



YEA SHIN TECHNOLOGY CO., LTD

YS2102W

# N-Channel Enhancement MOSFET



V<sub>DS</sub>= 20V, I<sub>D</sub>= 2.1A

## DESCRIPTION

The YS2102W is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent R<sub>DS(ON)</sub> and gate charge for most of the small power switching and load switch applications.

The YS2102W meet the RoHS and Green Product requirement with full function reliability approved.

## FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Simple Drive Requirement
- Fast Switching Characteristic

## MARKING

TS2

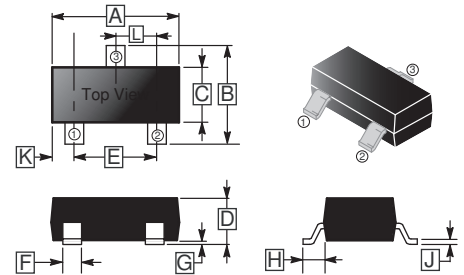
## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-323	3K	7 inch

## ORDER INFORMATION

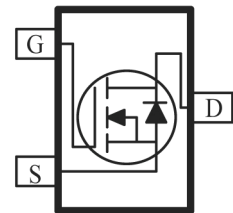
Part Number	Type
YS2102W	Lead (Pb)-free and Halogen-free

## SOT-323



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.80	2.20	G	0.1	REF.
B	1.80	2.45	H	0.525	REF.
C	1.1	1.4	J	0.08	0.25
D	0.80	1.10	K	0.8	TYP.
E	1.20	1.40	L	0.65	TYP.
F	0.15	0.40			

## Top View



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±8	V
Continuous Drain Current <sup>1</sup> @V <sub>GS</sub> =4.5V	I <sub>D</sub>	2.1	A
		1.7	
Pulsed Drain Current <sup>3</sup>	I <sub>DM</sub>	8	A
Maximum Power Dissipation <sup>1</sup>	P <sub>D</sub>	0.33	W
Operating Junction & Storage Temperature	T <sub>J</sub> , T <sub>STG</sub>	150, -55~150	°C
<b>Thermal Resistance Rating</b>			
Thermal Resistance Junction-Ambient <sup>1</sup>	R <sub>θJA</sub>	t ≤ 5s, 378	°C/W
		Steady state, 480	
Thermal Resistance Junction-Ambient <sup>2</sup>		625	

# YS2102W

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =250μA
Gate-Threshold Voltage	V <sub>GS(th)</sub>	0.5	-	1.2	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
Forward Transconductance	g <sub>fs</sub>	-	9	-	S	V <sub>DS</sub> =5V, I <sub>D</sub> =3A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> =0
Drain-Source Leakage Current	I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> =20V, V <sub>GS</sub> =0, T <sub>J</sub> =25°C
		-	-	10		V <sub>DS</sub> =20V, V <sub>GS</sub> =0, T <sub>J</sub> =55°C
Static Drain-Source On-Resistance <sup>4</sup>	R <sub>DS(on)</sub>	-	-	60	mΩ	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.6A
		-	-	80		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.1A
Total Gate Charge	Q <sub>g</sub>	-	6.2	-	nC	I <sub>D</sub> =3A V <sub>DS</sub> =15V V <sub>GS</sub> =4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	0.36	-		
Gate-Drain Change	Q <sub>gd</sub>	-	1.56	-		
Turn-on Delay Time	T <sub>d(on)</sub>	-	1.4	-	nS	V <sub>DS</sub> =10V V <sub>GS</sub> =4.5V R <sub>G</sub> =3.3Ω I <sub>D</sub> =3A
Rise Time	T <sub>r</sub>	-	40	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	17	-		
Fall Time	T <sub>f</sub>	-	5.6	-		
Input Capacitance	C <sub>iss</sub>	-	382	-	pF	V <sub>GS</sub> =0 V <sub>DS</sub> =15V f =1.0MHz
Output Capacitance	C <sub>oss</sub>	-	41	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	33	-		
<b>Source-Drain Diode</b>						
Continuous Source Current (Body Diode) <sup>1</sup>	I <sub>S</sub>	-	-	2.1	A	
Pulsed Source Current <sup>3</sup>	I <sub>SM</sub>	-	-	8	A	
Forward On Voltage <sup>4</sup>	V <sub>SD</sub>	-	-	1.2	V	I <sub>S</sub> =0.94A, V <sub>GS</sub> =0
Reverse Recovery Time	T <sub>rr</sub>	-	5.7	-	ns	I <sub>S</sub> =3A, V <sub>GS</sub> =0V dI/dt=100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	-	1.8	-	nC	

### Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR4 board with 20Z copper.
2. Surface mounted on FR4 board.
3. Pulse width limited by Max. junction temperature.
4. Pulse width ≤ 300μs, duty cycle ≤ 2%.

# DEVICE CHARACTERISTICS

## YS2102W

### CHARACTERISTIC CURVE

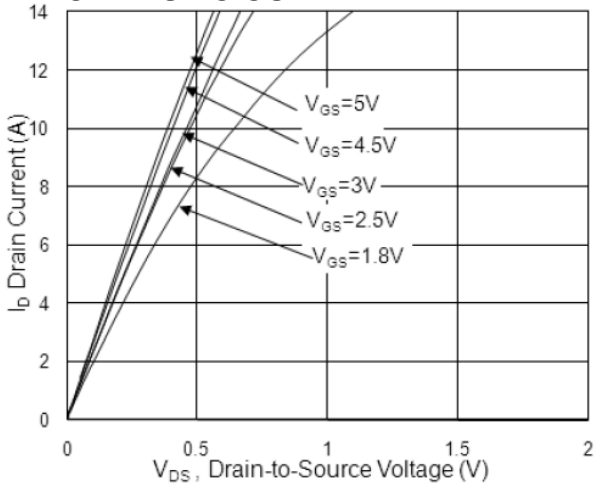


Fig.1 Typical Output Characteristics

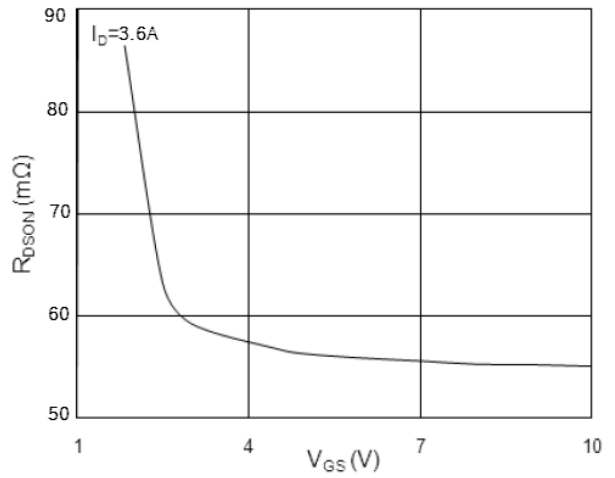


Fig.2 On-Resistance vs. Gate-Source

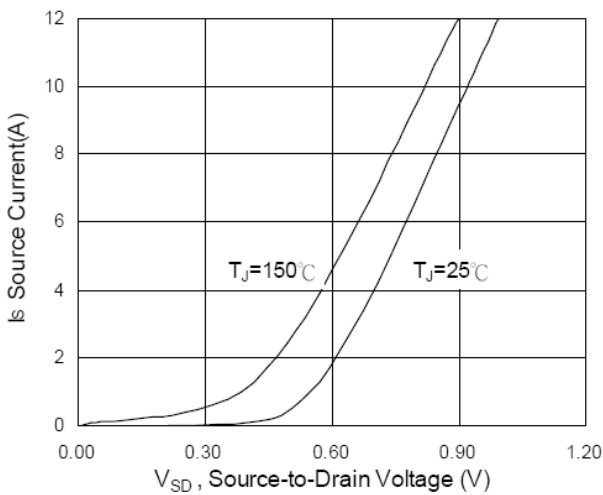


Fig.3 Forward Characteristics Of Reverse

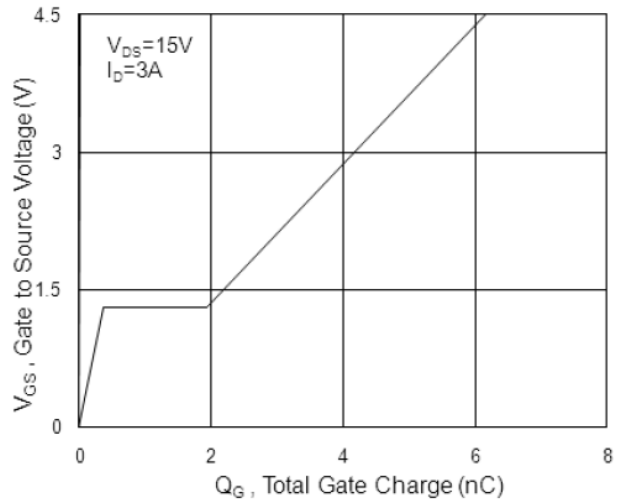


Fig.4 Gate-Charge Characteristics

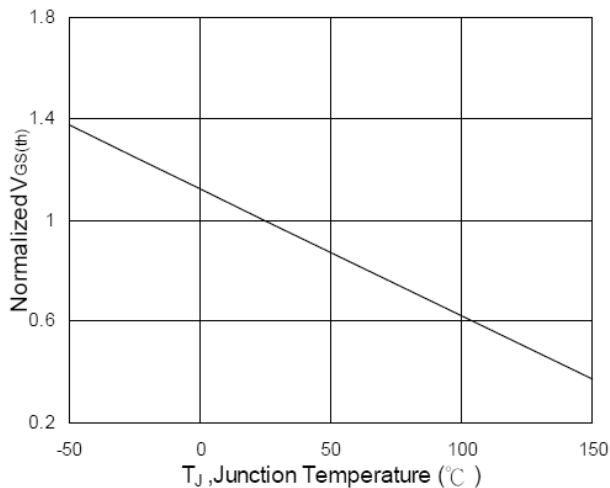


Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>

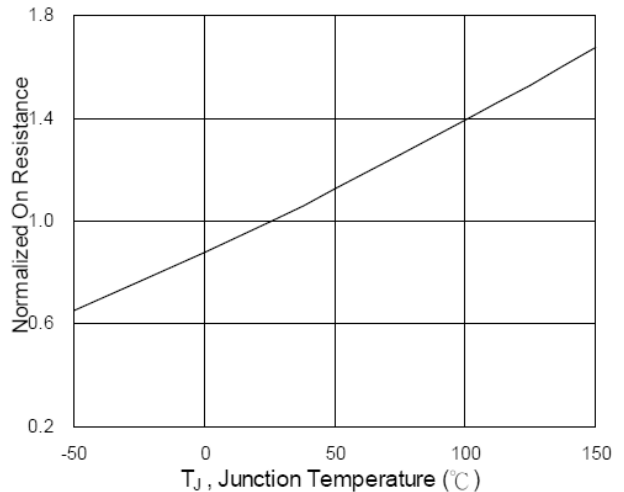


Fig.6 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>

# DEVICE CHARACTERISTICS

## YS2102W

### CHARACTERISTIC CURVE

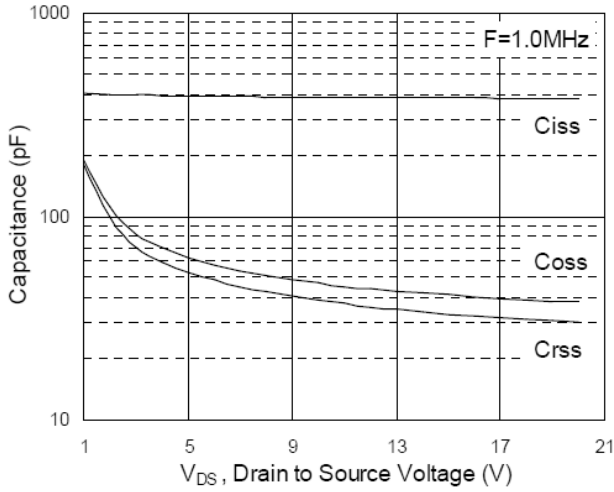


Fig.7 Capacitance

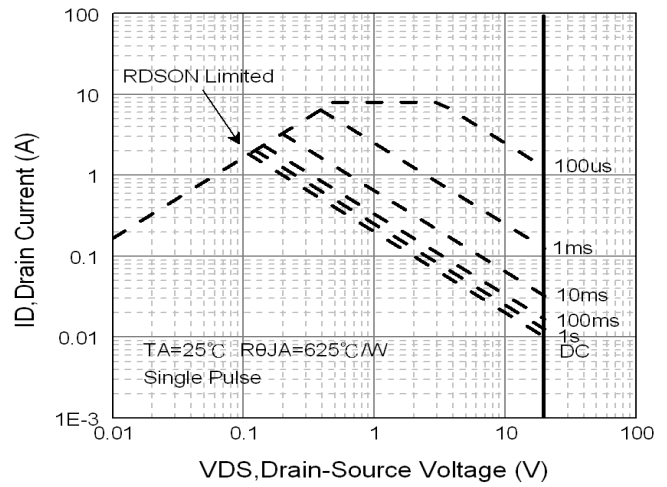


Fig.8 Safe Operating Area

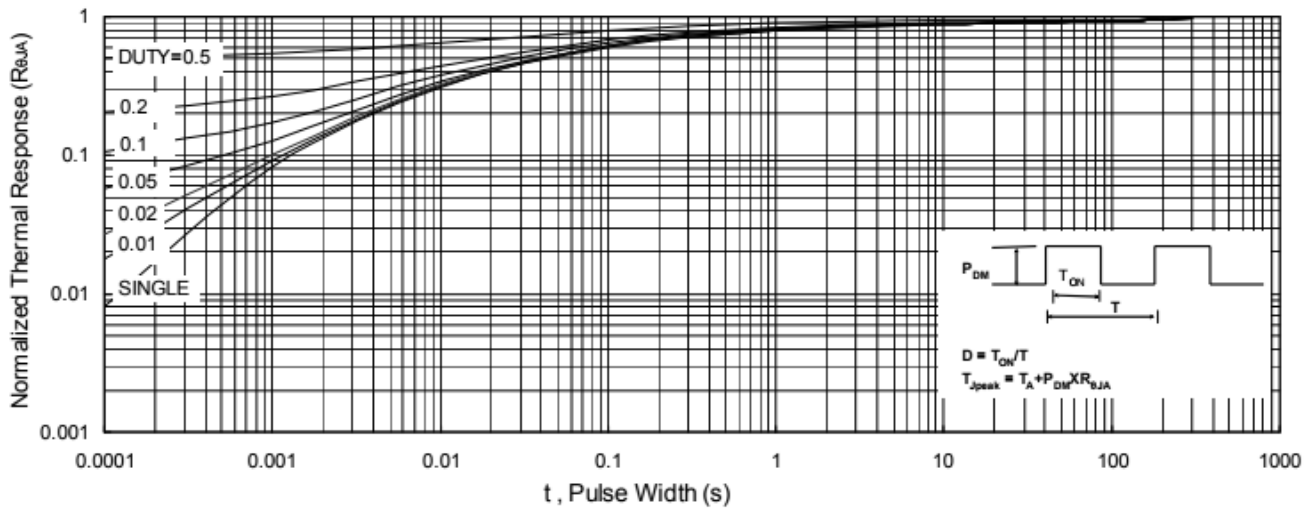


Fig.9 Normalized Maximum Transient Thermal Impedance

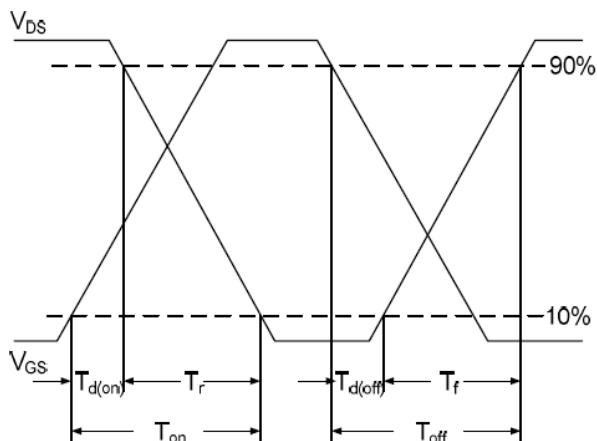


Fig.10 Switching Time Waveform

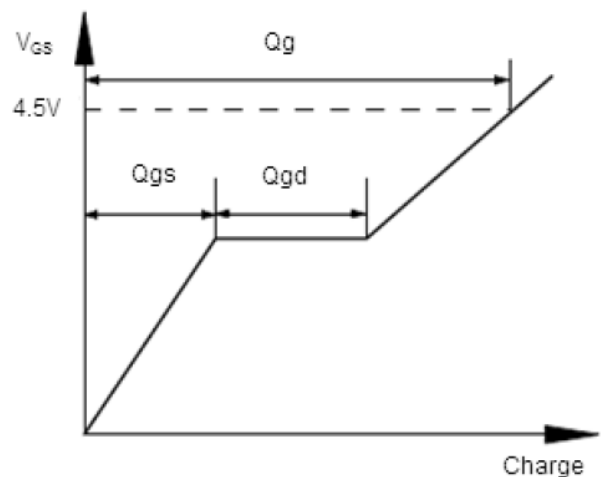


Fig.11 Gate Charge Waveform