### SPECIFICATION

**Customer:** SANKYOKU ELECTRONICS (HK) LTD.

<table>
<thead>
<tr>
<th>Item:</th>
<th>Quartz Crystal Controlled Oscillators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>NT7050BC</td>
</tr>
<tr>
<td>Nominal Frequency:</td>
<td>40.000 MHz</td>
</tr>
<tr>
<td>Customer’s Spec. No.:</td>
<td>---</td>
</tr>
<tr>
<td>NDK Spec. No.:</td>
<td>NCS5176B</td>
</tr>
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</table>

**Revision Record**

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date</th>
<th>Items</th>
<th>Contents</th>
<th>Approved</th>
<th>Checked</th>
<th>Drawn</th>
</tr>
</thead>
</table>

NIHON DEMPA KOGYO CO., LTD.

Form P-1E
This is specification of temperature compensated crystal oscillator.

1. Customer’s Spec. No. : ---
2. NDK Spec. No. : NCS5176B
3. Type : NT7050BC
4. External Dimension : ETD14B-01521

5. Rating
   5.1 Nominal Frequency \( f_{\text{nom}} \)
       40.000 MHz
   5.2 Supply Voltage \( V_{\text{CC}} \)
       DC+3.3 V±5 %
   5.3 Output Load Condition \( C_L \)
       15 pF±10 %
   5.4 Operating Temperature Range \( T_{\text{opr}} \)
       -40 °C to +105 °C
   5.5 Storage Temperature Range \( T_{\text{str}} \)
       -55 °C to +125 °C

6. Electrical Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Condition</th>
<th>Spec. Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Current Consumption</td>
<td>I_{\text{CC}}</td>
<td>-</td>
<td>-</td>
<td>10 mA</td>
</tr>
<tr>
<td>6.2 Overall Frequency Tolerance</td>
<td>Total of 6.2.1 to 6.2.5</td>
<td>-4.6</td>
<td>+4.6 ppm</td>
<td></td>
</tr>
<tr>
<td>6.2.1 Frequency Tolerance</td>
<td>\Delta f/f_{\text{nom}}</td>
<td>(*)1</td>
<td>-</td>
<td>ppm</td>
</tr>
<tr>
<td>6.2.2 Frequency/Temperature Characteristics</td>
<td>\Delta f/f</td>
<td>-40 °C to +105 °C (*2)</td>
<td>-0.1</td>
<td>+0.1 ppm</td>
</tr>
<tr>
<td>6.2.3 Frequency/Voltage Coefficient</td>
<td>\Delta f/f</td>
<td>DC+3.3 V±5 % (*3)</td>
<td>-</td>
<td>ppm</td>
</tr>
<tr>
<td>6.2.4 Frequency/Load Coefficient</td>
<td>\Delta f/f</td>
<td>15 pF±10 % (*3)</td>
<td>-</td>
<td>ppm</td>
</tr>
<tr>
<td>6.2.5 Long-Term Frequency Stability</td>
<td>\Delta f/f</td>
<td>15 years (*4)</td>
<td>-</td>
<td>ppm</td>
</tr>
<tr>
<td>6.3 Output</td>
<td>CMOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.1 Output Voltage (Square)</td>
<td>( V_{\text{OH}} )</td>
<td>-</td>
<td>90 % ( V_{\text{CC}} )</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>( V_{\text{OL}} )</td>
<td>-</td>
<td>-</td>
<td>10 % ( V_{\text{CC}} )</td>
</tr>
<tr>
<td>6.3.2 Symmetry</td>
<td>SYM</td>
<td>50 % ( V_{\text{CC}} )</td>
<td>40</td>
<td>60 %</td>
</tr>
<tr>
<td>6.3.3 Rise Time</td>
<td>( t_r )</td>
<td>10 % to 90 % ( V_{\text{CC}} )</td>
<td>-</td>
<td>8 ns</td>
</tr>
<tr>
<td>6.3.4 Fall Time</td>
<td>( t_f )</td>
<td>90 % to 10 % ( V_{\text{CC}} )</td>
<td>-</td>
<td>8 ns</td>
</tr>
<tr>
<td>6.4 Enable/Disable Function</td>
<td>Open or Min. 70 % ( V_{\text{CC}} )</td>
<td>Enable</td>
<td>Max. 30 % ( V_{\text{CC}} )</td>
<td>Enable</td>
</tr>
</tbody>
</table>

NIHON DEMPA KOGYO CO., LTD.
(*1) \( \Delta f_{\text{nom}} \): Frequency shift at \( T = +25 \pm 2 \, ^{\circ}C, V_{CC} = +3.3 \, V, C_L = 15 \, \text{pF} \) from nominal frequency (\( f_{\text{nom}} \)).

(*2) \( \Delta f / f \): Frequency shift from the reference frequency at \( (F_{\text{max}} + F_{\text{min}}) / 2 \).

(*3) \( \Delta f / f \): Frequency shift from the reference frequency at \( T = +25 \pm 2 \, ^{\circ}C, V_{CC} = +3.3 \, V, C_L = 15 \, \text{pF} \).

(*4) \( \Delta f / f \): Frequency shift from the reference frequency at \( T = +25 \pm 2 \, ^{\circ}C, V_{CC} = +3.3 \, V, C_L = 15 \, \text{pF} \), after 24 h operation.

7. Test circuit

![Test Circuit Diagram]

\( C_L = 15 \, \text{pF} \) including impedance of probe and jig.

**Fig.1 Test Circuit**

8. Environmental Conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1 Vibration Test</td>
<td>IEC60068-2-6, test Fc 10 to 500 Hz, 98.1 m/s², 2 hours, 3 directions.</td>
<td>After following test, Complies with all items of electrical characteristic specification.</td>
</tr>
<tr>
<td>8.2 Shock Test</td>
<td>IEC60068-2-27, test Ea 981 m/s², 6 ms, Half Sine, 3 bumps, 6 directions.</td>
<td></td>
</tr>
</tbody>
</table>

9. Marking Drawing

ETH11B-00685

10. Moisture Sensitivity Level

Level 3 (Compliant with J-STD-020)

11. Packing

ETK17B-00436

12. Notes on use

12.1 Even if the appearance color etc. of the product differs by purchasing the component parts by more than two companies, there is no influence on the characteristics and reliability.

12.2 IN THE CASE OF THE FOLLOWING ITEMS, WE ARE NOT RESPONSIBLE FOR WARRANTY / COMPENSATION.

(1) WHEN PRODUCTS OF THIS SPECIFICATION ARE USED FOR EQUIPMENT RELATED TO HUMAN LIFE OR PROPERTY, IT IS THE RESPONSIBILITY OF THE CUSTOMER TO CONFIRM THE INFLUENCE ON THIS PRODUCT AND EQUIPMENT TO BE USED BEFOREHAND, CONDUCT NECESSARY SAFETY DESIGN (INCLUDING REDUNDANT DESIGN, MALFUNCTION PREVENTION DESIGN, etc.), AND PLEASE USE IT AFTER SECURING SUFFICIENT SAFETY OF EQUIPMENT.

NIHON DEMPA KOGYO CO., LTD.

Form P-3E
1. SAFETY-RELATED EQUIPMENT SUCH AS AUTOMOBILES, TRAINS, SHIPS, etc., OR EQUIPMENT DIRECTLY INVOLVED IN OPERATION
2. AIRCRAFT EQUIPMENT
3. SPACE EQUIPMENT
4. MEDICAL EQUIPMENT
5. MILITARY EQUIPMENT
6. DISASTER PREVENTION / CRIME PREVENTION EQUIPMENT
7. TRAFFIC LIGHT
8. OTHER EQUIPMENT REQUIRING THE SAME PERFORMANCE AS THE BOVE-MENTIONED EQUIPMENT

(2) IN CASES WHERE IT IS NOT INDICATED IN THE REQUESTED STANDARD AND IS USED UNDER CONDITIONS OF USE (INCLUDING CIRCUIT MARGIN etc.) THAT CAN NOT BE PREDICTED AT THE PRODUCTION STAGE.

(3) WHEN USING ULTRASONIC WELDING MACHINE. (THERE IS A POSSIBILITY THAT THE CHARACTERISTIC DEGRADATION IS CAUSED BY THE RESONANCE PHENOMENON OF THE PIEZOELECTORIC MATERIAL. (EXAMPLE; CRYSTAL PIECE))
WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS’ PROCESS.
SO, PLEASE SUFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE ULTRASONIC WELDING MACHINE.

(4) USING RESIN MOLD MAY AFFECT THE PRODUCT CHARACTERISTIC.
P LEASE MAKE SURE TO TELL OUR SALES CONTACT WHEN YOU USE RESIN MOLD. WE WILL PERFORM INDIVIDUAL CORRESPONDENCE ABOUT A DELIVERY SPECIFICATION AND AN EVALUATION METHOD.
IN ADDITION, IF YOU USE RESIN MOLD WITHOUT CONTACTING US, AND CAUSES DAMAGES AGAINST A CUSTOMER OR A THIRD PARTY, WE WILL NOT BE LIABLE FOR THE DAMAGES AND OTHER RESPONSIBILITIES BECAUSE WE CONSIDER IT IS UNDER SELF-RESPONSIBILITY USING RESIN MOLD.
WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS’ PROCESS. PLEASE SUFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE RESIN MOLD.

(5) WHEN PERFORMING IMPROPER HANDLING THAT EXCEEDS THE GUARANTEED RANGE.

12.3 This product cannot be used for automotive applications.
We have other products available for automotive applications so please contact us.

13. Notes on storage
13.1 When storing the product in high temperature and high humidity condition for a long time, product characteristics (solderability etc.) and packaging condition may be deteriorated. Please store product at temperature + 5 °C ~ + 35 °C, humidity 85 % RH or less. The product is an electronic component, so please do not storage and use, under a dewing state.
13.2 The product storage deadline is 12 months after delivery in unopened state. Please use within storage deadline. If you exceed storage deadline, please check the product characteristic etc, please use.

14. Other Requests
14.1 Please use this specification only for confirmation of the specification of this product.
14.2 If there is a change request, please contact within three weeks from issue date. If there is no communication, we will deliver the product under the contents of this specification. In addition, if the product delivery date is within 3 weeks and there is a change request, we will consult the processing separately.
14.3 NOTES THAT ARE DESCRIBED IN THIS DOCUMENT, IF YOU DID NOT COMPLY WITH THE PROHIBITIONS, AND OTHER PLEASE, INCLUDING THE FAILURE CORRESPONDENCE OR COMPENSATION OR DAMAGES, WE CAN NOT ASSUME THE RESPONSIBILITY, PLEASE UNDERSTAND.
15. Prohibited items

Be sure to use the product under the following conditions. Otherwise, the characteristics deterioration or destruction of the product may result.

(1) Reflow soldering heat resistance
   - Peak temperature: 260 °C /10 s
   - Heating: 225 °C or higher/30 s
   - Preheating: 150 °C to 180 °C /120 s
   - Reflow passage times: twice
   - Please do not reflow the board upside down after mounting them.
     (The products themselves or their covers may fall off.)

(2) Manual soldering heat resistance
   - Press a soldering iron of 350 °C on the terminal electrode for five seconds (twice).

(3) Washing
   - This product does not correspond to rinsing.
*1 Please do not connect with terminal.
*2 Please connect a 0.01 uF bypass capacitor near the VCC terminal.
### Date of Revise

<table>
<thead>
<tr>
<th>Date</th>
<th>Charge</th>
<th>Approved</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

### Charge

- **Date**: 16. Jul. 2019
- **Name**: N. Sekine
- **Third Angle Projection**: Dimension: mm
- **Tolerance**: -
- **Scale**: -

### Reason

- **Drawn**: 16. Jul. 2019
- **Designed**: 16. Jul. 2019
- **Checked**: 16. Jul. 2019
- **Approved**: 16. Jul. 2019

### Marking Drawing

**ETH11B-00685**

NIHON DEMPA KOGYO CO., LTD.

---

**Crystal Lot No.**

**Dot Mark**

**Manufacture's symbol mark**

- **1** Type
- **2** Nominal frequency (5 digits, a unit (MHz) is not written)
- **3** Oscillator Lot No.

**Serial No. (2 digits)**

**Month Code (see Table)**

**Year Code (Last one digit)**

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>Month Code</td>
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<td>5</td>
<td>6</td>
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<td>8</td>
<td>9</td>
<td>O</td>
<td>N</td>
<td>D</td>
</tr>
</tbody>
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* **Dot Mark**
  - Manufacture's symbol mark

* **Crystal Lot No.**

* **Serial No. (2 digits)**

* **Month Code (see Table)**

* **Year Code (Last one digit)**

---

**Oscillator Lot No.**

**Serial No. (2 digits)**

**Month Code (see Table)**

**Year Code (Last one digit)**

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<td>D</td>
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</table>

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**Nominal frequency (5 digits, a unit (MHz) is not written)**

**Type**

---

**NIHON DEMPA KOGYO CO., LTD.**

Form M-1
Top cover tape

Embossed carrier tape

<table>
<thead>
<tr>
<th>Embossed carrier tape</th>
<th>Top cover tape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>PS</td>
</tr>
<tr>
<td></td>
<td>PET+PE+Adhesive layer</td>
</tr>
<tr>
<td>Disposition</td>
<td>Antistatic</td>
</tr>
<tr>
<td></td>
<td>Antistatic</td>
</tr>
</tbody>
</table>

NIIHON DEMP A KOGYO CO., LTD.
Materials: PS + Carbon
Disposition: Conductive

Date of Revise | Charge | Approved | Reason
---|---|---|---
A

<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>Third Angle Projection</th>
<th>Tolerance</th>
<th>Scale</th>
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<tbody>
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<td>Drawn</td>
<td>11.May.2016</td>
<td>N.Sekine</td>
<td>Dimension:mm</td>
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<tr>
<td>Checked</td>
<td>11.May.2016</td>
<td>A.Nakamura</td>
<td>Packing</td>
<td>ETK17B-00436 (2/4)</td>
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<tr>
<td>Approved</td>
<td>11.May.2016</td>
<td>T.Matsumoto</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NIHON DEMPA KOGYO CO., LTD.
Tape break force, peel strength and angle

Required setting:
- Tape break force: Min 10 N
- Top cover tape strength: Min 10 N
- Top cover tape peel force: 0.1-1.3 N (0.1-1.0 for 8 mm carrier tapes), at a peel speed of 300 +/-10 mm/min.

Angle between the top cover tape and the direction of feed during peel off: 165-180°

The cover tapes not extend over the edge of the carrier tape or cover any part of the sprocket holes.

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<td>Packing</td>
<td>ETK17B-00436 (3/4)</td>
</tr>
<tr>
<td>Approved</td>
<td>T.Matsumoto</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Aluminum bag
φ180 reel
Pasteboard
Shock pad

Outer box

Label

Packing ETK17B-00436 (4/4)

Date of Revise | Charge | Approved | Reason
--- | --- | --- | ---
A | | | |

Drawn 11.May.2016 | N.Sekine | | |
Designed 11.May.2016 | N.Sekine | | |
Checked 11.May.2016 | A.Nakamura | | |
Approved 11.May.2016 | T.Matsumoto | | |

NIHON DEMPA KOGYO CO., LTD.