

FMOSBSS138KW

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FMOSBSS138KW

**400mA, 60V N-Channel Enhancement
Mode MOSFET**

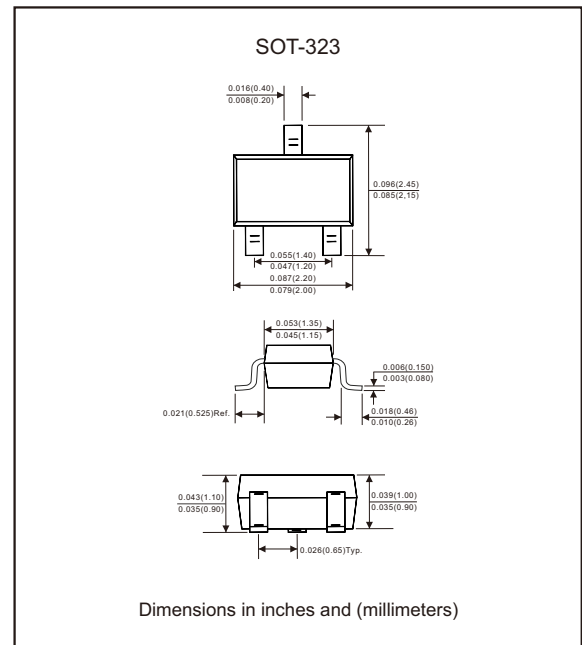
Features

- Low input capacitance : 38pF (Typ).
- Low output capacitance : 5pF (Typ).
- Low gate threshold voltage : 1.4V max.
- Lead free parts meet RoHS requirements
- Suffix "-H" for Halogen-free part, ex. FMOSBSS138KW-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-323
- Terminals : Solder plated, solderable per
MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

Package outline



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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_c=25^{\circ}\text{C}$)	I_D	400	mA
Continuous drain current ($T_c=100^{\circ}\text{C}$)		280	
Drain current pulse (Note 3)	I_{DM}	1	A
Power dissipation ($T_c=25^{\circ}\text{C}$)	P_D	0.35	W
Power dissipation ($T_c=100^{\circ}\text{C}$)		0.14	
Operating Junction temperature range	T_J	+150	
Storage temperature range	T_{STG}	-40 to +150	
Thermal resistance junction to ambient	$R_{\theta JA}$	350	/W

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Electrical characteristics (At $T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=100\mu A$, $V_{GS}=0V$	60			V
Drain-source leakage current	I_{DSS}	$V_{DS}=48V$, $V_{GS}=0V$			1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 16V$, $V_{DS}=0V$			± 30	μA
On characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=100\mu A$	0.6	1.0	1.4	V
On-state drain current (Note 1)	$I_{D(ON)}$	$V_{DS}=10V$, $V_{GS}=10V$	1			A
Static drain-source on-resistance (Note 1)	$R_{DS(ON)}$	$V_{GS}=3.5V$, $I_D=10mA$		3.5	5.0	Ω
		$V_{GS}=4.5V$, $I_D=100mA$		2.5	3.5	
		$V_{GS}=10V$, $I_D=200mA$		2.0	2.5	
Forward transconductance (Note 1)	g_{FS}	$V_{GS}=20V$, $I_D=200mA$		0.18		S
Dynamic parameters						
Input capacitance	C_{iss}	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0MHz$		38		pF
Out capacitance	C_{oss}			5		
Reverse transfer capacitance	C_{rss}			2		
Input capacitance	Q_g	$V_{GS}=10V$, $V_{DS}=0.5V_{(BR)DSS}$, $I_D=200mA$		1.9		nC
Out capacitance	Q_{gs}			0.4		
Reverse transfer capacitance	Q_{gd}			1		
Drain-source diode characteristics and maximum ratings						
Continuous source current	I_S	$V_{GS}=V_{DS}=0V$, Force current			300	mA
Drain-source diode forward voltage	V_{SD}	$V_{GS}=0V$, $I_S=200mA$			1.2	V

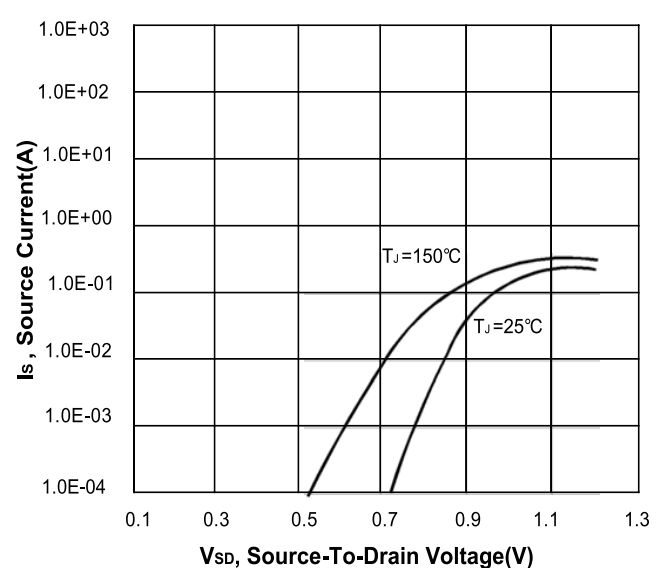
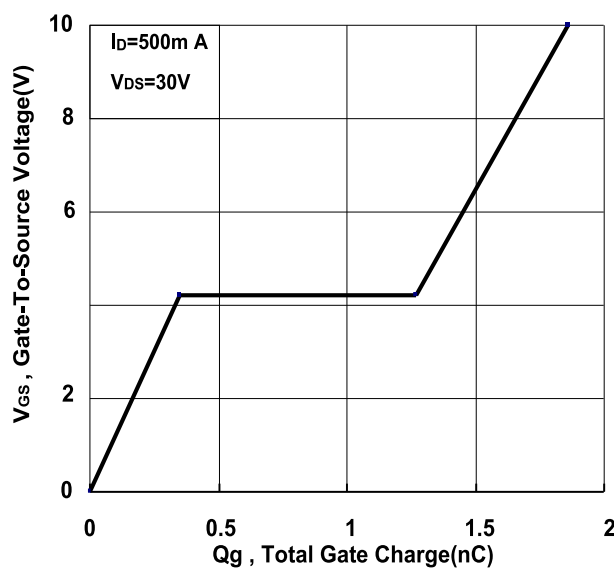
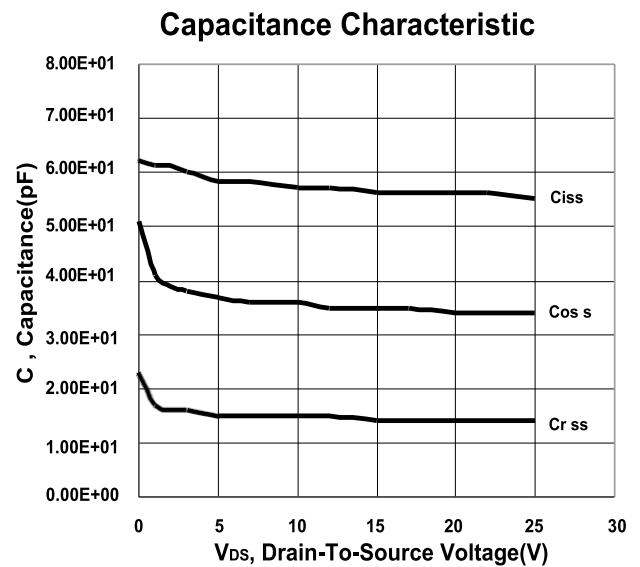
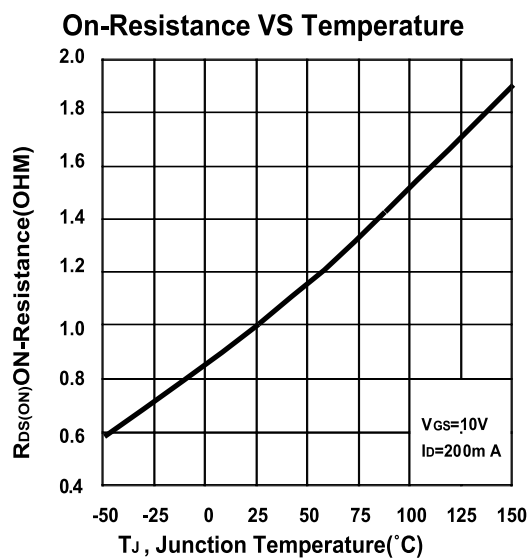
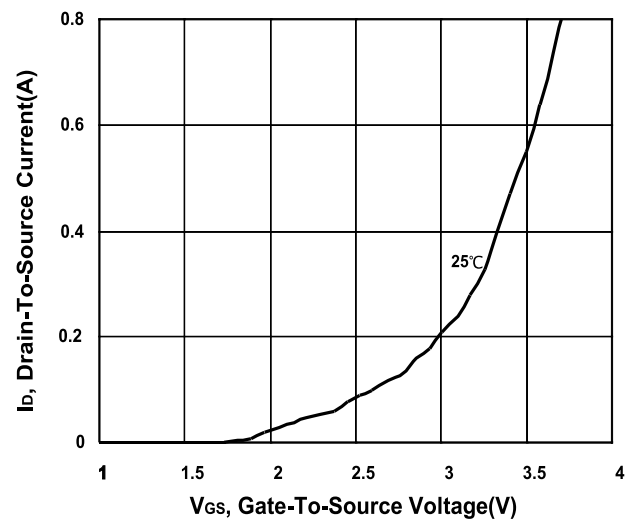
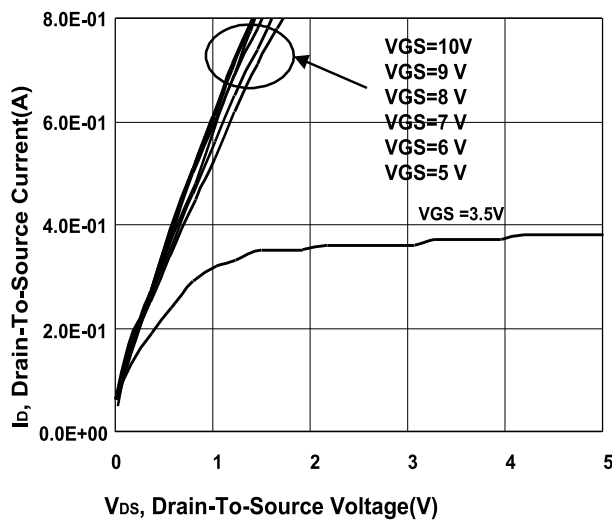
Note : 1. Pulse test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Independent of operating temperature.

3. Pulse width limited by maximum junction temperature.

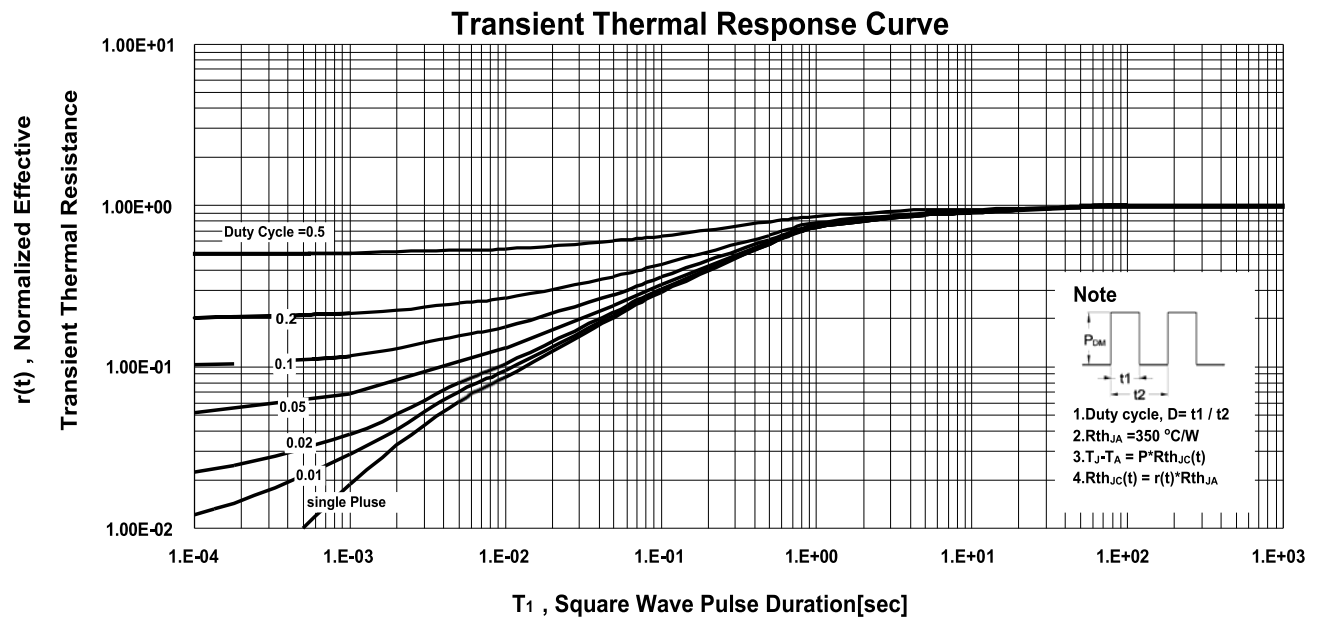
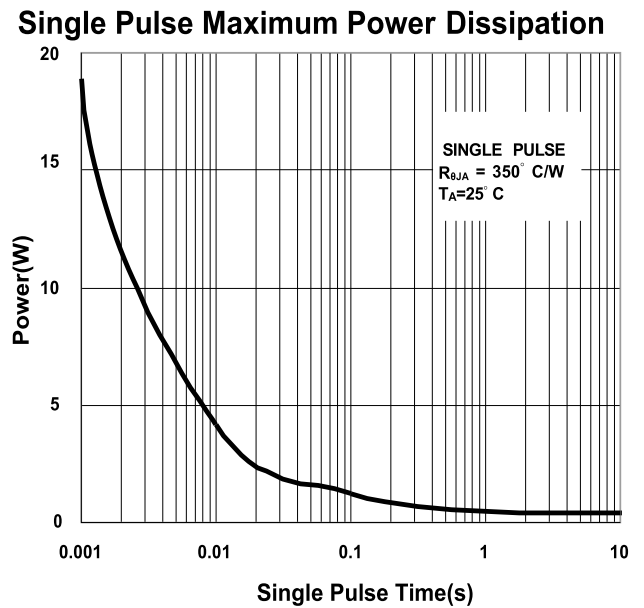
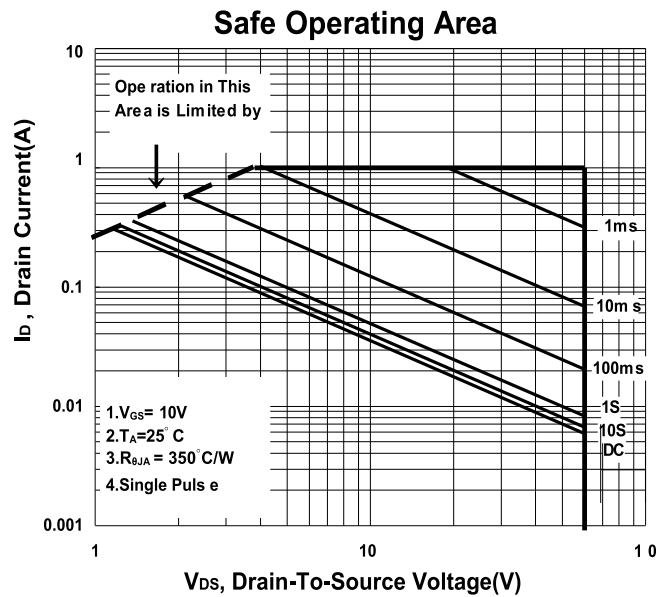
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Rating and characteristic curves



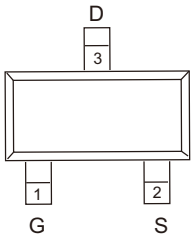
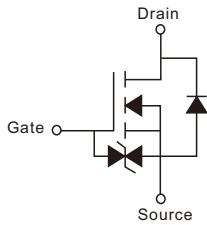
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Rating and characteristic curves



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Pinning information

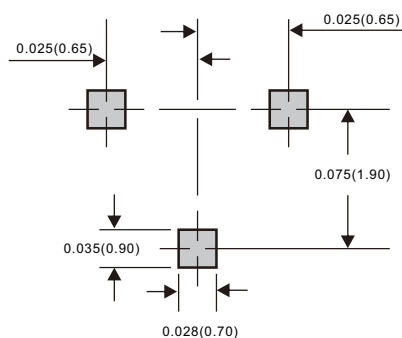
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
FMOSBSS138KW	J1♂

Suggested solder pad layout

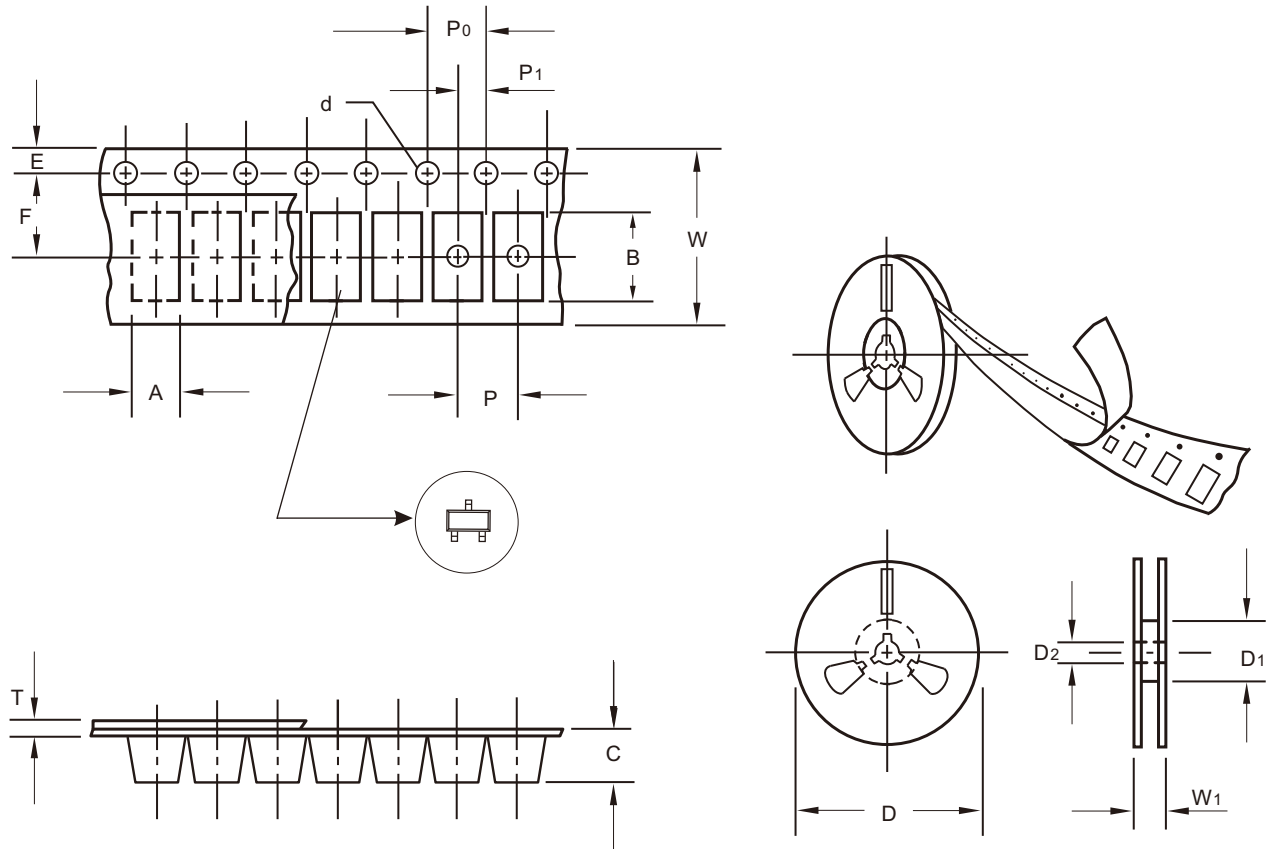
SOT-323



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	62.00
Feed hole diameter	D ₂	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

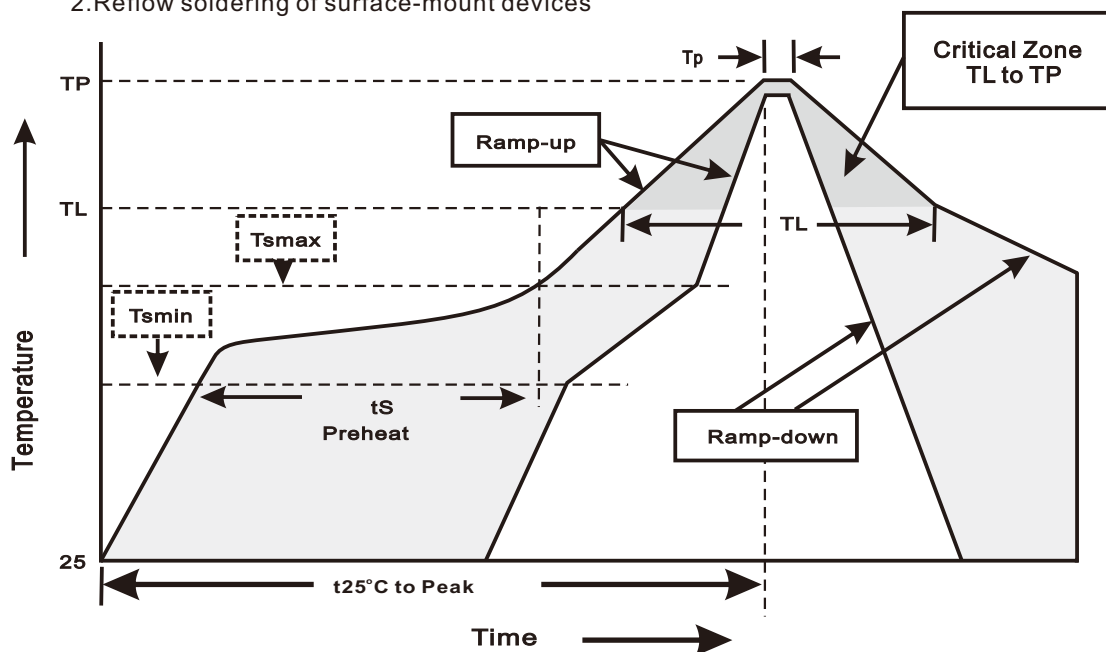
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-323	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000	9.5

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$
Preheat -Temperature Min(T_{Smin}) -Temperature Max(T_{Smax}) -Time(min to max)(t_S)	150°C 200°C 60~120sec
T_{Smax} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C 60~260sec
Peak Temperature(T_P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t_P)	10~30sec
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$