advancedligo	DCC Number: E050129-00 Date Prepared: 4/25/2005

Originator	Cognizant Engineer	Ext./Phone#	Project	Account Number
Dennis Coyne	Dennis Coyne	#2034	LIGO	LIGO.TEC-1.3

Dwg/Part Number	Rev	Part Description	Serial Number	Qty
		Electronic Devices for the SUS OSEM assy.		
Centronics BPX65		Photodiode		80
Optek OP232		Emitter		80

Used In (next higher assembly):	To be used in the SUS OSEM assemblies for advanced LIGO

Vendor Name	PO/Contract Number
Ordered from Newark InOne. Manufacturers listed above.	P-card charges: CP404378 and CP403394

Data Package, Receiving/Inspection Remarks:

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/ Initials	Date Comp.
N	N	This RGA Specification sheets are attached to this traveller. Note that the base of the photodiode TO18 package appears to encapsulated with epoxy. Materials are not listed in the data sheets. One of the leads for the emitter is insulated from the can (package) with a dielectric – probably a polymer of some sort.	D. Coyne	4/25

Process Flow:

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.
1	Clean		CIT	per E960022 Attempt to remove the ink markings on the electronic packages with solvent.	R. Taylor	
2	Vacuum Bake		CIT	per E960022 to a temperature of 125C (max storage temperature of the BPX65)	R. Taylor	
3	Control Point		NA	Review/approve RGA scan #_____	D. Coyne	

N.B.: A copy of this traveller must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveller has been completed.

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.
4	Vent		CIT	To address concerns on the integrity of the hermetic package: Using a clean and air baked drill bit, make a small hole in the side of 40 PDs and 40 Emitters. Do this in a clean manner. Do not reclean the devices.	R. Taylor	
5	Re-Vacuum Bake		CIT	re-bake the intentionally vented devices per E960022 to a temperature of 125C (max storage temperature of the BPX65)	R. Taylor	
6	Control Point		NA	Review/approve RGA scan #_____	D. Coyne	
7	Wrap & Tag & Deliver		CIT	UHV Wrap/protect – use anti-static packaging. Deliver to Lee Cardenas for Optical Contamination Cavity Testing	R. Taylor	
8	Optical Contamination Cavity Testing		CIT	Test in the optical contamination exposure cavity per E960022. Include all devices (vented and not vented)	L. Cardenas	
9	Control Point		NA	Review absorption and scatter loss versus time data approve release from the cavity	D. Coyne	
7	Wrap & Tag vacuum clean parts per E960022-A		CIT	Wrap (UHV foil) and bag (CP Stat or equiv.) per E960022. Keep the vented and unvented, PDs and emitters separate.	L. Cardenas	
5	Deliver		CIT	Make 2 copies of the Traveler. File one copy with the DCC. Original goes with devices to Dennis Coyne **Note: Keep original traveler with these parts.**	R. Taylor	
END: Go to Traveler or procedure associated with next higher assembly processing if/as appropriate.						

Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:

N.B.: A copy of this traveller must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveller has been completed.

Step 1: Remove ink markings Step 4: Drill holes to vent ½ of the devices

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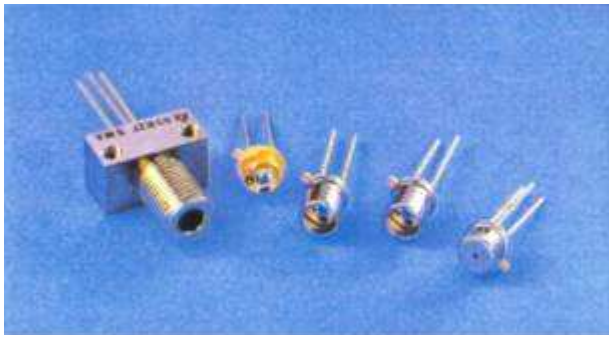
Silicon Photodetector BPX65 Series

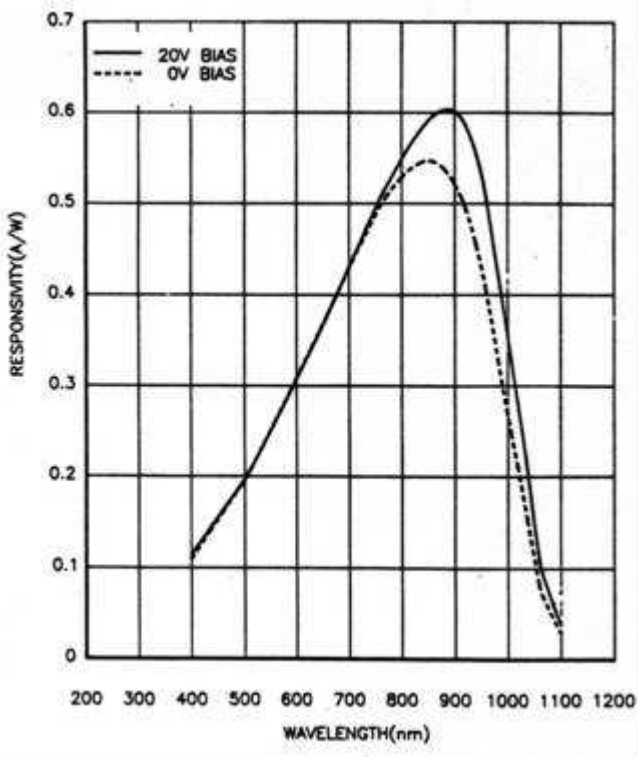
The BPX65 family of detectors feature Centronic's 1mm^2 high speed, high sensitivity chip already successful in a wide variety of applications. The chip can be packaged in various forms suitable for fibre-optic communication, such as the AX65-RF (precisely centred, isolated, low chip to window spacing) a standard 2 or 3 lead TO18 or even epoxy encapsulated. It has also been used for encoder designs and with MIL SPEC release at the heart of advanced laser warning systems.



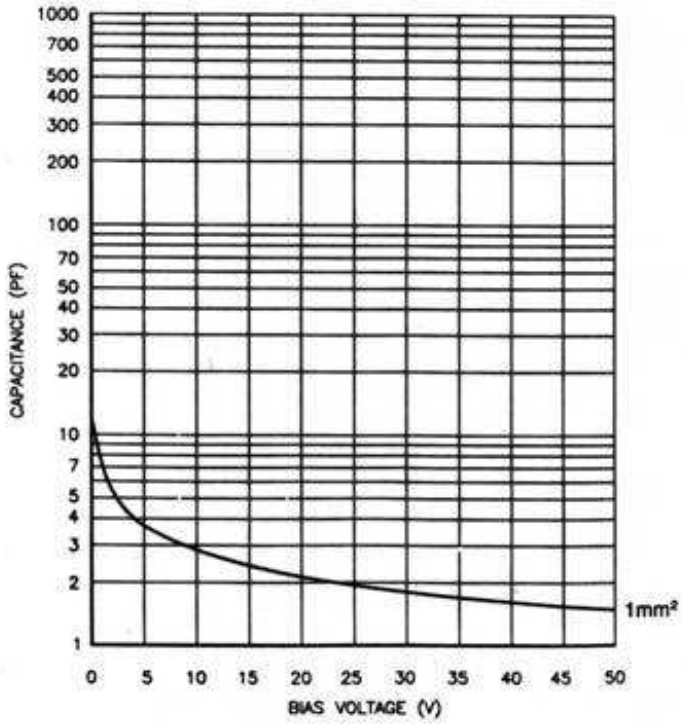
ABSOLUTE MAXIMUM RATINGS

	Max. Rating
DC Reverse Voltage	50V
Peak Pulse Current (1 μs, 1% duty cycle)	200mA
Peak DC Current	10mA
Illumination level for saturation	5W/cm^2
Storage Temperature Range	-55°C to + 125°C
Operating Temperature Range	-55°C to + 120°C
Soldering Temperature Range	200°C

Series BPX65 – Typical Spectral Response



Series BPX65 – Typical Capacitance versus Bias Voltage



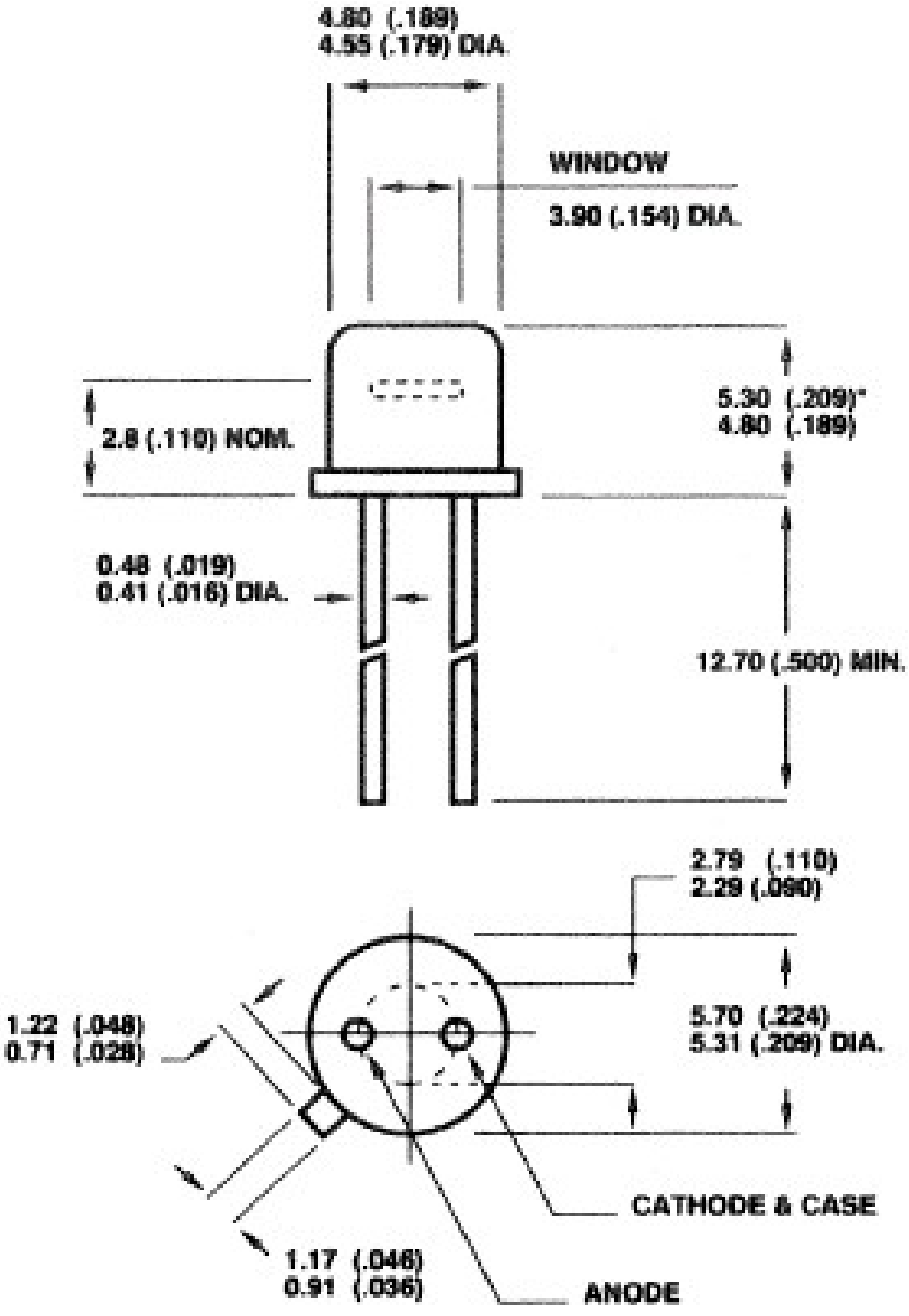
Electrical / Optical Specifications

Characteristics measured at 22°C (±2) ambient.

Single Elements BPX65 Series

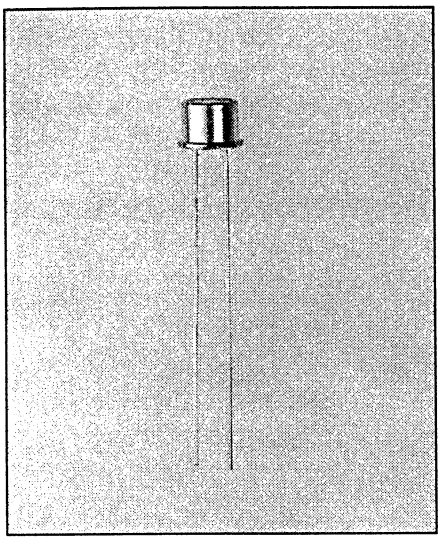
Type No.	Active Area		Responsivity A/W λ = 900 nm		Dark Current nA		NEP $WHz^{-½}$ λ = 900 nm	Capacitance pF		Risetime ns λ = 820 nm R_L = 50 Ω	Package
	mm^2	mm	Min.	Typ.	Max.	Typ.	Typ.	Vr = 0V Max.	Vr = 20V Max.	Typ.	
BPX65	1	1 x 1 mm	0.52	0.55	5	1	3.3×10^{-14}	20	3.5	3.5	TO18
AX65R2F	1	1 x 1 mm	0.52	0.55	5	1	3.3×10^{-14}	20	3.5	3.5	TO46
BPX65RT	1	1 x 1 mm	0.52	0.55	5	1	3.3×10^{-14}	20	3.5	8	TO18
X65EB	1	1 x 1 mm	0.52	0.55	5	1	3.3×10^{-14}	20	3.5	3.5	1B

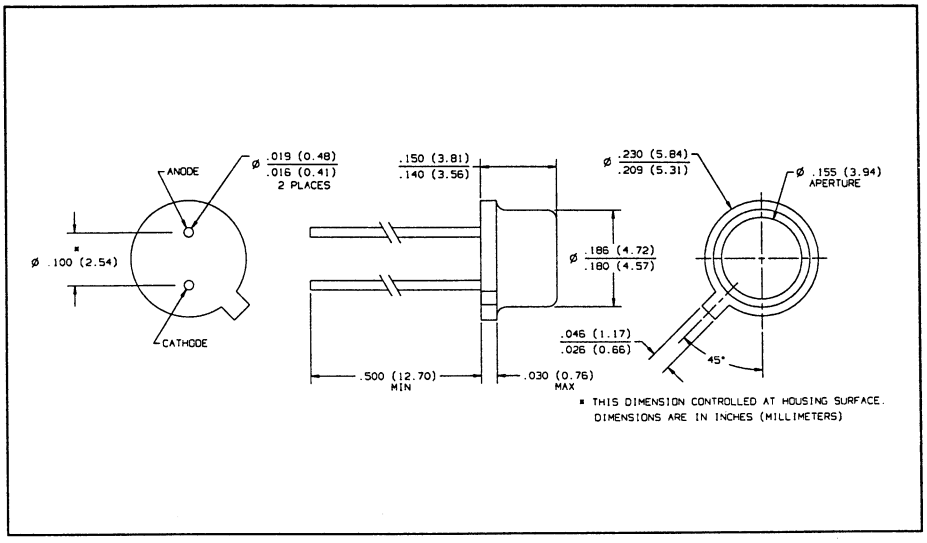
Highlighted items are Centronic standard products generally available from stock


4.80 (.189)
4.55 (.179) DIA.
WINDOW
3.90 (.154) DIA.
2.8 (.110) NOM.
5.30 (.209)*
4.80 (.189)
0.48 (.019)
0.41 (.016) DIA.
12.70 (.500) MIN.
2.79 (.110)
2.29 (.090)
1.22 (.048)
0.71 (.028)
5.70 (.224)
5.31 (.209) DIA.
CATHODE & CASE
1.17 (.046)
0.91 (.036)
ANODE

1 (TO18)

GaAlAs Hermetic Infrared Emitting Diodes
Types OP231W, OP232W, OP233W





Features

- Wide irradiance pattern
- Enhanced temperature range
- Mechanically and spectrally matched to the OP800WSL and OP830SL series devices
- Significantly higher power output than GaAs at equivalent drive currents
- TO-46 hermetically sealed package

Description

The OP231W series devices are 890nm gallium aluminum arsenide infrared emitting diodes mounted in hermetically sealed packages. The broad irradiance pattern provides relatively even illumination over a large area.

Replaces

K6300 series

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

Reverse Voltage	2.0 V
Continuous Forward Current	100 mA
Peak Forward Current (2 µs pulse width, 0.1% duty cycle)	10.0 A
Storage Temperature Range	-65° C to +150° C
Operating Temperature Range	-65° C to +125° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	260° C(1)
Power Dissipation	200 mW(2)

Notes:
(1) RMA flux is recommended. Duration can be extended to 10 seconds max. when flow soldering.
(2) Derate linearly 2.0 mW/° C above 25° C.
(3) $E_{e(APT)}$ is a measurement of the average radiant intensity within the cone formed by the measurement surface, a radius of 0.466" (11.84 mm) measured from the lens side of the tab to the sensing surface, and a sensing surface of 0.250" (6.35 mm) in diameter forming a 30° cone. $E_{e(APT)}$ is not necessarily uniform within the measured area.
(4) Measurement made with 100µs pulse measured at the trailing edge of the pulse with a duty cycle of 0.1% and an I_F = 100 mA.

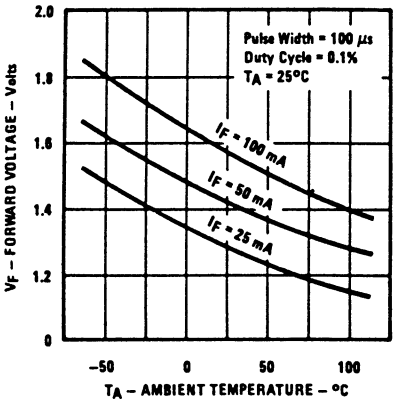
Types OP231W, OP232W, OP233W

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

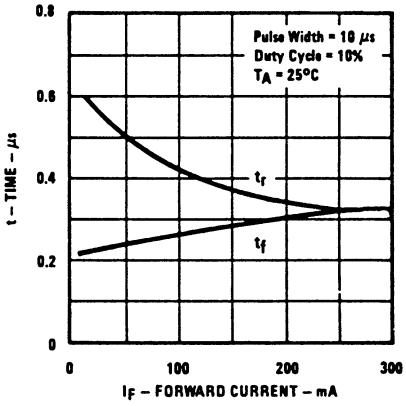
SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
$E_{e(APT)}$	Apertured Radiant Incidence	OP231W	1.5			mW/cm^2	I_F = 100 mA[3][4]
		OP232W	3.5		7.0	mW/cm^2	I_F = 100 mA[3][4]
		OP233W	5.0			mW/cm^2	I_F = 100 mA[3][4]
V_F	Forward Voltage				2.0	V	I_F = 100 mA[4]
I_R	Reverse Current				100	µA	V_R = 2.0 V
λp	Wavelength at Peak Emission			890		nm	I_F = 10 mA
B	Spectral Bandwidth Half Power Points			80		nm	I_F = 10 mA
$\Delta\lambda_P/\Delta T$	Spectral Shift with Temperature			+0.30		nm/°C	I_F = Constant
θ_{HP}	Emission Angle at Half Power Points			50		Deg.	I_F = 100 mA
t_r	Output Rise Time			500		ns	$I_{F(PK)}$ = 100 mA, PW = 10 µs, D.C. = 10%
t_f	Output Fall Time			250		ns	

Typical Performance Curves

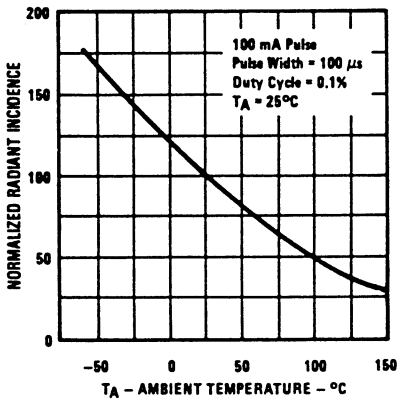
Forward Voltage vs. Ambient Temperature



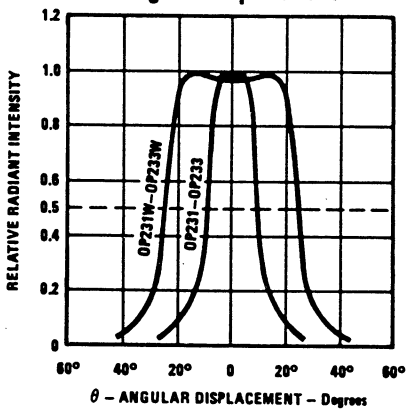
Rise Time and Fall Time vs. Forward Current



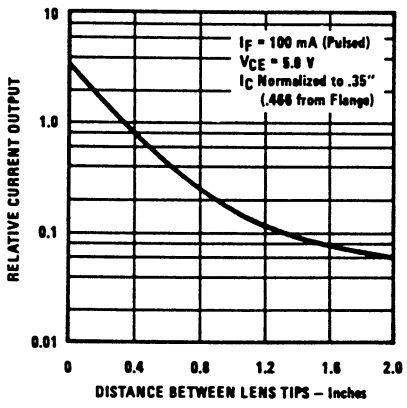
Normalized Radiant Incidence vs. Ambient Temperature



Relative Radiant Intensity vs. Angular Displacement



Coupling Characteristics of OP231W and OP800WSL



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