TMX U386
SAW Filter datasheet
3.8 x 3.8 x 1.5 mm, SMD

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Features

- 433.92 MHz center frequency
- Ceramic package for Surface Mounted Technology
- Low Loss: 2.8 dB typical value within PassBand Width 433.13 to 434.71 MHz
- Maximum pulse power: 15 dBm
- No matching network required for operation at 50 Ω

Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature range (T_{stg})</td>
<td>-45</td>
<td></td>
<td>90</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature range (T_{a})</td>
<td>-40</td>
<td></td>
<td>85</td>
<td>°C</td>
</tr>
<tr>
<td>DC permissible voltage</td>
<td>0</td>
<td></td>
<td>15</td>
<td>V</td>
</tr>
<tr>
<td>Maximum pulse input power</td>
<td></td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
</tbody>
</table>

Frequency and Electrical Characteristics (Reference temperature @ 25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center frequency (f_c)</td>
<td>433.92</td>
<td></td>
<td></td>
<td>MHz</td>
</tr>
<tr>
<td>Bandwidth (BW, passband width)</td>
<td>1.58</td>
<td></td>
<td></td>
<td>MHz</td>
</tr>
<tr>
<td>Insertion loss (IL, 433.13 – 434.71 MHz)</td>
<td>2.8</td>
<td>3.9</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Amplitude ripple (433.13 – 434.71 MHz)</td>
<td>0.3</td>
<td>1.0</td>
<td></td>
<td>dB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative attenuation (relative to IL)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>From 10.00 to 350.0 MHz</td>
<td>60</td>
<td>65</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 350.0 to 393.0 MHz</td>
<td>52</td>
<td>57</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 393.0 to 408.0 MHz</td>
<td>45</td>
<td>50</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 408.0 to 415.0 MHz</td>
<td>52</td>
<td>57</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 415.0 to 425.0 MHz</td>
<td>40</td>
<td>48</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 443.5 to 454.0 MHz</td>
<td>12</td>
<td>16</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 454.0 to 475.0 MHz</td>
<td>34</td>
<td>39</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 475.0 to 650.0 MHz</td>
<td>48</td>
<td>53</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>From 650.0 to 1000.0 MHz</td>
<td>45</td>
<td>49</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Temperature coefficient of frequency</td>
<td>-30.0</td>
<td></td>
<td></td>
<td>ppm/K</td>
</tr>
<tr>
<td>Source impedance(^2) (Single ended)</td>
<td>50</td>
<td></td>
<td></td>
<td>Ω</td>
</tr>
<tr>
<td>Load impedance(^2) (Single ended)</td>
<td>50</td>
<td></td>
<td></td>
<td>Ω</td>
</tr>
</tbody>
</table>

1 Typical values are nominal performances at room temperature
2 No external matching is required

Issue: Rev 3, 9 November 2022
Model Outline, Pin Connection and Marking

<table>
<thead>
<tr>
<th>Pin</th>
<th>Connections</th>
<th>Code</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Input</td>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>1, 3</td>
<td>Input Ground</td>
<td>B</td>
<td>1.27</td>
</tr>
<tr>
<td>6</td>
<td>Output</td>
<td>C</td>
<td>0.6</td>
</tr>
<tr>
<td>5, 7</td>
<td>Output Ground</td>
<td>D</td>
<td>1.3 (1.5 max.)</td>
</tr>
<tr>
<td>4, 8</td>
<td>To be grounded</td>
<td>E</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Unit: mm

Test Circuit

50 Ω / 50 Ω Configuration
Frequency Characteristics

TYPICAL S21 RESPONSE
Recommended Reflow Soldering Profile

NOTE:
- The components shall remain within the electrical specifications after it soldered on the 1mm thickness PCB board and dipped in the solder at 260 ± 5°C during 10 ± 1 seconds.
- The components shall remain within the electrical specifications after it soldered by electric iron, solder at 350 ± 10 °C during 3~4 seconds. Recovery time: 2 ± 0.5 hour.
- Ultrasonic cleaning may cause deterioration and destruction of the component. Please avoid ultrasonic cleaning.
- Only leads of components may be soldered. Please avoid soldering another part of the component.
Tape and Reel Specifications

**TAPE DETAILS:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Code</th>
<th>Dimension</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of component hole</td>
<td>A</td>
<td>4.1</td>
<td>± 0.1</td>
</tr>
<tr>
<td>Width of component hole</td>
<td>B</td>
<td>4.1</td>
<td>± 0.1</td>
</tr>
<tr>
<td>Diameter of sprocket hole</td>
<td>D₀</td>
<td>Φ 1.5</td>
<td>± 0.1</td>
</tr>
<tr>
<td>Diameter of feed hole</td>
<td>D₁</td>
<td>Φ 1.5 min</td>
<td></td>
</tr>
<tr>
<td>Pitch of sprocket hole</td>
<td>P₀</td>
<td>4.0</td>
<td>± 0.1</td>
</tr>
<tr>
<td>Length from hole center to component center</td>
<td>P₁</td>
<td>8.0</td>
<td>± 0.1</td>
</tr>
<tr>
<td>Length from Pocket hole center to sprocket hole</td>
<td>P₂</td>
<td>4.0</td>
<td>± 0.1</td>
</tr>
<tr>
<td>Width of carrier tape</td>
<td>W</td>
<td>12.0</td>
<td>± 0.3</td>
</tr>
<tr>
<td>Width of adhesive tape</td>
<td>F</td>
<td>5.5</td>
<td>± 0.3</td>
</tr>
<tr>
<td>Gap of hold down tape and carrier tape</td>
<td>E</td>
<td>1.75</td>
<td>± 0.1</td>
</tr>
<tr>
<td>Thickness of Ebossed tape sheet</td>
<td>t₁</td>
<td>0.31 max</td>
<td></td>
</tr>
<tr>
<td>Thickness of Ebossed tape</td>
<td>t₂</td>
<td>1.7 max</td>
<td></td>
</tr>
</tbody>
</table>

**REEL DETAILS:**

- Unit: mm
- Standard Packing Quantity (SPQ) is 1000 pieces/ reel

**NOTE:**

- Unit: mm
- Standard Packing Quantity (SPQ) is 1000 pieces/ reel
## Reliability Test

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test condition / Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Shock</td>
<td>The components shall remain within the electrical specifications after being kept at the condition of heat cycle conditions: $TA=-40,^\circ C\pm3,^\circ C$, $TB=85,^\circ C\pm2,^\circ C$, $t1=t2=30\text{min}$, switch time $\leq 3\text{min}$ &amp; cycle time: $100$ times, recovery time: $2h\pm0.5h$.</td>
</tr>
</tbody>
</table>
| Temperature Storage | High Temperature Storage: The components shall remain within the electrical specifications after being kept at the $85\,^\circ C\pm2\,^\circ C$ for $500$ hours, recovery time: $2h\pm0.5h$.  
Low Temperature Storage: The components shall remain within the electrical specifications after being kept at the $-40\,^\circ C\pm3\,^\circ C$ for $500$ hours, recovery time: $2h\pm0.5h$. | |
| Humidity test     | The components shall remain within the electrical specifications after being kept at the condition of ambient temperature $60\,^\circ C\pm2\,^\circ C$, and $90\sim95\%\text{ RH}$ for $500$ hours.                                                                 |
| Drop test         | The components shall remain within the electrical specifications after random free drops $10$ times from height of $1.0\text{ meter}$ onto concrete floor, and the specimens shall meet the electrical specifications. |
| Vibration Fatigue  | The components shall remain within the electrical specifications after loaded vibration at $10\sim55Hz$, amplitude $1.5mm$, $X$, $Y$, $Z$, direction, during $2$ hours.                                                                   |
| Mechanical Shock  | The components shall remain within the electrical specifications after $1000$ shocks, acceleration $392\,m/s^2$, duration $6ms$.                                                                                         |
| Note              | As a result of the particularity of inner structure of SAW products, the components can easily be breakdown by electrostatic shock; so it’s mandatory to pay attention to ESD protect during the tests. |