

FMOSH01N03K

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FMOSH01N03K

1.0A 30V N-Channel Enhancement Mode Power MOSFET ESD Protection

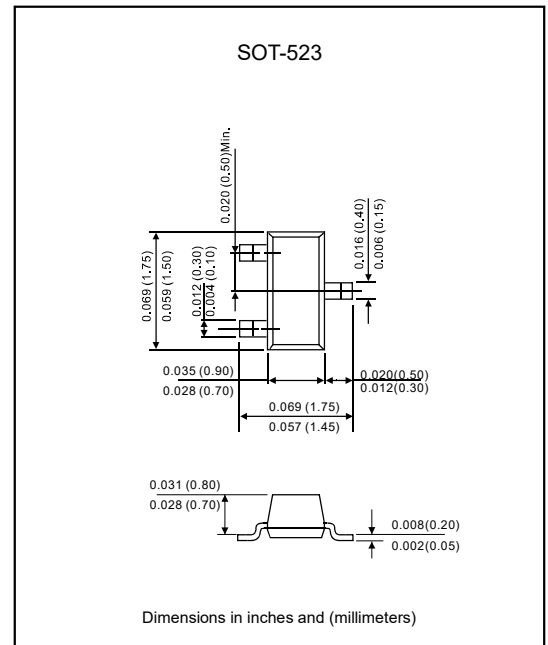
Features

- $V_{DS}=30V$, $I_D=1A$.
- $R_{DS(on)} \leq 0.7\Omega$ @ $V_{GS}=10V$, $I_D=0.2A$.
- $R_{DS(on)} \leq 1.0\Omega$ @ $V_{GS}=4.5V$, $I_D=0.2A$.
- $R_{DS(on)} \leq 6.5\Omega$ @ $V_{GS}=2.5V$, $I_D=0.2A$.
- ESD protected gate, typical 3KV (HBM).
- High speed switching.
- Easily designed drive circuits and easy to use in parallel.
- Low-voltage drive.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSH01N03K-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-523.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



Maximum Ratings (At $T_A=25^\circ C$ Unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain source voltage	V_{DS}	30	V
Gate source voltage	V_{GS}	± 20	V
Drain current continuous ($V_{GS}=10V$, $T_A=25^\circ C$) ($V_{GS}=10V$, $T_A=70^\circ C$)	I_D	1	A
		0.8	
Pulsed drain current (Note 1)	I_{DM}	3	A
Continuous body diode forward current	I_S	1	A
ESD susceptibility (Note 2)	V_{ESD}	3	kV
Power dissipation	P_D	1.3	W
Thermal resistance, junction to ambient	$R_{\theta JA}$	96	$^\circ C/W$
Operating junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static parameters						
Drain-source breakdown voltage	I _D =250μA, V _{GS} =0V	BV _{DSS}	30			V
Drain-source leakage current	V _{DS} =24V, V _{GS} =0V	I _{DSS}			1	μA
Gate-source leakage current	V _{GS} =±16V, V _{DS} =0V	I _{GSS}			±10	μA
Gate threshold voltage	V _{DS} =V _{GS} , I _D =250μA	V _{GS(TH)}	0.7		1.6	V
Static drain-source on-state resistance	V _{GS} =10V, I _D =0.2A	R _{DS(ON)}		0.35	0.7	Ω
	V _{GS} =4.5V, I _D =0.2A			0.45	1	
	V _{GS} =2.5V, I _D =0.2A			0.75	6.5	
Forward transconductance	V _{DS} =10V, I _D =0.2A	g _{FS}		0.4		S
Dynamic parameters						
Input capacitance	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	C _{iss}		29		pF
Out capacitance		C _{oss}		15		
Reverse transfer capacitance		C _{rss}		4		
Switching parameters (Note 3, 4)						
Total gate charge	V _{GS} =10V, V _{DS} =15V, I _D =0.2A	Q _g		1.7		nC
Gate to source charge		Q _{gs}		0.7		
Gate to drain charge		Q _{gd}		0.3		
Turn-on delay time	V _{DS} =15V, V _{GS} =10V, R _g =6Ω, I _D =0.2A	t _{d(on)}		3.2		ns
Rise time		t _r		16		
Turn-off delay time		t _{d(off)}		10		
Fall time		t _f		14		
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage (Note3)	I _S =0.2A, V _{GS} =0V	V _{SD}		0.8	1.2	V
Reverse recovery time	I _F =0.2A, di _F /dt=100A/μs	t _{rr}		5		ns
Reverse recovery charge		Q _{rr}		1.2		nC

Notes: 1. Repetitive rating, pulse width limited by junction temperature $T_{j_Max}=150^{\circ}\text{C}$. Ratings are based on low frequency and low duty cycles to keep initial $T_j=25^{\circ}\text{C}$.

2. Human body model, $1.5\text{k}\Omega$ in series with 100pF .

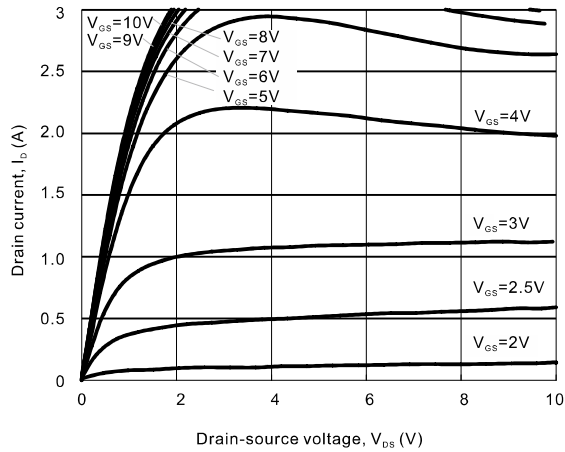
3. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

4. Independent of operating temperature.

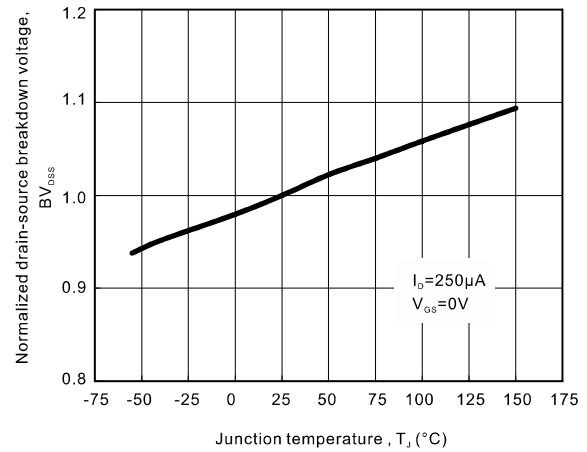
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Rating and characteristic curves

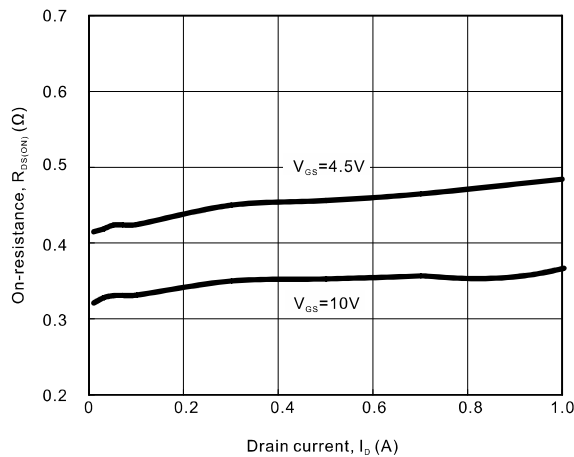
Typical output characteristics



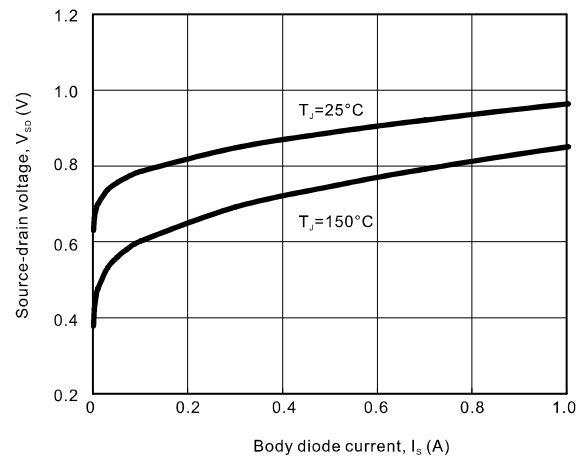
Breakdown voltage vs. Junction temperature



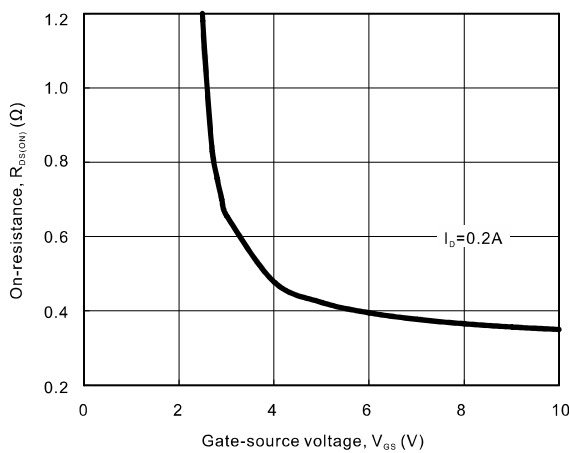
On-resistance vs. Drain current



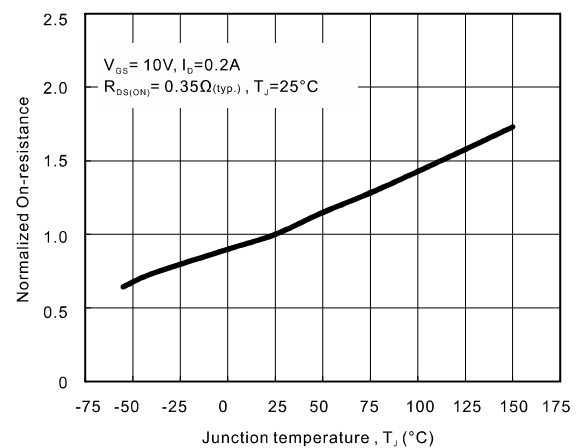
Body diode current vs. Source-drain voltage



On-resistance vs. Gate-source voltage

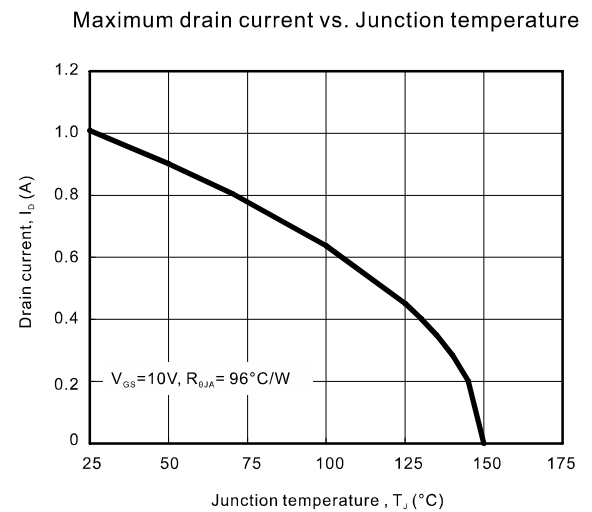
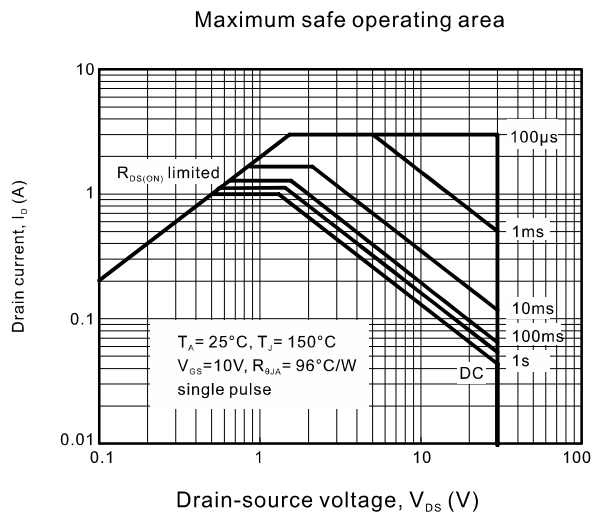
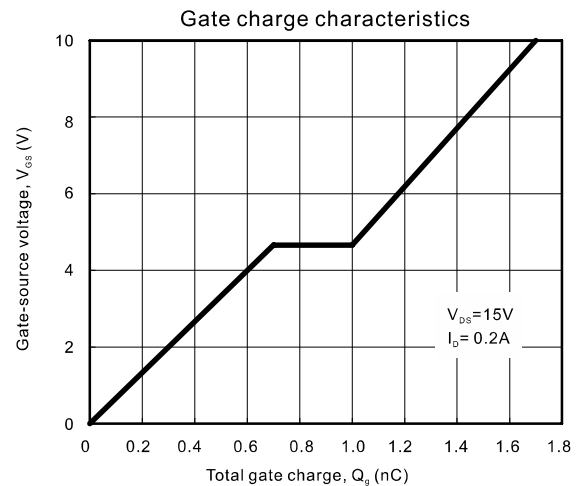
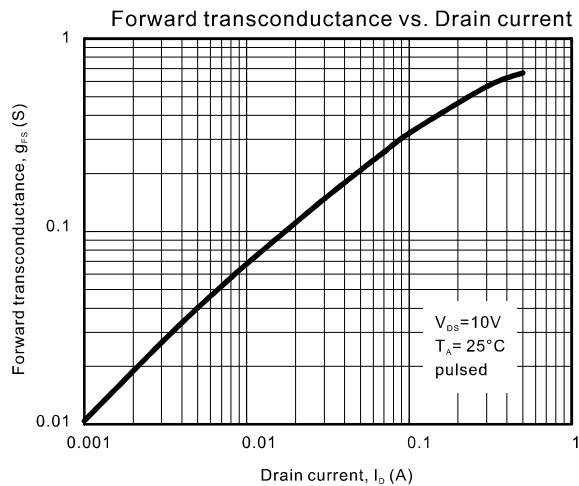
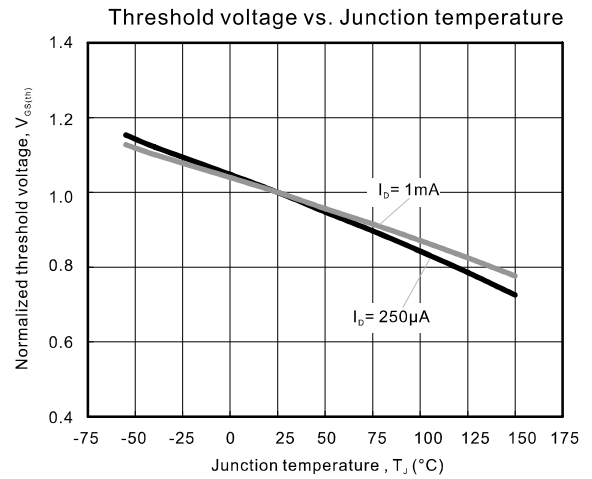
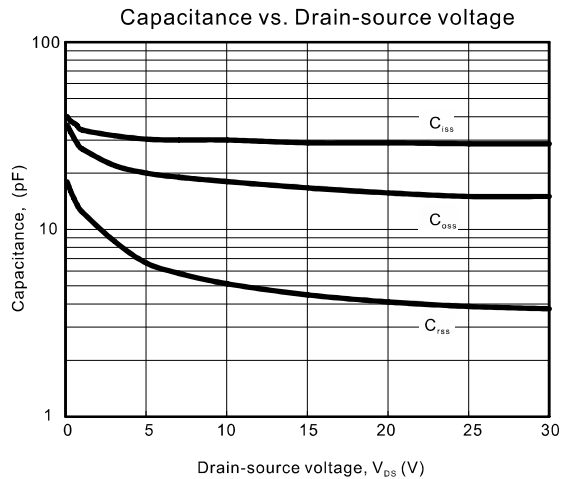


Normalized on-resistance vs. Junction temperature



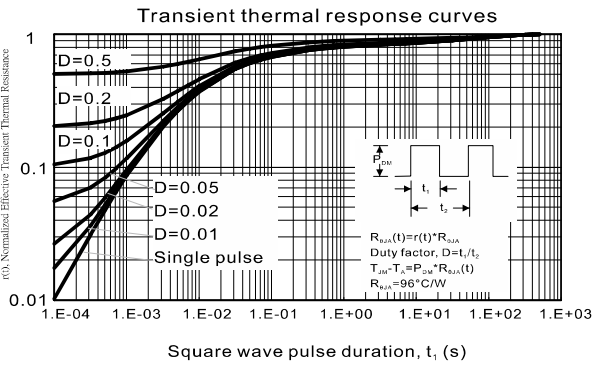
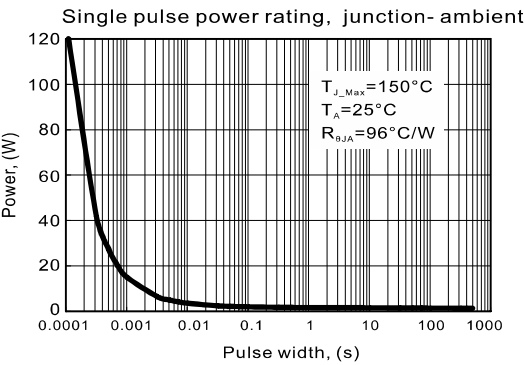
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Rating and characteristic curves



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Rating and characteristic curves



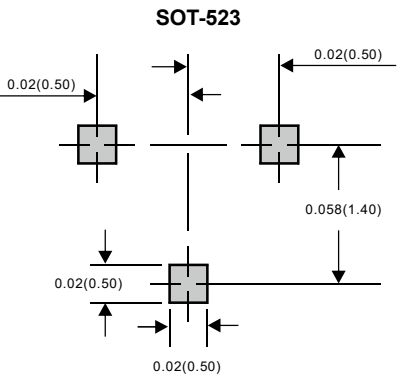
Pinning information

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

Marking

Type number	Marking code
FMOSH01N03K	K8

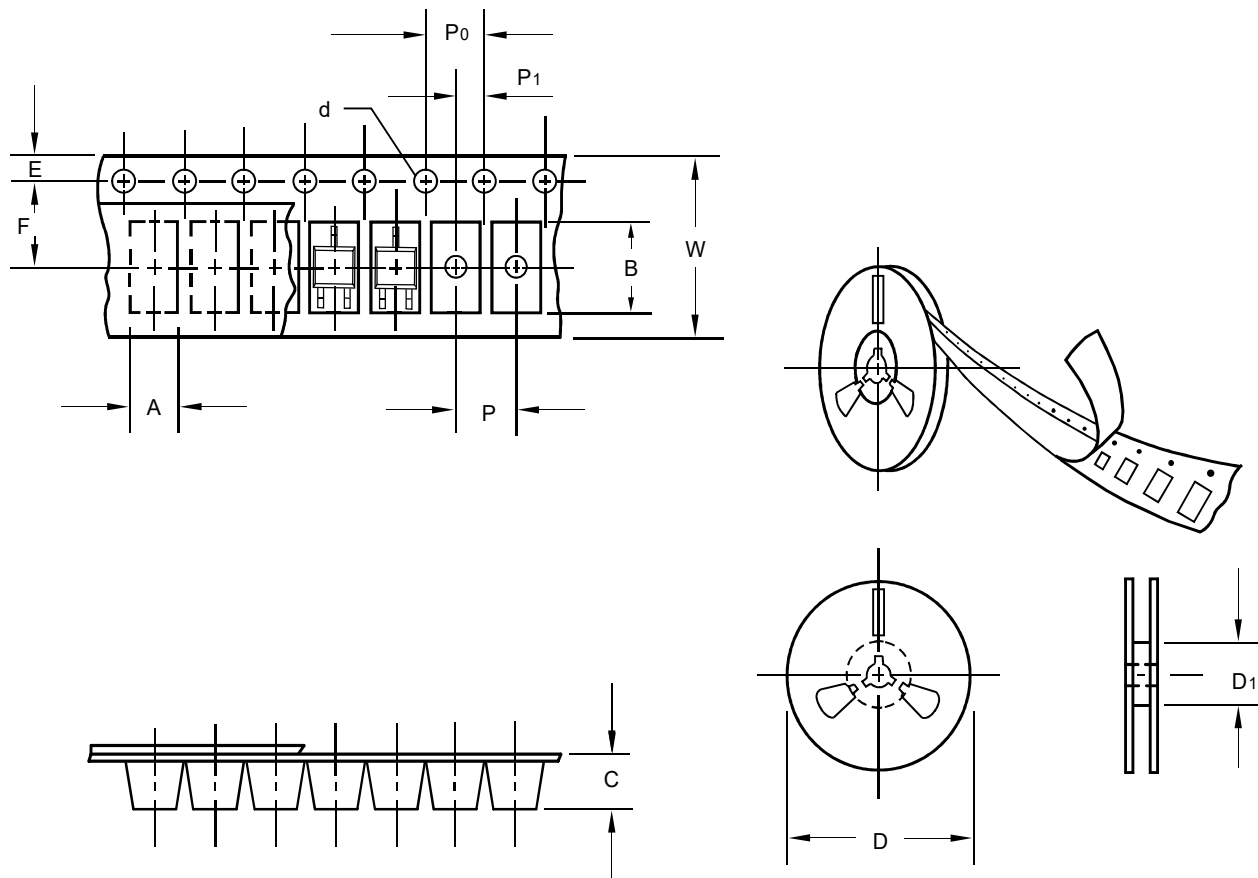
Suggested solder pad layout



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-523
Carrier width	A	0.5	1.85
Carrier length	B	0.5	1.85
Carrier depth	C	0.5	0.875
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	49.00
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	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Tape width	W	0.3	8.00

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

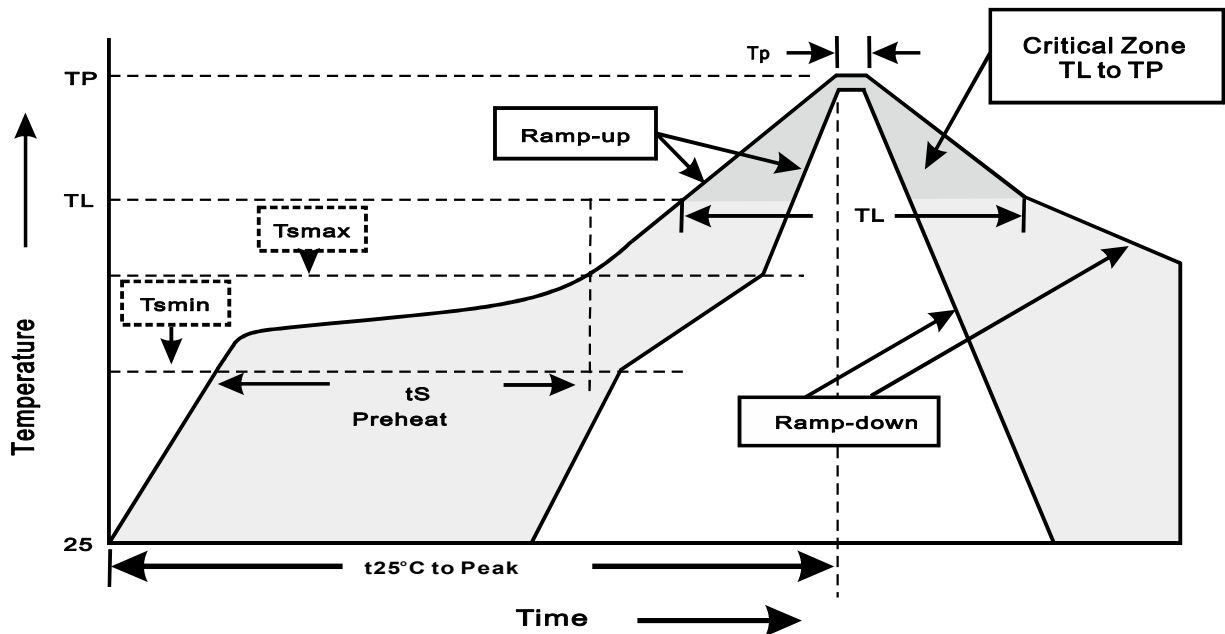
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Reel packing

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)
SOT-523	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

Suggested thermal profiles for soldering processes

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



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tp)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes