

FMOSN01P44N03E-H**List**

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FMOSN01P44N03E-H

1.44A 30V N-Channel Enhancement Mode MOSFET ESD Protection

Features

- $R_{DS(on)}$ max=300m Ω @ $V_{GS}=2.5V$, $I_D=1.2A$
- $R_{DS(on)}$ max=240m Ω @ $V_{GS}=4.5V$, $I_D=1.4A$
- Low $R_{DS(on)}$
- High speed switching
- ESD protected up to 2.0kV(HBM)
- Lead-free parts meet RoHS requirements
- Halogen-free (IEC61249-2-21)

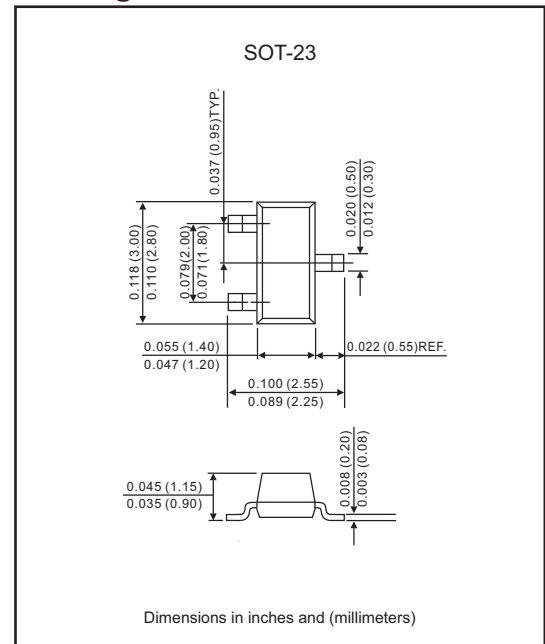
Applications

- PWM applications
- Power management
- Load switch

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Weight : Approximated 0.008 gram

Package outline

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

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	± 10	V
Continuous drain current (Note1,2) Steady-state @ $V_{GS}=10V$	I_D	1.44	A
$T_A=25^\circ\text{C}$ $T_A=100^\circ\text{C}$		0.91	
Pulsed drain current $T_A=25^\circ\text{C}$, $t_p \leq 10\mu\text{s}$	I_{DM}	5.76	A
Power dissipation (Note1,2) Steady-state	P_D	0.87	W
$T_A=25^\circ\text{C}$ $T_A=100^\circ\text{C}$		0.35	
Thermal resistance junction to ambient, steady-state (Note2)	$R_{\theta JA}$	143	$^\circ\text{C/W}$
Thermal resistance junction to case, steady-state	$R_{\theta JC}$	36	
Operating junction temperature range	T_J	-55 to +150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

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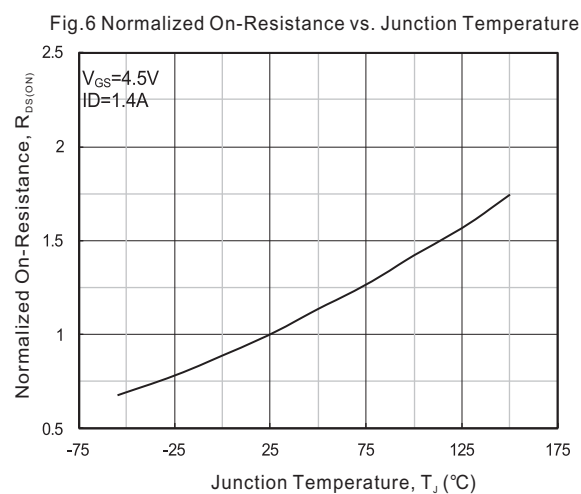
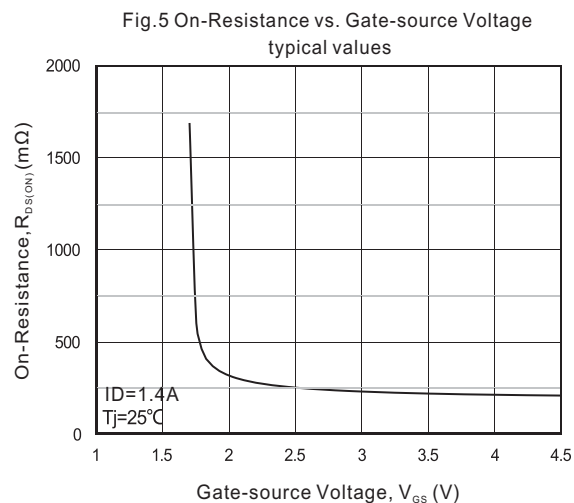
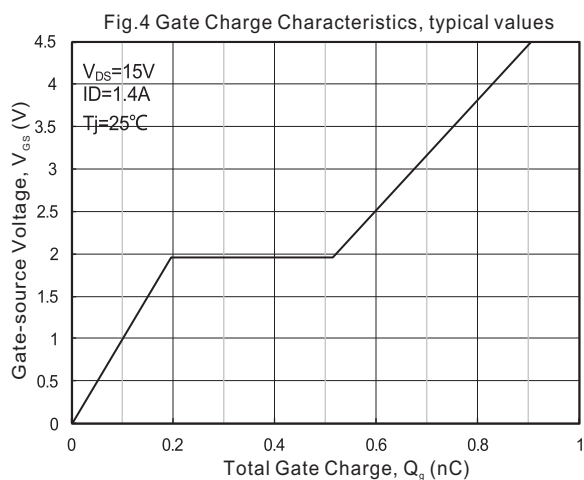
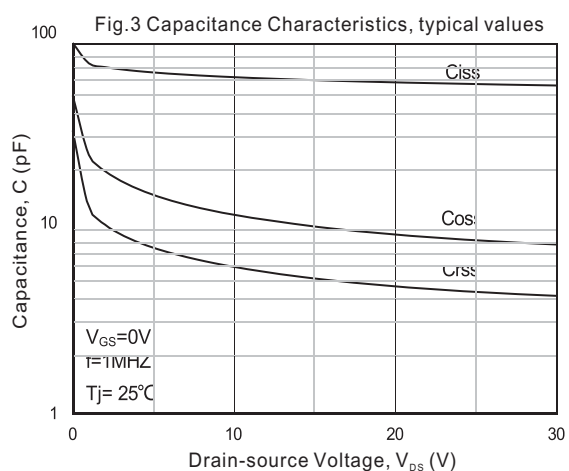
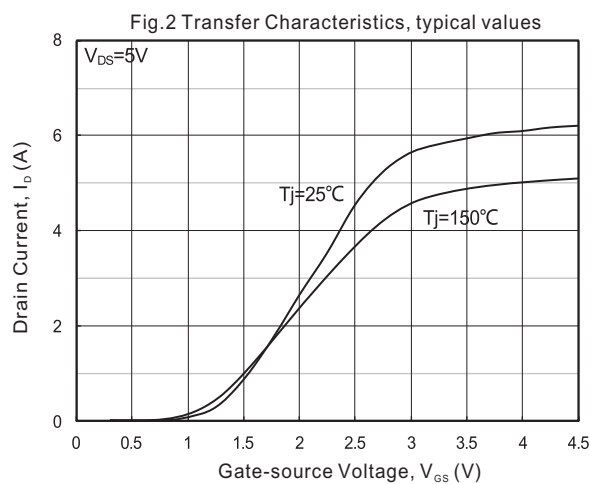
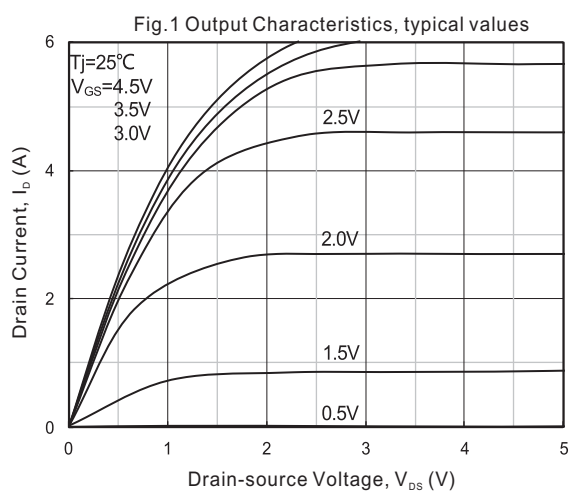
Electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Drain-source leakage current	I _{DSS}	V _{DS} =30V, V _{GS} =0V, T _J =25°C			1	μA
		V _{DS} =30V, V _{GS} =0V, T _J =150°C			100	
Gate-source leakage current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V			±10	μA
On characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.45	0.75	1.0	V
Static drain-source on-resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =1.4A		200	240	mΩ
		V _{GS} =2.5V, I _D =1.2A		250	300	
Gate resistance	R _g	f=1.0MHz		4		Ω
Dynamic parameters						
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1.0MHz		56.5		pF
Output capacitance	C _{oss}			9.6		
Reverse transfer capacitance	C _{rss}			5.1		
Switching parameters						
Total gate charge	Q _g	V _{GS} =4.5V, V _{DS} =15V, I _D =1.4A		0.9		nC
Gate-source charge	Q _{gs}			0.3		
Gate-drain charge	Q _{gd}			0.3		
Turn-on delay time	t _{d(on)}	V _{GS} =4.5V, V _{DS} =15V, I _D =1.4A, R _{GEN} =3Ω		3.7		ns
Rise time	t _r			5.9		
Turn-off delay time	t _{d(off)}			10.4		
Fall time	t _f			4.1		
Source-drain diode ratings and Characteristics						
Source to drain forward voltage drop	V _{SD}	I _S =1.4A, V _{GS} =0V		0.9	1.2	V
Diode continuous current	I _S	T _A =25°C			0.9	A
Reverse recovery time	t _{rr}	I _F =1.4A, d _i /d _t =100A/μs, V _{GS} =0V, V _R =15V		16		ns
Reverse recovery charge	Q _{rr}			5		nC

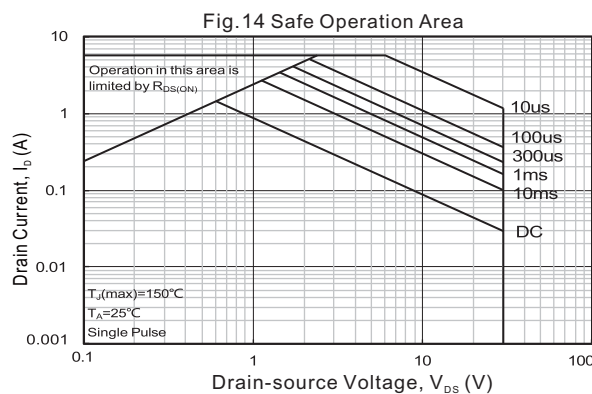
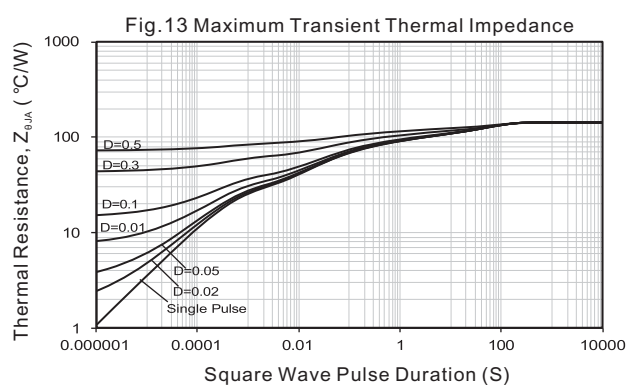
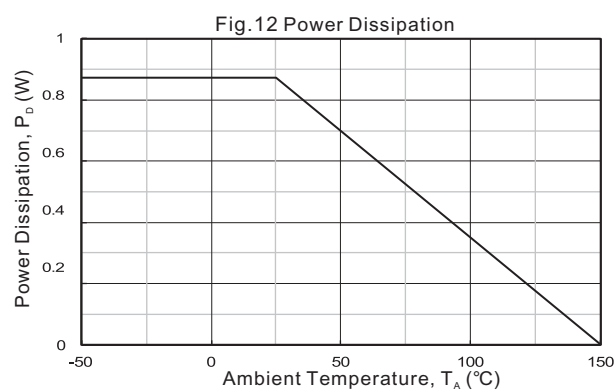
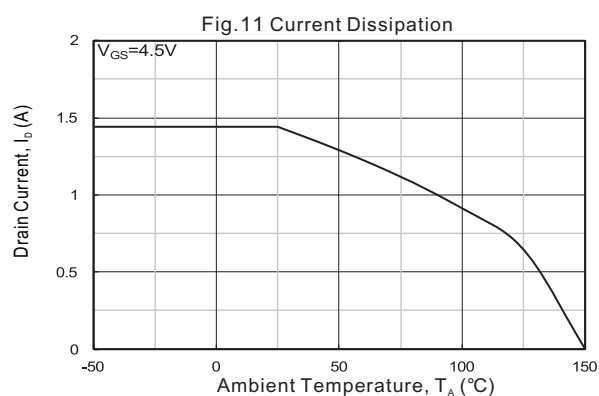
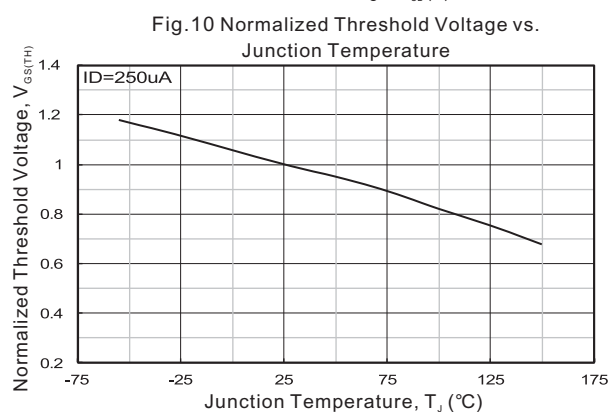
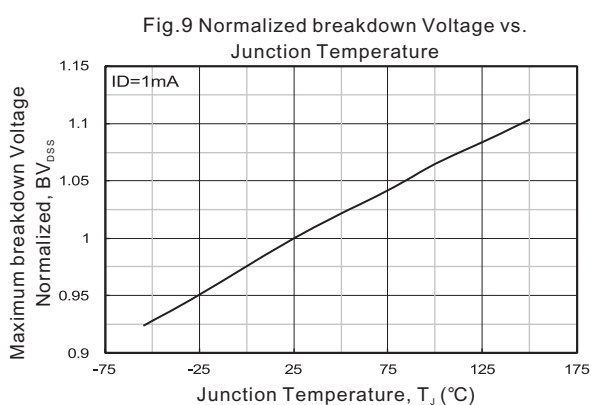
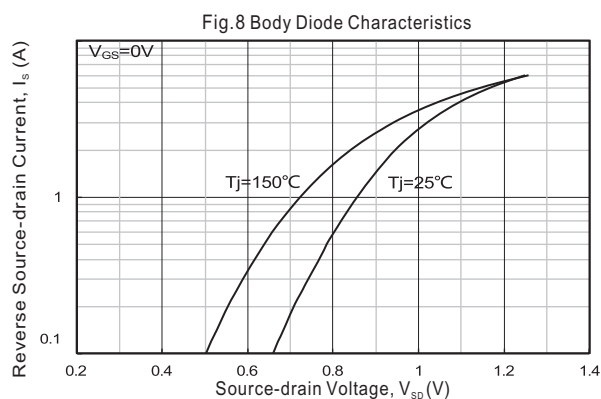
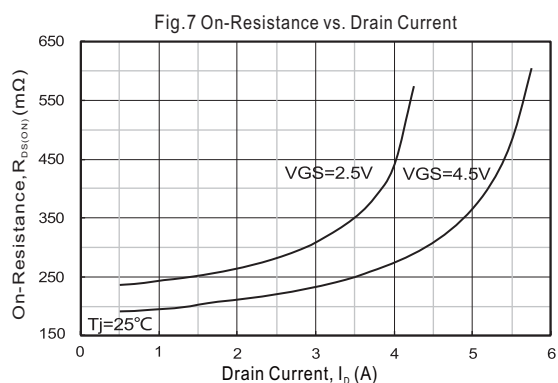
Notes 1: The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

2: The value of R_{JA} is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ\text{C}$. The maximum allowed junction temperature of 150 $^\circ\text{C}$. The value in any given application depends on the user's specific board design.

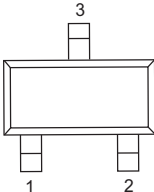
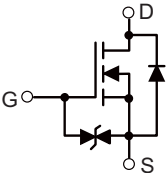
Rating and characteristic curves (FMOSN01P44N03E-H)



Rating and characteristic curves (FMOSN01P44N03E-H)

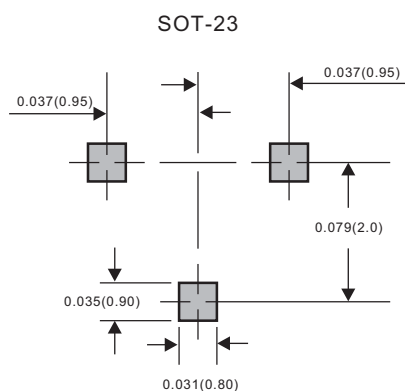


FMOSN01P44N03E-H**Pinning information**

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

Marking

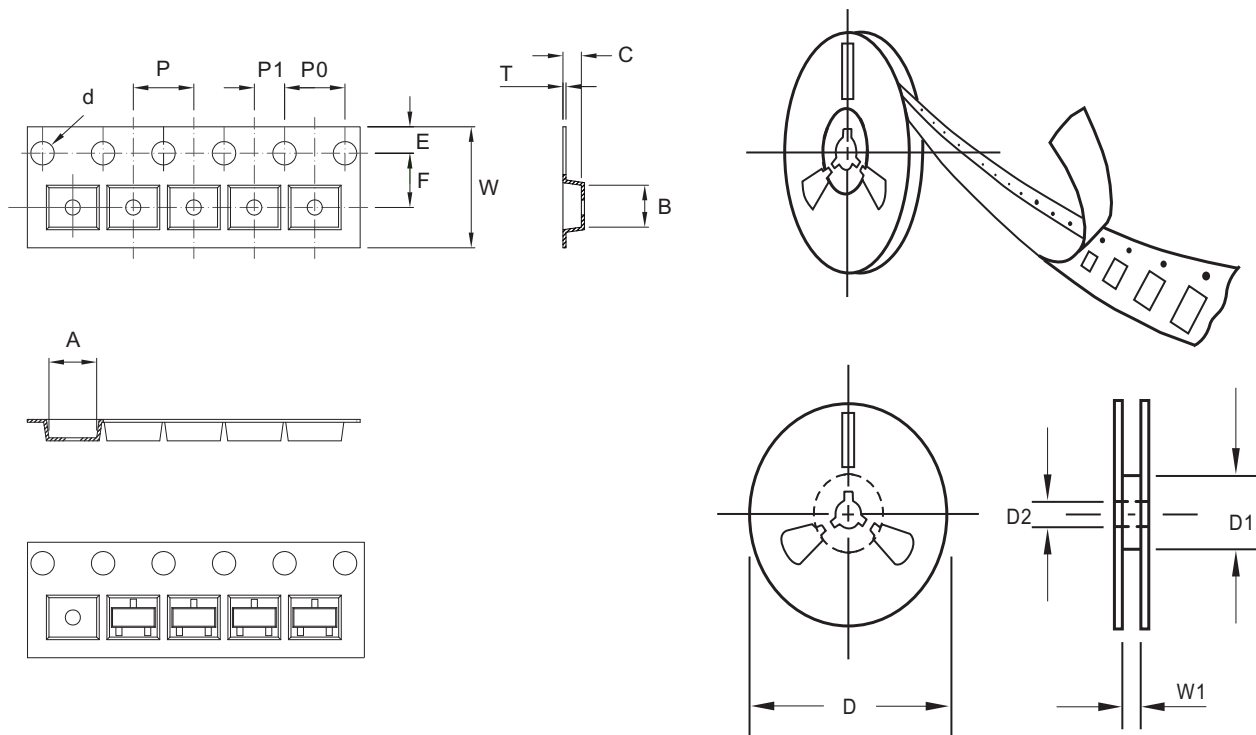
Type number	Marking code
FMOSN01P44N03E-H	240N03

Suggested solder pad layout

Dimensions in inches and (millimeters)

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Packing information



Unit : mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	±0.1	3.15
Carrier length	B	±0.1	2.77
Carrier depth	C	±0.1	1.32
Sprocket hole	d	±0.1	1.50
7" Reel outside diameter	D	±1.0	178.0
7" Reel inner diameter	D1	±0.5	54.0
Feed hole diameter	D2	±0.3	13.0
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
Over all tape thickness	T	±0.1	0.23
Tape width	W	±0.2	8.00
Reel width	W1	±0.2	12.30

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

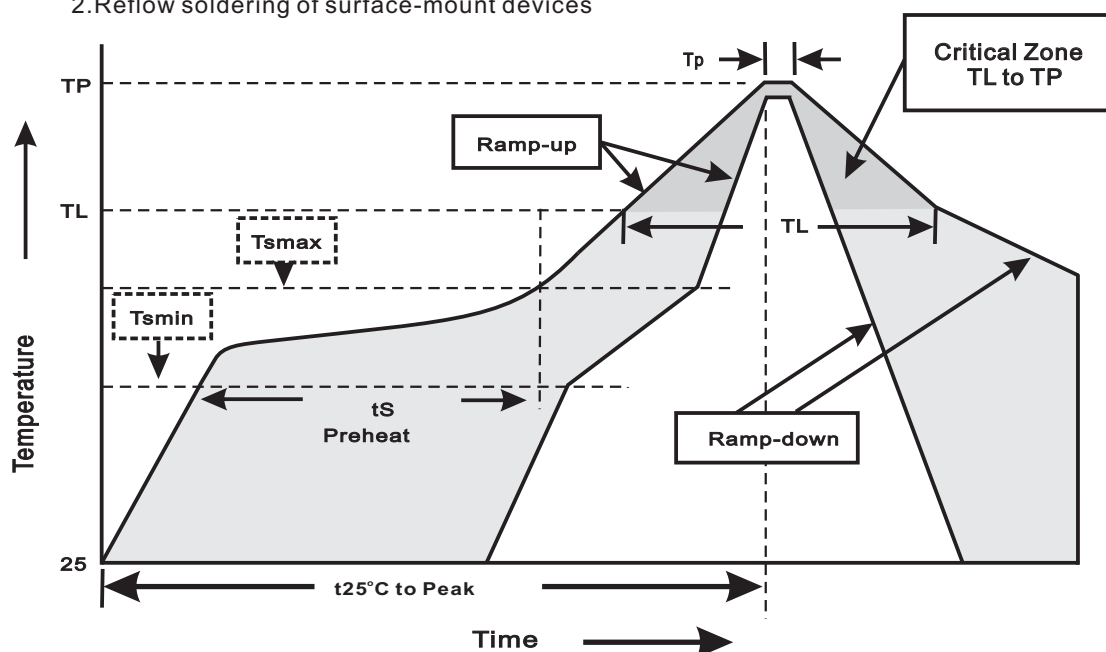
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Reel packing

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-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

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)	$< 3^\circ\text{C/sec}$
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	$< 3^\circ\text{C/sec}$
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	$< 6^\circ\text{C/sec}$
Time 25°C to Peak Temperature	$< 6\text{minutes}$