

FMOSGTAC100N08-Q1-H

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FMOSGTAC100N08-Q1-H**100A 80V N-Channel Shield Gate Trench
Enhancement Mode Power MOSFET****Features**

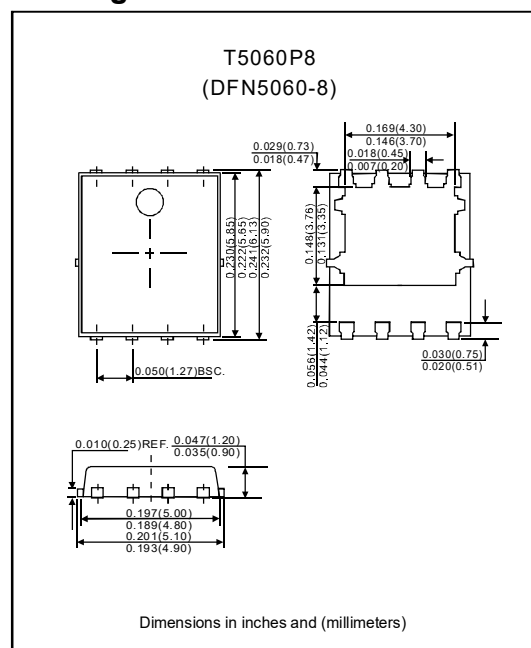
- $V_{DS}=80V$, $I_D=100A$.
- $R_{DS(ON)} \leq 3.9m\Omega$, @ $V_{GS}=10V$, $I_D=30A$.
- $R_{DS(ON)} \leq 6.0m\Omega$, @ $V_{GS}=6.0V$, $I_D=30A$.
- Good stability and uniformity with high E_{AS} .
- High density cell design for ultra-low on-resistance.
- Excellent package for good heat dissipation.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Applications

- Battery switch, load switch and networking.
- LED application and motor drive application.
- Power tools.

Mechanical data

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

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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	80	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current (Note1)	I_D	100	A
Pulsed drain current (Note2)	I_{DM}	400	A
Single pulse avalanche energy (Note3)	E_{AS}	560	mJ
Power dissipation (Note1)	P_D	125	W
Thermal resistance, junction to ambient (Note4)	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal resistance, junction to case	$R_{\theta JC}$	1.2	$^\circ C/W$
Operating Junction temperature	T_J	+175	$^\circ C$
Storage temperature range	T_{STG}	-55 to +175	$^\circ C$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DS}	$I_D=1.0\text{mA}$, $V_{GS}=0\text{V}$	80			V
Drain-source leakage current	I_{DSS}	$V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$			1	μA
		$V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			100	
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$			± 100	nA

On characteristics (Note5)

Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	2.0	2.7	4.0	V
Static drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=30\text{A}$		3.0	3.9	m Ω
		$V_{GS}=6.0\text{V}$, $I_D=30\text{A}$		4.0	6.0	

Dynamic parameters (Note6)

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=40\text{V}$, $f=100\text{kHz}$		3700		pF
Out capacitance	C_{oss}			890		
Reverse transfer capacitance	C_{rss}			19		
Gate resistance	R_g	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1.0\text{MHz}$		2.8		Ω

Switching parameters (Note6)

Total gate charge	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=40\text{V}$, $I_D=50\text{A}$		54		nC
Gate to source charge	Q_{gs}			14		
Gate to drain charge	Q_{gd}			12		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=40\text{V}$, $V_{GS}=10\text{V}$, $R_G=2.5\Omega$, $I_D=50\text{A}$, $R_L=0.8\Omega$		11.5		ns
Rise time	t_r			12.0		
Turn-off delay time	$t_{d(off)}$			42.6		
Fall time	t_f			14.0		

Source-drain diode ratings and characteristics

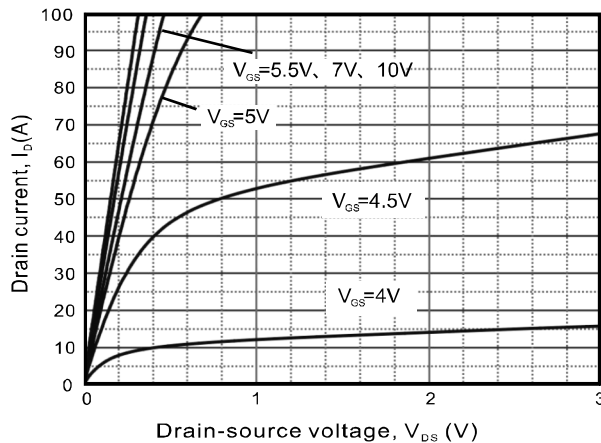
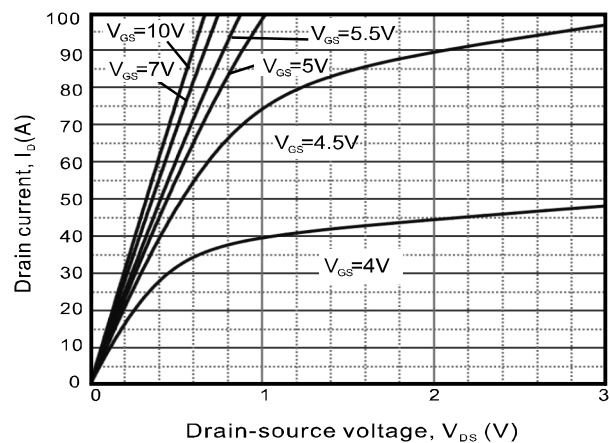
Drain-source diode forward voltage (Note 5)	V_{SD}	$I_S=10\text{A}$, $V_{GS}=0\text{V}$			1.1	V
Continuous source current (Note 1)	I_S				100	A
Pulsed drain-source diode forward (Note 2)	I_{SM}				400	A
Reverse recovery time	t_{rr}	$V_R=40\text{V}$, $I_F=50\text{A}$, $di_F/dt=200\text{A}/\mu\text{s}$		47		ns
Reverse recovery charge	Q_{rr}			125		nC

Note : 1. $T_C=25^{\circ}\text{C}$.2. Pulse width $\leq 10\mu\text{s}$, duty cycle $\leq 1\%$.3. Test condition: $V_{DS}=40\text{V}$, $V_{GS}=10\text{V}$, $L=0.5\text{mH}$, $R_G=25\Omega$, starting at $T_J=25^{\circ}\text{C}$.4. Measured with the device mounted on 1 inch² FR-4 board with 2oz. copper, in a still air environment with $T_A=25^{\circ}\text{C}$.5. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

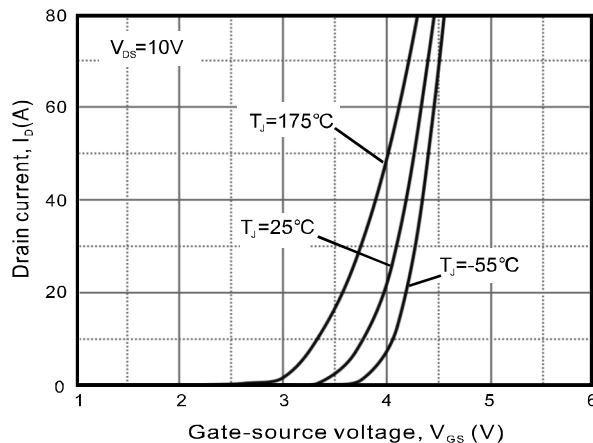
6. Guaranteed by design, not subject to production.

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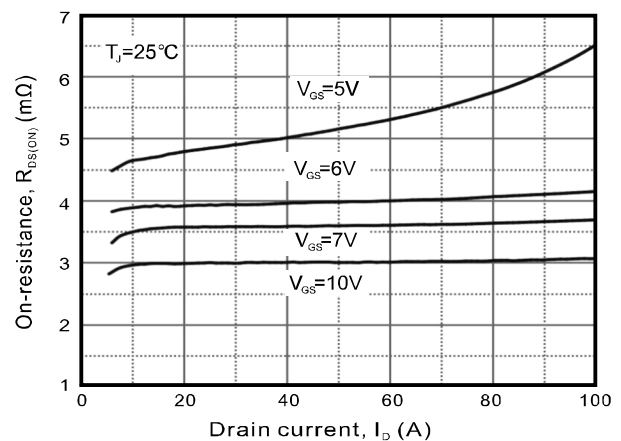
Rating and characteristic curves

Output characteristics ($T_J=25^\circ\text{C}$)Output characteristics ($T_J=175^\circ\text{C}$)

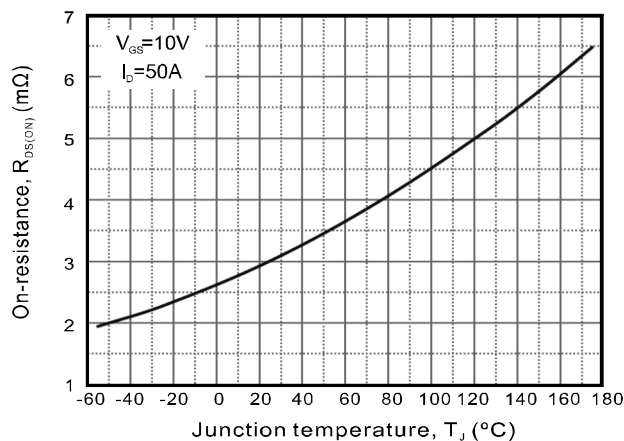
Transfer characteristics



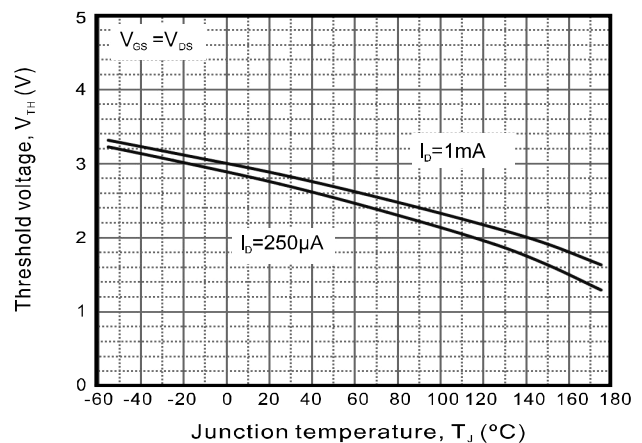
On resistance vs. Drain current



On-resistance vs Junction temperature

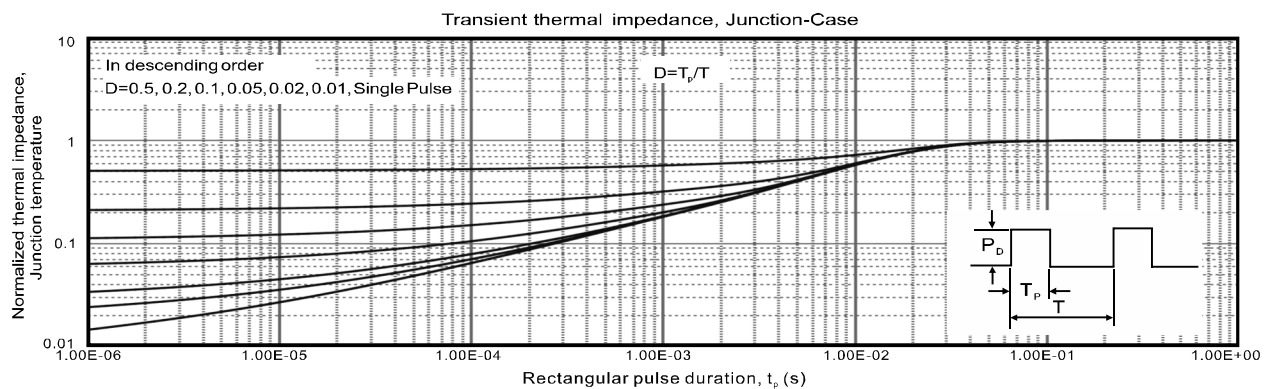
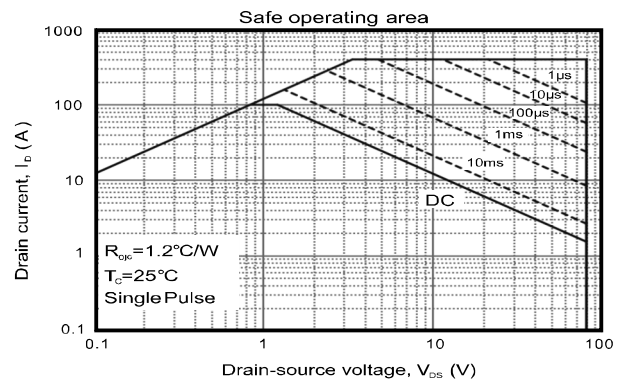
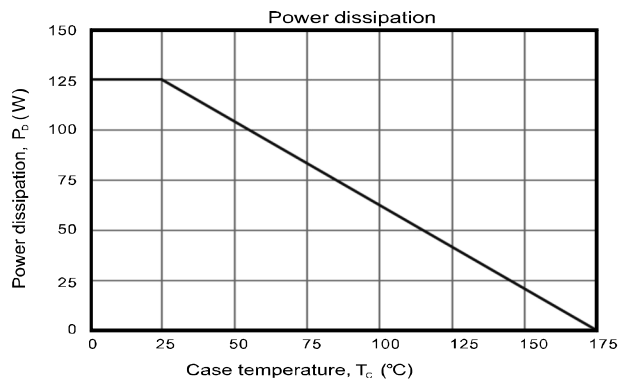
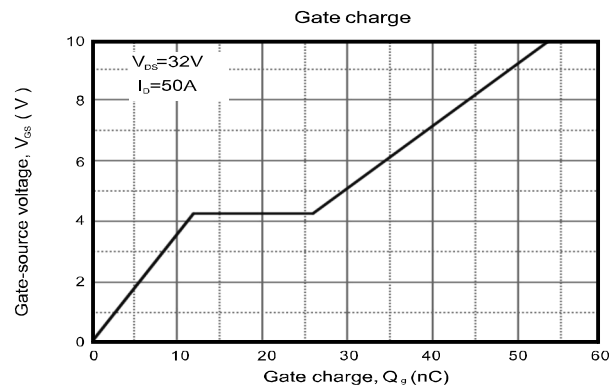
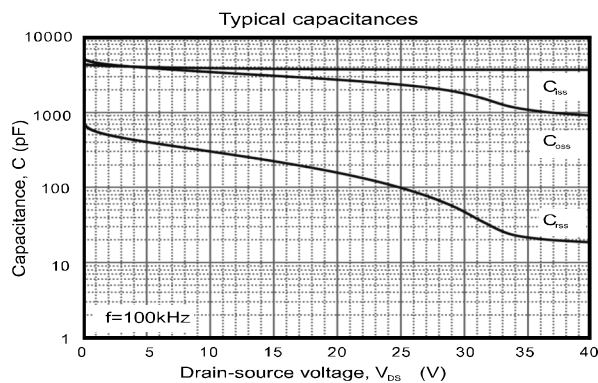
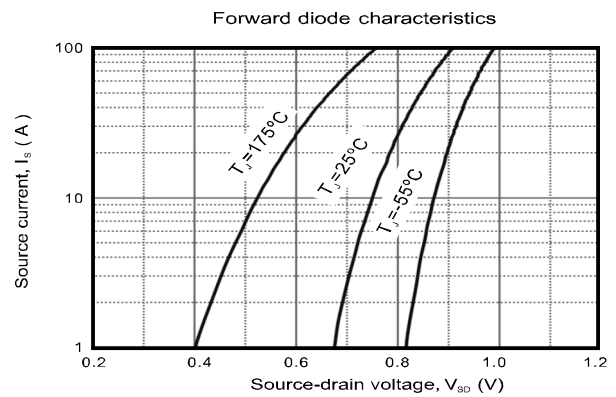
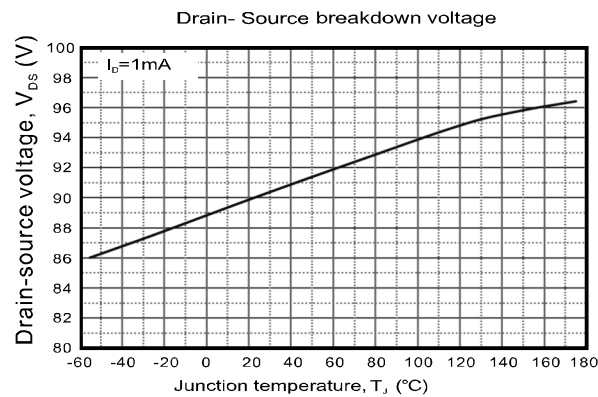


Gate threshold vs. Junction temperature



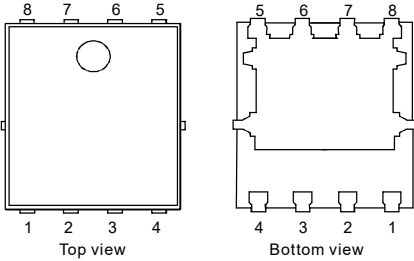
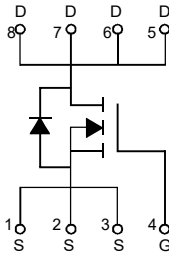
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Rating and characteristic curves



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Pinning information

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

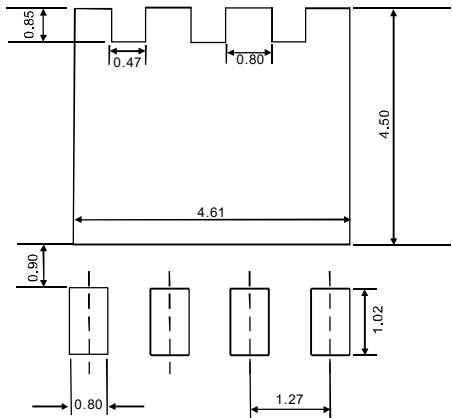
Marking

Type number	Marking code
FMOSGTAC100N08-Q1-H	AC100N08 XX

*XX: Wafer date code

Suggested solder pad layout

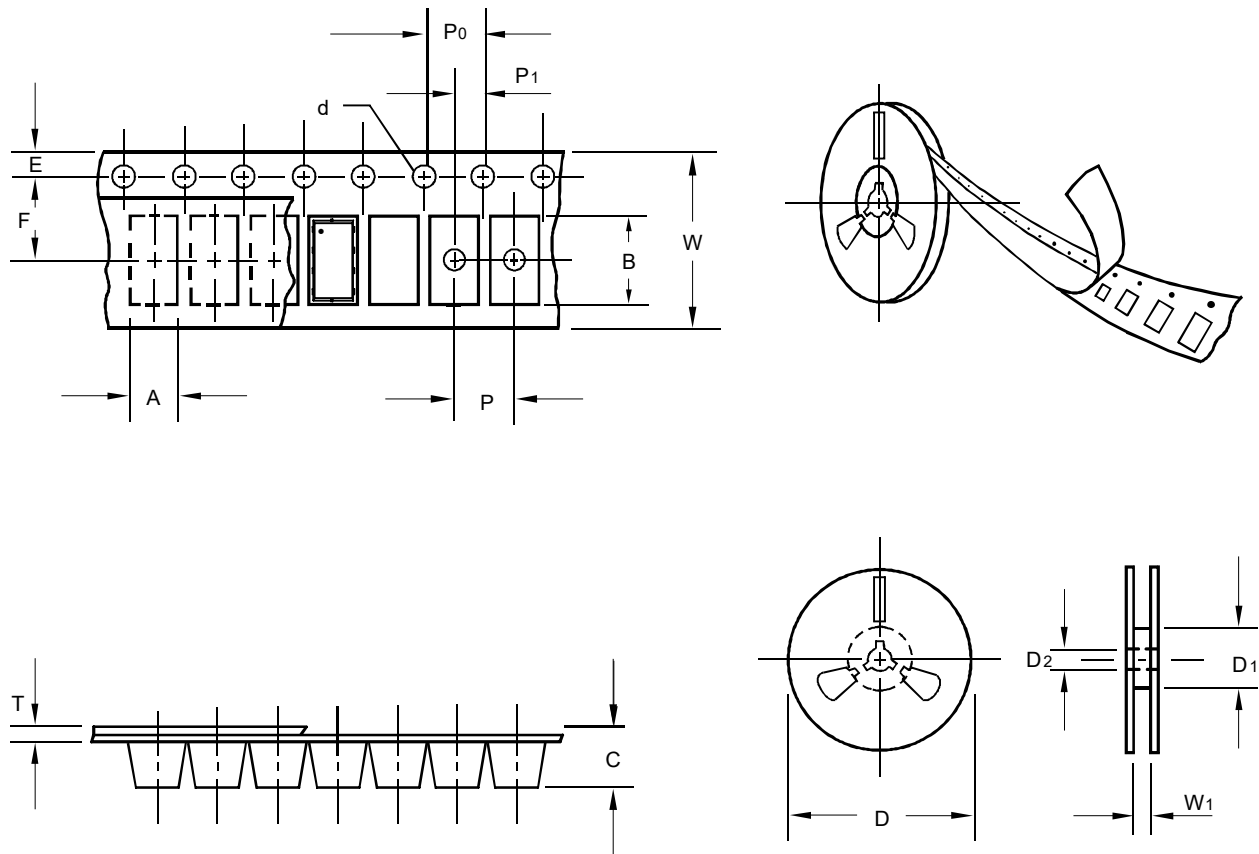
T5060P8



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.1 mm.
3. The pad layout is for reference purposes only.

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Packing information



unit:mm

Item	Symbol	Tolerance	T5060P8 (DFN5060-8)
Carrier width	A	0.5	6.30
Carrier length	B	0.5	5.30
Carrier depth	C	0.5	1.10
Sprocket hole	d	0.5	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	13.50
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
Tape width	W	0.5	12.00
Reel width	W1	5.0	12.40

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

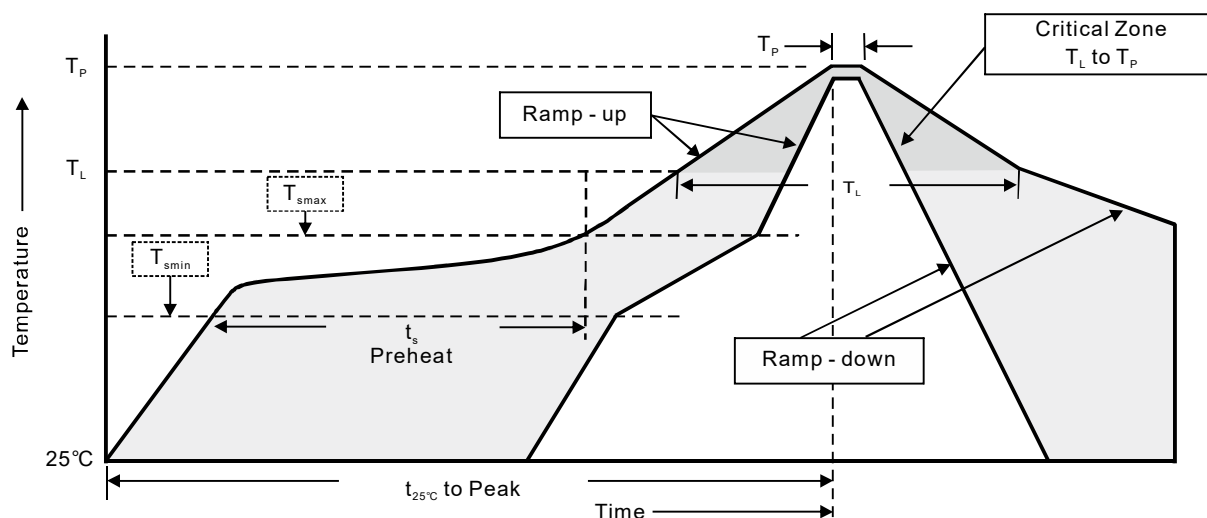
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Reel packing

Device	Outline	Device Package	Reel Size	Reel (pcs)
FMOSGTAC100N08-Q1-H	Taping	T5060P8	13 inch	5,000

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 (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