D1MPD5P8

40V P-Channel MOSFETs

General Description

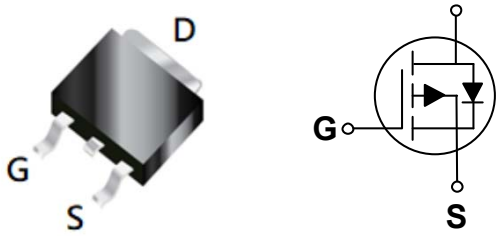
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
-40 V	5.8 mΩ	-90 A

Features

- $R_{DS(ON)} \leqq 5.8m\Omega @ V_{GS}$= -10V
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

TO-252 Pin Configuration



Applications

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous (T_C=25°C)	-90	A
	Drain Current - Continuous (T_C=100°C)	-57	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-360	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	174	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	-59	A
P_D	Power Dissipation (T_C=25°C)	101	W
	Power Dissipation - Derate above 25°C	0.81	W/°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.23	°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	-40	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}= -40V , V_{GS}= 0V , T_J=25°C	---	---	-1	uA
		V_{DS}= -32V , V_{GS}= 0V , T_J=125°C	---	---	-10	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= -25A	---	---	5.8	mΩ
		V_{GS}= -4.5V , I_D= -15A	---	---	8.3	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-1.2	-1.6	-2.5	V
gfs	Forward Transconductance	V_{DS}= -10V , I_D= -3A	---	15	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}= -20V , V_{GS}= -10V , I_D= -45A (NOTE 3、4)	---	115	---	nC
Q_{gs}	Gate-Source Charge		---	16	---	
Q_{gd}	Gate-Drain Charge		---	25	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= -20V , V_{GS}= -10V , R_G= 6Ω , I_D= -45A (NOTE 3、4)	---	41.6	---	ns
T_r	Rise Time (NOTE 3、4)		---	12.7	---	
$T_{d(off)}$	Turn-Off Delay Time		---	308	---	
T_f	Fall Time		---	70	---	
C_{iss}	Input Capacitance	V_{DS}= -20V , V_{GS}= 0V , F= 1MHz	---	6100	---	pF
C_{oss}	Output Capacitance		---	600	---	
C_{rss}	Reverse Transfer Capacitance		---	540	---	
R_g	Gate resistance	V_{GS}= 0V , V_{DS}= 0V , F=1MHZ	---	4.2	---	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	---	---	-90	A
I_{SM}	Pulsed Source Current		---	---	-180	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}=-59A, 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

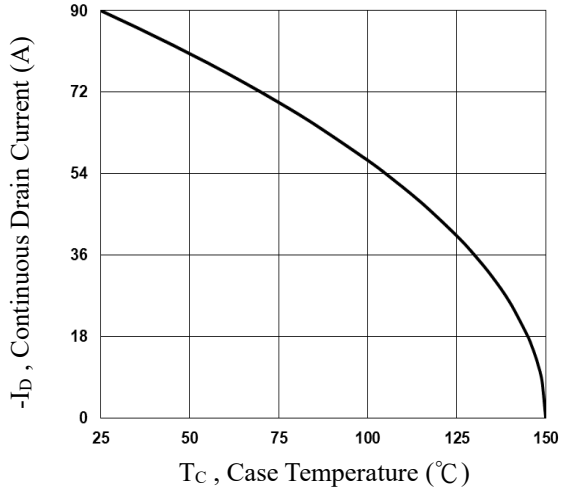


Fig.1 Continuous Drain Current vs. T_C

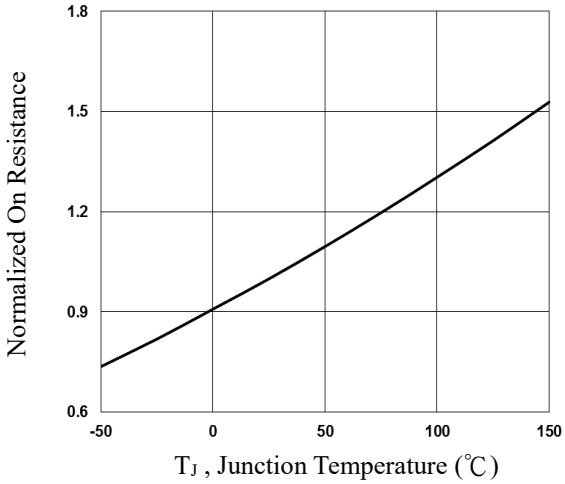


Fig.2 Normalized RDSON vs. T_J

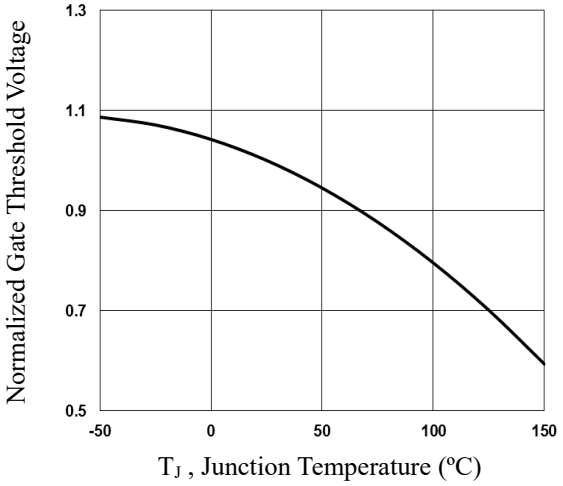


Fig.3 Normalized V_{th} vs. T_J

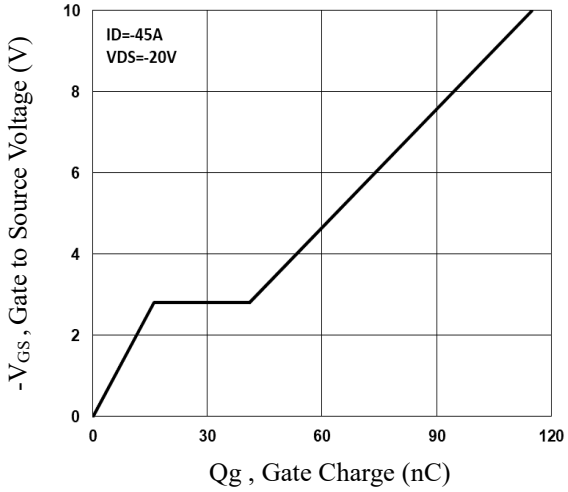


Fig.4 Gate Charge Waveform

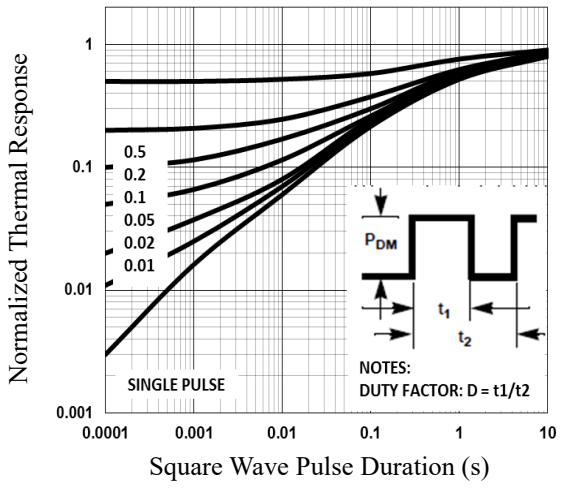


Fig.5 Normalized Transient Impedance

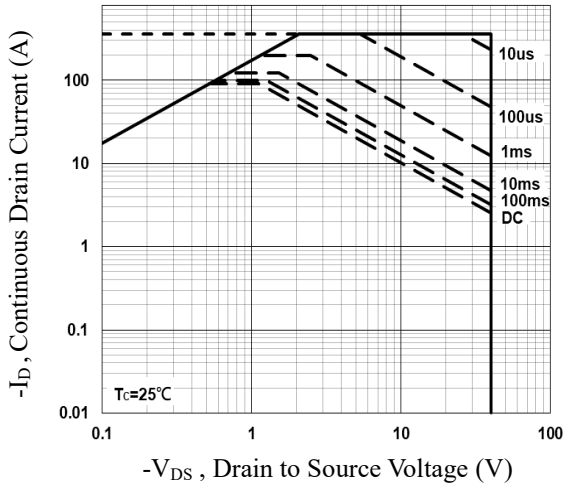


Fig.6 Maximum Safe Operation Area

Characteristics Curves

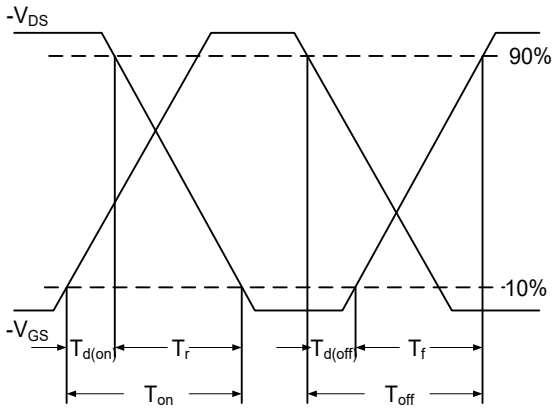


Fig.7 Switching Time Waveform

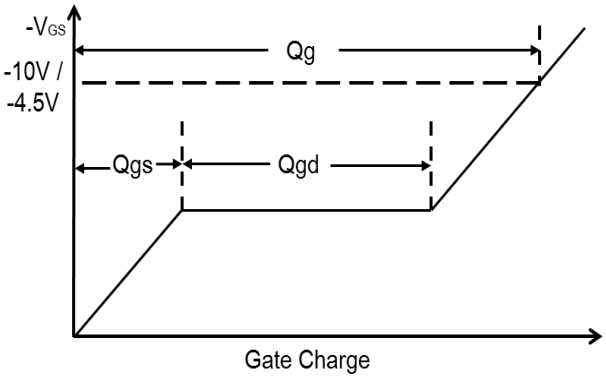
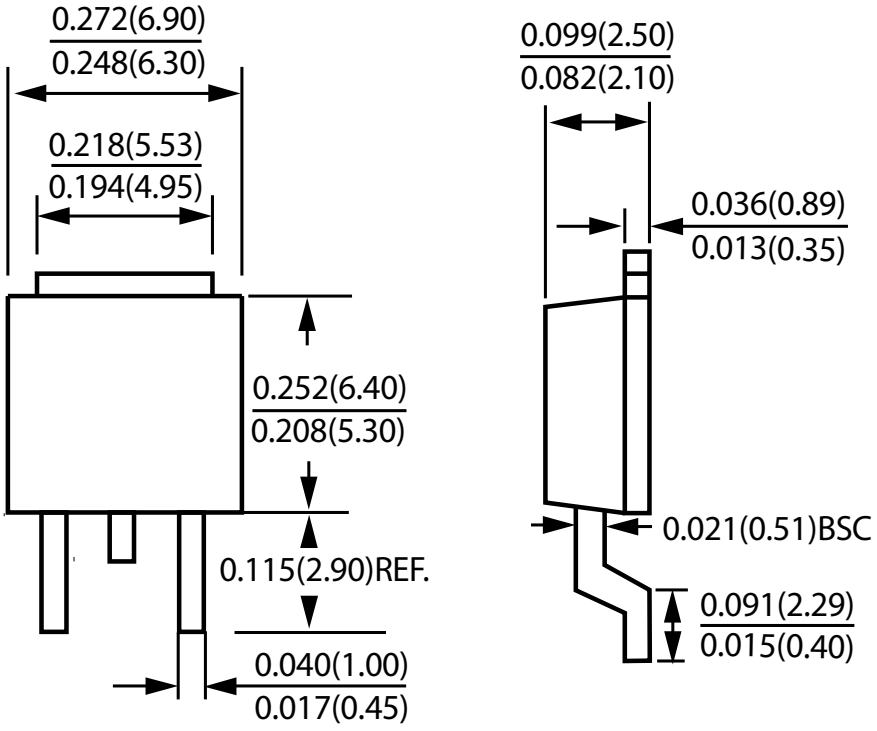


Fig.8 Gate Charge Waveform

Package Outline Dimensions



TO-252

Dimensions in inches and (millimeters)

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