

FMOSTHAT42N10-H

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FMOSTHAT42N10-H

42A 100V Dual N-Channel Trench Enhancement Mode Power MOSFET

Features

- $V_{DS}=100V$, $I_D=42A$.
- $R_{DS(ON)} \leq 15m\Omega$, @ $V_{GS}=10V$, $I_D=20A$.
- $R_{DS(ON)} \leq 20m\Omega$, @ $V_{GS}=4.5V$, $I_D=20A$.
- Excellent gate charge x on-resistance product. (FOM.)
- Very low-on resistance.
- 100% UIS and ΔV_{ds} tested.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21) .

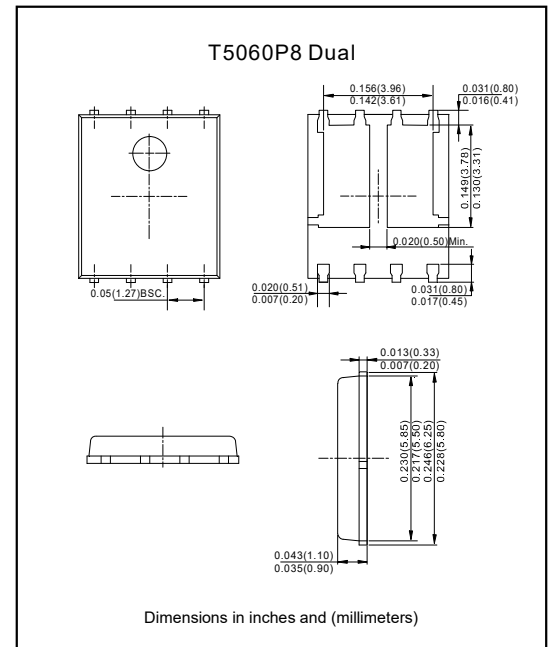
Application

- DC/DC converter.
- Ideal for high-frequency switching and synchronous rectification.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, T5060P8 Dual (DFN5060-8 Dual) .
- Mounting Position : Any.

Package outline



Maximum ratings (At $T_c=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current ($T_c=100^\circ C$)	I_D	42	A
		26.5	
Pulse drain current tested	I_{DM}	168	A
Derating factor		0.45	W/ $^\circ C$
Avalanche energy (note 1)	E_{AS}	125	mJ
Maximum power dissipation	P_D	56	W
Thermal resistance, junction to case	$R_{\theta JC}$	2.23	$^\circ C/W$
Maximum junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	100			V
Drain-source leakage current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
Gate-source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
On characteristics						
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.1	1.8	2.5	V
Static drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A		13	15	mΩ
		V _{GS} =4.5V, I _D =20A		16.5	20	mΩ
Forward transconductance	g _{FS}	V _{DS} =5V, I _D =20A		20		S
Dynamic parameters						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =50V, f=1.0MHz		2050		pF
Out capacitance	C _{oss}			180		
Reverse transfer capacitance	C _{rss}			21		
Switching parameters (Note 2)						
Total gate charge	Q _g	V _{GS} =10V, V _{DS} =50V, I _D =20A		42		nC
Gate to source charge	Q _{gs}			7.8		
Gate to drain charge	Q _{gd}			11		
Turn-on delay time	t _{d(on)}	V _{DD} =50V, V _{GS} =10V, I _D =20A, R _G =3Ω		16		ns
Rise time	t _r			18		
Turn-off delay time	t _{d(off)}			32		
Fall time	t _f			10		
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage	V _{SD}	I _S =20A, V _{GS} =0V			1.2	V
Diode continuous current	I _S				42	A
Reverse recovery time	t _{rr}	I _F =20A, dI/dt=100A/μs, T _J =25°C		45		ns
Reverse recovery charge	Q _{rr}			95		nC

Notes : 1. E_{AS} condition : $T_J=25^\circ\text{C}$, $V_{DS}=50\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$.

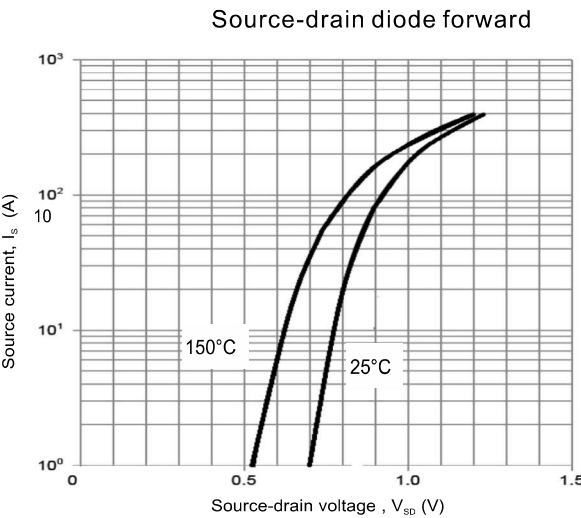
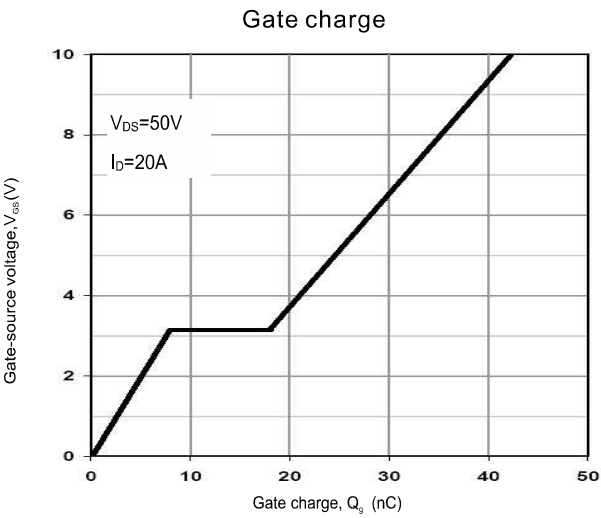
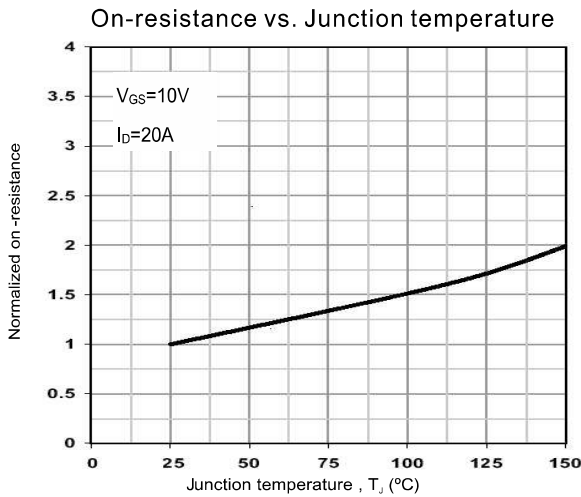
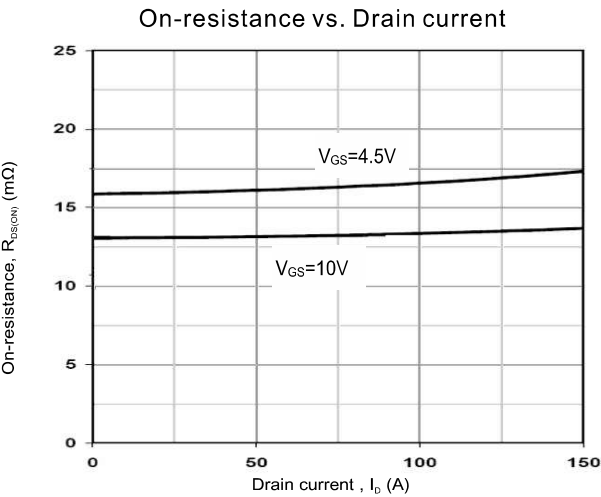
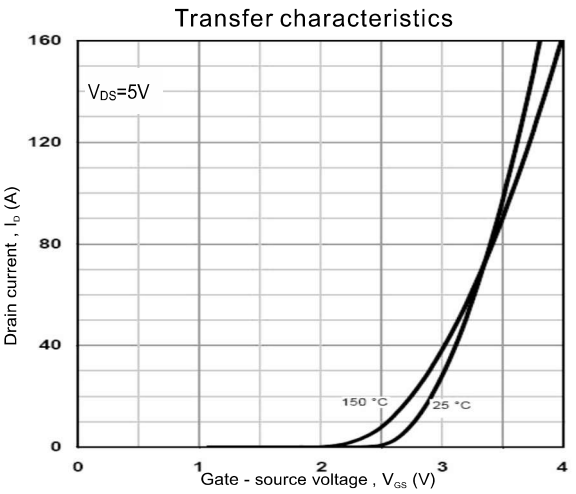
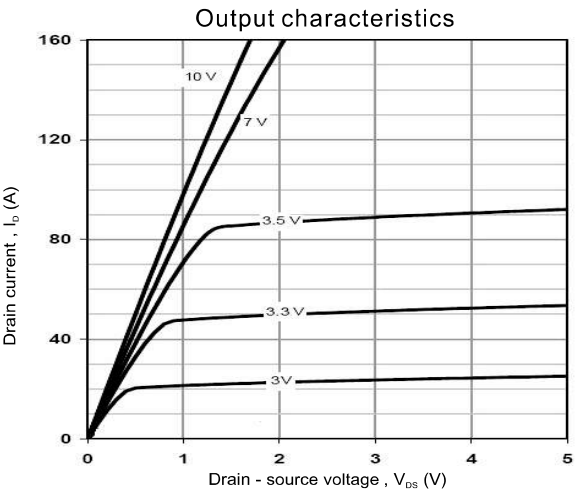
2. Guaranteed by design, not subject to production.

3. These curves are based on the junction-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(max)}=150^\circ\text{C}$.

The SOA curve provides a single pulse rating.

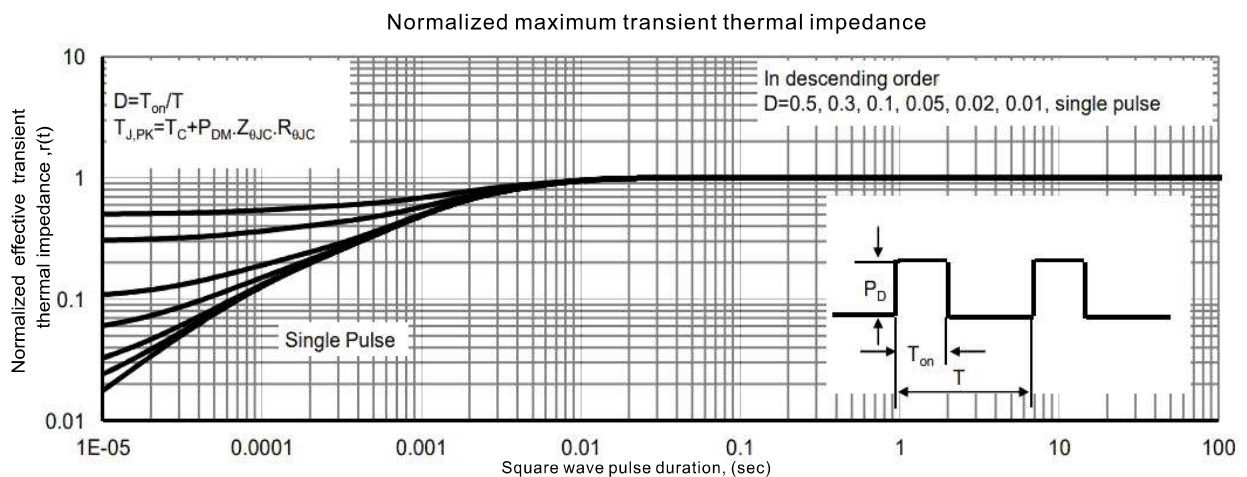
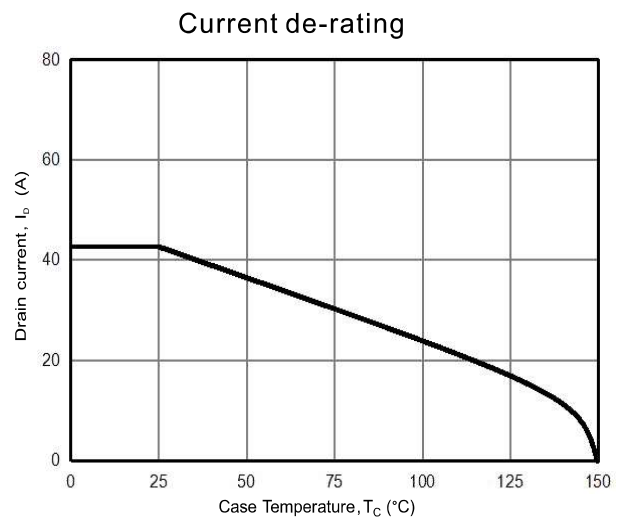
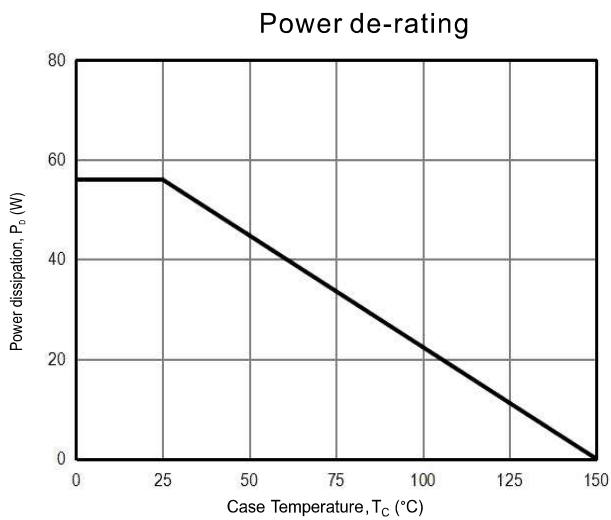
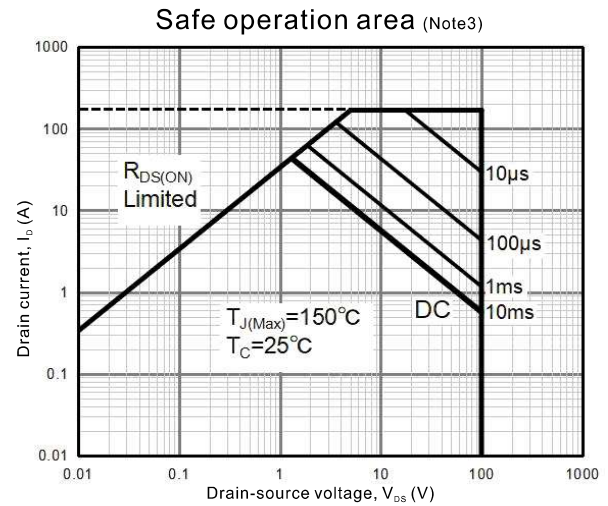
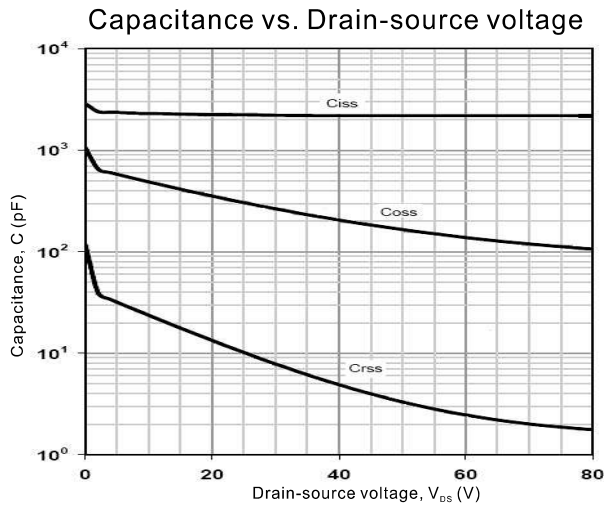
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Rating and characteristic curves



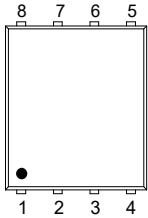
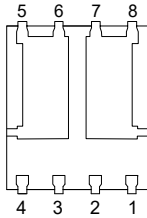
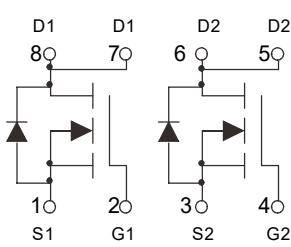
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Rating and characteristic curves



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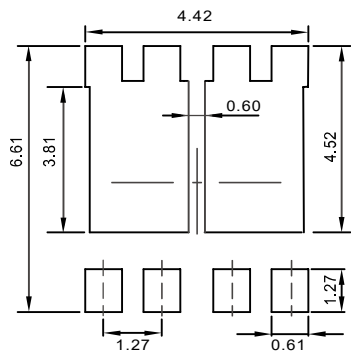
Pinning information

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

Marking

Type number	Marking code
FMOSTHAT42N10-H	P15ND10AG

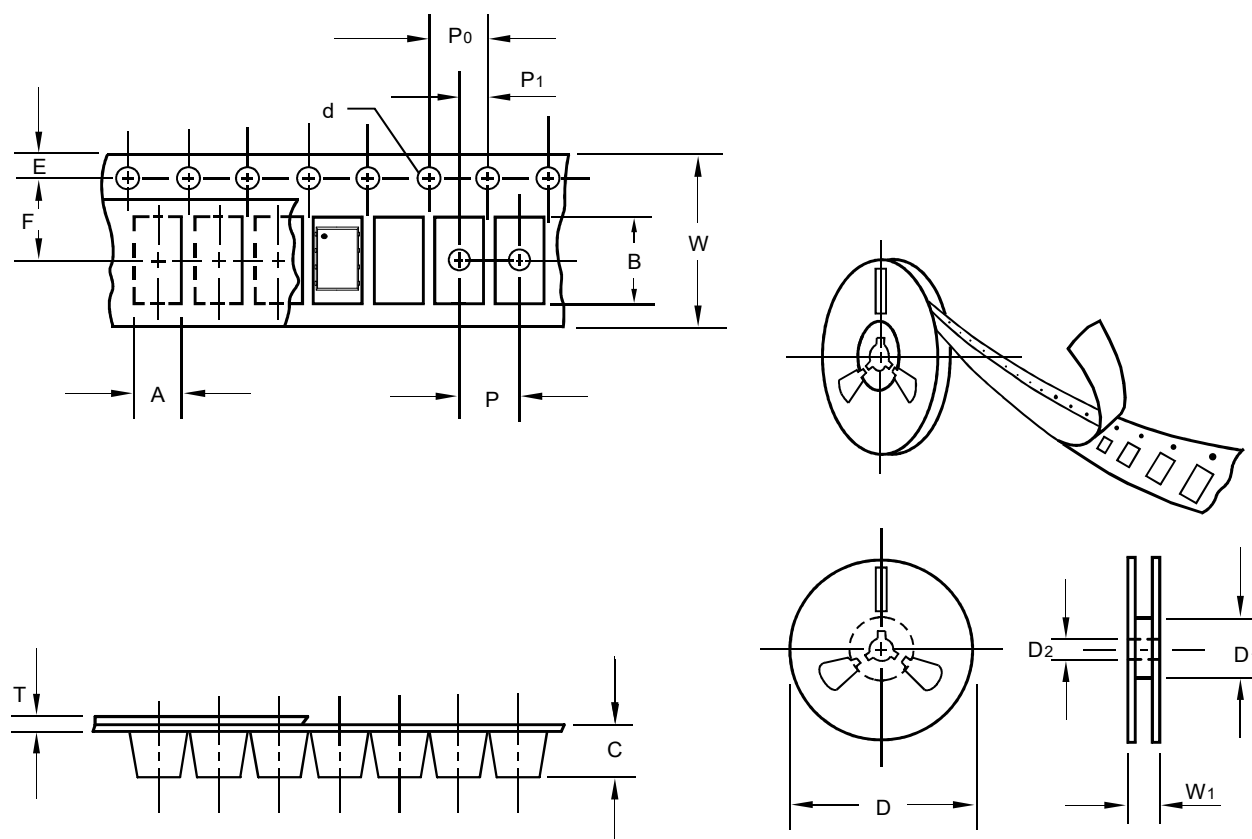
Suggested solder pad layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only.

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Packing information



unit:mm

Item	Symbol	Tolerance	T5060P8 Dual
Carrier width	A	0.1	6.40
Carrier length	B	0.1	5.40
Carrier depth	C	0.1	1.25
Sprocket hole	d	0.1	1.55
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D ₁	min	100.00
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D ₁	min	-
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.30
Tape width	W	0.3	12.00
Reel width	W ₁	1.0	17.60

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

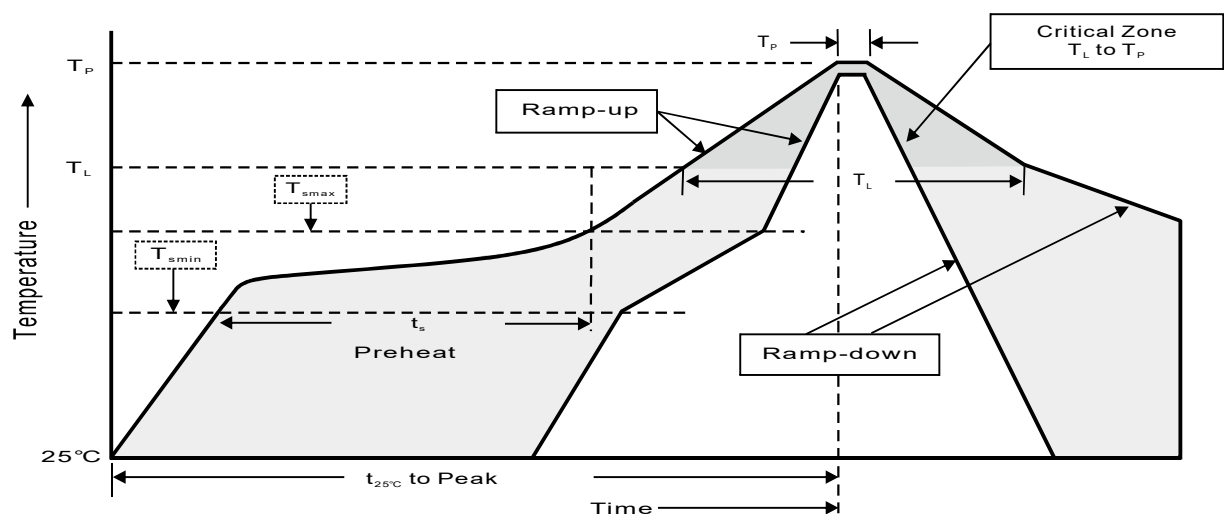
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Reel packing

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)
T5060P8 Dual	13"	5,000	4.0	10,000	335*335*38	330	350*350*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 ~ 120 sec
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 with 5°C of actual peak temperature (T_P)	10 ~30 sec
Ramp-down rate	< 6 °C/sec
Time 25°C to peak temperature	< 6 minutes