

# CTL0402FWH1T-L DATASHEET

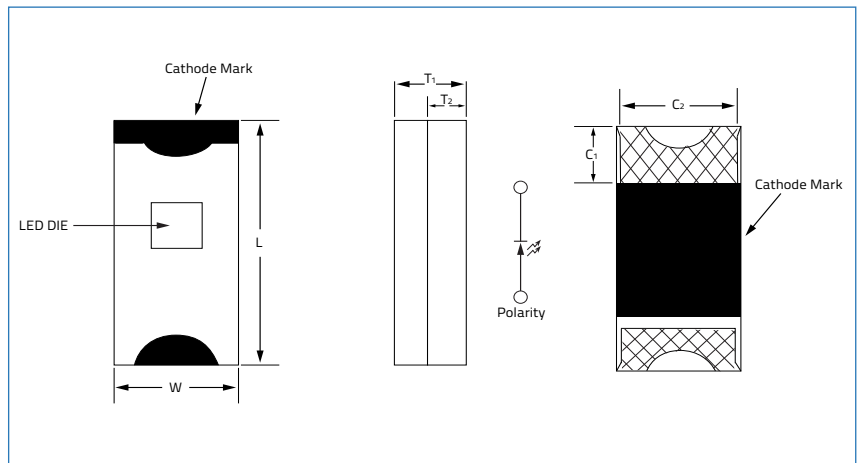
Chip Type LED, 0402, Flat Lens, White, Low Profile



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Part Number	Size	Emitting Color	Emitting Material	Lens-Color	Luminous Intensity ( $I_f=5\text{mA}$ ) mcd	Viewing Angle ( $2\theta$ 1/2)
CTL0402FWH1T-L	0402	White	InGaN	Yellow Diffused	90 min 140 typ	130°

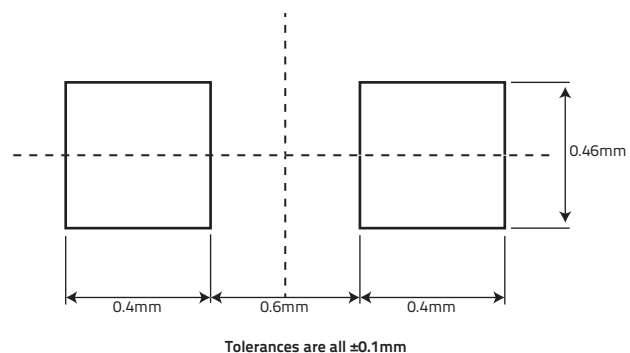
Electrical & Optical Specifications ( $T_A=25^\circ\text{C}$ )	WH1 (InGaN)	Unit
Forward Voltage (Min.) ( $I_F=5\text{mA}$ )	$V_F$	2.8 V
Forward Voltage (Max.) ( $I_F=5\text{mA}$ )	$V_F$	3.2 V
Reverse Current (Max) ( $V_R=5\text{V}$ )	$I_R$	100 $\mu\text{A}$
Chromatic Coordinates (Min.) ( $I_F=5\text{mA}$ )	X	0.25
Chromatic Coordinates (Max.) ( $I_F=5\text{mA}$ )	X	0.33
Chromatic Coordinates (Min.) ( $I_F=5\text{mA}$ )	Y	0.2050
Chromatic Coordinates (Max.) ( $I_F=5\text{mA}$ )	Y	0.36



Dimensions		Units: Inches (mm)	
$L_1$	W	$T_1$	$T_2$
0.039±0.004 (1.0±0.1)	0.0196±0.004 (0.5±0.1)	0.01±0.004 (0.25±0.1)	0.0055±0.004 (0.14±0.1)
$C_1$	$C_2$		
0.0079±0.004 (0.20±0.1)	0.018±0.004 (0.46±0.1)		

Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ )	WH1 (InGaN)	Unit
Reverse Voltage	$V_R$	5 V
DC Forward Current	$I_F$	5 mA
Peak Forward Current 1/10 Duty Cycle @ 10KHz	$1_{FP}$	60 mA
Power Dissipation	$P_D$	16.25 mW
Operating Temperature	$T_A$	-40 ~ +85 °C
Storage Temperature	Tstg	-40 ~ +100 °C

## Soldering Pad Layout



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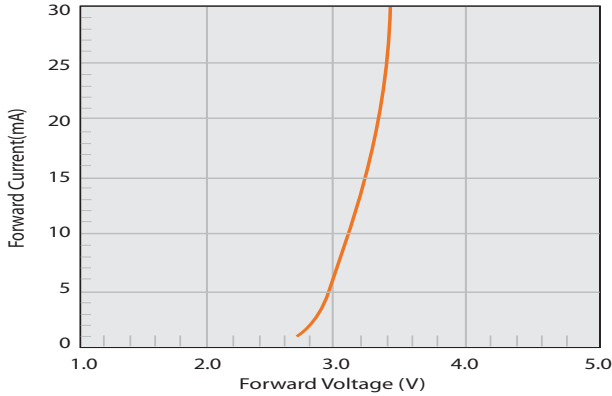
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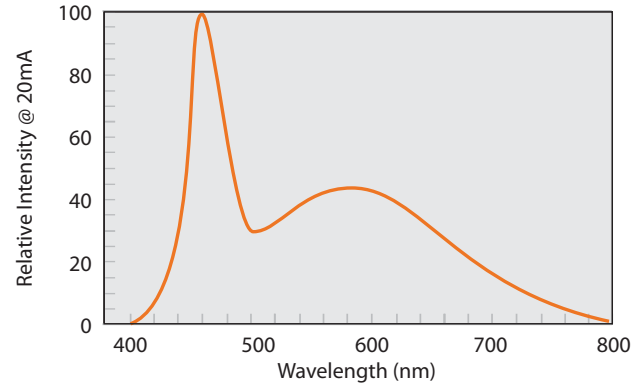
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## Graphs

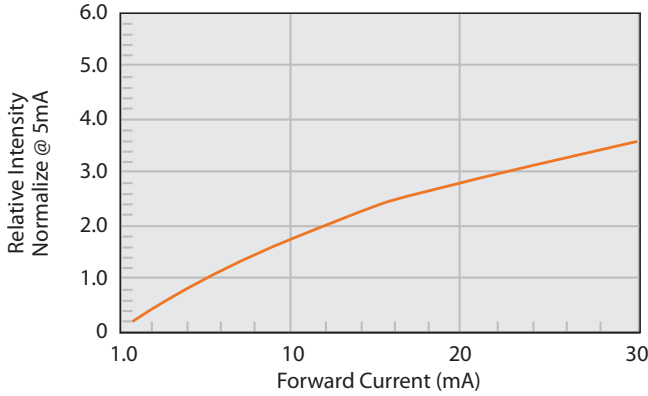
**Fig. 1 Forward Current vs Forward Voltage**



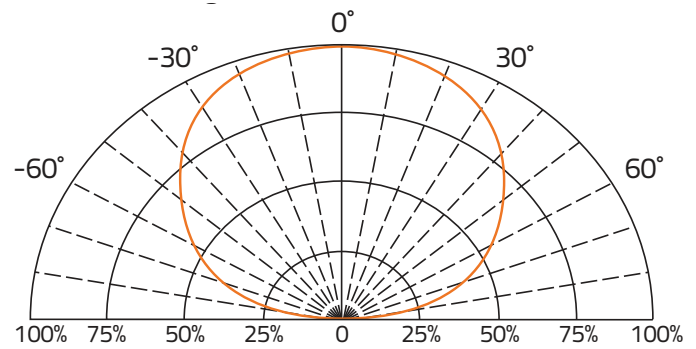
**Fig. 4 Relative Intensity vs Wavelength**



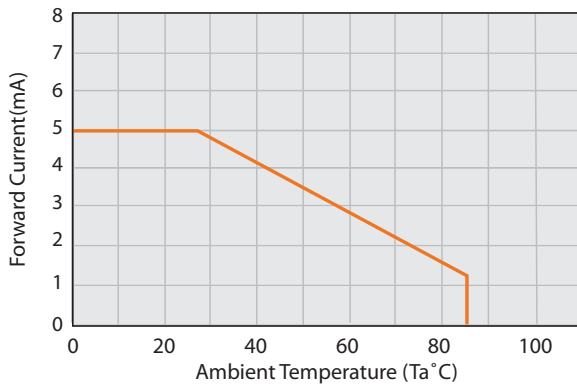
**Fig. 2 Relative Intensity vs Forward Current**



**Fig. 6 Direct Radiation**



**Fig. 3 Current vs Temp**



### Environmental information

RoHS Status	6 of 6 Compliant
REACH Status	Compliant
Halogen Status	Halogen Free
Conflict Mineral Status	Conflict Mineral Free
Moisture Sensitivity Level (MSL)	3

### Reflow profile

Max Reflow Temperature	260°C
Number of Reflow Cycles	2

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## Label Example

Item: CTLO402FWH1T-L

Chip Type LED,0402,Flat Lens,White,Low Profile

Qty: 3000

D/C: 1616

Lot: E1A1A22L12

BIN/HUE: R1/C1

VF: 2.8-2.9

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### Codes:

VF: Forward Voltage | BIN: Luminous Intensity | HUE: Dominant Wavelength

## Luminous Intensity Classification (BIN Code)

BIN Code	Iv(mcd) at 5mA	
	Min.	Max.
Q2	90	112.5
R1	112.5	140
R2	140	180
S1	180	226
S2	226	285

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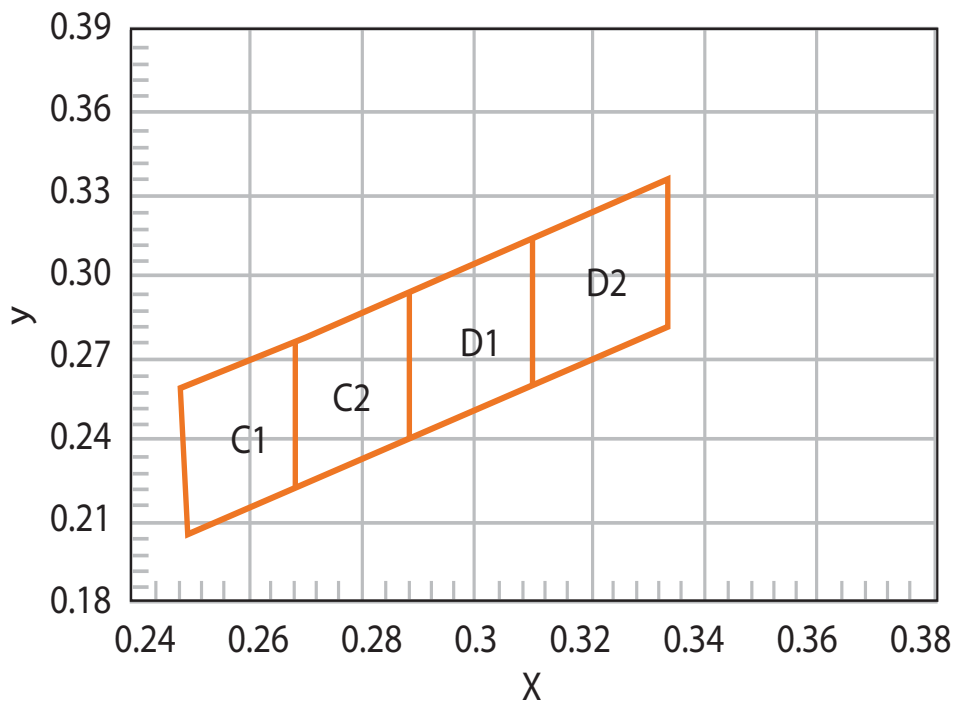


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## CHROMATICITY COORDINATES SPECIFICATIONS FOR HUE GRADING

Color Coordinates at 5mA								
BIN CODE	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
C1	0.25	0.2050	0.25	0.25	0.27	0.2775	0.27	0.2325
C2	0.27	0.2325	0.27	0.2775	0.29	0.305	0.29	0.26
D1	0.29	0.26	0.29	0.3025	0.31	0.3352	0.31	0.2875
D2	0.31	0.2875	0.31	0.3325	0.33	0.36	0.33	0.315

## CIE CHROMATICITY DIAGRAM



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Reel Specifications		Units: mm		
<b>M</b>	<b>C</b>	<b>F</b>	<b>E</b>	<b>G</b>
178±1.50	56.0±1.0	12.0±1.0	60.0±1.0	9.0±1.0

Packaging Specifications	
Reel Size:	7"
Quantity per Reel :	3,000

Storage Specifications
1. Storage temperature and RH: 5°C~35°C, RH60%
2. Once the package is opened, the LEDs should be used within a week. Otherwise, they should be kept in a moisture proof bag with desiccant. We suggest that you use this product within one year from date code.
3. If opened for more than one week in an atmosphere of 5°C~35°C, RH60%. The parts should be heat treated at 60°C±5°C for 15 hours.

Tape Specifications		Units: mm		
<b>T</b>	<b>W</b>	<b>A</b>	<b>B</b>	<b>F</b>
0.60±0.5	8.0±0.3	1.75±0.5	0.90±0.1	3.5±0.2
<b>E</b>	<b>H</b>	<b>J</b>	<b>D</b>	<b>G</b>
1.75±0.1	4.0±0.2	2.0±0.1	1.5±0.1	4.0±0.2

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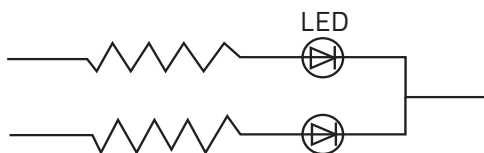
## Environmental Test Criteria

Classification	Test Item	Test Condition	Sample Size
Endurance Test	Operating Life	1. Ta=25°C 2. If=20mA 3. t=1000hrs (-24hrs, +72hrs)	22
	High Temperature Storage	1. Ta=105°C±5°C 2. t=1000hrs (-24hrs, +72hrs)	22
	Low Temperature Storage	1. Ta=-40°C±5°C 2. t=1000hrs (-24hrs, +72hrs)	22
	High Temperature, High Humidity Storage	1. Ta=85°C 2. RH=85% 3. t=1000hrs(-24hrs, +72hrs)	22
Environmental Test	Thermal Shock	1. Ta=100°C±5°C & -40°C±5°C 20min / 10sec / 20min 3. Total: 100 cycles total	22
	Temperature Cycling	1. 100°C±5°C & -40°C±5°C 30mins / 5mins / 30mins 2. 100 Cycles	22
	IR Reflow	1. T=260°C Max. 10 seconds Max 2. 6 Min	22

## Drive Method

LED is a current operated drive, and therefore it requires some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in series with the LED. Consider worst case voltage variations that can occur across the current limiting resistor placed in series with the LED. The forward current should not be allowed to change by more than 40% of its desired value.

Circuit model A



Circuit model B

