

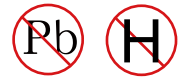


YEA SHIN TECHNOLOGY CO., LTD

YS6910L

N-Channel Enhancement MOSFET

V_{DS}= 60V, I_D= 6.8A



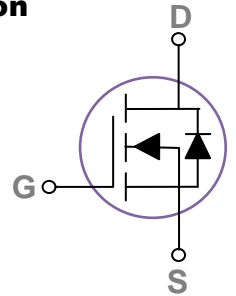
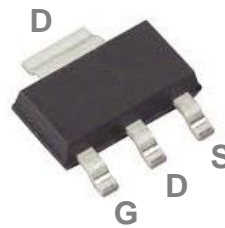
Features

- 60V, 6.8A, R_{DS(ON)} = 60mΩ @ V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

Applications

- Motor Drive
- Power Tools
- LED Lighting

SOT-223 Pin Configuration



Absolute Maximum Rating T_c=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current – Continuous (T _c =25°C)	6.8	A
	Drain Current – Continuous (T _c =100°C)	4.3	A
I _{DM}	Drain Current – Pulsed ¹	27.2	A
EAS	Single Pulse Avalanche Energy ²	11	mJ
IAS	Single Pulse Avalanche Current ²	15	A
P _D	Power Dissipation (T _c =25°C)	5.4	W
	Power Dissipation – Derate above 25°C	0.043	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	85	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	23	°C/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_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.05	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	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	$V_{GS}=10V, I_D=6A$	---	50	60	$m\Omega$
		$V_{GS}=4.5V, I_D=3A$	---	56	70	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.2	---	$mV/^\circ\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_S=4A$	---	10	---	S

Dynamic and Switching Characteristics

Q_g	Total Gate Charge ^{3,4}	$V_{DS}=48V, V_{GS}=10V, I_D=8A$	---	14	21	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	2.9	5	
Q_{gd}	Gate-Drain Charge ^{3,4}		---	2.4	4	
$T_{d(on)}$	Turn-On Delay Time ^{3,4}	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=8A$	---	14	27	ns
T_r	Rise Time ^{3,4}		---	4	8	
$T_{d(off)}$	Turn-Off Delay Time ^{3,4}		---	32	60	
T_f	Fall Time ^{3,4}		---	2	4	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	---	835	1300	pF
C_{oss}	Output Capacitance		---	69	130	
C_{rss}	Reverse Transfer Capacitance		---	40	80	
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	---	1.7	3.4	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	---	---	6.8	A
I_{SM}	Pulsed Source Current ³		---	---	13.6	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. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=15A$, 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.

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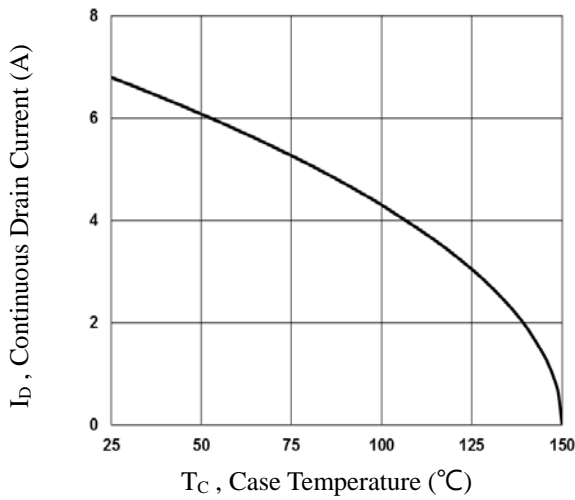


Fig.1 Continuous Drain Current vs. T_C

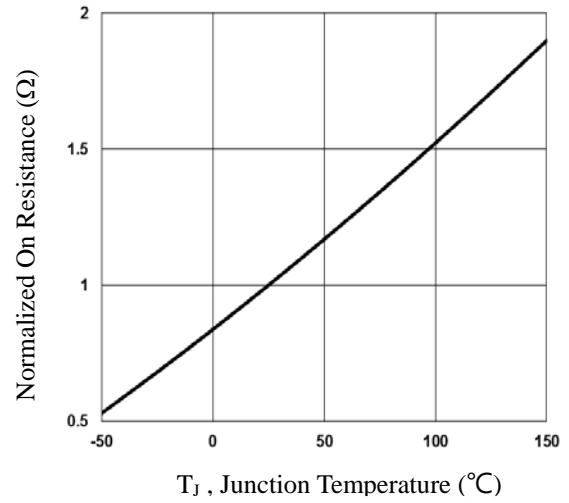


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

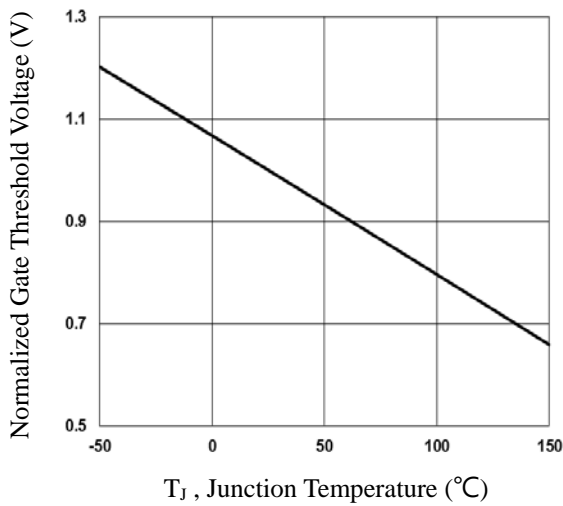


Fig.3 Normalized V_{th} vs. T_J

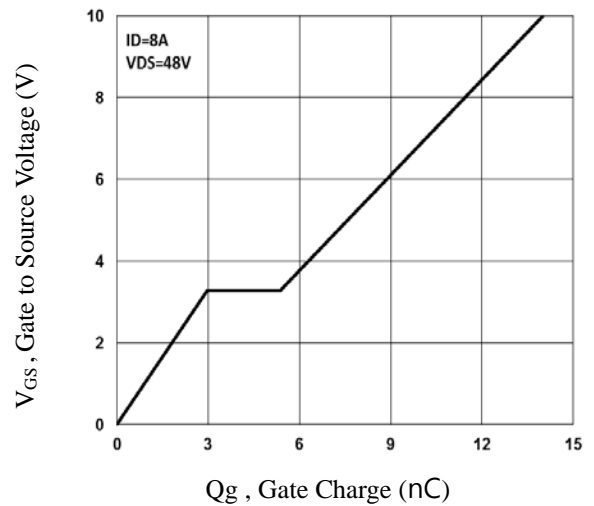


Fig.4 Gate Charge Waveform

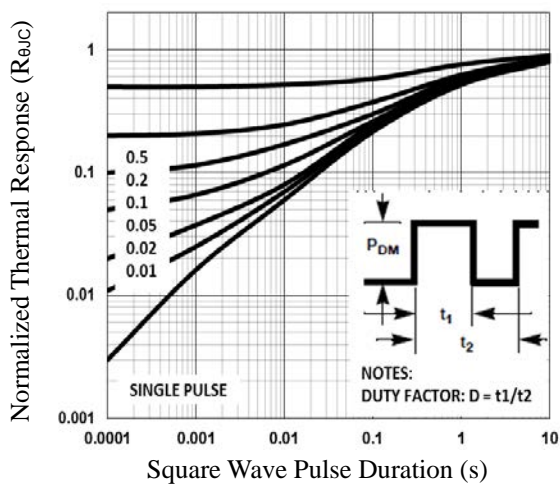


Fig.5 Normalized Transient Impedance

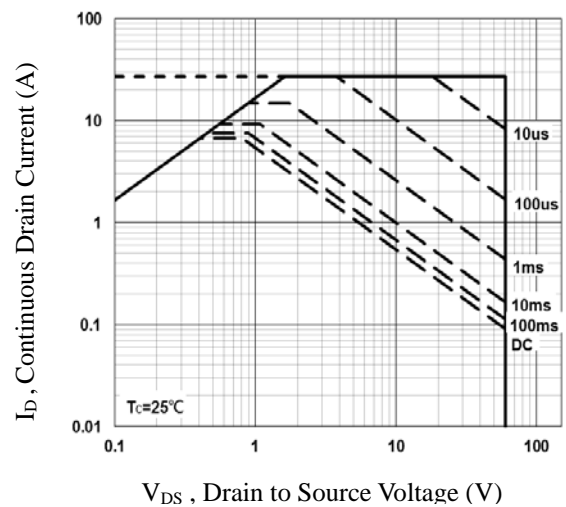


Fig.6 Maximum Safe Operation Area

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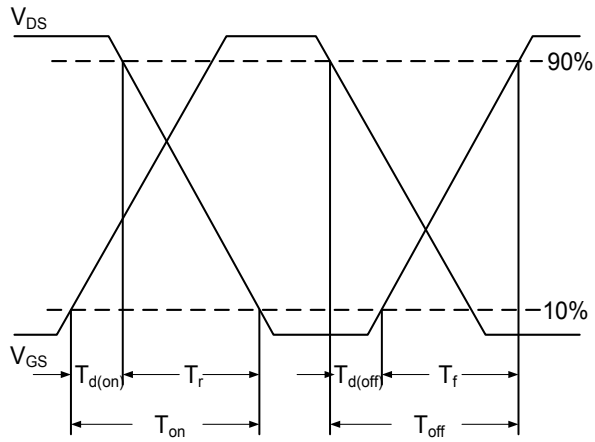


Fig.7 Switching Time Waveform

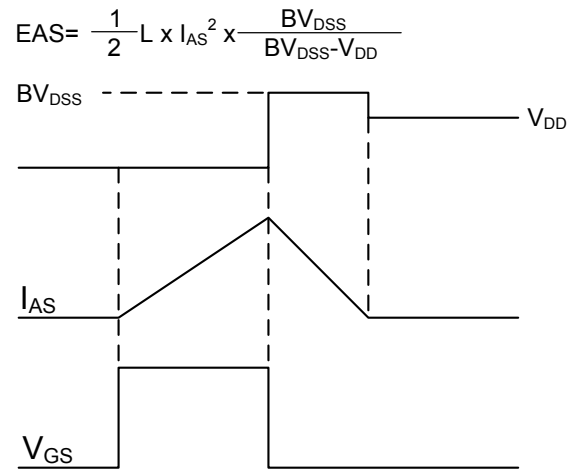


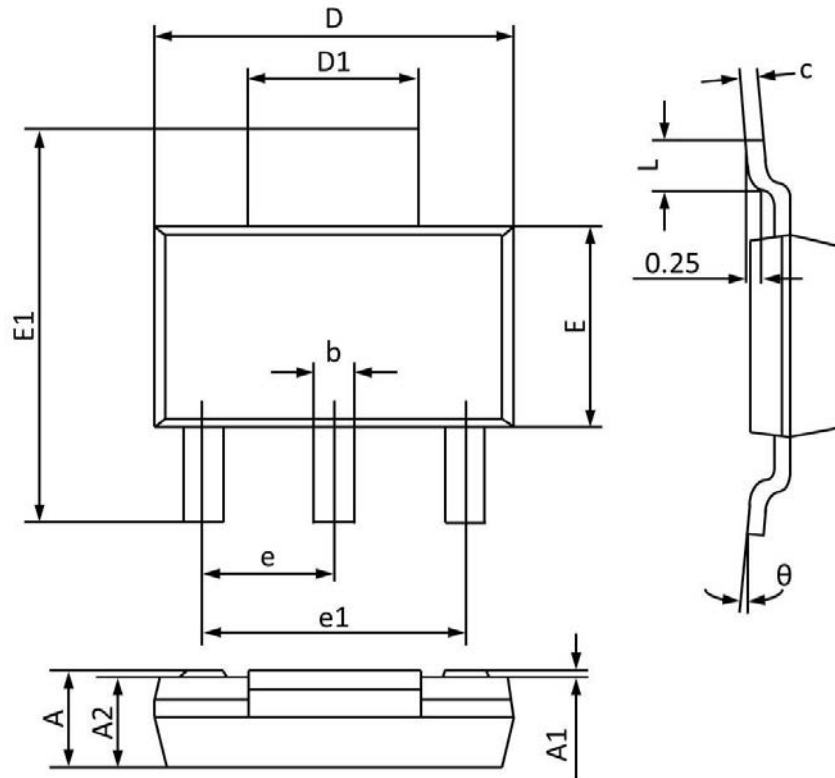
Fig.8 EAS Waveform

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

PACKAGE OUTLINE & DIMENSIONS

YS6910L

SOT-223 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300 (BSC)		0.091 (BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°