

TitanBrite™

10-Watt High Power LED



Market-Leading Brightness and Thermal Resistance

Lumex's new TitanBrite™ 10-Watt (SML-LX4747 series) SMD high-power LED technology provides market-leading brightness and thermal resistance. The technology also provides opportunities for significant cost and real estate savings for applications switching from two 5W or ten 1W technologies to a single 10W LED. The new TitanBrite 10W White LED provides market-leading brightness (23% brighter than alternative 10W LEDs), and thanks to its unique thermal enhanced design with the LEDs mounted onto a ceramic substrate (rather than onto a PCB), heat dissipation performance is improved up to 61% compared to the use of two 5W LEDs.

Features:

- Brightness of 600lm for cool white, 550lm for neutral white and 530lm for warm white
- Unique thermal enhanced design
- Compact 12mm² package size
- 120° viewing angle
- Extended operating temperature of -40°C to 100°C

Recommended Markets:

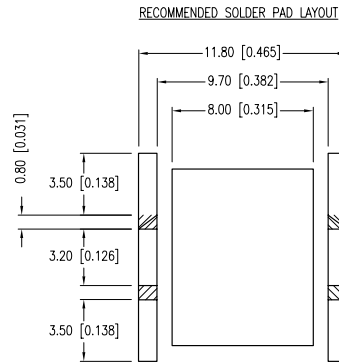
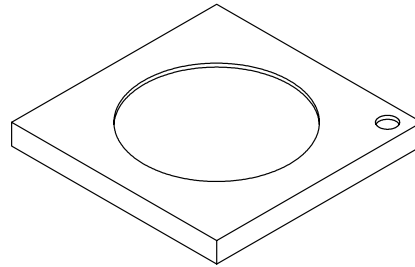
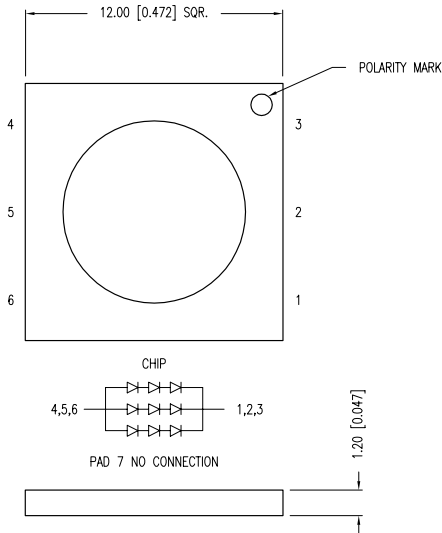
- Small space lighting
- Medical devices
- Appliances



05/04/2011



TitanBrite™ 10-Watt High Power LEDs-Square Package



TitanBrite™ 10-Watt High Power LEDs

PN	Emitted Color	Chip Material	Color Temp (K)	Lens Type	V _f (V)	I _f (mA)	Total Flux (lm)	View Angle
SML-LX4747MWC-TR10	Warm White	InGaN	3000	Yellow	10.4	1000	530lm	120
SML-LX4747NWC-TR10	Neutral White	InGaN	4000	Yellow	10.4	1000	550lm	120
SML-LX4747UWC-TR10	Cool White	InGaN	6000	Yellow	10.4	1000	600lm	120



TitanBrite™ 10-Watt High Power LEDs

Product Specifications

	Specification	Material
Total Flux	Warm White: 530lm @ 1000mA Neutral white: 550lm @ 1000mA Cool white: 600lm @ 1000mA	
Correlated Color Temperature:	Warm white: 3000K Neutral white: 4000K Cool white: 6000K	
Vf	10.4V	
Resin		Epoxy

Electric Static Discharge (ESD) Protection:

ESD protection for GaP and AlGaAs based chips is required even though they are relatively resistant to low levels of electro-static discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE** devices and strict ESD precautions must be taken during design, handling and assembly. If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.



Absolute Maximum Ratings

Parameter	White	Unit	Conditions
DC Forward Current	1000	mA	-
Peak Pulsed Forward Current	1200	mA	0.1ms PW, 1/10 duty
Average Forward Current	1000	mA	-
Reverse Voltage	5	V	$I_r = \mu\text{O}\mu\text{A}$
LED Junction Temperature	110	°C	-
Operating Temperature	-40°C ~ +100°C	°C	-
Storage Temperature	260°C	°C	-
Soldering Temperature	See Temperature Profile Chart		

Electro-Optical Characteristics

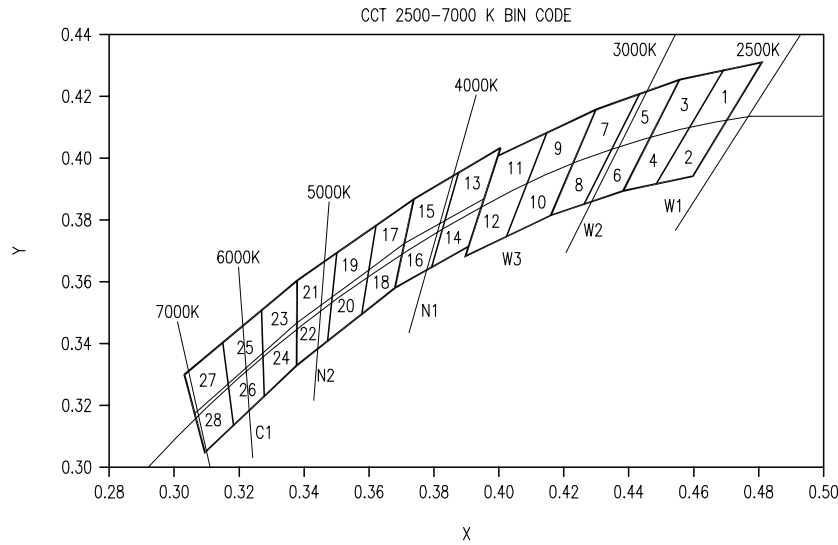
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	-	10.4	-	V	$I_f=1000\text{mA}$
View Angle	$2\theta_{\frac{1}{2}}$	-	120	-	deg	$I_f=1000\text{mA}$
Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta T$			-5.6	mV/°C	
Thermal Resistance Junction to Board				3.5	°C/W	

Correlated Color Temperature Rank for White

Color	Condition	Bin Code	Min.	Typ.	Max.	Unit
Warm White	$I_f=1000\text{mA}$	TW1	2580	2700	2870	K
		TW2	2870	3000	3220	K
		TW3	3220	3500	3710	K
Neutral White	$I_f=1000\text{mA}$	TN1	3710	4000	4260	K
		TN2	4260	4700	5310	K
Cold White	$I_f=1000\text{mA}$	TC1	5310	6000	7040	K
Tolerance $\pm 5\%$						



Correlated Color Temperature Rank for White (X_E, X_F)

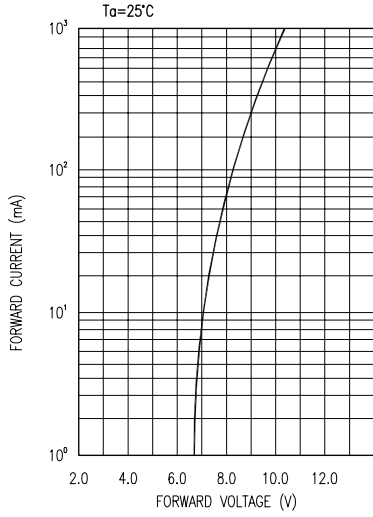


COLOR	GROUP	CHROMATICITY REGIONS	MIN.	TYP.	MAX.
WARM WHITE	W1	1,2,3,4	2580	2700	2870
	W2	5,6,7,8	2870	3000	3220
	W3	9,10,11,12	3220	3500	3710
WARM WHITE	N1	13,14,15,16	3710	4000	4260
	N2	17,18,19,20,21,22	4260	4700	5310
COOL WHITE	C1	23,24,25,26,27,28	5310	6000	7040

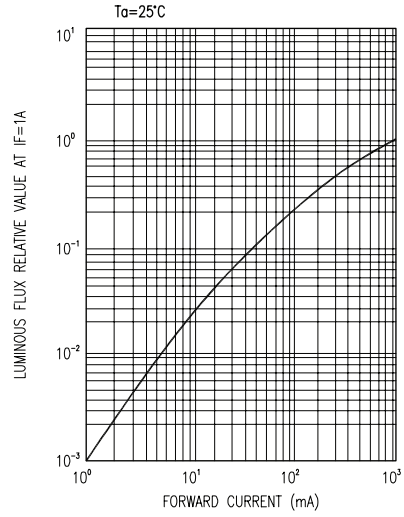
	X	Y		X	Y		X	Y		X	Y		X	Y		X	Y
1	0.4582	0.4099	6	0.4259	0.3853	11	0.3941	0.3848	16	0.3670	0.3578	21	0.3496	0.3702	26	0.3265	0.3371
	0.4687	0.4289		0.4342	0.4028		0.3996	0.4015		0.3702	0.3722		0.3376	0.3616		0.3160	0.3274
	0.4813	0.4319		0.4465	0.4071		0.4146	0.4089		0.3825	0.3798		0.3370	0.3472		0.3175	0.3139
	0.4700	0.4126		0.4373	0.3893		0.4080	0.3916		0.3783	0.3646		0.3481	0.3557		0.3270	0.3230
2	0.4483	0.3919	7	0.4221	0.3984	12	0.3889	0.3690	17	0.3736	0.3874	22	0.3481	0.3557	27	0.3144	0.3408
	0.4582	0.4099		0.4299	0.4165		0.3941	0.3848		0.3616	0.3788		0.3370	0.3472		0.3028	0.3304
	0.4700	0.4126		0.4430	0.4212		0.4080	0.3916		0.3592	0.3641		0.3364	0.3328		0.3055	0.3177
	0.4593	0.3944		0.4342	0.4028		0.4017	0.3751		0.3703	0.3726		0.3466	0.3411		0.3160	0.3274
3	0.4465	0.4071	8	0.4147	0.3814	13	0.3825	0.3798	18	0.3703	0.3726	23	0.3376	0.3616	28	0.3160	0.3274
	0.4562	0.4260		0.4221	0.3984		0.3869	0.3959		0.3592	0.3641		0.3260	0.3512		0.3055	0.3177
	0.4687	0.4289		0.4342	0.4028		0.4006	0.4044		0.3568	0.3495		0.3265	0.3371		0.3081	0.3049
	0.4582	0.4099		0.4259	0.3853		0.3950	0.3875		0.3670	0.3578		0.3370	0.3472		0.3175	0.3139
4	0.4373	0.3893	9	0.4080	0.3916	14	0.3783	0.3646	19	0.3616	0.3788	24	0.3370	0.3472			
	0.4465	0.4071		0.4146	0.4089		0.3825	0.3798		0.3496	0.3702		0.3265	0.3371			
	0.4582	0.4099		0.4299	0.4165		0.3950	0.3875		0.3481	0.3557		0.3270	0.3230			
	0.4483	0.3919		0.4221	0.3984		0.3898	0.3716		0.3592	0.3641		0.3364	0.3328			
5	0.4342	0.4028	10	0.4017	0.3751	15	0.3702	0.3722	20	0.3592	0.3641	25	0.3260	0.3512			
	0.4430	0.4212		0.4080	0.3916		0.3736	0.3874		0.3481	0.3557		0.3144	0.3408			
	0.4562	0.4260		0.4221	0.3984		0.3869	0.3958		0.3466	0.3411		0.3160	0.3274			
	0.4465	0.4071		0.4147	0.3814		0.3825	0.3798		0.3568	0.3495		0.3265	0.3371			



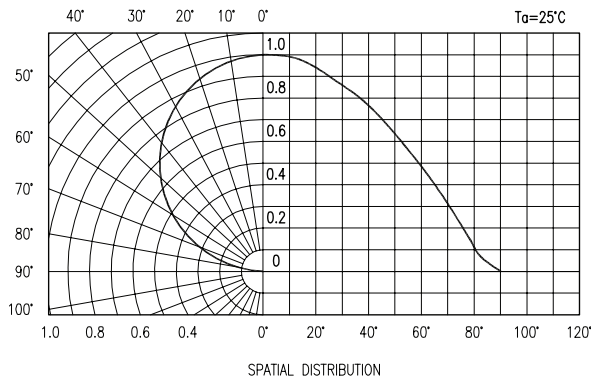
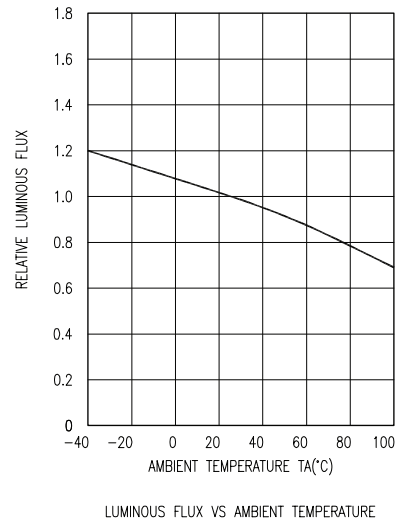
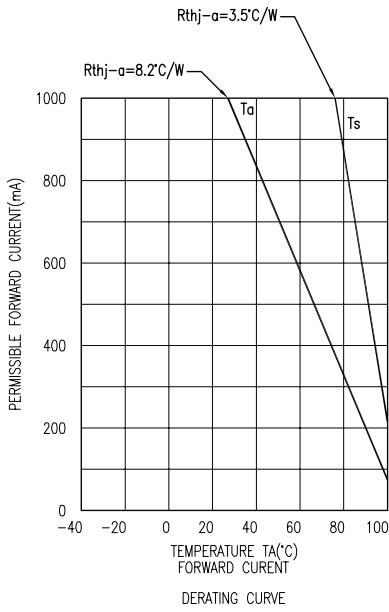
Characteristics Curves (WARM WHITE)



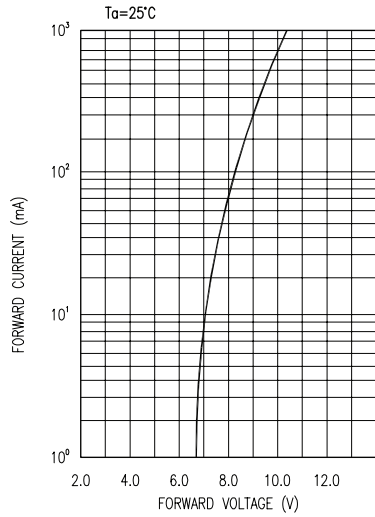
FORWARD CURRENT VS FORWARD VOLTAGE



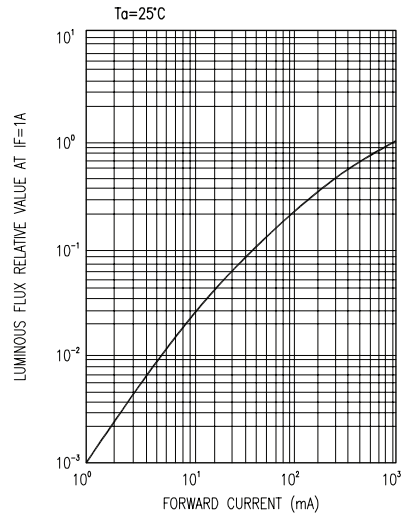
LUMINOUS FLUX VS FORWARD CURRENT



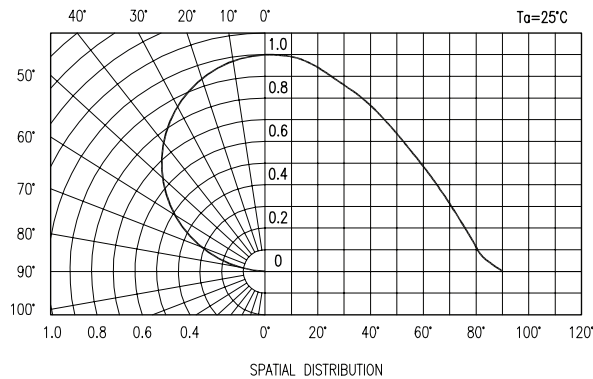
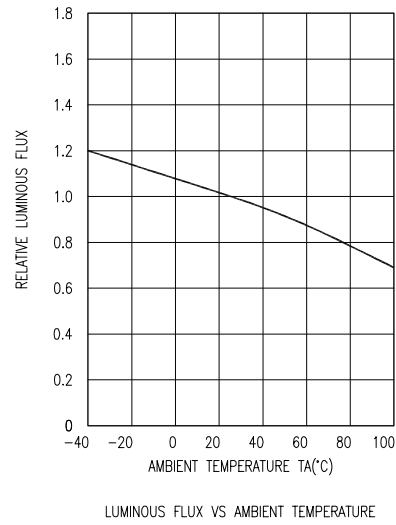
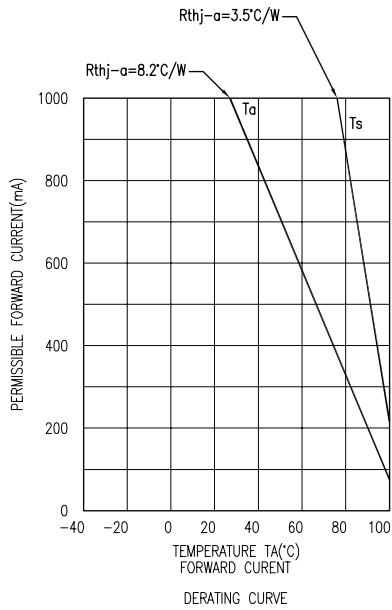
Characteristics Curves (NEUTRAL WHITE)



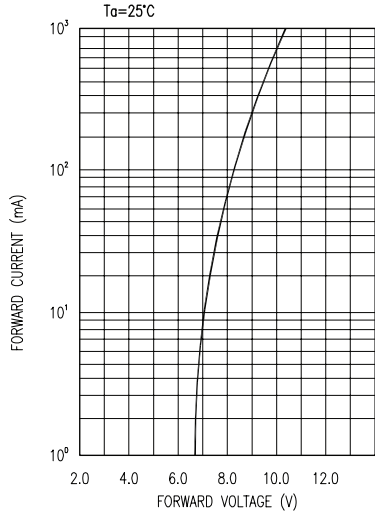
FORWARD CURRENT VS FORWARD VOLTAGE



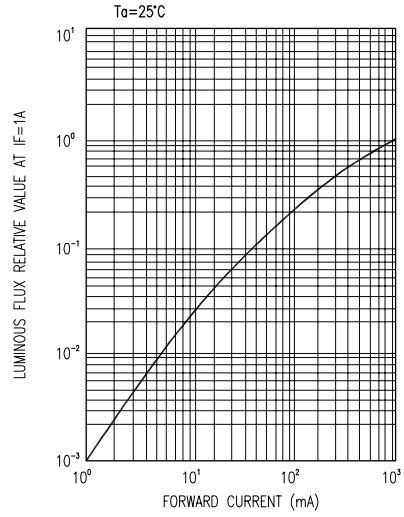
LUMINOUS FLUX VS FORWARD CURRENT



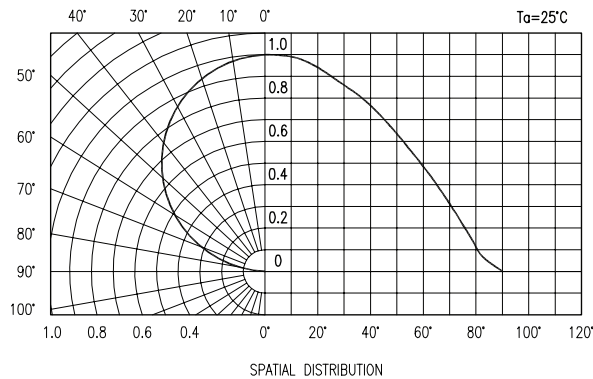
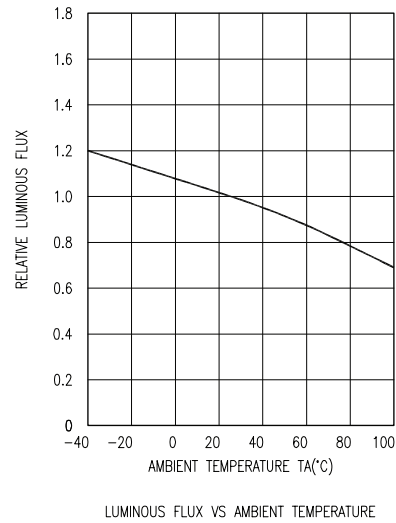
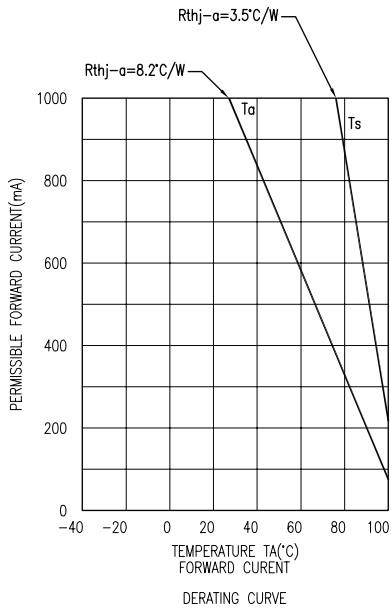
Characteristics Curves (COOL WHITE)



FORWARD CURRENT VS FORWARD VOLTAGE



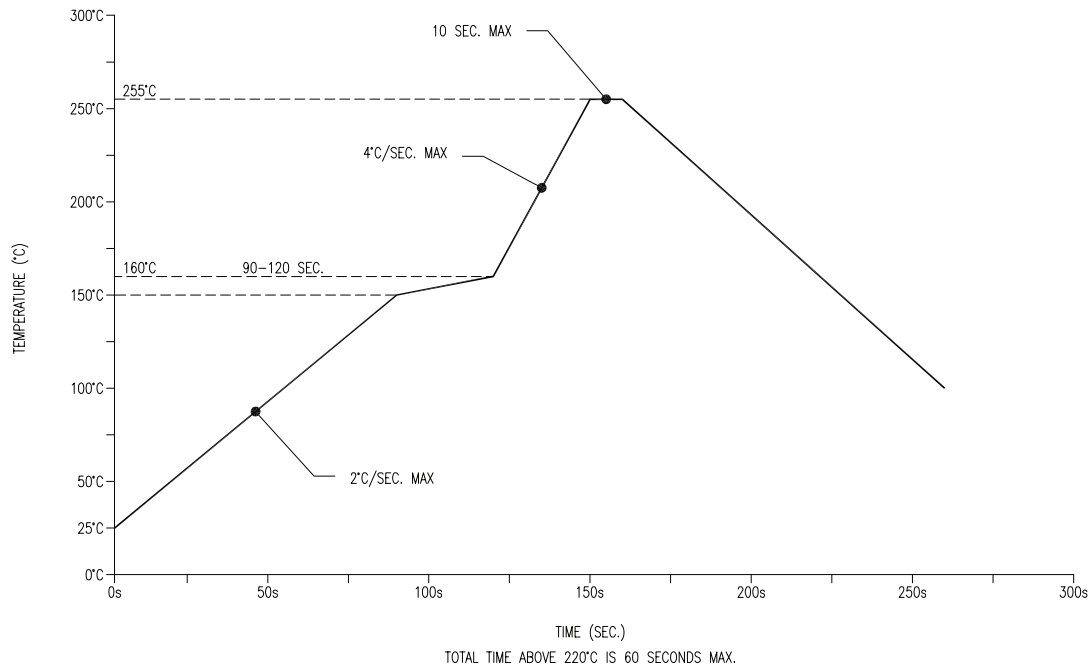
LUMINOUS FLUX VS FORWARD CURRENT



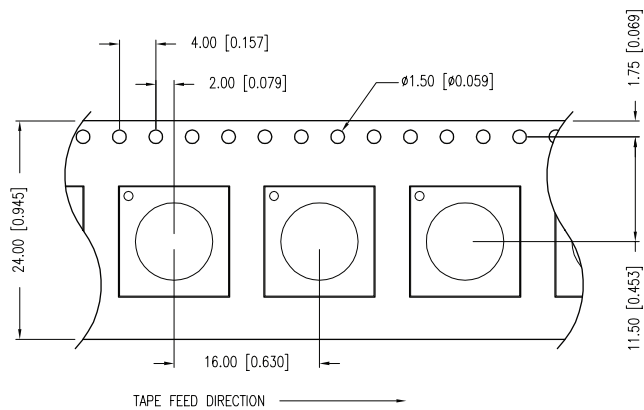
Soldering

- Recommend tin glue specifications: melting temperature in the range of 178°C ~ 192°C.
- The recommended soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):

Lead-Free Solder Profile



Tape and Reel



Rework

- Rework should be completed within 5 seconds under 260°C.
- Manual soldering (not recommended):
 - Soldering tin material: tin 6/4 alloy or contained Ag.
 - To prevent cracking, bake before manual soldering.
 - Temperature of iron tip: 300°C±5 °C maximum (25W)
 - Soldering duration: 3sec±1sec

Cleaning

The following are cleaning procedures after soldering:

- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature x Time should be 50°C x 30sec. or <30°C x 3min.
- Ultra sonic cleaning: <15W/ bath; bath volume ≤ 1 liter
- Curing: 100°C max, <3min.

Pick and Place Hazards

- Avoid stress on the resin at elevated temperature.
- Avoid rubbing or scraping the resin by any object.
- Electric-static may cause damage to the component. Please ensure that the equipment is properly grounded. Use of an ionizer fan is recommended.

Storage

- It is recommended that products be stored under the following conditions:
 - Humidity: 60%R.H. maximum
 - Temperature: 5°C ~ 30°C
- Shelf life in sealed bag: 6 months at <40°C and <90%R.H.
- After opening the bag, devices that will be subjected to soldering or equivalent processing should be used within one year at a condition of ≤30°C / 60%R.H.



Reliability Test

Item	Duration	JIS C 7021 Ref	Conditions	Criteria
High Temperature Operating Life	1000 hrs	JIS C7035	If = 1A	Note 2
Room Temperature Operating Life	1000 hrs		If = 1A	Note 2
High Temperature Humidity Operation	1000 hrs	Method B-11	If = 1A 85°C / 85% RH	Note 2
Powered Temperature Cycle (PTMCL)	100 cycles	Method A-4	-40°C/100°C 5min dwell, 5mm xter	Note 1, No. Catastrophic
Non Operating Temperature Cycle (TMCL)	100 cycles	Method A-4	-40°C/100°C 5min dwell, 5mm xter	No Catastrophic
High Temperature Storage Life (HTSL)	1000 hrs	Method B-11	85°C, non op.	Note 2
Low Temperature Storage Life (LTSL)	1000 hrs	Method B-11	-40°C, non op.	Note 2
Solder Heat Resistance (SHR)		Method A-1	260°C 5 sec	No Catastrophic
Note 1: Dependant upon the maximum de-rating curve				
Note 2: Failure criteria includes units with catastrophic failure, or units with greater than 50% Iv degradation at 1000 hours, or an average Iv degradation for the test of greater than 35% at 1000 hours.				

