



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.

BV _{DSS}	R _{DS(ON)}	I _D
30 V	8.5 mΩ	48 A

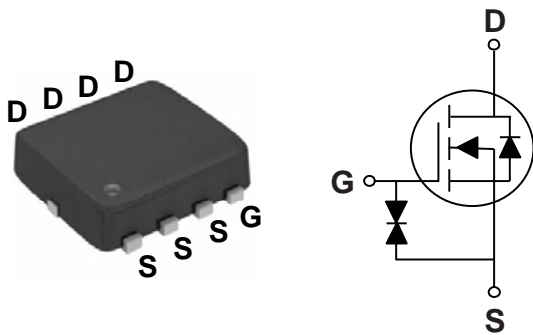
Features

- R_{DS(ON)} ≤ 8.5mΩ @V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

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

PPAK3X3 Pin Configuration



Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current - Continuous (T _C =25°C)	48	A
	Drain Current - Continuous (T _C =100°C)	30	A
I _{DM}	Drain Current - Pulsed (NOTE 1)	192	A
E _{AS}	Single Pulse Avalanche Energy (NOTE 2)	45	mJ
I _{AS}	Single Pulse Avalanche Current (NOTE 2)	30	A
P _D	Power Dissipation (T _C =25°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		NC8P5A , EC3908	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to Ambient	---	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	3.6	°C/W



Electrical Characteristics (T_J=25°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	30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±10	uA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-Source On-Resistance (NOTE 3)	V _{GS} =10V, I _D =16A	---	6.2	8.5	mΩ
		V _{GS} =4.5V, I _D =8A	---	9	13	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =8A	---	9.5	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =20A (NOTE 3、4)	---	7.5	12	nC
Q _{gs}	Gate-Source Charge		---	1.3	2.6	
Q _{gd}	Gate-Drain Charge		---	4.5	8	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =15A (NOTE 3、4)	---	4.8	9	nS
T _r	Rise Time		---	12.5	24	
T _{d(off)}	Turn-Off Delay Time		---	27.6	52	
T _f	Fall Time		---	8.2	16	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	680	1000	pF
C _{oss}	Output Capacitance		---	150	220	
C _{rss}	Reverse Transfer Capacitance		---	70	105	
R _g	Gate resistance		V _{GS} =0V, V _{DS} =0V, F=1MHz	---	2.7	

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
E _{AS}	Single Pulse Avalanche Energy	V _{DD} =25V, L=0.1mH, I _{AS} =15A	12	---	---	mJ

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	---	---	48	A
I _{SM}	Pulsed Source Current (NOTE 3)		---	---	192	A
V _{SD}	Diode Forward Voltage (NOTE 3)	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=30A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

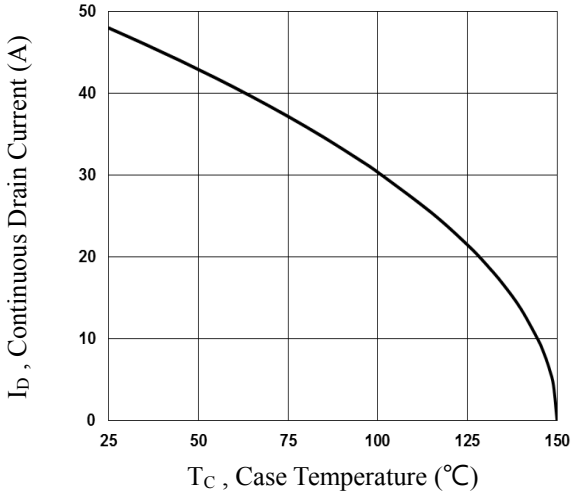


Fig.1 Continuous Drain Current vs. T_c

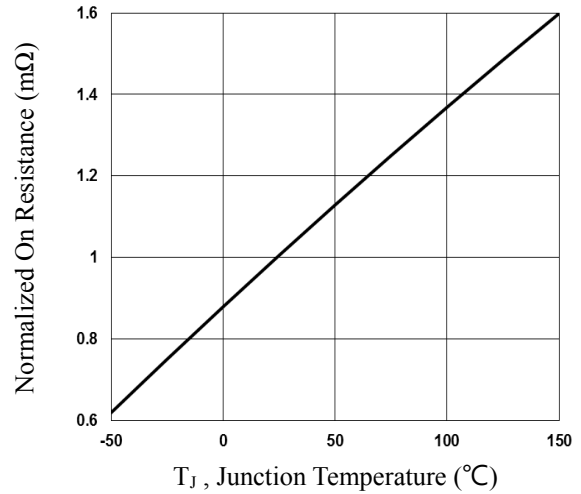


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

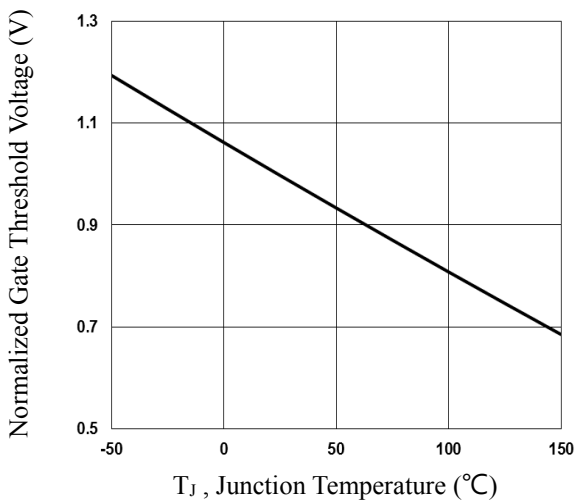


Fig.3 Normalized V_{th} vs. T_j

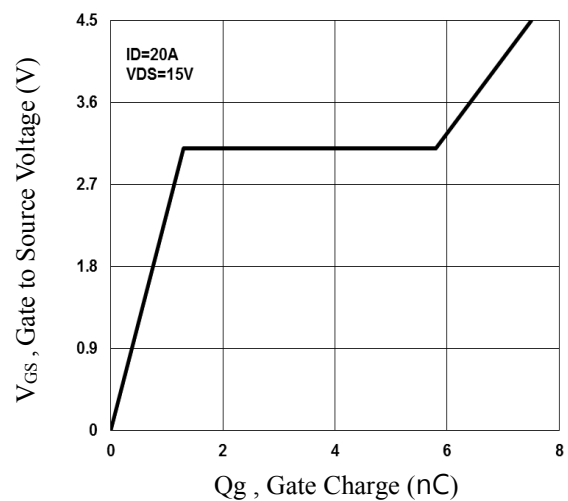


Fig.4 Gate Charge Waveform

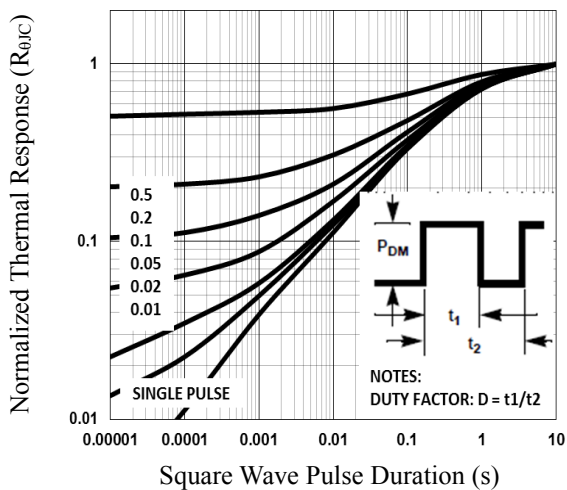


Fig.5 Normalized Transient Impedance

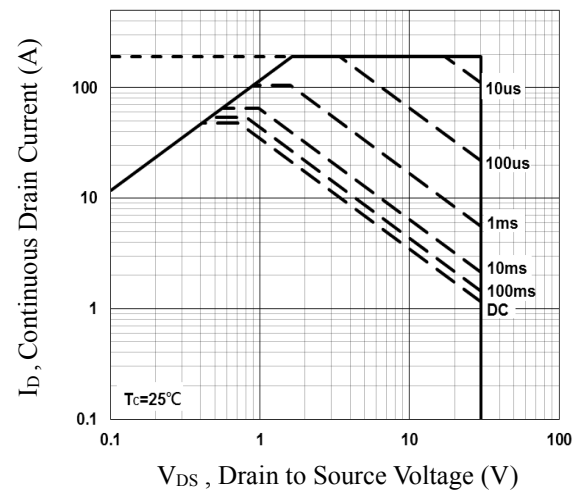


Fig.6 Maximum Safe Operation Area



Characteristics Curves

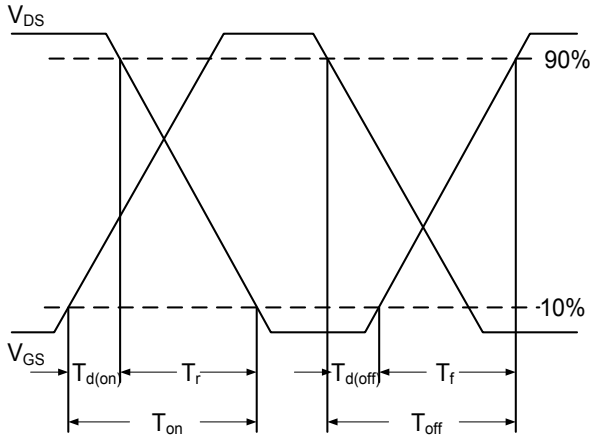


Fig.7 Switching Time Waveform

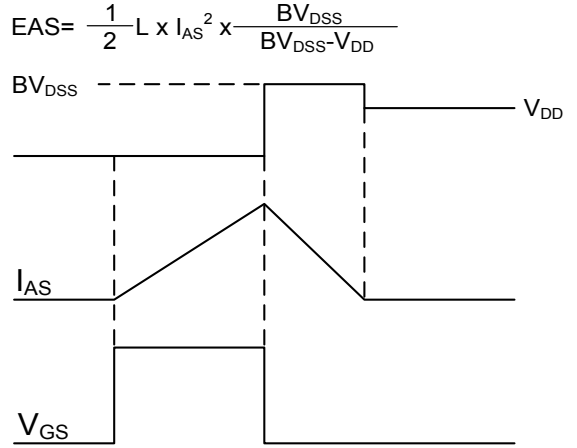
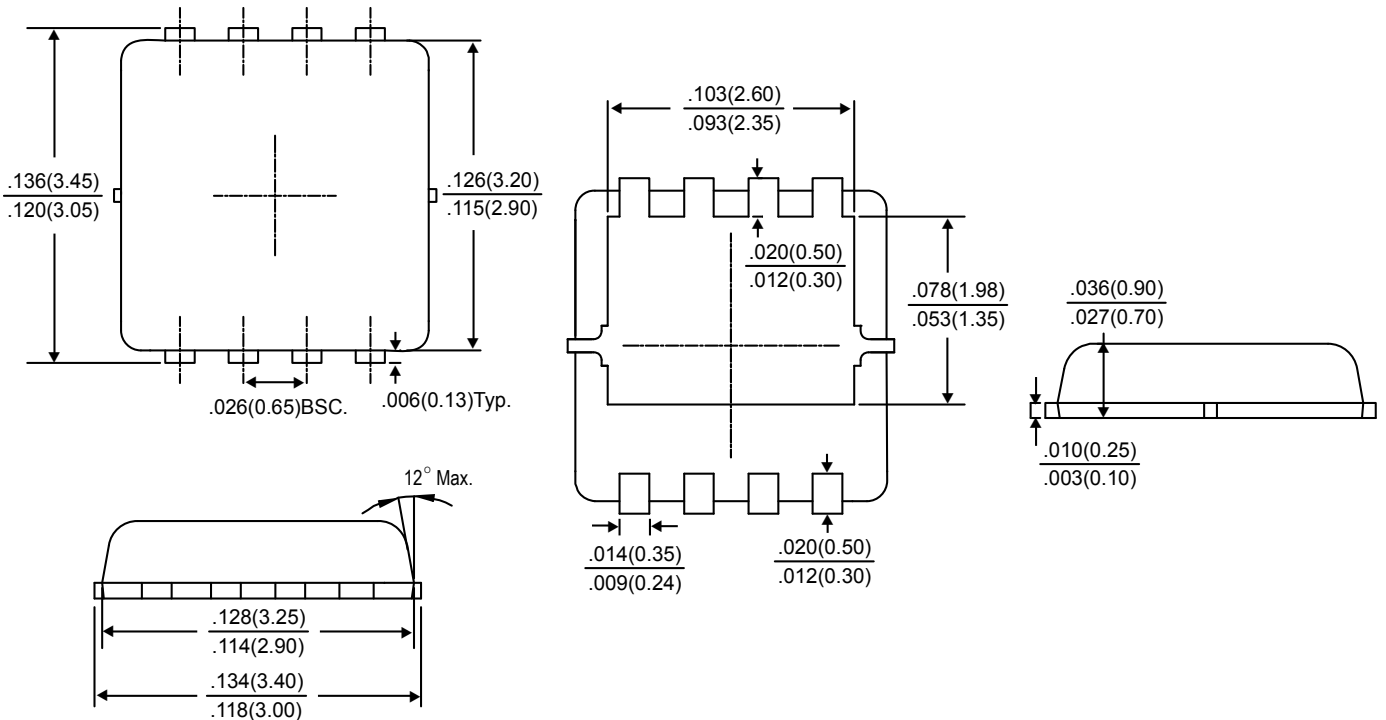


Fig.8 EAS Waveform

Package Outline Dimensions



PPAK3X3

Dimensions in inches and (millimeters)



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