PDC8974AX

80V N-Channel MOSFETs
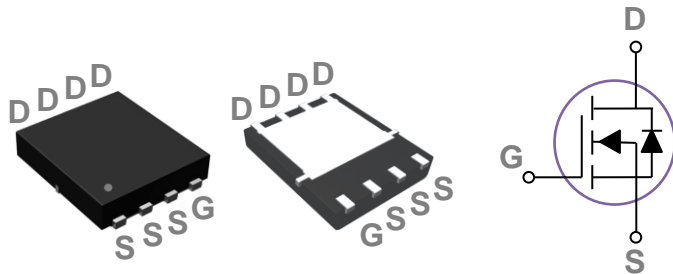
General Description

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	3.5mΩ	130A

Features

- *80V,130A, RDS(ON) =3.5mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *Networking*
- *Load Switch*
- *LED applications*
- *Quick Charger*

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/-12	V
I_D	Drain Current – Continuous (T_C=25℃)	130	A
	Drain Current – Continuous (T_C=100℃)	82	A
I_{DM}	Drain Current – Pulsed[1]	520	A
EAS	Single Pulse Avalanche Energy[2]	400	mJ
IAS	Single Pulse Avalanche Current[2]	90	A
P_D	Power Dissipation (T_C=25℃)	142	W
	Power Dissipation – Derate above 25℃	1.13	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
$R_{θJA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{θJC}$	Thermal Resistance Junction to Case	---	0.88	℃/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	80	---	---	V
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=80V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=64V , V$_{GS}$=0V , T$_J$=85℃	---	---	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$_D$=20A	---	2.9	3.5	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	2	3	4	V
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=5A	---	19	---	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$_D$=70A	---	95.5	143	nC
Q$_{gs}$	Gate-Source Charge[3],[4]		---	23.5	35	
Q$_{gd}$	Gate-Drain Charge[3],[4]		---	32	48	
T$_{d(on)}$	Turn-On Delay Time[3],[4]	V$_{DD}$=40V , V$_{GS}$=10V , R$_G$=6Ω I$_D$=70A	---	22	33	ns
T$_r$	Rise Time[3],[4]		---	15	23	
T$_{d(off)}$	Turn-Off Delay Time[3],[4]		---	40	60	
T$_f$	Fall Time[3],[4]		---	19	29	
C$_{iss}$	Input Capacitance	V$_{DS}$=40V , V$_{GS}$=0V , F=1MHz	---	5510	8265	pF
C$_{oss}$	Output Capacitance		---	1200	1800	
C$_{rss}$	Reverse Transfer Capacitance		---	70	100	
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, F=1MHz	---	1.5	---	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	---	---	130	A
I$_{SM}$	Pulsed Source Current		---	---	260	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1	V
t$_{rr}$	Reverse Recovery Time	V$_R$=50V, I$_S$=10A ,	---	65	---	nS
Q$_{rr}$	Reverse Recovery Charge	dI/dt=100A/μs , T$_J$=25℃	---	130	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V$_{DD}$=25V,V$_{GS}$=10V,L=0.1mH,I$_{AS}$=90A.,R$_G$=25Ω,Starting T$_J$=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
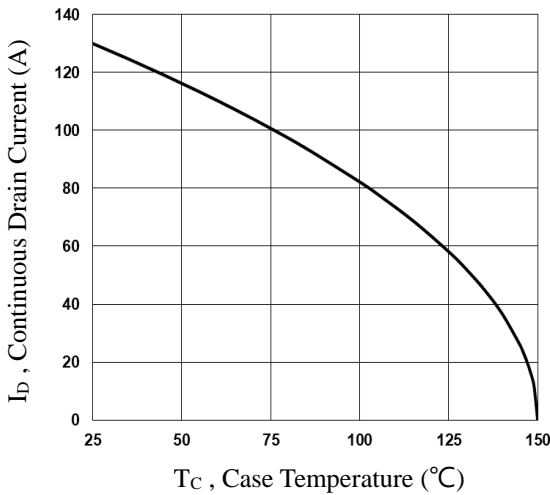4. Essentially independent of operating temperature.
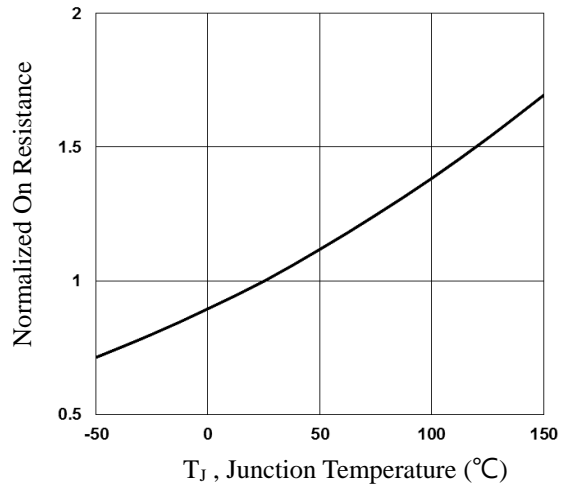
Fig.1   Continuous Drain Current vs. T_C
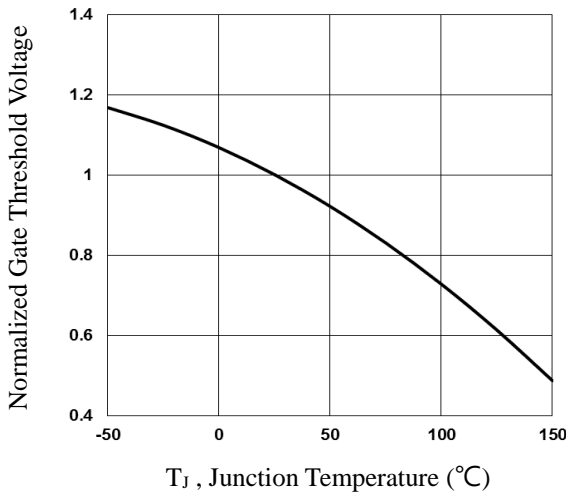

Fig.2   Normalized RDSON vs. T_J

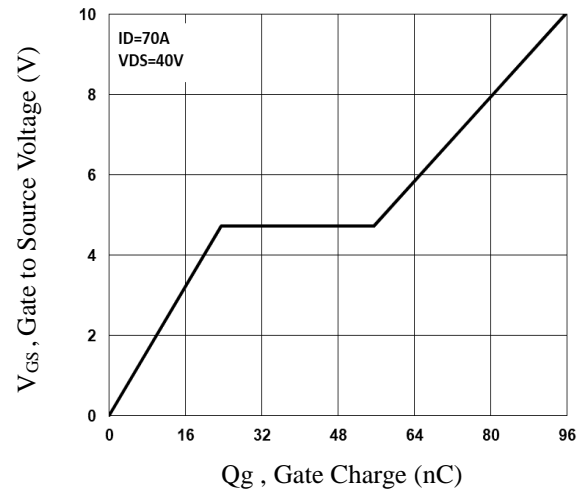Fig.3   Normalized Vth vs. T_J

Fig.4   Gate Charge Characteristics

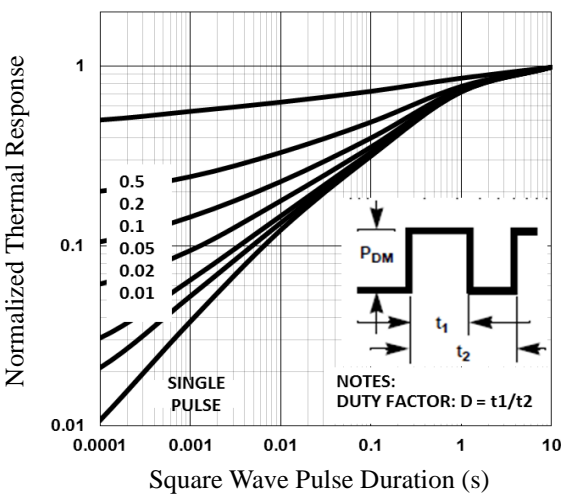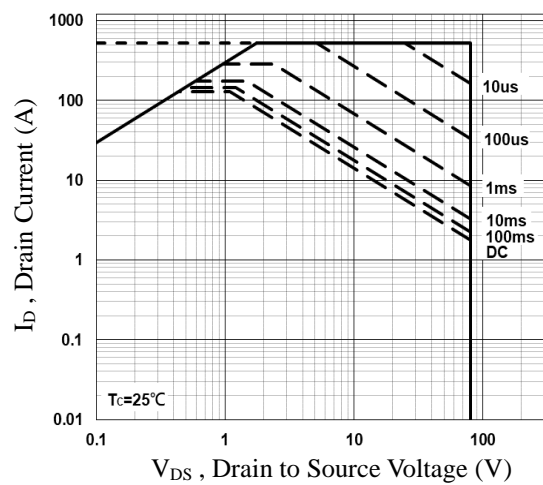Fig.5   Normalized Transient Impedance

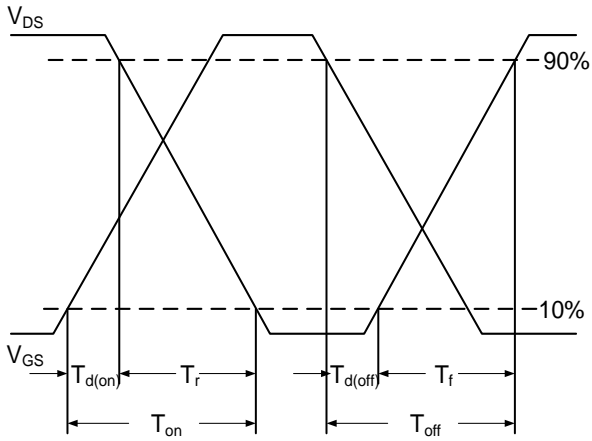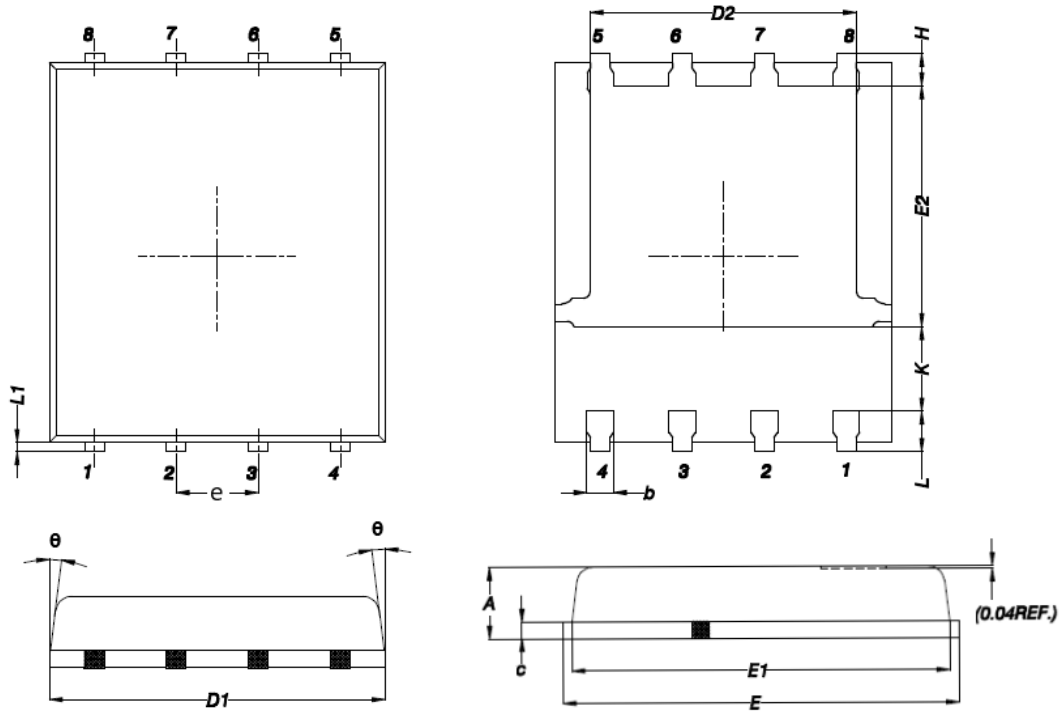Fig.6   Maximum Safe Operation Area

Fig.7 Switching Time Waveform

Fig.8 Gate Charge Waveform

PPAK5x6 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	**MIN**	**MAX**	**MIN**
A	1.200	0.850	0.047	0.031
b	0.510	0.300	0.020	0.012
C	0.300	0.200	0.012	0.008
D1	5.400	4.800	0.212	0.189
D2	4.310	3.610	0.170	0.142
E	6.300	5.850	0.248	0.230
E1	5.960	5.450	0.235	0.215
E2	3.920	3.300	0.154	0.130
e	1.27BSC		0.05BSC	
H	0.650	0.380	0.026	0.015
K	---	1.100	---	0.043
L	0.710	0.380	0.028	0.015
L1	0.250	0.050	0.009	0.002
θ	12°	0°	12°	0°