80V N-Channel MOSFETs

PDC8902X
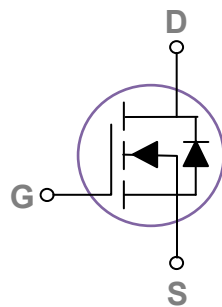
General Description

These N-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
80V	8mΩ	90A

Features

- *80V,90A, RDS(ON) =8mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *Networking*
- *Load Switch*
- *LED applications*

PPAK5X6 Pin Configuration

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	80	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	90	A
	Drain Current – Continuous (T_C=100℃)	57	A
I_{DM}	Drain Current – Pulsed[1]	360	A
EAS	Single Pulse Avalanche Energy[2]	230	mJ
IAS	Single Pulse Avalanche Current[2]	68	A
P_D	Power Dissipation (T_C=25℃)	142	W
	Power Dissipation – Derate above 25℃	1.13	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.88	℃/W

Electrical Characteristics (T_J=25 $^{\circ}$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	80	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=64V , V_{GS}=0V , T_J=125°C	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=$\pm$25V , V_{DS}=0V	---	---	$\pm$100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=15A	---	6.5	8	mΩ
		V_{GS}=4.5V , I_D=8A	---	7.5	10	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1	2	3	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]	V_{DS}=40V , V_{GS}=10V , I_D=10A	---	86	170	nC
Q_{gs}	Gate-Source Charge[3,4]		---	14.5	28	
Q_{gd}	Gate-Drain Charge[3,4]		---	17.5	35	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=40V , V_{GS}=10V , R_G=10Ω I_D=10A	---	21.8	42	ns
T_r	Rise Time[3,4]		---	27.8	54	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	111	220	
T_f	Fall Time[3,4]		---	56	112	
C_{iss}	Input Capacitance	V_{DS}=30V , V_{GS}=0V , F=1MHz	---	5335	10000	pF
C_{oss}	Output Capacitance		---	350	700	
C_{rss}	Reverse Transfer Capacitance		---	185	370	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.6	3.2	Ω

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	---	---	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
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=20A , di/dt=100A/μs	---	28	---	ns
Q_{rr}	Reverse Recovery Charge	T_J=25°C	---	20	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=68A., Starting T_J=25°C
3. The data tested by pulsed , pulse width $\leq$ 300us , duty cycle $\leq$ 2%.
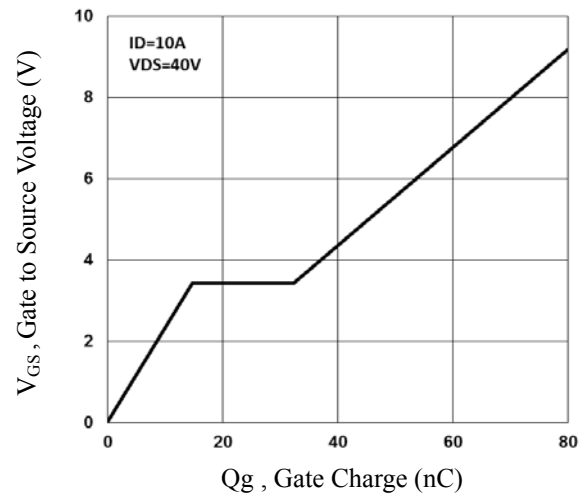4. Essentially independent of operating temperature.
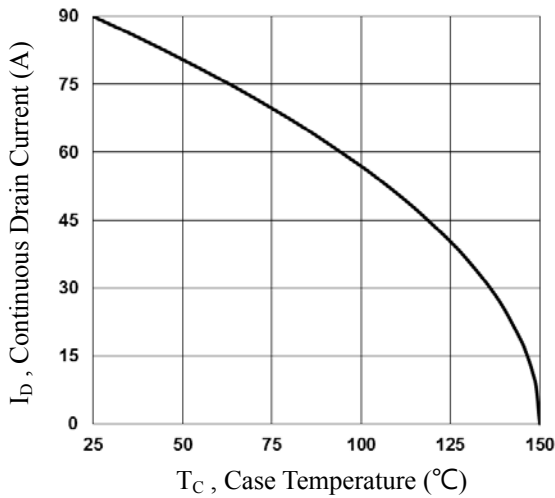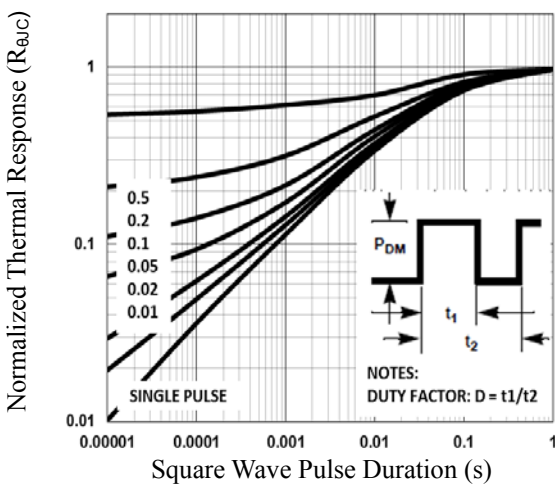
Fig.1   Continuous Drain Current vs. T$_C$
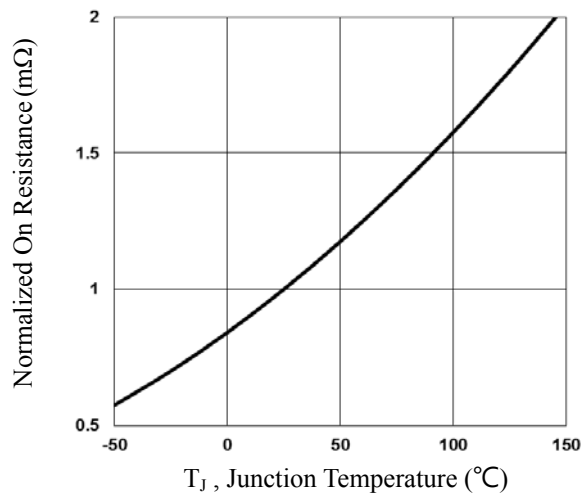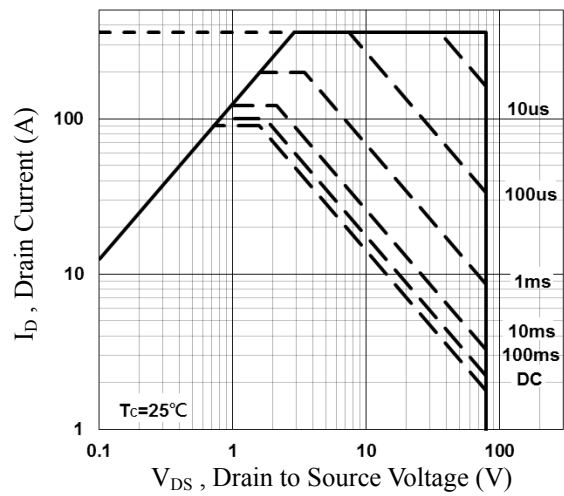

Fig.2   Normalized RDSON vs. T$_J$
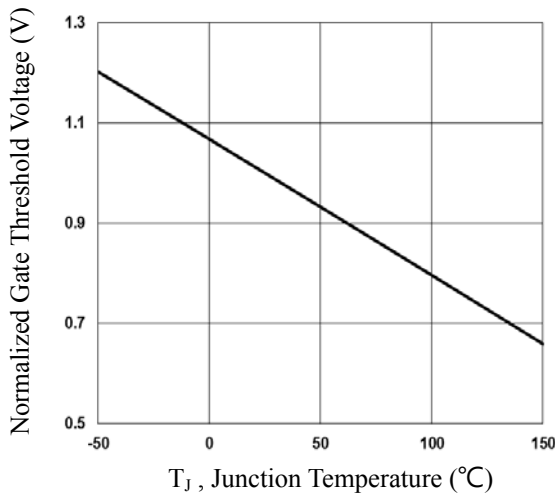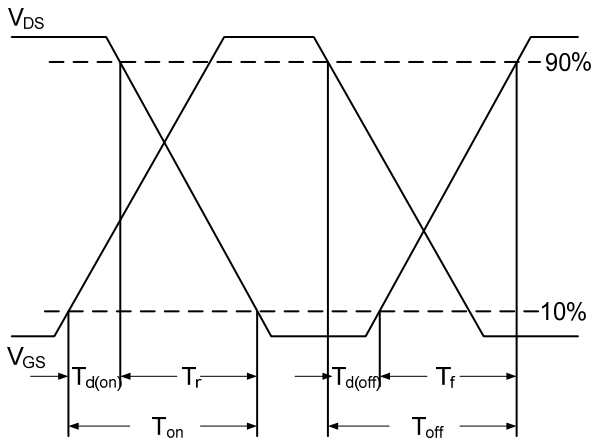

Fig.3   Normalized Vth vs. T$_J$
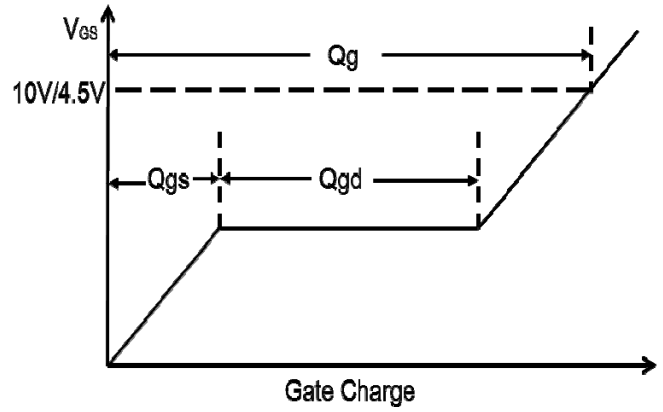

Fig.4   Gate Charge Characteristics

Fig.5   Normalized Transient Impedance

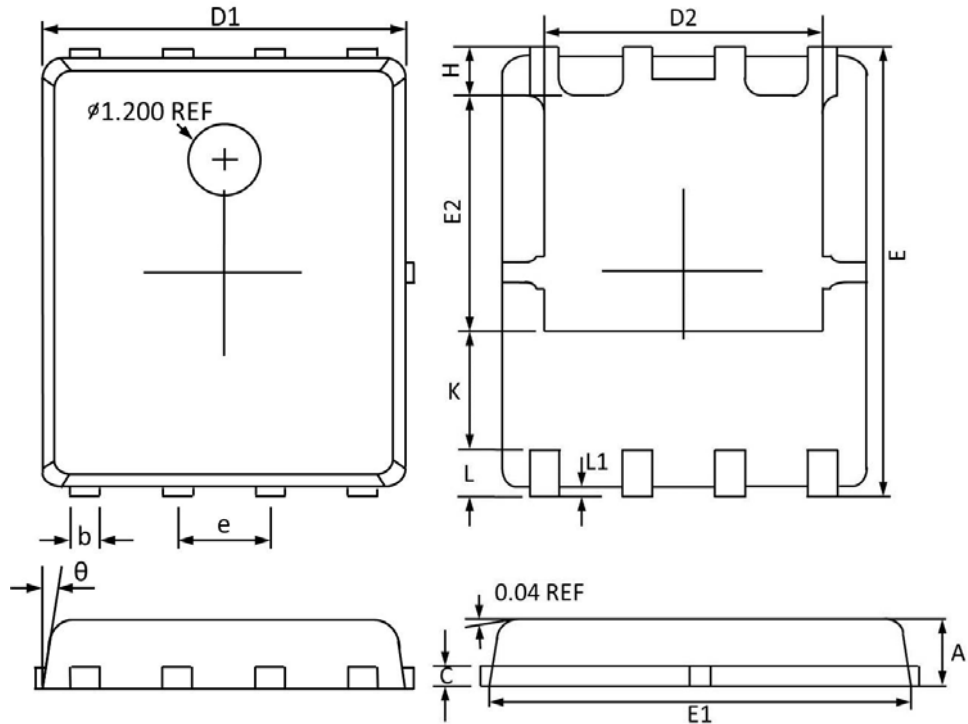Fig.6   Maximum Safe Operation Area

Fig.7　Switching Time Waveform

Fig.8　Gate Charge Waveform

PPAK5x6 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
θ	12°	0°	12°	0°