



# 30V Dual N-Channel MOSFETs

## General Description

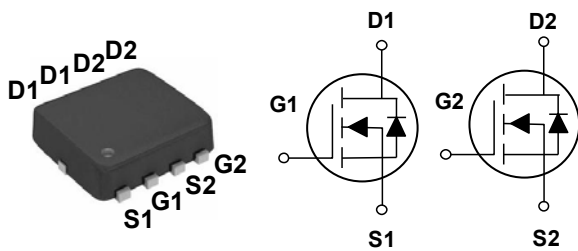
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
30V	13 mΩ	35 A

## Features

- 30V, 35A,  $R_{DS(ON)}=13m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

PPAK3X3 Pin Configuration



## Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2<sup>nd</sup> SR

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_C=25^\circ\text{C}$ )	35	A
	Drain Current - Continuous ( $T_C=100^\circ\text{C}$ )	22	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	140	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	13	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	16	A
$P_D$	Power Dissipation ( $T_C=25^\circ\text{C}$ )	27	W
	Power Dissipation - Derate above $25^\circ\text{C}$	0.22	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		NC013	

## 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	---	4.6	$^\circ\text{C}/\text{W}$

**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	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=30V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance (NOTE 3)	$V_{GS}=10V, I_D=10A$	---	10	13	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	14	18	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
gfs	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	6	---	S

**Dynamic and switching Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$Q_g$	Total Gate Charge (NOTE 3 · 4)	$V_{DS}=15V, V_{GS}=4.5V, I_D=5A$	---	7.4	12	nC
$Q_{gs}$	Gate-Source Charge (NOTE 3 · 4)		---	2.3	5	
$Q_{gd}$	Gate-Drain Charge (NOTE 3 · 4)		---	3	6	
$T_{d(on)}$	Turn-On Delay Time (NOTE 3 · 4)	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	3.8	7	ns
$T_r$	Rise Time (NOTE 3 · 4)		---	10	19	
$T_{d(off)}$	Turn-Off Delay Time (NOTE 3 · 4)		---	22	42	
$T_f$	Fall Time (NOTE 3 · 4)		---	6.6	13	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	620	900	pF
$C_{oss}$	Output Capacitance		---	85	125	
$C_{rss}$	Reverse Transfer Capacitance		---	60	90	
Rg	Gate resistance		$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.8	

**Drain-Source Diode Characteristics and Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	35	A
$I_{SM}$	Pulsed Source Current (NOTE 3)		---	---	70	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.  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=16A, R_G=25\Omega$ , 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

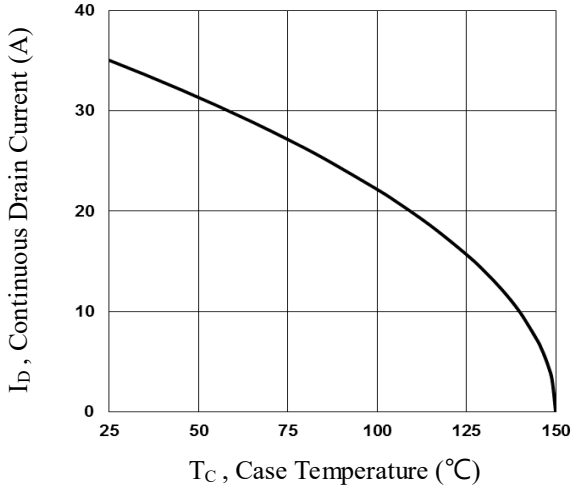


Fig.1 Continuous Drain Current vs.  $T_c$

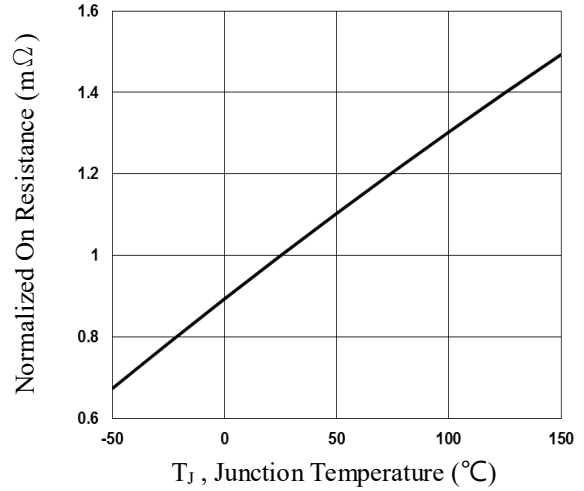


Fig.2 Normalized RDSON vs.  $T_j$

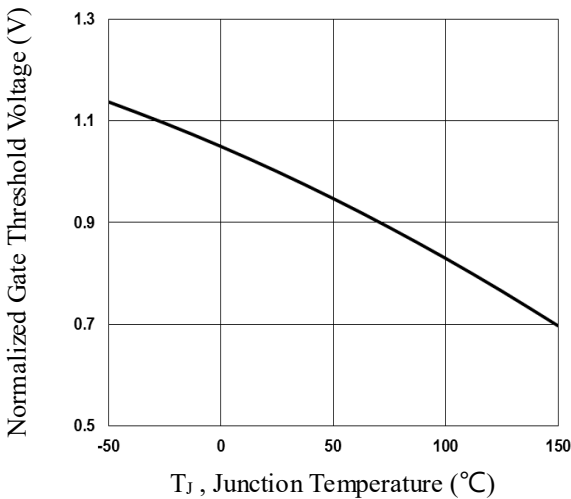


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

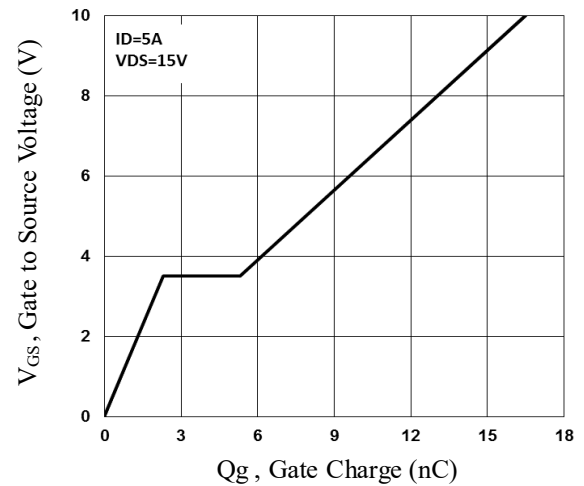


Fig.4 Gate Charge Waveform

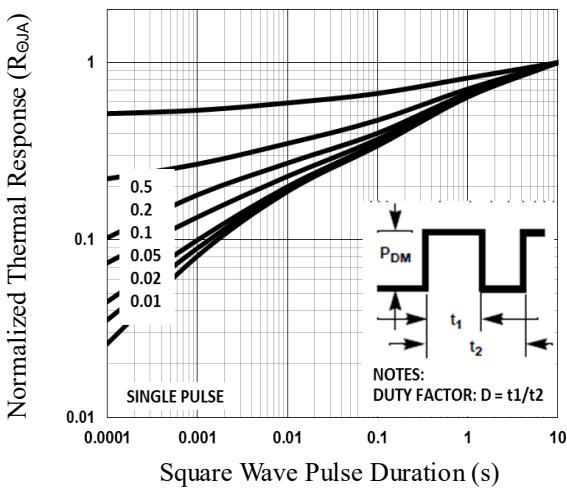


Fig.5 Normalized Transient Response

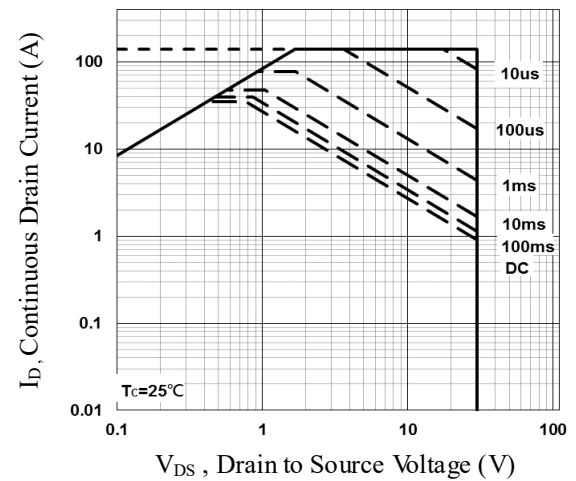


Fig.6 Maximum Safe Operation Area



Characteristics Curves

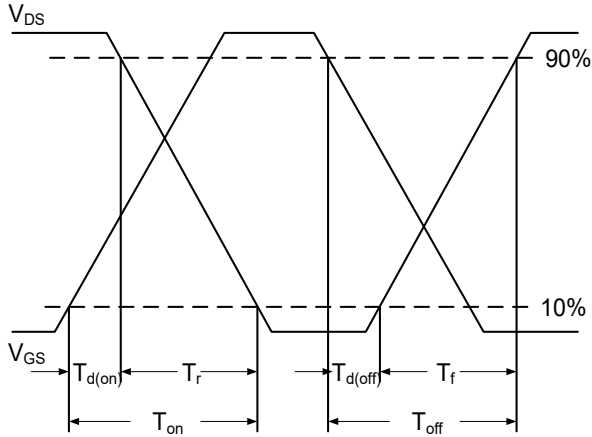
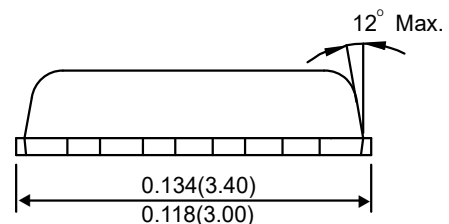
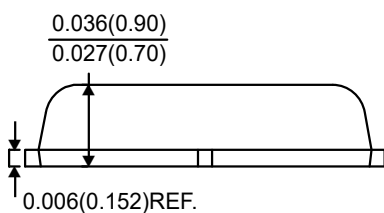
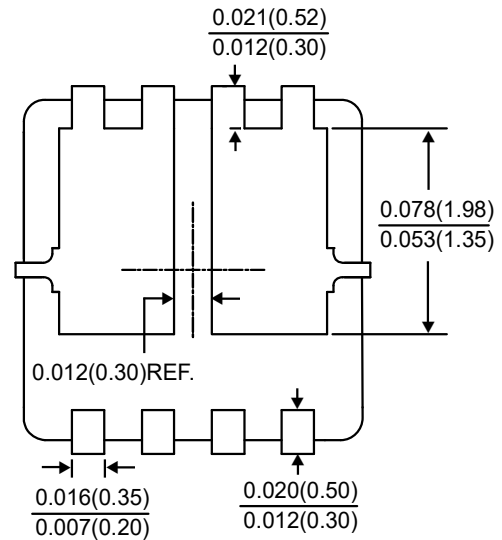
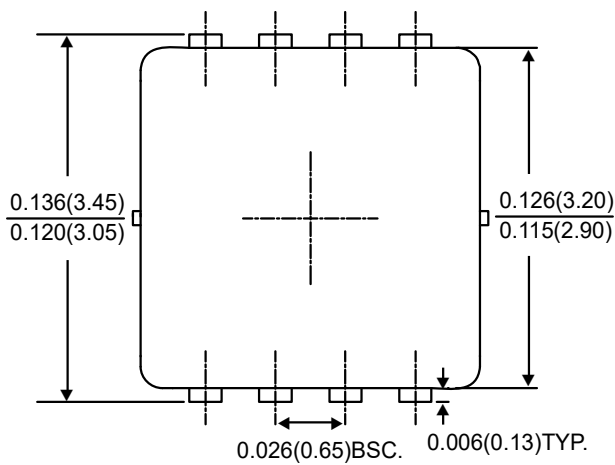


Fig.7 Switching Time Waveform

Package Outline Dimensions



PPAK3X3

Dimensions in inches and (millimeters)



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