Confidential

Accurate Kinetic Energy

APPROVAL SHEET

Customer Name	:	
Customer P/N	:	
Frequency	:	32.768000 KHz
Aker Approved P/N	:	D21-032768-2DRD60
Aker MPN	:	D21-032768-2DRD60
REVISION	:	A0
ISSUED DATE	:	2022/2/7

APPROVED	CHECKED	PREPARED
Earnest		Kika
APPROVED BY CUSTOMER		

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RoHS compliant

Accurate Kinetic Energy	Aker Approved P/N :	D21-032768-2DRD60	
	APPROVED :	Earnest	SHEET : 1 of 5
	PREPARED :	Kiku	REV . : A0
			Confidential

Rev.	Date	Reviser	Revise contents
A0	2022/2/7	Kiku	Initial Released

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

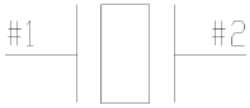
TUNING FORK CRYSTAL SPECIFICATION

1 . ELECTRICAL CHARACTERISTICS

Item	Symbol	Rating value			Unit	Note
		Min.	Typ.	Max.		
Storage temperature range	T_stg	-55		+125	°C	Store as bare product after unpacking
Maximum level of drive	GL		0.5		μW	
Operating temperature range	T_use	-40		+85	°C	
Level of drive	DL	0.01	0.1	0.5	μW	
Vibration mode		Fundamental				

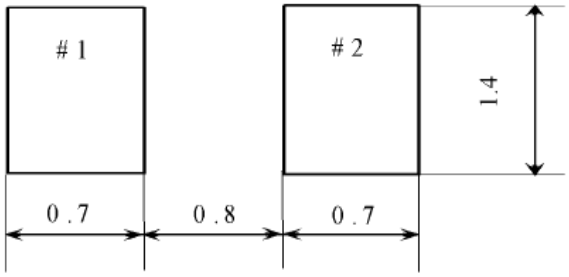
No.	Item		Symbol	Value	Unit	Conditions
1	Nominal Frequency		f_nom	32.768	kHz	
2	Frequency tolerance		f_tol	± 20	$\times 10^{-6}$	CL = 12.5 pF Ta = + 25 ± 3°C Level of drive : 0.1 μW Not include aging
3	Motional resistance		R1	90 Max.	kΩ	CI meter : Saunders 140B Level of drive : 0.5 μW
4	Motional capacitance		C1	6.4 Typ.	fF	
5	Shunt capacitance		C0	1.3 Typ.	pF	
6	Frequency temperature characteristics	Turnover temperature	Ti	+ 25 ± 5	°C	Values are calculated by The frequencies at + 10, + 25, + 40°C with C-MOS circuit.
		Parabolic coefficient	B	- 0.04 Max.	$\times 10^{-6}/°C^2$	
7	Isolation resistance		IR	500 Min.	MΩ	DC 100 V± 15, 60 seconds Between terminal # 1 and terminal # 2
8	Frequency Aging		f_age	± 3	$\times 10^{-6}$/year	Ta = + 25 °C ± 3 °C Level of drive : 0.1 μW

2 . INTERNAL CONNECTION:

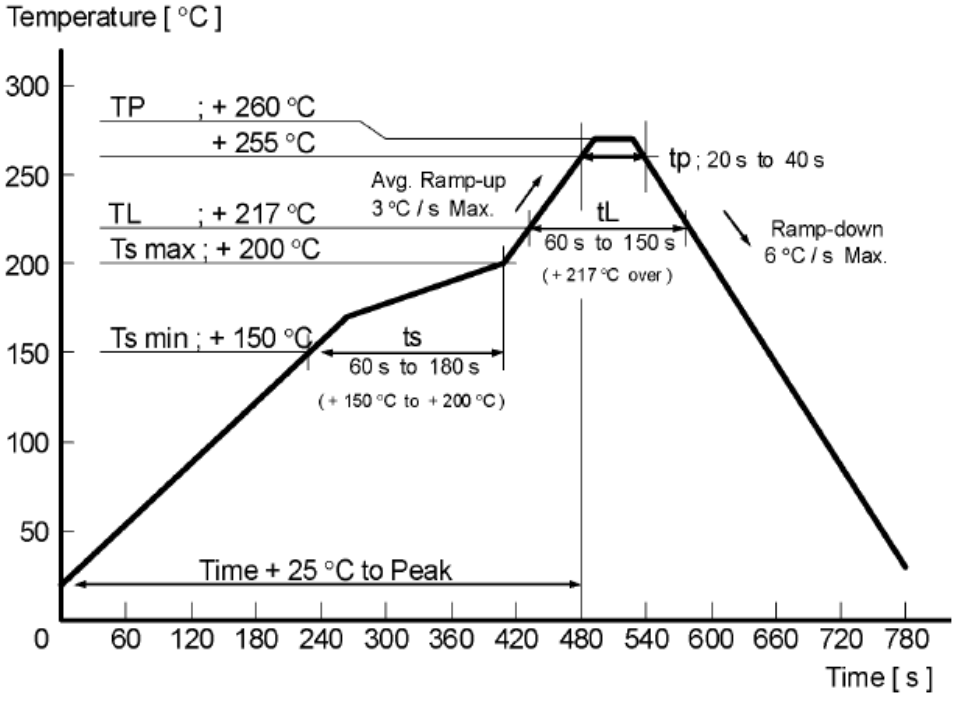


Package : Ceramic(Al_2O_3)
Terminal Au plate : 0.5 μm Min.
Lid : Metal

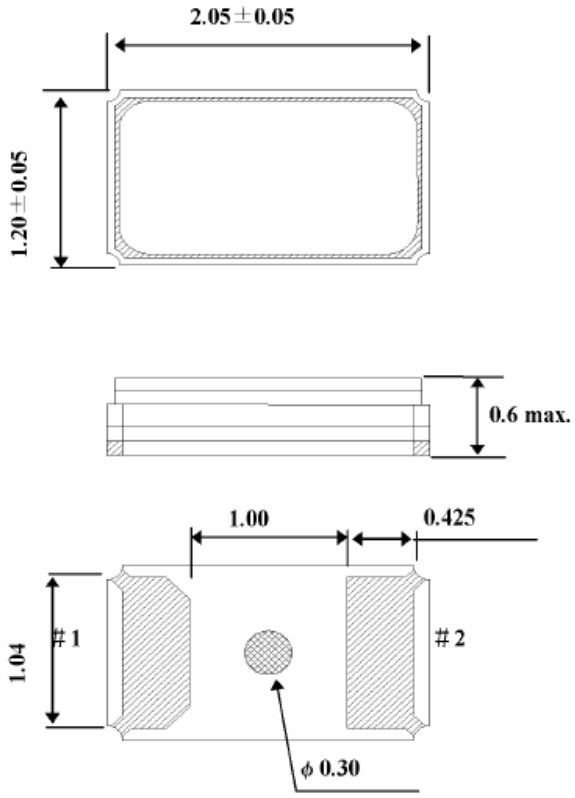
3 . RECOMMENDED SOLDERING PATTERN:(Unit : mm)

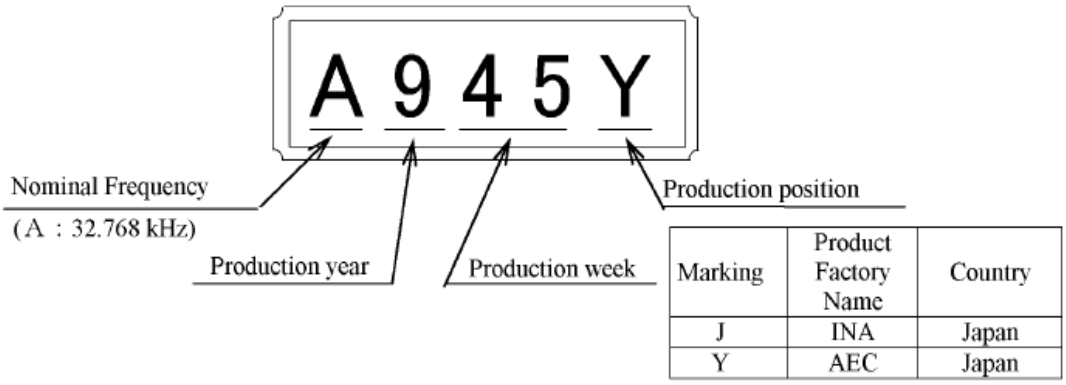


4. SOLDERING REFLOW PROFILE :



5 . DIMENSIONS : (Unit : mm)





Marking	Product Factory Name	Country
J	INA	Japan
Y	AEC	Japan

* The above marking layout shows only marking contents and their approximate position and it is not for font, size and exact position.

6 . NOTES :

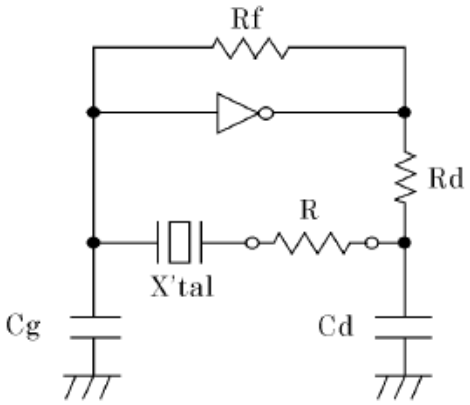
1. Max three (3) times reflow is allowed. Once miss soldering is happened, hand work soldering by soldering iron is recommended. (+ 350 °C × within 5 s)

2. Patterning should be followed by our recommended one.

3. Applying excessive excitation force to the crystal resonator may cause deterioration damage.

4. Unless adequate negative resistance is allocated in the oscillation circuit, start up time of oscillation may be increased, or no oscillation may occur.

   How to check the negative resistance.



(1) Connect the resistance (R) to the circuit in series with the crystal resonator.
(2) Adjust R so that oscillation can start (or stop).
(3) Measure R when oscillation just start (or stop) in above (2).
(4) Get the negative resistance
$-R = R + CI$ value.
(5) Recommended -R
$|-R| > CI \times (5 \sim 10)$

5. The shortest patterning line on board is recommendable.
   Too long line on board may cause of abnormal oscillation.

6. This device must be stored at the normal temperature and humidity conditions before mounting on a board.

7. Too much exciting shock or vibration may cause deterioration on damage.
   Depending on the condition such as a shock in assembly machinery, the products may be damaged.
   Please check your condition in advance to maintain shock level to be smallest.

8. Depending on the conditions, ultrasonic cleaning may cause resonant damage of the internal crystal resonator. Since we are unable to determine the conditions (type of cleaning unit, power, time, conditions inside the bath, etc.) to be used in your company, we cannot guarantee the safety of this unit when it is cleaned in an ultrasonic cleaner.

9. Please refer to packing specification regarding how to storage the products in the pack.