



## 30V P-Channel MOSFETs

### General Description

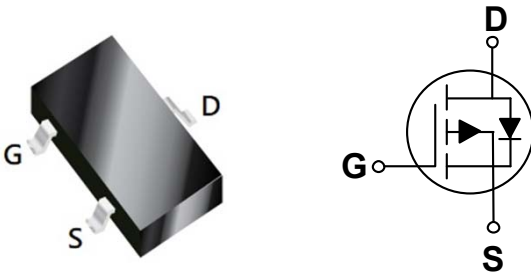
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
-30 V	90 mΩ	-3.3 A

### Features

- -30V, -3.3A,  $R_{DS(ON)} \leq 90m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

SOT-23 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	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_A=25^\circ\text{C}$ )	-3.3	A
	Drain Current - Continuous ( $T_A=70^\circ\text{C}$ )	-2.64	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	-13.2	A
$P_D$	Power Dissipation ( $T_A=25^\circ\text{C}$ )	1.56	W
	Power Dissipation - Derate above $25^\circ\text{C}$	0.012	W/ $^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
Marking Code		E · H	

### Thermal Characteristics

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



# 30V P-Channel MOSFETs

**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V , I <sub>D</sub> = -250uA	-30	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> = -30V , V <sub>GS</sub> = 0V , T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> = -24V , V <sub>GS</sub> = 0V , T <sub>J</sub> =125°C	---	---	-10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±20V , V <sub>DS</sub> = 0V	---	---	±100	nA

**On Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> = -10V , I <sub>D</sub> = -3A	---	75	90	mΩ
		V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -2A	---	110	140	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> = -250uA	-1.2	-1.6	-2.2	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = -10V , I <sub>D</sub> = -1A	---	3	---	S

**Dynamic and switching Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge (NOTE 2、3)	V <sub>DS</sub> = -24V , V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -2A	---	2.5	5	nC
Q <sub>gs</sub>	Gate-Source Charge (NOTE 2、3)		---	0.1	0.3	
Q <sub>gd</sub>	Gate-Drain Charge (NOTE 2、3)		---	1.8	3.6	
T <sub>d(on)</sub>	Turn-On Delay Time (NOTE 2、3)	V <sub>DD</sub> = -15V , V <sub>GS</sub> = -10V , R <sub>G</sub> = 6Ω , I <sub>D</sub> = -1A	---	6.1	12	ns
T <sub>r</sub>	Rise Time (NOTE 2、3)		---	8.7	17	
T <sub>d(off)</sub>	Turn-Off Delay Time (NOTE 2、3)		---	33.2	66	
T <sub>f</sub>	Fall Time (NOTE 2、3)		---	3.7	7	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V , V <sub>GS</sub> = 0V , F= 1MHz	---	226	450	pF
C <sub>oss</sub>	Output Capacitance		---	39	78	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	29	58	

**Drain-Source Diode Characteristics and Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> = V <sub>D</sub> = 0V , Force Current	---	---	-3.3	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-6.6	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0V , I <sub>S</sub> = -1A , T <sub>J</sub> = 25°C	---	---	-1	V

NOTES :

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.



Characteristics Curves

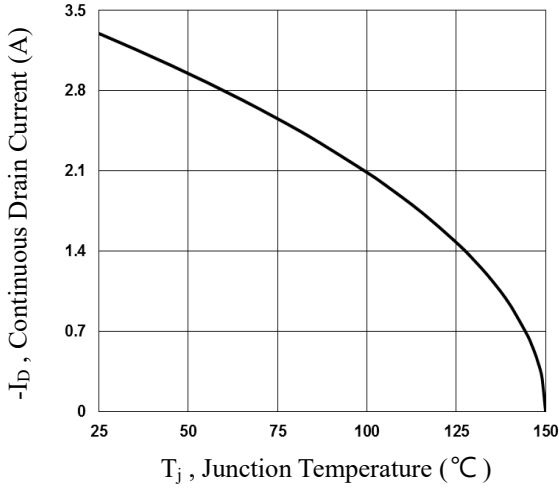


Fig.1 Continuous Drain Current vs.  $T_c$

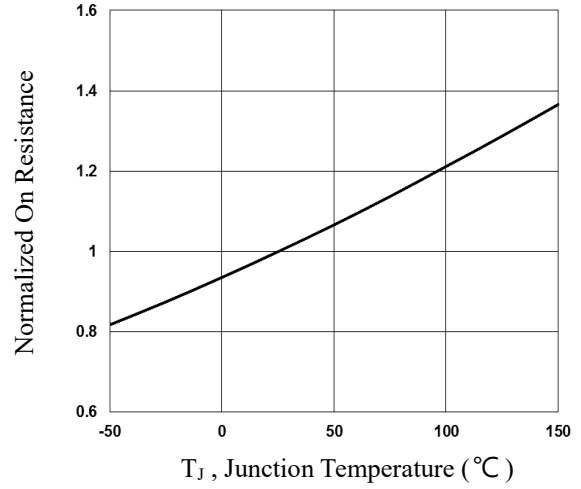


Fig.2 Normalized RDSON vs.  $T_j$

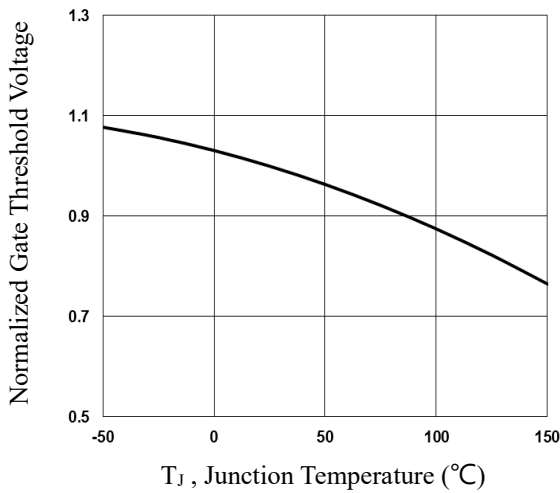


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

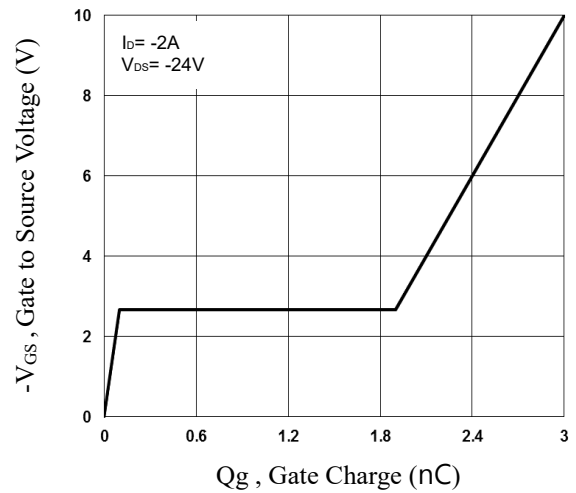


Fig.4 Gate Charge Waveform

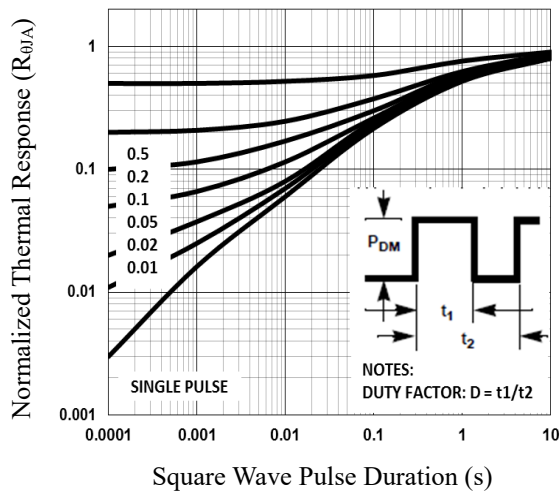


Fig.5 Normalized Transient Impedance

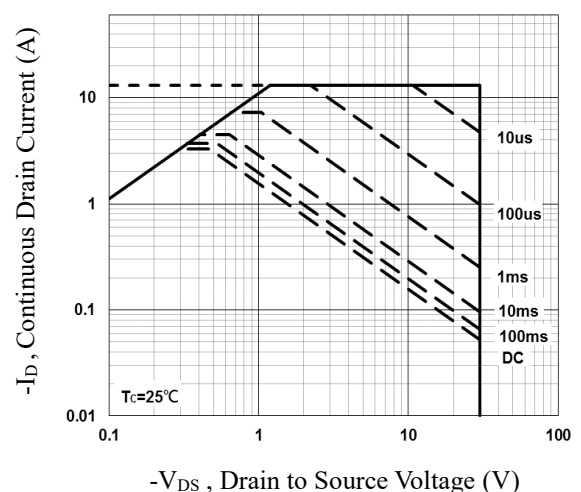


Fig.6 Maximum Safe Operation Area



Characteristics Curves

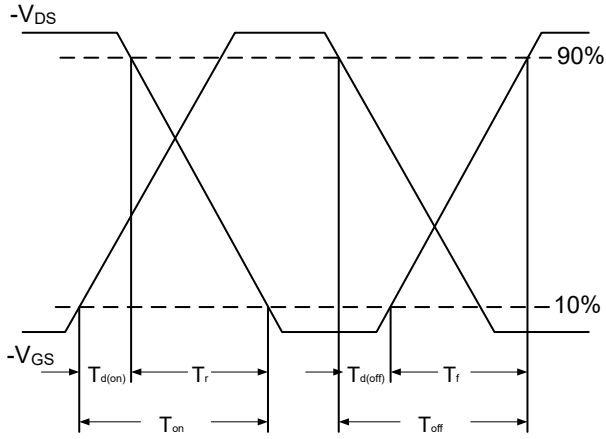


Fig.7 Switching Time Waveform

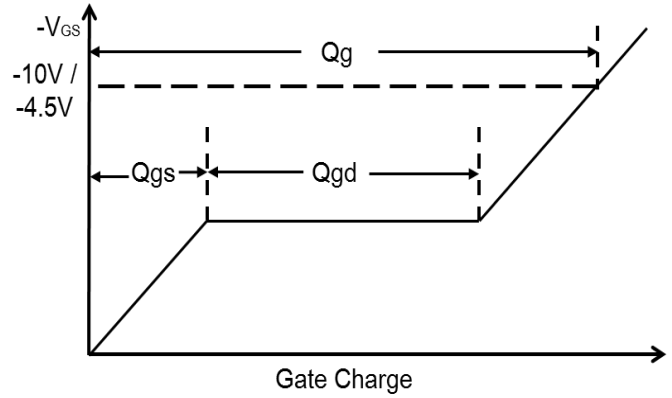
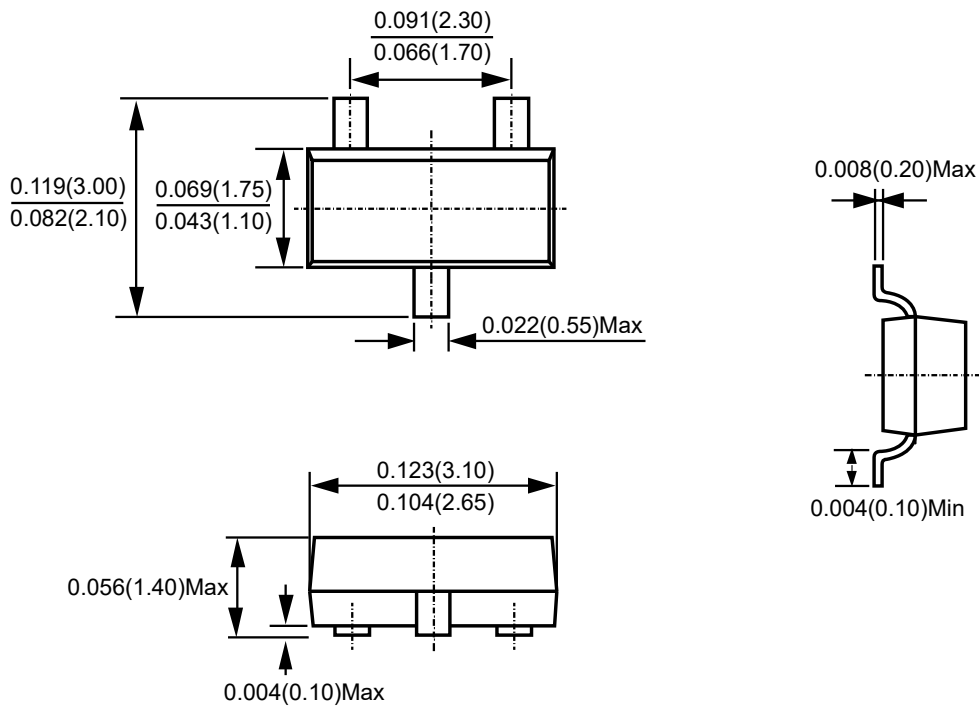


Fig.8 Gate Charge Waveform

Package Outline Dimensions



SOT-23

Dimensions in inches and (millimeters)



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