60V P-Channel MOSFETs

PDH6903

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.

BVDSS	RDSON	ID
-60V	27mΩ	-42A

Features

- -60V,-42A, RDS(ON) =27mΩ@VGS = -10V
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

Application

- POL Applications
- Load Switch
- LED Application

TO263 Pin Configuration

Absolute Maximum Ratings Tc=25℃ 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℃)	-42	A
	Drain Current – Continuous (T_C=100℃)	-26.5	A
I_{DM}	Drain Current – Pulsed[1]	-168	A
EAS	Single Pulse Avalanche Energy[2]	105	mJ
IAS	Single Pulse Avalanched Current[2]	46	A
P_D	Power Dissipation (T_C=25℃)	121	W
	Power Dissipation – Derate above 25℃	0.97	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.03	℃/W

Electrical Characteristics (T$_J$=25 ℃, 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℃	---	---	-1	uA
		V$_{DS}$=-48V , V$_{GS}$=0V , T$_J$=125℃	---	---	-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$_D$=-8A	---	22	27	mΩ
		V$_{GS}$=-4.5V , I$_D$=-6A	---	28	36	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.0	-1.6	-2.5	V
gfs	Forward Transconductance	V$_{DS}$=-10V , I$_D$=-3A	---	18	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[3],[4]		---	43.8	88	
Q$_{gs}$	Gate-Source Charge[3],[4]	V$_{DS}$=-30V , V$_{GS}$=-10V , I$_D$=-5A	---	4.6	9	nC
Q$_{gd}$	Gate-Drain Charge[3],[4]		---	8.3	17	
T$_{d(on)}$	Turn-On Delay Time[3],[4]		---	25	50	
T$_r$	Rise Time[3],[4]	V$_{DD}$=-30V , V$_{GS}$=-10V , R$_G$=6Ω	---	13.8	28	ns
T$_{d(off)}$	Turn-Off Delay Time[3],[4]	I$_D$=-1A	---	148	290	
T$_f$	Fall Time[3],[4]		---	51	100	
C$_{iss}$	Input Capacitance		---	2595	3900	
C$_{oss}$	Output Capacitance	V$_{DS}$=-25V , V$_{GS}$=0V , F=1MHz	---	162	240	pF
C$_{rss}$	Reverse Transfer Capacitance		---	115	170	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current	V$_G$=V$_D$=0V , Force Current	---	---	-42	A
I$_{SM}$	Pulsed Source Current		---	---	-70	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	-1	V
T$_{rr}$	Reverse Recovery Time	VR=30V,IS=10A	---	150	---	nS
Q$_{rr}$	Reverse Recovery Charge	di/dt=100A/μs TJ=25℃	---	380	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V$_{DD}$=25V,V$_{GS}$=10V,L=0.1mH,I$_{AS}$=46A.,R$_G$=25Ω,Starting T$_J$=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
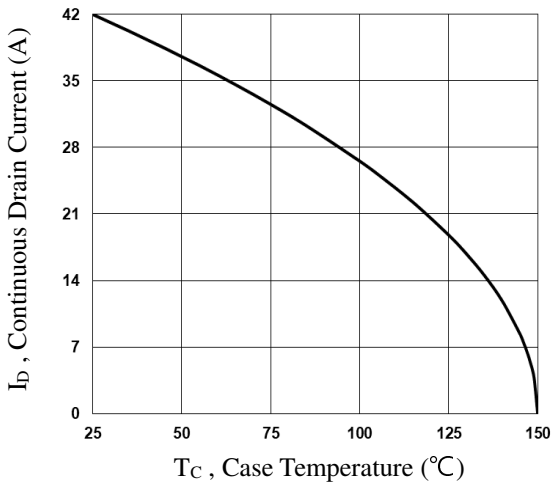4. Essentially independent of operating temperature.
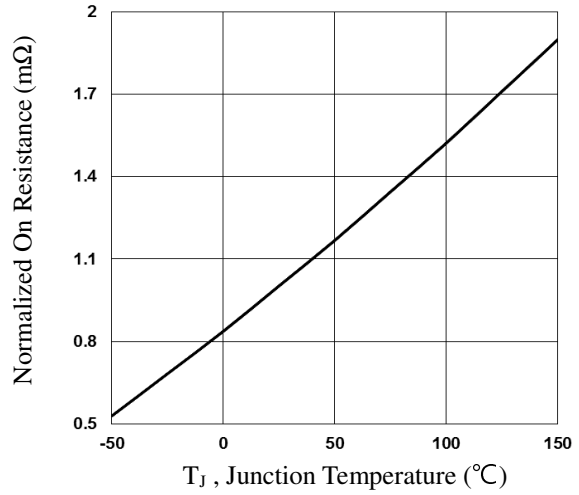
Fig.1   Continuous Drain Current vs. T$_C$
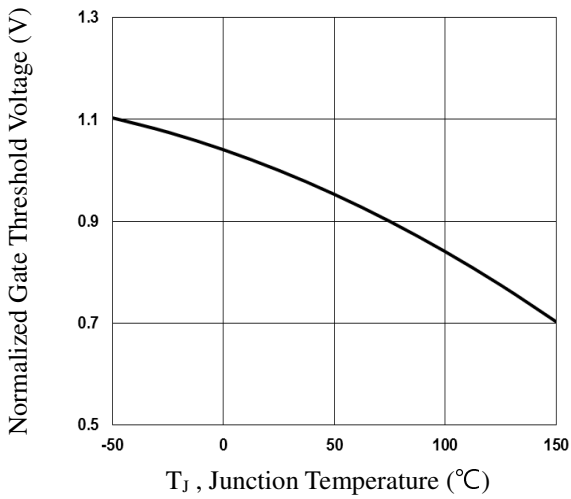

Fig.2   Normalized RDSON vs. T$_J$
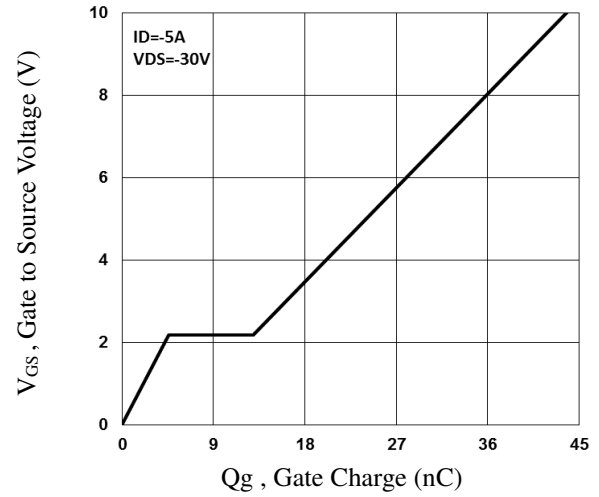

Fig.3   Normalized Vth vs. T$_J$

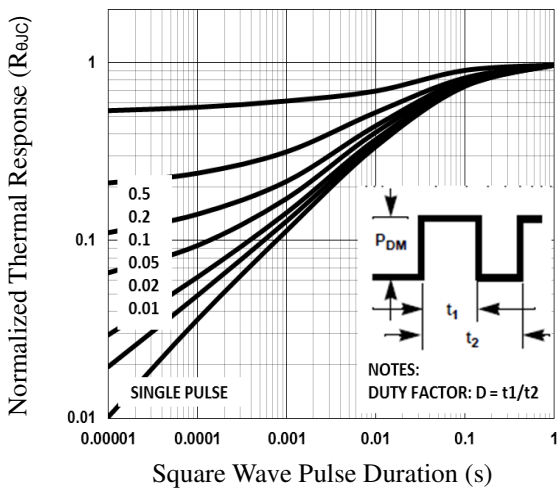Fig.4   Gate Charge Characteristics

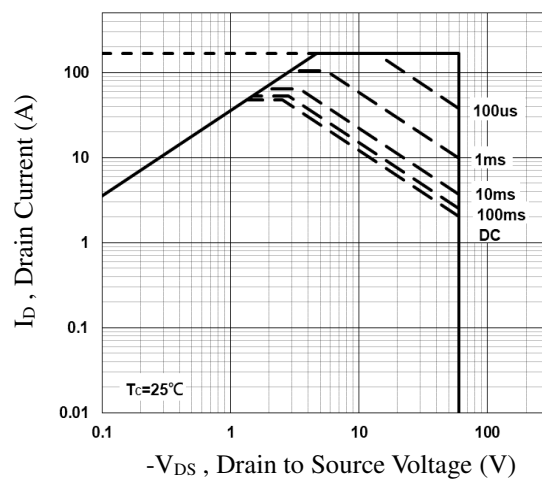Fig.5   Normalized Transient Impedance

Fig.6   Maximum Safe Operation Area

Fig.7   Switching Time Waveform

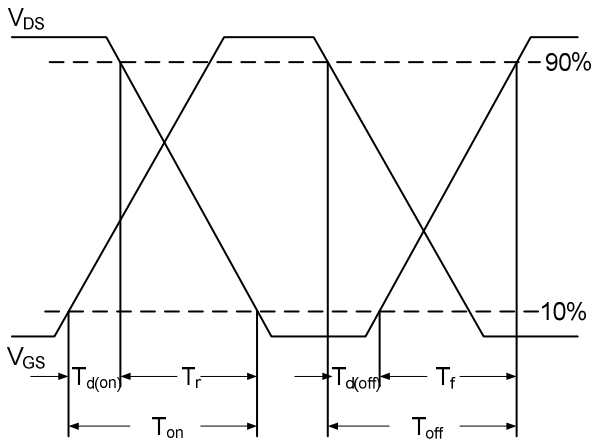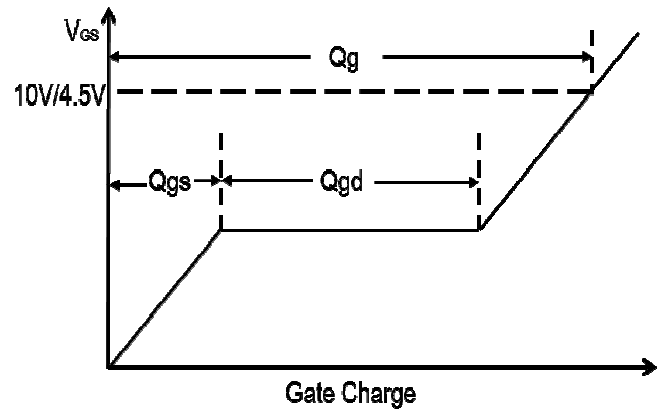**Fig.8   Gate Charge Waveform**

TO263 PACKAGE INFORMATION