

FMOSAE0085P02

List

List.....1

Package outline.....2

Features.....2

Application.....2

Mechanical data.....2

Maximum ratings2

Electrical characteristics.....3

Typical Performance Characteristics.....4~5

Pinning information.....6

Marking.....6

Suggested solder pad layout.....6

Packing Information.....7

Reel packing.....8

Suggested thermal profiles for soldering processes.....8

FMOSAE0085P02

-0.85A -20V P-Channel MOSFET

Features

- $-V_{DS}=20V$, $-I_D=0.85A$.
- $R_{DS(ON)} < 0.64\Omega @ -V_{GS}=4.5V$.
 $R_{DS(ON)} < 0.95\Omega @ -V_{GS}=2.5V$.
 $R_{DS(ON)} < 1.95\Omega @ -V_{GS}=1.8V$.
- Reliable and rugged.
- Surface mount package.
- ESD Protected.
- Green device available.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex.FMOSAE0085P02-H.

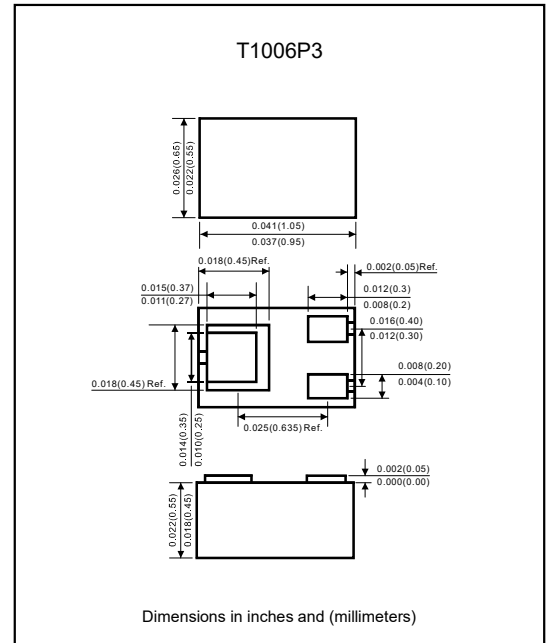
Applications

- Small signal switch.
- Load Switch.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, T1006P3.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Weight : Approximated 0.8mg.

Package outline

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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	$-V_{DS}$	20	V
Gate-source voltage	V_{GS}	± 12	V
Continuous drain Current - Continuous ($T_c=25^\circ C$)	$-I_D$	0.85	A
- Continuous ($T_c=70^\circ C$)		0.68	
Pulsed drain current (Note 1)	$-I_{DM}$	2.1	A
Power dissipation ($T_c=25^\circ C$)	P_D	0.69	W
($T_c=70^\circ C$)		0.44	
Operating Junction temperature range	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$
Thermal resistance Junction to ambient (Note 2)	$R_{\theta JA}$	180	$^\circ C/W$

Notes :

1. Max. current is limited by junction temperature.
2. Surface mounted on 1in² FR-4 board with 1oz.

FMOSAE0085P02

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	$-BV_{\text{DSS}}$	$-I_{\text{D}}=250\mu\text{A}$, $V_{\text{GS}}=0\text{V}$	20			V
Drain-source leakage current	$-I_{\text{DSS}}$	$-V_{\text{DS}}=16\text{V}$, $V_{\text{GS}}=0\text{V}$, $T_{\text{J}}=25^{\circ}\text{C}$			1	μA
Gate-source leakage current	I_{GSS}	$V_{\text{GS}}=\pm 12\text{V}$, $V_{\text{DS}}=0\text{V}$			± 10	μA
On characteristics						
Gate threshold voltage	$-V_{\text{GS(TH)}}$	$V_{\text{GS}}=V_{\text{DS}}$, $-I_{\text{D}}=250\mu\text{A}$	0.5	0.75	1	V
Static drain-source on-resistance (Note 1)	$R_{\text{DS(ON)}}$	$-V_{\text{GS}}=4.5\text{V}$, $-I_{\text{D}}=0.55\text{A}$		0.53	0.64	Ω
		$-V_{\text{GS}}=2.5\text{V}$, $-I_{\text{D}}=0.45\text{A}$		0.73	0.95	
		$-V_{\text{GS}}=1.8\text{V}$, $-I_{\text{D}}=0.35\text{A}$		1.3	1.95	
Dynamic parameters (Note 2)						
Input capacitance	C_{iss}	$V_{\text{GS}}=0\text{V}$, $-V_{\text{DS}}=10\text{V}$, $f=1.0\text{MHz}$		58		pF
Out capacitance	C_{oss}			5.7		
Reverse transfer capacitance	C_{rss}			4.4		
Total gate charge	Q_{g}	$-V_{\text{DS}}=10\text{V}$, $-V_{\text{GS}}=4.5\text{V}$, $-I_{\text{D}}=1\text{A}$		0.8		nC
Gate source charge	Q_{gs}			0.2		
Gate drain charge	Q_{gd}			0.2		
Turn-on delay time	$t_{\text{d(on)}}$	$-V_{\text{DS}}=10\text{V}$, $-V_{\text{GS}}=4.5\text{V}$, $R_{\text{G}}=3\Omega$, $-I_{\text{D}}=1.33\text{A}$		400		ns
Rise time	t_{r}			60		
Turn-off delay time	$t_{\text{d(off)}}$			20		
Fall time	t_{f}			800		
Source-drain diode ratings and characteristics						
Reverse recovery time	t_{rr}	$-I_{\text{F}}=1\text{A}$, $V_{\text{GS}}=0\text{V}$, $dI_{\text{F}}/dt=100\text{A}/\mu\text{s}$		9.2		ns
Reverse recovery charge	Q_{rr}			0.8		nC
Drain-source diode forward voltage (Note 1)	$-V_{\text{SD}}$	$-I_{\text{S}}=1\text{A}$, $V_{\text{GS}}=0\text{V}$		0.75	1.1	V

Notes :

1. Pulse test : Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

2. Guaranteed by design, not subject to production testing.

FMOSAE0085P02

Typical Performance Characteristics

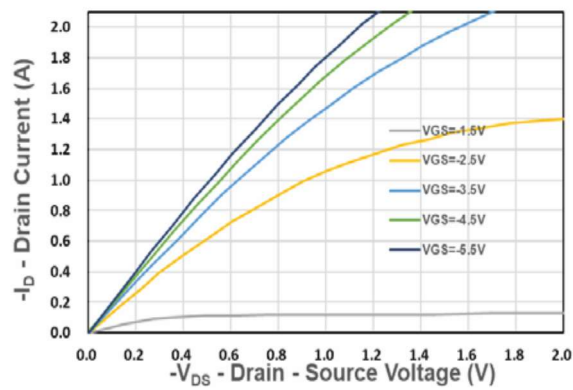


Figure 1. Output Characteristics

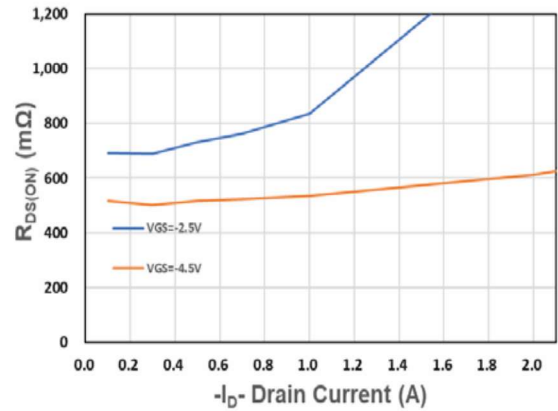


Figure 2. On-Resistance vs. I_D

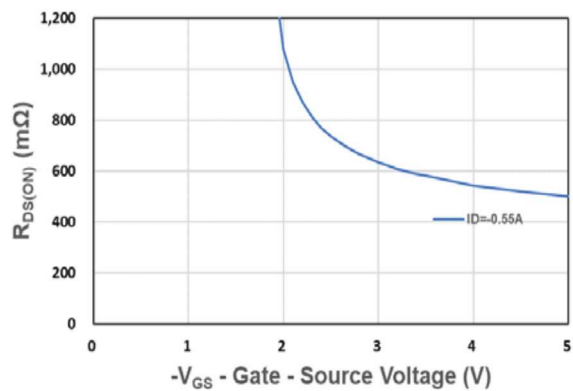


Figure 3. On-Resistance vs. V_{GS}

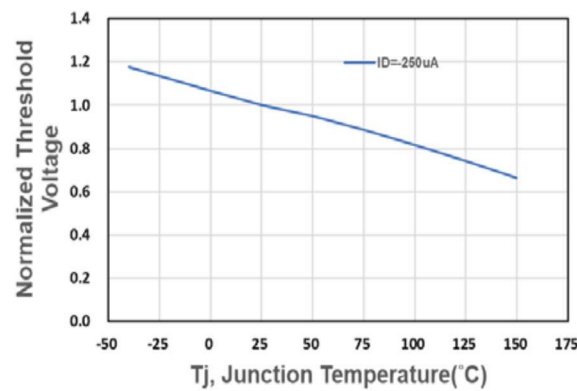


Figure 4. Gate Threshold Voltage

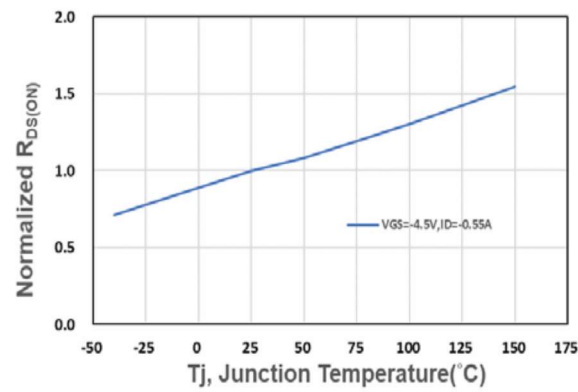


Figure 5. Drain-Source On Resistance

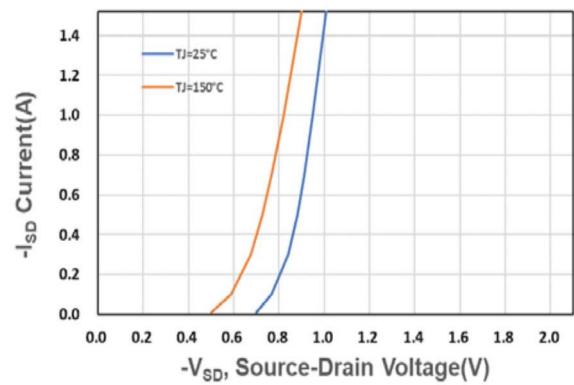


Figure 6. Source-Drain Diode Forward

FMOSAE0085P02

Typical Performance Characteristics

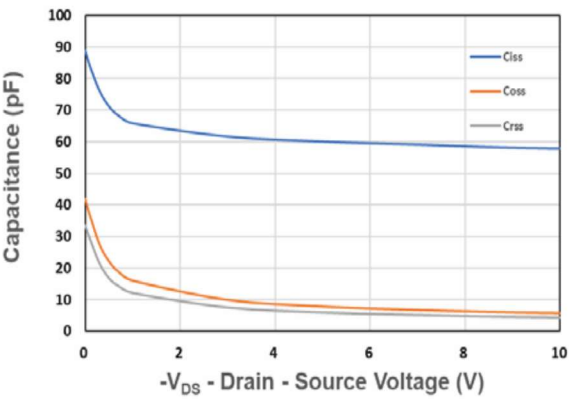


Figure 7. Capacitance

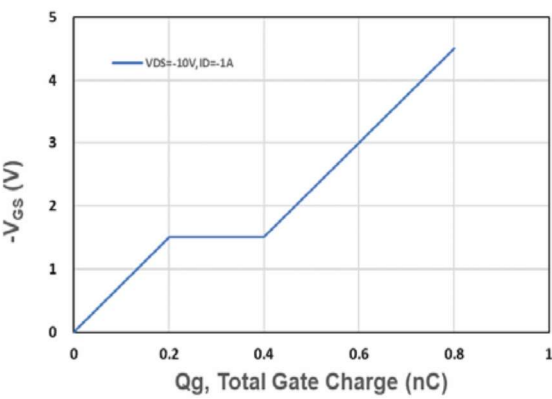


Figure 8. Gate Charge Characteristics

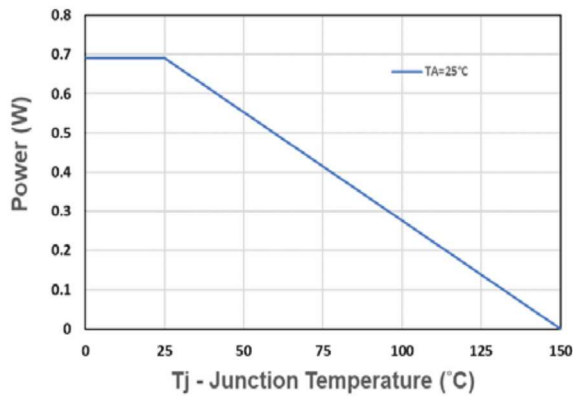


Figure 9. Power Dissipation

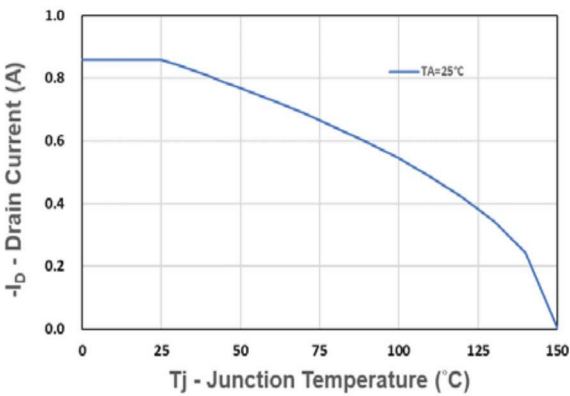


Figure 10. Drain Current

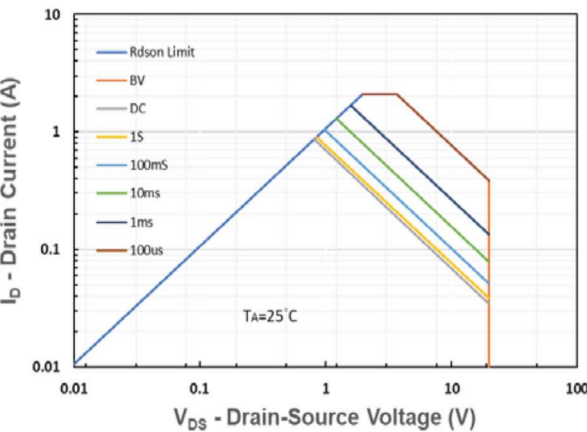


Figure 11. Safe Operating Area

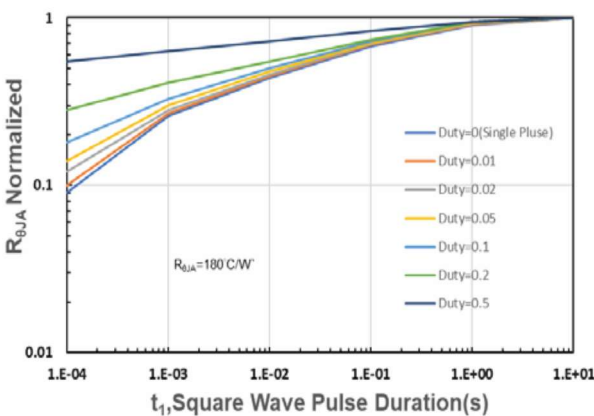
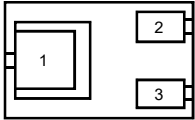
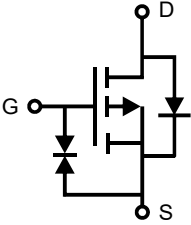


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance

FMOSAE0085P02

Pinning information

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

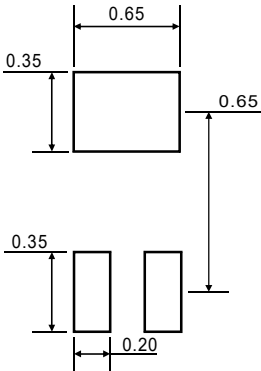
Marking

Type number	Marking code
FMOSAE0085P02	X4

Note:
1st code control code : "X" (0~9,A~Z,a~z)
2nd code product code : "4"

Suggested solder pad layout

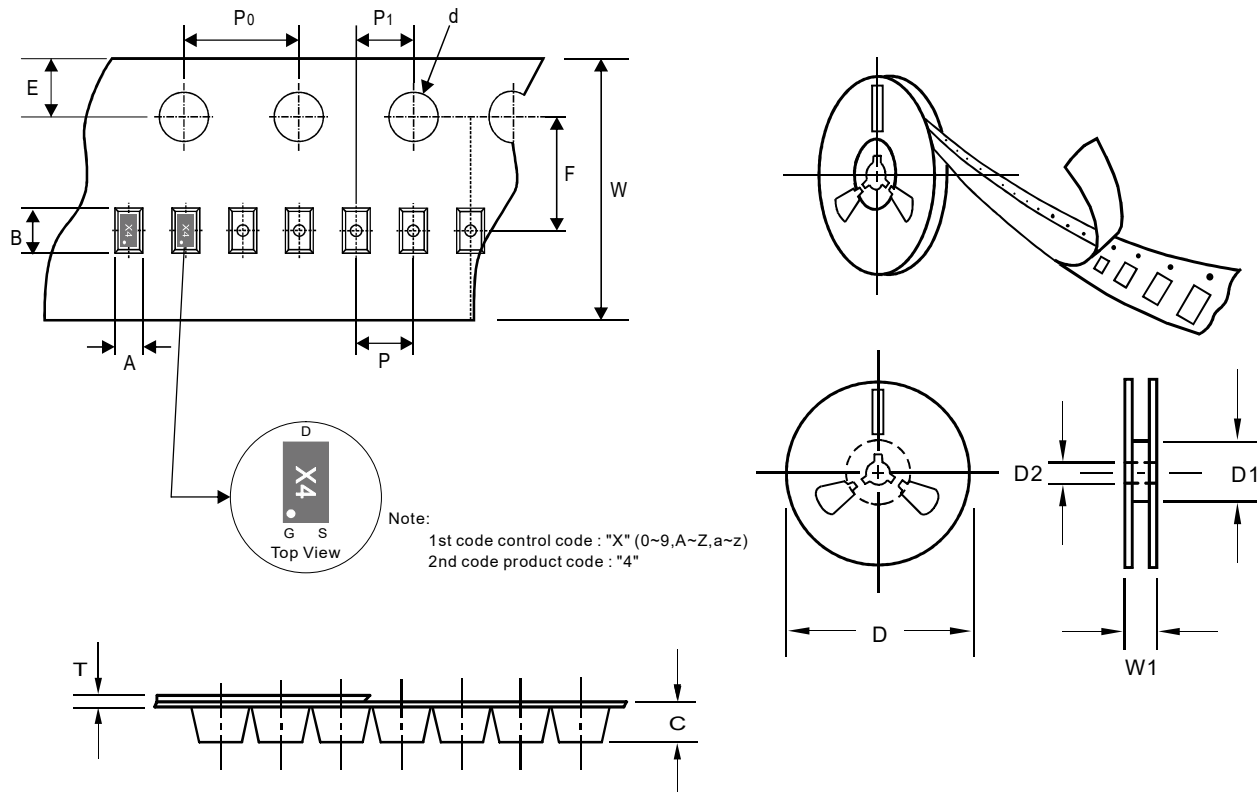
T1006P3



DIMENSIONS: MILLIMETERS

FMOSAE0085P02

Packing information



unit:mm

Item	Symbol	Tolerance	T1006P3
Carrier width	A	0.1	0.66
Carrier length	B	0.1	1.15
Carrier depth	C	0.1	0.66
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	178.00
7" Reel inner diameter	D1	min	55.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	±0.05	3.50
Punch hole pitch	P	±0.1	2.00
Sprocket hole pitch	P0	±0.1	4.00
Embossment center	P1	±0.05	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	+0.3, -0.1	8.00
Reel width	W1	1.0	9.50

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

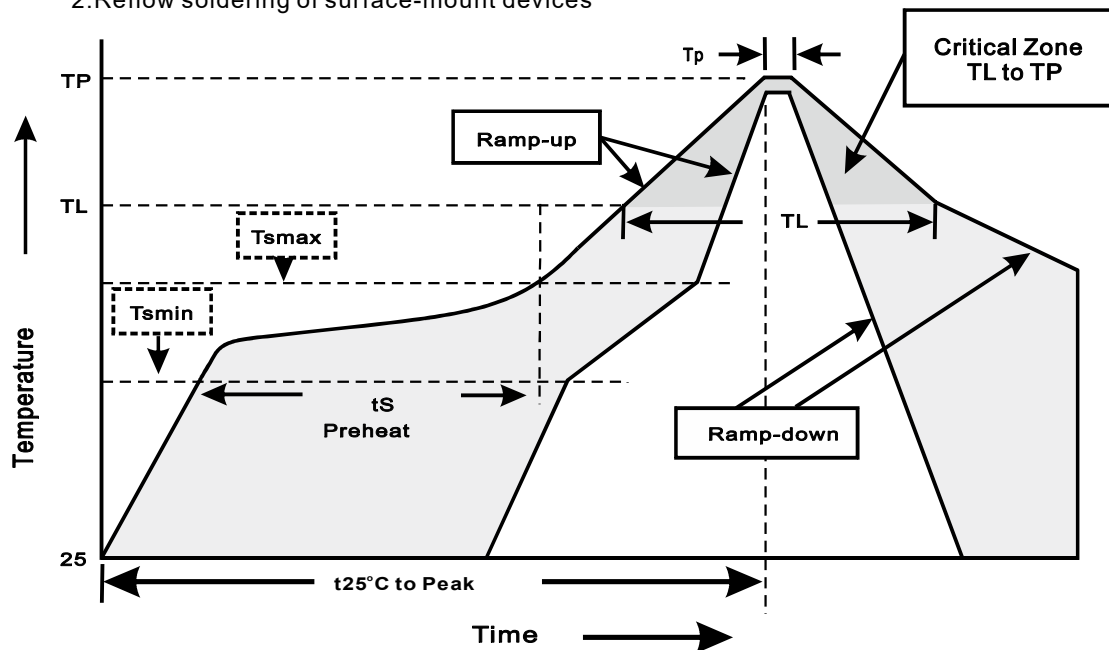
FMOSAE0085P02

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)	APPROX. GROSS WEIGHT (kg)
T1006P3	7"	10,000	4.0	100,000	183*123*183	178	382*257*387	800,000	2.6

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(TL to TP)	<3°C/sec
Preheat - Temperature Min(Tsmin) - Temperature Max(Tsmax) - Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL - Ramp-upRate	<3°C/sec
Time maintained above: - Temperature(TL) - Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tp)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes