



60V P-Channel MOSFETs

General Description

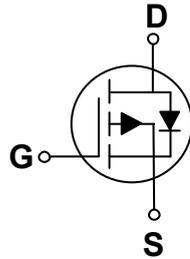
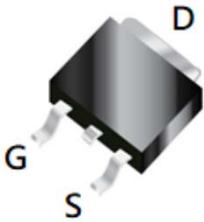
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
-60 V	48 mΩ	-16 A

Features

- $R_{DS(ON)} \leq 48m\Omega @ V_{GS} = -10V$
- Fast Switching
- Green Device Available
- Improved dv/dt Capability

TO-252 Pin Configuration



Applications

- Motor Drive
- Power Tools
- LED Lighting

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	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$)	-16	A
	Drain Current - Continuous ($T_C=100^\circ C$)	-10	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-64	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	51	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	-32	A
P_D	Power Dissipation ($T_C=25^\circ C$)	25	W
	Power Dissipation - Derate above $25^\circ C$	0.2	W/ $^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		PG048	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	5	$^\circ C/W$

**Electrical Characteristics (T_J=25°C, unless otherwise noted)****Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V , I _D = -250uA	-60	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -60V , V _{GS} = 0V , T _J =25°C	---	---	-1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V , V _{DS} = 0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = -10V , I _D = -8A	---	---	48	mΩ
		V _{GS} = -4.5V , I _D = -4A	---	---	65	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1.2	-1.6	-2.2	V
g _{fs}	Forward Transconductance	V _{DS} = -10V , I _D = -8A	---	10	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} = -30V , V _{GS} = -10V , I _D = -8A (NOTE 3 ∙ 4)	---	22.4	---	nC
Q _{gs}	Gate-Source Charge		---	4.1	---	
Q _{gd}	Gate-Drain Charge		---	5.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} = -30V , V _{GS} = -10V , R _G = 6Ω , I _D = -1A (NOTE 3 ∙ 4)	---	13	---	ns
T _r	Rise Time (NOTE 3 ∙ 4)		---	42.4	---	
T _{d(off)}	Turn-Off Delay Time		---	64.6	---	
T _f	Fall Time		---	16.4	---	
C _{iss}	Input Capacitance	V _{DS} = -30V , V _{GS} = 0V , F= 1MHz	---	1250	---	pF
C _{oss}	Output Capacitance		---	85	---	
C _{rss}	Reverse Transfer Capacitance		---	65	---	
R _g	Gate resistance	V _{GS} = 0V , V _{DS} = 0V , F=1MHZ	---	15	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G = V _D = 0V , Force Current	---	---	-16	A
I _{SM}	Pulsed Source Current		---	---	-64	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0V , I _S = -1A , T _J = 25°C	---	---	-1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-32A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

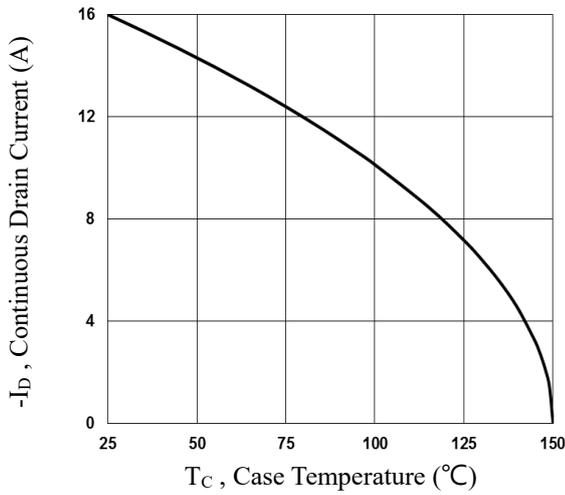


Fig.1 Continuous Drain Current vs. T_c

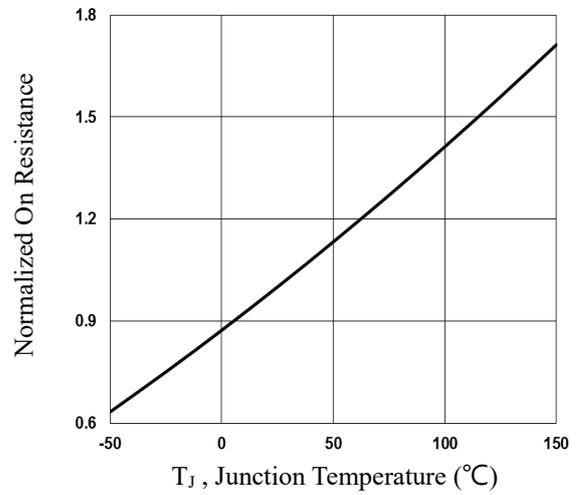


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

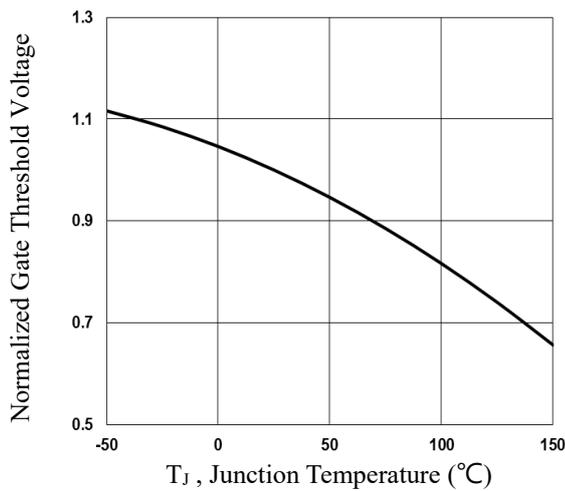


Fig.3 Normalized V_{th} vs. T_j

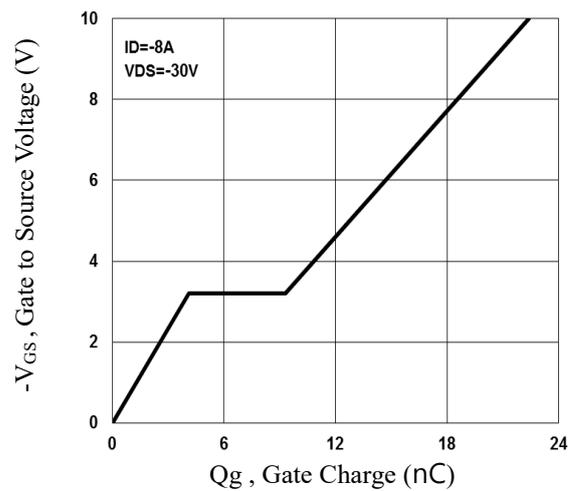


Fig.4 Gate Charge Waveform

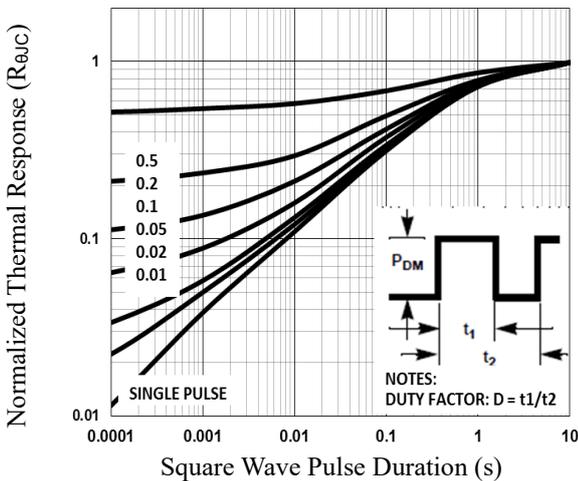


Fig.5 Normalized Transient Impedance

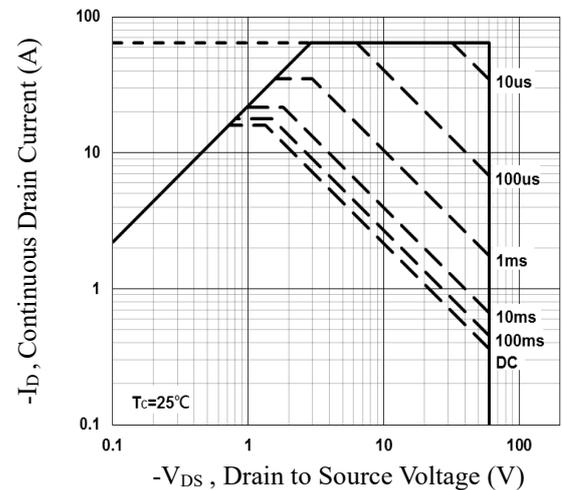


Fig.6 Maximum Safe Operation Area



Characteristics Curves

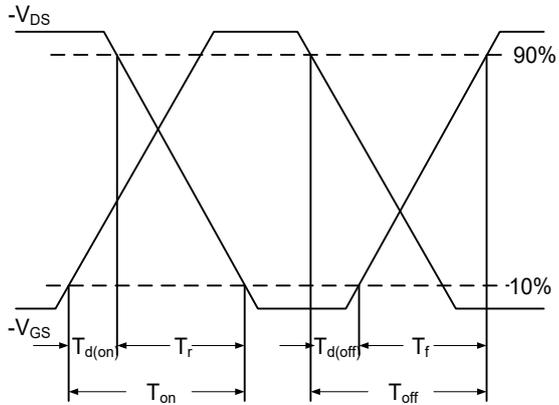
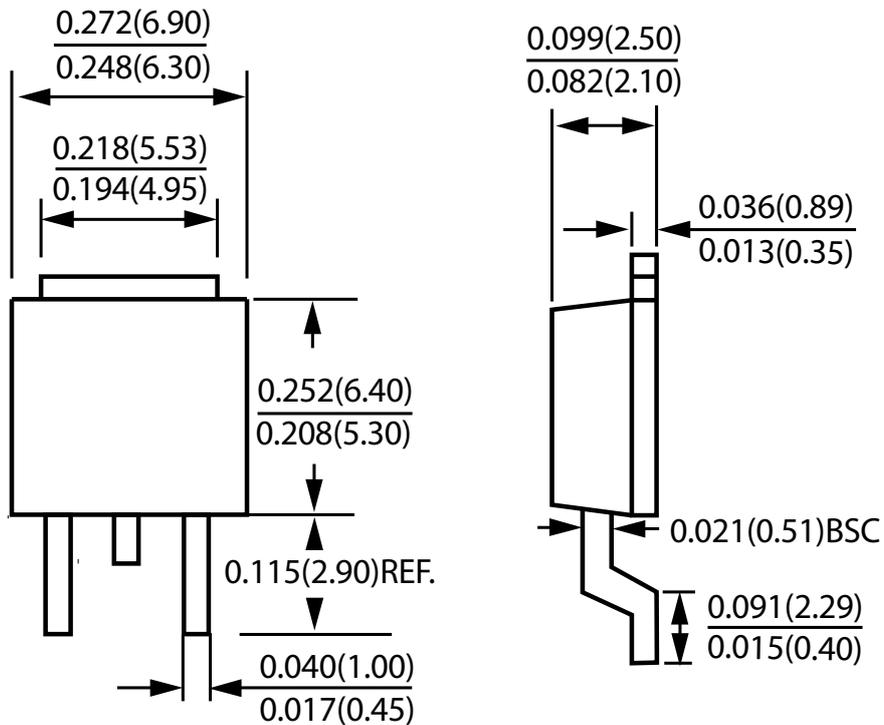


Fig.7 Switching Time Waveform

Package Outline Dimensions



TO-252

Dimensions in inches and (millimeters)



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