

APPROVAL SHEET

Customer Name : _____
Customer P/N : _____
Frequency : 135.000000 MHz
Aker Approved P/N : SMDF-135000-3-AL-01
Aker MPN : SMDF-135000-3-AL-01
Rev. : 1
ISSUE DATE : Jan.30.2024

APPROVED	CHECKED	PREPARED
<i>Tin</i>		<i>PTY</i>
APPROVED BY CUSTOMER		

AKER TECHNOLOGY CO., LTD.

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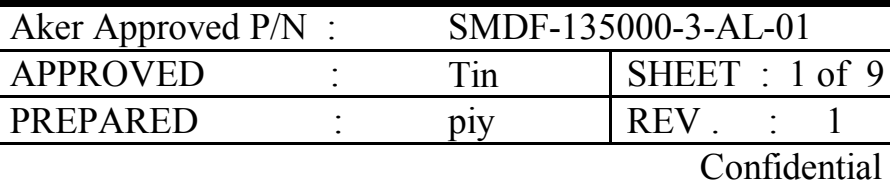
Web: www.aker.com.tw

MSL:Level 1

RoHS compliance

IATF 16949 Certified

AEC-Q200 Qualified



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 : $25 \pm 5^{\circ}\text{C}$

Relative humidity : 40%~70%

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

Ambient temperature : $25 \pm 3^{\circ}\text{C}$

Relative humidity : 40%~70%

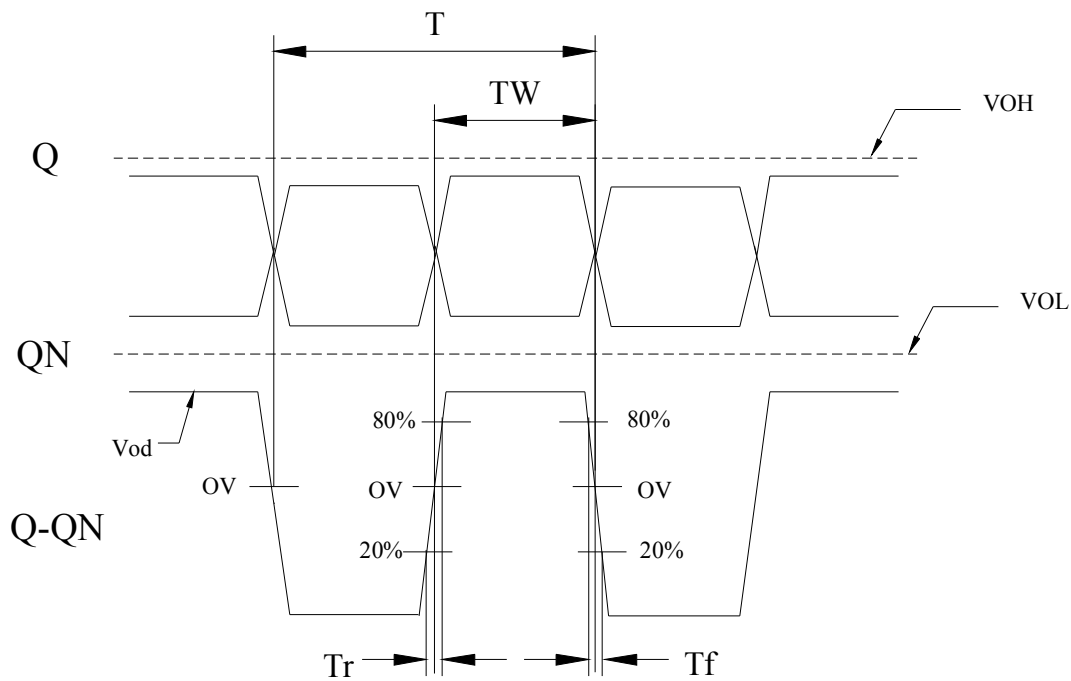
■ AKER Model : SMDF-321

■ Cutting Mode : AT CUT

Parameters	Symbol	Electrical Spec				Notes
		Min.	Typ.	Max.	Units.	
Nominal Frequency		135.000000			MHz	
Frequency Stability		± 100			ppm	
Supply Voltage	V_{CC}	$3.3 \pm 5\%$			V	
Output Load				100	Ω	Connected Between Q to QN
Aging		± 3			ppm	First Year at 25°C
Enable Control		Yes			—	Pad 1
Operating Temperature		-40	25	125	$^{\circ}\text{C}$	
Storage Temperature Range		-55	~	150	$^{\circ}\text{C}$	
Output Voltage High	V_{OH}			1.6	V	
Output Voltage Low	V_{OL}	0.9			V	
Differential Output Voltage	V_{OD}	250	~	450	mV	
Offset Voltage	V_{OS}	1.125	1.25	1.375	V	
Input Current	I_{cc}			50	mA	
Rise Time	T_r			0.5	ns	20%~80%
Fall Time	T_f			0.5	ns	80%~20%
Symmetry (Duty ratio)	TH/T	45	~	55	%	
Start-up Time	T_{osc}			10	ms	
Enable Voltage High	V_{hi}	70%VDD			V	
Disable Voltage Low	V_{lo}			30%VDD	V	
Output Enable Delay Time	T_{on}			2	ms	
Output Disable Delay Time	T_{off}			200	ns	
Phase Jitter RMS				1	ps	Fj:12K~20MHz

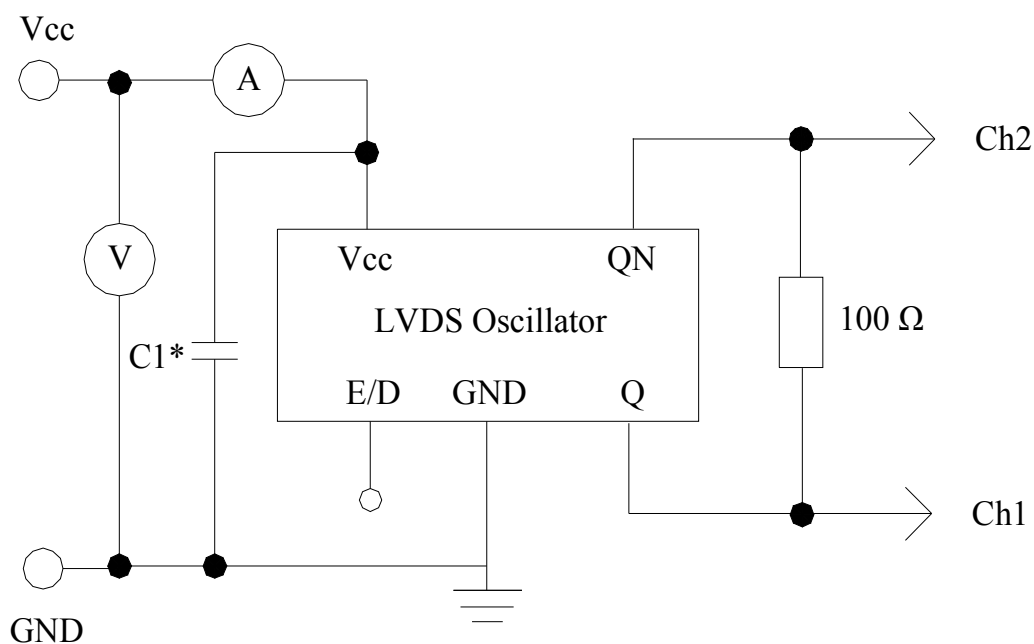
Please kindly be noted that AKER DO NOT guarantee parts quality which involves human security application.

2 . LVDS OUTPUT WAVEFORM



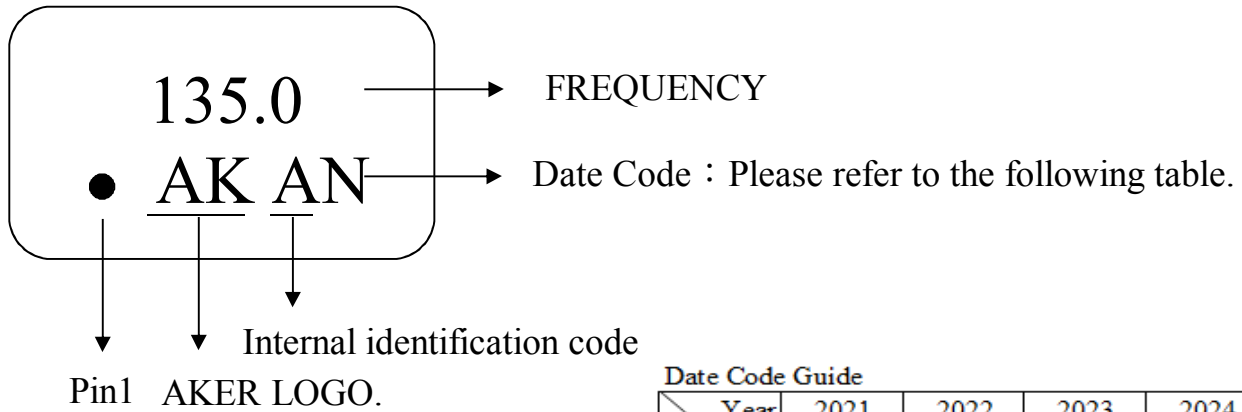
$$\text{Duty Cycle} = (T_w/T) * 100[\%]$$

3 . LVDS TEST CIRCUIT



*C1: A 0.01 μF or 0.1 μF decoupling capacitor is recommended.

4. MARKING :



Date Code Guide

Year	2021	2022	2023	2024
	2025	2026	2027	2028
Month	(4N+1)	(4N+2)	(4N+3)	(4N+0)
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

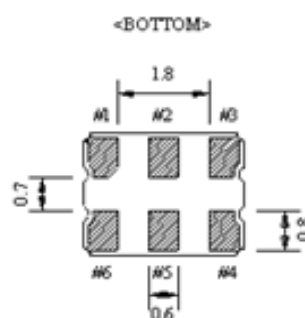
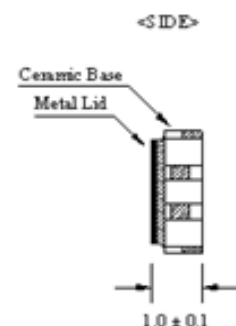
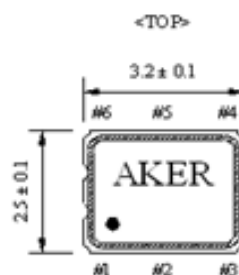
A cycle every four years

5. DIMENSION :

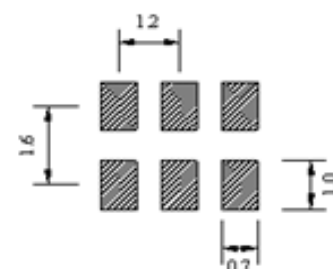
(UNIT : mm)

Enable/Disable Function

INH(#1)	Q(#4) & QN(#5)
HIGH(open)	Operating
LOW	High impedance



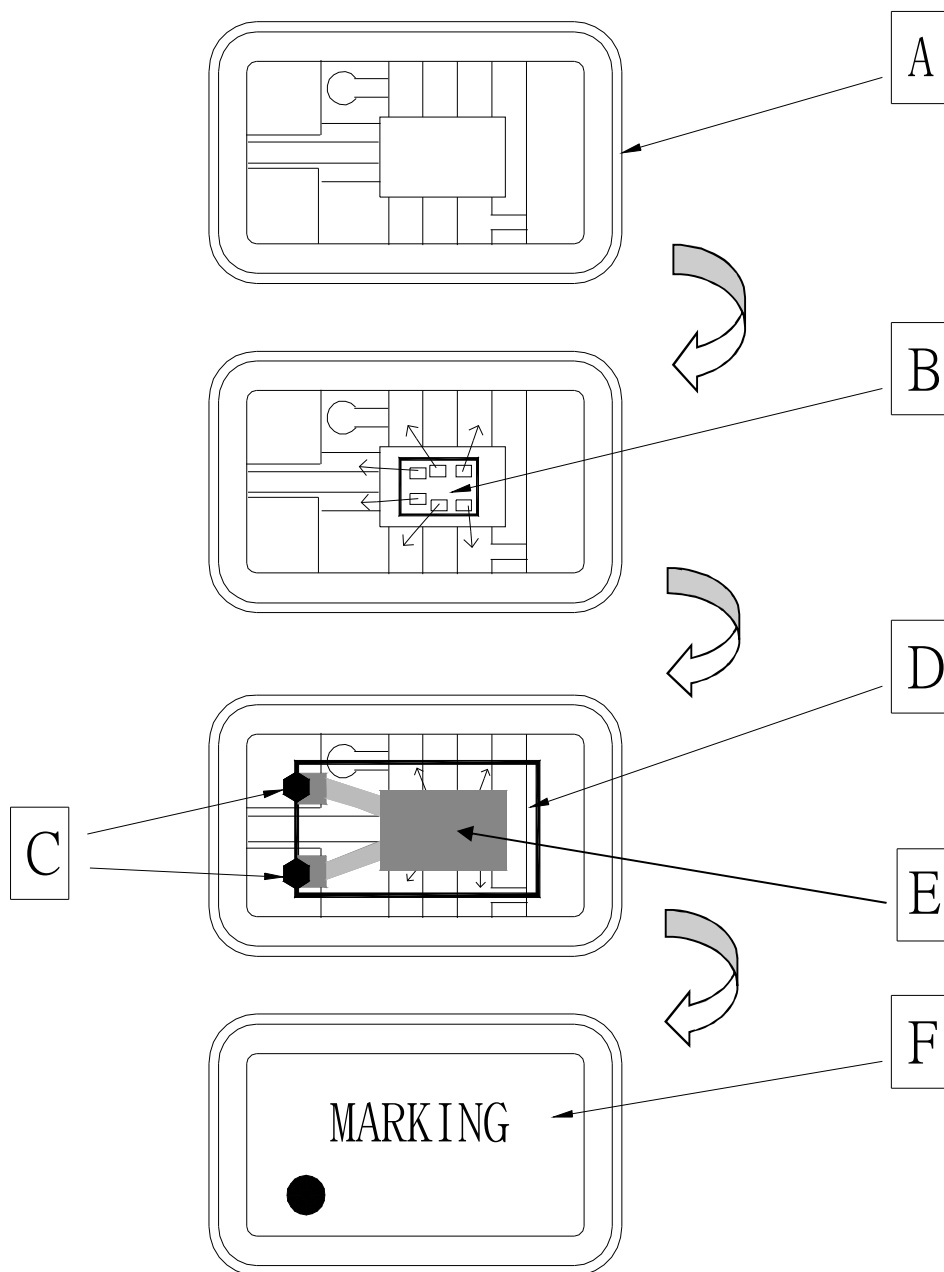
<SUGGESTED LAYOUT>



#1:E/D #2:NC #3:GND
#6:Vcc #5:QN #4:Q

(Recommended Land Pattern)

6 . STRUCTURE ILLUSTRATION

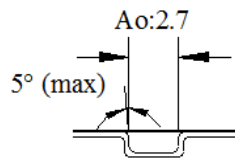
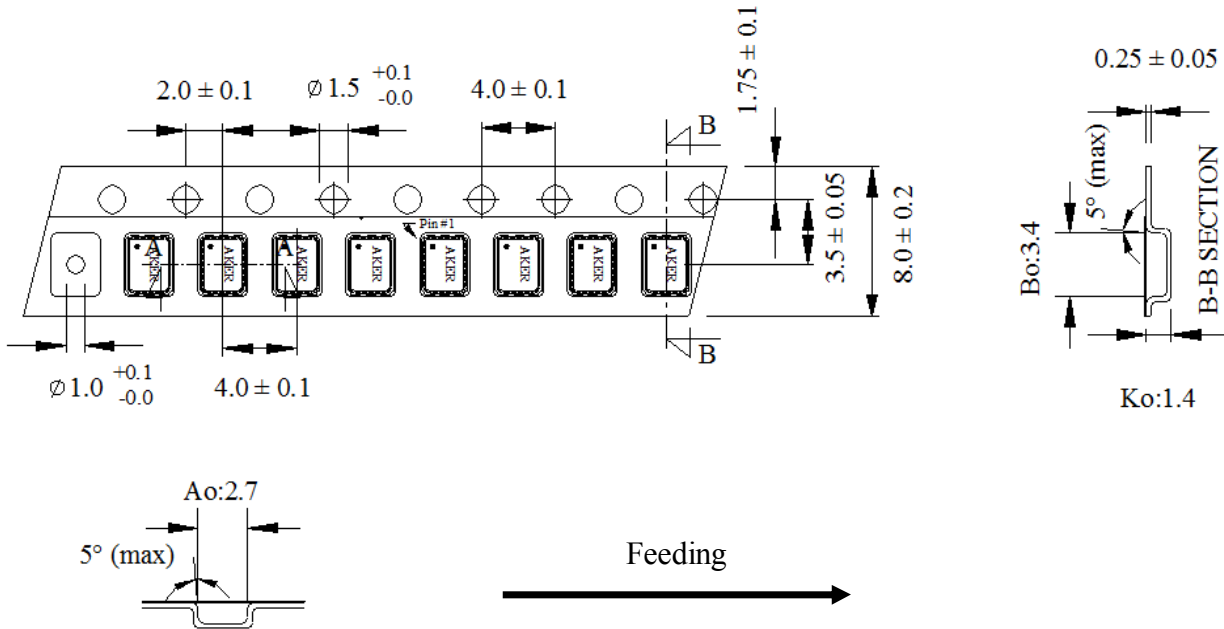


COMPONENTS		MATERIALS		COMPONENTS		MATERIALS	
A	Base(Package)	Cera mic (Al2O3)+Kovar(Fe/Co/Ni)		D	Crystal blank	SiO2	
B	IC chip			E	Electrode	Noble metal	
C	Conductive adhesive	Ag / Silicon resin		F	Lid	Fe/Co/Ni	

7. PACKING :

TAPE SPECIFICATION

(Unit : mm)

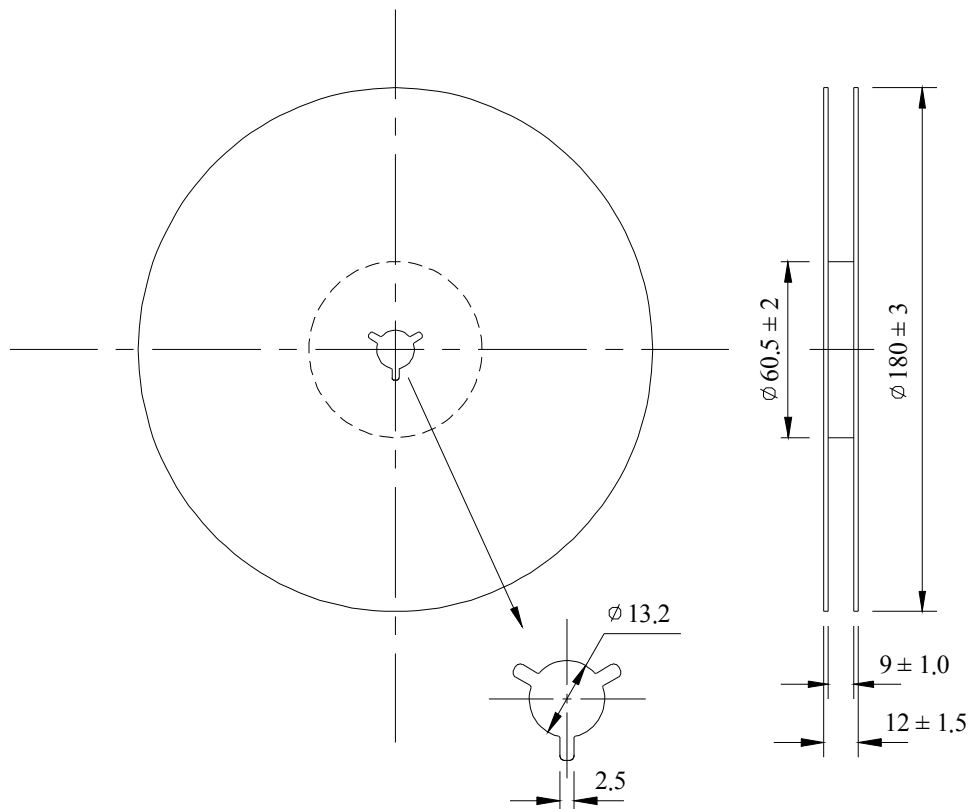


A-A SECTION

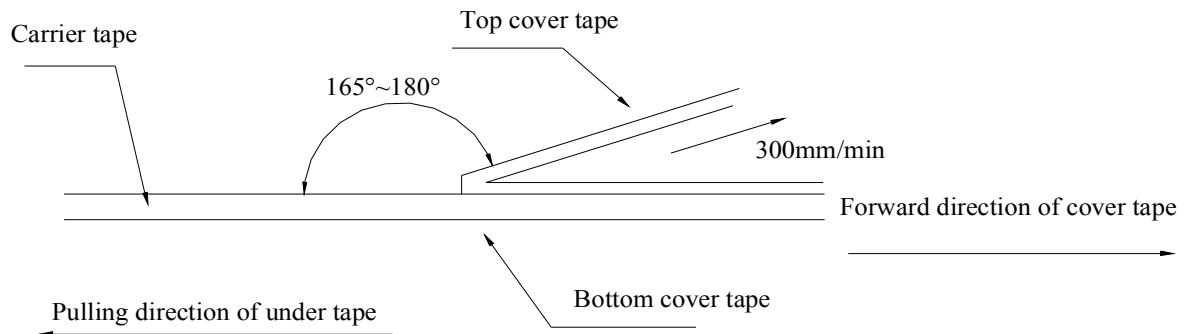
Feeding

OUTLINE DIMENSION

(Unit : mm)



8. COVER TAPE ADHESION STRENGTH :

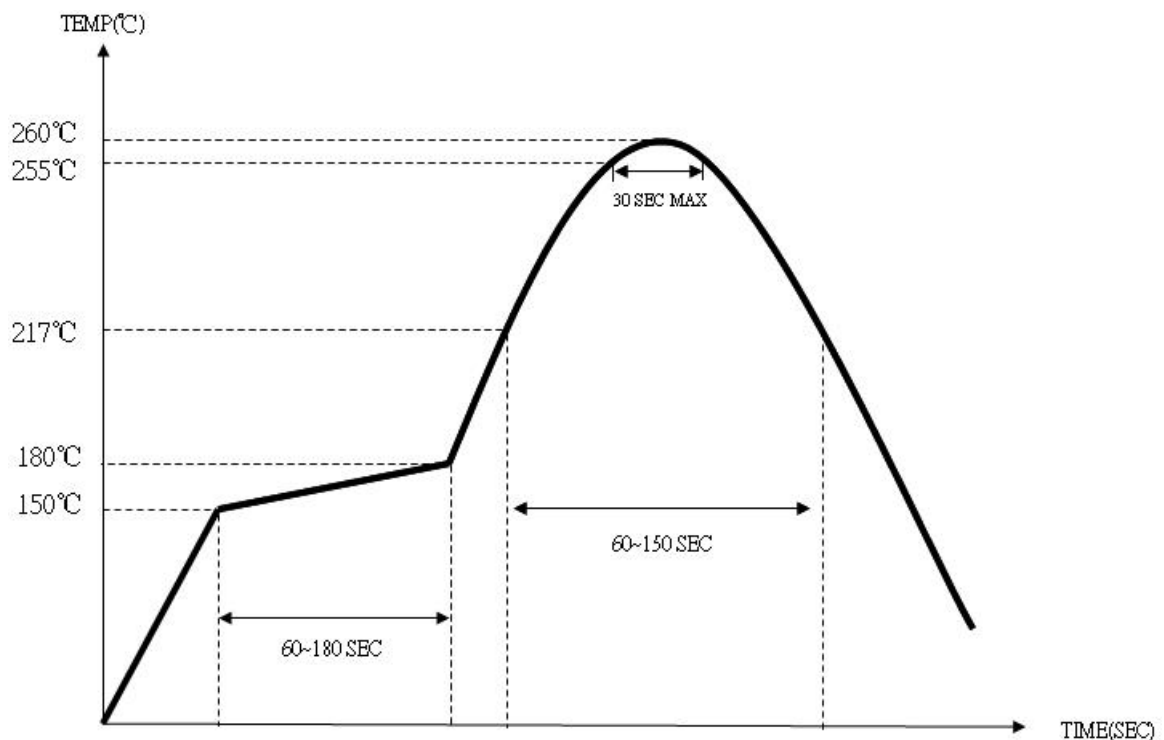


*** In the case, the cover tape is pulled off under the above conditions the cover tape adhesion strength should be as follows. ***

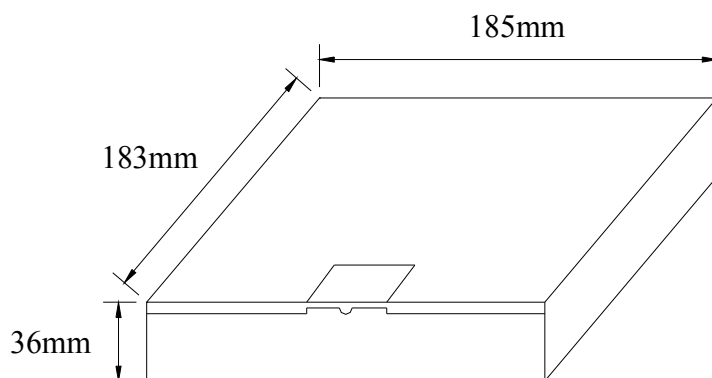
Plastic tape: 10.2g~71.4g

(Cover tape adhesion strength)

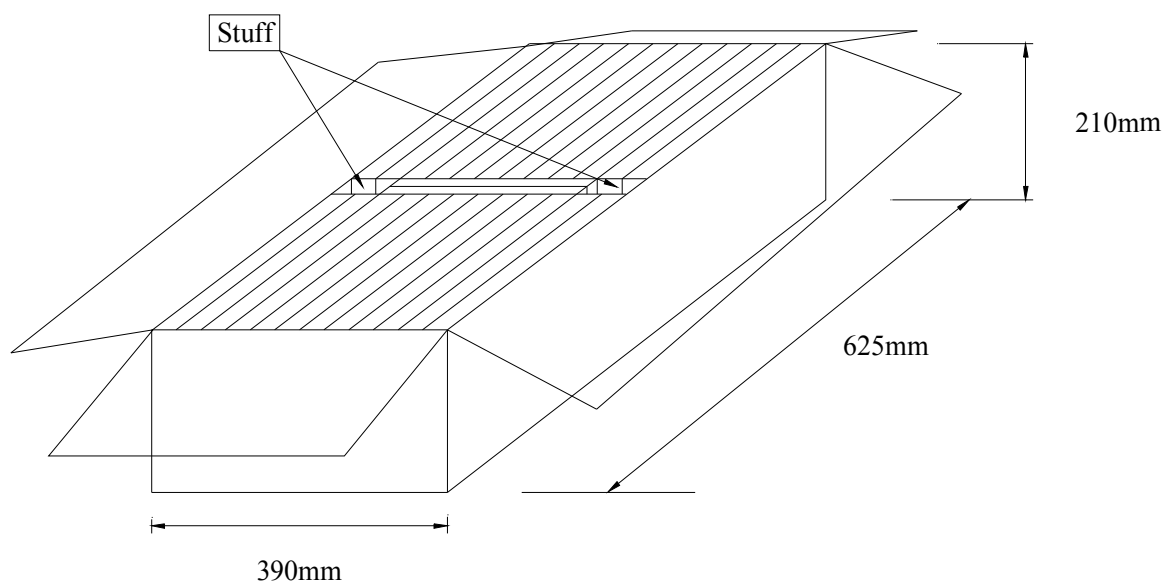
9 . SOLDERING REFLOW PROFILE



10. PACKING :



BOX = 3000 PCS / REEL



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

11 . MECHANICAL PERFORMANCE

TEST ITEMS	TEST METHODS AND TEST CONDITION	PERFORMANCE
11.1 Temperature Cycling	-55±3℃/30min maximum~+125±3℃/30min maximum , 1000cycles	To satisfy the electrical performance .
11.2 Operational Life	125℃±3℃ , 1000hrs±12hrs Rated VDD applied.	
11.3 Biased Humidity	85℃±5℃&85%±5%R.H. , 1000±12hrs Rated VDD applied.	
11.4 Resistance To Soldering Heat Test	Reflow test 2 times.	
11.5 High Temperature Exposure	150℃±3℃ , 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℃ , Coated > 95%	
11.10 Board Flex	PCB=100*40(mm) , Bending=2 mm (min) , Duration=60+5/-0 sec	
11.11 External Visual	<u>Inspect device construction and marking.</u>	
11.12 Terminal Strength	A force of 17.7N for 60 seconds.	