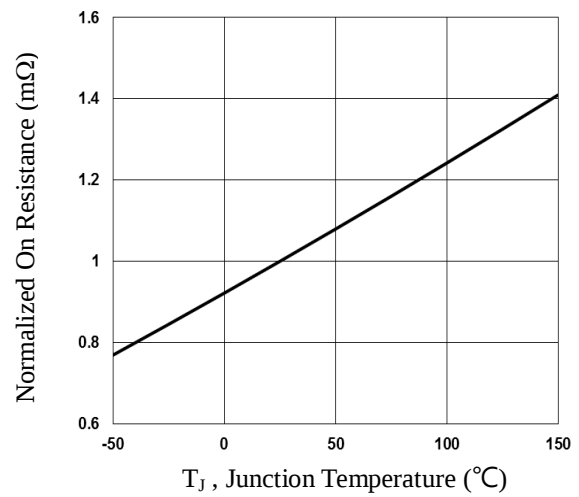
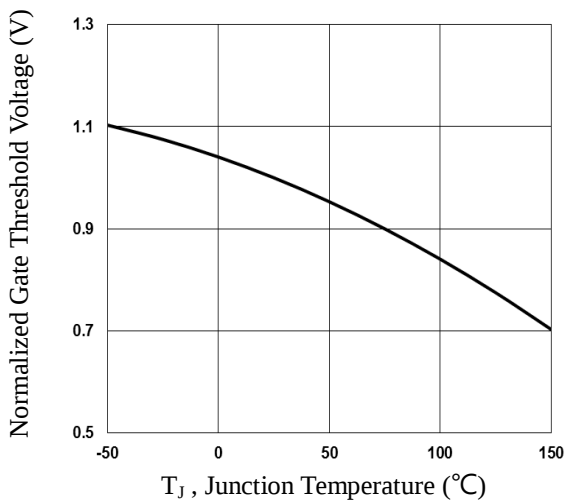
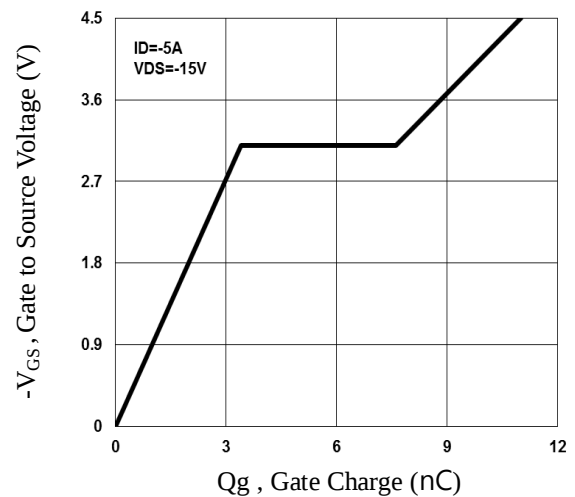
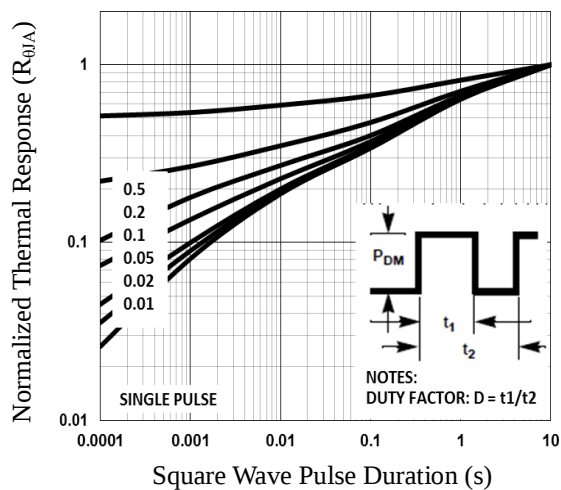
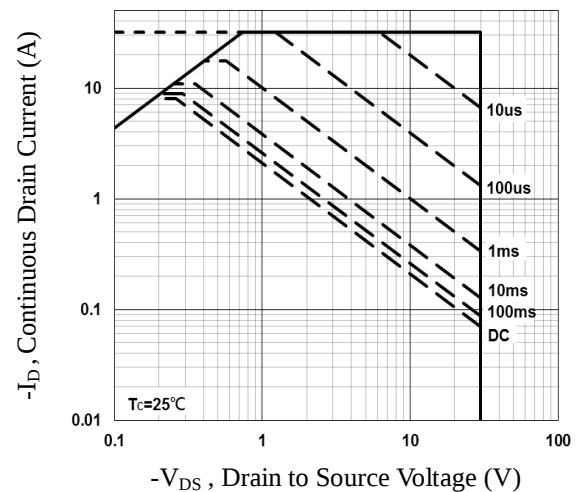
|              |                                    |                                                            |     |      |      |    |
|--------------|------------------------------------|------------------------------------------------------------|-----|------|------|----|
| $Q_g$        | Total Gate Charge <sup>2,3</sup>   | $V_{DS}=-15V$ , $V_{GS}=-4.5V$ , $I_D=-5A$                 | --- | 11   | 17   | nC |
| $Q_{gs}$     | Gate-Source Charge <sup>2,3</sup>  |                                                            | --- | 3.4  | 6    |    |
| $Q_{gd}$     | Gate-Drain Charge <sup>2,3</sup>   |                                                            | --- | 4.2  | 8    |    |
| $T_{d(on)}$  | Turn-On Delay Time <sup>2,3</sup>  | $V_{DD}=-15V$ , $V_{GS}=-10V$ , $R_G=6\Omega$<br>$I_D=-1A$ | --- | 5.8  | 11   | ns |
| $T_r$        | Rise Time <sup>2,3</sup>           |                                                            | --- | 18.8 | 36   |    |
| $T_{d(off)}$ | Turn-Off Delay Time <sup>2,3</sup> |                                                            | --- | 46.9 | 89   |    |
| $T_f$        | Fall Time <sup>2,3</sup>           |                                                            | --- | 12.3 | 23   |    |
| $C_{iss}$    | Input Capacitance                  | $V_{DS}=-15V$ , $V_{GS}=0V$ , $F=1MHz$                     | --- | 1250 | 1820 | pF |
| $C_{oss}$    | Output Capacitance                 |                                                            | --- | 160  | 235  |    |
| $C_{rss}$    | Reverse Transfer Capacitance       |                                                            | --- | 90   | 130  |    |

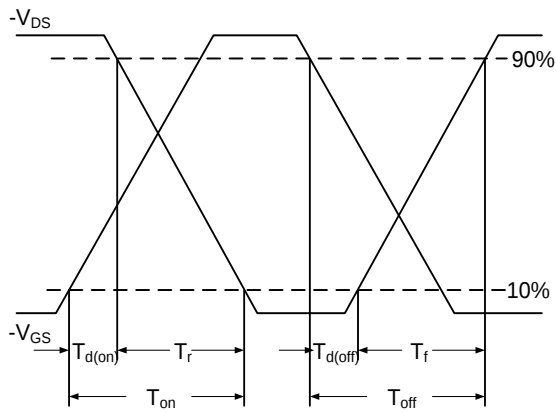
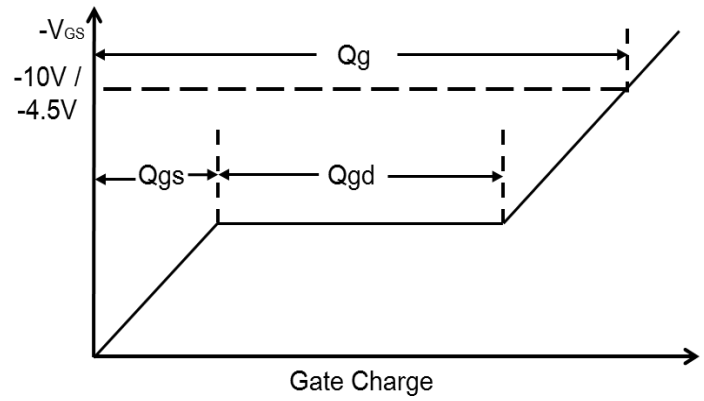
**Drain-Source Diode Characteristics and Maximum Ratings**

| 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    |

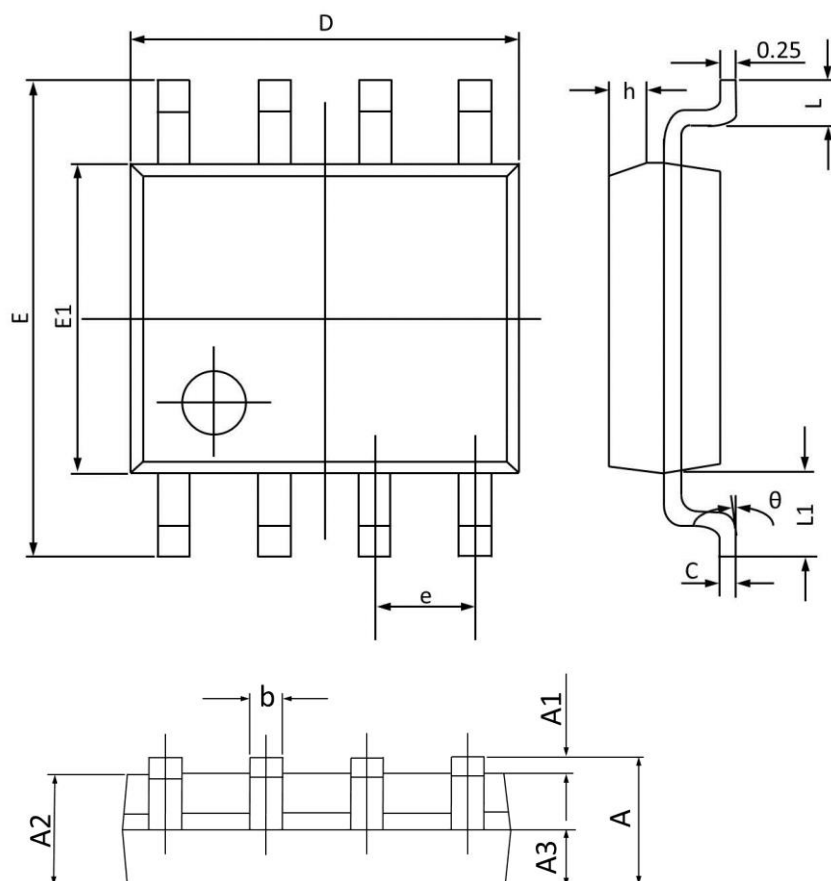
Note :

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**

## SOP8 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°    |