



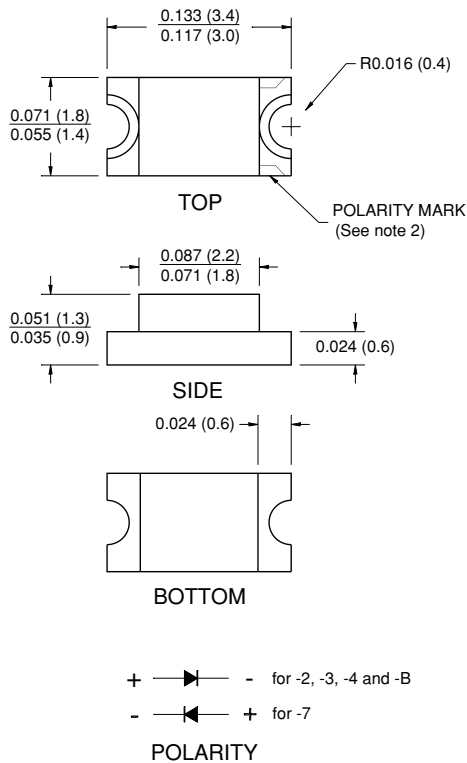
**THE DATASHEET OF  
QTLP650D4TR**



QTLP650C-2 / QTLP650D-2 HER  
QTLP650C-4 / QTLP650D-4 Green  
QTLP650C-B Blue

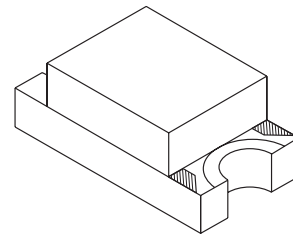
QTLP650C-3 / QTLP650D-3 Yellow  
QTLP650C-7 / QTLP650D-7 AlGaAs Red

### PACKAGE DIMENSIONS



**NOTE:**

1. Dimensions for all drawings are in inches (mm).
2. Cathode for -2, -3, -4 and B. Anode for -7.



### APPLICATIONS

- Keypad backlighting
- Push-button backlighting
- LCD backlighting

### DESCRIPTION

These surface mount chip LEDs are designed to fit industry standard footprint. Low profile and wide viewing angle make these LEDs ideal choices for backlighting applications and panel illumination.

### FEATURES

- Small footprint - 3.2(L) X 1.6(W) X 1.1(H) mm
- Wide viewing angle of 140°(QTLP650C) or 160°(QTLP650D)
- Water clear (QTLP650C) or diffused (QTLP650D) optics
- Moisture-proof packaging
- Available in 0.315" (8mm) width tape on 7" (178mm) diameter reel; 2,000 units per reel

QTLP650C-2 / QTLP650D-2 HER

QTLP650C-3 / QTLP650D-3 Yellow

QTLP650C-4 / QTLP650D-4 Green

QTLP650C-7 / QTLP650D-7 AlGaAs Red

QTLP650C-B Blue

**ABSOLUTE MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified)

| Parameter   | Symbol    | QTLP650C / QTLP650D |     |     |     |     | Units            |
|---|-----------|---------------------|-----|-----|-----|-----|------------------|
|   |           | -2                  | -3  | -4  | -7  | -B* |                  |
| Continuous Forward Current  | $I_F$     | 30                  | 30  | 30  | 30  | 30  | mA               |
| Peak Forward Current<br>( $f = 1.0 \text{ KHz}$ , Duty Factor = 1/10) | $I_{FM}$  | 160                 | 160 | 160 | 180 | 100 | mA               |
| Reverse Voltage ( $I_R = 10 \mu\text{A}$ )                            | $V_R$     | 5                   | 5   | 5   | 5   | 5   | V                |
| Power Dissipation   | $P_D$     | 84                  | 84  | 84  | 72  | 135 | mW               |
| Operating Temperature   | $T_{OPR}$ | -40 to +85          |     |     |     |     | $^\circ\text{C}$ |
| Storage Temperature   | $T_{STG}$ | -40 to +90          |     |     |     |     | $^\circ\text{C}$ |
| Lead Soldering Time   | $T_{SOL}$ | 260 for 5 sec       |     |     |     |     | $^\circ\text{C}$ |

**ELECTRICAL / OPTICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ )

| Part Number                   | Symbol          | QTLP650C / QTLP650D |           |           |           |         | Condition           |
|-------------------------------|-----------------|---------------------|-----------|-----------|-----------|---------|---------------------|
|                               |                 | -2                  | -3        | -4        | -7        | -B*     |                     |
| Luminous Intensity (mcd)      | $I_V$           | 4 / 3               | 4 / 3     | 6 / 5     | 10 / 8    | 10 / -  | $I_F = 20\text{mA}$ |
| Minimum                       |                 | 10 / 8              | 10 / 8    | 10 / 8    | 20 / 15   | 20 / -  |                     |
| Typical                       | $V_F$           | 2.8                 | 2.8       | 2.8       | 2.4       | 4.5     | $I_F = 20\text{mA}$ |
| Forward Voltage (V)           |                 | 2.0                 | 2.0       | 2.1       | 1.9       | 3.8     |                     |
| Maximum                       | $\lambda_P$     | 635                 | 585       | 565       | 660       | 430     | $I_F = 20\text{mA}$ |
| Typical                       |                 | $\lambda_D$         | 630       | 590       | 570       | 645     |                     |
| Wavelength (nm)               | $\Delta\lambda$ | 45                  | 35        | 30        | 20        | 65      | $I_F = 20\text{mA}$ |
| Peak                          | $2\Theta_{1/2}$ | 140 / 160           | 140 / 160 | 140 / 160 | 140 / 160 | 140 / - | $I_F = 20\text{mA}$ |
| Dominant                      |                 |                     |           |           |           |         |                     |
| Spectral Line Half Width (nm) |                 |                     |           |           |           |         |                     |
| Viewing Angle ( $^\circ$ )    |                 |                     |           |           |           |         |                     |

\* Available only in QTLP650C

QTLP650C-2 / QTLP650D-2 HER  
QTLP650C-4 / QTLP650D-4 Green  
QTLP650C-B Blue

QTLP650C-3 / QTLP650D-3 Yellow  
QTLP650C-7 / QTLP650D-7 AlGaAs Red

## TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Current vs. Forward Voltage

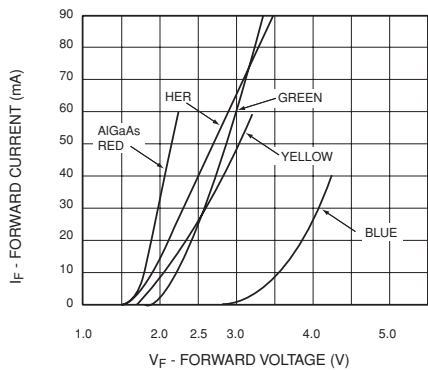


Fig. 2 Relative Luminous Intensity vs. DC Forward Current

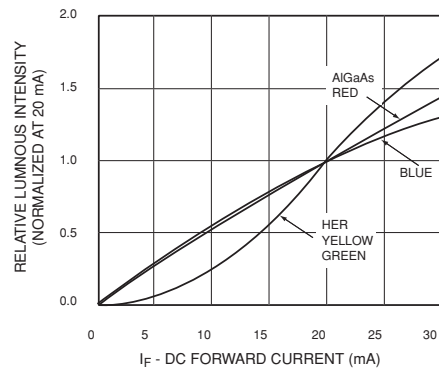


Fig. 3 Relative Intensity vs. Peak Wavelength

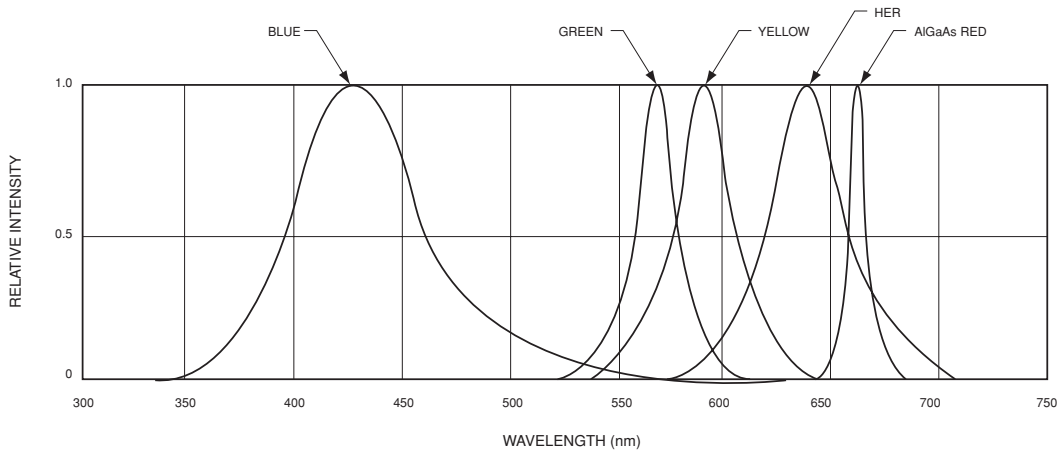


Fig. 4 Radiation Diagram

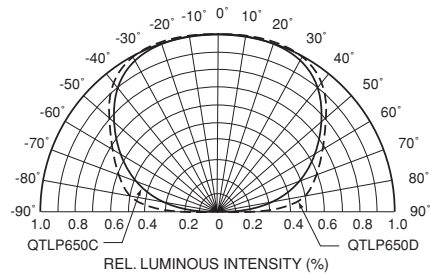
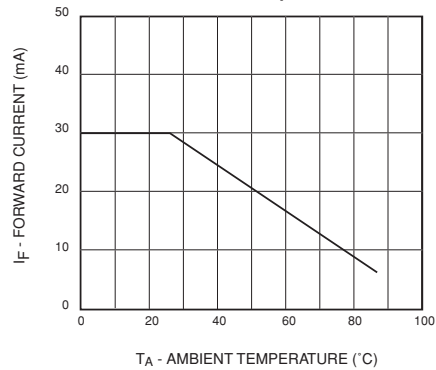


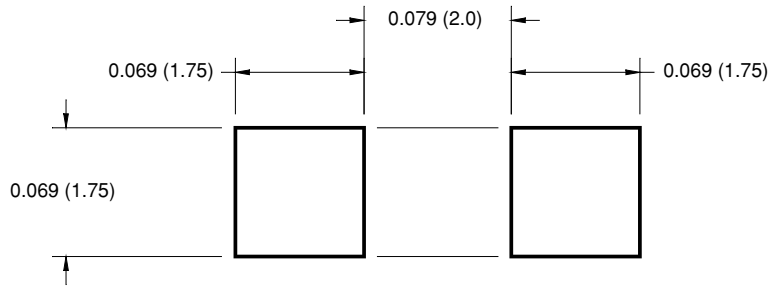
Fig. 5 Maximum Forward Current vs. Ambient Temperature



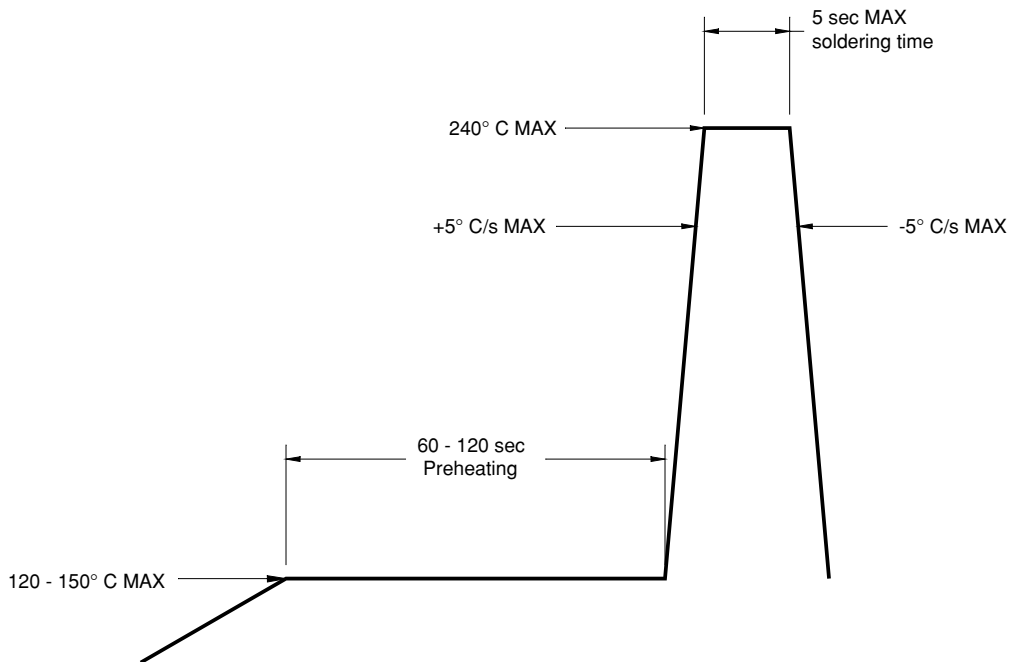
QTLP650C-2 / QTLP650D-2 HER  
 QTLP650C-4 / QTLP650D-4 Green  
 QTLP650C-B Blue

QTLP650C-3 / QTLP650D-3 Yellow  
 QTLP650C-7 / QTLP650D-7 AlGaAs Red

**RECOMMENDED PRINTED CIRCUIT BOARD PATTERN**



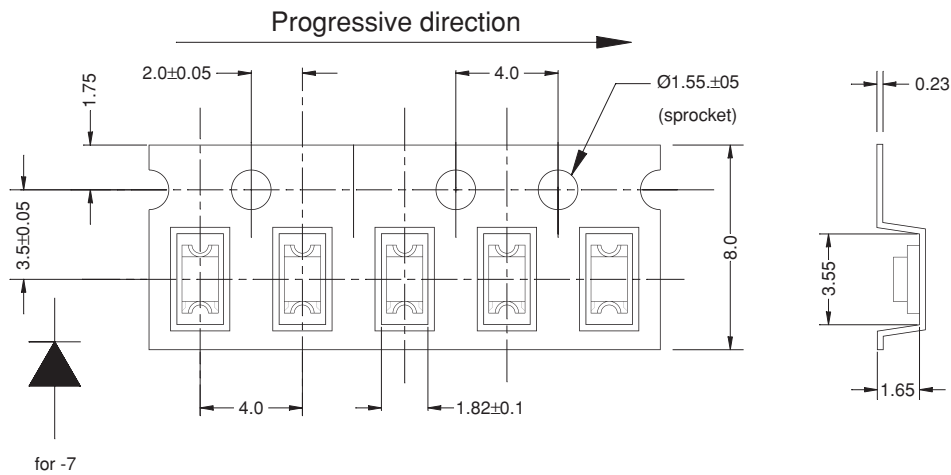
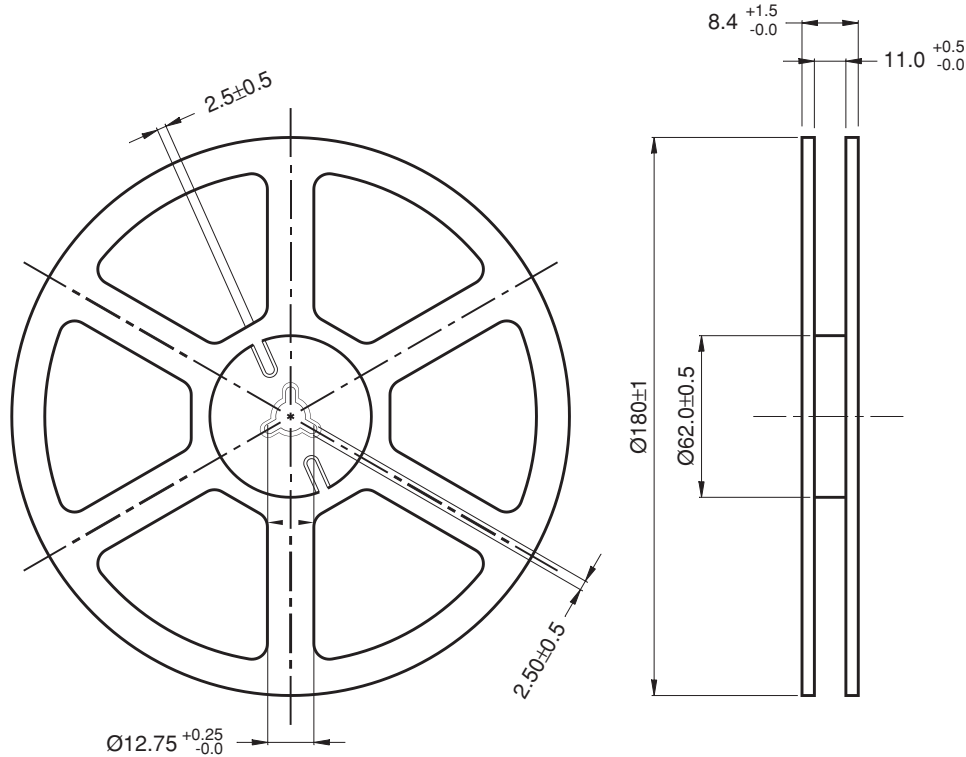
**RECOMMENDED IR REFLOW SOLDERING PROFILE**




QTLP650C-2 / QTLP650D-2 HER  
 QTLP650C-4 / QTLP650D-4 Green  
 QTLP650C-B Blue

QTLP650C-3 / QTLP650D-3 Yellow  
 QTLP650C-7 / QTLP650D-7 AlGaAs Red

### TAPE AND REEL DIMENSIONS



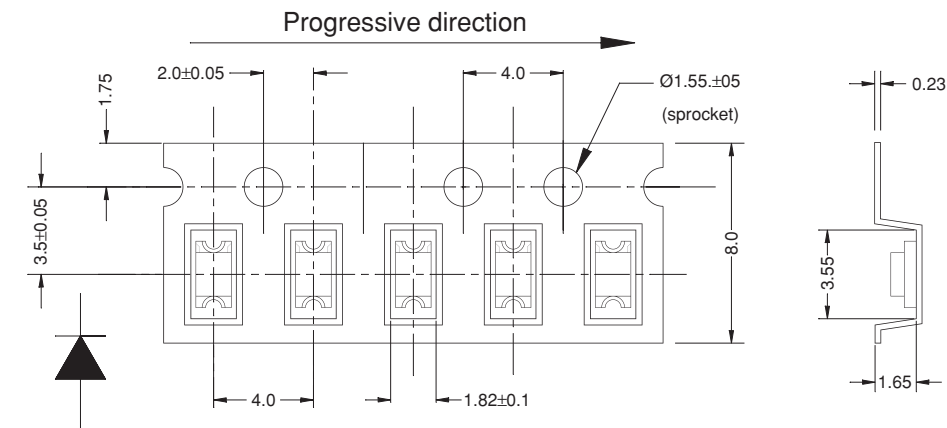
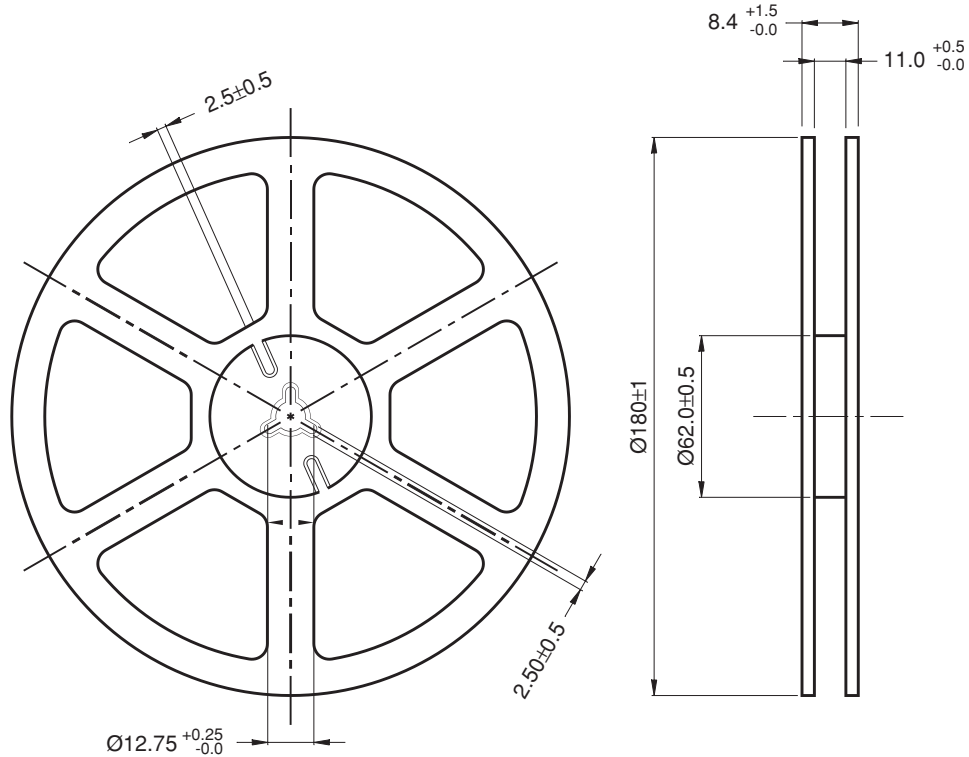
Polarity  for -7

Dimensional tolerance is  $\pm 0.1$  mm unless otherwise specified  
 Angle:  $\pm 0.5$   
 Unit: mm  
 Polarity marks on opposite sprocket side.

QTLP650C-2 / QTLP650D-2 HER  
 QTLP650C-4 / QTLP650D-4 Green  
 QTLP650C-B Blue

QTLP650C-3 / QTLP650D-3 Yellow  
 QTLP650C-7 / QTLP650D-7 AlGaAs Red

### TAPE AND REEL DIMENSIONS



for -2, -3, -4 and -B

Polarity

Dimensional tolerance is  $\pm 0.1$  mm unless otherwise specified

Angle:  $\pm 0.5$

Unit: mm

Polarity marks on the sprocket side.

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**QTLP650C-2 / QTLP650D-2** HER

**QTLP650C-3 / QTLP650D-3** Yellow

**QTLP650C-4 / QTLP650D-4** Green

**QTLP650C-7 / QTLP650D-7** AlGaAs Red

**QTLP650C-B** Blue

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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.

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