

## 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

## APPLICATION

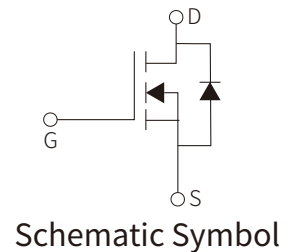
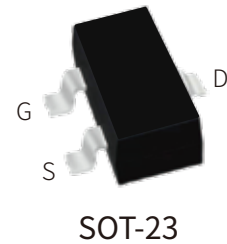
- | Direct logic-level interface: TTL/CMOS
- | Drivers: relays, solenoids, lamps
- | hammers, display, memories, etc.
- | Battery operated systems
- | Solid-state relays

## 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	$V_{DS}$	20	V
Continuous Drain Current	$I_D$	4.0	A
Continuous Source-Drain Current(Diode Conduction)	$I_S$	0.6	A
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Power Dissipation	$P_D$	0.35	W
Thermal Resistance From Junction to Ambient( $t \leq 5s$ )	$R_{\theta JA}$	357	$^{\circ}\text{C}/\text{W}$
Operating Junction	$T_J$	150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-55~+150	$^{\circ}\text{C}$



## ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}\text{C}$ )

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-source Breakdown Voltage	$BV_{(BR)DSS}$	$V_{GS}=0V, I_D=10\mu A$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=50\mu A$	0.55	0.70	1.2	V
Drain-Source On-State Resistance <sup>(Note 1)</sup>	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3.6A$		0.030	0.040	$\Omega$
		$V_{GS}=2.5V, I_D=3.1A$		0.036	0.050	
Forward Transconductance <sup>(Note 1)</sup>	$g_{FS}$	$V_{DS}=5V, I_D=3.6A$		8		S
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=0.94A$		0.76	1.2	V
<b>Dynamic</b>						
Input Capacitance <sup>(Note 2)</sup>	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, F=1.0MHz$		300		pF
Output Capacitance <sup>(Note 2)</sup>	$C_{oss}$			120		
Reverse Transfer Capacitance <sup>(Note 2)</sup>	$C_{rss}$			80		
Total Gate Charge	$Q_g$	$V_{DS}=10V, V_{GS}=4.5V, I_D=3.6A$		4.0	10	nC
Gate- Source Charge	$Q_{gs}$			0.65		
Gate- Drain Charge	$Q_{gd}$			1.5		
<b>Switching<sup>(Note 2)</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=10V$ $R_L=5.5\Omega, I_D\approx 3.6A,$ $V_{GEN}=4.5V, R_G=6\Omega$		7	15	nS
Turn-On Rise Time	$t_r$			55	80	
Turn-Off Delay Time	$t_{d(off)}$			16	60	
Turn-Off Fall Time	$t_f$			10	25	

**Notes:**

- 1.Pulse Test:Pulse Width $\leq 300\mu s$ ,Duty Cycle $\leq 2\%$ .
- 2.These Parameters have no way to verify.

# PARAMETER CHARACTERISTIC CURVE

Figure 1: Output Characteristics

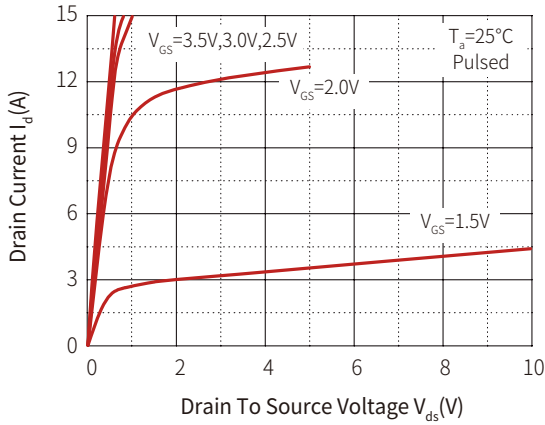


Figure 2: Transfer Characteristics

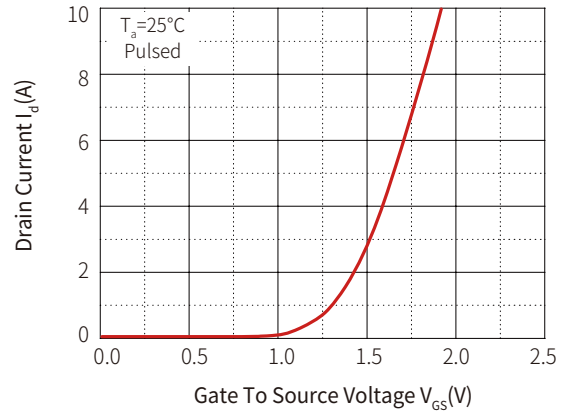


Figure 3:  $R_{DS(ON)}$  —  $I_D$

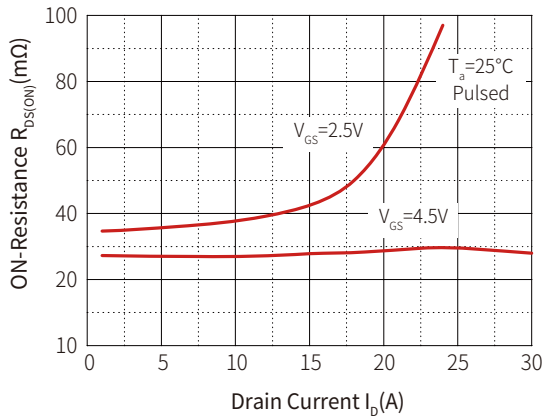
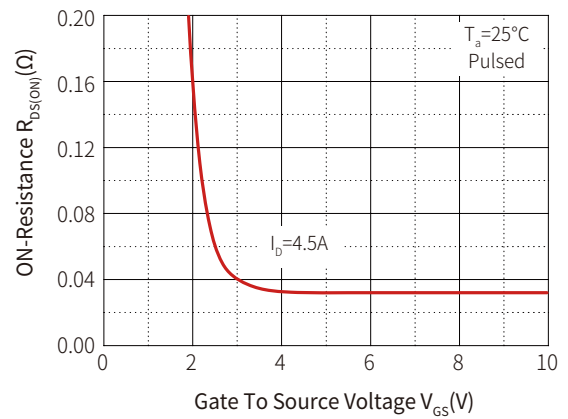
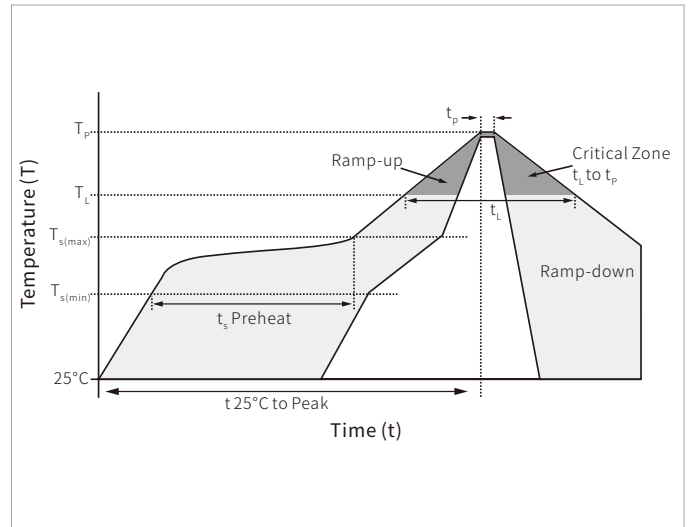


Figure 4:  $R_{DS(ON)}$  —  $V_{GS}$

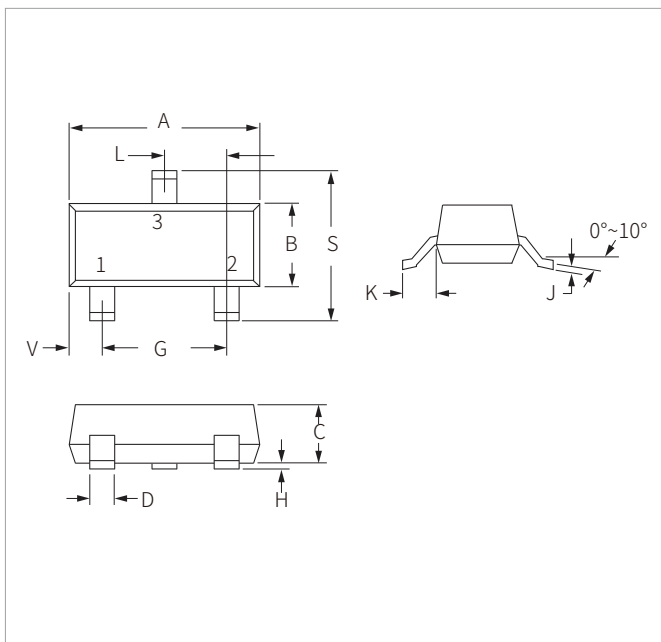


## SOLDERING PARAMETERS

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

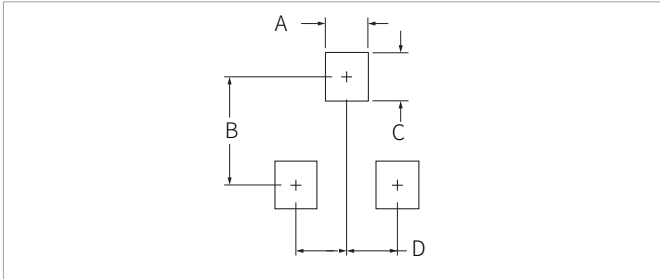


## SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.05	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.90	1.15	0.035	0.045
D	0.37	0.50	0.015	0.020
G	1.75	2.05	0.069	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.65	0.083	0.104
V	0.45	0.60	0.018	0.024

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SNM23T2N02	SOT-23	3000PCS	7"

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