

FMOSTHAB02P15-H

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FMOSTHAB02P15-H

**-2.0A -150V P-Channel Trench
Enhancement Mode Power MOSFET****Features**

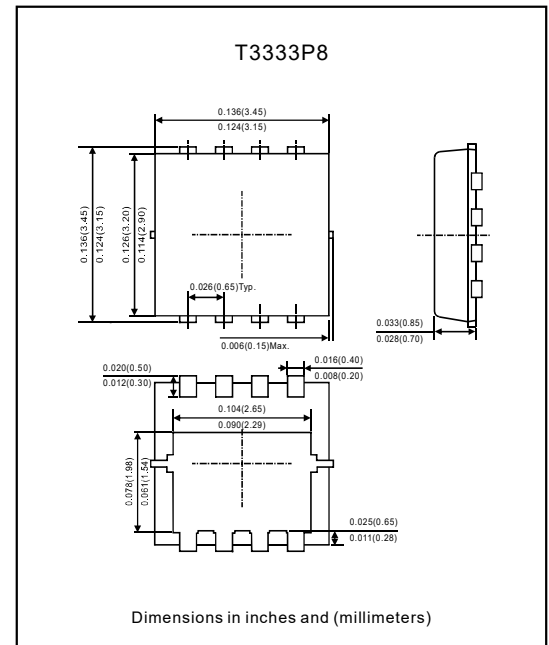
- $-V_{DS}=150V$, $-I_D=2A$.
- $R_{DS(ON)} \leq 780m\Omega$, @ $-V_{GS}=10V$, $-I_D=1A$.
- $R_{DS(ON)} \leq 980m\Omega$, @ $-V_{GS}=6V$, $-I_D=0.5A$.
- Advanced trench MOS technology.
- 100% E_{AS} guaranteed.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Applications

- Load switch.
- Power management.
- LED backlighting.
- Networking applications.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, T3333P8 (DFN3333-8).
- Mounting Position : Any.

Package outline**Maximum ratings** (At $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	$-V_{DS}$	150	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current, $-V_{GS}@-10V$ (Note1)	$-I_D$	2	A
		1.5	
Pulsed drain current (Note2)	$-I_{DM}$	8	A
Avalanche current	$-I_{AS}$	5	A
Single pulse avalanche energy (Note3)	E_{AS}	12.5	mJ
Power dissipation (Note4)	P_D	7.8	W
Thermal resistance, junction to ambient (note1)	$R_{\theta JA}$	62	$^\circ C/W$
Thermal resistance, junction to case (note1)	$R_{\theta JC}$	16	$^\circ C/W$
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 $T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
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Off characteristics

Drain-source breakdown voltage	$-BV_{DS}$	$-I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	150			V
Drain-source leakage current	$-I_{DSS}$	$-V_{DS}=120\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$-V_{DS}=120\text{V}$, $V_{GS}=0\text{V}$, $T_J=85^{\circ}\text{C}$			30	
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$			± 100	nA

On characteristics

Gate threshold voltage	$-V_{GS(TH)}$	$V_{GS}=V_{DS}$, $-I_D=250\mu\text{A}$	2	3	4	V
Drain-Source on-state resistance (Note2)	$R_{DS(ON)}$	$-V_{GS}=10\text{V}$, $-I_D=1\text{A}$		650	780	m Ω
		$-V_{GS}=6\text{V}$, $-I_D=0.5\text{A}$		700	980	

Dynamic parameters

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $-V_{DS}=75\text{V}$, $f=1.0\text{MHz}$		706		pF
Out capacitance	C_{oss}			23		
Reverse transfer capacitance	C_{rss}			13		
Gate resistance	R_g	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1.0\text{MHz}$		12		Ω

Switching parameters

Total gate charge	Q_g	$-V_{GS}=10\text{V}$, $-V_{DS}=75\text{V}$, $-I_D=1\text{A}$		10.8		nC
Gate to source charge	Q_{gs}			3.1		
Gate to drain charge	Q_{gd}			2.2		
Turn-on delay time	$t_{d(on)}$	$-V_{DD}=30\text{V}$, $-V_{GS}=10\text{V}$, $R_G=6\Omega$, $-I_D=1\text{A}$		21		ns
Rise time	t_r			16		
Turn-off delay time	$t_{d(off)}$			40		
Fall time	t_f			18		

Source-drain diode ratings and characteristics

Drain-source diode forward voltage (Note2)	$-V_{SD}$	$-I_{SD}=1\text{A}$, $V_{GS}=0\text{V}$			1.2	V
Continuous source current (Note1,5)	$-I_S$	$V_G=V_D=0\text{V}$, Force current			1	A

Note: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2oz copper.

2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

3. The E_{AS} data shows maximum rating. The test condition is $-V_{DD}=50\text{V}$, $-V_{GS}=10\text{V}$, $L=1\text{mH}$, $-I_{AS}=5\text{A}$.

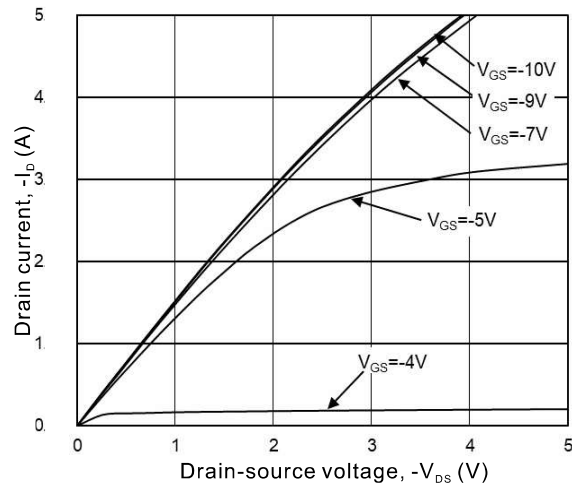
4. The power dissipation is limited by 150°C junction temperature.

5. The data is theoretically the same as I_D and I_{DM} , in real application, should be limited by total power dissipation.

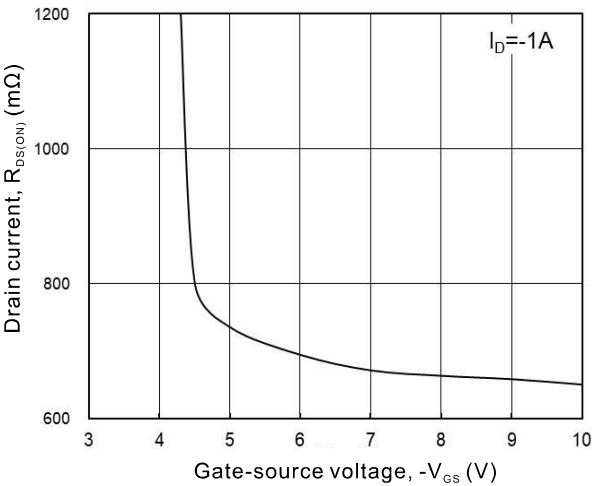
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Rating and characteristic curves

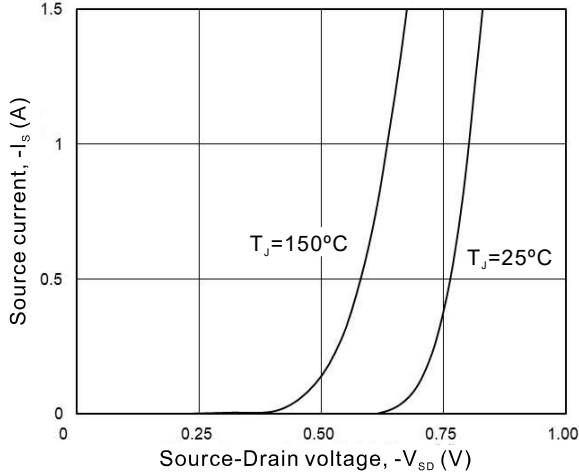
Typical Output Characteristics



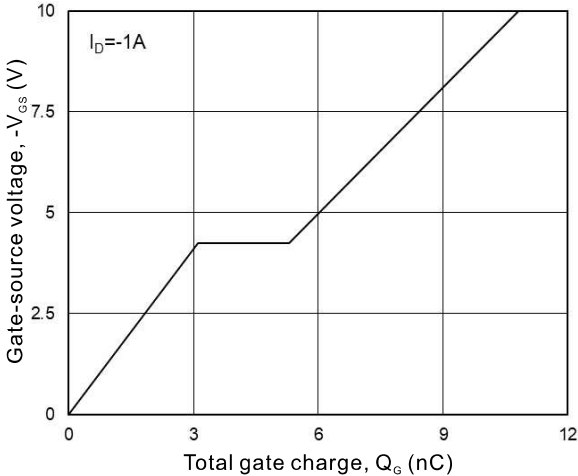
On-Resistance vs G-S Voltage



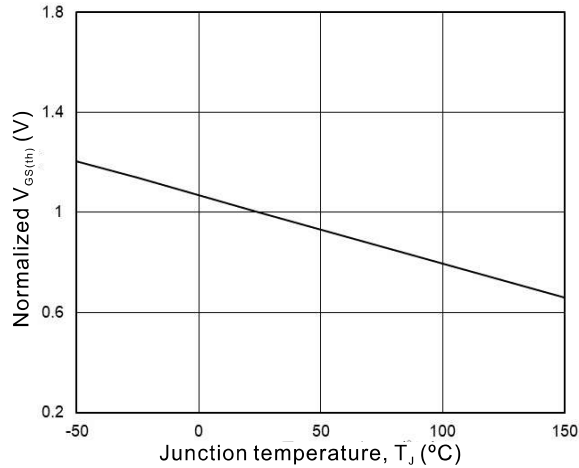
Source Drain Forward Characteristics



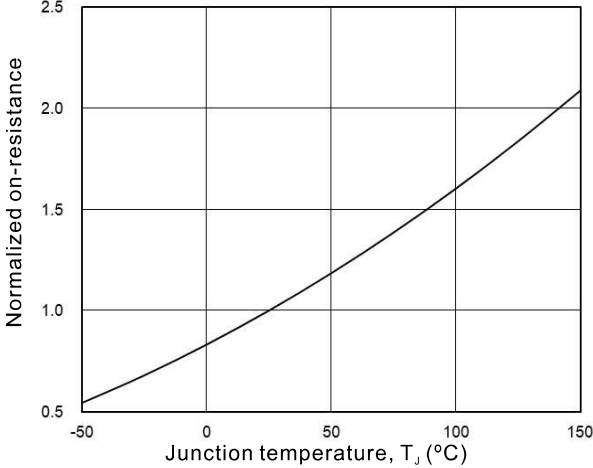
Gate-Charge Characteristics



Normalized $V_{GS(th)}$ vs T_J

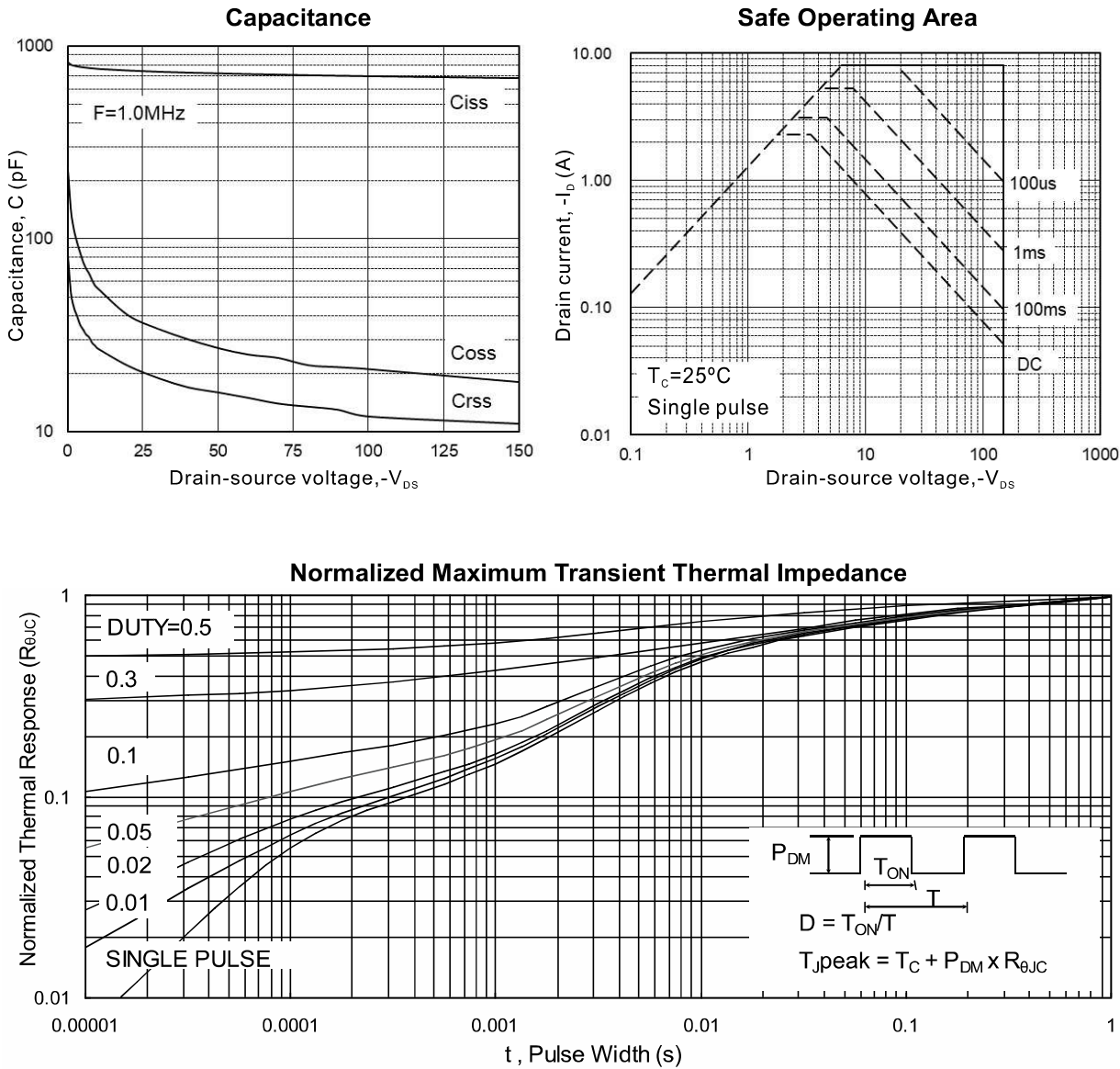


Normalized $R_{DS(on)}$ vs T_J



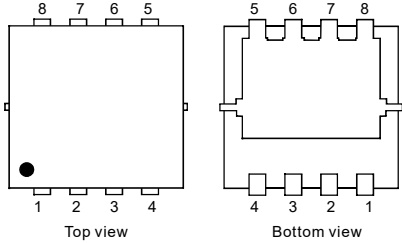
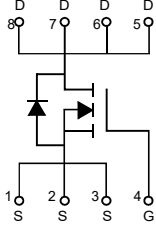
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Rating and characteristic curves



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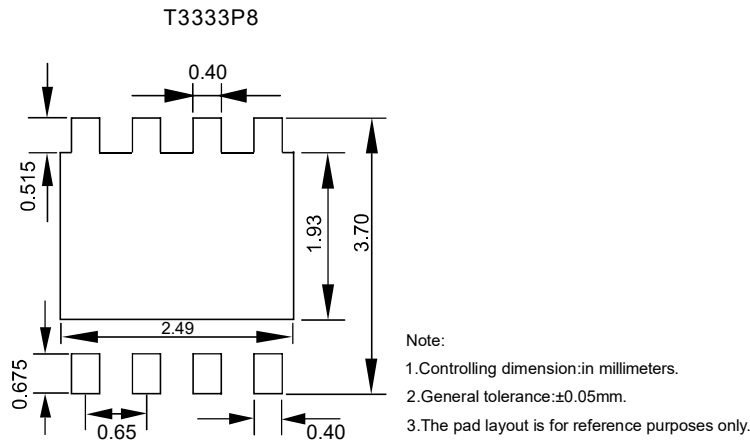
Pinning information

Pin	Simplified outline	Symbol
Pin 1, 2, 3 Source		
Pin 4 Gate		
Pin 5, 6, 7, 8 Drain		

Marking

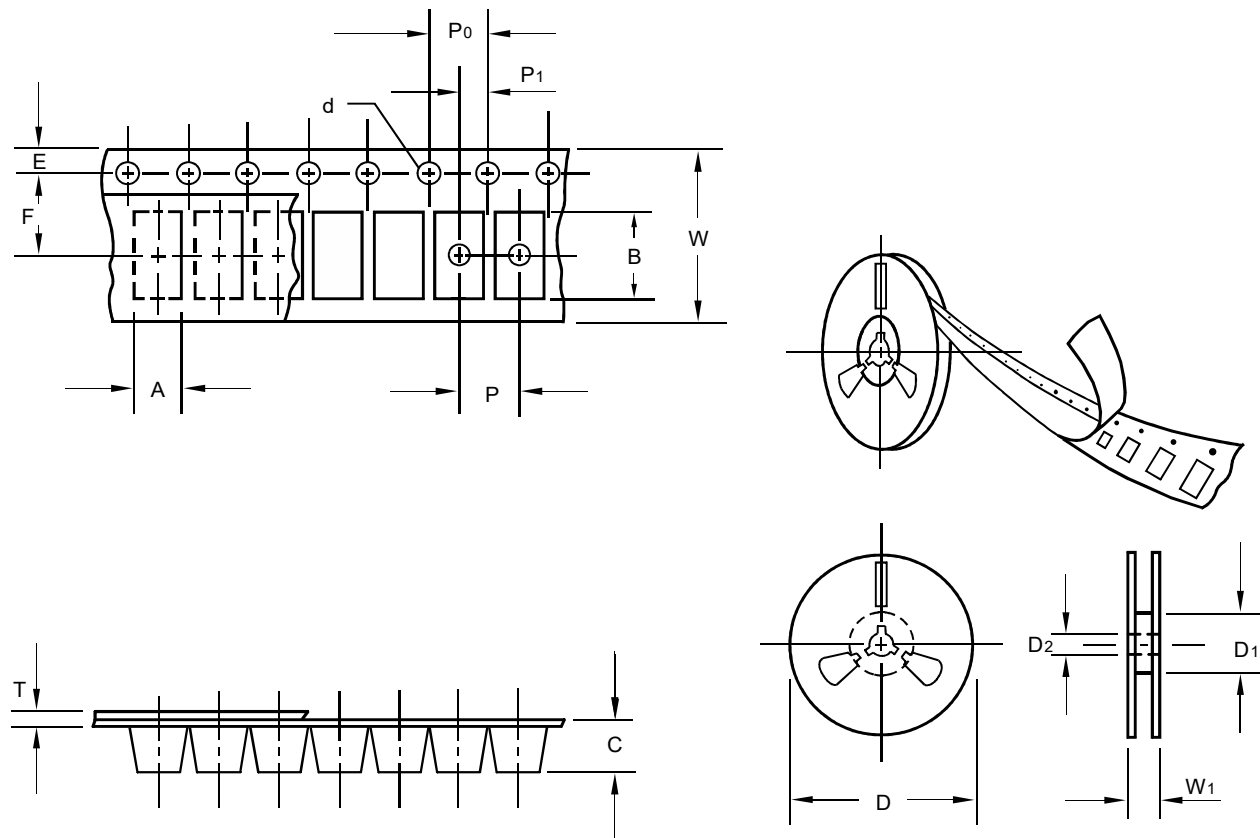
Type number	Marking code
FMOSTHAB02P15-H	AB02P15

Suggested solder pad layout



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Packing information



unit:mm

Item	Symbol	Tolerance	T3333P8
Carrier width	A	0.1	3.55
Carrier length	B	0.1	3.55
Carrier depth	C	0.1	1.10
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	100.00
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D1	min	-
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	8.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	12.00
Reel width	W1	1.0	17.60

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

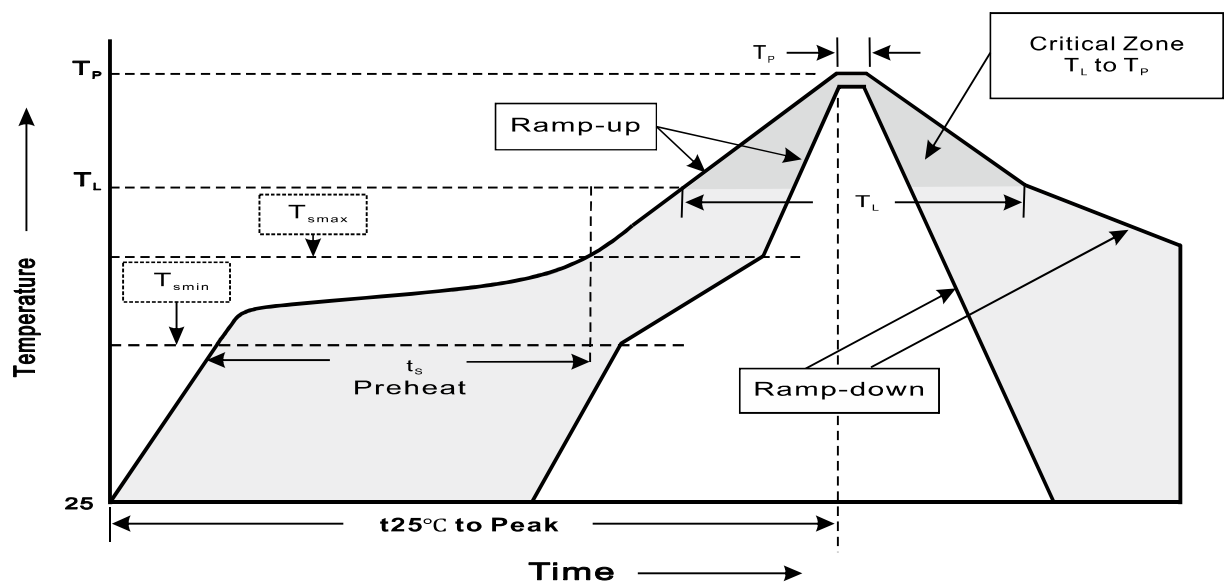
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Reel packing

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)
T3333P8	13"	5,000	8.0	10,000	355*335*38	330	350*330*360	80,000

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°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-up rate	< 3°C/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	217°C 60 ~ 260 sec
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°C/sec
Time 25°C to peak temperature	< 6 minutes