



40V P-Channel MOSFETs

General Description

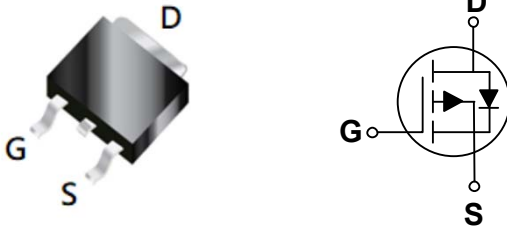
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
-40 V	15 m Ω	-45 A

Features

- $R_{DS(ON)} \leq 15m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

TO-252 Pin Configuration



Applications

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

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	-45	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-180	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	130	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	-51	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	73.5	W
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		PD015	

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.7	$^\circ\text{C/W}$



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} = -32V , 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 = -10A	---	---	15	mΩ
		V _{GS} = -4.5V , I _D = -8A	---	---	22	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1.0	---	-2.5	V
gfs	Forward Transconductance	V _{DS} = -10V , I _D = -10A	---	13	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge (NOTE 3、4)	V _{DS} = -32V , V _{GS} = -4.5V , I _D = -10A	---	22.2	---	nC
Q _{gs}	Gate-Source Charge (NOTE 3、4)		---	8.2	---	
Q _{gd}	Gate-Drain Charge (NOTE 3、4)		---	8.8	---	
T _{d(on)}	Turn-On Delay Time (NOTE 3、4)	V _{DD} = -20V , V _{GS} = -10V , R _G = 6Ω , I _D = -1A	---	23	---	ns
T _r	Rise Time (NOTE 3、4)		---	10	---	
T _{d(off)}	Turn-Off Delay Time (NOTE 3、4)		---	135	---	
T _f	Fall Time (NOTE 3、4)		---	46	---	
C _{iss}	Input Capacitance	V _{DS} = -25V , V _{GS} = 0V , F= 1MHz	---	2757	---	pF
C _{OSS}	Output Capacitance		---	240	---	
C _{rSS}	Reverse Transfer Capacitance		---	137	---	

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	---	---	-45	A
I _{SM}	Pulsed Source Current		---	---	-90	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}=-51A, 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

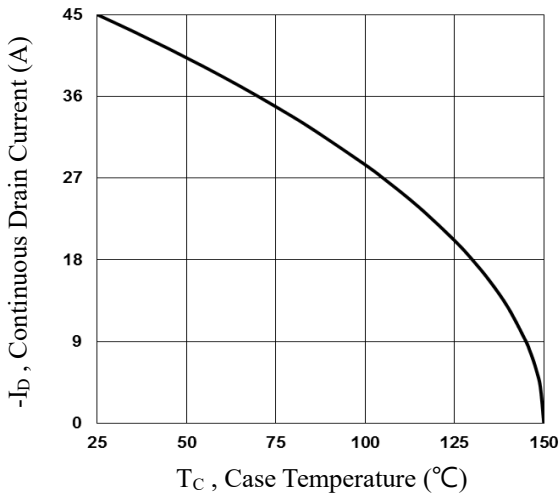


Fig.1 Continuous Drain Current vs. T_C

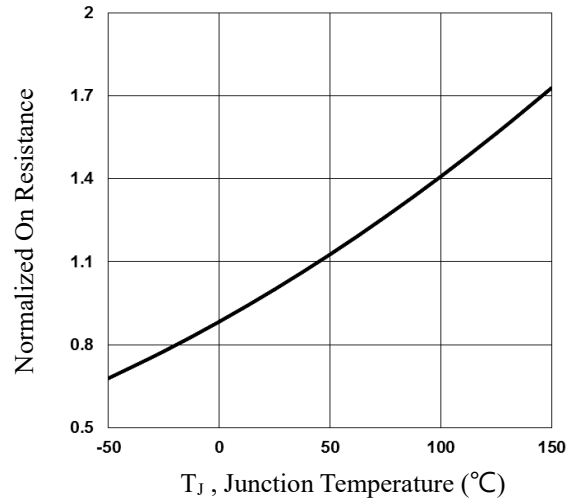


Fig.2 Normalized RDSON vs. T_J

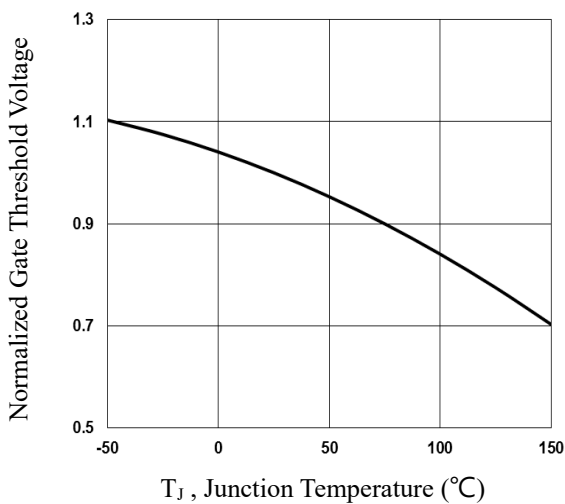


Fig.3 Normalized V_{th} vs. T_J

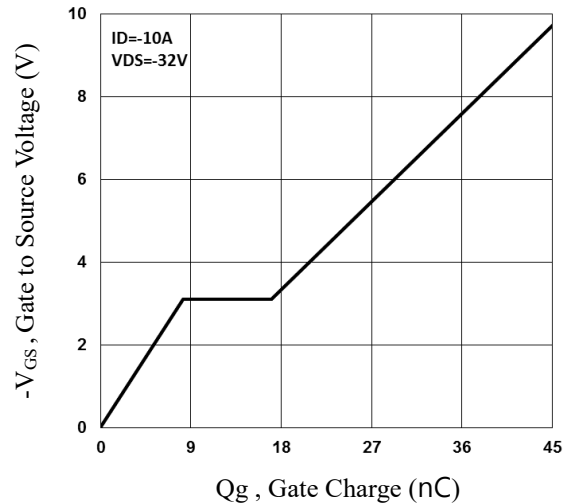


Fig.4 Gate Charge Waveform

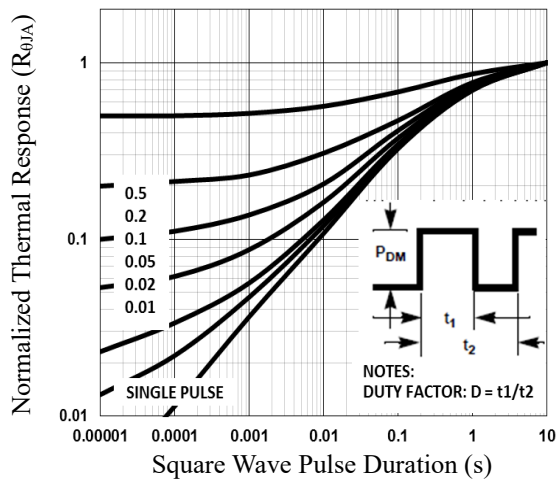


Fig.5 Normalized Transient Impedance

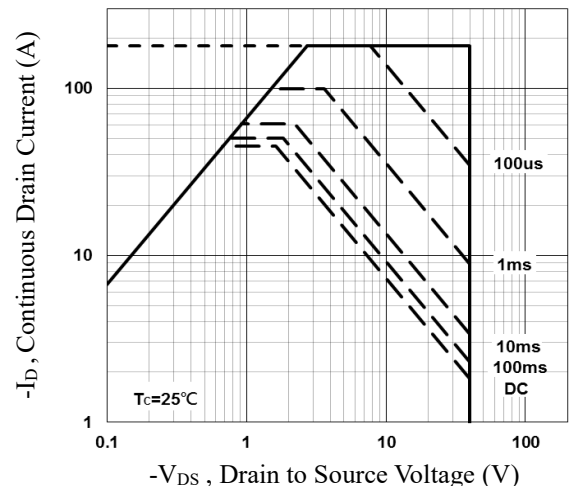


Fig.6 Maximum Safe Operation Area



Characteristics Curves

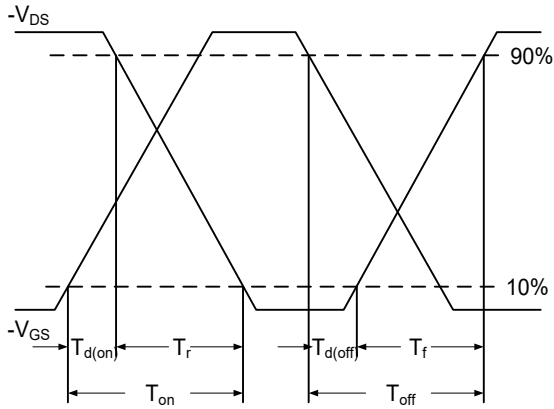


Fig.7 Switching Time Waveform

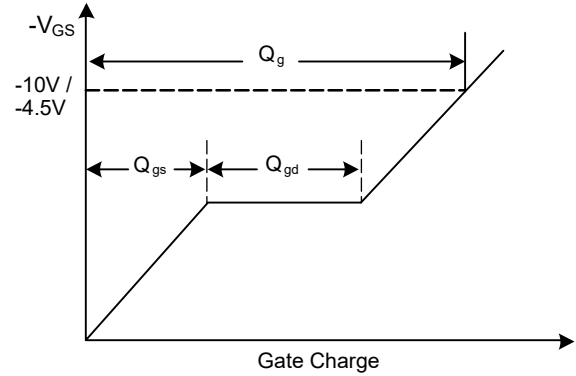
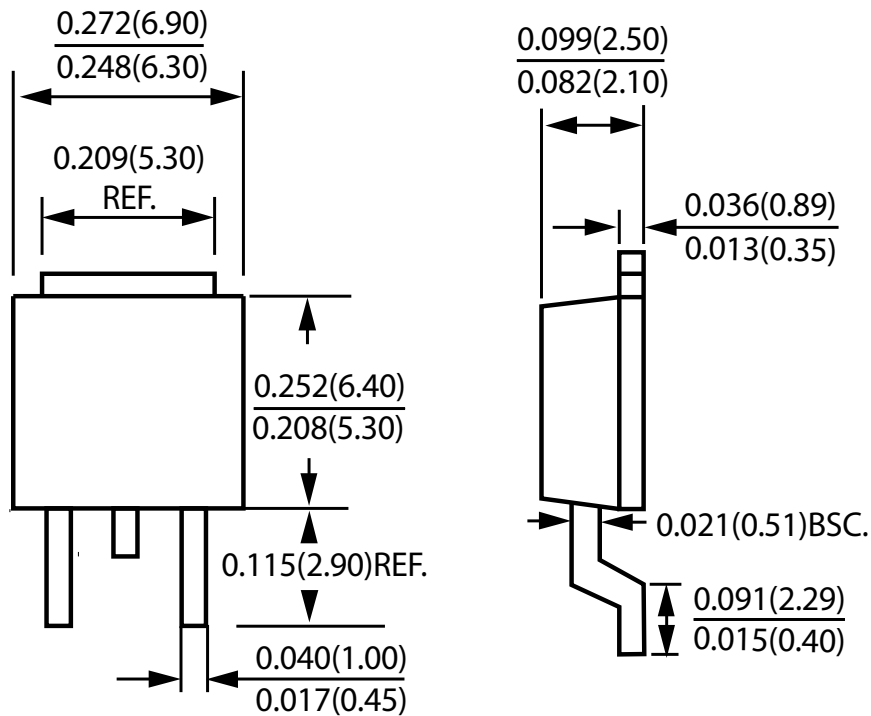


Fig.8 Gate Charge Waveform

Package Outline Dimensions



TO-252

Dimensions in inches and (millimeters)



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