



**30V N-Channel MOSFETs**

**General Description**

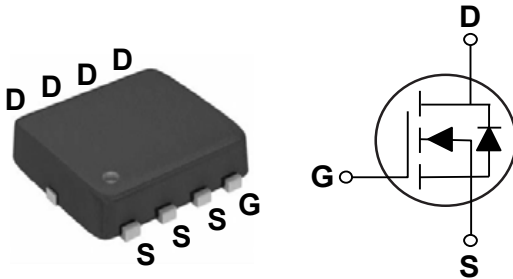
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub></b>	<b>I<sub>D</sub></b>
30V	8.5 mΩ	48 A

**Features**

- $R_{DS(ON)} \leq 8.5m\Omega @ V_{GS}=10V$
- 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  $T_C=25^\circ C$  unless otherwise noted**

<b>Symbol</b>	<b>Parameter</b>	<b>Rating</b>	<b>Units</b>
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	±20	V
$I_D$	Drain Current - Continuous ( $T_C=25^\circ C$ )	48	A
	Drain Current - Continuous ( $T_C=100^\circ C$ )	30	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	192	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	31	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	25	A
$P_D$	Power Dissipation ( $T_C=25^\circ C$ )	35	W
	Power Dissipation - Derate above 25°C	0.28	W/°C
$T_J$	Operating Junction Temperature Range	-50 to 150	°C
$T_{STG}$	Storage Temperature Range	-50 to 150	°C
Marking Code		NC8P5 , DC3908	

**Thermal Characteristics**

<b>Symbol</b>	<b>Parameter</b>	<b>Typ.</b>	<b>Max</b>	<b>Unit</b>
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3.6	°C/W



**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA

**On Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance (NOTE 3)	V <sub>GS</sub> =10V, I <sub>D</sub> =15A	---	---	8.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	---	---	13	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	1.6	2.5	V
gfs	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =15A	---	17	---	S

**Dynamic and switching Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =1A	---	23.2	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	3.2	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	3.7	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =10V, V <sub>GS</sub> =10V, R <sub>GEN</sub> =2.7Ω, I <sub>D</sub> =30A	---	7	---	nS
T <sub>r</sub>	Rise Time		---	76.6	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	27.1	---	
T <sub>f</sub>	Fall Time		---	52.6	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1MHz	---	1180	---	pF
C <sub>oss</sub>	Output Capacitance		---	177	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	132	---	
R <sub>g</sub>	Gate resistance		V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	3.2	

**Drain-Source Diode Characteristics and Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	48	A
I <sub>SM</sub>	Pulsed Source Current (NOTE 3)		---	---	192	A
V <sub>SD</sub>	Diode Forward Voltage (NOTE 3)	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=25A, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

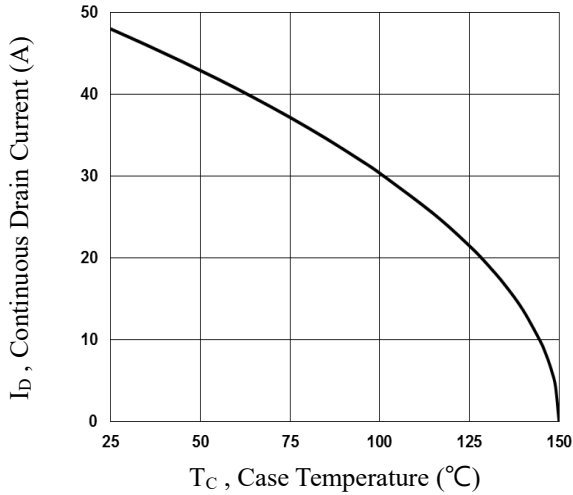


Fig.1 Continuous Drain Current vs.  $T_c$

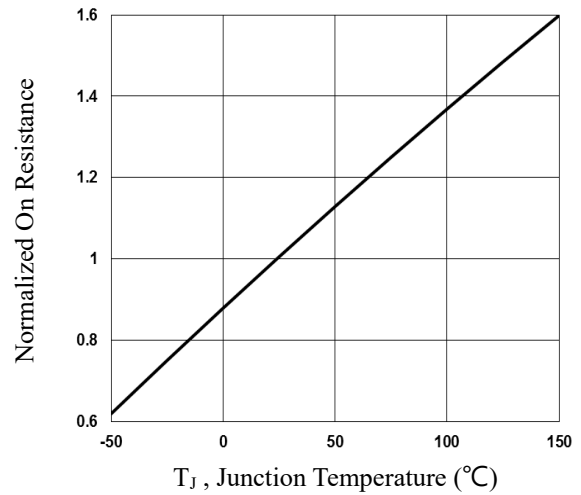


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

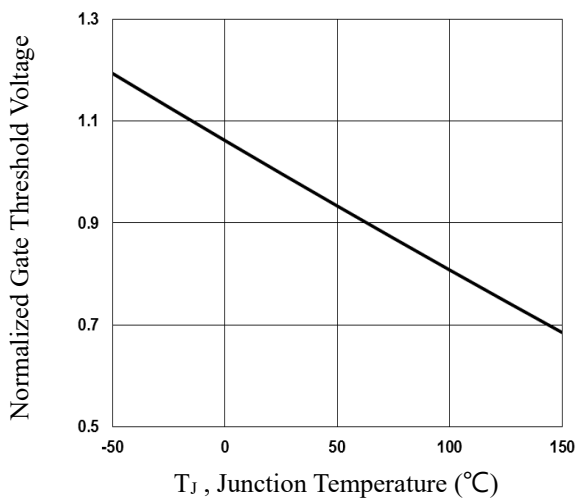


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

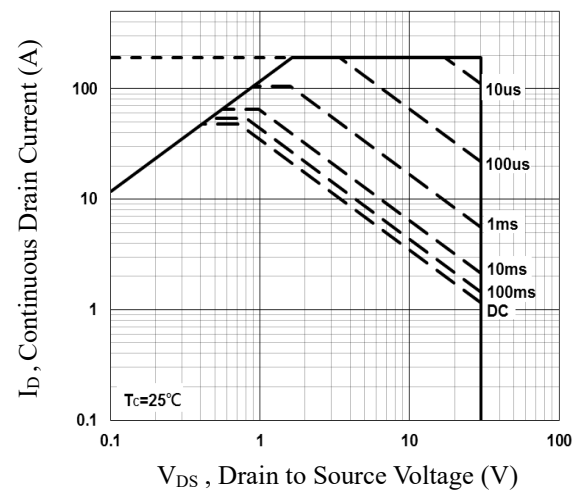


Fig.4 Maximum Safe Operation Area

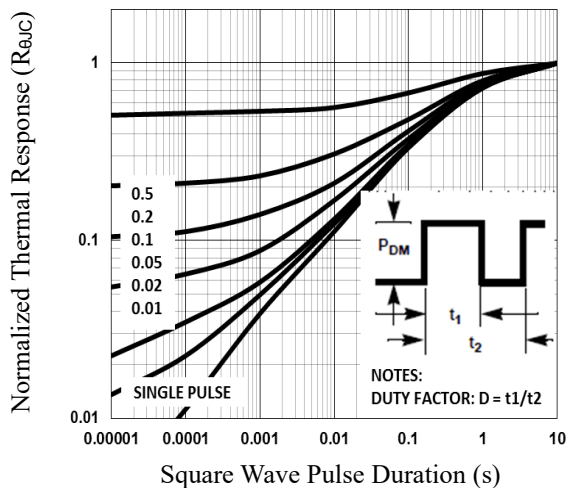


Fig.5 Normalized Transient Impedance

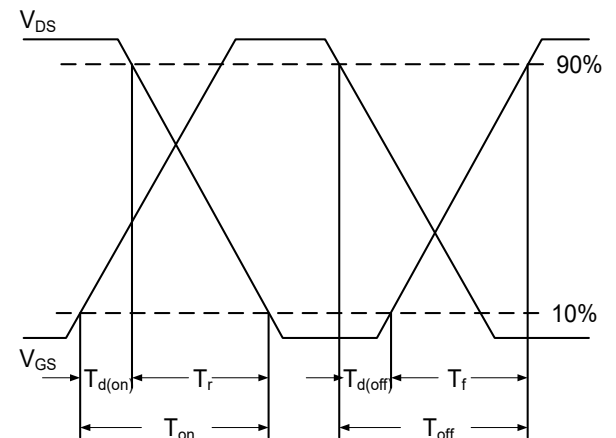


Fig.6 Switching Time Waveform



Characteristics Curves

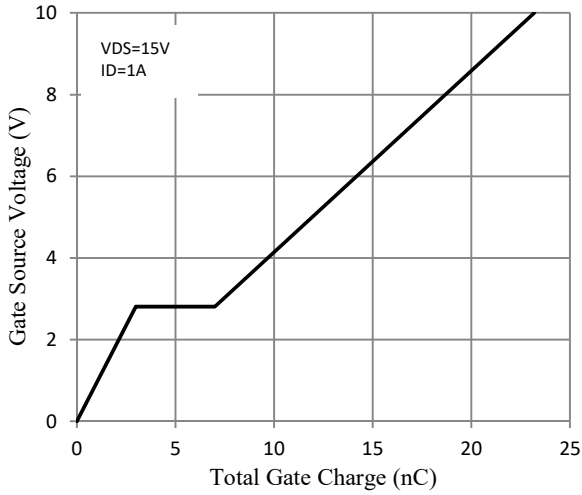


FIG. 7 Gate Charge Characteristics

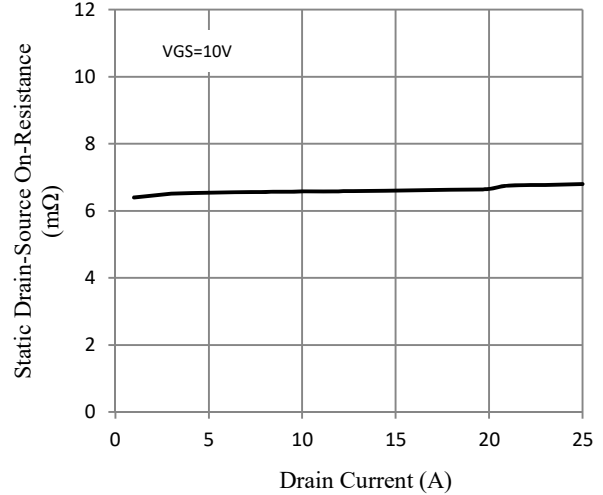


FIG. 8 RDSON vs  $I_D$

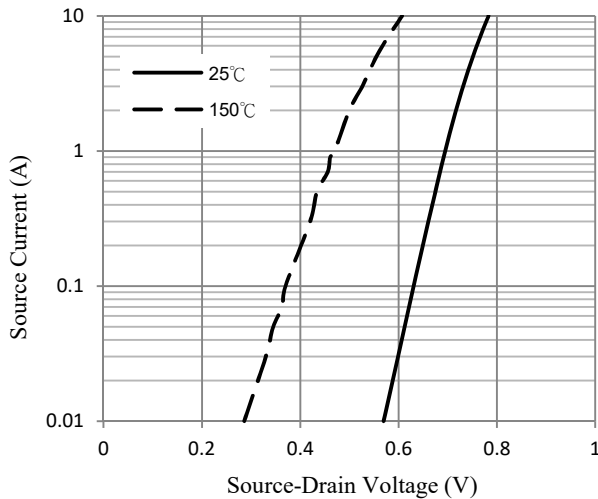


FIG. 9 Diode Forward Characteristics

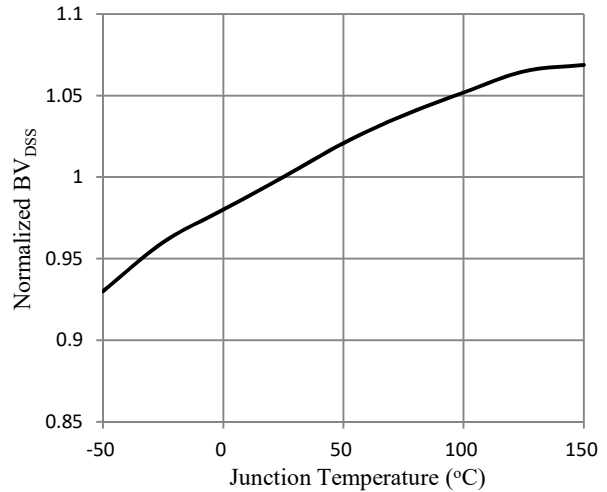


FIG. 10 Normalized  $BV_{DSS}$  vs  $T_J$

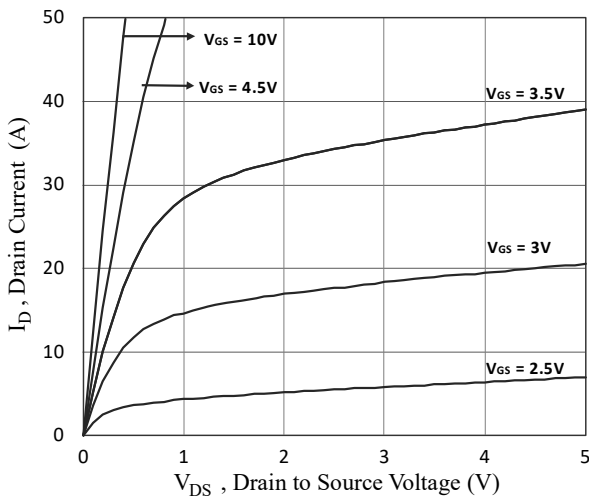


FIG. 11 Output Characteristics

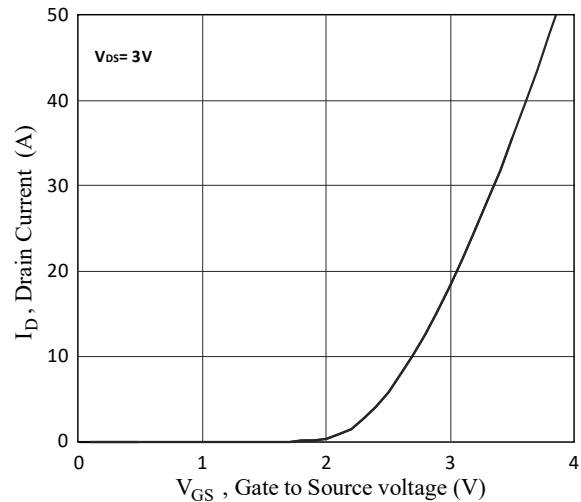
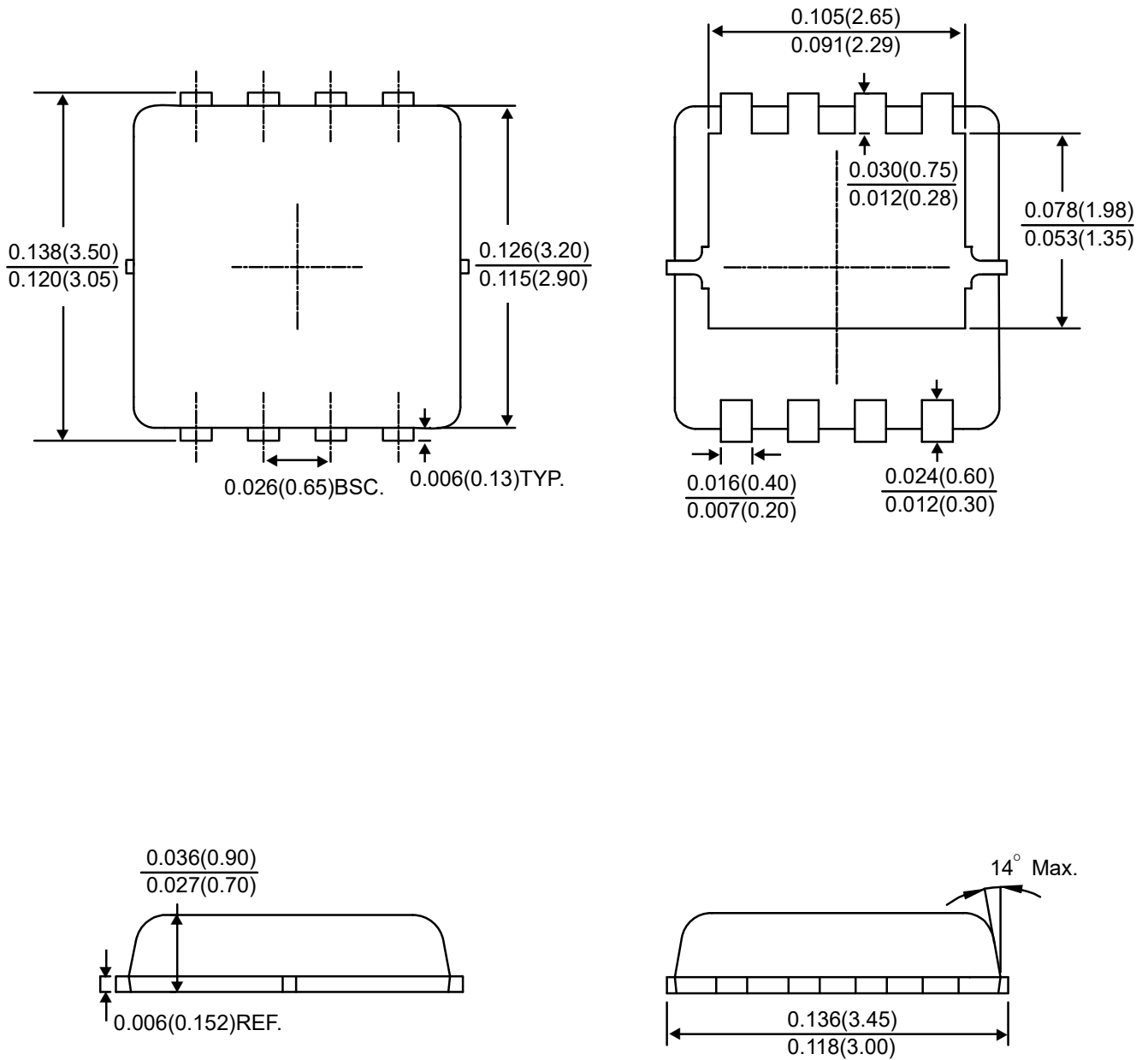


FIG. 12 Transfer Characteristics



Package Outline Dimensions



PPAK3X3

Dimensions in inches and (millimeters)



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