



LED LAMPS GENERAL INFORMATION

HOW TO USE LED

● FORMING:

1. Please do not form the LED after soldering. If forming is necessary, it must be done before soldering.
2. Any unsuitable stress applied to the epoxy may break bonding wires in LED.

● SOLDERING:

1. Soldering Bath -- 260 ± 5 within 5 seconds : Soldering Iron-Under 30W within 5 seconds. (1.6mm from epoxy body)
2. Do not apply any force or mechanical stress onto the leads or epoxy body during soldering heat is remained.
3. If soldering one line of LED on a P.C. board by using a soldering iron, don't solder both the leads of the LED at same time.

● CLEANING:

1. Use Alcohol, Freon TE or Chlorosen to clean LED at normal temperature for less than 1 minute.
2. Do not use unspecified Chemical liquid because it may cause crack or haze on the surface of the epoxy body.

● PREVENTING OVER CURRENT:

1. In order to operate LED in stable condition, please put protective resistors in series.
2. Resistor value can be determined by the formula

$$R = \frac{V_s - V_F}{I_F} \quad \text{WHERE:}$$

V_s = Source Voltage

V_F = Forward Voltage of LED

I_F = Recommended Current of LED (10-20 mA)

● BRIGHTNESS:

1. For the purpose of obtaining uniform brightness, LEDs shall be kept at the same current.
2. It is useful for uniform brightness if you use larger source voltage and protective resistor.

QUALITY CONTROL AND ASSURANCE

● SAMPLING PLAN

U.S. Ministry of defense MIL-STD-105D level II (single sampling plans)

● INSPECTION ITEMS AND CRITERIONS FOR JUDGEMENTS

“Measuring Methods for light Emitting Diodes(No.11830)” and “Light Emitting Diodes(No.11829)”

Stipulated by ministry of economical affairs of R.O.C. and by reference to Q.C. standards prevailing in prominent LED plants worldwide.

● RELIABILITY TESTS

“General Provisions for Environmental Tests of CNS-Categorized Electronic Parts”, 3623-3634, 5637, 11233-11238, and U.S. Ministry of National Defense MIL-STD-750 Specifications.

TEST	CONDITIONS
THERMAL SHOCK TEST	LED placed in a chamber (-35) for 20 minutes, temperature increased instantaneously to +85 for 20 minutes. The duration of the test shall be for 10 complete cycles. (MIL-STD-202:107D)
HUMIDITY TEST	LED placed in a humidity chamber which is maintained at 65 , 95% RH. The duration of the test is for 96 hours. (MIL-STD-202:103D)
LIFE TEST	LED connected to a source of power and charged with 20mA at room temperature (25) for 1000 hours. (MIL-STD-750:1026)
SOLDERABILITY TEST	The pins of LED (1.6mm form body) dipped into Solder bath which is maintained at 260 ± 5 The duration of the test is for 5seconds. (MIL-STD-202:208D)
VIBRATION TEST	LED placed on a vibrator which is maintained at 10-55-10 Hz/minute. 0.82 mm amplitude. The duration of the test is for 30 minutes.
PACKING TEST	LED packed in a corrugated fiberboard box and fallen on 6 faces at a diagonal angle to the ground. The altitude of the fall will be in the range of 229-609 mm considering of the packed product.

THE MEASURING TERMS AFTER TEST AND FAILURE CRITERIA AS FOLLOWS:

MEASURE TERMS	FAILURE CRITERIA
LUMINOUS INTENSITY (I_V)	LOWER STANDARD LIMIT × 0.5
FORWARD VOLTAGE (V_F)	UPPER STANDARD LIMIT × 1.2
REVERSE CURRENT (I_R)	UPPER STANDARD LIMIT × 2.0



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ABSOLUTE MAXIMUM RATINGS

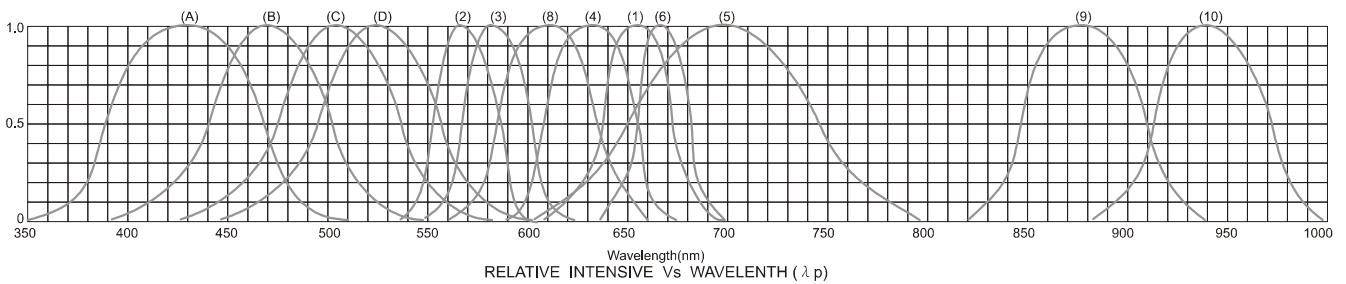
1. Test Condition For Each Parameter:

Parameter	Symdol	Unit	Test Condition
Reverse Voltage	V_R	V	
Reverse Current	I_R	μA	$V_R = 5.0$ Volt
Forward Voltage	V_F	V	$I_F = 20$ mA
Luminous Intensity	I_V	mcd	$I_F = 20$ mA
Viewing Angle	2θ 1/2	Degree	$I_F = 20$ mA
Spectral Line Half-Width	$\Delta \lambda$	nm	$I_F = 20$ mA
Power Dissipation	P_D	mW	$I_F = 20$ mA
Peak Forward Current (Duty 1/10 1KHz)	$I_F(\text{Peak})$	mA	$I_F(\text{Peak}) = 150$ mA

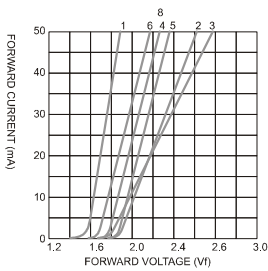
2. Absolute Maximum Rating: ($T_a = 25$)

Reverse Voltage	5.0 Volt
Reverse Current($V_R = 5V$)	$\leq 100 \mu A$
Operating Temperature Range	-40 ~ +80
Storage Temperature Range	-40 ~ +85

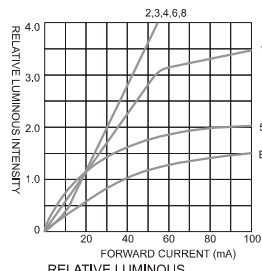
TYPICAL ELECTRICAL-OPTICAL CHARACTERISTICS CURVES



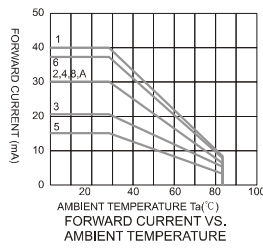
- (1) wGaAsP/GaAs 655nm/Red
- (2) wGaP 568nm/Yellow Green
- (3) wGaAsP/GaP 585nm/Yellow
- (4) wGaAsP/GaP 635nm/Orange & Hi-Eff Red
- (5) wGaP 700nm/Bright Red
- (6) wGaAlAs/GaAs 660nm/Super Red
- (7) wGaAsP/GaP 610nm/Super Red
- (8) GaAlAs 880nm
- (9) GaAs/GaAs & GaAlAs/GaAs 940nm
- (A) GaN/SiC 430nm/Blue
- (B) InGaN/SiC 470nm/Blue
- (C) InGaN/SiC 502nm/Ultra Green
- (D) InGaAl/SiC 523nm/Ultra Green



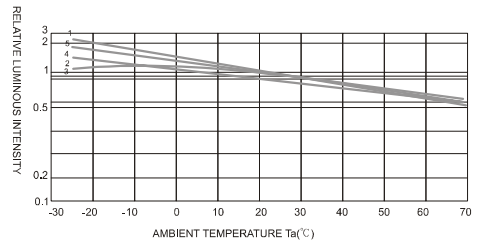
FORWARD CURRENT VS. FORWARD VOLTAGE



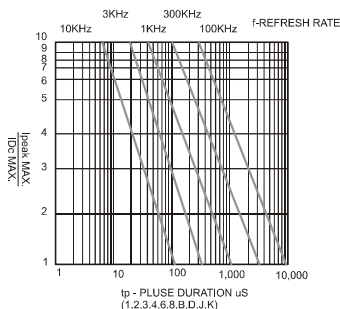
RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT



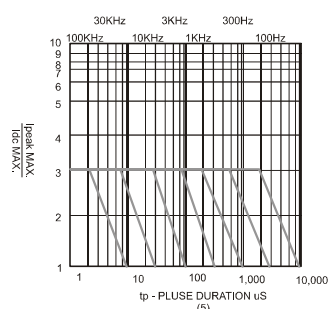
FORWARD CURRENT VS. AMBIENT TEMPERATURE



RELATIVE LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE T_a (°C)



t_p - PULSE DURATION μs
(1, 2, 3, 4, 5, 6, 8, D, J, K)



t_p - PULSE DURATION μs
(9)