Accelerate state-of-the-art camera module developments with feature-packed camera socket solutions for serial and parallel data applications

The absence of a camera socket industry standard led to compatibility issues that made component sourcing and matching difficult. The release of the SMIA specification addressed standardization issues, making multiple sourcing easier and shortened design cycles.

Molex unveiled a class of SMT, SMIA-compliant sockets for serial data applications. These space-saving and high reliability sockets support ultra-slim mobile phone, tablet PC and vision system applications. Available in through-board and on-board mounting styles, they meet a variety of design requirements including low-profile (space-constrained), single-side PCB, compact footprint and more.

Complementing these are parallel data sockets available in side or bottom-contact, on-board or through-board mounting. These sockets feature a characteristically higher pin count than serial versions and can also come in a variety of X-Y (camera module) dimensions; housing and shell features; and mounting styles. An example is the 34-circuit, 8.50 by 9.50mm series 105199 socket which comes with side-contacts and on-board mounting configuration.

Molex offers sockets in both on-board (105028-1001) and through-board (105028-2001) versions for series 105028.

Molex is also ready to assist customers with customized socket solutions if needed.

For more information visit our website at: www.molex.com/product/camerasocket.html

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Features and Benefits

**Serial Data (SMIA-compliant) Sockets**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMIA-compliant sockets</td>
<td>Eliminate compatibility issues when used with non-standard camera modules For faster and easier camera module selection by mobile phone makers using PCB-to-socket footprint matching</td>
</tr>
<tr>
<td>Anti-short housing wall design</td>
<td>Prevents electrical shorting between socket terminals and the base metal shell</td>
</tr>
<tr>
<td>Dimpled terminal design</td>
<td>For added contact reliability between camera socket and module</td>
</tr>
<tr>
<td>Dual locking latches on socket</td>
<td>Position and secure the camera module to socket</td>
</tr>
<tr>
<td>Bottom-contact styles</td>
<td>Meet common module requirements based on latest trends</td>
</tr>
</tbody>
</table>

**Parallel Data (non-SMIA-compliant) Sockets**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side-contact options (series 47337, 105028 and 105199)</td>
<td>Requires zero height between housing base and camera base Better contact force of (typically) 0.35N when mated</td>
</tr>
<tr>
<td>Higher pin-count</td>
<td>Supports additional features and functionality built into camera modules</td>
</tr>
<tr>
<td>Wide range of socket designs</td>
<td>Expand configuration possibilities for customized camera applications</td>
</tr>
</tbody>
</table>

* SMIA stands for Standard Mobile Imaging Architecture (SMIA) and is a royalty-free, open standard specification developed jointly by Nokia Corporation, ST Microelectronics NV and their licensors. Its purpose is to standardize functional and optical aspects of camera modules and allow mobile handset vendors to work with multiple suppliers in cost-efficient module sourcing.
Camera Sockets for Serial and Parallel Data Applications

**Reference Information**
- Packaging: Tape-and-reel
- Mates with: Camera modules
- Designed In: mm
- RoHS: Yes
- Halogen Free: Yes
- Glow Wire Compliant: No

**Electrical**
- **Voltage (max.):**
  - 10V DC (Series 78725, 105168)
  - 50V DC (others)
- **Current (max.):** 0.5A per contact
- **Contact Resistance:**
  - 60 milliohms (78725, 105167, 105168, 105190, 105200)
  - 80 milliohms (105163)
- **Dielectric Withstanding Voltage (1 min.):**
  - 500VAC (RMS) (78725, 105190)
  - 150VAC (RMS) (105163, 105167, 105200)
- **Insulation Resistance (min.):**
  - 400 Megohm (105163, 105167); 100 Megohm (others)

**Specifications - Serial Data Versions**

**Mechanical**
- **Contact Force at max. deflection of contact spring (max.):**
  - 0.70N (105167, 105168, 105190)
- **Contact Force at min. deflection of contact spring (min.):**
  - 0.2N (78725, 105167, 105168, 105200)
- **Module Insertion Force (min.):**
  - 15N (78725, 105190); 10N (105167, 105168, 105200)
- **Module Locking Force (min.):**
  - 15N (78725, 105168, 105190, 105200); 12N (105167)
- **Durability (cycles min.):**
  - 30 (78725, 105168, 105190); 20 (105163, 105167, 105200)

**Physical**
- **Housing:**
  - High temperature thermoplastic, black, UL94-V0
- **Contact:**
  - Phosphor Bronze Alloy (105190); Copper Alloy (others)
- **Plating:**
  - Contact Area — 0.30μm (12μ")
  - Gold (Au)
  - Solder Tail Area — Gold (Au) Flash
  - Underplating — 2.0μm (80μ")
  - Nickel (Ni) overall
- **Operating Temperature:**
  - -30 to +85°C (78725, 105168, 105200)
  - -55 to +85°C (105163, 105167, 105190)

**Ordering Information - Serial Data Versions**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>SMIA Classification</th>
<th>Circuits</th>
<th>Socket Height (mm)</th>
<th>Module Dimensions (mm)</th>
<th>Mounting Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>105200-0008</td>
<td>SMIA55</td>
<td>14</td>
<td>3.78</td>
<td>5.50 by 5.50</td>
<td>Through-board</td>
</tr>
<tr>
<td>105167-0001</td>
<td>SMIA65</td>
<td>12</td>
<td>4.50</td>
<td>6.50 by 6.50</td>
<td>On-board</td>
</tr>
<tr>
<td>105163-1001</td>
<td></td>
<td></td>
<td>3.10</td>
<td></td>
<td>Through-board</td>
</tr>
<tr>
<td>105190-0001</td>
<td>SMIA75</td>
<td>16</td>
<td>4.00</td>
<td>7.50 by 7.50</td>
<td>On-board</td>
</tr>
<tr>
<td>105168-0601</td>
<td></td>
<td></td>
<td>4.20</td>
<td></td>
<td>Through-board</td>
</tr>
<tr>
<td>78725-1002</td>
<td>SMIA85</td>
<td>18</td>
<td>5.25</td>
<td>8.50 by 8.50</td>
<td></td>
</tr>
</tbody>
</table>
**Specifications - Parallel Data Versions**

**Reference Information**
- Packaging: Tape-and-reel
- Mates with: Camera modules
- Designed In: mm
- RoHS: Yes
- Halogen Free: Yes
- Glow Wire Compliant: No

**Mechanical**
- Terminal / Housing Retention Force (min.):
  - 0.49N (105199)
  - 1.0N (47337, 78499, 105028)
- Durability (cycles min.):
  - 5 (78499)
  - 20 (105199, 105028)
  - 30 (47337)

**Electrical**
- Voltage (max.): 50V DC
- Current (max.): 0.5A DC per contact
- Contact Resistance:
  - 60milliohms (47337, 105028)
  - 80milliohms (78499, 105199)
- Dielectric Withstanding Voltage (1 min.):
  - 500VAC (RMS) (105199)
  - 150V AC (RMS) (47337, 78499, 105028)
- Insulation Resistance (min.):
  - 100 (78499)
  - 400 (47337, 105028)
  - 1000 Megaohm (105199)

**Physical**
- Housing:
  - High temperature thermoplastic, white (105199), black (others), UL94-V0
- Contact: Copper Alloy
- Plating:
  - Contact Area — 0.30μm (12μ”)
  - Gold (Au)
  - Solder Tail Area — Gold (Au) Flash Underplating — 2.0μm (80μ”)
  - Nickel (Ni) overall
- Operating Temperature:
  - -30 to +85°C (105199)
  - -55 to +85°C (47337, 78499, 105028)

**Ordering Information - Parallel Data Versions**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Module Dimensions (mm)</th>
<th>Circuits</th>
<th>Socket Height (mm)</th>
<th>Contact Style</th>
<th>Mounting Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>78499-0002</td>
<td>6.50 by 6.50</td>
<td>24</td>
<td>3.50</td>
<td>Bottom contact</td>
<td>On-board</td>
</tr>
<tr>
<td>105028-1001</td>
<td>8.50 by 8.50</td>
<td>32</td>
<td>4.20</td>
<td></td>
<td>Through-board</td>
</tr>
<tr>
<td>105028-2001</td>
<td>8.50 by 8.50</td>
<td>32</td>
<td>5.25</td>
<td></td>
<td>Through-board</td>
</tr>
<tr>
<td>47337-0001</td>
<td>8.50 by 8.50</td>
<td>24</td>
<td>4.20</td>
<td></td>
<td>On-board</td>
</tr>
<tr>
<td>105199-0001</td>
<td>8.50 by 9.50</td>
<td>34</td>
<td>4.28</td>
<td></td>
<td>On-board</td>
</tr>
</tbody>
</table>

Camera Sockets for Serial and Parallel Data Applications
Product Features - Mounting Configurations

On-board (top-mount) and Through-board (mid-mount) style features and advantages

<table>
<thead>
<tr>
<th>On-board style mounting (Serial data: Series 105167, 105190; Parallel data: Series 78499, 105028 and 105199)</th>
<th>Through-board style mounting (Serial data: Series 78725, 105163, 105168, 105200; Parallel data: Series 47337, 105028)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupies only single side of the PCB, frees up the entire opposite side for other uses</td>
<td>Occupies both sides of the PCB but frees up vertical space above PCB for other uses</td>
</tr>
<tr>
<td>Comprises fewer components (housing, terminals and metal shell)</td>
<td>Includes more components (housing, terminals, top and bottom shells)</td>
</tr>
<tr>
<td>Increases overall mobile phone height</td>
<td>Greater vertical space-saving with its lower profile height; excellent for ultra-slim applications</td>
</tr>
</tbody>
</table>

Product Features - Contact Styles

Advantages of side- and bottom-contact style camera sockets

<table>
<thead>
<tr>
<th>Side-contact style (Parallel data: Series 47337, 105028, 105199)</th>
<th>Bottom-contact style (Serial data: Series 78725, 78499, 105167, 105168, 105190, 105200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero height</td>
<td>Height between housing and camera base (~ 0.25mm)</td>
</tr>
<tr>
<td>Better contact force (~ 0.35N)</td>
<td>Contact force (~ 0.25N)</td>
</tr>
<tr>
<td>Specially designed camera module</td>
<td>Common camera module design</td>
</tr>
<tr>
<td>Non market trend</td>
<td>Market trend</td>
</tr>
</tbody>
</table>

Product Features - Dual Locking Latches

Dual-locking latches feature a 0.12mm height difference to accommodate the camera module’s ‘shoulders’ (zoom-in). By locking the module to the socket in the correct position, it ensures proper mechanical and electrical contact is maintained during operation.

Dual locking latches on the socket wall for precise positioning and securing of mated module.
Product Features - Anti-Short Housing Wall Feature
(SMIA-Compliant Versions Only)

Molex’s anti-short housing wall feature prevents shorting of the socket’s bottom contacts with the metal shell particularly during mating with the camera module. This feature is vital as it protects the costly investments of mobile phone, camera module and other user-applications.

Cross-section illustration of an anti-shorting feature in Molex’s SMIA-compliant camera sockets

Product Features - Dimped Contact Design

- Molex’s dimpled terminal design has been tested to demonstrate the ability in accepting maximum stress levels (measured in Mega Pascal) compared with variant designs. This feature is important as the terminal’s reduced contact radius, width and area provides higher contact pressure between camera module and socket terminals for improved contact reliability.

- Gold-plated contacts with their excellent electrical and mechanical qualities offer even higher contact integrity. All Molex’s dimpled contacts are gold-plated.

<table>
<thead>
<tr>
<th>Terminal designs</th>
<th>Contact height (Nominal)</th>
<th>Contact force (Nominal)</th>
<th>Stress (Pa = Pascals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-dimpled</td>
<td>0.70 +/- 0.10mm</td>
<td>30gf</td>
<td>~80MPa</td>
</tr>
<tr>
<td>Dimpled</td>
<td>0.70 +/- 0.10mm</td>
<td></td>
<td>~350MPa</td>
</tr>
<tr>
<td>Crowned</td>
<td>0.70 +/- 0.10mm</td>
<td></td>
<td>~180MPa</td>
</tr>
</tbody>
</table>
Unique Design Features - SMIA85 Camera Socket

Typical Parallel Data Camera Socket Features
Applications

Consumer
- Camera phones
- Tablet PCs
- Phablets (a larger category of smart phones that combines the functionality of smart phones with those of tablets)
- Game cameras
- Pinhole cameras
- Webcams (notebook and PC monitors)

Industrial
- Surveillance (Internet protocol) and security cameras
- Traffic cameras
- Industrial cameras
- Remote or trail cameras

Automotive
- GPS navigator with digital camera

Selection Matrix

<table>
<thead>
<tr>
<th>Termination Styles</th>
<th>Socket Height (mm)</th>
<th>Serial Data (SMIA-compliant) Sockets</th>
<th>Parallel Data (non-SMIA-compliant) Sockets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bottom Contact (Module dimensions in mm)</td>
<td>Side Contact (Module dimensions in mm)</td>
</tr>
<tr>
<td>SMT (on-board)</td>
<td></td>
<td>3.50 105190-0001 (7.50 by 7.50)</td>
<td>105028-1001 (8.50 by 8.50)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.00 105199-0001 (8.50 by 9.50)</td>
<td>105199-0001 (8.50 by 9.50)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.20 105167-0001 (6.50 by 6.50)</td>
<td>105199-0001 (8.50 by 9.50)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.50 105168-0601 (7.50 by 7.50)</td>
<td>47337-0001 (8.50 by 8.50)</td>
</tr>
<tr>
<td>SMT (through-board) (known also as midmount or sink-type)</td>
<td>3.10 105163-1001 (6.50 by 6.50)</td>
<td>105200-0008 (5.50 by 5.50)</td>
<td>105028-2001 (8.50 by 8.50)</td>
</tr>
<tr>
<td></td>
<td>3.78 105163-1001 (6.50 by 6.50)</td>
<td>105200-0008 (5.50 by 5.50)</td>
<td>105028-2001 (8.50 by 8.50)</td>
</tr>
<tr>
<td></td>
<td>4.20 105168-0601 (7.50 by 7.50)</td>
<td>47337-0001 (8.50 by 8.50)</td>
<td>105028-2001 (8.50 by 8.50)</td>
</tr>
<tr>
<td></td>
<td>5.25 78725-1002 (8.50 by 8.50)</td>
<td>105028-2001 (8.50 by 8.50)</td>
<td>105028-2001 (8.50 by 8.50)</td>
</tr>
</tbody>
</table>

www.molex.com/product/camerasocket.html