

CRYSTAL SPECIFICATION

Product Code : C7M1356020AFSAF0-QE04

Description : Quartz Crystal

Revision History

| Rev. | Date | Reason | Issued By |
|------|------------|--------|--------------|
| 0 | 29/12/2014 | | szom_xiaopei |

CRYSTAL SPECIFICATION

Customer :
End User : 上海旭谷國際貿易有限公司
Customer Part No. : C7M1356020AFSAF0-QE04
Product Code : C7M1356020AFSAF0-QE04
Description : Quartz Crystal
Nominal Frequency : 13.560 MHz
Oscillation Mode : Fundamental
Holder Type : C7

Measure equipment

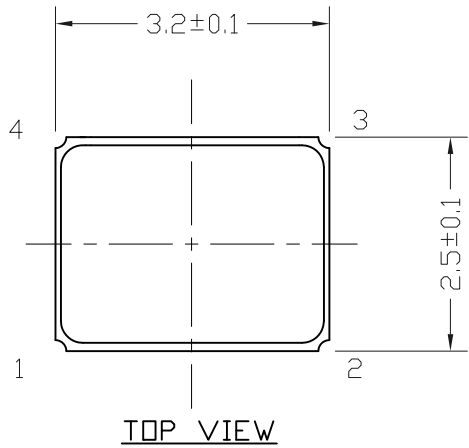
Electrical characteristics measured by Kolinker KH1240 or HP5100 equivalent.

Electrical Characteristics :

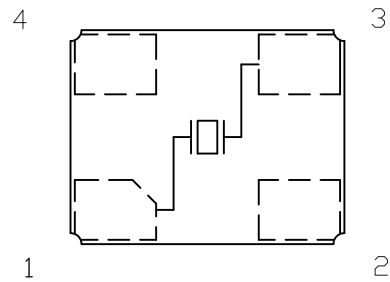
| | |
|------------------------------|-------------------------|
| Load Capacitance | 20 pF |
| Frequency Tolerance At 25 °C | ± 10 ppm |
| Frequency Stability | ± 50 ppm |
| Operating Temperature Range | -40 ~ 85 °C |
| Storage Temperature Range | -45 ~ 90 °C |
| Aging | <± 5 ppm first year |
| Drive Level | 50 µW |
| Equivalent Series Resistance | 150 ohms Max. |
| Shunt Capacitance | 7 pF Max. |
| Insulation Resistance | 500M ohm Min at 100 VDC |
| Marking | 13.560+LOT NO. |

Remarks for Customer Specifications :

| | |
|-------------|----------|
| Application | BCM |
| Remark | SPQ 3K/R |

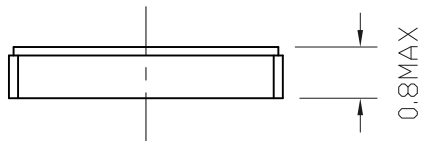


TOP VIEW

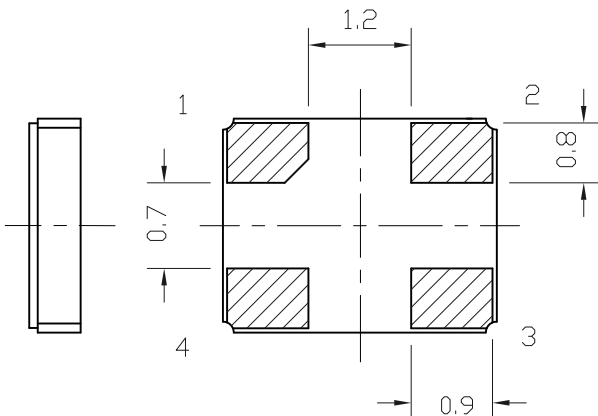


INTERNAL CONNECTION

REMARK: 1,3 -CRYSTAL
2,4 - GND

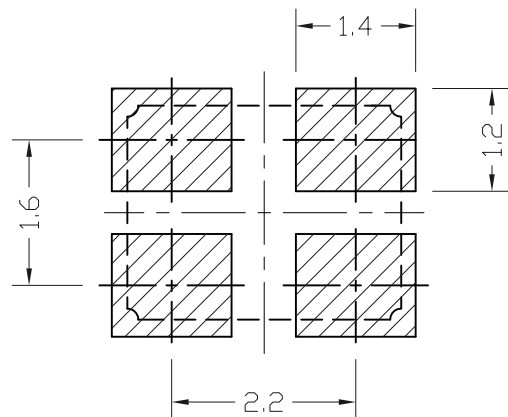


FRONT VIEW



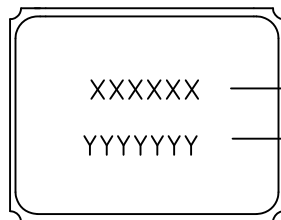
SIDE VIEW

BOTTOM VIEW



RECOMMENDED LAND PATTERN

MARKING INFORMATION



XXXXXX

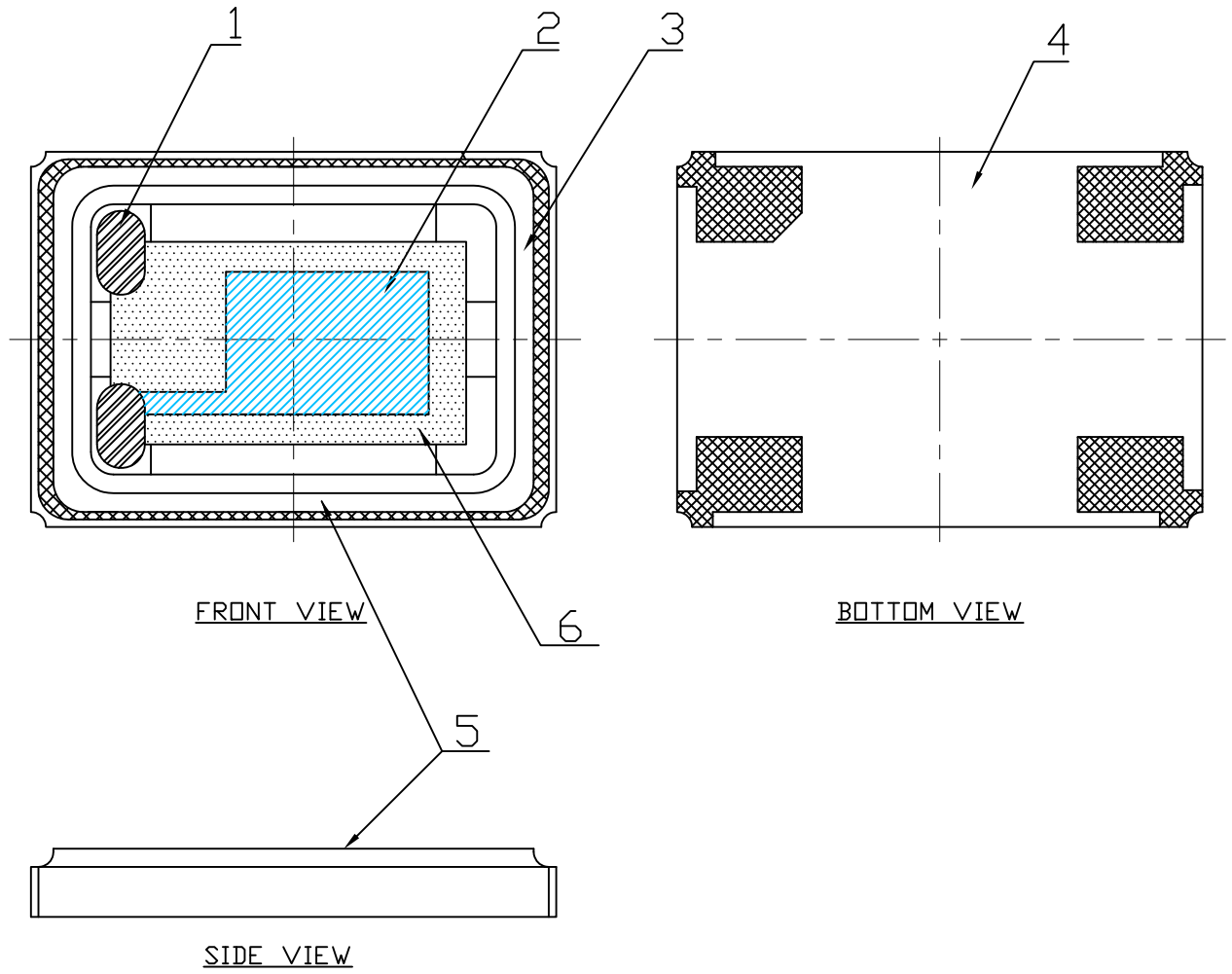
XXXXXX = CRYSTAL FREQUENCY

YYYYYY

YYYYYY = 7 DIGITS LOT NO.

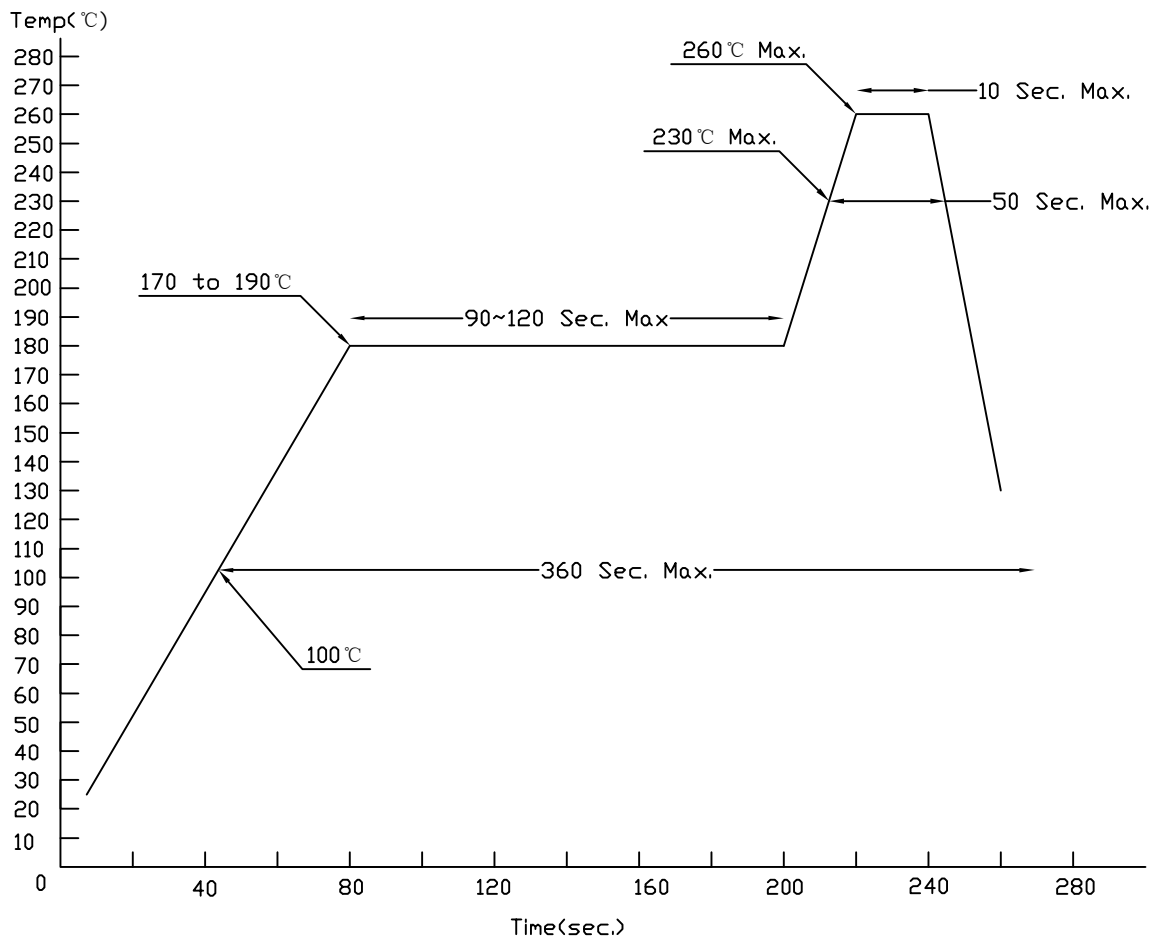
Note: #2 & #4 are connected with the cover

| DIMENSION AND DETAILS | | | | | | | | |
|-----------------------|------|---|----------|------|----------------------------------|------------|--|---------|
| ITEM | QTY. | DESCRIPTION | MAT'L | HDN. | SURFACE | MAT'L SIZE | REMARK | |
| GENERAL TOLERANCE: | | .X=±0.1 .XX=±0.05 PROPRIETARY NOTICE : THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF HKC. | DATE | NAME | | TITLE : | 3.2x2.5 CERAMIC SMD CRYSTAL PART No.: C7 DRAWING No.: 12040938 | |
| DRAWN | | | 26-02-10 | Deng | | | | |
| CHECK | | | 26-02-10 | Hong | | | | |
| APROV. | | 26-02-10 | | | HONG KONG AUTOMOTIVE X'TALS LTD. | | | |
| DO NOT SCALE DRAWING | | ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED | | | | SCALE: NA | SHT. 1 OF 1 | REV. 01 |



| ITEM | DESCRIPTION | MATERIAL |
|------|--------------------|------------------|
| 1 | CONDUCTIVE BONDING | EPOXY |
| 2 | ELECTRODE | Ag |
| 3 | EDGE | Ag-Cu Alloy |
| 4 | SUBSTRATE | CERAMIC |
| 5 | COVER (LID) | Fe-Ni-Co Alloy |
| 6 | BLANK | SYNTHETIC QUARTZ |

| | | INTERNAL STRUCTURE | | | | | | |
|---|-------------|--|----------|------|--------------------------|---|-----------------------|--|
| ITEM | QTY. | DESCRIPTION | MAT'L | HDN. | SURFACE | MAT'L SIZE | REMARK | |
| GENERAL TOLERANCE: | | | DATE | NAME | | TITLE: CERAMIC SMD TYPE CRYSTAL<4PADS> CROSS SECTION | | |
| X=±0.5 | X°=±0.5° | DRAWN | 16-03-10 | Deng | | | | |
| .X=±0.1 | .X°=±0.1° | CHECK | 16-03-10 | Hong | | | | |
| .XX=±0.05 | .XX°=±0.05° | APROV. | 16-03-10 | | | | | |
| PROPRIETARY NOTICE : THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF KOLINKER | | | | | PART No.: C1 C3 C5 C7 CA | | DRAWING No.: 12037956 | |
| DO NOT SCALE DRAWING | | ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED | | | SCALE:NA | SHT. 1 OF 1 | REV. 01 | |



Note:

1. Lead Free or RoHS Compliance
2. Ramp up rate (from 217°C to 260°C): 3°C/Sec. Max.
3. Ramp down rate: 4°C/Sec. Max.
4. Recommended reflow times: 2 times Max.
5. Effective products:
 - AT cut SMD type crystals including 49US SMD Crystal, Ceramic SMD Crystal, Glass Frit Crystal etc.
 - AT cut SMD type oscillators including crystal oscillator, VCXO, TCXO, OCXO etc.
6. High temperature type SMD tuning fork crystal

| ITEM | QTY. | DESCRIPTION | MAT'L | HDN. | SURFACE | MAT'L SIZE | REMARK |
|--|-------------|--|------------|------|-------------|------------------------------------|--------|
| GENERAL TOLERANCE: | | | DATE | NAME | | TITLE: Product Reflow Profile | |
| X=±0.5 | X°=±0.5° | DRAWN | 11-06-2013 | TAN | | PART No.: Refer to DWG Description | |
| .X=±0.1 | .X°=±0.1° | CHECK | 11-06-2013 | PANG | | DRAWING No.: 13000002 | |
| .XX=±0.05 | .XX°=±0.05° | APROV. | 11-06-2013 | | | SCALE: NA | |
| PROPRIETARY NOTICE : THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF HKC. | | | | | SHT. 1 OF 1 | | REV.02 |
| DO NOT SCALE DRAWING | | ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED | | | | | |



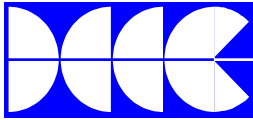
Hong Kong X'tals Limited
Hong Kong Automotive X'tals Limited

Unit L-M, 24/F, Shield Industrial Center, 84 - 92 Chai Wan Kok Street, Tsuen Wan, New Territories, Hong Kong.
 Tel: (852) 35112388 Fax: (852) 35112420 Email : hkxtals@hongkongcrystal.com

AEC-Q200-Rev D Reliability Test for Quartz Crystal

Drawing No. : 12080065 rev. 00

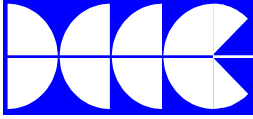
| Reliability Test | Condition of Test | Requirements |
|--|---|---|
| 1. Pre-and Post-Stress Electrical Test | Test is performed except as specified in the applicable stress reference and the additional requirements in this table. | All Electrical Functions must meet with the specifications. Note: *Generic data allowed. |
| 2. TEST NOT USED | - | - |
| 3. High Temperature Exposure (Storage) | MIL-STD-202 Method 108 1000 hrs. at rated operating temperature (e.g. 85°C part can be stored for 1000 hrs at 85°C. The same applies for 125°C). Unpowered. Measurement at 24±2 hours after test conclusion. | All Electrical Functions must meet with the specifications. Note: *Generic data allowed. **Devices are not to be reused for qualification or production. |
| 4. Temperature Cycling | JESD22 Method JA-104 1000 cycles (-40°C to 125°C) Note: If 85°C part the 1000 cycles will be at that temperature rating. Measurement at 24±2 hours after test conclusion. | Ditto Note: *Generic data allowed. **Devices are not to be reused for qualification or production. |
| 5. TEST NOT USED | - | - |
| 6. TEST NOT USED | - | - |
| 7. Biased Humidity | MIL-STD-202 Method 103 1000 hours 85°C/85%RH. Rated VDD applied with 1 MΩ and inverter in parallel, 2X crystal CL capacitors between each crystal leg and GND. Measurement at 24±2 hours after test conclusion. | Ditto Note: *Generic data allowed. **Devices are not to be reused for qualification or production. |
| 8. Operational Life | MIL-STD-202 Method 108 Note: 1000 hrs @ 125°C. If 85°C part will be tested at that temperature. Rated VDD applied with 1MΩ and inverter in parallel, 2X crystal CL capacitors between each crystal leg and GND. Measurement at 24±2 hours after test conclusion. | Ditto Note: *Generic data allowed. **Devices are not to be reused for qualification or production. |
| 9. External Visual | MIL-STD-883 Method 2009 Inspect device construction, marking and workmanship. Electrical Test not required. | Parts should meet with the criteria presents by MIL-STD-883 Method 2009 Note: *Generic data allowed. **Devices can be used to populate other tests or they can be used for production. |
| 10. Physical Dimension | JESD22 Method JB-100 Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers spec. Electrical Test not required. | Dimensions should meet with the specification. Note: *Generic data allowed. **Devices can be used to populate other tests or they can be used for production. |



Hong Kong X'tals Limited
Hong Kong Automotive X'tals Limited

Unit L-M, 24/F, Shield Industrial Center, 84 - 92 Chai Wan Kok Street, Tsuen Wan, New Territories, Hong Kong.
 Tel: (852) 35112388 Fax: (852) 35112420 Email : hkxtals@hongkongcrystal.com

| | | |
|----------------------------------|---|---|
| 11. Terminal Strength (Leaded) | MIL-STD-202 Method 211 Test leaded device lead integrity only. Conditions: A (227 g) - Pull test - also known as a tension or tensile test for terminals. It is usually applicable to most types of terminals. C (227 g): Wire-lead bend test - also known as a lead-fatigue, bend, or flexibility test. It is applicable to solid-wire-lead terminals of limited ductility, such as nickel-alloy-type leads and those used in hermetically-sealed component parts. | All Electrical Functions must meet with the specifications. Note: *Generic data allowed. **Devices are not to be reused for qualification or production. ***Required for leaded devices only. |
| 12. Resistance to Solvents | MIL-STD-202 Method 215 Note: Also aqueous wash chemical - OKEM clean or equivalent. Do not use banned solvents. | No deterioration in marking Note: *Generic data allowed. **Devices are not to be reused for qualification or production. |
| 13. Mechanical Shock | MIL-STD-202 Method 213 Figure 1 of Method 213. Condition C | All Electrical Functions must meet with the specifications. Note: *Generic data allowed. **Devices are not to be reused for qualification or production. |
| 14. Vibration | MIL-STD-202 Method 204 5g's for 20 minutes 12 cycles each of 3 orientations. Note: Use 8"X5" PCB .031" thick with 7 secure points on one 8" side and 2 secure points on corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz. | Ditto Note: *Generic data allowed. **Devices are not to be reused for qualification or production. |
| 15. Resistance to Soldering Heat | MIL-STD-202 Method 210 Condition B No pre-heat of samples. Note: Single Wave solder - Procedure 1 with solder within 1.5mm of device body for Leaded. Procedure 1 except 230°C and immerse only to level to cover terminals for SMD. | Ditto Note: *Generic data allowed. **Devices are not to be reused for qualification or production. ***The solderability (test #18) and resistance to solder heat (test #15) tests are still required to be performed on Pb-free product for backward compatibility with Pb processes. |
| 16. TEST NOT USED | - | - |
| 17. TEST NOT USED | - | - |
| 18. Solderability | J-STD-002 For both Leaded & SMD. Electrical Test not required. Magnification 50 X. Conditions: Leaded: Method A @235°C, category 3. SMD: a) Method B, 4 hrs @155°C dry heat @235°C b) Method B @215°C category 3. c) Method D category 3 @ 260°C. | Solder should cover at least 95% of the surface being tested. Note: *Devices are not to be reused for qualification or production. **The solderability (test #18) and resistance to solder heat (test #15) tests are still required to be performed on Pb-free product for backward compatibility with Pb processes. |

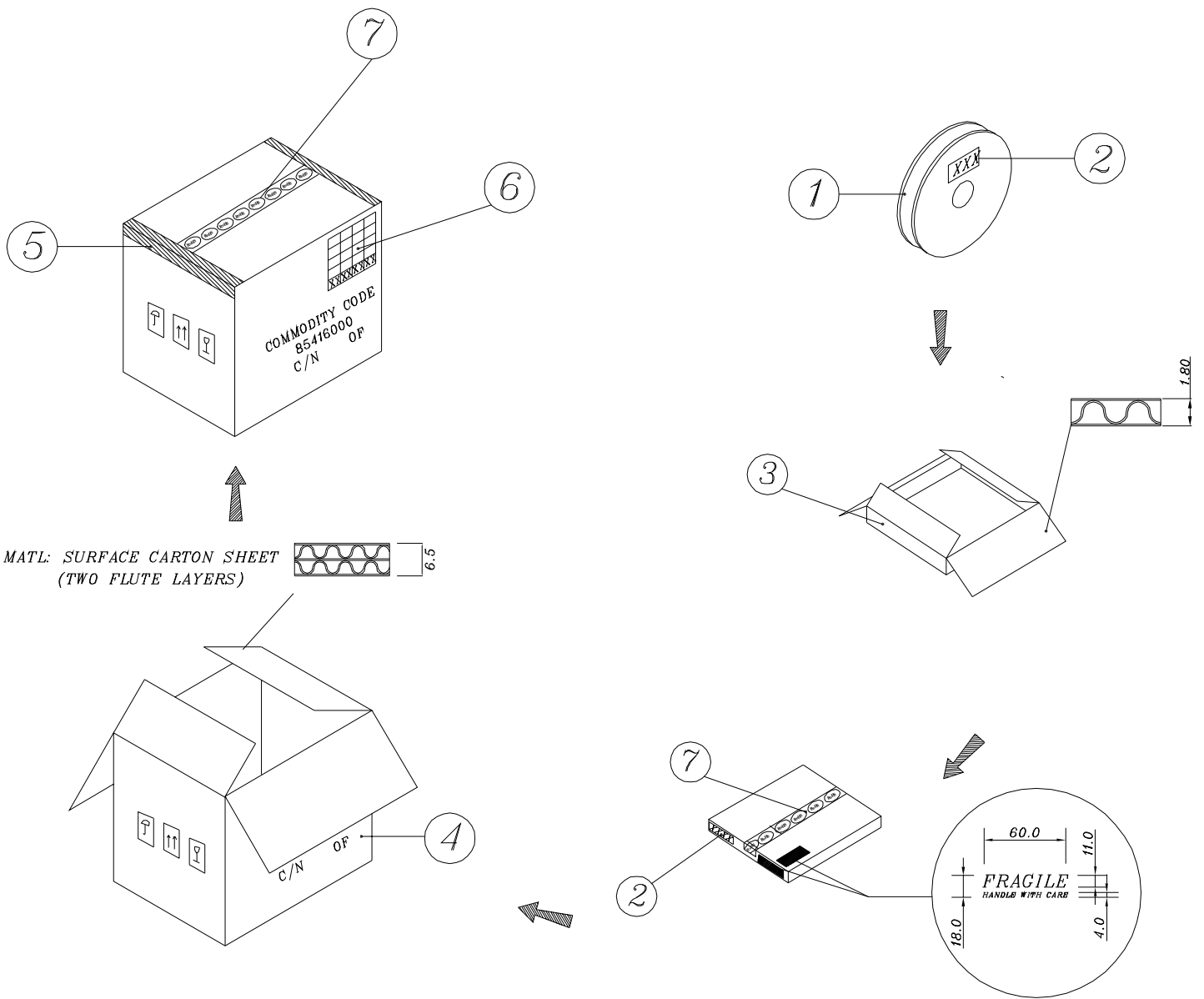


Hong Kong X'tals Limited
Hong Kong Automotive X'tals Limited

Unit L-M, 24/F, Shield Industrial Center, 84 - 92 Chai Wan Kok Street, Tsuen Wan, New Territories, Hong Kong.
 Tel: (852) 35112388 Fax: (852) 35112420 Email : hkxtals@hongkongcrystal.com

| | | |
|---------------------------------|--|---|
| 19. Electrical Characterization | User Spec. Parametrically test per lot and sample size requirements, summary to show Min, Max, Mean and Standard deviation at room as well as Min and Max operating temperatures. | All Electrical Functions must meet with the specifications. Note: *Generic data allowed. **Devices can be used to populate other tests or they can be used for production. |
| 20. Flammability | UL-94 | V-0 or V-1 Acceptable. Note: *Devices are not to be reused for qualification or production. |
| 21. Board Flex | AEC-Q200-005 Note: 2mm (Min) 60 sec minimum holding time | A failure is when a part cracks or causes a change in the parametric being monitored. Note: *Devices are not to be reused for qualification or production. **Required for surface mount devices only. |
| 22. Terminal Strength (SMD) | AEC-Q200-006 Note: A force of 1.8kg for 60 seconds. | The failure criteria are governed by not meeting the device specification, along with evidence of cracking or part being sheared off from its pad. Note: *Devices are not to be reused for qualification or production. **Required for surface mount devices only. |

12080065 rev. 00



MAT'L: SURFACE CARTON SHEET (TWO FLUTE LAYERS) 6.5

NOTES:

1. CERAMIC SMD CRYSTAL/OSCILLATOR IN RADIAL PACKAGE. (1K OR 3K PER REEL)
2. LABEL - OUR PART NO., FREQUENCY, CL, TYPE, IQC NO., LOT NO. & QTY. ETC.
3. SMALL INNER BOX. (1 REEL PER BOX) (SIZE : 18.4x18.4x2.3CM) (PART NO.: FBZ-ZL05W07XXXXXX-00)
4. CARTON BOX. (10 SMALL INNER BOXES PER CARTON BOX, TOTAL 10K CERAMIC SMD CRYSTALS/OSCILLATORS) (SIZE: 26.5x20.0x20.5CM) (DRAWING NO.: 48010054)
5. ADHESIVE TAPE
6. SHIPMENT DETAILS.
7. RoHS STICKER -- RoHS COMPLIANCE PARTS (PLEASE REFER TO CUSTOMER'S REQUEST)

| | | PACKING PROCEDURE | | | | | | |
|--|------|--|-----------|----------------------------------|---|--------------|-------------|---------|
| ITEM | QTY. | DESCRIPTION | MAT'L | HDN. | SURFACE | MAT'L SIZE | REMARK | |
| GENERAL TOLERANCE: | | DATE | NAME | | TITLE : CERAMIC SMD CRYSTAL/OSCILLATORS- 10K/30K PACKING PROCEDURE | | | |
| .X=±0.5 | | DRAWN | TAN | | | | | |
| | | CHECK | PANG | | | | | |
| PROPRIETARY NOTICE : THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTIES OF HKC. | | APROV. | 2014-12-3 | HONG KONG AUTOMOTIVE X'TALS LTD. | | PART No.: | NIL | |
| DO NOT SCALE DRAWING | | ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED | | | | DRAWING No.: | 12038032 | |
| | | | | | | SCALE: NA | SHT. 1 OF 1 | REV. 04 |