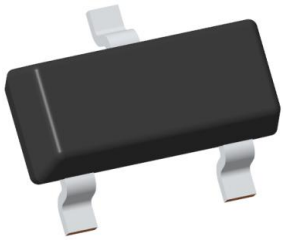
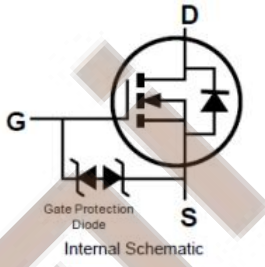
General Description

V_R	$R_{DSON\ MAX}$	I_D Max.
50V	3.5Ω@10V	0.31A
	6Ω@4.5V	





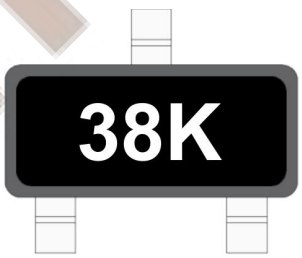
Internal Schematic

Features

- Low On-Resistance
- Low Input Capacitance.
- Fast Switching Speed.

Mechanical Data

- SOT-23 Small Outline Plastic Package.
- Epoxy UL: 94V-0.
- Mounting Position: Any.



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
BSS138K	SOT-23	38K	3000

Absolute Maximum Ratings (Ta=25℃ unless otherwise noted)

Parameter	Symbols	Value	Units
Drain-Source Voltage	VDS	50	V
Gate-Source Voltage	VGS	±20	V
Continuous Drain Current	ID	0.31	A
Maximum Continuous Body Diode Forward Current	IS	0.50	A
Pulsed Drain Current(10us Pulse, Duty Cycle=1%)	IDM	0.80	A
Power Dissipation	PD	350	mW
Junction Temperature	Tj	150	℃
Storage Temperature	Tstg	-50-+150	℃
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	357	℃/W

Electrical Characteristics (Ta=25℃,unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V(BR)DSS	VGS=0V, ID=250uA	50			V
Gate-Threshold voltage(note1)	VGS (th)	VDS=VGS, ID=1mA	0.5		1.5	V
Gate-body Leakage	IGSS	VDS=0V, VGS=±20V			±10	uA
Zero Gate Voltage Drain current	IDSS	VDS=50V, VGS=0V			1.0	uA
Drain-Source On-Resistance (note1)	RDS(ON)	VGS=10V, ID=0.22A		1.5	3.5	Ω
		VGS=4.5V, IC=0.22A		1.63	6	
Forward trans conductance (note1)	gfs	VDS=10V, ID=0.22A	0.12			S
Diode forward voltage(note1)	VSD	IS=0.22A, VGS=0V			1.2	V
Dynamic(note2)						
Input capacitance	Ciss	VDS=25V, VGS=0V,f=1MHz		27		pF
Output capacitance	Coss			13		
Reverse Transfer capacitance	Crss			6		
Turn-on Time	td(on)	VDD=30V, RGEN=6Ω, VDS=10V, ID≈0.29A,			5	ns
Rise time	tr				18	
Turn-off Time	td(off)				36	
Fall time	tf				14	
Reverse Recovery Time	tRR			8.8		ns
Reverse Recovery Charge	QRR			2.6		nC
Total Gate Charge(VGS=4.5V)	Qg	VDS=25V, ID=0.2A,		0.45		nC
Total Gate Charge(VGS=10V)	Qg			0.95		
Gate-Source Charge	Qgs			0.10		
Gate-Drain Charge	Qgd			0.14		
Gate Resistance	Rg			69		Ω

Notes:

1. Pulse Test: Pulse Width ≤300us, Duty Cycle≤2%.

2. These parameters have no way to verify.

Typical Characteristics

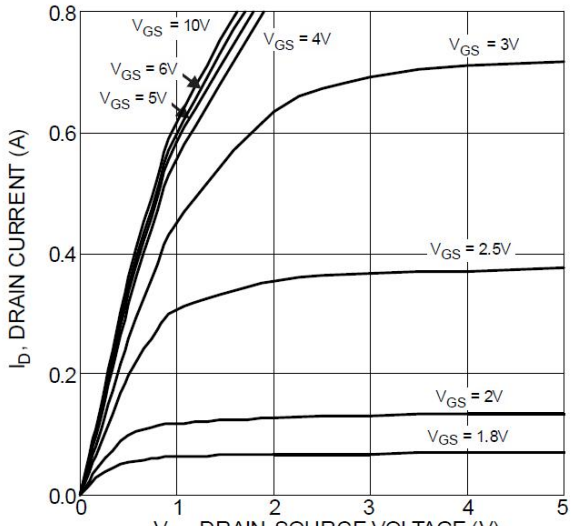


Figure 1 Typical Output Characteristic

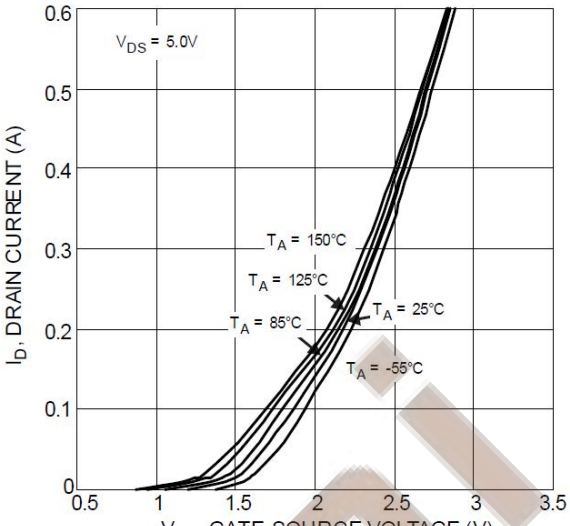


Figure 2 Typical Transfer Characteristics

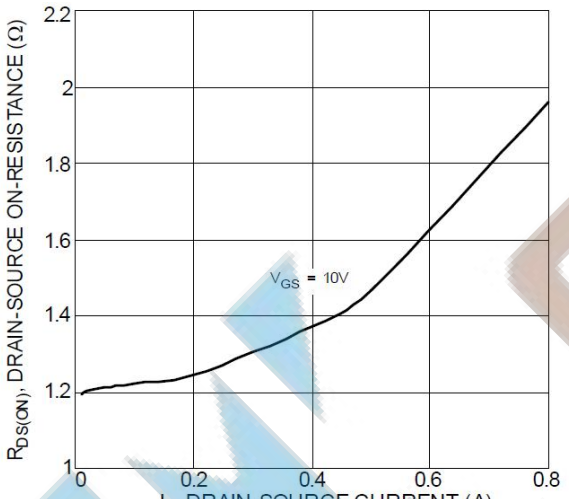


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

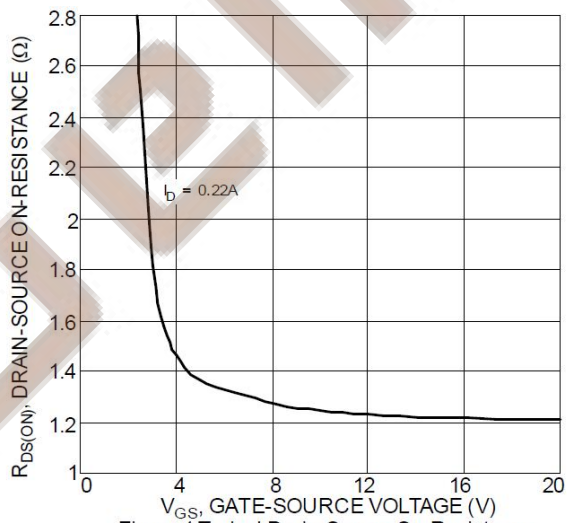


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

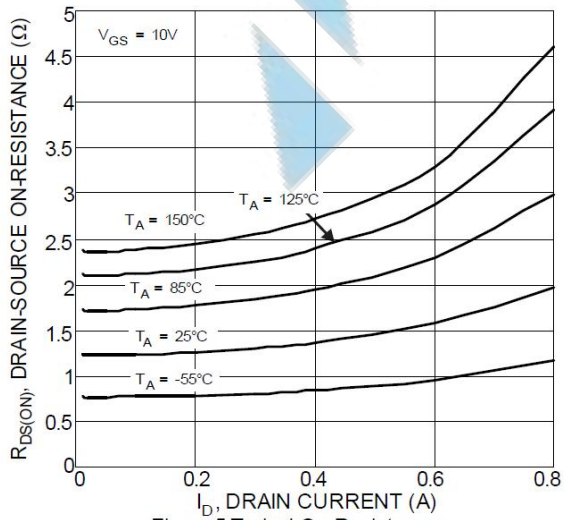


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

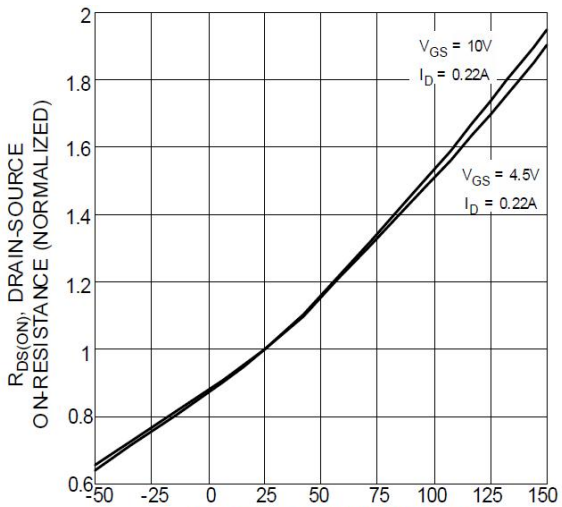


Figure 6 On-Resistance Variation with Temperature

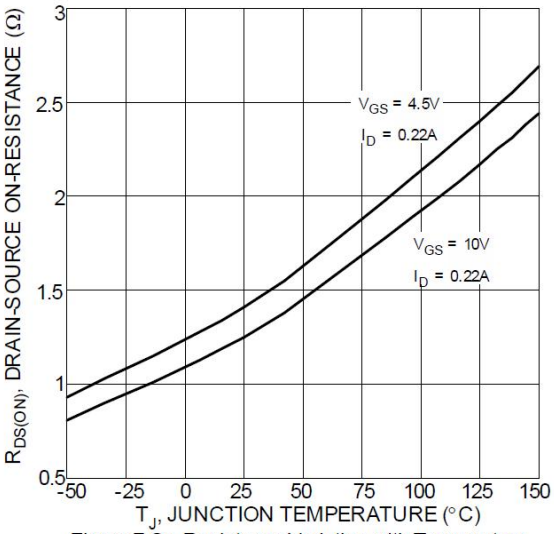


Figure 7 On-Resistance Variation with Temperature

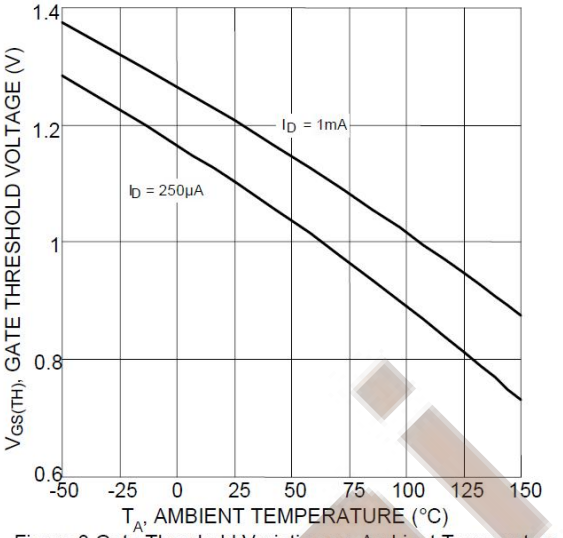


Figure 8 Gate Threshold Variation vs. Ambient Temperature

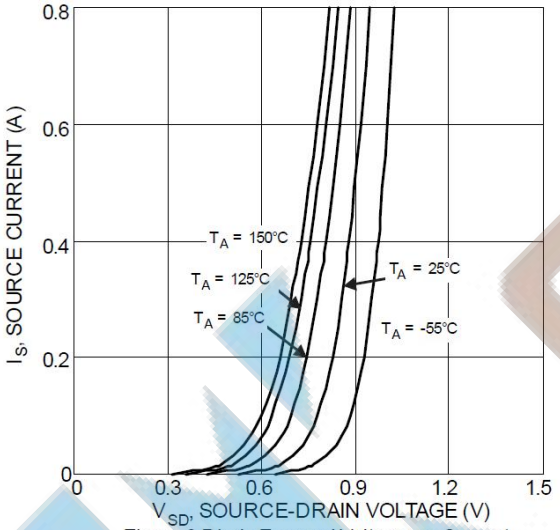


Figure 9 Diode Forward Voltage vs. Current

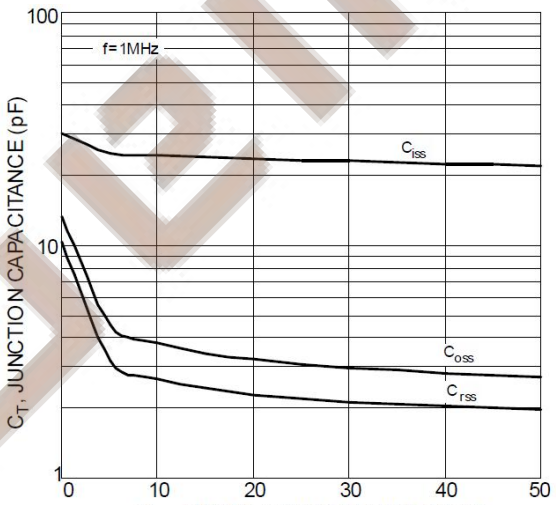


Figure 10 Typical Junction Capacitance

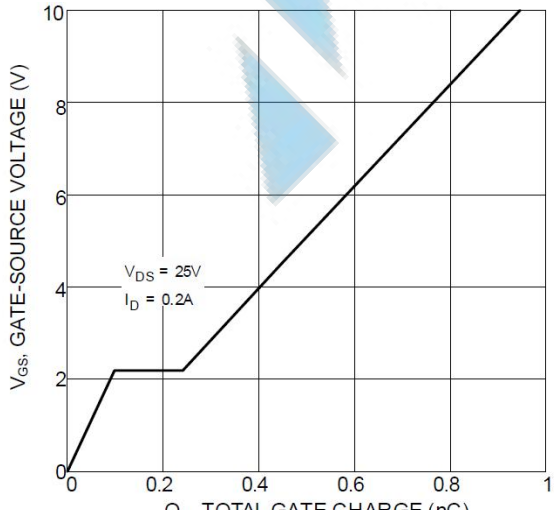


Figure 11 Gate Charge

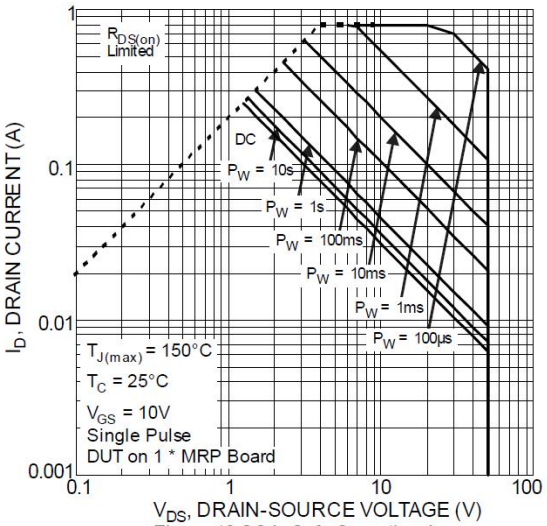


Figure 12 SOA, Safe Operation Area

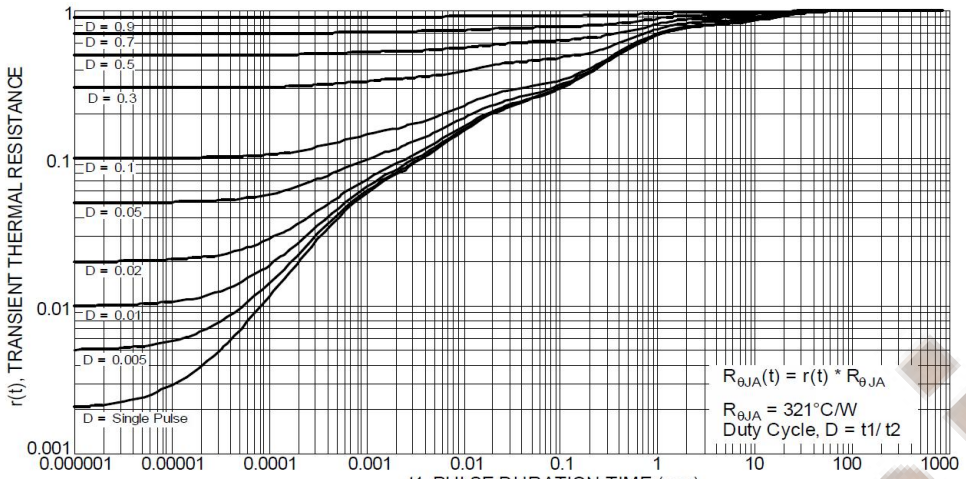
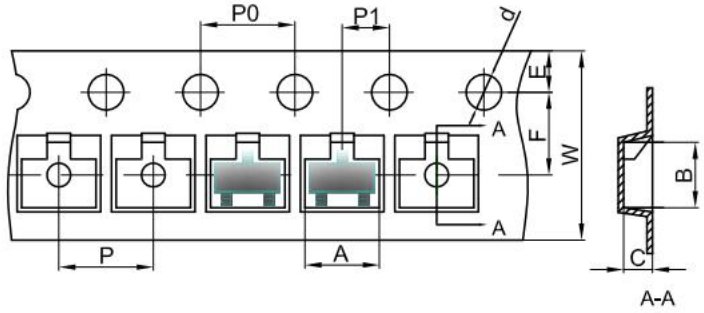


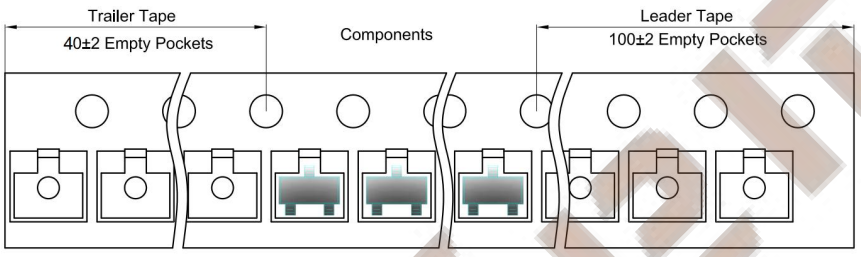
Figure 13 Transient Thermal Resistance

Package Information

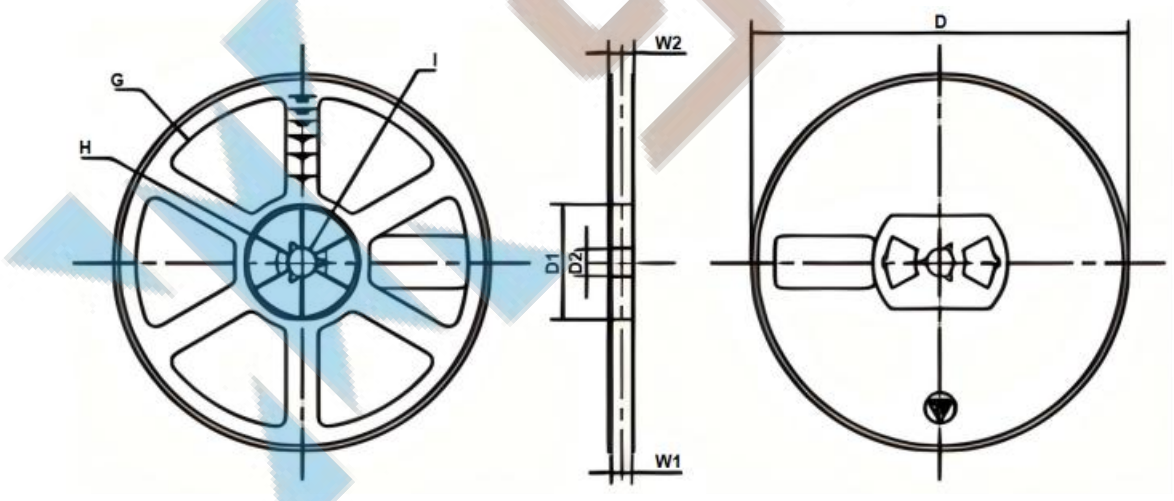
Carrier Dimension(mm)



Dimensions are in millimeter											
Pkg Type	A	B	C	d	E	F	P0	P	P1	10*P0	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	40.00	8.00
(Tolerance)	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.1



Reel Dimension(mm)



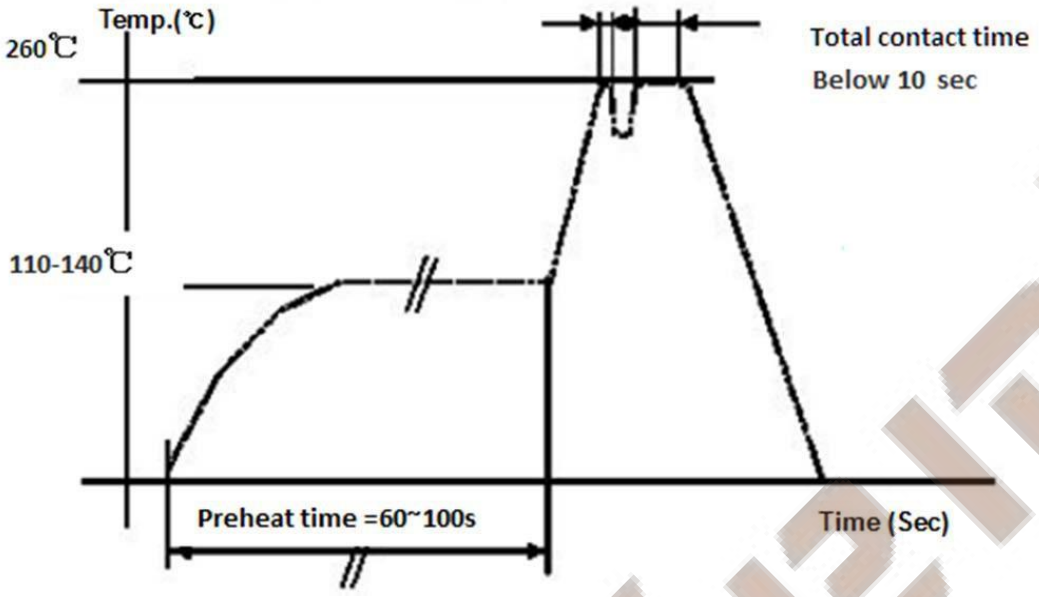
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Φ178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30
Tolerance	±2	±1	±1	±1	±1	±1	±1	±1

Package Specifications

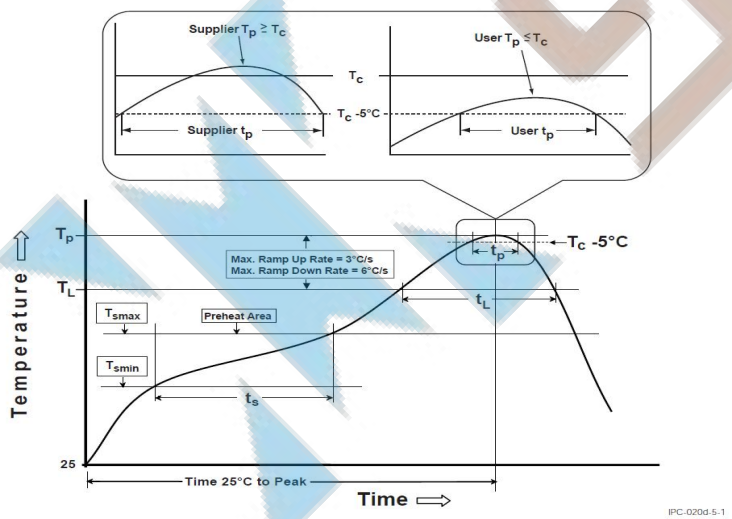
Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (Kpcs)	Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
SOT23	7'	178	3	210*208*203	45	440*400*230	180

Recommended Soldering Profile for Rectifier Diodes (Pb Free)

a) Wave Soldering Profile



b) Reflow Soldering Profile (Pb Free Application), refer to IPC/JEDEC J-STD-020

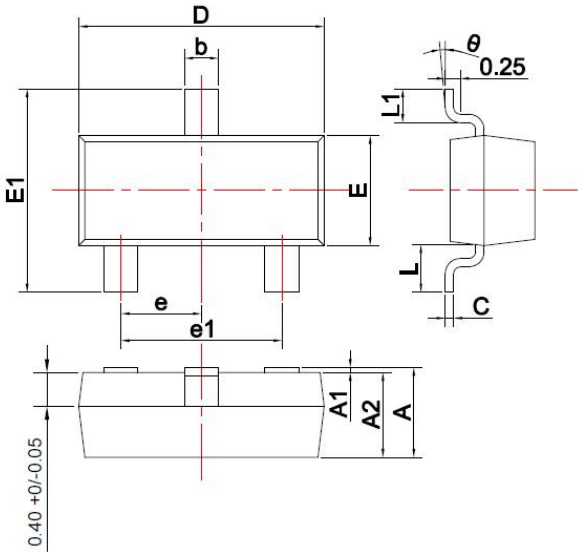


Preheat/Soak Temperature Min (Tsmin) Temperature Max (Tsmax) Time (ts) from (Tsmin to Tsmax)	50 °C 200 °C 60-120 seconds
Melting Point of Solder (Sn Ag Cu)	217℃
Ramp-up Rate to 217℃(Melting Point of Solder)	3℃/sec
Time at Temp.>217℃ (Melting Point of Solder)	60~150 Sec
Peak Temperature	255±5℃
Time within 5℃below Peak Temp.	20~40 Sec
Cooling Rate	6℃/sec (max)
Time from 25℃ to Peak Temp.	8min (max)

c) Manual Soldering

When using an electric soldering iron for manual soldering, it is recommended that the temperature does not exceed 300°C and the soldering time is less than 10 seconds.

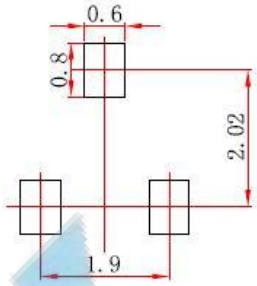
Package Mechanical Data



SYMBOL	DIMENSIONS	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Unit: mm

Suggested Pad Layout



Note:
1.Controlling dimension:In millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

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