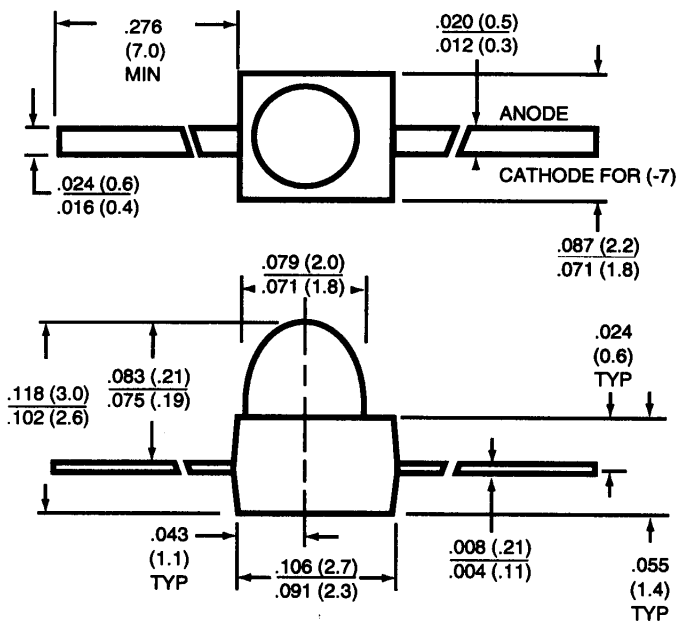




# SUBMINIATURE T-3/4 (1.9 mm) SOLID STATE LAMPS

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 <b>QTLP913-2</b> <b>QTLP912-2</b>	Yellow <b>QTLP913C-3</b> <b>QTLP912C-3</b>	Green <b>QTLP913-4</b> <b>QTLP912-4</b>	AlGaAs Red <b>QTLP913C-7,9</b> <b>QTLP912C-7,9</b>	Unit
DC Forward Current (I <sub>F</sub> )	30	20	30	40	mA
Peak Forward Current (I <sub>F</sub> ) @ f = 1.0 KHz, Duty factor = 1/10	160	160	160	200	mA
Power Dissipation (P <sub>d</sub> )	100	85	100	100	mW
Reversed Voltage (V <sub>R</sub> ) I <sub>R</sub> = 10μA	5	5	5	5	V
Operating Temperature Range	-40°C to +85°C				
Storage Temperature Range	-40°C to +100°C				
Lead Soldering Time	5 secs @ 260°C for wave solder; 10 secs @ 260°C for IR reflow				



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

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

Part Number: <b>QTLP</b>	High Eff. Red <b>912-2</b>	Yellow <b>912-3</b>	Green <b>912-4</b>	AlGaAs Red <b>912-7,9</b>	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: <b>QTLP</b>	High Eff. Red <b>913-2</b>	Yellow <b>913-3</b>	Green <b>913-4</b>	AlGaAs Red <b>913-7,9</b>	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** ( $T_A = 25^\circ\text{C}$ )

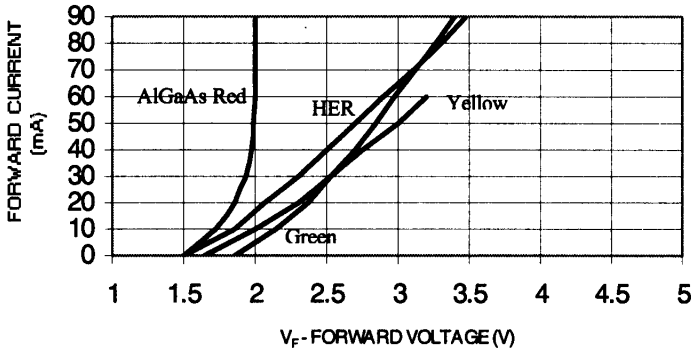


Fig 1. Forward Current vs. Forward Voltage

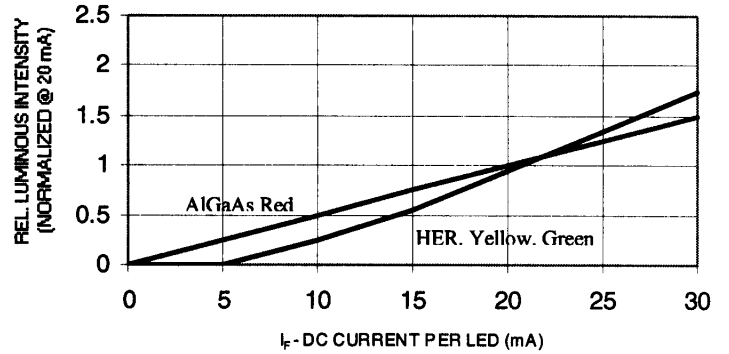


Fig 2. Forward Current vs. Forward Voltage

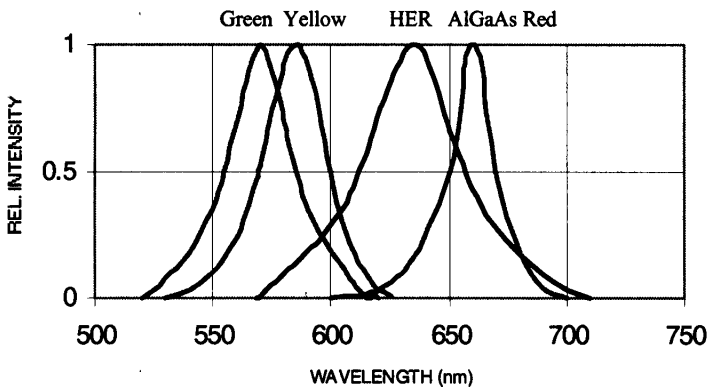


Fig 3. Relative Intensity vs. Wavelength

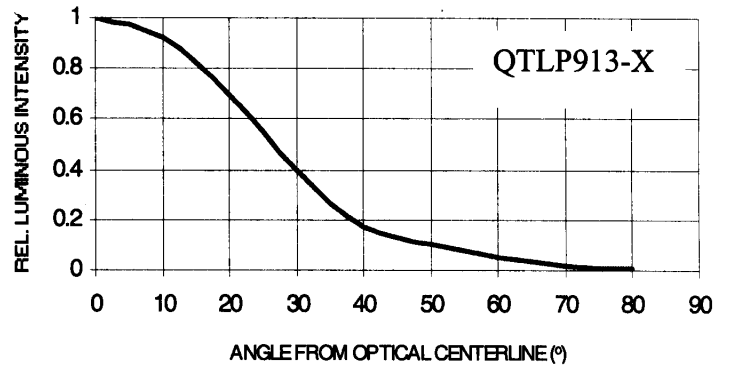


Fig 4. Relative Intensity vs. Angular Displacement

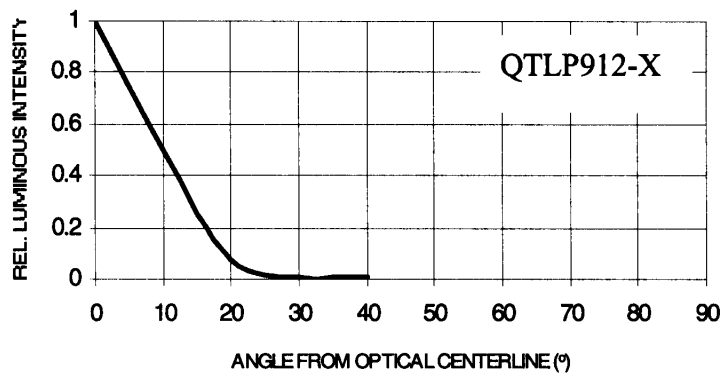


Fig 5. Relative Intensity vs. Angular Displacement