

FMOSGTAC375N04-H

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FMOSGTAC375N04-H

375A 40V N-Channel Shield Gate Trench
Enhancement Mode Power MOSFET

Features

- $V_{DS} = 40V$, $I_D = 375A$.
- $R_{DS(ON)} \leq 0.85\text{ m}\Omega$, @ $V_{GS} = 10V$, $I_D = 20A$.
- $R_{DS(ON)} \leq 1.35\text{ m}\Omega$, @ $V_{GS} = 4.5V$, $I_D = 20A$.
- 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).

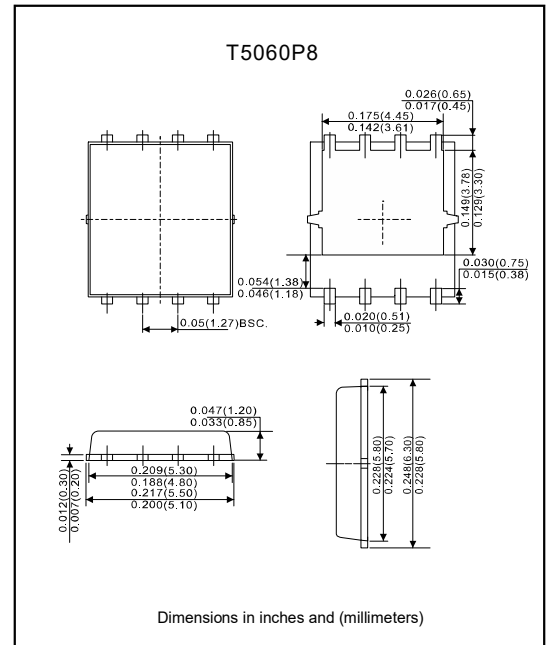
Application

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

Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : Molded plastic, T5060P8 (DFN5060-8).
- Weight : Approximated 105mg.

Package outline

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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	40	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_c = 100^\circ\text{C}$)	I_D	375	A
		236	
Pulsed drain current tested	I_{DM}	1500	A
Single pulse avalanche energy (Note 1)	E_{AS}	1797	mJ
Derating factor	-	1.6	W/ $^\circ\text{C}$
Power dissipation	P_D	200	W
Thermal resistance, junction to case	$R_{\theta JC}$	0.63	$^\circ\text{C}/\text{W}$
Operating junction temperature	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu A$, $V_{GS}=0V$	40			V
Drain-source leakage current	I_{DSS}	$V_{DS}=40V$, $V_{GS}=0V$			1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V$, $V_{DS}=0V$			± 100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.0	1.7	2.5	V
Static drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=20A$		0.60	0.85	m Ω
		$V_{GS}=4.5V$, $I_D=20A$		0.95	1.35	
Forward trans conductance	g_{FS}	$V_{DS}=10V$, $I_D=20A$		50		S
Dynamic parameters						
Input capacitance	C_{iss}	$V_{GS}=0V$, $V_{DS}=20V$, $f=1.0MHz$		7600		pF
Out capacitance	C_{oss}			1950		
Reverse transfer capacitance	C_{rss}			150		
Switching parameters (Note2)						
Total gate charge	Q_g	$V_{GS}=10V$, $V_{DS}=20V$, $I_D=20A$		140		nC
Gate to source charge	Q_{gs}			24		
Gate to drain charge	Q_{gd}			30		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=20V$, $V_{GS}=10V$, $R_G=1.6\Omega$, $I_D=20A$		30		ns
Rise time	t_r			50		
Turn-off delay time	$t_{d(off)}$			90		
Fall time	t_f			35		
Source-drain diode ratings and characteristics						
Diode forward voltage	V_{SD}	$I_S=20A$, $V_{GS}=0V$			1.2	V
Diode forward current	I_S				375	A
Body diode reverse recovery time	t_{rr}	$I_F=20A$, $T_J=25^{\circ}C$, $di/dt=100A/\mu s$		100		nS
Body diode reverse recovery charge	Q_{rr}			66		nC

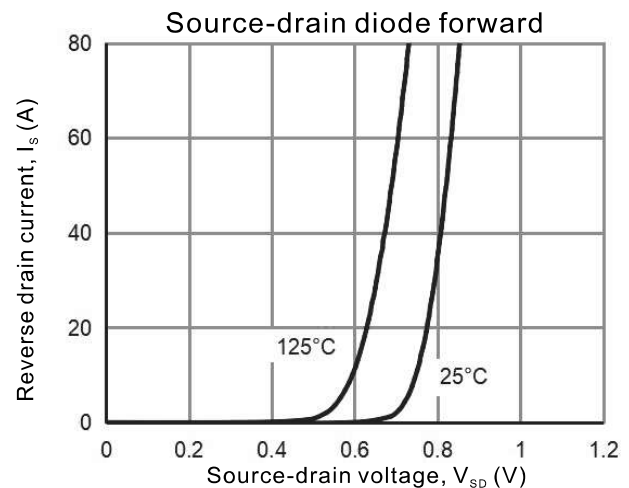
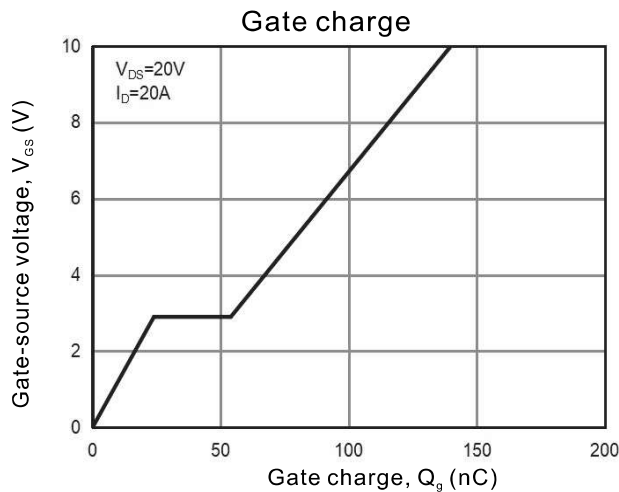
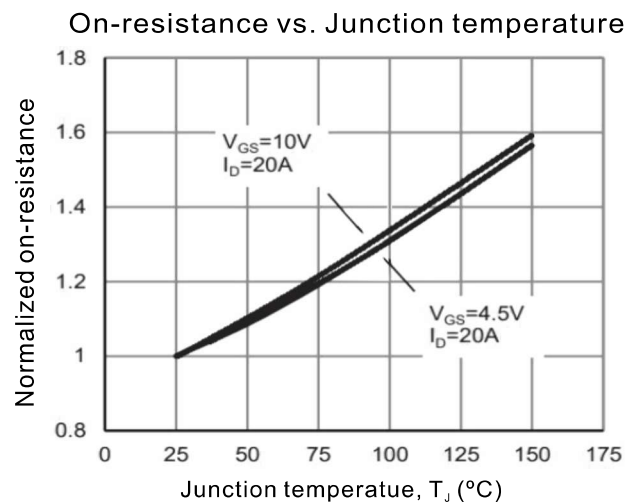
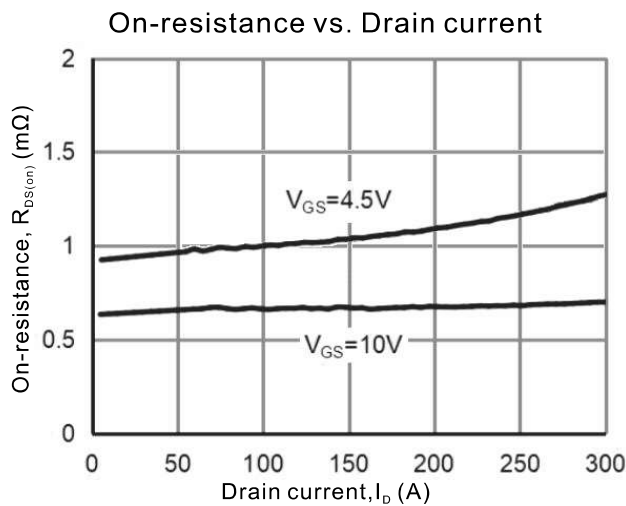
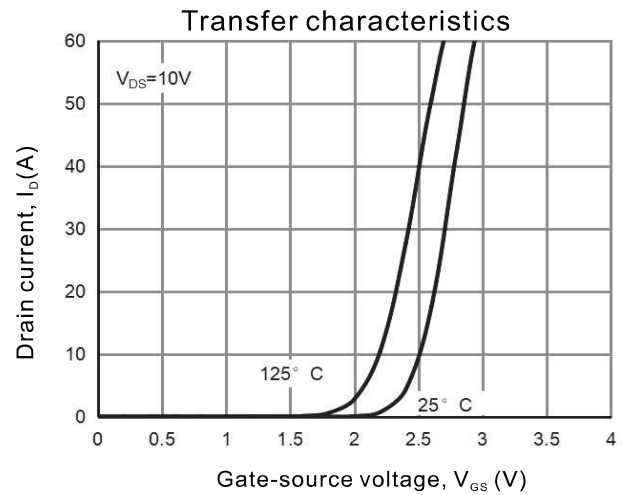
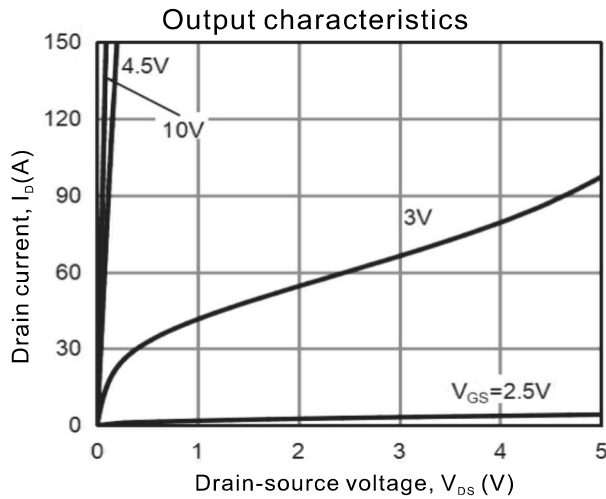
Note: 1. E_{AS} condition: $T_J=25^\circ\text{C}$, $V_{DD}=20\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$.

2. Guaranteed by design, not subject to production.

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

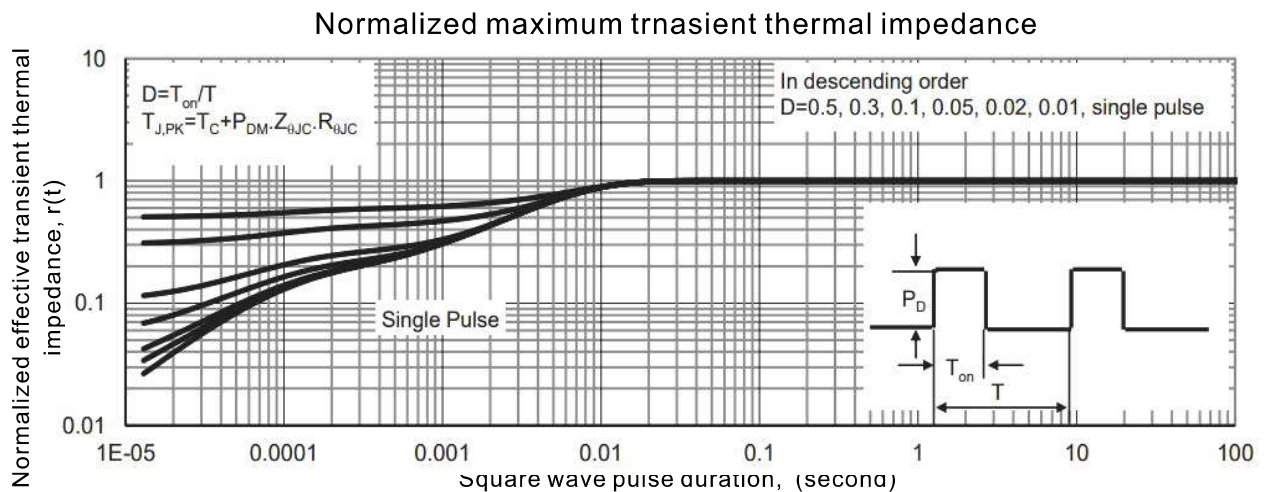
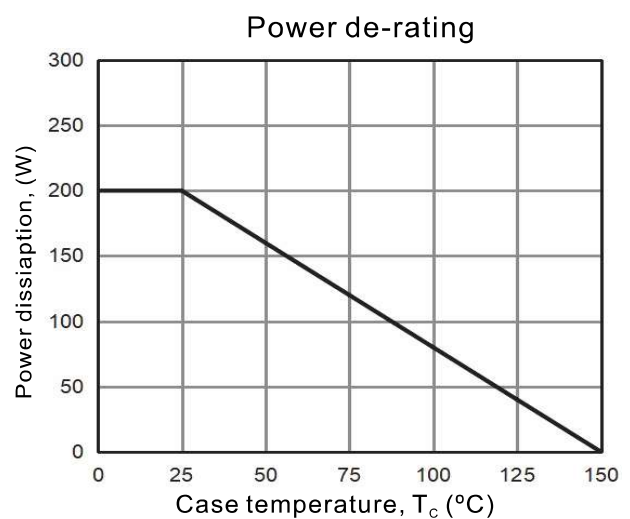
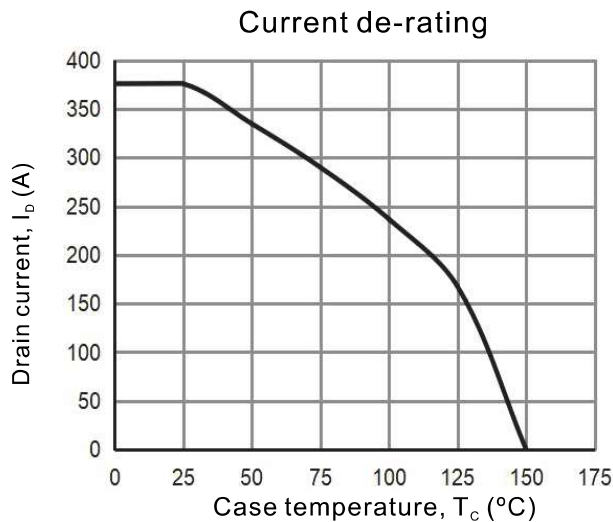
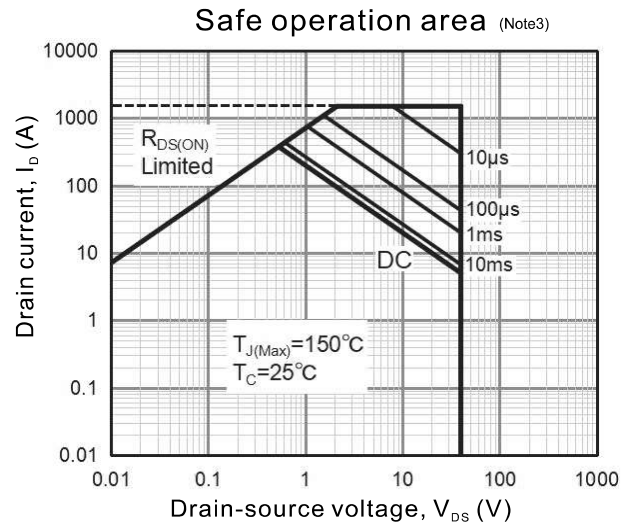
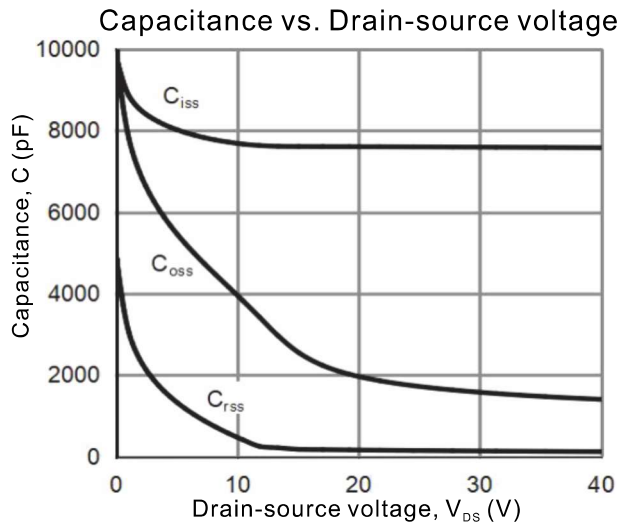
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Rating and characteristic curves



FMOSGTAC375N04-H

Rating and characteristic curves



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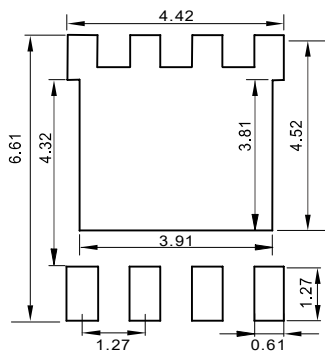
Pinning information

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

Marking

Type number	Marking code
FMOSGTAC375N04-H	P008NH40GU

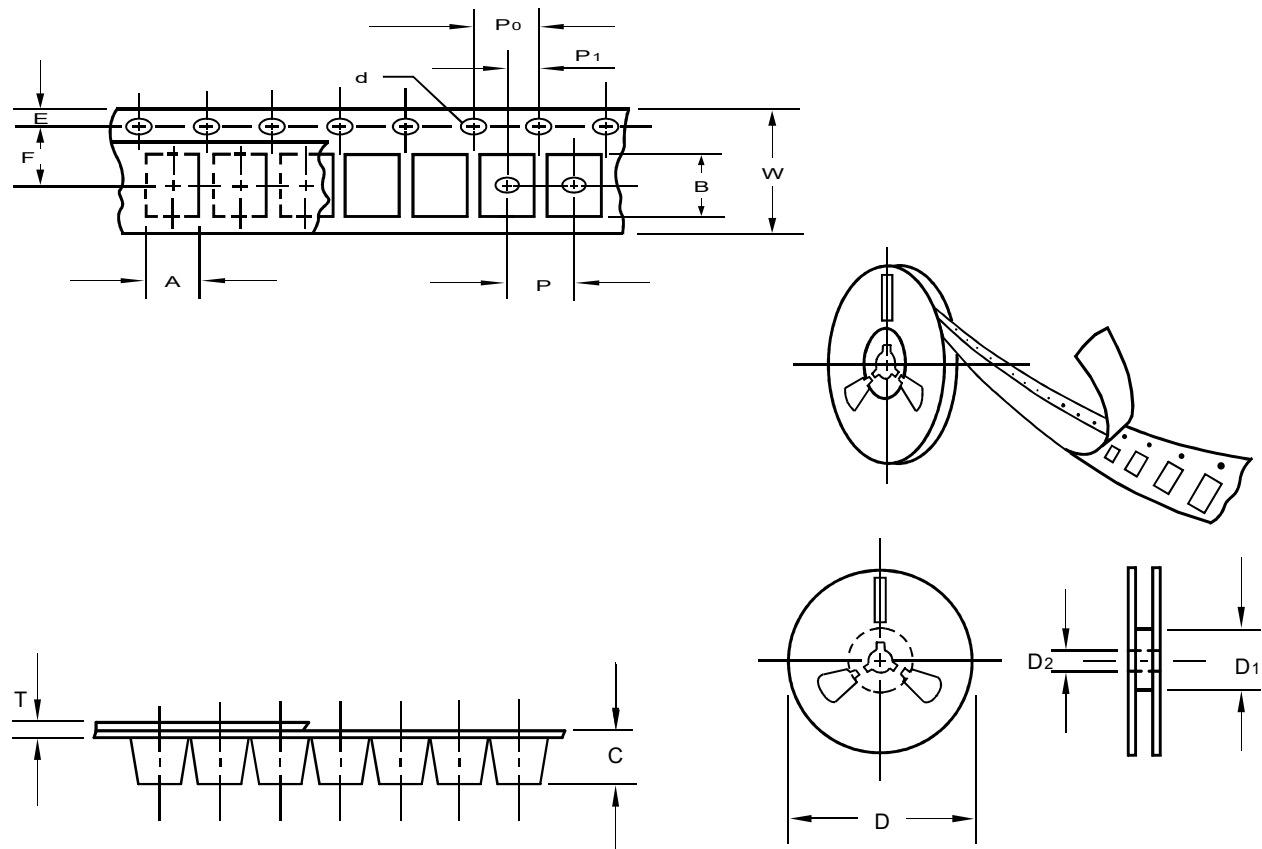
Suggested solder pad layout



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
Carrier width	A	0.3	6.40
Carrier length	B	0.3	5.40
Carrier depth	C	0.3	1.20
Sprocket hole	d	0.3	1.55
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	0.3	1.75
Punch hole position	F	0.3	5.50
Punch hole pitch	P	0.3	8.00
Sprocket hole pitch	P0	0.3	4.00
Embossment center	P1	0.3	2.00
Overall tape thickness	T	0.3	0.25
Tape width	W	0.3	12.0

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

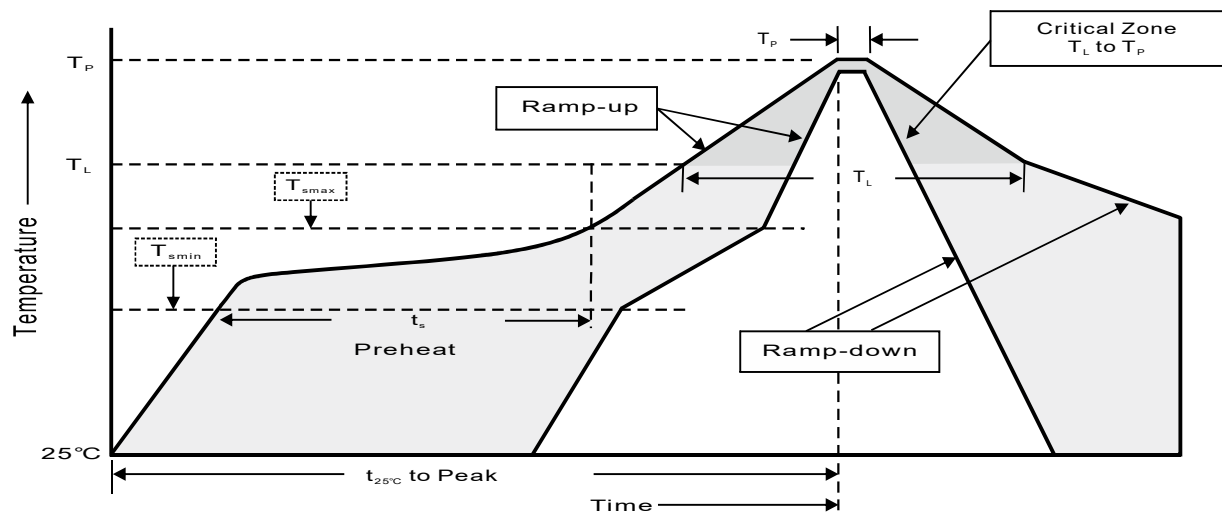
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Reel packing

Device	Outline	Device Package	Reel Size
FMOSGTAC375N04-H	Taping	T5060P8	13 inch

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