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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor’s system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.
QEE113
Plastic Infrared Light Emitting Diode

Features
• $\lambda = 940$ nm
• Package Type = Sidelooker
• Chip Material = GaAs
• Matched Photosensor: QSE113
• Medium Wide Emission Angle, 50°
• Package Material: Clear Epoxy
• High Output Power
• Gray dot marking on the top side

Description
The QEE113 is a 940 nm GaAs LED encapsulated in a medium wide angle, plastic sidelooker package.

Package Dimensions

Notes:
1. Dimensions for all drawings are in inches (mm).
2. Tolerance of ±0.010 (0.25) on all non-nominal dimensions unless otherwise specified.
Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ C$ unless otherwise noted.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOPR</td>
<td>Operating Temperature</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>TSTG</td>
<td>Storage Temperature</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>TSOL-I</td>
<td>Soldering Temperature (Iron)(^{(4, 5, 6)})</td>
<td>240 for 5 sec</td>
<td>°C</td>
</tr>
<tr>
<td>TSOL-F</td>
<td>Soldering Temperature (Flow)(^{(4, 5)})</td>
<td>260 for 10 sec</td>
<td>°C</td>
</tr>
<tr>
<td>IF</td>
<td>Continuous Forward Current</td>
<td>50</td>
<td>mA</td>
</tr>
<tr>
<td>VR</td>
<td>Reverse Voltage</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>PD</td>
<td>Power Dissipation(^{(3)})</td>
<td>100</td>
<td>mW</td>
</tr>
</tbody>
</table>

Notes:
3. Derate power dissipation linearly 1.33 mW/°C above 25°C.
4. RMA flux is recommended.
5. Methanol or isopropyl alcohols are recommended as cleaning agents.
6. Soldering iron 1/16” (1.6mm) minimum from housing.

Electrical / Optical Characteristics

Values are at $T_A = 25^\circ C$ unless otherwise noted.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda_{PE}$</td>
<td>Peak Emission Wavelength</td>
<td>$I_F = 20$ mA</td>
<td>945</td>
<td>nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC$_A$</td>
<td>Temperature Coefficient</td>
<td></td>
<td>0.3</td>
<td>nm/°C</td>
<td></td>
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<tr>
<td>$2\theta_{1/2}$</td>
<td>Emission Angle</td>
<td>$I_F = 100$ mA</td>
<td>50</td>
<td>°</td>
<td></td>
<td></td>
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<tr>
<td>$V_F$</td>
<td>Forward Voltage</td>
<td>$I_F = 100$ mA, $t_p = 20$ ms</td>
<td>1.5</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC$_{VF}$</td>
<td>Temperature Coefficient</td>
<td></td>
<td>-2</td>
<td>mV/°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_R$</td>
<td>Reverse Current</td>
<td>$V_R = 5$ V</td>
<td>10</td>
<td>$\mu A$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_E$</td>
<td>Radiant Intensity</td>
<td>$I_F = 100$ mA, $t_p = 20$ ms</td>
<td>3</td>
<td>7.5</td>
<td>12</td>
<td>mW/sr</td>
</tr>
<tr>
<td>TC$_{IE}$</td>
<td>Temperature Coefficient</td>
<td></td>
<td>-0.7</td>
<td>%/°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t_r$</td>
<td>Rise Time</td>
<td>$I_F = 100$ mA</td>
<td>800</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t_f$</td>
<td>Fall Time</td>
<td>$I_F = 100$ mA</td>
<td>800</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$C_j$</td>
<td>Junction Capacitance</td>
<td>$V_R = 0$ V</td>
<td>14</td>
<td>pF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Typical Performance Characteristics

Figure 1. Normalized Intensity vs. Wavelength

Figure 2. Peak Wavelength vs. Ambient Temperature

Figure 3. Normalized Radiant Intensity vs. Forward Current

Figure 4. Normalized Radiant intensity vs. Ambient Temperature

Figure 5. Forward Voltage vs. Forward Current

Figure 6. Forward Voltage vs. Ambient Temperature
Typical Performance Characteristics (Continued)

Figure 7. Radiation Diagram

Figure 8. Coupling Characteristics of QEE113 and QSE113

Normalized to:
- $d = 0$ inch
- $I_r$ Pulsed
- $t_{pw} = 100\mu s$
- Duty Cycle $= 0.1\%$
- $V_{CC} = 5V$
- $R_L = 100\Omega$
- $T_A = 25^\circ C$
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<thead>
<tr>
<th>Datasheet Identification</th>
<th>Product Status</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Advance Information</td>
<td>Formative / In Design</td>
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<tr>
<td>Preliminary</td>
<td>First Production</td>
<td></td>
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<tr>
<td>No Identification Needed</td>
<td>Full Production</td>
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</tr>
<tr>
<td>Obsolete</td>
<td>Not In Production</td>
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Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.

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