

FMOSAC154N06

List

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

FMOSAC154N06

154A 60V N-Channel Enhancement Mode Power MOSFET

Features

- $V_{DS}=60V$, $I_D=154A$.
- $R_{DS(ON)} \leq 2.3m\Omega$, @ $V_{GS}=10V$, $I_D=20A$.
- $R_{DS(ON)} \leq 3.2m\Omega$, @ $V_{GS}=4.5V$, $I_D=15A$.
- Low on-resistance and low gate charge.
- 100% UIS tested, 100% R_g tested.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSAC154N06-H.

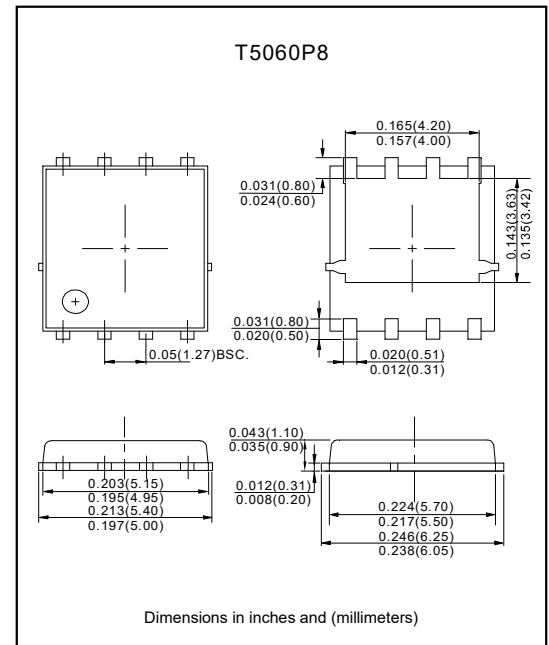
Applications

- Current switching in DC/DC & AC/DC (SR) sub systems.
- Load switching, quick/wireless charging, motor driving.
- Power management in computing, IE 4.0, communications, 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 specified)

Parameter	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain Current (Note 1)	I_D	154	A
		97	
Pulsed drain current (Note 2)	I_{DM}	434	A
Avalanche current (Note 3)	I_{AS}	40	A
Single pulse avalanche energy (Note 3)	E_{AS}	240	mJ
Power dissipation (Note 4)	P_D	104	W
		42	
Thermal resistance-junction to ambient	$R_{\theta JA}$	55	$^\circ C/W$
Thermal resistance-junction to case	$R_{\theta JC}$	1.2	$^\circ C/W$
Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

FMOSAC154N06

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_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	60			V
Drain-source leakage current	I_{DSS}	$V_{DS}=48\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=48\text{V}$, $V_{GS}=0\text{V}$, $T_J=55^\circ\text{C}$			5	
Gate-source leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	1.2	1.7	2.5	V
Static drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=20\text{A}$		1.8	2.3	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=15\text{A}$		2.4	3.2	$\text{m}\Omega$
Forward transconductance	g_{FS}	$V_{DS}=5\text{V}$, $I_D=20\text{A}$		136		S

Dynamic parameters (Note5)

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1.0\text{MHz}$		2880		pF
Out capacitance	C_{oss}			958		
Reverse transfer capacitance	C_{rss}			44		
Gate resistance	R_G	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1.0\text{MHz}$		2.0		Ω

Switching parameters (Note5)

Total gate charge	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$, $I_D=20\text{A}$		48		nC
		$V_{GS}=4.5\text{V}$, $V_{DS}=30\text{V}$, $I_D=20\text{A}$		25		
Gate to source charge	Q_{gs}	$V_{GS}=0$ to 10V , $V_{DS}=30\text{V}$, $I_D=20\text{A}$		9.1		
Gate to drain charge	Q_{gd}			9.2		
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$, $R_L=1.5\Omega$, $R_G=6\Omega$		2.6		ns
Rise time	t_r			6.7		
Turn-off delay time	$t_{d(off)}$			41		
Fall time	t_f			16.4		

Source-drain diode ratings and characteristics

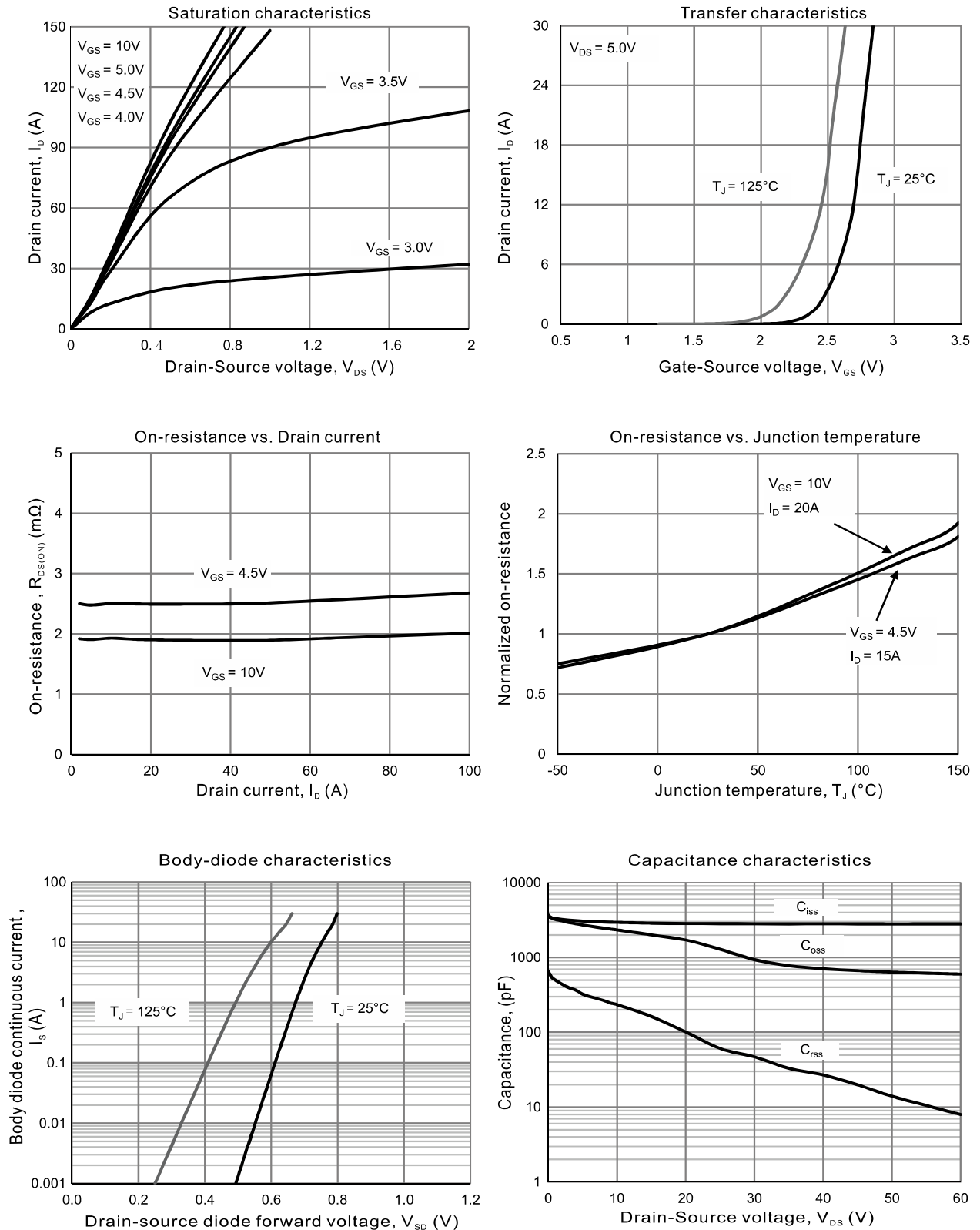
Drain-source diode forward voltage	V_{SD}	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.65	1	V
Diode Continuous Current	I_S	$T_C=25^\circ\text{C}$			104	A
Body diode reverse recovery time	t_{rr}	$I_F=20\text{A}$, $dI_F/dt=100\text{A}/\mu\text{s}$		60		ns
Body diode reverse recovery charge	Q_{rr}			70		nC

Note :

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. This single-pulse measurement was taken under the following condition [$L = 300\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DD} = 30\text{V}$] while its value is limited by $T_{J_Max} = 150^\circ\text{C}$.
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.

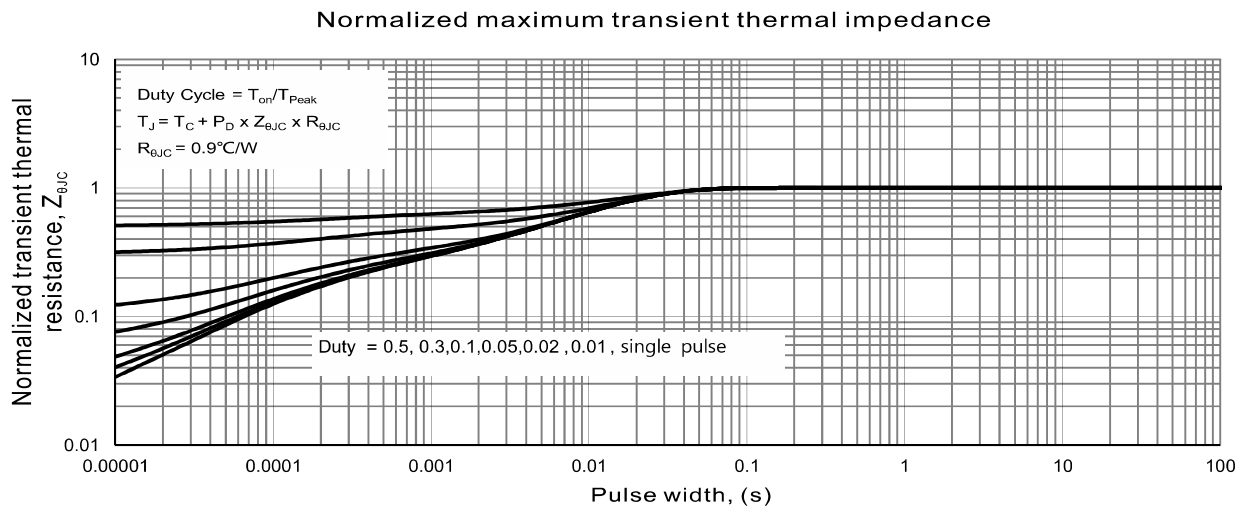
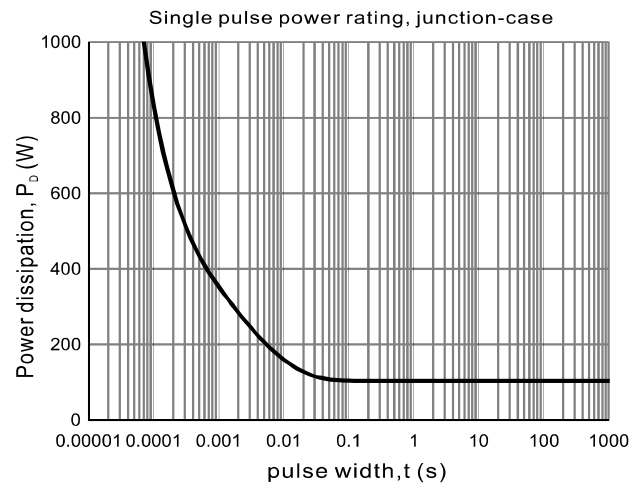
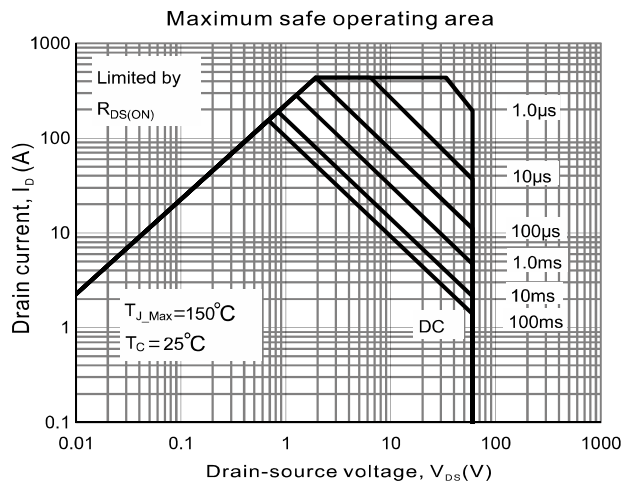
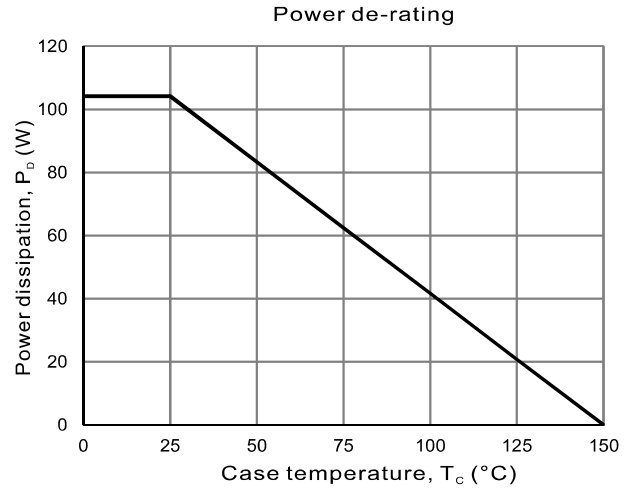
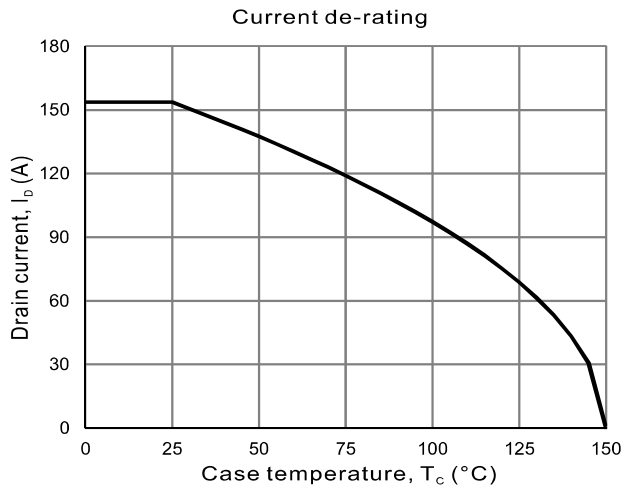
FMOSAC154N06

Rating and characteristic curves



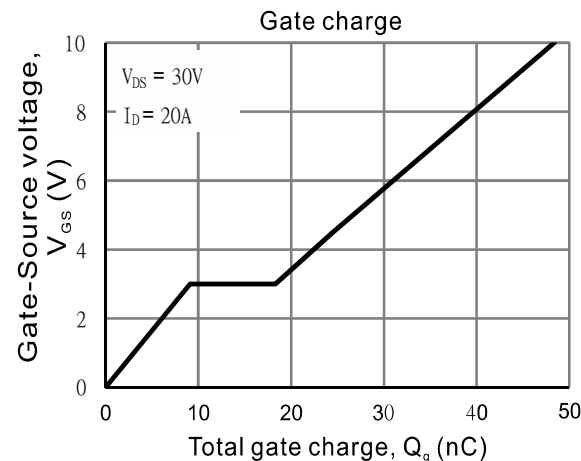
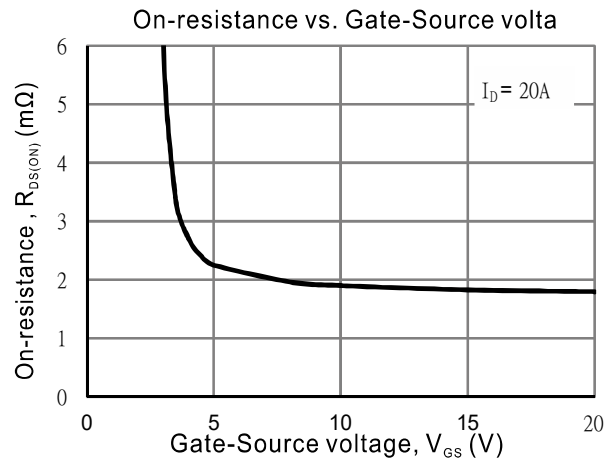
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Rating and characteristic curves



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Rating and characteristic curves



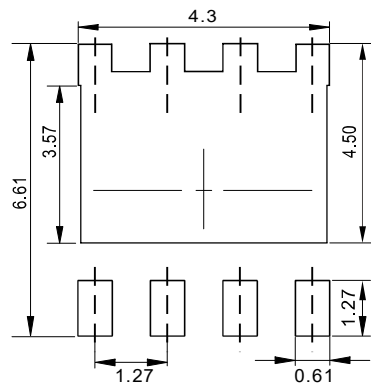
Pinning information

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
FMOSAC154N06	SL0602A

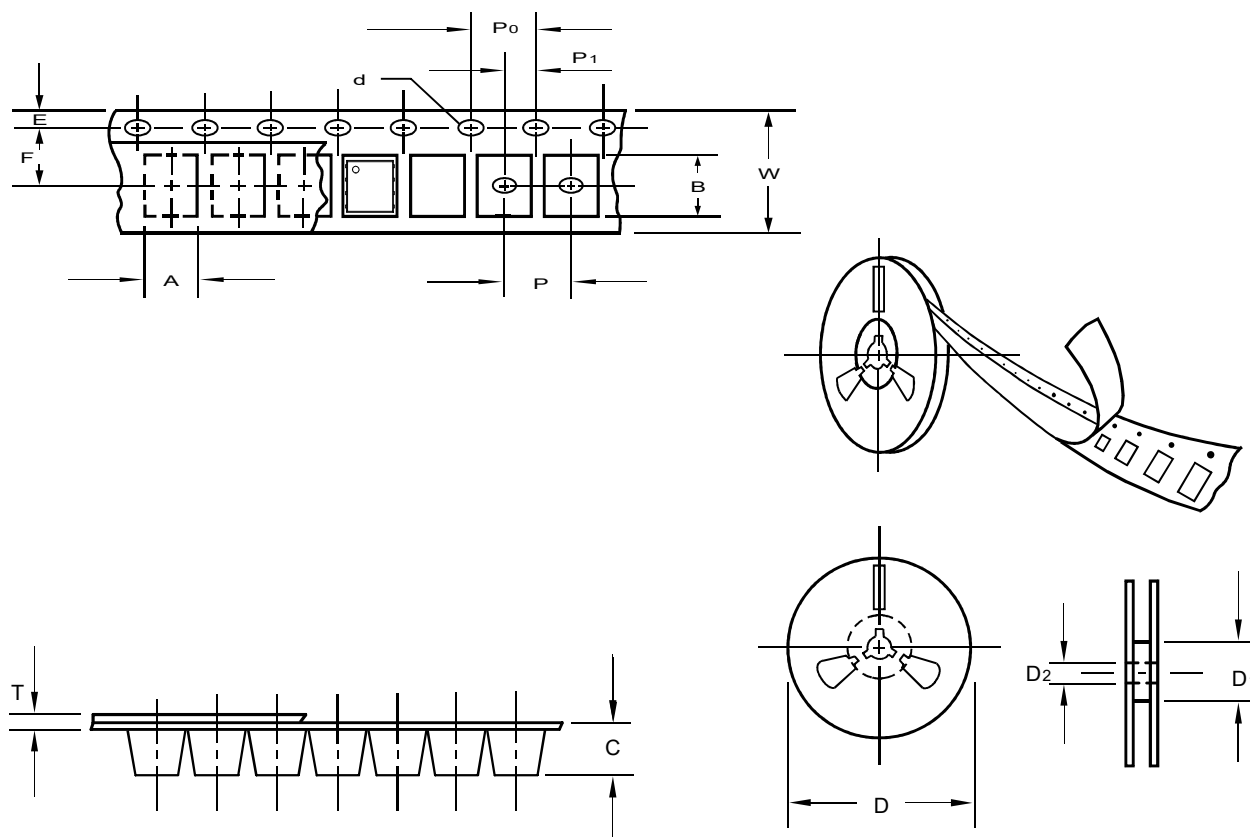
Suggested solder pad layout



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

FMOSAC154N06

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.

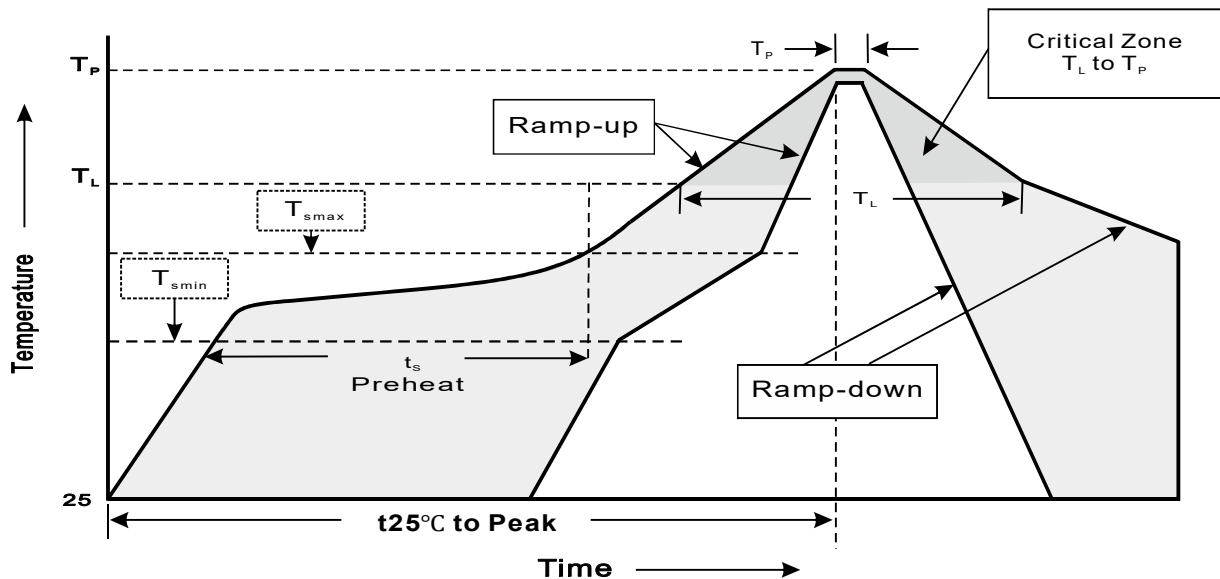
FMOSAC154N06

Reel packing

Device	Outline	Package	Reel Size	Reel (PCS)
FMOSAC154N06	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