Automotive

Automotive package options

<table>
<thead>
<tr>
<th>Suffix</th>
<th>BG</th>
<th>PW</th>
<th>D</th>
<th>PW</th>
<th>BG</th>
<th>PW</th>
<th>GW</th>
<th>GM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SOT763-1</td>
<td>SOT403-1</td>
<td>SOT108-1</td>
<td>SOT402-1</td>
<td>SOT764-1</td>
<td>SOT360-1</td>
<td>SOT363</td>
<td>SOT886</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>1.00</td>
<td>1.60</td>
<td>1.00</td>
<td>1.60</td>
<td>2.00</td>
<td>1.60</td>
<td>2.00</td>
<td>1.60</td>
</tr>
<tr>
<td>Length (mm)</td>
<td>1.00</td>
<td>1.60</td>
<td>1.00</td>
<td>1.60</td>
<td>2.00</td>
<td>1.60</td>
<td>2.00</td>
<td>1.60</td>
</tr>
<tr>
<td>Pitch (mm)</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
</tr>
</tbody>
</table>

Q100 Logic samples available in e-sample store. Order them today!
Haven’t found your function? Please contact your local NXP representative.

NXP Logic – Q100 logic portfolio

Continuing to lead the way in automotive logic

www.nxp.com
Introduction

The operating environment of automobile semiconductor components is much more hostile than that of semiconductors used in home or portable applications. A vehicle坐在 ont will generally spend its operating lifetime within an ambient temperature range of 0-125 ˚C. Due to internal heating, its semiconductor devices can be expected to operate between 20-40 ˚C. By comparison, an automobile is expected to operate at temperatures lower than -20 ˚C, and, in some cases, operate within the engine compartment at temperatures approaching 125 ˚C.

To ensure the reliability of automotive electronics, the Automotive Electronics Council introduced in AEC-Q100 standard which outlines procedures to be followed to ensure integrated circuits meet the quality and reliability levels required by automotive applications. As the global number one supplier, the introduction of its Q100 logic portfolio shows NXP continuing to lead the way in automotive logic.

Key benefits of the Q100 logic portfolio

- **AEC-Q100 product qualification and reliability monitoring:**
  - Tightened manufacturing process controls
  - Process qualification procedures to ensure automotive applications meet the quality and reliability levels required by automotive applications.
  - Six sigma design, zero defect test and inspection methodology
  - Six sigma design philosophy, applied to all Q100 devices.
  - Six sigma design, zero defect test and inspection methodology

- **NXP’s first and second tier technical support teams:**
  - NXP’s first and second tier technical support teams give Q100 product design-in assistance their highest priority.
  - Upon confirming that it has been qualified in accordance with AEC-Q100 and is suitable for automotive applications.

- **NXP logic guarantees a 10 day throughput time with initial verification within 24 hours for its Q100 portfolio:**
  - Applied for Q100 products instead of the 90 day PCN approval cycle for standard types.
  - In the unlikely event of a quality issue, qualification requirements of automotive end user applications, a 180 day process change notification (PCN) approval cycle is applied for Q100 products instead of the 90 day PCN approval cycle for standard types.

- **NXP's first and second tier technical support teams:**
  - NXP's first and second tier technical support teams give Q100 product design-in assistance their highest priority.
  - Upon confirming that it has been qualified in accordance with AEC-Q100 and is suitable for automotive applications.

- **Examples of NXP-Q100 logic automotive applications:**
  - Large pin count controllers are expensive, so when possible to reduce the complexity and pin-count of control solutions, input/output expansion devices such as multiplexer/multiplexer devices are used. Figure 2 shows an example of an 8-bit multiplexer used to sequentially switch analog sensor signals to a single analog-to-digital pin of a microcontroller.
  - NXP logic guarantees a 10 day throughput time with initial verification within 24 hours for its Q100 portfolio.

- **Display drivers:**
  - Display drivers integrate analog-to-digital expansion devices, which are common in O/D expansion devices, with a number of MOSFET LED drivers. With 8-bit and 12-bit solutions, shift register based display drivers enable a controller to drive 8 or 12 LEDs using 3 output lines. Cascading devices as shown in figure 3 increases the number of LED’s controlled by the same 3 output lines.

- **Control logic:**
  - Control logic consists of simple Boolean functions, such as AND or NAND, to facilitate changing settings in simple subsystems that don’t require a micro-controller.

- **Statistical test:**
  - Six sigma design philosophy is applied to all Q100 devices. This ensures that an end user application designed to the datasheet limits will not exceed a shift as high as one and a half sigma in NXP’s manufacturing processes. As the process control limits are much tighter than one and a half sigma, this virtually guarantees trouble-free automotive applications. During electrical test, average test limits or statistical test limits are applied to screen outliers within automotive lots. Figure 1 shows how the distribution of devices passing a test and the calculated statistical test limits in red. Although the outliers are within the upper and lower specification limits they are not delivered as Q100 products.

- **NXP logic guarantees a 10 day throughput time with initial verification within 24 hours for its Q100 portfolio:**
  - Applied for Q100 products instead of the 90 day PCN approval cycle for standard types. In the unlikely event of a quality issue, qualification requirements of automotive end user applications, a 180 day process change notification (PCN) approval cycle is applied for Q100 products instead of the 90 day PCN approval cycle for standard types.

- **NXP’s first and second tier technical support teams:**
  - NXP’s first and second tier technical support teams give Q100 product design-in assistance their highest priority.
  - Upon confirming that it has been qualified in accordance with AEC-Q100 and is suitable for automotive applications.

- **Examples of NXP-Q100 logic automotive applications:**
  - Large pin count controllers are expensive, so when possible to reduce the complexity and pin-count of control solutions, input/output expansion devices such as multiplexer/multiplexer devices are used. Figure 2 shows an example of an 8-bit multiplexer used to sequentially switch analog sensor signals to a single analog-to-digital pin of a microcontroller.