

**QTLP650C-R** Red

**QTLP650C-E** Orange

**QTLP650C-O** Yellow-Orange

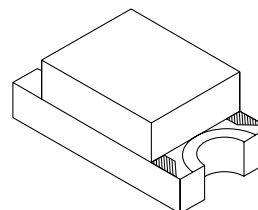
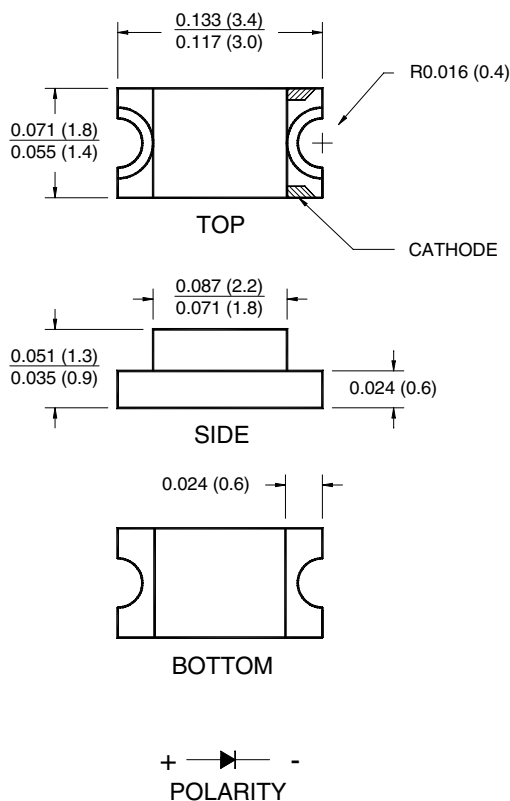
**QTLP650C-Y** Yellow

**QTLP650C-AG** Yellow-Green

**QTLP650C-IG** True Green

**QTLP650C-IB** Blue

### PACKAGE DIMENSIONS



NOTE:

Dimensions for all drawings are in inches (mm).

### 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
- AlInGaP technology for -R, -E, -O, -Y and -AG
- InGaN/SiC technology for -IG and -IB
- Wide viewing angle of 140°
- Water clear optics
- Moisture-proof packaging
- Available in 0.315" (8mm) width tape on 7" (178mm) diameter reel; 2,000 units per reel

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

| Parameter                                                 | Symbol           | QTLP650C      |     |     |     |     | Units |
|-----------------------------------------------------------|------------------|---------------|-----|-----|-----|-----|-------|
|                                                           |                  | -R            | -E  | -O  | -Y  | -AG |       |
| Continuous Forward Current                                | I <sub>F</sub>   | 30            | 30  | 30  | 25  | 30  | mA    |
| Peak Forward Current<br>(f = 1.0 KHz, Duty Factor = 1/10) | I <sub>FM</sub>  | 160           | 160 | 160 | 120 | 160 | mA    |
| Reverse Voltage                                           | V <sub>R</sub>   | 5             | 5   | 5   | 5   | 5   | V     |
| Power Dissipation                                         | P <sub>D</sub>   | 72            | 72  | 72  | 60  | 72  | mW    |
| Operating Temperature                                     | T <sub>OPR</sub> | -40 to +85    |     |     |     |     | °C    |
| Storage Temperature                                       | T <sub>STG</sub> | -40 to +90    |     |     |     |     | °C    |
| Lead Soldering Time                                       | T <sub>SOL</sub> | 260 for 5 sec |     |     |     |     | °C    |

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| Parameter                                                 | Symbol           | QTLP650C      |     | Units |
|-----------------------------------------------------------|------------------|---------------|-----|-------|
|                                                           |                  | -IB           | -IG |       |
| Continuous Forward Current                                | I <sub>F</sub>   | 30            | 30  | mA    |
| Peak Forward Current<br>(f = 1.0 KHz, Duty Factor = 1/10) | I <sub>FM</sub>  | 100           | 100 | mA    |
| Reverse Voltage                                           | V <sub>R</sub>   | 5             | 5   | V     |
| Power Dissipation                                         | P <sub>D</sub>   | 120           | 120 | mW    |
| Operating Temperature                                     | T <sub>OPR</sub> | -40 to +85    |     | °C    |
| Storage Temperature                                       | T <sub>STG</sub> | -40 to +90    |     | °C    |
| Lead Soldering Time                                       | T <sub>SOL</sub> | 260 for 5 sec |     | °C    |

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### ELECTRICAL / OPTICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

| Part Number                   | Symbol            | QTLP650C |     |     |     |     | Condition             |
|-------------------------------|-------------------|----------|-----|-----|-----|-----|-----------------------|
|                               |                   | -R       | -E  | -O  | -Y  | -AG |                       |
| Luminous Intensity (mcd)      | I <sub>V</sub>    |          |     |     |     |     | I <sub>F</sub> = 20mA |
| Minimum                       |                   | 25       | 25  | 25  | 25  | 15  |                       |
| Typical                       |                   | 70       | 70  | 70  | 70  | 30  |                       |
| Forward Voltage (V)           | V <sub>F</sub>    |          |     |     |     |     | I <sub>F</sub> = 20mA |
| Maximum                       |                   | 2.4      | 2.4 | 2.4 | 2.4 | 2.4 |                       |
| Typical                       |                   | 2.0      | 2.0 | 2.0 | 2.0 | 2.0 |                       |
| Wavelength (nm)               | λ <sub>P</sub>    |          |     |     |     |     | I <sub>F</sub> = 20mA |
| Peak                          |                   | 630      | 620 | 610 | 590 | 575 |                       |
| Dominant                      | λ <sub>D</sub>    | 624      | 615 | 605 | 589 | 573 |                       |
| Spectral Line Half Width (nm) | Δλ                | 20       | 18  | 18  | 15  | 20  | I <sub>F</sub> = 20mA |
| Viewing Angle (°)             | 2Θ <sub>1/2</sub> | 140      | 140 | 140 | 140 | 140 | I <sub>F</sub> = 20mA |

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| Part Number                   | Symbol            | QTLP650C |     | Condition             |
|-------------------------------|-------------------|----------|-----|-----------------------|
|                               |                   | -IB      | -IG |                       |
| Luminous Intensity (mcd)      | I <sub>V</sub>    |          |     | I <sub>F</sub> = 20mA |
| Minimum                       |                   | 35       | 100 |                       |
| Typical                       |                   | 45       | 140 |                       |
| Forward Voltage (V)           | V <sub>F</sub>    |          |     | I <sub>F</sub> = 20mA |
| Maximum                       |                   | 4.0      | 4.0 |                       |
| Typical                       |                   | 3.5      | 3.5 |                       |
| Wavelength (nm)               | λ <sub>P</sub>    |          |     | I <sub>F</sub> = 20mA |
| Peak                          |                   | 465      | 520 |                       |
| Dominant                      | λ <sub>D</sub>    | 470      | 525 |                       |
| Spectral Line Half Width (nm) | Δλ                | 25       | 35  | I <sub>F</sub> = 20mA |
| Viewing Angle (°)             | 2Θ <sub>1/2</sub> | 140      | 140 | I <sub>F</sub> = 20mA |

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### TYPICAL PERFORMANCE CURVES (QTLP650C-R, -E, -O, -Y and -AG)

Fig. 1 Forward Current vs. Forward Voltage

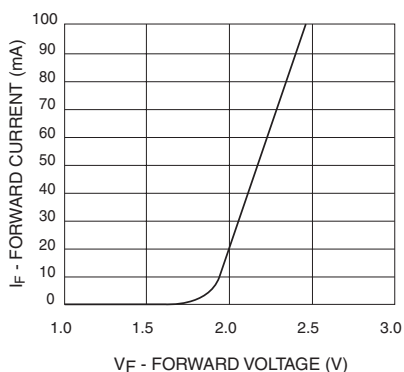


Fig. 2 Relative Luminous Intensity vs. DC Forward Current

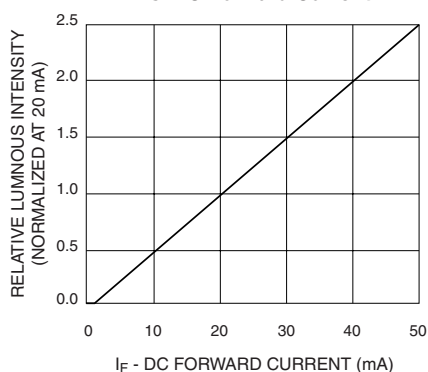


Fig. 3 Relative Intensity vs. Peak Wavelength

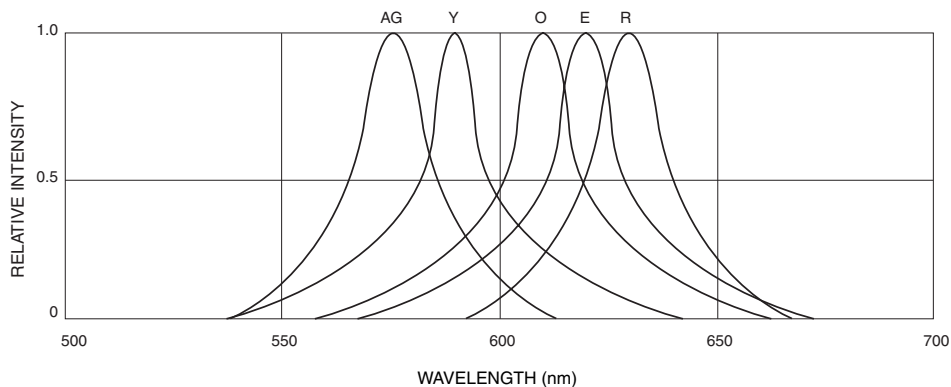


Fig.4 Radiation Diagram

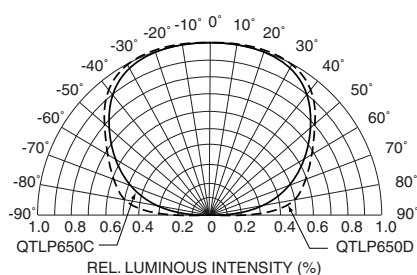
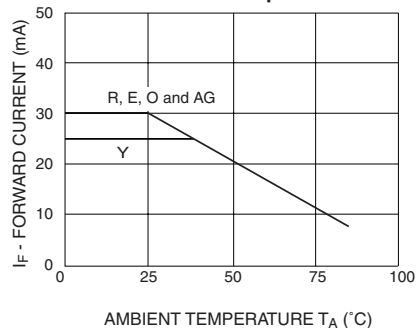


Fig.5 Maximum Forward Current vs. Ambient Temperature



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### TYPICAL PERFORMANCE CURVES (QTLP650C-IG and IB)

Fig. 1 Forward Current vs. Forward Voltage

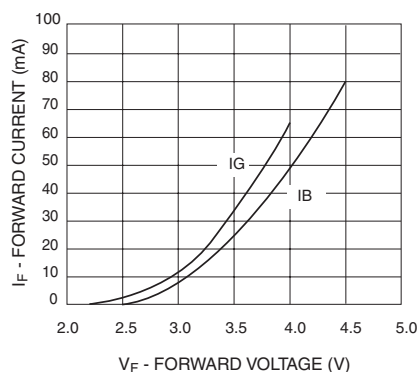


Fig. 2 Relative Luminous Intensity vs. DC Forward Current

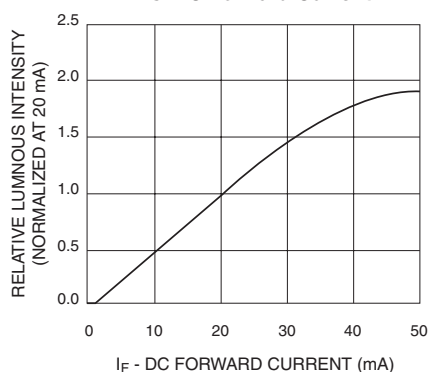


Fig. 3 Relative Intensity vs. Peak Wavelength

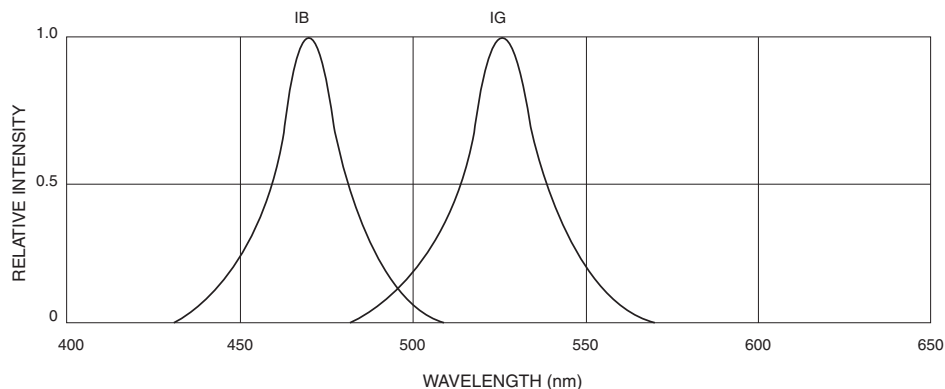


Fig. 4 Radiation Diagram

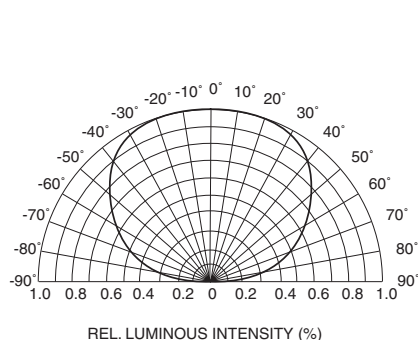
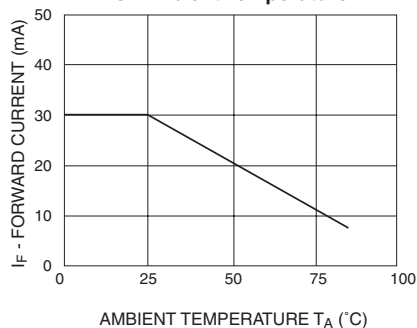


Fig. 5 Maximum Forward Current vs. Ambient Temperature



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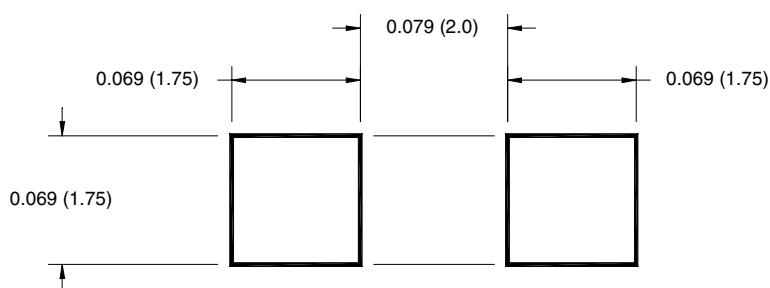
QTLP650C-Y Yellow

QTLP650C-AG Yellow-Green

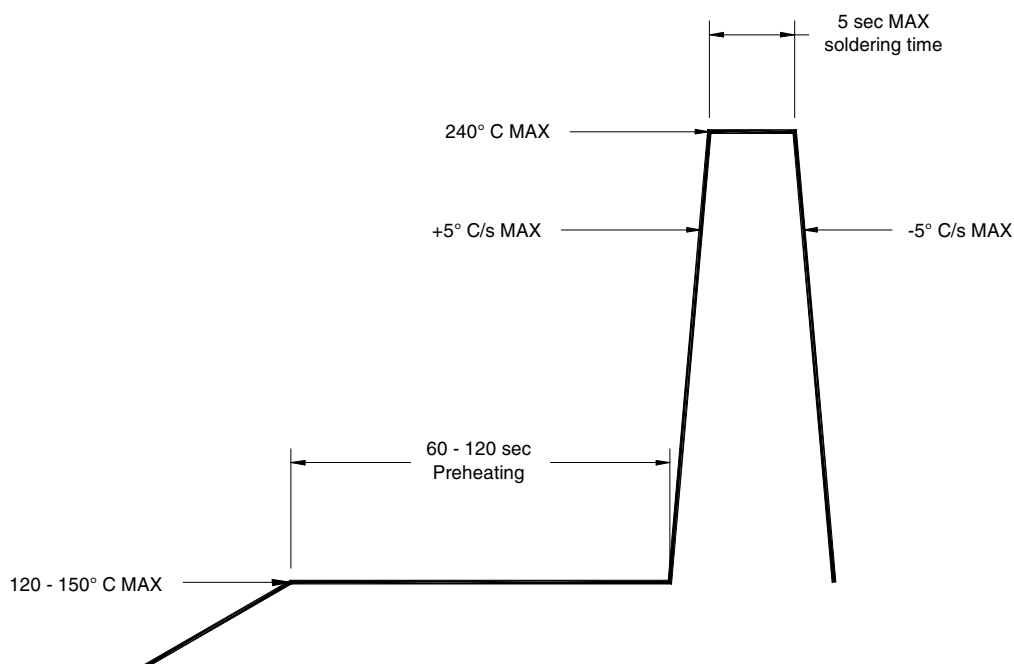
QTLP650C-IG True Green

QTLP650C-IB Blue

### RECOMMENDED PRINTED CIRCUIT BOARD PATTERN



### RECOMMENDED IR REFLOW SOLDERING PROFILE



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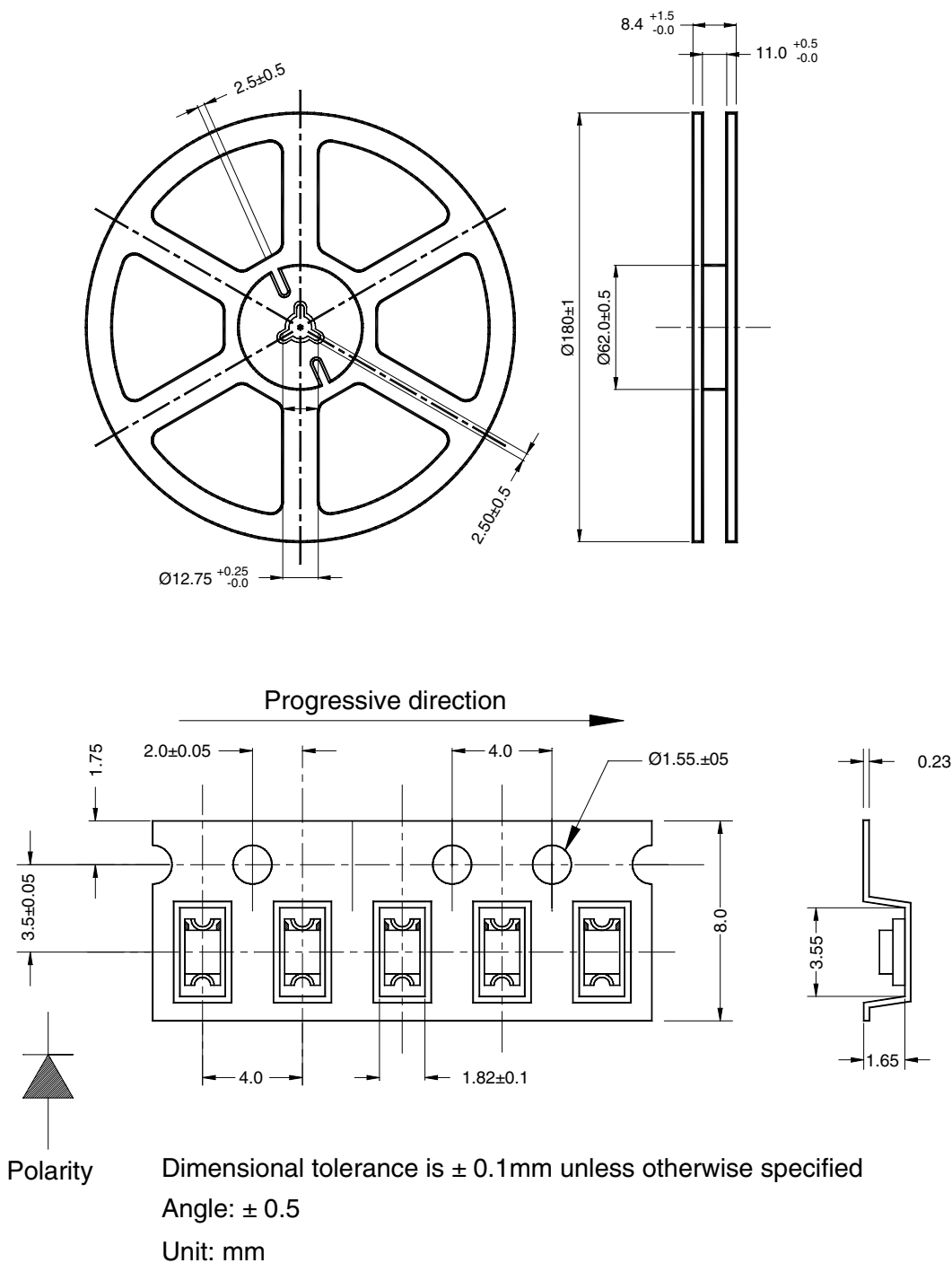
## QTL P650C-Y Yellow

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**QTLP650C-IB Blue**

## TAPE AND REEL DIMENSIONS



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