

FMOSAC24P06-Q1

List

List.....	1
Package outline.....	2
Features.....	2
Application.....	2
Mechanical data.....	2
Maximum ratings	2
Electrical characteristics.....	3
Rating and characteristic curves.....	4~6
Pinning information.....	7
Marking.....	7
Suggested solder pad layout.....	7
Packing information.....	8
Reel packing.....	9
Suggested thermal profiles for soldering processes.....	9

FMOSAC24P06-Q1

-24A , -60V P-Channel Power MOSFET

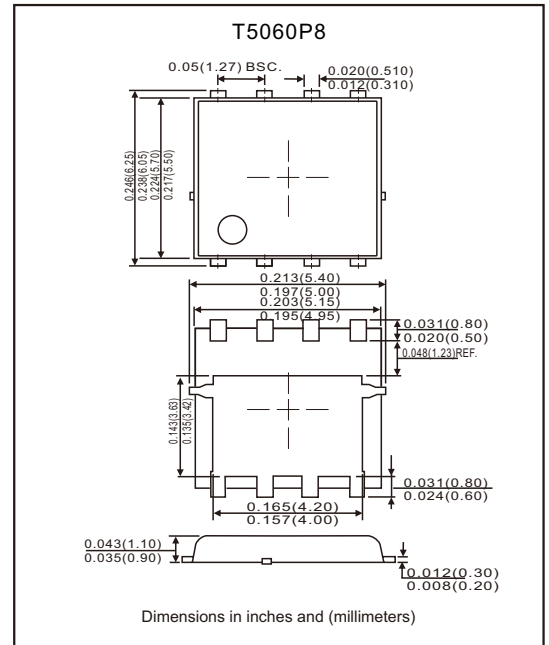
Features

- $V_{DS} = -60V$, $I_D = -24A$.
- $R_{DS(ON)} \leq 50m\Omega$, $V_{GS} = -10V$, $I_D = -7A$.
- $R_{DS(ON)} \leq 72m\Omega$, $V_{GS} = -4.5V$, $I_D = -5A$.
- Low gate charge.
- 100% UIS and R_g tested.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSAC24P06-Q1-H.

Mechanical data

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

Package outline



Maximum ratings (AT $T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Ratings	Units
Drain-source voltage	$-V_{DS}$	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current (Note1)	$-I_D$	24	A
		15	
Pulsed drain current (Note2)	$-I_{DM}$	96	A
Single pulsed avalanche energy (Note3)	E_{AS}	75	mJ
Power dissipation	P_D	50	W
		20	
Thermal resistance junction to ambient	$R_{\theta JA}$	69	$^\circ C/W$
Thermal resistance junction to case	$R_{\theta JC}$	2.9	$^\circ C/W$
Operation junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

FMOSAC24P06-Q1

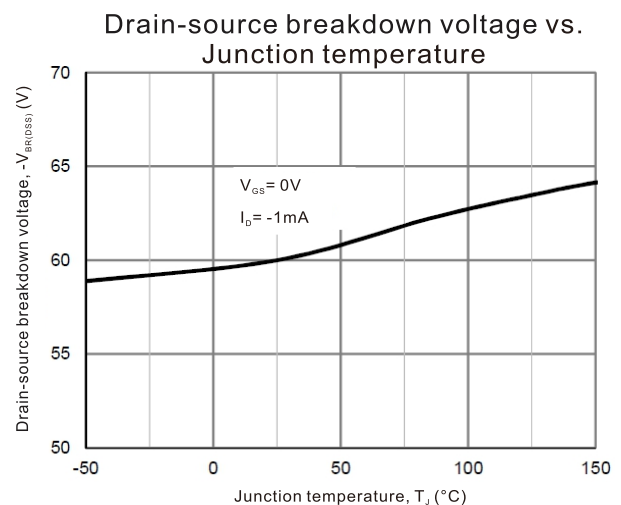
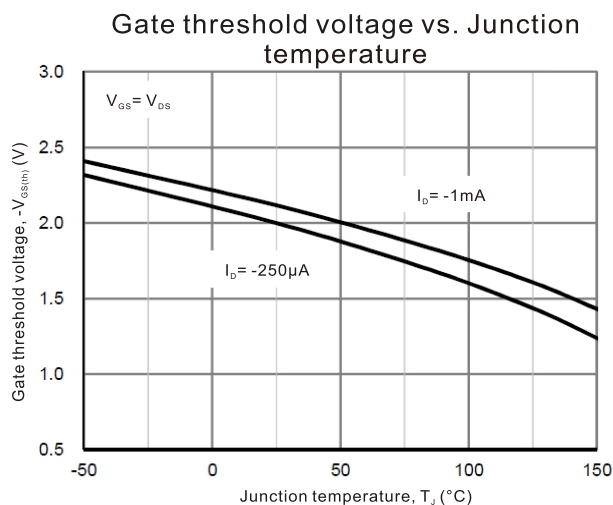
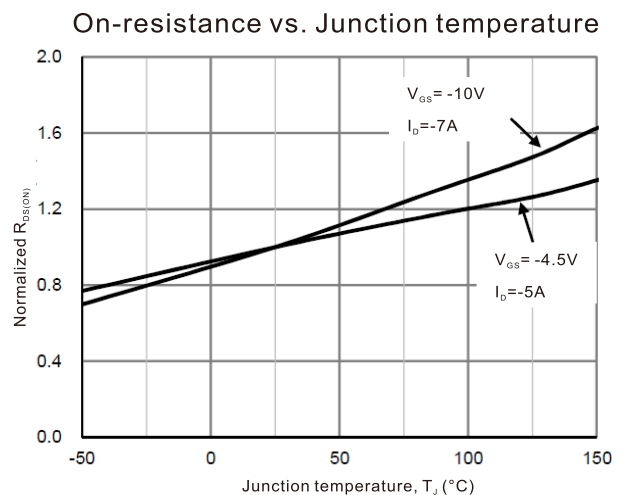
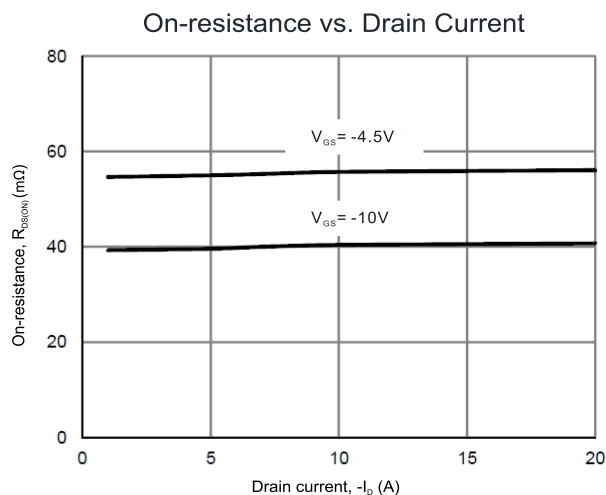
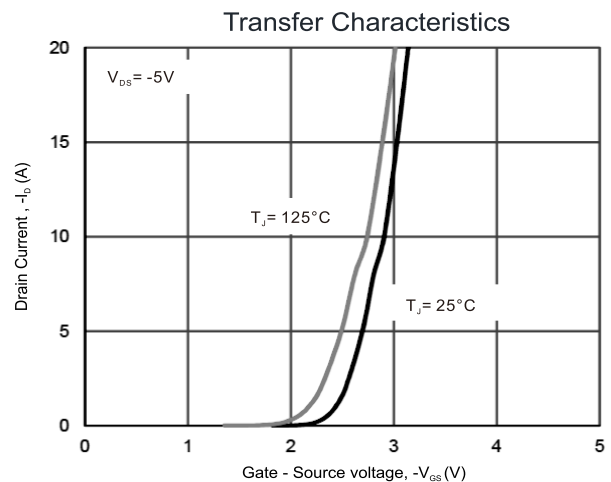
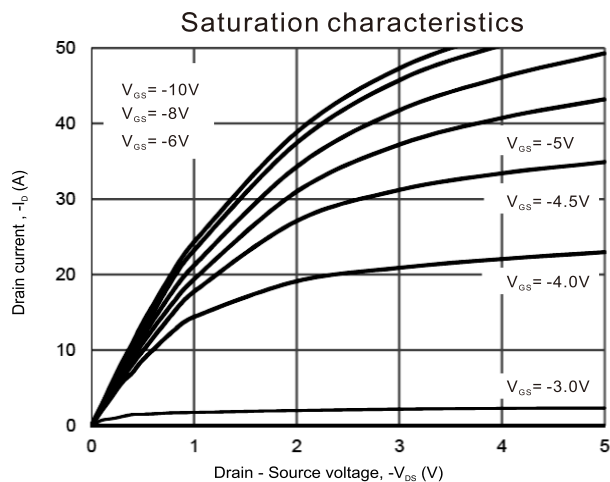
Electrical characteristics (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{GS} = 0V, -I_D = 250\mu A$	$-V_{(BR)DSS}$	60			V
Gate- source leakage current	$-V_{DS} = 48V, V_{GS} = 0V$	$-I_{DSS}$			1	μA
	$-V_{DS} = 48V, V_{GS} = 0V, T_J = 55^{\circ}C$				5	
Gate-body leakage current	$V_{DS} = 0V, V_{GS} = \pm 20V$	I_{GSS}			± 100	nA
On characteristics						
Gate threshold voltage	$V_{GS} = V_{DS}, -I_D = 250\mu A$	$-V_{GS(th)}$	1	2	3	V
Drain-source on-resistance	$-V_{GS} = 10V, -I_D = 7A$	$R_{DS(on)}$		40	50	m Ω
	$-V_{GS} = 4.5V, -I_D = 5A$			55	72	
Forward transconductance	$-V_{DS} = 5V, -I_D = 7V$	g_{FS}		20		S
Dynamic characteristics (Note5)						
Intput capacitance	$-V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz$	C_{iss}		855		μF
Output capacitance		C_{oss}		189		
Reverse transfer capacitance		C_{rss}		9.5		
Gate resistance	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	R_g		9.8		Ω
Switching characteristics (Note5)						
Total gate charge	$-V_{GS} = 10V, -V_{DS} = 30V, -I_D = 7A$	Q_g		13.5		nC
	$-V_{GS} = 4.5V, -V_{DS} = 30V, -I_D = 7A$			6.4		
Gate-source charge	$-V_{GS} = 10V, -V_{DS} = 30V, -I_D = 7A$	Q_{gs}		3.6		nC
Gate-drain charge		Q_{gd}		1.8		
Turn-on delay time	$-V_{DS} = 30V, -V_{GS} = 10V, R_L = 4.3\Omega$ $R_G = 3\Omega$	$t_{d(on)}$		5.4		nS
Turn-on rise time		t_r		1.9		
Turn-off delay time		$t_{d(off)}$		23		
Turn-off fall time		t_f		4.2		
Drain-source diode characteristics						
Drain-source diode forward voltage	$V_{GS} = 0V, -I_S = 1A$	$-V_{SD}$		0.77	1	V
Continuous drain-source diode forward current		$-I_S$			24	A
Body diode reverse recovery time	$-I_F = 7A, dI_F/dt = 100A/\mu s$	t_{rr}		27		nS
Body diode reverse recovery charge		Q_{rr}		28		nC

Notes: 1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_Max} = 150^{\circ}\text{C}$.
3. E_{AS} of 75mJ is based on starting $T_J = 25^{\circ}\text{C}$, $L = 3.0\text{mH}$, $I_{AS} = -7.1A$, $V_{GS} = -10V$, $V_{DS} = -30V$, 100% test at $L = 0.1\text{mH}$, $I_{AS} = -25A$, $T_{J_Max} = 150^{\circ}\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max} = 150^{\circ}\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

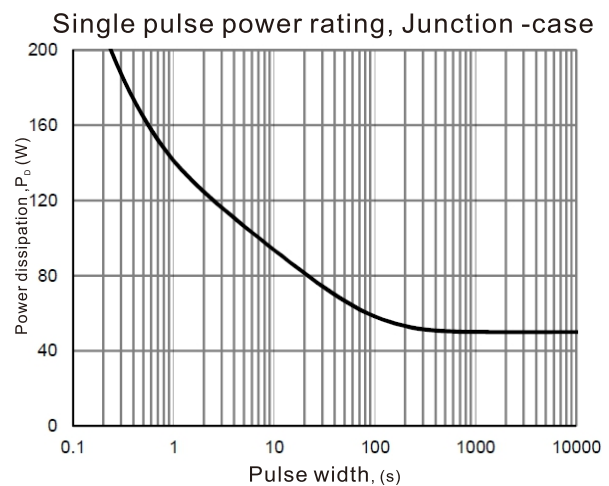
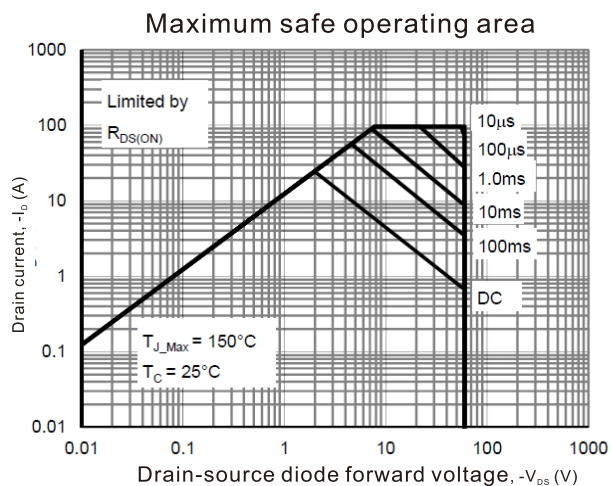
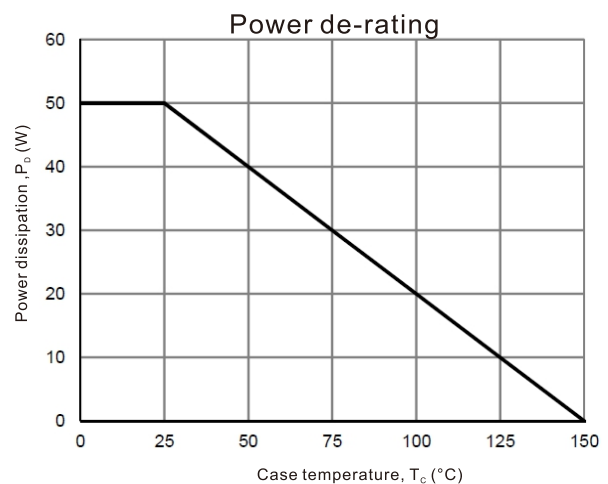
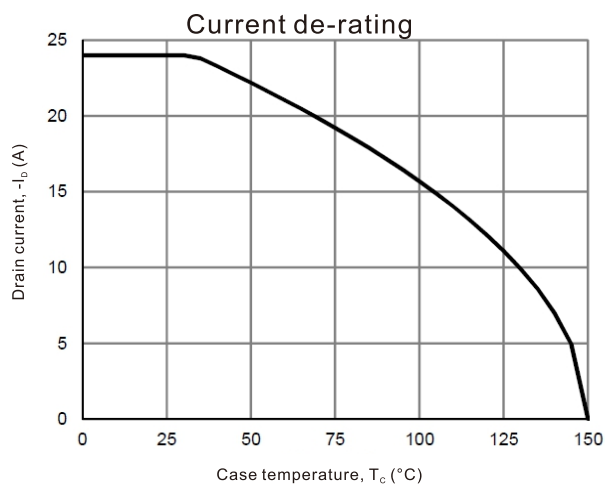
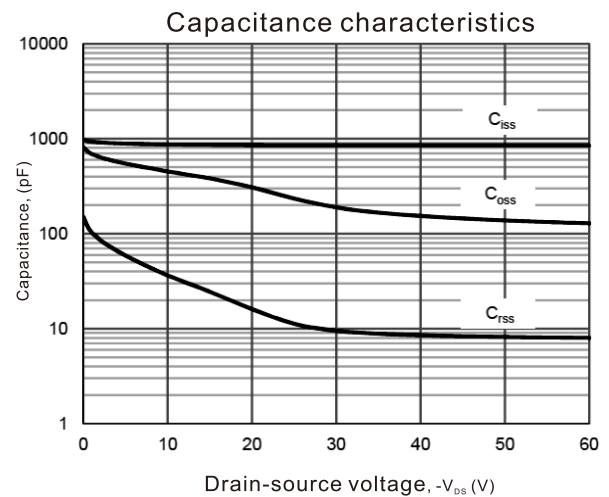
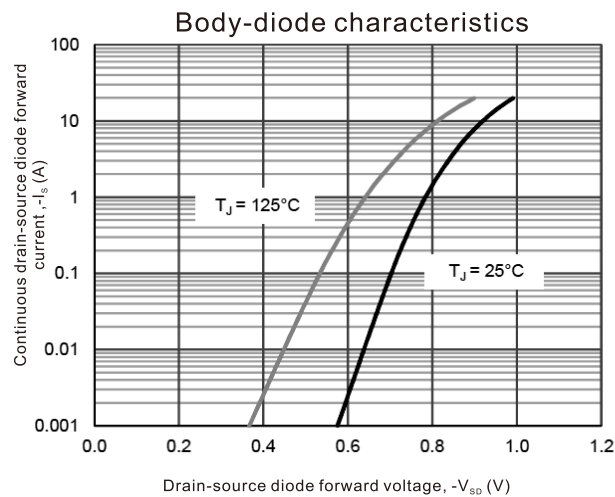
FMOSAC24P06-Q1

Rating and characteristic curves



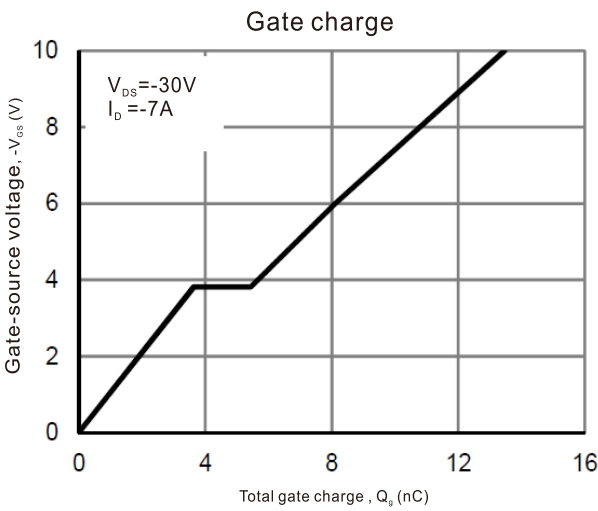
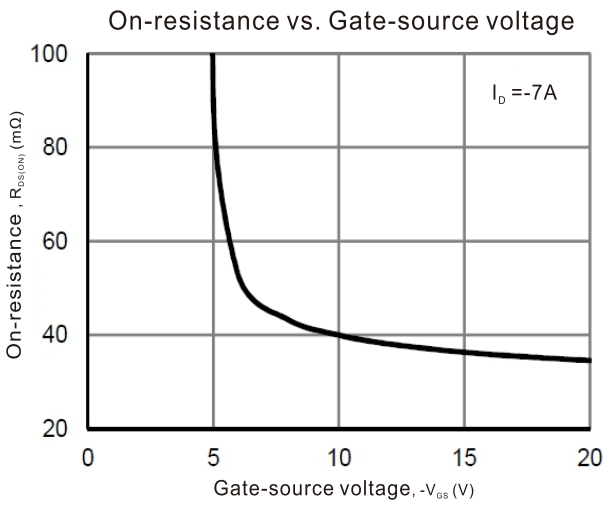
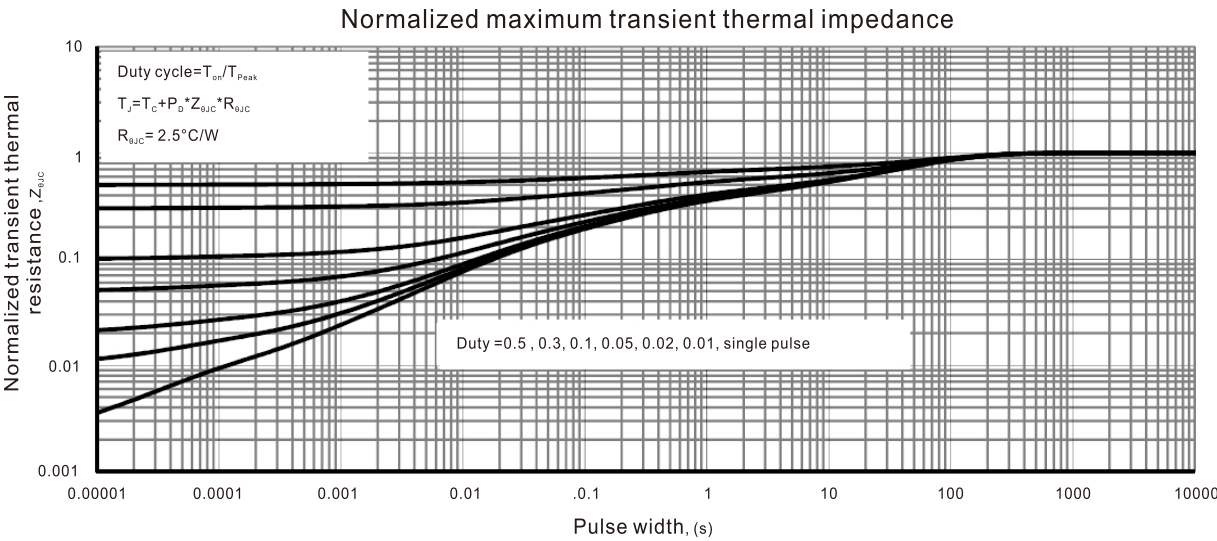
FMOSAC24P06-Q1

Rating and characteristic curves



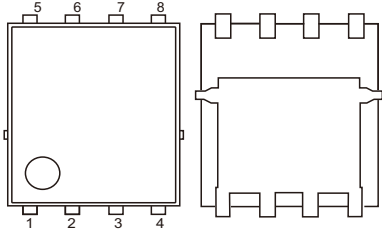
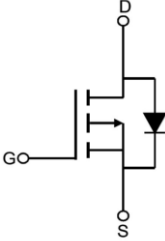
FMOSAC24P06-Q1

Rating and characteristic curves



FMOSAC24P06-Q1

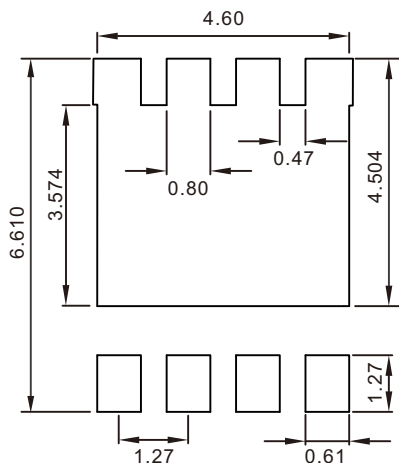
Pinning information

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

Marking

Type number	Marking code
FMOSAC24P06-Q1	AC24P06

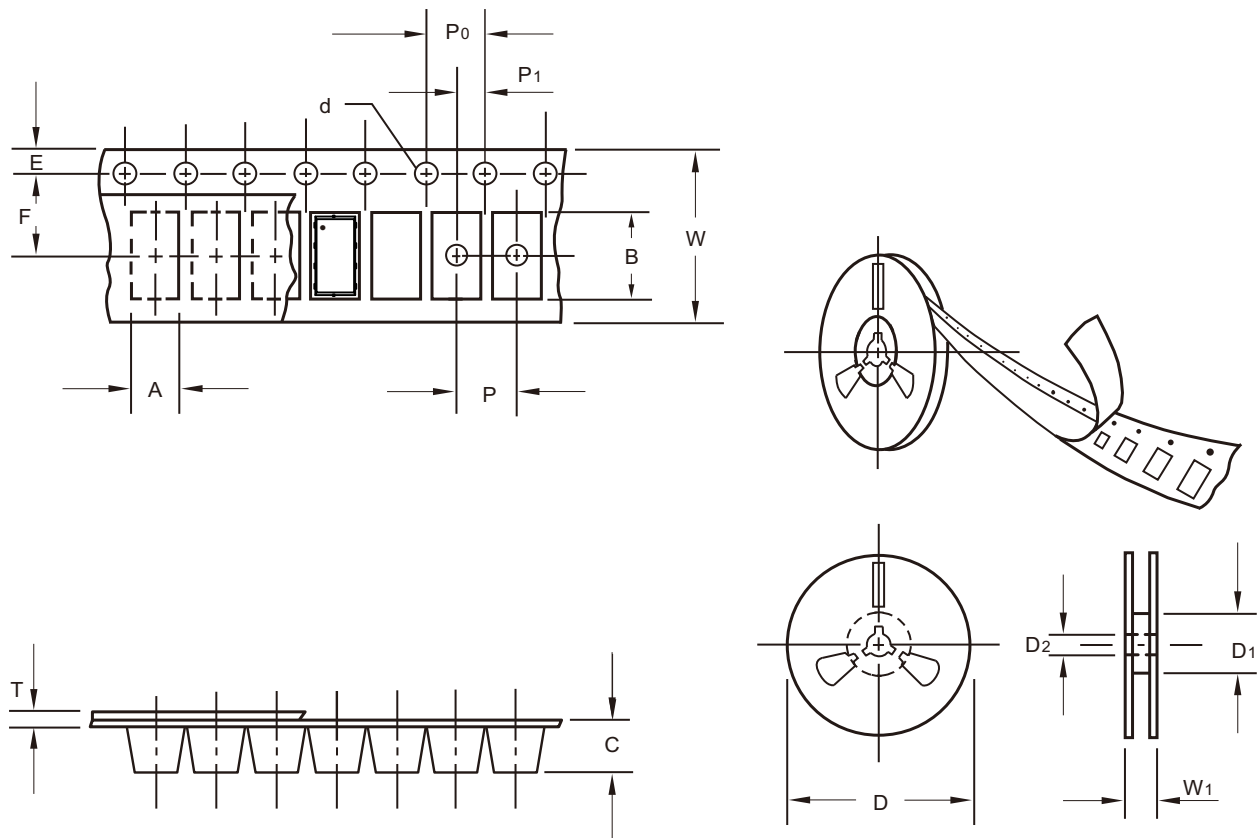
Suggested solder pad layout



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

FMOSAC24P06-Q1

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.

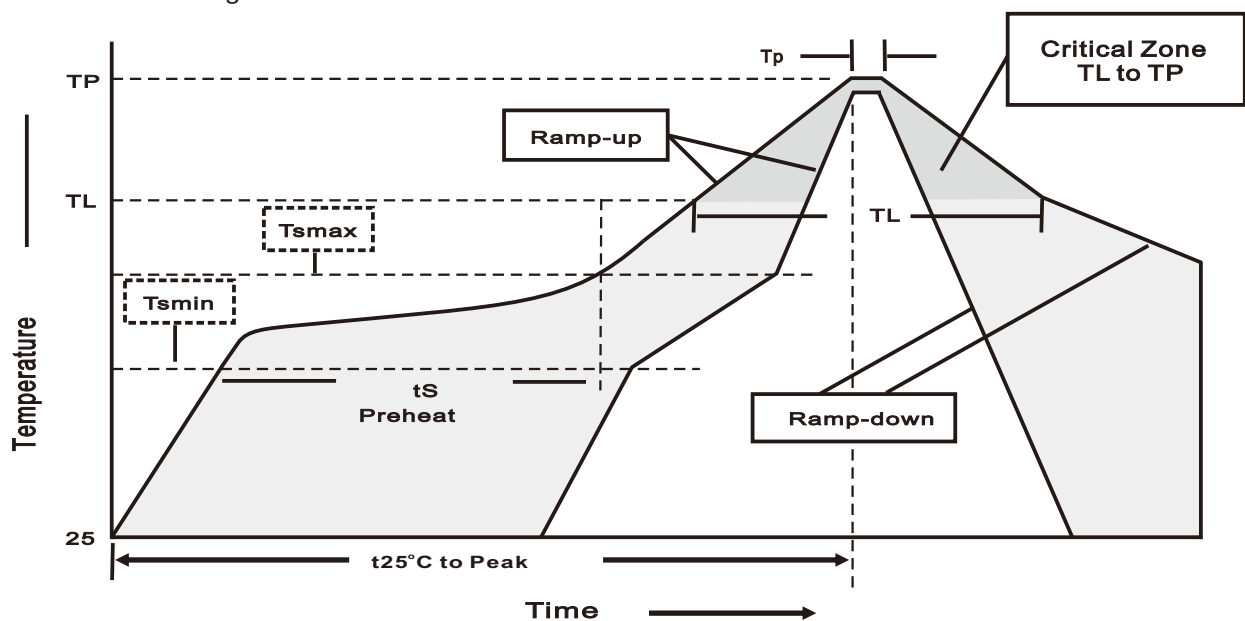
FMOSAC24P06-Q1

Reel packing

Device	Outline	Package	Reel Size	Reel (PCS)
FMOSAC24P06-Q1	TAPING	T5060P8	13inch	5,000

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(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tp)	10~30sec
Ramp-down Rate	<3°C/sec
Time 25°C to Peak Temperature	<6minutes