



YEA SHIN TECHNOLOGY CO., LTD

YS0956L

## N-Channel Enhancement MOSFET

VDS= 100V, ID= 4A



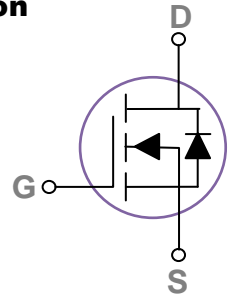
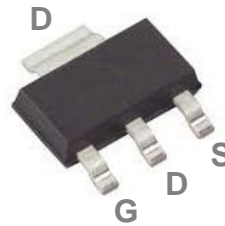
### Features

- 100V, 4A,  $R_{DS(ON)}=120m\Omega$  @  $V_{GS}=10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available

### Applications

- Networking
- Load Switch
- LED applications

### SOT-223 Pin Configuration



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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	4	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	2.6	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	16	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	5.2	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.042	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	70	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	24	$^\circ\text{C}/\text{W}$

# 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	$V_{GS}=0V$ , $I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1mA$	---	0.09	---	$V/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA

### On Characteristics

$R_{DS(ON)}$	Static Drain-source On-Resistance <sup>2</sup>	$V_{GS}=10V$ , $I_D=4A$	---	---	120	$m\Omega$
		$V_{GS}=4.5V$ , $I_D=2A$	---	---	130	$m\Omega$
$V_{GS(th)}$	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	$V_{DS}=10V$ , $I_D=2A$	---	8.7	---	S

### Dynamic and Switching Characteristics

$Q_g$	Total Gate Charge <sup>2,3</sup>	$V_{DS}=50V$ , $V_{GS}=10V$ , $I_D=2A$	---	20	40	nC
$Q_{gs}$	Gate-Source Charge <sup>2,3</sup>		---	3.2	6	
$Q_{gd}$	Gate-Drain Charge <sup>2,3</sup>		---	3.6	7	
$T_{d(on)}$	Turn-On Delay Time <sup>2,3</sup>	$V_{DD}=50V$ , $V_{GS}=10V$ , $R_G=3.3\Omega$ , $I_D=1A$	---	18	36	ns
$T_r$	Rise Time <sup>2,3</sup>		---	4	8	
$T_{d(off)}$	Turn-Off Delay Time <sup>2,3</sup>		---	40	80	
$T_f$	Fall Time <sup>2,3</sup>		---	3	6	
$C_{iss}$	Input Capacitance	$V_{DS}=25V$ , $V_{GS}=0V$ , $f=1MHz$	---	1400	2800	pF
$C_{oss}$	Output Capacitance		---	60	120	
$C_{rss}$	Reverse Transfer Capacitance		---	35	70	
$R_g$	Gate Resistance	$V_{GS}=0V$ , $V_{DS}=0V$ , $f=1MHz$	---	2	4	$\Omega$

### 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	---	---	4	A
$I_{SM}$	Pulsed Source Current <sup>2</sup>		---	---	8	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V$ , $I_S=1A$ , $T_J=25^\circ\text{C}$	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

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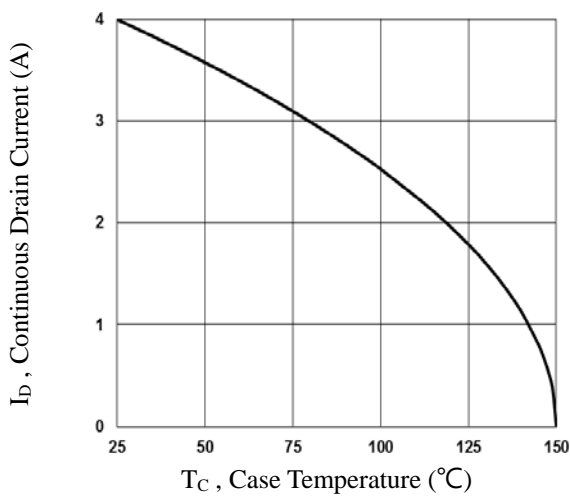


Fig.1 Continuous Drain Current vs.  $T_C$

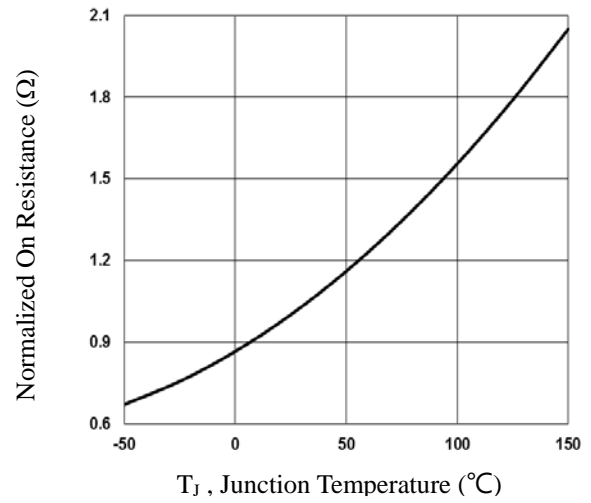


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

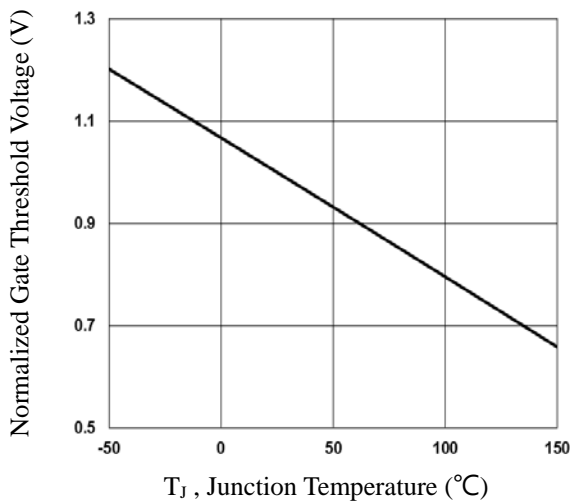


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

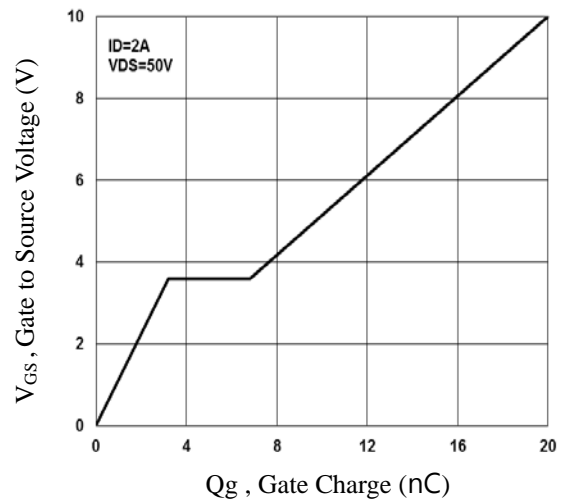


Fig.4 Gate Charge Waveform

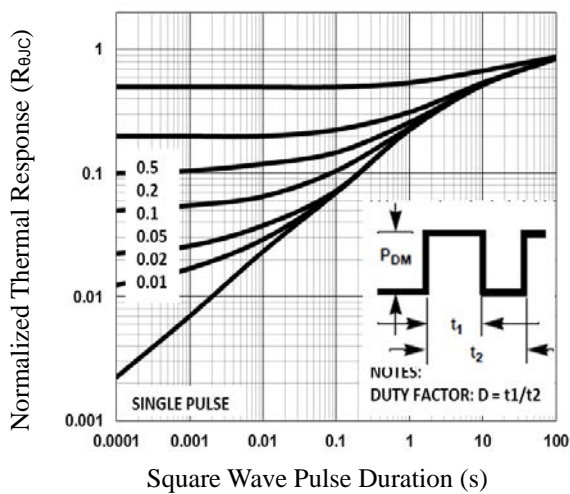


Fig.5 Normalized Transient Impedance

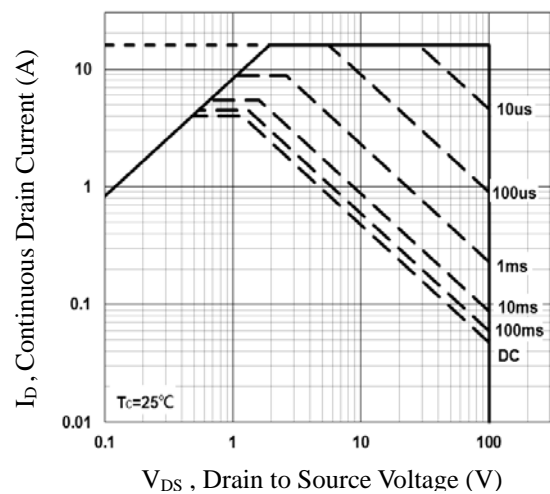
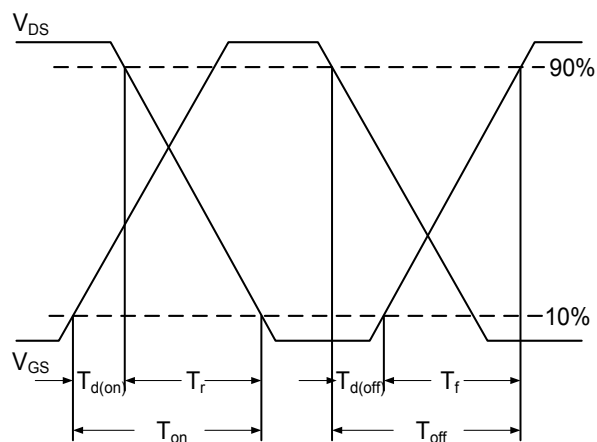


Fig.6 Maximum Safe Operation Area

# DEVICE CHARACTERISTICS

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**Fig.7 Switching Time Waveform**

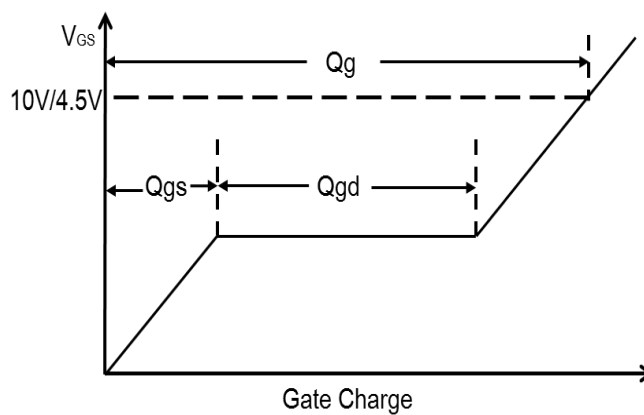
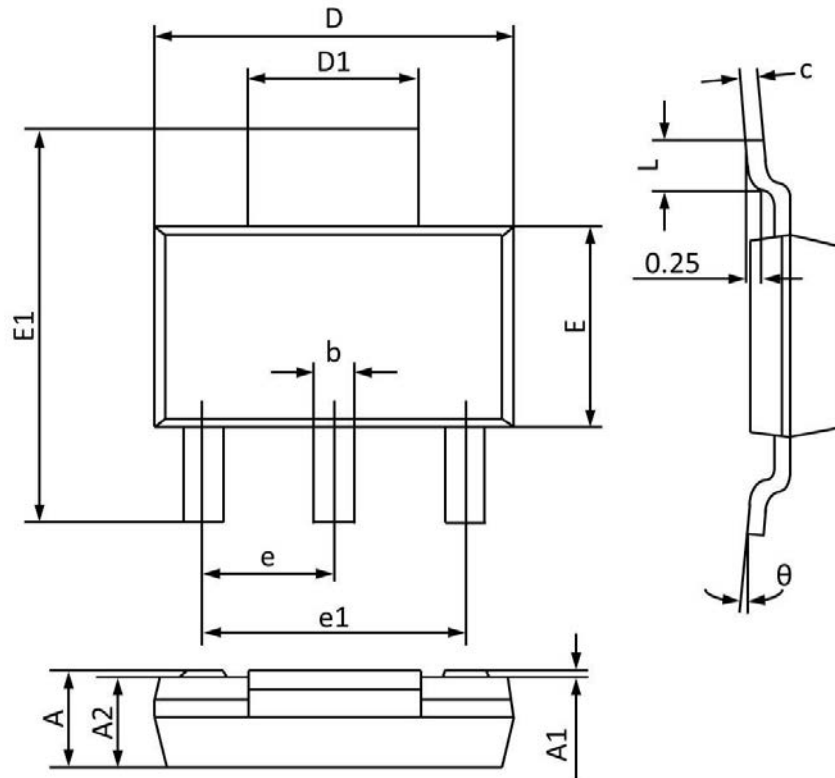


Fig.8 Gate Charge Waveform

# PACKAGE OUTLINE & DIMENSIONS

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## 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
$\theta$	0°	10°	0°	10°