

FMOSAC110N10-Q1-H

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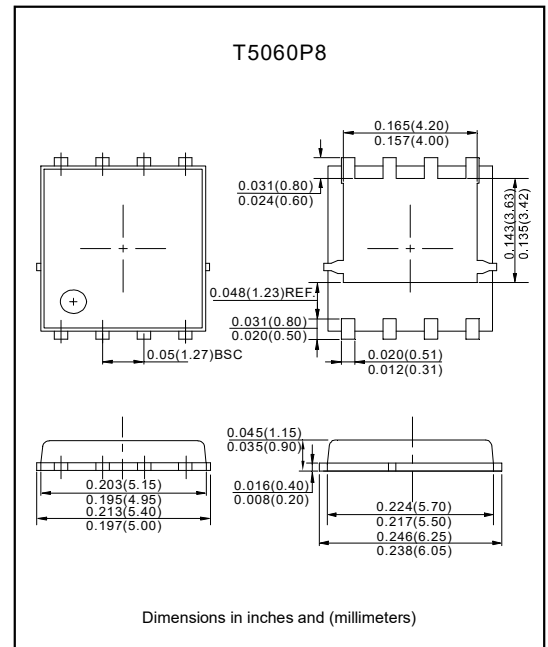
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FMOSAC110N10-Q1-H**120A 100V N-Channel
Enhancement Mode Power MOSFET****Features**

- $V_{DS}=100V$, $I_D=120A$.
- $R_{DS(ON)} \leq 5.8m\Omega$, @ $V_{GS}=10V$, $I_D=20A$.
- $R_{DS(ON)} \leq 7.1m\Omega$, @ $V_{GS}=4.5V$, $I_D=15A$.
- Ultra-low on-resistance.
- Low gate charge.
- 100% UIS and 100% ΔV_{DS} tested.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.

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	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current	I_D	120	A
		85	
Pulsed drain current (Note 1)	I_{DM}	Refer to Fig.4	A
Single pulse avalanche energy (Note 2)	E_{AS}	389	mJ
Power dissipation	P_D	188	W
		94	
Thermal resistance, Junction to ambient (Note 3)	$R_{\theta JA}$	42	$^\circ C/W$
Thermal resistance Junction to case	$R_{\theta JC}$	0.8	$^\circ C/W$
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)

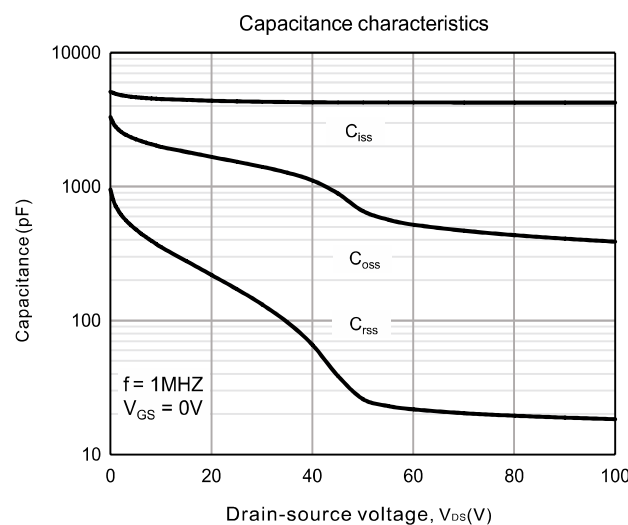
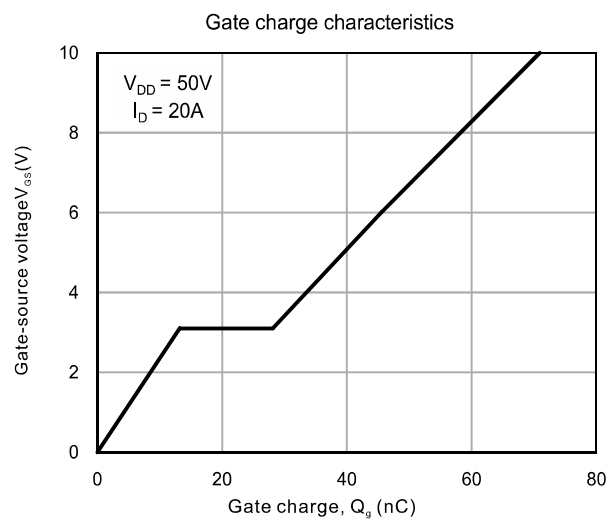
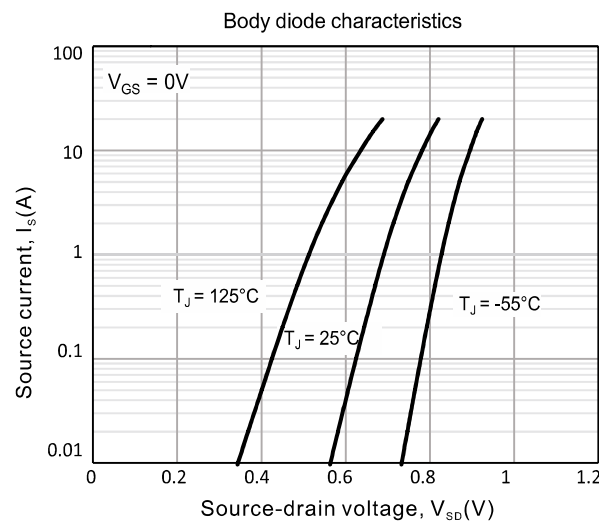
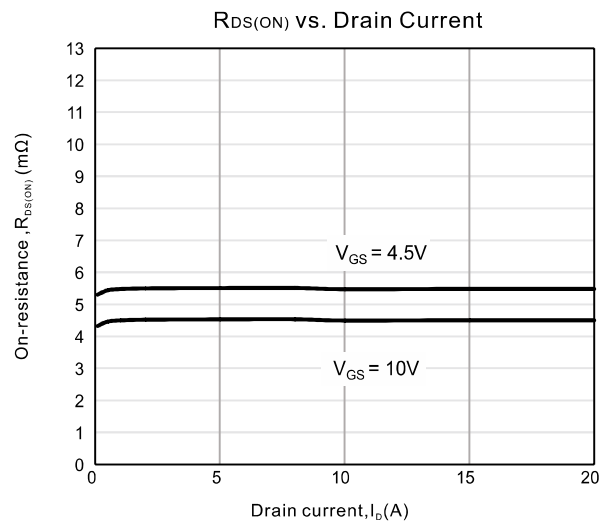
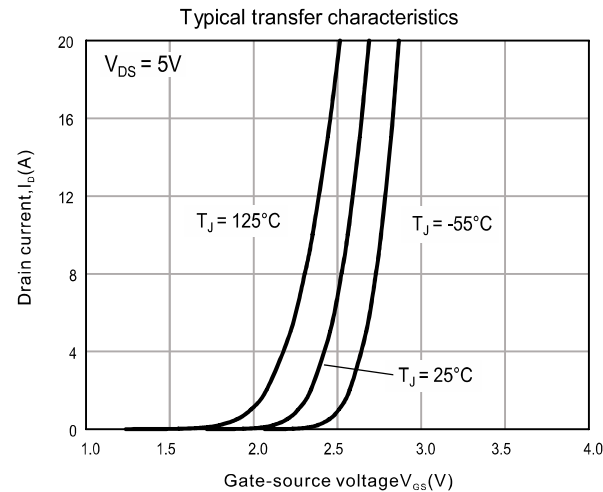
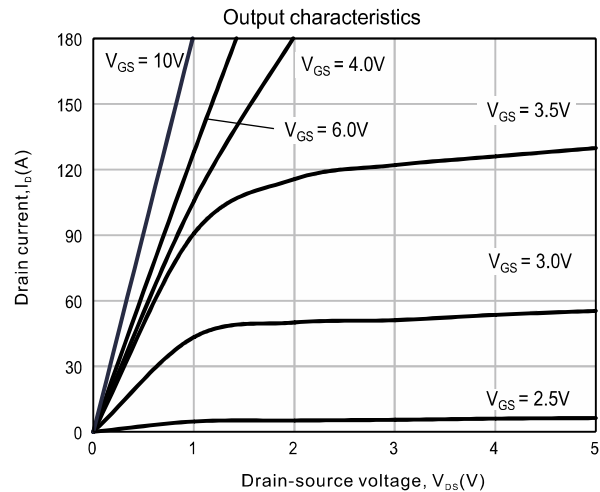
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	100			V
Drain-source leakage current	I _{DSS}	V _{DS} =80V, V _{GS} =0V			1	μA
Gate-source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
On characteristics						
Gate threshold voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250μA	1.2	1.6	2.1	V
Static drain-source on-resistance (Note4)	R _{DS(ON)}	V _{GS} =10V, I _D =20A		4.5	5.8	mΩ
		V _{GS} =4.5V, I _D =15A		5.5	7.1	
Dynamic parameters						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =50V, f=1.0MHz	3036	4251	5739	pF
Out capacitance	C _{oss}		470	658	888	
Reverse transfer capacitance	C _{rss}		19	26	35	
Gate resistance	R _g	f=1.0MHz		1.9		Ω
Switching parameters						
Total gate charge	Q _g	V _{GS} =0 to 10V, V _{DS} =50V, I _D =20A	51	71	96	nC
Gate to source charge	Q _{gs}		9	13	18	
Gate to drain charge	Q _{gd}		11	15	20	
Turn-on delay time	t _{d(on)}	V _{DD} =50V, V _{GS} =10V, I _D =20A, R _G =3Ω		14		ns
Rise time	t _r			23		
Turn-off delay time	t _{d(off)}			57		
Fall time	t _f			26		
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage	V _{SD}	I _S =20A, V _{GS} =0V			1.2	V
Maximum body-diode continuous current	I _S				120	A
Maximum pulsed body diode forward current	I _{SM}				479	A
Body diode reverse recovery time	t _{rr}	I _F =20A, di/dt =100A/μs	45	63	86	ns
Body diode reverse recovery charge	Q _{rr}			114		nC

Notes : 1. Repetitive rating: pulse width limited by maximum junction temperature.

2. E_{AS} condition: starting $T_J=25^{\circ}\text{C}$, $V_{DS}=50\text{V}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=3\text{mH}$, $I_{AS}=16.1\text{A}$, $V_{DD}=0\text{V}$ during time in avalanche.3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.4. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 0.5\%$.

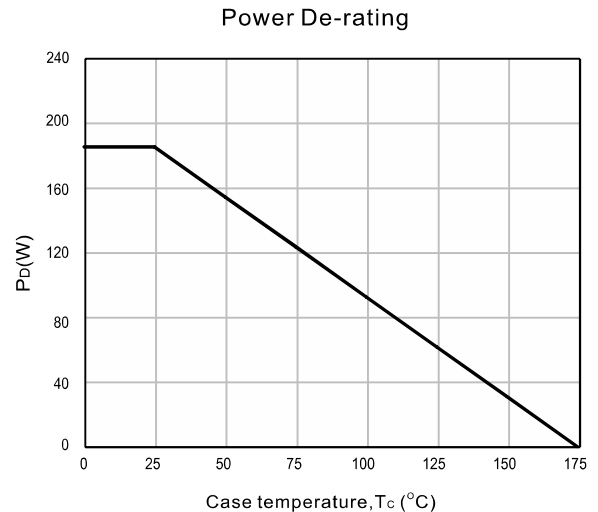
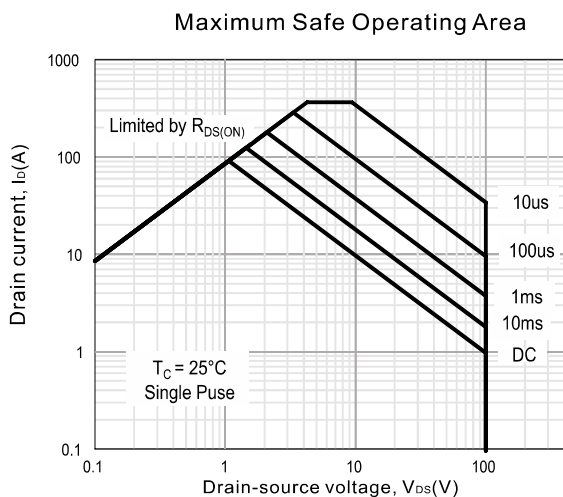
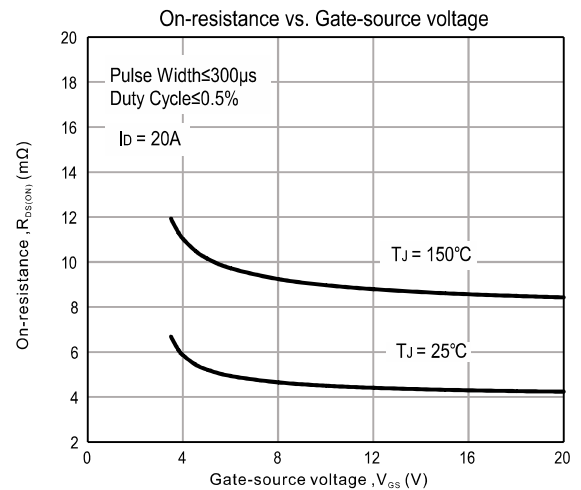
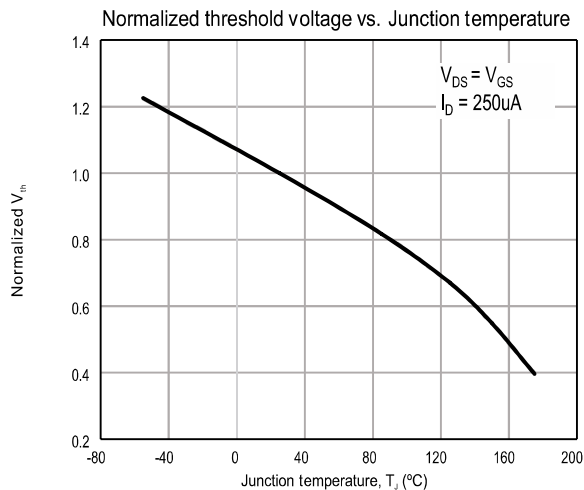
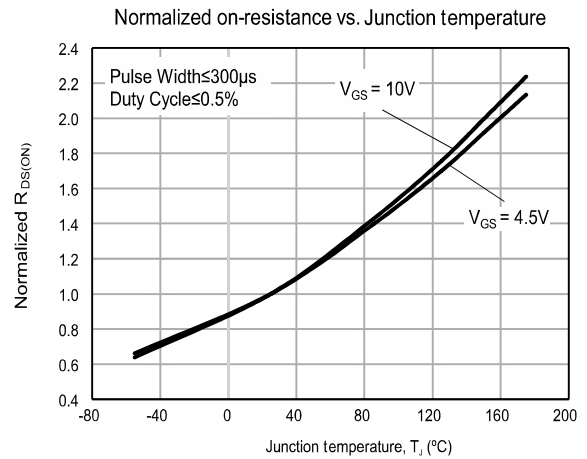
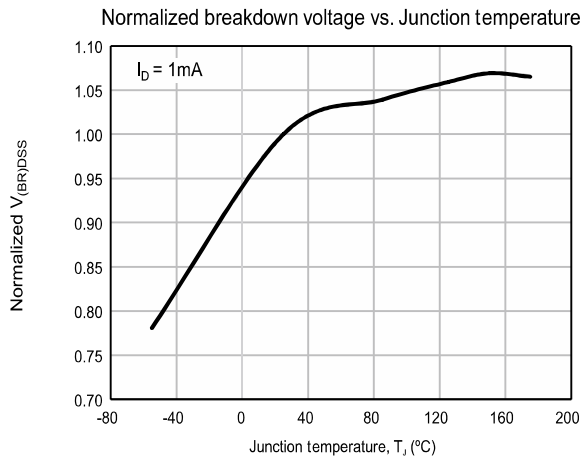
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Rating and characteristic curves



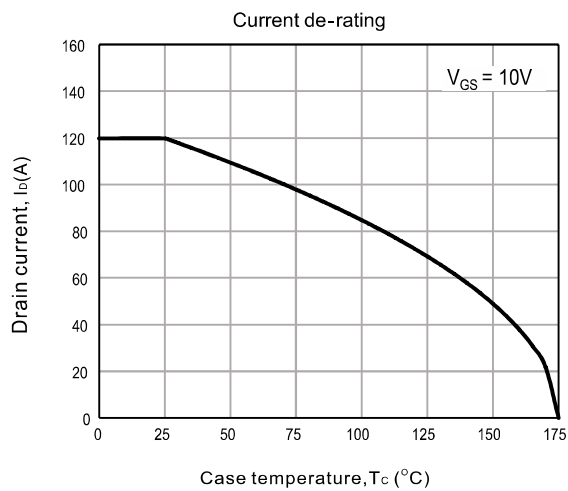
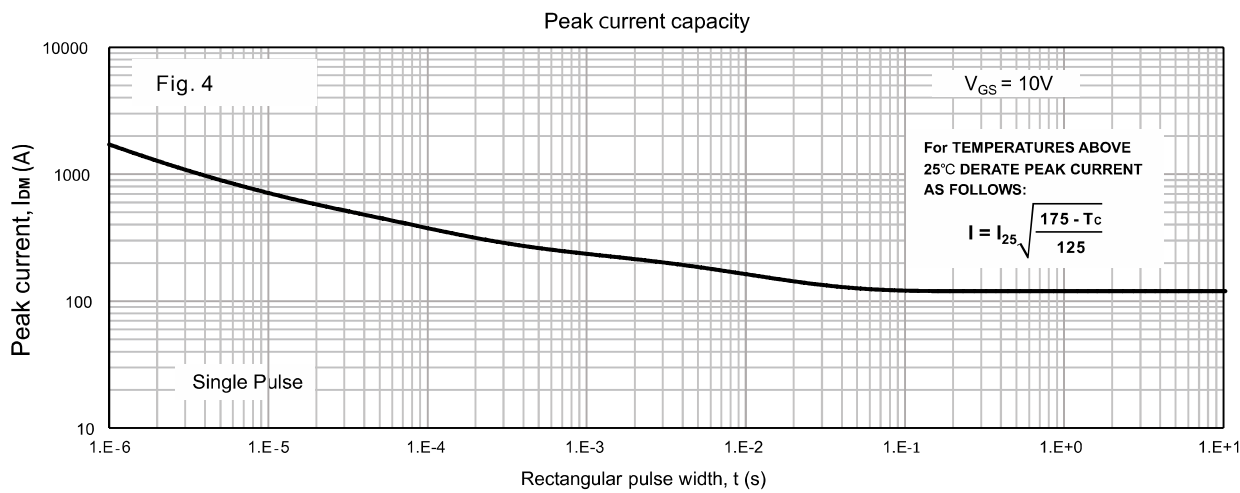
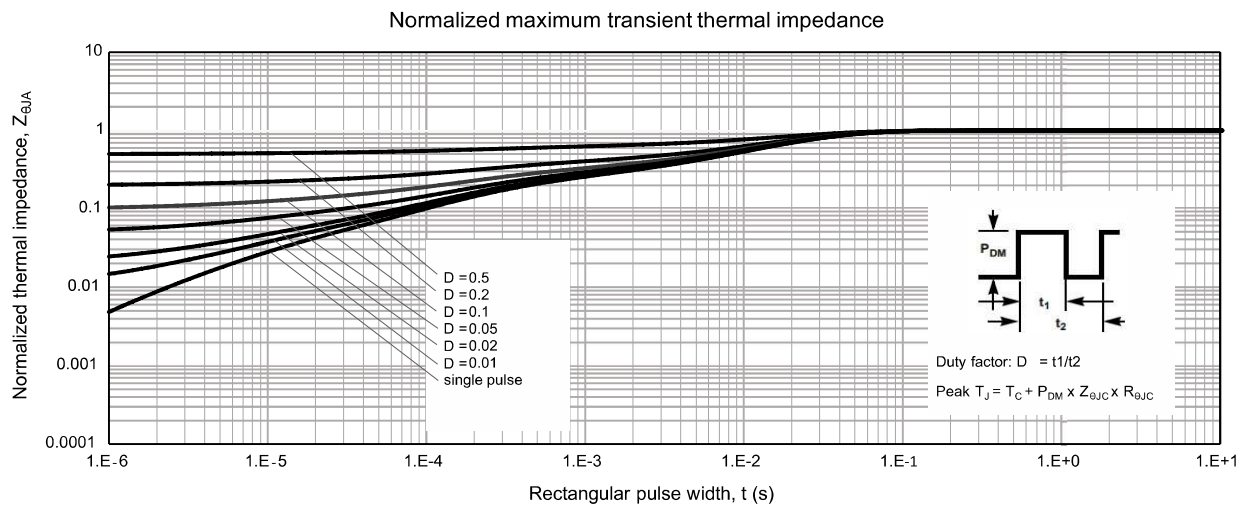
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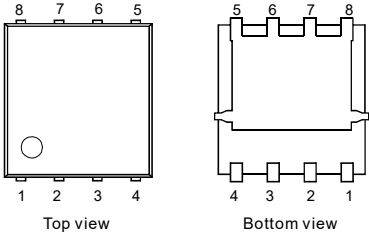
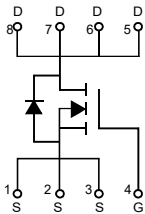
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Rating and characteristic curves



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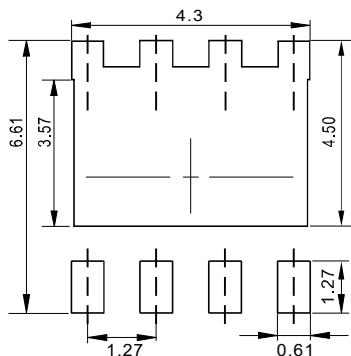
Pinning information

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

Marking

Type numbe	Marking code
FMOSAC110N10-Q1-H	SL1006PQ

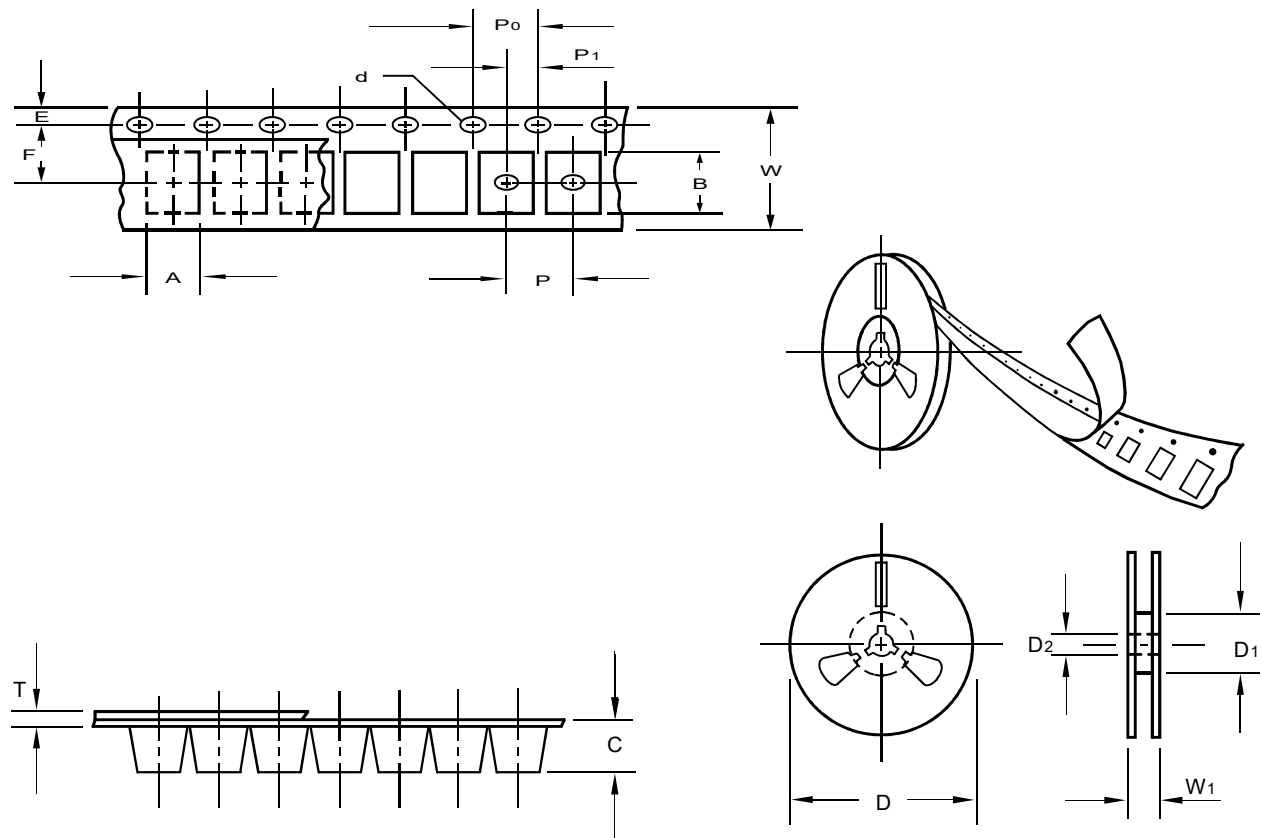
Suggested solder pad layout



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.

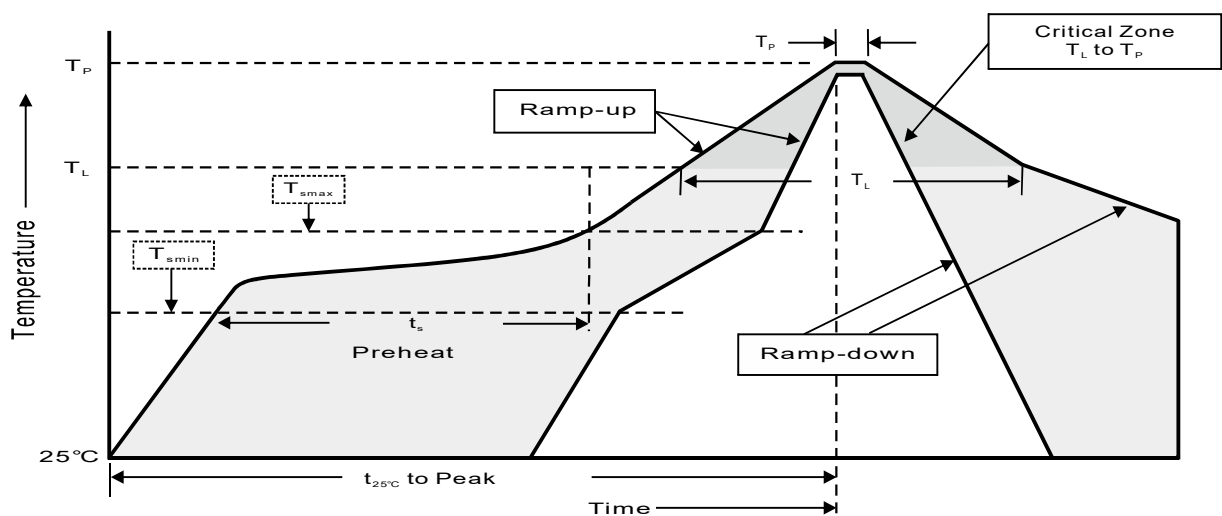
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Reel packing

Device	Outline	Package	Reel Size	Reel (PCS)
FMOSAC110N10-Q1-H	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 (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

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High reliability test capabilities

Item	Conditions	Reference
1. MSL Preconditioning	24hr bake @125°C+168hrs @85°C / 85%RH + 3 x I _{DSS} @260°C + 1flux Immersion + Alcohol + DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	V _{DS} = V _{DS} x 80% (T _J = T _J max.) Test Duration : 1000hrs	JESD22-A108
3. High Temperature Storage Life	T _A = 150°C Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	-55°C (15min) to 150°C (15min) Test Cycles : 1000cycles	JESD22 A-104
5. Autoclave	P = 2Atm T _A = 121°C RH = 100% Test Duration : 96hrs	JESD22 A-102
6. Solder ability	245 ± 5°C for 5sec	J-STD-002
7. Moisture Resistance	T _A = 85°C / 85% Relative Humidity Test Duration : 1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	T _A = 85°C, 85% RH, V _{DS} = 80% rated V _{DS} Test Duration : 1000hrs	JESD22-A101