

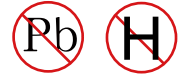


YEA SHIN TECHNOLOGY CO., LTD

YS6912K

## N-Channel Enhancement MOSFET

VDS= 60V, ID= 5A



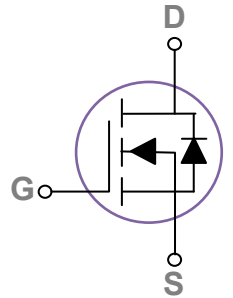
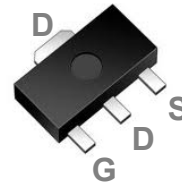
### Features

- 60V, 5A,  $R_{DS(ON)} = 75m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### Applications

- Motor Drive
- Power Tools
- LED Lighting

### SOT-89 Pin Configuration



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

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	5	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	3.2	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	20	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	25	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	7	A
P <sub>D</sub>	Power Dissipation ( $T_c=25^\circ\text{C}$ )	1.79	W
	Power Dissipation – Derate above 25°C	0.014	W/°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Characteristics $T_j=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to ambient	---	70	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	---	30	°C/W

# DEVICE CHARACTERISTICS

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Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise)

### Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA		0.05		V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA

### On Characteristics

R <sub>DS(ON)</sub>	Static Drain-source On-Resistance <sup>3</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =5A	---	60	75	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	---	70	90	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	1.8	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-5	---	mV/°C
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =3A	---	7	---	S

### Dynamic and Switching Characteristics

Q <sub>g</sub>	Total Gate Charge <sup>3,4</sup>	V <sub>DS</sub> =48V, V <sub>GS</sub> =10V, I <sub>D</sub> =5A	---	9.3	14	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3,4</sup>		---	2.1	4	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3,4</sup>		---	1.8	4	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3,4</sup>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =1A	---	2.9	6	ns
T <sub>r</sub>	Rise Time <sup>3,4</sup>		---	9.5	18	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3,4</sup>		---	18.4	35	
T <sub>f</sub>	Fall Time <sup>3,4</sup>		---	5.3	10	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	---	500	725	pF
C <sub>oss</sub>	Output Capacitance		---	45	65	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	16	30	
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	---	2	4	Ω

### Drain-Source Diode Characteristics and Maximum Ratings

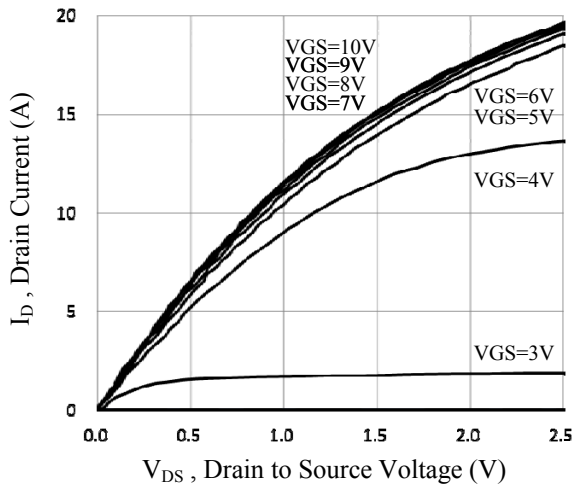
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	5	A
I <sub>SM</sub>	Pulsed Source Current <sup>3</sup>		---	---	20	A
V <sub>SD</sub>	Diode Forward Voltage <sup>3</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V

Note :

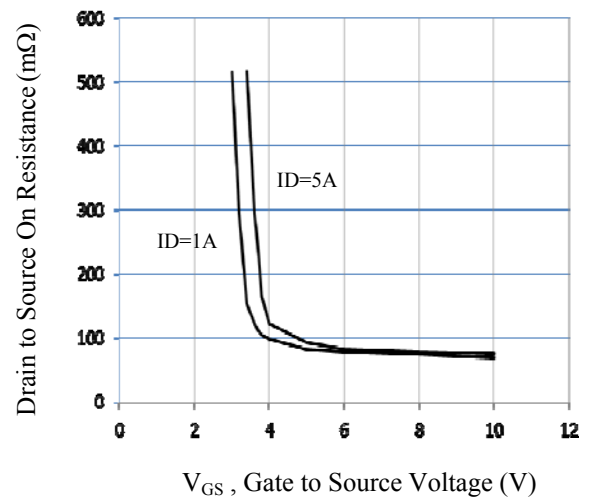
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=1mH, I<sub>AS</sub>=7A, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

# DEVICE CHARACTERISTICS

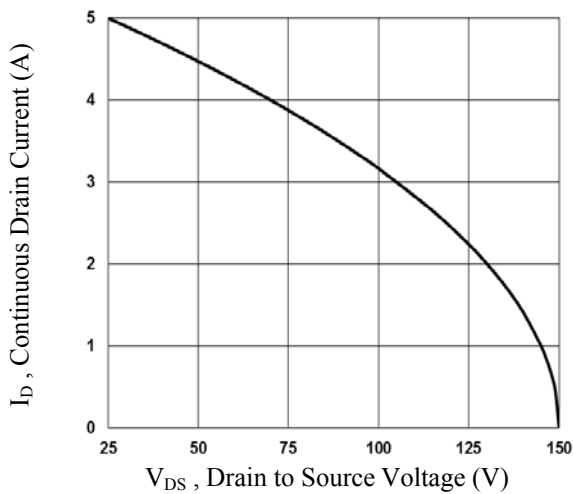
## YS6912K



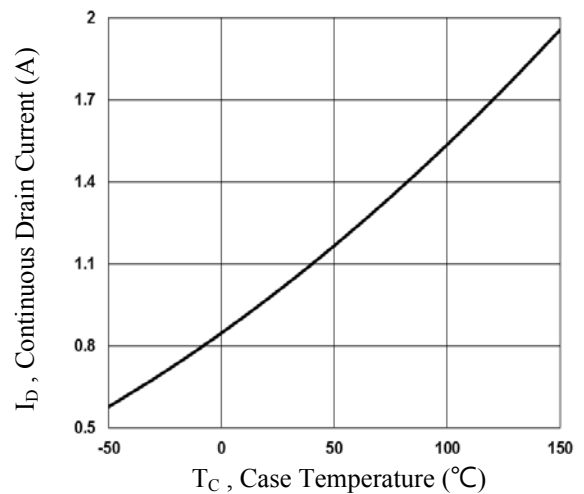
**Fig.1 Typical Output Characteristics**



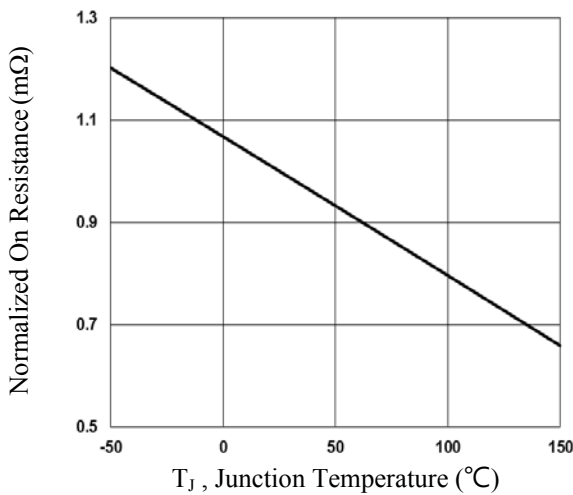
**Fig.2  $R_{DS(on)}$  vs. Gate Voltage**



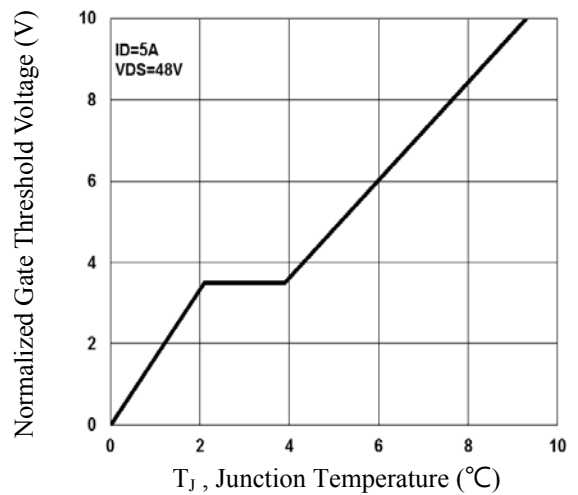
**Fig.3 Output Characteristics**



**Fig.4 Continuous Drain Current vs.  $T_C$**



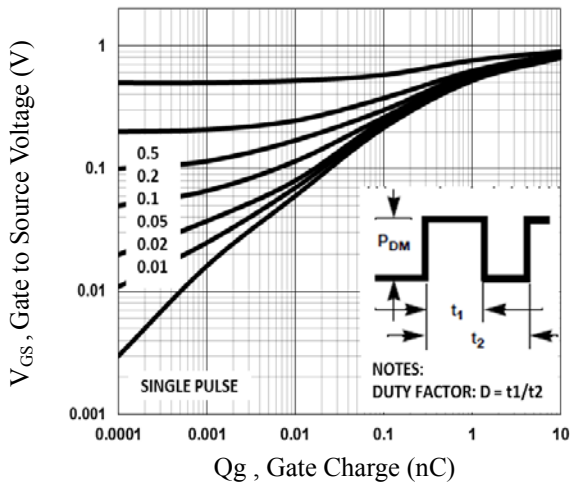
**Fig.5 Normalized  $R_{DS(on)}$  vs.  $T_J$**



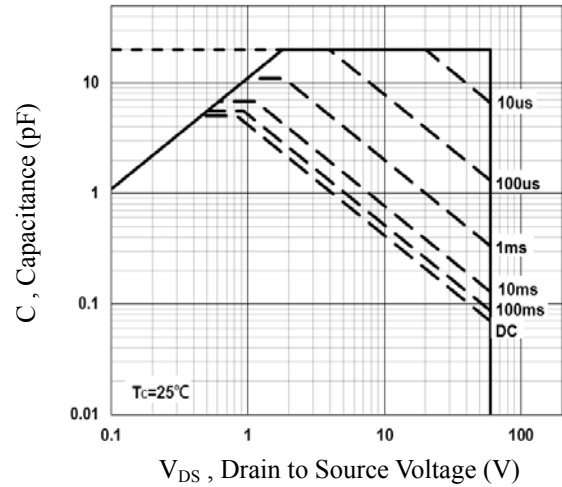
**Fig.6 Normalized  $V_{th}$  vs.  $T_J$**

# DEVICE CHARACTERISTICS

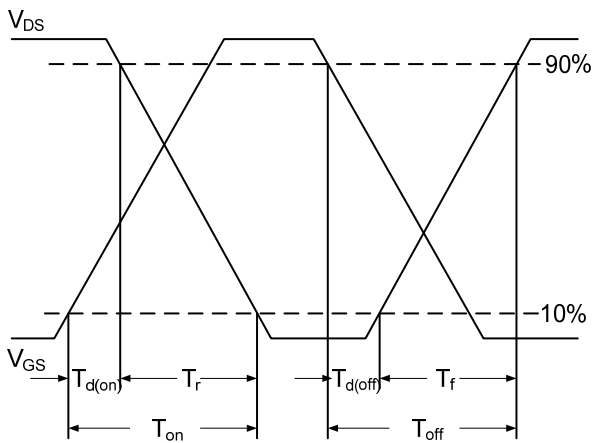
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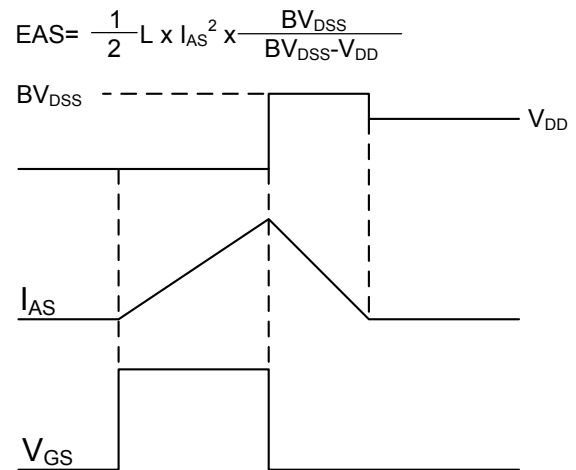
**Fig.7 Gate Charge Waveform**



**Fig.8 Capacitance Characteristics**



**Fig.9 Switching Time Waveform**

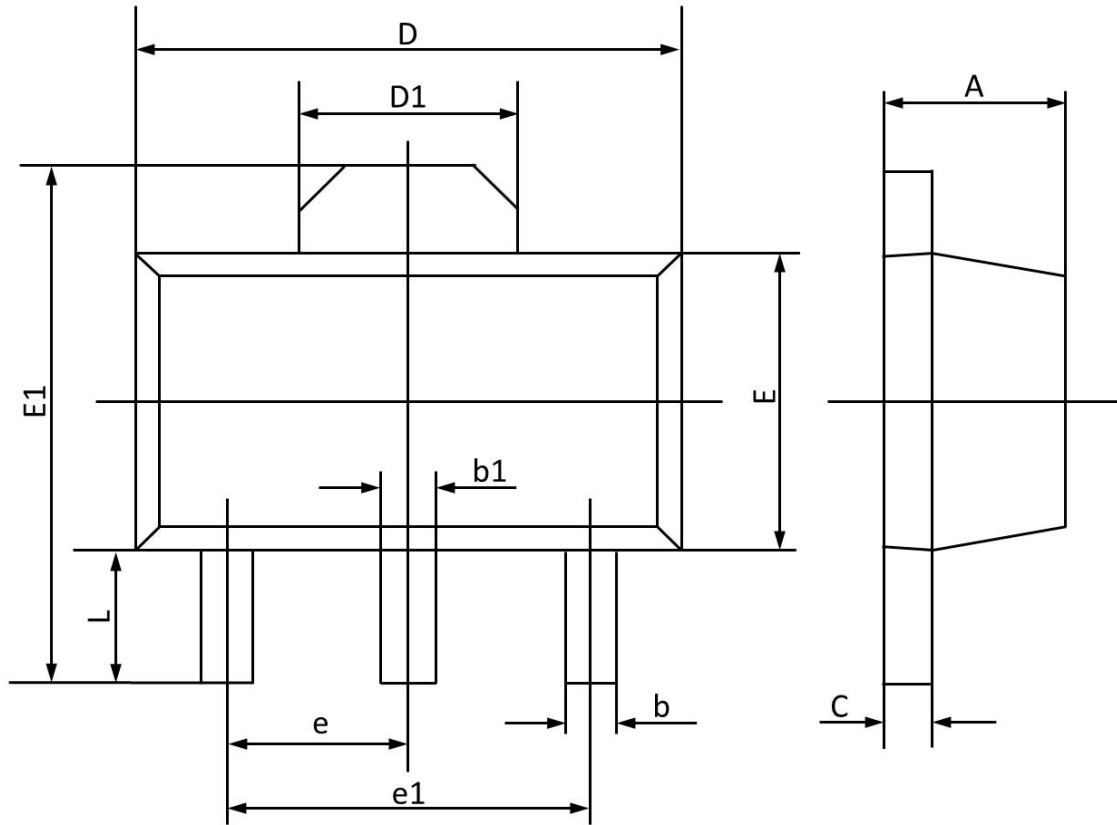


**Fig.10 EAS Waveform**

# PACKAGE OUTLINE & DIMENSIONS

YS6912K

## SOT-89 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047