

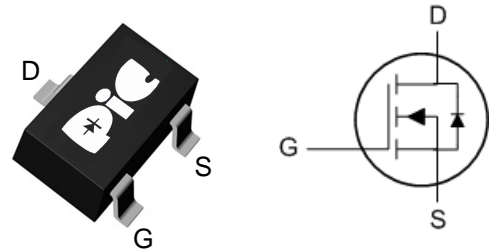
➤ General Description

This PAN6018NS N-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent $R_{ds(On)}$ performance and efficiency for power switching and load switching application., this device also comply with the RoHS and Green Product requirement with full function reliability approved.

➤ Feature

- Super Low Gate Charge
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology
- SOT-23S package design

➤ SOT-23S



➤ Application

- Load Switch
- Portable instrument
- MB / NB / 3C device

➤ Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, V_{GS} @ 10V ¹	$I_D@T_A=25^\circ C$	2.3	A
Continuous Drain Current, V_{GS} @ 10V ¹	$I_D@T_A=70^\circ C$	1.8	A
Pulsed Drain Current ²	I_{DM}	9.2	A
Total Power Dissipation ³	$P_D@T_A=25^\circ C$	1	W
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ C$
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	125	$^\circ C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	80	$^\circ C/W$

➤ Electrical Characteristics ($T_J=25^\circ C$ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$, $I_D=250\mu A$	60	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ C$, $I_D=1mA$	---	0.054	---	$V/^\circ C$
Static Drain-Source On-Resistance ²	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=2A$	---	80	100	m Ω
		$V_{GS}=4.5V$, $I_D=1A$	---	85	110	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	---	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-4.96	---	mV/ $^\circ C$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=48V$, $V_{GS}=0V$, $T_J=25^\circ C$	---	---	1	uA
		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=55^\circ C$	---	---	5	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
Forward Transconductance	g_{fs}	$V_{DS}=5V$, $I_D=2A$	---	13	---	S
Total Gate Charge (4.5V)	Q_g	$V_{DS}=48V$, $V_{GS}=4.5V$, $I_D=2A$	---	5	7.0	nC
Gate-Source Charge	Q_{gs}		---	1.68	2.4	
Gate-Drain Charge	Q_{gd}		---	1.9	2.7	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=30V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=2A$	---	1.6	3.2	ns
Rise Time	T_r		---	7.2	13	
Turn-Off Delay Time	$T_{d(off)}$		---	25	50	
Fall Time	T_f		---	14.4	28.8	
Input Capacitance	C_{iss}	$V_{DS}=15V$, $V_{GS}=0V$, $f=1MHz$	---	511	715	pF
Output Capacitance	C_{oss}		---	38	53	
Reverse Transfer Capacitance	C_{rss}		---	25	35	

➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current ^{1,4}	I_S	$V_G=V_D=0V$, Force Current	---	---	2.3	A
Pulsed Source Current ^{2,4}	I_{SM}		---	---	9.2	A
Diode Forward Voltage ²	V_{SD}	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ C$	---	---	1.2	V
Reverse Recovery Time	t_{rr}	$I_F=2A$, $dI/dt=100A/\mu s$, $T_J=25^\circ C$	---	9.7	---	nS
Reverse Recovery Charge	Q_{rr}		---	5.8	---	nC

Note :

1. Pulse width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Ensure that the channel temperature does not exceed $150^\circ C$.
4. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

➤ Typical Characteristics

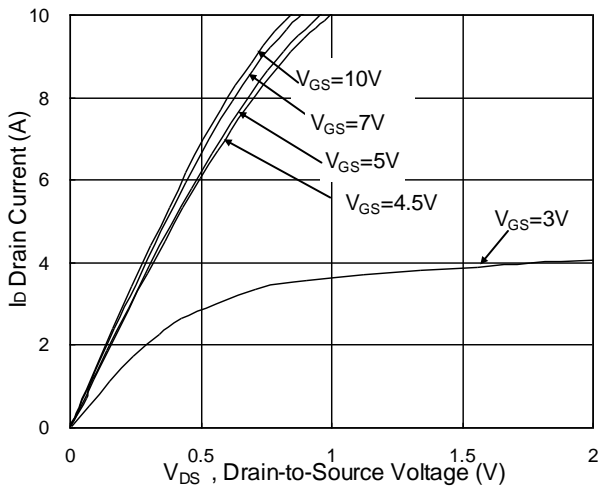


Fig.1 Typical Output Characteristics

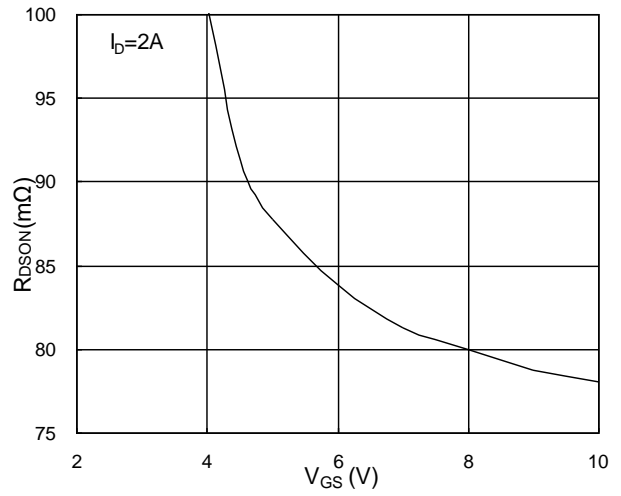


Fig.2 On-Resistance v.s Gate-Source

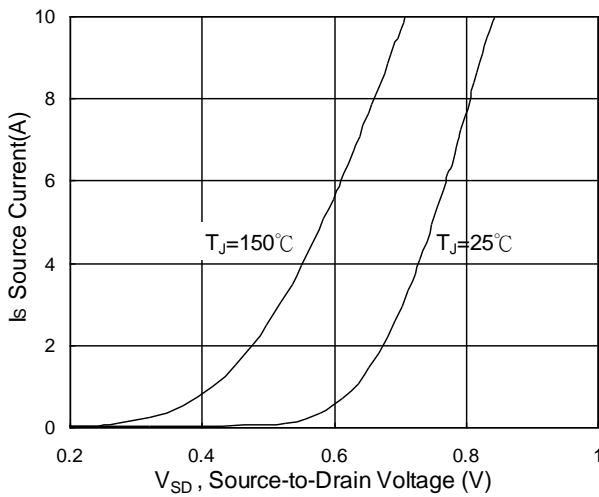


Fig.3 Forward Characteristics of Reverse

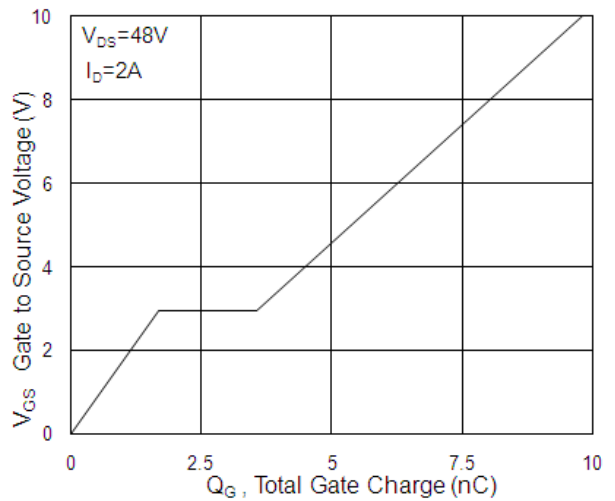


Fig.4 Gate-Charge Characteristics

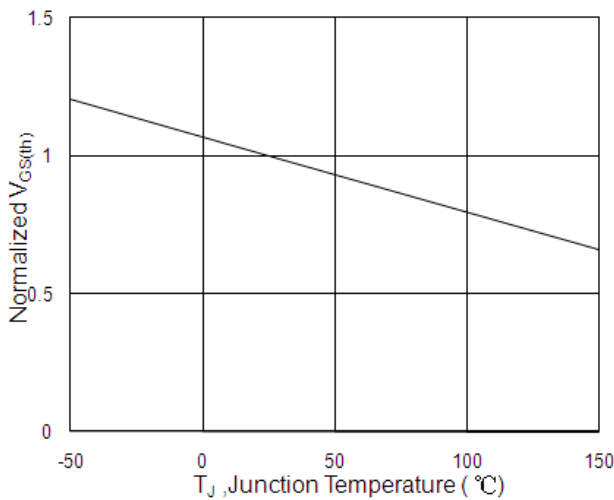


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

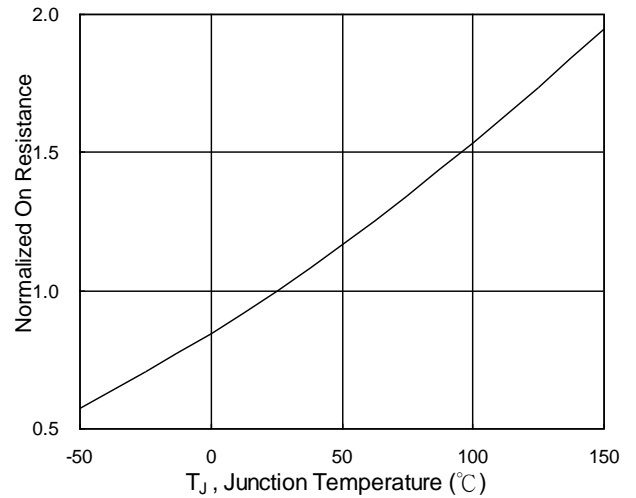


Fig.6 Normalized $R_{DS(ON)}$ v.s T_J

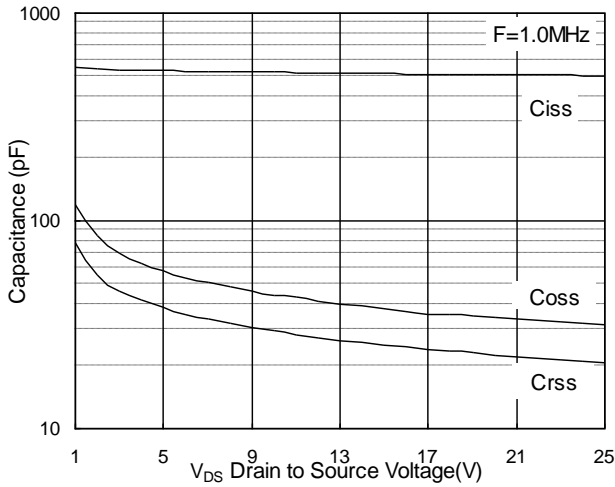


Fig.7 Capacitance

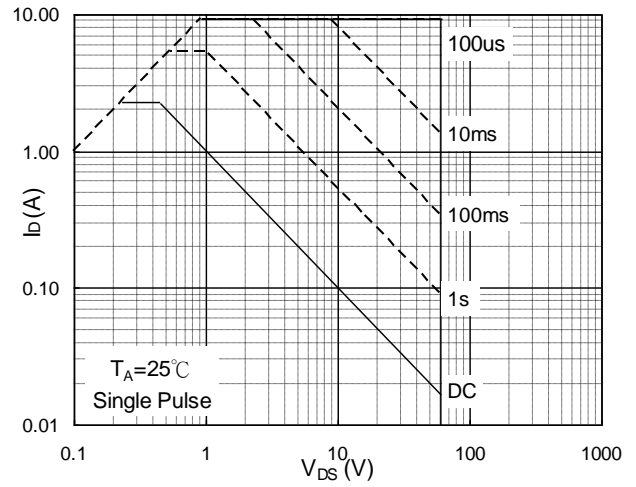


Fig.8 Safe Operating Area

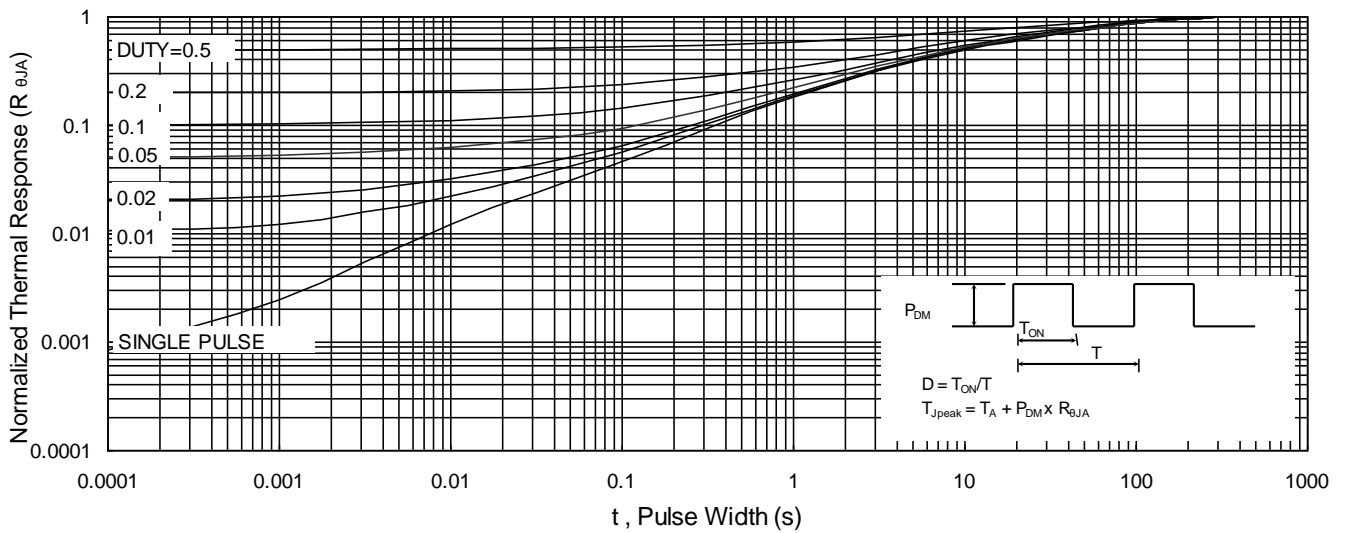


Fig.9 Normalized Maximum Transient Thermal Impedance

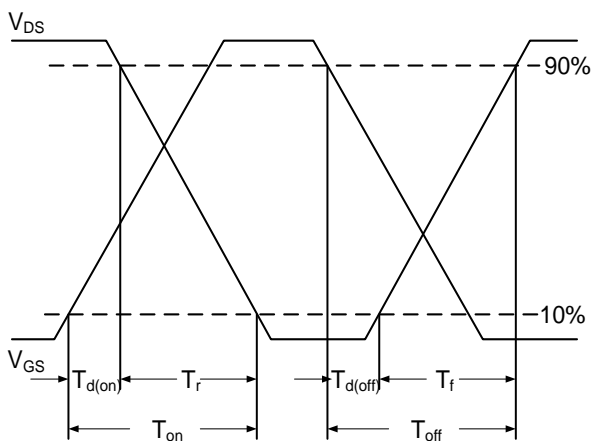


Fig.10 Switching Time Waveform

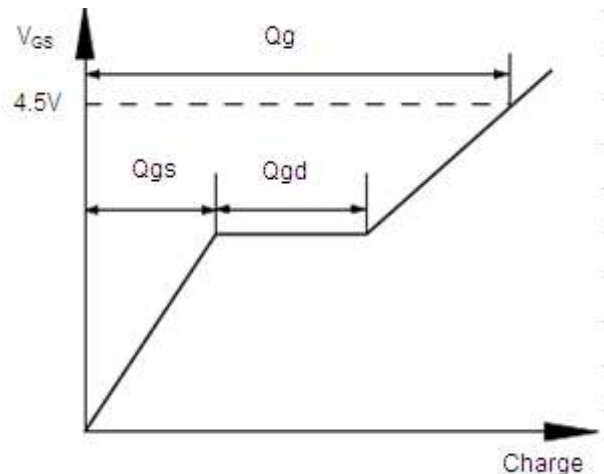
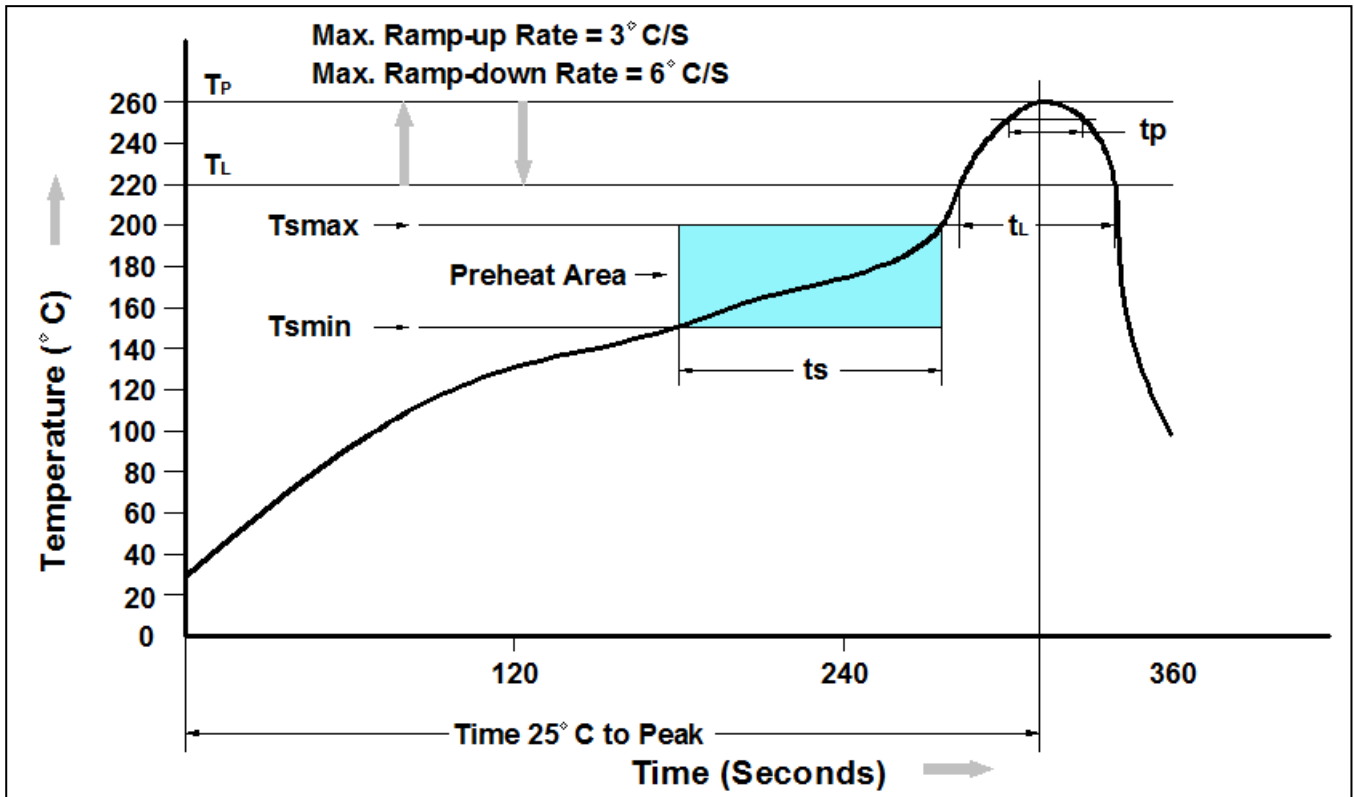


Fig.11 Gate Charge Waveform

➤ Recommand IR Reflow Soldering Thermal Profile

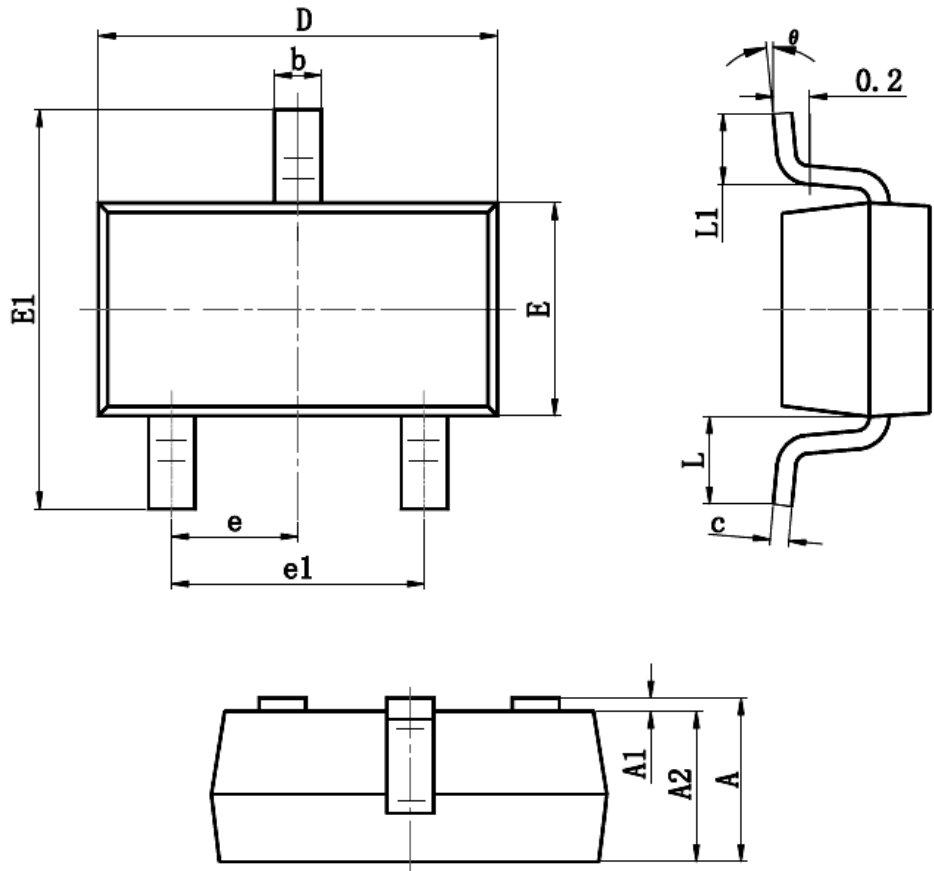


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T Amin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (T Amin to Tsmax)	60-120 seconds
Average Ramp-up Rate (tL to tP)	3°C/second max.
Liquidous Temperature (TL)	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (tP) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

➤ Ordering Information

Part Number	Description	Quantity
PAN6018NS	SOT-23S Reel	3000 pcs

➤ Package Information (SOT-23S)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
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	0°	8°	0°	6°

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