PDEC2209K

20V P-Channel Dual MOSFETs

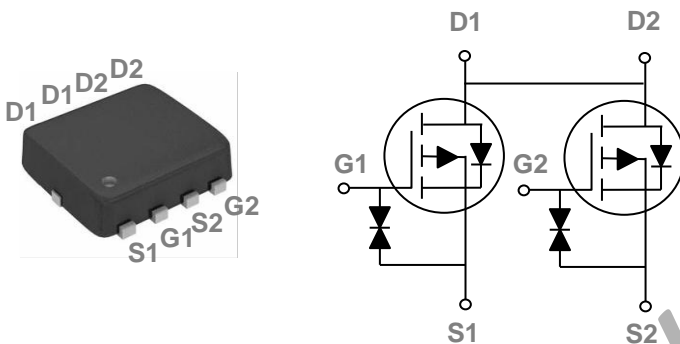| BVDSS	RDSON	ID
-20V	33mΩ	-5.6A

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

- *-20V,-5.6A, RDS(ON) =33mΩ @VGS = -4.5V*
- *Improved dv/dt capability*
- *Fast switching*
- *Green Device Available*

PPAK3x3 Dual NEP Pin Configuration

Applications

- *MB / VGA / Vcore*
- *POL Applications*
- *Networking*

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±10	V
I_D	Drain Current – Continuous (T_A=25℃)	5.6	A
	Drain Current – Continuous (T_A=70℃)	4.5	A
I_{DM}	Drain Current – Pulsed[1]	22.4	A
P_D	Power Dissipation (T_A=25℃)	1.67	W
	Power Dissipation – Derate above 25℃	0.01	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	---	75	℃/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	-20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , I_D=-1mA	---	-0.02	---	V/$^{\circ}$C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-20V , V_{GS}=0V , T_J=25°C	---	---	-1	uA
		V_{DS}=-16V , V_{GS}=0V , T_J=125°C	---	---	-10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=$\pm$10V , V_{DS}=0V	---	---	$\pm$100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-4A	---	28	33	mΩ
		V_{GS}=-2.5V , I_D=-3A	---	37	45	mΩ
		V_{GS}=-1.8V , I_D=-2A		49	65	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.3	-0.6	-1	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2	---	mV/$^{\circ}$C
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-3A	---	8.5	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge[2,3]	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-4A	---	16.1	25	nC
Q_{gs}	Gate-Source Charge[2,3]		---	1.8	3.6	
Q_{gd}	Gate-Drain Charge[2,3]		---	3.8	7	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-10V , V_{GS}=-4.5V , R_G=25Ω I_D=1A	---	8.2	16	ns
T_r	Rise Time[2,3]		---	30	57	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	71	135	
T_f	Fall Time[2,3]		---	20	38	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz	---	1440	2100	pF
C_{oss}	Output Capacitance		---	155	230	
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	---	---	-5.6	A
I_{SM}	Pulsed Source Current[2]		---	---	-11.2	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25°C	---	---	-1	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq$ 300us , duty cycle $\leq$ 2%.
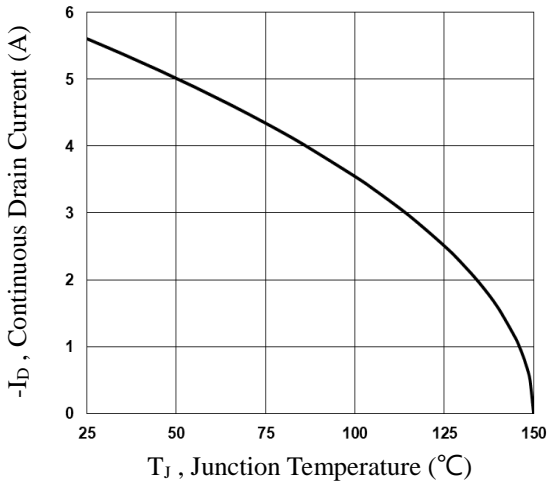3. Essentially independent of operating temperature.
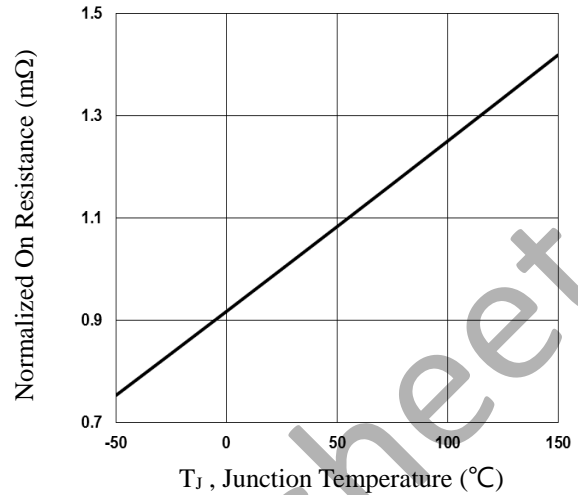
Fig.1   Continuous Drain Current vs. T$_C$
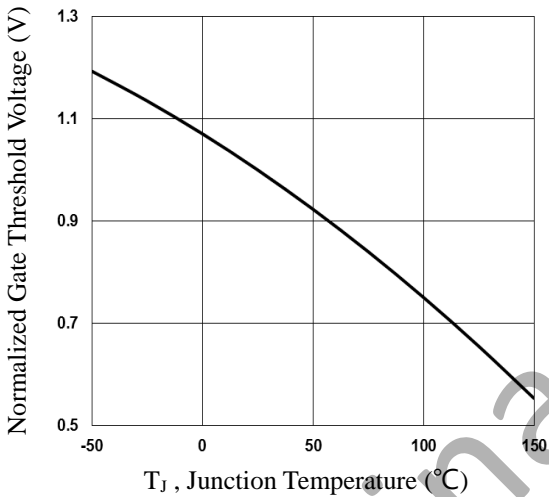

Fig.2   Normalized RDSON vs. T$_J$

Fig.3   Normalized V$_{th}$ vs. T$_J$
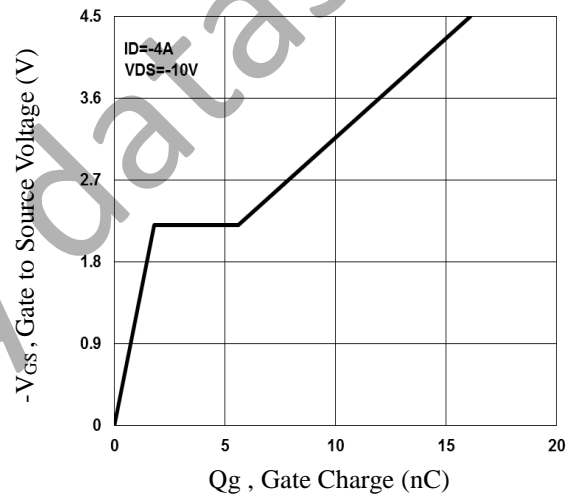

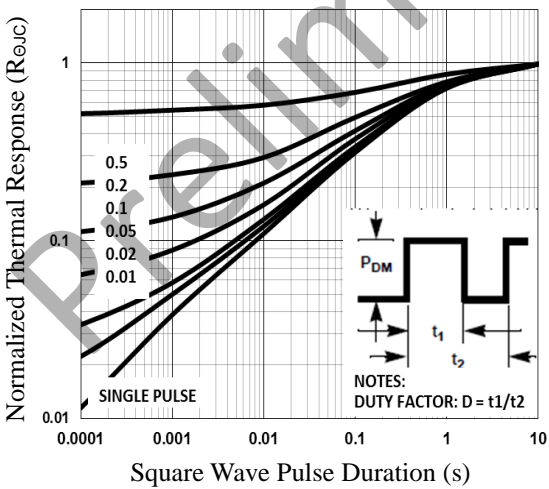**Fig.4   Gate Charge Waveform**

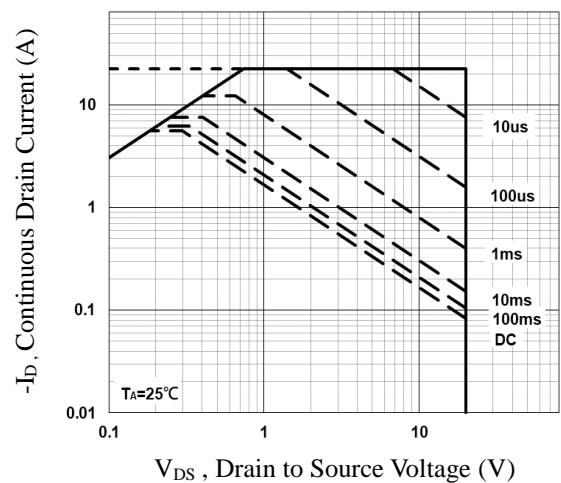**Fig.5   Normalized Transient Response**

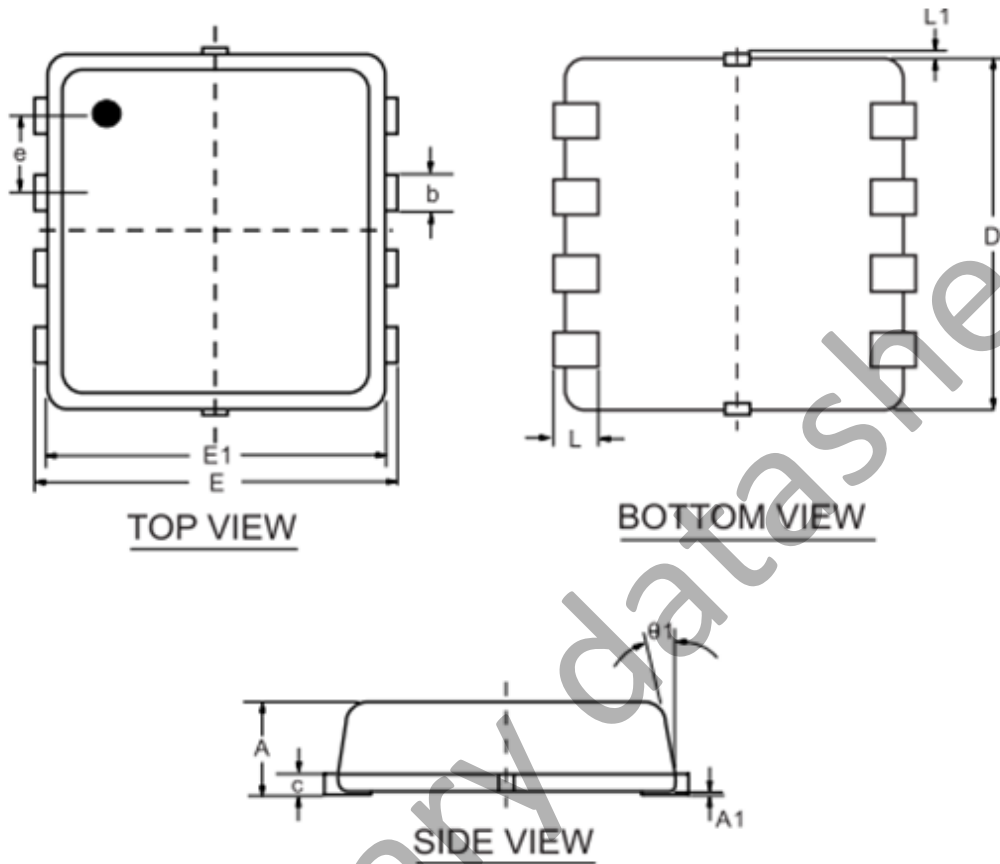**Fig.6   Maximum Safe Operation Area**

Fig.7   Switching Time Waveform

Fig.8   Gate Charge Waveform

PPAK3x3 Dual NEP PACKAGE INFORMATION

TOP VIEW

BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	0.700	0.800	0.900
A1	0.000	---	0.050
b	0.250	0.300	0.350
c	0.080	0.152	0.250
D	2.800	2.900	3.000
E	2.700	2.800	2.900
E1	2.200	2.300	2.400
e	0.65BSC		
L	0.200	0.375	0.450
L1	0.00	---	0.10
Θ1	0°	10°	12°