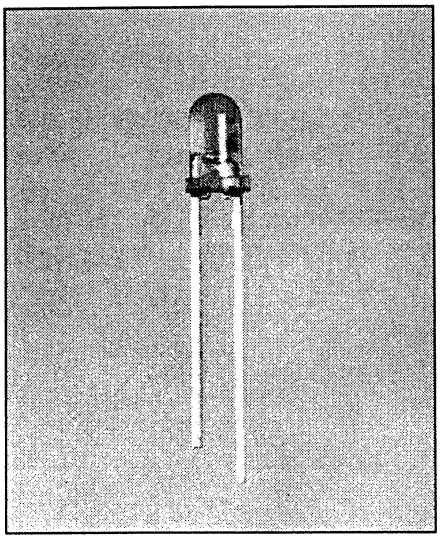
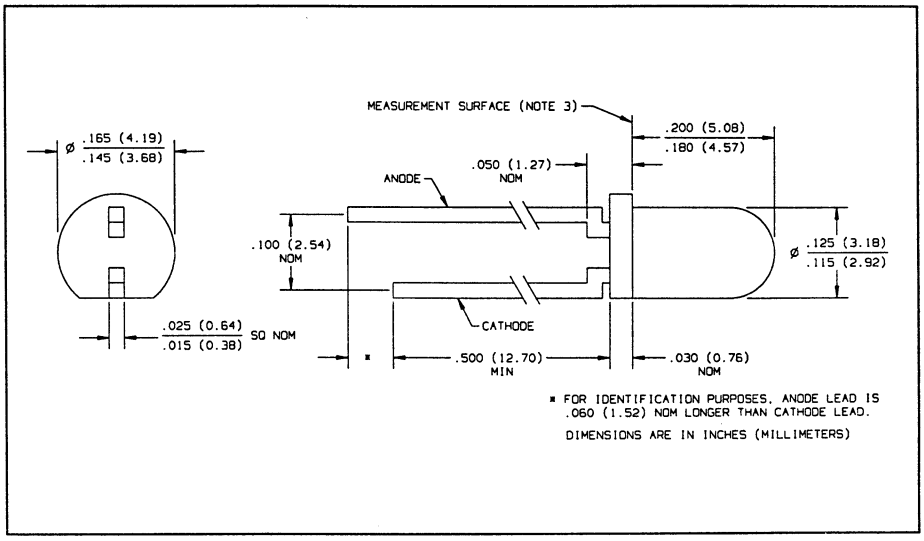
Product Bulletin OP166A
June 1996

# GaAs Plastic Infrared Emitting Diodes
# Types OP166A, OP166B, OP166C, OP166D






## Features

- Narrow irradiance pattern
- Mechanically and spectrally matched to the OP506 series phototransistors
- Variety of Sensitivity ranges
- Small package size for space limited applications
- T-1 package style

## Description

The OP166 series devices are 935 nm high intensity gallium arsenide infrared emitting diodes molded in IR transmissive amber tinted plastic packages. The narrow irradiance pattern provides high on-axis intensity for excellent coupling efficiency. Lead spacing on this series is 0.100 inch (2.54 mm).

## Replaces

OP161SL series
OP164 Series

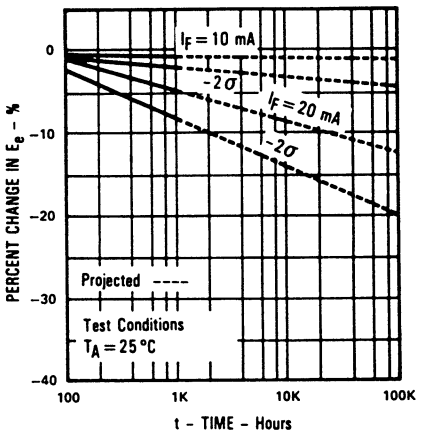
## Absolute Maximum Ratings ($T_A$ = 25° C unless otherwise noted)

| | |
|---|---|
| Reverse Voltage | 2.0 V |
| Continuous Forward Current | 50 mA |
| Peak Forward Current (1 µs pulse width, 300 pps) | 3.0 A |
| Storage and Operating Temperature Range | -40° C to +100° C |
| Lead Soldering Temperature [1/16 inch (1.6mm) from case for 5 sec. with soldering iron] | 260° C(1) |
| Power Dissipation | 100 mW(2) |

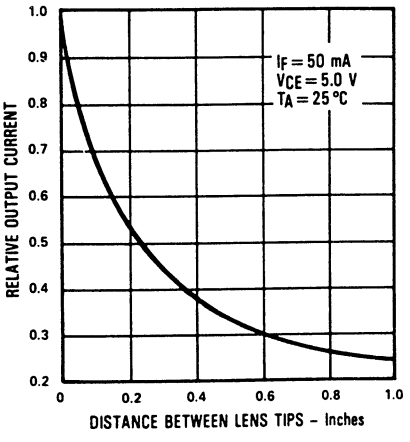
**Notes:**
(1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering. A max. of 20 grams force may be applied to the leads when soldering.
(2) Derate linearly 1.33 mW/° C above 25° C.
(3) $E_{e(APT)}$ is a measurement of the average apertured radiant incidence upon a sensing area 0.081" (2.06 mm) in diameter, perpendicular to and centered on the mechanical axis of the lens, and 0.590" (14.99 mm) from the measurement surface. $E_{e(APT)}$ is not necessarily uniform within the measured area.

## Typical Performance Curves

**Percent Changes in Radiant Intensity vs Time**




**Coupling Characteristics OP166 and OP506**

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# Types OP166A, OP166B, OP166C, OP166D

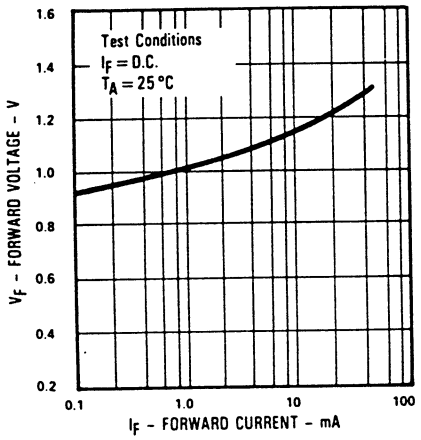
**Electrical Characteristics** ($T_A$ = 25° C unless otherwise noted)

| SYMBOL | PARAMETER | | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|---|
| Ee(APT) | Apertured Radiant Incidence | OP166D | 0.28 | | | $mW/cm^2$ | $I_F$ = 20 mA(3) |
| | | OP166C | 0.85 | | 1.60 | $mW/cm^2$ | $I_F$ = 20 mA(3) |
| | | OP166B | 1.40 | | 2.20 | $mW/cm^2$ | $I_F$ = 20 mA(3) |
| | | OP166A | 1.95 | | | $mW/cm^2$ | $I_F$ = 20 mA(3) |
| $V_F$ | Forward Voltage | | | | 1.60 | V | IF = 20 mA |
| $I_R$ | Reverse Current | | | | 100 | µA | $V_R$ = 2.0 V |
| λp | Wavelength at Peak Emission | | | 935 | | nm | $I_F$ = 10 mA |
| B | Spectral Bandwidth Between Half Power Points | | | 50 | | nm | $I_F$ = 10 mA |
| Δλp/ΔT | Spectral Shift with Temperature | | | +0.30 | | nm/°C | $I_F$ = Constant |
| $\theta_{HP}$ | Emission Angle at Half Power Points | | | 18 | | Deg. | $I_F$ = 20 mA |
| $t_r$ | Output Rise Time | | | 1000 | | ns | $I_{F(PK)}$ = 100 mA, PW = 10µs, D.C. = 10.0% |
| $t_f$ | Output Fall Time | | | 500 | | ns | |

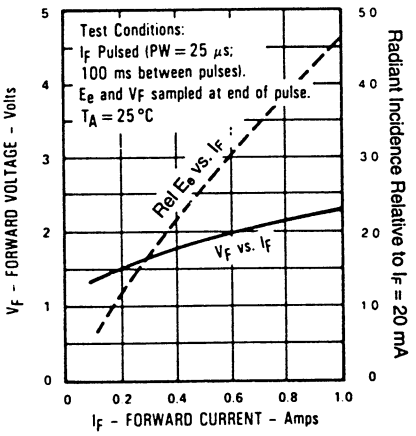
INFRARED EMITTING DIODES

## Typical Performance Curves

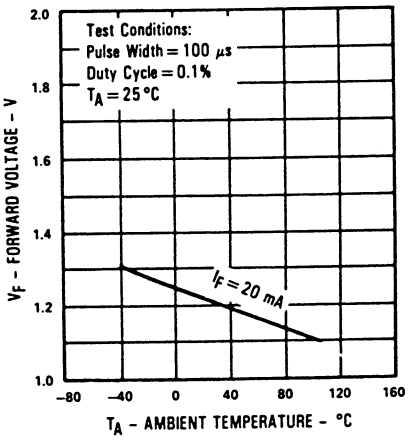
**Forward Voltage vs Forward Current**



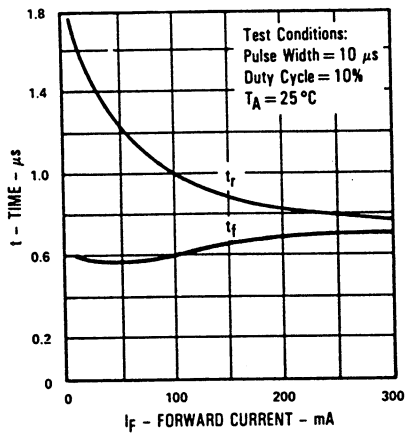

**Forward Voltage and Relative Radiant Incidence vs. Forward Current**



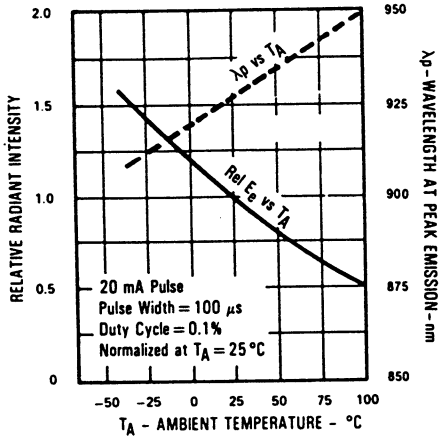

**Forward Voltage vs Ambient Temperature**




**Rise Time and Fall Time vs Forward Current**




**Relative Radiant Intensity and Wavelength at Peak Emission vs Ambient Temperature**




**Relative Radiant Intensity vs Angular Displacement**