

T1-3/4 PACKAGE TYPE
 ALL-IN-ONE LED SPARKLING LAMP

P/N: RAINBOW LED SERIES

1) Description

The RAINBOW LED, adopting the latest AlInGaP, InGaN and CMOS driving technology, is an ALL-IN-ONE LED sparkling and flashing lamp. With multi-colored SMD chip and controller chip embedded in a standard T1-3/4 Package, it shows various colors by simply applying DC power. The package epoxy is available in transparent or diffused form.

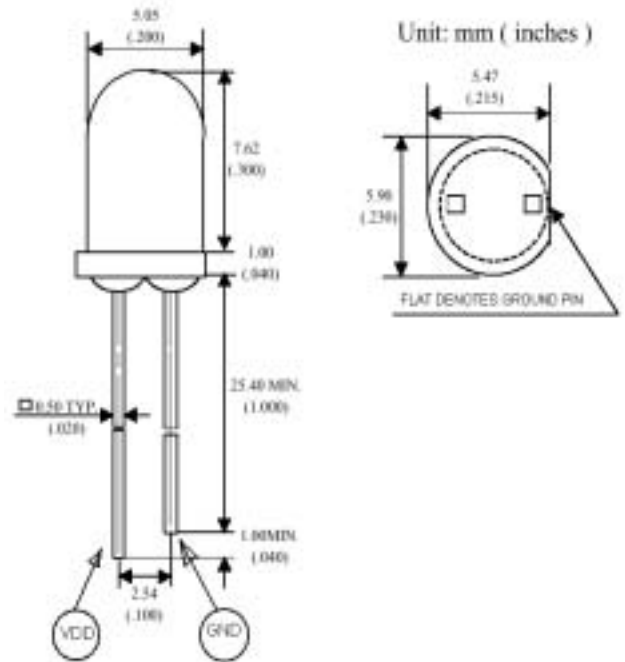
2) Features

- ◆ AlInGaP and InGaN materials.
- ◆ SMD LED and controller in a standard T1-3/4 package.
- ◆ High reliability and compact size.
- ◆ Multi-color combination and optional working mode.

3) Applications

- ◆ Electronic toys
- ◆ Decoration lighting
- ◆ Electronic candles
- ◆ Shoes and bags
- ◆ Warning signal
- ◆ Fishing tools
- ◆ Bicycle signal light
- ◆ Light pens
- ◆ Key chain and other gifts

4) Package Dimensions



- Notes:
- 1) Tolerance is 0.25mm(0.10") unless otherwise noted
 - 2) Protruded resin under flange is 0.15mm(0.059") maximum
 - 3) Lead spacing is measured where the leads emerge from the body of the package

5) Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
Forward Voltage	6.0	V
Reverse Voltage	-0.3	V
Power Dissipation	480	mW
Operating Temperature Range	0 ~ +70	
Storage Temperature Range	-40~ +85	
Soldering Temperature	+235 , less than 5 seconds	

@Ta=25°C

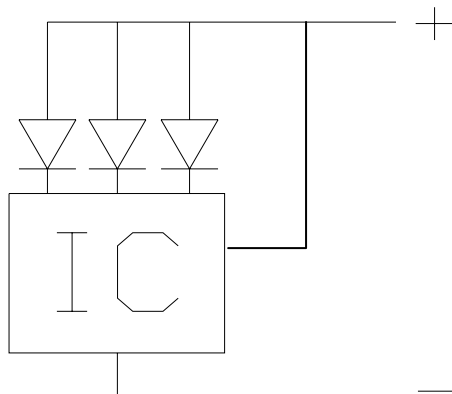
6) Recommended Working Condition

Parameter	Minimum	Typical	Maximum	Unit
Power Supply Voltage (VDD)	3.0	4.5	5.0	V
Power Dissipation (Pd)	-	225	400	mW
Operating Current (Id)	20	50	80	mA
Operating Temperature Range	5	40	65	

7) Initial Optical-Electrical Characteristics

Color	Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Red	AlInGaP Technology						
	Luminous Intensity	20mA DC	Iv	45	80	-	mcd
	Forward Voltage	20mA DC	Vf	-	2.1	2.6	V
	Reverse Current	Vr=5V DC	Ir	-	-	10	μA
	Dominant Wave Length	20mA DC	λd	-	625	-	nm
	Spectral Radiation Bandwidth	20 mA DC	Δλ	-	20	-	nm
Green	InGaN Technology						
	Luminous Intensity	20mA DC	Iv	65	130	-	mcd
	Forward Voltage	20mA DC	Vf	-	3.5	4.2	V
	Reverse Current	Vr=5V DC	Ir	-	-	30	μA
	Dominant Wave Length	20mA DC	λd	-	525	-	nm
	Spectral Radiation Bandwidth	20 mA DC	Δλ	-	35	-	nm
Blue	InGaN Technology						
	Luminous Intensity	20mA DC	Iv	20	55	-	mcd
	Forward Voltage	20mA DC	Vf	-	3.5	4.2	V
	Reverse Current	Vr=5V DC	Ir	-	-	30	μA
	Dominant Wave Length	20mA DC	λd	-	470	-	nm
	Spectral Radiation Bandwidth	20 mA DC	Δλ	-	35	-	nm
Viewing Angle		VDD= 4.5V	2θ1/2	-	35	-	deg
Controller's Timing Interval		VDD= 4.5V	T	1.0	-	1.75	S
Controller's Clock Frequency		VDD = 4.5V	F0		128		KHz

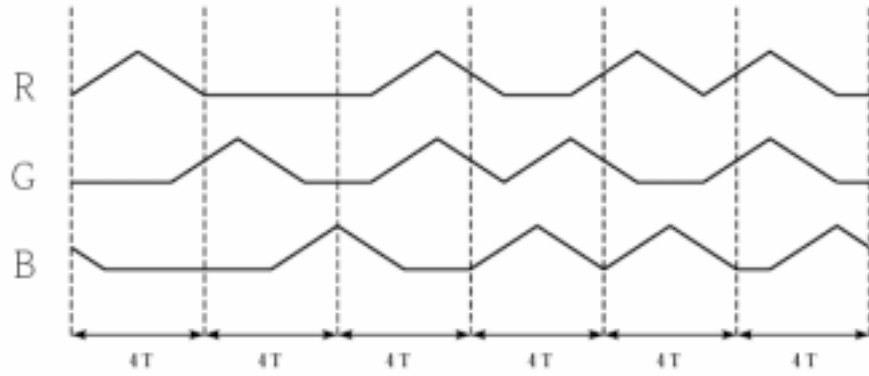
Basic Circuit Diagram for internal structure



8) Working Mode Options

Working mode, as stated below, could be selected among different choices while bonding the controller chip.

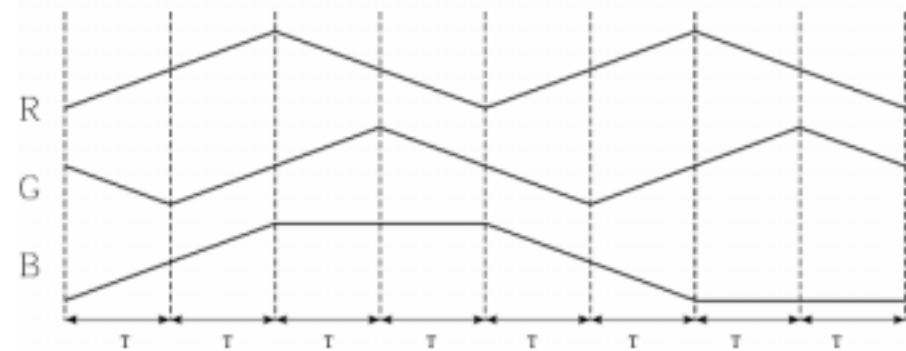
◆ Timing chart for mode R1



$T = 1.75\text{sec}$

1cycle = $6 * 4T$

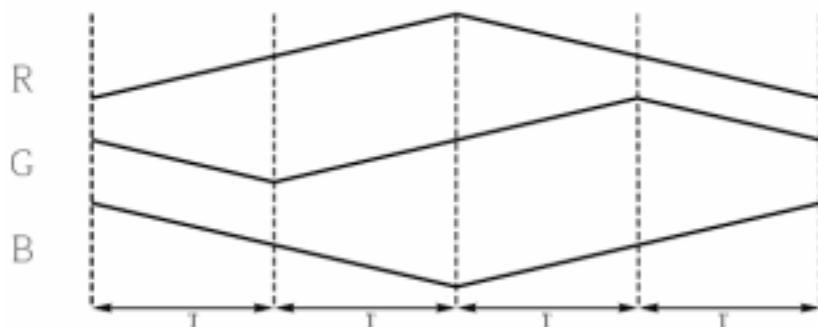
◆ Timing chart for mode R2



$T = 1.75\text{sec}$

1cycle = $8T$

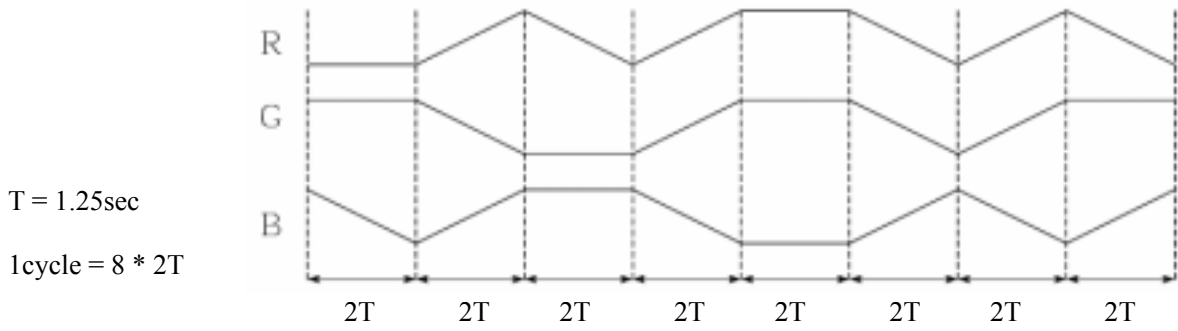
◆ Timing chart for mode R3



$T = 1.25\text{sec}$

1cycle = $4T$

◆ Timing chart for mode R4



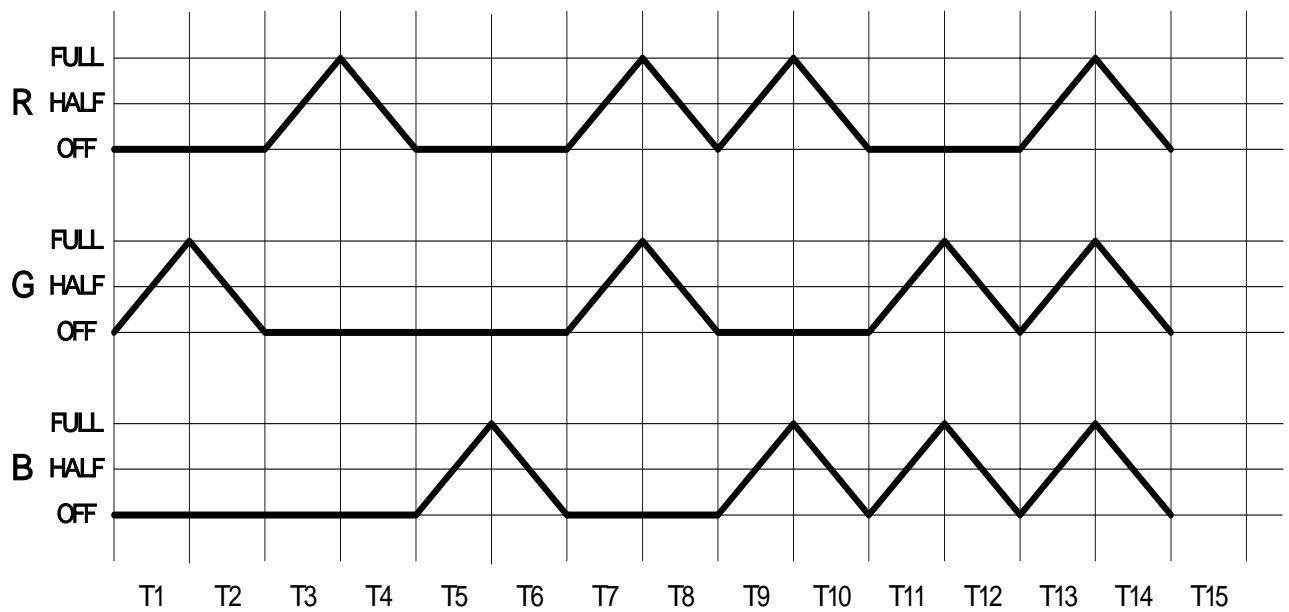
◆ Working mode R5

LEDs are lit by the sequence of R-G-B-RG-RB-GB-RGB, repeating continuously. Repeating frequency is 4Hz.

◆ Working mode R6

LEDs are lit by the sequence of R-OFF-G-OFF-B-OFF-RG-OFF-RB-OFF-BG-OFF-RGB-OFF, repeating continuously. Repeating frequency is 128Hz.

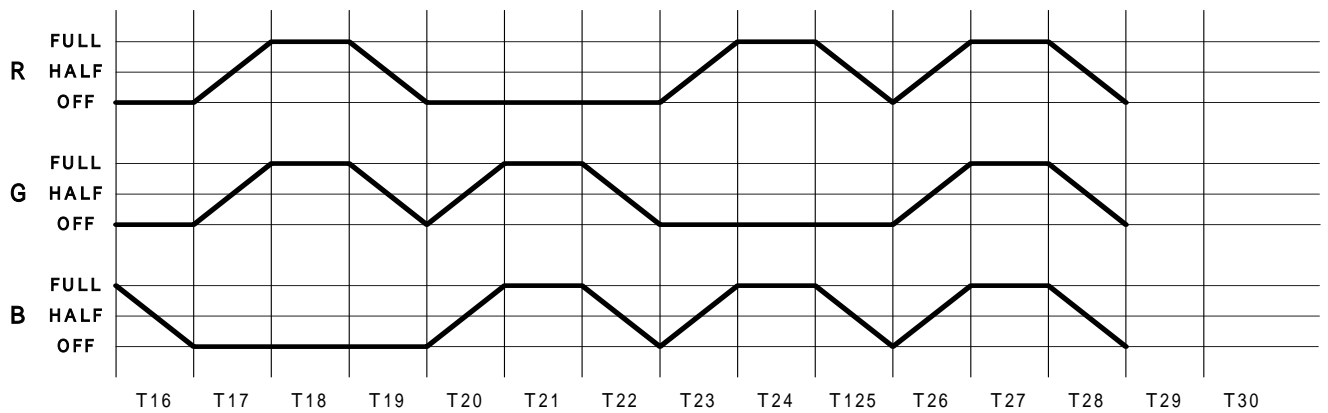
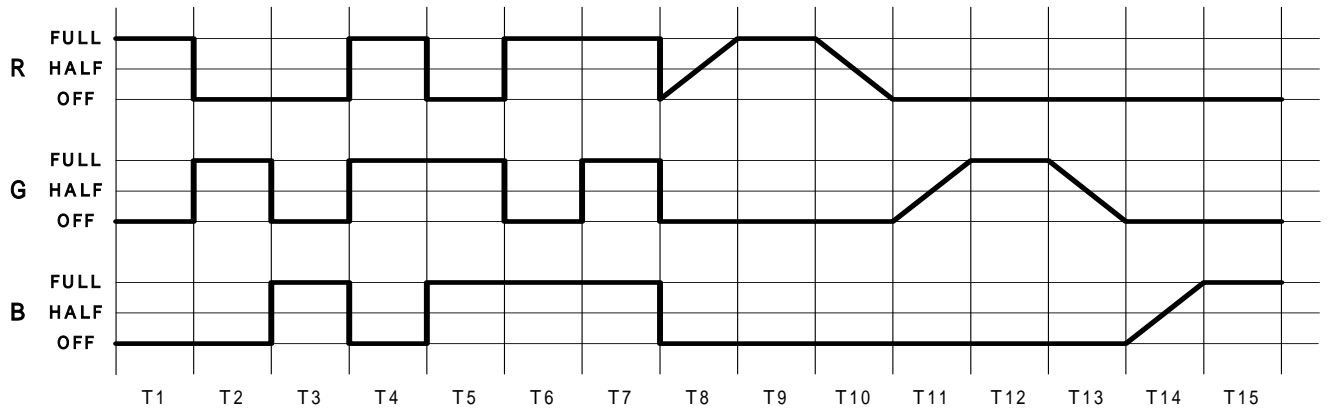
◆ Timing chart for mode R7



$T = 1.75\text{sec}$

$1\text{cycle} = 14T$

◆ Timing chart for mode R8

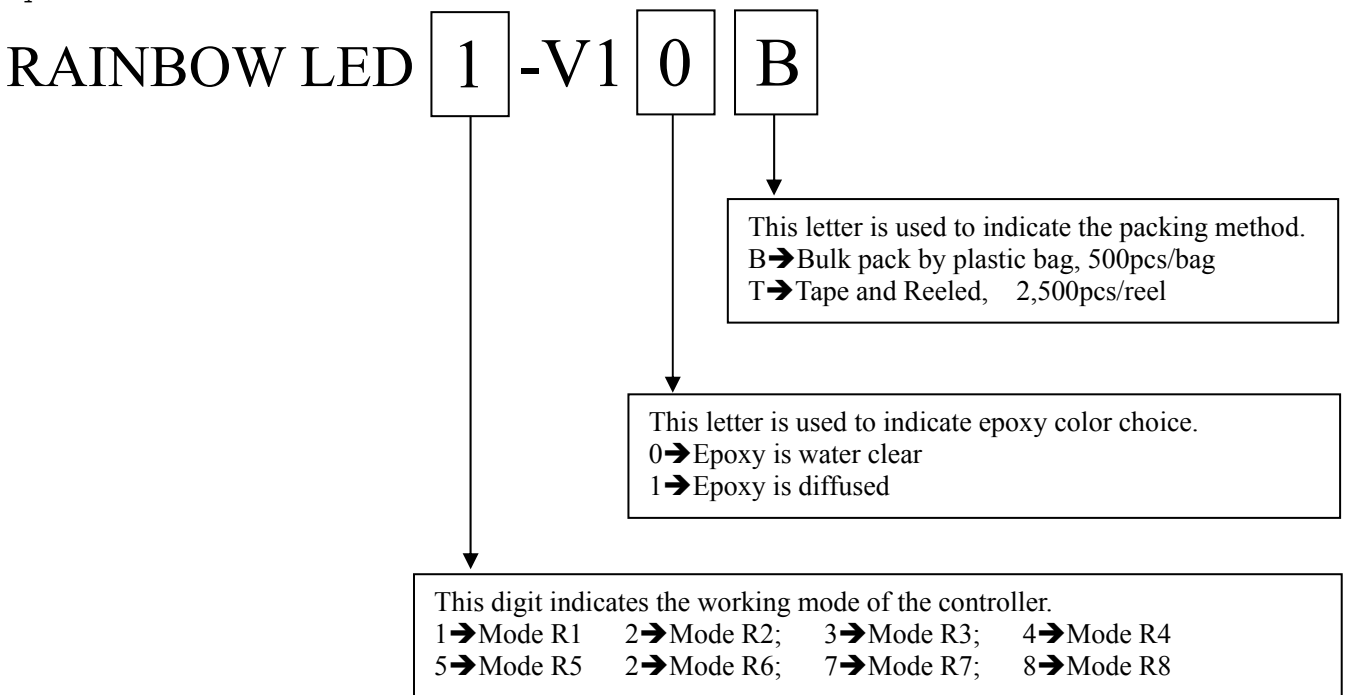


T = 1sec

1cycle = 28T

9) Ordering Information

Buyers should supply additional information, as indicated by the following numbering system:



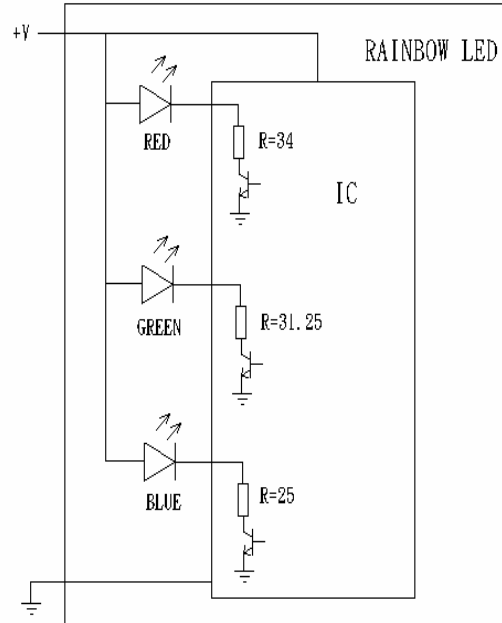
Application Note :**(1) Standard supply voltage 4.5V**

Original Test Circuit :

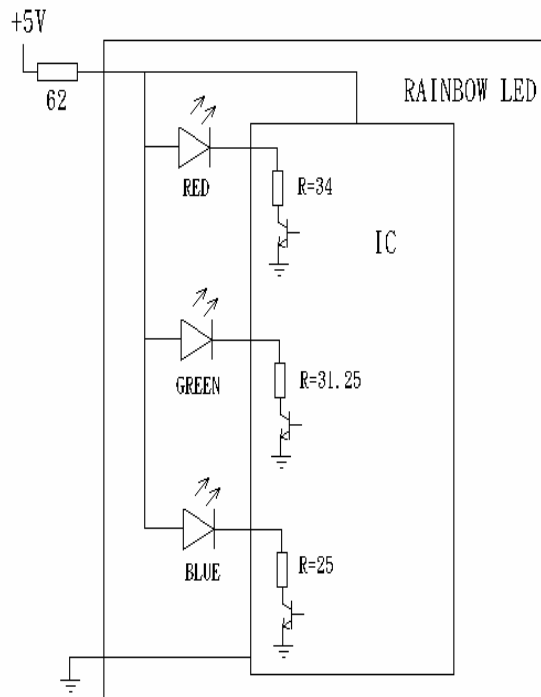
1. VDD = + 4.5V
2. Iop(max) : 90mA
3. I(Red) : 30mA(max)
4. I(Green) : 25mA(max)
5. I(Blue) : 35mA(max)

***Caution:**

When you measured Iop(max) is Higher than 90mA, you should Serial a resistor from 10~30Ω, It will be safe on your application

**(2) Normal brightness on 5V mode:**

1. VDD = + 5V
2. Serial a 62Ω resistor
3. Iop(max) : 60mA
4. I(Red) : 20mA(max)
5. I(Blue) : 20mA(max)
6. I(Green) : 20mA(max)

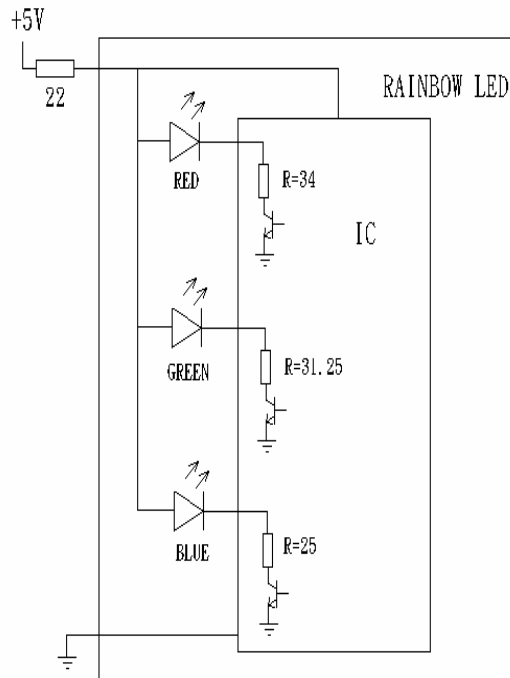


REMARK : 1.LED $I_{FMAX} = 30mA$, $I_{PF} = 100mA(1/10duty\ duty\ cycle , 0.1ms\ pulse\ width)$.

(3) Higher brightness on 5V mode:

1. VDD = + 5V
2. Serial a 22Ω resistor
3. Iop(max) : 90mA
4. I(Red) : 30mA(max)
5. I(Blue) : 30mA(max)
6. I(Green) : 30mA(max)

*Caution:
 When you measured Iop(max) > 90mA
 You should up resistor to 33Ω on safe mode.



(4) Parellel 2 Rainbow LED on 5V mode:

To serial a 10Ω resistor which limited current on safe range.

