



**N-CHANNEL ENHANCEMENT MOSFET**  
**VDS=30V, ID=60A**



**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.

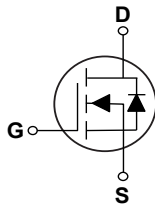
**FEATURES**

- 30V, 60A,  $R_{DS(ON)} \leq 8.5m\Omega @ V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Marking : NC8P5

**APPLICATIONS**

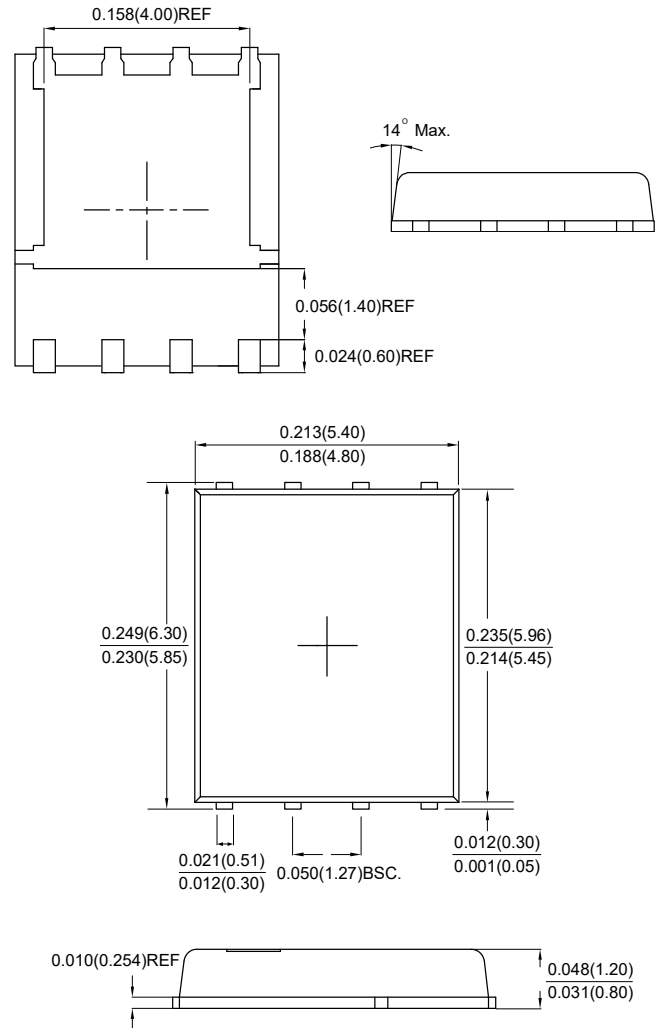
- MB / VGA / Vcore
- POL Applications
- SMPS 2<sup>nd</sup> SR

**PPAK5X6 PIN CONFIGURATION**



**PPAK5x6**

nit:inch(mm)



**Maximum Ratings @ T<sub>C</sub>=25°C unless otherwise noted**

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V <sub>DSS</sub>	30	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Drain Current - Continuous	T <sub>C</sub> =25°C	I <sub>D</sub>	60	A
	T <sub>C</sub> =100°C		38	A
Drain Current - Pulsed (NOTE 1)		I <sub>DM</sub>	240	A
Single Pulse Avalanche Energy (NOTE 2)		EAS	45	mJ
Single Pulse Avalanche Current (NOTE 2)		IAS	30	A
Power Dissipation (T <sub>C</sub> =25°C)		P <sub>D</sub>	54	W
Thermal Resistance Junction to Ambient		R <sub>θJA</sub>	62	°C/W
Thermal Resistance Junction to Case		R <sub>θJC</sub>	2.3	°C/W
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-50 to +150	°C

# DEVICE CHARACTERISTICS

## YS30N8P5BA

### 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> =30V, 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> =16A	---	6.2	8.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	---	8.9	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
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =8A	---	9.5	---	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> =4.5V, I <sub>D</sub> =20A (NOTE 3 · 4)	---	7.5	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	4.5	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	1.3	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =15A (NOTE 3 · 4)	---	4.8	---	ns
T <sub>r</sub>	Rise Time		---	12.5	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	27.6	---	
T <sub>f</sub>	Fall Time		---	8.2	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1MHz	---	680	---	pF
C <sub>oss</sub>	Output Capacitance		---	150	---	
C <sub>riss</sub>	Reverse Transfer Capacitance		---	70	---	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2.7	---	Ω

#### Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	V <sub>DD</sub> =25V, L=0.1mH, I <sub>AS</sub> =15A	12	---	---	mJ

#### 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	---	---	60	A
I <sub>SM</sub>	Pulsed Source Current		---	---	240	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =10A,	---	8.1	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/us T <sub>J</sub> =25°C	---	1.6	---	nC

#### 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>=30A, 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.

# DEVICE CHARACTERISTICS

## YS30N8P5BA

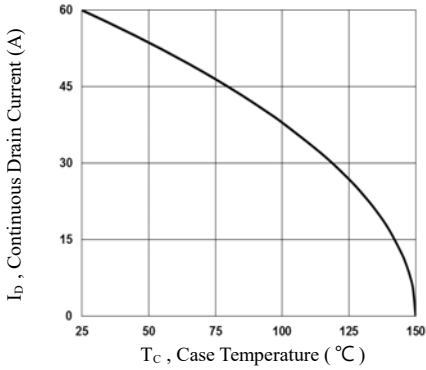


Fig.1 Continuous Drain Current vs.  $T_c$

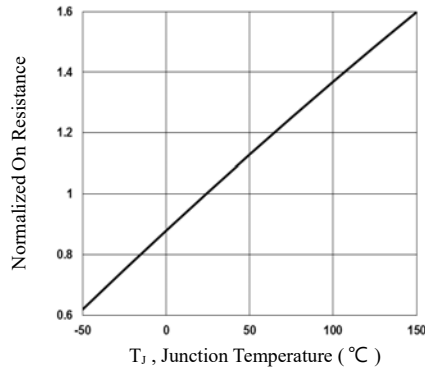


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

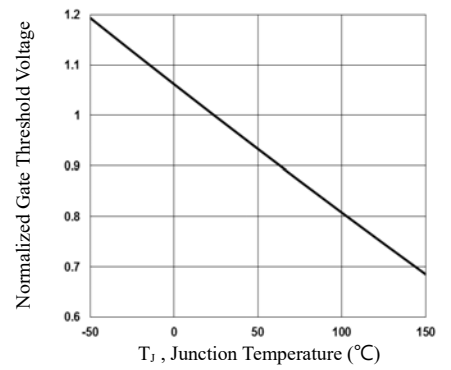


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

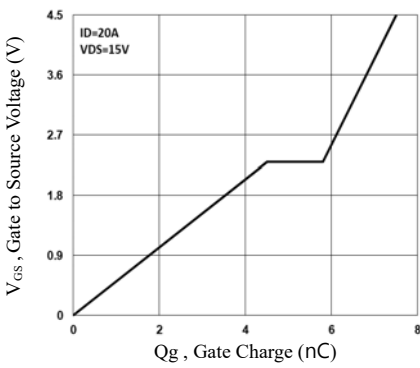


Fig.4 Gate Charge Waveform

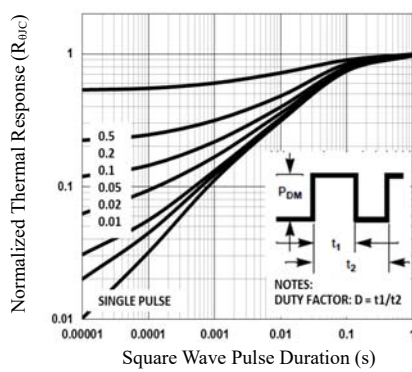


Fig.5 Normalized Transient Impedance

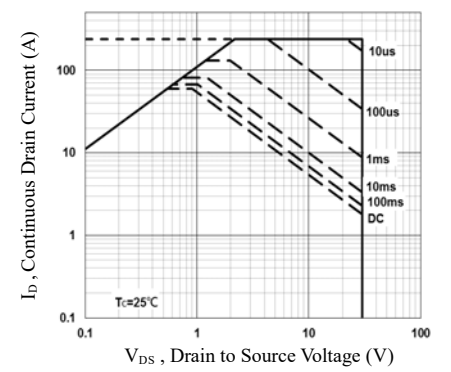


Fig.6 Maximum Safe Operation Area

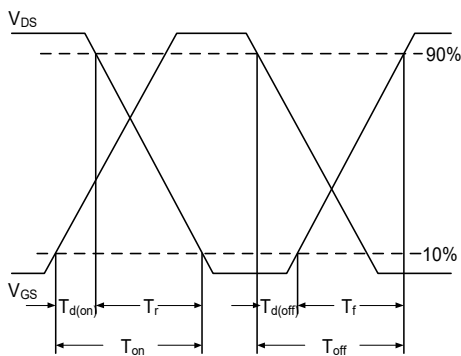


Fig.7 Switching Time Waveform