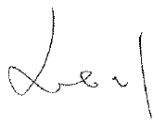



APPROVAL SHEET

Customer Name : _____
Customer P/N : _____
Frequency : 48.000000 MHz
Aker Approved P/N : SMF-048000-3CL4T0
Aker MPN : SMF-048000-3CL4T0
Rev. : 1
ISSUE DATE : Jan.25.2019

APPROVED	CHECKED	PREPARED
		
APPROVED BY CUSTOMER		

AKER TECHNOLOGY CO., LTD.

ADDRESS : NO 11-3, Jianguo Rd., T.E.P.Z ,Tanzi Dist., Taichung City 427, Taiwan.

TEL : 886-4-25335978 FAX : 886-4-25336011

Web: www.aker.com.tw

RoHS Compliant

IATF 16949 Certified

AEC-Q200 Qualified



CUST. P/N	:	
Aker Approved P/N	:	SMF-048000-3CL4T0
APPROVED	:	Xtal
PREPARED	:	Kiku
		SHEET : 2 of 9
		REV . : 1

SMD CRYSTAL OSCILLATOR

1. ELECTRICAL CHARACTERISTICS

■ Standard atmospheric conditions

Unless otherwise specified , the standard range of atmospheric conditions for making measurement and tests are as follow :

Ambient temperature : 25±5 °C

Relative humidity : 40%~70%

If there is any doubt about the results , measurement shall be made within the following limits :

Ambient temperature : 25±3 °C

Relative humidity : 40%~70%

■ AKER Model : SMF-321

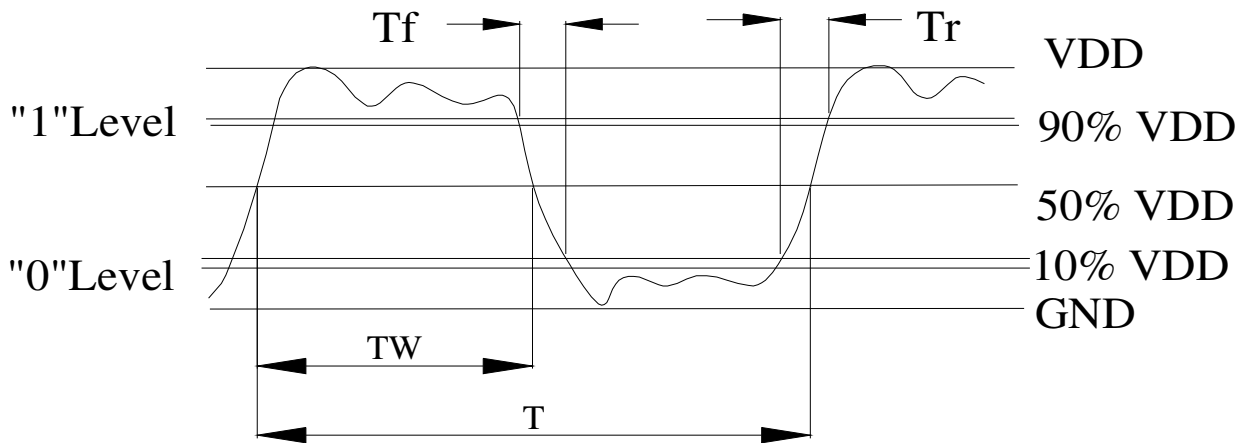
■ Cutting Model : AT CUT

Parameters	Symbol	Electrical Spec				Notes
		Min.	Typ.	Max.	Units.	
Nominal Frequency		48.000000			MHz	
Frequency Stability		±25			ppm	
Supply Voltage	V _{DD}	3.3±10%			V	
Output Load CMOS	CL	15			pF	
Aging		±3			ppm	First Year
Enable Control		Yes				Pad 1
Operating Temperature		-40	25	85	°C	
Storage Temperature Range		-55	~	125	°C	
Output Voltage High	VoH	2.97			V	
Output Voltage Low	VoL			0.33	V	
Input Current	I _{cc}			20	mA	
Standby Current	I _{ST}			10	μA	
Rise Time	Tr			5	ns	10%~90%V _{DD} Level
Fall Time	Tf			5	ns	10%~90%V _{DD} Level
Symmetry (Duty ratio)	TH/T	40	~	60	%	
Start-up Time	T _{osc}			10	ms	
Enable Voltage High	V _{hi}	70%V _{DD}			V	
Disable Voltage Low	V _{lo}			30%V _{DD}	V	
Output Enable Delay Time	T _{on}			10	ms	
Output Disable Delay Time	T _{off}			200	ns	
Phase Jitter RMS				1	ps	12KHz~20MHz

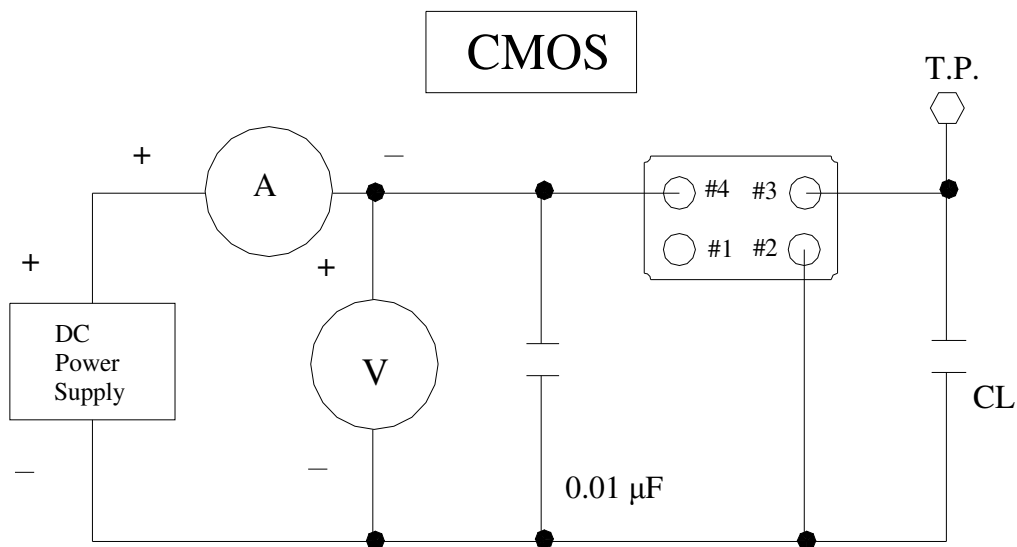
Please kindly be noted that AKER DO NOT guarantee parts quality which involves human security application.

CUST. P/N	:		
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2. C - MOS LOAD OUTPUT WAVEFORM

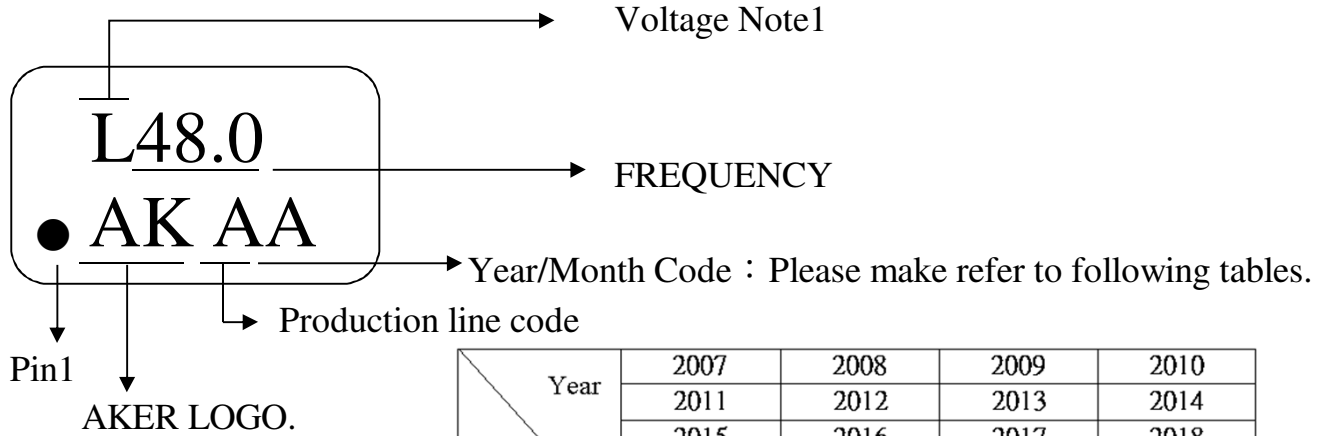


3. C - MOS LOAD TEST CIRCUIT



***Because SMA series has no by pass capacitor.
So,we recommend our customer to use capacitor 0.01 μF
in join Vcc and GND.

4. MARKING :



NOTE1:

T	5.0V TTL
C	4.5~5.0V CMOS
L	2.97~3.63V TTL&CMOS
R	2.8~3.0V CMOS
S	2.25~2.75V CMOS
Y	1.5~2.0V CMOS
Z	0.8~1.4V CMOS
W	Voltage Range CMOS

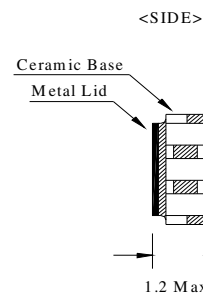
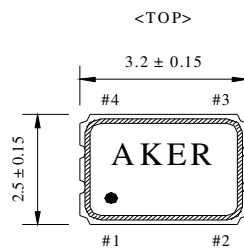
Year Month	2007	2008	2009	2010
		2011	2012	2013
	2015	2016	2017	2018
	2019	2020	2021	2022
	2023	2024	2025	2026
JAN	A	N	a	n
FEB	B	P	b	p
MAR	C	Q	c	q
APR	D	R	d	r
MAY	E	S	e	s
JUN	F	T	f	t
JUL	G	U	g	u
AUG	H	V	h	v
SEP	J	W	j	w
OCT	K	X	k	x
NOV	L	Y	l	y
DEC	M	Z	m	z

5. DIMENSION :

(UNIT : mm)

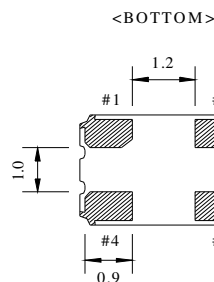
Enable / Disable Function

E/D (#1)	OUTPUT (#3)
HIGH (Open)	Operating
LOW	High impedance

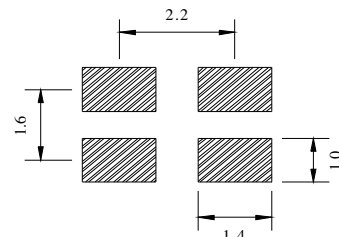


PIN FUNCTION

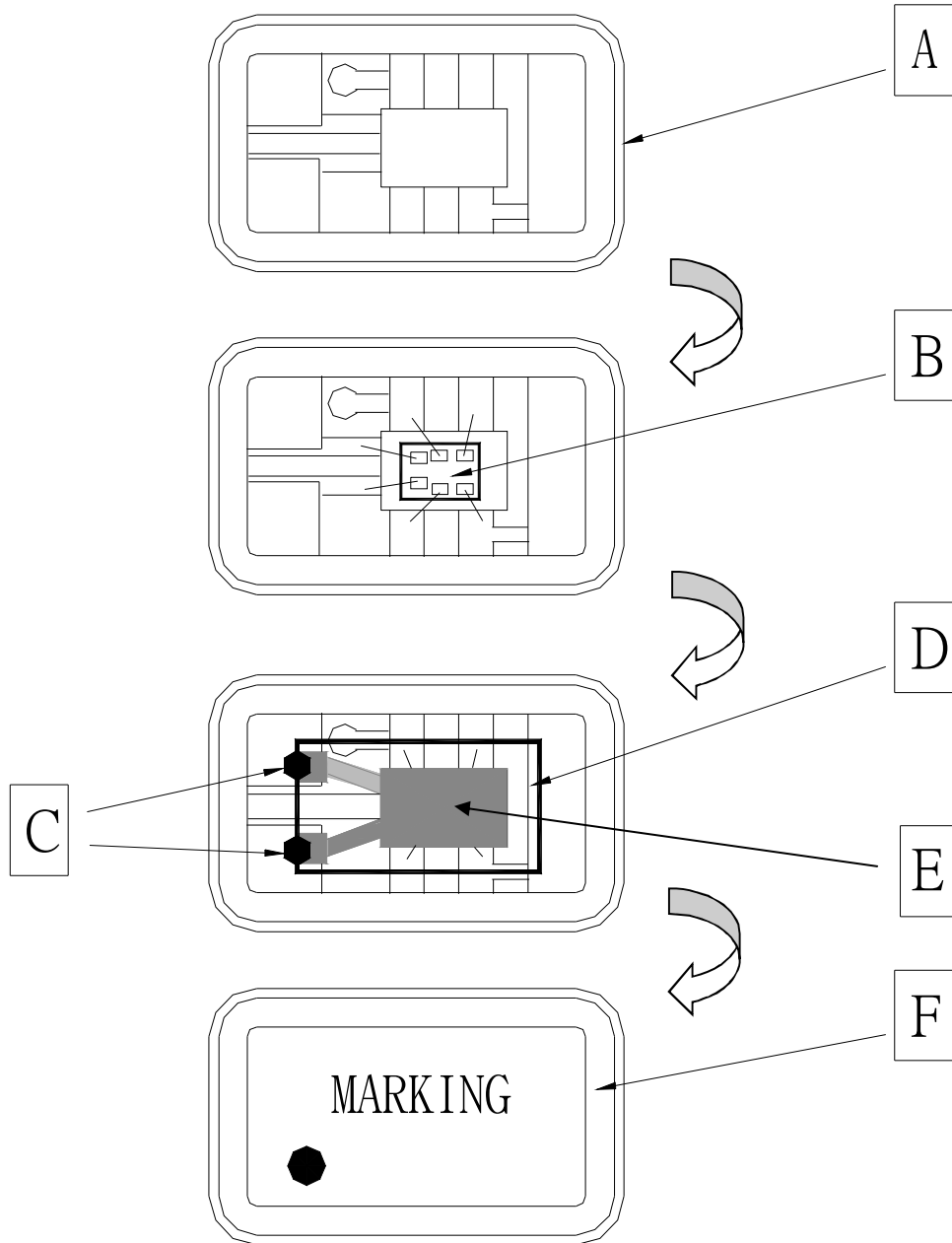
- #1 : Enable / Disable Control
- #2 : GND
- #3 : OUTPUT
- #4 : VDD



<SUGGESTED LAYOUT>



6 . STRUCTURE ILLUSTRATION



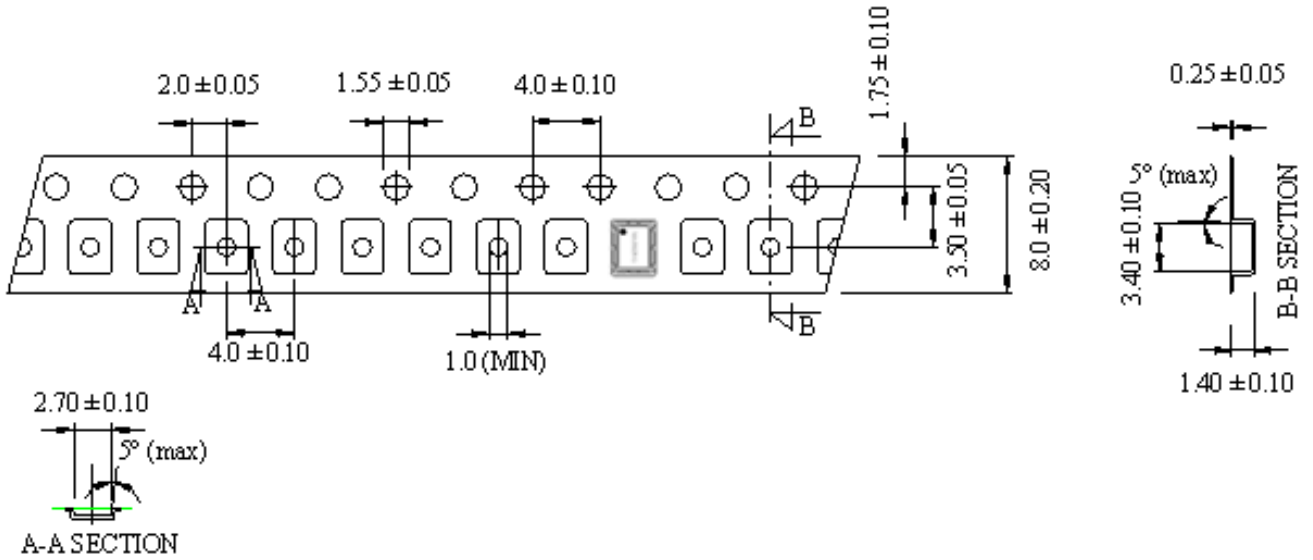
COMPONENTS		MATERIALS	COMPONENTS		MATERIALS
A	Base (Package)	Ceramic (Al ₂ O ₃)+Kovar (Fe/Co/Ni)	D	Crystal blank	SiO ₂
B	IC chip	-	E	Electrode	Cr / Ag
C	Conductive adhesive	Ag / Silicon resin	F	Lid	Fe/Co/Ni

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7. PACKING :

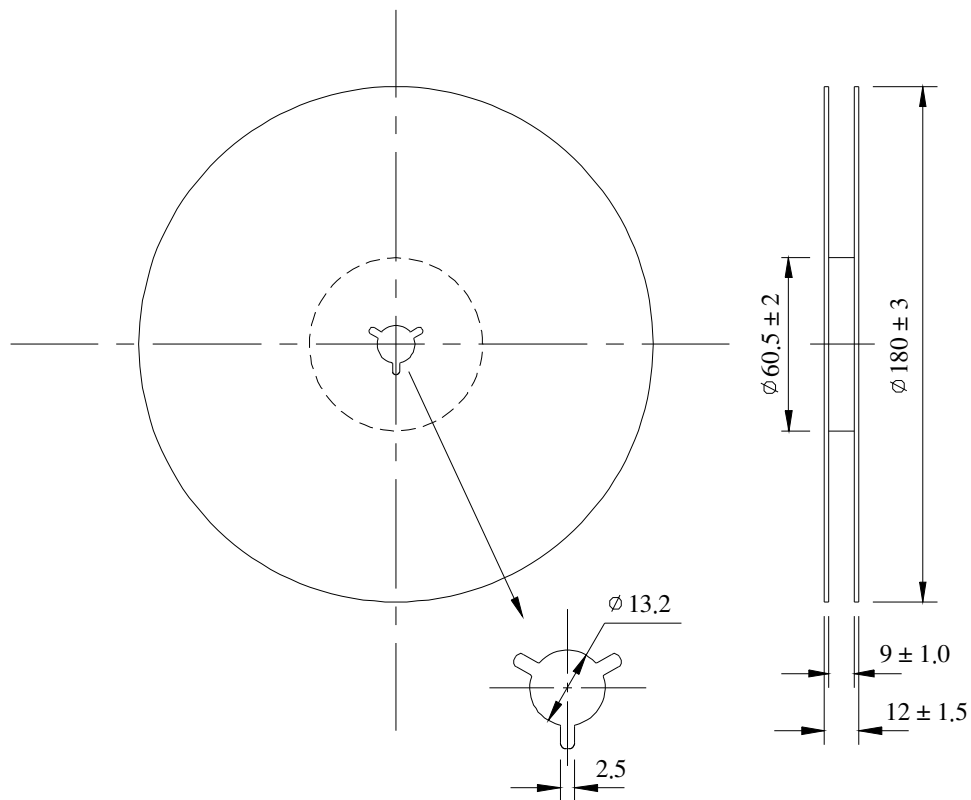
TAPE SPECIFICATION

(Unit : mm)



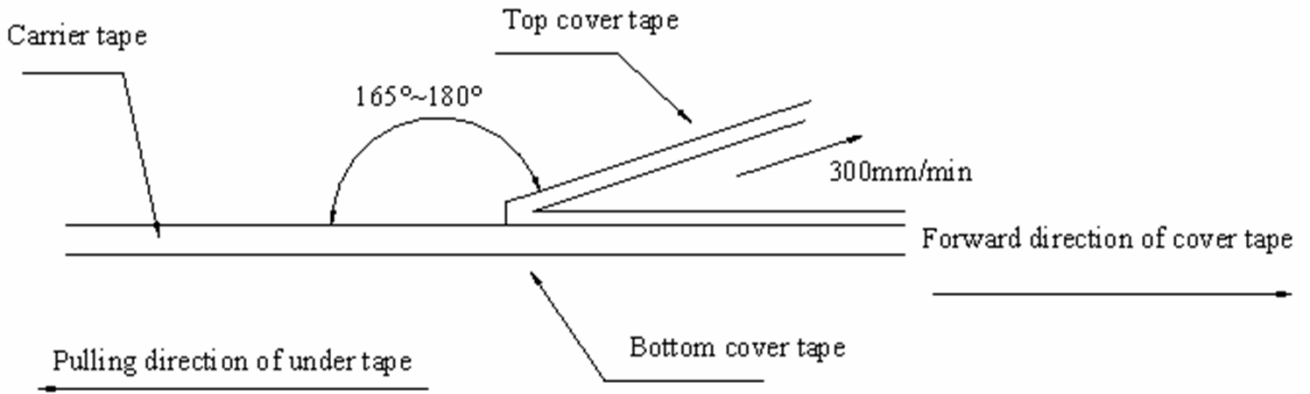
OUTLINE DIMENSION

(Unit : mm)



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8. COVER TAPE ADHESION STRENGTH :

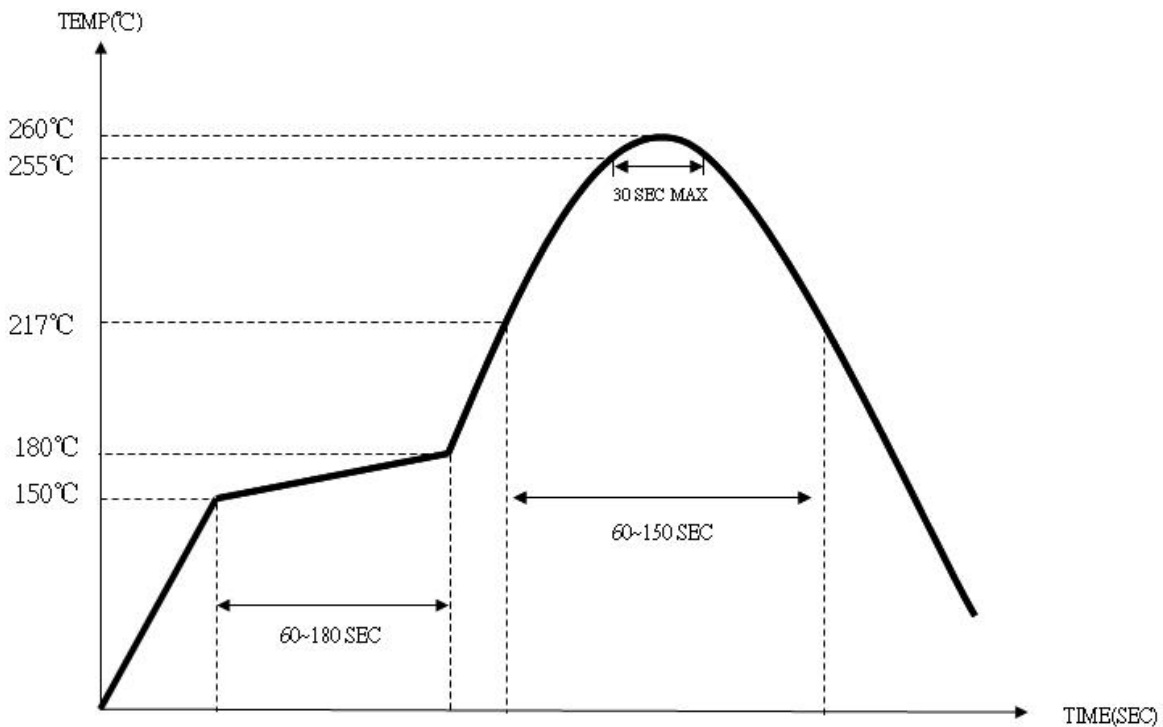


*** In the case, the cover tape is pulled off under the above conditions, the cover tape adhesion strength should be 10.2g~71.4g

Plastic tape: 10.2g~71.4g

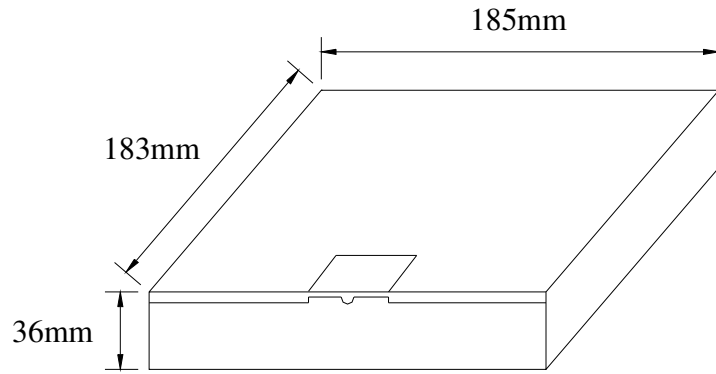
(Cover tape adhesion strength)

9. SOLDERING REFLOW PROFILE

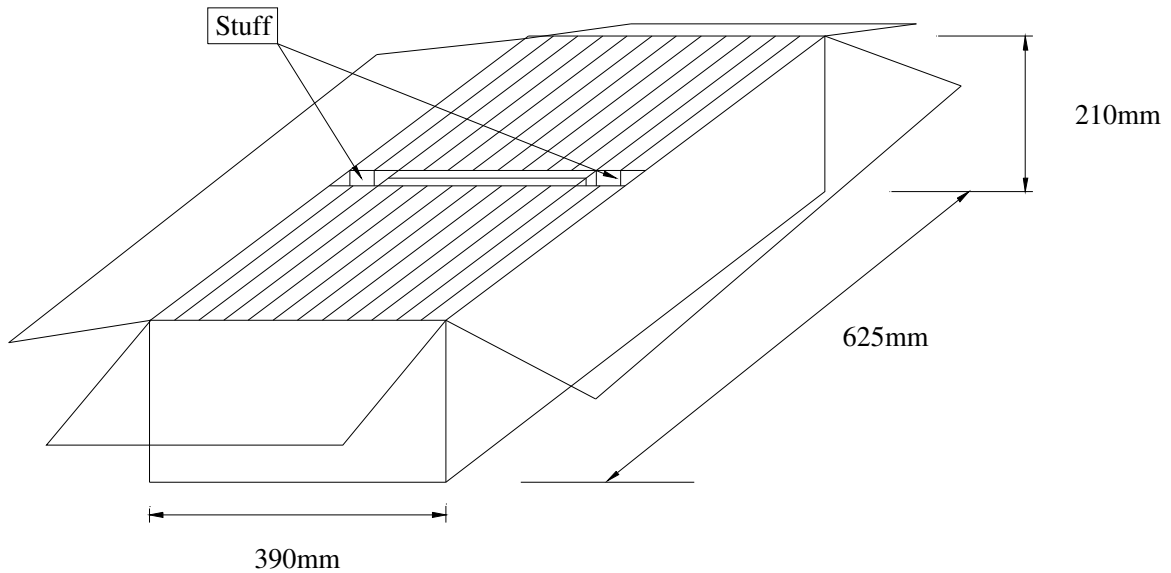


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APPROVED	:	Xtal
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10. PACKING :



BOX = 3000 PCS / REEL(MAX)



SMD product packs 32 BOX=The outside box packs (3000 PCS * 32 BOX = 96000 PCS)(MAX)



CUST. P/N	:	
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APPROVED	:	Xtal
PREPARED	:	Kiku
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		REV . : 1

11 . MECHANICAL PERFORMANCE

TEST ITEMS	TEST METHODS AND TEST CONDITION	PERFORMANCE
11.1 Temperature Cycling	-40±3°C /30min maximum~+125±3°C /30min maximum , 1000cycles	To satisfy the electrical performance .
11.2 Operational Life	125°C ±3°C , 1000hrs±12hrs	
11.3 Biased Humidity	85°C±5°C&85%±5%R.H. , 1000±12hrs	
11.4 Resistance To Soldering Heat Test	Reflow test 2 times.	
11.5 High Temperature Exposure	125°C ±3°C , 1000hrs±12hrs	
11.6 Vibration Test	Freq.range: 10~2000Hz , Peak to peak amplitude:1.52mm Peak acceleration:5G (49m/s ²) , 3 direction(X, Y,Z) , 20min 12cycles each of 3 orientations.	
11.7 Mechanical Shock	100G , 6mS , 3 times for each direction(X, Y, Z) , 3 cycles	
11.8 Physical Dimension	Verify physical dimensions to the applicable device detail specification.	
11.9 Solderability	260°C , Coated > 95%	
11.10 Board Flex	PCB=100*40(mm) , Bending=2 mm (min) , Duration=60+5/-0 sec	
11.11 External Visual	Inspect device construction and marking.	
11.12 Terminal Strength	A force of 17.7N for 60 seconds.	