



60V Dual P-Channel MOSFETs

General Description

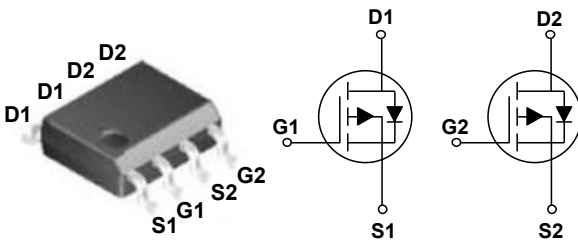
These P-Channel enhancement mode power field effect transistors are using trench MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These 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>
-60 V	105 mΩ	-4 A

Features

- $R_{DS(ON)} \leq 105m\Omega @ V_{GS} = -10V$
- Fast Switching
- Green Device Available
- Improved dv/dt Capability

SOP-8 Pin Configuration



Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2<sup>nd</sup> SR

Absolute Maximum Ratings  $T_C=25^\circ C$  unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_A=25^\circ C$ )	-4	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	-8	A
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	2.1	W
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		DS6809	

Thermal Characteristics

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

**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	-60	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> = -60V , V <sub>GS</sub> = 0V , T <sub>J</sub> =25°C	---	---	-1	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> = -2A	---	---	105	mΩ
		V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -1A	---	---	145	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> = -250uA	-1.2	---	-2.5	V
gfs	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	V <sub>DS</sub> = -30V , V <sub>GS</sub> = -10V , I <sub>D</sub> = -2A (NOTE 3)	---	10.4	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	1.1	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	2.7	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = -30V , V <sub>GS</sub> = -10V , R <sub>G</sub> =6Ω , I <sub>D</sub> = -1A (NOTE 3)	---	8	---	nS
T <sub>r</sub>	Rise Time		---	15.4	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	42.8	---	
T <sub>f</sub>	Fall Time		---	8.4	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -30V , V <sub>GS</sub> = 0V , F= 1MHz	---	785	---	pF
C <sub>oss</sub>	Output Capacitance		---	175	---	
C <sub>riss</sub>	Reverse Transfer Capacitance		---	112	---	
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> = 0V , V <sub>DS</sub> = 0V , F= 1MHz	---	27	---	Ω

**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	---	---	-4	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-8	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
t <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> = -50V , I <sub>S</sub> = -1A , di/dt=100A/us	---	30	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	15	---	nC

**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.



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## Characteristics Curves

Fig.1  $I_D$  vs.  $T_C$

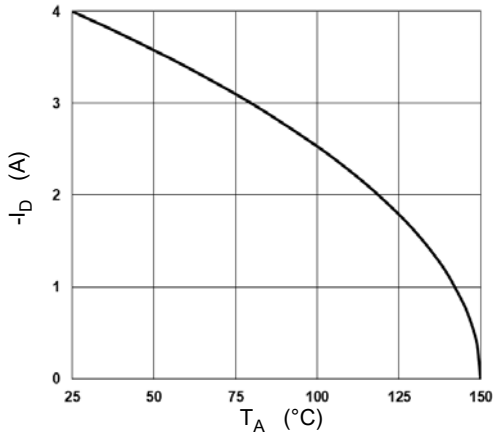


Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_J$

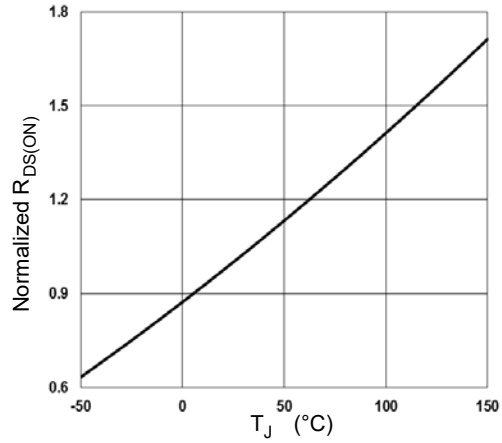


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

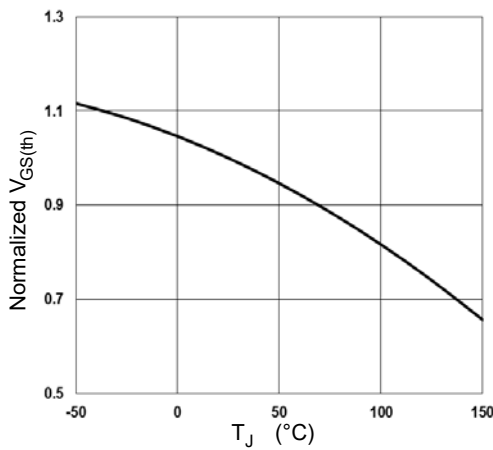


Fig.4 Gate Charge Waveform

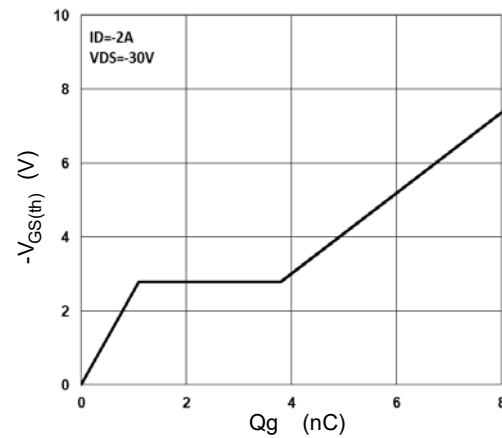


Fig.5 Normalized Transient Response

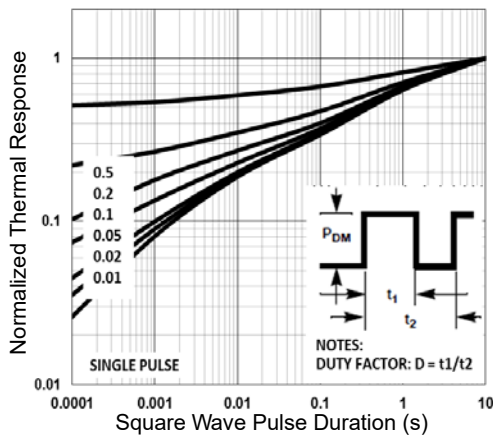
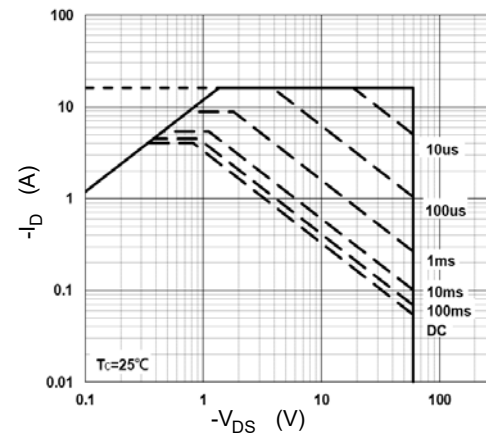


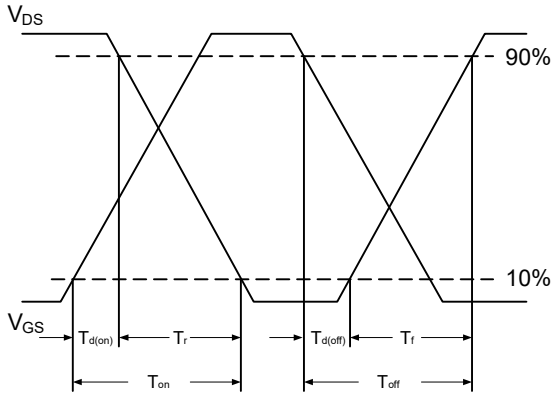
Fig.6 Maximum Safe Operation Area



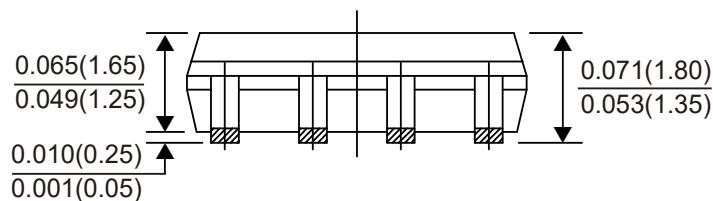
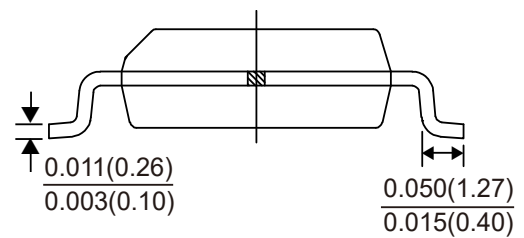
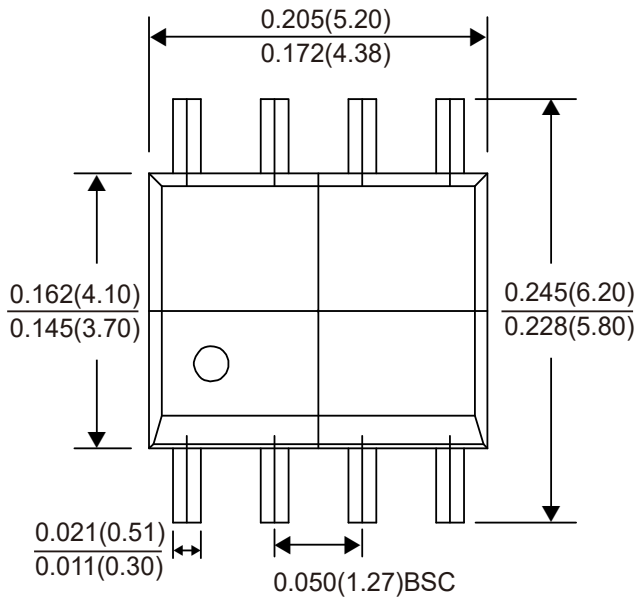


Characteristics Curves

Fig.7 Switching Time Waveform



Package Outline Dimensions



SOP-8

Dimensions in inches and (millimeters)



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