

FMOSAE0P75N02AE-H

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0.75A 20V N-Channel Enhancement Mode Power MOSFET ESD Protection

Features

- $V_{DS}=20V$, $I_D=0.75A$.
- $R_{DS(ON)} \leq 300m\Omega$, @ $V_{GS}=4.5V$, $I_D=0.65A$.
- $R_{DS(ON)} \leq 400m\Omega$, @ $V_{GS}=2.5V$, $I_D=0.45A$.
- Low Threshold Voltage.
- Fast Switching Speed.
- ESD protected: 2.0KV.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

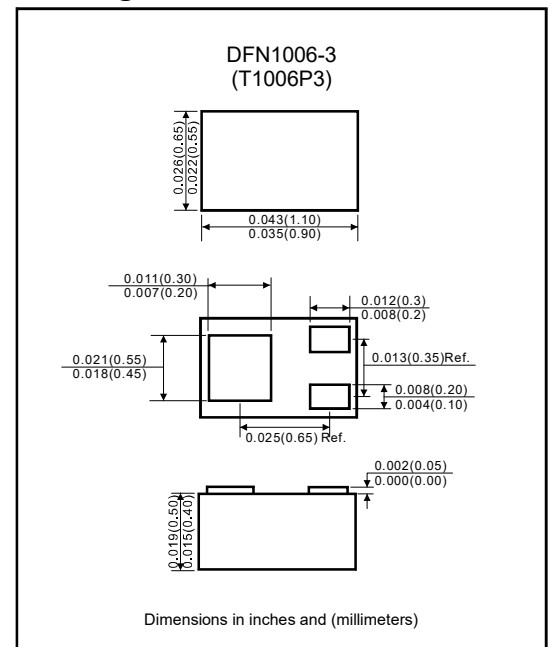
Applications

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

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, DFN1006-3 (T1006P3).
- Weight : Approximated 1.0mg.

Package outline



Maximum ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	± 12	V
Continuous drain current ($T_A=25^\circ\text{C}$)	I_D	0.75	A
Pulse drain current tested (Note 1)	I_{DM}	1.8	A
Power dissipation (Note2) ($T_A=25^\circ\text{C}$)	P_D	0.70	W
Thermal resistance form junction to ambient (Note2)	$R_{\theta JA}$	175	$^\circ\text{C/W}$
Junction temperature range	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

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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						
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	20			V
Drain-source leakage current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate-source leakage current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V			±10	μA
On characteristics						
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	0.35	0.75	1.1	V
Static drain-source on-resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =0.65A		190	300	mΩ
		V _{GS} =2.5V, I _D =0.45A		250	400	
Forward transconductance	g _{FS}	V _{DS} =5V, I _D =0.15A	15			S
Dynamic Parameters						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =16V, f=1.0MHz		79		pF
Output capacitance	C _{oss}			13		
Reverse transfer capacitance	C _{rss}			9		
Switching parameters						
Total gate charge	Q _g	V _{GS} =4.5V, V _{DS} =10V, I _D =0.65A		1.24		nC
Gate to source charge	Q _{gs}			0.37		
Gate to Drain charge	Q _{gd}			0.27		
Turn-on delay time	t _{d(on)}	V _{DS} =10V, V _{GS} =4.5V, I _D =1A, R _G =10Ω		6.7		ns
Rise time	t _r			4.8		
Turn-off delay time	t _{d(off)}			17.3		
Fall time	t _f			7.4		
Source-drain diode ratings and characteristics						
Drain - source diode forward voltage	V _{SD}	V _{GS} =0V, I _{SD} =0.15A			1.2	V
Reverse recovery time	t _{rr}	I _F =5.6A, dI/dt=100A/μs		14		ns
Reverse recovery charge	Q _{rr}			0.4		nC

Note: 1. Pulse width $\leq 100\mu\text{s}$, duty cycle $\leq 1\%$, limited by T_j max.

2. Device mounted on FR-4 substrate PC board, 2ozcopper, with 1-inch square copper plate in still air.

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Rating and characteristic curves

Fig. 1 - Output Characteristics

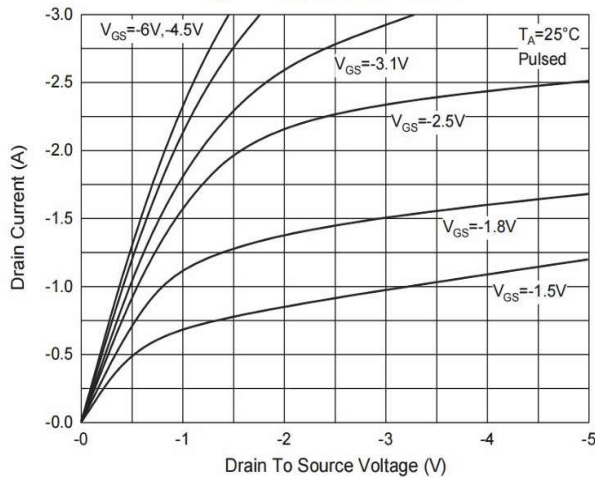


Fig. 2 - Transfer Characteristics

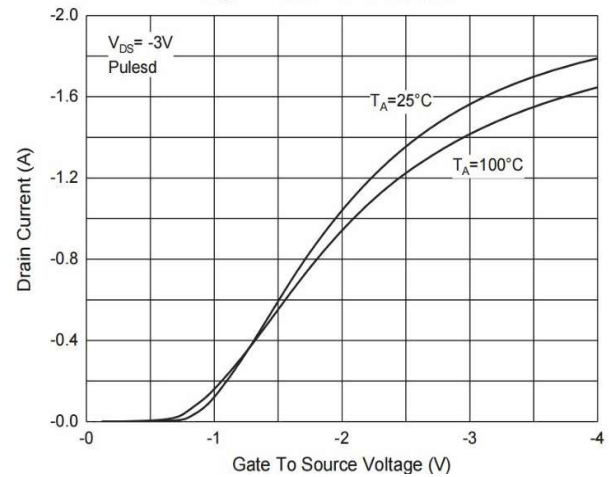
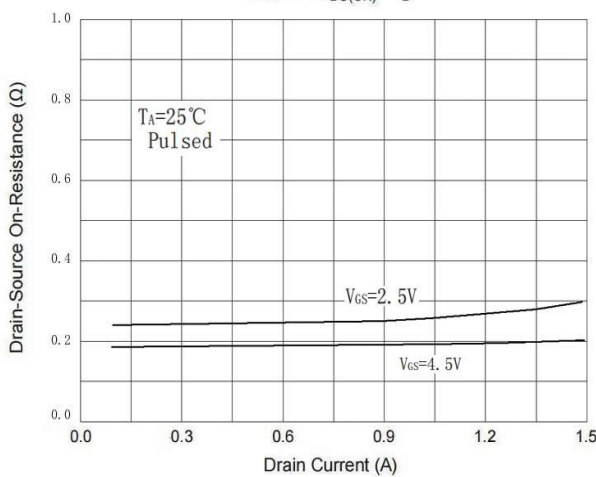
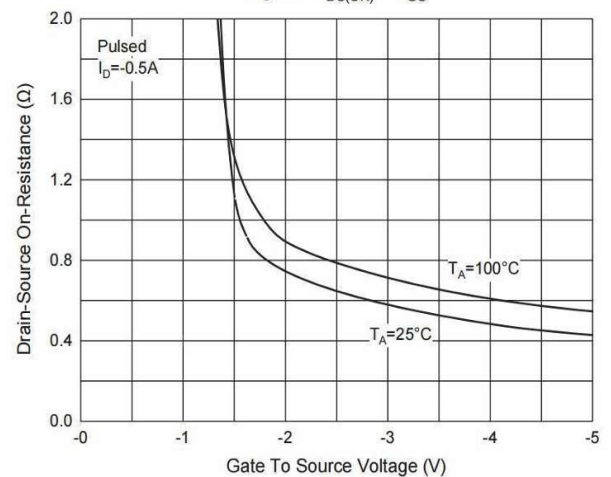
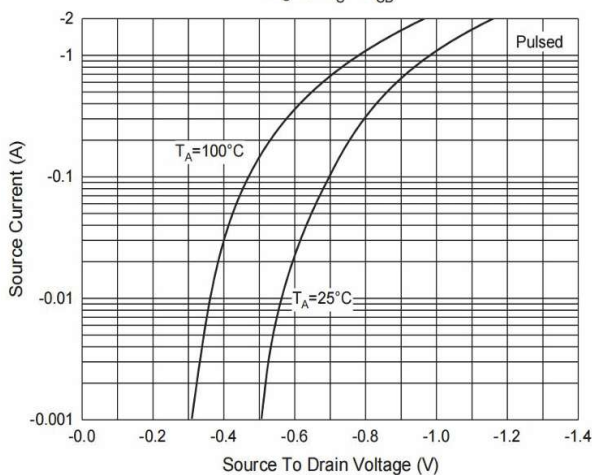
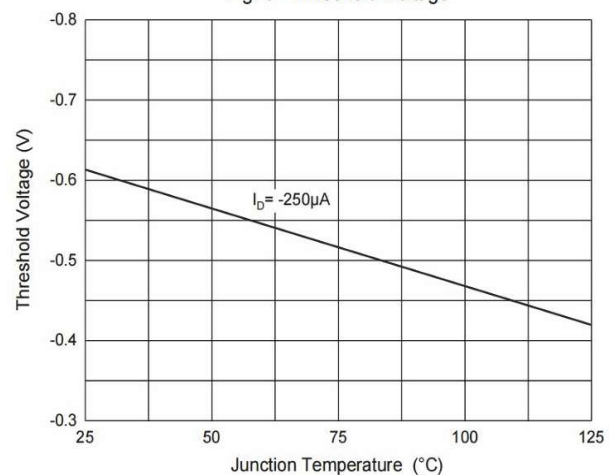
Fig. 3 - $R_{DS(ON)} - I_D$ Fig. 4 - $R_{DS(ON)} - V_{GS}$ Fig. 5 - $I_S - V_{SD}$ 

Fig. 6 - Threshold Voltage



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Rating and characteristic curves

Figure 7. Capacitance characteristics

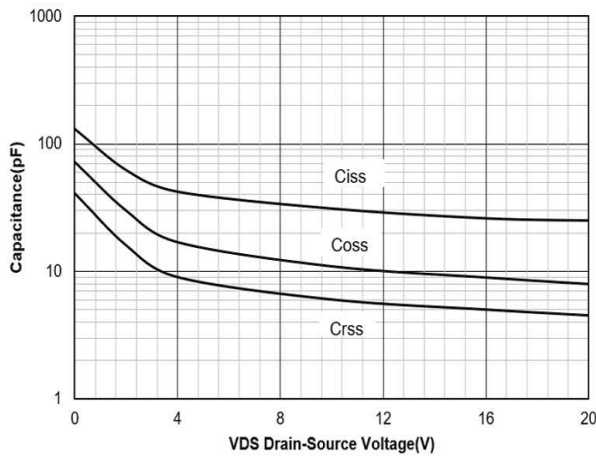


Figure 8. Gate charge

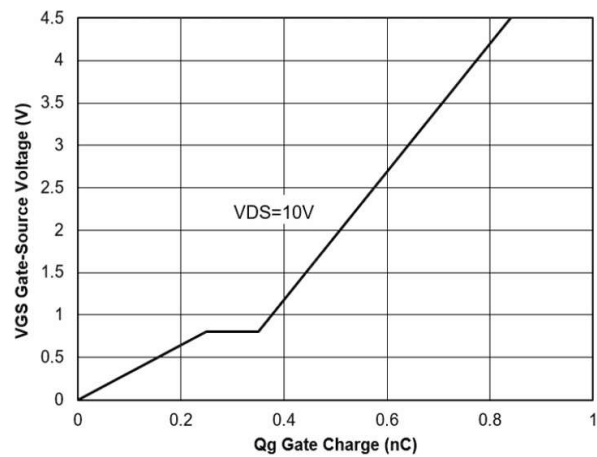


Figure 9. Current dissipation

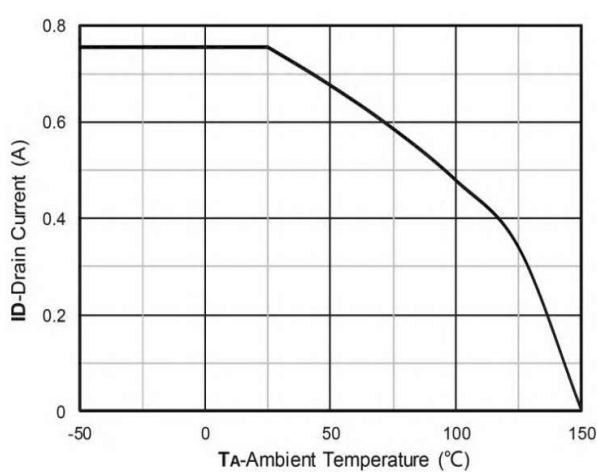


Figure 10. Power dissipation

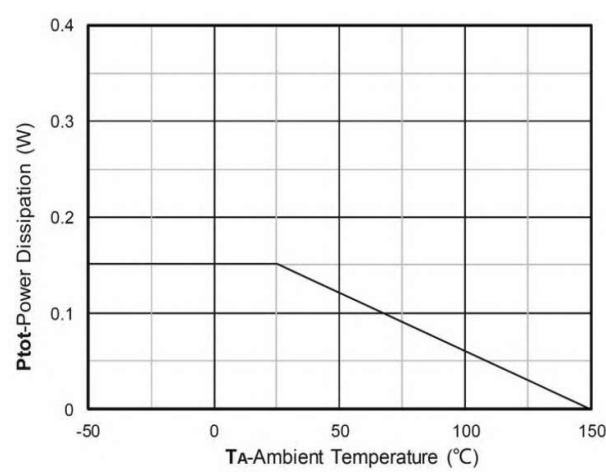
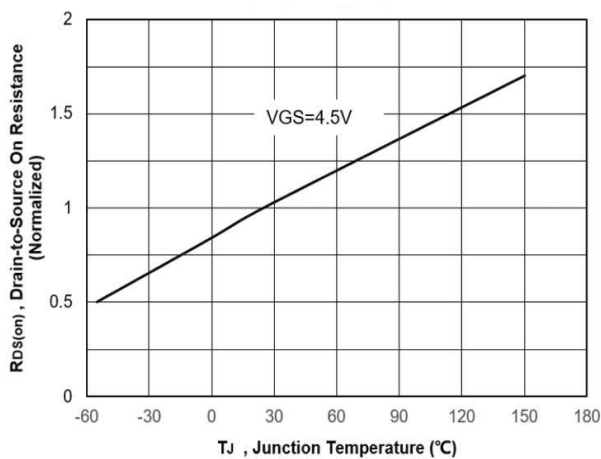
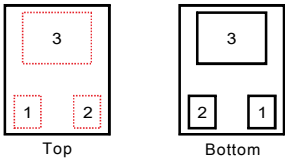
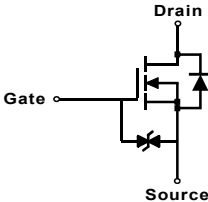


Figure 11. Normalized on-resistance vs. Temperature



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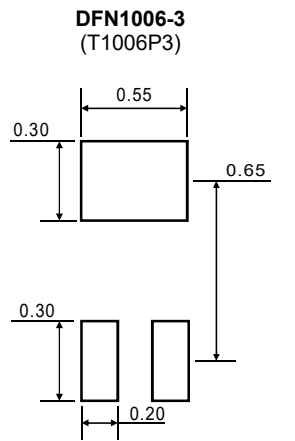
Pinning information

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

Marking

Type number	Marking code
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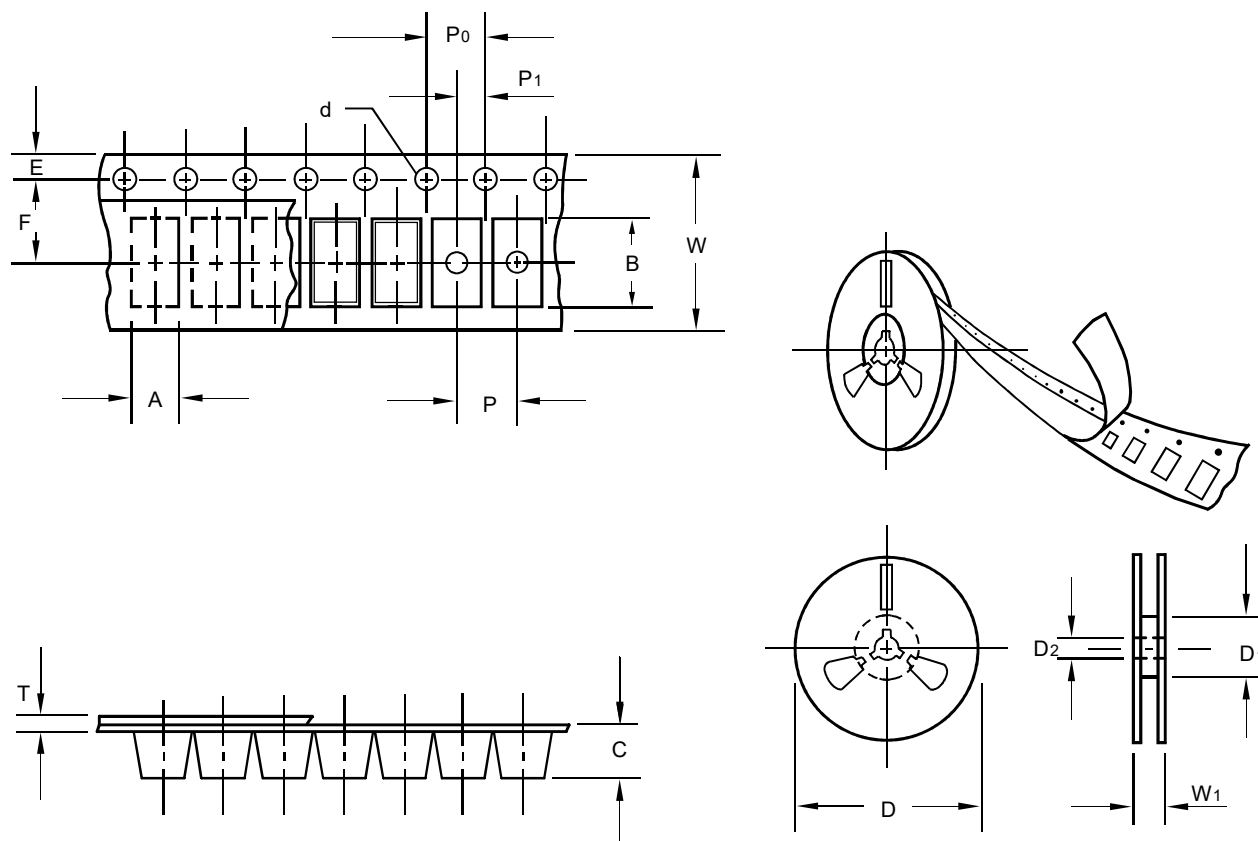
Suggested solder pad layout



Dimensions in inches and (millimeters)

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Packing information



Unit : mm

Item	Symbol	Tolerance	DFN1006-3 (T1006P3)
Carrier width	A	0.1	0.65
Carrier length	B	0.1	1.10
Carrier depth	C	0.05	0.60
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	0.2	1.65
Punch hole position	F	0.1	3.45
Punch hole pitch	P	0.1	2.00
Sprocket hole pitch	P0	0.2	3.90
Embossment center	P1	0.2	3.90
Overall tape thickness	T	0.6	0.17
Tape width	W	0.3	7.9
Reel width	W1	1.0	9.50

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

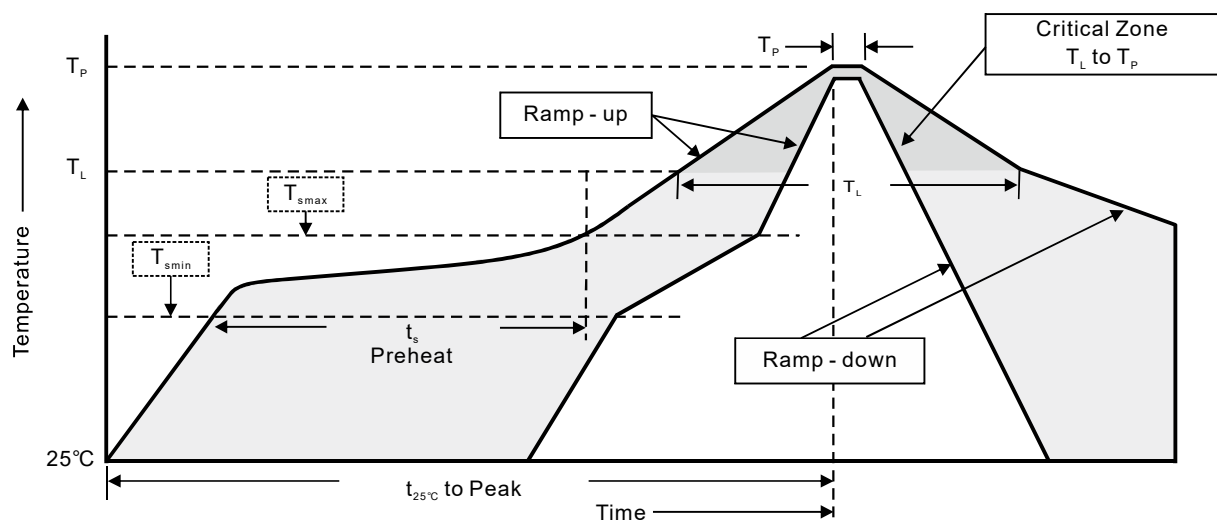
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Reel packing

Package	Units (pcs)			Dimension (Unit : mm ³)		
	Reel	Inner Box	Outer Box	Reel DIA,	Inner Box	Outer Box
T1006P3	10,000	100,000	600,000	178 (7")	180 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