N-CHANNEL ENHANCEMENT MOSFET
VDS=40V, ID=54A

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.

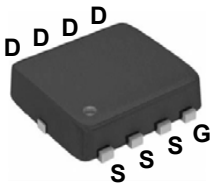
FEATURES

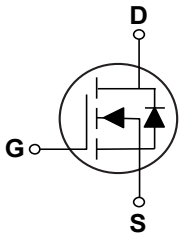
- $R_{DS(ON)}$：6mΩ(typ)@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Marking：ND6P5、DC4964

APPLICATIONS

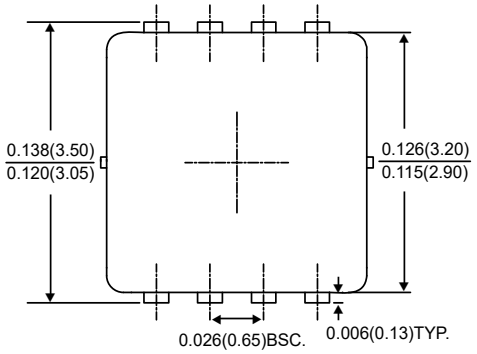
- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

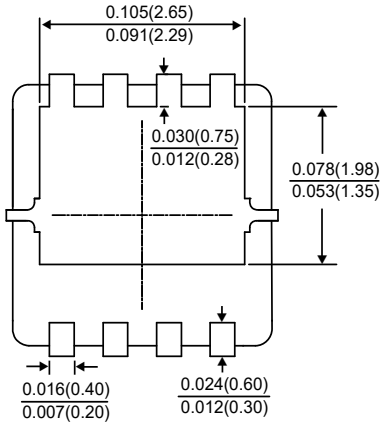
PPAK3X3 PIN CONFIGURATION

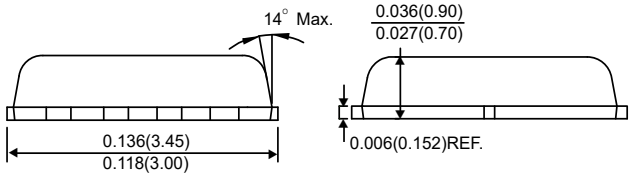




PPAK3x3 Unit：inch(mm)







Maximum Ratings @ T_C=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current - Continuous	T_C=25°C	I_D	54	A
	T_C=100°C		34.1	A
Drain Current - Pulsed (NOTE 1)		I_{DM}	216	A
Single Pulse Avalanche Energy (NOTE 2)		EAS	76	mJ
Single Pulse Avalanche Current (NOTE 2)		IAS	39	A
Power Dissipation (T_C=25°C)		P_D	52	W
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction to Case		$R_{\theta JC}$	2.4	°C/W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to +150	°C

DEVICE CHARACTERISTICS

YS4964ZBB

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	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=125°C	---	---	10	uA
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 (NOTE 3)	V_{GS}=10V , I_D=10A	---	6	---	mΩ
		V_{GS}=4.5V , I_D=5A	---	11	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.2	1.6	2.5	V
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	---	16	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=20V , V_{GS}=10V , I_D=10A (NOTE 3、4)	---	36	---	nC
Q_{gs}	Gate-Source Charge		---	3.85	---	
Q_{gd}	Gate-Drain Charge		---	6.05	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=6Ω , I_D=1A (NOTE 3、4)	---	13.6	---	ns
T_r	Rise Time		---	2.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	68	---	
T_f	Fall Time		---	5	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	1540	---	pF
C_{oss}	Output Capacitance		---	171	---	
C_{rss}	Reverse Transfer Capacitance		---	115	---	
Rg	Gate Resistance	V_{GS}=0V , V_{DS}=0V , F=1MHz	---	1.2	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	54	A
I_{SM}	Pulsed Source Current (NOTE 3)		---	---	108	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}=39A, Starting T_J=25ºC.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

DEVICE CHARACTERISTICS

YS4964ZBB

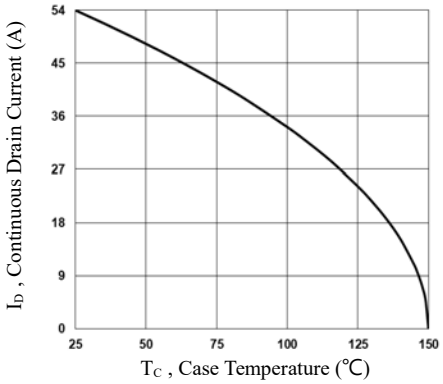


Fig.1 Continuous Drain Current vs. T_C

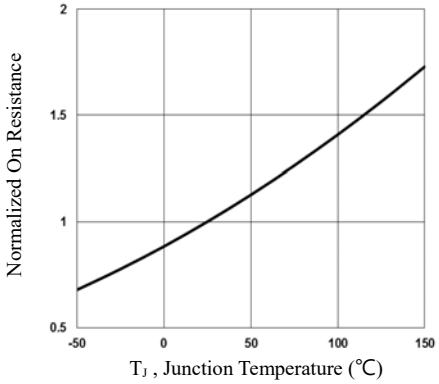


Fig.2 Normalized RDSON vs. T_J

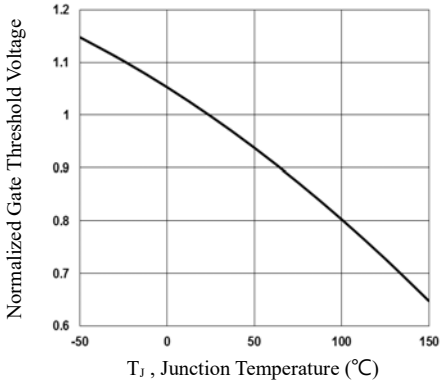


Fig.3 Normalized V_{th} vs. T_J

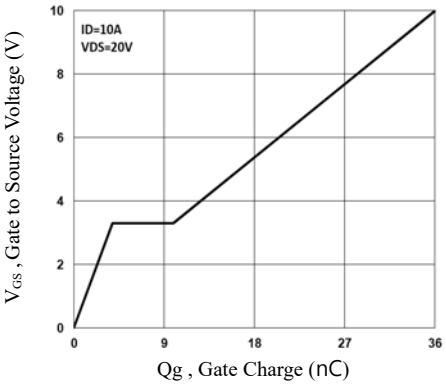


Fig.4 Gate Charge Waveform

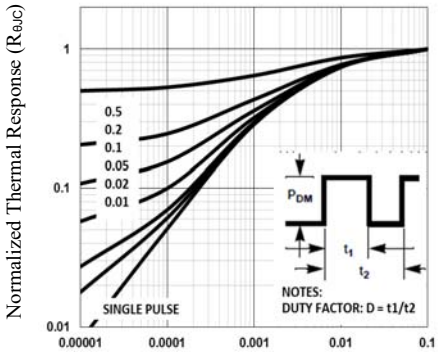


Fig.5 Normalized Transient Impedance

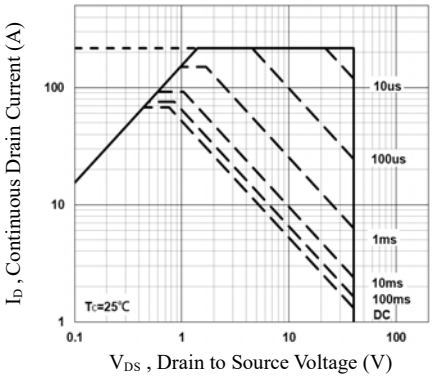


Fig.6 Maximum Safe Operation Area

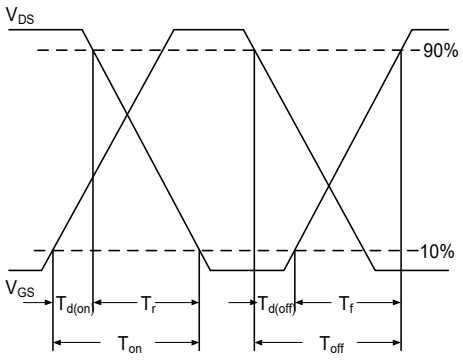


Fig.7 Switching Time Waveform