PDQ3909

30V P-Channel MOSFETs

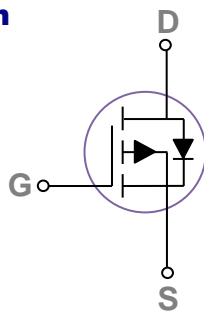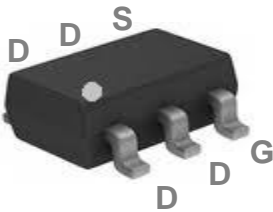| BVDSS	RDSON	ID
-30V	32mΩ	-5.5A

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.

Features

- *-30V,-5.5A, RDS(ON) =32mΩ@VGS = -10V*
- *Fast switching*
- *Green Device Available*
- *Suit for -4.5V Gate Drive Applications*

Applications

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

SOT23-6 Pin Configuration

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_A=25℃)	-5.5	A
	Drain Current – Continuous (T_A=70℃)	-4.4	A
I_{DM}	Drain Current – Pulsed[1]	-22	A
EAS	Single Pulse Avalanche Energy[2]	39.2	mJ
IAS	Single Pulse Avalanche Current[2]	-28	A
P_D	Power Dissipation (T_A=25℃)	1.56	W
	Power Dissipation – Derate above 25℃	0.012	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	---	80	℃/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=-250µA	-30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.02	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-30V , V_{GS}=0V , T_J=25℃	---	---	-1	µA
		V_{DS}=-24V , V_{GS}=0V , T_J=125℃	---	---	-10	µA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-4A	---	27	32	mΩ
		V_{GS}=-4.5V , I_D=-2A	---	38	46	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250µA	-1.2	-1.6	-2.2	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.3	---	mV/℃
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-3A	---	9	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]		---	17.8	35	
Q_{gs}	Gate-Source Charge[3,4]	V_{DS}=-15V , V_{GS}=-10V , I_D=-5A	---	3.3	6	nC
Q_{gd}	Gate-Drain Charge[3,4]		---	2.3	5	
$T_{d(on)}$	Turn-On Delay Time[3,4]		---	4.6	9	
T_r	Rise Time[3,4]	V_{DD}=-15V , V_{GS}=-10V , R_G=6Ω	---	14	26	ns
$T_{d(off)}$	Turn-Off Delay Time[3,4]	I_D=-1A	---	34	58	
T_f	Fall Time[3,4]		---	18	35	
C_{iss}	Input Capacitance		---	757	1280	
C_{oss}	Output Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz	---	122	210	pF
C_{rss}	Reverse Transfer Capacitance		---	88	175	

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	---	---	-5.5	A
I_{SM}	Pulsed Source Current		---	---	-11	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}=-28A.,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300µs , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.
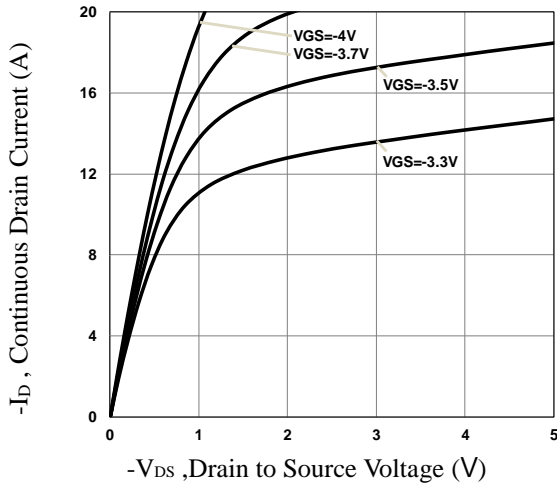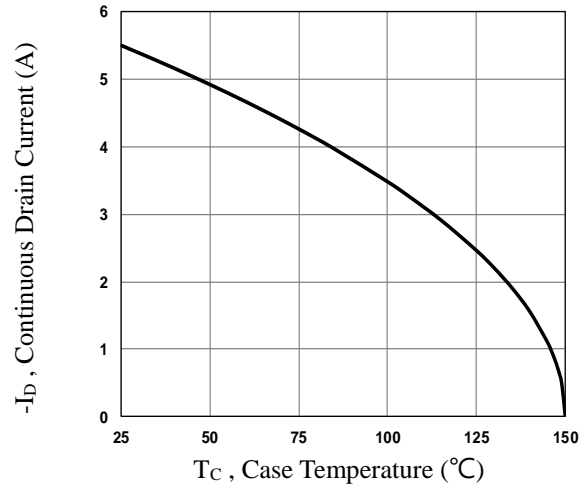
Fig.1   Typical Output Characteristics
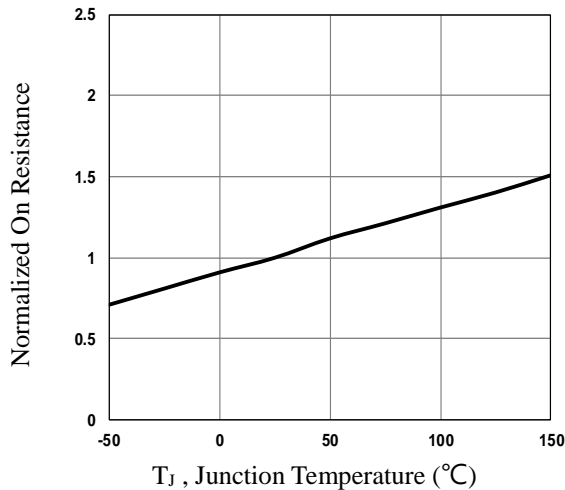

Fig.2   Continuous Drain Current vs. T_C

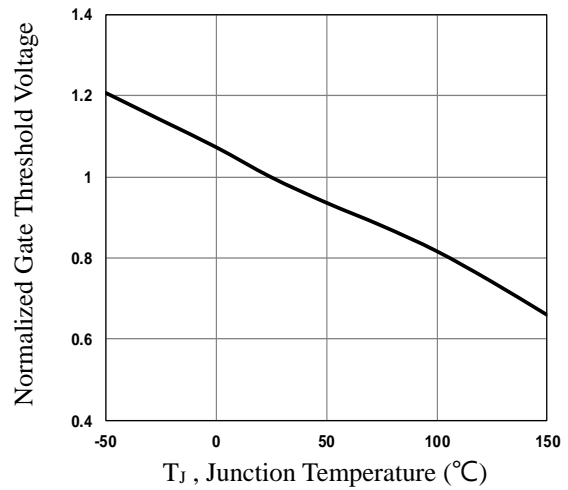Fig.3   Normalized RDSON vs. T_J

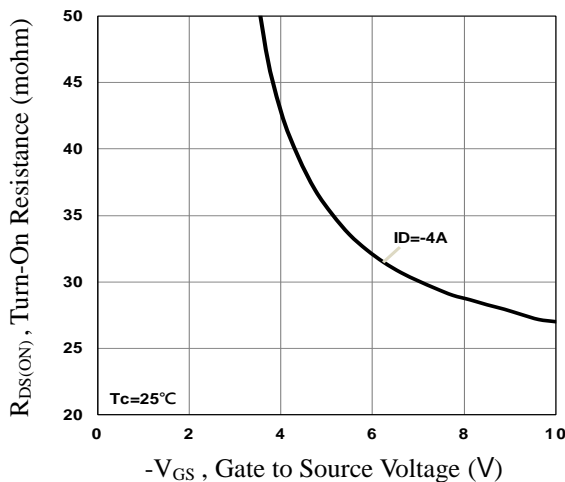Fig.4   Normalized V_{th} vs. T_J
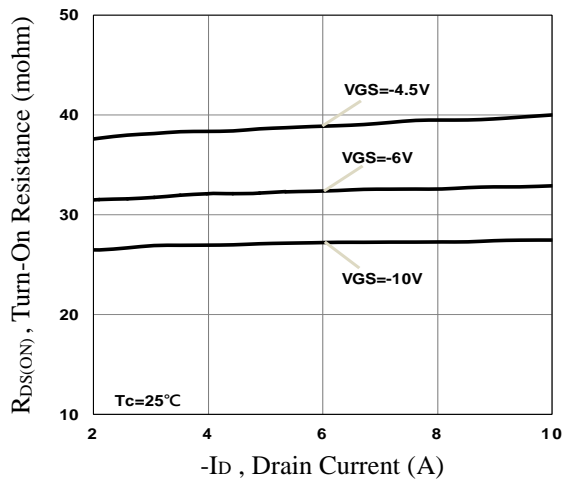

Fig.5   Turn-On Resistance vs. V_{GS}

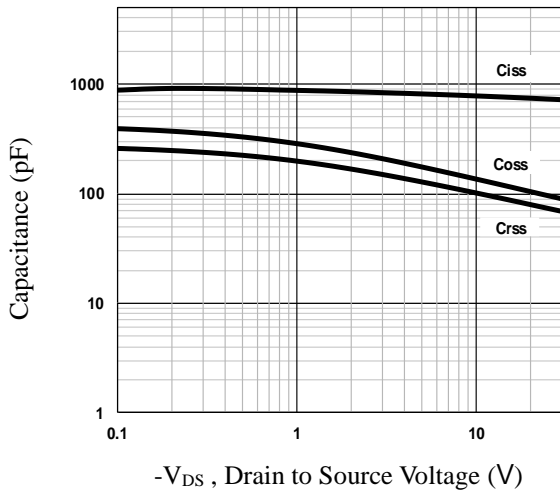Fig.6   Turn-On Resistance vs. I_D

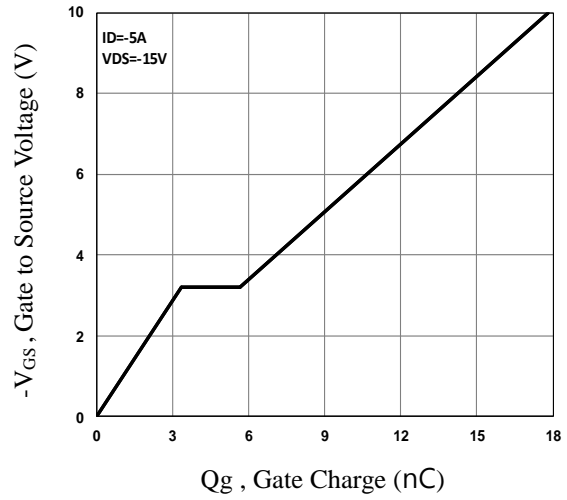**Fig.7 Capacitance Characteristics**

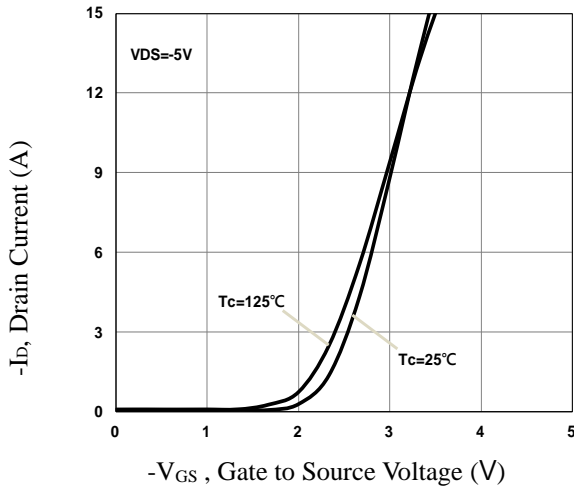**Fig.8 Gate Charge Characteristics**
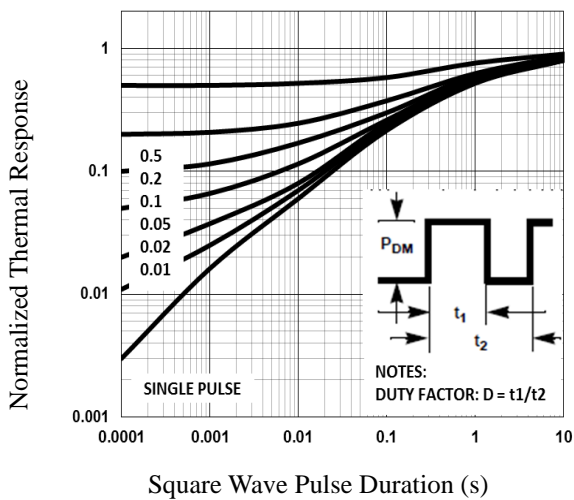

Fig.9 Transfer Characteristics
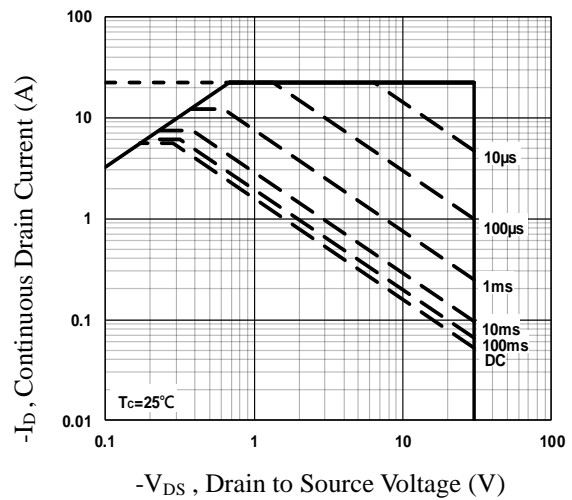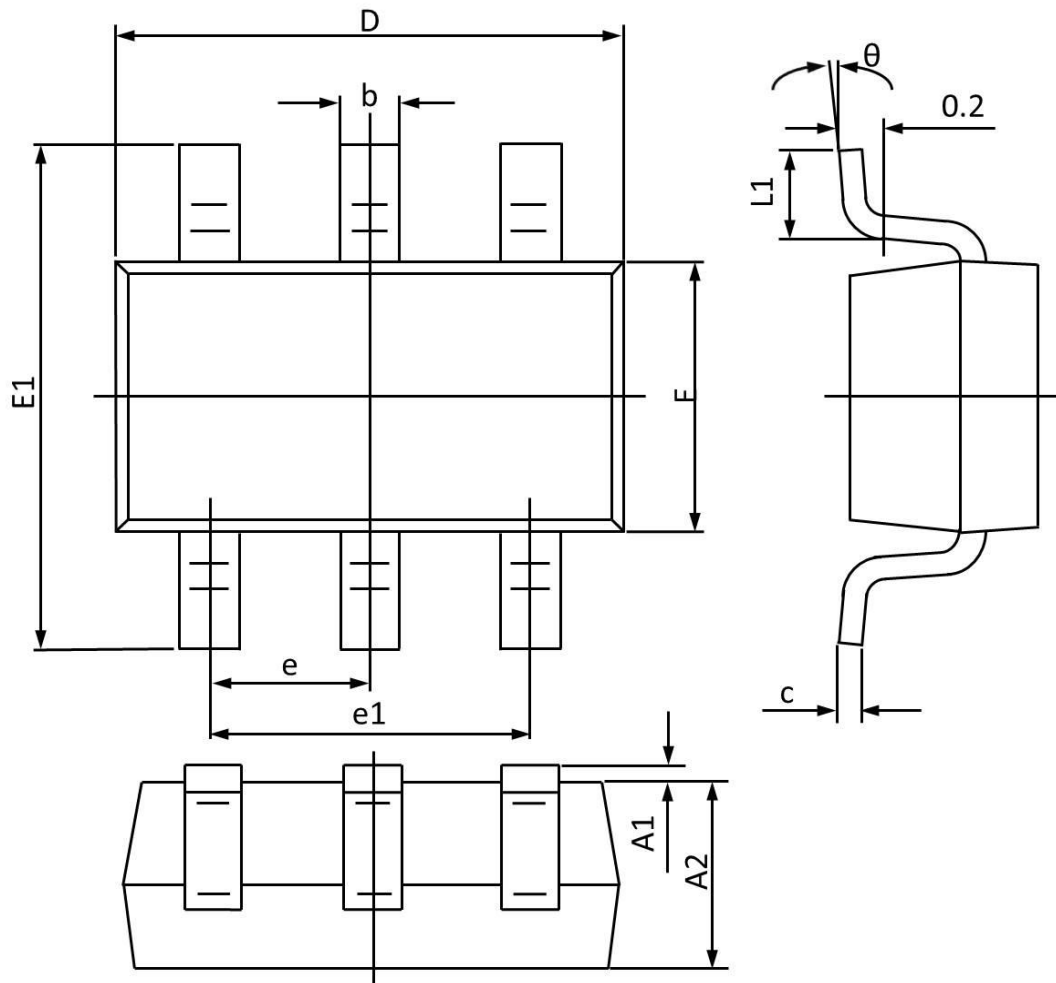

Fig.10 Normalized Transient Impedance

Fig.11 Maximum Safe Operation Area

SOT23-6 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	---	0.150	---	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.500	0.012	0.019
c	0.100	0.200	0.004	0.008
D	2.800	3.050	0.110	0.120
E1	2.600	3.000	0.103	0.118
F	1.500	1.800	0.059	0.071
e	0.950 TYP		0.037 TYP	
e1	1.900 TYP		0.075 TYP	
L1	0.250	0.600	0.010	0.024
θ	0°	8°	0°	8°