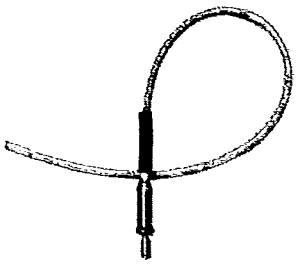
C86051E Series
GaAlAs Injection Lasers

Developmental Types

800-900 nm Gallium Aluminum Arsenide Injection Lasers for Pulsed Operation
With Integral Fiber Optic Output Cables and Connectors



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The RCA C86051E Series of fiber coupled single diode gallium aluminum arsenide injection lasers emit radiant flux in the spectral range from 800 to 900 nanometers and will provide peak power output minimums of 150 milliwatts within this spectral range. The construction of these devices uses the LOC (Large Optical Cavity) material synthesis technology for improved carrier and photon confinement, thus assuring both low threshold current and high efficiency operation.

The device is constructed with a length of fiber optic cable terminated with a Siecor T11 connector. The cable is internally coupled to the emitting region of the GaAlAs chip and extends for a minimum length of 750 mm (29.5 in) from the surface of the device package.

Variants of these devices in other package configurations or fiber optic cable selections are available on request.

- **Wavelength of Peak Radiant Intensity - nanometers**
  C86051EW1: 810 ± 10
  C86051EW2: 830 ± 10
  C86051EW3: 850 ± 10
  C86051EW4: 895 ± 10
- **Minimum Power Output - at Output End of Cable:**
  150 mW @ I_{FM} = 8 A
- **Typical Response Time:**
  < 1 ns
- **Coaxial Packages for Simple Mounting and Good Thermal Dissipation Capability**
- **Variants With Reverse-Case Polarity Available on Request**

General

Output Window –
Material (Fiber optic cable):
Siecor 104[1], or equivalent (50 μm core, graded index)
Connector ..... Siecor T11, or equivalent
Minimum length extending
from package face ..... 750 mm (29.5 in)
Package ..... See **Figure 6**

[1] A product of Siecor Optical Cables, Inc., Hickory, NC 28601.

Absolute-Maximum Ratings

	Limiting Values	
Peak Forward Current, I_{FM}		
At Case Temperature, T_C = 25° C	8	A
(See **Figure 2**)		
Forward Current Pulse Conditions		
For Case Temperature (T_C) Range of -35 to +60 ° C (See **Figure 2**)		
Pulse Duration, t_w (50% points)	100	ns
Duty Factor, du	0.05	%
Peak Reverse Voltage, V_{RM}	2	V
Temperature		
Storage, T_{stg}	-40 to +70	°C
Operating, Case, T_C	-35 to +60	°C
Lead Temperature During Soldering:		
At a distance of 0.8 mm (1/32 in) from seating plane for 10 s max.	230	°C

RCA Solid State Emitters

Typical Characteristics (Except as noted)

At $T_C = 25°$ C, prr = 1 kHz, $t_w = 100$ ns, and $I_F = I_{FM} = 8$ A

Electrical		
Minimum Total Peak Radiant Flux Φ_M (Power Output) at Output End of Cable	150	mW
Threshold Current, I_{th}	3.0	A
Peak Forward Voltage, V_F	6.0	V
Radiant Flux		
Wavelength of Peak Radiant Intensity, λ_M:		
Type W1	810 ± 10	nm
Type W2	830 ± 10	nm
Type W3	850 ± 10	nm
Type W4	895 ± 10	nm
Spectral Bandwidth, $\Delta\lambda$, at 50% Intensity Points	5.0	nm
Half-Angle Beam Spread at 50% Intensity Points	8	deg
Switching		
Rise Time of Emitted Pulse, t_r (10% to 90%)	<1	ns
Mechanical		
Core Diameter of Fiber Optic Cable	50 (2)	μm mils

Operating Considerations

The C86051E Series lasers are operated by pulsing the devices in the forward-bias direction.

The peak forward current at the operating temperature must be limited to the value shown in **Figure 2**.

The maximum rated pulse durations and duty factors must never be exceeded. If the specified pulse duration or duty cycle is exceeded, the lasing action may damage the diode and eventually cause it to be destroyed. However, the repetition rate may be increased if the pulse duration is reduced.

Warning - Personal Safety Hazards

Laser Radiation - This device in operation produces invisible electromagnetic radiation which may be harmful to the human eye.

Personal Safety Hazards

Injection Laser Diodes emit electromagnetic radiation at wavelengths which may be invisible to the human eye. Suitable precautions must be taken to avoid possible damage to the eye from overexposure to this radiant energy. Precautionary measures include the following:

1. **In systems with no external lens**
   Avoid viewing the laser source at close range. Since the emitted beam is not collimated, increasing the distance to the laser source greatly reduces the risk of overexposure.
2. **In systems utilizing external optics**
   Avoid viewing the emitter directly along the optical axis of the radiated beam.
3. **Reflections from surfaces**
   Minimize unwanted specular reflections in the system.

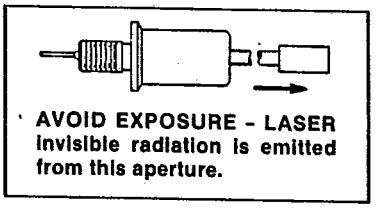
Because of the size of these devices, each of the labels shown below are attached to the individual laser-unit shipping container. They are illustrated here to comply with the requirements of DHHS standards under the Radiation Control for Health and Safety Act of 1968.

Warning and Certification Label (See Note)

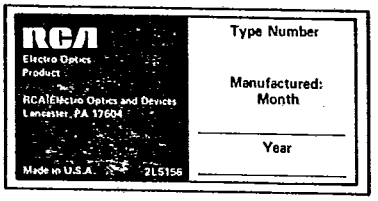
Note: The maximum accessible peak radiant flux output value (*) and the wavelength of peak radiant intensity value (**) for each individual laser type is entered in this position on the Warning and Certification Label. See Table 1.

Table 1

Type	Max. Output (W)	Wavelength (nm)
C86051EW1	9	810
C86051EW2	9	830
C86051EW3	9	850
C86051EW4	9	895



Aperture Label



Identification Label

Maximum Peak Accessible Emission Levels (Power Output)

The maximum peak power output level, to which human access is possible, when the device is operated at its maximum forward current rating and pulse duration is shown below. This radiant flux level should not be considered as a characteristic range limit, it is based on product design and includes possible changes in device characteristics during life. Appropriate precautions should be taken to avoid harmful exposure.

Type	Max. Forward Current (A)	Max. Accessible Peak Radiant Flux Output (W)
C86051E Series	8.0	9

In order to insure that this laser component meets the requirements of Class IIIb laser products, the device must not be operated outside of its maximum ratings. Power supplies (laser energy sources) used with the component must be such that the maximum peak forward current can not be exceeded.

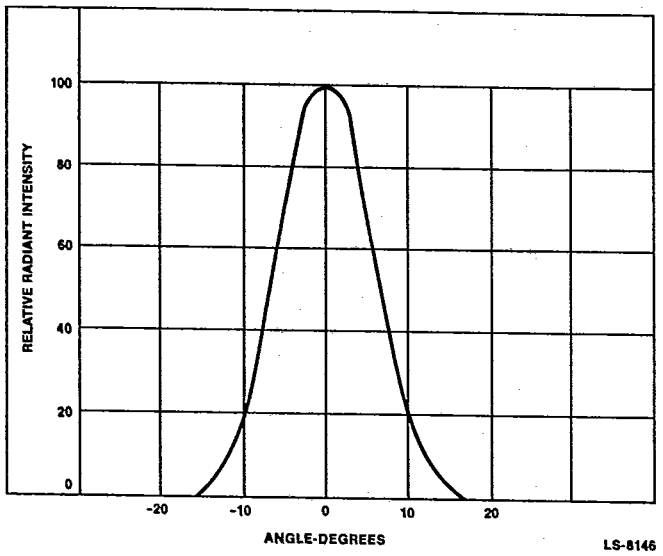


Figure 1 - Typical Exit Radiation Pattern

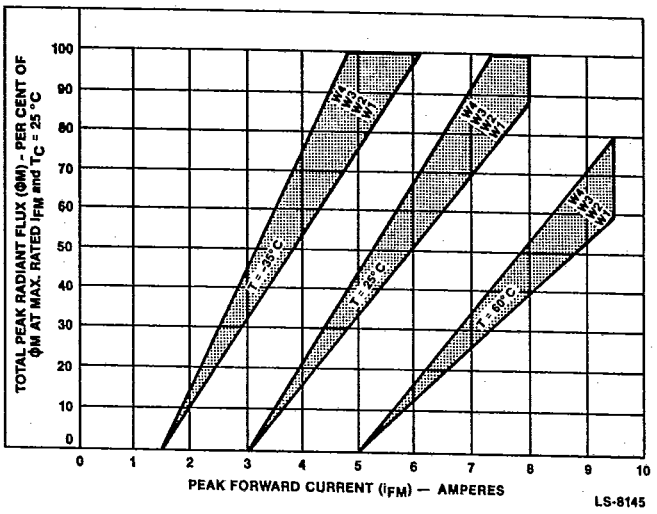


Figure 3 - Typical Total Peak Radiant Flux vs Peak Forward Current

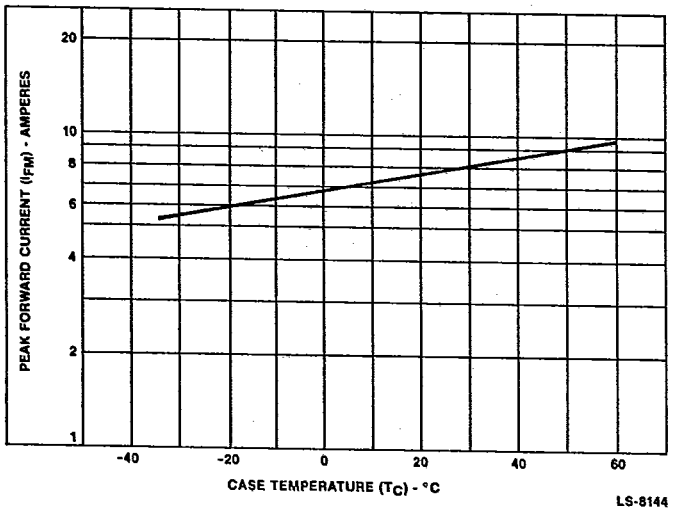


Figure 2 - Peak Forward Current vs Case Temperature

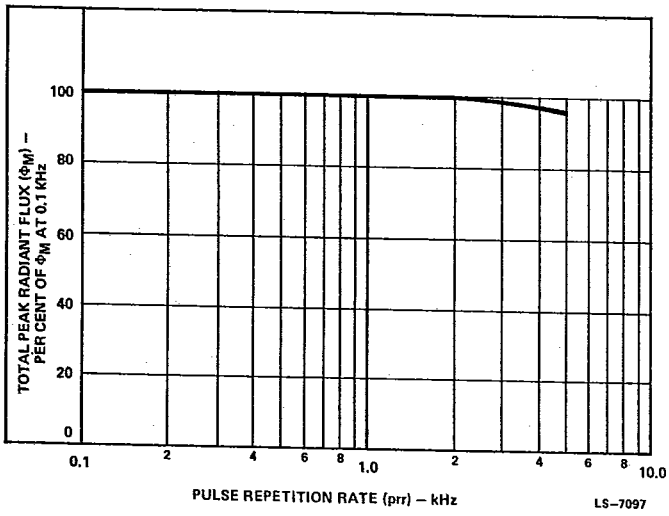


Figure 4 - Typical Total Peak Radiant Flux vs Repetition Rate

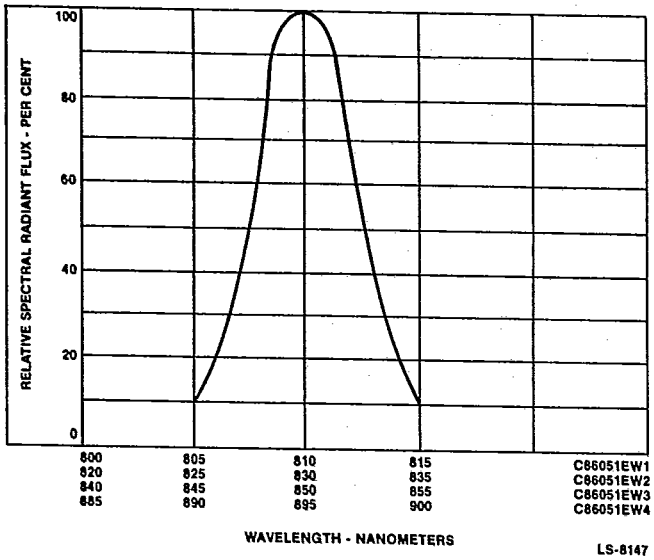
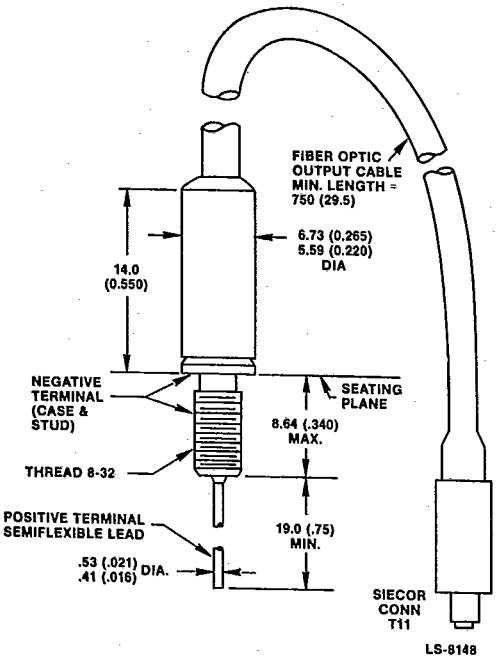


Figure 5 - Typical Spectral Radiant Flux



Dimensions in millimeters. Dimensions in parentheses are in inches.

Figure 6 - Dimensional Outline

For further information or application assistance, contact your RCA Sales Representative or write Solid State Emitters Marketing, RCA, Lancaster, PA 17604-3140.