

FMOSAC254N03

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FMOSAC254N03

254A 30V N-Channel Enhancement Mode MOSFET

Features

- $V_{DS}=30V$, $I_D=254A$.
- $R_{DS(ON)} \leq 1.0m\Omega @ V_{GS}=10V, I_D=20A$.
- $R_{DS(ON)} \leq 1.4m\Omega @ V_{GS}=4.5V, I_D=15A$.
- Very low $R_{DS(ON)}$ at $4.5V_{GS}$.
- Reliable and rugged.
- 100% UIS and Rg tested.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. FMOSAC254N03-H.

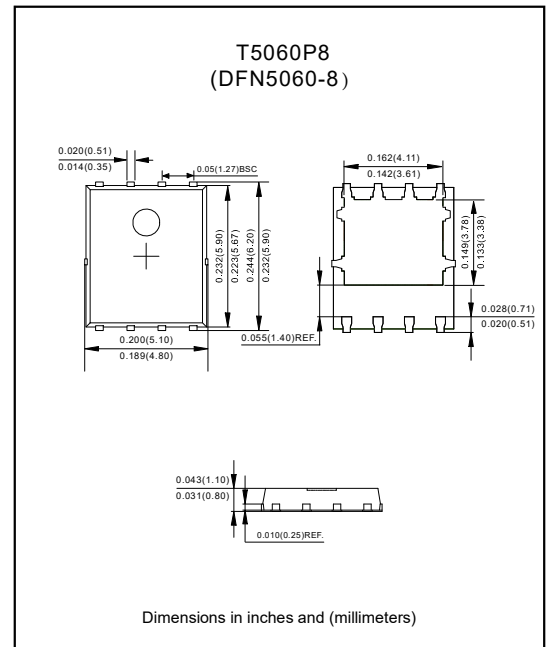
Application

- Power load switch.
- Motor control.

Mechanical data

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

Package outline



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

Parameter	Symbol	Ratings	Unit	
Drain-source voltage	V_{DS}	30	V	
Gate-source voltage	V_{GS}	± 20	V	
Diode continuous forward current	I_s	87	A	
Continuous drain current	I_D	($T_C=25^\circ C$)	254	
		($T_C=100^\circ C$)	160	
		($T_A=25^\circ C$)	42	
		($T_A=70^\circ C$)	33	
Pulsed drain current tested (Note 1)	($T_C=25^\circ C$)	I_{DM}	400	A
Avalanche current, Single pulse (Note 2)	($L=0.3mH$)	I_{AS}	50	A
Avalanche energy, Single pulse (Note 2)	($L=0.3mH$)	E_{AS}	375	mJ
Power dissipation	P_D	($T_C=25^\circ C$)	96	
		($T_C=100^\circ C$)	39	
		($T_A=25^\circ C$)	2.5	
		($T_A=70^\circ C$)	1.6	
Operating Junction temperature	T_J	+150	$^\circ C$	
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$	
Thermal resistance junction to ambient (Note 3)	$R_{\theta JA}$	50	$^\circ C/W$	
Thermal resistance Junction to case	$R_{\theta JC}$	1.3	$^\circ C/W$	

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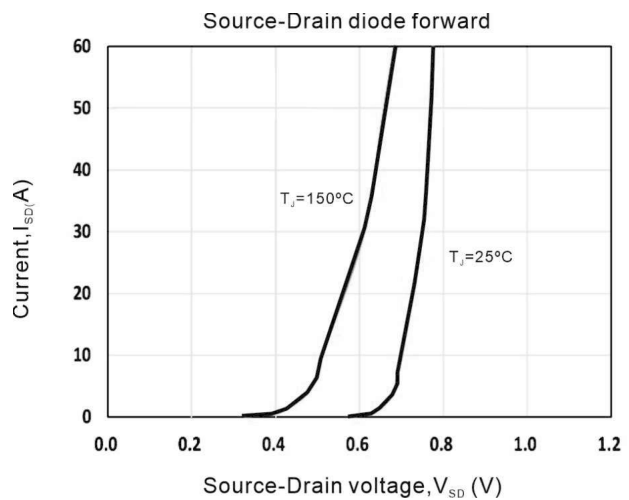
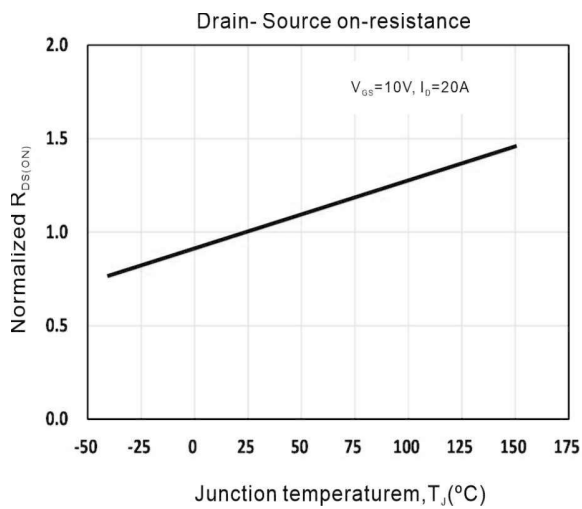
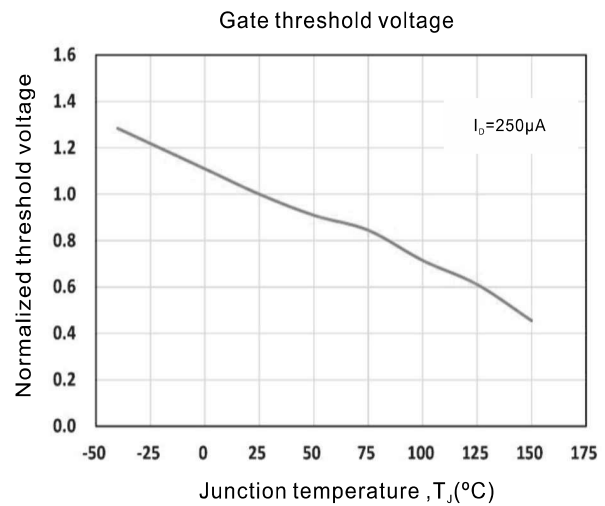
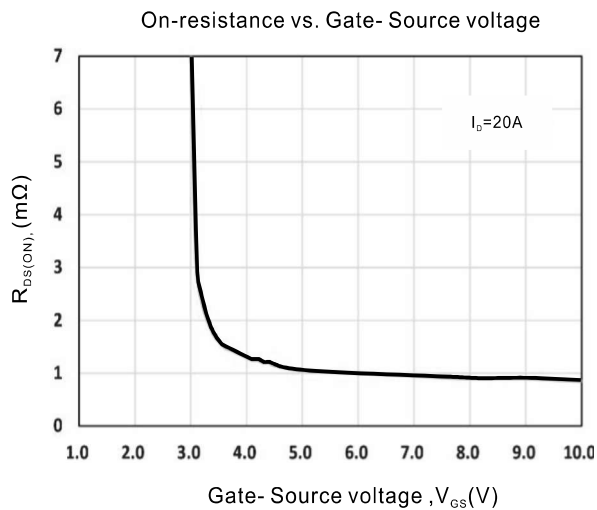
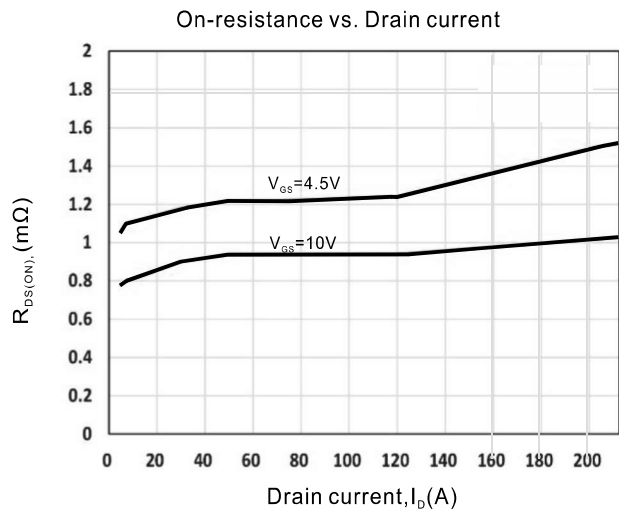
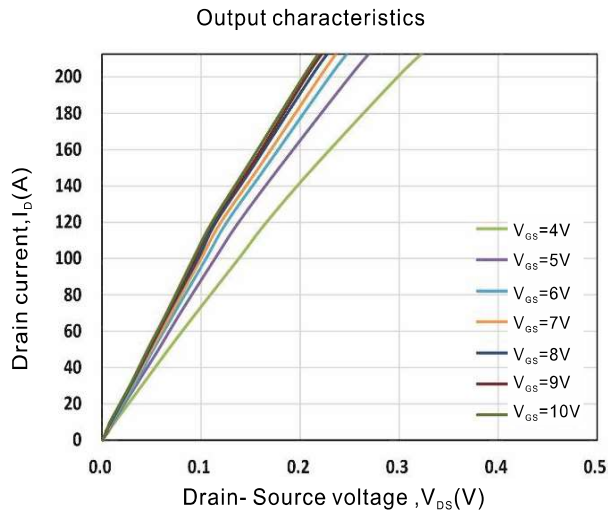
Electrical characteristics (At $T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	30			V
Drain-source leakage current	I_{DSS}	$V_{DS}=24\text{V}, V_{GS}=0\text{V}$			1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$			± 100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	1	1.5	2	V
Static drain-source on-resistance (Note 4)	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=20\text{A}$		0.85	1	m Ω
		$V_{GS}=4.5\text{V}, I_D=15\text{A}$		1.1	1.4	
Forward trans conductance	g_{FS}	$V_{DS}=5\text{V}, I_D=10\text{A}$		54		S
Dynamic parameters (Note 5)						
Gate resistance	R_G	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, F_{req.}=1\text{MHz}$		4		Ω
Input capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=15\text{V}, F_{req.}=1.0\text{MHz}$		6545		pF
Out capacitance	C_{oss}			996		
Reverse transfer capacitance	C_{rss}			772		
Switching parameters						
Total gate charge	Q_g	$V_{GS}=4.5\text{V}, V_{DS}=15\text{V}, I_D=20\text{A}$		84		nC
				175.7		
				30.6		
Gate to source charge	Q_{gs}	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, I_D=20\text{A}$		30.6		nC
Gate to drain charge	Q_{gd}			30		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=15\text{V}, V_{GS}=10\text{V}, R_G=6\Omega, I_D=1\text{A}$		14		ns
Rise time	t_r			24.1		
Turn-off delay time	$t_{d(off)}$			330		
Fall time	t_f			133.5		
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage (Note 4)	V_{SD}	$I_S=10\text{A}, V_{GS}=0\text{V}$		0.7	1.1	V
Body diode reverse recovery time	t_{rr}	$V_R=15\text{V}, I_F=10\text{A}, di_F/dt=100\text{A}/\mu\text{s}$		36.9		ns
Body diode reverse recovery charge	Q_{rr}			35.6		nC

- Note: 1. Max. current is limited by bonding.
2. UIS tested and pulse width are limited by maximum junction temperature 150°C .
3. Surface mounted on 1in^2 FR-4 board with 1oz.
4. Pulse tere (pulse width $\leq 300\mu\text{A}$, duty cycle $\leq 2\%$).
5. Guaranteed by design, not subject to production testing.

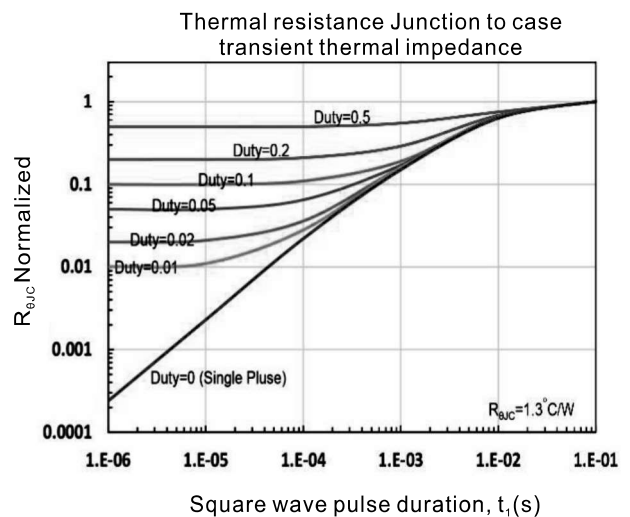
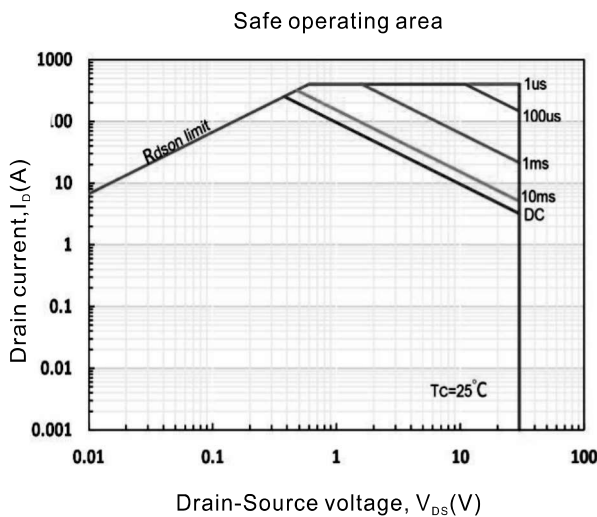
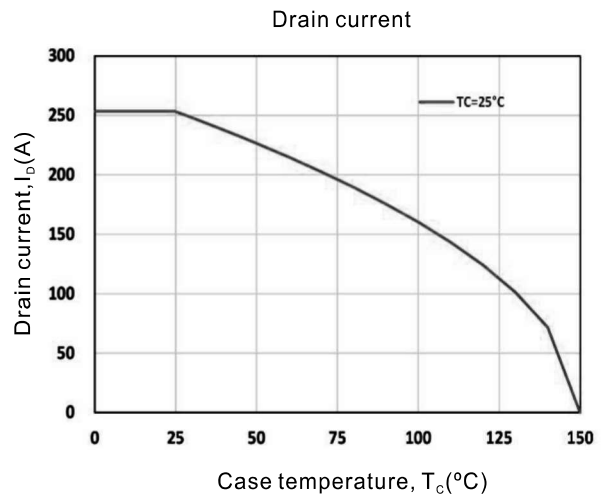
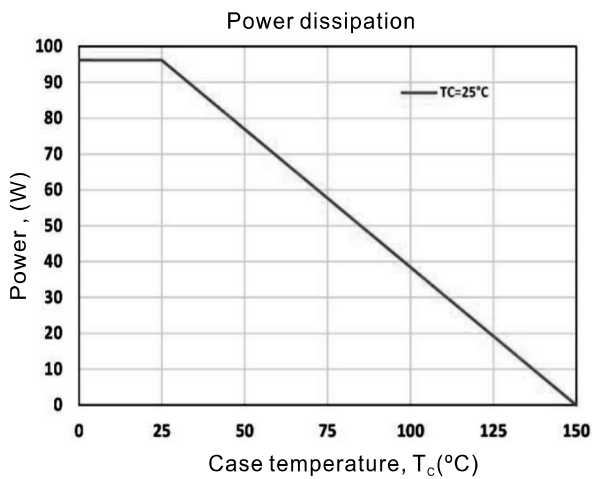
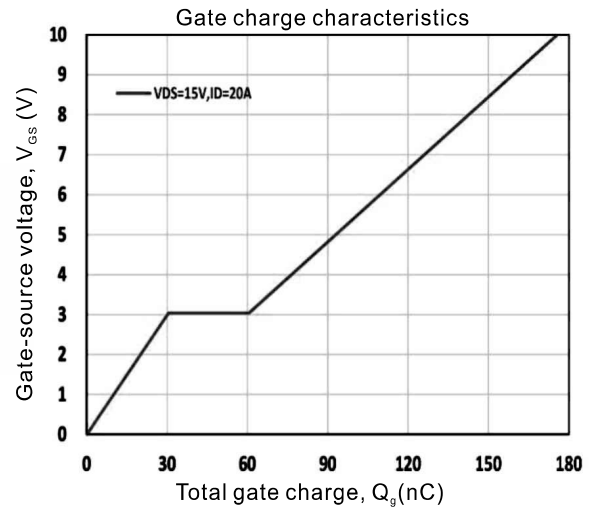
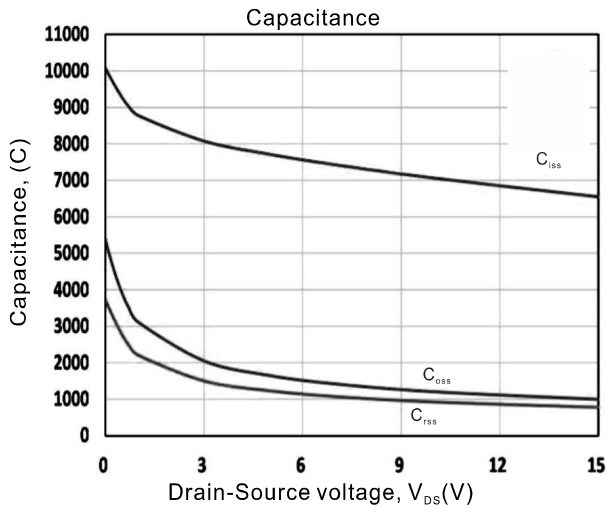
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Rating and characteristic curves



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Rating and characteristic curves



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Pinning information

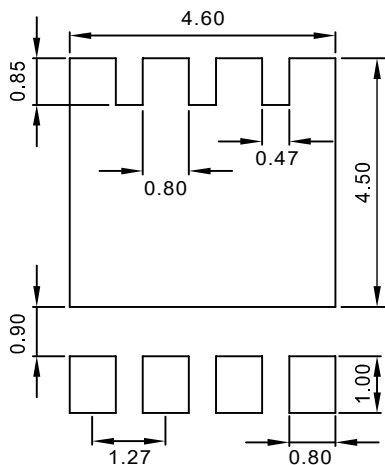
Pin	Simplified outline	Symbol
Pin1 Source Pin2 Source Pin3 Source Pin4 Gate Pin5 Drain Pin6 Drain Pin7 Drain Pin8 Drain	<p>Top view</p> <p>Bottom view</p>	<p>1 2 3 4 S S S G</p> <p>5 6 7 8 D D D D</p>

Marking

Type number	Marking code
FMOSF01NP02E	

*YWW:Wafer Lot Code
 Y: Year
 WW: Week
 SS:Sequence
 X: Assy.code

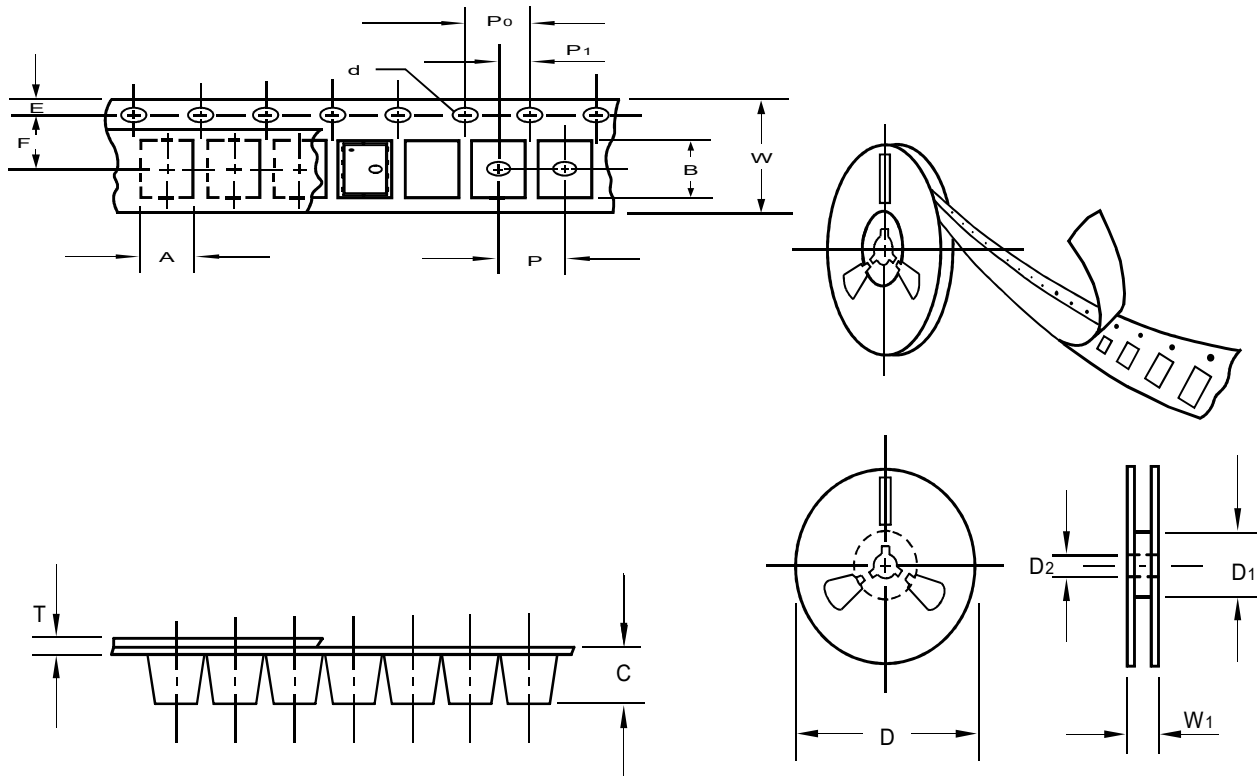
Suggested solder pad layout



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	0.1	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	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	0.30
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.

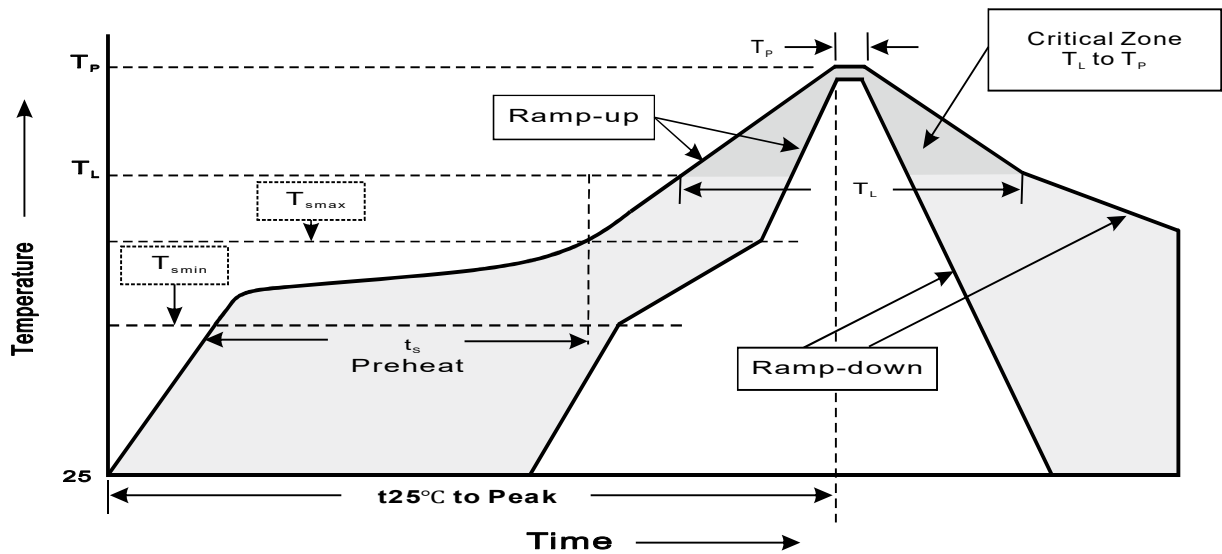
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Reel packing

Device	Outline	Device Package	Reel Size	Reel (pcs)	Per Carton (pcs)
FMOSAC254N03	Taping	T5060P8	13 inch	5000	60000

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