



P5MND2P8



40V N-Channel MOSFETs

General Description

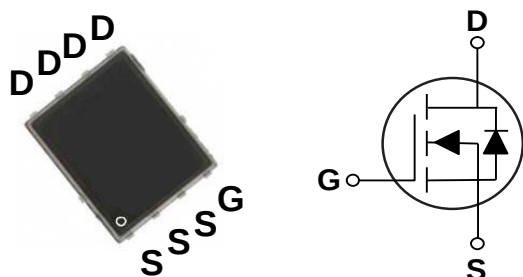
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
40V	2.8m Ω	100A

Features

- 40V, 100A, $R_{DS(ON)}=2.8m\Omega$ @ $V_{GS}=10V$
- Fast switching
- Improved dv/dt capability
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ\text{C}$)	100	A
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	63	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	400	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	312	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	79	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	135	W
	Power Dissipation - Derate above 25°C	1.08	W/ $^\circ\text{C}$
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
Marking Code		ND2P8	

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.92	$^\circ\text{C}/\text{W}$

**P5MND2P8****40V N-Channel MOSFETs****Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)****Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=40V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=32V$, $V_{GS}=0V$, $T_J=125^{\circ}\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance (NOTE 3)	$V_{GS}=10V$, $I_D=25A$	---	2.2	2.8	m Ω
		$V_{GS}=4.5V$, $I_D=12A$	---	2.6	3.5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.6	2.5	V
g_{fs}	Forward Transconductance	$V_{DS}=10V$, $I_D=2A$	---	16	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge (NOTE 3、4)	$V_{DS}=20V$, $V_{GS}=4.5V$, $I_D=10A$	---	44.4	80	nC
Q_{gs}	Gate-Source Charge (NOTE 3、4)		---	9.6	18	
Q_{gd}	Gate-Drain Charge (NOTE 3、4)		---	16	30	
$T_{d(on)}$	Turn-On Delay Time (NOTE 3、4)	$V_{DD}=20V$, $V_{GS}=10V$, $R_G=6\Omega$, $I_D=1A$	---	28	50	ns
T_r	Rise Time (NOTE 3、4)		---	3.2	6.5	
$T_{d(off)}$	Turn-Off Delay Time (NOTE 3、4)		---	89	160	
T_f	Fall Time (NOTE 3、4)		---	14	28	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $F=1\text{MHz}$	---	4940	7800	pF
C_{oss}	Output Capacitance		---	425	800	
C_{rss}	Reverse Transfer Capacitance		---	170	330	
R_g	Gate resistance	$V_{GS}=0V$, $V_{DS}=0V$, $F=1\text{MHz}$	---	1.4	2.8	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	100	A
I_{SM}	Pulsed Source Current (NOTE 3)		---	---	200	A
V_{SD}	Diode Forward Voltage (NOTE 3)	$V_{GS}=0V$, $I_S=1A$, $T_J=25^{\circ}\text{C}$	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1\text{mH}$, $I_{AS}=79A$, Starting $T_J=25^{\circ}\text{C}$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.



Characteristics Curves

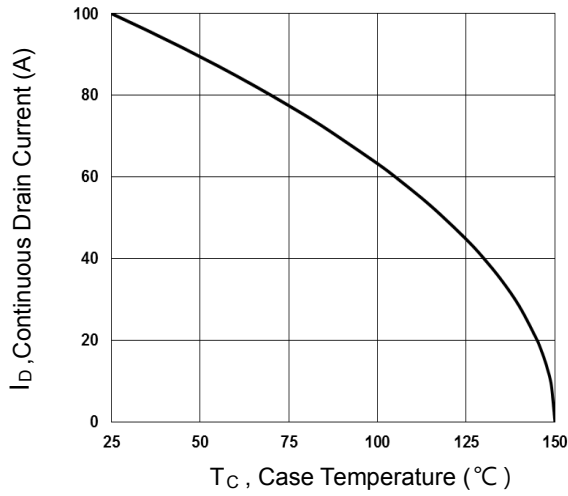


Fig.1 Continuous Drain Current vs. T_C

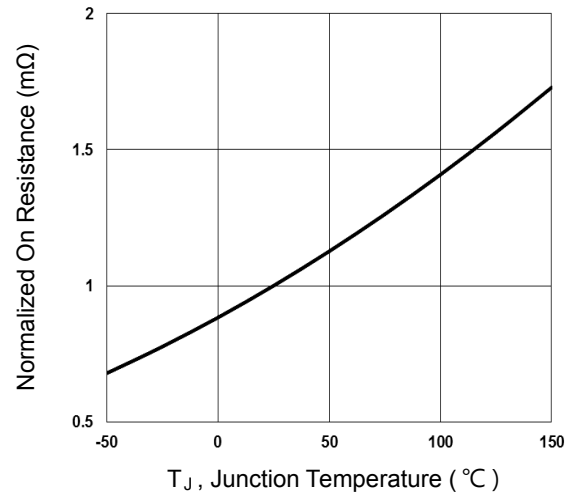


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

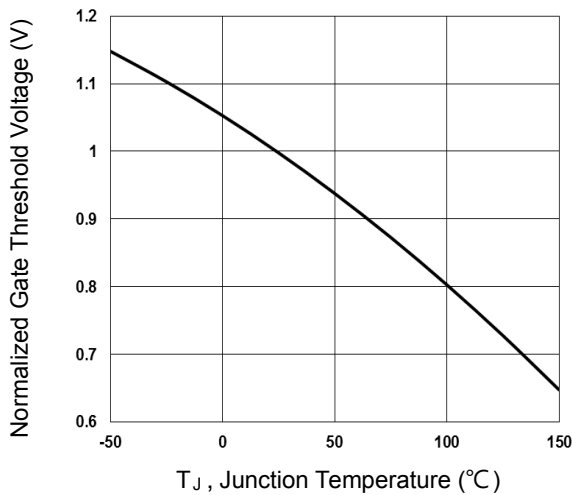


Fig.3 Normalized V_{th} vs. T_J

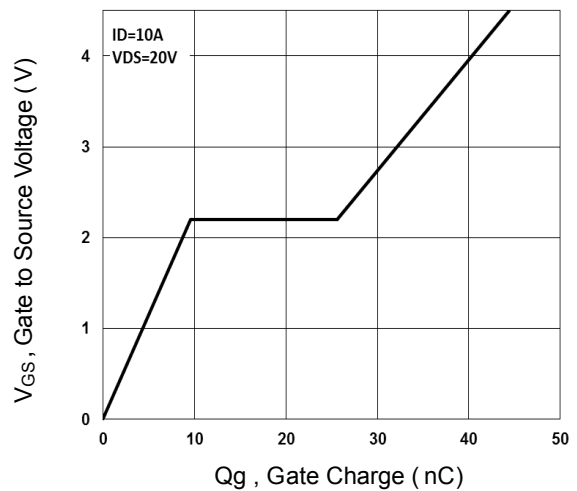


Fig.4 Gate Charge Waveform

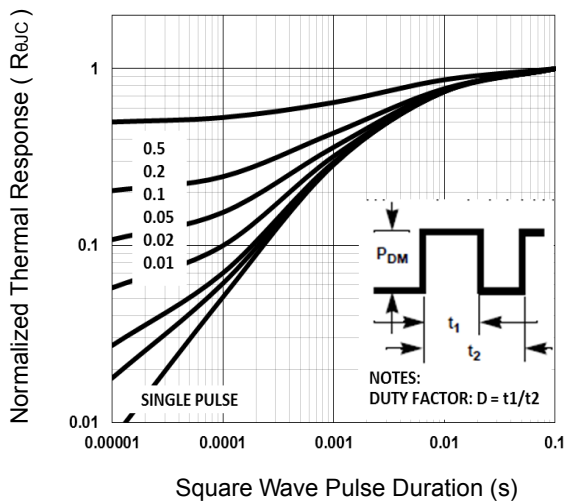


Fig.5 Normalized Transient Impedance

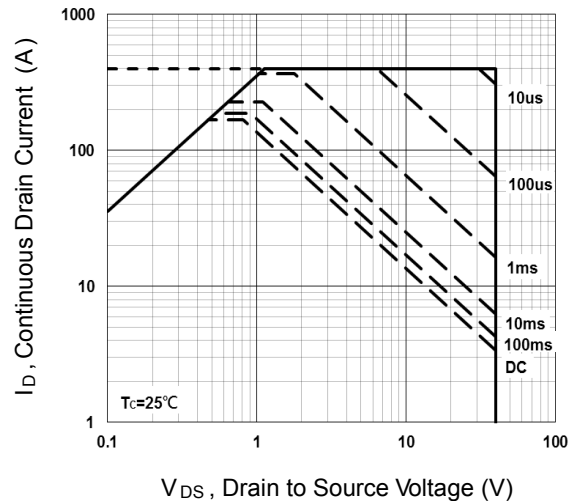


Fig.6 Maximum Safe Operation Area



Characteristics Curves

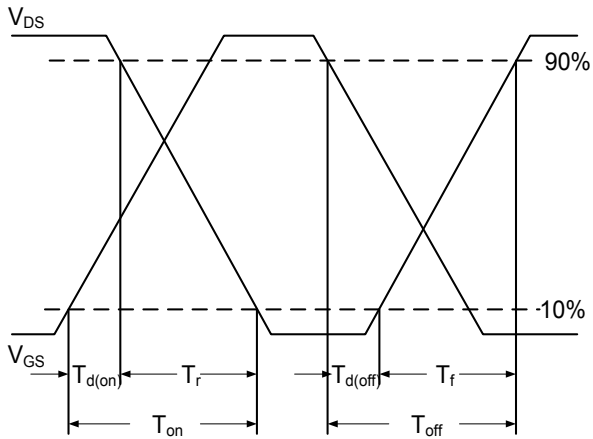


Fig.7 Switching Time Waveform

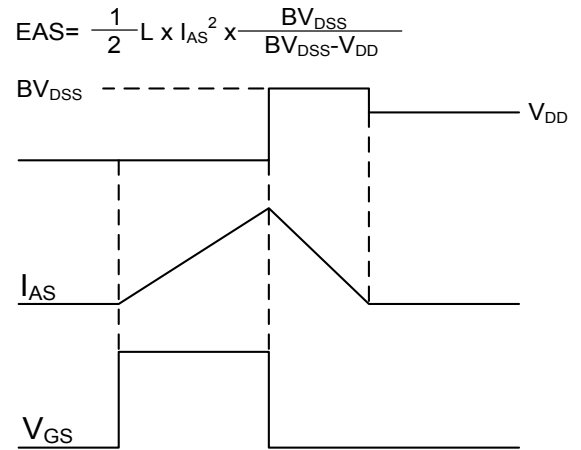
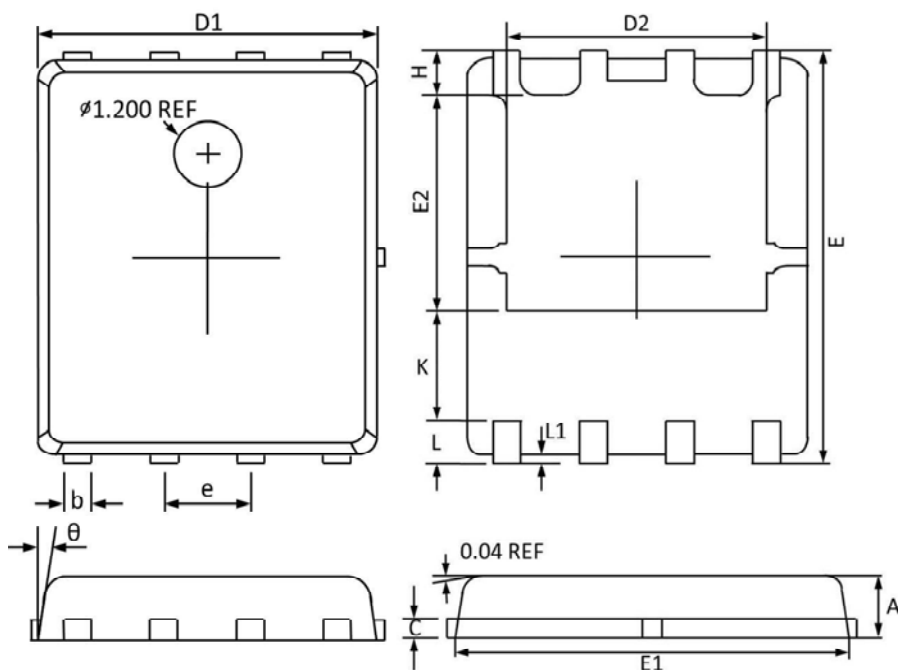


Fig.8 EAS Waveform



Package Outline Dimensions

PPAK5X6



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



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