

NAKAGAWA ELECTRONICS LIMITED**QUARTZ CRYSTAL OSCILLATOR SPECIFICATION**

| | |
|-----------------|--|
| NKG PART NUMBER | SCO37A100.000NTS |
| DESCRIPTION: | OSCILLATOR in SMD 7x5 package, 100.0MHz, 1.8V; ±25ppm, 15pF, 0°C to 70°C |

| |
|---------------|
| CUSTOMER: |
| CUSTOMER P/N: |

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REVISION TABLE:

| REV. | DESCRIPTION | PREPARED | APPROVED | DATE |
|----------|------------------------|---------------|------------------|-------------------|
| A | Original release | <i>C. Lui</i> | <i>M. Bruech</i> | 2007/10/04 |
| B | New spec format | <i>S. Liu</i> | <i>M. Bruech</i> | 2011/11/03 |
| C | NO ENTRY | | | |
| D | NO ENTRY | | | |

Add: Block A, Flat 1-2 7/F., Hoi Luen Ind. Centre, 55 Hoi Yuen Rd., Kwun Tong, Kln., Hong Kong,
Tel: (852) 2389 9201, Fax: (852) 2341 0001, E-mail: info@nkg.com.hk, Web: www.nkg.com.hk

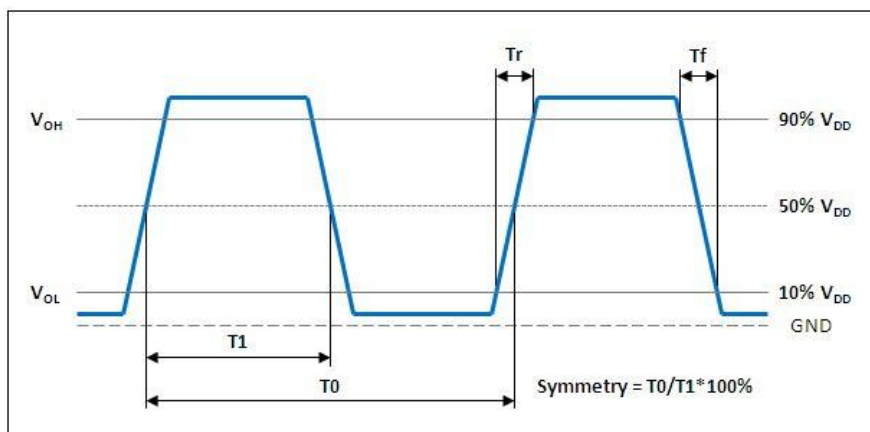
1. ELECTRICAL CHARACTERISTICS

▪ ELECTRICAL PARAMETERS

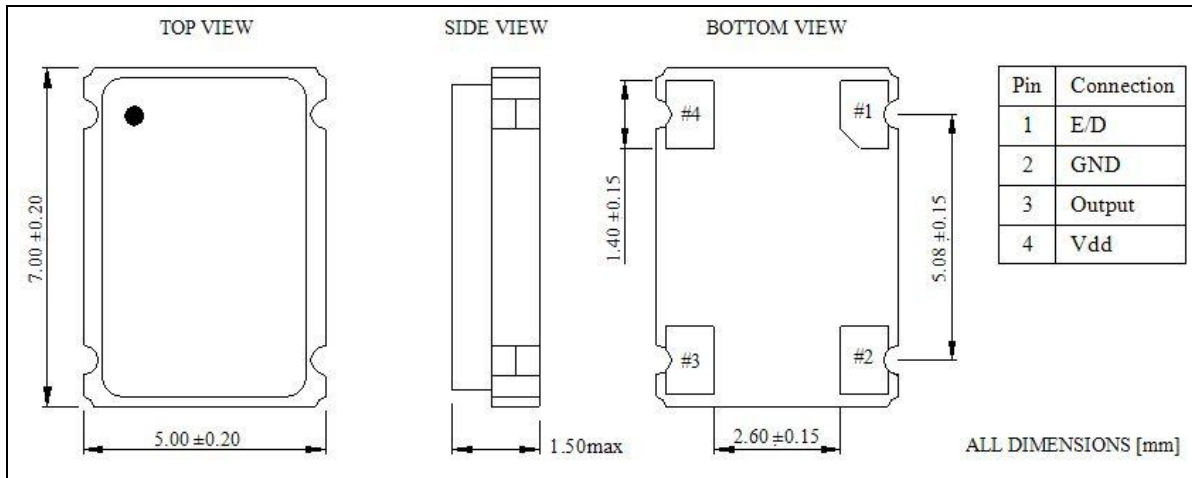
| | |
|-----------------------------------|---|
| PACKAGE TYPE (SEE DWG NEXT PAGE) | SCO36 (SMD 7x5x1.5) |
| NOMINAL FREQUENCY | 100.000MHz |
| POWER SUPPLY: | 1.8V _{DC} ±10% |
| INPUT CURRENT | 25mA MAX |
| FREQUENCY STABILITY (SEE NOTE 1) | ±25ppm MAX |
| OPERATION TEMPERATURE | 0°C to +70°C |
| STORAGE TEMPERATURE | -55°C to +125°C |
| OUTPUT // OUTPUT LOAD | HCMOS // 15pF MAX (or 10 LS-TTL) |
| OUTPUT SYMMETRY | 45~55% |
| RISE TIME (10%~90%VDD) | 6ns MAX |
| FALL TIME (90%~10%VDD) | 6ns MAX |
| OUTPUT VOLTAGE V _{OH} | 90%V _{p-p} MIN |
| OUTPUT VOLTAGE V _{OL} | 10%V _{p-p} MAX |
| PIN 1 E/D FUNCTION (TRI-STATE) | Pin1 = High or open → Output at pin3 active |
| | Pin1 = Low → Output at pin3 high impedance |
| STANDBY CURRENT | 10μA MAX |
| STARTUP TIME | 10ms MAX |

NOTE 1: Including 25deg C tolerance, operating temperature range, input voltage changes, aging, output load changes, shock and vibration.

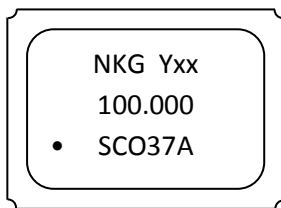
▪ OUTPUT WAVEFORM



2. PACKAGE DIMENSIONS



3. PRODUCT MARKING



NKG = NAKAGAWA logo and DATE CODE "Yxx"

[Y] = alpha YEAR CODE per table below

[xx] = WEEK number

FREQUENCY in MHz (3 digits after decimal point)

MODEL NUMBER

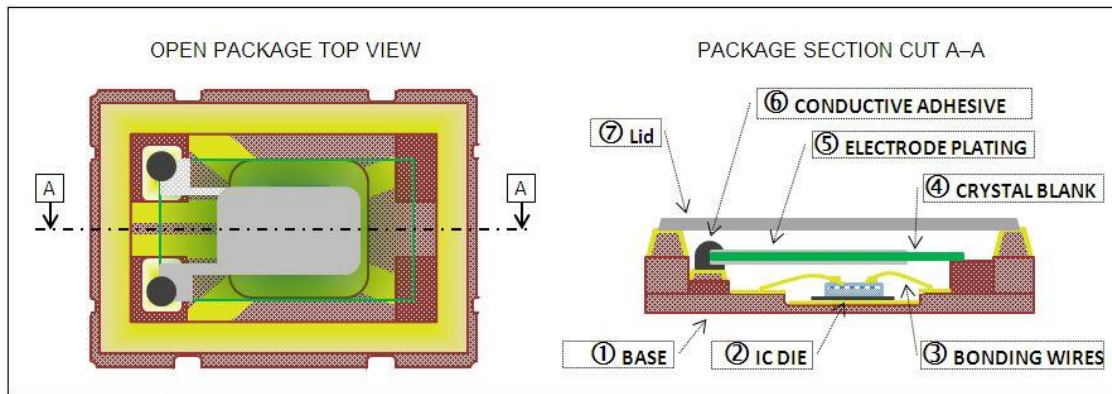
| YEAR | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| CODE | K | L | M | N | O | P | Q | R | S | T | U |

4. ENVIRONMENTAL COMPLIANCE INFORMATION

The product consists of the following parts and materials:

| NO. | PART | MATERIAL | REMARKS |
|-----|---------------------|----------------------------|-----------------------|
| 1 | BASE (PACKAGE) | Ceramic (Al_2O_3) | Terminals gold plated |
| 2 | IC DIE | Silicon (SiO_2) | Semiconductor die |
| 3 | BONDING WIRES | Gold (Au) | Pure metal |
| 4 | CRYSTAL BLANK | Quartz (SiO_2) | Synthetic material |
| 5 | ELECTRODE PLATING | Silver (Ag) | Pure metal |
| 6 | CONDUCTIVE ADHESIVE | Silver filled silicon type | Conductive cement |
| 7 | LID (COVER) | Kovar (FeNiCo alloy) | Metal alloy |

For more detail please refer to Material Declaration Sheet (MDS).



▪ RoHS COMPLIANCE

We can certify herewith that the product is fully RoHS compliant according to the “DIRECTIVE 2002/95/EC OF THE EUROPEAN COUNCIL OF 27. JANUARY 2003 ON THE RESTRICTION OF THE USE OF CERTAIN HAZARDOUS SUBSTANCES” in electrical and electronic equipment (RoHS) and its amendments.

No exemptions are applicable for this product.

▪ RoHS II COMPLIANCE

The draft COM(2008) 809/4 by Commission of the European Communities proposes 4 new substances in the next generation of RoHS Directive. The product is fully compliant to **RoHS II** as well.

▪ HALOGEN FREE

We can certify that the products are being Halogen-Free per IEC 61249-2-21:2003.

▪ REACH (SVHC) COMPLIANCE

We can certify that the product does not contain substances (SVHC) listed in REACH, Registration, Evaluation, Authorization and Restriction of Chemicals, a European Community Regulation on chemicals and their safe use (Regulation (EC) No 1907/2006) entered into force on June 1st 2007.

▪ JIG-101 Level A & B COMPLIANCE

Declarable substances per **Table A of Joint Industry Guide JIG-101** are NOT being added intentionally into the product, based on the material declarations and certifications provided by our suppliers we can confirm that substances per Table A do not exceed the specified threshold levels and / or being intentionally added.

We can declare that the product is **COMPLIANT to JIG-101 Level A**.

Certain declarable substances per **Table B of Joint Industry Guide JIG-101** are being added intentionally and used on purpose in various ways, product is **NOT compliant**.

▪ PFOS / PFOA FREE

We can certify that the products are being FREE of any PFOS's and PFOA's .

▪ ELECTROSTATIC DISCHARGE (ESD) SENSITIVITY

This product is sensitive to ELECTROSTATIC DISCHARGE (ESD), precautions for handling and storage shall be applied based on suggested internal standards listed below.

(JEITA EIAJ ED-4701 / JSD22 / ANSI-ESD-S20-20 / IEC 61000-4-2)

▪ **MOISTURE SENSITIVITY (MSL) CLASSIFICATION [J-STD-020C]**

This product in a hermetically sealed package does NOT fall under the classification of moisture sensitivity per above stated standard (Standard is for non-hermetically sealed components).

If customers system requires an entry in this regard we suggest to use LEVEL 1.

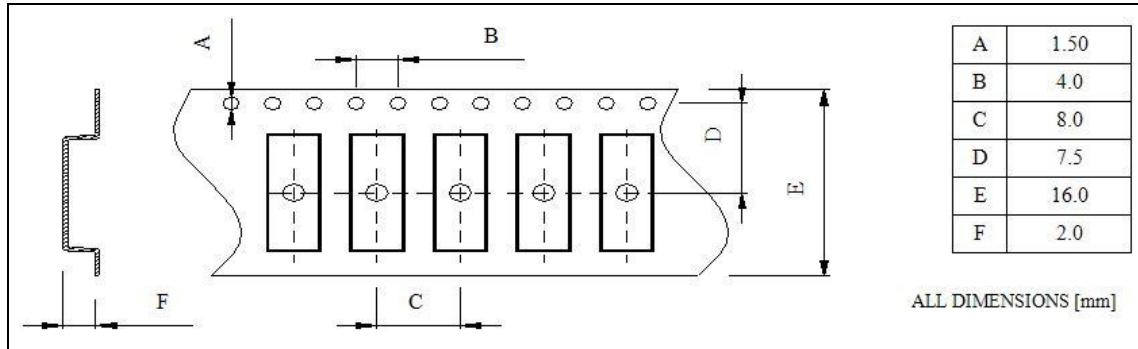
5. RELIABILITY TEST INFORMATION

| NO. | TEST ITEM | TEST CONDITIONS | REFERENCE |
|-----|---|---|--------------|
| 1 | High Temperature Storage | Temperature: 125°C ±10°C Time: 1000 ±24 Hours | MIL-STD-883E |
| 2 | Temperature Cycling | Temperature 1: -55°C±10°C Temperature 2: 125°C±10°C Temperature change between T1 and T2 at soonest Run 10 cycles, maintain T1 and T2 30minutes each in one cycle | MIL-STD-883E |
| 3 | Solder Heat Resistance | Pre-heat: 125°C 60~120 Seconds Solder Temperature: 260°C±10°C Time: 5 Seconds | MIL-STD-202F |
| 4 | Drop Test | 3 Times Free Fall from 75cm height onto 3cm thick hard wood board | MIL-STD-202F |
| 5 | High Temperature, High Humidity Storage | Temperature: 40°C ± 5°C Relative Humidity: 90% ± 95% Time: 1344 ± 24Hours | MIL-STD-202F |
| 6 | Steam Aging | Temperature: 97°C Time: 8 Hours 230°C solder pot to check solderability | MIL-STD-883E |
| 7 | Solderability | Dip in flux 5~10 seconds Temperature: 230°C±10°C Time: 5 Seconds | MIL-STD-883E |
| 8 | Aging | Temperature: 85°C±5°C Time: 250 ±12 Hours | MIL-STD-202F |
| 9 | Thermal Shock | Temperature 1: -55°C±10°C Temperature 2: 125°C±10°C Temperature change between T1 and T2: 5 seconds 10 cycles, maintain T1 and T2 for 30 minutes each in one cycle | MIL-STD-883E |
| 10 | Vibration | Frequency Range: 10Hz~1000Hz Amplitude: 1.5mm 40mins in each direction, total 120mins | MIL-STD-202F |

6. PACKAGING INFORMATION

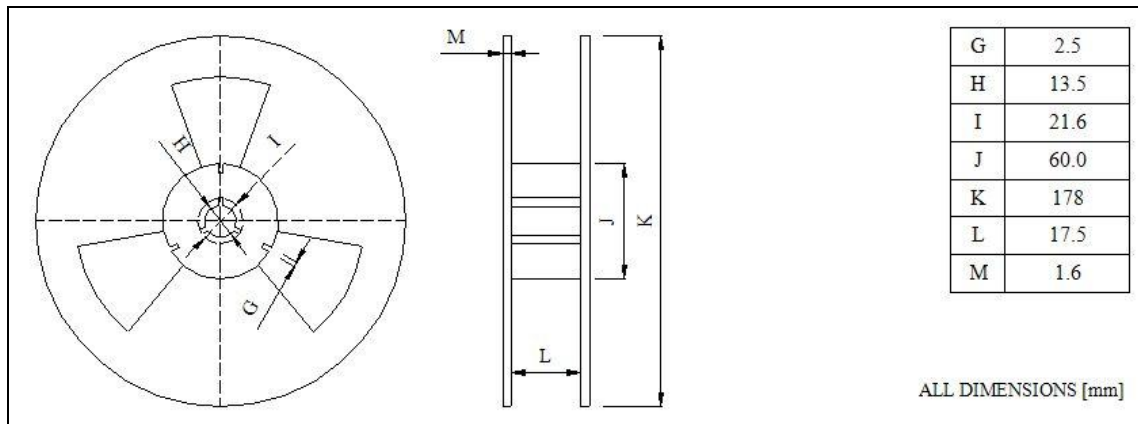
ALL NON-SPECIFIED DIMENSIONS AND T&R PARAMETERS ARE IN COMPLIANCE TO EIA-481.

▪ CARRIER TAPE



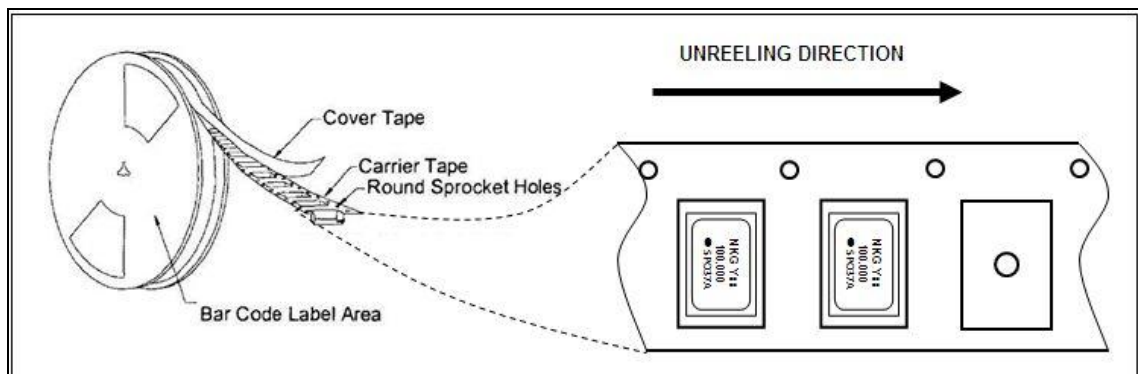
▪ REEL

QTY per reel: 1,000pcs



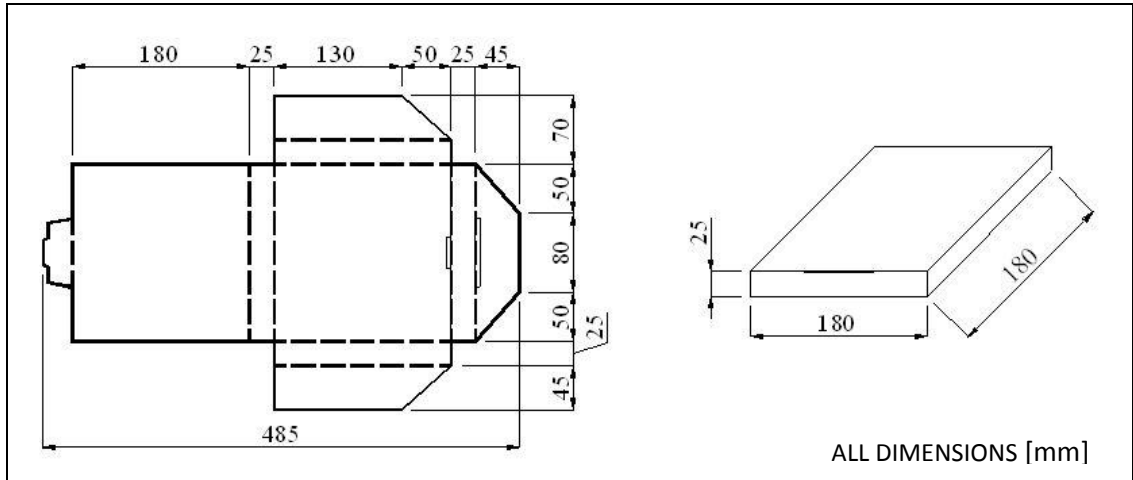
▪ UNREELING AND PRODUCT ORIENTATION

Quartz crystal oscillators are polarized components; therefore **PIN 1** is identified with a **DOT**. Orientation in T&R as shown below, PIN 1 and therefore the marking is oriented as shown.



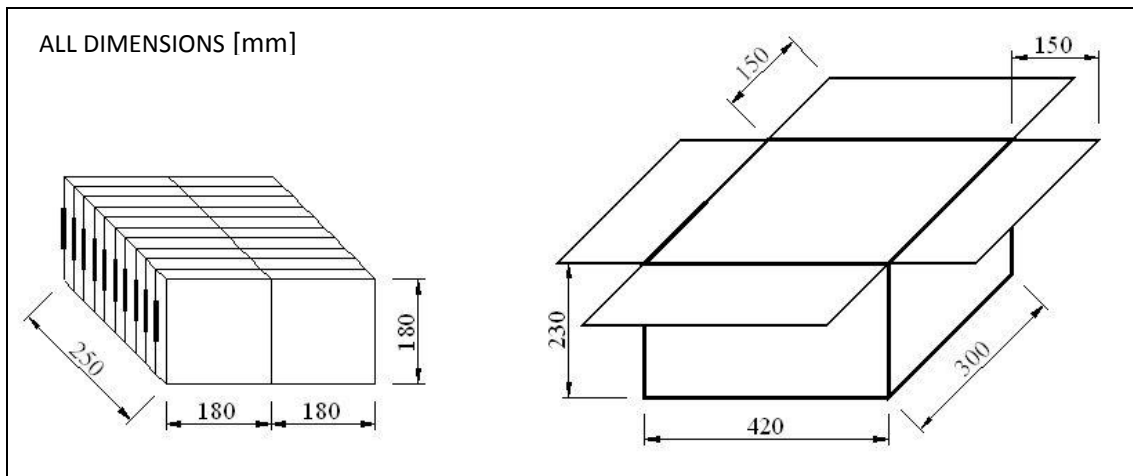
▪ **INNER BOX (Pizza box)**

QTY per box: 1 reel



▪ **CARTON**

QTY per carton: 20 Inner boxes (Pizza boxes)



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