PDC3806T

30V Dual N-Channel MOSFETs

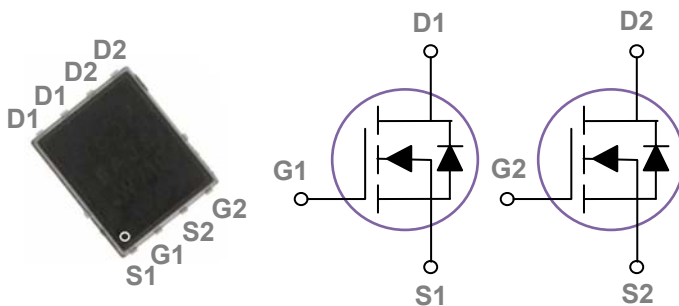| BVDSS	RDSON	ID
30V	6.5mΩ	40A

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.

Features

- *30V,40A, RDS(ON) =6.5mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

PPAK5x6 Dual Pin Configuration

Applications

- *MB / VGA / Vcore*
- *POL Applications*
- *SMPS 2nd SR*
- *USB Type C*

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_C=25℃)	40	A
	Drain Current – Continuous (T_C=100℃)	25.3	A
I_{DM}	Drain Current – Pulsed[1]	160	A
EAS	Single Pulse Avalanche Energy[2]	88	mJ
IAS	Single Pulse Avalanche Current[2]	42	A
P_D	Power Dissipation (T_C=25℃)	46	W
	Power Dissipation – Derate above 25℃	0.37	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	---	2.7	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Static State Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=250uA	30	---	---	V
$\triangle$BV$_{DSS}$/$\triangle$T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=1mA	---	0.04	---	V/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=30V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=24V , V$_{GS}$=0V , T$_J$=125℃	---	---	10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=$\pm$20V , V$_{DS}$=0V	---	---	$\pm$100	nA
R$_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V$_{GS}$=10V , I$_D$=20A	---	5.5	6.5	mΩ
		V$_{GS}$=4.5V , I$_D$=10A	---	7	9	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	1	1.6	2.5	V
$\triangle$V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=10A	---	18	---	S

Dynamic Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[3,4]	V$_{DS}$=15V , V$_{GS}$=4.5V , I$_D$=20A	---	11.1	22	nC
Q$_{gs}$	Gate-Source Charge[3,4]		---	1.85	4	
Q$_{gd}$	Gate-Drain Charge[3,4]		---	6.8	13	
T$_{d(on)}$	Turn-On Delay Time[3,4]	V$_{DD}$=15V , V$_{GS}$=10V , R$_G$=3.3Ω I$_D$=15A	---	7.5	15	ns
T$_r$	Rise Time[3,4]		---	14.5	28	
T$_{d(off)}$	Turn-Off Delay Time[3,4]		---	35.2	70	
T$_f$	Fall Time[3,4]		---	9.6	20	
C$_{iss}$	Input Capacitance	V$_{DS}$=25V , V$_{GS}$=0V , F=1MHz	---	1160	1750	pF
C$_{oss}$	Output Capacitance		---	200	300	
C$_{rss}$	Reverse Transfer Capacitance		---	180	270	
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, F=1MHz	---	2.5	5	Ω

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	V$_{DD}$=25V, L=0.1mH, IAS=20A	20	---	---	mJ

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current	V$_G$=V$_D$=0V , Force Current	---	---	40	A
I$_{SM}$	Pulsed Source Current[3]		---	---	80	A
V$_{SD}$	Diode Forward Voltage[3]	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$_{AS}$=42A.,R$_G$=25Ω, Starting T$_J$=25℃.
3. The data tested by pulsed , pulse width $\leqq$ 300us , duty cycle $\leqq$ 2%.
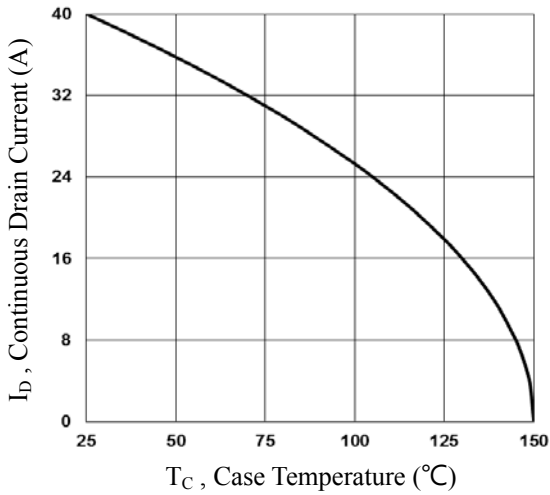4. Essentially independent of operating temperature.

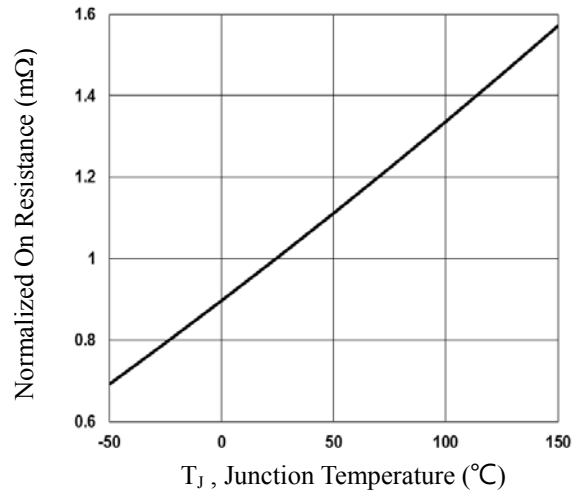**Fig.1   Continuous Drain Current vs. T_C**
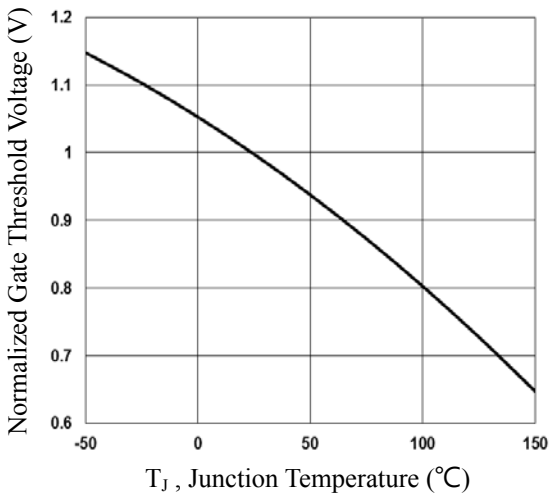

Fig.2   Normalized RDSON vs. T_J

Fig.3   Normalized V_{th} vs. T_J
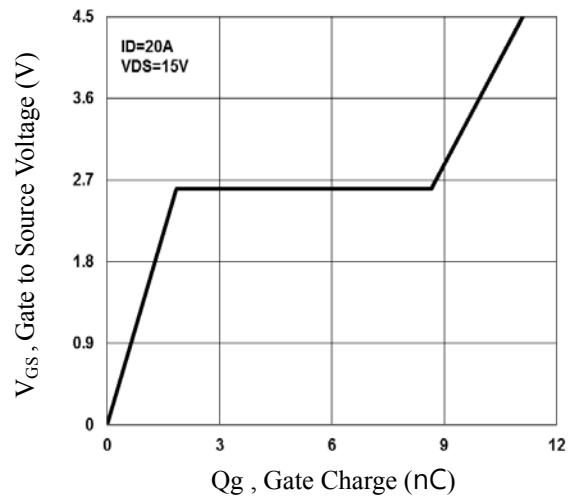

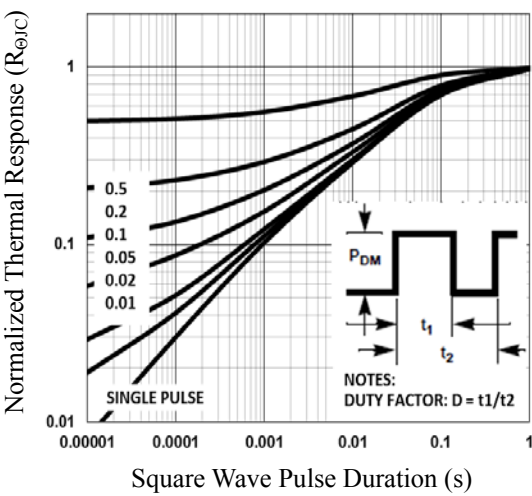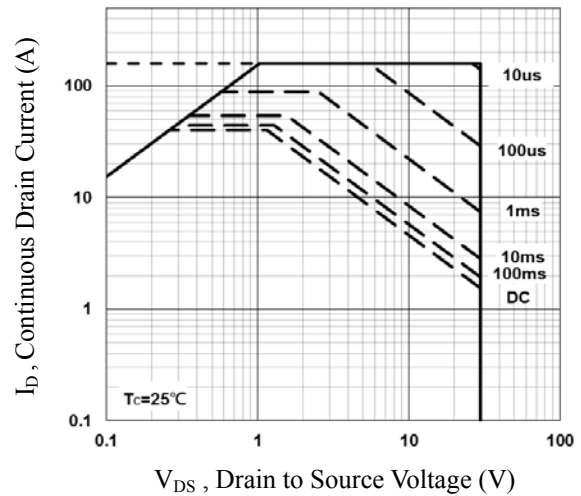**Fig.4   Gate Charge Waveform**

Fig.5   Normalized Transient Impedance

Fig.6   Maximum Safe Operation Area

Fig.7   Switching Time Waveform

$$EAS= \frac{1}{2}L \times I_{AS}{}^{2} \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

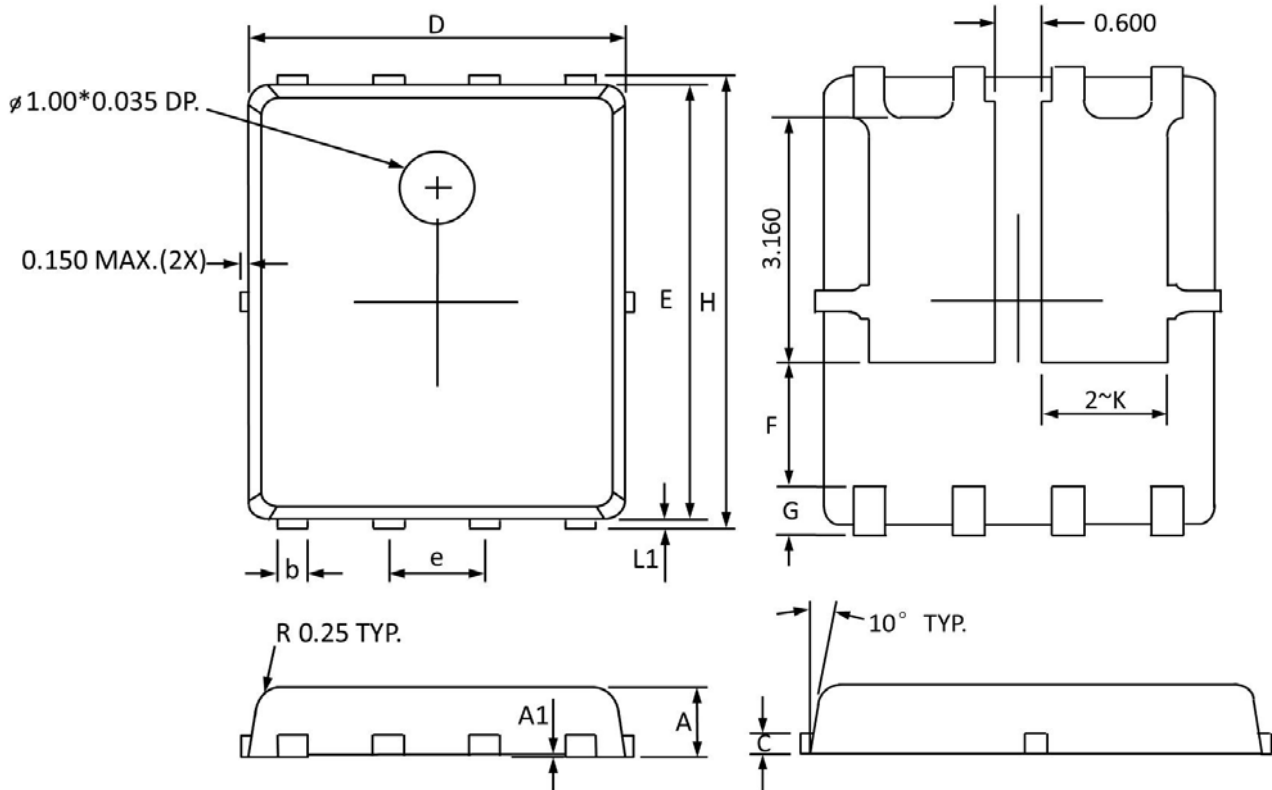**Fig.8   EAS Waveform**

PPAK5x6 Dual PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.600 Ref		1.600 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	1.600 Ref		1.600 Ref	