

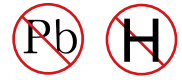


YEA SHIN TECHNOLOGY CO., LTD

YS2604ZBB

# N-Channel Enhancement MOSFET

VDS= 20V, ID= 80A



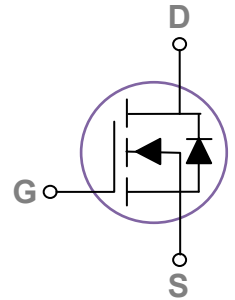
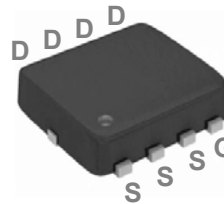
## Features

- 20V, 80A,  $R_{DS(ON)} = 3.5m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available

## Applications

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

## PPAK3x3 Pin Configuration



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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	80	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	51	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	320	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	66	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.53	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$

## 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	---	2	$^\circ\text{C}/\text{W}$

# DEVICE CHARACTERISTICS

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Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)

### Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=16V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	$\pm 100$	nA

### On Characteristics

$R_{DS(ON)}$	Static Drain-source On-Resistance <sup>2</sup>	$V_{GS}=4.5V, I_D=15A$	---	2.8	3.5	$m\Omega$
		$V_{GS}=2.5V, I_D=10A$	---	3.5	4.5	$m\Omega$
		$V_{GS}=1.8V, I_D=6A$	---	5	7	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.3	0.65	1	V
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=5A$	---	35	---	S

### Dynamic and Switching Characteristics

$Q_g$	Total Gate Charge <sup>2,3</sup>	$V_{DS}=10V, V_{GS}=4.5V, I_D=5A$	---	52	100	nC
$Q_{gs}$	Gate-Source Charge <sup>2,3</sup>		---	6.6	12	
$Q_{gd}$	Gate-Drain Charge <sup>2,3</sup>		---	13.8	28	
$T_{d(on)}$	Turn-On Delay Time <sup>2,3</sup>	$V_{DD}=10V, V_{GS}=4.5V, R_G=3.3\Omega, I_D=1A$	---	20.2	40	ns
$T_r$	Rise Time <sup>2,3</sup>		---	31.2	60	
$T_{d(off)}$	Turn-Off Delay Time <sup>2,3</sup>		---	68.5	120	
$T_f$	Fall Time <sup>2,3</sup>		---	21.2	42	
$C_{iss}$	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$	---	3870	5500	pF
$C_{oss}$	Output Capacitance		---	580	850	
$C_{rss}$	Reverse Transfer Capacitance		---	340	600	
$R_g$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	---	1.3	2.6	$\Omega$

### Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current	---	---	80	A
$I_{SM}$	Pulsed Source Current <sup>2</sup>		---	---	160	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

# DEVICE CHARACTERISTICS

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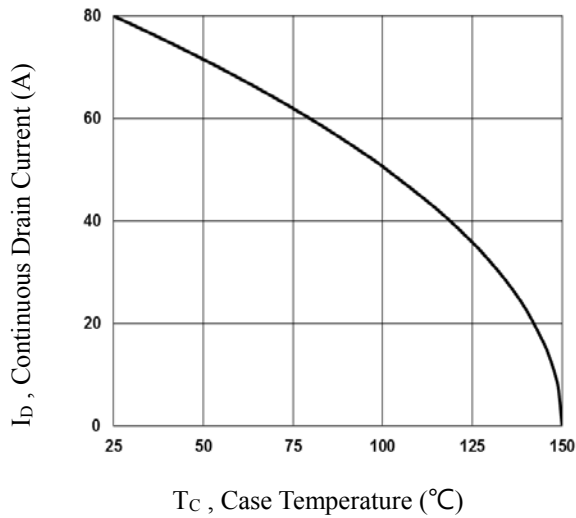


Fig.1 Continuous Drain Current vs.  $T_C$

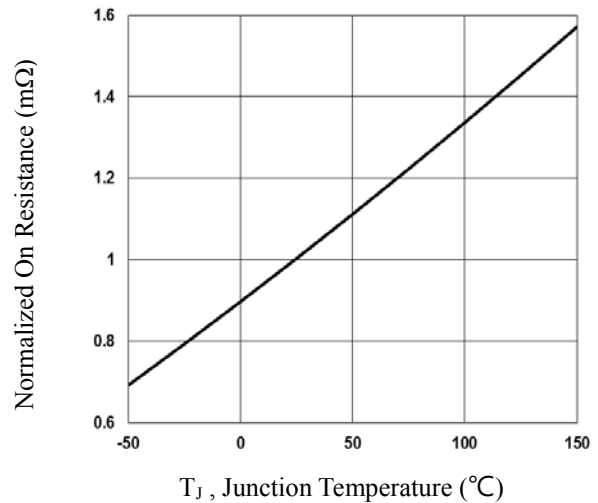


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

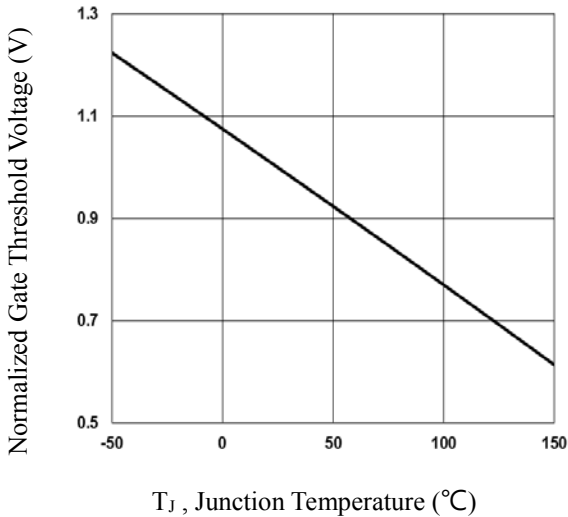


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

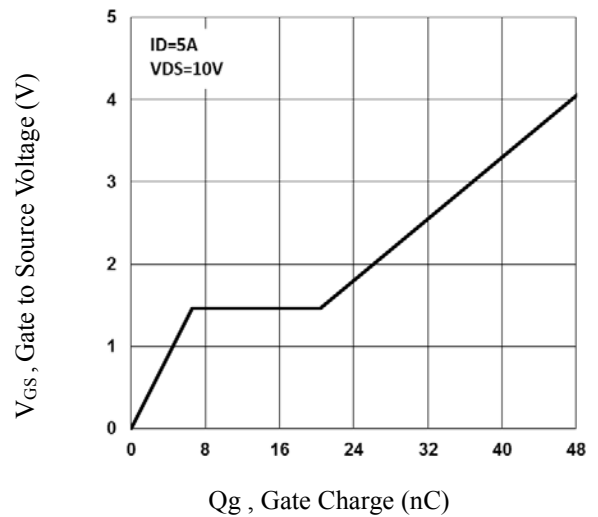


Fig.4 Gate Charge Waveform

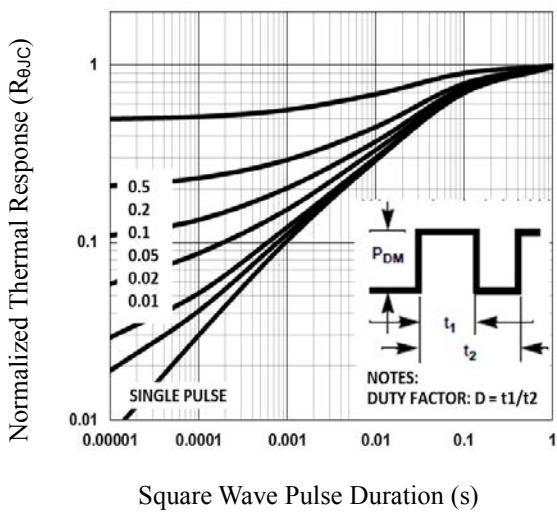


Fig.5 Normalized Transient Impedance

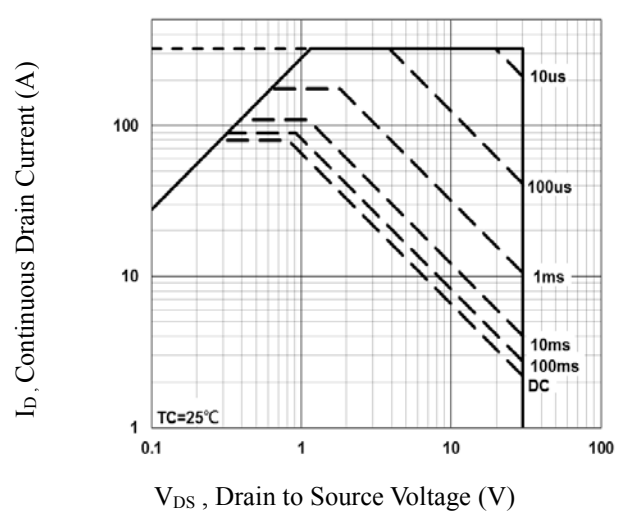


Fig.6 Maximum Safe Operation Area

# DEVICE CHARACTERISTICS

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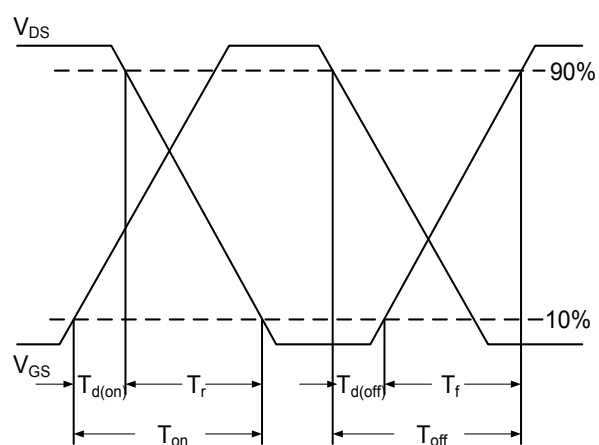


Fig.7 Switching Time Waveform

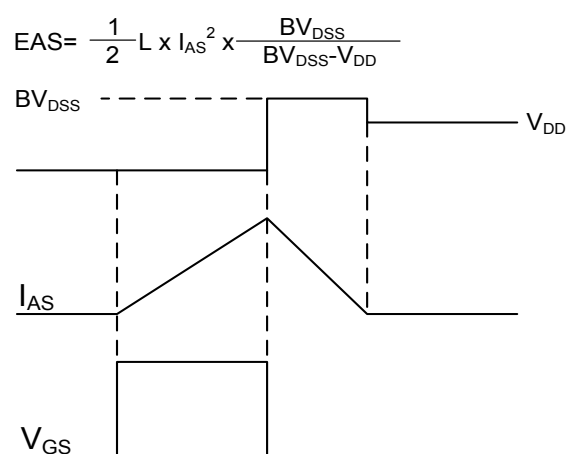
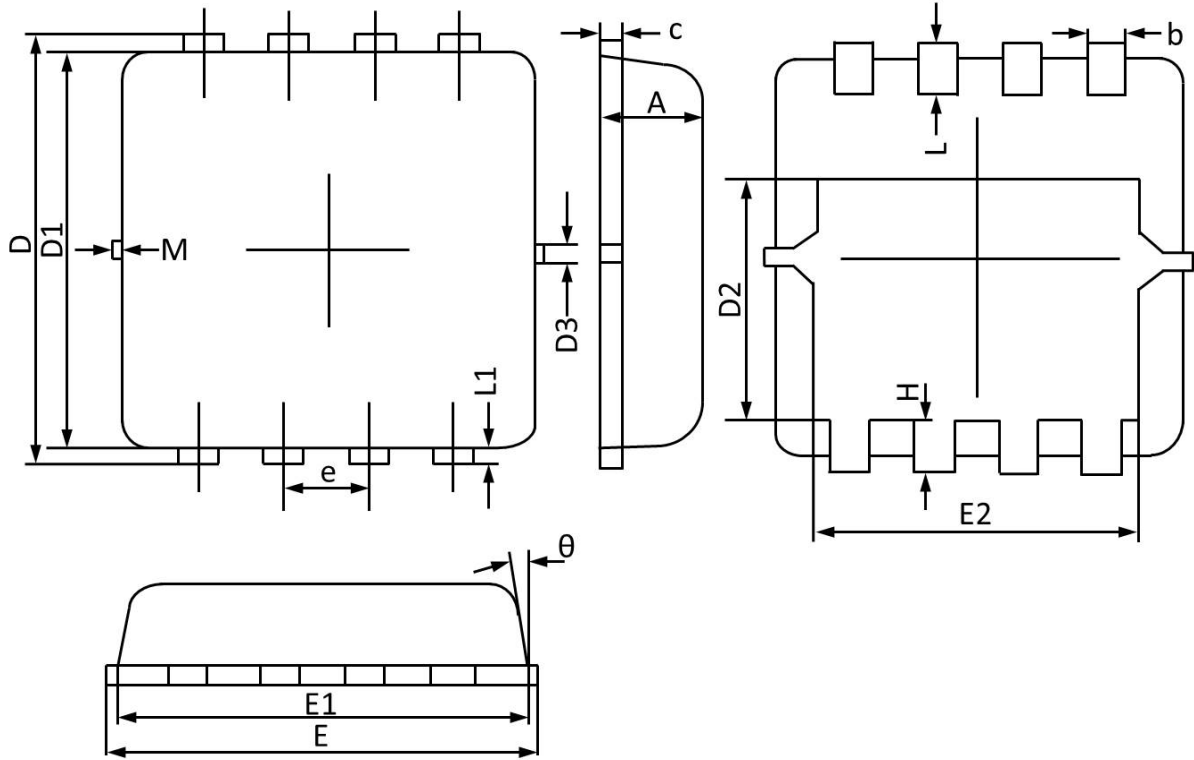


Fig.8 EAS Waveform

# PACKAGE OUTLINE & DIMENSIONS

YS2604ZBB

## PPAK3x3 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
$\theta$	0°	12°	0°	12°
M	0.150 REF		0.006 REF	