APPENDIX D
Information on Piezoelectric Materials
PIEZOELECTRIC SINGLE SHEET

5H Ceramic
H4E Series

• Description
• Specifications
• Pricing

Description:
Our single layer piezoceramic sheets are available in the standard size for immediate delivery. In most cases, we can cut the sheets to size for you. Contact us for a price quote.

We recommend our Solder/Flux Kit for use when soldering wires to our single sheets.

Specifications:

<table>
<thead>
<tr>
<th>Capacitance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
</tr>
<tr>
<td>T105-H4E-602</td>
</tr>
<tr>
<td>T107-H4E-602</td>
</tr>
<tr>
<td>T110-H4E-602</td>
</tr>
</tbody>
</table>

PIEZOELECTRIC

Composition: Lead Zirconate Titanate

Material Designation: PSI-5H-S4-ENH
<table>
<thead>
<tr>
<th>Relative Dielectric Constant (@ 1 KHz)</th>
<th>K_{33}</th>
<th>3800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piezoelectric Strain Coefficient</td>
<td>d_{33}</td>
<td>650 x 10^{-12} Meters/Volt</td>
</tr>
<tr>
<td></td>
<td>d_{31}</td>
<td>-320 x 10^{-12} Meters/Volt</td>
</tr>
<tr>
<td>Piezoelectric Voltage Coefficient</td>
<td>g_{33}</td>
<td>19.0 x 10^{-3} Volt Meters/Newton</td>
</tr>
<tr>
<td></td>
<td>g_{31}</td>
<td>-9.5 x 10^{-3} Volt Meters/Newton</td>
</tr>
<tr>
<td>Coupling Coefficient</td>
<td>k_{33}</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>k_{31}</td>
<td>0.44</td>
</tr>
<tr>
<td>Polarization Field</td>
<td>Ep</td>
<td>1.5 x 10^6 Volts/Meter</td>
</tr>
<tr>
<td>Initial Depolarization Field</td>
<td>Ec</td>
<td>3.0 x 10^5 Volts/Meter</td>
</tr>
</tbody>
</table>

**MECHANICAL**

<table>
<thead>
<tr>
<th>Density</th>
<th>7800 Kg/Meter^3</th>
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</thead>
<tbody>
<tr>
<td>Mechanical Q</td>
<td>30</td>
</tr>
<tr>
<td>Elastic Modulus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_E^E_{3} 5.0 x 10^{10} Newtons/Meter^2</td>
</tr>
<tr>
<td></td>
<td>Y_E^E_{1} 6.2 x 10^{10} Newtons/Meter^2</td>
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</tbody>
</table>

**THERMAL**

<table>
<thead>
<tr>
<th>Thermal Expansion Coefficient</th>
<th>~3 x 10^{-6} Meters/Meter °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curie Temperature</td>
<td>250 °C</td>
</tr>
</tbody>
</table>

**Pricing:**

<table>
<thead>
<tr>
<th>Ordering Information</th>
<th>Part No.</th>
<th>1 pc.</th>
<th>5 pcs.</th>
<th>25 pcs.</th>
<th>100 pcs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI-5H-S4-ENH (2.85&quot; Sq. x .005&quot;T)</td>
<td>T105-H4E-602</td>
<td>$100</td>
<td>$70</td>
<td>$50</td>
<td>$35</td>
</tr>
<tr>
<td>PSI-5H-S4-ENH (2.85&quot; Sq. x .0075&quot;T)</td>
<td>T107-H4E-602</td>
<td>$100</td>
<td>$60</td>
<td>$40</td>
<td>$30</td>
</tr>
<tr>
<td>PSI-5H-S4-ENH (2.85&quot; Sq. x .0105&quot;T)</td>
<td>T110-H4E-602</td>
<td>$100</td>
<td>$70</td>
<td>$50</td>
<td>$35</td>
</tr>
</tbody>
</table>