

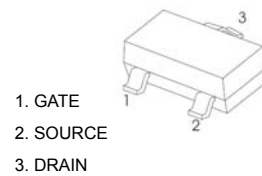
## FEATURES

- High density cell design for low  $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability

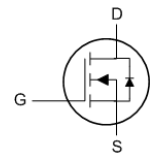
$V_{DSS}$  30 V  
 $I_D$  4.0 A  
 $R_{DS(ON)}$  36 m  $\Omega$

A29T

### SOT-23



### Equivalent Circuit



## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Maximum ratings ( $T_a=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	4	A
Pulsed Drain Current (note 1)	$I_{DM}$	15	A
Power Dissipation	$P_D$	1.2	W
Thermal Resistance from Junction to Ambient (note 2)	$R_{\theta JA}$	103	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~+150	$^\circ\text{C}$

**$T_a=25\text{ }^\circ\text{C}$  unless otherwise specified**

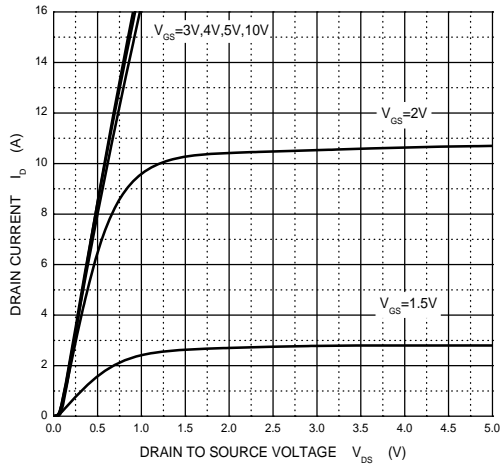
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>STATIC CHARACTERISTICS</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 24V, V_{GS} = 0V$			1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$			100	nA
Gate threshold voltage (note 3)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.6		1.4	V
Drain-source on-resistance (note 3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4A$		36	55	m $\Omega$
		$V_{GS} = 4.5V, I_D = 3A$			70	m $\Omega$
		$V_{GS} = 2.5V, I_D = 2A$			110	m $\Omega$
Forward transconductance (note 3)	$g_{FS}$	$V_{DS} = 15V, I_D = 4A$		8		S
Diode forward voltage (note 3)	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$			1	V
<b>DYNAMIC CHARACTERISTICS (note 4)</b>						
Input capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$		390		pF
Output capacitance	$C_{oss}$			54.5		pF
Reverse transfer capacitance	$C_{rss}$			41		Pf
Gate resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		3		$\Omega$
<b>SWITCHING CHARACTERISTICS (note 4)</b>						
Turn-on delay time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 15V,$ $R_L = 3.75\Omega, R_{GEN} = 6\Omega$		3.3		ns
Turn-on rise time	$t_r$			1		ns
Turn-off delay time	$t_{d(off)}$			21.7		ns
Turn-off fall time	$t_f$			2.1		ns
Total gate charge	$Q_g$	$V_{DS} = 15V, V_{GS} = 4.5V, I_D = 4A$		4.34		nC
Gate-source Charge	$Q_{gs}$			0.6		nC
Gate-drain Charge	$Q_{gd}$			1.38		nC
Body diode reverse recovery time	$t_r$	$I_F = 4A, dI/dt = 100A/\mu s$		1.2		ns
Body diode reverse recovery charge	$Q_{rr}$			6.3		nC

**Notes :**

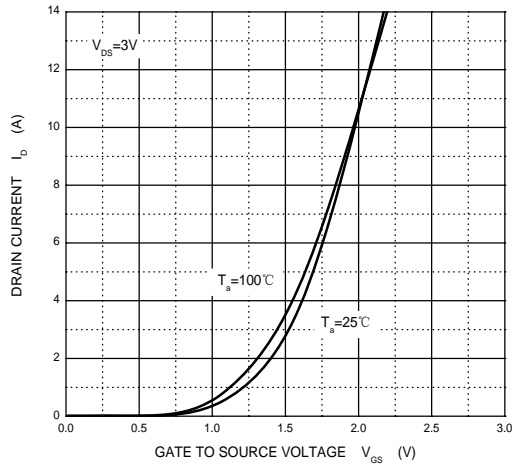
1. Repetitive rating : Pulse width limited by junction temperature.
2. Surface mounted on FR4 board ,  $t_s \leq 10s$ .
3. Pulse Test : Pulse Width  $\leq 80\mu s$ , Duty Cycle  $\leq 0.5\%$ .
4. Guaranteed by design, not subject to producing.

RATING AND CHARACTERISTIC CURVES

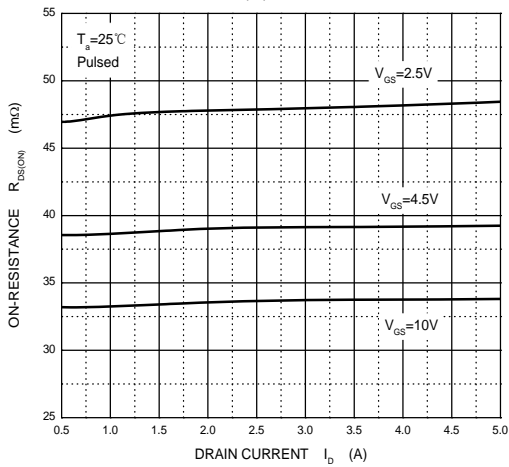
Output Characteristics



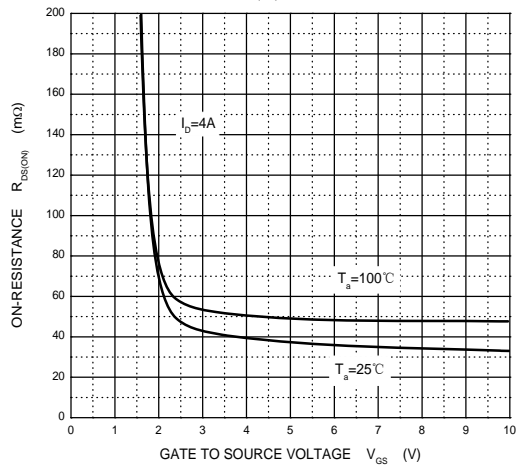
Transfer Characteristics



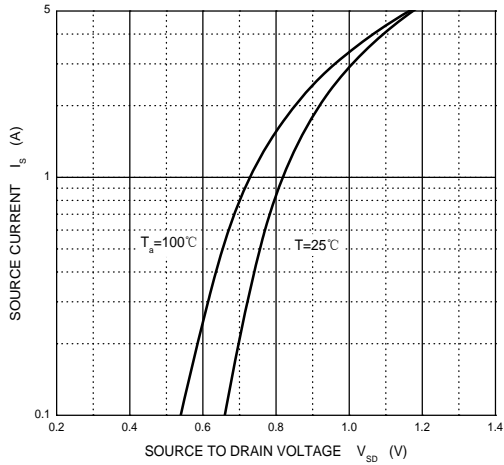
$R_{DS(ON)}$  —  $I_D$



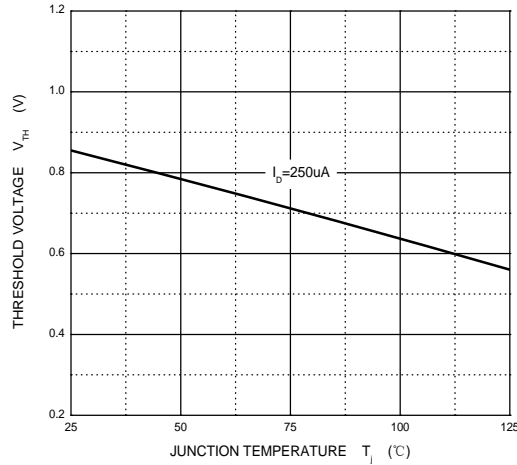
$R_{DS(ON)}$  —  $V_{GS}$



$I_S$  —  $V_{SD}$

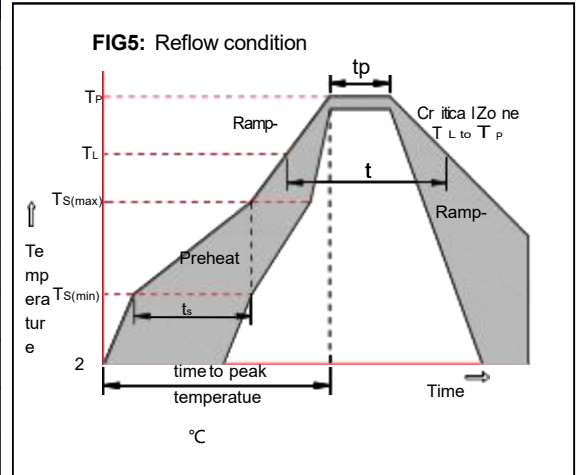


Threshold Voltage



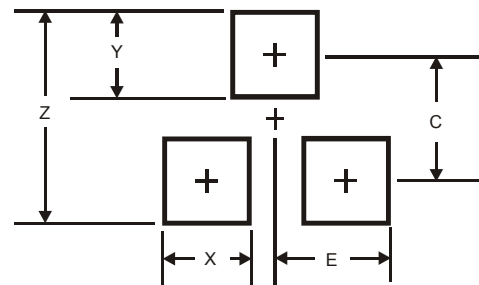
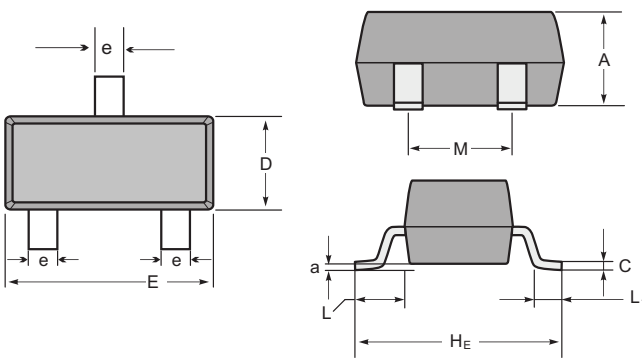
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ )(Liquid us)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_P$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_P$ )		8 min. Max
Do not exceed		+260°C



Package Dimensions & Suggested Pad Layout

SOT23



SOT-23 mechanical data

UNIT	A	C	D	E	HE	e	M	L	L1	a	
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Dimensions	SOT23
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

Tape & reel specification

Tape		Symbol	Dimension (mm)		
<p>SECTION : A-A</p> <p>SECTION : B-B</p>		P0	4.00±0.10		
		P1	4.00±0.10		
		P2	2.00±0.10		
		D0	1.55±0.10		
		D1	1.05±0.10		
		E	1.55±0.10		
		F	3.60±0.10		
		W	8.00±0.10		
		A0	3.80±0.20		
		B0	3.25±0.20		
		K0	1.45±0.10		
		T	0.25±0.05		
		7" Reel		D2	178.0±3.0
				D3	55Min.
D4	R24.0±3.0				
G	R82.0±3.0				
I	13.0±2.0				
W1	11.0±3.0				
Quantity: 3000PCS					