# SPECIFICATION OF SMD MICROPHONE

( TO : )

MODEL NO. : (S)SPOB- 413S44- RC3310  
DIRECTIVITY : OMNI- DIRECTIONAL

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4 0 5 - 8 1 7
## SPECIFICATION HISTORY

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<td>2007.08.22</td>
<td>(S)SPOB-413S44-RC3310</td>
<td>1st Submission of Microphone spec.</td>
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**Microphone Technology Leadership**
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1. INTRODUCTION
This specification is for the SMD possible Electret Condenser Microphone (ECM) which has endurable reflow temperature of up to 250°C for under 30 seconds.

2. MODEL NO.
(S)SPOB-413S44-RC3310

3. ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>NO.</th>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Limits</th>
<th>Unit</th>
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<tr>
<td>1</td>
<td>Sensitivity</td>
<td>S</td>
<td>f=1 Hz, S.P.L =1Pa, Q = 1V/Pa</td>
<td>-48</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>Output impedance</td>
<td>Z_{OUT}</td>
<td>f=1 Hz</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Current Consumption</td>
<td>I_{dss}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>V_{cc}=2.0V, R_{L} = 2.2Ω</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Signal to Noise Ratio</td>
<td>S/N</td>
<td>f=1 Hz, S.P.L =1Pa</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(A-Weighted Curve)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Decreasing Voltage</td>
<td>ΔS- VS</td>
<td>V_{cc}=2.0V to 1.5V</td>
<td>-3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Operating Voltage</td>
<td></td>
<td>V_{cc}=2.0V to 1.5V</td>
<td>1.5</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Maximum input S.P.L.</td>
<td></td>
<td></td>
<td>110</td>
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</table>

4. MEASUREMENT CIRCUIT

![Diagram of measurement circuit]

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5. TYPICAL FREQUENCY RESPONSE CURVE ( FAR FIELD )

Far Field Measurement Condition
Temperature :  23 ± 2 °C
Bias Voltage :  2.0V ( with 2.2Ω series resistor )
Acoustic stimulus :  1Pa ( 94dB SPL at 1m ) at 50 cm from the loud-speaker.
                    The loud-speaker must be calibrated to make a flat frequency response input signal
Position :                The frequency response of microphone unit measured at 50cm from the loud-speaker

6. MECHANICAL CHARACTERISTICS

■ SMD Type

<table>
<thead>
<tr>
<th></th>
<th>(S)SPOB- 413S44- RC3310</th>
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<tr>
<td>1.3±0.1</td>
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<td>4±0.1</td>
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7. RELIABILITY TEST

7.1 VIBRATION TEST

To be no interference in operation after vibrations. 10° to 55° for 1 minute full amplitude 1.52", for 2 hours at three axes

7.2 DROP TEST

To be no interference in operation after dropped to concrete floor each one time from 1 meter height at three directions in state of packing

7.3 TEMPERATURE TEST

- After exposure at 70°C for 200 hours, sensitivity to be within ±3% from initial sensitivity. (The measurement to be done after 2 hours of conditioning at room temperature)

- After exposure at -25°C for 200 hours, sensitivity to be within ±3% from initial sensitivity. (The measurement to be done after 2 hours of conditioning at room temperature)

7.4 HUMIDITY TEST

After exposure at 70°C and 90 to 95% relative humidity for 240 hours, sensitivity to be within ±3% from initial sensitivity.

7.5 TEMPERATURE CYCLE TEST

After exposure at -25°C for 30 minutes, at 20°C for 10 minutes, at 70°C for 30 minutes, at 20°C for 10 minutes. 5 cycles, sensitivity to be within ±3% from initial sensitivity (The measurement to be done after 2 hours of conditioning at room temperature)

7.6 TEMPERATURE SHOCK

Temperature change from -40°C to 85°C for 30 minutes. (changing time : 20 sec.) After 32 cycles, sensitivity to be within ±3% from initial sensitivity (The measurement to be done after 2 hours of conditioning at room temperature)

8. TEMPERATURE CONDITIONS

8.1 STORAGE TEMPERATURE : -40°C ~ +85°C

8.2 OPERATING TEMPERATURE : -25°C ~ +70°C
9. MEASUREMENT SYSTEM

![Diagram of measurement system]

10. REFLOW PROFILE (Guaranteed Maximum Reflow Condition)

<table>
<thead>
<tr>
<th>Setting Temperature at Peak</th>
<th>Depend on the user conditions</th>
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<tr>
<td>Actual Temperature to Microphone</td>
<td>240°C ~ 250°C</td>
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<tr>
<td>Duration at Peak Temperature</td>
<td>≤ 30 sec</td>
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<tr>
<td>Total Duration Period</td>
<td>6 minutes</td>
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11. CAUTIONS WITH USING SMD MICROPHONE

11-1 X-ray inspection

- X-ray inspection is possible only under the setting conditions with Voltage: 60~80kV, Current: 60~100μA, Time: within 1min
- Don’t do the REFLOW or REWORK process after X-ray inspection
- BUT, post-baking (at 105°C for 2hrs) after X-ray inspection is recommended for stabilizing SMD microphone

11-2 Cleaning process

- Don’t do the cleaning process with any kind of volatile solvent (Acetone, TCE, alcohol, etc.), water, or detergent
→ Possible only for the purpose of removing any dust or particle only with tissue or cotton tip without direct contact to the microphone

11-3 Router process on Printed Circuit Board after reflow

- It’s possible to affect the acoustic properties of SMD microphone, when any particle gets into the SMD microphone inside through sound holes
12. PACKAGE
12.1 Reel Dimension & Taping Specification
12.2 Recommended Metal Mask (Stencil Design) and Land Pattern

**Metal Mask Pattern**

- Opening for solder cream
  - thickness of metal mask: 0.1 mm

**Soldering Surface – Land Pattern**

(Unit: mm)
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