YEA SHIN TECHNOLOGY CO., LTD

N-Channel Enhancement MOSFET

VDS= 30V, ID= 35A

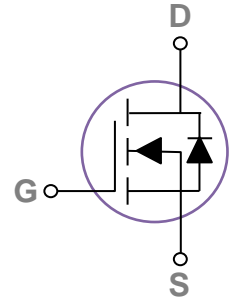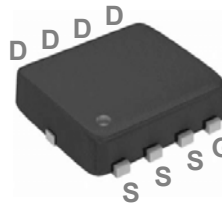# YS3910ZBB

Features

- *30V,35A, RDS(ON) =12mΩ(Typ)@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

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

PPAK3x3 Pin Configuration

Absolute Maximum Rating Tc=25℃   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 (Tc=25℃)	35	A
	Drain Current – Continuous (Tc=100℃)	22	A
I_{DM}	Drain Current – Pulsed[1]	140	A
EAS	Single Pulse Avalanche Energy[2]	13	mJ
IAS	Single Pulse Avalanche Current[2]	16	A
P_D	Power Dissipation (Tc=25℃)	27	W
	Power Dissipation – Derate above 25℃	0.21	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction to ambient	---	62	℃ /W
$R_{θJC}$	Thermal Resistance Junction to Case	---	4.6	℃ /W

DEVICE CHARACTERISTICS

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Electrical Characteristics (T$_J$=25 ℃, 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
$\triangle$BV$_{DSS}$/$\triangle$T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=1mA	---	0.04	---	V/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=30V, V$_{GS}$=0V, T$_J$=25℃	---	---	1	uA
		V$_{DS}$=24V, V$_{GS}$=0V, T$_J$=125℃	---	---	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[3]	V$_{GS}$=10V, I$_D$=10A	---	9.4	12	mΩ
		V$_{GS}$=4.5V, I$_D$=5A	---	13	18	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250uA	1.2	1.8	2.5	V
$\triangle$V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=10V, I$_D$=10A	---	6.4	---	S

Dynamic and Switching Characteristics

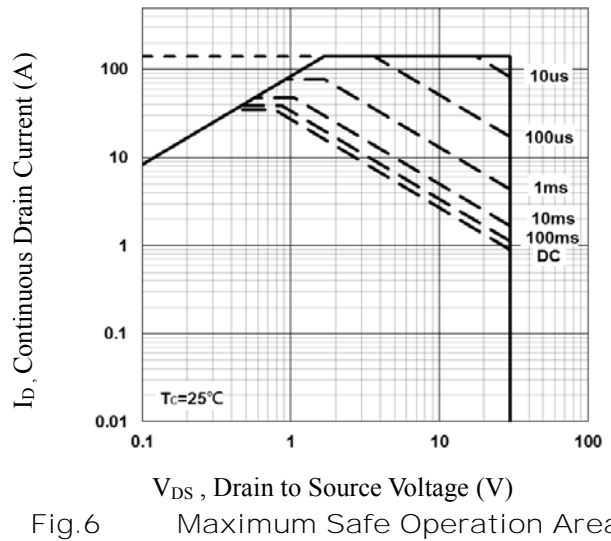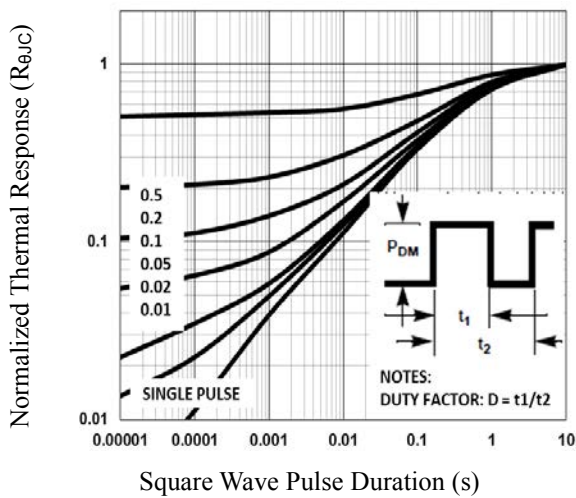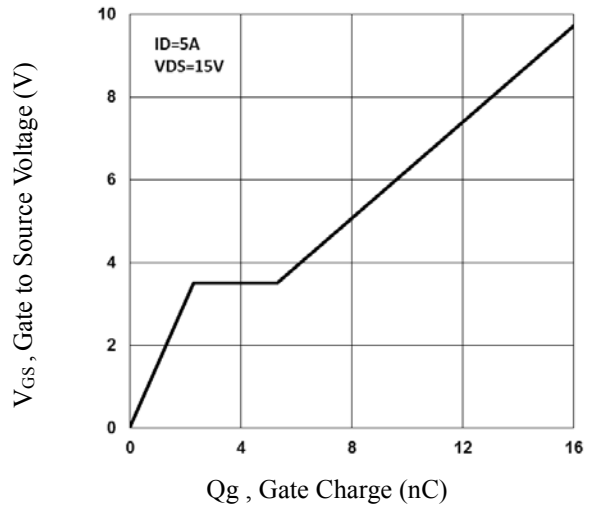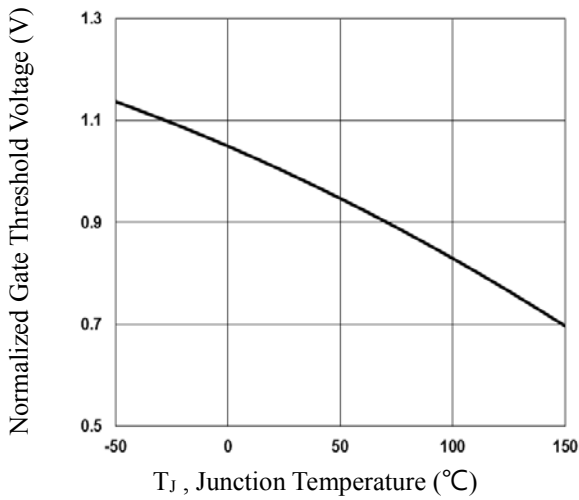| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[3,4]	V$_{DS}$=15V, V$_{GS}$=4.5V, I$_D$=5A	---	7.4	12	nC
Q$_{gs}$	Gate-Source Charge[3,4]		---	2.3	5	
Q$_{gd}$	Gate-Drain Charge[3,4]		---	3	6	
T$_{d(on)}$	Turn-On Delay Time[3,4]	V$_{DD}$=15V, V$_{GS}$=10V, R$_G$=6Ω , I$_D$=1A	---	3.8	7	ns
T$_r$	Rise Time[3,4]		---	10	19	
T$_{d(off)}$	Turn-On Delay Time[3,4]		---	22	42	
T$_f$	Fall Time[3,4]		---	6.6	13	
C$_{iss}$	Input Capacitance	V$_{DS}$=25V, V$_{GS}$=0V, f=1MHz	---	620	900	pF
C$_{oss}$	Output Capacitance		---	85	125	
C$_{rss}$	Reverse Transfer Capacitance		---	60	90	
R$_g$	Gate Resistance	V$_{GS}$=0V, V$_{DS}$=0V, f=1MHz	---	2.8	5.6	Ω

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	---	---	35	A
I$_{SM}$	Pulsed Source Current[3]		---	---	70	A
V$_{SD}$	Diode Forward Voltage[3]	V$_{GS}$=0V, I$_S$=1A, T$_J$=25℃	---	---	1	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V$_{DD}$=25V,V$_{GS}$=10V,L=0.1mH,I$_{AS}$=16A.,R$_G$=25Ω,Starting T$_J$=25℃.
3. The data tested by pulsed , pulse width $\leqq$ 300us , duty cycle $\leqq$ 2%.
4. Essentially independent of operating temperature.

DEVICE CHARACTERISTICS

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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
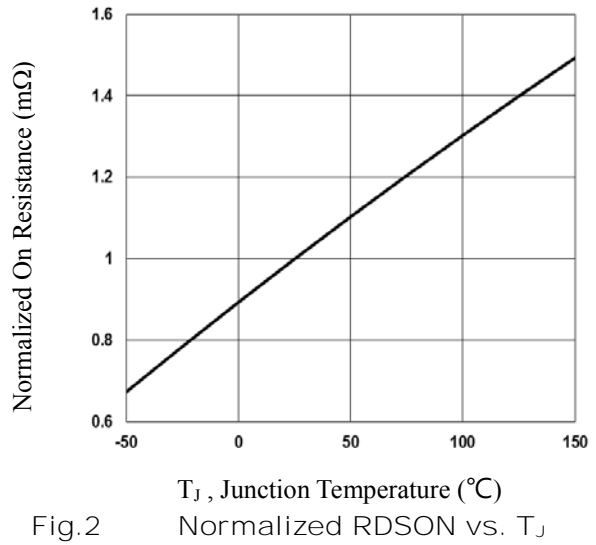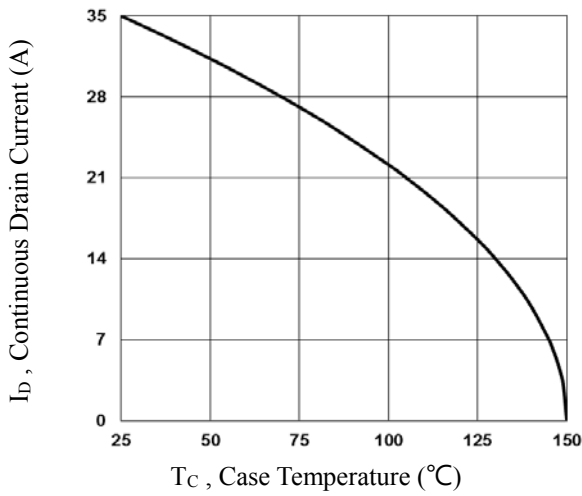
DEVICE CHARACTERISTICS

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Fig.7   Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$
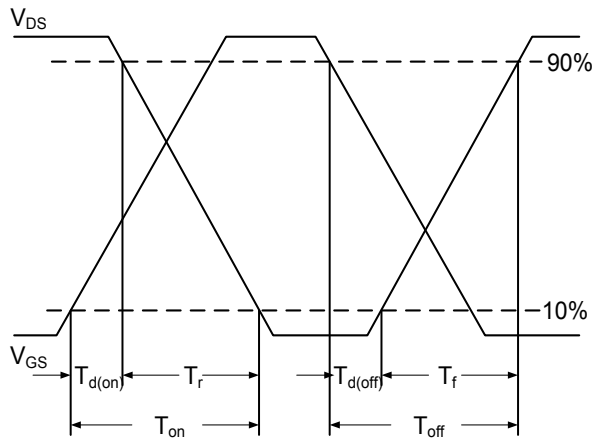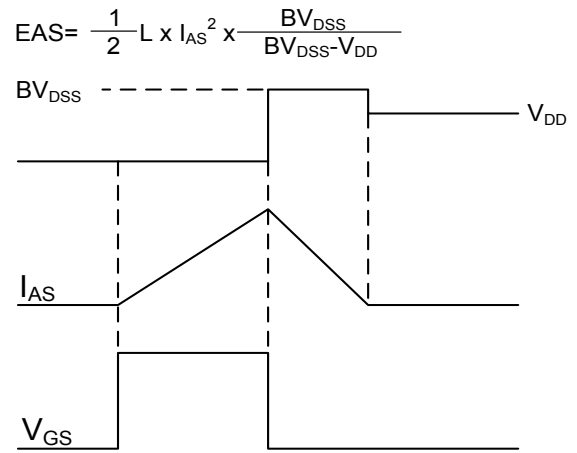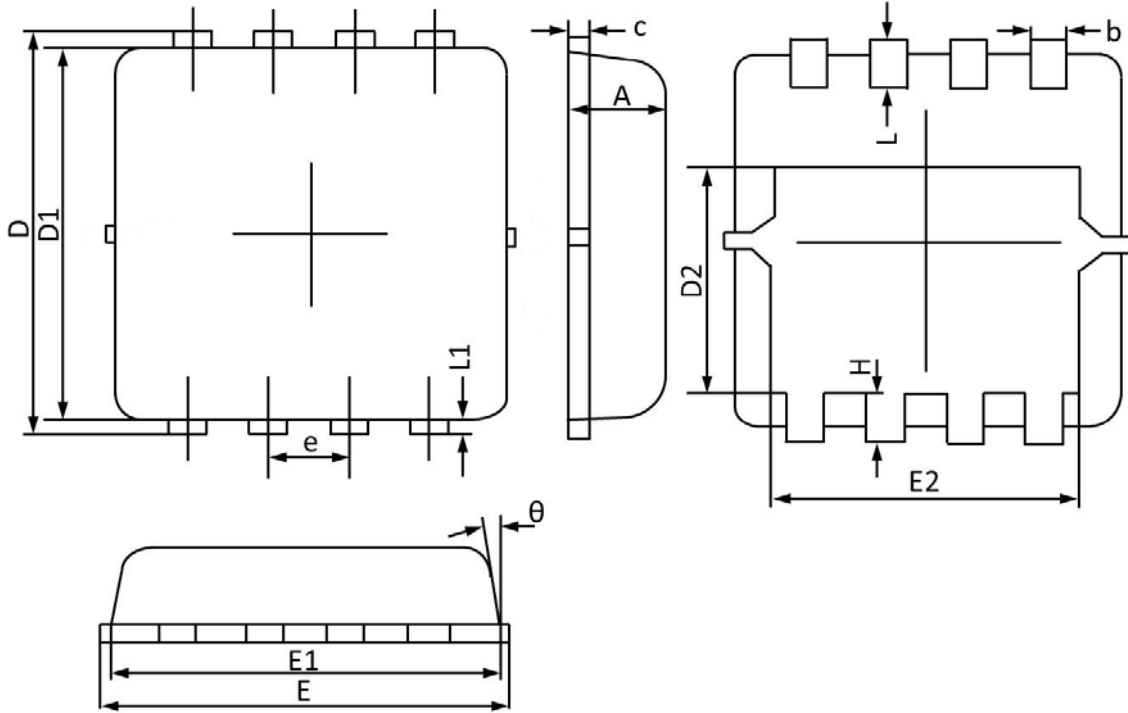

Fig.8   EAS Waveform

PACKAGE OUTLINE & DIMENSIONS

YS3910ZBB

PPAK3x3 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.900	0.028	0.035
b	0.240	0.350	0.009	0.014
c	0.100	0.250	0.004	0.010
D	3.050	3.450	0.120	0.136
D1	2.900	3.200	0.114	0.126
D2	1.350	1.850	0.053	0.073
E	3.000	3.400	0.118	0.134
E1	2.900	3.250	0.114	0.128
E2	2.350	2.600	0.093	0.102
e	0.65BSC		0.026BSC	
H	0.300	0.500	0.012	0.020
L	0.300	0.500	0.012	0.020
L	0.070	0.200	0.003	0.008
θ	0 °	1 2 °	0 °	1 2 °