

PLCC Series

ET-3528x-1F3W Series Datasheet



Features :

- High luminous Intensity and high efficiency
- Based on Blue/Green : InGa_N, Red : AlGaInP technology
- Wide viewing angle : 120°
- Excellent performance and visibility
- Suitable for all SMT assembly methods
- IR reflow process compatible
- Environmental friendly; RoHS compliance

Typical Applications

- Signal and Symbol Luminaire
- Indoor and Outdoor Displays
- Backlighting (illuminated advertising, general lighting)
- Interior Automotive Lighting

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General Information

Introduction

Ultra high luminous efficacy, combined with the flexibility in design due to its slim and miniature size, PLCC LED Series are optimized to be used as lighting for building.

Product Nomenclature

The following table describes the available color, package size, and chip quantity.

Table 1. PLCC 3528 series Nomenclature

ET		3528		X	-	1	F	3	W		
X1		X2		X3		X4	X5	X6	X7		
X1 LED Item		X2 Package Type		X3 Emitter Color		X4 Chip Quantity		X5~X6 Serial No.		X7 Feature	
Code	Type	Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
ET	Edison Top LED	3528	3.5X2.8mm	W	Cool White	1	1pcs			W	White surface
				H	Neutral White						
				X	Warm White						

LED Package Dimension and Polarity

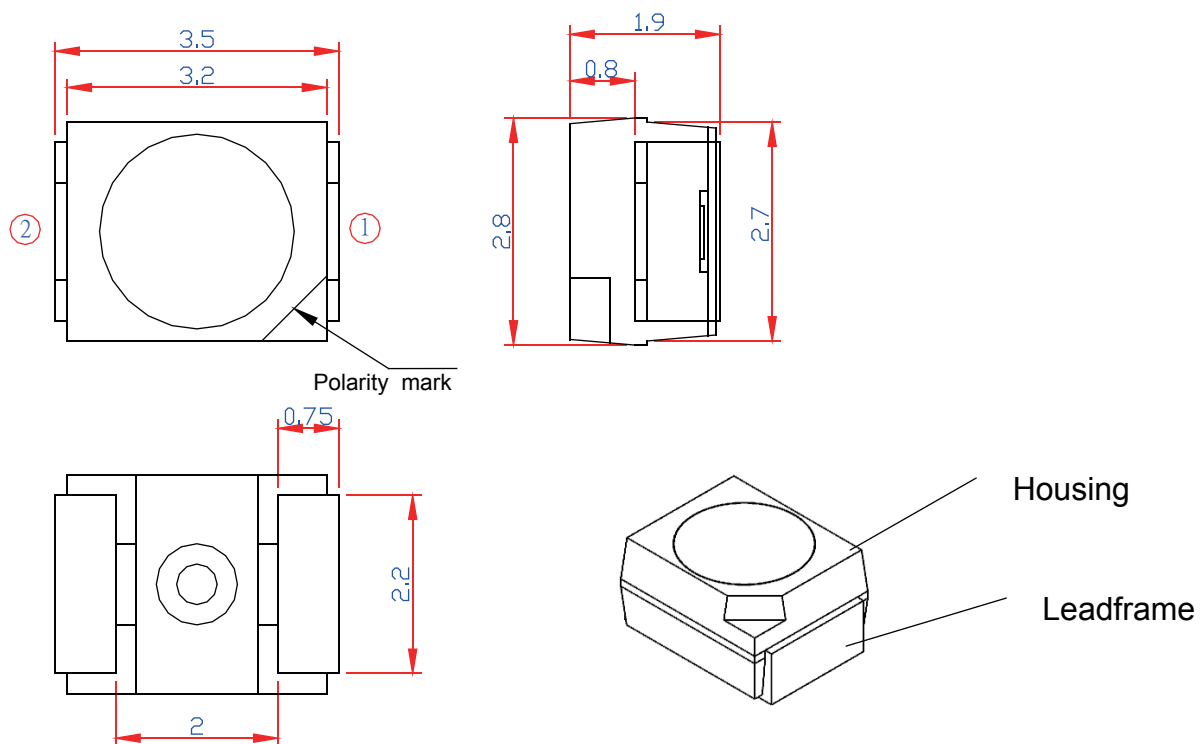


Figure 1. PLCC 3528 series Dimension

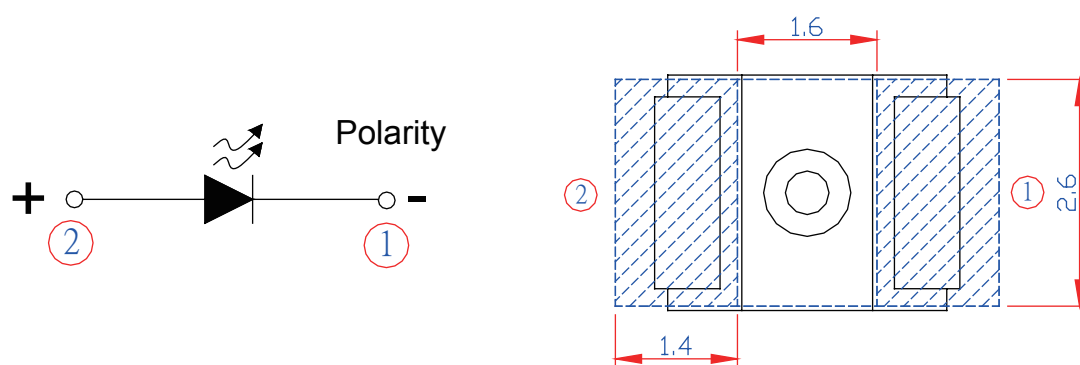


Figure 2. PLCC 3528 series circuit diagram

Notes:

1. All dimensions are measured in mm.
2. Tolerance : ± 0.20 mm

Absolute Maximum Ratings

The following table describe absolute maximum ratings of PLCC 3528 series.

Table 2 . Absolute maximum ratings for PLCC 3528 series

Parameter	Rating	Units	Symbol
Forward Current	30	mA	I_F
Pulse Forward Current ($t_p \leq 100\mu s$, Duty cycle=0.25)	100	mA	-
Reverse Voltage	5	V	V_R
Forward Voltage	3.8	V	V_F
LED Junction Temperature	125	$^{\circ}C$	T_J
Operating Temperature	-30 ~ +85	$^{\circ}C$	-
Storage Temperature	-40 ~ +100	$^{\circ}C$	-
Soldering Temperature	255~260	$^{\circ}C$	-
Manual Soldering at 350 $^{\circ}C$ (Max.)	3	Sec	-

Notes:

1. Above values are based on one chip performance.
2. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
3. LEDs are not designed to be driven in reverse bias.
4. t_p : Pulse width time.

Luminous Intensity Characteristic

The following table describes luminous intensity of PLCC 3528 series.

Table 3 . Luminous Flux characteristics at $I_f=20\text{mA}$ and $T_a=25^\circ\text{C}$ for PLCC 3528 series

Part Name	Color	Luminous Flux (lm)			Luminous Intensity (mcd)Typ.	Forward Current (mA)
		Group	Min.	Max		
ET-3528W-1F3W	Cool White	L23	6.4	6.7	2,600	20
		L24	6.7	7.0		
		L25	7.0	7.3		
		L26	7.3	7.5		
		L27	7.5	7.8		
		L28	7.8	8.1		
		L29	8.1	8.7		
ET-3528H-1F3W	Neutral White	L22	6.1	6.4	2,500	20
		L23	6.4	6.7		
		L24	6.7	7.0		
		L25	7.0	7.3		
		L26	7.3	7.5		
		L27	7.5	7.8		
		L28	7.8	8.1		
ET-3528X-1F3W	Warm White	L29	8.1	8.7	2,100	20
		L18	5.0	5.3		
		L19	5.3	5.6		
		L20	5.6	5.8		
		L21	5.8	6.1		
		L22	6.1	6.4		
		L23	6.4	6.7		
		L24	6.7	7.0		
		L25	7.0	7.3		

Note: Luminous intensity is measured with an accuracy of $\pm 10\%$

Characteristic

Optical Characteristics

The following table describes CCT of PLCC 3528 series

Table 4. Optical characteristics at $I_F=30\text{mA}$ and $T_a=25^\circ\text{C}$

Part Name	Color	V_F (V)			CRI	Viewing Angle (Degree)
		Min.	Typ.	Max.		
ET-3528W-1F3W	Cool White	2.8	--	3.8	70	120
ET-3528H-1F3W	Neutral White	2.8	--	3.8	75	120
ET-3528X-1F3W	Warm White	2.8	--	3.8	80	120

Note: CRI is measured with an accuracy of ± 5

Electrical Characteristics

The following table describes forward voltage of PLCC 3528 series

Table 5. Electrical Characteristics Characteristics at $T_J=25^\circ\text{C}$

Part Name	Color	CCT(K)		Forward Current (mA)	Thermal Resistance ($^\circ\text{C}/\text{W}$)
		Min.	Max.		
ET-3528W-1F3W	Cool White	5,000	10,000	20	180
ET-3528H-1F3W	Neutral White	3,800	5,000	20	180
ET-3528X-1F3W	Warm White	2,670	3,800	20	180

Note: Forward Voltage is measured with an accuracy of $\pm 0.1\text{V}$

Forward Voltage Ranks

Table 6. Forward voltage rank at $T_a=25^\circ\text{C}$

Bin	Condition	Min	Max	Unit
UJ-1	$I_F=20\text{mA}$	2.8	2.9	V
UJ-2		2.9	3.0	
UK-1		3.0	3.1	
UK-2		3.1	3.2	
UL-1		3.2	3.3	
UL-2		3.3	3.4	
UM-1		3.4	3.5	
UM-2		3.5	3.6	
UN		3.6	3.8	
UO		3.8	4.0	

Note: Forward voltage measurement allowance is $\pm 0.1\text{V}$.

Reliability Test Items

The following table describes operating life, mechanical, and environmental tests performed on PLCC series package.

Test 1⁽¹⁾: JEDEC LEVEL 2a Test

Stress Test	Stress Conditions	Duration	Failure Criteria
Temperature and Humidity	60°C/ 60%RH	120 Hr(<0.5W) 168 Hr(≥0.5W)	No Catastrophes
IR reflow	Peak temp. = 255~260°C/ <10 Sec.	3 Times	No Catastrophes

Test 2: Other Test

Stress Test	Stress Conditions	Duration	Failure Criteria
Room Temperature Operating Life	25°C, $I_F = I_{DCmax}$ (2)	1000 Hours	(3)
High Temperature High Humidity Operating Life	85°C/ 85%RH, $I_F = I_{DCmax} \times 0.5$	1000 Hours	(3)
High Temperature Storage Life	85°C	1000 Hours	(3)
Low Temperature Storage Life	-40°C	1000 Hours	(3)
Non-Operating Thermal Shock	-40°C/125°C 15 min dwell < 10 sec transfer	1000Hours/ 200 Cycles	No Catastrophes
Non-Operating Thermal Cycle	-40°C/100°C 30 min dwell < 15min transfer	1000Hours/ 200 Cycles	No Catastrophes

Notes:

- Reliability test 2 is performed after reliability test 1.
- DC max is defined to be under the indicated driving current for PLCC respectively/
- Failure Criteria:
 - Electrical failures: VF shifts $\geq 10\%$
 - Light Output Degradation: Percentage level shift $\geq 35\%$ for PLCC<0.5W
 - Light Output Degradation: Percentage level shift $\geq 50\%$ at 1,000hrs or 500cycle for PLCC $\geq 0.5W$
 - Visual failures: Broken or damaged package on lens or substrate

Characteristic Curves

Beam Pattern Diagram

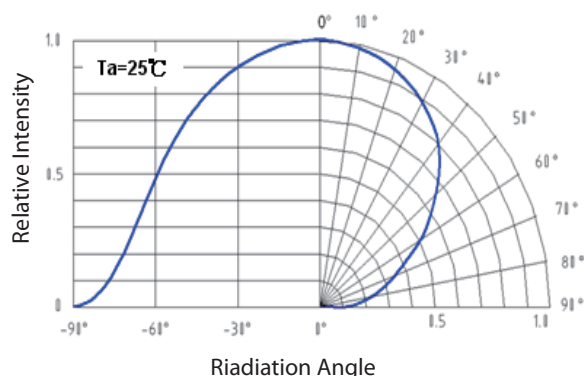


Figure 3. Beam pattern diagram for PLCC 3528 series

Luminous Flux & Wavelength

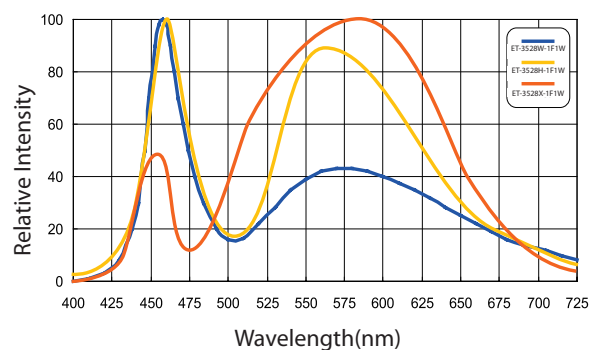


Figure 4. Wavelength & relative intensity for PLCC 3528 series

Luminous Flux & Temperature

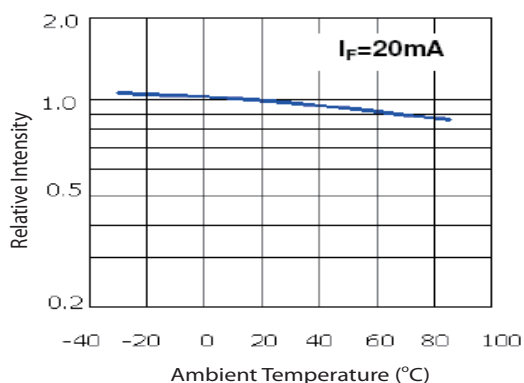


Figure 5. Ambient temperature & relative intensity for PLCC 3528 series

Forward Voltage & Forward Current

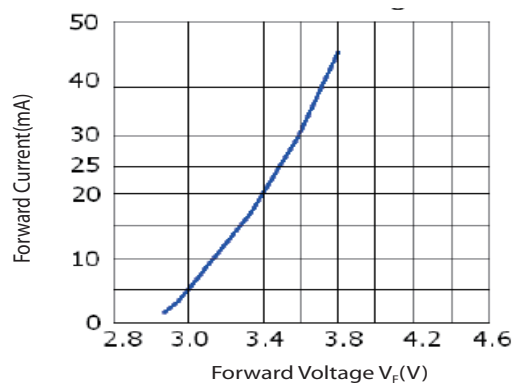


Figure 6. Forward current & forward voltage for PLCC 3528 series

Forward Current & Temperature

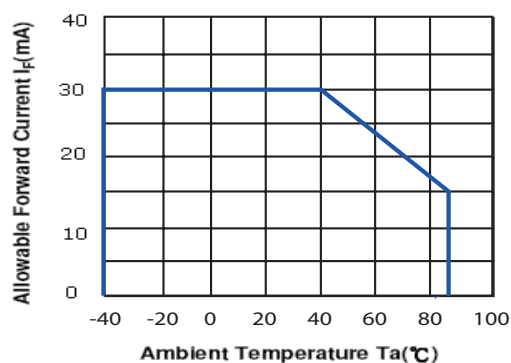


Figure 7. Ambient temperature & forward current for PLCC 3528 series

Luminous Flux & Forward Current

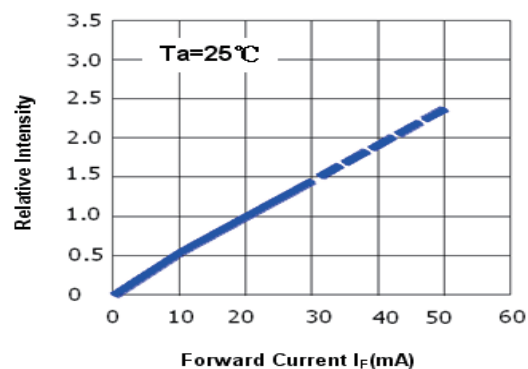
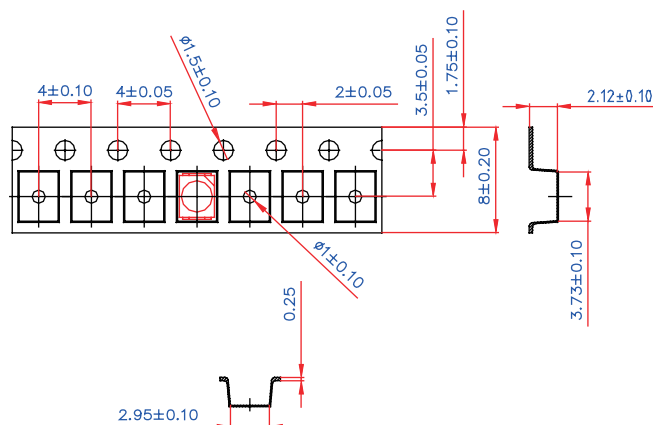


Figure 8. Forward current & relative intensity for PLCC 3528 series

Product Packaging Information

3528 Diemision



Taping Reel

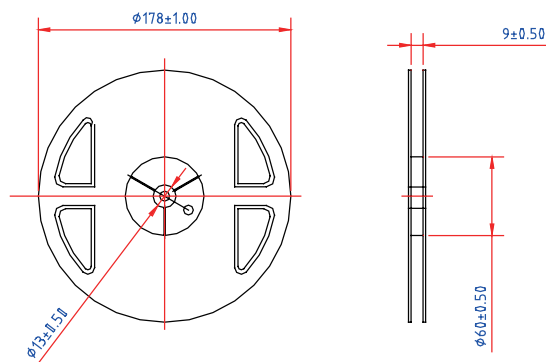
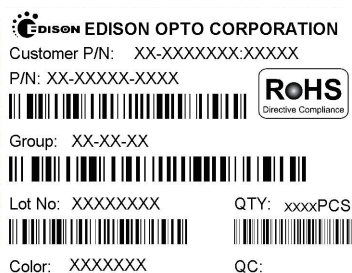


Figure 9. Taping reel dimensions

Package Label



Quantity and Package Dimension

There are two different package quantities for PLCC LEDs. Please confirm the noted quantity before unseal.

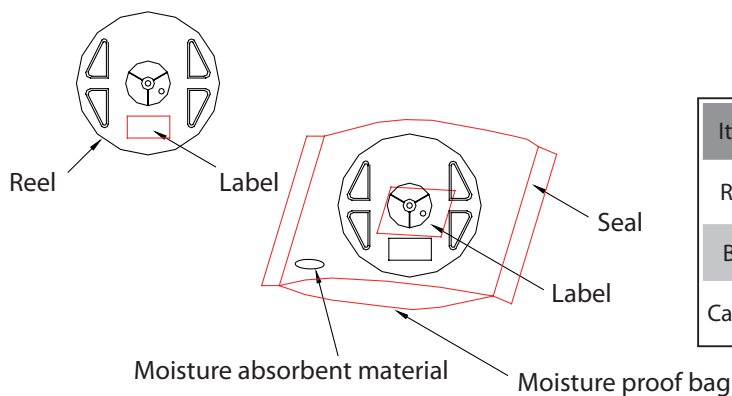


Figure 10. Package label

Table 7. Package dimensions and quantity

Item	Quantity	Total	Dimensions(mm)
Reel	2,000pcs	2,000pcs	Diameter=178
Box	5 reels	10,000pcs	240*235*67mm
Carton	5 boxes	50,000pcs	353*254*256mm

Revision History

Table 8. Revision history of PLCC 3528.

Versions	Modification	Date
1.	Establish a datasheet	2011/10/27
2.	1. Update the Luminous Intensity Characteristic	2012/08/09

About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at www.edison-opto.com

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