

FMOSGTAC71N15-H

71A 150V N-Channel Shield Gate Trench Enhancement Mode Power MOSFET

Features

- $V_{DS}=150V$, $I_D=71A$.
- $R_{DS(ON)} \leq 9.9m\Omega$, @ $V_{GS}=10V$, $I_D=20A$.
- Low on-resistance.
- Excellent FOM (figure of merit).
- 100% UIS and R_g and ΔV_{DS} tested.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21) .

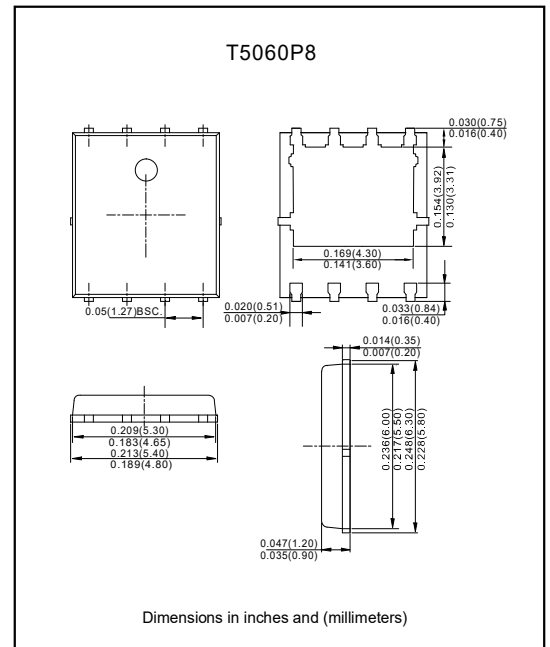
Application

- DC/DC in telecoms and industrial.
- Synchronous rectification in SMPS.
- Hard switching and high speed circuit.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, T5060P8 (DFN5060-8).
- Weight : Approximated 105mg.

Package outline

Maximum ratings (At $T_c=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	150	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current @ $V_{GS}=10V$ (note 1)	I_D	71 ($T_c=25^\circ C$)	A
		45 ($T_c=100^\circ C$)	
Pulse drain current tested (note 2)	I_{DM}	285	A
Avalanche current (L=0.1mH)	I_{AS}	61	A
Avalanche energy (note 3)	E_{AS}	672	mJ
Maximum power dissipation	P_D	125 ($T_c=25^\circ C$)	W
		50 ($T_c=100^\circ C$)	
Thermal resistance, junction to ambient (note 4)	$R_{\theta JA}$	43	$^\circ C/W$
Thermal resistance, junction to case (note 5)	$R_{\theta JC}$	1	$^\circ C/W$
Maximum 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 specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics (Note 6)						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	150			V
Drain-source leakage current	I_{DSS}	$V_{DS}=150\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=150\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$			100	
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$			± 100	nA

On characteristics (Note 6)

Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.5	3.4	4.5	V
Static drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=20\text{A}$		8.6	9.9	m Ω
Forward transconductance	g_{FS}	$V_{DS}=5\text{V}$, $I_D=20\text{A}$		43		S

Dynamic parameters (Note 7)

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=75\text{V}$, $f=1.0\text{MHz}$		2330		pF
Out capacitance	C_{oss}			316		
Reverse transfer capacitance	C_{rss}			17		
Gate resistance	R_G	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1.0\text{MHz}$		2.2		Ω

Switching parameters (Note 7)

Total gate charge	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=75\text{V}$, $I_D=20\text{A}$		36		nC
Total gate charge		$V_{GS}=6\text{V}$, $V_{DS}=75\text{V}$, $I_D=20\text{A}$		24		
Gate to source charge	Q_{gs}	$V_{GS}=10\text{V}$, $V_{DS}=75\text{V}$, $I_D=20\text{A}$		10		
Gate to drain charge	Q_{gd}			7.7		V
Gate plateau voltage	$V_{plateau}$			4.2		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=75\text{V}$, $V_{GS}=10\text{V}$, $I_D=20\text{A}$, $R_{GEN}=3\Omega$		8.6		ns
Rise time	t_r			17		
Turn-off delay time	$t_{d(off)}$			28		
Fall time	t_f			22		

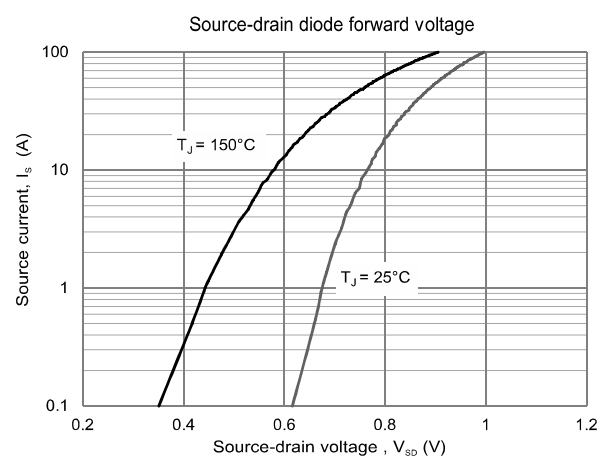
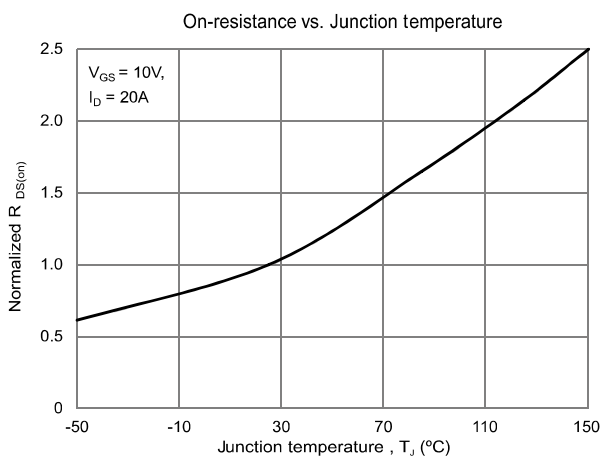
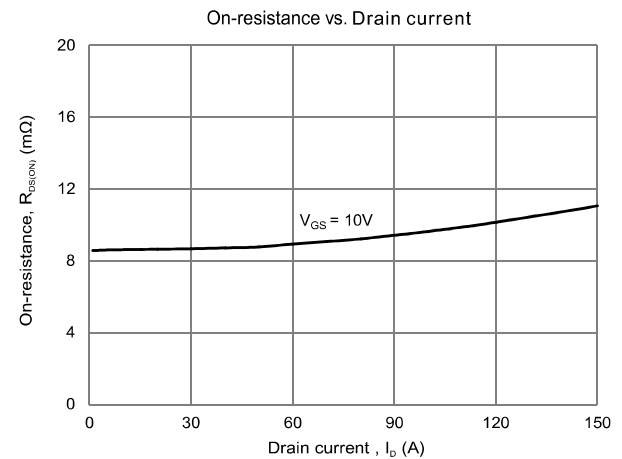
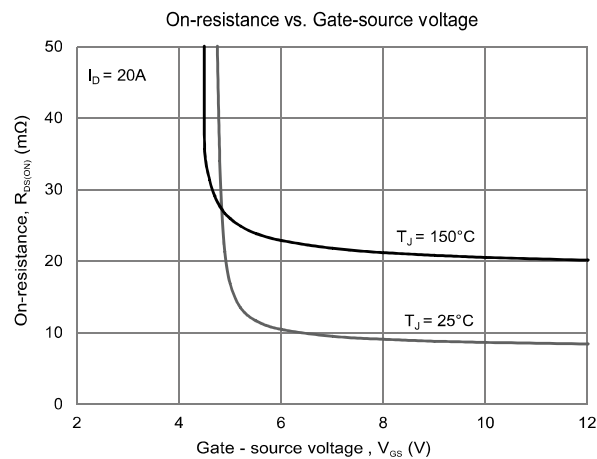
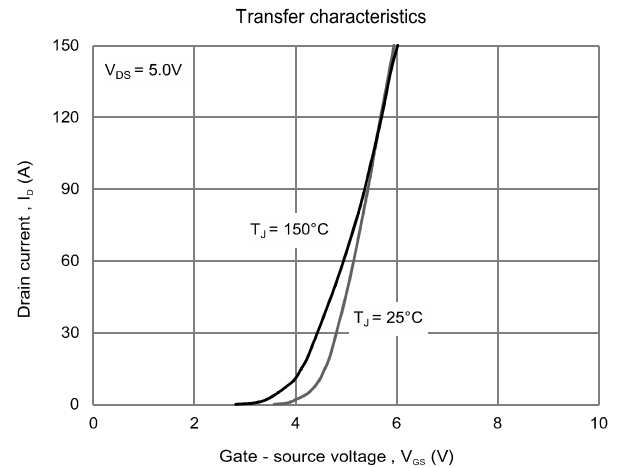
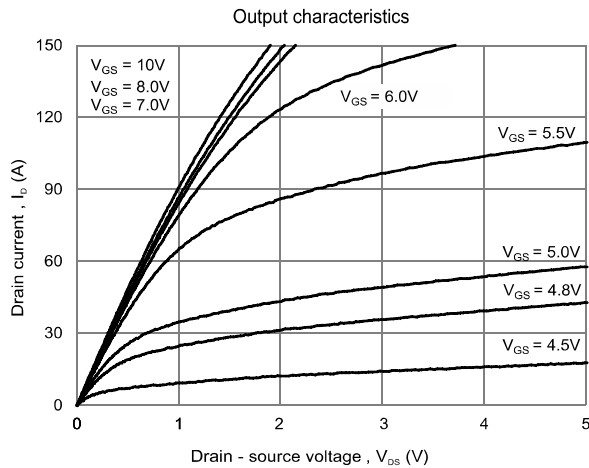
Source-drain diode ratings and characteristics

Drain-source diode forward voltage (Note 6)	V_{SD}	$I_S=2\text{A}$, $V_{GS}=0\text{V}$		0.7	1.2	V
Diode continuous current (Note 7)	I_S	$T_C=25^\circ\text{C}$			71	A
Reverse recovery time (Note 7)	t_{rr}	$I_F=20\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$, $T_J=25^\circ\text{C}$		76		ns
Reverse recovery charge (Note 7)	Q_{rr}			227		nC

- Notes : 1. This current chip limited, which is calculated base on $R_{\theta JC}$.
2. This current is calculated on single pulse with $10\mu\text{s}$ pulse and duty cycle=1%.
3. Defined by design, not subject to production test, E_{AS} condition: $T_J=25^\circ\text{C}$, $V_{DS}=75\text{V}$, $V_{GS}=10\text{V}$, $L=1.0\text{mH}$.
4. Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
5. Thermal resistance from junction to soldering point (on the exposed drain pad).
6. Short duration pulse test used to minimize self-heating effect.
7. Defined by design, not subject to production.

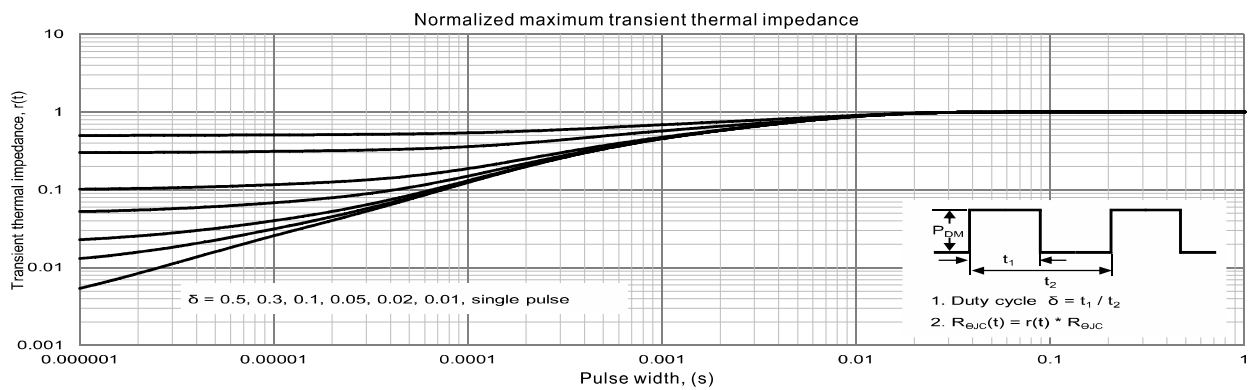
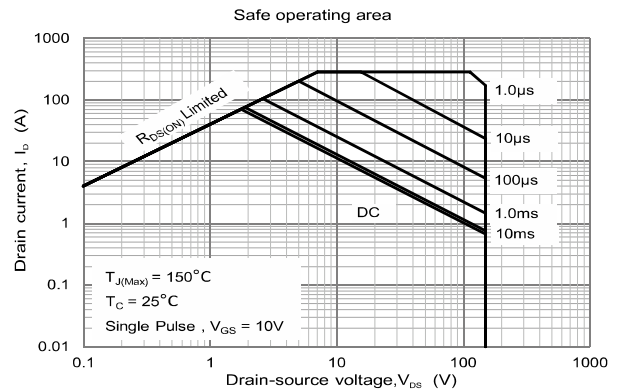
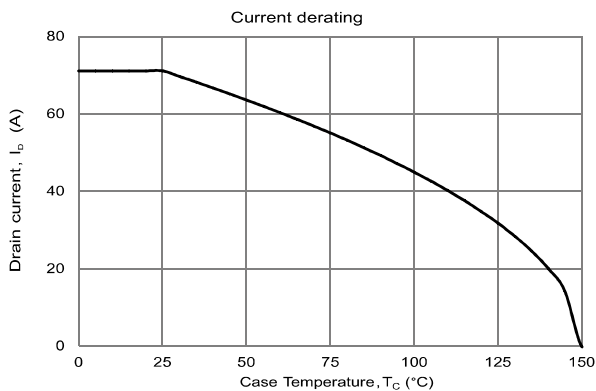
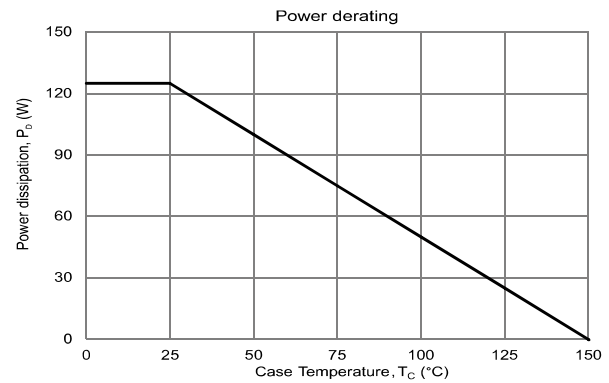
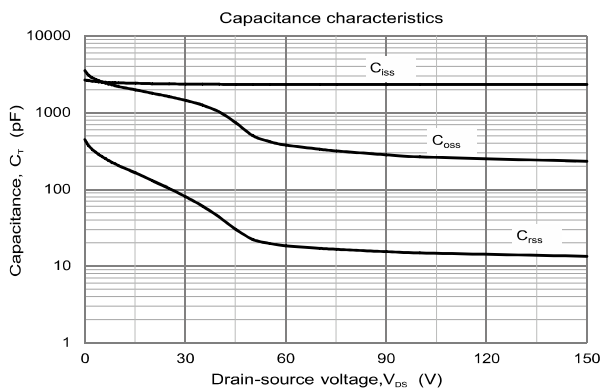
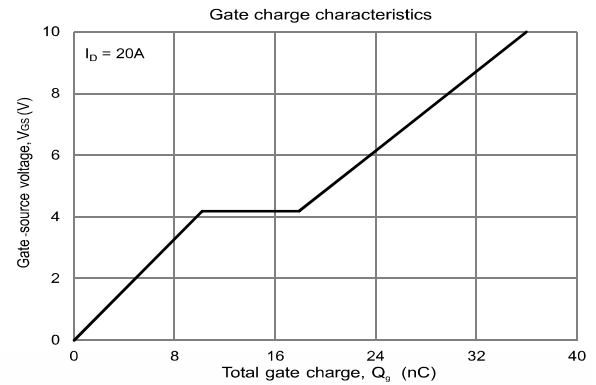
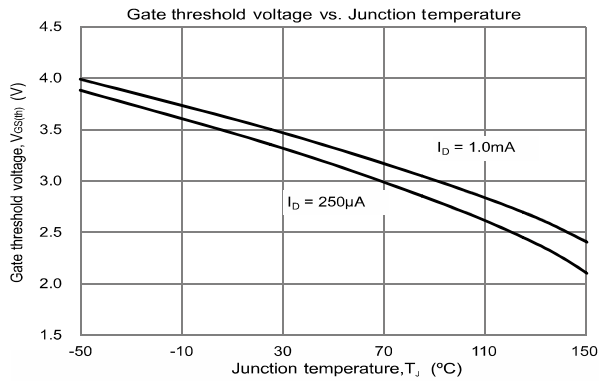
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Rating and characteristic curves



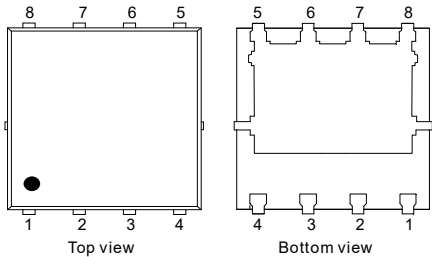
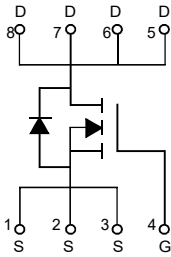
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Rating and characteristic curves



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Pinning information

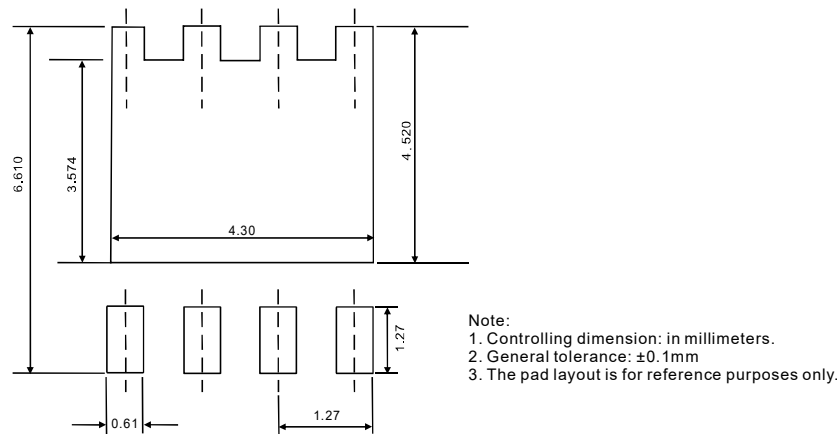
Pin	Simplified outline	Symbol
Pin 1, 2, 3, Source Pin 4 Gate Pin 5, 6, 7, 8 Drain		

Marking

Type number	Marking code
FMOSGTAC71N15-H	15T09AH

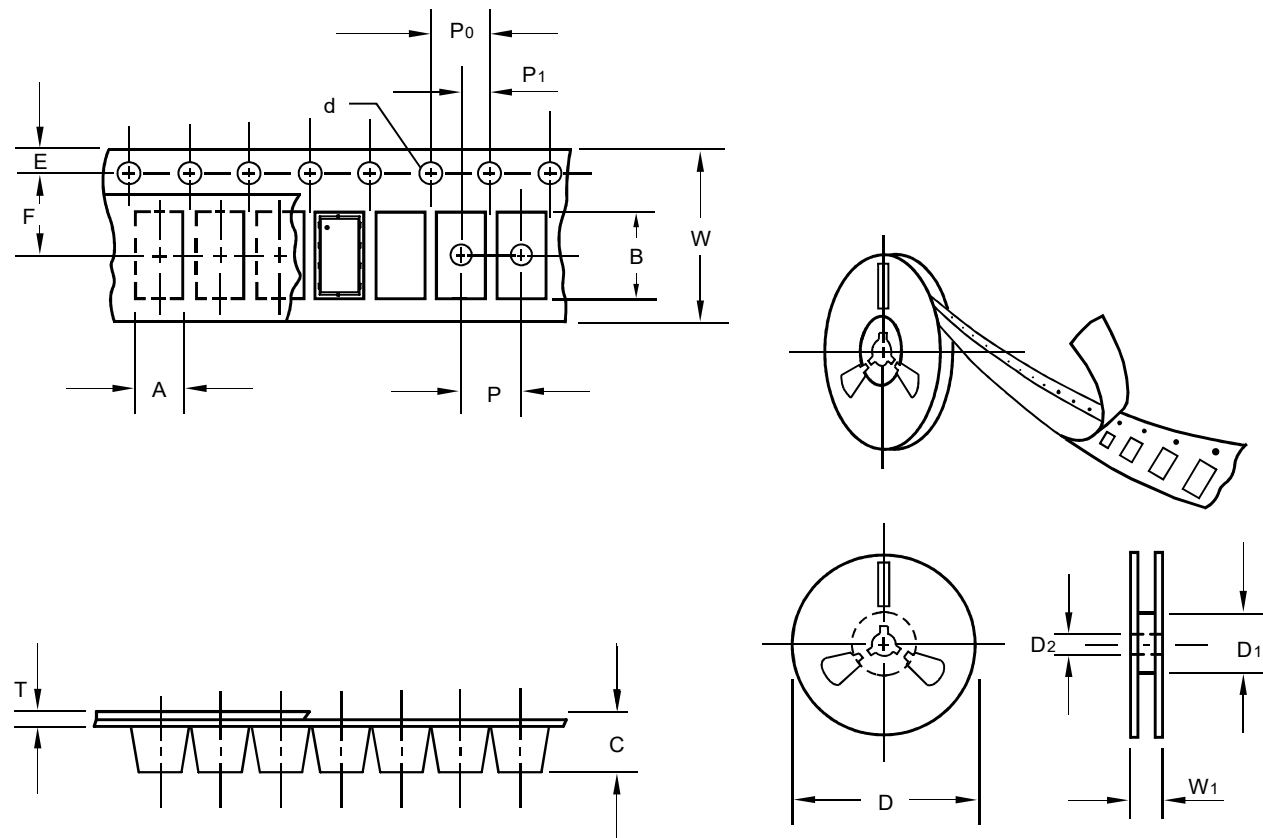
Suggested solder pad layout

T5060P8



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Packing information



unit:mm

Item	Symbol	Tolerance	T5060P8
Carrier width	A	0.3	6.50
Carrier length	B	0.3	5.28
Carrier depth	C	0.3	2.00
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
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	3.0	17.60

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

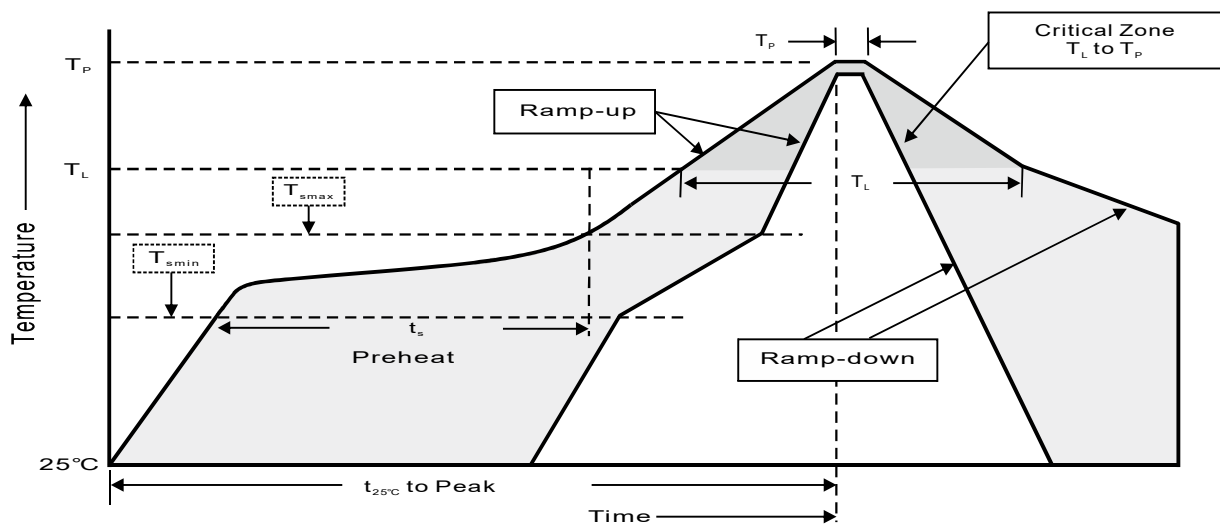
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
T5060P8	13"	5,000	4.0	10,000	335*335*38	330	350*350*360	80,000

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