

# Opto Product Selection Guide

## Applications

- Datacom, 850nm
- Datacom, 1300nm
- Telecom, CATV
- Video
- Industry
- Test Equipment
- Avionics, Military

## Packages

## Glossary

- Applications
- Parameters
- Fibers

## How to Reach Mitel Semiconductor



# Datacom, 850nm

Device	Type	Wave-length nm	Band-width MHz	Rated Current mA	Rated Fiber	Optical Power		Respon-sivity A/W, V/W	Applications
						Rated	62.5G1		
						$\mu W$	$\mu W$		
<i>850 nm Emitters and Detectors</i>									
<b>MF430</b>	LED	865	250	60	62.5G1	50	50		Ethernet 100 Mbps, Intra-Office Telecom
<b>1A239</b>	LED	840	50	50	50G1	90	150		Ethernet, General Purpose
<b>1A225</b>	LED	880	50	50	10SM	2,5	150		Single-Mode Ethernet
<b>1A286</b>	LED	820	70	100	-	4000	-		Free Air Communication
<b>1A194</b>	LED	860	70	60	50G1	45	95		Ethernet, General Purpose
<b>1A388</b>	LED	820	250	50	62.5G1	50	50		Ethernet 100 Mbps, Intra-Office Telecom
<b>1A301</b>	LED	820	350	100	62.5G1	80	80		Fibre Channel 266 Mbps
<b>1A363</b>	LED	820	700	50	62.5G1	35	35		ATM 622 Mbps
<b>1A440</b>	VCSEL	840	2000	12	50G1	1300	1300		Fibre Channel, Gigabit Ethernet, ATM
<b>1A444</b>	VCSEL	840	2000	12	50G1	1300	1300		Fibre Channel, Gigabit Ethernet, ATM
<b>1A448</b>	VCSEL	840	2000	12	50G1	300	300		Fibre Channel, Gigabit Ethernet, ATM
<b>2B454</b>	VCSEL	840	2000	12	50G1	300	300		Fibre Channel, Gigabit Ethernet, ATM
<b>2B455</b>	VCSEL	840	2000	12	50G1	1300	1300		Fibre Channel, Gigabit Ethernet, ATM
<b>1A354</b>	PIN	850	1000		62.5G1			0.45	Fibre Channel, Gigabit Ethernet, ATM
<b>8B397</b>	PIN/Preamp	850	1000		62.5G1			1000	Fibre Channel, Gigabit Ethernet, ATM
<b>8C449</b>	PIN/Preamp	850	175		62.5G1			10k	Ethernet, ATM 155 Mbps
<i>850 and 1300 nm Duplex Devices</i>									
<b>MF699</b>	Duplex	1320/820	125	60	62.5G1	25	25	0.25	Full Duplex WDM (used with MF799)
<b>MF799</b>	Duplex	820/1320	250	60	62.5G1	35	35	0.5	Full Duplex WDM (used with MF699)
<b>1A212</b>	Duplex	880	50	60	50G1	55	90	0.15	Half Duplex Communication
<b>1A353</b>	Duplex	1320	50	80	62.5G1	55	55	0.3	Half Duplex Communication



# Datacom, 1300nm

Device	Type	Wave-length nm	Band-width MHz	Rated Current mA	Rated Fiber	Optical Power		Respon-sivity A/W, V/W	Applications
						Rated	62.5GI		
						$\mu W$	$\mu W$		
<i>1300 and 1550 nm Emitters and Detectors</i>									
<b>MF431</b>	LED	1320	125	60	62.5GI	40	40		FDDI, ATM 155 Mbps
<b>1A439</b>	LED	1320	125	60	62.5GI	50	50		FDDI, ATM 155 Mbps
<b>1A380</b>	LED	1320	160	60	62.5GI	40	40		ESCON, Fibre Channel 266 Mbps
<b>1A427</b>	LED	1320	450	80	62.5GI	35	35		ATM 622 Mbps
<b>MF432</b>	PIN	1300	2500		62.5GI			0.8	FDDI, ATM 155 and 622 Mbps
<b>1A358</b>	PIN	1300	2500		62.5GI			0.83	FDDI, ATM 155 and 622 Mbps
<b>8B428</b>	PIN/Preamp	1300	1000		62.5GI			1650	Fibre Channel, Gigabit Ethernet, ATM
<b>8C443</b>	PIN/Preamp	1300	140		62.5GI			200k	ATM 155 Mbps, FDDI
<b>8C447</b>	PIN/Preamp	1300	175		62.5GI			16k	ATM 155 Mbps, FDDI



# Telecom, CATV

<i>Device</i>	<i>Type</i>	<i>Wave-length nm</i>	<i>Band-width MHz</i>	<i>Rated Fiber</i>	<i>Respon-sivity A/W, V/W</i>	<i>Applications</i>
<i>1300 and 1550 nm Detectors</i>						
<b>MF432</b>	PIN	1300/1550	2500	10SI	0.8/1.0	SDH/Sonet 155 to 2488 Mbps
<b>MF435</b>	PIN	1300/1550	2000	10SI	0.84/1.0	CATV
<b>1A358</b>	PIN	1300/1550	2500	10SI	0.83/1.0	SDH/Sonet 155 to 2488 Mbps
<b>1A391</b>	PIN	1300	2500	10SI	0.83	WDM Telecom
<b>1A426</b>	PIN	1550	2500	10SI	1.0	WDM Telecom
<b>8C443</b>	PIN/Preamp	1300/1550	140	10SI	200k	SDH/Sonet 155 Mbps
<b>8C447</b>	PIN/Preamp	1300/1550	175	10SI	16k	SDH/Sonet 155 Mbps



# Video

Device	Type	Wave-length nm	Band-width MHz	Rated Current mA	Rated Fiber	<u>Optical Power</u> Rated 62.5GI $\mu$ W $\mu$ W		Respon-sivity A/W, V/W	Thermal Droop %	Harmonic Distortion dB	Applications
<i>850 nm Emitters and Detectors</i>											
<b>1A314</b>	LED	860	55	100	62.5GI	100	100		1		Baseband Video
<b>1A255</b>	LED	860	55	80	62.5GI	120	120		2		Baseband Video
<b>1A359</b>	LED	780	55	80	62.5GI	120	120		2		Baseband Video
<b>1A292</b>	LED	860	75	80	62.5GI	150	150		4		Baseband Video
<b>1A277A</b>	LED	880	250	100	62.5GI	130	130		4	-40/-50	FM and Baseband Video
<b>1A184A</b>	LED	870	140	100	50GI	55	150			-40/-45	FM Video
<b>1A354</b>	PIN	850	1000		62.5GI			0.45			General Purpose
<b>8C449</b>	PIN/Preamp	850	175		62.5GI			10k			General Purpose
<i>1300 nm Emitters and Detectors</i>											
<b>1A284</b>	LED	1320	55	100	62.5GI	50	50		5		Baseband Video
<b>1A302</b>	LED	1320	100	80	62.5GI	50	50			-26/-38	FM Video
<b>MF432</b>	PIN	1300/1550	2500		62.5GI			0.8/1.0			General Purpose
<b>1A358</b>	PIN	1300/1550	2500		62.5GI			0.83/1.0			General Purpose
<b>8C447</b>	PIN/Preamp	1300/1550	175		62.5GI			16k			General Purpose



# Industry

Device	Type	Wave-length nm	Band-width MHz	Rated Current mA	Rated Fiber	<u>Optical Power</u> Rated 62.5GI $\mu W$ $\mu W$		Respon-sivity A/W, V/W	Applications
<i>850 nm Emitters, Detectors and Duplex Devices</i>									
<b>MF430</b>	LED	865	250	60	62.5GI	50	50		General Purpose
<b>1A334</b>	LED	740	35	80	50GI	25	50		Sensors
<b>1A208</b>	LED	810	50	100	200SI/B	1200	150		Sensors
<b>1A286</b>	LED	820	70	100	-	4000	-		Sensors
<b>1A440</b>	VCSEL	840	5000	10	50GI	1000	1000		Sensors, Signal Transmission
<b>1A444</b>	VCSEL	840	5000	10	50GI	1000	1000		Sensors, Signal Transmission
<b>1A458</b>	VCSEL	850	1000	70	62.5GI	10000	-		Sensors, General Purpose
<b>1A228</b>	LED	850	50	100	200SI/B	1200	150		Electronic Distance Measurement
<b>1A313</b>	LED	860	85	300	300SI	7000	-		Power Transmission
<b>1A229</b>	LED	870	4	5	50GI	3	8		Battery-Operated Equipment
<b>1A192</b>	LED	880	45	100	50GI	115	280		Sensors, Signal Transmission
<b>1A226</b>	LED	900	100	60	62.5GI	70	70		Sensors
<b>1A354</b>	PIN	850	1000		62.5GI			0.45	General Purpose
<b>8C449</b>	PIN/Preamp	850	175		62.5GI			10k	General Purpose
<b>1A212</b>	Duplex	880	50	60	50GI	55	90	0.15	Half Duplex Communication
<i>1300 nm Emitters, Detectors and Duplex Devices</i>									
<b>MF431</b>	LED	1320	125	60	62.5GI	40	40		General Purpose
<b>1A436</b>	LED	1300	50	80	50GI	27	80		Sensors, Signal Transmission
<b>MF432</b>	PIN	1300	2500		62.5GI			0.8	General Purpose
<b>1A358</b>	PIN	1300/1550	2500		62.5GI			0.83/1.0	General Purpose
<b>8C447</b>	PIN/Preamp	1300/1550	175		62.5GI			16k	General Purpose
<b>1A353</b>	Duplex	1320	50	80	62.5GI	55	55	0.3	Half Duplex Communication



# Test Equipment

<i>Device</i>	<i>Type</i>	<i>Wave-length nm</i>	<i>Band-width MHz</i>	<i>Rated Current mA</i>	<i>Rated Fiber</i>	<i>Optical Power Rated</i>		<i>Applications</i>
						<i>62.5GI <math>\mu W</math></i>	<i>62.5GI <math>\mu W</math></i>	
<i>850 and 1300 nm Emitters</i>								
<b>1A191</b>	LED	850	35	100	50GI	130	300	Optical Power Sources
<b>1A398</b>	LED	1300	35	75	62.5GI	60	60	Optical Power Sources



# Avionics, Military

Device	Type	Wave-length nm	Band-width MHz	Rated Current mA	Rated Fiber	<u>Optical Power</u>		Respon-sivity A/W, V/W	Applications
						Rated 62.5GI $\mu W$	$\mu W$		
<i>850 nm Emitters, Detectors and Duplex Devices</i>									
<b>1A272</b>	LED	810	70	100	200SI/B	1600	150		Avionics, Military Datacom
<b>1A288</b>	LED	840	100	100	100GI	850	400		Avionics, Military Datacom
<b>1A279</b>	LED	835	15	100	100SI	400	150		Position Sensors
<b>1A458</b>	VCSEL	850	1000	70	62.5GI	10000	-		Sensors, General Purpose
<b>1A354</b>	PIN	850	1000		62.5GI			0.45	General Purpose
<b>8C449</b>	PIN/Preamplifier	850	175		62.5GI			10k	General Purpose
<b>1A212</b>	Duplex	880	50	60	50GI	55	90	0.15	Half-Duplex Communication





# Packages

<i>Package</i>	<i>Description</i>	<i>Ordering Information</i>
<b>TO-46</b>	TO-46 Package	1Axxx
<b>ST-2A</b>	ST Receptacle	1Axxx ST-2A
<b>SC-2A</b>	SC Receptacle	1Axxx SC-2A
<b>FC-2A</b>	FC Receptacle	1Axxx FC-2A
<b>SMA-2A</b>	SMA Receptacle	1Axxx SMA-2A
<b>Pigtail-3A</b>	Assembly with 1 meter Fiber Pigtail	1Axxx Pigtail-3A (Specify Fiber)



# Glossary - Applications

<b>ATM</b>	Asynchronous Transfer Mode, typically 155 Mbps or 622 Mbps transmission.
<b>Baseband Video</b>	Video system where the video signal modulates the LED directly.
<b>CATV</b>	Cable TV, typically in public networks.
<b>CCTV</b>	Closed circuit TV, typically in private networks.
<b>EDM</b>	Electronic Distance Measurement by the use of an optical signal
<b>Ethernet</b>	Datacom network with 10 Mbps transmission speed.
<b>Fast Ethernet</b>	Datacom network with 100 Mbps transmission speed.
<b>Fibre Channel</b>	Point-to-point link with 266 or 1064 Mbps transmission speed.
<b>FITL</b>	Fiber in the loop; common name for FTTH and FTTC.
<b>FM Video</b>	Video System where the video signal is modulated using a subcarrier.
<b>FTTC</b>	Fiber to the curb
<b>FTTH</b>	Fiber to the home
<b>Gigabit Ethernet</b>	Datacom network with 1 Gbps transmission speed.
<b>LAN</b>	Local Area Network
<b>OC-3, 12, 48</b>	Transmission speed in Sonet systems: OC-3=155 Mbps, OC-12=622 Mbps, OC-48=2488 Mbps.
<b>SDH</b>	Synchronous Digital Hierarchy: Telecom standard in Europe and Asia. Similar to Sonet.
<b>Sonet</b>	Synchronous Optical Network: Telecom standard in America. Similar to SDH.
<b>STM-1, 4, 16</b>	Transmission speed in SDH systems: STM-1=155 Mbps, STM-4=622 Mbps, STM-16=2488 Mbps.
<b>Test Equipment</b>	Typically optical power sources or power meters.
<b>Video</b>	Analog video, typically in CCTV, surveillance or computer graphics.
<b>WAN</b>	Wide Area Network
<b>WDM</b>	Wavelength Division Multiplex: A technique to multiplex several information channels over one fiber by using different wavelengths.



# Glossary - Parameters

<b>Bandwidth</b>	Frequency where the amplitude of the optical output has decreased by 3dB.
<b>BER</b>	Bit Error Rate: Probability to misinterpret one bit of information.
<b>Center Wavelength</b>	Center of the spectral distribution (50% points) for an emitter.
<b>Dark Current</b>	Current from a detector when kept in a dark environment.
<b>dBm</b>	Decibel in relation to 1mW optical power: $P(\text{dBm}) = 10\log(P(\text{mW}))$
<b>Dynamic Range</b>	Ratio between the maximum and minimum optical power for a detector.
<b>Extinction Ratio</b>	Ratio between optical power for logical "0" and optical power for logical "1".
<b>Fiber-Coupled Power</b>	Optical power coupled into a specified fiber.
<b>FWHM</b>	Full Width Half Maximum
<b>Harmonic Distortion</b>	Harmonic distortion when an emitter is modulated with a pure sine wave. Causes distortion in FM video systems.
<b>LED</b>	Light-Emitting Diode
<b>MTTF</b>	Mean time to failure
<b>NEP</b>	Noise Equivalent Power: Optical power input for a detector, for which the electrical output power equals the output noise power.
<b>Optical Power</b>	Optical power from an emitter, where applicable coupled into a fiber.
<b>Peak Wavelength</b>	Peak of the spectral distribution for an emitter.
<b>PIN</b>	PIN (P-type, Intrinsic, N-type) Photodiode
<b>PIN/Preamp</b>	PIN Photodiode with preamplifier integrated in one package.
<b>Rated Current</b>	Drive current for which an emitter's output is specified.
<b>Rated Fiber</b>	Fiber for which an emitter's output or a detector's input is specified.
<b>Responsivity</b>	Ratio between detector current or voltage and incident optical power for a detector.
<b>Rise and Fall Time</b>	Rise or fall time between 10% and 90% when a step signal is applied.
<b>Sensitivity</b>	For a detector, average optical input power corresponding to a certain bit error rate.
<b>Spectral Width</b>	FWHM of the spectral distribution for an emitter.
<b>Thermal Droop</b>	Drop in optical power due to self-heating of an emitter. Causes distortion in baseband video systems.
<b>Thermal Resistance</b>	Resistance for heat transfer from the active chip area to the environment.
<b>TO-46 Package</b>	Jedec TO-46 standard transistor type package.
<b>VCSEL</b>	Vertical Cavity Surface-Emitting Laser
<b>Wavelength</b>	Emission wavelength of an emitter or acceptance wavelength of a detector.



# Glossary - Fibers

<i>Fiber</i>	<i>Core Diameter</i>	<i>Cladding Diameter</i>	<i>Fiber Type</i>	<i>Numerical Aperture</i>
	$\mu m$	$\mu m$		
<b>10SM</b>	10	125	Single-Mode	0.11
<b>50GI</b>	50	125	Graded Index	0.20
<b>62.5GI</b>	62.5	125	Graded Index	0.275
<b>100SI</b>	100	140	Step Index	0.22
<b>100GI</b>	100	140	Graded Index	0.29
<b>200SI/A</b>	200	230	Step Index	0.37
<b>200SI/B</b>	200	280	Step Index	0.24
<b>300SI</b>	300	330	Step Index	0.37

**Acceptance Angle**

The maximum angle for which incident light is coupled into the fiber.

**Dispersion**

Broadening of optical pulses in the fiber.

**Fiber Cladding**

Material surrounding the core of the fiber, acts as a reflector.

**Fiber Core**

The core of the fiber, where light is guided

**GI**

Graded Index fiber

**Graded Index Fiber**

Fiber with parabolic refractive index profile; reduces dispersion.

**Multimode Fiber**

Fiber with large diameter core, allowing multiple modes.

**Numerical Aperture**

The inverse sine of the fiber's maximum acceptance angle.

**SI**

Step Index fiber

**Single-Mode Fiber**

Fiber with small diameter core, allowing only one mode.

**SM**

Single-Mode fiber

**Step index Fiber**

Fiber with step refractive index profile.



# How to Reach Mitel Semiconductor

## North America

### Canada

Tel: (613) 592-2122  
Fax: (613) 592-6909  
1-800-96MITEL/64835

### United States

#### Georgia

Tel: (770) 486-0194  
Fax: (770) 631-8213

#### Texas

Tel: (972) 509-2082  
Fax: (972) 509-2083

#### California

Tel: (619) 675-3433  
Fax: (619) 675-3450

## Europe

### United Kingdom

Tel: (44) 1291 436180  
Fax: (44) 1291 436771

### Sweden

Tel: (46) 8 58 02 45 00  
Fax: (46) 8 58 02 01 10

### France

Tel: (33) 169 28 30 78  
Fax: (33) 169 28 31 56

## South America

### Brazil

Tel: (55) 11 3766 2261

## Asia/Pacific

### Singapore

Tel: (65) 293 5312  
Fax: (65) 293 8527

### Japan

Tel: (81) 45 471 0403  
Fax: (81) 45 471 0408

### Internet

[www.semicon.mitel.com](http://www.semicon.mitel.com)



## MF430 ST



ST Assembly

Ordering Information	
PART #	RECEPTACLE
MF430 ST	ST
-40°C to +85°C	

### Applications

- Ethernet 10 or 100Mbps
- Token Ring
- Fibre Channel 266Mbps
- Short Wavelength FDDI
- Short Wavelength ATM-SDH/SONET 155Mbps
- Intra-Office Telecom
- General Purpose

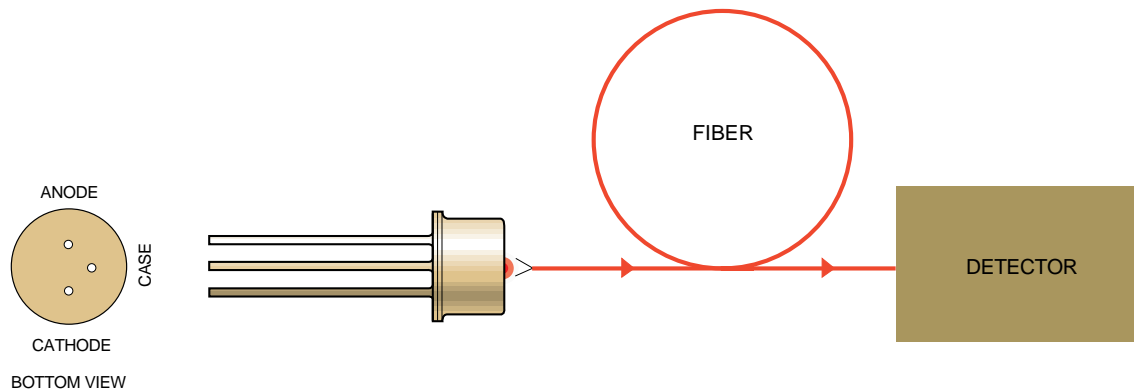
### Features

- 865nm Surface-Emitting LED
- 250MHz Bandwidth
- Designed for 62.5/125µm Fiber
- Aligned in ST® Receptacle
- MTTF >1,000,000 hours

### Description

This high performance LED has been designed for Datacom, Telecom or General Purpose Applications. The short wavelength LED allows cost-effective links over short distances. This very high speed device has an actively aligned receptacle for optimized coupling of power to 62.5/125µm fiber. A Silicon Photodiode is recommended as Receiver for this LED.

## MF430 Functional Diagram



**MF430 LED**

**Absolute Maximum Ratings\***

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{stg}$	-40	+85	°C
Operating Temperature (Fig 4)	$T_{op}$	-40	+85	°C
Electrical Power Dissipation (Fig 4)	$P_{tot}$		250	mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$		110	mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{FRM}$		180	mA
Reverse Voltage	$V_R$		1.5	V
Soldering Temperature (Note 1)	$T_{sld}$		260	°C

\*Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied.

Note 1: 2mm from the case for 10s.

**Optical & Electrical Characteristics** (Case Temperature -25 to +70°C)

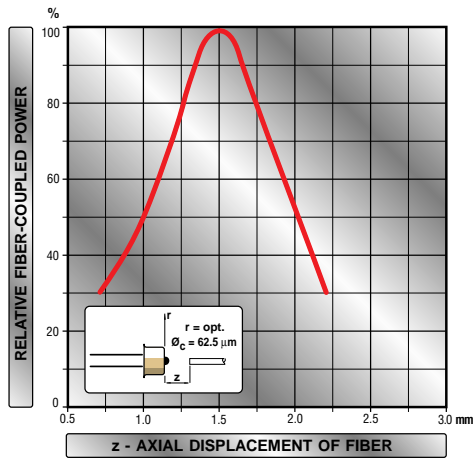
Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Fiber-Coupled-Power (Fig 1, 2, 3)	$P_{fiber}$	-17.5			dBm	$I_{Peak}=60\text{mA}$ (Note 1,2)
Rise & Fall Time (10-90%, no bias)	$t_r, t_f$		1.5	2	ns	$I_F=60\text{mA}$ (Note 2)
Bandwidth (3dB <sub>e1</sub> )	$f_c$		250		MHz	$I_F=60\text{mA}$ (Note 2)
Peak Wavelength	$\lambda_p$	850	865	880	nm	$I_F=60\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50	60	nm	$I_F=60\text{mA}$
Forward Voltage (Fig 5)	$V_F$			2.1	V	$I_F=60\text{mA}$
Reverse Current	$I_R$			20	μA	$V_R=1\text{V}$
Capacitance	C		20		pF	$V_R=0\text{V}$ , $f=1\text{MHz}$

Note 1: Average power at 10MHz/50% duty cycle. Measured at the exit of 100m of fiber.

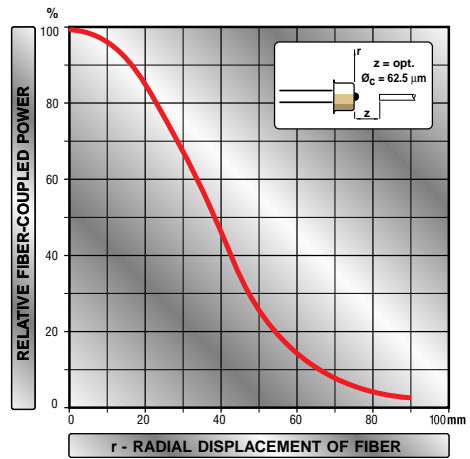
Note 2: 62.5/125μm graded index fiber (NA = 0.275).

**Thermal Characteristics**

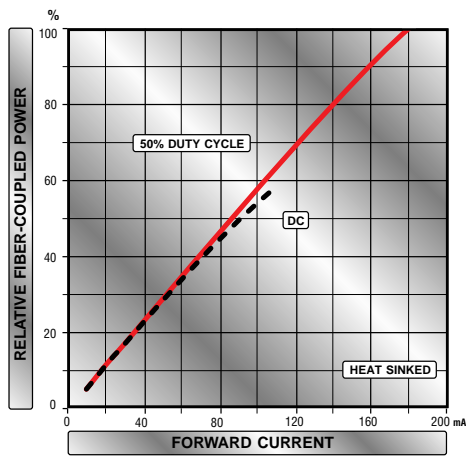
Parameter	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance - Infinite Heat Sink	$R_{thjc}$			200	°C/W
Thermal Resistance - On PCB	$R_{thjb}$			300	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$\Delta\lambda/dT_j$		0.3		nm/°C



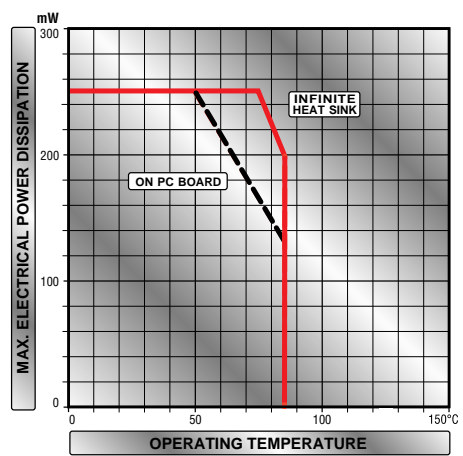
**Figure 1**



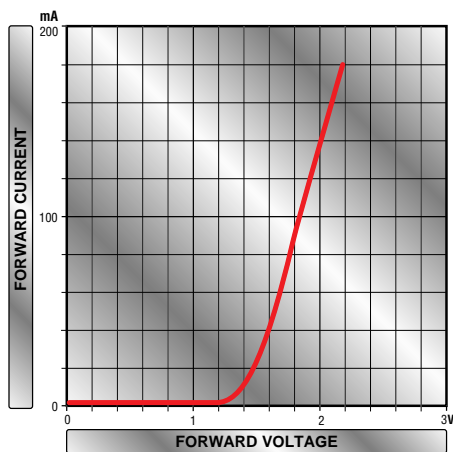
**Figure 2**



**Figure 3**



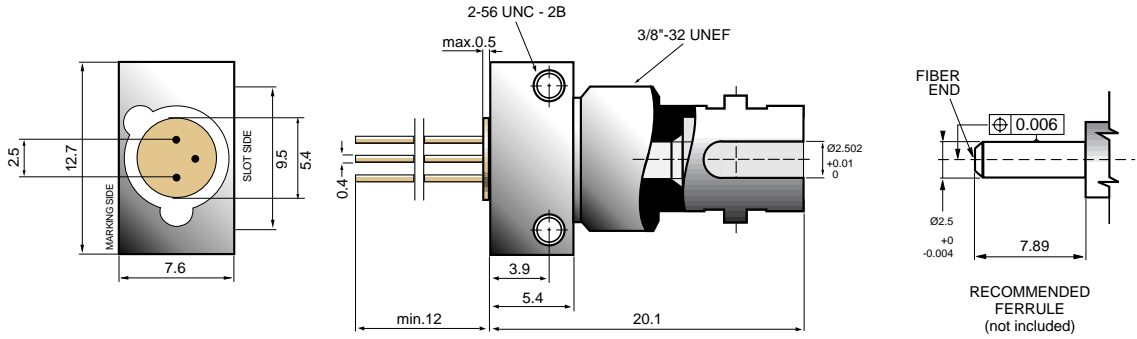
**Figure 4**



**Figure 5**

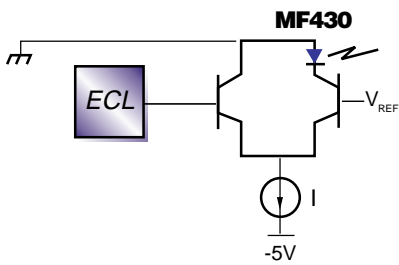


**MF430 ST Mechanical Data**

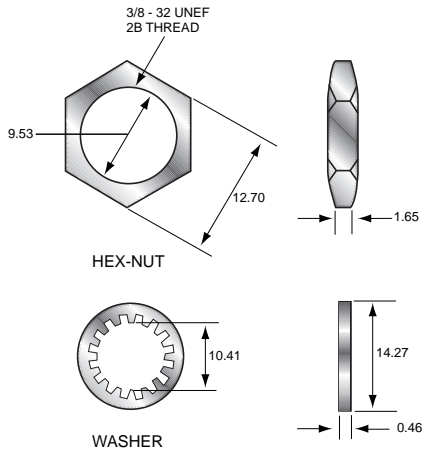


Note: The LED chip is isolated from the case. All dimensions in mm.

**Typical Drive Circuit**



**ST Packaging Hardware**



## MF431 ST



ST Assembly

Ordering Information	
PART #	RECEPTACLE
MF431 ST	ST
-40°C to +85°C	

### Applications

- FDDI
- ATM-SDH/SONET 155Mbps
- Intra-Office Telecommunications
- General Purpose

### Features

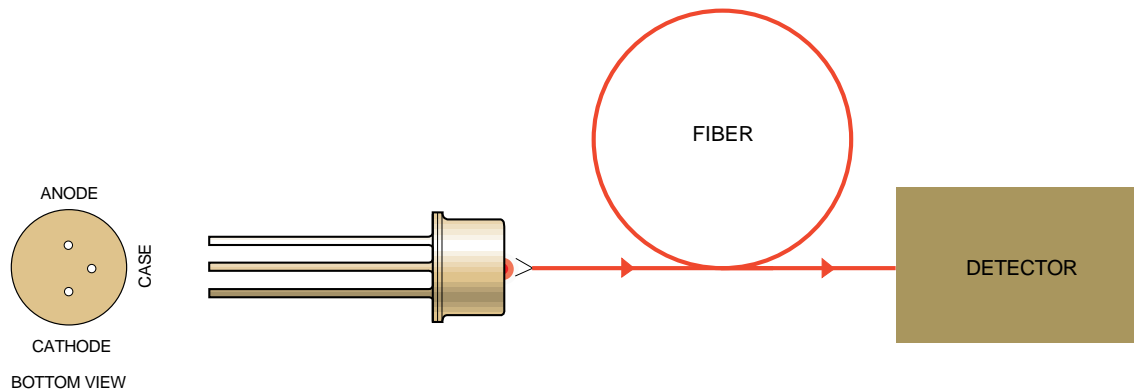
- 1320nm Surface-Emitting LED
- 125MHz Bandwidth
- Designed for 62.5/125µm Fiber
- Aligned in ST® Receptacle
- MTTF >1,000,000 hours

### Description

This LED is designed for Datacom, Telecom and General Purpose Applications. It has a long wavelength LED for links up to 10 km at 125Mbps. It meets standards for FDDI (ANSI X3T9.5) and ATM155Mbps.

The device is optimized for 62.5/125µm fiber and actively aligned in an ST® receptacle. The MF432 PIN Photodiode is recommended as Receiver for this LED.

## MF431 Functional Diagram



**MF431 LED**

**Absolute Maximum Ratings\***

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	Tstg	-40	+85	°C
Operating Temperature (Fig 4)	Top	-40	+85	°C
Electrical Power Dissipation (Fig 4)	Ptot		160	mW
Continuous Forward Current (f≤10kHz)	IF		80	mA
Peak Forward Current (duty cycle ≤50%, f≥1MHz)	IFRM		130	mA
Reverse Voltage	VR		0.5	V
Soldering Temperature (Note 1)	Tsld		260	°C

\*Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied.

Note 1: 2mm from the case for 10s.

**Optical & Electrical Characteristics** (Case Temperature -25 to +70°C)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Fiber-Coupled-Power (Fig 1, 2, 3)	P <sub>fiber</sub>	-19			dBm	I <sub>Peak</sub> =60mA (Note 1, 2)
Rise & Fall Time (10-90%, no bias)	t <sub>r</sub> t <sub>f</sub>		2.0	2.5	ns	I <sub>F</sub> =60mA (Note 2, 3)
Bandwidth (3dB <sub>el</sub> )	f <sub>c</sub>		125		MHz	I <sub>F</sub> =60mA (Note 2)
Peak Wavelength	λ <sub>p</sub>	1285	1320	1355	nm	I <sub>F</sub> =60mA (Note 3)
Spectral Width (FWHM)	Δλ		135	170	nm	I <sub>F</sub> =60mA (Note 3)
Forward Voltage (Fig 5)	V <sub>F</sub>		1.3	1.65	V	I <sub>F</sub> =60mA
Reverse Current	I <sub>R</sub>			100	μA	V <sub>R</sub> =1V
Capacitance	C		200		pF	V <sub>R</sub> =0V, f=1MHz

Note 1: Average power at 10MHz/50% duty cycle. Measured at the exit of 100m of fiber.

Note 2: 62.5/125μm graded index fiber (NA = 0.275).

Note 3: Meets the FDDI ANSI X3T9.5 specification for FDDI.

**Thermal Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance - Infinite Heat Sink	R <sub>thjc</sub>			200	°C/W
Thermal Resistance - On PCB	R <sub>thjb</sub>			300	°C/W
Temperature Coefficient - Optical Power	dP/dT <sub>j</sub>		-0.75		%/°C
Temperature Coefficient - Wavelength	Δλ/dT <sub>j</sub>		0.45		nm/°C

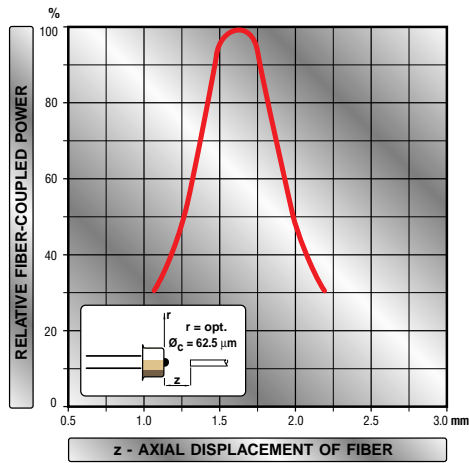


Figure 1

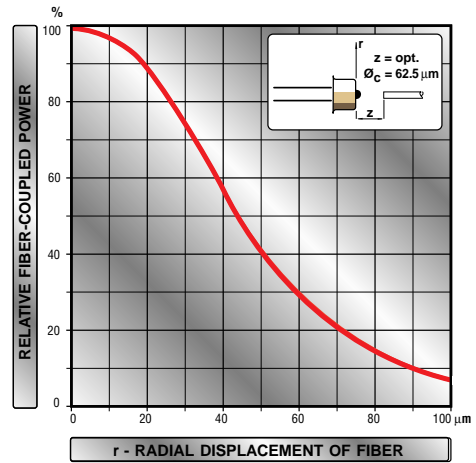


Figure 2

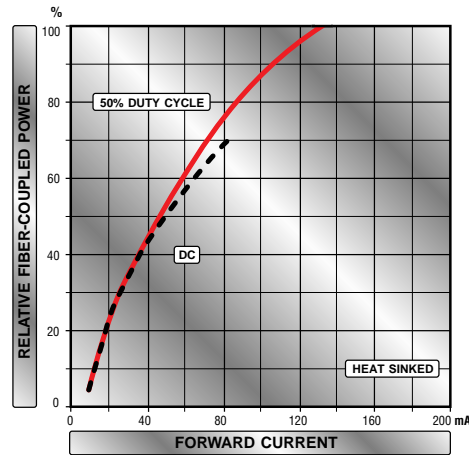


Figure 3

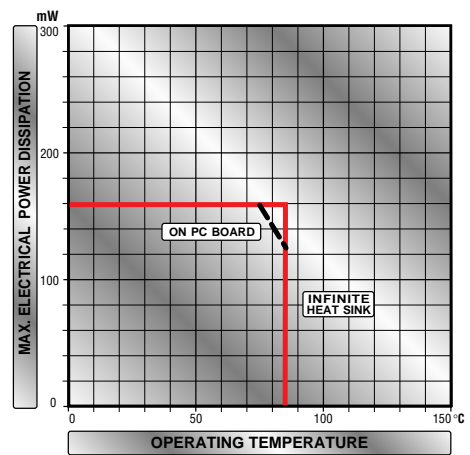


Figure 4

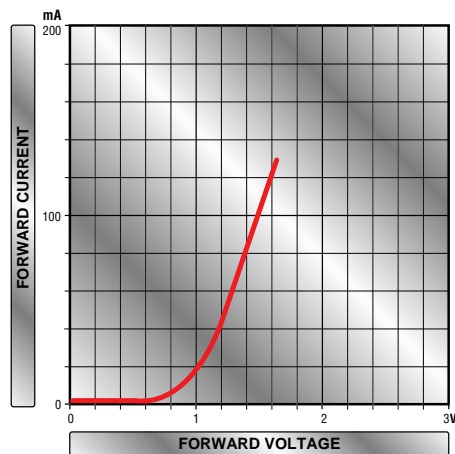
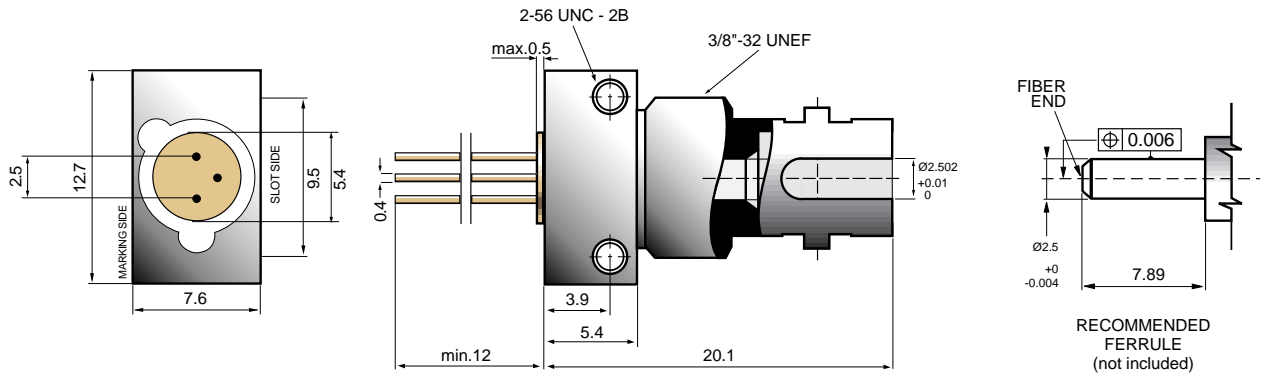


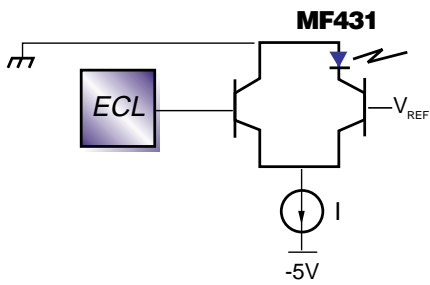
Figure 5

**MF431 ST Mechanical Data**

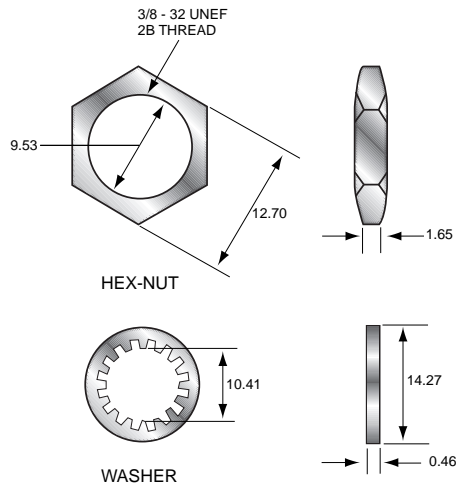


Note: The LED chip is isolated from the case. All dimensions in mm.

**Typical Drive Circuit**



**ST Packaging Hardware**



## MF432 ST



ST Assembly

### ST Applications

- FDDI
- ESCON
- ATM-SDH/SONET 155, 622 and 2488Mbps
- FITL - Fiber In The Loop
- FTTH/FTTC - Fiber To The Home/Curb
- Intra-Office Telecommunications
- General Purpose

### Features-All MF432 Devices

- 1300 and 1550nm PIN Photodiode
- 2.5GHz Bandwidth
- Designed for Single-Mode and Multi-Mode Fiber
- Aligned in ST®, SC Receptacle or with a Single-Mode Fiber Pigtail
- Tested to Bellcore TA-NWT-000983
- High Return Loss in Pigtail Configuration

## MF432 SC



SC Assembly

### SC Applications

- FDDI
- ESCON
- ATM-SDH/SONET 155, 622 and 2488Mbps
- FITL - Fiber In The Loop
- FTTH/FTTC - Fiber To The Home/Curb
- Intra-Office Telecommunications
- General Purpose

### Description

This family of PIN Photodiodes is designed for Datacom, Telecom and General purpose applications. Their unique design combines high bandwidth with high responsivity for single-mode as well as multimode fibers up to 62.5µm core diameter. The MF432 PIN Photodiode is available in ST, SC, or Pigtail package.

Specially-designed connectors and clips for PC board assembly are included in deliveries of MF432 in SC and Pigtail configurations.

The MF431 LED is the recommended transmitter for these PIN photodiodes.

Ordering Information	
PART #	RECEPTACLE
MF431 ST	ST
MF 432 SC	SC
MF 432 Pigtail	Pigtail
-40°C to +85°C	

## MF432 Pigtail

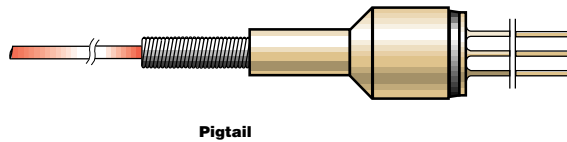
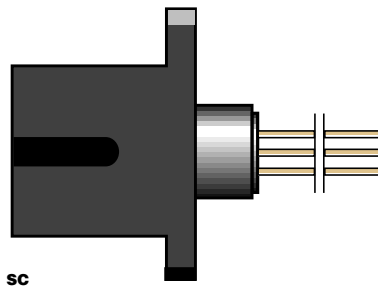
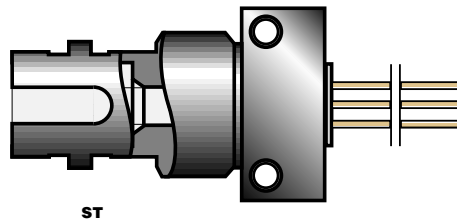
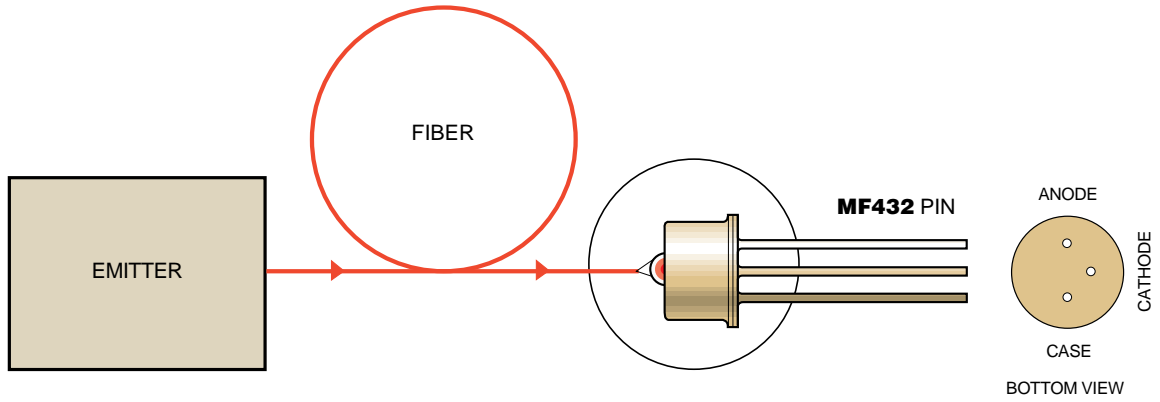


Pigtail Assembly

### Pigtail Applications

- ATM-SDH/SONET 155, 622 and 2488Mbps
- FITL - Fiber In The Loop
- FTTH/FTTC - Fiber To The Home/Curb

**MF432 Functional Diagram For ST, SC and Pigtail**



## Absolute Maximum Ratings\*

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{stg}$	-40	+85	°C
Operating Temperature	$T_{op}$	-40	+85	°C
Reverse Voltage	$V_R$		20	V
Soldering Temperature (Note 1)	$T_{sld}$		260	°C

\*Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied.

Note 1: 2mm from the case for 10s.

## Optical & Electrical Characteristics (Case Temperature -25 to +70°C)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Responsivity (Fig 1, 2, 3)	R	0.7 0.8	0.8 1.0		A/W	$\lambda=1300\text{nm}$ (Note 1) $\lambda=1550\text{nm}$ $V_R=5\text{V}$
Bandwidth	$f_c$	2.5			GHz	$V_R=5\text{V}$ $R_L=50\Omega$ (Note 1)
Capacitance (Fig 4)	C		0.8	1.2	pF	$V_R=5\text{V}$ $f=1\text{MHz}$
Dark Current	$I_d$			3 50	nA	$T_{Case}=25^\circ\text{C}$ $T_{Case}=70^\circ\text{C}$ $V_R=5\text{V}$
Return Loss	RL	40	55			(Note 2)

Note 1: Data for 10/125 $\mu\text{m}$  single-mode fiber (NA=0.11) to 62.5/125 $\mu\text{m}$  graded index fiber (NA=0.275).

Note 2: With 10/125 $\mu\text{m}$  single-mode fiber pigtail (NA:0.11).

## Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Temperature Coefficient - Dark Current	$dl_d/dT_j$		5		%/°C



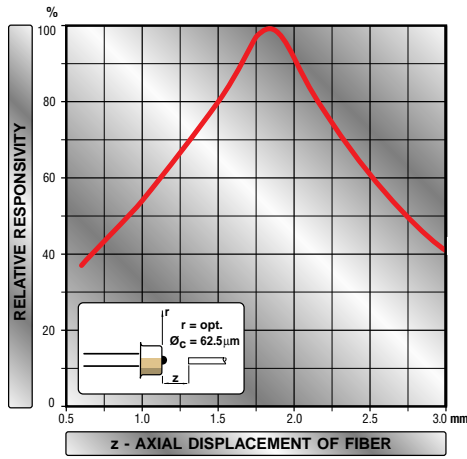


Figure 1

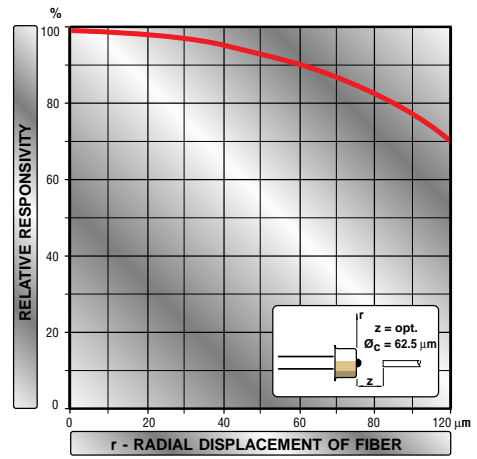


Figure 2

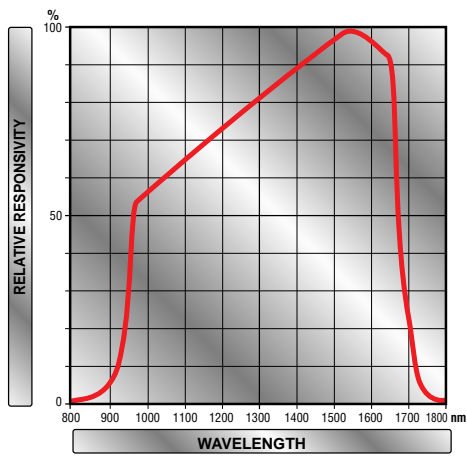


Figure 3

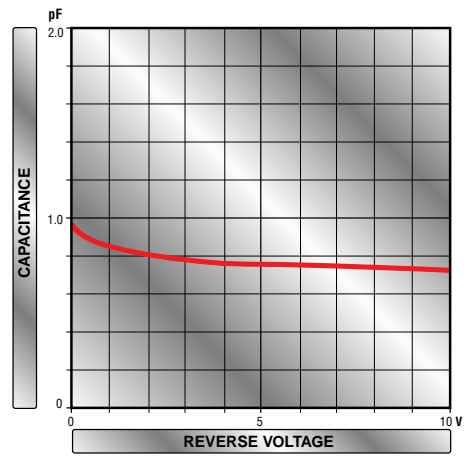
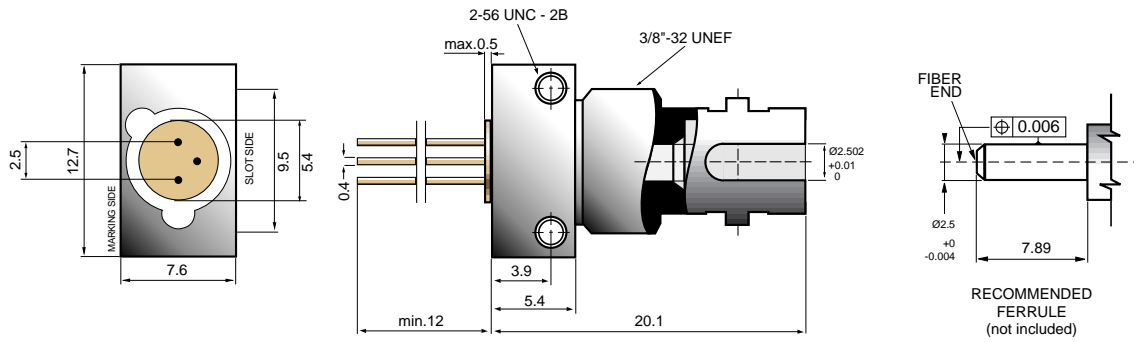


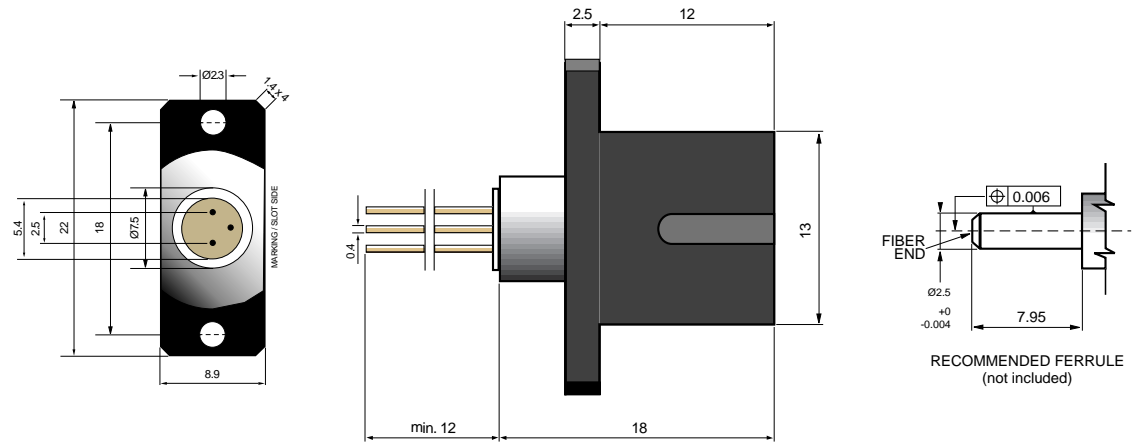
Figure 4

## MF432 ST Mechanical Data

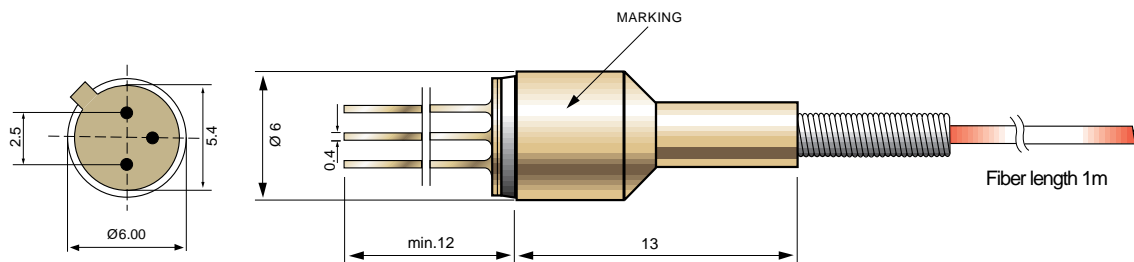


Note: The PIN chip is isolated from the case. All dimensions in mm.

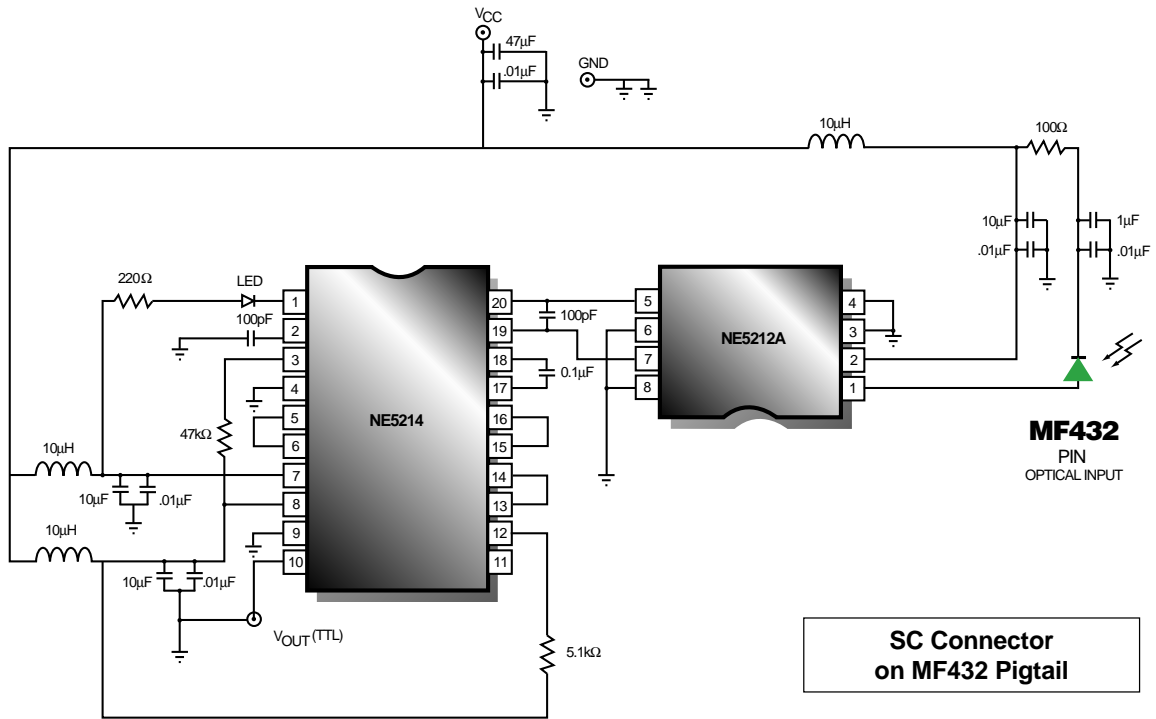
## MF432 SC Mechanical Data



## MF432 Pigtail Mechanical Data

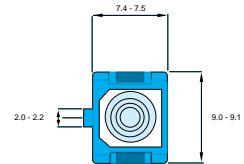
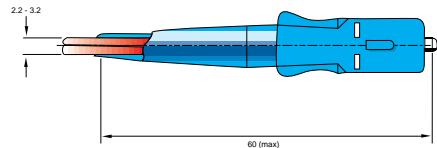


**Typical Receiver Circuit**

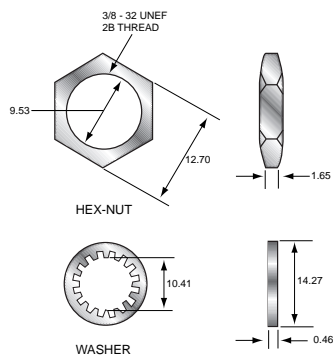


**SC Connector on MF432 Pigtail**

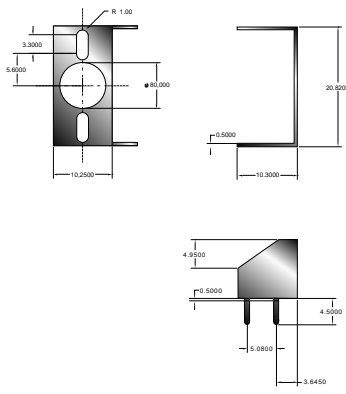
A typical Fiber Optic Receiver Circuit interfacing the PIN Photodiode to a Philips NE52121 transimpedance amplifier (140MHz) and to the Philips NE5211 FDDI Fiber Optic Postamplifier. This design is capable of operating at 125Mbps with single +5 or -5.2V supply with differential output impedance of 100k.



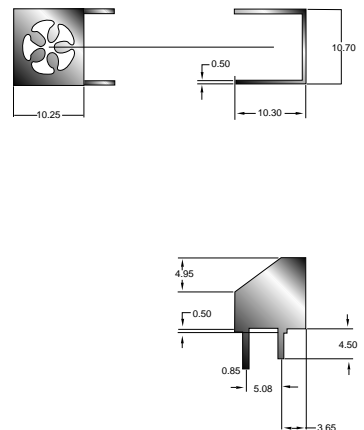
**ST Packaging Hardware**



**MF432 SC Clip**



**MF432 Pigtail Clip**



## MF435 Pigtail



Pigtail Assembly

### Applications

- CATV

### Features

- Linear 1300 and 1550nm PIN photodiode
- Very Low Intermodulation Distortion
- Very High Return Loss
- 2.5GHz Bandwidth
- Assembled with a Single-Mode Fiber Pigtail
- Pigtail Terminated with an SC Connector

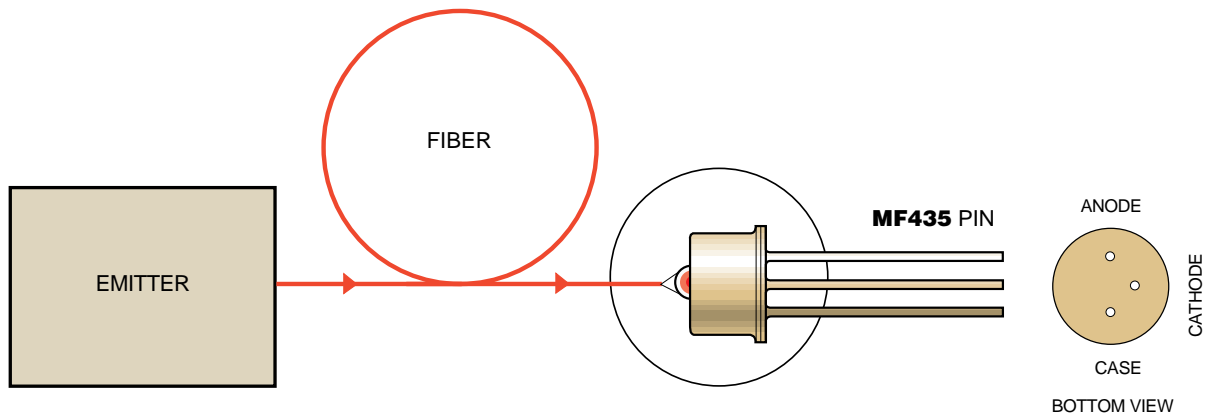
### Description

PIN Photodiode for Cable TV (CATV). This PIN has very high bandwidth, very low intermodulation distortion and very high return loss. It has an actively aligned fiber Pigtail for optimum coupling to the fiber and maximum return loss. A 1300 or 1550nm Laser is recommended as Transmitter.

### Ordering Information

PART #	RECEPTACLE
MF435 Pigtail	Pigtail
-40°C to +85°C	

### MF435 Functional Diagram



**Absolute Maximum Ratings\***

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{stg}$	-40	+85	°C
Operating Temperature	$T_{op}$	-40	+85	°C
Reverse Voltage	$V_R$		20	V
Soldering Temperature (Note 1)	$T_{sld}$		260	°C

\*Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied.

Note 1: 2mm from the case for 10s.

**Optical & Electrical Characteristics** (Case Temperature -25 to +70°C)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Responsivity (Fig 1)	R	0.75 0.90	0.84 1.00		A/W	$\lambda=1300\text{nm}$ (Note 1) $\lambda=1550\text{nm}$ $V_R=10\text{V}$
Return Loss	RL	45	55		dB	(Note 1)
Bandwidth	$f_c$	2			GHz	$V_R=10\text{V}$ $R_L=50\Omega$ (Note 1)
Intermodulation Distortion	IMD <sub>2</sub> IMD <sub>3</sub>		-78 -90		dBc	OMI <sub>L</sub> =70%, $P_C=1\text{mW}$ $f_2-f_1=40\text{MHz}$ (Note 1, 2)
Capacitance (Fig 2)	C		0.8	1.2	pF	$V_R=10\text{V}$ $f=1\text{MHz}$
Dark Current	$I_d$			5 50	nA	$T_{Case}=25^\circ\text{C}$ $T_{Case}=70^\circ\text{C}$ $V_R=10\text{V}$

Note 1: 10/125 $\mu\text{m}$  single-mode fiber pigtail (NA=0.11).

Note 2:  $f_1=100 - 1000\text{MHz}$ ,  $V_R=10\text{V}$   $R_L=50\Omega$ .

**Thermal Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Units
Temperature Coefficient - Dark Current	$dI_d/dT_j$		5		% / °C

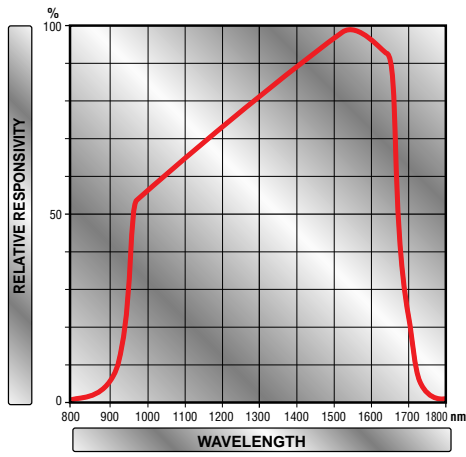


Figure 1

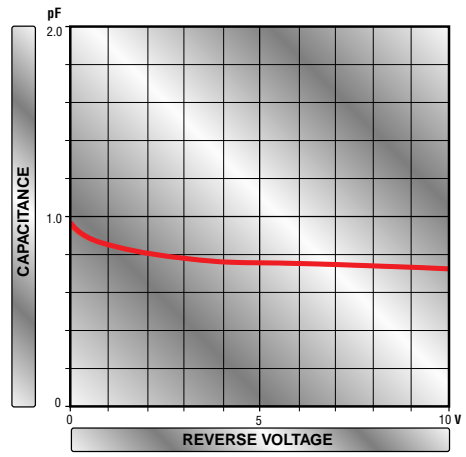
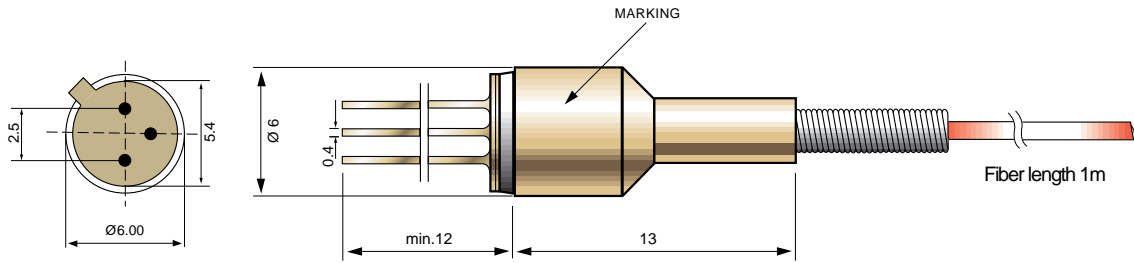


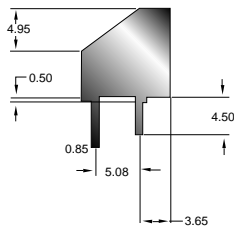
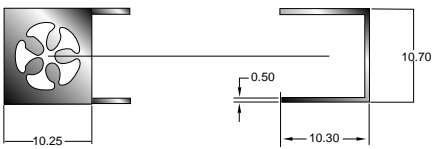
Figure 2

**MF435 Pigtail Mechanical Data**

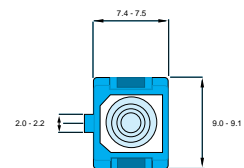
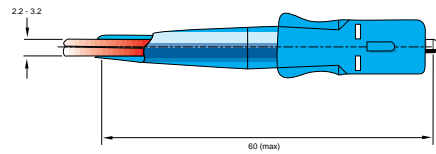


Note: The PIN chip is isolated from the case. All dimensions in mm.

**MF435 Pigtail Clip**



**SC Connector on MF435 Pigtail**



## MF699 ST



ST Assembly

Ordering Information	
PART #	RECEPTACLE
MF699	ST
-40°C to +85°C	

### Applications

- Ethernet 10 or 100Mbps
- Token Ring
- Fibre Channel 266Mbps
- FDDI
- ATM-SDH/SONET 155Mbps
- Intra-Office Telecom
- WDM Applications

### Features

- Full Duplex Communication Over One Fiber
- Dual Wavelengths 820/1300nm
- Very Small Size
- Very Low Internal Crosstalk
- Packaged in Industry-Standard ST® Receptacle
- Designed for 62.5/125µm Fiber

### Description

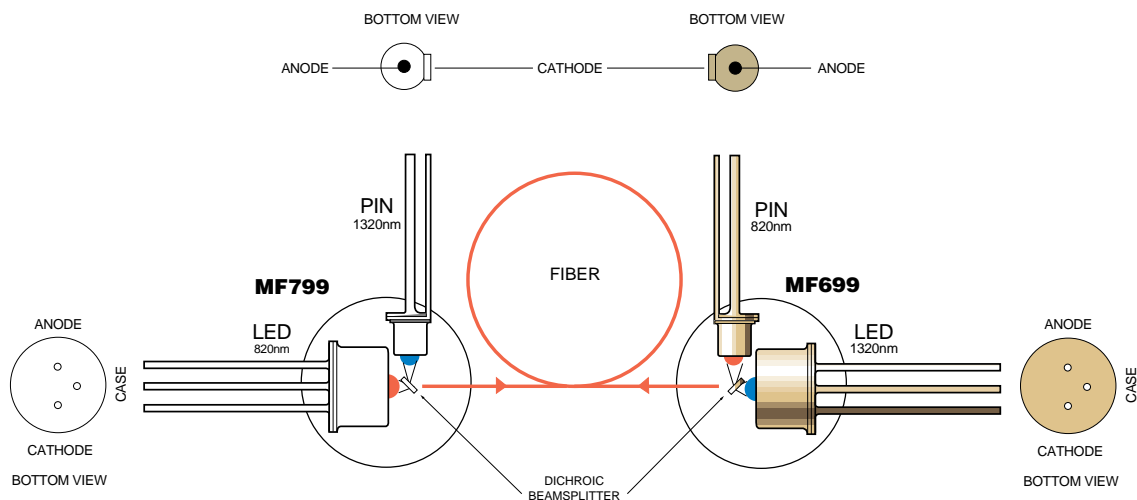
Used in combination with the MF799, the MF699 Duplex Device is designed for WDM

(Wavelength Division Multiplex), Datacom, Video Links, or Intra-Office Telecom Applications. It emits optical power at 1320nm and detects incoming optical power at 820nm, allowing full Duplex Communication over one single fiber.

The MF699 uses dichroic (wavelength-selective) beamsplitters for maximum power budget and minimum crosstalk. Minimum internal crosstalk is achieved with wavelength-selective detectors. The long wavelength path meets requirements for FDDI (ANSI X3T9.5) and ATM 155Mbps.

The MF699 is designed for multi-mode fiber and optimized for 62.5/125µm fiber.

## MF699 Functional Diagram





**Absolute Maximum Ratings\***

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	T <sub>stg</sub>	-40	+85	°C
Operating Temperature (Fig 2)	T <sub>op</sub>	-40	+85	°C
LED Power Dissipation (Fig 2)	P <sub>tot</sub>		160	mW
LED Continuous Forward Current (f≤10kHz)	I <sub>F</sub>		80	mA
LED Peak Forward Current (duty cycle ≤50%, f≥1MHz)	I <sub>FRM</sub>		130	mA
LED Reverse Voltage	V <sub>RL</sub>		0.5	V
PIN Reverse Voltage	V <sub>RP</sub>		20	V
Soldering Temperature (Note 1)	T <sub>sld</sub>		260	°C

\*Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied. Note 1: 2mm from the case for 10s.

**LED Optical & Electrical Characteristics (Case Temperature -25 to +70°C)**

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Fiber-Coupled-Power (Fig 1)	P <sub>fiber</sub>	-20.5			dBm	I <sub>Peak</sub> =60mA (Note 1, 2)
Rise & Fall Time (10-90% no bias)	t <sub>r</sub> t <sub>f</sub>		2.5		ns	I <sub>F</sub> =60mA (Note 2, 3)
Bandwidth (3dB <sub>ei</sub> )	f <sub>c</sub>		125		MHz	I <sub>F</sub> =60mA (Note 2)
Peak Wavelength	λ <sub>p</sub>		1320		nm	I <sub>F</sub> =60mA (Note 3)
Spectral Width (FWHM)	Δλ		135		nm	I <sub>F</sub> =60mA (Note 3)
Forward Voltage (Fig 3)	V <sub>F</sub>		1.3	1.65	V	I <sub>F</sub> =60mA
Reverse Current	I <sub>R</sub>			100	μA	V <sub>R</sub> =1V
Capacitance	C		200		pF	V <sub>R</sub> =0V, f=1MHz

Note 1: Average power at 10MHz/50% duty cycle. Measured at the exit of 100m of fiber.

Note 2: 62.5/125μm graded index fiber (NA=0.275). Note 3: Meets the FDDI ANSI X3T9.5 specification.

**PIN Optical & Electrical Characteristics (Case Temperature -25 to +70°C)**

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Responsivity (Fig 4)	R	0.25			A/W	V <sub>R</sub> =5V λ=820nm (Note 1)
Bandwidth	f <sub>c</sub>	500			MHz	V <sub>R</sub> =5V R <sub>L</sub> =50Ω (Note 1)
Capacitance (Fig 5)	C		1		pF	V <sub>R</sub> =5V f=1MHz
Dark Current	I <sub>d</sub>			3 50	nA	T <sub>Case</sub> =25°C T <sub>Case</sub> =70°C V <sub>R</sub> =5V I <sub>LED</sub> =0mA
Crosstalk Current	I <sub>Cr</sub>		3		nA	V <sub>R</sub> =5V I <sub>LED</sub> =60mA (Note 2)

Note 1: 62.5/125μm graded index fiber (NA=0.275). Note 2: Internal crosstalk with ceramic ferrule inserted but no power from the fiber. Total Current = Dark Current + Crosstalk Current.

**LED Thermal Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance - Infinite Heat Sink	R <sub>thjc</sub>			200	°C/W
Thermal Resistance - On PC Board	R <sub>thjb</sub>			300	°C/W
Temperature Coefficient - Optical Power	dP/dT <sub>j</sub>		-0.75		%/°C
Temperature Coefficient - Wavelength	dλ/dT <sub>j</sub>		0.45		nm/°C

**PIN Thermal Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Units
Temperature Coefficient - Dark Current	dI <sub>d</sub> /dT <sub>j</sub>		5		%/°C
Temperature Coefficient - Crosstalk Current	dI <sub>Cr</sub> /dT <sub>j</sub>		-0.75		%/°C

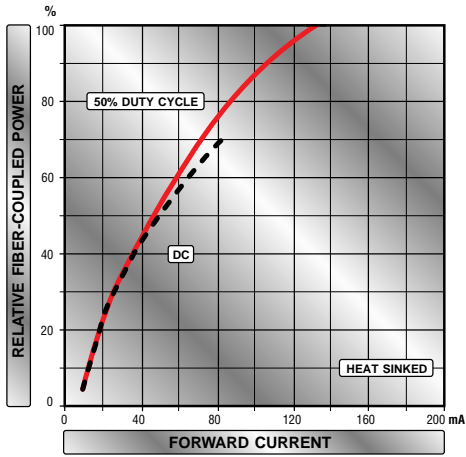


Figure 1

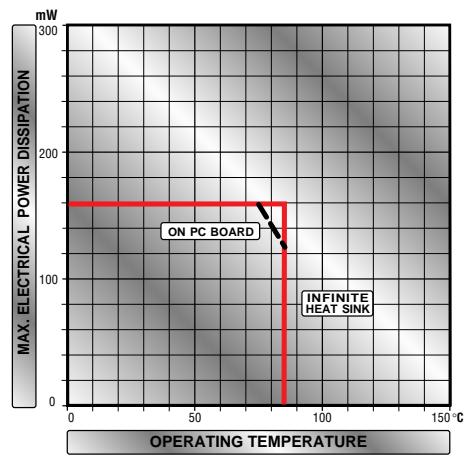


Figure 2

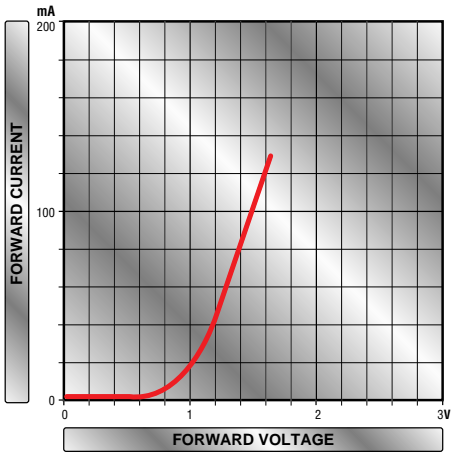


Figure 3

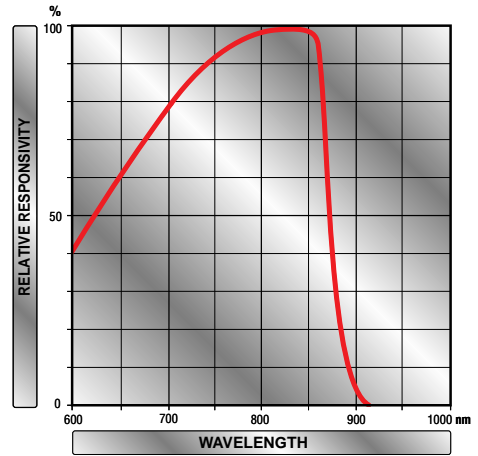


Figure 4

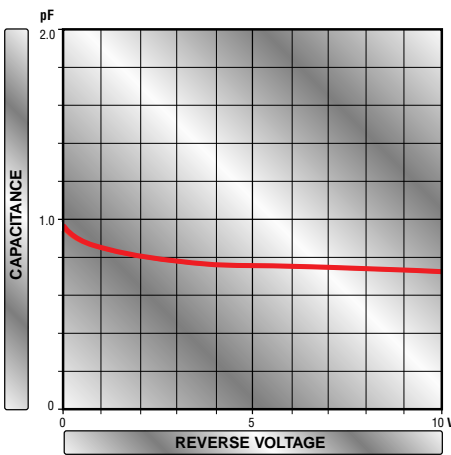
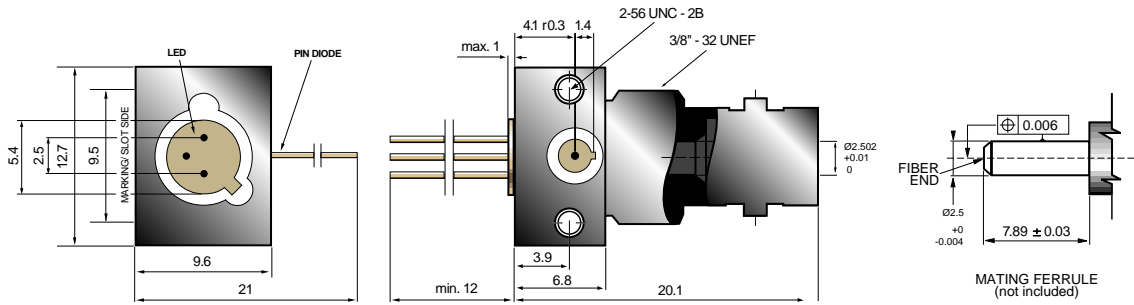


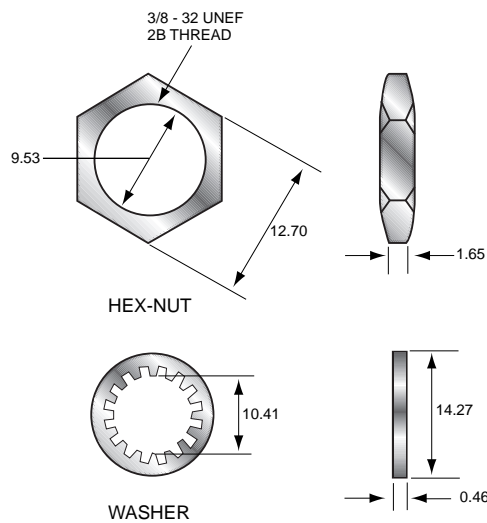
Figure 5

**MF699 Mechanical Data**



Note: The LED chip is isolated from the case. All dimensions in mm.

**Packaging Hardware**



## MF799 ST



ST Assembly

Ordering Information	
PART #	RECEPTACLE
MF799	ST
-40°C to +85°C	

### Applications

- Ethernet 10 or 100Mbps
- Token Ring
- Fibre Channel 266Mbps
- FDDI
- ATM-SDH/SONET 155Mbps
- Intra-Office Telecom
- WDM Applications

### Features

- Full Duplex Communication Over One Fiber
- Dual Wavelengths 820/1300nm
- Very Small Size
- Very Low Internal Crosstalk
- Packaged in Industry-Standard ST® Receptacle
- Designed for 62.5/125µm Fiber

### Description

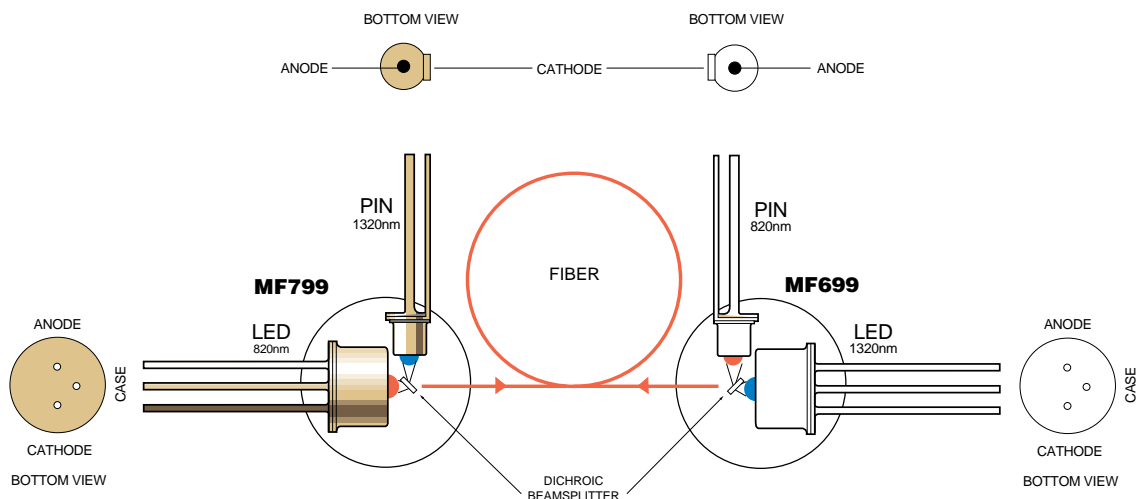
Used in combination with the MF699, the MF-799 Duplex Device is designed for WDM

(Wavelength Division Multiplex), Datacom, Video Links, or Intra-Office Telecom Applications. It emits optical power at 820nm and detects incoming optical power at 1320nm, allowing full Duplex Communication over one single fiber.

The MF799 uses dichroic (wavelength-selective) beamsplitters for maximum power budget and minimum crosstalk. Minimum internal crosstalk is achieved by the use of wavelength-selective Detectors. The long wavelength path meets requirements for FDDI (ANSI X3T9.5 and ATM 155Mbps).

The MF799 is designed for multi-mode fiber and optimized for 62.5/125µm fiber.

## MF799 Functional Diagram



**Absolute Maximum Ratings\***

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{stg}$	-40	+85	°C
Operating Temperature (Fig 2)	$T_{op}$	-40	+85	°C
LED Power Dissipation (Fig 2)	$P_{tot}$		250	mW
LED Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$		110	mA
LED Peak Forward Current (Duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{FRM}$		180	mA
LED Reverse Voltage	$V_{RL}$		1.5	V
PIN Reverse Voltage	$V_{RP}$		20	V
Solder Temperature (Note 1)	$T_{sld}$		260	°C

\*Exceeding these values may cause permanent damage. Functional operation under these conditions is not implied. Note 1: 2mm from the case for 10s.

**LED Optical & Electrical Characteristics** (Case Temperature -25 to +70°C)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Fiber-Coupled-Power (Fig 1)	$P_{fiber}$	-19			dBm	$I_{Peak}=60\text{mA}$ (Note 1, 2)
Rise & Fall Time (10-90% no bias)	$t_r, t_f$		1.5	2	ns	$I_F=60\text{mA}$ (Note 2)
Bandwidth (3dB <sub>el</sub> )	$f_c$		250		MHz	$I_F=60\text{mA}$ (Note 2)
Peak Wavelength	$\lambda_p$	800	820	840	nm	$I_F=60\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50	60	nm	$I_F=60\text{mA}$
Forward Voltage (Fig 3)	$V_F$			2.1	V	$I_F=60\text{mA}$
Reverse Current	$I_R$			20	μA	$V_R=1\text{V}$
Capacitance	$C$		20		pF	$V_R=0\text{V}$ , $f=1\text{MHz}$

Note 1: Average power at 10MHz/50% duty cycle. Measured at the exit of 100m of fiber. Note 2: 62.5/125μm graded index fiber (NA=0.275).

**PIN Optical & Electrical Characteristics** (Case Temperature -25 to +70°C)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Responsivity (Fig 4)	$R$	0.5			A/W	$V_R=5\text{V}$ $\lambda=1320\text{nm}$ (note 1)
Bandwidth	$f_c$	500			MHz	$V_R=5\text{V}$ $R_L=50\Omega$ (note 1)
Capacitance (Fig 5)	$C$		1.6		pF	$V_R=5\text{V}$ $f=1\text{MHz}$
Dark Current	$I_d$			5 100	nA	$T_{Case}=25^\circ\text{C}$ $T_{Case}=70^\circ\text{C}$ $V_R=5\text{V}$ $I_{LED}=0\text{mA}$
Crosstalk Current	$I_{Cr}$		75		nA	$V_R=5\text{V}$ $I_{LED}=60\text{mA}$ (note 2)

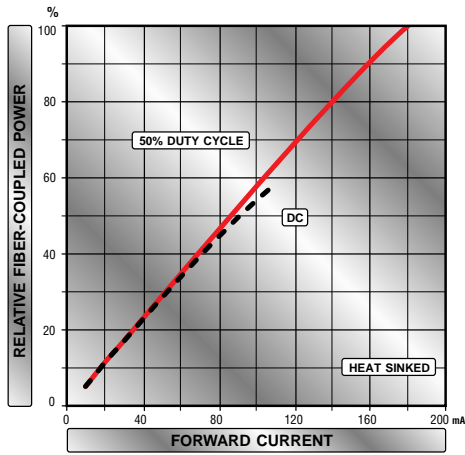
Note 1: 62.5/125μm graded index fiber (NA=0.275) Note 2: Internal crosstalk with ceramic ferrule inserted but no power from the fiber. Total Current = Dark Current + Crosstalk Current.

**LED Thermal Characteristics**

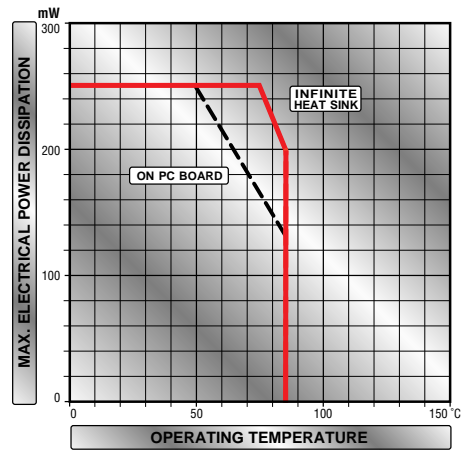
Parameter	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance - Infinite Heat Sink	$R_{thjc}$			200	°C/W
Thermal Resistance - On PC Board	$R_{thjb}$			300	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

**PIN Thermal Characteristics**

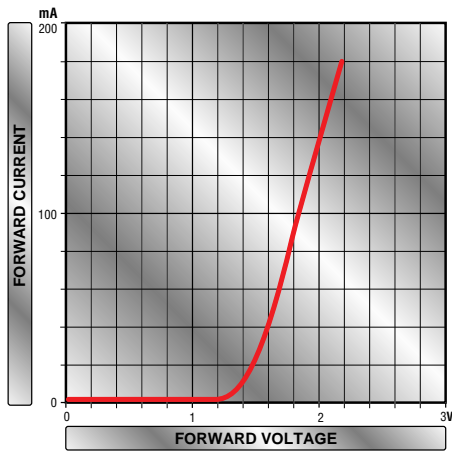
Parameter	Symbol	Min.	Typ.	Max.	Units
Temperature Coefficient - Dark Current	$dI_d/dT_j$		5		%/°C
Temperature Coefficient - Crosstalk Current	$dI_{Cr}/dT_j$		-0.6		%/°C



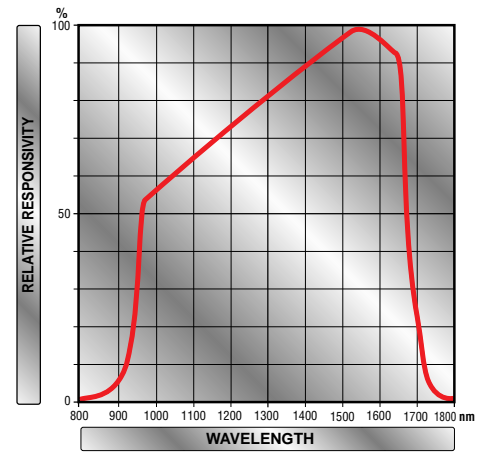
**Figure 1**



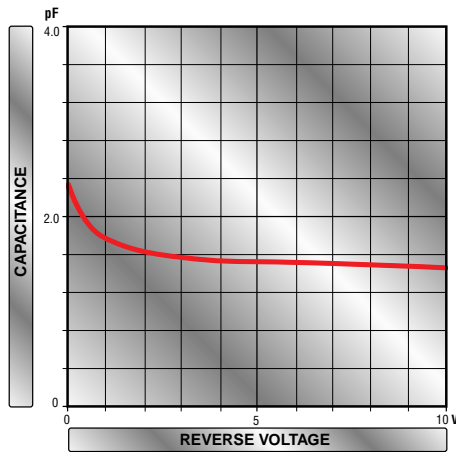
**Figure 2**



**Figure 3**

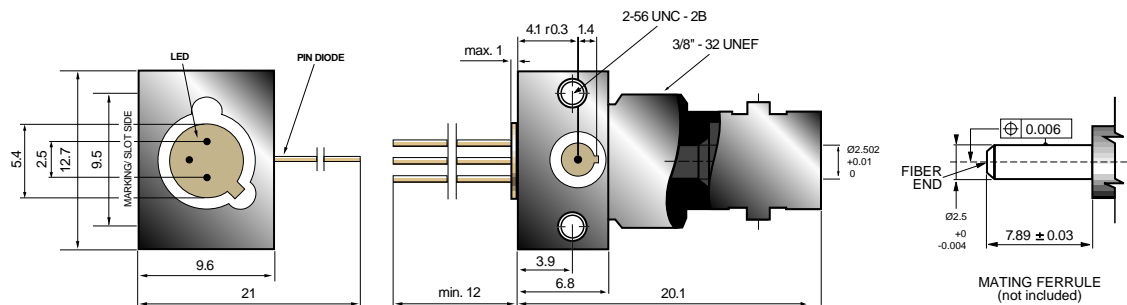


**Figure 4**



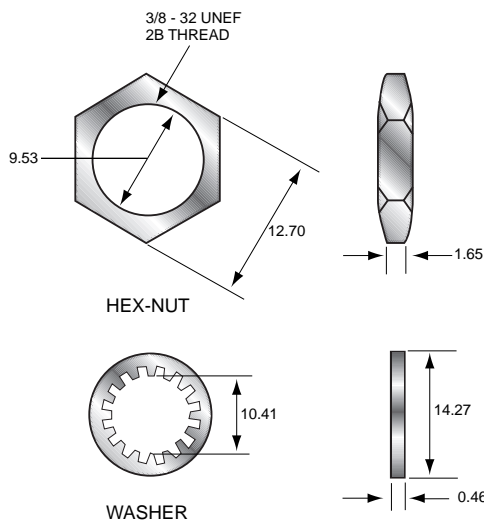
**Figure 5**

**MF799 Mechanical Data**



Note: The LED chip is isolated from the case. All dimensions in mm.

**MF799 Packaging Hardware**



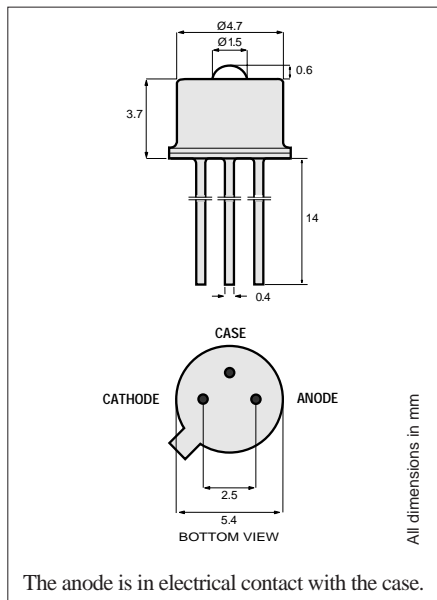
# PRODUCT INFORMATION

870nm

**1A184A**  
High-Performance LED

**FM Video**

The low harmonic distortion makes this device ideal for subcarrier FM video applications. Video transmission can be accomplished with minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1,2,&3) (Table 1)	$P_{\text{fiber}}$	40	55		$\mu\text{W}$	$I_F=100\text{ mA}$
Rise and Fall Time (10-90%)	$t_r, t_f$		2.5	3	ns	$I_F=100\text{ mA}$ (no bias)
Bandwidth (3dB <sub>el</sub> )	$f_c$		140		MHz	$I_F=100\text{ mA}$
Harmonic Distortion (nonlinearity)	$-H_2$		40		dB	$I_F=80\text{ mA}$ $m=0.8$ $f=10\text{ MHz}$
	$-H_3$		45		dB	
Peak Wavelength	$\lambda_p$	850	870	890	nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		60		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.8	2.2	V	$I_F=100\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125° C
Operating Temperature see (derating: Fig.4)	$T_{\text{op}}$	-55 to +125° C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{sld}}$	260° C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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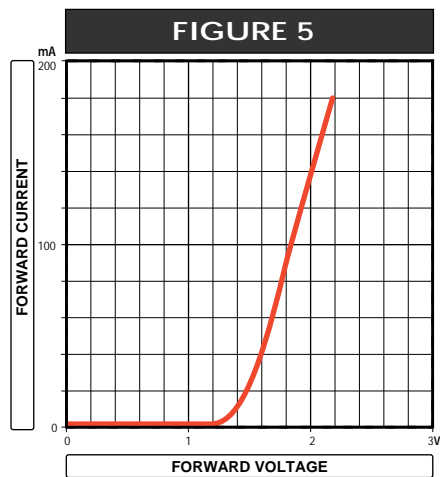
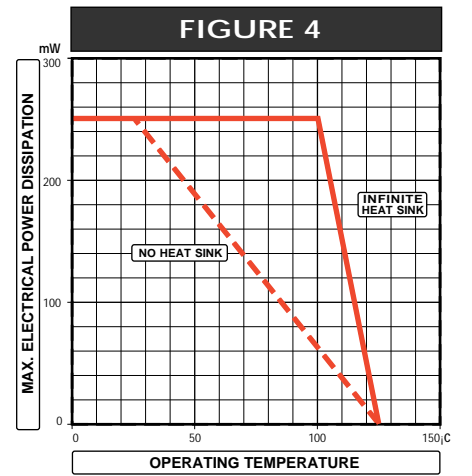
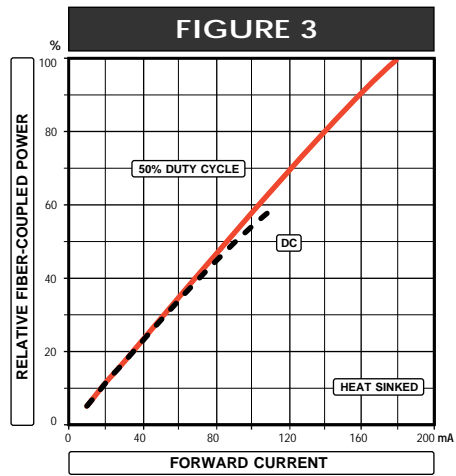
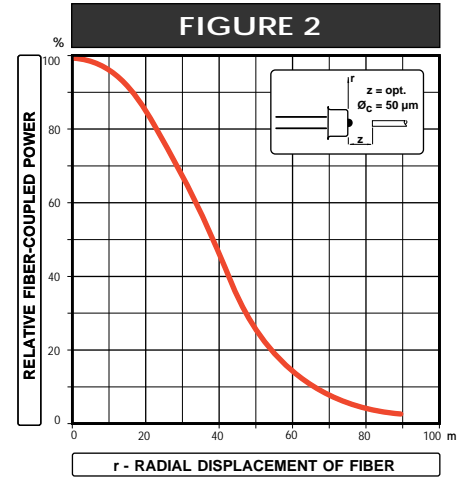
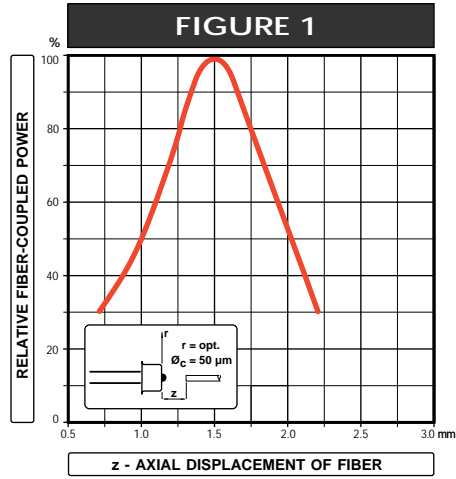
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Typical Fiber-Coupled Power			
CORE DIAMETER/CLADDING DIAMETER NUMERICAL APERTURE			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
55 $\mu\text{W}$	150 $\mu\text{W}$	300 $\mu\text{W}$	390 $\mu\text{W}$

Table 1



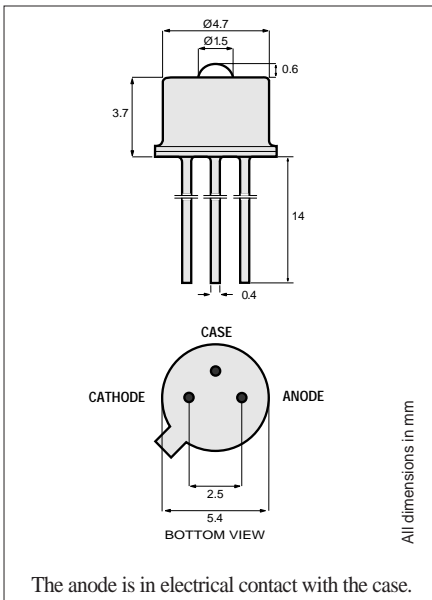
# PRODUCT INFORMATION

850nm

**1A191**  
High-Performance LED

## Test Equipment

The strictly defined 850 nm wavelength and high power is ideal for test equipment applications. It is packaged in a hermetically sealed can for high reliability and maximum resistance to harsh operating environments. The double-lens optical system results in optimum coupling of power into the fiber.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	100	130		$\mu\text{W}$	$I_F=100\text{ mA}$ (Note 1) Fiber: 50/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		10	15	ns	$I_F=100\text{ mA}$ (no bias) Graded Index
Bandwidth (3dB <sub>e1</sub> )	$f_c$		35		MHz	$I_F=100\text{ mA}$ NA=0.20
Peak Wavelength	$\lambda_p$	840	850	860	nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig. 5)	$V_F$		1.8	2.2	V	$I_F=100\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig. 4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig. 4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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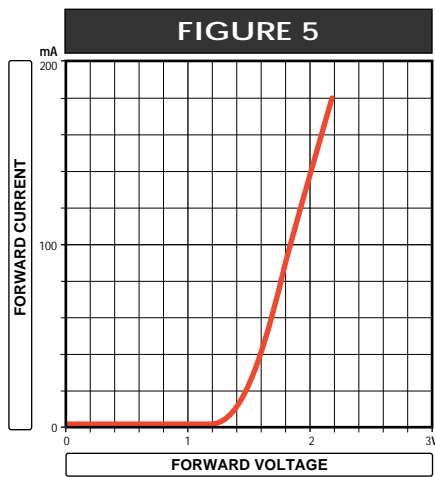
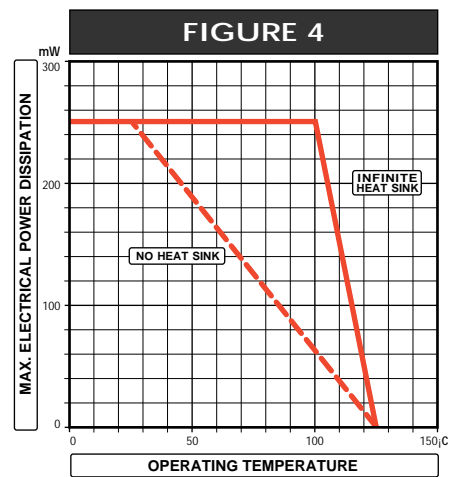
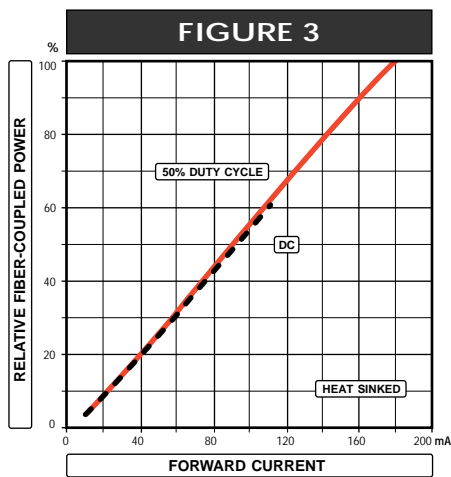
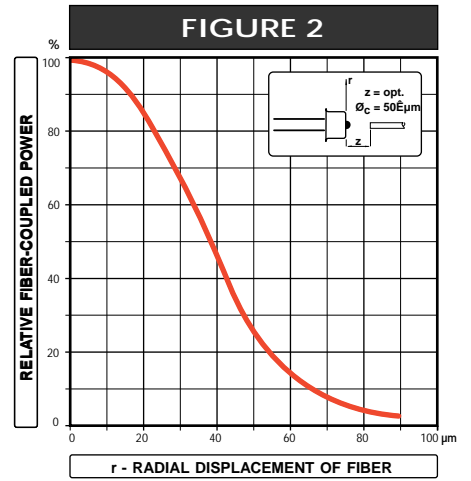
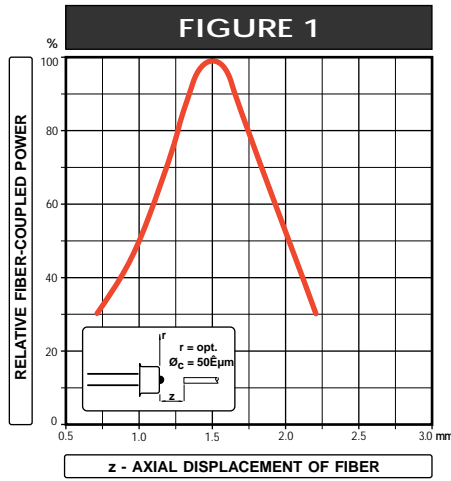


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Asia: Tel (65) 293 5312 Fax (65) 293 8527

Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
130 $\mu\text{W}$	300 $\mu\text{W}$	700 $\mu\text{W}$	1100 $\mu\text{W}$

Table 1



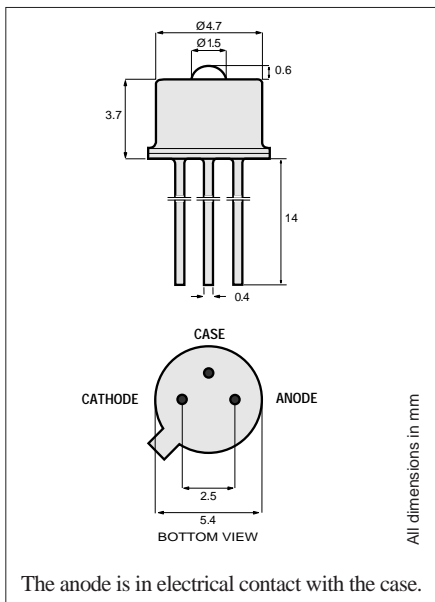
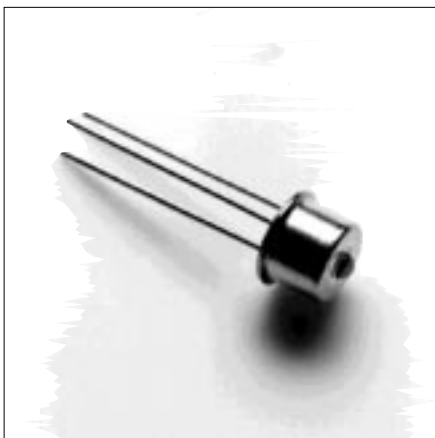
# PRODUCT INFORMATION

880nm

**1A192**  
High-Performance LED

Sensors, Signal Transmission

This device generates very high power which makes it ideal for many sensors and signal transmission applications. It operates in a wide range of temperatures, and can satisfy virtually any environmental specification. The double-lens optical system results in optimum coupling of power into the fiber.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	80	115		$\mu\text{W}$	$I_F=100\text{ mA}$ (Note 1) Fiber: 50/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		8	12	ns	$I_F=100\text{ mA}$ (no bias) Graded Index NA=0.20
Bandwidth (3dB <sub>e1</sub> )	$f_c$		45		MHz	$I_F=100\text{ mA}$
Peak Wavelength	$\lambda_p$	860	880	900	nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig. 5)	$V_F$		1.8	2.2	V	$I_F=100\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125° C
Operating Temperature (derating: Fig. 4)	$T_{\text{op}}$	-55 to +125° C
Electrical Power Dissipation (derating: Fig. 4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260° C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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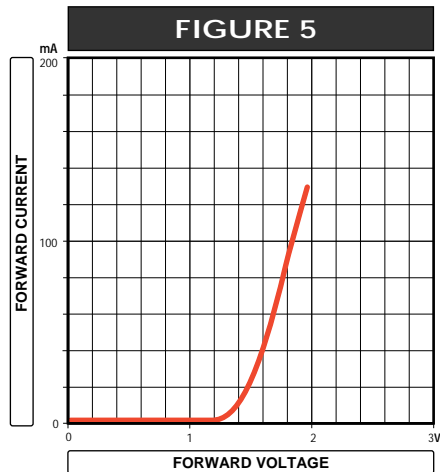
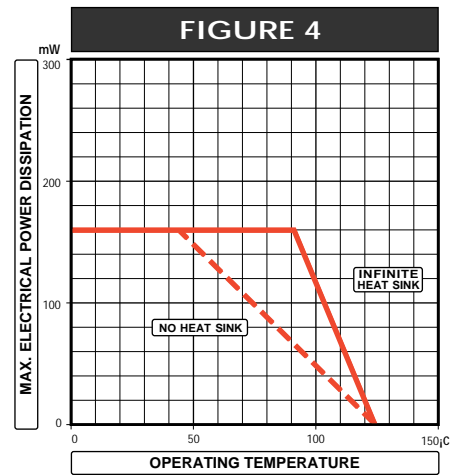
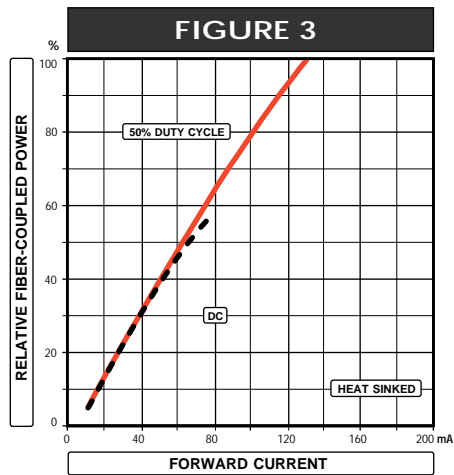
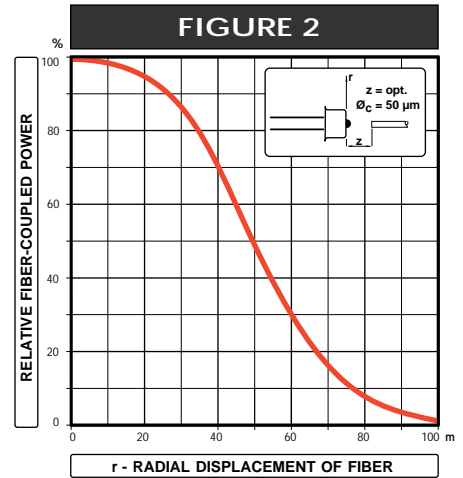
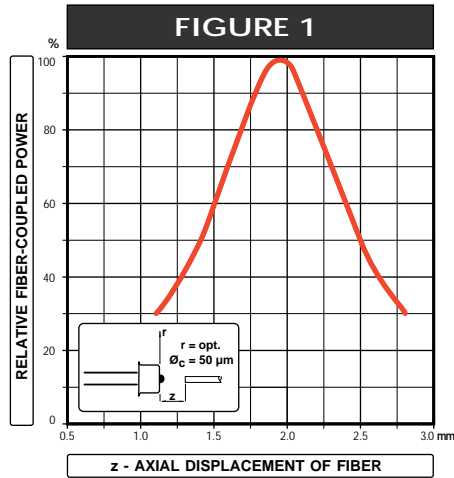


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Asia: Tel (65) 293 5312 Fax (65) 293 8527

Typical Fiber-Coupled Power			
CORE DIAMETER/CLADDING DIAMETER NUMERICAL APERTURE			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
115 $\mu\text{W}$	280 $\mu\text{W}$	640 $\mu\text{W}$	1000 $\mu\text{W}$

Table 1



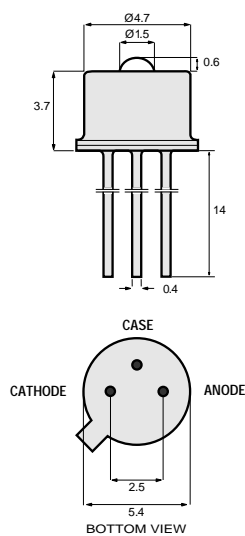
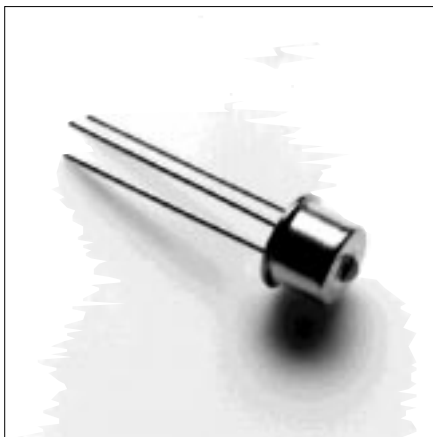
# PRODUCT INFORMATION

860nm

**1A194**  
High-Performance LED

**Datacom, General Purpose**

This device is designed for Ethernet and general applications and offers an excellent price/performance ratio for cost-effective solutions. Its double-lens optical system results in optimum coupling of power into the fiber.



All dimensions in mm

**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	25	45		$\mu\text{W}$	$I_F=60\text{ mA}$ (Note 1) Fiber: 50/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		5	7	ns	$I_F=60\text{ mA}$ (no bias) Graded Index
Bandwidth (3dB <sub>e</sub> )	$f_c$		70		MHz	$I_F=60\text{ mA}$ NA=0.20
Peak Wavelength	$\lambda_p$	840	860	880	nm	$I_F=60\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=60\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.7	1.9	V	$I_F=60\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	80 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			200	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			500	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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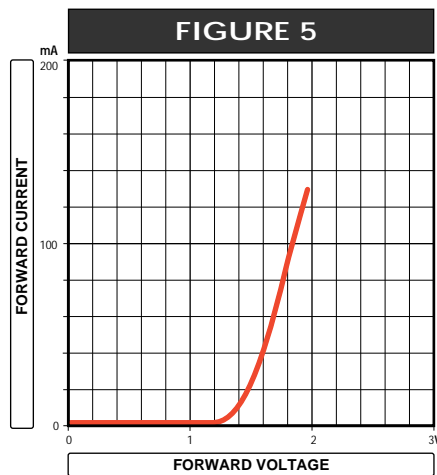
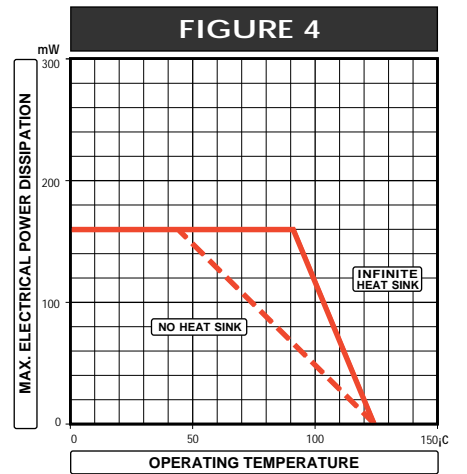
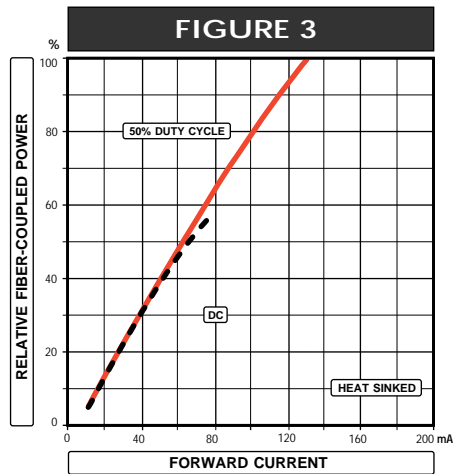
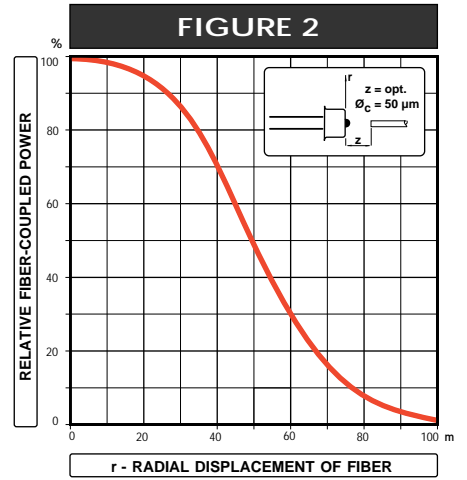
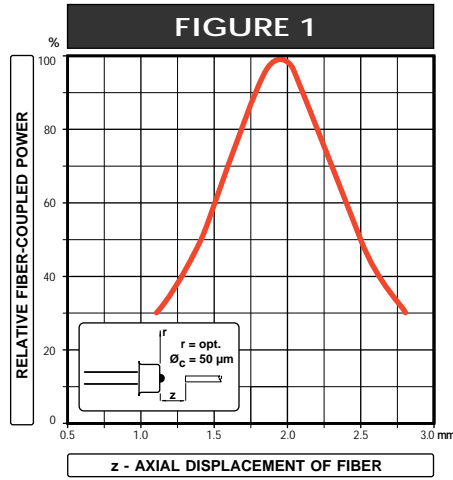


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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
45 $\mu\text{W}$	95 $\mu\text{W}$	210 $\mu\text{W}$	440 $\mu\text{W}$

Table 1



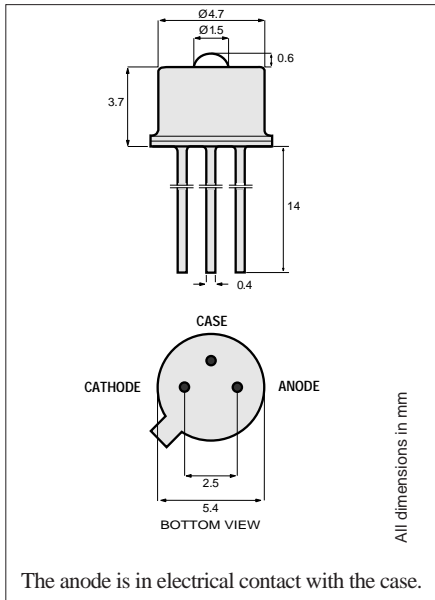
# PRODUCT INFORMATION

810nm

**1A208**  
High-Performance LED

Sensors

The 810 nm wavelength and high power into large-core fiber is ideal for many sensor applications. It is packaged in a hermetically sealed can for high reliability and maximum resistance to harsh operating environments.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	1000	1200		$\mu\text{W}$	$I_F=100\text{ mA}$ (Note 1) Fiber 200/280 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		7	10	ns	$I_F=100\text{ mA}$ (no bias) Step Index NA=0.24
Bandwidth (3dB <sub>e1</sub> )	$f_c$		50		MHz	$I_F=100\text{ mA}$
Peak Wavelength	$\lambda_p$	790	810	830	nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		2.1	2.3	V	$I_F=100\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125° C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125° C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260° C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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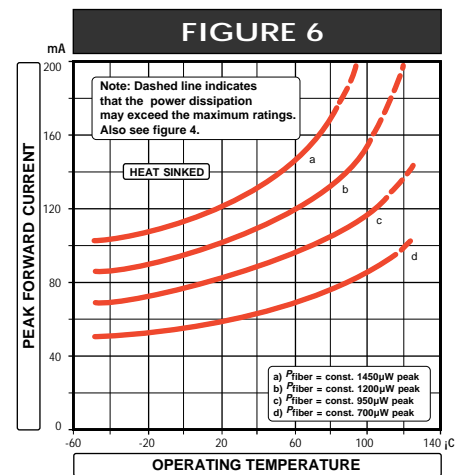
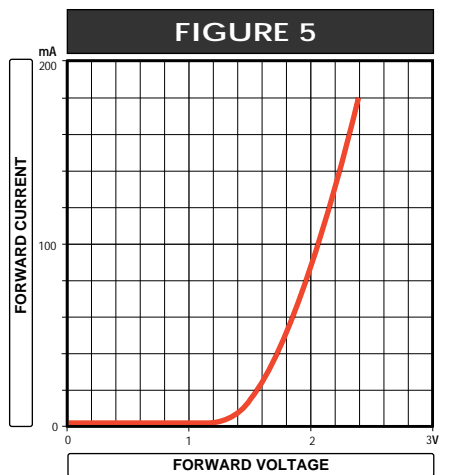
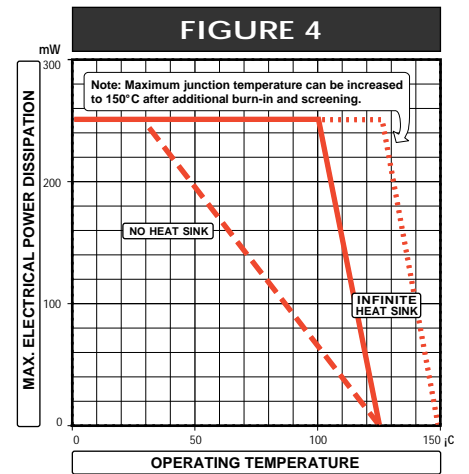
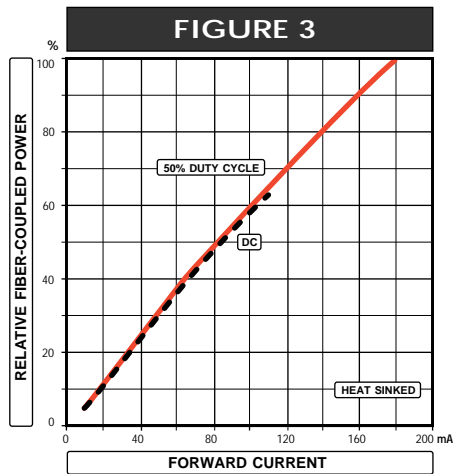
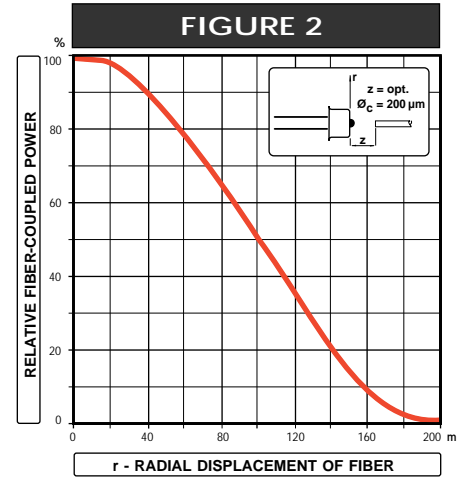
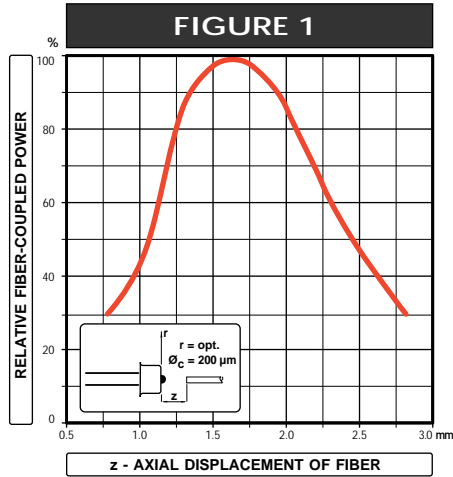
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Typical Fiber-Coupled Power				
CORE DIAMETER/CLADDING DIAMETER NUMERICAL APERTURE				
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37	200/280 $\mu\text{m}$ 0.24
60 $\mu\text{W}$	150 $\mu\text{W}$	450 $\mu\text{W}$	1300 $\mu\text{W}$	1200 $\mu\text{W}$

Table 1



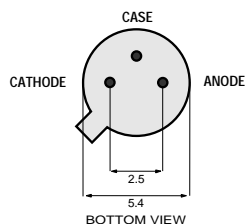
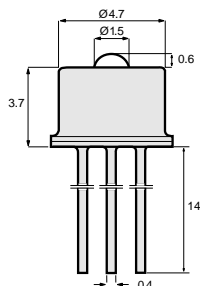
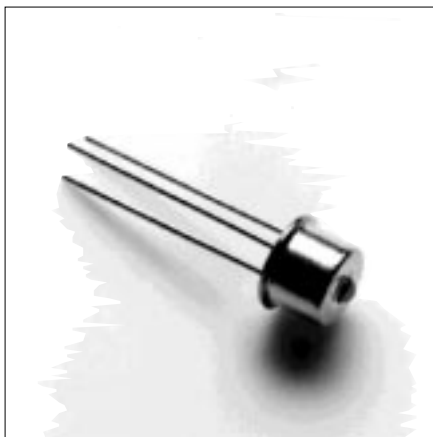
# PRODUCT INFORMATION

880nm

**1A212**  
High-Performance DUPLEX

**Half-Duplex Communication**

This single-chip device operates as both an Emitter and Detector, and transmits data over a single fiber in half-duplex mode — thus reducing both fiber and component costs when compared with traditional approaches.



All dimensions in mm

The diode chip is isolated from the case.

**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	
EMITTING MODE	Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	25	55		$\mu\text{W}$	$I_F=60\text{ mA}$ (Note 1)	Fiber: 50/125 $\mu\text{m}$
	Rise and Fall Time (10-90%)	$t_r, t_f$		7	10	ns	$I_F=60\text{ mA}$ (no bias)	Graded Index
	Bandwidth (3 dB <sub>el</sub> )	$f_c$		50		MHz	$I_F=60\text{ mA}$	NA=0.20
	Peak Wavelength	$\lambda_p$	870	880	890	nm	$I_F=60\text{ mA}$	
	Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=60\text{ mA}$	
	Forward Voltage (Fig. 5)	$V_F$		1.7	1.9	V	$I_F=60\text{ mA}$	
RECEIVING MODE	Responsivity (Fig. 6, 7, & 8) (Table 2)	$R$	0.10	0.15		A/W	$V_R=1\text{ V}$ $\lambda=880\text{ nm}$	Fiber: 50/125 $\mu\text{m}$
	Rise and Fall Time (10-90%)	$t_r, t_f$		7	10	ns	$V_R=1\text{ V}$ $R_L=50\Omega$ (no bias)	Graded Index
	Bandwidth	$f_c$		50		MHz	$V_R=1\text{ V}$ $R_L=50\Omega$	NA=0.20
	Capacitance	$C$		30		pF	$V_R=1\text{ V}, f=1\text{ MHz}$	
	Dark Current	$I_d$		5	10	nA	$V_R=1\text{ V}$	

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig. 4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig. 4)	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	80 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_R$	2.0 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			200	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			500	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C
Temperature Coefficient - Responsivity	$dR/dT_j$		0.2		%/°C
Temperature Coefficient - Dark Current	$dI_d/dT_j$		2.5		%/°C

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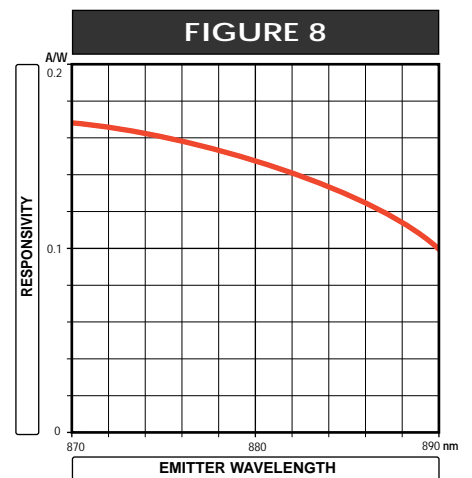
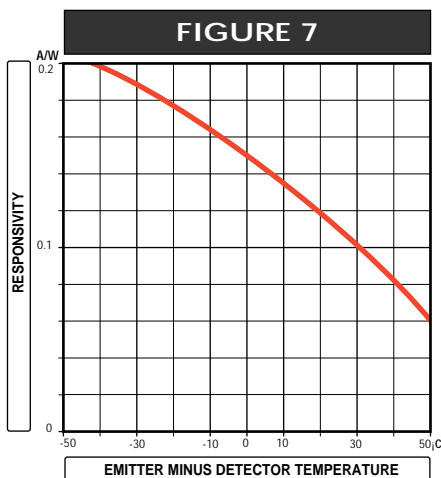
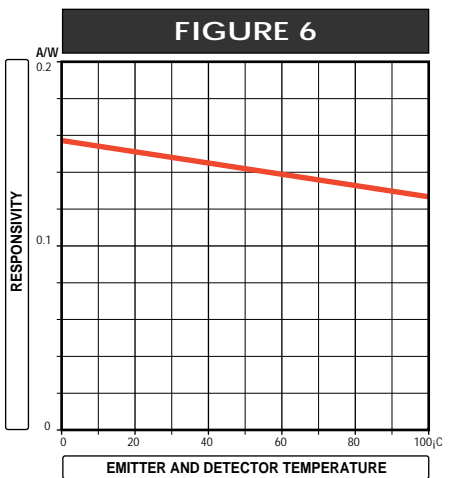
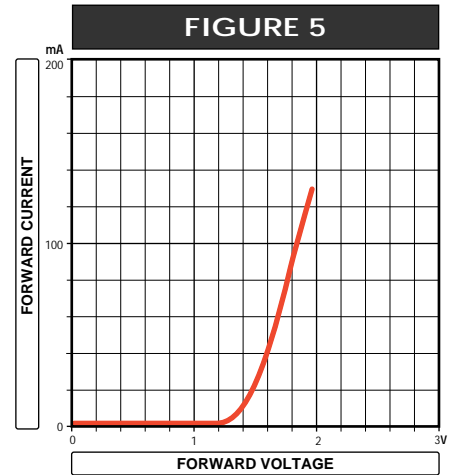
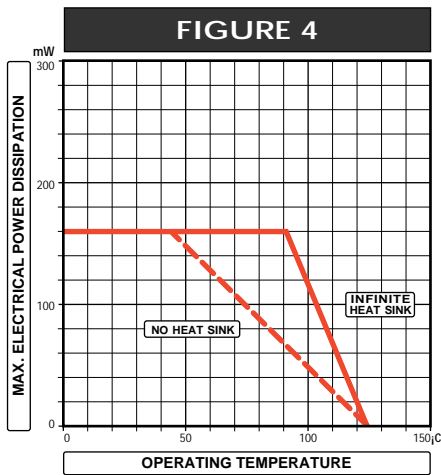
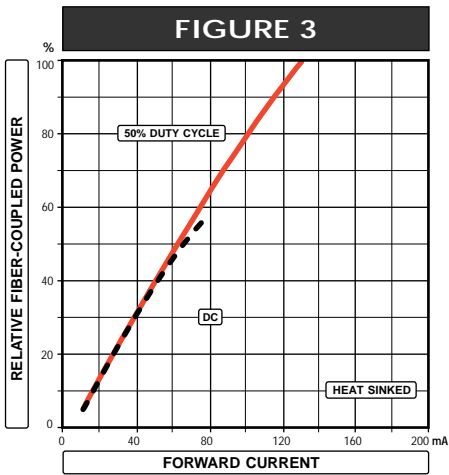
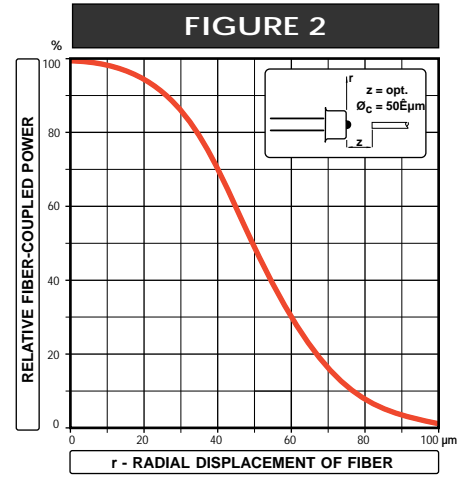
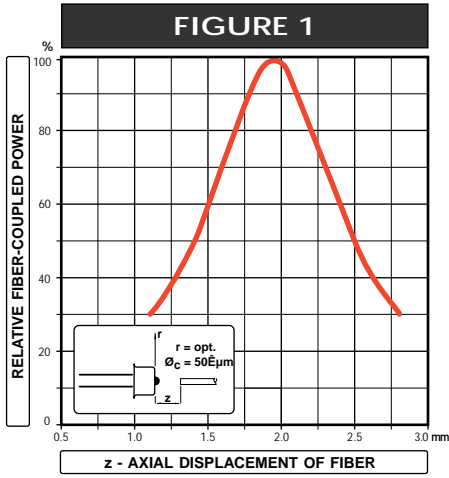
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Typical Fiber-Coupled Power	
Core Diameter/Cladding Diameter Numerical Aperture	
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275
55 $\mu\text{W}$	90 $\mu\text{W}$

Table 1

Typical Responsivity	
Core Diameter/Cladding Diameter Numerical Aperture	
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275
0.15 A/W	0.15 A/W

Table 2



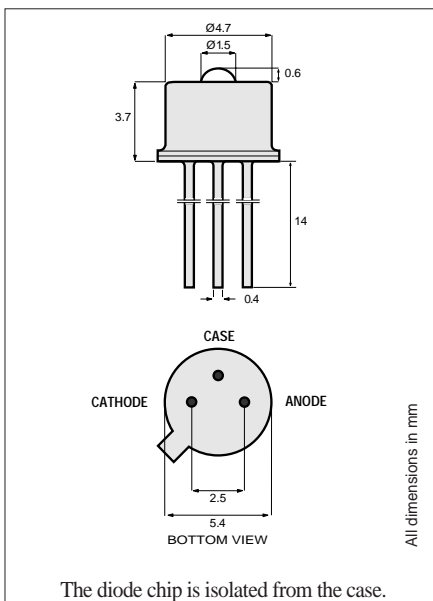
# PRODUCT INFORMATION

880nm

**1A225**  
High-Performance LED

Single-Mode Datacom

Compared with lasers and ELEDs, this device can reduce device costs in single-mode Ethernet networks. And since it's packaged in a hermetically sealed can, it achieves high reliability even in harsh operating environments.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	2.0	2.5		$\mu\text{W}$	$I_F=50\text{ mA}$ (Note 1) Fiber: 10/125 $\mu\text{m}$ Single Mode NA=0.11
Rise and Fall Time (10-90%)	$t_r, t_f$		7	10	ns	$I_F=50\text{ mA}$ (no bias)
Bandwidth (3dB <sub>e1</sub> )	$f_c$		50		MHz	$I_F=50\text{ mA}$
Peak Wavelength	$\lambda_p$	860	880	900	nm	$I_F=50\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=50\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		2.0	2.2	V	$I_F=50\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}$ , $f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	130 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	60 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	100 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			300	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			600	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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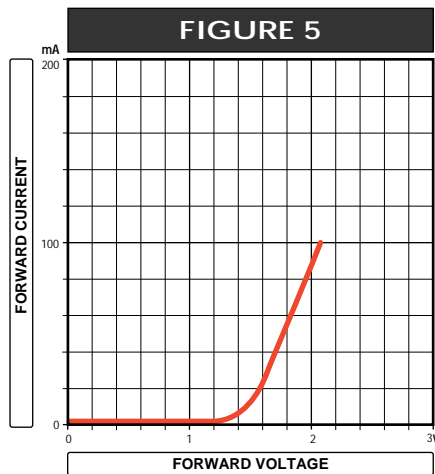
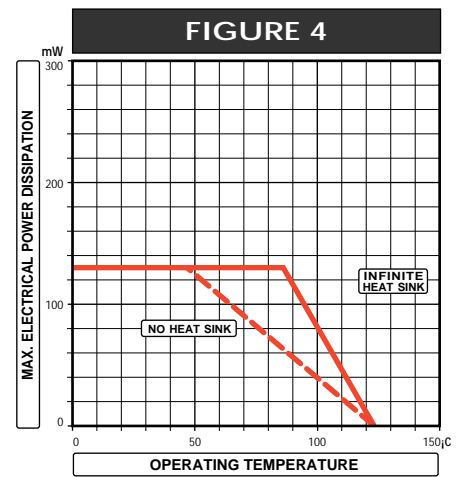
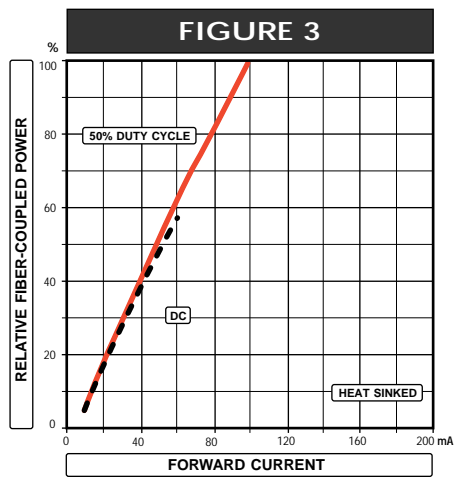
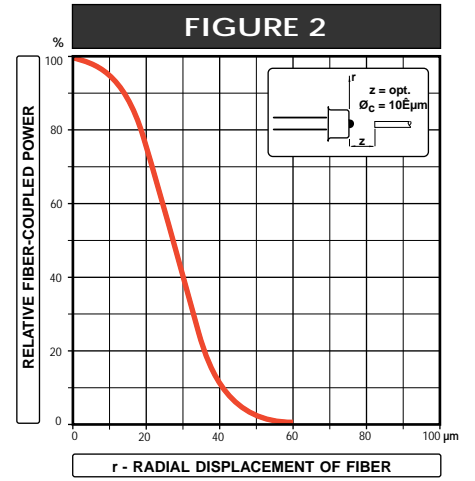
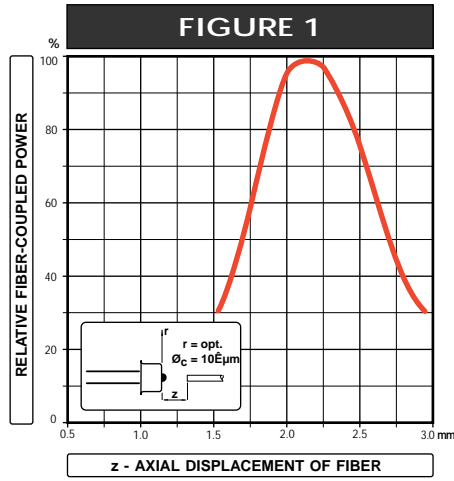


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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
10/125 $\mu\text{m}$ 0.11	50/125 $\mu\text{m}$ 0.20	62/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29
2.5 $\mu\text{W}$	90 $\mu\text{W}$	150 $\mu\text{W}$	250 $\mu\text{W}$

Table 1



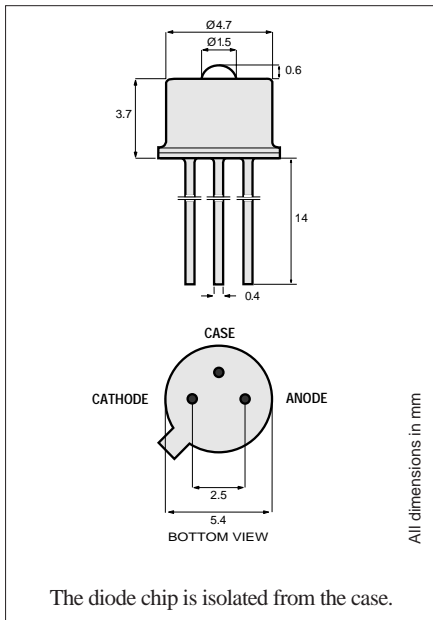
# PRODUCT INFORMATION

900nm

**1A226**  
High-Performance LED

Sensors

The wavelength for this LED is 900nm —ideal for unique sensor applications. The double-lens optical system achieves optimum coupling of power into the fiber. It's packaged in a hermetically sealed can to survive harsh environments and a wide range of operating temperatures.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	50	70		$\mu\text{W}$	$I_F=60\text{ mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		3	6	ns	$I_F=60\text{ mA}$ (no bias) Graded Index
Bandwidth (3dB <sub>el</sub> )	$f_c$		100		MHz	$I_F=60\text{ mA}$ NA=0.275
Peak Wavelength	$\lambda_p$	875	900	915	nm	$I_F=60\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		55		nm	$I_F=60\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.6	2.0	V	$I_F=60\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	80 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_R$	1.5V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			200	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			500	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

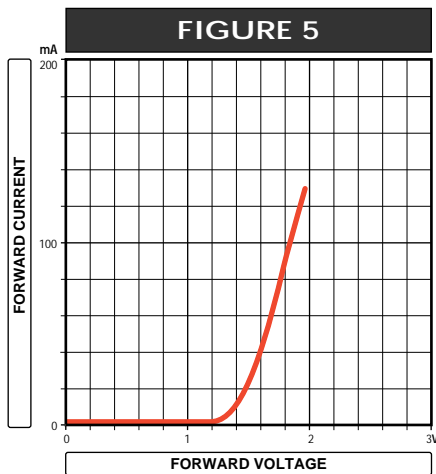
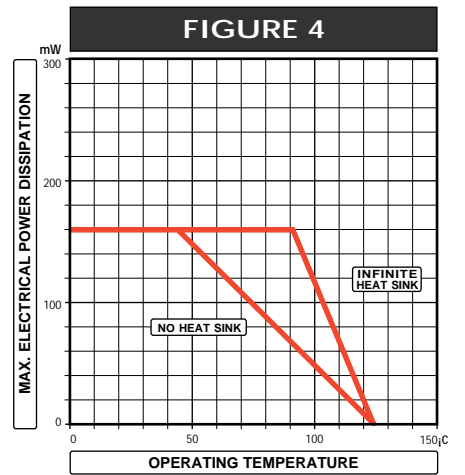
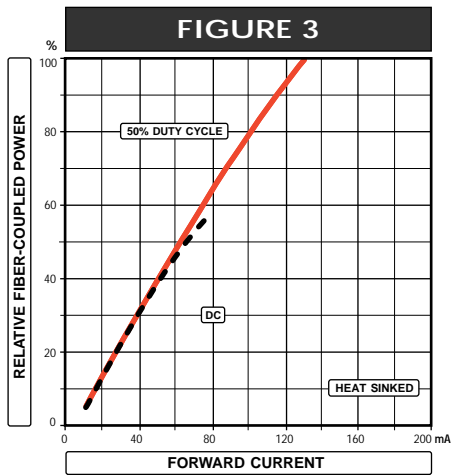
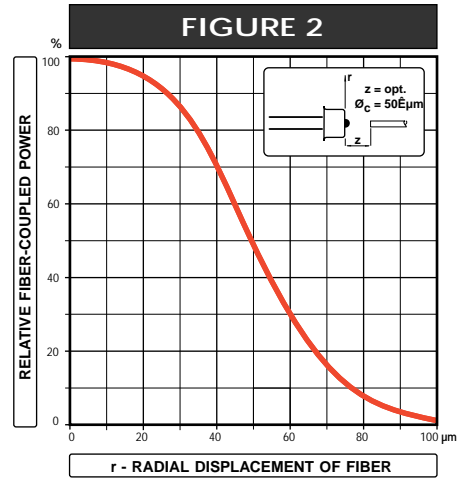
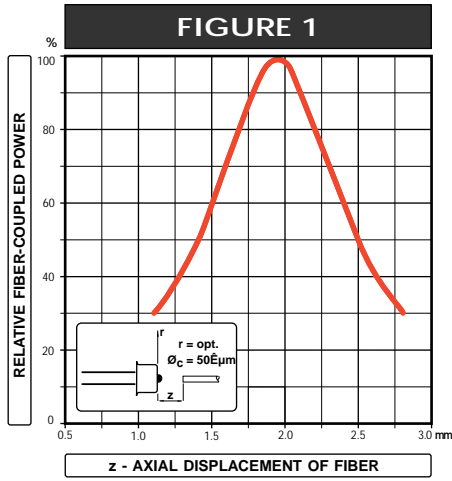
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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/148 $\mu\text{m}$ 0.24	200/230 $\mu\text{m}$ 0.37
25 $\mu\text{W}$	70 $\mu\text{W}$	170 $\mu\text{W}$	400 $\mu\text{W}$



# PRODUCT INFORMATION

850nm

**1A228**  
High-Performance LED

**Electronic Distance Measurement**

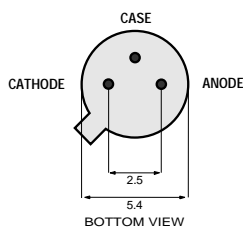
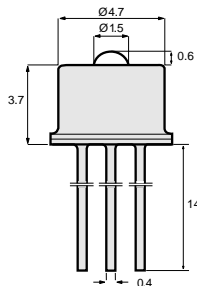
This device is capable of providing high power into large-core fiber over a wide temperature range. Thanks to its very uniform phase distribution of the optical power, it is ideal for Electronic Distance Measurement equipment.



## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	1000	1200		$\mu\text{W}$	$I_F=100\text{ mA}$ (Note 1) Fiber: 200/280 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		7	10	ns	$I_F=100\text{ mA}$ (no bias) Step Index
Bandwidth (3dB $_{e1}$ )	$f_c$		50		MHz	$I_F=100\text{ mA}$ NA=0.24
Peak Wavelength	$\lambda_p$	830	850	870	nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.8	2.2	V	$I_F=100\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}$ , $f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.



All dimensions in mm

The anode is in electrical contact with the case.

### TO-46 Package With Lens

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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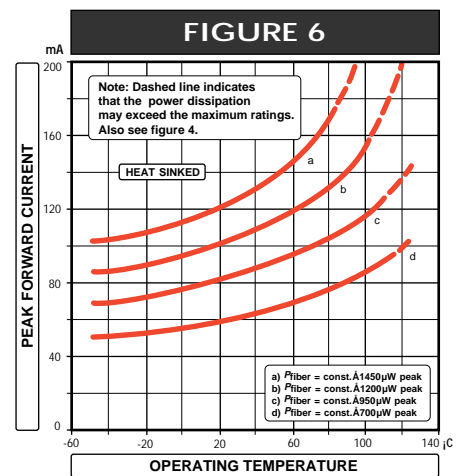
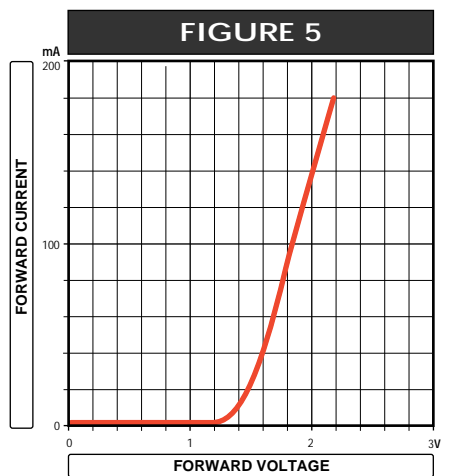
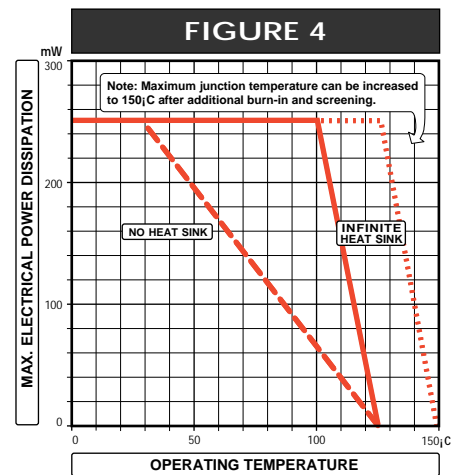
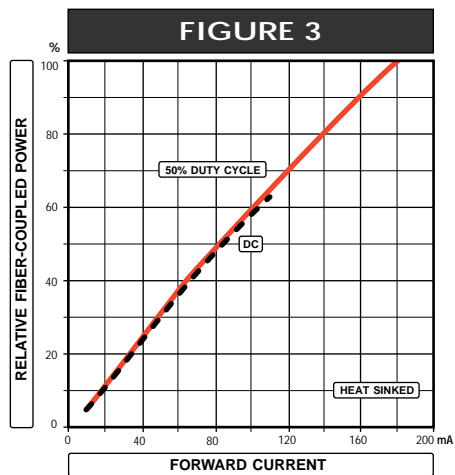
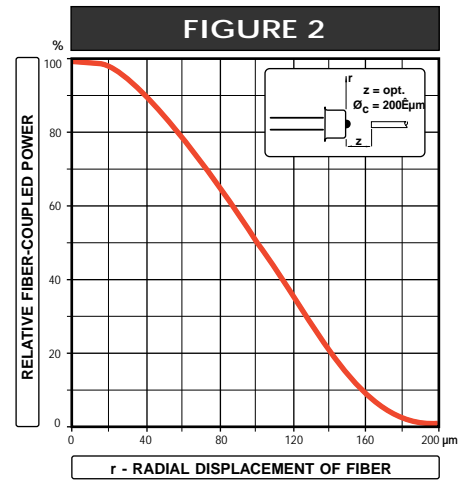
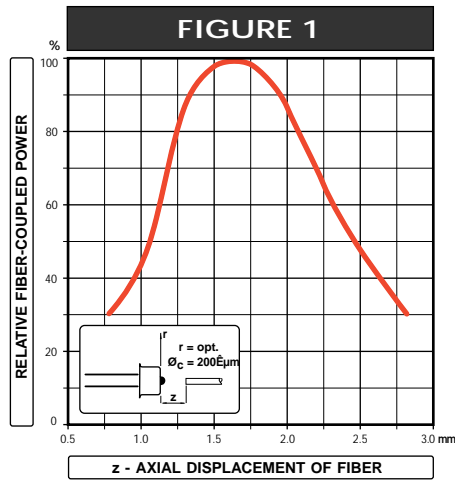
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Typical Fiber-Coupled Power				
Core Diameter/Cladding Diameter Numerical Aperture				
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37	200/280 $\mu\text{m}$ 0.24
60 $\mu\text{W}$	150 $\mu\text{W}$	450 $\mu\text{W}$	1300 $\mu\text{W}$	1200 $\mu\text{W}$

Table 1



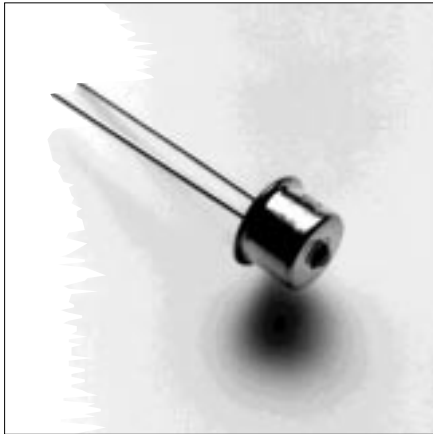
# PRODUCT INFORMATION

870nm

**1A229**  
High-Performance LED

**Battery-Operated Equipment**

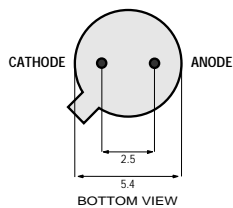
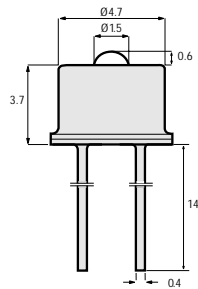
This device operates at very low drive current, which makes it well suited for battery-operated equipment. In fact, it can be driven directly by TTL circuitry.



## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	2	3		$\mu\text{W}$	$I_F=5\text{ mA}$ (Note 1) Fiber: 50/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		85	100	ns	$I_F=5\text{ mA}$ (no bias) Graded Index NA=0.20
Bandwidth (3dB $_{e1}$ )	$f_c$		4		MHz	$I_F=5\text{ mA}$
Peak Wavelength	$\lambda_p$	850	870	890	nm	$I_F=5\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		60		nm	$I_F=5\text{ mA}$
Forward Voltage (Fig. 4)	$V_F$		1.4	1.6	V	$I_F=5\text{ mA}$
Reverse Current	$I_R$			1	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

Note 1: Measured at the exit of 100 meters of fiber.



All dimensions in mm

The anode is in electrical contact with the case.

**TO-46 Package With Lens**

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	16 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	10 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	20 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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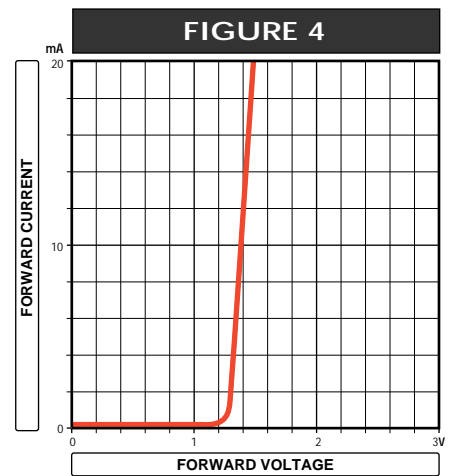
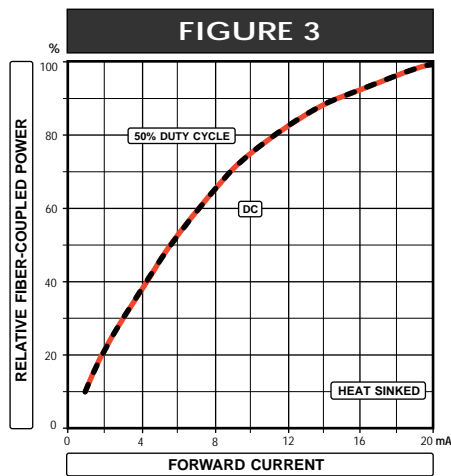
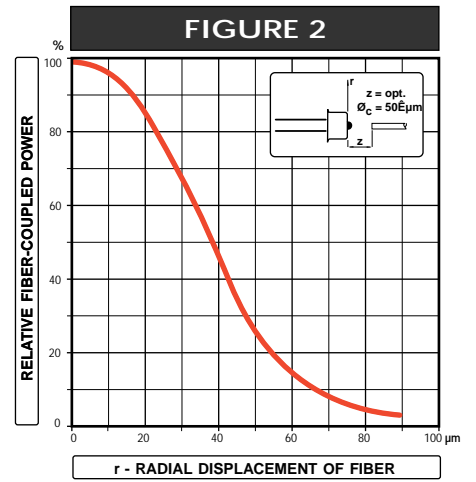
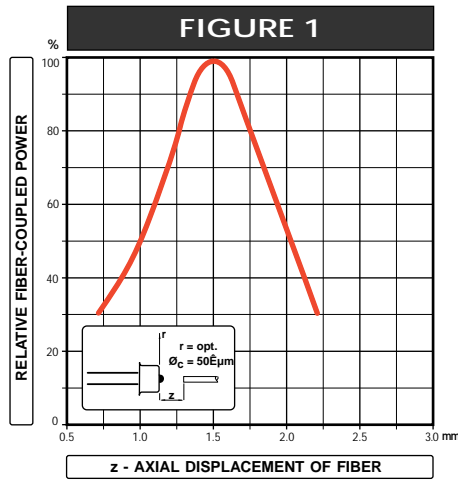


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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
3 $\mu\text{W}$	8 $\mu\text{W}$	15 $\mu\text{W}$	20 $\mu\text{W}$

Table 1



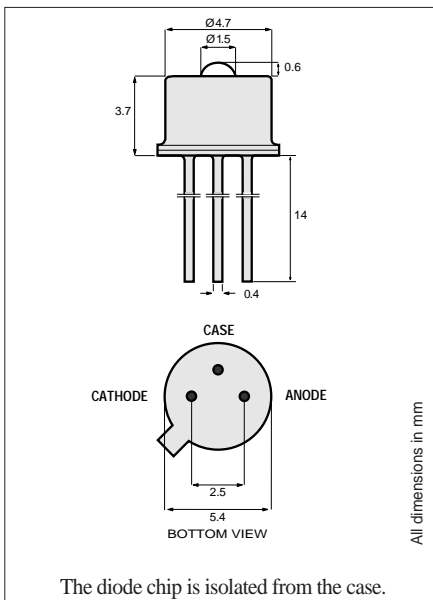
# PRODUCT INFORMATION

840nm

**1A239**  
High-Performance LED

**Datacom, General Purpose**

This device is designed for Ethernet and general applications and offers an excellent price/performance ratio for cost-effective solutions. Since it operates at low drive current, it generates minimal heat — reducing cooling requirements in systems employing large numbers of LEDs.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	50	90		$\mu\text{W}$	$I_F=50\text{ mA}$ (Note 1,2) Fiber: 50/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		7	10	ns	$I_F=50\text{ mA}$ (no bias) Graded Index
Bandwidth (3dB <sub>e</sub> )	$f_c$		50		MHz	$I_F=50\text{ mA}$ NA=0.20
Peak Wavelength	$\lambda_p$	820	840	860	nm	$I_F=50\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=50\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.8	2.0	V	$I_F=50\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** 1A239A version with Fiber-Coupled Power > 80  $\mu\text{W}$  available on request.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	130 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	60 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	100 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			300	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			600	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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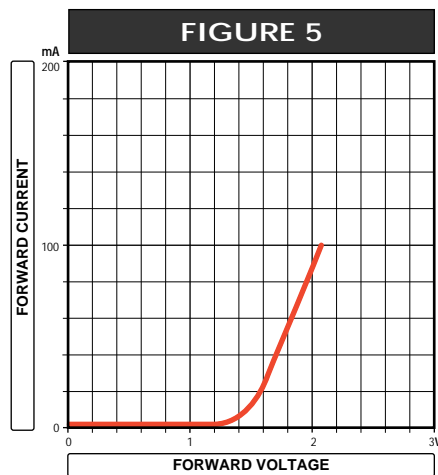
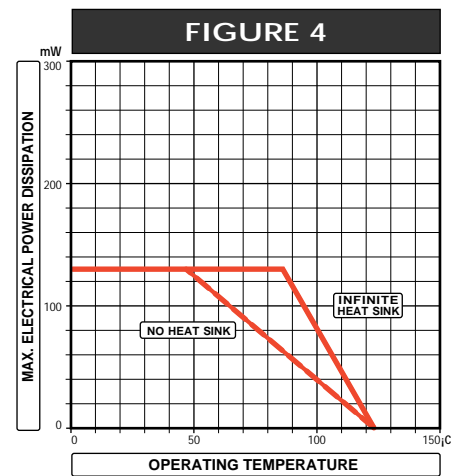
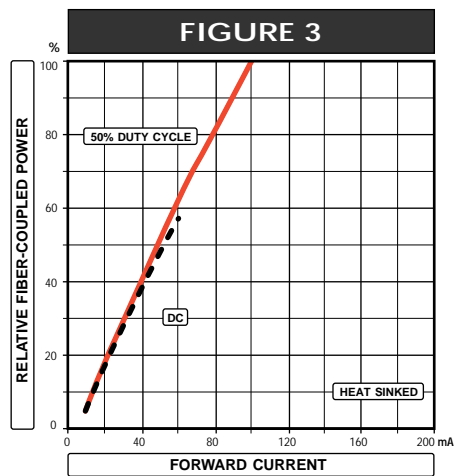
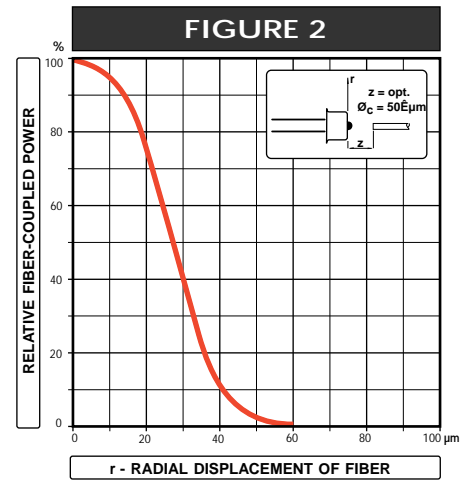
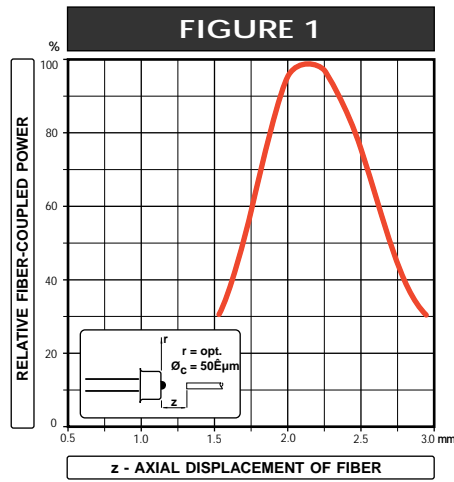


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Typical Fiber-Coupled Power		
Core Diameter/Cladding Diameter Numerical Aperture		
50/125 $\mu\text{m}$ 0.20	62/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29
90 $\mu\text{W}$	150 $\mu\text{W}$	250 $\mu\text{W}$

Table 1



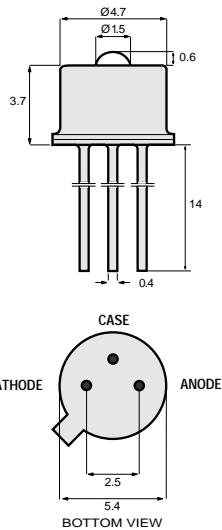
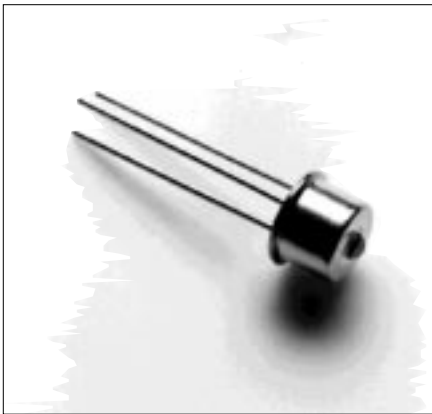
# PRODUCT INFORMATION

860nm

**1A255**  
High-Performance LED

Baseband Video

The low thermal droop of this device allows baseband video transmission with minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber.



The anode is in electrical contact with the case.

**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	80	120		$\mu\text{W}$	$I_F=80\text{ mA}$ (Note 1)
Rise and Fall Time (10-90%)	$t_r, t_f$		6	8	ns	$I_F=80\text{ mA}$ (no bias)
Bandwidth (3dB <sub>e</sub> )	$f_c$		55		MHz	$I_F=80\text{ mA}$
Thermal Droop (nonlinearity) (Note 2)	$ \Delta P $		2		%	$I_F=80\text{ mA}$
Peak Wavelength	$\lambda_p$	840	860	880	nm	$I_F=80\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=80\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.8	2.2	V	$I_F=80\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** Transient decline in optical power due to self-heating.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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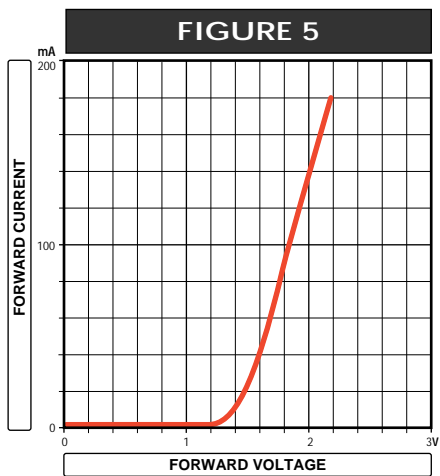
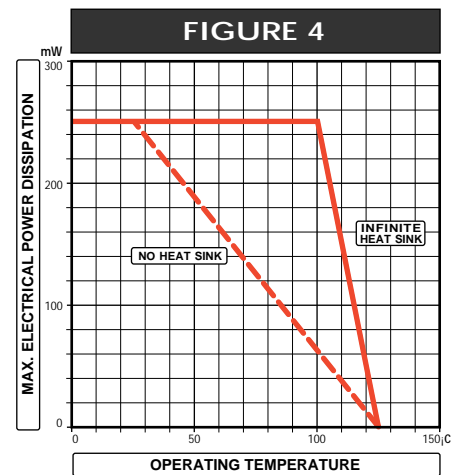
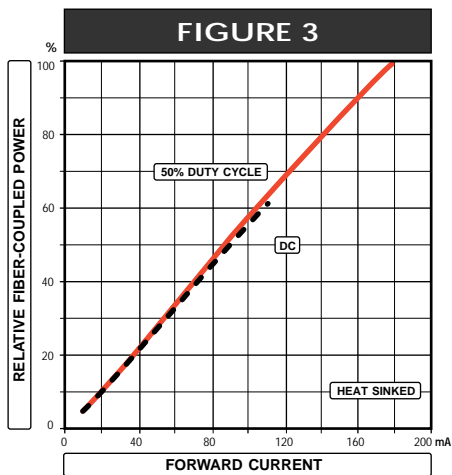
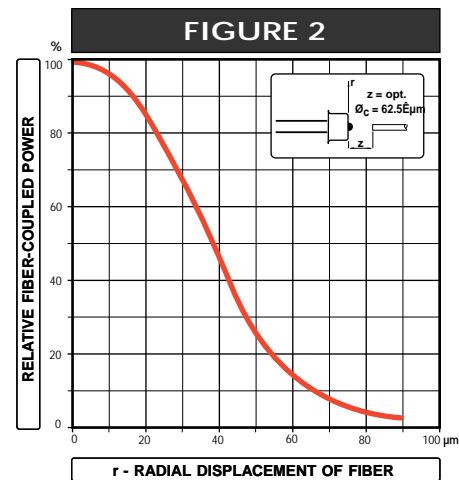
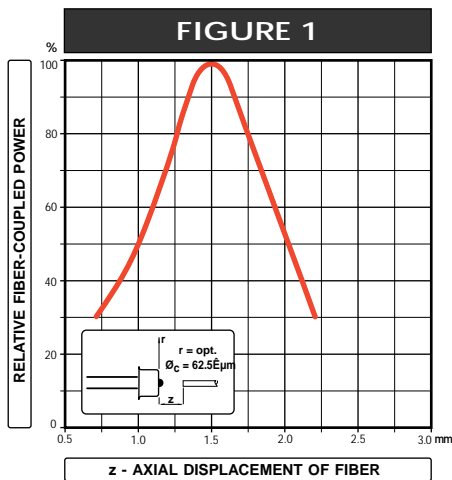


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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
60 $\mu\text{W}$	120 $\mu\text{W}$	250 $\mu\text{W}$	400 $\mu\text{W}$

Table 1



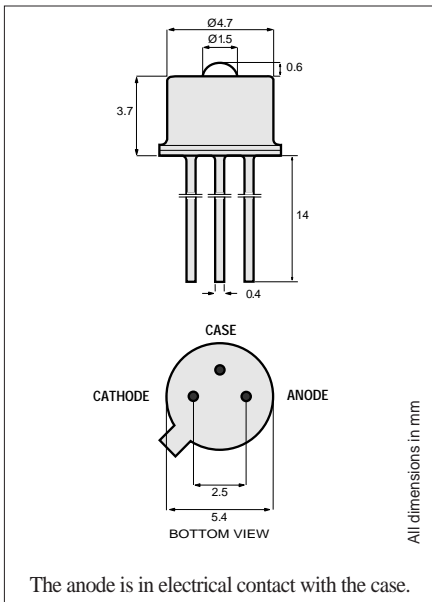
# PRODUCT INFORMATION

810nm

**1A272**  
High-Performance LED

Avionics, Military Datacom

This high speed device is optimized at 810 nm wavelength which is of particular interest for use in radiation-hardened fiber. It operates in a wide temperature range and delivers very high power to 200  $\mu\text{m}$  core fiber, making it ideal in avionics and military datacom applications.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	1300	1600		$\mu\text{W}$	$I_F=100\text{ mA}$ (Note 1) Fiber: 200/280 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		5	8	ns	$I_F=100\text{ mA}$ (no bias) Step Index NA=0.24
Bandwidth (3dB $_{e1}$ )	$f_c$		70		MHz	$I_F=100\text{ mA}$
Peak Wavelength	$\lambda_p$	790	810	830	nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig. 5)	$V_F$		2.2	2.4	V	$I_F=100\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig. 4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig. 4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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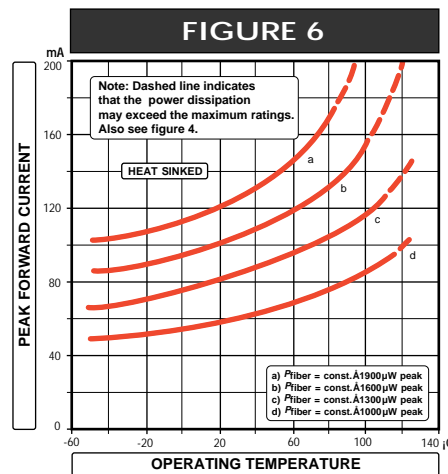
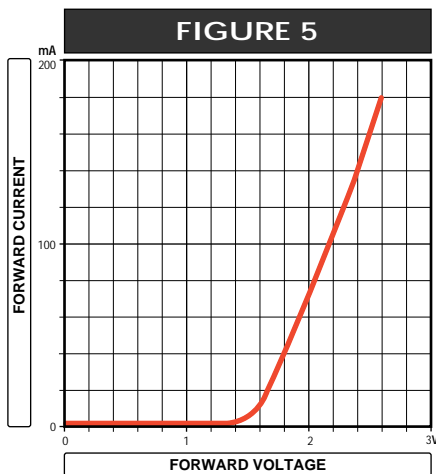
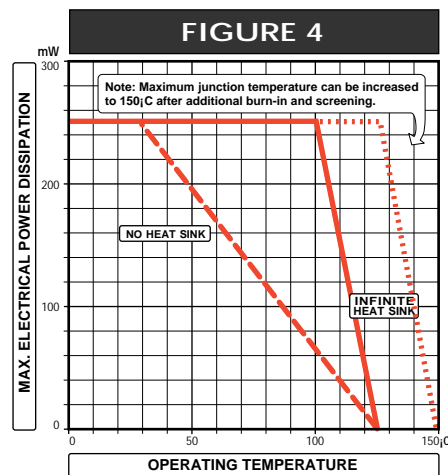
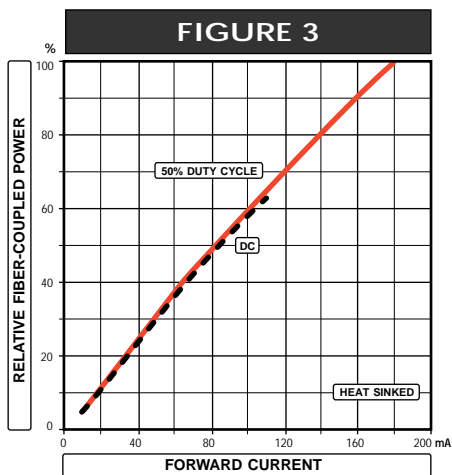
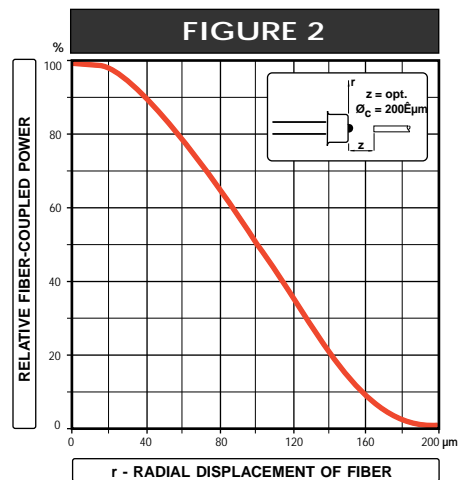
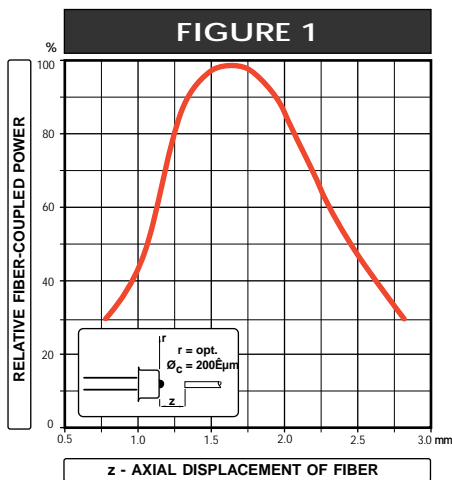
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Typical Fiber-Coupled Power				
Core Diameter/Cladding Diameter Numerical Aperture				
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37	200/280 $\mu\text{m}$ 0.24
60 $\mu\text{W}$	150 $\mu\text{W}$	600 $\mu\text{W}$	2000 $\mu\text{W}$	1600 $\mu\text{W}$

Table 1



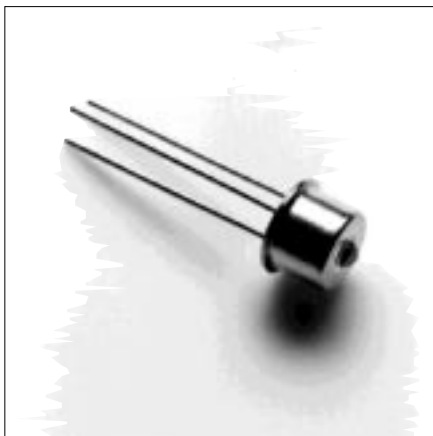
# PRODUCT INFORMATION

880nm

**1A277A**  
High-Performance LED

**FM and Baseband Video**

The low harmonic distortion and low thermal droop makes this device ideal for subcarrier FM and baseband video applications. Video transmission can be accomplished with minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber.



## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	100	130		$\mu\text{W}$	$I_F=100\text{mA}$ (Note 1)
Rise and Fall Time (10-90%)	$t_r, t_f$		1.5	2	ns	$I_F=100\text{mA}$ (no bias)
Bandwidth (3dB <sub>e1</sub> )	$f_c$		250		MHz	$I_F=100\text{mA}$
Harmonic Distortion (nonlinearity)	$-H_2$		40		dB	$I_F=100\text{mA}$ $m=0.8$ $f=10\text{MHz}$
	$-H_3$		50		dB	
Thermal Droop (nonlinearity) (Note 2)	$ \Delta P $		4		%	$I_F=100\text{mA}$
Peak Wavelength	$\lambda_p$	860	880	900	nm	$I_F=100\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		60		nm	$I_F=100\text{mA}$
Forward Voltage (Fig.5)	$V_F$		1.8	2.2	V	$I_F=100\text{mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		250		pF	$V_R=0\text{V}, f=1\text{MHz}$

Fiber:  
62.5/125  $\mu\text{m}$   
Graded  
Index  
NA=0.275

**Note 1:** Measured at the exit of 100 meters of fiber

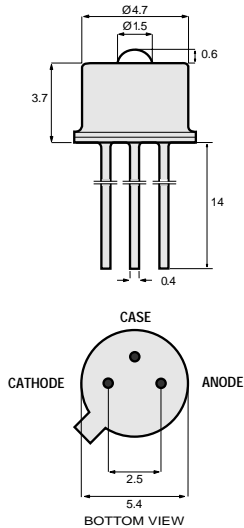
**Note 2:** Transient decline in optical power due to self-heating.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C



All dimensions in mm

The anode is in electrical contact with the case.

**TO-46 Package With Lens**

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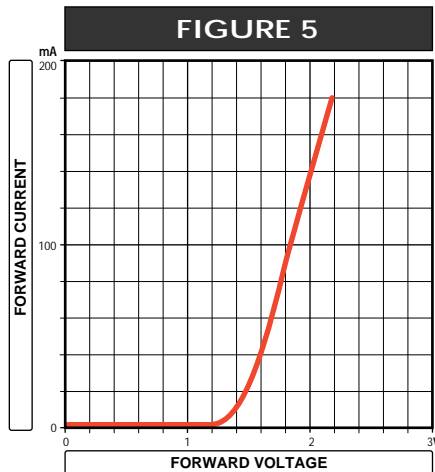
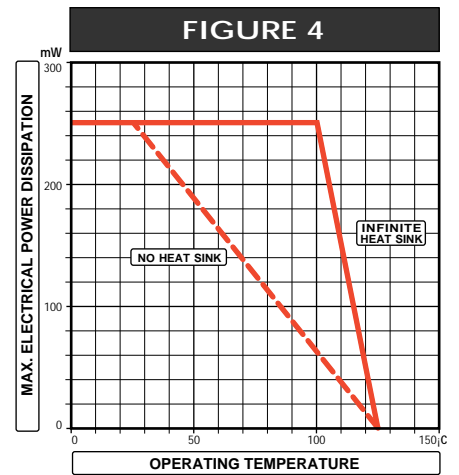
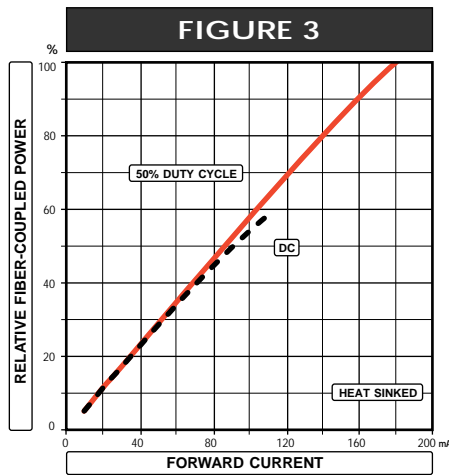
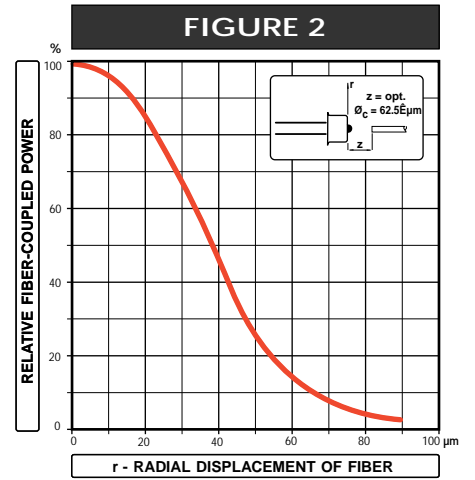
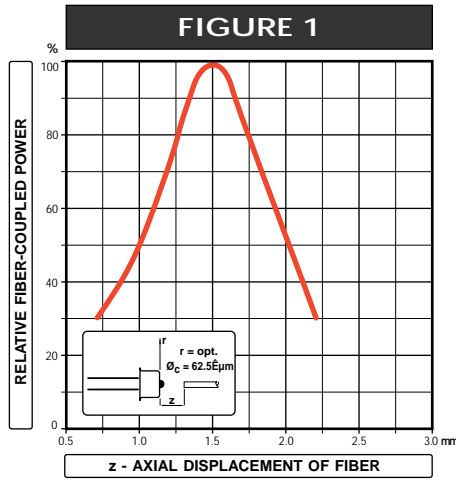
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**Typical Fiber-Coupled Power**

Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
45 $\mu\text{W}$	130 $\mu\text{W}$	225 $\mu\text{W}$	300 $\mu\text{W}$

Table 1



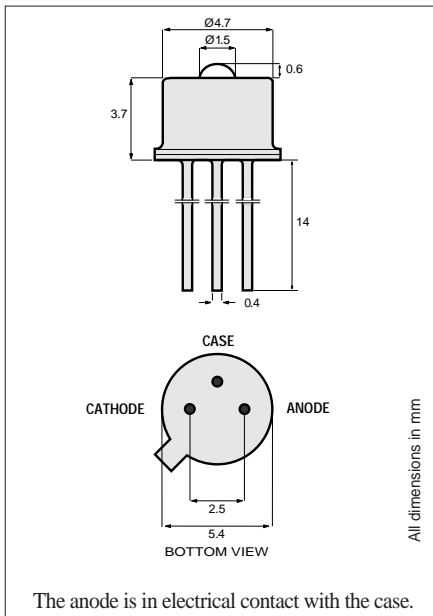
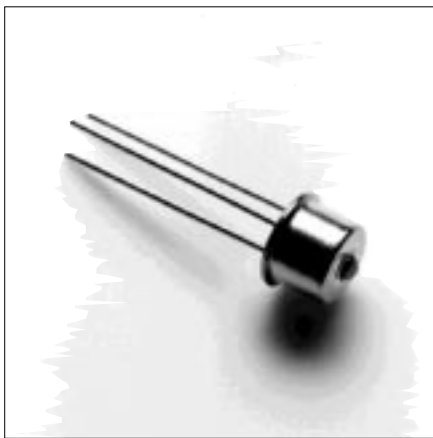
# PRODUCT INFORMATION

835nm

**1A279**  
High-Performance LED

**Position Sensors**

This device features broad spectral width which makes it ideal in certain sensor applications. It operates in a wide temperature range and delivers high power to large-core fiber, making it ideal for WDM-based position sensors in aircraft.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	300	400		$\mu\text{W}$	$I_F=100\text{ mA}$ (Note 1) Fiber: 100/140 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		20		ns	$I_F=100\text{ mA}$ (no bias) Step Index
Bandwidth (3dB <sub>e1</sub> )	$f_c$		15		MHz	$I_F=100\text{ mA}$ NA=0.22
Center Wavelength (Fig.6)	$\lambda_c$		835		nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		120		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		2.3		V	$I_F=100\text{ mA}$
Reverse Current	$I_R$		20		$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$		100		°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$		400		°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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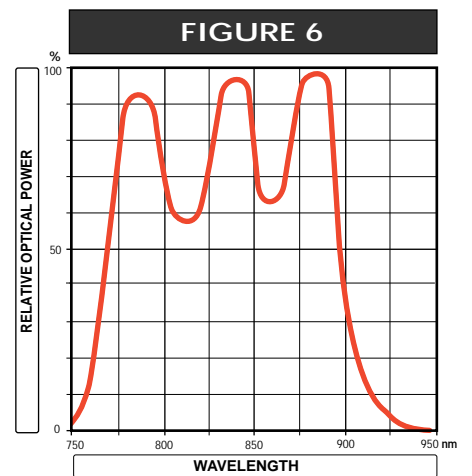
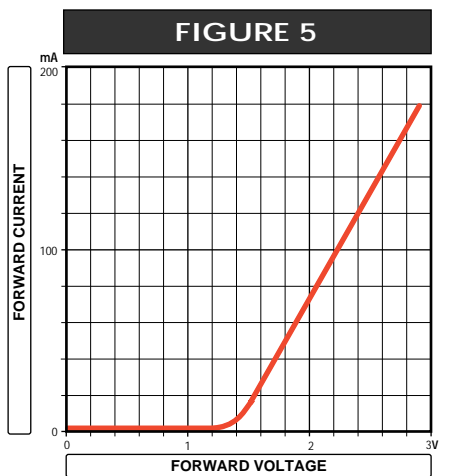
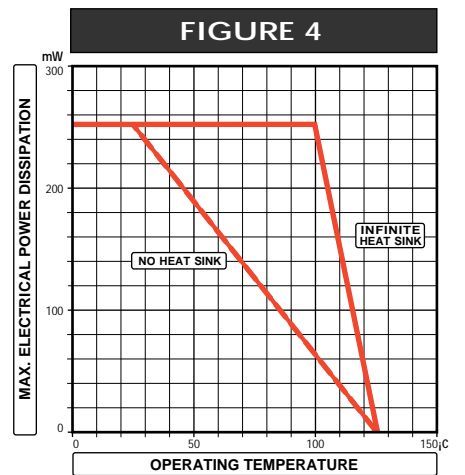
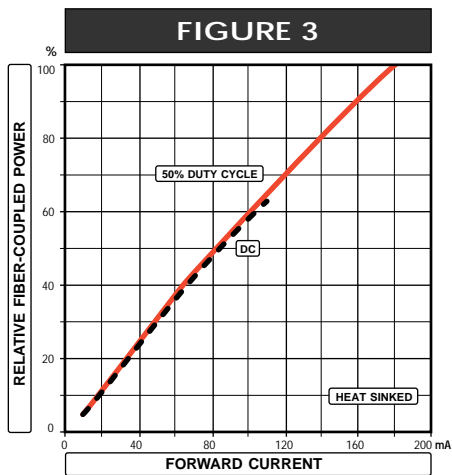
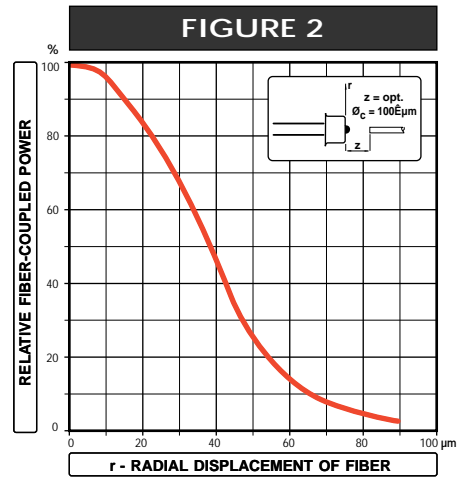
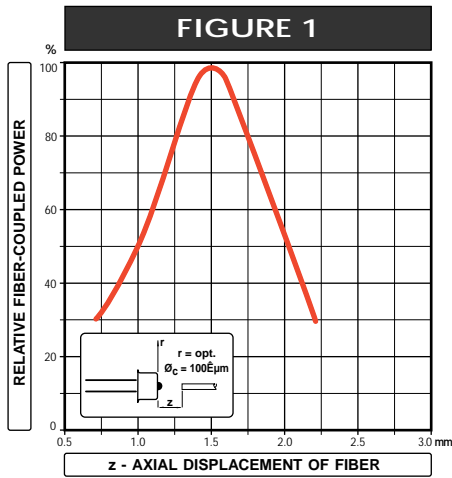


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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
60 $\mu\text{W}$	150 $\mu\text{W}$	400 $\mu\text{W}$	800 $\mu\text{W}$

Table 1



# PRODUCT INFORMATION

1320nm **1A284**  
High-Performance LED

**Baseband Video**

The low thermal droop of this device allows baseband video transmission with minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber.

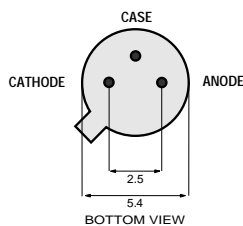
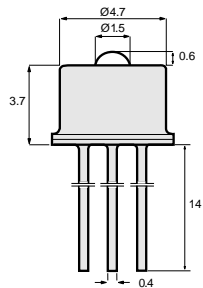


## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	35	50		$\mu\text{W}$	$I_F=100\text{mA}$ (Note 1)
Rise and Fall Time (10-90%)	$t_r, t_f$		6	9	ns	$I_F=100\text{mA}$ (no bias)
Bandwidth (3dB <sub>e1</sub> )	$f_c$		55		MHz	$I_F=100\text{mA}$
Thermal Droop (nonlinearity) (Note 2)	$ \Delta P $		2		%	$I_F=100\text{mA}$
Peak Wavelength	$\lambda_p$	1280	1320	1350	nm	$I_F=100\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		120	155	nm	$I_F=100\text{mA}$
Forward Voltage (Fig.5)	$V_F$		1.5	2	V	$I_F=100\text{mA}$
Reverse Current	$I_R$			100	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		200		pF	$V_R=0\text{V}, f=1\text{MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** Transient decline in optical power due to self-heating.



All dimensions in mm

The anode is in electrical contact with the case.

**TO-46 Package With Lens**

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125° C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125° C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	230 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	170 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260° C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.8		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.55		nm/°C

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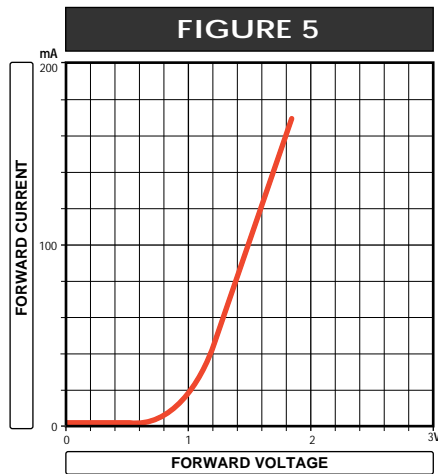
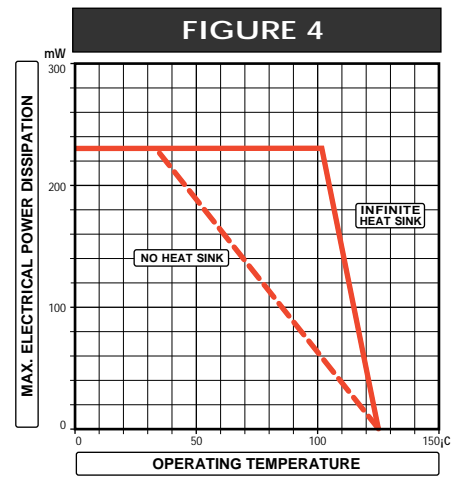
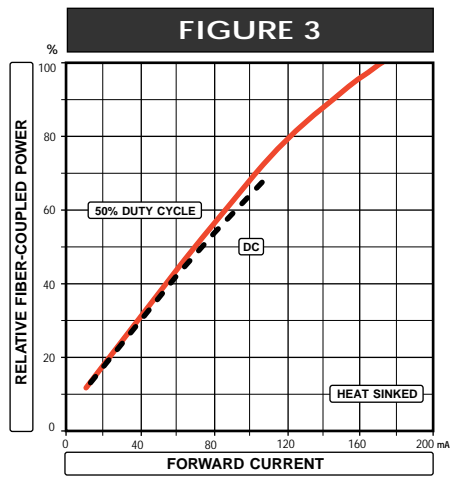
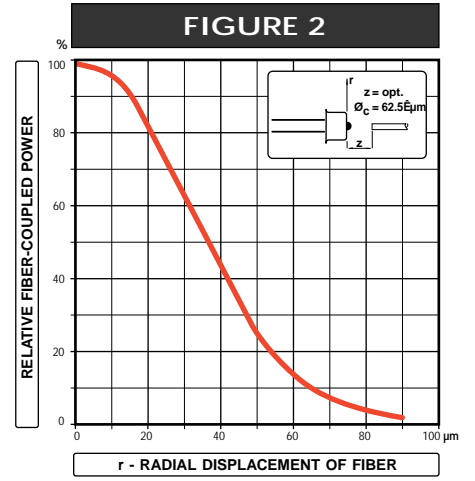
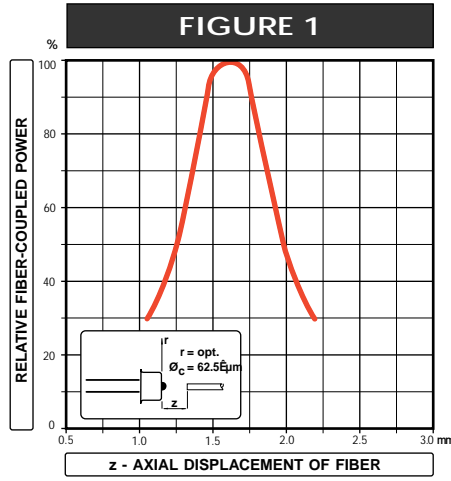


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Typical Fiber-Coupled Power		
Core Diameter/Cladding Diameter Numerical Aperture		
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29
12 $\mu\text{W}$	50 $\mu\text{W}$	90 $\mu\text{W}$

Table 1

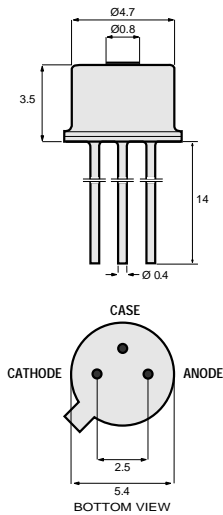


# PRODUCT INFORMATION

820nm **1A286**  
High-Performance LED

Free Air Communication, Sensors

This LED is designed for communication in free air. Its high optical output power makes it suitable for sensor applications as well. The hermetically sealed package contributes to its high reliability and the device can withstand the harshest environmental conditions.



All dimensions in mm

The anode is in electrical contact with the case.

**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Total Optical Power (Fig.3, & 6)	$P_{tot}$	2	4		mW	$I_F=100mA$
Fiber-Coupled Power (Fig.1, & 2)	$P_{fiber}$		1		mW	$I_F=100mA$ (Note 1) Fiber: 200/230 $\mu m$
Rise and Fall Time (10-90%)	$t_r, t_f$		5	10	ns	$I_F=100 mA$ (no bias) Step Index NA=0.37
Bandwidth (3dB $_{el}$ )	$f_c$		70		MHz	$I_F=100 mA$
Peak Wavelength	$\lambda_p$	800	820	840	nm	$I_F=100 mA$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100 mA$
Forward Voltage (Fig.5)	$V_F$		2.2	2.4	V	$I_F=100 mA$
Reverse Current	$I_R$			20	$\mu A$	$V_R=1V$
Capacitance	$C$		250		pF	$V_R=0V, f=1 MHz$

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{stg}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{op}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{tot}$	250 mW
Continuous Forward Current ( $f \leq 10$ kHz)	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1$ MHz)	$I_{FRM}$	180 mA
Reverse Voltage	$V_R$	1.5V
Soldering Temperature (2mm from the case for 10sec)	$T_{sld}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{thjc}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{thja}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

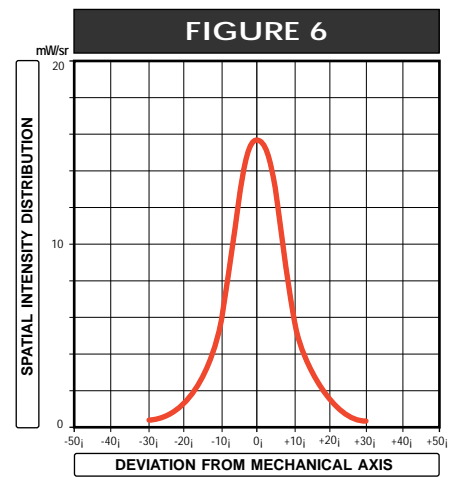
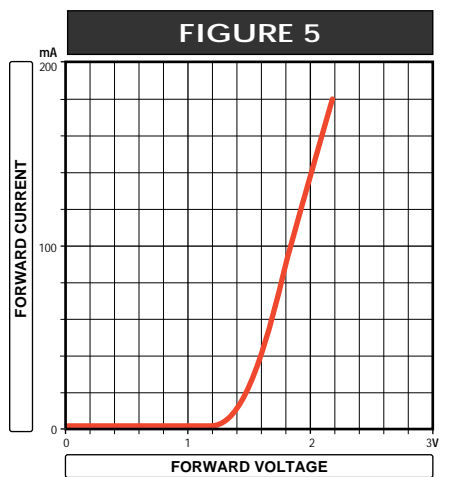
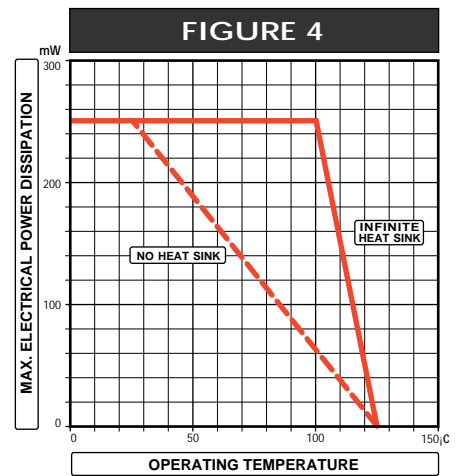
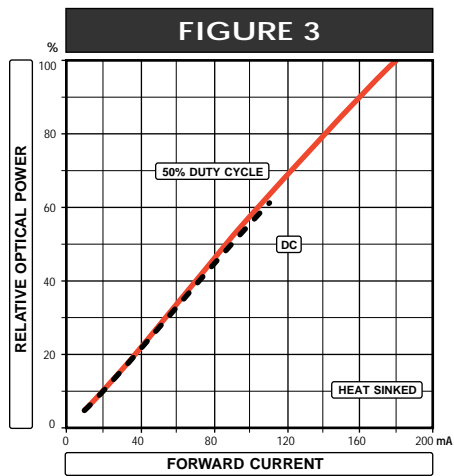
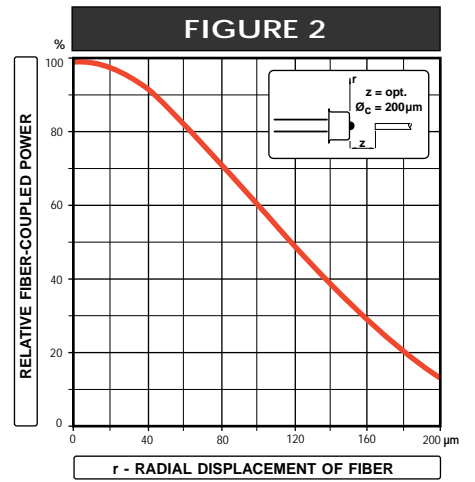
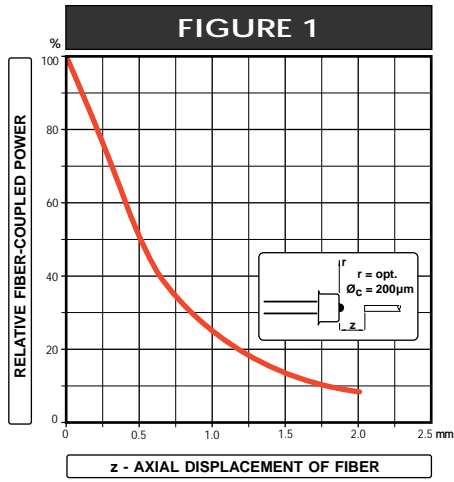
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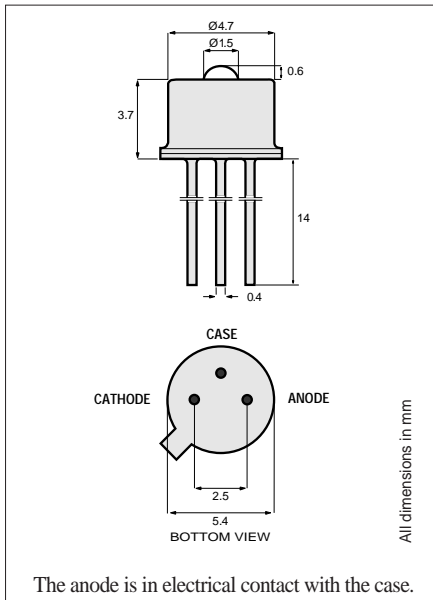
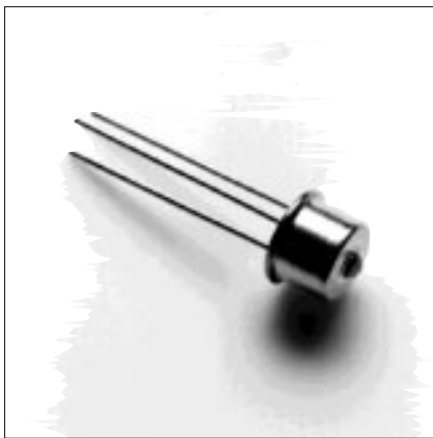
# PRODUCT INFORMATION

840nm

**1A288**  
High-Performance LED

Avionics, Military Datacom

This high speed device is optimized at 810 nm wavelength which is of particular interest for use in radiation-hardened fiber. It operates in a wide temperature range and delivers very high power to 200  $\mu\text{m}$  core fiber, making it ideal in avionics and military datacom applications.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	700	850		$\mu\text{W}$	$I_F=100 \text{ mA}$ (Note 1) Fiber: 100/140 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		3.5	5	ns	$I_F=100 \text{ mA}$ (no bias) Graded Index NA=0.29
Bandwidth (3dB $_{\text{el}}$ )	$f_c$		100		MHz	$I_F=100 \text{ mA}$
Peak Wavelength	$\lambda_p$	800	840	880	nm	$I_F=100 \text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100 \text{ mA}$
Forward Voltage (Fig.5)	$V_F$		2.0	2.4	V	$I_F=100 \text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		250		pF	$V_R=0\text{V}, f=1 \text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10 \text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1 \text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.4		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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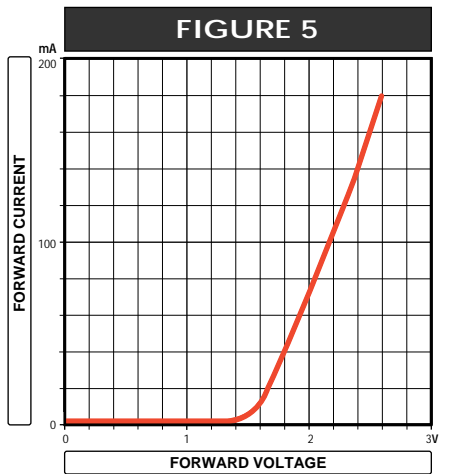
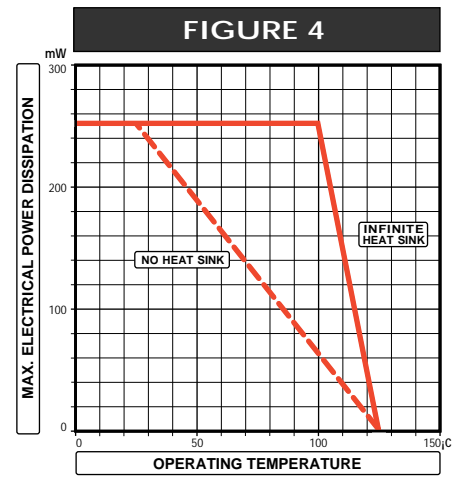
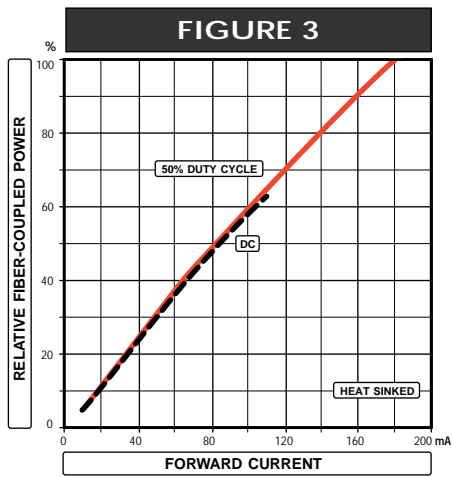
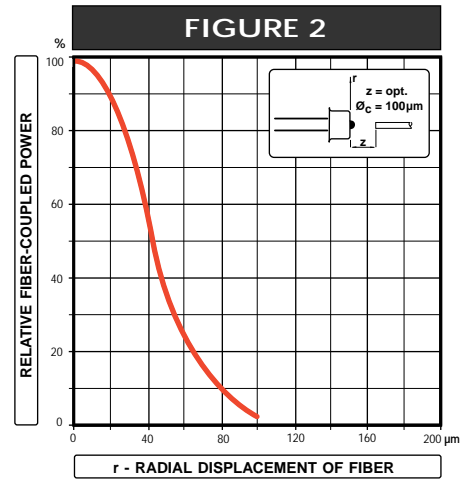
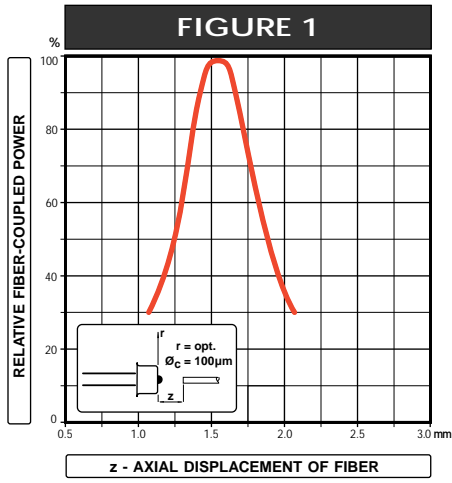
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**Typical Fiber-Coupled Power**

Core Diameter/Cladding Diameter Numerical Aperture		
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29
150 $\mu\text{W}$	400 $\mu\text{W}$	850 $\mu\text{W}$

Table 1



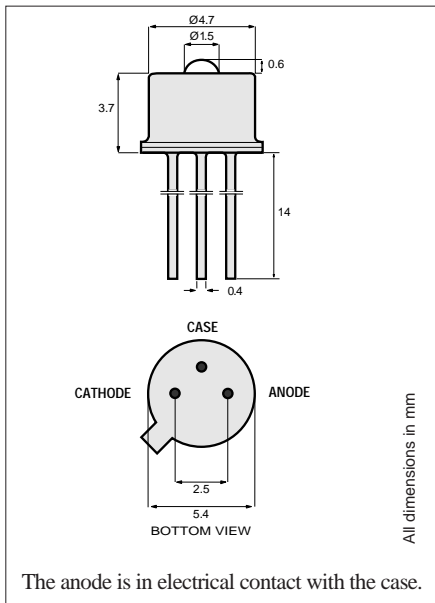
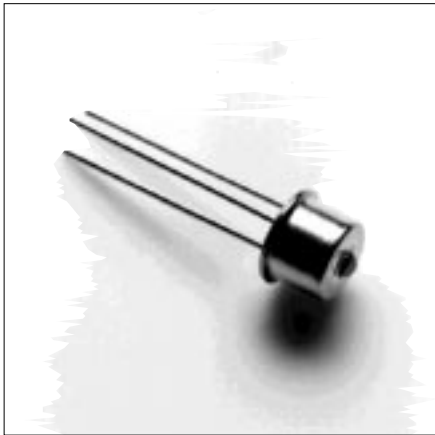
# PRODUCT INFORMATION

860nm

**1A292**  
High-Performance LED

**Baseband Video**

The low thermal droop and high speed of this device allows high-frequency baseband video transmission with minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig.1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	120	150		$\mu\text{W}$	$I_F=80\text{ mA}$ (Note 1)
Rise and Fall Time (10-90%)	$t_r, t_f$		4.5	6	ns	$I_F=80\text{ mA}$ (no bias)
Bandwidth (3dB <sub>e1</sub> )	$f_c$		75		MHz	$I_F=80\text{ mA}$
Thermal Droop (nonlinearity) (Note 2)	$ \Delta P $		4		%	$I_F=80\text{ mA}$
Peak Wavelength	$\lambda_p$	840	860	880	nm	$I_F=80\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=80\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.8	2.2	V	$I_F=80\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** Transient decline in optical power due to self-heating.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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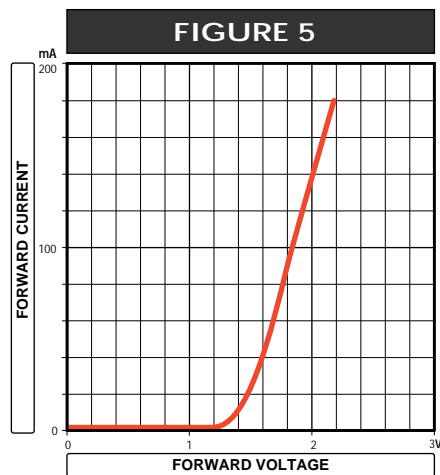
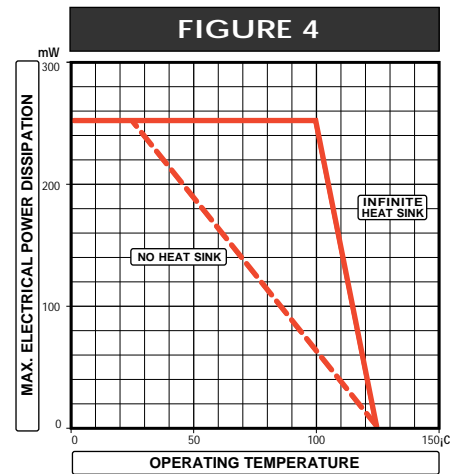
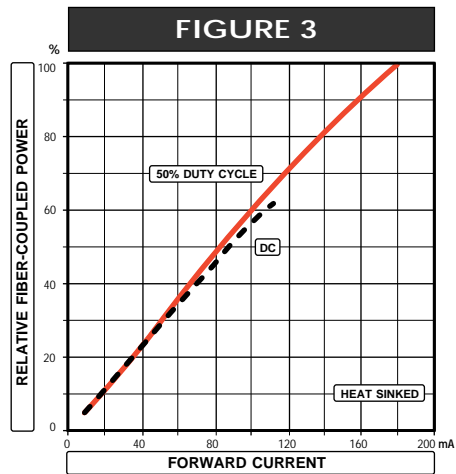
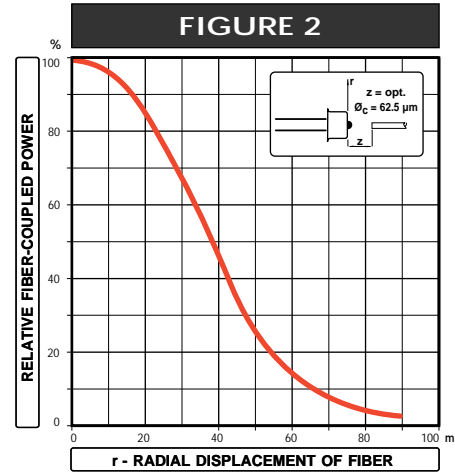
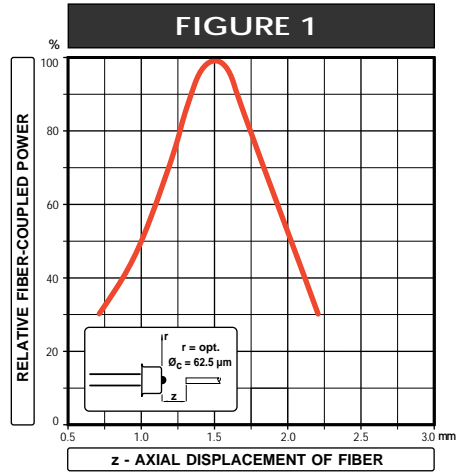


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Typical Fiber-Coupled Power			
CORE DIAMETER/CLADDING DIAMETER NUMERICAL APERTURE			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
65 $\mu\text{W}$	150 $\mu\text{W}$	300 $\mu\text{W}$	450 $\mu\text{W}$

Table 1



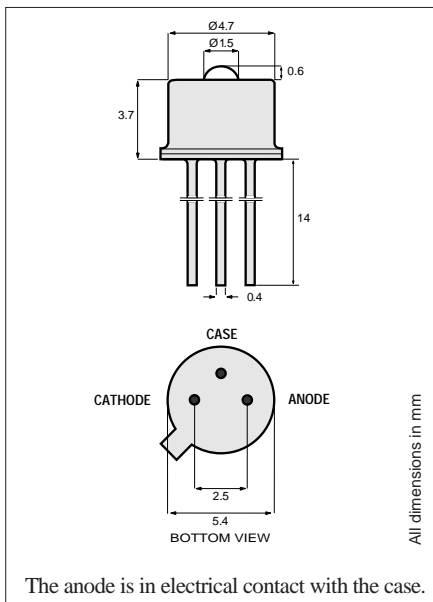
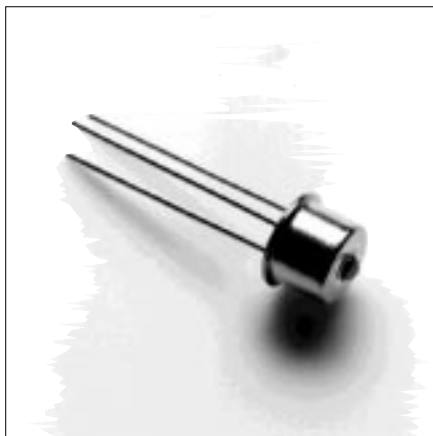
# PRODUCT INFORMATION

820nm

**1A301**  
High-Performance LED

**Datacom**

This device is designed for Fibre Channel 266 Mbps applications and offers an excellent price/performance ratio for cost-effective solutions. Its double-lens optical system results in optimum coupling of power into the fiber. And it matches the 1A354 PIN Photodiode.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	50	80		$\mu\text{W}$	$I_F=100\text{ mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		1.0	1.5	ns	$I_F=100\text{ mA}$ (no bias) Graded Index NA=0.275
Bandwidth (3dB <sub>el</sub> )	$f_c$		350		MHz	$I_F=100\text{ mA}$
Peak Wavelength	$\lambda_p$	800	820	840	nm	$I_F=100\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.8	2.2	V	$I_F=100\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		20		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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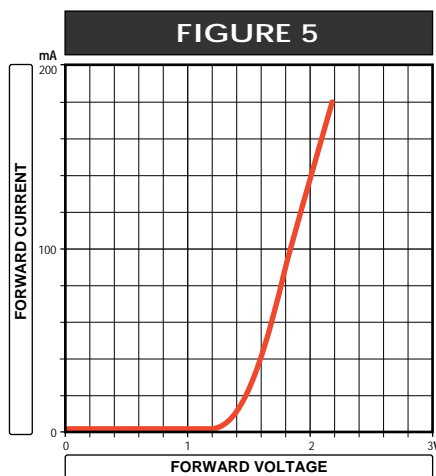
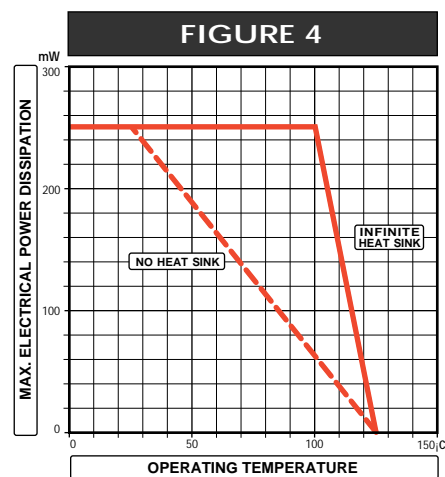
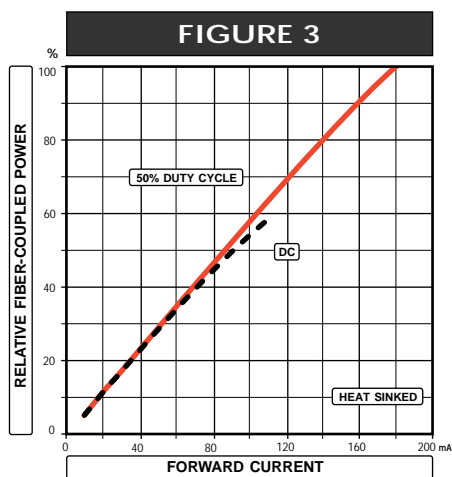
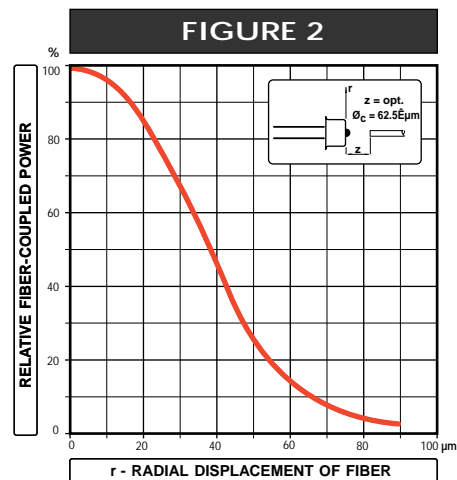
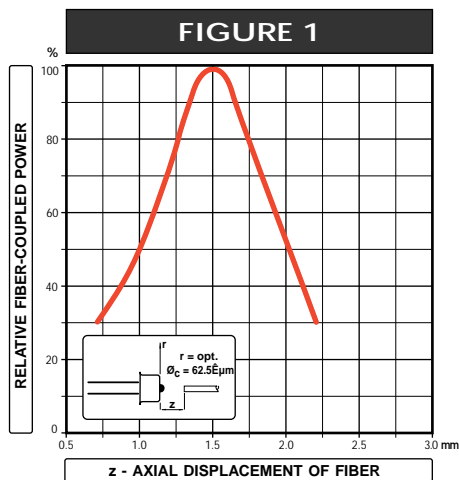


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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
30 $\mu\text{W}$	80 $\mu\text{W}$	160 $\mu\text{W}$	210 $\mu\text{W}$

Table 1



# PRODUCT INFORMATION

1320nm

**1A302**  
High-Performance LED

**FM Video**

The low harmonic distortion makes this device ideal for subcarrier FM video applications. Video transmission can be accomplished with minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber.

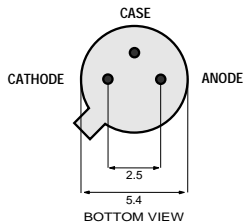
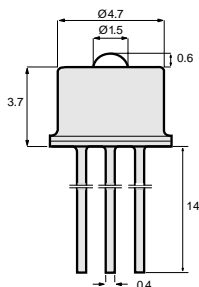


## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	40	50		$\mu\text{W}$	$I_F=80\text{ mA}$ (Note 1)
Rise and Fall Time (10-90%)	$t_r, t_f$		3		ns	$I_F=80\text{ mA}$ (no bias)
Bandwidth (3dB <sub>e1</sub> )	$f_c$		100		MHz	$I_F=80\text{ mA}$
Harmonic Distortion (nonlinearity)	$-H_2$		26		dB	$I_F=60\text{ mA}$ $m=0.8$ $f=10\text{ MHz}$
	$-H_3$		38		dB	
Peak Wavelength	$\lambda_p$	1280	1320	1350	nm	$I_F=80\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		120	155	nm	$I_F=80\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		1.5	2	V	$I_F=80\text{ mA}$
Reverse Current	$I_R$			100	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		200		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

Fiber:  
62.5/125 $\mu\text{m}$   
Graded  
Index  
NA=0.275

Note 1: Measured at the exit of 100 meters of fiber.



All dimensions in mm.

The anode is in electrical contact with the case.

### TO-46 Package With Lens

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	230 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	170 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.8		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.55		nm/°C

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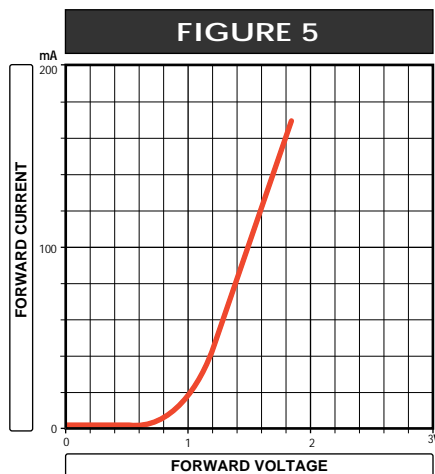
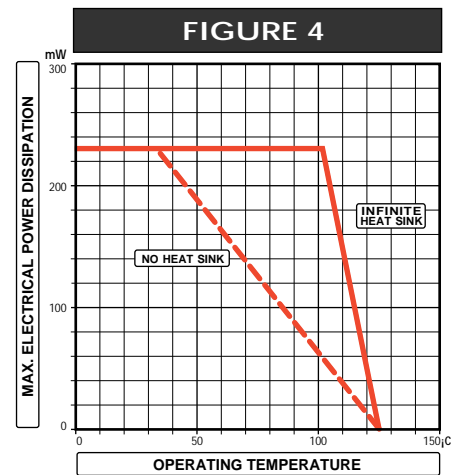
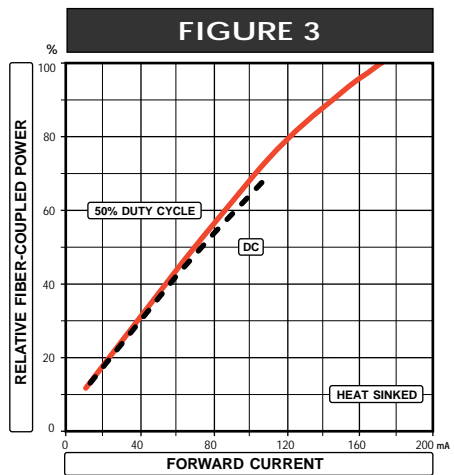
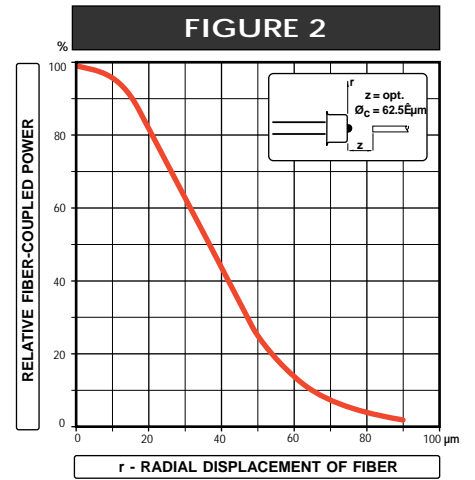
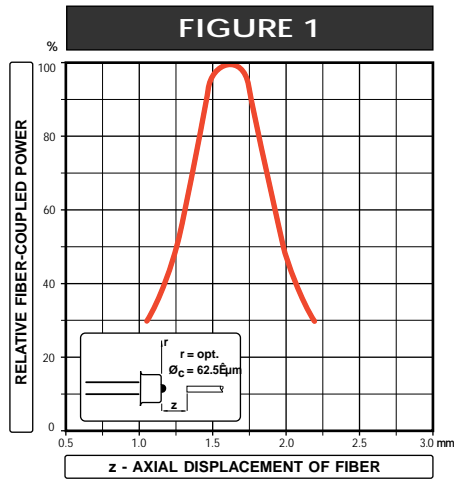
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**Typical Fiber-Coupled Power**

Core Diameter/Cladding Diameter Numerical Aperture		
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29
12 $\mu\text{W}$	50 $\mu\text{W}$	90 $\mu\text{W}$

Table 1



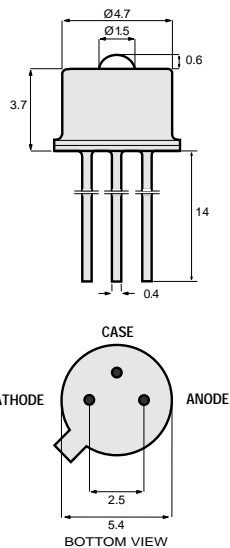
# PRODUCT INFORMATION

860nm

**1A313**  
High-Performance LED

## Power Transmission

This is the ultimate in high power for 850 nm LEDs - making it the device of choice for high power transmission via large core fibers. The hermetically sealed package contributes to its high reliability and the device can withstand the harshest environmental conditions.



All dimensions in mm

The anode is in electrical contact with the case.

### TO-46 Package With Lens

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	5	7		mW	$I_F=300$ mA (Note 1) (Note 2) Fiber: 300/330 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		4	8	ns	$I_F=300$ mA (no bias) Step Index NA=0.37
Bandwidth (3dB <sub>el</sub> )	$f_c$		85		MHz	$I_F=300$ mA
Peak Wavelength	$\lambda_p$	840	860	880	nm	$I_F=100$ mA
Spectral Width (FWHM)	$\Delta\lambda$		40		nm	$I_F=100$ mA
Forward Voltage (Fig.5)	$V_F$		1.9	2.2	V	$I_F=300$ mA
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1$ V
Capacitance	$C$		250		pF	$V_R=0$ V, $f=1$ MHz

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** Mounted in a heatsinked metal housing.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	660 mW
Continuous Forward Current (f 10 kHz)	$I_F$	300 mA
Peak Forward Repetitive Current (duty cycle 50%)	$I_{\text{FRM}}$	500 mA
Peak Forward Surge Current (100 $\mu\text{s}$ pulse)	$I_{\text{FSM}}$	1000 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			75	°C/W
Thermal Resistance - In Housing (Note 2)	$R_{\text{thja}}$			150	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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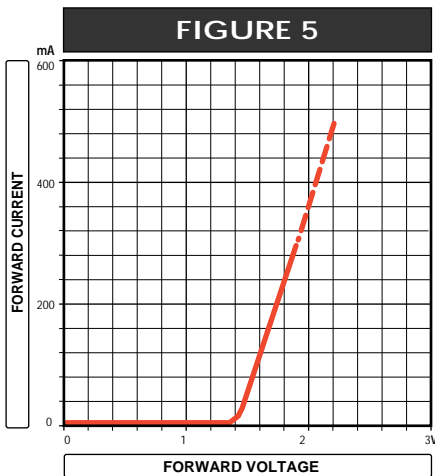
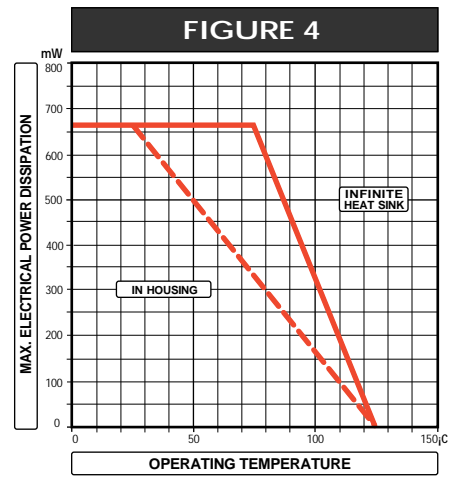
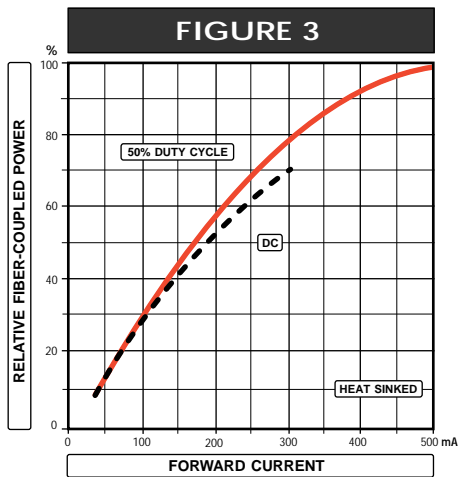
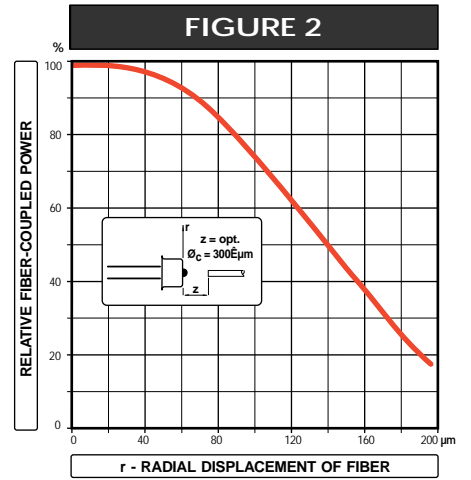
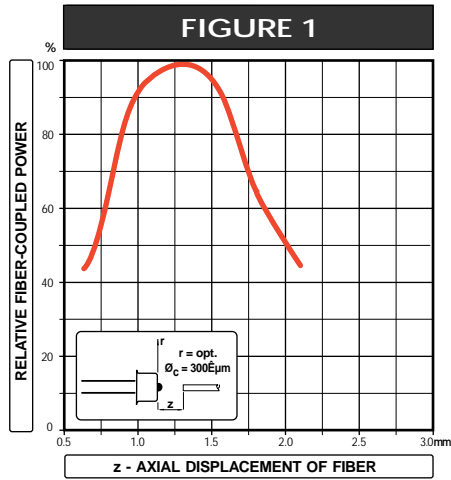
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**Typical Fiber-Coupled Power**

Core Diameter/Cladding Diameter Numerical Aperture	
200/230 $\mu\text{m}$ 0.37	300/330 $\mu\text{m}$ 0.37
4 mW	7 mW

Table 1



# PRODUCT INFORMATION

860nm

**1A314**  
High-Performance LED

Baseband Video

The exceptionally low thermal droop of this device allows baseband video transmission with ultimate quality and minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber.

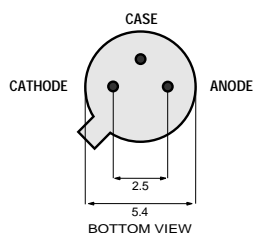
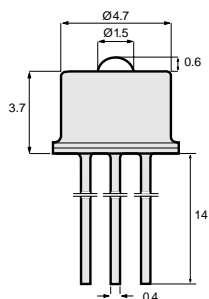


## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	70	100		$\mu\text{W}$	$I_F=100\text{mA}$ (Note 1)
Rise and Fall Time (10-90%)	$t_r, t_f$		6	8	ns	$I_F=100\text{mA}$ (no bias)
Bandwidth (3dB <sub>el</sub> )	$f_c$		55		MHz	$I_F=100\text{mA}$
Thermal Droop (nonlinearity) (Note 2)	$ \Delta P $		1		%	$I_F=100\text{mA}$
Peak Wavelength	$\lambda_p$	840	860	880	nm	$I_F=100\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=100\text{mA}$
Forward Voltage (Fig.5)	$V_F$		1.6	2	V	$I_F=100\text{mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		250		pF	$V_R=0\text{V}, f=1\text{MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** Transient decline in optical power due to self-heating.



All dimensions in mm

The anode is in electrical contact with the case.

### TO-46 Package With Lens

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $\leq 10\text{kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

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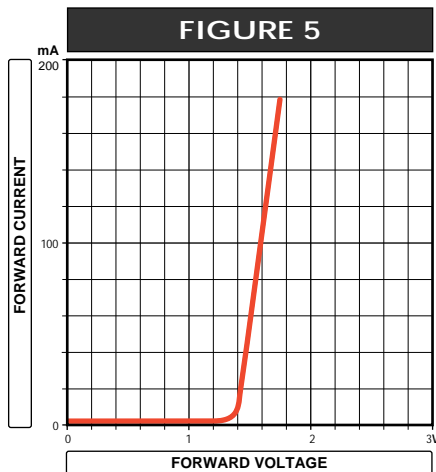
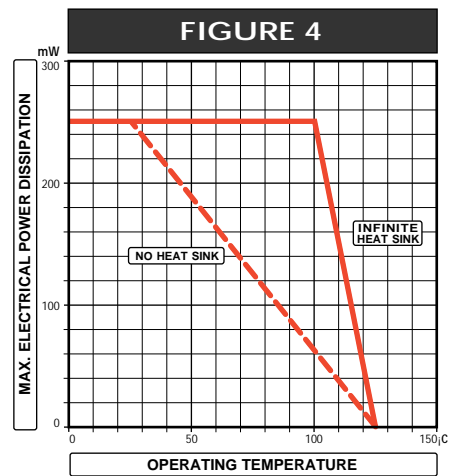
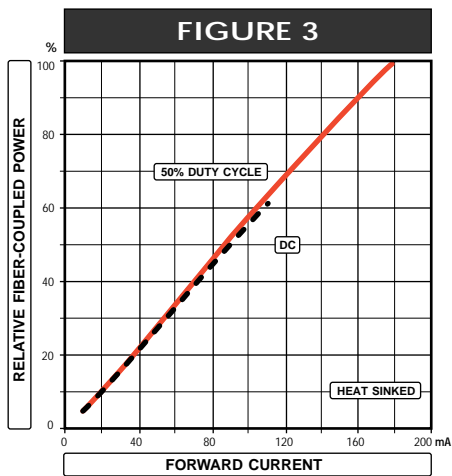
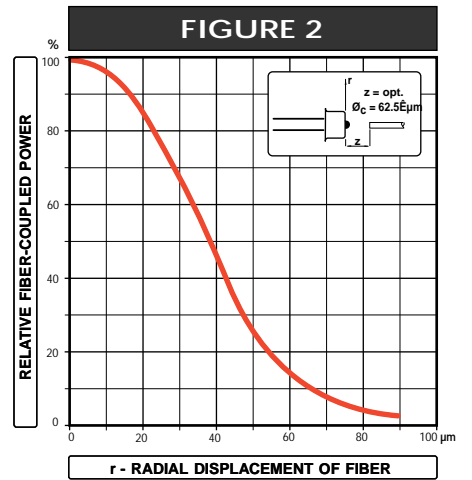
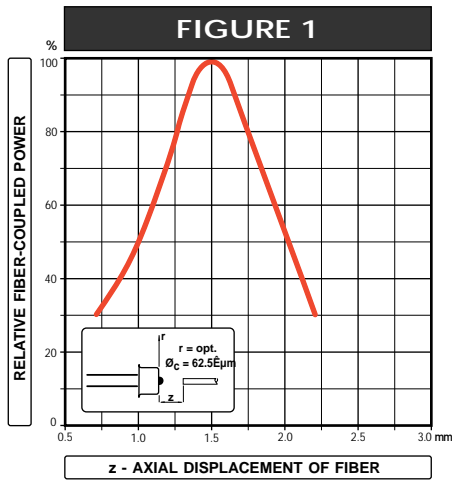


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Typical Fiber-Coupled Power			
Core Diameter/Cladding Diameter Numerical Aperture			
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275	100/140 $\mu\text{m}$ 0.29	200/230 $\mu\text{m}$ 0.37
40 $\mu\text{W}$	100 $\mu\text{W}$	250 $\mu\text{W}$	400 $\mu\text{W}$

Table 1



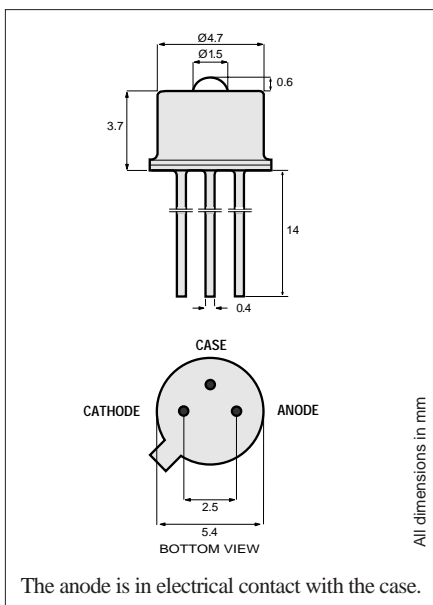
# PRODUCT INFORMATION

740nm

**1A334**  
High-Performance LED

Sensors

The 740 nm wavelength is ideal for certain sensors and other applications where light visibility is needed. It is packaged in a hermetically sealed can for high reliability and maximum resistance to harsh operating environments.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$	15	25		$\mu\text{W}$	$I_F=80\text{ mA}$ (Note 1) Fiber: 50/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		10	15	ns	$I_F=80\text{ mA}$ (no bias) Graded Index NA=0.20
Bandwidth (3 dB <sub>el</sub> )	$f_c$		35		MHz	$I_F=80\text{ mA}$
Peak Wavelength	$\lambda_p$	720	740	760	nm	$I_F=80\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=80\text{ mA}$
Forward Voltage	$V_F$		2.6	3.0	V	$I_F=80\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	80 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_R$	1.5V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

12502.11 1994-05-27



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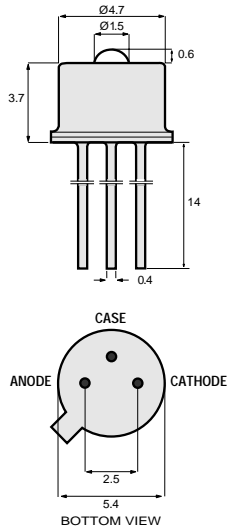
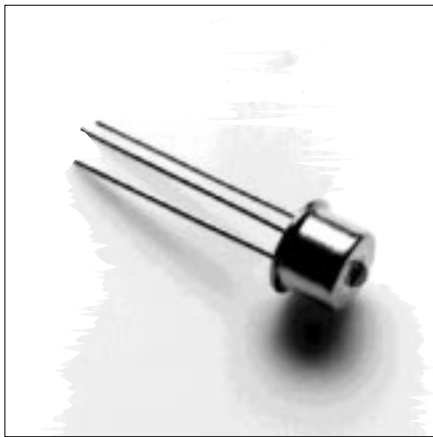
# PRODUCT INFORMATION

1320nm

**1A353**  
High-Performance Duplex

**Half-Duplex Communication**

This single-chip device operates as both an Emitter and Detector, and transmits data over a single fiber in half-duplex mode — thus reducing both fiber and component costs when compared with traditional approaches.



All dimensions in mm

The diode chip is isolated from the case.

**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	
EMITTING MODE	Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	50	55		$I_F=80 \text{ mA}$ (Note 1)	
	Rise and Fall Time (10-90%)	$t_r, t_f$		4		$I_F=80 \text{ mA}$ (no bias)	
	Bandwidth (3 dB <sub>el</sub> )	$f_c$		50		$I_F=80 \text{ mA}$	
	Peak Wavelength	$\lambda_p$	1280	1320	1350	nm	$I_F=80 \text{ mA}$
	Spectral Width (FWHM)	$\Delta\lambda$		140		nm	$I_F=80 \text{ mA}$
	Forward Voltage (Fig. 5)	$V_F$		1.7	1.9	V	$I_F=80 \text{ mA}$
RECEIVING MODE	Responsivity (Fig. 1, 2) (Table 2)	$R$	0.25	0.3		$V_R=1 \text{ V}$ $\lambda=1320 \text{ nm}$	
	Rise and Fall Time (10-90%)	$t_r, t_f$		4		$V_R=1 \text{ V}$ $R_L=50\Omega$ (no bias)	
	Bandwidth	$f_c$		50		MHz	$V_R=1 \text{ V}$ $R_L=50\Omega$
	Capacitance	$C$		300		pF	$V_R=1 \text{ V}, f=1 \text{ MHz}$
	Dark Current	$I_d$		20	100	nA	$V_R=1 \text{ V}$

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig. 4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig. 4)	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10 \text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1 \text{ MHz}$ )	$I_{\text{FRM}}$	150 mA
Reverse Voltage	$V_R$	2.0 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			200	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			500	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.8		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.55		nm/°C
Temperature Coefficient - Responsivity	$dR/dT_j$		0.2		%/°C
Temperature Coefficient - Dark Current	$dI_d/dT_j$		5		%/°C

12604.11 1995-10-26



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**Typical Fiber-Coupled Power**

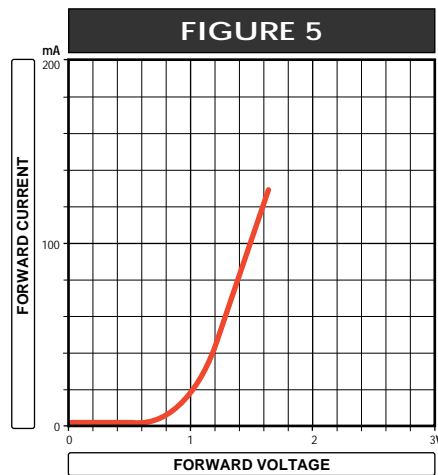
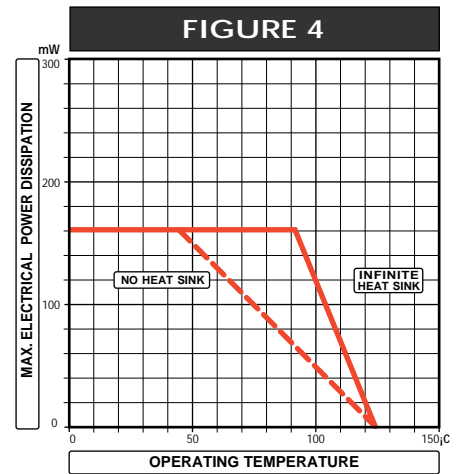
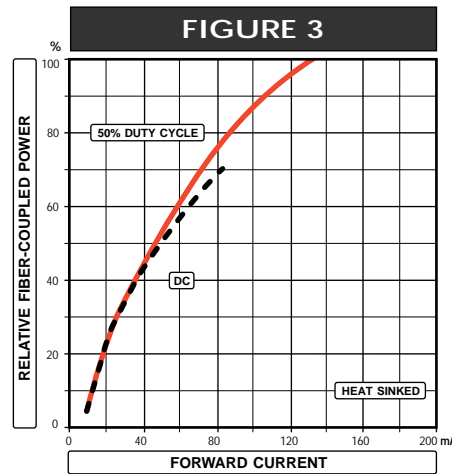
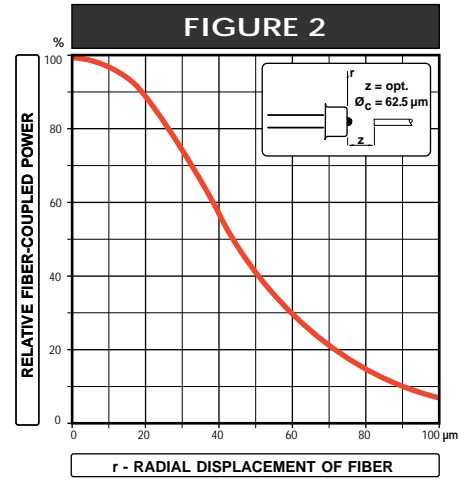
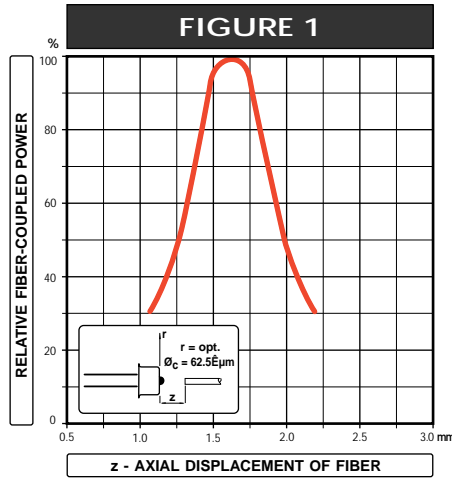
Core Diameter/Cladding Diameter Numerical Aperture	
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275
15 $\mu\text{W}$	55 $\mu\text{W}$

Table 1

**Typical Responsivity**

Core Diameter/Cladding Diameter Numerical Aperture	
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275
0.3 A/W	0.3 A/W

Table 2





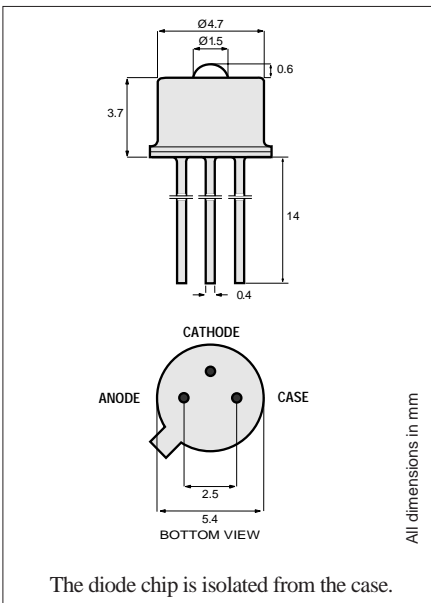
# PRODUCT INFORMATION

750nm  
850nm

**1A354**  
High-Performance PIN

**Datacom, General Purpose**

The very high speed and low capacitance of this GaAs PIN Photodiode makes it ideal for datacom and general purpose applications. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5 $\mu$ m. And a reverse voltage of only 5 Volts makes interfacing to a preamplifier easy.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity (Fig. 1 & 2) (Table 1)	$R$	0.35	0.45		A/W	$\lambda=850\text{nm}$
Bandwidth	$f_c$		1		GHz	$R_L=50\Omega$
Capacitance (Fig. 4)	$C$		1	2	pF	$f=1\text{MHz}$
Dark Current	$I_d$		0.4	1	nA	

**Operating Conditions:**  $V_R=5\text{V}$ . Fiber: Single-mode to multimode 62.5/125 $\mu$ m.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{stg}$	-55 to +125°C
Operating Temperature	$T_{op}$	-55 to +125°C
Reverse Voltage	$V_R$	30V
Soldering Temperature (2mm from the case for 10 sec)	$T_{sld}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Temperature Coefficient - Dark Current	$dI_d/dT_j$		5		%/°C

12627.11 1998-02-04

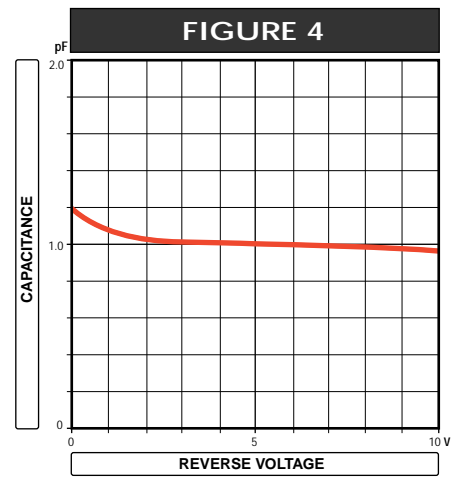
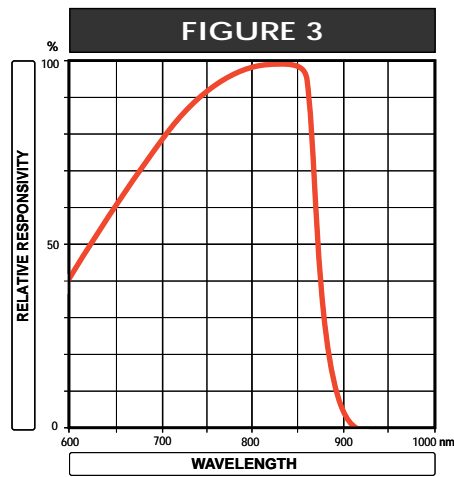
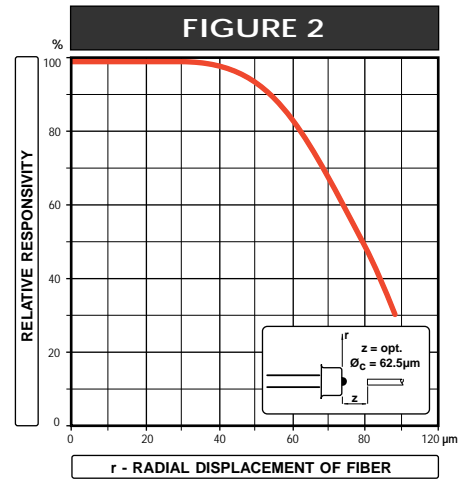
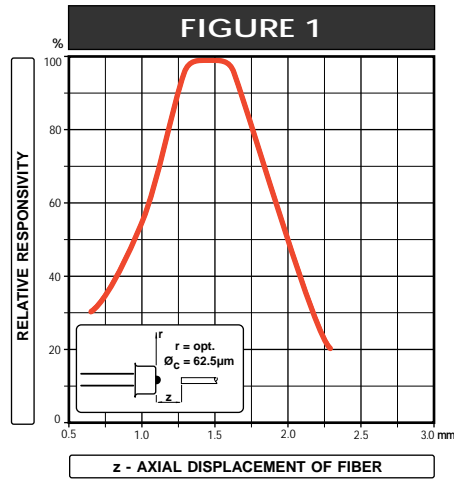


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Typical Responsivity		
Core Diameter/Cladding Diameter Numerical Aperture		
10/125 $\mu\text{m}$ 0.11	50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275
0.45 A/W	0.45 A/W	0.45 A/W

Table 1



# PRODUCT INFORMATION

1300nm  
1550nm **1A358**  
High-Performance PIN

**Datacom, Telecom, General Purpose**

The very high speed and low capacitance of this InGaAs PIN Photodiode makes it ideal for datacom, telecom and general purpose applications. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5µm. And when used in the Pigtail-3A package, the optical return loss is very high.



## Optical and Electrical Characteristics (Case Temperature -40 to +85°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity (Fig.1 & 2) (Table 1)	$R$	0.75 0.85	0.83 1.0		A/W	$\lambda=1300\text{ nm}$ $\lambda=1550\text{ nm}$
Bandwidth	$f_c$	2.5			GHz	$R_L=50\Omega$
Capacitance (Fig. 4)	$C$		0.8	1.2	pF	$f=1\text{MHz}$
Dark Current	$I_d$			3 80	nA	$T_{\text{Case}}=25^\circ\text{C}$ $T_{\text{Case}}=85^\circ\text{C}$

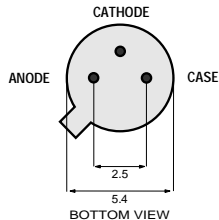
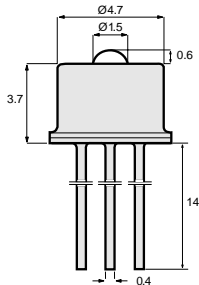
Operating Conditions:  $V_R=5\text{V}$ . Fiber: Single-mode to multimode 62.5/125µm.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Reverse Voltage	$V_R$	20V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Temperature Coefficient - Dark Current	$dI_d/dT_j$		5		%/°C



All dimensions in mm

The diode chip is isolated from the case.

### TO-46 Package With Lens

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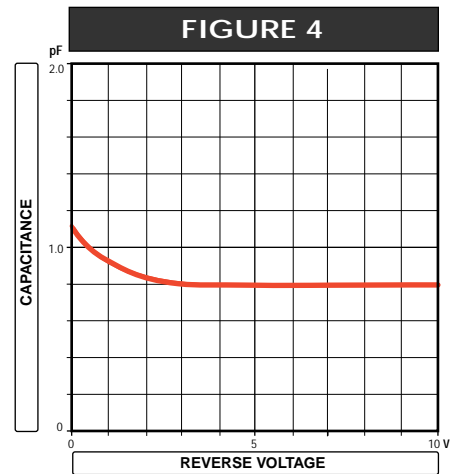
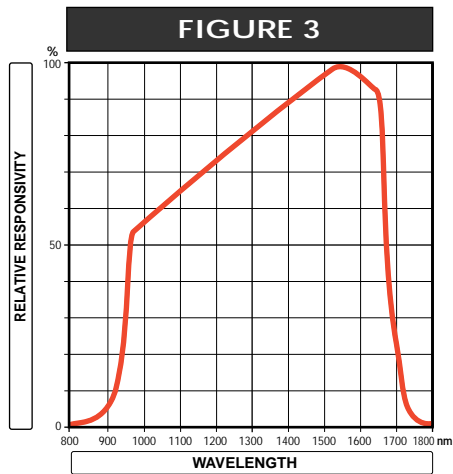
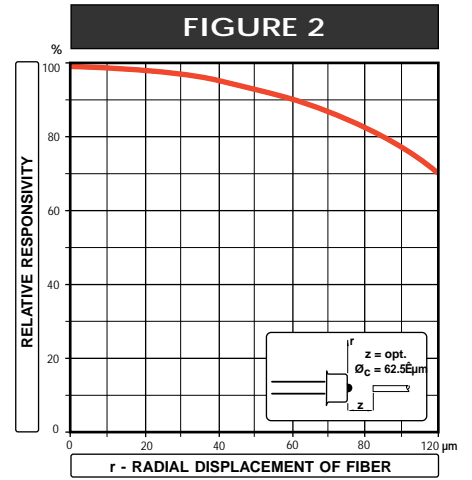
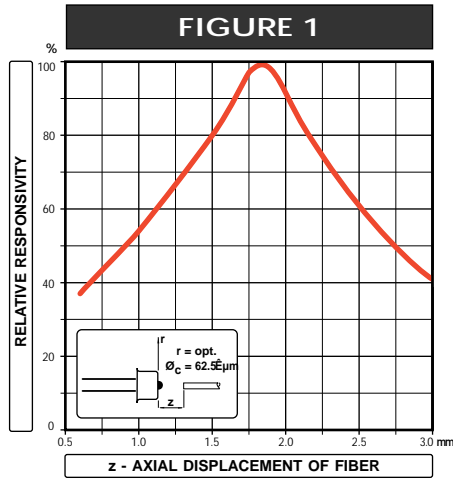


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Typical Responsivity			
Core Diameter/Cladding Diameter Numerical Aperture			
	10/125 $\mu\text{m}$ 0.11	50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275
1300	0.83 A/W	0.83 A/W	0.83 A/W
1550	1.0 A/W	1.0 A/W	1.0 A/W

Table 1



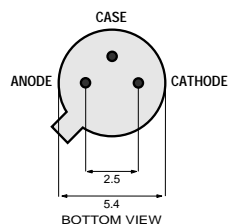
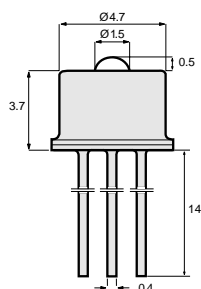
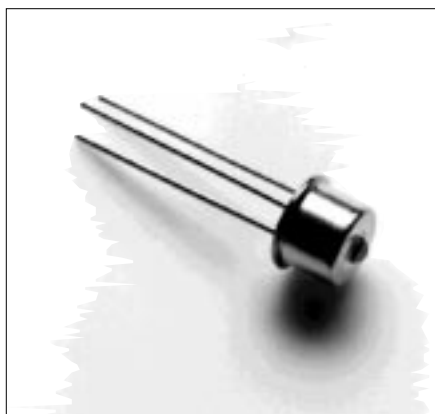
# PRODUCT INFORMATION

780nm

**1A359**  
High-Performance LED

Baseband Video

The low thermal droop of this device allows baseband video transmission with minimum distortion. The double-lens optical system provides for optimum coupling of power into the fiber. It matches with the 1A354 PIN Photodiode.



All dimensions in mm

The diode chip is isolated from the case.

**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	80	120		$\mu\text{W}$	$I_F=80\text{ mA}$ (Note 1)
Rise and Fall Time (10-90%)	$t_r, t_f$		6	8	ns	$I_F=80\text{ mA}$ (no bias)
Bandwidth (3dB <sub>e</sub> )	$f_c$		55		MHz	$I_F=80\text{ mA}$
Thermal Droop (nonlinearity) (Note 2)	$ \Delta P $		2		%	$I_F=80\text{ mA}$
Peak Wavelength	$\lambda_p$	760	780	800	nm	$I_F=80\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=80\text{ mA}$
Forward Voltage (Fig.5)	$V_F$		2.2	2.4	V	$I_F=80\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		250		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** Transient decline in optical power due to self-heating.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig.4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig.4)	$P_{\text{tot}}$	300 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.5		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

12669.11 1996-10-02



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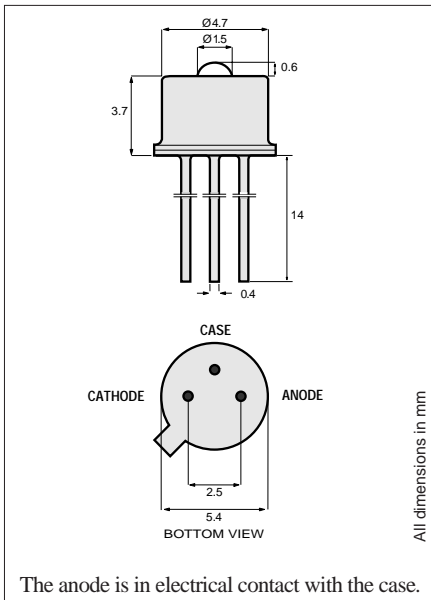
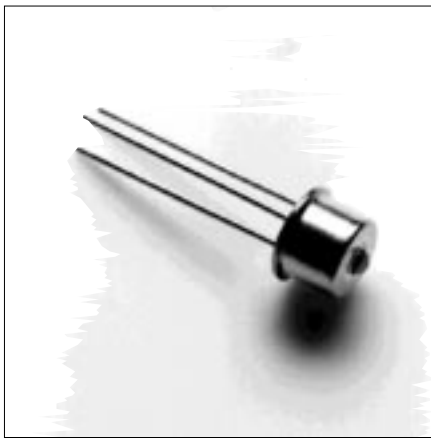
# PRODUCT INFORMATION

820nm

**1A363**  
High-Performance LED

**Datacom**

This is the ultimate in high speed for 850 nm LEDs. It is designed for ATM 622 Mbps applications and offers an excellent price/performance ratio for cost-effective solutions. Its double-lens optical system results in optimum coupling of power into the fiber. And it matches the 1A354 PIN Photodiode.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3) (Table 1)	$P_{\text{fiber}}$	25	35		$\mu\text{W}$	$I_F=50\text{ mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		0.5	0.7	ns	$I_F=50\text{ mA}$ (no bias) Graded Index
Bandwidth (3dB <sub>el</sub> )	$f_c$		700		MHz	$I_F=50\text{ mA}$ NA=0.275
Peak Wavelength	$\lambda_p$	800	820	840	nm	$I_F=50\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		50		nm	$I_F=50\text{ mA}$
Forward Voltage (Fig. 5)	$V_F$		2.0	2.2	V	$I_F=50\text{ mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		10		pF	$V_R=0\text{ V}, f=1\text{ MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig. 4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig. 4)	$P_{\text{tot}}$	130 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	60 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	100 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			200	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			500	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

12703.11 1994-09-20



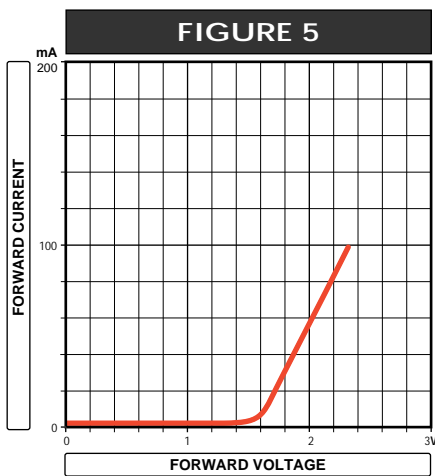
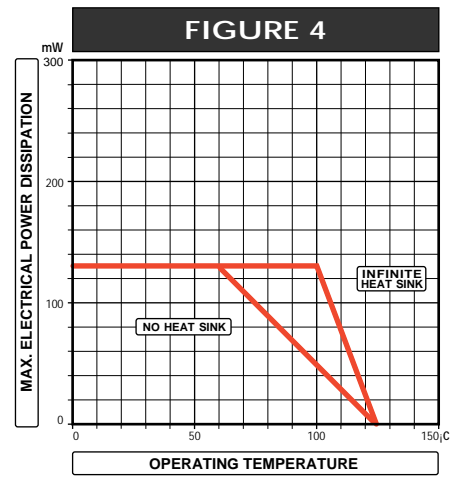
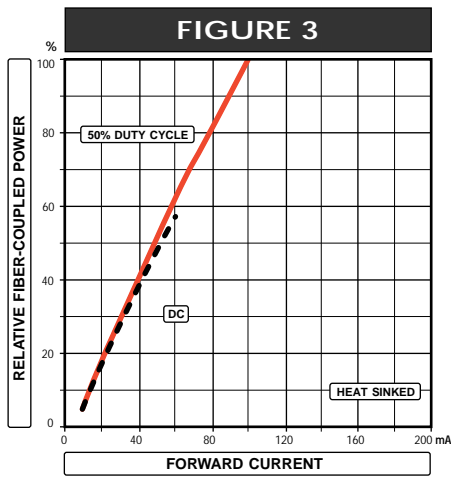
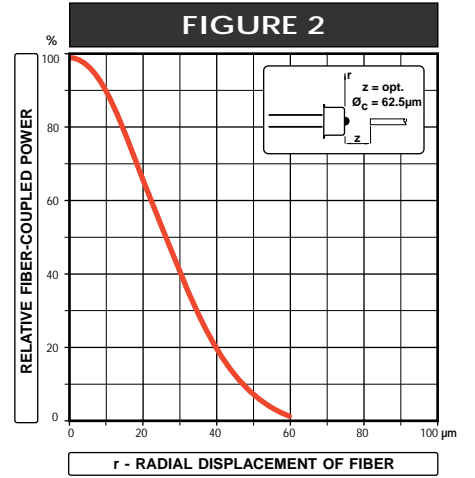
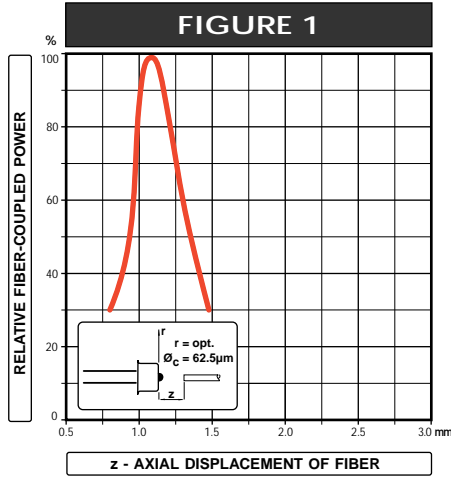
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**Typical Fiber-Coupled Power**

Core Diameter/Cladding Diameter Numerical Aperture	
50/125 $\mu\text{m}$ 0.20	62.5/125 $\mu\text{m}$ 0.275
20 $\mu\text{W}$	35 $\mu\text{W}$

Table 1



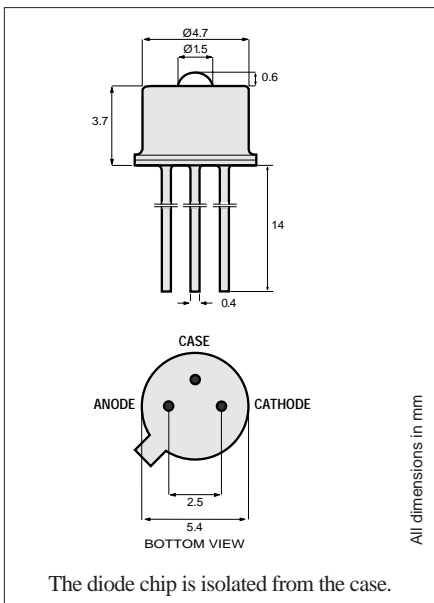
# PRODUCT INFORMATION

1300nm

**1A380**  
High-Performance LED

**Datacom**

This device is designed for ESCON and Fibre Channel 266 Mbps applications and offers an excellent price/performance ratio for cost-effective solutions. Its double-lens optical system results in optimum coupling of power into the fiber.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$	-18.5		-14.5	dBm	$I_F=60\text{mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%, no bias)	$t_r, t_f$		1.4		ns	$I_F=60\text{mA}$ (Note 2) Graded Index NA=0.275
Bandwidth (3 dB <sub>el</sub> )	$f_c$		160		MHz	$I_F=60\text{mA}$
Center Wavelength	$\lambda_c$		1320		nm	$I_F=60\text{mA}$ (Note 2)
Spectral Width (FWHM)	$\Delta\lambda$		135		nm	$I_F=60\text{mA}$ (Note 2)
Forward Voltage	$V_F$		1.3	1.65	V	$I_F=60\text{mA}$
Reverse Current	$I_R$			100	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		200		pF	$V_R=0\text{V}, f=1\text{MHz}$

**Note 1:** Measured at the exit of 100 meters of fiber.

**Note 2:** Meets the ANSI X3.320 specification for Fibre Channel.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	80 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_R$	1.5V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			150	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			500	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.8		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.55		nm/°C

12871.11 1997-04-23



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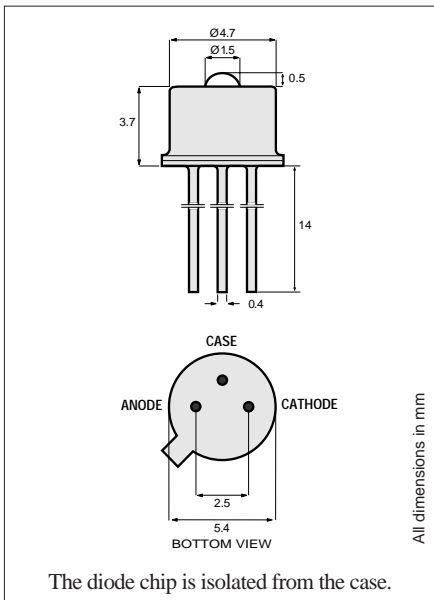
# PRODUCT INFORMATION

820nm

**1A388**  
High-Performance LED

**Datacom, Intra-Office Telecom**

This device is designed for Ethernet 100 Mbps and Intra-Office Telecom applications and offers an excellent price/performance ratio for cost-effective solutions. Its double-lens optical system results in optimum coupling of power into the fiber. And it matches the 1A354 PIN Photodiode.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$	40	50		$\mu\text{W}$	$I_F=50\text{mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$			2	ns	$I_F=50\text{mA}$ (no bias) Graded Index NA=0.275
Bandwidth (3 dB <sub>el</sub> )	$f_c$	200	250		MHz	$I_F=50\text{mA}$
Peak Wavelength	$\lambda_p$	800	820	840	nm	$I_F=50\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$			60	nm	$I_F=50\text{mA}$
Forward Voltage	$V_F$			1.85	V	$I_F=50\text{mA}$
Reverse Current	$I_R$			20	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		20		pF	$V_R=0\text{V}, f=1\text{MHz}$

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	250 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	180 mA
Reverse Voltage	$V_R$	1.5V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{slid}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			100	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.3		nm/°C

12940.11 1996-10-02



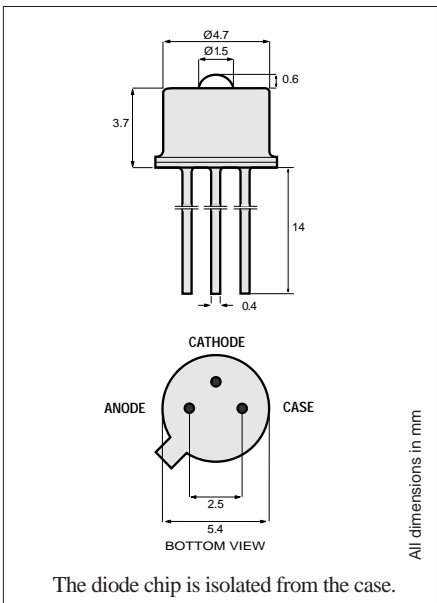
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# PRODUCT INFORMATION

1300 nm	<b>1A391</b> High-Performance PIN	<b>WDM Telecom</b>
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This device has a built-in filter, designed by bandgap engineering, which suppresses 1550nm wavelength. This results in very low crosstalk in 1300/1550nm WDM applications. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5 $\mu$ m. And when used in the Pigtail-3A package, the optical return loss is very high.



**TO-46 Package With Lens**

<b>Optical and Electrical Characteristics</b> (25° C Case Temperature)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity	$R$	0.65	0.83	0.001	A/W	$\lambda=1300\text{nm}$ $\lambda=1550\text{nm}$
Bandwidth	$f_c$	2.5			GHz	$R_L=50\Omega$
Capacitance	$C$		0.8	1.2	pF	$f=1\text{MHz}$
Dark Current	$I_d$			3	nA	

Operating Conditions:  $V_R=5\text{V}$ . Fiber: Single-mode to multimode 62.5/125 $\mu$ m.

<b>Absolute Maximum Ratings</b>		
PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{stg}$	-55 to +125° C
Operating Temperature	$T_{op}$	-55 to +125° C
Reverse Voltage	$V_R$	20V
Soldering Temperature (2mm from the case for 10 sec)	$T_{sld}$	260° C

<b>Thermal Characteristics</b>					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Temperature Coefficient - Dark Current	$dI_d/dT_j$		5		%/°C

12966.11 1998-02-04



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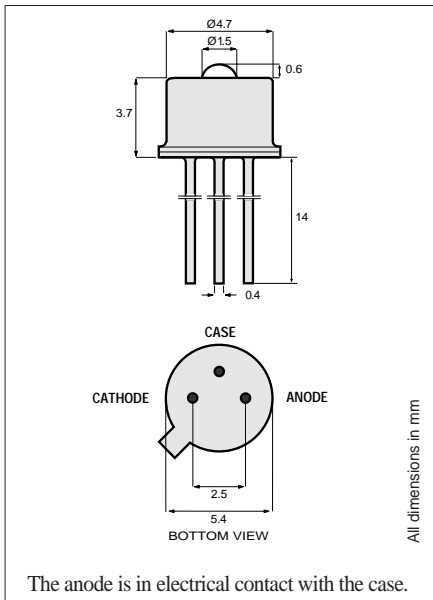
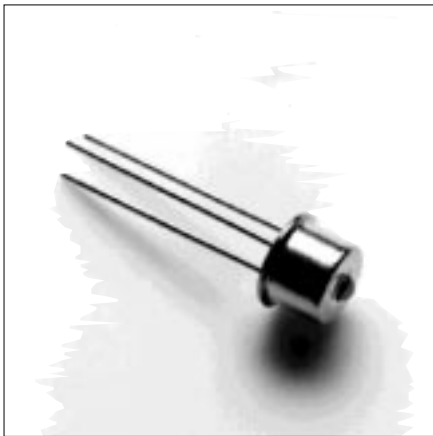
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# PRODUCT INFORMATION

1300nm **1A398**  
High-Performance LED

## Test Equipment

The strictly defined 1300 nm wavelength and high power is ideal for test equipment applications. It is packaged in a hermetically sealed can for high reliability and maximum resistance to harsh operating environments. The double-lens optical system results in optimum coupling of power into the fiber.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$	50	60		$\mu\text{W}$	$I_F=75\text{mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		10		ns	$I_F=75\text{mA}$ (no bias) Graded Index
Bandwidth (3dB <sub>el</sub> )	$f_c$		35		MHz	$I_F=75\text{mA}$ NA=0.275
Center Wavelength	$\lambda_c$	1280	1300	1320	nm	$I_F=75\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		140	155	nm	$I_F=75\text{mA}$
Forward Voltage	$V_F$		1.5	2	V	$I_F=75\text{mA}$
Reverse Current	$I_R$			100	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		200		pF	$V_R=0\text{V}, f=1\text{MHz}$

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	230 mW
Continuous Forward Current ( $f \leq 10$ kHz)	$I_F$	110 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1$ MHz)	$I_{\text{FRM}}$	170 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			150	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			450	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.55		nm/°C
Temperature Coefficient - Spectral Width	$d\Delta\lambda/dT_j$		0.25		nm/°C

13000.11 1996-11-21



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# PRODUCT INFORMATION

1550 nm	<b>1A426</b> High-Performance PIN	<b>WDM Telecom</b>
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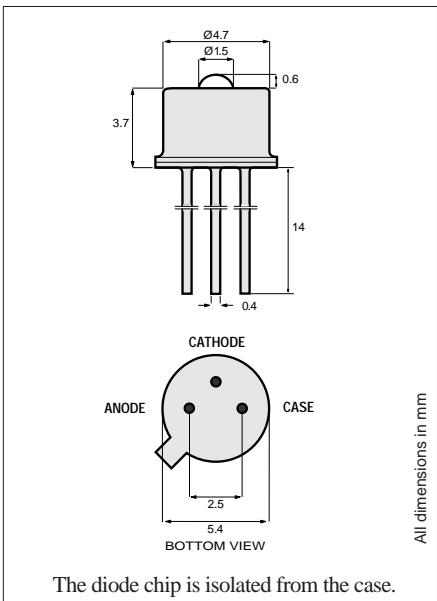
This device has a built-in filter, designed by bandgap engineering, which suppresses 1300nm wavelength. This results in very low crosstalk in 1300/1550nm WDM applications. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5µm. And when used in the Pigtail-3A package, the optical return loss is very high.

Optical and Electrical Characteristics (25° C Case Temperature)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity	$R$	0.85	0.002 1.0	0.004	A/W	$\lambda=1300\text{nm}$ $\lambda=1550\text{nm}, f>40\text{MHz}$
Bandwidth	$f_c$	2.5			GHz	$R_L=50\Omega$
Capacitance	$C$		0.8	1.2	pF	$f=1\text{MHz}$
Dark Current	$I_d$			3	nA	

Operating Conditions:  $V_R=5\text{V}$ . Fiber: Single-mode to multimode 62.5/125µm.



Absolute Maximum Ratings			
PARAMETER	SYMBOL	LIMIT	
Storage Temperature	$T_{stg}$	-55 to +125° C	
Operating Temperature	$T_{op}$	-55 to +125° C	
Reverse Voltage	$V_R$	20V	
Soldering Temperature (2mm from the case for 10 sec)	$T_{sld}$	260° C	



**TO-46 Package With Lens**

Thermal Characteristics						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Temperature Coefficient - Dark Current	$dI_d/dT_j$		5		% / °C	

13256.11 1998-02-04



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# PRODUCT INFORMATION

1320nm

**1A427**  
High-Performance LED

Datacom

PRELIMINARY/β

This is the ultimate in high speed for 1300 nm LEDs. It is designed for ATM 622 Mbps applications and offers an excellent price/performance ratio for cost-effective solutions. Its double-lens optical system results in optimum coupling of power into the fiber.



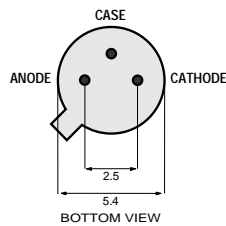
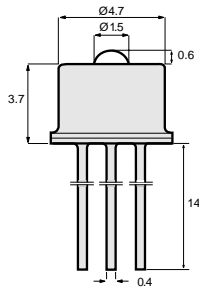
## Optical and Electrical Characteristics (Case Temperature -25 to +70°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$	-20			dBm	$I_{\text{Peak}}=80\text{mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%)	$t_r, t_f$		0.9	1.3	ns	$I_{\text{F}}=80\text{mA}$ (no bias) Graded Index NA=0.275
Bandwidth (3dB <sub>e1</sub> )	$f_c$		450		MHz	$I_{\text{F}}=80\text{mA}$
Center Wavelength	$\lambda_c$	1270	1320	1380	nm	$I_{\text{F}}=80\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		130	200	nm	$I_{\text{F}}=80\text{mA}$
Forward Voltage	$V_{\text{F}}$		1.3	1.65	V	$I_{\text{F}}=80\text{mA}$
Reverse Current	$I_{\text{R}}$			100	$\mu\text{A}$	$V_{\text{R}}=1\text{V}$
Capacitance	$C$		200		pF	$V_{\text{R}}=0\text{V}, f=1\text{MHz}$

Note 1: Average power at 10 MHz/50% duty cycle. Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_{\text{F}}$	80 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_{\text{R}}$	0.5 V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{sld}}$	260°C



All dimensions in mm

The diode chip is isolated from the case.

**TO-46 Package With Lens**

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			150	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.75		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.45		nm/°C

13265.11 1998-02-12



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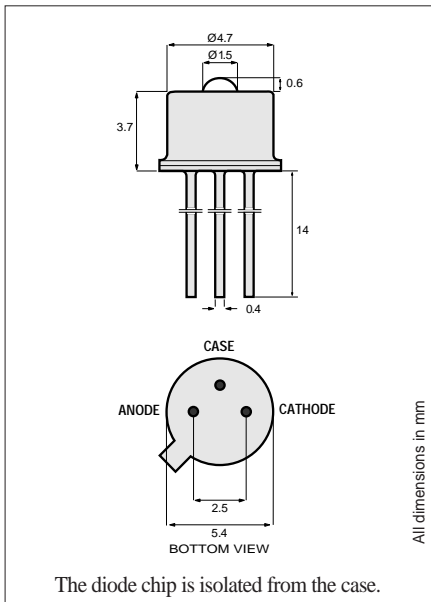
# PRODUCT INFORMATION

1300nm

**1A436**  
High-Performance LED

Sensors, Signal Transmission

This device generates very high power which makes it ideal for many sensors and signal transmission applications. It operates in a wide range of temperatures, and can satisfy virtually any environmental specification. The double-lens optical system results in optimum coupling of power into the fiber.



## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$	20	27		$\mu\text{W}$	$I_F=80\text{ mA}$ , Note 1 Fiber: 50/125 $\mu\text{m}$ , NA=0.20
		70	80		$\mu\text{W}$	$I_F=80\text{ mA}$ , Note 1 Fiber: 62.5/125 $\mu\text{m}$ , NA=0.275
Rise and Fall Time (10-90%)	$t_r, t_f$		7	10	ns	$I_F=80\text{ mA}$ (no bias)
Bandwidth (3dB <sub>el</sub> )	$f_c$		50		MHz	$I_F=80\text{ mA}$
Peak Wavelength	$\lambda_p$	1270	1300	1350	nm	$I_F=80\text{ mA}$
Spectral Width (FWHM)	$\Delta\lambda$		145	165	nm	$I_F=80\text{ mA}$
Forward Voltage	$V_F$		1.5	2	V	$I_F=80\text{ mA}$
Reverse Current	$I_R$			100	$\mu\text{A}$	$V_R=1\text{ V}$
Capacitance	$C$		200		pF	$V_R=0\text{ V}$ , $f=1\text{ MHz}$

Note 1: Measured at the exit of 100 meters of fiber.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10\text{ kHz}$ )	$I_F$	90 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{ MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_R$	0.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			150	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			450	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.6		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.45		nm/°C
Temperature Coefficient - Spectral Width	$d\Delta\lambda/dT_j$		0.25		nm/°C

13393.11 1996-12-10



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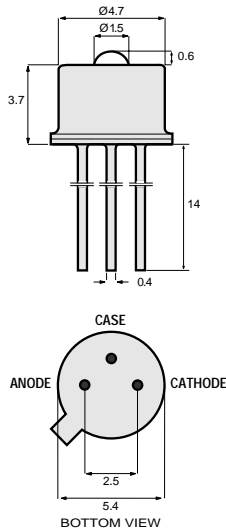
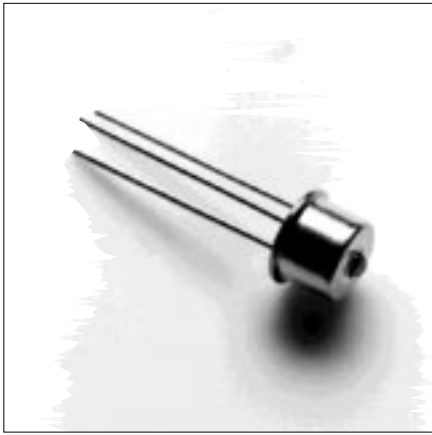
# PRODUCT INFORMATION

1320nm

**1A439**  
High-Performance LED

**Datacom**

This device is designed for FDDI and ATM 155 Mbps applications and offers an excellent price/performance ratio for cost-effective solutions. Its double-lens optical system results in optimum coupling of power into the fiber.



All dimensions in mm

**TO-46 Package With Lens**

## Optical and Electrical Characteristics (Case Temperature -25 to +70°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power (Fig. 1, 2, & 3)	$P_{\text{fiber}}$	-18.5			dBm	$I_{\text{Peak}}=60\text{mA}$ (Note 1) Fiber: 62.5/125 $\mu\text{m}$
Rise and Fall Time (10-90%, no bias)	$t_r, t_f$		2.5		ns	$I_F=60\text{mA}$ (Note 2) Graded Index NA=0.275
Bandwidth (3dB $_{e1}$ )	$f_c$		125		MHz	$I_F=60\text{mA}$
Center Wavelength	$\lambda_c$		1320		nm	$I_F=60\text{mA}$ (Note 2)
Spectral Width (FWHM)	$\Delta\lambda$		135		nm	$I_F=60\text{mA}$ (Note 2)
Forward Voltage (Fig. 5)	$V_F$		1.3	1.65	V	$I_F=60\text{mA}$
Reverse Current	$I_R$			100	$\mu\text{A}$	$V_R=1\text{V}$
Capacitance	$C$		200		pF	$V_R=0\text{V}, f=1\text{MHz}$

**Note 1:** Average power at 10 MHz/50% duty cycle. Measured at the exit of 100 meters of fiber.

**Note 2:** Meets the FDDI ANSI X3T9.5 specification.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature (derating: Fig. 4)	$T_{\text{op}}$	-55 to +125°C
Electrical Power Dissipation (derating: Fig. 4)	$P_{\text{tot}}$	160 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	80 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	130 mA
Reverse Voltage	$V_R$	0.5 V
Soldering Temperature (2mm from the case for 10sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

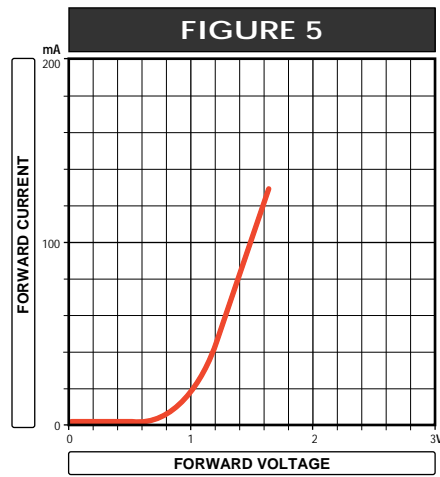
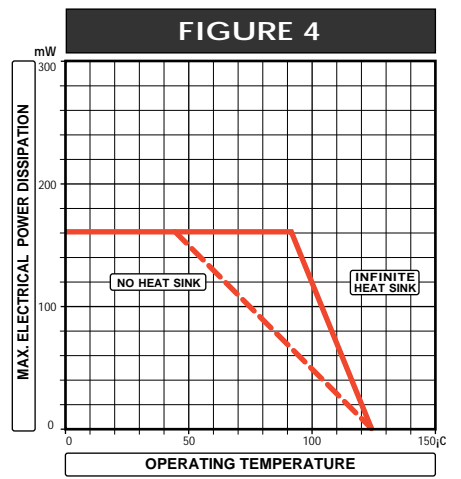
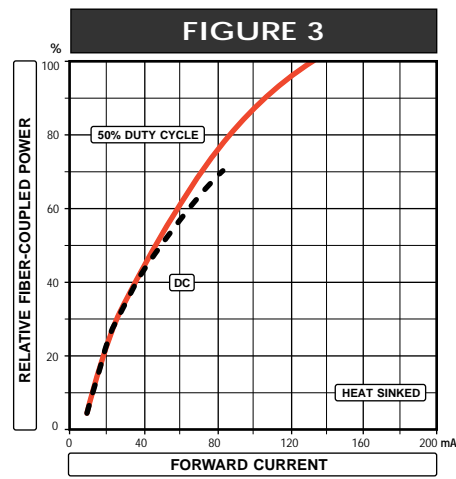
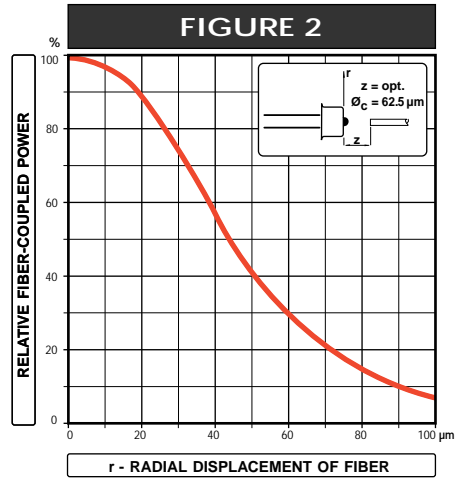
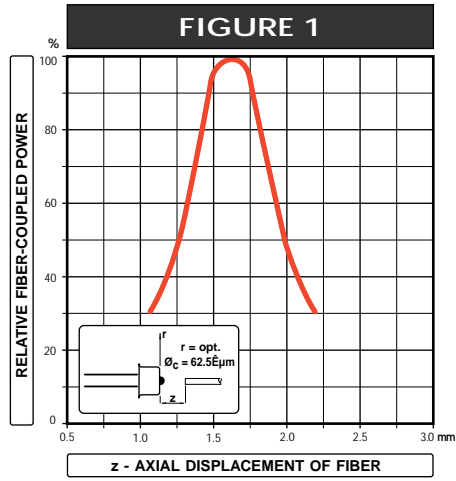
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$			150	°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$			400	°C/W
Temperature Coefficient - Optical Power	$dP/dT_j$		-0.75		%/°C
Temperature Coefficient - Wavelength	$d\lambda/dT_j$		0.45		nm/°C

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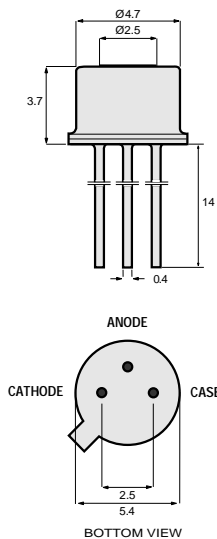
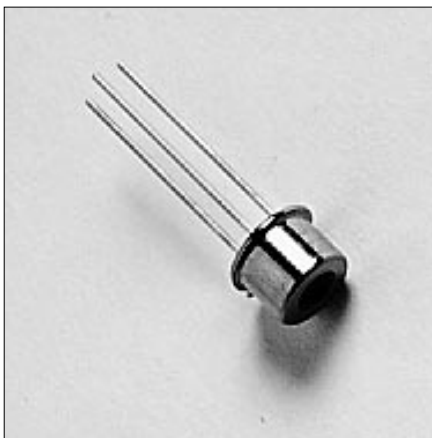
# PRODUCT INFORMATION

840nm

**1A440**  
VCSEL Laser Diode

**Datacom, General Purpose**

This Vertical Cavity Surface-Emitting Laser is designed for Fibre Channel, Gigabit Ethernet, ATM and general applications. It operates in multiple transverse and single longitudinal mode, ensuring stable coupling of power and low noise. And it matches the 1A354 PIN Photodiode.



All dimensions in mm

The chip is isolated from the case.

### TO-46 Package With Flat Window

**WARNING:** Laser Radiation, avoid exposure to beam. Class 3B laser product, potential eye hazard. Warning labels in each box.

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$		1.3		mW	$I_F=12\text{mA}$ (Note 1)
Optical Power	$P_O$	0.9	1.7	3.0	mW	$I_F=12\text{mA}$
Slope Efficiency ( $dP_O/dI_F$ )	$\eta$		200		mW/A	$I_F=12\text{mA}$
Beam Divergence	$\theta$		15		deg	Full Width at $1/e^2$
Bandwidth ( $3\text{dB}_{\text{e}1}$ )	$f_C$		2		GHz	$I_F=12\text{mA}$
Peak Wavelength	$\lambda_p$	830	840	860	nm	$I_F=12\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		0.5	1	nm	$I_F=12\text{mA}$
Forward Voltage	$V_F$		1.9	2.2	V	$I_F=12\text{mA}$
Threshold Current	$I_{th}$		3.5	6	mA	
Relative Intensity Noise	RIN		-130		dB/Hz	$I_F=12\text{mA}$ , $f=1\text{GHz}$

**Note 1:** Fiber: 50/125 Graded Index, NA=0.2 or 62.5/125 Graded Index, NA=0.275. An external glass ball lens with 2 mm diameter is required.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	0 to +70°C
Electrical Power Dissipation	$P_{\text{tot}}$	35 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	15 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	25 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$		400		°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$		700		°C/W
Temp. Coefficient - Wavelength	$d\lambda/dT_j$		0.06		nm/°C
Optical Power - Variation 0 to 70°C	$\Delta P$		$\pm 0.7$		dB
Threshold Current - Variation 0 to 70°C	$\Delta I_{th}$		$\pm 0.6$		mA

13430.11 1998-02-04



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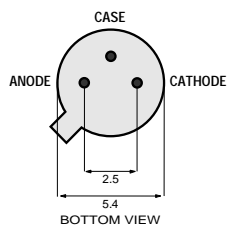
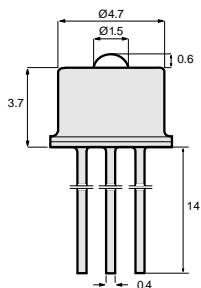
# PRODUCT INFORMATION

840nm

**1A444**  
VCSEL Laser Diode

**Datacom, General Purpose**

This Vertical Cavity Surface-Emitting Laser is designed for Fibre Channel, Gigabit Ethernet, ATM and general applications. It operates in multiple transverse and single longitudinal mode, ensuring stable coupling of power and low noise. And it matches the 1A354 PIN Photodiode.



All dimensions in mm

The chip is isolated from the case.

**TO-46 Package With Lens**

**WARNING:** Laser Radiation, avoid exposure to beam. Class 3B laser product, potential eye hazard. Warning labels in each box.

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$		1.3		mW	$I_F=12\text{mA}$ (Note 1)
Optical Power	$P_O$	0.9	1.7	3.0	mW	$I_F=12\text{mA}$
Slope Efficiency ( $dP_O/dI_F$ )	$\eta$		200		mW/A	$I_F=12\text{mA}$
Bandwidth (3dB <sub>e1</sub> )	$f_C$		2		GHz	$I_F=12\text{mA}$
Peak Wavelength	$\lambda_p$	830	840	860	nm	$I_F=12\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		0.5	1	nm	$I_F=12\text{mA}$
Forward Voltage	$V_F$		1.9	2.2	V	$I_F=12\text{mA}$
Threshold Current	$I_{th}$		3.5	6	mA	
Relative Intensity Noise	RIN		-130		dB/Hz	$I_F=12\text{mA}$ , $f=1\text{GHz}$

Note 1: Fiber: 50/125 Graded Index, NA=0.2 or 62.5/125 Graded Index, NA=0.275.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	0 to +70°C
Electrical Power Dissipation	$P_{\text{tot}}$	35 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	15 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	25 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$		400		°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$		700		°C/W
Temp. Coefficient - Wavelength	$d\lambda/dT_j$		0.06		nm/°C
Optical Power - Variation 0 to 70°C	$\Delta P$		$\pm 0.7$		dB
Threshold Current - Variation 0 to 70°C	$\Delta I_{th}$		$\pm 0.6$		mA

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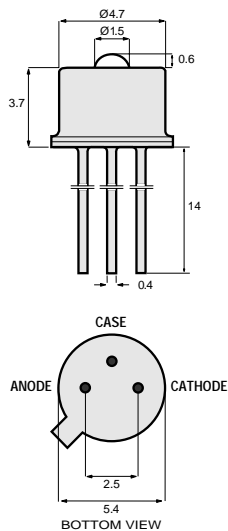
# PRODUCT INFORMATION

840nm

**1A448**  
VCSEL Laser Diode

**Datacom**

This Vertical Cavity Surface-Emitting Laser is designed for Fibre Channel, Gigabit Ethernet and ATM applications. For eye safety, the optical power is attenuated to comply with IEC Laser Class 1 requirements. And it matches the 1A354 PIN Photodiode.



All dimensions in mm

The chip is isolated from the case.

**TO-46 Package With Lens**

**Class 1 Laser Product**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power 1A448 1A448A	$P_{\text{fiber}}$	100 160			$\mu\text{W}$	$I_F=12\text{mA}$ (Note 1)
Optical Power	$P_O$			400	$\mu\text{W}$	$I_F=12\text{mA}$ (Note 2)
Slope Efficiency ( $dP_O/dI_F$ )	$\eta$		50		mW/A	$I_F=12\text{mA}$
Bandwidth (3dB <sub>cl</sub> )	$f_c$		2		GHz	$I_F=12\text{mA}$
Peak Wavelength	$\lambda_p$	830	840	860	nm	$I_F=12\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		0.5	1	nm	$I_F=12\text{mA}$
Forward Voltage	$V_F$		1.9	2.2	V	$I_F=12\text{mA}$
Threshold Current	$I_{th}$		3.5	6	mA	
Relative Intensity Noise	RIN		-130		dB/Hz	$I_F=12\text{mA}$ , f=1 GHz

Note 1: Fiber: 50/125 Graded Index, NA=0.2 or 62.5/125 Graded Index, NA=0.275.

Note 2: Complies with laser Class 1 when operated at max 12 mA; Class 3 above 12 mA.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125° C
Operating Temperature	$T_{\text{op}}$	0 to +70° C
Electrical Power Dissipation	$P_{\text{tot}}$	35 mW
Continuous Forward Current (f≤10 kHz)	$I_F$	15 mA
Peak Forward Current (duty cycle≤50%, f≥1 MHz)	$I_{\text{FRM}}$	25 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260° C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$		400		°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$		700		°C/W
Temp. Coefficient - Wavelength	$d\lambda/dT_j$		0.06		nm/°C
Optical Power - Variation 0 to 70° C	$\Delta P$		±0.7		dB
Threshold Current - Variation 0 to 70° C	$\Delta I_{th}$		±0.6		mA

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# PRODUCT INFORMATION

850nm

**1A458**  
VCSEL Laser Diode

Industry, Sensors

PRELIMINARY/β

This High-Power VCSEL (Vertical Cavity Surface-Emitting Laser) is designed for Industrial and sensors applications. It operates in multiple transverse and single longitudinal mode, ensuring stable output power and low noise. And it matches the 1A354 PIN Photodiode.

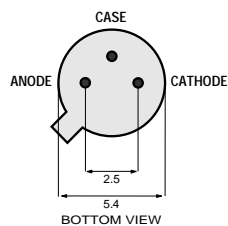
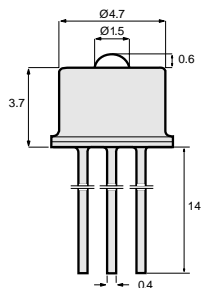


## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Optical Power	$P_O$		10		mW	$I_F=70\text{mA}$
Slope Efficiency ( $dP_O/dI_F$ )	$\eta$		250		mW/A	$I_F=70\text{mA}$
Beam Divergence	$\theta$		15		deg	Full Width at $1/e^2$
Bandwidth (3dB <sub>el</sub> )	$f_c$		1		GHz	$I_F=70\text{mA}$
Peak Wavelength	$\lambda_p$	830	840	860	nm	$I_F=70\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		1		nm	$I_F=70\text{mA}$
Forward Voltage	$V_F$		2.2		V	$I_F=70\text{mA}$
Threshold Current	$I_{th}$		30	40	mA	

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{stg}$	-55 to +125°C
Operating Temperature	$T_{op}$	0 to +70°C
Electrical Power Dissipation	$P_{tot}$	200 mW
Continuous Forward Current ( $f \leq 10$ kHz)	$I_F$	100 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1$ MHz)	$I_{FRM}$	125 mA
Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{sld}$	260°C



All dimensions in mm

The chip is isolated from the case.

### TO-46 Package With Lens

**WARNING:** Laser Radiation, avoid exposure to beam. Class 3B laser product, potential eye hazard. Warning labels in each box.

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{thjc}$		200		°C/W
Thermal Resistance - No Heat Sink	$R_{thja}$		500		°C/W
Temp. Coefficient - Wavelength	$d\lambda/dT_j$		0.06		nm/°C
Optical Power - Variation 0 to 70°C	$\Delta P$		$\pm 2.7$		dB
Threshold Current - Variation 0 to 70°C	$\Delta I_{th}$		$\pm 5$		mA

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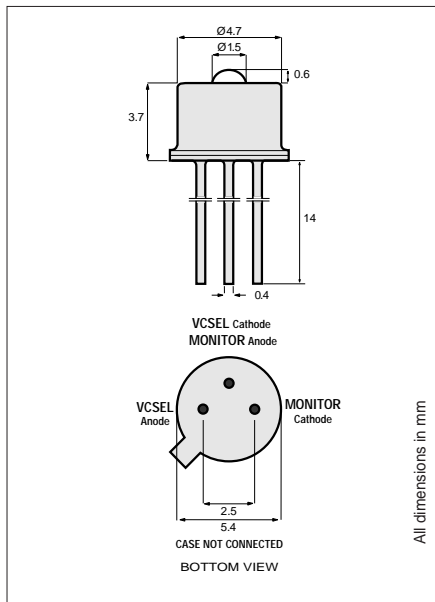
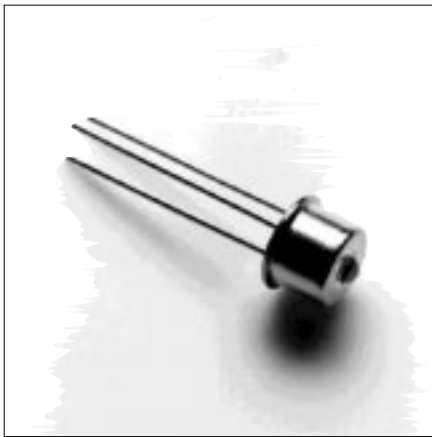
# PRODUCT INFORMATION

**PRELIMINARY/β**

840nm  
**2B454**  
VCSEL Laser Diode

**Datacom, General Purpose**

This Vertical Cavity Surface-Emitting Laser is designed for Fibre Channel, Gigabit Ethernet, ATM and general applications. It incorporates a photodiode to monitor the optical power and allow for feedback control. For eye safety, the optical power is attenuated to comply with IEC Laser Class 1 requirements. And it matches the 1A354 PIN Photodiode.



**TO-46 Package With Lens**

**Class 1 Laser Product**

Optical and Electrical Characteristics (25° C Case Temperature)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$	100			$\mu\text{W}$	$I_F=12\text{mA}$ (Note 1)
Optical Power	$P_O$			400	$\mu\text{W}$	$I_F=12\text{mA}$ (Note 2)
Slope Efficiency ( $dP_O/dI_F$ )	$\eta$		50		mW/A	$I_F=12\text{mA}$
Bandwidth (3dB <sub>e1</sub> )	$f_C$		2		GHz	$I_F=12\text{mA}$
Peak Wavelength	$\lambda_p$	830	840	860	nm	$I_F=12\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		0.5	1	nm	$I_F=12\text{mA}$
Forward Voltage	$V_F$		1.9	2.2	V	$I_F=12\text{mA}$
Threshold Current	$I_{th}$		3.5	6	mA	
Monitor Current	$I_m$	30	100		$\mu\text{A}$	$I_F=12\text{mA}$ , $V_R>1\text{V}$
Monitor Dark Current	$I_d$			30	nA	$V_R=5\text{V}$
Relative Intensity Noise	RIN		-130		dB/Hz	$I_F=12\text{mA}$ , $f=1\text{GHz}$

Note 1: Fiber: 50/125 Graded Index, NA=0.2 or 62.5/125 Graded Index, NA=0.275.

Note 2: Complies with laser Class 1 when operated at max 12 mA; Class 3 above 12 mA.

Absolute Maximum Ratings		
PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	0 to +70°C
Electrical Power Dissipation	$P_{\text{tot}}$	35 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	15 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	25 mA
VCSEL Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{slid}}$	260°C

Thermal Characteristics					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$		500		°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$		800		°C/W
Temp. Coefficient - Wavelength	$d\lambda/dT_j$		0.06		nm/°C
Optical Power - Variation 0 to 70°C	$\Delta P$		$\pm 0.7$		dB
Threshold Current - Variation 0 to 70°C	$\Delta I_{th}$		$\pm 0.6$		mA

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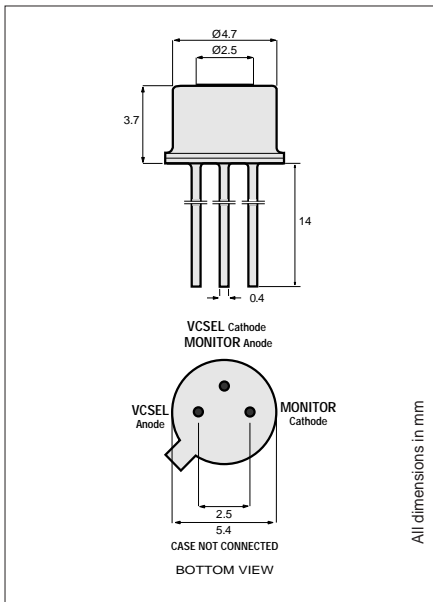
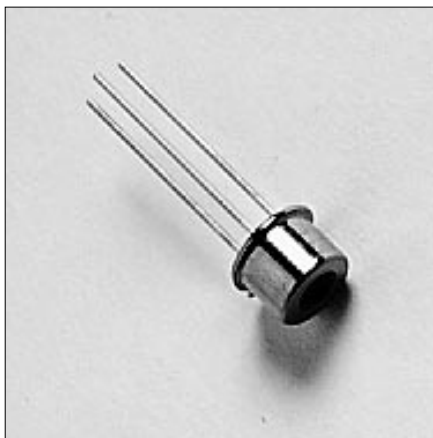
# PRODUCT INFORMATION

**PRELIMINARY/β**

840nm  
**2B455**  
VCSEL Laser Diode

**Datacom, General Purpose**

This Vertical Cavity Surface-Emitting Laser is designed for Fibre Channel, Gigabit Ethernet, ATM and general applications. It incorporates a photodiode to monitor the optical power and allow for feedback control. And it matches the 1A354 PIN Photodiode.



**TO-46 Package With Flat Window**

**WARNING:** Laser Radiation, avoid exposure to beam. Class 3B laser product, potential eye hazard. Warning labels in each box.

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## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Fiber-Coupled Power	$P_{\text{fiber}}$		1.3		mW	$I_F=12\text{mA}$ (Note 1)
Optical Power	$P_O$	0.9	1.7	3.0	mW	$I_F=12\text{mA}$
Slope Efficiency ( $dP_O/dI_F$ )	$\eta$		200		mW/A	$I_F=12\text{mA}$
Beam Divergence	$\theta$		15		deg	Full Width at $1/e^2$
Bandwidth ( $3\text{dB}_{e1}$ )	$f_c$		2		GHz	$I_F=12\text{mA}$
Peak Wavelength	$\lambda_p$	830	840	860	nm	$I_F=12\text{mA}$
Spectral Width (FWHM)	$\Delta\lambda$		0.5	1	nm	$I_F=12\text{mA}$
Forward Voltage	$V_F$		1.9	2.2	V	$I_F=12\text{mA}$
Threshold Current	$I_{th}$		3.5	6	mA	
Monitor Current	$I_m$	20	30		$\mu\text{A}$	$I_F=12\text{mA}$ , $V_R>1\text{V}$
Monitor Dark Current	$I_d$			30	nA	$V_R=5\text{V}$
Relative Intensity Noise	RIN		-130		dB/Hz	$I_F=12\text{mA}$ , $f=1\text{GHz}$

**Note 1:** Fiber: 50/125 Graded Index, NA=0.2 or 62.5/125 Graded Index, NA=0.275. An external glass ball lens with 2 mm diameter is required.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Storage Temperature	$T_{\text{stg}}$	-55 to +125°C
Operating Temperature	$T_{\text{op}}$	0 to +70°C
Electrical Power Dissipation	$P_{\text{tot}}$	35 mW
Continuous Forward Current ( $f \leq 10\text{kHz}$ )	$I_F$	15 mA
Peak Forward Current (duty cycle $\leq 50\%$ , $f \geq 1\text{MHz}$ )	$I_{\text{FRM}}$	25 mA
VCSEL Reverse Voltage	$V_R$	1.5 V
Soldering Temperature (2mm from the case for 10 sec)	$T_{\text{sld}}$	260°C

## Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink	$R_{\text{thjc}}$		500		°C/W
Thermal Resistance - No Heat Sink	$R_{\text{thja}}$		800		°C/W
Temp. Coefficient - Wavelength	$d\lambda/dT_j$		0.06		nm/°C
Optical Power - Variation 0 to 70°C	$\Delta P$		$\pm 0.7$		dB
Threshold Current - Variation 0 to 70°C	$\Delta I_{th}$		$\pm 0.6$		mA



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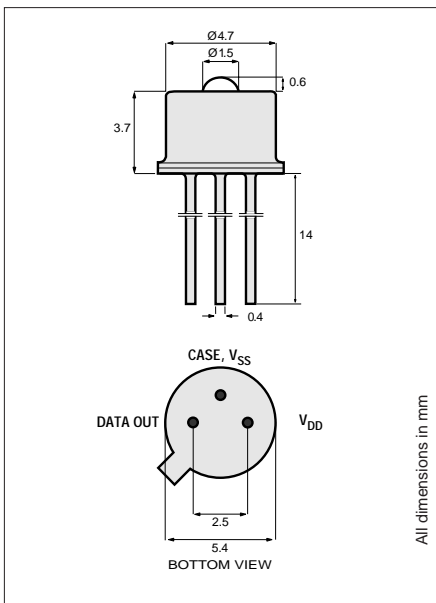
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# PRODUCT INFORMATION

PRELIMINARY/β

850nm	<b>8B397</b> PIN/Preamp	Datacom
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This device consists of a PIN photodiode and a transimpedance amplifier assembled in a TO-46 package. It is designed for Fibre Channel, Gigabit Ethernet and other VCSEL-based applications. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5µm.



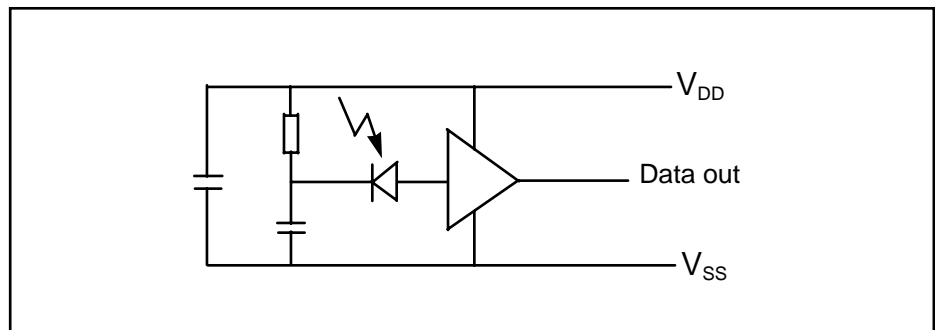
TO-46 Package With Lens

Optical and Electrical Characteristics (25° C Case Temperature)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity	$R$	600	1000	1500	V/W	$\lambda=850\text{ nm}$ $P_f=10\text{ }\mu\text{W}$
Bandwidth (3dB <sub>e1</sub> )	$f_c$		1		GHz	
Noise-Equivalent Power	$NEP$			600	nW	$\lambda=850\text{ nm}$
Sensitivity (BER 10 <sup>-9</sup> )	$S$		-25		dBm	$\lambda=850\text{ nm}$ Extinction Ratio=0
Dynamic Range			25		dB	
Output Resistance	$R_O$		3		$\Omega$	
Power Supply Current	$I_{DD}$		56	70	mA	

Operating Conditions: See table below. Fiber: Single-mode to multimode 62.5/125µm.

Absolute Maximum Ratings				
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	0	6.0	V
Operating Temperature	$T_{Op}$	-40	85	°C
Storage Temperature	$T_{stg}$	-55	125	°C

Recommended Operating Conditions					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	4.75	5.0	5.25	V
Output DC Load	$R_L$		50		$\Omega$



Functional schematic

12997.11 1998-02-04



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Tel (44) 1291 436180 Fax (44) 1291 436771

America: Tel 1-800-96MITEL Fax (613) 592-6909  
Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

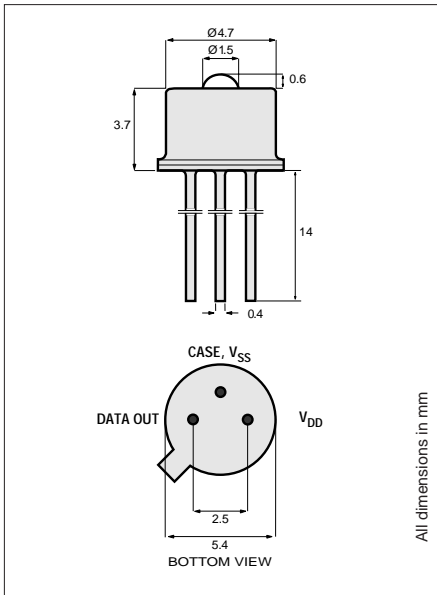
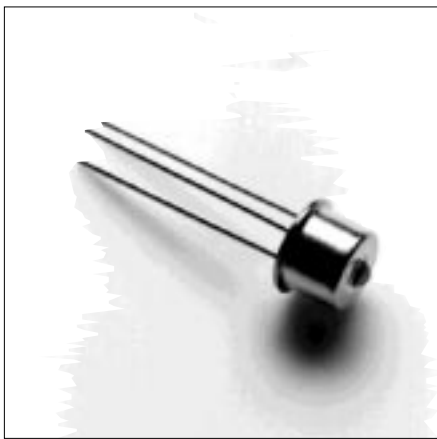
PRELIMINARY/β

1300nm  
1550nm

**8B428**  
PIN/Preamp

**Datacom, Telecom**

This device consists of a PIN photodiode and a transimpedance amplifier assembled in a TO-46 package. It is designed for Fibre Channel, Gigabit Ethernet, ATM and SDH/Sonet up to 622 Mbps. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5µm.



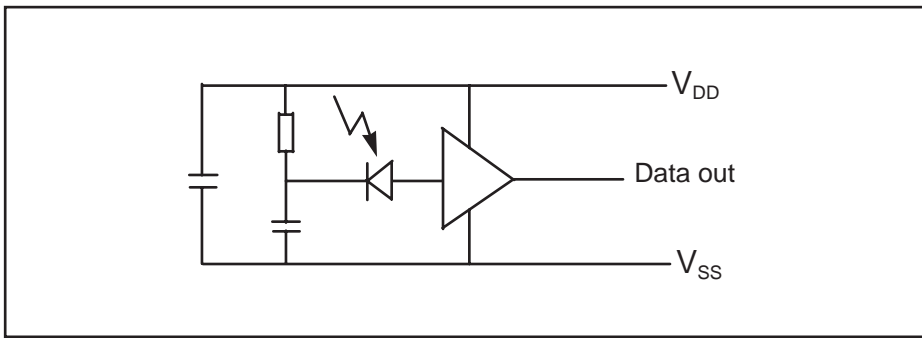
**TO-46 Package With Lens**

Optical and Electrical Characteristics (25° C Case Temperature)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity	<i>R</i>	1200	1650 2100	2200	V/W	λ=1300 nm λ=1550 nm P <sub>f</sub> =10 µW
Bandwidth (3 dB <sub>el</sub> )	<i>f<sub>c</sub></i>		1		GHz	
Noise-Equivalent Power	<i>NEP</i>			350	nW	λ=1300 nm
Sensitivity (BER 10 <sup>-9</sup> )	<i>S</i>		-27		dBm	λ=1300 nm Extinction Ratio=0
Dynamic Range			25		dB	
Output Resistance	<i>R<sub>O</sub></i>		3		Ω	
Power Supply Current	<i>I<sub>DD</sub></i>		56	70	mA	

**Operating Conditions:** See table below. Fiber: Single-mode to multimode 62.5/125µm.

Absolute Maximum Ratings				
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V <sub>DD</sub> -V <sub>SS</sub>	0	6.0	V
Operating Temperature	T <sub>Op</sub>	-40	85	°C
Storage Temperature	T <sub>stg</sub>	-55	125	°C

Recommended Operating Conditions					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>DD</sub> -V <sub>SS</sub>	4.75	5.0	5.25	V
Output DC Load	R <sub>L</sub>		50		Ω



**Functional schematic**

13266.11 1998-02-04



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 Tel (44) 1291 436180 Fax (44) 1291 436771

America: Tel 1-800-96MITEL Fax (613) 592-6909  
 Asia: Tel (65) 293 5312 Fax (65) 293 8527



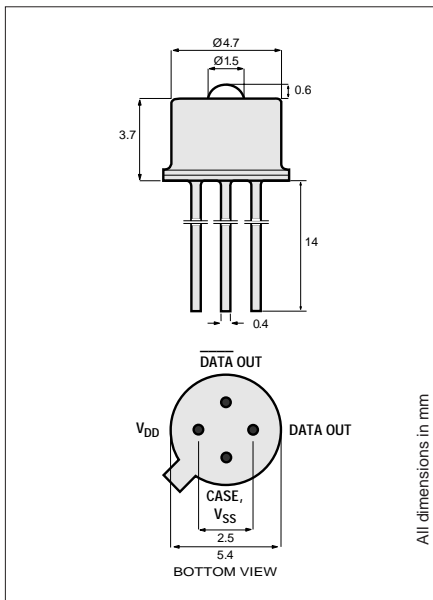
# PRODUCT INFORMATION

PRELIMINARY/β

1300nm  
1550nm  
**8C443**  
PIN/Preamp

**Datacom, Telecom**

This device consists of a PIN photodiode and a transimpedance amplifier assembled in a TO-46 package. It is designed for FDDI, ATM and SDH/Sonet up to 155 Mbps. The AGC (Automatic Gain Control) ensures a wide dynamic range. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5μm.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25° C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity, single ended differential	$R$		100 200		kV/W	$\lambda=1300$ nm Note 1
Output Voltage (differential, peak to peak)	$V_O$			1.2	V	
Bandwidth (3dB <sub>e1</sub> )	$f_c$		140		MHz	$P_f=1$ μW
Noise-Equivalent Power	$NEP$		15		nW	$\lambda=1300$ nm
Sensitivity (BER 10 <sup>-9</sup> )	$S$		-39		dBm	$\lambda=1300$ nm Extinction Ratio=0
Dynamic Range		36	40		dB	
Output Resistance (differential)	$R_O$		50		Ω	
Power Supply Current	$I_{DD}$		32 40		mA	

**Operating Conditions:** See table below. Fiber: Single-mode to multimode 62.5/125μm.

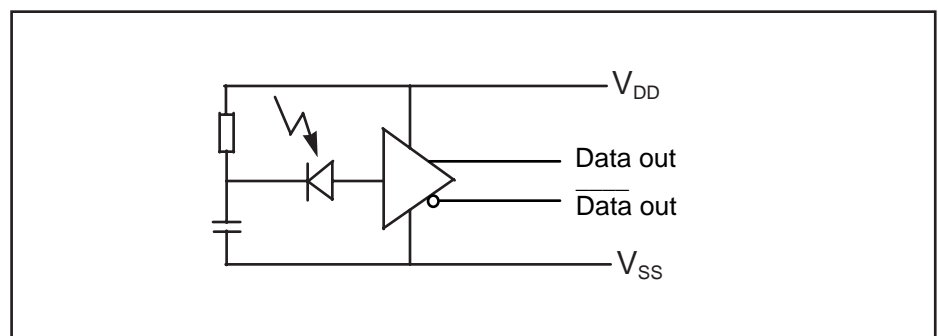
**Note 1:**  $P_f=1$  μW average power at 10MHz/50% duty cycle.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	0	6.0	V
Operating Temperature	$T_{Op}$	-40	85	°C
Storage Temperature	$T_{Stg}$	-55	125	°C

## Recommended Operating Conditions

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	4.5	5.0	5.25	V
Output Differential Load	$R_L$	1	3		kΩ



**Functional schematic**

13451.11 1998-02-04



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America: Tel 1-800-96MITEL Fax (613) 592-6909  
Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

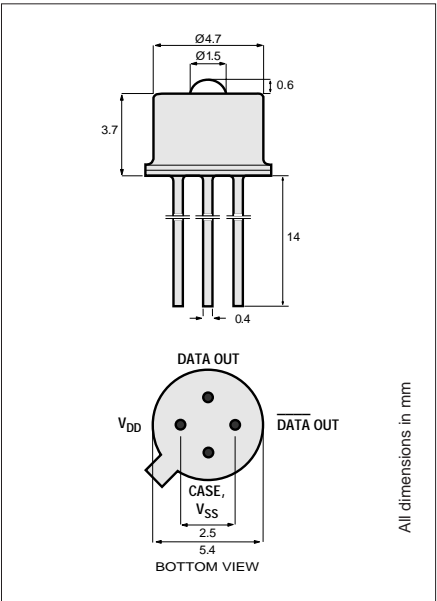
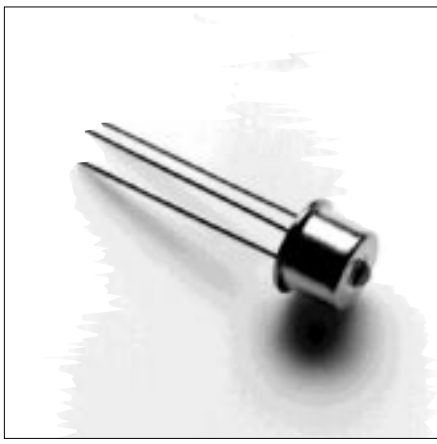
**PRELIMINARY/β**

1300nm  
1550nm

**8C447**  
PIN/Preamp

**Datacom, General Purpose, Analog Applications**

This device consists of a PIN photodiode and a transimpedance amplifier assembled in a TO-46 package. It is designed for short-distance FDDI and ATM up to 155 Mbps. The pre-amplifier's linearity and absence of automatic gain control makes it ideal also for analog applications and applications with bursty signals. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5μm.



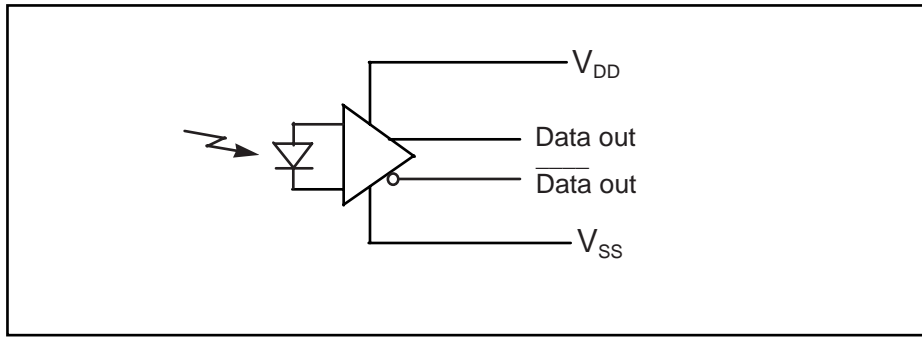
**TO-46 Package With Lens**

Optical and Electrical Characteristics (25° C Case Temperature)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity, single ended differential	$R$	5 10	8 16	12 24	kV/W	$\lambda=1300$ nm $P_f=10$ $\mu$ W
Bandwidth (3dB <sub>el</sub> )	$f_c$	100	175		MHz	
Noise-Equivalent Power	$NEP$			35	nW	$\lambda=1300$ nm
Sensitivity (BER 10 <sup>-9</sup> )	$S$		-35		dBm	$\lambda=1300$ nm Extinction Ratio=0
Dynamic Range			25		dB	
Output Resistance (differential)	$R_O$		50		$\Omega$	
Power Supply Current	$I_{DD}$			35	mA	

**Operating Conditions:** See table below. Fiber: Single-mode to multimode 62.5/125μm.

Absolute Maximum Ratings				
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	0	6.0	V
Operating Temperature	$T_{op}$	-40	85	°C
Storage Temperature	$T_{stg}$	-55	125	°C

Recommended Operating Conditions					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	4.5	5.0	5.5	V
Output Differential Load	$R_L$	1	3		k $\Omega$



**Functional schematic**

13517.11 1998-02-04



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 Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

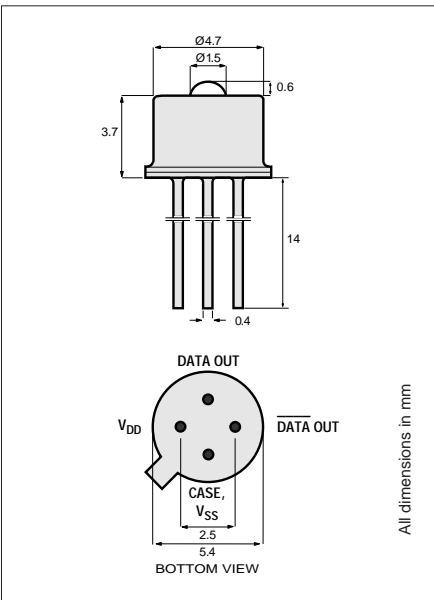
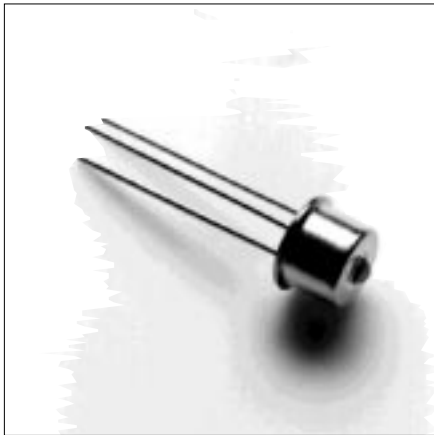
850nm

**8C449**  
PIN/Preamp

**Datacom, General Purpose, Analog Applications**

**PRELIMINARY/β**

This device consists of a PIN photodiode and a transimpedance amplifier assembled in a TO-46 package. It is designed for short-distance ATM up to 155 Mbps. The preamplifier's linearity and absence of automatic gain control makes it ideal also for analog applications and applications with bursty signals. Its double-lens optical system is designed for single-mode fiber as well as for multimode fiber with core diameter up to 62.5μm.



**TO-46 Package With Lens**

## Optical and Electrical Characteristics (25°C Case Temperature)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Responsivity, single ended differential	$R$	3 6	5 10	8 16	kV/W	$\lambda=850$ nm $P_f=10$ $\mu$ W
Bandwidth (3dB <sub>el</sub> )	$f_c$	100	175		MHz	
Noise-Equivalent Power	$NEP$			65	nW	$\lambda=850$ nm
Sensitivity (BER 10 <sup>-9</sup> )	$S$		-34		dBm	$\lambda=850$ nm Extinction Ratio=0
Dynamic Range			25		dB	
Output Resistance (differential)	$R_O$		50		$\Omega$	
Power Supply Current	$I_{DD}$			35	mA	

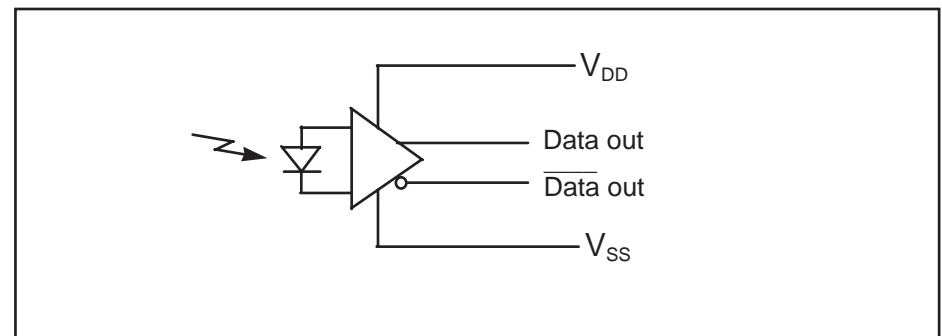
Operating Conditions: See table below. Fiber: Single-mode to multimode 62.5/125μm.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	0	6.0	V
Operating Temperature	$T_{op}$	-40	85	°C
Storage Temperature	$T_{stg}$	-55	125	°C

## Recommended Operating Conditions

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{DD}-V_{SS}$	4.5	5.0	5.5	V
Output Differential Load	$R_L$	1	3		k $\Omega$



**Functional schematic**

13540.11 1998-02-04



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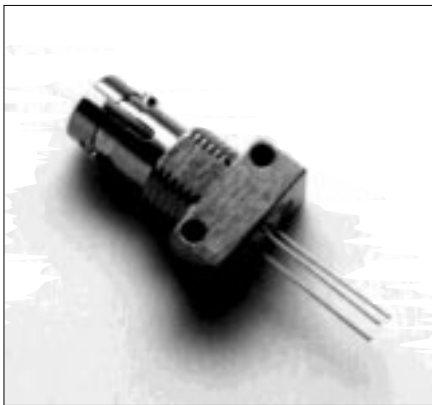
America: Tel 1-800-96MITEL Fax (613) 592-6909  
 Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

## ST-2A Package

## Emitter or Detector in ST® Package

Mitel emitters and detectors can be provided in this low-profile ST® package. The device is electrically isolated from the ST® receptacle to facilitate electrical connection. And optimum fiber-coupled power or responsivity is ensured by active alignment against the fiber.



### Absolute Maximum Ratings

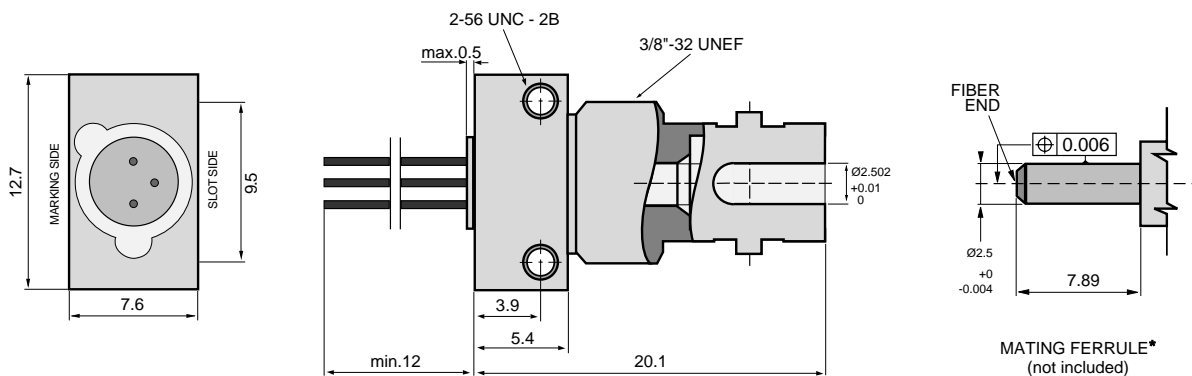
PARAMETER	SYMBOL	LIMIT
Operating & Storage Temperature ST-2A (Note 1)	$T_{stg}, T_{op}$	-40 to +85°C

Note 1: Temperature range can be extended to -55° to +125°C on request.

### Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink (Note 2)	$R_{thcc}$			40	°C/W
Thermal Resistance - No Heat Sink (Note 2)	$R_{thca}$			200	°C/W
Thermal Resistance - On PC Board (Note 2)	$R_{thca}$		80		°C/W

Note 2: Add  $R_{thjc}$  for emitter or detector to estimate the total thermal resistance.



All Dimensions in mm

\*The fiber-coupled power/responsivity is guaranteed to meet the LED/PIN data sheet - provided a ferrule meeting this specification is used.

### Mechanical Outline of Diode in ST-2A Housing

(ST is a registered trademark of AT&T)

103326 1994-09-20



Europe: Tel (46) 8 58 02 45 00 Fax (46) 8 58 02 01 10  
Tel (44) 1291 436180 Fax (44) 1291 436771

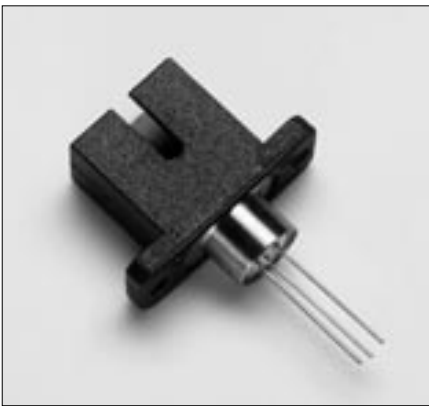
America: Tel 1-800-96MITEL Fax (613) 592-6909  
Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

## SC-2A Package

## Emitter or Detector in SC Package

Mitel emitters and detectors can be provided in this low-profile SC package. The device is electrically isolated from the SC receptacle to facilitate electrical connection. And optimum fiber-coupled power or responsivity is ensured by active alignment against the fiber.



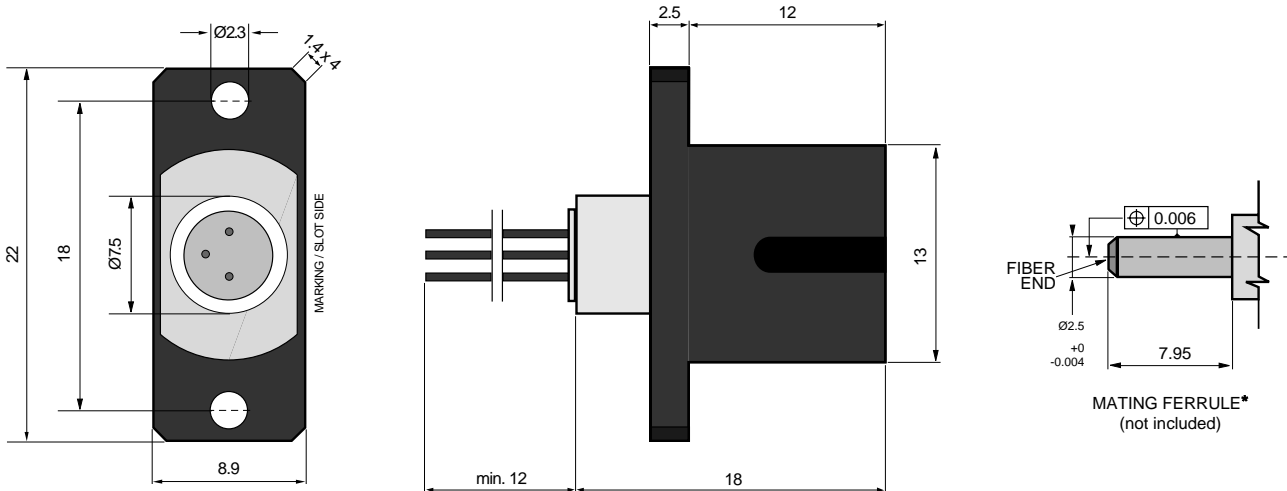
### Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Operating & Storage Temperature	$T_{stg}, T_{op}$	-40 to +85°C

### Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink (Note 1)	$R_{thcc}$			40	°C/W
Thermal Resistance - No Heat Sink (Note 1)	$R_{thca}$			200	°C/W
Thermal Resistance - On PC Board (Note 1)	$R_{thca}$		125		°C/W

Note 1: Add  $R_{thjc}$  for emitter or detector to estimate the total thermal resistance.



All Dimensions in mm

\* The fiber-coupled power/responsivity is guaranteed to meet the LED/PIN data sheet - provided a ferrule meeting this specification is used.

### Mechanical Outline of Diode in SC-2A Housing

105967 1994-09-20



Europe: Tel (46) 8 58 02 45 00 Fax (46) 8 58 02 01 10  
Tel (44) 1291 436180 Fax (44) 1291 436771

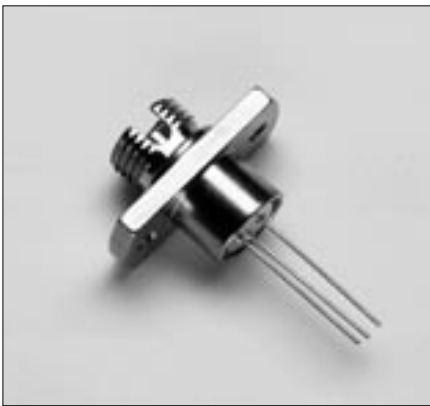
America: Tel 1-800-96MITEL Fax (613) 592-6909  
Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

## FC-2A Package

## Emitter or Detector in FC Package

Mitel emitters and detectors can be provided in this low-profile FC package. The device is electrically isolated from the FC receptacle to facilitate electrical connection. And optimum fiber-coupled power or responsivity is ensured by active alignment against the fiber.



### Absolute Maximum Ratings

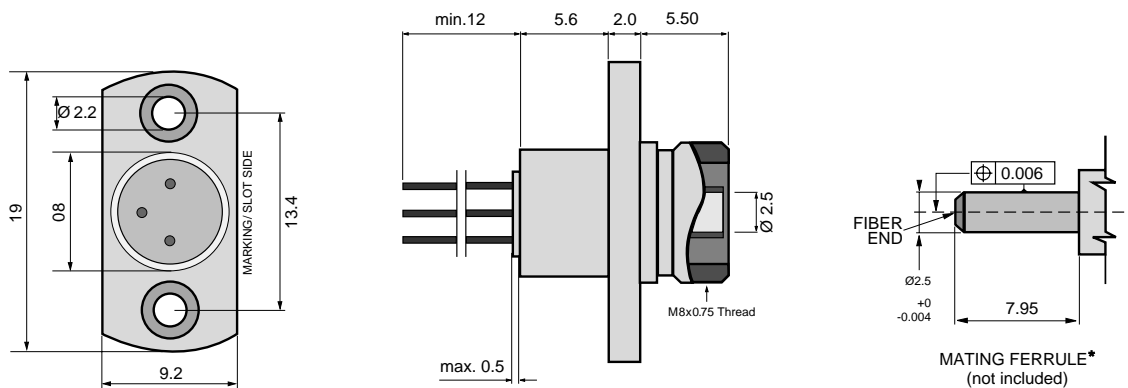
PARAMETER	SYMBOL	LIMIT
Operating & Storage Temperature FC-2A (Note 1)	$T_{stg}, T_{op}$	-40 to +85°C

Note 1: Temperature range can be extended to -55° to +125°C on request.

### Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink (Note 2)	$R_{thcc}$			40	°C/W
Thermal Resistance - No Heat Sink (Note 2)	$R_{thca}$			200	°C/W
Thermal Resistance - On PC Board (Note 2)	$R_{thca}$		80		°C/W

Note 2: Add  $R_{thjc}$  for emitter or detector to estimate the total thermal resistance.



All Dimensions in mm

\* The fiber-coupled power/responsivity is guaranteed to meet the LED/PIN data sheet - provided a ferrule meeting this specification is used.

### Mechanical Outline of Diode in FC-2A Housing

105515 1994-09-20



Europe: Tel (46) 8 58 02 45 00 Fax (46) 8 58 02 01 10  
Tel (44) 1291 436180 Fax (44) 1291 436771

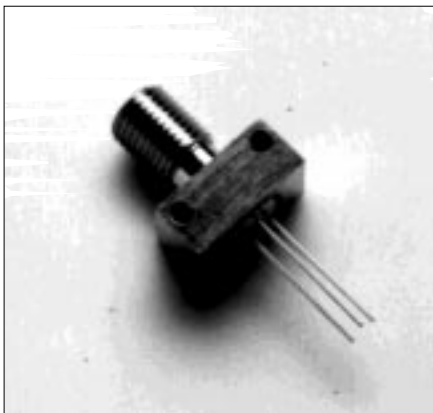
America: Tel 1-800-96MITEL Fax (613) 592-6909  
Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

## SMA-2A Package

## Emitter or Detector in SMA Package

Mitel emitters and detectors can be provided in this low-profile SMA package. The device is electrically isolated from the SMA receptacle to facilitate electrical connection. And optimum fiber-coupled power or responsivity is ensured by active alignment against the fiber.



### Absolute Maximum Ratings

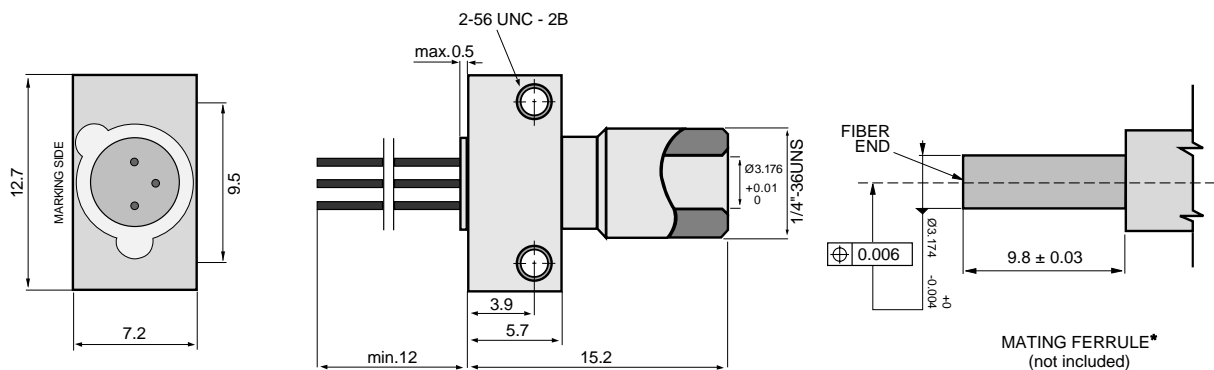
PARAMETER	SYMBOL	LIMIT
Operating & Storage Temperature SMA-2A (Note 1)	$T_{stg}, T_{op}$	-40 to +85°C

Note 1: Temperature range can be extended to -55° to +125°C on request.

### Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink (Note 2)	$R_{thcc}$			40	°C/W
Thermal Resistance - No Heat Sink (Note 2)	$R_{thca}$			200	°C/W
Thermal Resistance - On PC Board (Note 2)	$R_{thca}$		80		°C/W

Note 2: Add  $R_{thjc}$  for emitter or detector to estimate the total thermal resistance.



All Dimensions in mm

\*The fiber-coupled power/responsivity is guaranteed to meet the LED/PIN data sheet - provided a ferrule meeting this specification is used.

### Mechanical Outline of Diode in SMA-2A Housing

103325 1994-09-20



Europe: Tel (46) 8 58 02 45 00 Fax (46) 8 58 02 01 10  
Tel (44) 1291 436180 Fax (44) 1291 436771

America: Tel 1-800-96MITEL Fax (613) 592-6909  
Asia: Tel (65) 293 5312 Fax (65) 293 8527

# PRODUCT INFORMATION

## Pigtail-3A Package

### Emitter or Detector in Pigtail Package

Mitel emitters and detectors can be provided in this pigtail package with a wide selection of fiber types. The device is electrically isolated from the pigtail receptacle to facilitate electrical connection. And optimum fiber-coupled power or responsivity is ensured by active alignment against the fiber. A special design maximizes the return loss for detectors in this package.



### Absolute Maximum Ratings

PARAMETER	SYMBOL	LIMIT
Operating & Storage Temperature (Note 1 & 2)	$T_{stg}, T_{op}$	-40 to +85°C

Note 1: Temperature range can be extended to -55/+125°C on request.

Note 2: Temperature range may be limited by the specification of the fiber.

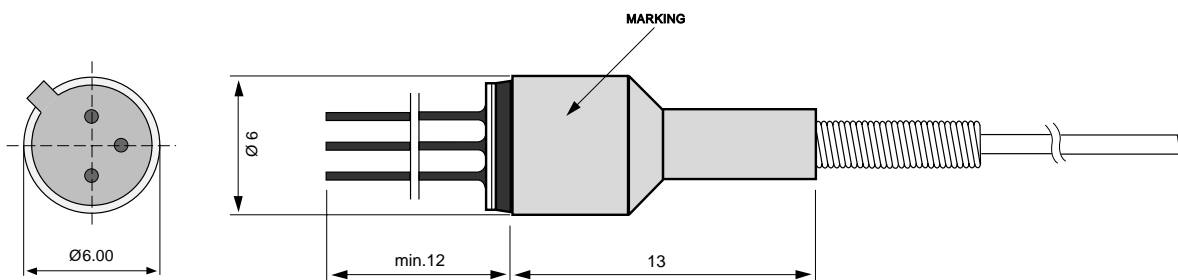
### Thermal Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Thermal Resistance - Infinite Heat Sink (Note 3)	$R_{thcc}$			25	°C/W
Thermal Resistance - No Heat Sink (Note 3)	$R_{thca}$			250	°C/W
Thermal Resistance - On PC-Board (Note 3)	$R_{thca}$		120		°C/W

Note 3: Add  $R_{thjc}$  for LED to estimate the total thermal resistance.

### Optical Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Return Loss 10/125μm fiber (PIN only)	RL	40	55		dB



All Dimensions in mm

### Mechanical Outline of Diode in PIGTAIL-3A Housing

105429 1997-07-03



Europe: Tel (46) 8 58 02 45 00 Fax (46) 8 58 02 01 10  
Tel (44) 1291 436180 Fax (44) 1291 436771

America: Tel 1-800-96MITEL Fax (613) 592-6909  
Asia: Tel (65) 293 5312 Fax (65) 293 8527