

FMOSGTAC358N03-H

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FMOSGTAC358N03-H**358A 30V N-Channel Shield Gate Trench
Enhancement Mode Power MOSFET****Features**

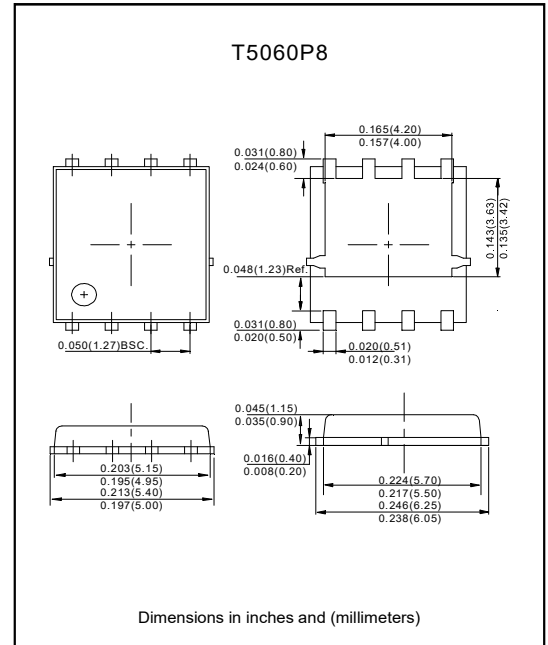
- $V_{DS} = 30V$, $I_D = 358A$.
- $R_{DS(ON)} \leq 0.7m\Omega$ @ $V_{GS} = 10V$, $I_D = 20A$.
- $R_{DS(ON)} \leq 1.4m\Omega$ @ $V_{GS} = 4.5V$, $I_D = 15A$.
- Excellent on-resistance and low gate charge.
- 100% UIS and 100% ΔV_{DS} tested.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Applications

- Load switch.
- PWM application.
- Power management.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, T5060P8.
- Weight : Approximated 105mg.

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 ($T_c = 25^\circ C$) ($T_c = 100^\circ C$)	I_D	358	A
		227	
Pulsed drain current (Note 1)	I_{DM}	Refer to Fig.4	A
Single pulse avalanche energy (Note 2)	E_{AS}	1176	mJ
Power dissipation ($T_c = 25^\circ C$) ($T_c = 100^\circ C$)	P_D	156	W
		63	
Thermal resistance, junction to ambient	$R_{\theta JA}$	41	$^\circ C/W$
Thermal resistance, junction to case	$R_{\theta JC}$	0.8	$^\circ C/W$
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
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	30			V
Drain-source leakage current	I _{DSS}	V _{DS} =24V, 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	1.1	1.6	2.2	V
Static drain-source on-resistance (Note4)	R _{DS(ON)}	V _{GS} =10V, I _D =20A		0.5	0.7	mΩ
		V _{GS} =4.5V, I _D =15A		1.0	1.4	
Dynamic parameters						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =15V, f=1.0MHz	8605	12048	16264	pF
Out capacitance	C _{oss}		6749	9449	12756	
Reverse transfer capacitance	C _{rss}		196	275	371	
Gate resistance	R _g	f=1.0MHz		2.2		Ω
Switching parameters						
Total gate charge	Q _g	V _{GS} =0 to 10V, V _{DS} =15V, I _D =20A	109	153	207	nC
Gate to source charge	Q _{gs}		23	33	44	
Gate to drain charge	Q _{gd}		14	20	27	
Turn-on delay time	t _{d(on)}	V _{DD} =15V, V _{GS} =10V, I _D =20A, R _{GEN} =3Ω		18		ns
Rise time	t _r			36		
Turn-off delay time	t _{d(off)}			116		
Fall time	t _f			59		
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage	V _{SD}	I _S =20A, V _{GS} =0V			1.2	V
Maximum continuous body diode forward current	I _S				358	A
Maximum pulsed body diode forward current	I _{SM}				1434	V
Body diode reverse recovery time	t _{rr}	I _F =20A, di/dt = 100A/μs	84	118	160	ns
Body diode reverse recovery charge	Q _{rr}			232		nC

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

2. E_{AS} condition: starting $T_J=25^{\circ}\text{C}$, $V_{DD}=15\text{V}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$, $L=3\text{mH}$, $I_{AS}=28\text{A}$, $V_{DD}=0\text{V}$, 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: width $\leq 300\mu\text{s}$, duty cycle $\leq 0.5\%$.

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Rating and characteristic curves

Figure 1. Power De-rating

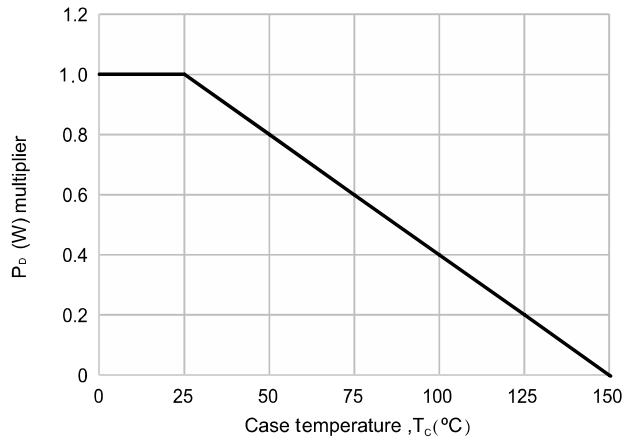


Figure 2. Current De-rating

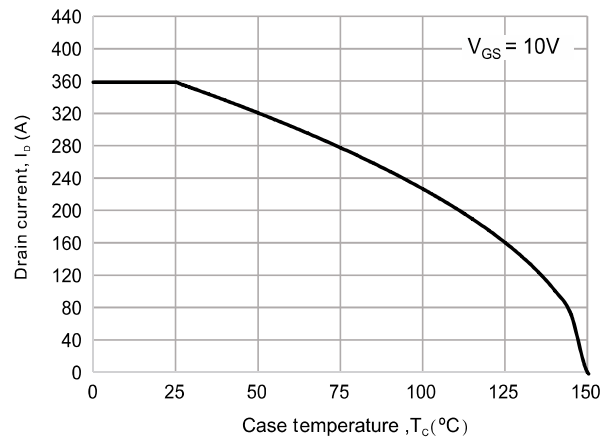


Figure 3. Normalized maximum transient thermal impedance

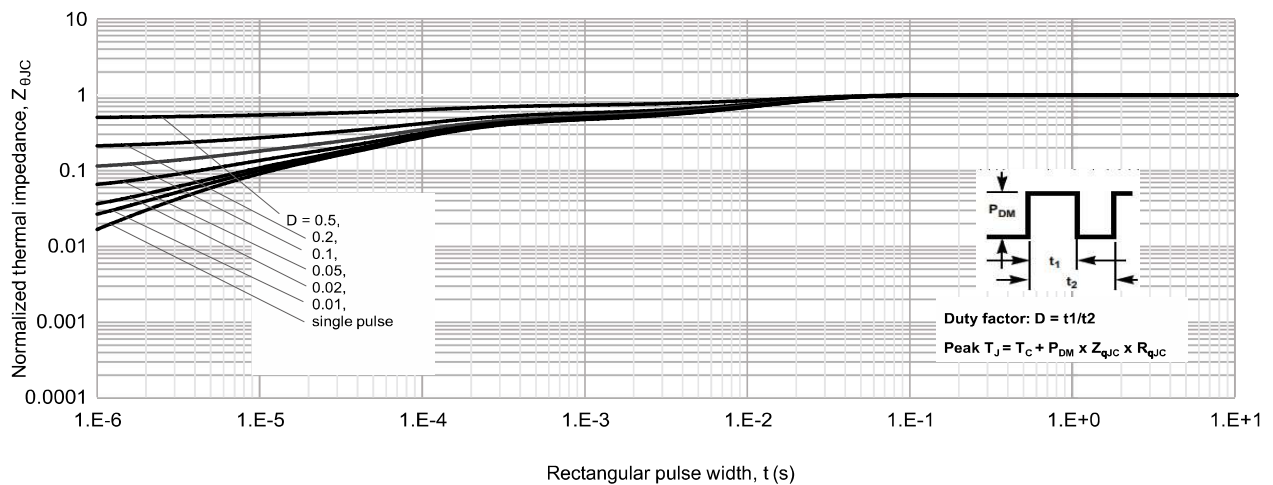
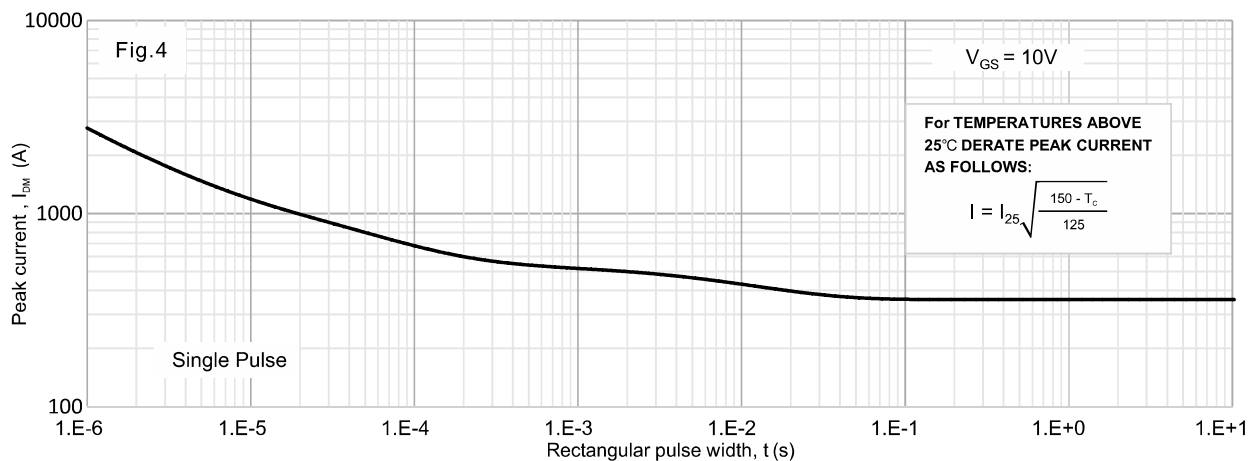


Figure 4. Peak current capacity



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Rating and characteristic curves

Figure 5. Output characteristics

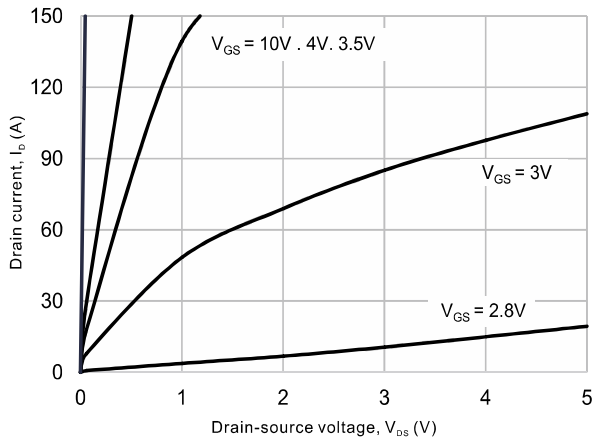


Figure 6. Typical transfer characteristics

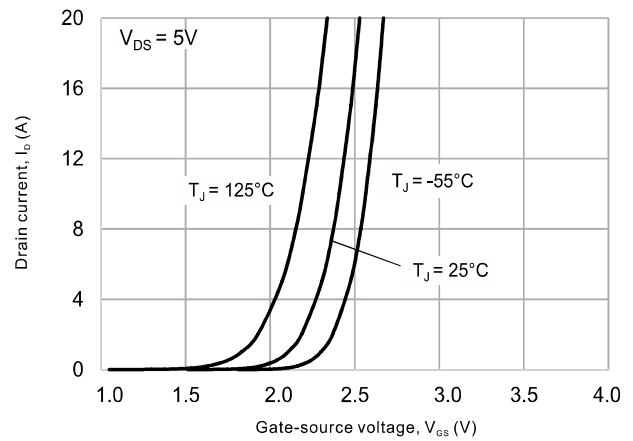


Figure 7. On-resistance vs. Drain current

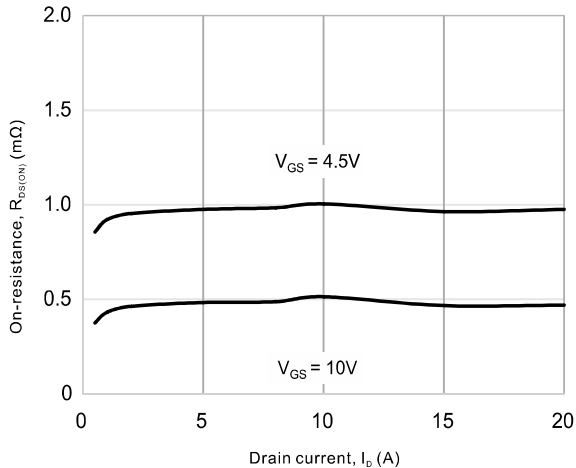


Figure 8. Body diode characteristics

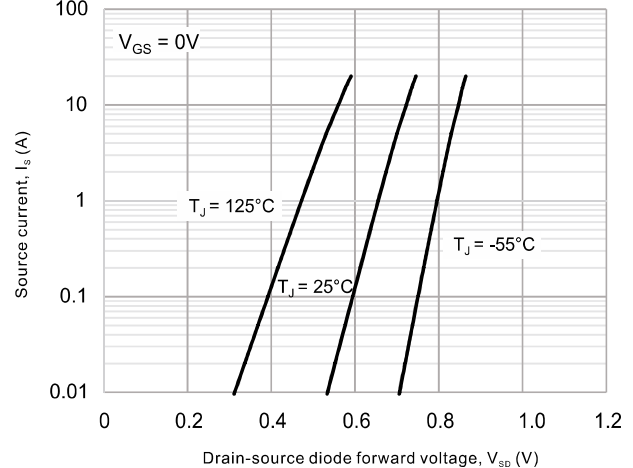


Figure 9. Gate charge characteristics

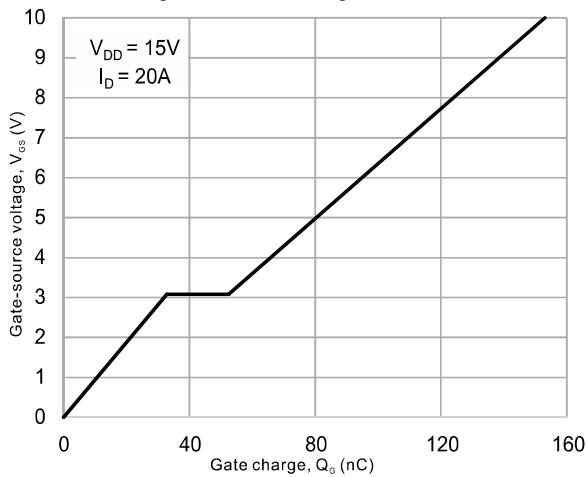
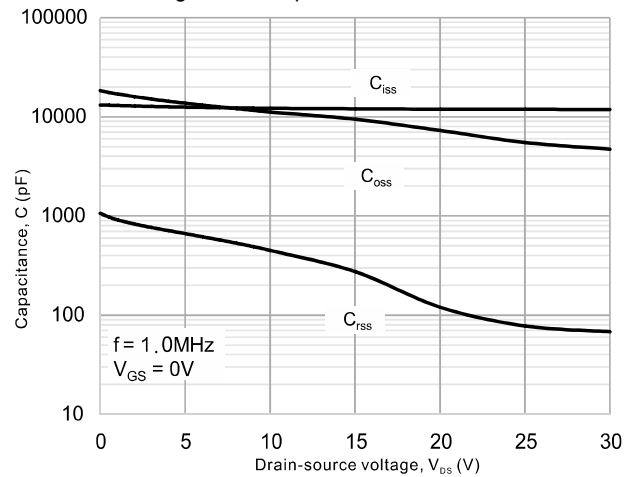


Figure 10. Capacitance characteristics



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Rating and characteristic curves

Figure 11. Normalized breakdown voltage vs. Junction temperature

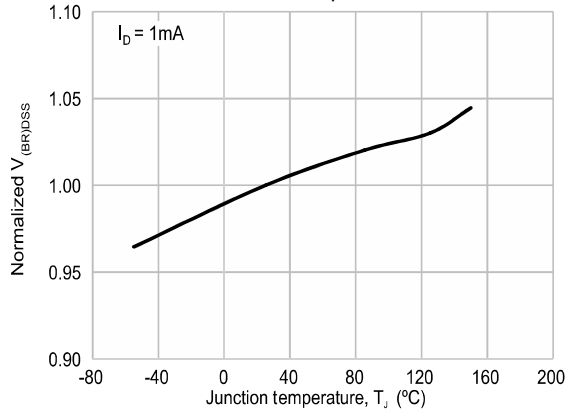


Figure 12. Normalized on-resistance vs. Junction temperature

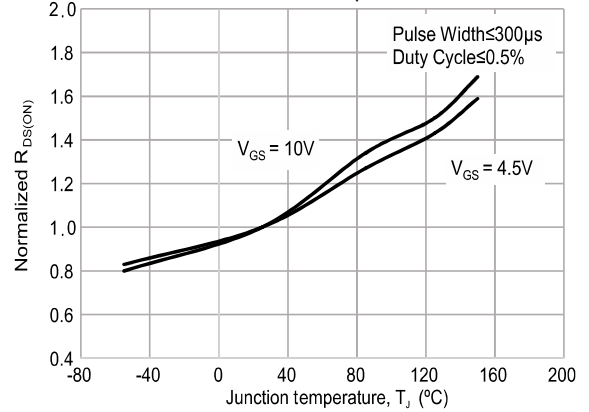


Figure 13. Normalized threshold voltage vs. Junction temperature

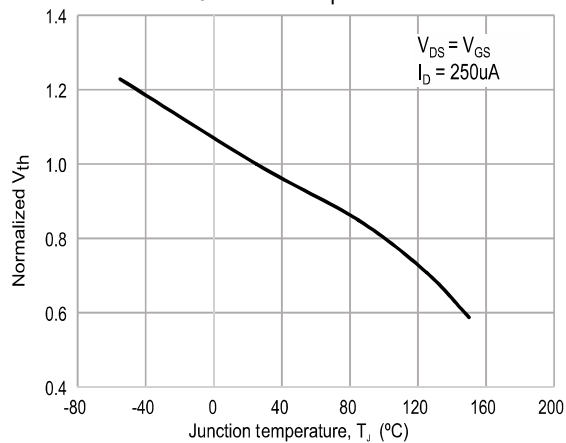
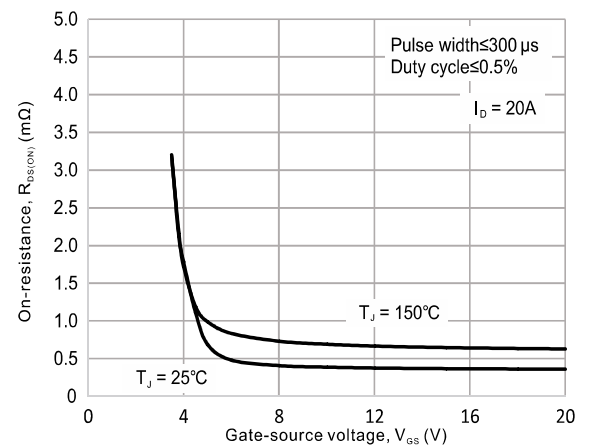
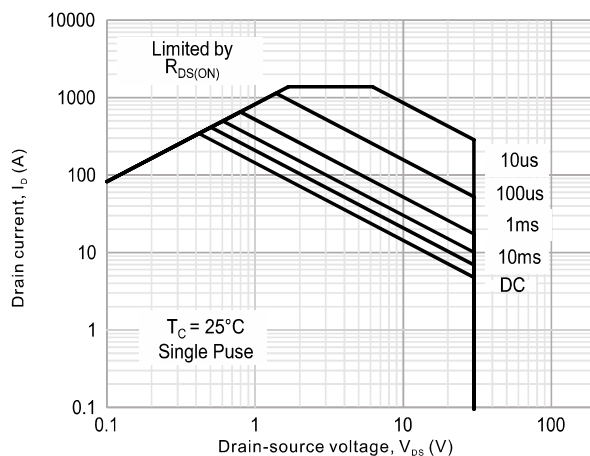
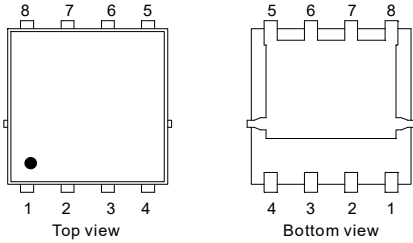
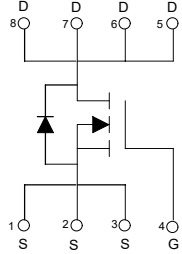
Figure 14. $R_{DS(ON)}$ vs. V_{GS} 

Figure 15. Maximum safe operating area



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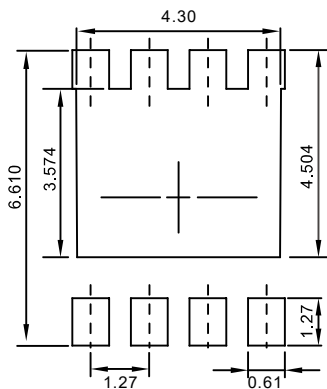
Pinning information

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

Marking

Type number	Marking code
FMOSGTAC358N03-H	SL030STG

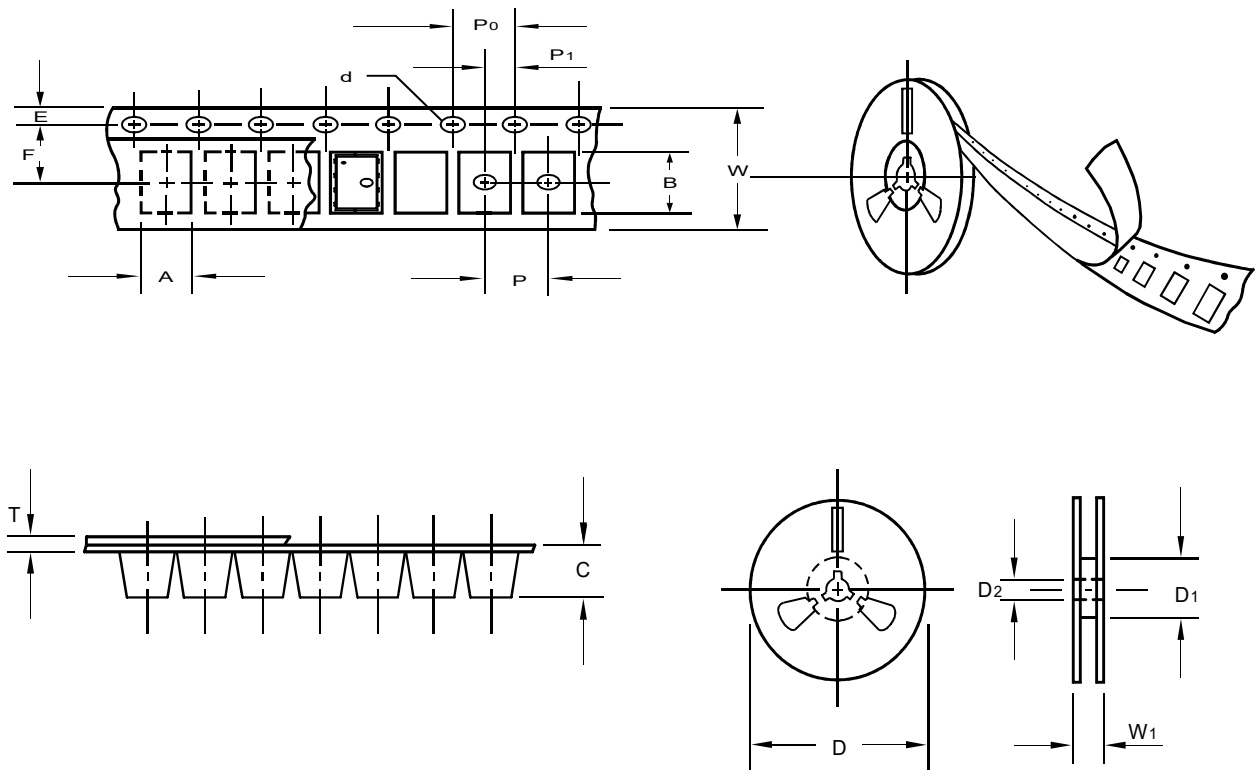
Suggested solder pad layout



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.

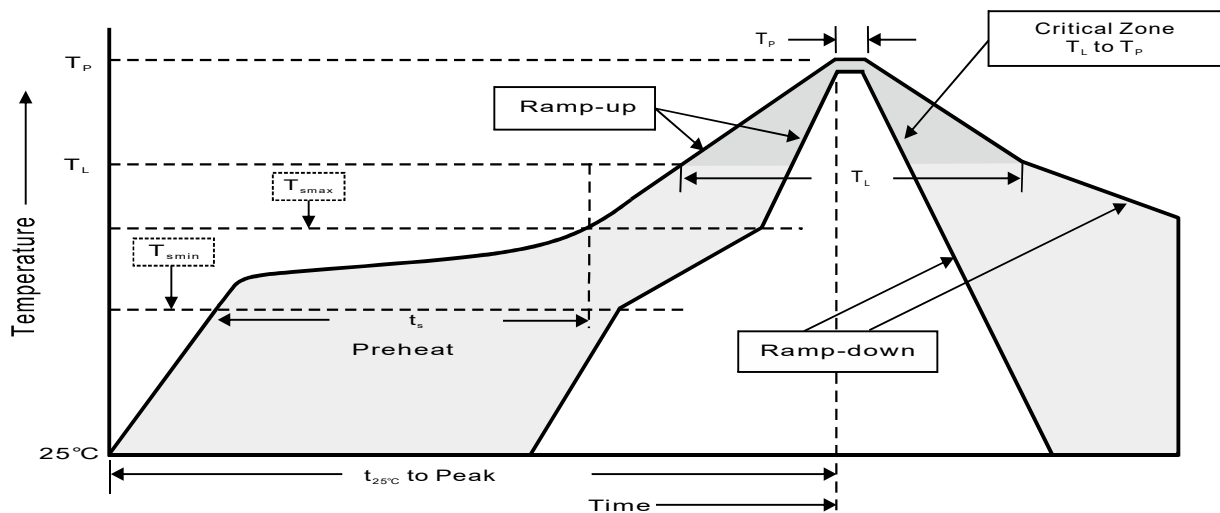
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Reel packing

Device	Outline	Device Package	Reel Size	Reel (pcs)
FMOSGTAC358N03-H	Taping	T5060P8	13 inch	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