

FMOSAC3004

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FMOSAC3004

58A 30V N-Channel Fast Switching Power MOSFET

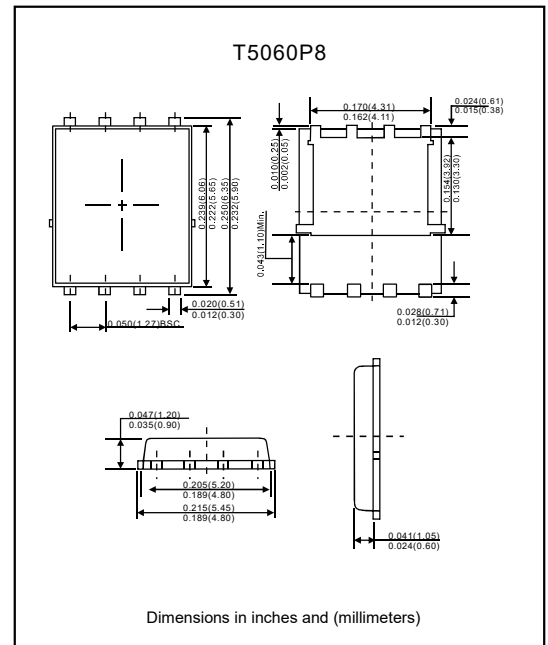
Features

- $V_{DS}=30V$, $I_D=58A$.
- $R_{DS(ON)} < 8.5m\Omega$, @ $V_{GS}=10V$, $I_D=30A$.
- $R_{DS(ON)} < 14m\Omega$, @ $V_{GS}=4.5V$, $I_D=15A$.
- 100% E_{AS} Guaranteed.
- Super low gate charge.
- Excellent CdV/dt effect decline.
- Advanced high cell density trench technology.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. FMOSAC3004-H.

Mechanical data

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

Package outline

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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain Current (Note1)	I_D	$V_{GS}=10V, T_c=25^\circ C$ 58	A
		$V_{GS}=10V, T_c=100^\circ C$ 38	
		$V_{GS}=10V, T_A=25^\circ C$ 12	
		$V_{GS}=10V, T_A=70^\circ C$ 9.6	
Pulsed drain current (Note2)	I_{DM}	115	A
Single pulse avalanche energy (Note3)	E_{AS}	57.8	mJ
Avalanche current	I_{AS}	34	A
Power dissipation (Note4)	P_D	$T_c=25^\circ C$ 46	W
		$T_A=25^\circ C$ 2	
Operating Junction temperature range	T_J	-55 to +150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$
Thermal resistance Junction to ambient (Note1)	$R_{\theta JA}$	62	$^\circ C/W$
Thermal resistance Junction to case (Note1)	$R_{\theta JC}$	2.7	$^\circ C/W$

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 $\leq 300\mu s$, duty cycle $\leq 2\%$.

3. The E_{AS} data shows Max. rating. The test condition is $V_{DS}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=34A$.

4. The power dissipation is limited by $150^\circ C$ junction temperature.

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

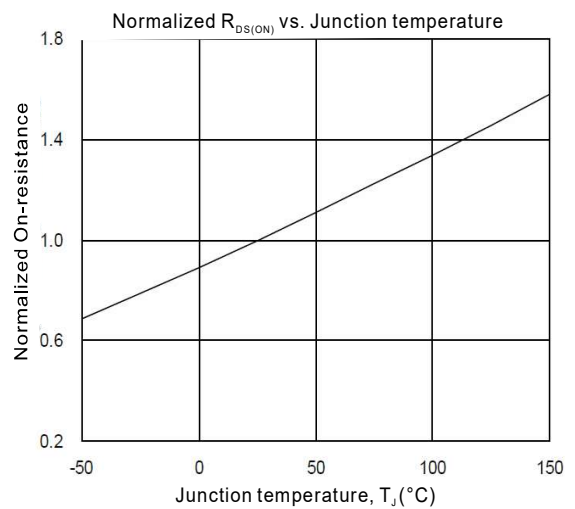
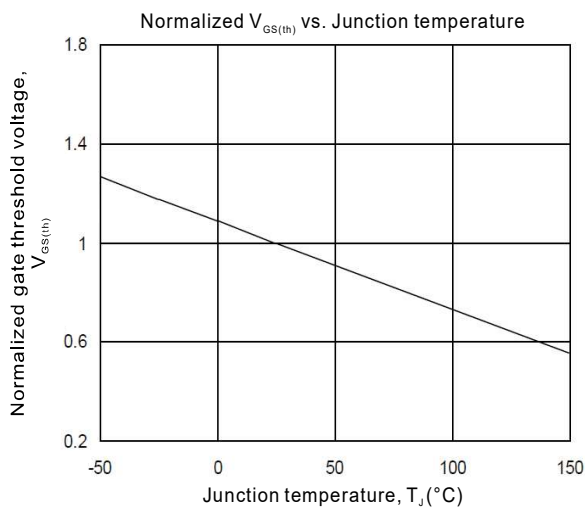
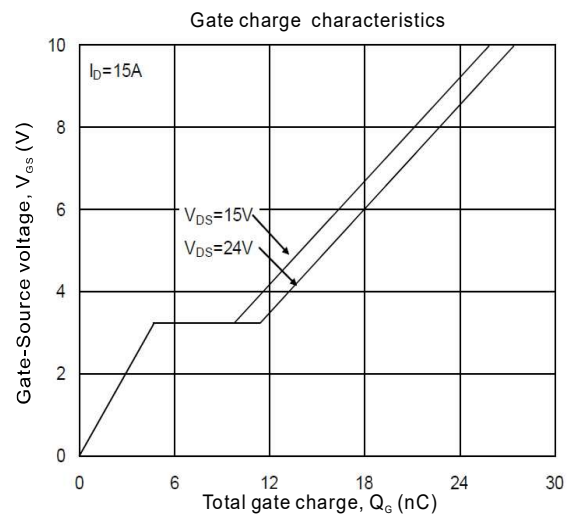
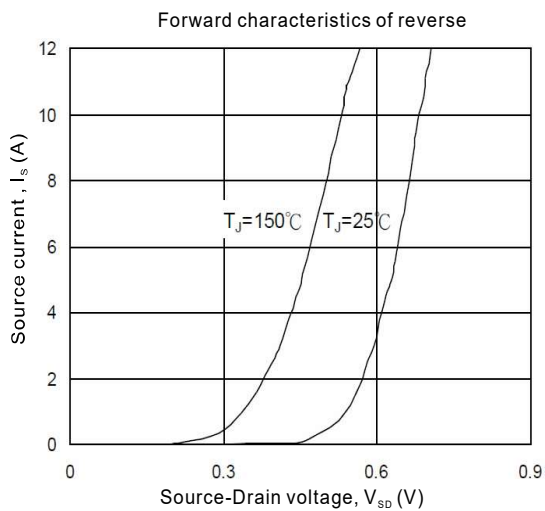
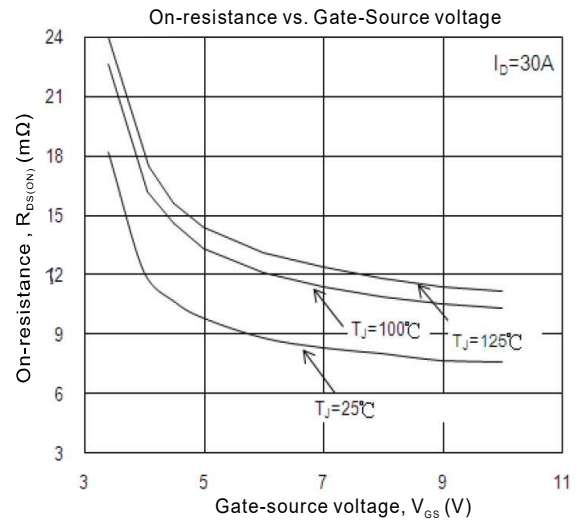
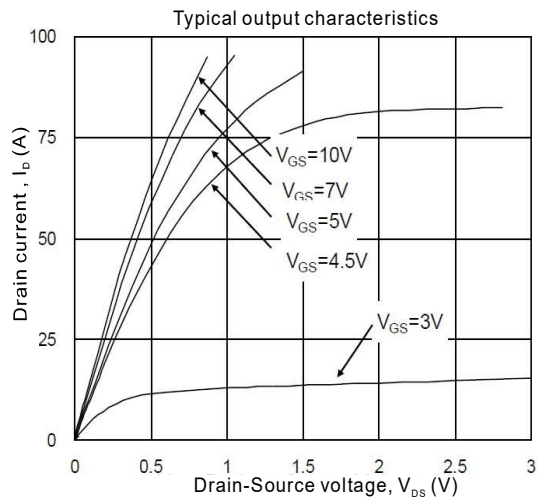
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Electrical characteristics (At $T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	30			V
BV_{DSS} temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, $I_D=1mA$		0.027		V/°C
Drain-source leakage current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V, T_J=25^\circ C$			1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ C$			5	
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.5	2.5	V
Gate threshold voltage temperature coefficient	$\Delta V_{GS(TH)}$			-5.8		mV/°C
Static drain-source on-resistance (Note 2)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$		6.5	8.5	mΩ
		$V_{GS}=4.5V, I_D=15A$		11	14	
Forward transconductance	g_{FS}	$V_{DS}=5V, I_D=30A$		38		S
Dynamic parameters						
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=15V, f=1.0MHz$		1317	1844	pF
Out capacitance	C_{oss}			163	228	
Reverse transfer capacitance	C_{rss}			131	183	
Gate resistance	R_g	$V_{DS}=0V, V_{GS}=0V, f=1.0MHz$		1.7	2.9	Ω
Switching parameters						
Total gate charge	Q_g	$V_{GS}=4.5V, V_{DS}=15V, I_D=15A$		12.6	17.6	nC
Gate to source charge	Q_{gs}			4.2	5.9	
Gate to drain charge	Q_{gd}			5.1	7.1	
Turn-on delay time	$t_{d(on)}$	$V_{DS}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=15A$		4.6	9.2	ns
Rise time	t_r			12.2	22	
Turn-off delay time	$t_{d(off)}$			26.6	53	
Fall time	t_f			8	16	
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage (Note 2)	V_{SD}	$I_S=1A, V_{GS}=0V, T_J=25^\circ C$			1	V
Continuous source current (Note 1, 5)	I_S	$V_G=V_D=0V$, Force current			58	A
Pulsed source current (Note 2, 5)	I_{SM}				115	
Reverse recovery time	t_{rr}	$I_F=30A, dl/dt=100A/\mu A, T_J=25^\circ C$		9.2		nS
Reverse recovery charge	Q_{rr}			2		nC

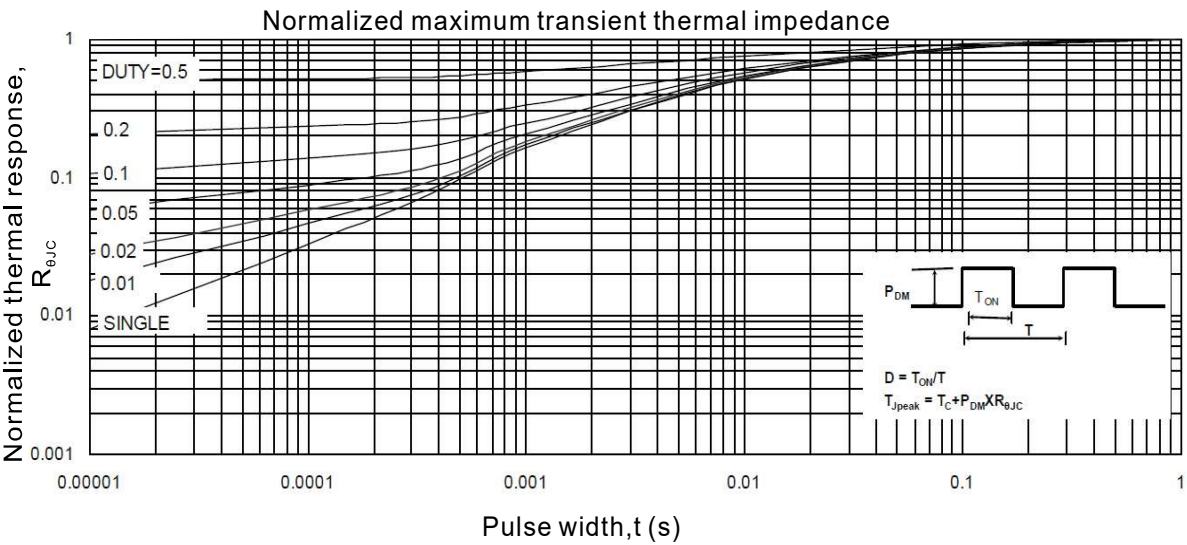
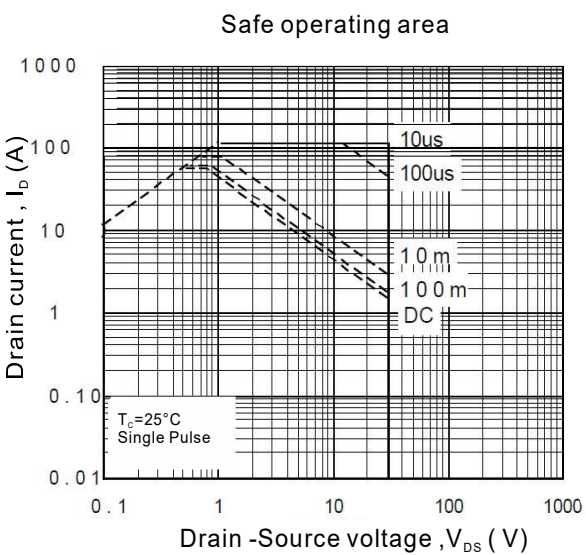
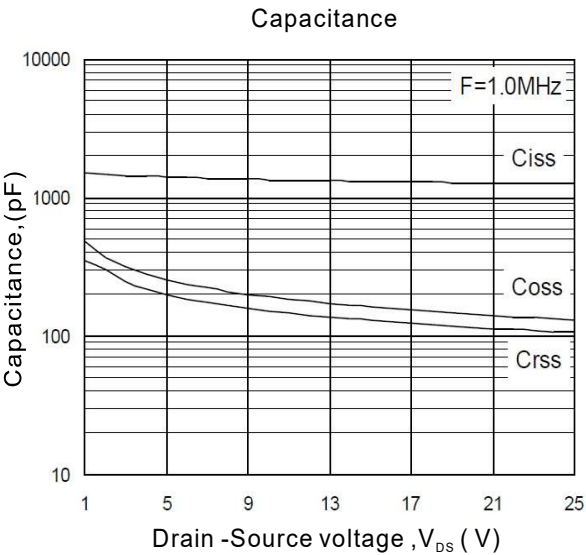
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Rating and characteristic curves



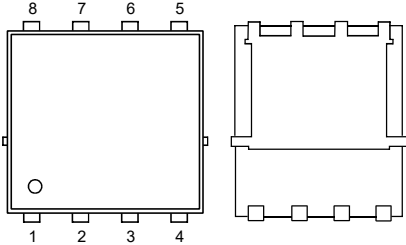
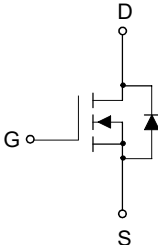
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Rating and characteristic curves



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Pinning information

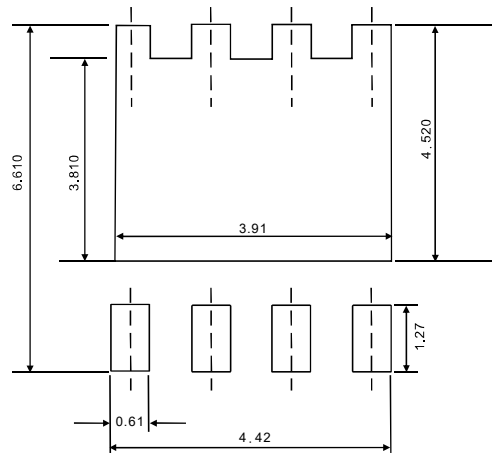
Pin	Simplified outline	Symbol
Pin 1, 2, 3, Source Pin 4 Gate Pin 5, 6, 7, 8 Drain		

Marking

Type number	Marking code
FMOSAC3004	A3004

Suggested solder pad layout

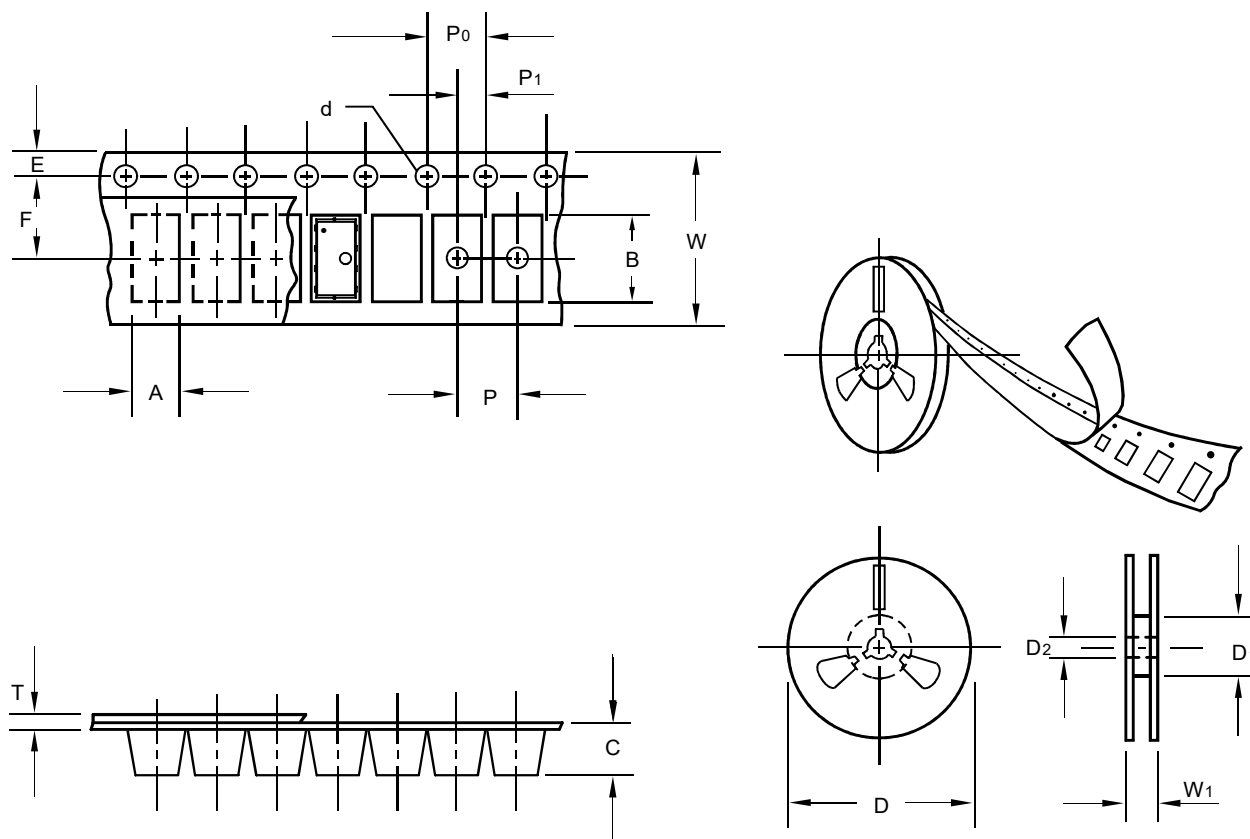
T5060P8



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.1\text{mm}$
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	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.

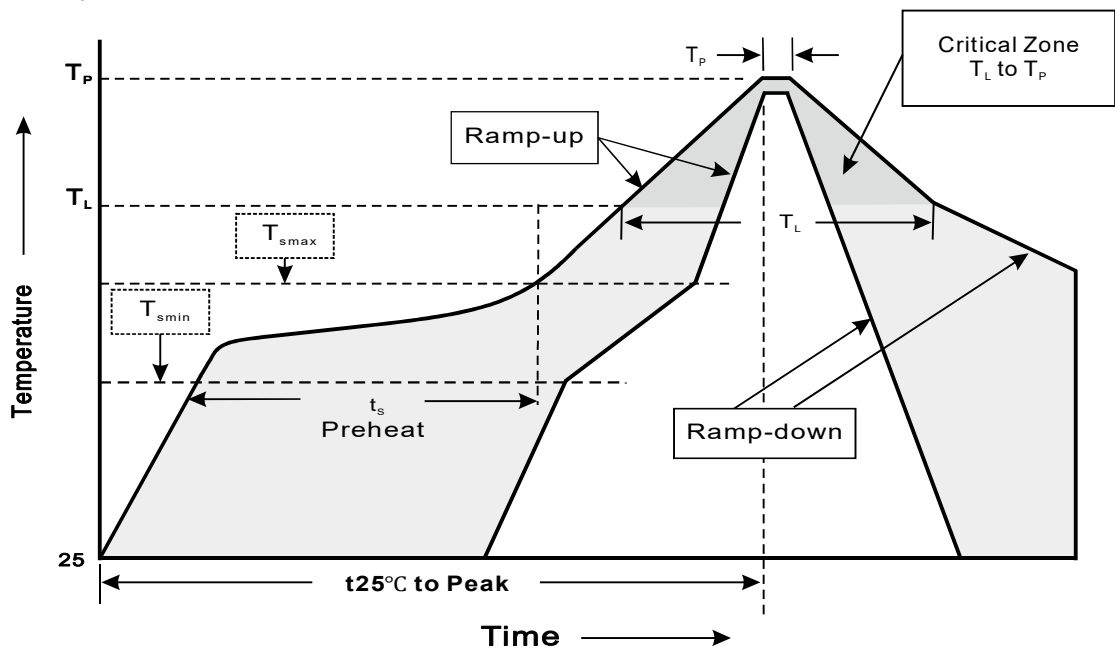
FMOSAC3004

Reel packing

Device	Outline	Device Package	Reel Size
FMOSAC3004	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 ~ 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