HELICAL FILTERS
for Communications Equipment

- Car telephone
- Two way radio
- Paging system
- Amateur radio equipment
- Satellite TV receivers
- Measuring instruments
HELI CAL FILTERS
for Communications Equipment

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For Use in—
- Car telephone.
- Two way radio.
- Paging system.
- Amateur radio equipment.
- Satellite TV receivers.
- Measuring instruments.

<table>
<thead>
<tr>
<th>Series</th>
<th>Resonator</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>5HW</td>
<td>Two</td>
<td>650 – 1500MHz</td>
</tr>
<tr>
<td>5HT</td>
<td>Three</td>
<td>650 – 1500MHz</td>
</tr>
<tr>
<td>7HW</td>
<td>Two</td>
<td>350 – 1000MHz</td>
</tr>
<tr>
<td>7HT</td>
<td>Three</td>
<td>350 – 1000MHz</td>
</tr>
<tr>
<td>HRW</td>
<td>Two</td>
<td>350 – 520MHz</td>
</tr>
<tr>
<td>HRQ</td>
<td>Four</td>
<td>350 – 520MHz</td>
</tr>
<tr>
<td>CBW</td>
<td>Two</td>
<td>130 – 220MHz</td>
</tr>
<tr>
<td>CBT</td>
<td>Three</td>
<td>130 – 220MHz</td>
</tr>
</tbody>
</table>

Specifications in this catalog are subject to change without notice.
Please confirm when ordering.
5HW and 5HT Series

The 5HW and 5HT Series Helical Filters are designed for use in 0.65 to 1.5GHz frequency range. The filters are most suited for use in cordless phones, car radiophones, amateur radio sets and other equipment used in the UHF band.

FEATURES
- Miniature in size with low profile.
- Two types, 5HW (two pole) and 5HT (three pole) available.
- Available for coverage in the 0.65 to 1.5GHz.
- Simple circuit design.
- Adjustable core used in capacitance variation.
- High cost-performance characteristic.
- Superior environmental and mechanical characteristics.

APPLICATIONS
- In pager communications equipment and car radio-telephones.
- In measuring instruments.

PHYSICAL DIMENSIONS (Unit = mm)

5HW TYPE

5HT TYPE
**ELECTRICAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Item</th>
<th>5HW</th>
<th>5HT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Frequency</td>
<td>959 MHz</td>
<td>959 MHz</td>
</tr>
<tr>
<td>Bandwidth (1dB)</td>
<td>18 MHz Min</td>
<td>25 MHz Min</td>
</tr>
<tr>
<td>Selectivity</td>
<td>+100MHz 21dB Min</td>
<td>+100MHz 35dB Min</td>
</tr>
<tr>
<td></td>
<td>-100MHz 24dB Min</td>
<td>-100MHz 40dB Min</td>
</tr>
<tr>
<td>Ripple</td>
<td>1dB Max</td>
<td>1dB Max</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>3.5dB Max</td>
<td>4dB Max</td>
</tr>
<tr>
<td>Impedance</td>
<td>50Ω</td>
<td>50Ω</td>
</tr>
</tbody>
</table>

**STANDARD TEST CIRCUITS**

- **5HW**

  "A" CONNECTIONS

  "F" CONNECTIONS

- **5HT**

  "A" CONNECTIONS

  "F" CONNECTIONS

**5HW-5HT Notes**

- Cage lugs should be grounded.
- Connection will be concerned with bandwidth.
ENVIRONMENTAL & MECHANICAL CHARACTERISTICS (Typical values)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Center Frequency (1 dB)</th>
<th>Bandwidth (1 dB)</th>
<th>Selectivity</th>
<th>Ripple</th>
<th>Insertion Loss</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>At Low Temperature</td>
<td>±0.05%</td>
<td>+1.5%</td>
<td>+1%</td>
<td>-15%</td>
<td>±0.5dB</td>
<td>-25°C, 96hr</td>
</tr>
<tr>
<td>At High Temperature</td>
<td>+0.1%</td>
<td>+0.05%</td>
<td>+1%</td>
<td>-1.5%</td>
<td>±0.5dB</td>
<td>+80°C, 96hr</td>
</tr>
<tr>
<td>Temperature Cycling</td>
<td>±0.1%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5dB</td>
<td>5 cycles at 80°C to -25°C</td>
</tr>
<tr>
<td>Humidity Test</td>
<td>-0.2%</td>
<td>-3%</td>
<td>-4.5%</td>
<td>-1%</td>
<td>±0.5dB</td>
<td>500 hr at +40°C, 90-95% R.H.</td>
</tr>
<tr>
<td>Temperature Test +60°C</td>
<td>-0.1%</td>
<td>-1.5%</td>
<td>-1.5%</td>
<td>+1%</td>
<td>±0.5dB</td>
<td>-10°C to 25°C</td>
</tr>
<tr>
<td>Temperature Test -10°C</td>
<td>+0.5%</td>
<td>+1.5%</td>
<td>+1.5%</td>
<td>-0.5%</td>
<td>±0.5dB</td>
<td>+60°C</td>
</tr>
<tr>
<td>Vibration Test</td>
<td>±0.05%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5dB Note (1)</td>
<td>Note (1)</td>
</tr>
<tr>
<td>Shock Test</td>
<td>+0.05%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5dB Note (2)</td>
<td>Note (2)</td>
</tr>
</tbody>
</table>

Notes:
(1) At 10-55Hz, 1.5mm amplitude for 2hr in each of 3 orientations.
(2) 100G, 3 times in each of 3 orientations.

TYPICAL FREQUENCY RESPONSE

5HW·5HT, for 1.28GHz (1.25GHz) Amateur Radio Use
Sample No. 367MN—113F (5HW), No. 384MN—125F (5HT)
5HW ENVIRONMENTAL CHARACTERISTICS

CENTER FREQUENCY

BANDWIDTH

SELECTIVITY, $f_0 + 80$ MHz

SELECTIVITY, $f_0 - 80$ MHz
7HW and 7HT Series

The 7HW and 7HT Series Helical Filters are designed for use in 350 to 1000MHz frequency range. Due to their small size, the filters are most suited for incorporation in the high frequency stage in DBS, TVRO, special service and general purpose radio-telephones.

FEATURES

- Two types, 7HW (two pole) and 7HT (three pole) available.
- Wideband coverage, 350 to 1000MHz.
- High Q and low insertion loss.
- Simplifies circuit design.
- Adjustable core (screw type) used in capacitance variation.
- High cost-performance characteristic.
- Superior performance with respect to environmental conditions (temperature, humidity, vibration and shock).

APPLICATIONS

- In pager, DBS, communications equipment and car radio-telephones.
- In measuring instruments.

PHYSICAL DIMENSIONS (Unit = mm)

<table>
<thead>
<tr>
<th>TYPE 7HW</th>
<th>TYPE 7HT</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Diagram of 7HW]</td>
<td>![Diagram of 7HT]</td>
</tr>
</tbody>
</table>
EXAMPLES OF ELECTRICAL CHARACTERISTICS

**TYPE 7HW**

<table>
<thead>
<tr>
<th>Item</th>
<th>Example I</th>
<th>Example II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Frequency</td>
<td>465MHz</td>
<td>855MHz</td>
</tr>
<tr>
<td>Bandwidth, at -1dB</td>
<td>8MHz Min</td>
<td>10MHz Min</td>
</tr>
<tr>
<td>Selectivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+30MHz</td>
<td>17dB Min</td>
<td>14dB Min</td>
</tr>
<tr>
<td>-30MHz</td>
<td>18dB Min</td>
<td>16dB Min</td>
</tr>
<tr>
<td>Ripple</td>
<td>1dB Max</td>
<td>1dB Max</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>2.5dB Max</td>
<td>3dB Max</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω</td>
<td>50 Ω</td>
</tr>
</tbody>
</table>

**TYPE 7HT**

<table>
<thead>
<tr>
<th>Item</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Frequency</td>
<td>855MHz</td>
</tr>
<tr>
<td>Bandwidth, at -1dB</td>
<td>12MHz Min</td>
</tr>
<tr>
<td>Selectivity</td>
<td></td>
</tr>
<tr>
<td>+30MHz</td>
<td>18dB Min</td>
</tr>
<tr>
<td>-30MHz</td>
<td>22dB Min</td>
</tr>
<tr>
<td>Ripple</td>
<td>1dB Max</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>5dB Max</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω</td>
</tr>
</tbody>
</table>

EXAMPLES IN APPLICATION

```
ANT BPF → RF AMP → RF BPF → 1st Mix → 1st IF → 2nd Mix → 2nd IF → DET → PLL SYSTEM
```

REMARKS

*Recommended Toko products are given below for use together with the 7HW or 7HT Series.*

<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st IF Circuit, 20 – 60MHz</td>
<td>Coil : Type 7KL or 7KM</td>
</tr>
<tr>
<td>2nd IF Circuit, 455kHz</td>
<td>Coli : Type 7PL or 7P</td>
</tr>
<tr>
<td>FM Detector Circuit</td>
<td>IC : TK 10420D</td>
</tr>
<tr>
<td></td>
<td>Detector coil 7NP : 233LE-1203Z</td>
</tr>
<tr>
<td></td>
<td>Phase coil 7BS : 283AS-102K</td>
</tr>
<tr>
<td></td>
<td>DC-DC convertor : cp-1082</td>
</tr>
</tbody>
</table>
PERSONAL SIGNALLING EQUIPMENT

7HW : 252HN-1423 F

Test Circuits

(BOTTOM VIEW)

BANDWIDTH CHARACTERISTIC

ATTENUATION (dB)

fo : 904 MHz
IL : 1 dB

OFF-RESONANCE FREQUENCY (MHz)

SELECTIVITY

ATTENUATION (dB)

Return Loss

OFF-RESONANCE FREQUENCY (MHz)

BANDWIDTH CHARACTERISTIC

ATTENUATION (dB)

fo : 904 MHz
IL : 2.5 dB

OFF-RESONANCE FREQUENCY (MHz)

SELECTIVITY

ATTENUATION (dB)

OFF-RESONANCE FREQUENCY (MHz)
TOKO

7HW-7HT  Helical Filters for Communications Equipment  7HW-7HT

TYPICAL CHARACTERISTICS FOR MCA RADIOS (Multi channel access radio system in Japan)

ANTENNA CIRCUIT FILTER  7HW:252HN-1253

BANDWIDTH CHARACTERISTIC

SELECTIVITY

RF CIRCUIT FILTER  7HT:302HN-004

BANDWIDTH CHARACTERISTIC

SELECTIVITY

LOCAL OSC. FILTER  7HW:252HN-122B

BANDWIDTH CHARACTERISTIC

SELECTIVITY
7HW ENVIRONMENTAL CHARACTERISTICS

**CENTER FREQUENCY**

**BANDWIDTH**

**SELECTIVITY, \( f_0 +30 \text{MHz} \)**

**SELECTIVITY, \( f_0 -30 \text{MHz} \)**
HRW and HRQ Series

The HRW and HRQ Series are helical filters developed specially for use in the 350 to 520MHz frequency range. The helical filters have superior characteristics in the UHF range and are being widely used. Two series, HRW (two pole) and HRQ (four pole) are recommended for incorporation in special (marine, mobile) and in amateur communications equipment.

FEATURES

- Used in multi-stage circuits.
- Resin-sealed coil section for superior performance with respect to environmental conditions.
- High Q figure, 700~1000, and low insertion loss.

APPLICATIONS

- In UHF communications equipment.
- In amateur radio equipment.
- In measuring instruments.

PHYSICAL DIMENSIONS (Unit=mm)

<table>
<thead>
<tr>
<th>TYPE HRW</th>
<th>TYPE HRQ</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="HRW Diagram" /></td>
<td><img src="image2" alt="HRQ Diagram" /></td>
</tr>
</tbody>
</table>

---

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## ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>HRW (231MT-1001A)</th>
<th>HRQ (232MT-1001A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Frequency</td>
<td>HRW</td>
<td>435MHz</td>
<td>435MHz</td>
</tr>
<tr>
<td>Bandwidth, at 3dB</td>
<td>HRQ</td>
<td>12MHz Min</td>
<td>11MHz</td>
</tr>
<tr>
<td>Attenuation</td>
<td>HRW</td>
<td>20dB Min at +30MHz</td>
<td>25dB Min at +15MHz</td>
</tr>
<tr>
<td></td>
<td>HRQ</td>
<td>20dB Min at -30MHz</td>
<td>25dB Min at -15MHz</td>
</tr>
<tr>
<td>Ripple</td>
<td>HRW</td>
<td>1.5dB Max</td>
<td>2dB Max</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>HRQ</td>
<td>2.5dB Max</td>
<td>4dB Max</td>
</tr>
<tr>
<td>Impedance</td>
<td>HRW</td>
<td>50Ω</td>
<td>50Ω</td>
</tr>
<tr>
<td></td>
<td>HRQ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## TEST CIRCUITS (BOTTOM VIEW)

![Test Circuits Diagram]

Notes: 1. Case lugs must be grounded.

## ENVIRONMENTAL & MECHANICAL (Typical values)

### TYPE HRW

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating Limits</th>
<th>Center Frequency</th>
<th>Bandwidth</th>
<th>Selectivity</th>
<th>Ripple</th>
<th>Insertion Loss</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Within ± 0.3%</td>
<td>Within ± 15%</td>
<td>Within ± 4dB</td>
<td>Within ± 0.7dB</td>
<td>Within ± 0.7dB</td>
<td>96h at −25°C</td>
</tr>
<tr>
<td>Low Temp. Test</td>
<td>± 0.05%</td>
<td>± 6%</td>
<td>± 2dB</td>
<td>± 1dB</td>
<td>± 0.1dB</td>
<td>± 0.1dB</td>
<td>96h at +85°C</td>
</tr>
<tr>
<td>High Temp. Test</td>
<td>± 0.05%</td>
<td>± 4%</td>
<td>± 1dB</td>
<td>± 2dB</td>
<td>± 0.1dB</td>
<td>± 0.2dB</td>
<td>500h: 40° C, 90%~95% R.H.</td>
</tr>
<tr>
<td>Temp. Cycling</td>
<td>± 0.15%</td>
<td>± 7%</td>
<td>± 2dB</td>
<td>± 2dB</td>
<td>± 0.1dB</td>
<td>± 0.2dB</td>
<td></td>
</tr>
<tr>
<td>Humidity Test</td>
<td>± 0.15%</td>
<td>± 3%</td>
<td>± 2dB</td>
<td>± 2dB</td>
<td>± 0.1dB</td>
<td>± 0.1dB</td>
<td></td>
</tr>
<tr>
<td>Temp. Characteristic</td>
<td>± 0.13%</td>
<td>± 4%</td>
<td>± 2dB</td>
<td>± 2dB</td>
<td>± 0.1dB</td>
<td>± 0.5dB</td>
<td></td>
</tr>
<tr>
<td>Vibration Test</td>
<td>± 0.1%</td>
<td>± 8%</td>
<td>± 1dB</td>
<td>± 3dB</td>
<td>± 0.1dB</td>
<td>± 0.3dB</td>
<td></td>
</tr>
<tr>
<td>Shock Test</td>
<td>± 0.12%</td>
<td>± 4%</td>
<td>± 1dB</td>
<td>± 2dB</td>
<td>± 0.1dB</td>
<td>± 0.1dB</td>
<td></td>
</tr>
</tbody>
</table>

### TYPE HRQ

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating Limits</th>
<th>Center Frequency</th>
<th>Bandwidth</th>
<th>Selectivity</th>
<th>Ripple</th>
<th>Insertion Loss</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Within ± 0.3%</td>
<td>Within ± 15%</td>
<td>Within ± 4dB</td>
<td>Within ± 1dB</td>
<td>Within ± 1dB</td>
<td>96h at −25°C</td>
</tr>
<tr>
<td>Low Temp. Test</td>
<td>± 0.12%</td>
<td>± 8%</td>
<td>± 1dB</td>
<td>± 3dB</td>
<td>± 0.3dB</td>
<td>± 0.3dB</td>
<td>96h at +85°C</td>
</tr>
<tr>
<td>High Temp. Test</td>
<td>± 0.11%</td>
<td>± 4%</td>
<td>± 2dB</td>
<td>± 3dB</td>
<td>± 0.1dB</td>
<td>± 0.2dB</td>
<td>500h: 40° C, 90%~95% R.H.</td>
</tr>
<tr>
<td>Temp. Cycling</td>
<td>± 0.15%</td>
<td>± 12%</td>
<td>± 2dB</td>
<td>± 1dB</td>
<td>± 0.3dB</td>
<td>± 0.6dB</td>
<td></td>
</tr>
<tr>
<td>Humidity Test</td>
<td>± 0.08%</td>
<td>± 5%</td>
<td>± 1dB</td>
<td>± 1dB</td>
<td>± 0.1dB</td>
<td>± 0.1dB</td>
<td></td>
</tr>
<tr>
<td>Temp. Characteristic</td>
<td>± 0.11%</td>
<td>± 4%</td>
<td>± 2dB</td>
<td>± 3dB</td>
<td>± 0.1dB</td>
<td>± 0.5dB</td>
<td></td>
</tr>
<tr>
<td>Vibration Test</td>
<td>± 0.05%</td>
<td>± 4%</td>
<td>± 2dB</td>
<td>± 3dB</td>
<td>± 0.1dB</td>
<td>± 0.2dB</td>
<td></td>
</tr>
<tr>
<td>Shock Test</td>
<td>± 0.12%</td>
<td>± 7%</td>
<td>± 1dB</td>
<td>± 2dB</td>
<td>± 0.2dB</td>
<td>± 0.2dB</td>
<td></td>
</tr>
</tbody>
</table>
SELECTIVITY CHARACTERISTICS

HRQ(232MT-1001A)

\[ f_0 = 435 \text{ MHz} \]

HRW(231MT-1001A)

\[ f_0 = 435 \text{ MHz} \]
HRW ENVIRONMENTAL CHARACTERISTICS

CENTER FREQUENCY

BANDWIDTH

SELECTIVITY, \( f_o +15\text{MHz} \)

SELECTIVITY, \( f_o -15\text{MHz} \)

RIPPLE

INSERTION LOSS
CBW and CBT Series

The CBW and CBT Series are small-sized helical filters developed for use in the 130 to 220MHz frequency range. The helical type filters have superior characteristics and are widely used in the VHF band. Double-tuned and triple-tuned types are available to meet with circuit design requirements. The units are most suited for incorporation in specialized service and amateur communications equipment.

FEATURES
- Two types, CBW (two pole) and CBT (three pole), available.
- Frequency range: 130 to 220MHz.
- High Q figure and low insertion loss.
- Simplifies circuit design.
- High cost-performance characteristic.
- Superior performance with regard to environmental conditions (temperature, humidity, vibration and shock).

APPLICATIONS
- In amateur radio communications equipment.
- In specialized service communications equipment.
- CATV

PHYSICAL DIMENSIONS (Unit=mm)

TYPE CBW

TYPE CBT
EXAMPLES OF ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>CBW</th>
<th>CBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Frequency</td>
<td></td>
<td>145MHz</td>
<td>145MHz</td>
</tr>
<tr>
<td>Bandwidth, at 1dB</td>
<td></td>
<td>3MHz</td>
<td>3MHz</td>
</tr>
<tr>
<td>Attenuation</td>
<td></td>
<td>20dB</td>
<td>28dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fo + 10MHz</td>
<td>22dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fo - 10MHz</td>
<td>50Ω</td>
</tr>
</tbody>
</table>

TEST CIRCUITS (BOTTOM VIEW)

CBW

CBT

Notes: 1. Case lugs must be grounded.

ENVIRONMENTAL & MECHANICAL (Typical values)

TYPE CBW

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating Limits</th>
<th>Center Frequency</th>
<th>Bandwidth</th>
<th>Selectivity</th>
<th>Ripple</th>
<th>Insertion Loss</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Within ±0.5%</td>
<td>Within ±15%</td>
<td>Within ±4dB</td>
<td>Within ±0.7dB</td>
<td>Within ±0.7dB</td>
<td></td>
</tr>
<tr>
<td>Low Temp. Test</td>
<td>±0.15%</td>
<td>±7%</td>
<td>±1dB</td>
<td>±6dB</td>
<td>±6dB</td>
<td>±0.3dB</td>
<td>500hr: 10°C, 99% ~ 95% R.H.</td>
</tr>
<tr>
<td>High Temp. Test</td>
<td>±0.4%</td>
<td>±7%</td>
<td>±1dB</td>
<td>±6dB</td>
<td>±6dB</td>
<td>±0.3dB</td>
<td>99hr at -25°C</td>
</tr>
<tr>
<td>Temp. Cycling</td>
<td>±0.4%</td>
<td>±5%</td>
<td>±2dB</td>
<td>±4dB</td>
<td>±4dB</td>
<td>±0.3dB</td>
<td>99hr at +65°C</td>
</tr>
<tr>
<td>Humidity Test</td>
<td>±0.4%</td>
<td>±7%</td>
<td>±2dB</td>
<td>±4dB</td>
<td>±4dB</td>
<td>±0.3dB</td>
<td>500hr: 40°C, 90% ~ 95% R.H.</td>
</tr>
<tr>
<td>Temp. Characteristic</td>
<td>±0.1%</td>
<td>±5%</td>
<td>±2dB</td>
<td>±4dB</td>
<td>±4dB</td>
<td>±0.3dB</td>
<td></td>
</tr>
<tr>
<td>Vibration Test</td>
<td>±0.2%</td>
<td>±8%</td>
<td>±1dB</td>
<td>±4dB</td>
<td>±4dB</td>
<td>±0.3dB</td>
<td></td>
</tr>
<tr>
<td>Shock test</td>
<td>±0.25%</td>
<td>±7%</td>
<td>±1dB</td>
<td>±4dB</td>
<td>±4dB</td>
<td>±0.3dB</td>
<td></td>
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</tbody>
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TYPE CBT

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<tr>
<th>Item</th>
<th>Rating Limits</th>
<th>Center Frequency</th>
<th>Bandwidth</th>
<th>Selectivity</th>
<th>Ripple</th>
<th>Insertion Loss</th>
<th>Remarks</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Within ±0.5%</td>
<td>Within ±15%</td>
<td>Within ±4dB</td>
<td>Within ±0.7dB</td>
<td>Within ±1dB</td>
<td></td>
</tr>
<tr>
<td>Low Temp. Test</td>
<td>±0.1%</td>
<td>±12%</td>
<td>±1dB</td>
<td>±2dB</td>
<td>±0dB</td>
<td>±0.4dB</td>
<td>99hr at -25°C</td>
</tr>
<tr>
<td>High Temp. Test</td>
<td>±0.3%</td>
<td>±5%</td>
<td>±2dB</td>
<td>±2dB</td>
<td>±0dB</td>
<td>±0.3dB</td>
<td>99hr at +65°C</td>
</tr>
<tr>
<td>Temp. Cycling</td>
<td>±0.3%</td>
<td>±4%</td>
<td>±2dB</td>
<td>±2dB</td>
<td>±0dB</td>
<td>±0.3dB</td>
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<tr>
<td>Humidity Test</td>
<td>±0.2%</td>
<td>±10%</td>
<td>±2dB</td>
<td>±2dB</td>
<td>±0dB</td>
<td>±0.5dB</td>
<td>500hr: 40°C, 90% ~ 95% R.H.</td>
</tr>
<tr>
<td>Temp. Characteristic</td>
<td>±0.15%</td>
<td>±6%</td>
<td>±2dB</td>
<td>±2dB</td>
<td>±0dB</td>
<td>±0.3dB</td>
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<tr>
<td>Vibration Test</td>
<td>±0.1%</td>
<td>±5%</td>
<td>±1dB</td>
<td>±1dB</td>
<td>±0dB</td>
<td>±0.3dB</td>
<td></td>
</tr>
<tr>
<td>Shock Test</td>
<td>±0.2%</td>
<td>±7%</td>
<td>±1dB</td>
<td>±2dB</td>
<td>±0dB</td>
<td>±0.3dB</td>
<td></td>
</tr>
</tbody>
</table>
ENVIRONMENTAL TEST CONDITIONS

- Shock Test: Application of 200G three times in each of three orientations
- Vibration test: Vibration in range 10 to 55Hz, 1.5mm overall amplitude, applied at rate of 10-55-10Hz per minute for 2hr in each of three orientations (total 6hr).
- High Temperature test: Exposure to 85° ±2°C in a test chamber for 12hr and then exposed to room temperature for over 1hr but less than 2hr.
- Low Temperature Test: Exposure to -25° ±2°C in a test chamber for 12hr and then exposed to room temperature for over 1hr but less than 2hr.
- Humidity Test: Exposure to 40°C, 90%-95% relative humidity for 12hr and then exposed to room temperature for over 1hr but less than 2hr.
- Temperature Cycling: Five cycles at rate of 30min at -25°C, 10min at +25°C and 30min at +85°C per cycle and exposure to ambient temperature for over 1hr but less than 2hr.
- Solderability: Terminals of the coil under test are dipped in flux at ambient temperature for 5 to 10 sec and dipped in solder at 230°C ±5°C for 2 ±0.5sec to within 1.5mm from the base plate.
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