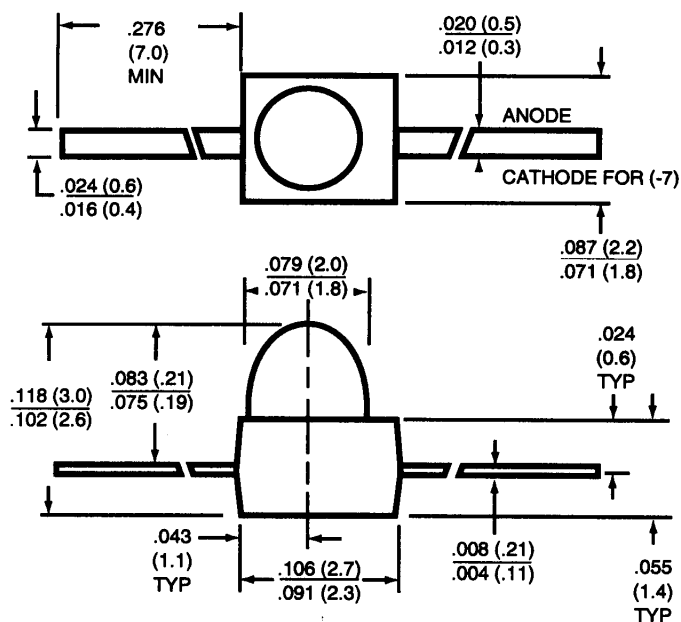


## SUBMINIATURE T-3/4 (1.9 mm) SOLID STATE LAMPS

|               |                  |                 |               |                  |       |
|---------------|------------------|-----------------|---------------|------------------|-------|
| High Eff. Red | <b>QTLP913-2</b> | RED DIFFUSED    | High Eff. Red | <b>QTLP912-2</b> | CLEAR |
| Yellow        | <b>QTLP913-3</b> | YELLOW DIFFUSED | Yellow        | <b>QTLP912-3</b> | CLEAR |
| Green         | <b>QTLP913-4</b> | GREEN DIFFUSED  | Green         | <b>QTLP912-4</b> | CLEAR |
| AlGaAs Red    | <b>QTLP913-7</b> | RED DIFFUSED    | AlGaAs Red    | <b>QTLP912-7</b> | CLEAR |
| AlGaAs Red    | <b>QTLP913-9</b> | RED DIFFUSED    | AlGaAs Red    | <b>QTLP912-9</b> | CLEAR |

## PACKAGE DIMENSIONS



**Note: All dimensions are in inches (mm).**

## DESCRIPTION

**These subminiature LED lamps are intended for low cost status indication on PCBs, backlighting keyboards and switches. They are compatible with vapor phase reflow or wave solder surface mount equipment. Both clear and tinted diffused lenses, as well as a choice of “yoke”, “Z-bend”, or “gull-wing” lead bends are available.**

## FEATURES

- **Subminiature package**
- **Low package profile**
- **Choice of clear or tinted diffused lens**
- **Three lead bend options**
- **Tape and reel option**

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise specified)

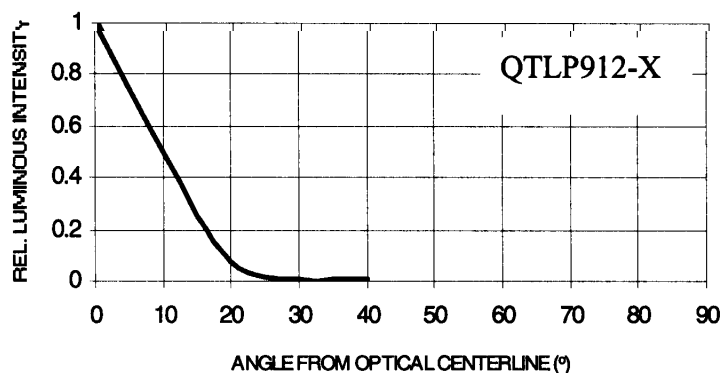
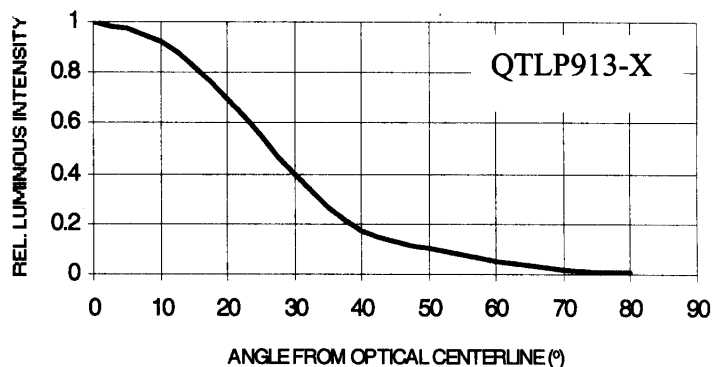
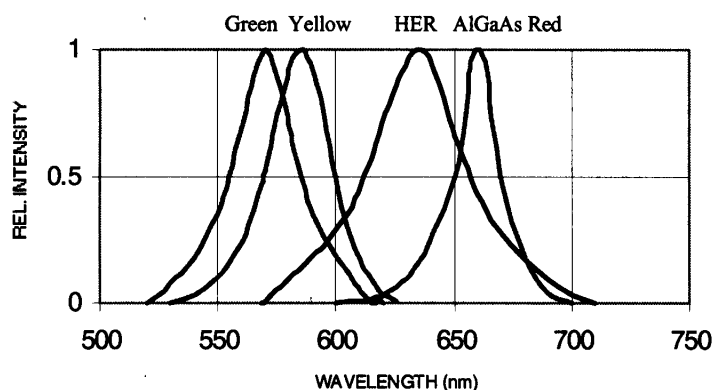
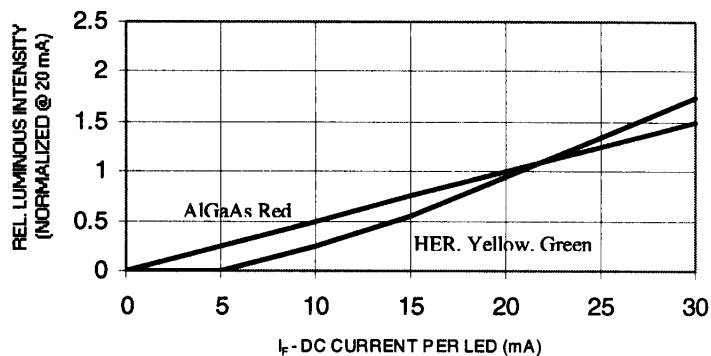
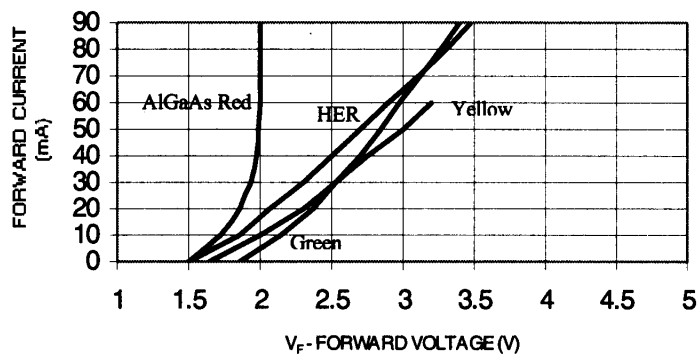
|                                                            | High Eff. Red                                                 | Yellow     | Green     | AlGaAs Red   |      |
|------------------------------------------------------------|---------------------------------------------------------------|------------|-----------|--------------|------|
|                                                            | QTLP913-2                                                     | QTLP913C-3 | QTLP913-4 | QTLP913C-7,9 |      |
|                                                            | QTLP912-2                                                     | QTLP912C-3 | QTLP912-4 | QTLP912C-7,9 | Unit |
| <b>DC Forward Current (<math>I_F</math>)</b>               | 30                                                            | 20         | 30        | 40           | mA   |
| <b>Peak Forward Current (<math>I_F</math>)</b>             | 160                                                           | 160        | 160       | 200          | mA   |
| @ f = 1.0 KHz, Duty factor = 1/10                          |                                                               |            |           |              |      |
| <b>Power Dissipation (<math>P_d</math>)</b>                | 100                                                           | 85         | 100       | 100          | mW   |
| <b>Reversed Voltage (<math>V_R</math>)</b> $I_R = 10\mu A$ | 5                                                             | 5          | 5         | 5            | V    |
| <b>Operating Temperature Range</b>                         | -40°C to +85°C                                                |            |           |              |      |
| <b>Storage Temperature Range</b>                           | -40°C to +100°C                                               |            |           |              |      |
| <b>Lead Soldering Time</b>                                 | 5 secs @ 260°C for wave solder; 10 secs @ 260°C for IR reflow |            |           |              |      |

#### ELECTRO-OPTICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise specified)

| Part Number: QTLP                      | High Eff.<br>Red<br>912-2 | Yellow<br>912-3 | Green<br>912-4 | AlGaAs<br>Red<br>912-7,9 | Test Condition         |
|----------------------------------------|---------------------------|-----------------|----------------|--------------------------|------------------------|
| <b>Luminous Intensity (mcd)</b>        |                           |                 |                |                          | I <sub>F</sub> = 20 mA |
| <b>Minimum</b>                         | 40                        | 15              | 30             | 110                      |                        |
| <b>Typical</b>                         | 80                        | 30              | 50             | 170                      |                        |
| <b>Forward Voltage (V<sub>F</sub>)</b> |                           |                 |                |                          | I <sub>F</sub> = 20 mA |
| <b>Minimum</b>                         | 1.7                       | 1.7             | 1.7            | 1.7                      |                        |
| <b>Typical</b>                         | 2.0                       | 2.0             | 2.1            | 2.0                      |                        |
| <b>Maximum</b>                         | 2.8                       | 2.8             | 2.8            | 2.8                      |                        |
| <b>Peak Wavelength (nm)</b>            | 635                       | 585             | 565            | 660                      | I <sub>F</sub> = 20 mA |
| <b>Spectral Line Half Width (nm)</b>   | 45                        | 35              | 30             | 20                       | I <sub>F</sub> = 20 mA |
| <b>Viewing Angle (degrees)</b>         | 25                        | 25              | 25             | 25                       | I <sub>F</sub> = 20 mA |

| Part Number: QTLP                      | High Eff.<br>Red<br>913-2 | Yellow<br>913-3 | Green<br>913-4 | AlGaAs<br>Red<br>913-7,9 | Test Condition         |
|----------------------------------------|---------------------------|-----------------|----------------|--------------------------|------------------------|
| <b>Luminous Intensity (mcd)</b>        |                           |                 |                |                          | I <sub>F</sub> = 20 mA |
| <b>Minimum</b>                         | 10                        | 10              | 2              | 70                       |                        |
| <b>Typical</b>                         | 15                        | 15              | 5              | 110                      |                        |
| <b>Forward Voltage (V<sub>F</sub>)</b> |                           |                 |                |                          | I <sub>F</sub> = 20 mA |
| <b>Minimum</b>                         | 1.7                       | 1.7             | 1.7            | 1.7                      |                        |
| <b>Typical</b>                         | 2.0                       | 2.0             | 2.1            | 2.0                      |                        |
| <b>Maximum</b>                         | 2.8                       | 2.8             | 2.8            | 2.8                      |                        |
| <b>Peak Wavelength (nm)</b>            | 635                       | 585             | 565            | 660                      | I <sub>F</sub> = 20 mA |
| <b>Spectral Line Half Width (nm)</b>   | 45                        | 35              | 30             | 20                       | I <sub>F</sub> = 20 mA |
| <b>Viewing Angle (degrees)</b>         | 50                        | 50              | 50             | 50                       | I <sub>F</sub> = 20 mA |

## TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES (T<sub>A</sub> = 25°C)



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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.