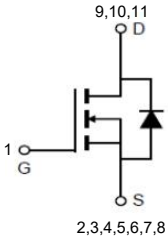
LH012N04G

40V N-Channel MOSFET

•General Description

The SGT MOSFET LH012N04G has the low $R_{DS(on)}$, low gate charge,fast switching and excellent avalanche characteristics.This device is suitable for fast charge and lighting.

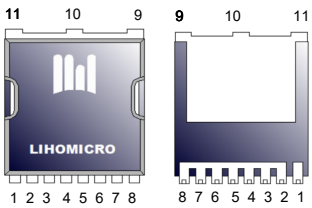


VDS =40V

$R_{DS(ON)}$ =1.2mΩ

ID =280A

■ RoHS COMPLIANT



TOLL

•Features

- ■Fast switching
- ■Low $R_{DS(on)}$ & FOM
- ■Low Gate Charge

•Application

- ■LED/LCD/PDP TV and monitor Lighting
- ■Power Supplies
- ■DC/DC Converters

•Ordering Information:

Part Number	LH012N04G
Package	TOLL
Basic Ordering Unit (pcs)	2000
Normal Package Material Ordering Code	LH012N04GLL-TOLL-TAP
Halogen Free Ordering Code	LH012N04GLL-TOLL-TAP-HF

•Absolute Maximum Ratings（TC =25℃）

PARAMETER	SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current ,T_C = 25°C	I_D	280	A
Pulsed drain current (TC = 25°C, tp limited by Tjmax)[1]	I_D pulse	560	A
Single Pulse Avalanche Energy[2]	E_{AS}	462	mJ
Power Dissipation(TC=25℃)	P_D	125	W
Operating Temperature	T_J	-55~+150	℃
Storage Temperature	T_{STG}	-55~+150	℃

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D=250uA	40	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	0.9	1.2	2.8	V
Drain-source On Resistance[3]	$R_{DS(ON)}$	V_{GS} =10V, I_D=20A	0.9	--	1.2	mΩ
		V_{GS} =4.5V, I_D=20A	--	1.2	1.5	
Drain-Source Leakage Current	I_{DSS}	V_{DS}=32V,V_{GS}=0V,T_J=25℃	--	--	1	uA
		V_{DS}=32V,V_{GS}=0V,T_J=85℃	--	--	5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20,V_{DS}=0V	--	--	±100	nA
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = 20V f = 1.0MHz	--	3200	--	pF
Output Capacitance	Coss		--	325	--	
Reverse transfer Capacitance	Crss		--	80	--	
Turn -Off Delay Time	Td(off)	V_{GS}=10V, I_D =20.0A R_G=3.3Ω	--	52	--	ns
Turn-on delay time	Td(on)		--	18	--	
Rise time	Tr		--	10	--	
Fall time	Tf		--	42	--	
Total Gate Charge	Qg	I_D =20A, V_{DS} = 15V V_{GS} = 10V	--	41	---	nC
Gate-to-Source Charge	Qgs		--	13	--	
Gate-to-Drain Charge	Qgd		--	12	---	
Continuous Diode Forward Current	I_S	--	--	--	280	A
Pulsed Diode Forward Current	I_{SM}	--	--	--	560	A
Diode Forward Voltage	V_{SD}	Tj=25°C, Is=10.0A V_{GS} =0V	--	--	1.2	V

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	Rth_{JC}	1.0	℃/W
Thermal Resistance Junction-ambient	Rth_{JA}	50	℃/W

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2. I_{AS} = 43A, V_{DD} = 25V, R_G = 25Ω, Starting T_J = 25°C

3. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

●Typical Characteristics

Fig.1 Typical Output Characteristics

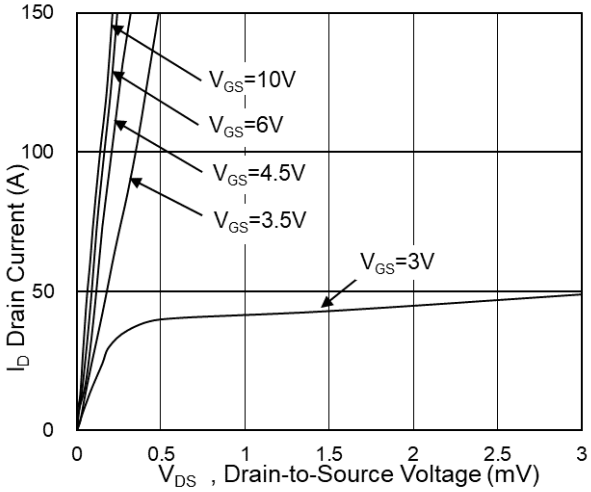


Fig.2 On-Resistance vs G-S Voltage

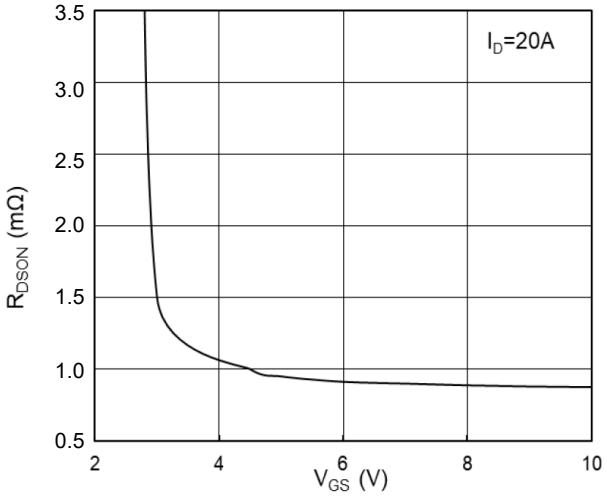


Fig.3 Source Drain Forward Characteristics

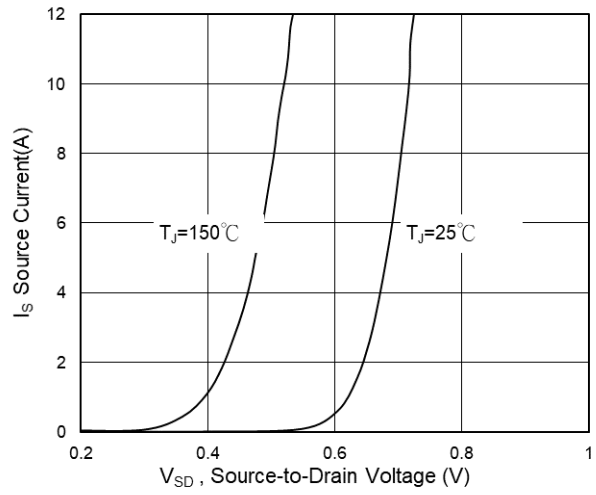


Fig.4 Capacitance

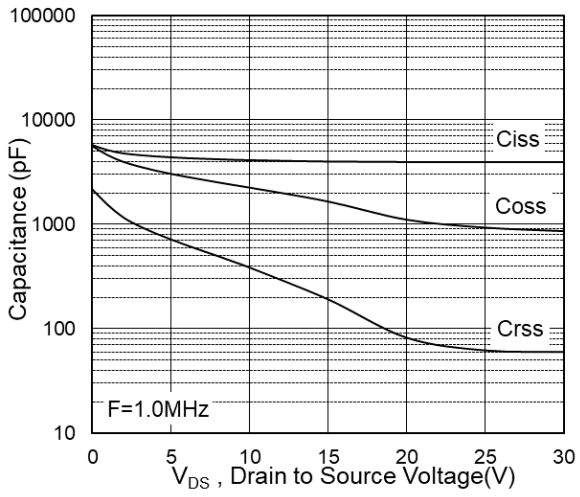


Fig.5 Normalized $V_{GS(th)}$ vs T_J

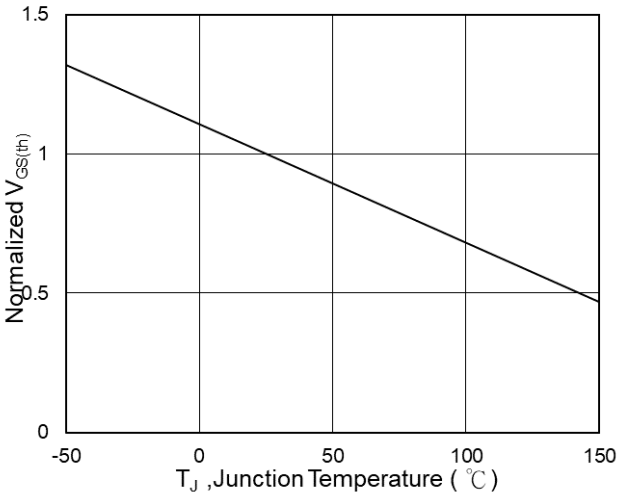
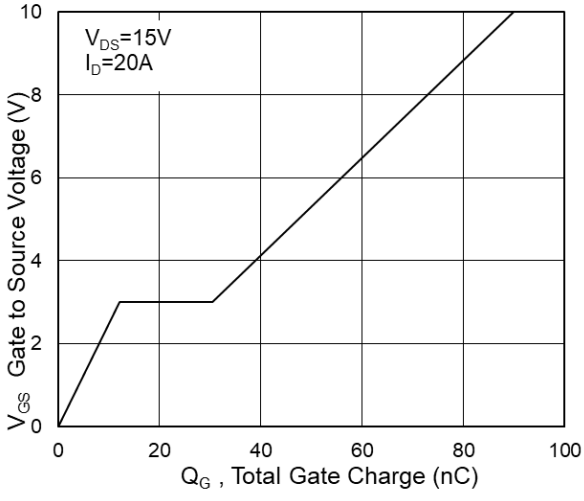


Fig.6 Gate-Charge Characteristics



●Typical Characteristics(cont.)

Fig.7 Normalized R_{DSON} vs T_J

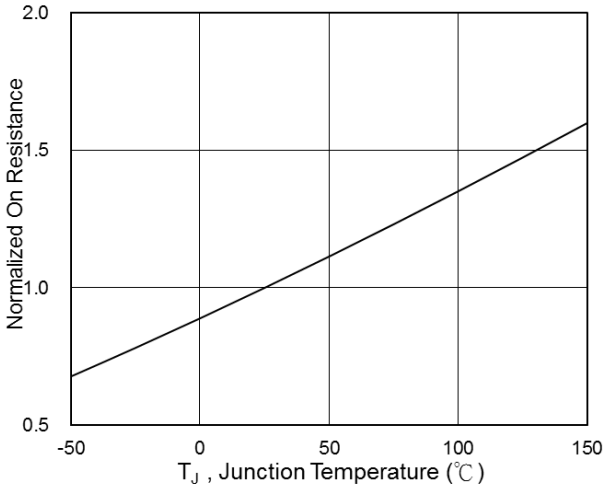


Fig.8 Safe Operating Area

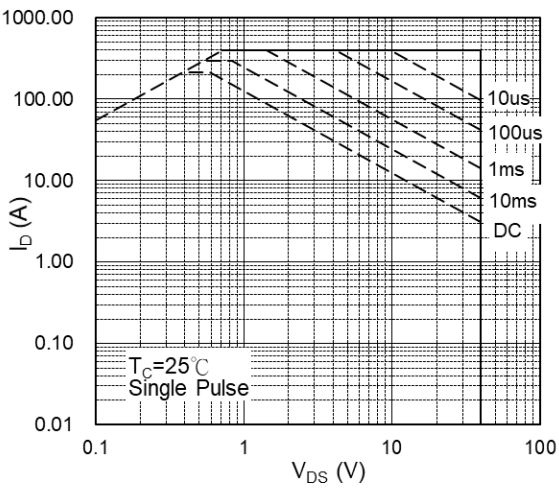
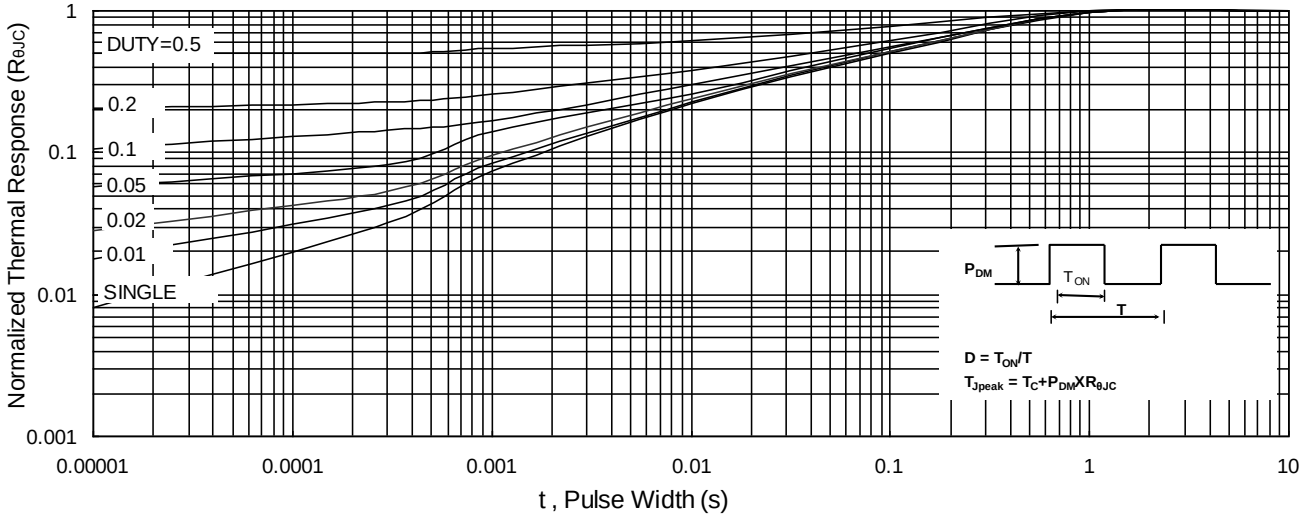


Fig.9 Normalized Maximum Transient Thermal Impedance



- **Test Circuits & Waveforms**

Fig1.E_{AS} test Circuits

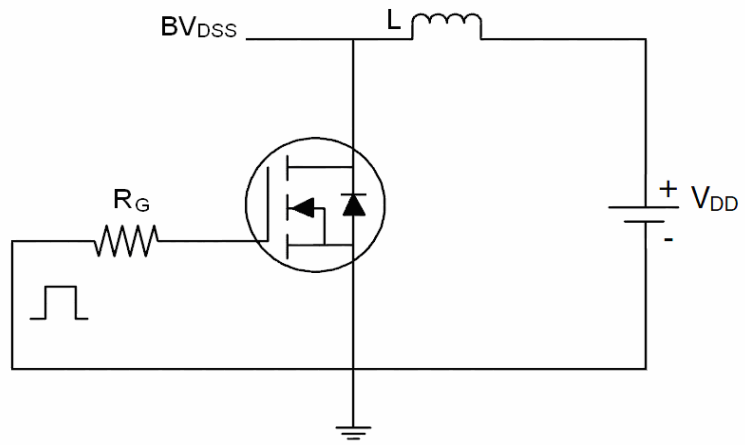


Fig2.Gate charge test Circuit

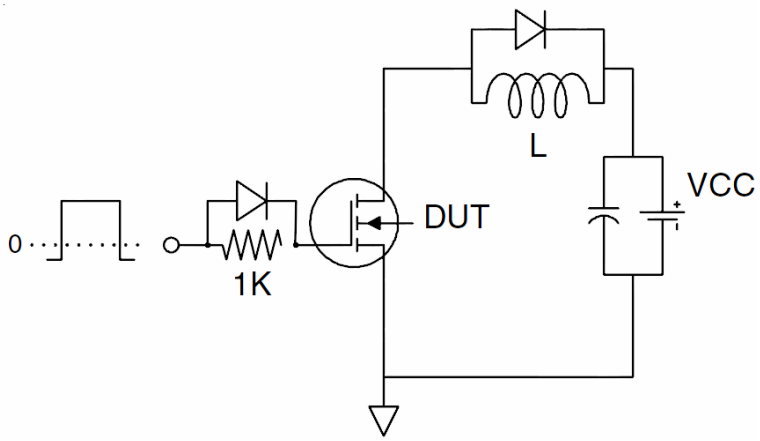
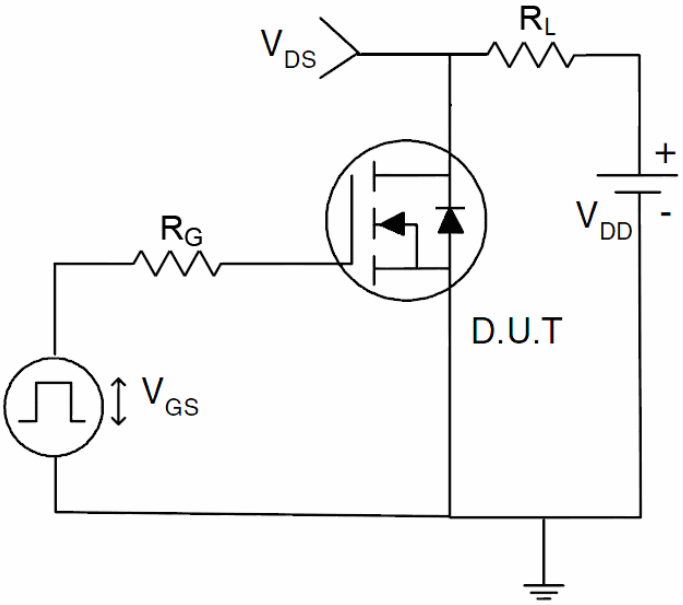


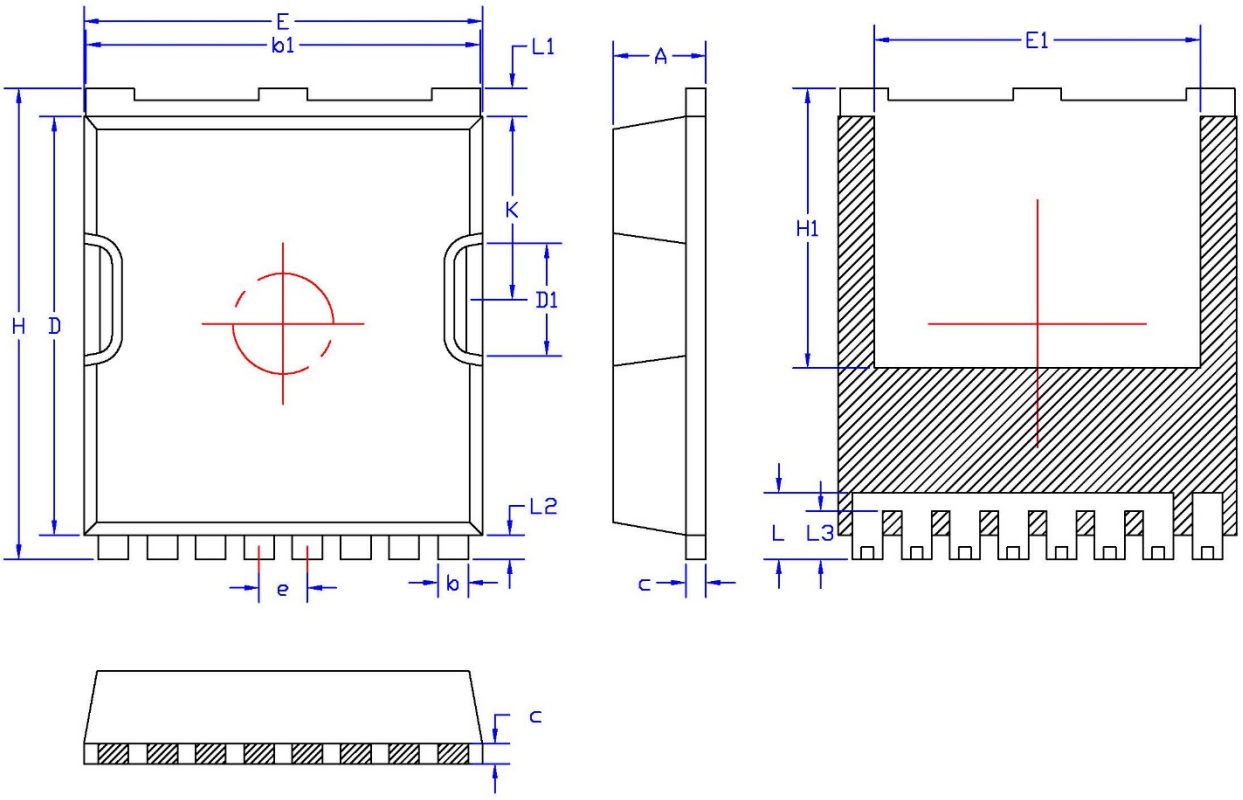
Fig3.Switch Time Test Circuit



•Dimensions（TOLL)

Unit：mm

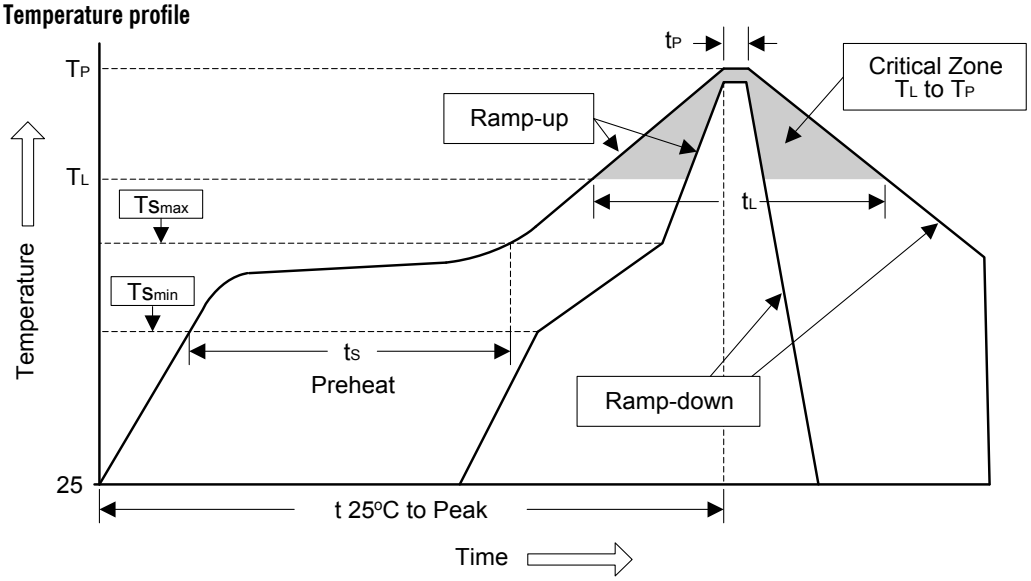
SYMBOL	min	max	SYMBOL	min	max
A	2.15	2.45	e	1.20BSC	
b	0.60	0.80	K	4.40	4.60
b1	9.70	9.90	L	1.50	1.90
c	0.45	0.75	L1	0.60	0.80
D	10.30	10.50	L2	0.50	0.70
D1	3.10	3.50	H	11.60	11.80
E	9.70	10.10	H1	6.80	7.10
E1	8.00	9.00			



• Soldering Methods for Lihomicro's Products

1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/sec
Preheat - Temperature Min (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60 to 120 sec	 150°C 200°C 60 to 180 sec
Tsmax to T_L - Ramp-up Rate	 <3°C/sec	 <3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60 to 150 sec	 217°C 60 to 150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec