

FMOSAG3002

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FMOSAG3002

28A 30V N-Channel Enhancement Mode Power MOSFET

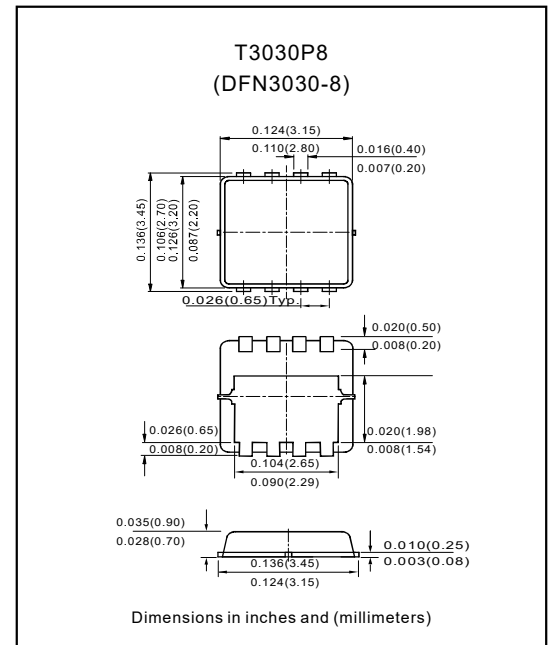
Features

- $V_{DS}=30V$, $I_D=28A$.
- $R_{DS(ON)} \leq 18m\Omega$, @ $V_{GS}=10V$, $I_D=10A$.
- $R_{DS(ON)} \leq 30m\Omega$, @ $V_{GS}=4.5V$, $I_D=5A$.
- Excellent CdV/dt effect decline.
- Super low gate charge.
- 100% E_{AS} guaranteed.
- Advanced high cell density trench technology.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSAG3002-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, T3030P8 (DFN3030-8).
- 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}	30	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current, $V_{GS}@10V$ (Note1)	I_D	28	A
($T_c=25^\circ C$) ($T_c=100^\circ C$)		18	
Pulsed drain current (Note2)	I_{DM}	55	A
Avalanche current	I_{AS}	21	A
Single pulse avalanche energy (Note3)	E_{AS}	22.1	mJ
Total power dissipation (Note4)	P_D	20	W
Thermal resistance, junction to ambient (note1)	$R_{\theta JA}$	75	$^\circ C/W$
Thermal resistance, junction to case (note1)	$R_{\theta JC}$	6	$^\circ C/W$
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}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
BV_{DSS} temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$		0.022		$\text{V}/^{\circ}\text{C}$
Drain-source leakage current	I_{DSS}	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=55^{\circ}\text{C}$			5	
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$			± 100	nA

On characteristics

Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	1		2.5	V
$V_{GS(TH)}$ temperature coefficient	$\Delta V_{GS(TH)}$			-5.1		$\text{mV}/^{\circ}\text{C}$
Drain-Source on-state resistance (Note2)	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=10\text{A}$			18	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=5\text{A}$			30	
Forward transconductance	g_{FS}	$V_{GS}=5\text{V}$, $I_D=1\text{A}$		4.5		S

Dynamic parameters

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1.0\text{MHz}$		572		pF
Out capacitance	C_{oss}			81		
Reverse transfer capacitance	C_{rss}			65		
Gate resistance	R_G	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1.0\text{MHz}$		2.5		Ω

Switching parameters

Total gate charge	Q_g	$V_{GS}=4.5\text{V}$, $V_{DS}=20\text{V}$, $I_D=10\text{A}$		7.2		nC
Gate to source charge	Q_{gs}			1.4		
Gate to drain charge	Q_{gd}			2.2		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=12\text{V}$, $V_{GS}=10\text{V}$, $R_G=3.3\Omega$, $I_D=5\text{A}$		4.1		ns
Rise time	t_r			9.8		
Turn-off delay time	$t_{d(off)}$			15.5		
Fall time	t_f			6		

Source-drain diode ratings and characteristics

Drain-source diode forward voltage (Note2)	V_{SD}	$I_S=1\text{A}$, $V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$			1.2	V
Continuous source current (Note1,5)	I_S	$V_G=V_D=0\text{V}$, Force current			28	A
Pulsed source current (Note2,5)	I_{SM}				55	A

Note: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2oz copper.

2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

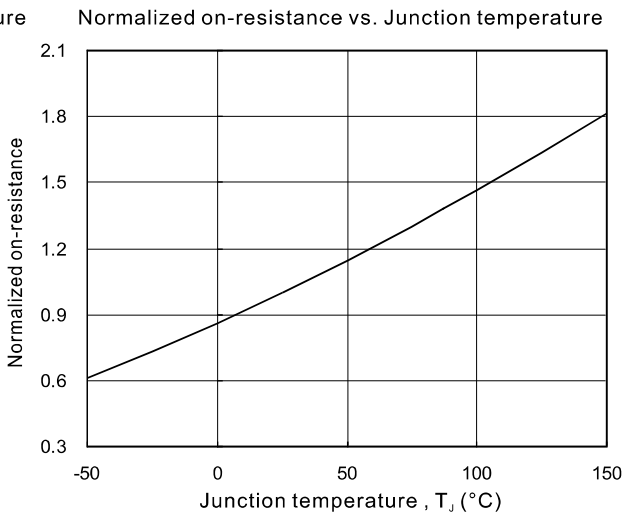
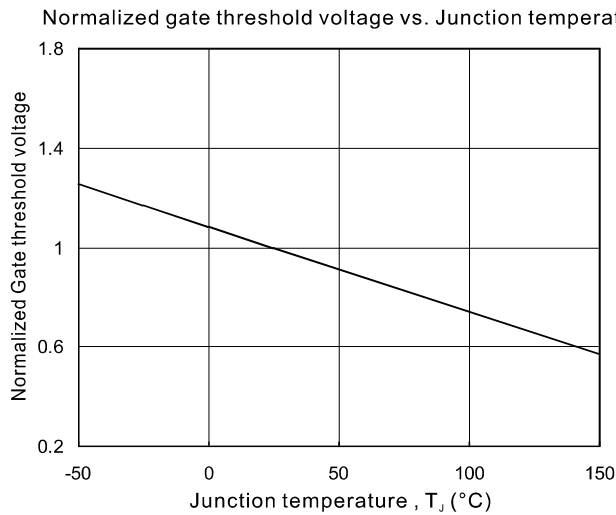
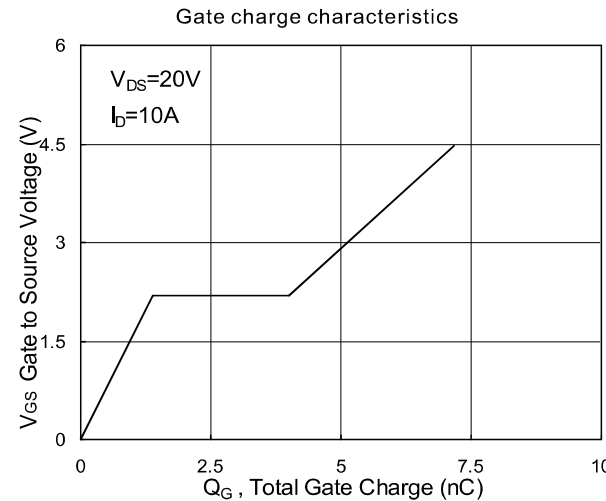
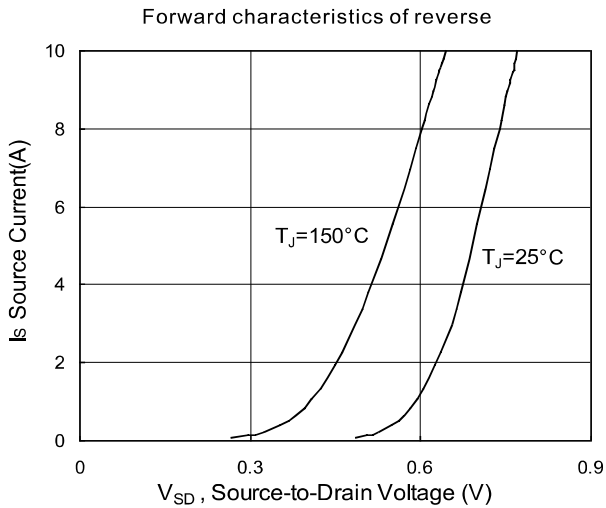
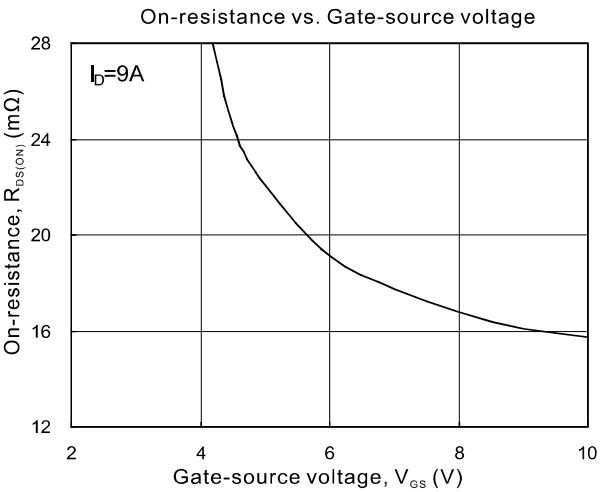
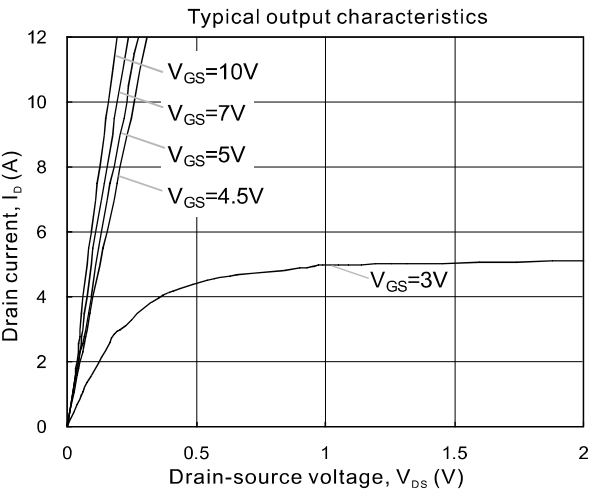
3. The E_{AS} data shows maximum rating. The test condition is $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=21\text{A}$.

4. The power dissipation is limited by 150°C junction temperature.

5. The data is theoretically the same as I_D and I_{DM} , in real application, should be limited by total power dissipation.

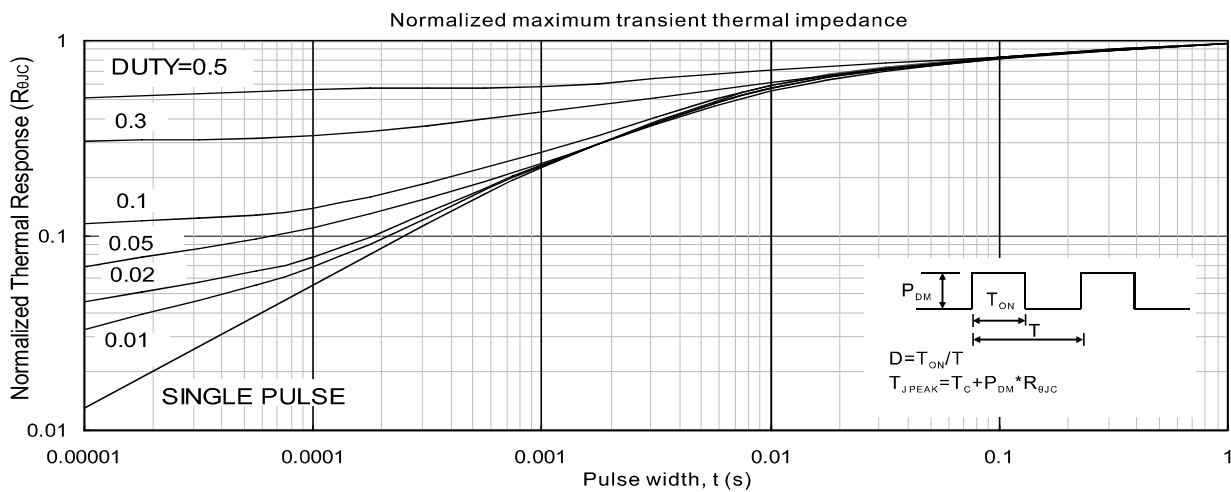
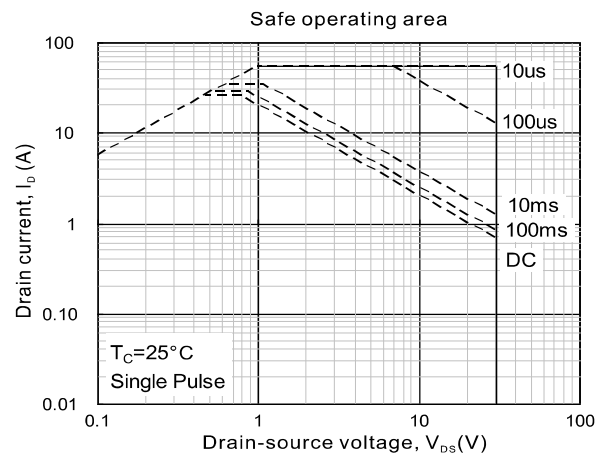
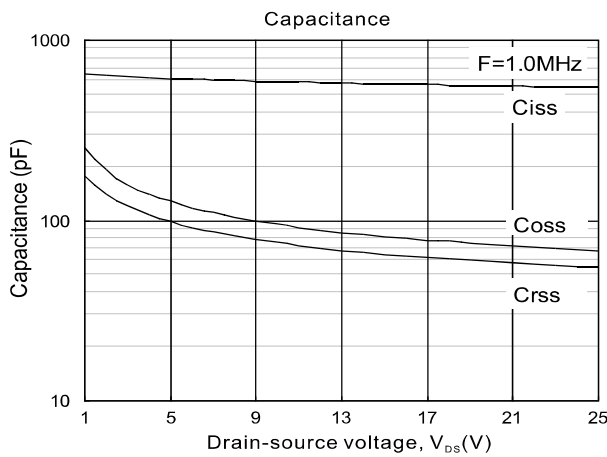
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Rating and characteristic curves



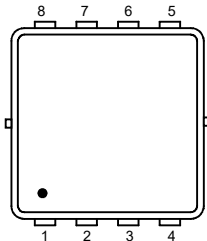
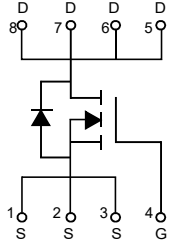
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Rating and characteristic curves



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Pinning information

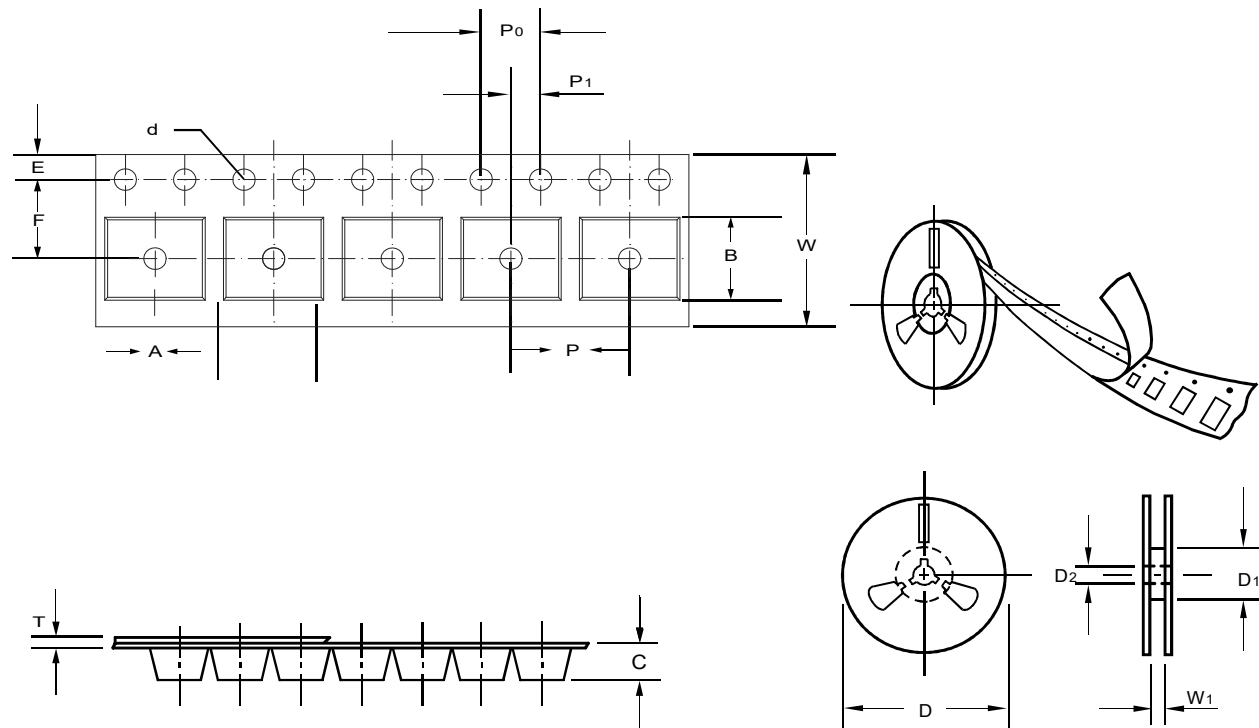
Pin	Simplified outline	Symbol
Pin 1 Source Pin 2 Source Pin 3 Source Pin 4 Gate Pin 5,6,7,8 Drain		

Marking

Type number	Marking code
FMOSAG3002	AG3002

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Packing information



unit:mm

Item	Symbol	Tolerance	T3030P8 (DFN3030-8)
Carrier width	A	0.1	3.35
Carrier length	B	0.1	3.20
Carrier depth	C	0.1	1.10
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.0
7" Reel inner diameter	D1	min	59.5
Feed hole diameter	D2	0.5	13.0
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.0
Sprocket hole pitch	P0	0.1	4.0
Embossment center	P1	0.1	2.0
Overall tape thickness	T	0.05	0.23
Tape width	W	0.3	8.0
Reel width	W1	2.0	8.4

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

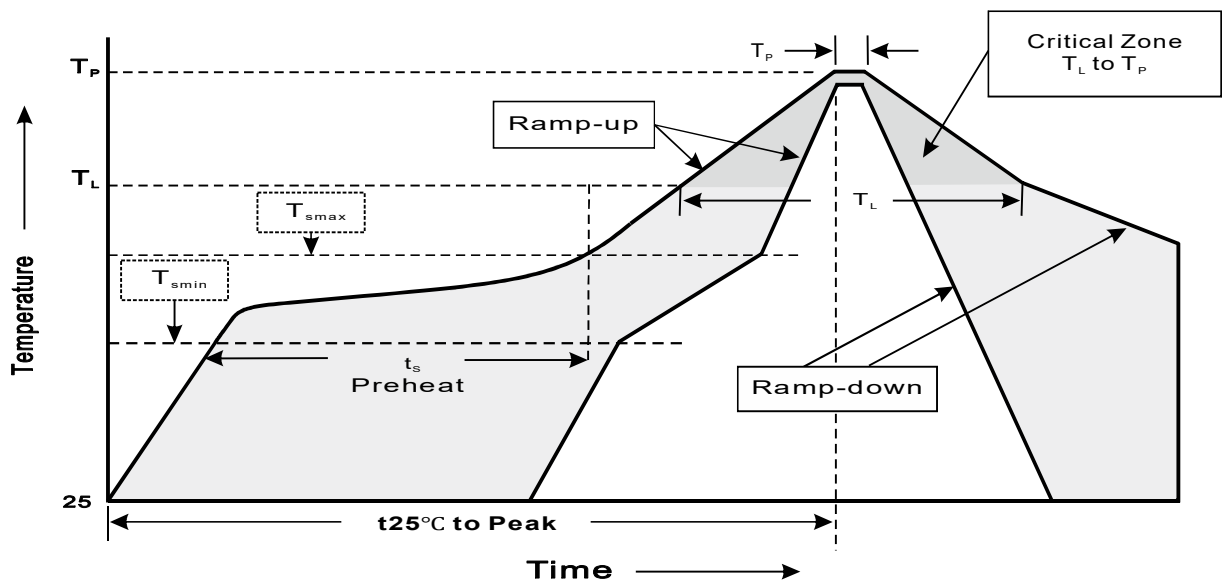
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Reel packing

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)
T3030P8	7"	3,000	8.0	30,000	183*123*183	178	382*257*387	240,000

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