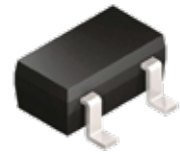
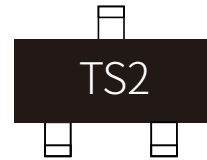


## FEATURES

- | High Density Cell Design For Low  $R_{DS(On)}$
- | Voltage Controlled Small Signal Switch
- | Rugged and Reliable
- | High Saturation Current Capability
- | Lead free product is acquired



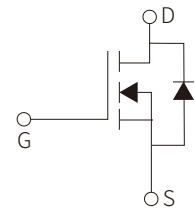
SOT-323



Marking

## APPLICATION

- | Direct logic-level interface: TTL/CMOS
- | Drivers: relays, solenoids, lamps
- | hammers, display, memories, etc.
- | Battery operated systems
- | Solid-state relays



Schematic Symbol

## APPROVALS

<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003

## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ )

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current	$I_D$	2.1	A
Continuous Source-Drain Current (Diode Conduction)	$I_S$	0.6	A
Power Dissipation	$P_D$	0.2	W
Junction Temperature	$T_J$	-50- +150	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-50- +150	$^{\circ}\text{C}$
Thermal Resistance from Junction to Ambient ( $t \leq 5\text{s}$ )	$R_{\theta JA}$	625	$^{\circ}\text{C}/\text{W}$

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

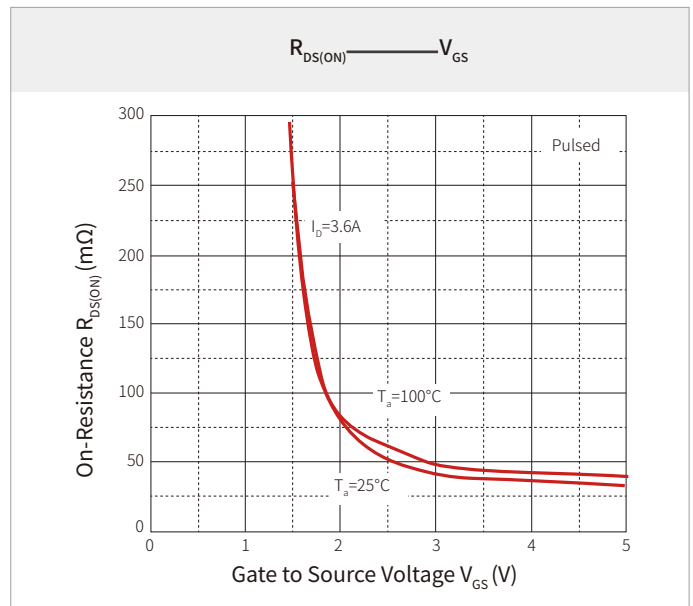
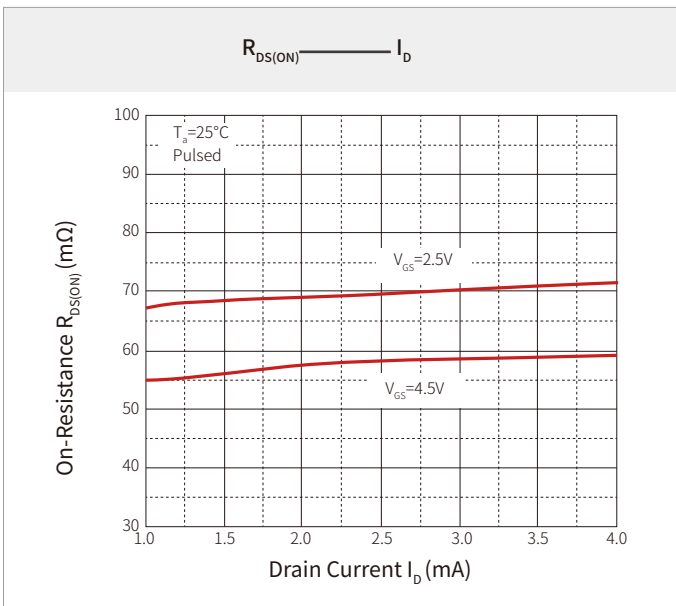
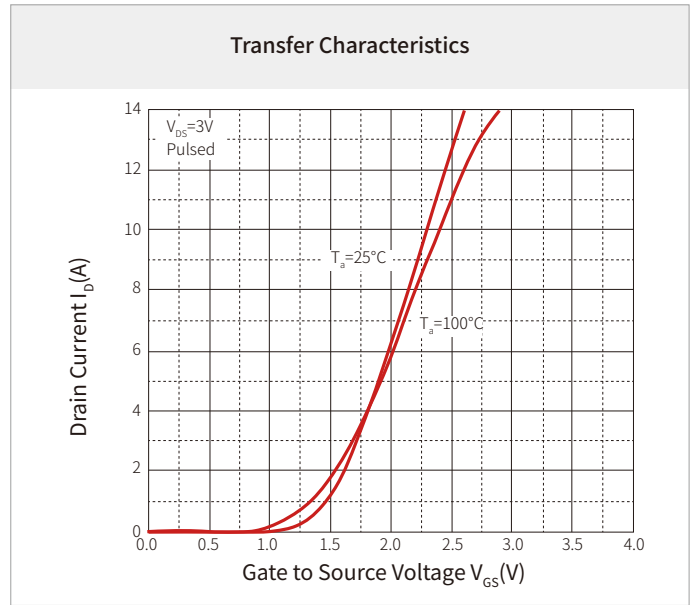
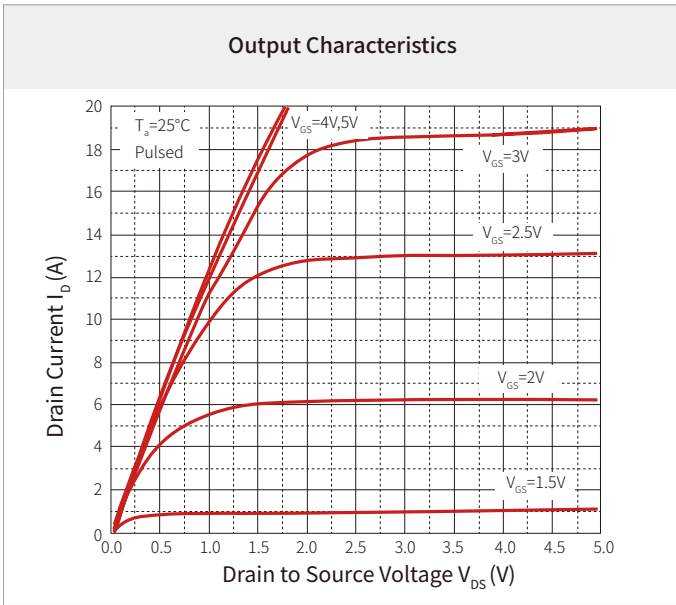
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =10μA	20			V
Gate-source leakage <sup>a</sup>	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V			±100	nA
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	μA
Gate-source threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =50μA	0.65	0.95	1.2	V
Drain-source on-state resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.6A		0.059	0.068	Ω
		V <sub>GS</sub> =2.5V, I <sub>C</sub> =3.1A		0.070	0.115	Ω
Forward tranconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =3.6A		8		S
Diode forward voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> =0.94A, V <sub>GS</sub> =0V		0.76	1.2	V
<b>Dynamic Characteristics<sup>b</sup></b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		300		pF
Output capacitance	C <sub>oss</sub>			120		pF
Reverse transfer capacitance	C <sub>rss</sub>			80		pF
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.6A		4.0	10	nC
Gate-source charge	Q <sub>gS</sub>			0.65		nC
Gate-drain charge	Q <sub>gD</sub>			1.5		nC
<b>Switching<sup>b</sup></b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, R <sub>L</sub> =5.5Ω, I <sub>D</sub> ≈3.6A, V <sub>GEN</sub> =4.5V, R <sub>g</sub> =6Ω		7	15	ns
Rise Time	t <sub>r</sub>			55	80	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			16	60	ns
Fall yime	t <sub>f</sub>			10	25	ns

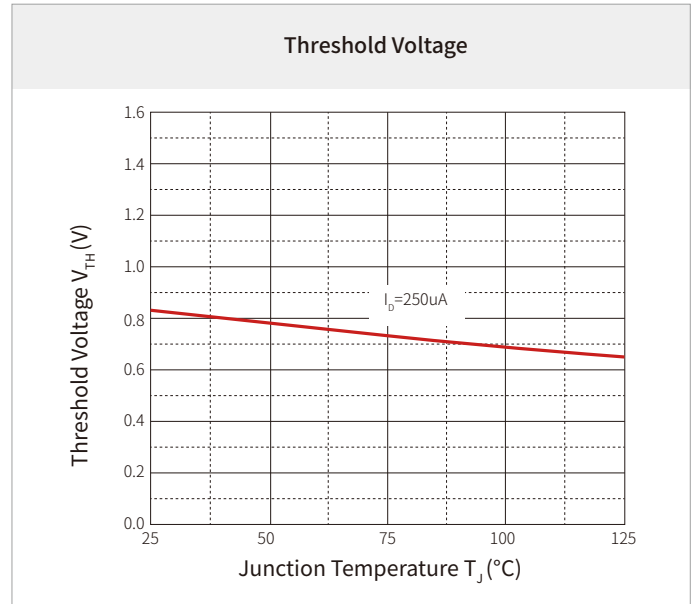
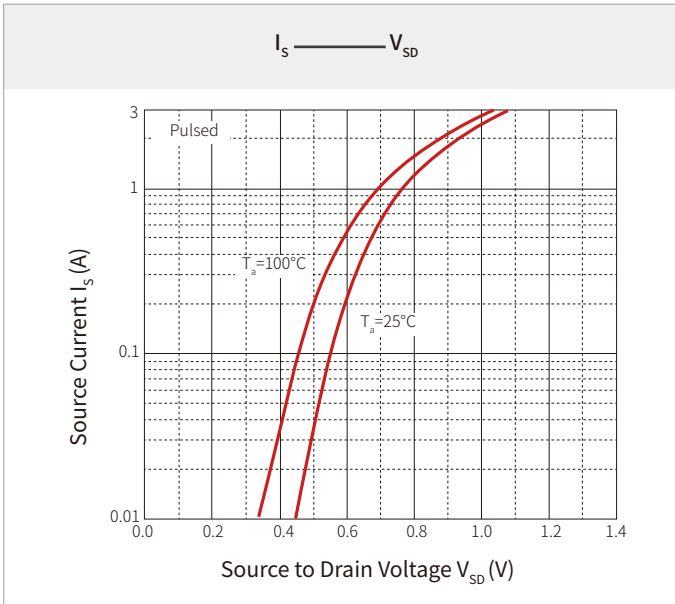
Notes:

a. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

b. These parameters have no way to verify.

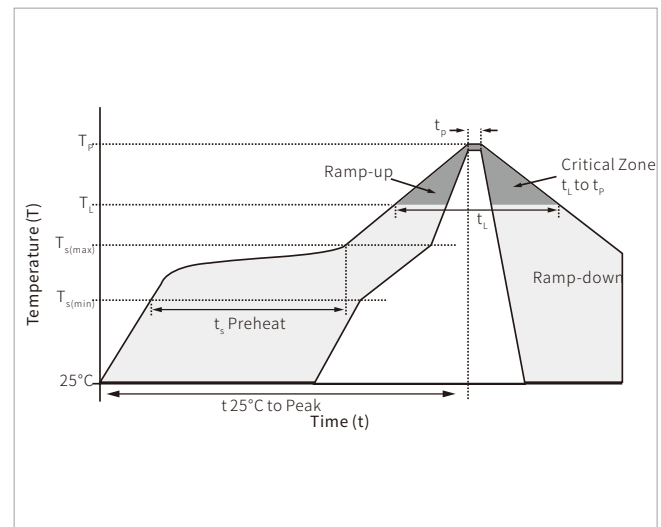
# CHARACTERISTIC CURVES



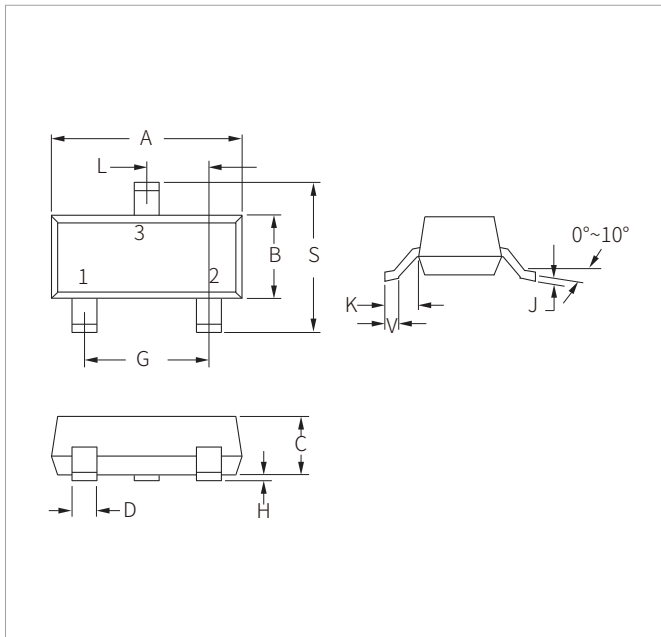


## SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ( $T_{s(\min)}$ )	150 $^\circ\text{C}$
	Temperature Max ( $T_{s(\max)}$ )	200 $^\circ\text{C}$
	Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3 $^\circ\text{C}/\text{second}$ max
$T_{s(\max)}$ to $T_L$ - Ramp-up Rate		3 $^\circ\text{C}/\text{second}$ max
Reflow	Temperature ( $T_L$ ) (Liquidus)	217 $^\circ\text{C}$
	Time (min to max) ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 $^\circ\text{C}$
Time within 5 $^\circ\text{C}$ of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		6 $^\circ\text{C}/\text{second}$ max
Time 25 $^\circ\text{C}$ to peak Temperature ( $T_p$ )		8 minutes max.
Do not exceed		260 $^\circ\text{C}$

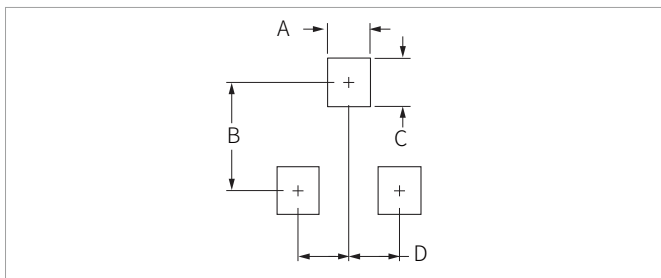


## SOT-323 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.00	2.20	0.079	0.087
B	1.15	1.35	0.045	0.053
C	0.80	1.10	0.031	0.043
D	0.20	0.40	0.008	0.016
G	1.20	1.40	0.047	0.055
H	0.00	0.10	0.000	0.004
J	0.08	0.15	0.003	0.006
K	0.525REF		0.021REF	
L	0.650TYP		0.026TYP	
S	2.15	2.45	0.085	0.096
V	0.26	0.46	0.010	0.018

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters	Inches
	NOR	NOR
A	0.50	0.020
B	2.20	0.087
C	0.80	0.031
D	1.30	0.051

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SNM2102	SOT-323	3000PCS	7"

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