



YEA SHIN TECHNOLOGY CO., LTD

YS3612K

# N-Channel Enhancement MOSFET



VDS= 30V, ID= 6.5A

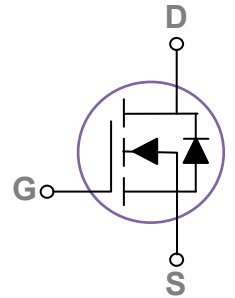
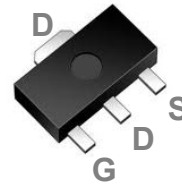
## Features

- 30V, 6.5A,  $R_{DS(ON)} = 32m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available
- Suit for 1.8V Gate Drive Applications

## Applications

- Notebook
- Load Switch
- Hand-Held Instruments

## SOT-89 Pin Configuration



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

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±12	V
I <sub>D</sub>	Drain Current – Continuous ( $T_c=25^\circ C$ )	6.5	A
	Drain Current – Continuous ( $T_c=100^\circ C$ )	4.1	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	26	A
P <sub>D</sub>	Power Dissipation ( $T_c=25^\circ C$ )	1.47	W
	Power Dissipation – Derate above 25°C	0.012	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

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to ambient	---	85	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	---	30	°C/W

# DEVICE CHARACTERISTICS

## YS3612K

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	30	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V, 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>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =4A	---	27	32	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	---	29	36	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A	---	34	45	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	0.4	0.6	1	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-2	---	mV/°C
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =2A	---	7	---	S

### Dynamic and Switching Characteristics

Q <sub>g</sub>	Total Gate Charge <sup>2,3</sup>	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	---	8.4	12	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2,3</sup>		---	1	2	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2,3</sup>		---	2.2	4	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>2,3</sup>	V <sub>DD</sub> =10V, V <sub>GS</sub> =4.5V, R <sub>G</sub> =25Ω, I <sub>D</sub> =1A	---	4.5	9	ns
T <sub>r</sub>	Rise Time <sup>2,3</sup>		---	13	25	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>2,3</sup>		---	27	51	
T <sub>f</sub>	Fall Time <sup>2,3</sup>		---	8.3	16	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	---	695	1000	pF
C <sub>oss</sub>	Output Capacitance		---	45	65	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	36	50	

### 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	---	---	6.5	A
I <sub>SM</sub>	Pulsed Source Current <sup>2</sup>		---	---	13	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</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. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

# DEVICE CHARACTERISTICS

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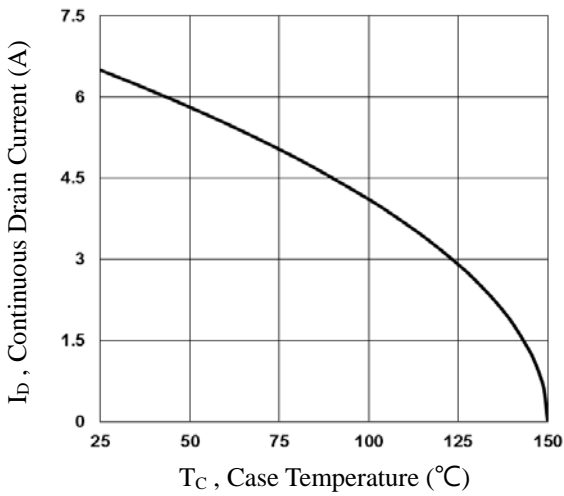


Fig.1 Continuous Drain Current vs.  $T_c$

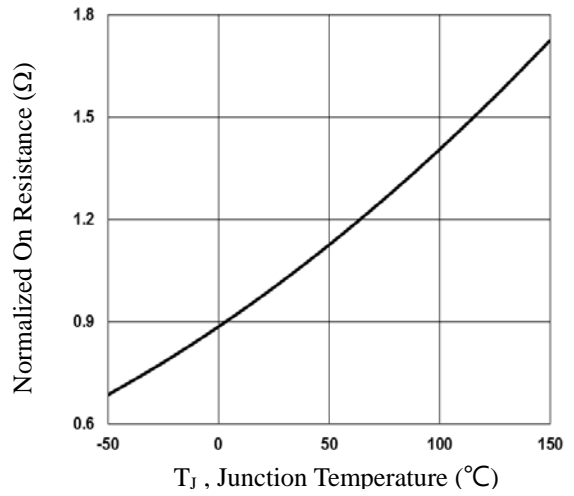


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

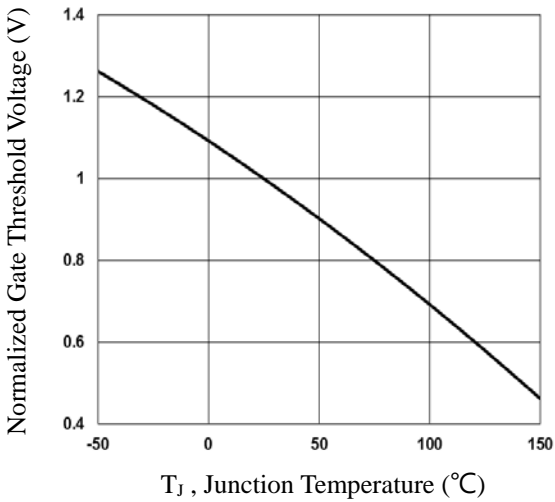


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

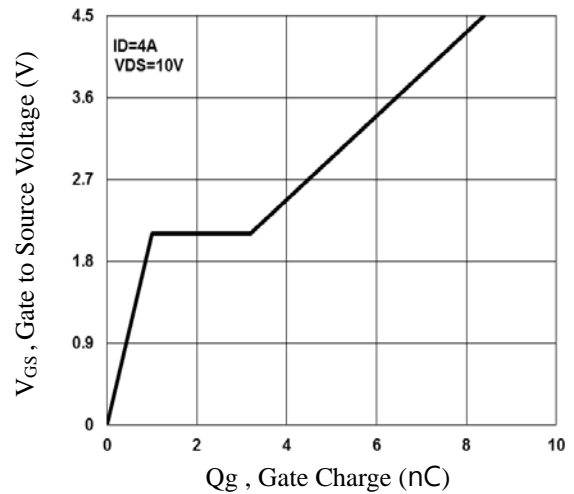


Fig.4 Gate Charge Waveform

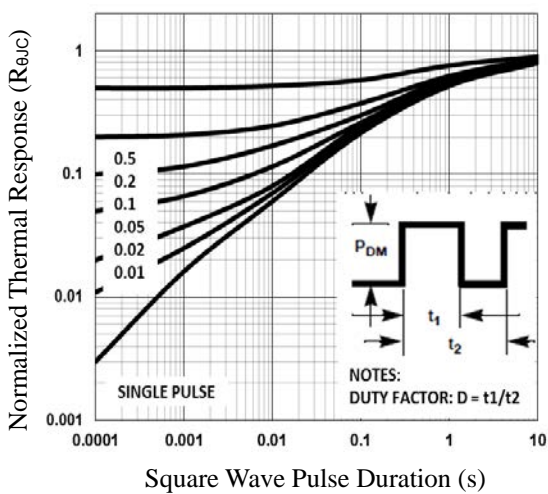


Fig.5 Normalized Transient Impedance

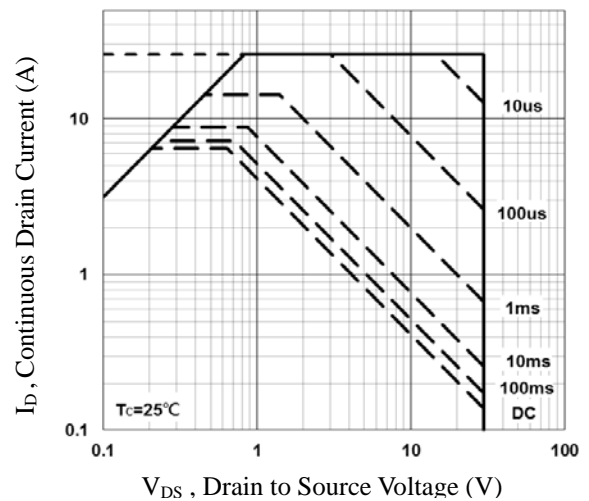
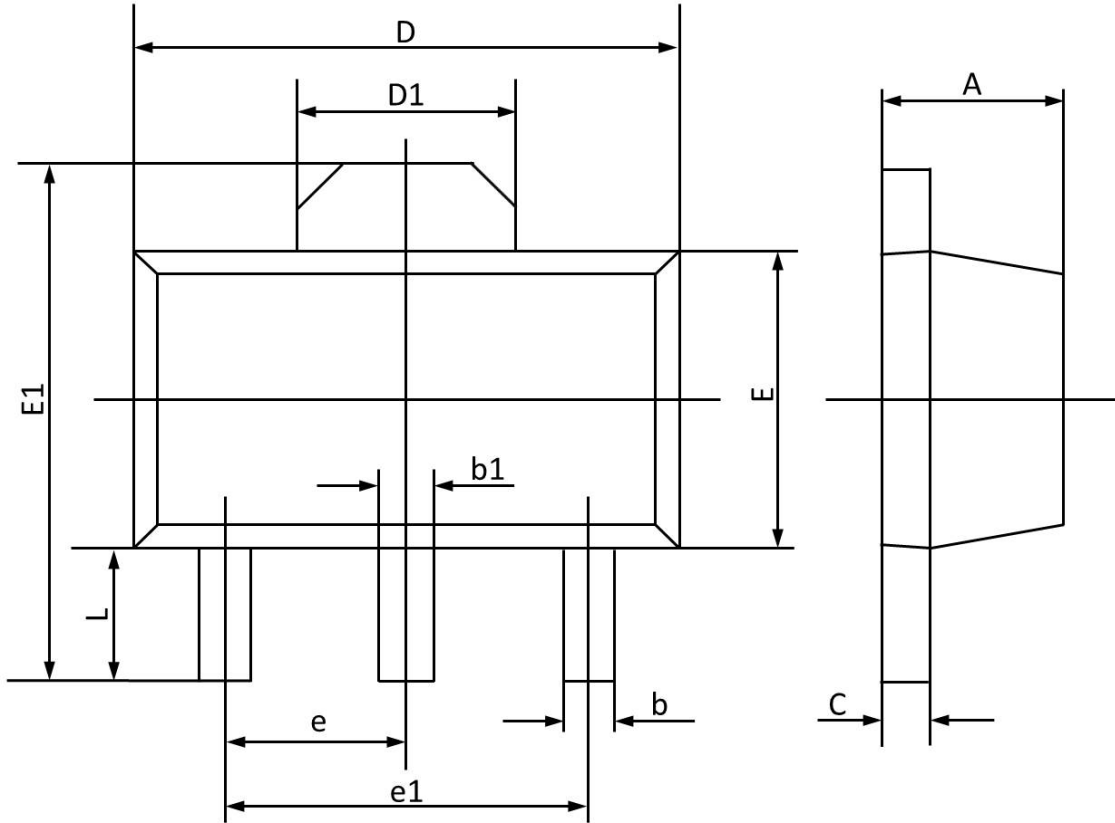


Fig.6 Maximum Safe Operation Area

# PACKAGE OUTLINE & DIMENSIONS

YS3612K

## 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