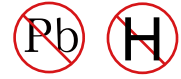




YEA SHIN TECHNOLOGY CO., LTD

YS3904ZBB

N-Channel Enhancement MOSFET

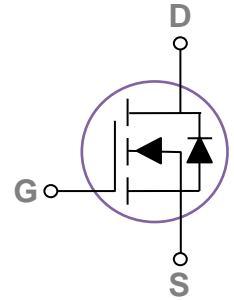
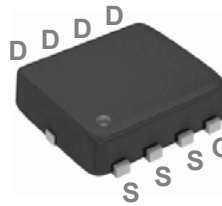


VDS= 30V, ID= 80A

Features

- 30V,80A, $R_{DS(ON)} = 3.8m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

PPAK3x3 Pin Configuration



Applications

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

Absolute Maximum Rating $T_c=25^\circ C$ 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 ($T_c=25^\circ C$)	80	A
	Drain Current – Continuous ($T_c=100^\circ C$)	51	A
I _{DM}	Drain Current – Pulsed ¹	320	A
EAS	Single Pulse Avalanche Energy ²	125	mJ
IAS	Single Pulse Avalanche Current ²	50	A
P _D	Power Dissipation ($T_c=25^\circ C$)	66	W
	Power Dissipation – Derate above 25 $^\circ C$	0.53	W/ $^\circ C$
T _{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T _J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	62	$^\circ C / W$
R _{θJC}	Thermal Resistance Junction to Case	---	2	$^\circ C / W$

DEVICE CHARACTERISTICS

YS3904ZBB

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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.03	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-source On-Resistance ³	$V_{GS}=10V, I_D=24A$	---	2.9	3.8	$m\Omega$
		$V_{GS}=4.5V, I_D=12A$	---	4.3	5.5	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5	---	$mV/^\circ\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=10A$	---	28	---	S

Dynamic and Switching Characteristics

Q_g	Total Gate Charge ^{3,4}	$V_{DS}=15V, V_{GS}=4.5V, I_D=24A$	---	24	34	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	4.2	6	
Q_{gd}	Gate-Drain Charge ^{3,4}		---	13	18	
$T_{d(on)}$	Turn-On Delay Time ^{3,4}	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=15A$	---	12.6	24	ns
T_r	Rise Time ^{3,4}		---	19.5	37	
$T_{d(off)}$	Turn-Off Delay Time ^{3,4}		---	42.8	81	
T_f	Fall Time ^{3,4}		---	13.2	25	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	2200	3190	pF
C_{oss}	Output Capacitance		---	280	405	
C_{rss}	Reverse Transfer Capacitance		---	177	255	
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	---	2	4	Ω

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V, L=0.1\text{mH}, I_{AS}=24A$	31			mJ

Drain-Source Diode Characteristics and Maximum Ratings

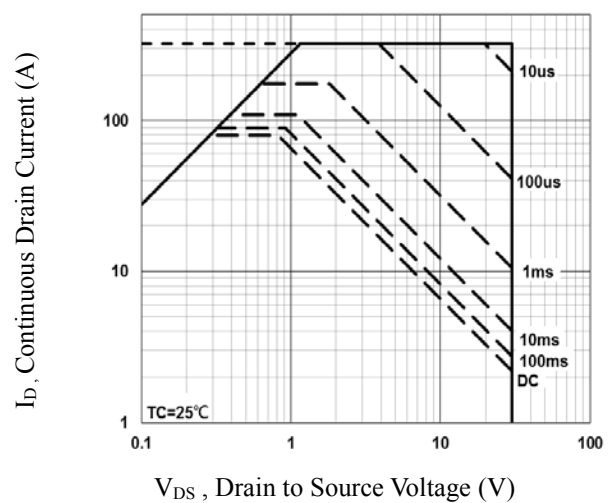
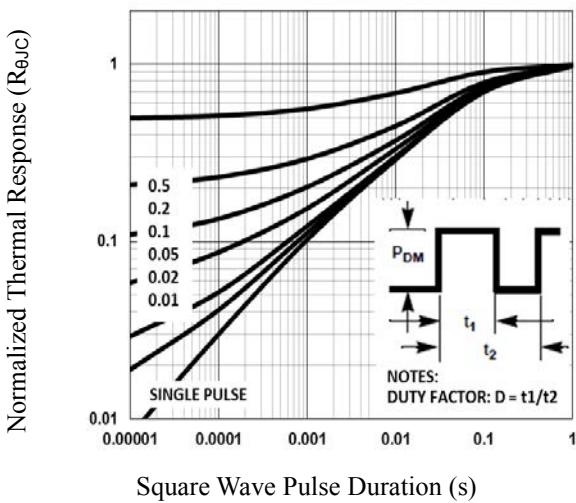
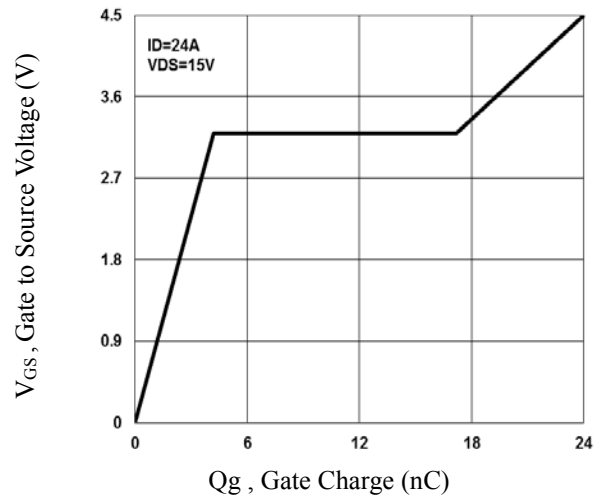
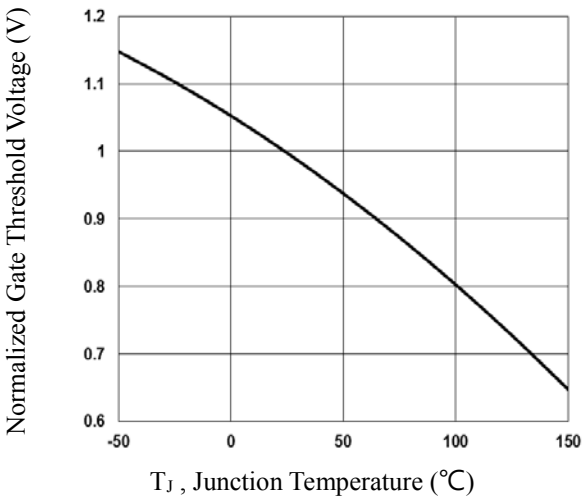
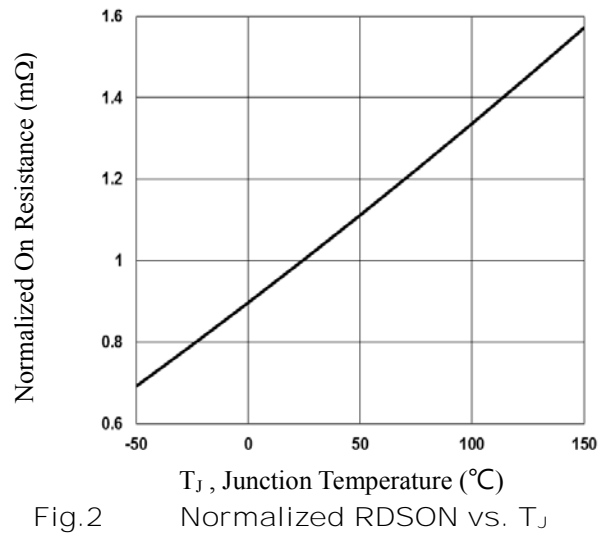
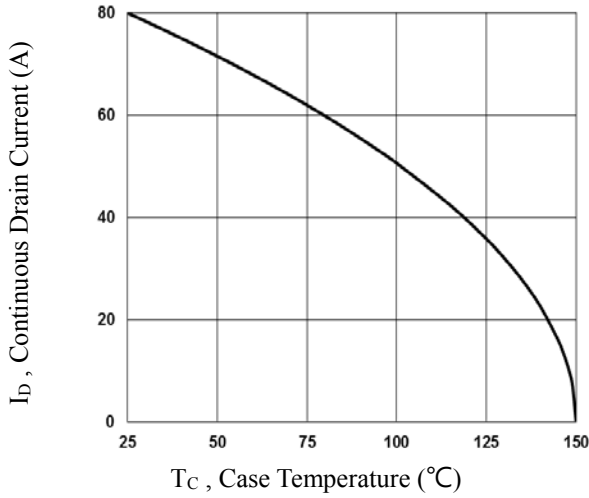
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	80	A
I_{SM}	Pulsed Source Current ³		---	---	320	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=50A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

DEVICE CHARACTERISTICS

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DEVICE CHARACTERISTICS

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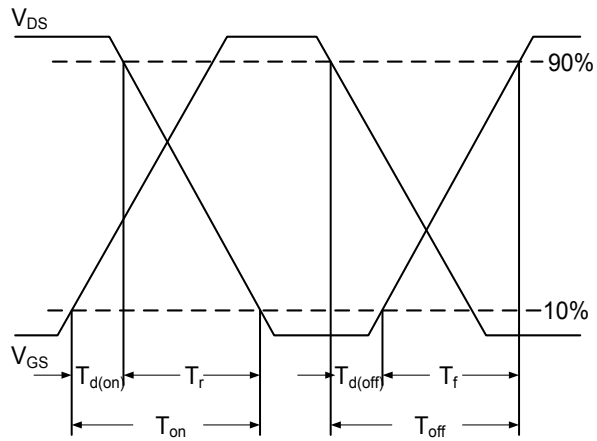


Fig.7 Switching Time Waveform

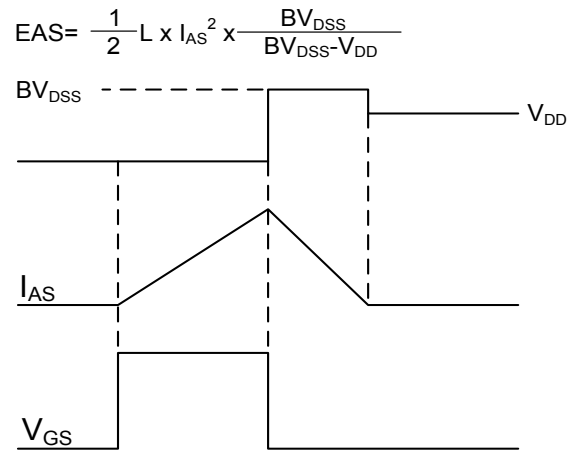
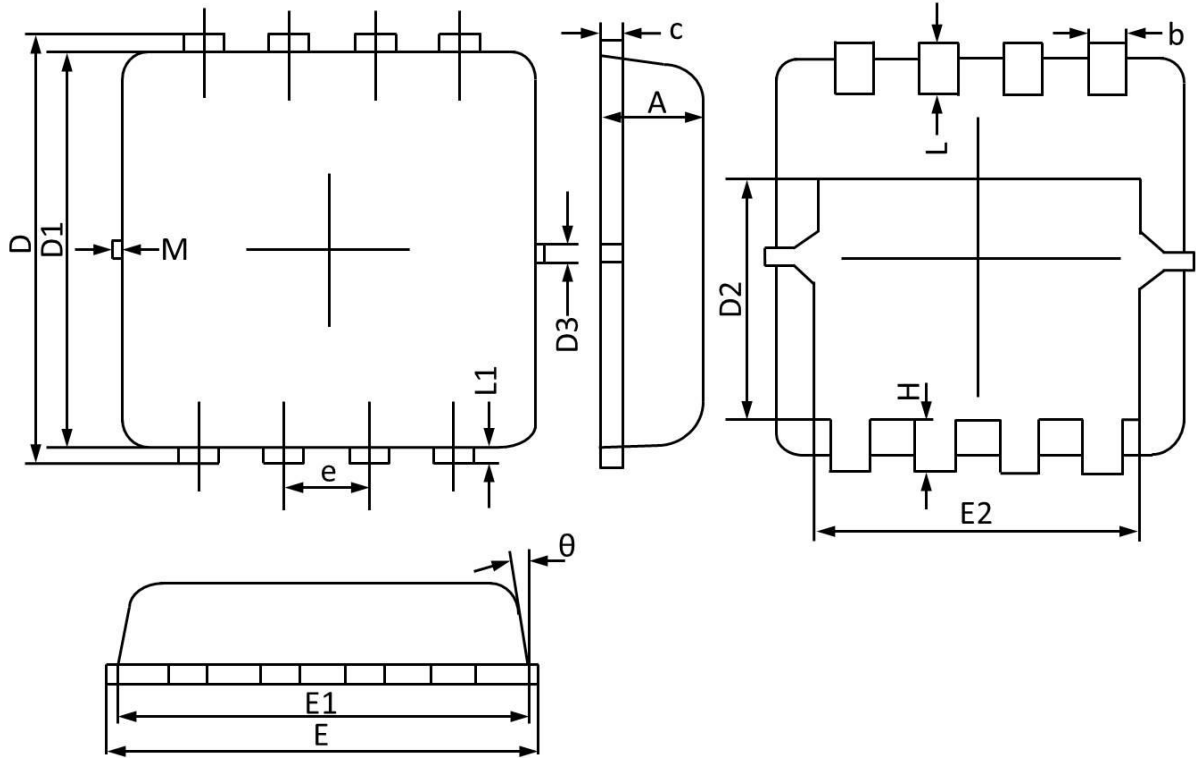


Fig.8 EAS Waveform

PACKAGE OUTLINE & DIMENSIONS

YS3904ZBB

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	
θ	0°	12°	0°	12°
M	0.150 REF		0.006 REF	