

FMOSN02P7N10-H

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FMOSN02P7N10-H

2.7A 100V N-Channel Enhancement Mode MOSFET ESD Protection

Features

- $V_{DS}=100V$, $I_D=2.7A$.
- $R_{DS(ON)} \leq 115m\Omega$, @ $V_{GS}=10V$, $I_D=5.0A$.
- $R_{DS(ON)} \leq 140m\Omega$, @ $V_{GS}=4.5V$, $I_D=3.0A$.
- Low Threshold Voltage.
- Fast Switching Speed.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

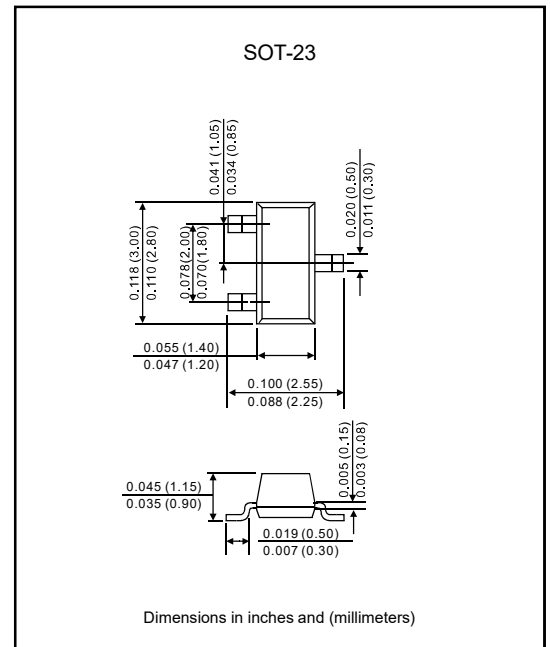
Applications

- Load Switch for Portable Devices .
- Voltage controlled small signal switch.

Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Weight : Approximated 8mg.

Package outline



Maximum ratings (At $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current	I_D	2.7	A
Pulsed drain current (Note1)	I_{DM}	15	A
Power dissipation (Note1)	P_D	1.25	W
Thermal resistance, junction to ambient (Note2)	$R_{\theta JA}$	100	$^\circ C/W$
Thermal resistance, junction to case	$R_{\theta JC}$	20	
Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to + 150	$^\circ C$

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

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

On characteristics

Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.0		2.5	V
Static drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=5\text{A}$		85	115	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=3\text{A}$		95	140	
Forward transconductance	g_{FS}	$V_{DS}=5\text{V}$, $I_D=4\text{A}$		22		S
Gate resistance	R_g	$V_{DS}=0\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		1.5		Ω

Dynamic parameters

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		573		pF
Out capacitance	C_{oss}			58		
Reverse transfer capacitance	C_{rss}			32		

Switching parameters

Total gate charge	Q_g	$V_{DS}=50\text{V}$, $V_{GS}=4.5\text{V}$, $I_D=4.0\text{A}$		8		nC
				13.6		
Gate-source charge	Q_{gs}	$V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=4.0\text{A}$		2		
Gate-drain charge	Q_{gd}			4.6		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=50\text{V}$, $I_D=4.0\text{A}$, $V_{GS}=10\text{V}$, $R_G=6\Omega$		16		ns
Rise time	t_r			5		
Turn-off delay time	$t_{d(off)}$			35		
Fall time	t_f			10		

Source-drain diode ratings and characteristics

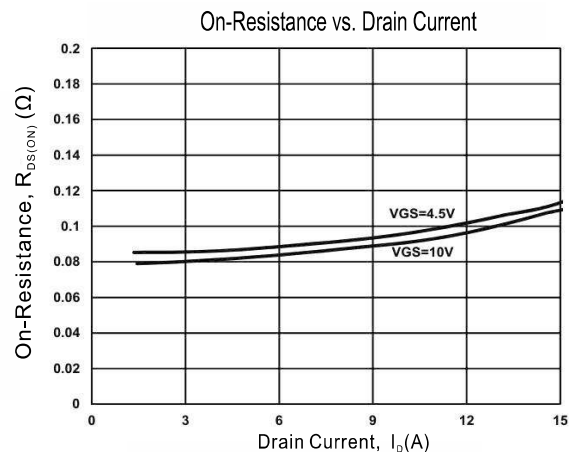
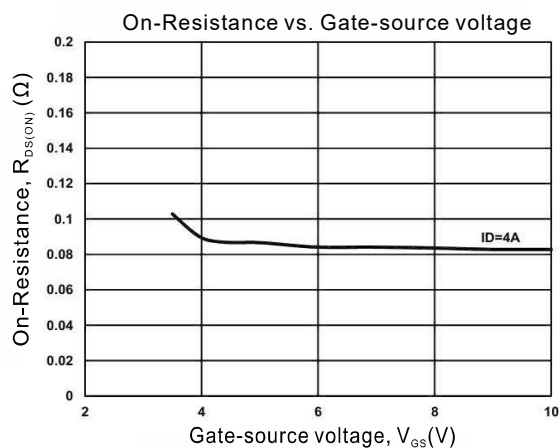
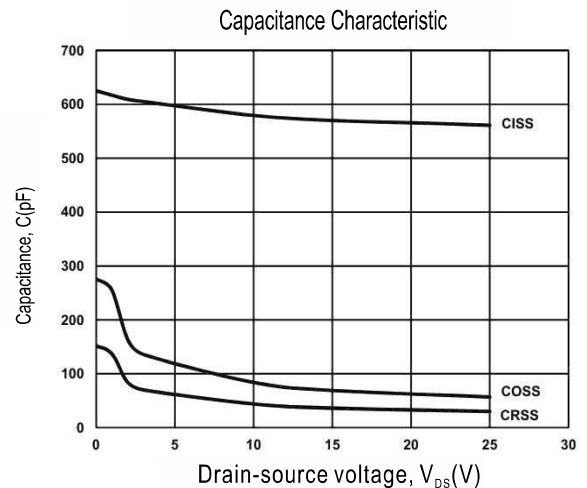
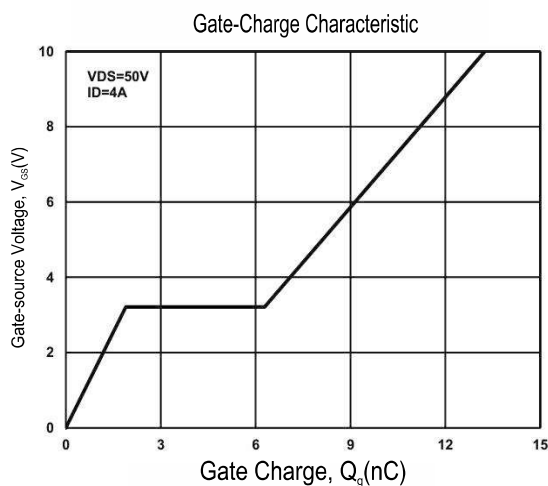
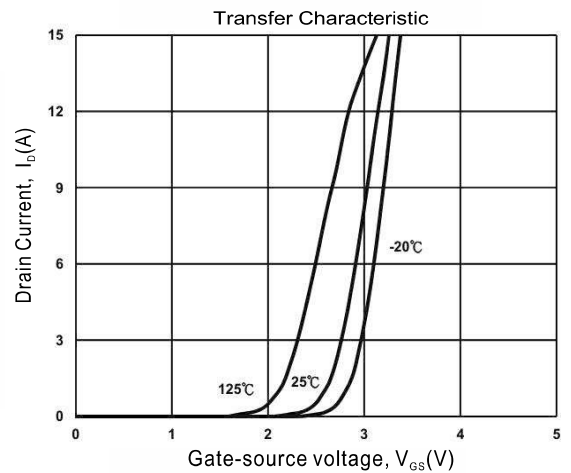
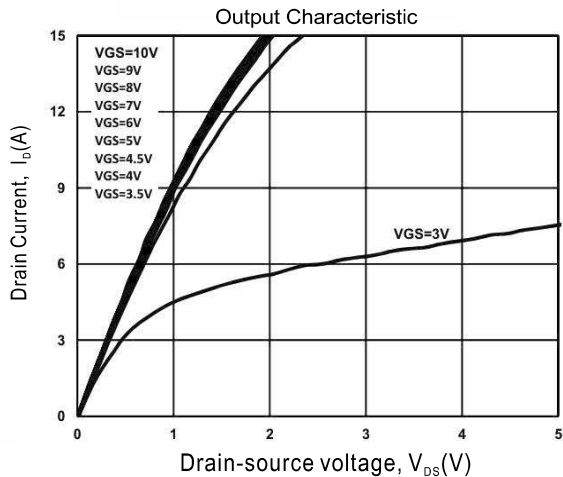
Source to drain forward voltage drop	V_{SD}	$I_S=4\text{A}$, $V_{GS}=0\text{V}$			1.2	V
Reverse recovery time	t_{rr}	$I_F=4\text{A}$, $di/dt=100\text{A}/\mu\text{s}$		21		ns
Peak reverse recovery current	Q_{rr}			14		

Notes : 1. Pulse width limited by maximum junction temperature.

2. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$.

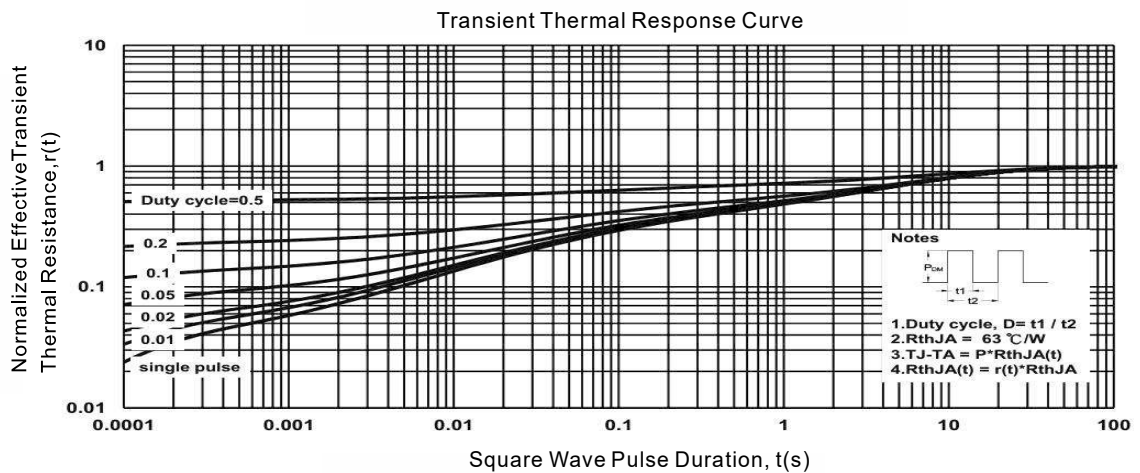
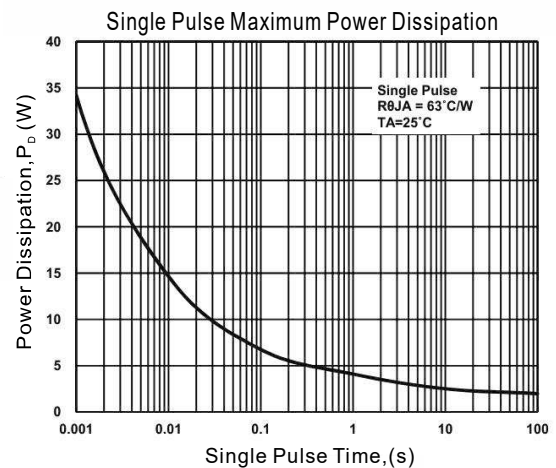
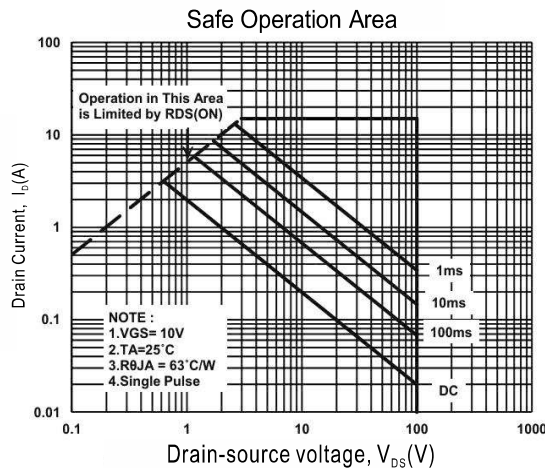
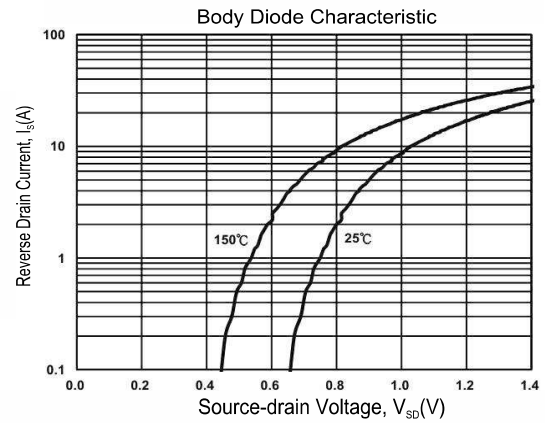
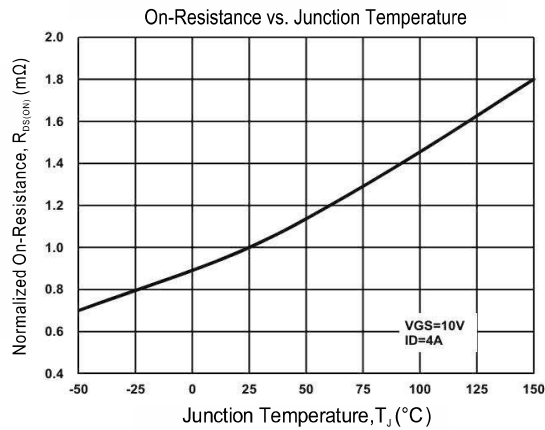
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Rating and characteristic curves



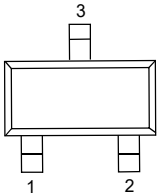
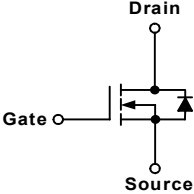
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Rating and characteristic curves



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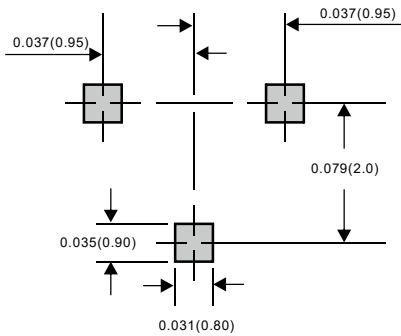
Pinning information

Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
FMOSN02P7N10-H	5N10

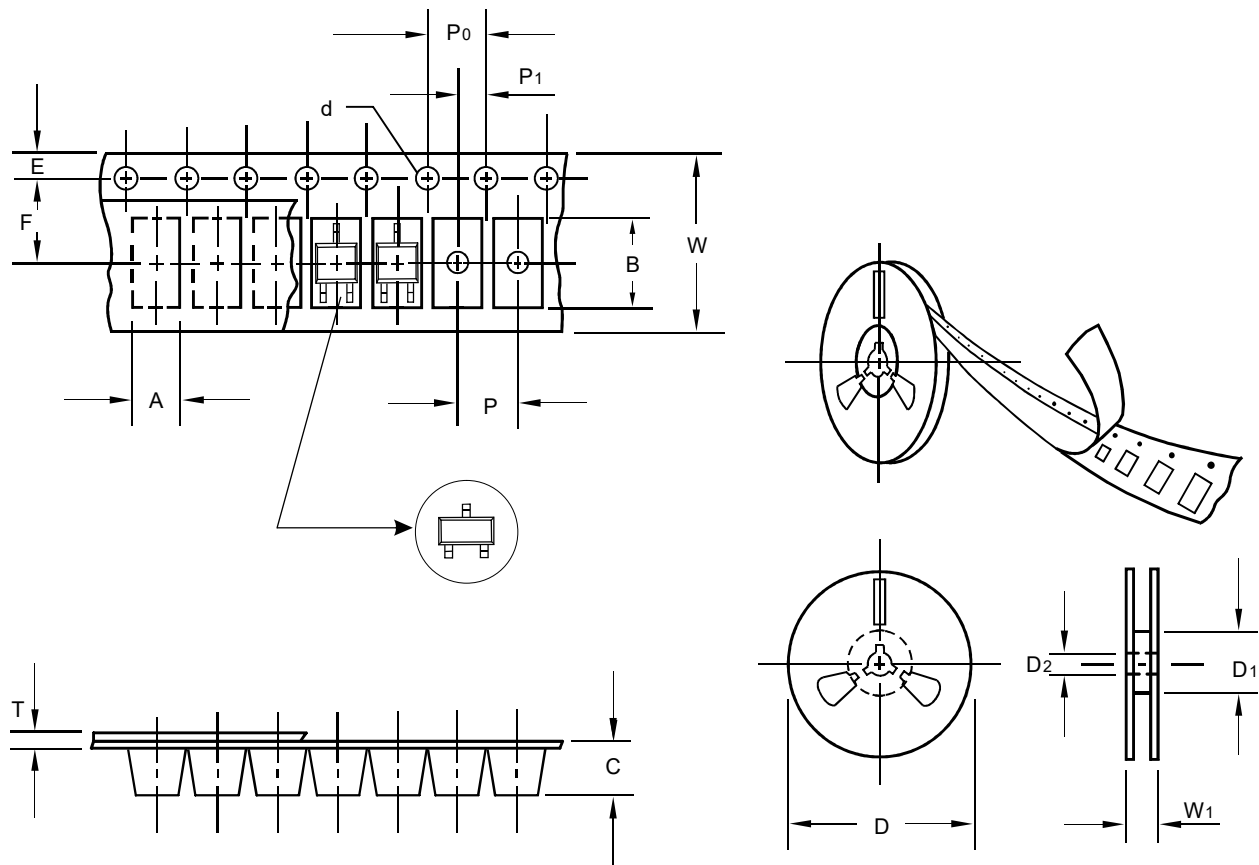
Suggested solder pad layout



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.5	3.15
Carrier length	B	0.5	2.77
Carrier depth	C	0.5	1.22
Sprocket hole	d	0.5	1.50
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	54.40
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.5	0.20
Tape width	W	0.3	8.00
Reel width	W1	1.0	12.3

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

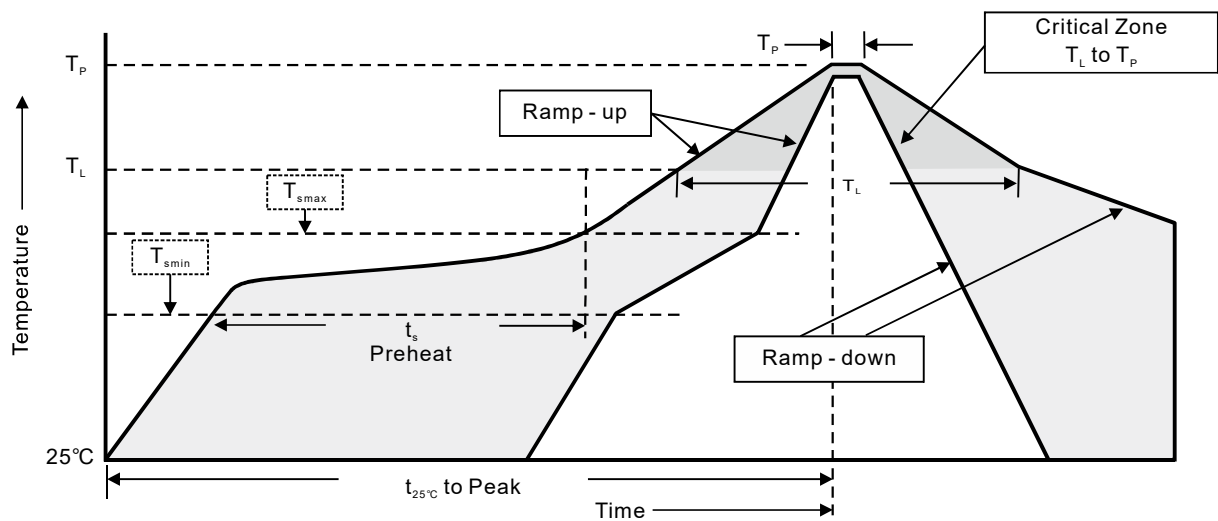
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Reel packing

Package	Units (pcs)			Dimension (Unit : mm ³)		
	Reel	Inner Box	Outer Box	Reel DIA,	Inner Box	Outer Box
SOT-23	3,000	30,000	180,000	178 (7")	183 x 120 x 180	390 x 385 x 205

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