



30V P-Channel MOSFETs

General Description

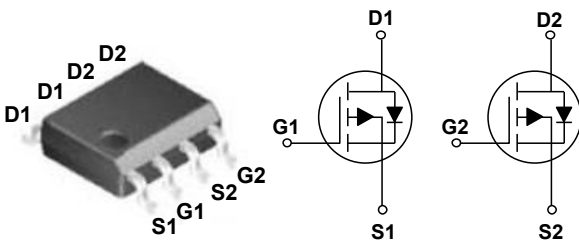
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub></b>	<b>I<sub>D</sub></b>
-30 V	23 mΩ	-7 A

Features

- -30V, -7A, R<sub>DS(ON)</sub> ≤ 23mΩ@V<sub>GS</sub> = -10V
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

SOP-8 Pin Configuration



Applications

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

Absolute Maximum Ratings T<sub>C</sub>=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-30	V
V <sub>GS1</sub>	Gate-Source Voltage (base on I <sub>GSS1</sub> condition)	±20	V
V <sub>GS2</sub>	Gate-Source Voltage (base on I <sub>GSS2</sub> condition)	±25	V
I <sub>D</sub>	Drain Current - Continuous (T <sub>C</sub> =25°C)	-7	A
	Drain Current - Continuous (T <sub>C</sub> =100°C)	-4.43	
I <sub>DM</sub>	Drain Current - Pulsed (NOTE 1)	-28	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	61	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	35	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	2.1	W
	Power Dissipation - Derate above 25°C	0.017	
T <sub>J</sub>	Operating Junction Temperature Range	-50 to 150	°C
T <sub>STG</sub>	Storage Temperature Range	-50 to 150	°C
Marking Code		PC023 , DS3807	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient	---	60	°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
$I_{DSS}$	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	$\mu A$
$I_{GSS1}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$I_{GSS2}$	Gate-Source Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	---	---	$\pm 1$	mA

**On Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-5A$	---	20	23	m $\Omega$
		$V_{GS}=-4.5V, I_D=-3A$	---	30	36	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	-1.6	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	---	6.8	---	S

**Dynamic and switching Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$Q_g$	Total Gate Charge	$V_{DS}=-15V, V_{GS}=-4.5V,$ $I_D=-5A$ (NOTE 3、4)	---	11	17	nC
$Q_{gs}$	Gate-Source Charge		---	3.4	6	
$Q_{gd}$	Gate-Drain Charge		---	4.2	8	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V,$ $R_G=6\Omega, I_D=-1A$ (NOTE 3、4)	---	5.8	11	nS
$T_r$	Rise Time		---	18.8	36	
$T_{d(off)}$	Turn-Off Delay Time		---	46.9	89	
$T_f$	Fall Time		---	12.3	23	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	---	1250	1820	pF
$C_{oss}$	Output Capacitance		---	160	235	
$C_{rss}$	Reverse Transfer Capacitance		---	90	130	

**Drain-Source Diode Characteristics and Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	-7	A
$I_{SM}$	Pulsed Source Current		---	---	-14	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.  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=35A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}.$
3. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.



Characteristics Curves

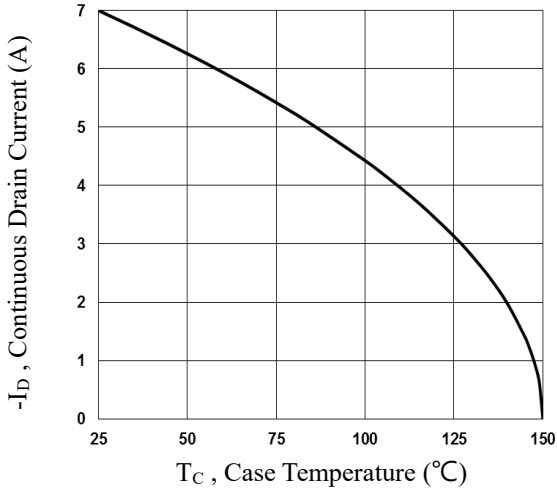


Fig.1 Continuous Drain Current vs. T<sub>C</sub>

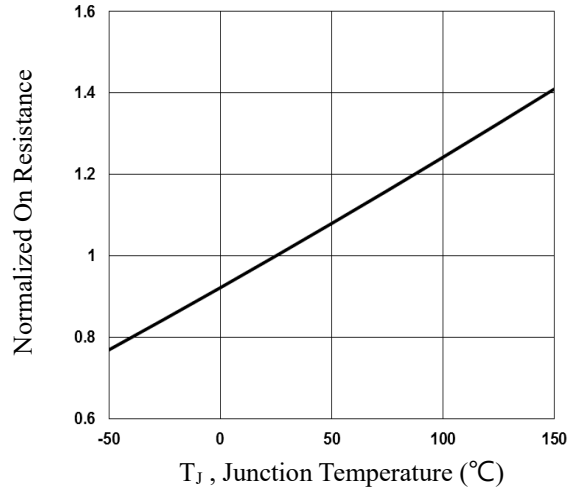


Fig.2 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>

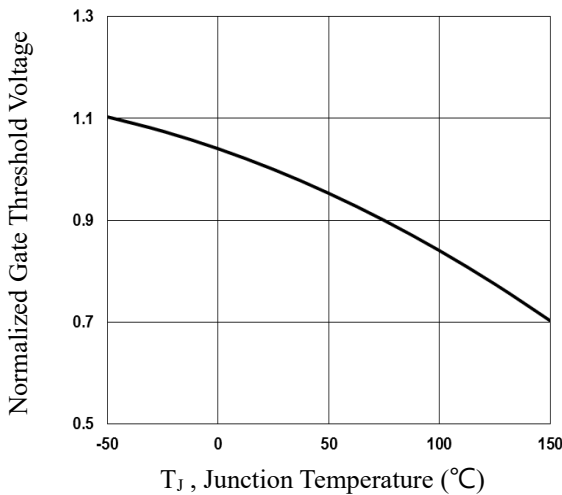


Fig.3 Normalized V<sub>th</sub> vs. T<sub>J</sub>

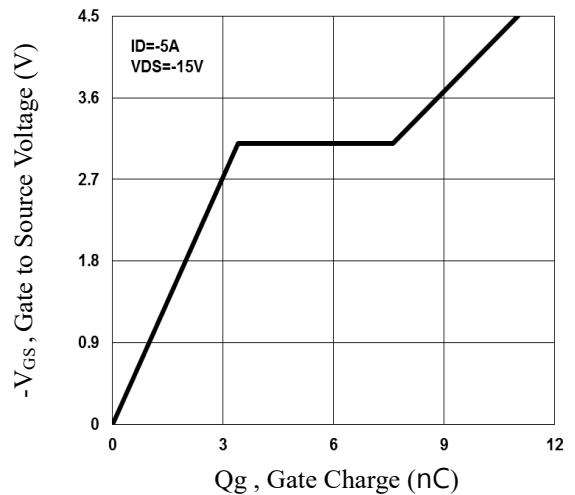


Fig.4 Gate Charge Waveform

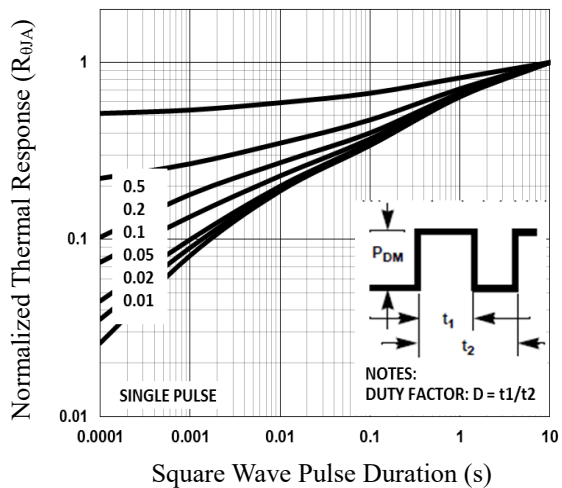


Fig.5 Normalized Transient Impedance

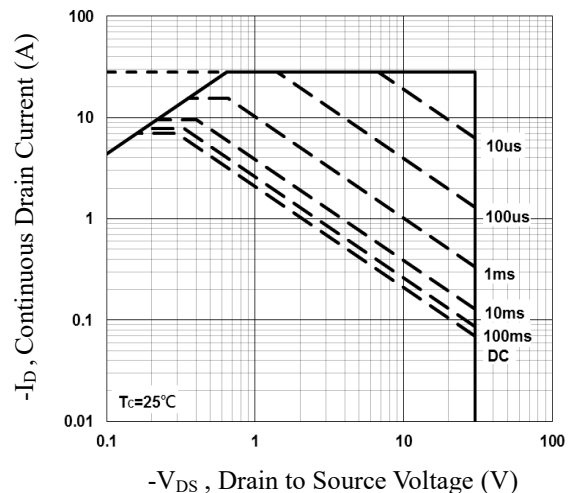


Fig.6 Maximum Safe Operation Area



Characteristics Curves

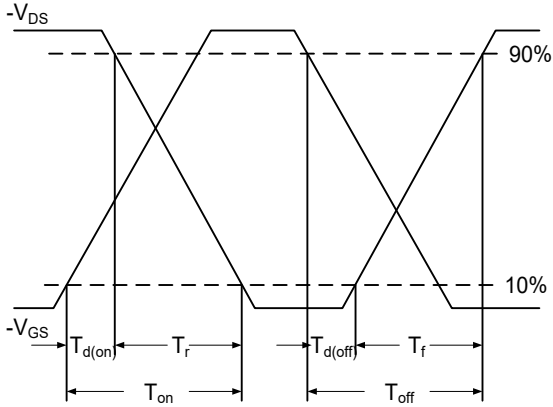


Fig.7 Switching Time Waveform

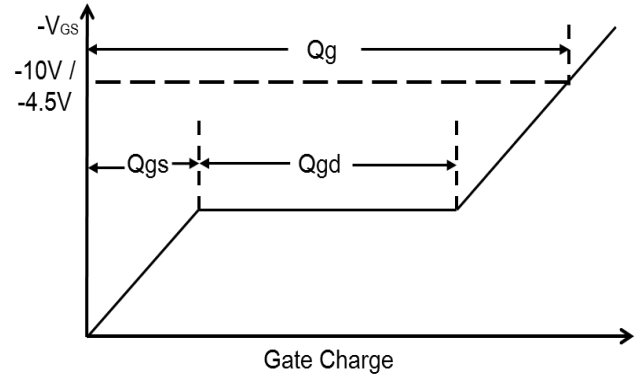
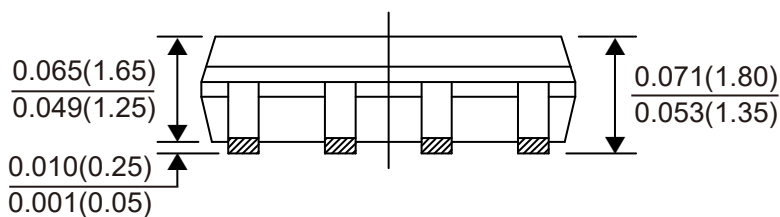
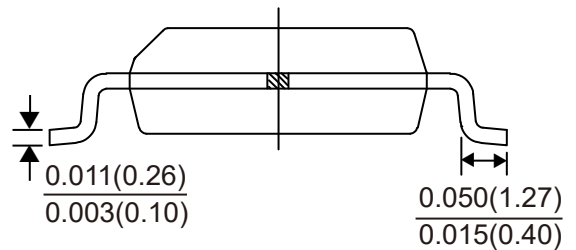
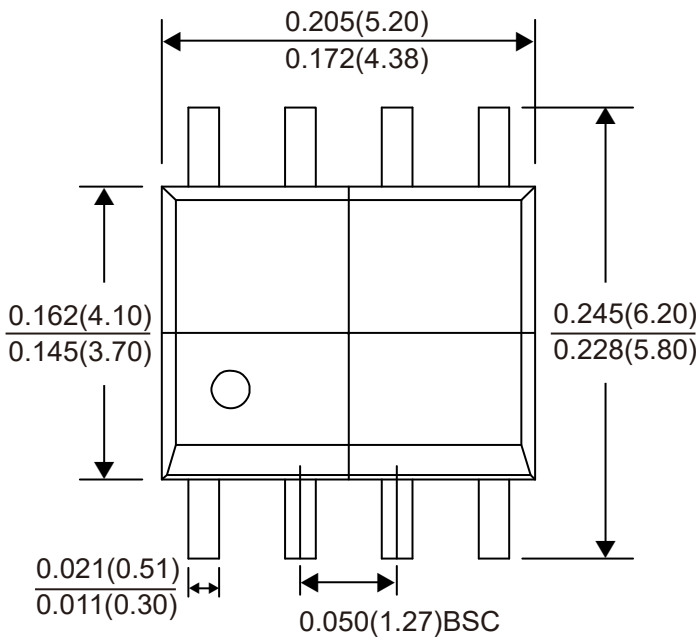


Fig.8 Gate Charge Waveform

Package Outline Dimensions



SOP-8

Dimensions in inches and (millimeters)



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