



40V Dual N-Channel MOSFETs

General Description

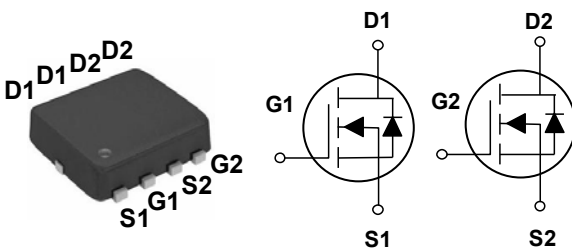
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
40 V	13.5 mΩ	30 A

Features

- $R_{DS(ON)} \leq 13.5m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

PPAK3X3 Dual Pin Configuration



Applications

- Networking
- LED Lighting Applications
- Quick Charger
- DC-DC Power Management

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	+20 / -12	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$)	30	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	120	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	24.2	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	22	A
P_D	Power Dissipation ($T_C=25^\circ C$)	26	W
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ C$
Marking Code		ND014	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4.8	$^\circ C/W$



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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
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	$V_{GS}=10V, I_D=4A$	---	---	13.5	m Ω
		$V_{GS}=4.5V, I_D=3A$	---	---	22	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.5	V
gfs	Forward Transconductance	$V_{DS}=10V, I_S=5A$	---	4	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge (NOTE 3 · 4)	$V_{DS}=20V, V_{GS}=10V, I_D=15A$	---	6.9	---	nC
Q_{gs}	Gate-Source Charge (NOTE 3 · 4)		---	1.3	---	
Q_{gd}	Gate-Drain Charge (NOTE 3 · 4)		---	3	---	
$T_{d(on)}$	Turn-On Delay Time (NOTE 3 · 4)	$V_{DD}=20V, V_{GS}=10V, R_G=6\Omega, I_D=10A$	---	8	---	nS
T_r	Rise Time (NOTE 3 · 4)		---	12	---	
$T_{d(off)}$	Turn-Off Delay Time (NOTE 3 · 4)		---	25	---	
T_f	Fall Time (NOTE 3 · 4)		---	18	---	
C_{iss}	Input Capacitance	$V_{DS}=20V, V_{GS}=0V, F=1\text{MHz}$	---	495	---	pF
C_{oss}	Output Capacitance		---	310	---	
C_{rss}	Reverse Transfer Capacitance		---	13.5	---	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	30	A
I_{SM}	Pulsed Source Current		---	---	60	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=22A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.



Characteristics Curves

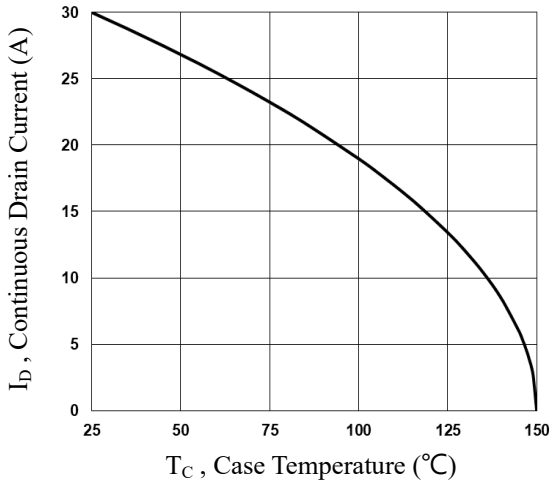


Fig.1 Continuous Drain Current vs. T_C

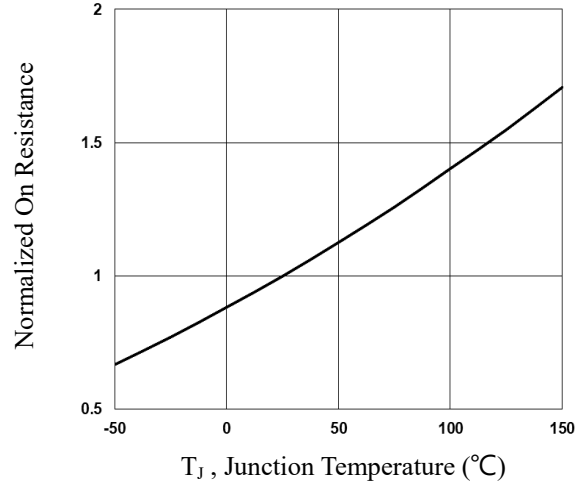


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

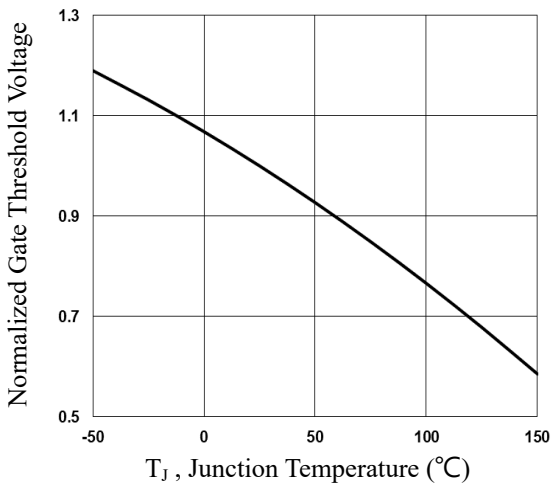


Fig.3 Normalized V_{th} vs. T_J

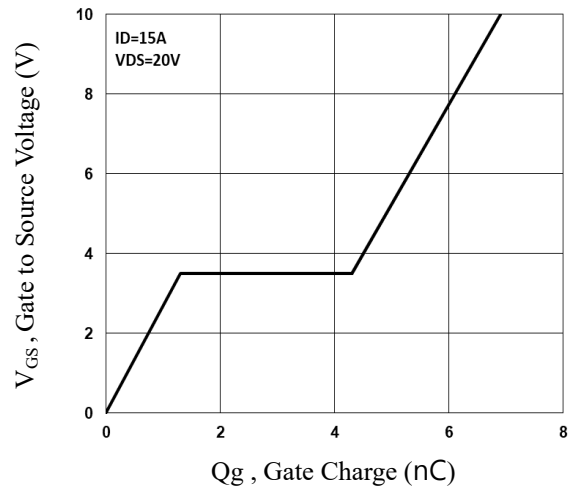


Fig.4 Gate Charge Waveform

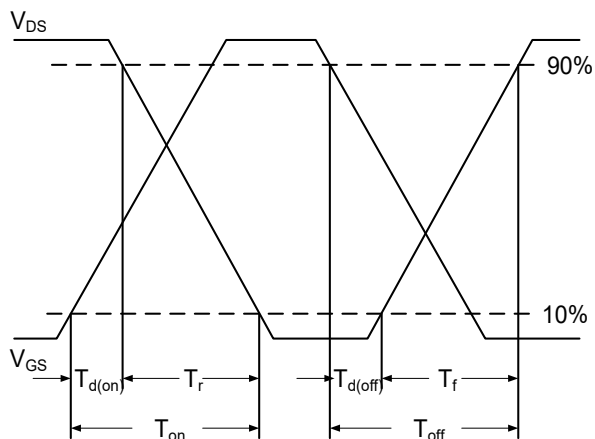


Fig.5 Switching Time Waveform

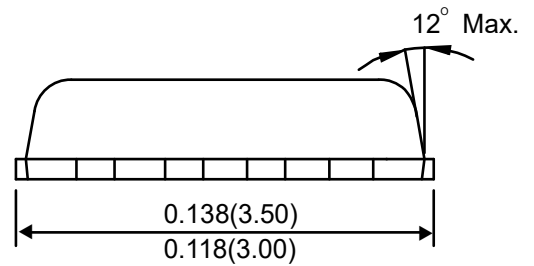
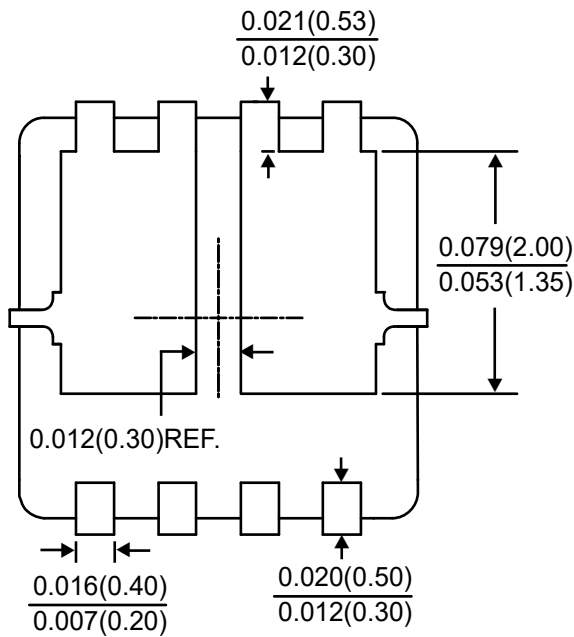
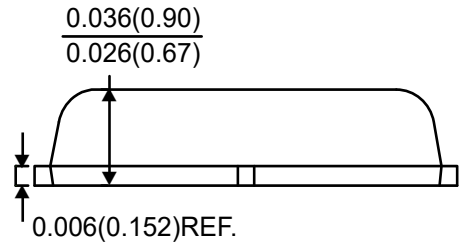
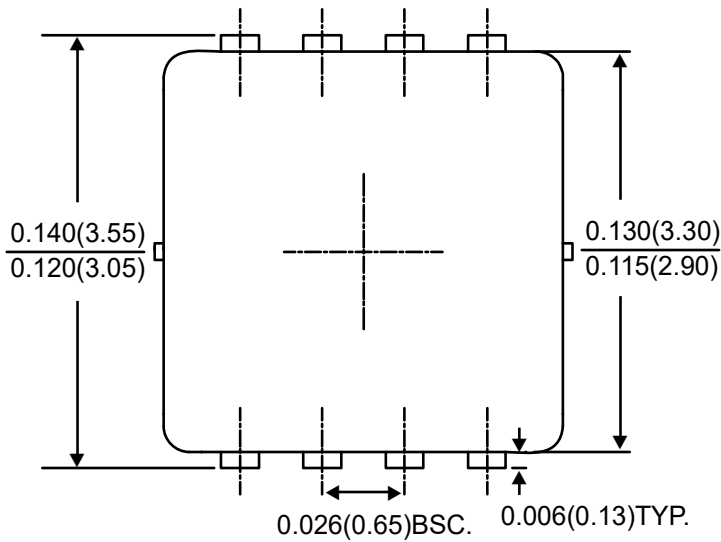


P3MND014



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Package Outline Dimensions



PPAK3X3 Dual

Dimensions in inches and (millimeters)



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