

FMOSAC137N085**List**

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FMOSAC137N085

137A 85V N-Channel Enhancement Mode Power MOSFET

Features

- $V_{DS}=85V$, $I_D=137A$.
- $R_{DS(ON)} \leq 3.9m\Omega$, @ $V_{GS}=10V$, $I_D=20A$.
- Ultra-low on-resistance and low gate charge.
- 100% UIS and R_g tested.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSAC137N085-H.

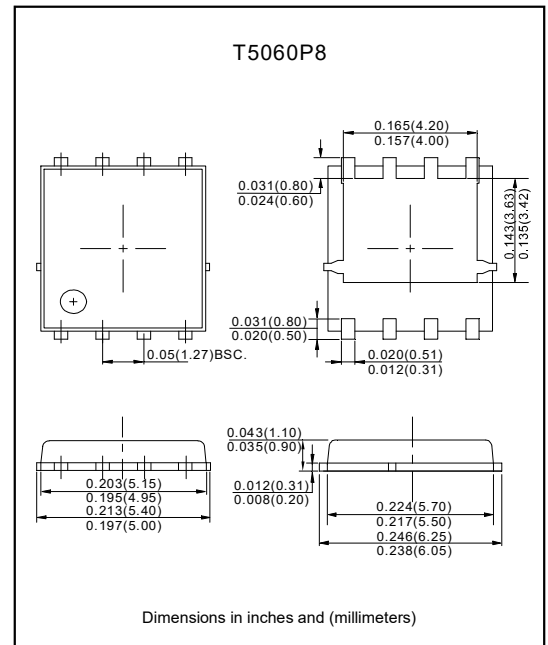
Applications

- Current switching in DC/DC & AC/DC sub systems.
- Motor driving in power tool, E-bike.
- Power management in telecom, industrial automation, CE.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, T5060P8 (DFN5060-8).
- 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}	85	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current (Note 1)	I_D	$T_c=25^\circ C$ 137	A
		$T_c=100^\circ C$ 86	
Pulsed drain current (Note 2)	I_{DM}	548	A
Single pulse avalanche energy (Note 3)	E_{AS}	434	mJ
Power dissipation (Note 4)	P_D	$T_c=25^\circ C$ 138	W
		$T_c=100^\circ C$ 55	
Thermal resistance, Junction to ambient	$R_{\theta JA}$	65	$^\circ C/W$
Thermal resistance, Junction to case	$R_{\theta JC}$	1.2	$^\circ C/W$
Operating junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static parameters						
Drain-source breakdown voltage	BV_{DS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	85			V
Drain-source leakage current	I_{DSS}	$V_{DS}=64\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=64\text{V}$, $V_{GS}=0\text{V}$, $T_J=55^\circ\text{C}$			5	
Gate-source leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	2	3	4	V
Static drain-source on-resistance (Note 4)	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=20\text{A}$		3.1	3.9	m Ω
Forward transconductance	g_{FS}	$V_{DS}=5\text{V}$, $I_D=20\text{A}$		38		S

Dynamic parameters (Note5)

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=40\text{V}$, $f=1.0\text{MHz}$		4083		pF
Out capacitance	C_{oss}			1313		
Reverse transfer capacitance	C_{rss}			42		
Gate resistance	R_g	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1.0\text{MHz}$		1.6		Ω

Switching parameters (Note5)

Total gate charge	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=40\text{V}$, $I_D=20\text{A}$		62		nC
		$V_{GS}=6\text{V}$, $V_{DS}=40\text{V}$, $I_D=20\text{A}$		40		
Gate to source charge	Q_{gs}	$V_{GS}=0$ to 10V , $V_{DS}=40\text{V}$, $I_D=20\text{A}$		21		
Gate to drain charge	Q_{gd}			13.8		
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10\text{V}$, $V_{DS}=40\text{V}$, $R_L=2\Omega$, $R_G=3\Omega$		18.9		ns
Rise time	t_r			28		
Turn-off delay time	$t_{d(off)}$			38		
Fall time	t_f			13.1		

Source-drain diode ratings and characteristics

Drain-source diode forward voltage	V_{SD}	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.66	1	V
Maximum body-diode continuous forward current	I_S	$T_C=25^\circ\text{C}$			137	A
Body diode reverse recovery time	t_{rr}	$I_F=20\text{A}$, $dI_F/dt=100\text{A}/\mu\text{s}$		57		ns
Body diode reverse recovery charge	Q_{rr}			85		nC

Notes : 1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous depends on the thermal & electro-mechanical application board design.

2. This single-pulse measurement was taken under $T_{J_Max}=150^\circ\text{C}$.

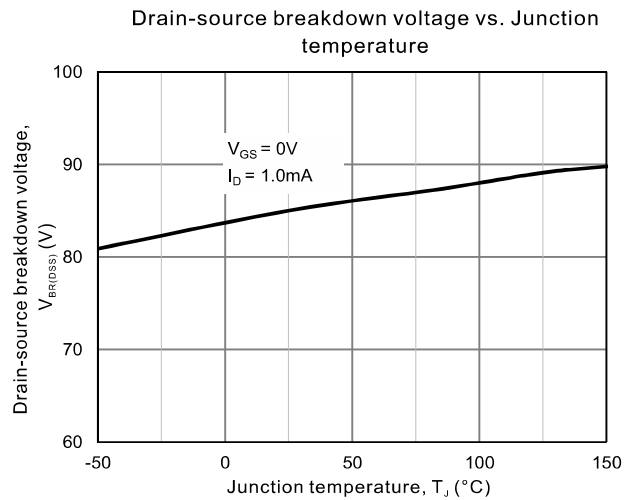
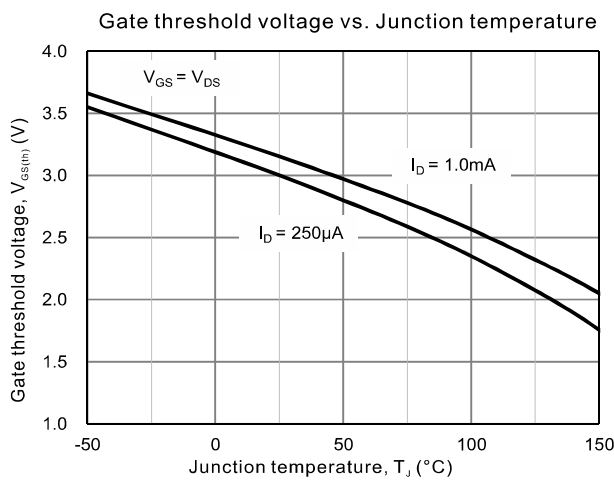
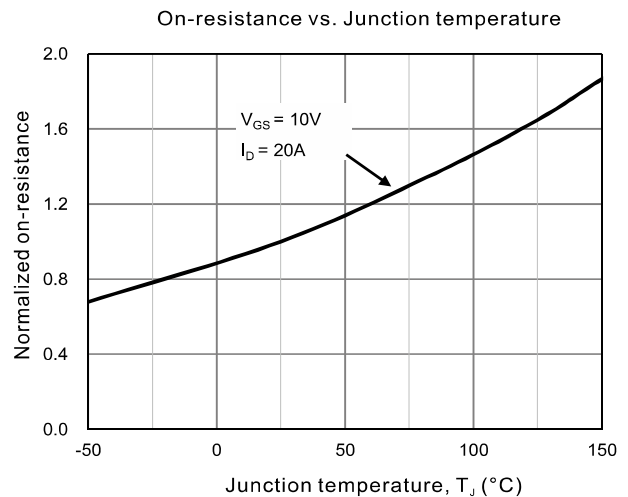
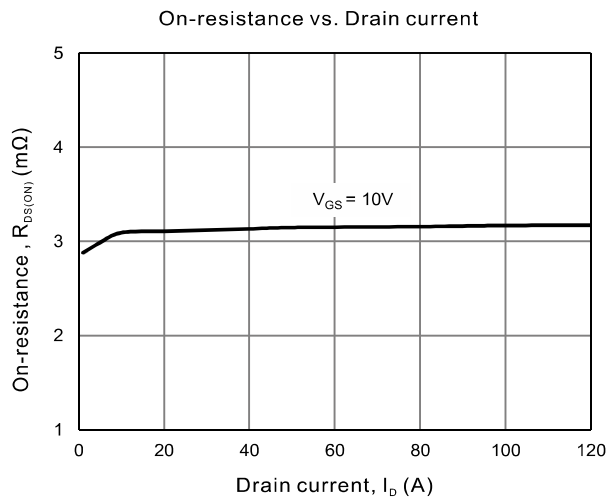
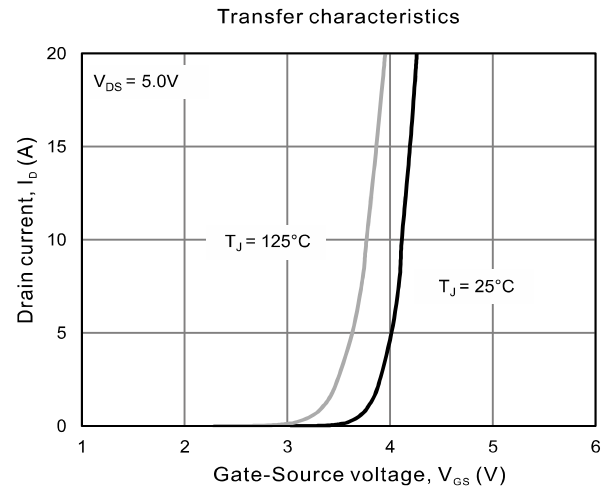
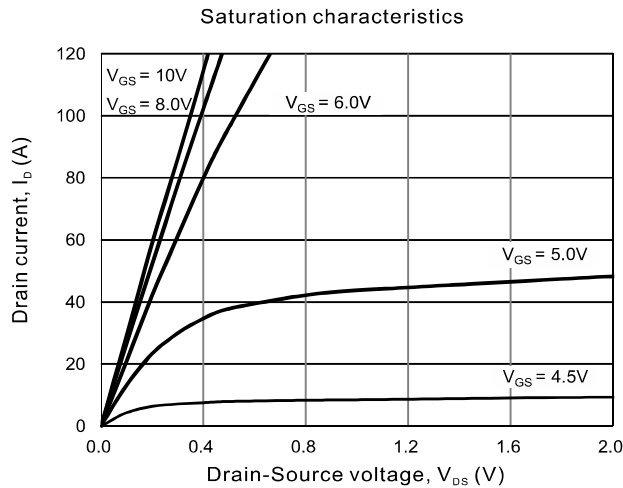
3. E_{AS} of 434mJ is based on starting $T_J=25^\circ\text{C}$, $L=3.0\text{mH}$, $I_{AS}=17\text{A}$, $V_{GS}=10\text{V}$, $V_{DS}=40\text{V}$, 100% test at $L=0.3\text{mH}$, $I_{AS}=40\text{A}$.

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.

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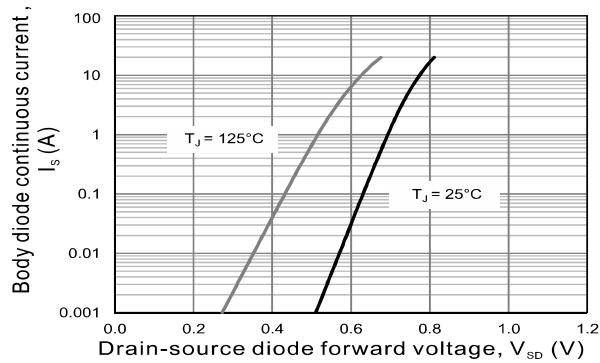
Rating and characteristic curves



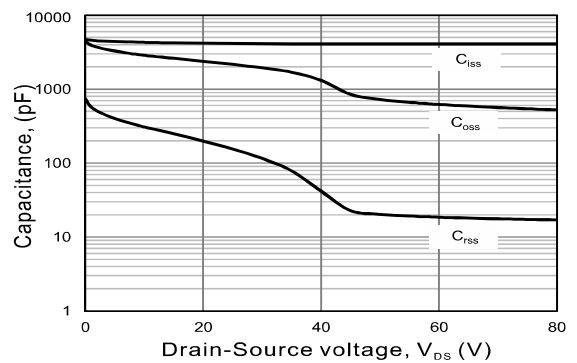
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Rating and characteristic curves

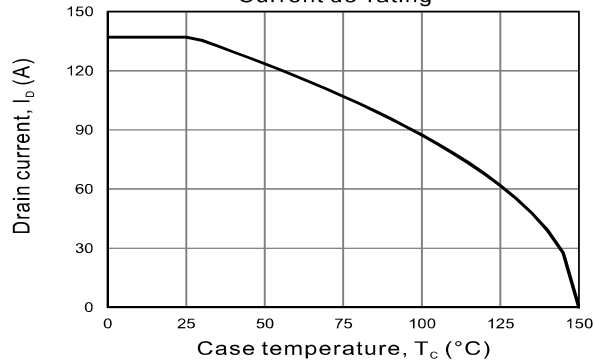
Body-diode characteristics



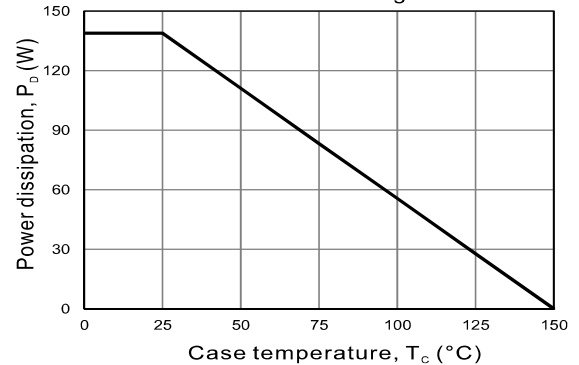
Capacitance characteristics



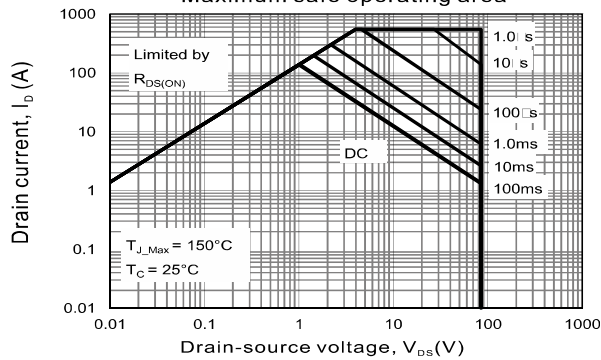
Current de-rating



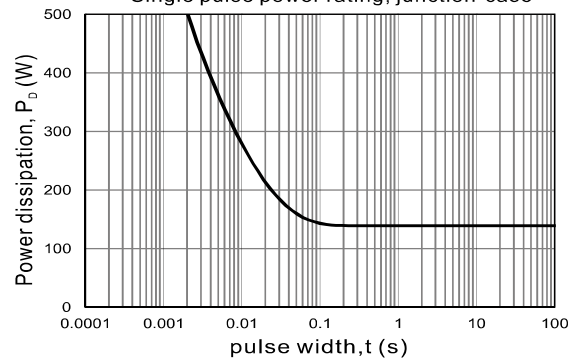
Power de-rating



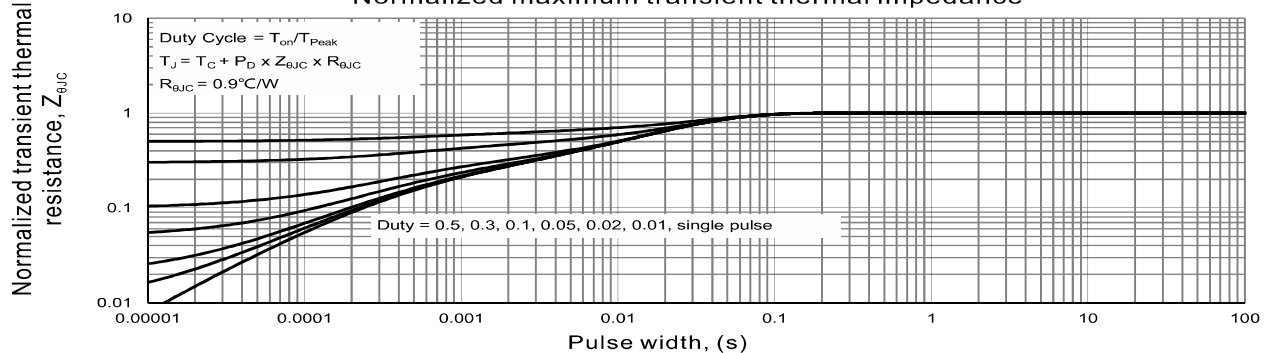
Maximum safe operating area



Single pulse power rating, junction-case

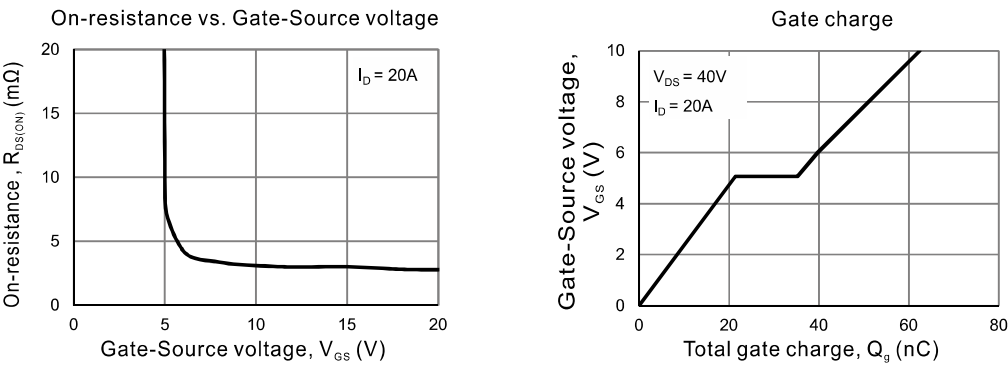


Normalized maximum transient thermal impedance



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Rating and characteristic curves



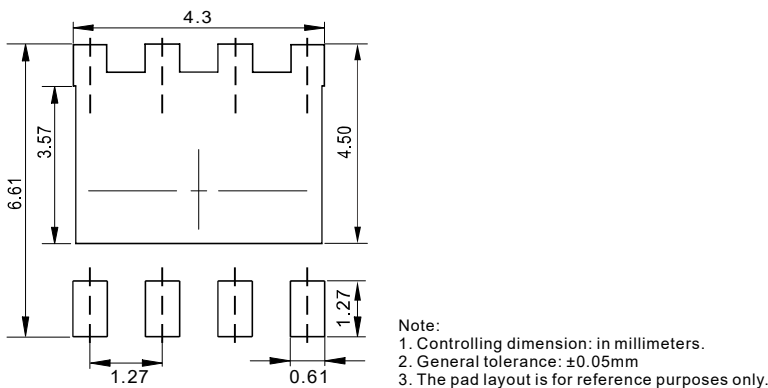
Pinning information

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

Marking

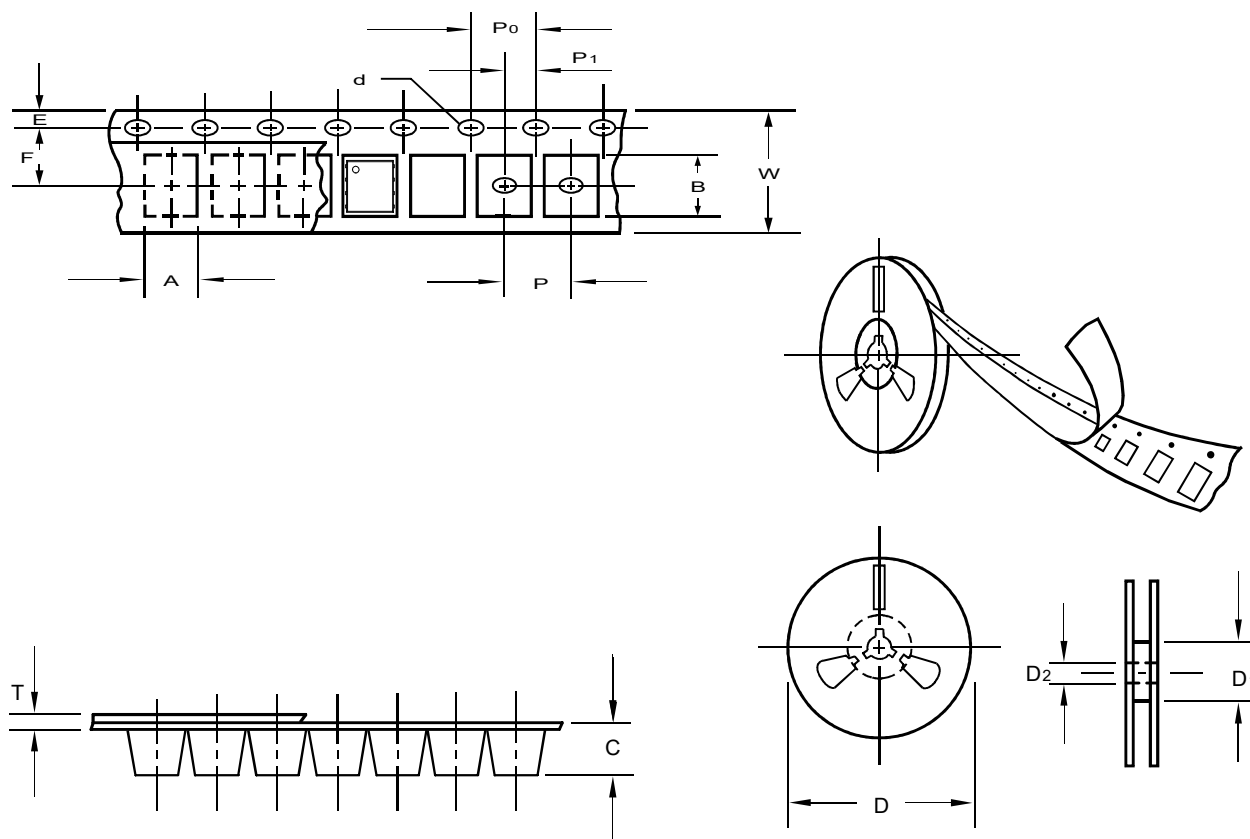
Type numbe	Marking code
FMOSAC137N085	AC137N085

Suggested solder pad layout



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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	2.0	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

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

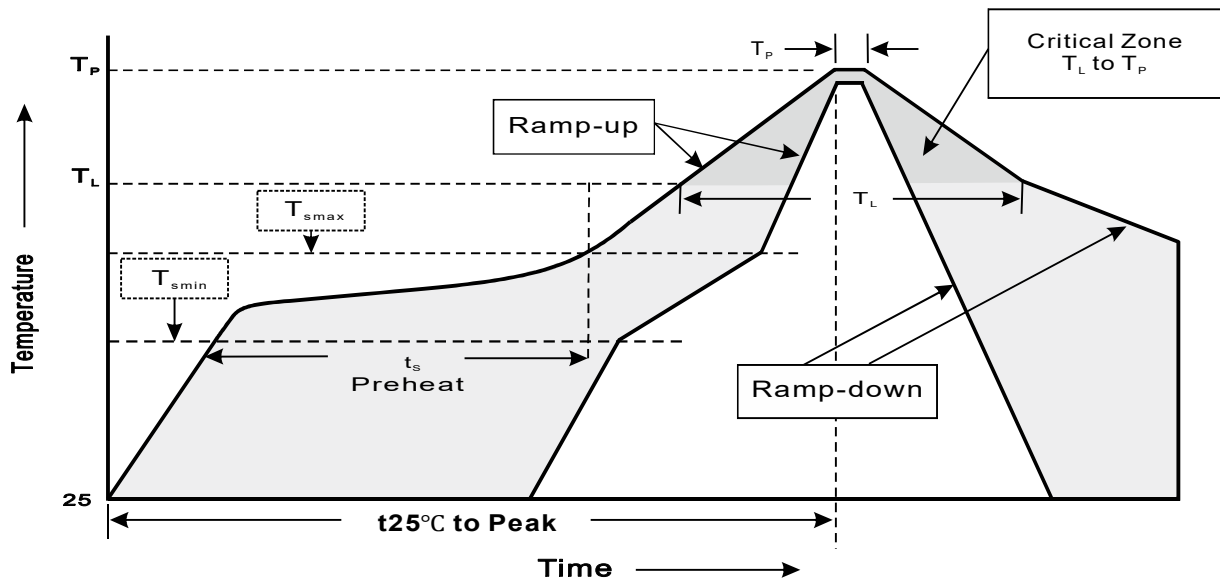
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Reel packing

Device	Outline	Package	Reel Size	Reel (PCS)
FMOSAC137N085	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 ~ 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