

## 30V P-Channel MOSFETs

### General Description

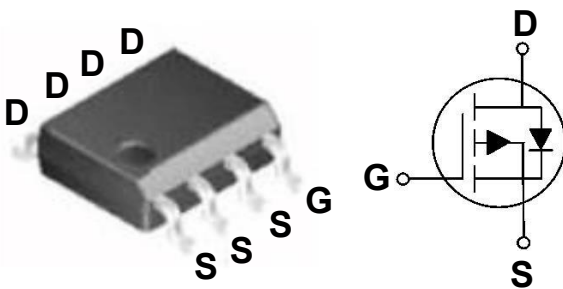
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
-30 V	11 m $\Omega$	-12 A

### Features

- -30V, -12A,  $R_{DS(ON)}=11m\Omega@V_{GS}=-10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

SOP-8 Pin Configuration



### Applications

- MB / VGA /  $V_{CORE}$
- POL Applications
- LED Application
- Load Switch

### 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 ( $T_c=25^\circ\text{C}$ )	-12	A
	Drain Current - Continuous ( $T_c=100^\circ\text{C}$ )	-7.8	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	-48	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	4.2	W
	Power Dissipation - Derate above $25^\circ\text{C}$	0.034	W/ $^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-50 to 150	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	60	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	30	$^\circ\text{C}/\text{W}$

## 30V P-Channel MOSFETs

### 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	$V_{GS}=0V, I_D=-250\mu\text{A}$	-30	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu\text{A}$
		$V_{DS}=-24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	-10	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

#### On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-10A$	---	8	11	m $\Omega$
		$V_{GS}=-4.5V, I_D=-8A$	---	12.4	17	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu\text{A}$	-1.0	-1.6	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-10A$	---	13	---	S

#### Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$Q_g$	Total Gate Charge (NOTE 2、3)	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-10A$	---	35	56	nC
$Q_{gs}$	Gate-Source Charge (NOTE 2、3)		---	10.8	16	
$Q_{gd}$	Gate-Drain Charge (NOTE 2、3)		---	10.6	16	
$T_{d(on)}$	Turn-On Delay Time (NOTE 2、3)	$V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A$	---	24.5	38	ns
$T_r$	Rise Time (NOTE 2,3)		---	10.5	16	
$T_{d(off)}$	Turn-off Delay Time (NOTE 2,3)		---	156.8	230	
$T_f$	Fall Time (NOTE 2,3)		---	50	75	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	---	3300	4800	pF
$C_{oss}$	Output Capacitance		---	410	700	
$C_{rss}$	Reverse Transfer Capacitance		---	280	500	
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0A, F=1\text{MHz}$	---	8.5	12	$\Omega$

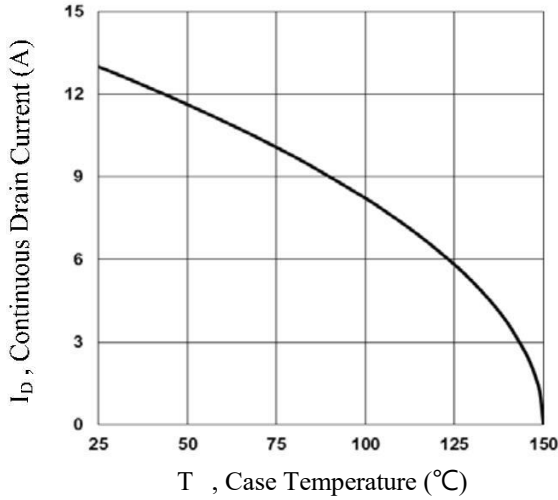
#### Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	-12	A
$I_{SM}$	Pulsed Source Current		---	---	-24	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V

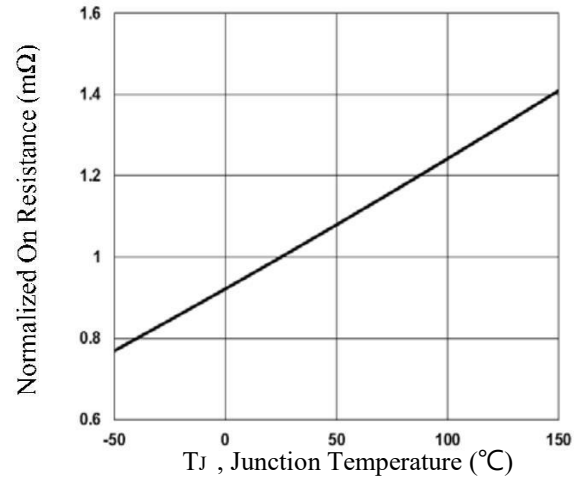
#### NOTES:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

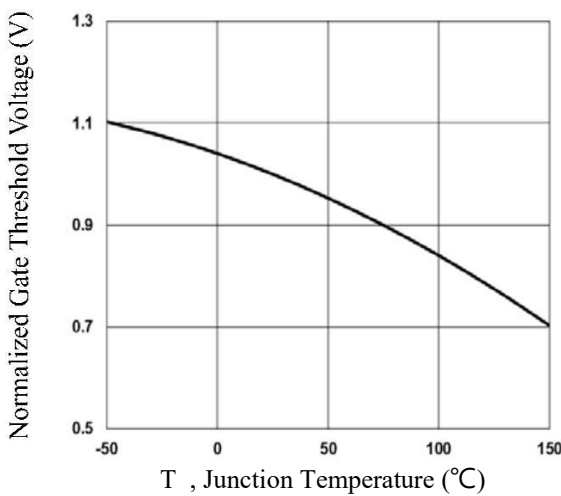
Characteristics Curves



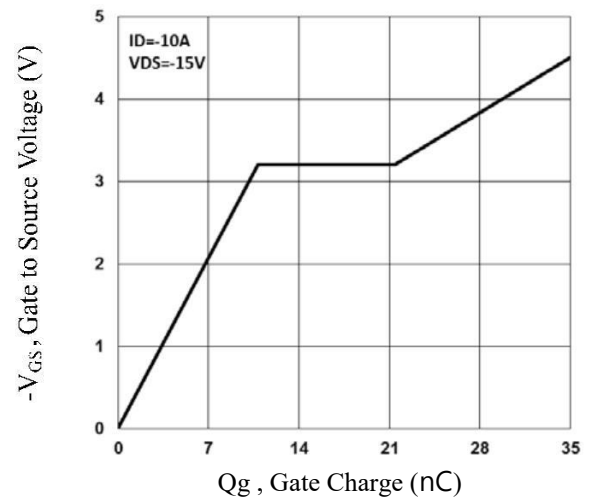
**Fig.1 Continuous Drain Current vs.  $T_c$**



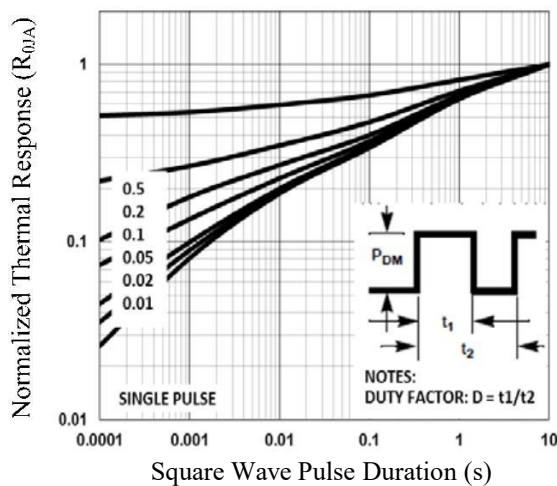
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$**



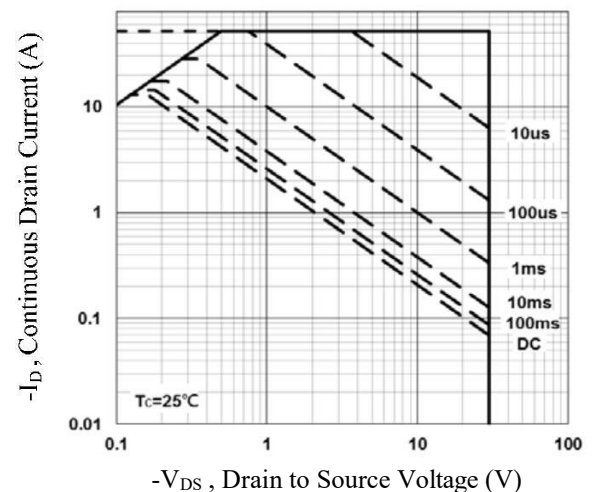
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Waveform**

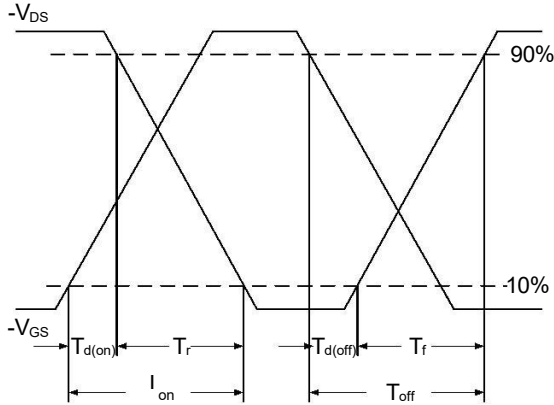


**Fig.5 Normalized Transient Impedance**

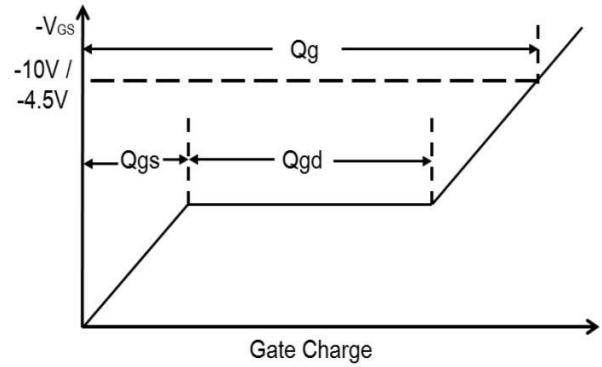


**Fig.6 Maximum Safe Operation Area**

**Characteristics Curves**

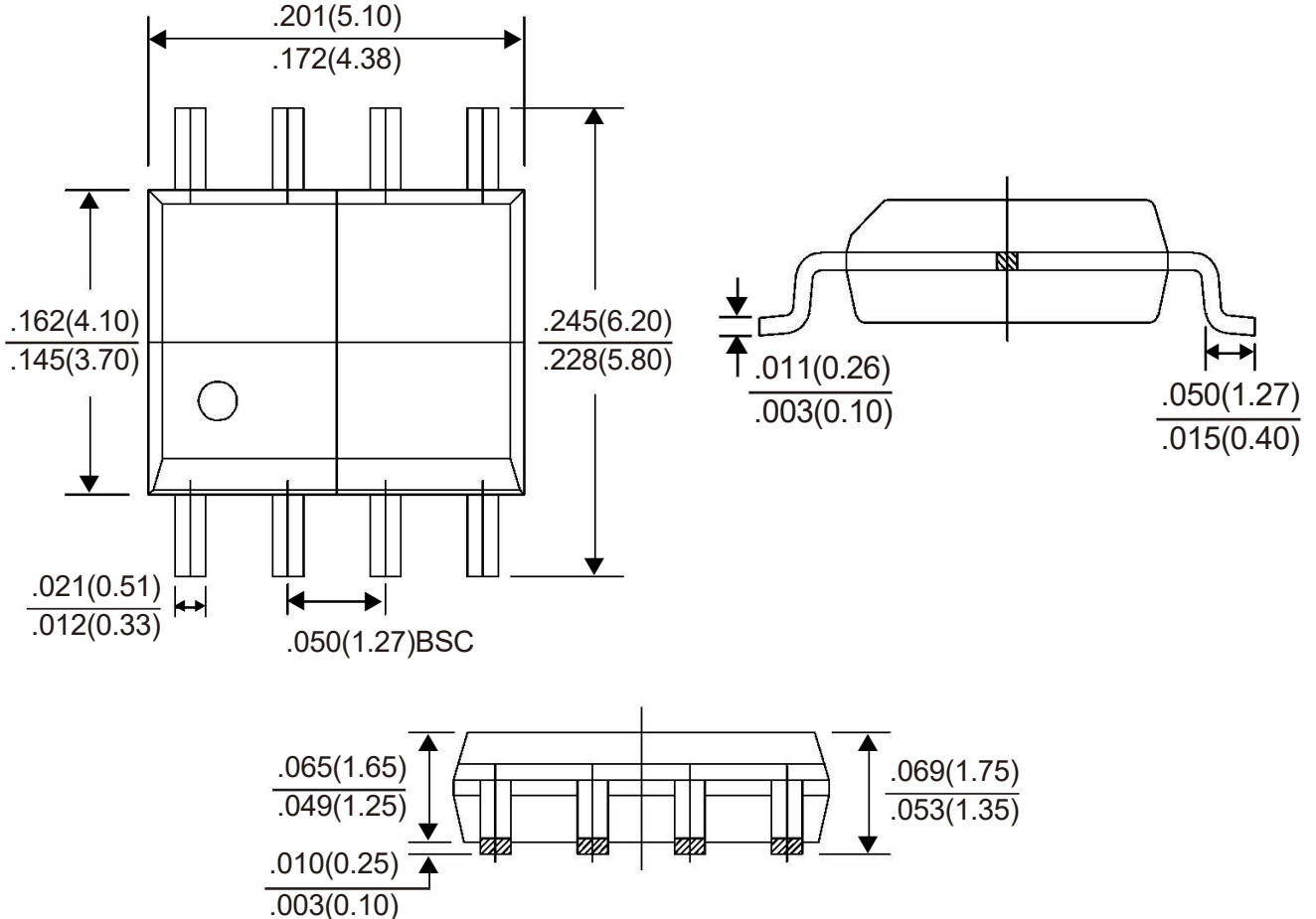


**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

**Package Outline Dimensions**



**SOP-8**

Dimensions in inches and (millimeters)

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