



YEA SHIN TECHNOLOGY CO., LTD

YS2313S

P-Channel Enhancement MOSFET

VDS= -20V, ID= -4.1A



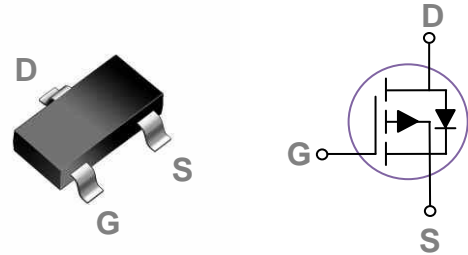
Features

- -20V, -4.1A, $R_{DS(ON)}=65m\Omega@V_{GS}=-4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for -1.8V Gate Drive Applications

Applications

- Notebook
- Load Switch
- Hand-Held Instruments

SOT-23 Pin Configuration



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

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-20	V
V _{GS}	Gate-Source Voltage	±10	V
I _D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	-4.1	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	-2.6	A
I _{DM}	Drain Current – Pulsed ¹	-16.4	A
P _D	Power Dissipation ($T_c=25^\circ\text{C}$)	1.56	W
	Power Dissipation – Derate above 25°C	0.012	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 _{θJA}	Thermal Resistance Junction to ambient	---	80	$^\circ\text{C}/\text{W}$

DEVICE CHARACTERISTICS

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Electrical Characteristics ($T_J=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.02	---	$V/^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	-1	μA
		$V_{DS}=-16V$, $V_{GS}=0V$, $T_J=125^{\circ}\text{C}$	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 10V$, $V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-source On-Resistance	$V_{GS}=-4.5V$, $I_D=-3A$	---	52	65	$m\Omega$
		$V_{GS}=-2.5V$, $I_D=-2A$	---	73	85	$m\Omega$
		$V_{GS}=-1.8V$, $I_D=-1.5A$		105	130	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-0.4	-0.6	-0.8	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2	---	$mV/^{\circ}\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=-10V$, $I_D=-3A$	---	5.5	---	S

Dynamic and Switching Characteristics

Q_g	Total Gate Charge ^{2,3}	$V_{DS}=-10V$, $V_{GS}=-4.5V$, $I_D=-3A$	---	6.4	9	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	0.9	1	
Q_{gd}	Gate-Drain Charge ^{2,3}		---	1.6	3	
$T_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=-10V$, $V_{GS}=-4.5V$, $R_G=25\Omega$, $I_D=-1A$	---	5	9	ns
T_r	Rise Time ^{2,3}		---	17.4	33	
$T_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	40.7	80	
T_f	Fall Time ^{2,3}		---	11.4	23	
C_{iss}	Input Capacitance	$V_{DS}=-10V$, $V_{GS}=0V$, $f=1MHz$	---	515	745	pF
C_{oss}	Output Capacitance		---	55	80	
C_{rss}	Reverse Transfer Capacitance		---	20	30	

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	---	---	-4.1	A
I_{SM}	Pulsed Source Current		---	---	-16.4	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^{\circ}\text{C}$	---	---	-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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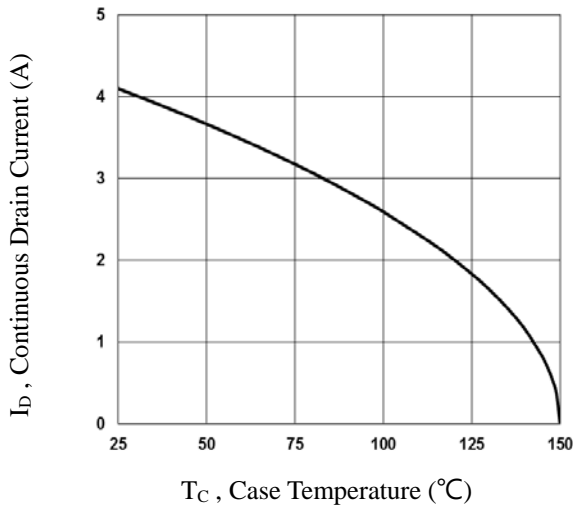


Fig.1 Continuous Drain Current vs. T_C

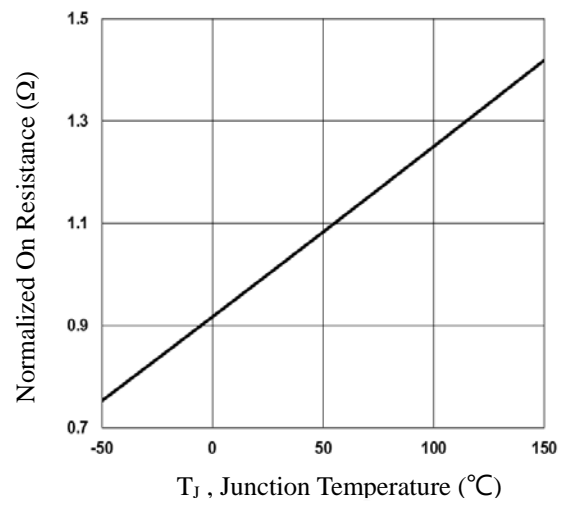


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

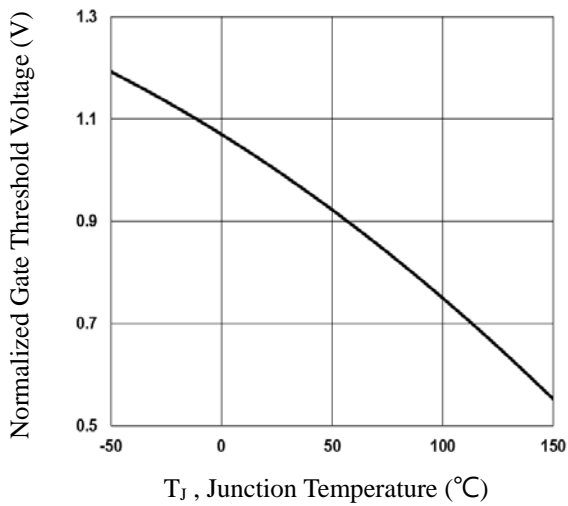


Fig.3 Normalized V_{th} vs. T_J

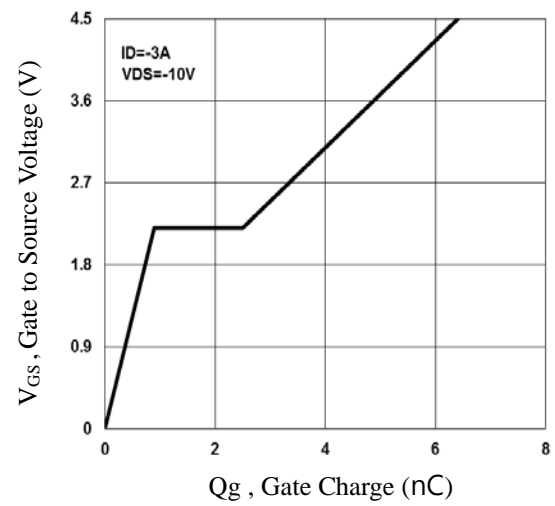


Fig.4 Gate Charge Waveform

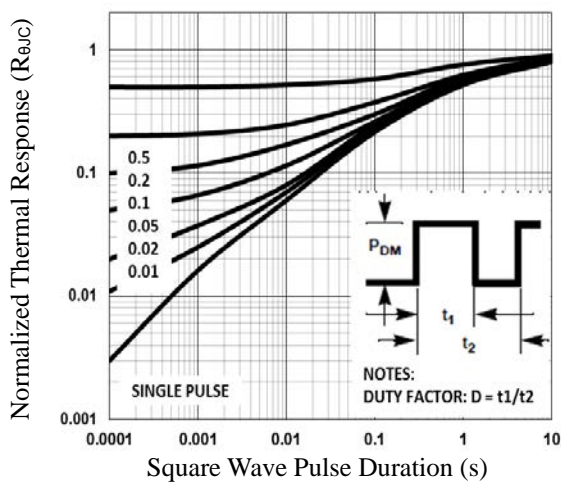


Fig.5 Normalized Transient Impedance

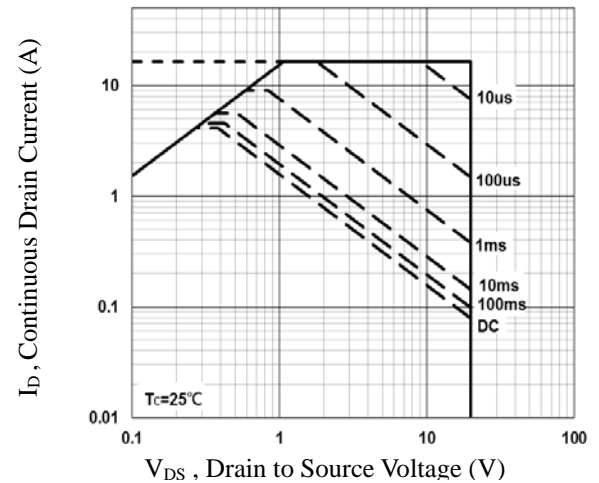


Fig.6 Maximum Safe Operation Area

DEVICE CHARACTERISTICS

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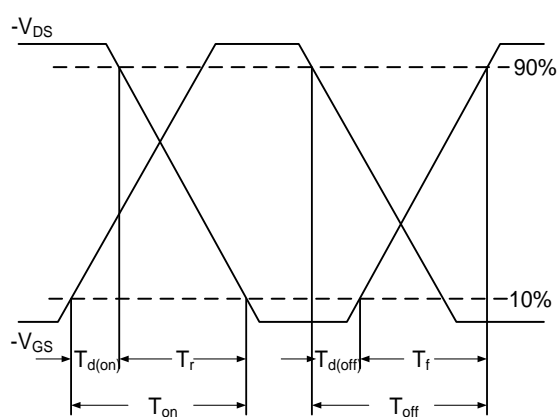


Fig.7 Switching Time Waveform

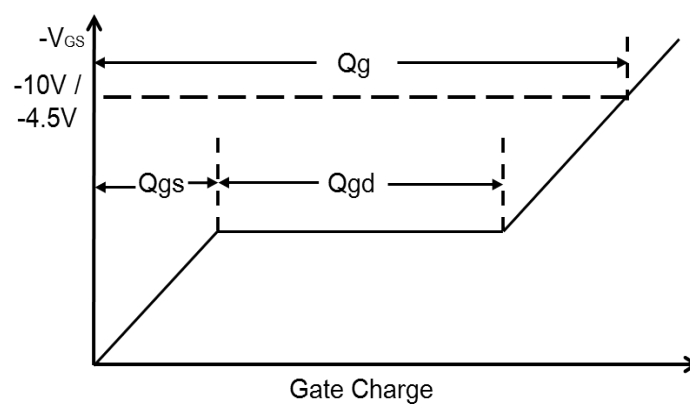
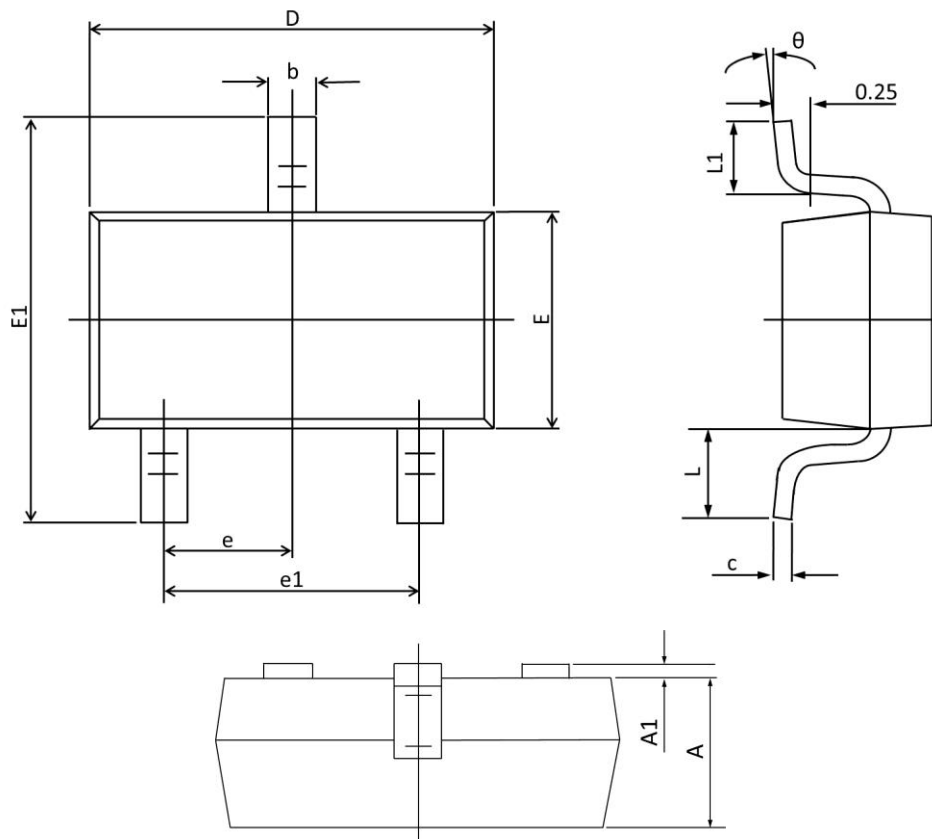


Fig.8 Gate Charge Waveform

PACKAGE OUTLINE & DIMENSIONS

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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°