

Table of Contents	Description
<b>1) Overview</b> <ul style="list-style-type: none"> <li>• Table of Contents</li> <li>• List of Figures and Tables</li> <li>• Introduction</li> <li>• Major Findings</li> </ul>	The MPR extends the Chipworks standard process review to include information specific to MEMS devices.
<b>2) Device Overview</b> <ul style="list-style-type: none"> <li>• Package and Die of Control ASIC and MEMS</li> <li>• Die Features</li> <li>• Residual Gas Analysis of MEMS Cavity</li> </ul>	Die features include memory blocks, and unusual components.
<b>3) ASIC Basic Device Analysis (Control Chip)</b> <ul style="list-style-type: none"> <li>• General Structure</li> <li>• Minimum Metal Pitch</li> <li>• Minimum Gate Length</li> <li>• Observed Critical Dimensions</li> </ul>	ASIC analysis is included for both monolithic and multi-chip package MEMS.
<b>4) MEMS Process Analysis</b> <ul style="list-style-type: none"> <li>• SEM images (No TEM images)</li> <li>• General Device Structure</li> <li>• Bond Pads</li> <li>• Dielectrics</li> <li>• Metallization</li> <li>• Vias and Contacts</li> <li>• Transistors and Poly</li> <li>• Wells and Substrate</li> <li>• Etch Structures</li> </ul>	The process analysis is the core of the MPR report and takes you inside the device to the smallest feature using SEM microscopy. <ul style="list-style-type: none"> <li>• SEM images show each feature including all dielectric levels, metal levels, transistors, poly and isolation.</li> <li>• SCM may be included.</li> <li>• SEM-EDS material analysis is typically included.</li> </ul>
<b>5) MEMS Architectural Analysis*</b> <ul style="list-style-type: none"> <li>• Structure Overview</li> <li>• Electrodes and capacitor plates</li> <li>• Proof Masses</li> <li>• Control Springs</li> <li>• Motions Stops</li> <li>• Anti-stiction bumps</li> </ul>	The architectural analysis is critical for understanding the MEMS structures. <ul style="list-style-type: none"> <li>• Plan view and cross section analysis.</li> <li>• Detailed vertical and horizontal dimensions for all structures.</li> </ul>

Please note, due to the nature of reverse engineering, Chipworks report content may vary. Reports published prior to the latest revision date (May 2007) may contain different content than stated above.



<p><b>6) Critical Dimensions</b></p> <ul style="list-style-type: none"> <li>• Horizontal Dimensions (metals, vias, transistors, poly, isolation, bond pads, memory cells)</li> <li>• Vertical Dimensions (dielectrics, metals, poly, diffusions, wells, die)</li> </ul>	<p>Full tabulation of all measurements taken allows for a detailed comparison between devices.</p>
<p><b>Optional (additional cost)</b></p> <ul style="list-style-type: none"> <li>• TEM images</li> <li>• SCM 2D junction analysis</li> <li>• TEM-EDS Analysis of Dielectrics, Metals and Gates</li> <li>• SIMS Analysis of Dielectrics</li> </ul>	

\* Example list provided for inertial sensors. Talk to your Chipworks representative to get a full sample table of contents for other MEMS types.

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