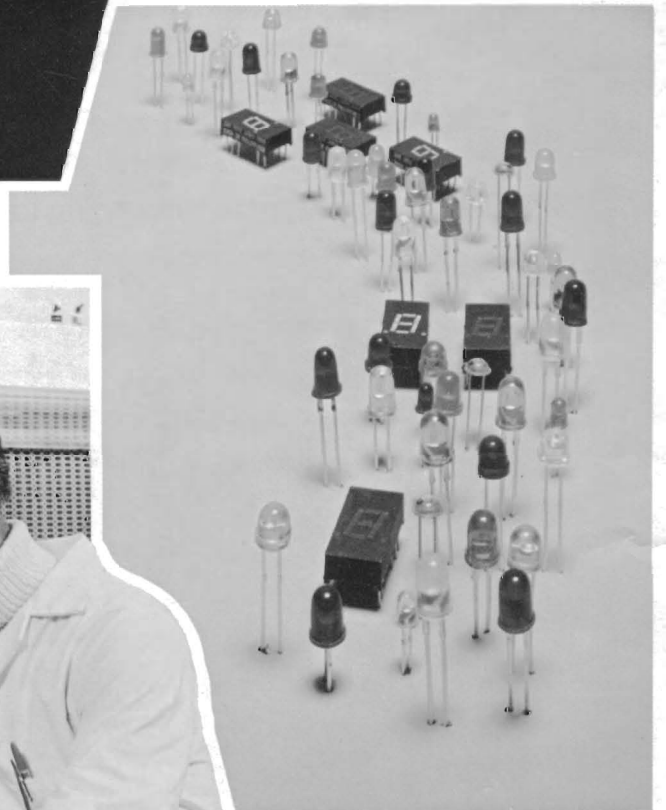
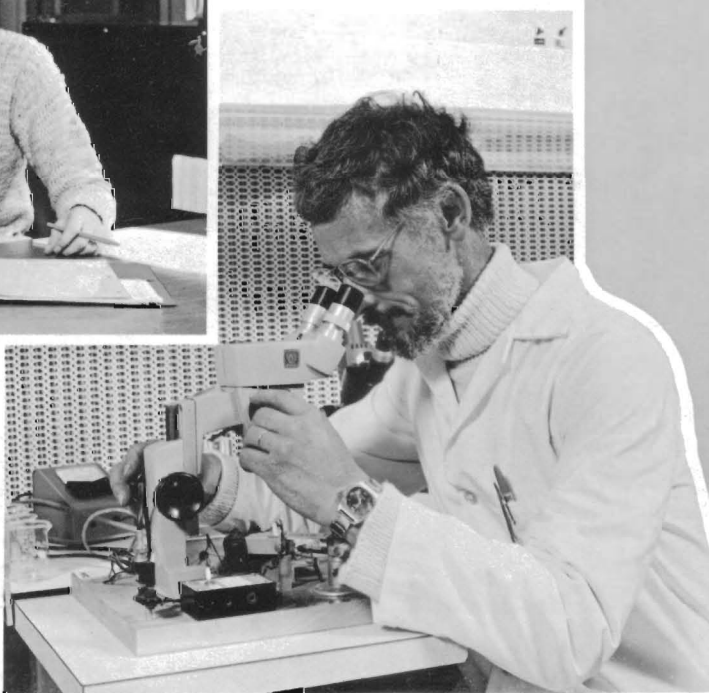
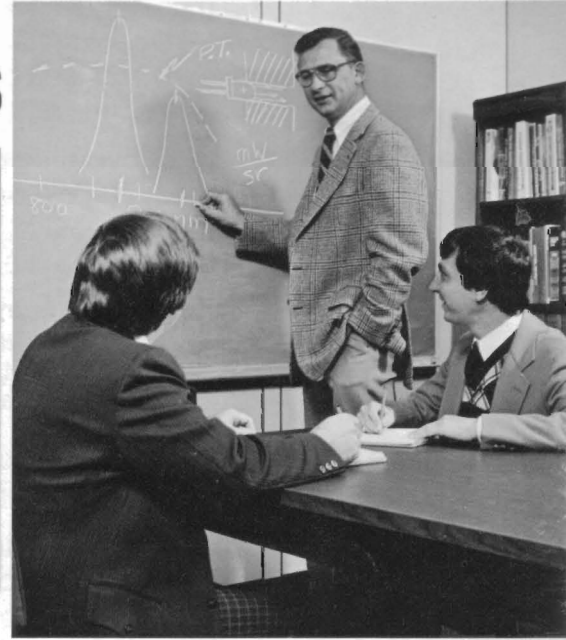
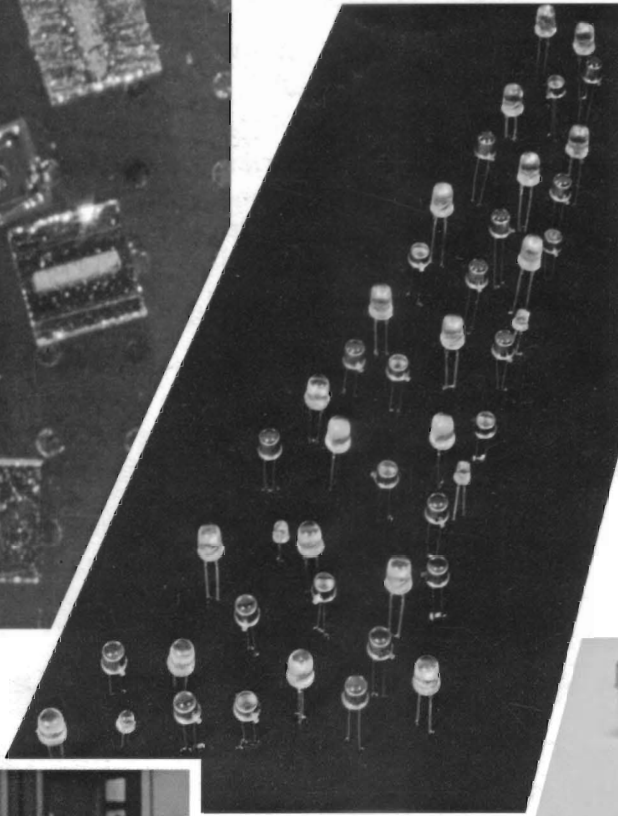
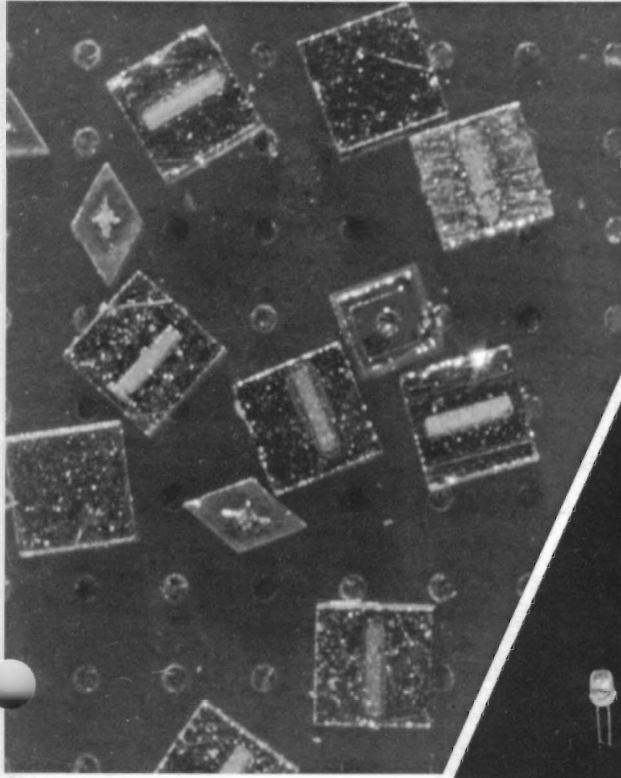


# Xciton OPTOELECTRONICS CATALOG

PEOPLE &  
PRODUCTS



**T**his catalog has been designed to help you find the product information you need, quickly and easily. It is divided into five major product categories with detailed specifications, electrical characteristics and package outlines.

During the past decade, Xciton has been recognized as a leader in liquid epitaxial Gallium Phosphide (GaP) and Gallium Arsenide (GaAs) technology. Our commitment to research and development assures a steady flow of new products to serve emerging markets and to insure performance improvement in existing products.

At Xciton, our volume production capability is committed to **high performance, quality products**. We provide a broad line of LED lamps, infrared emitters, LED numeric displays, and LED materials. We also provide custom services which include:

**Special Sorting  
Brightness Categorization  
Power Output Grading  
Environmental Screening**

**Burn-In  
Custom Configurations  
Visible and Infrared LED Dice  
for Hybrid Circuits**

Our LED's find use in such diverse applications as: alarm systems, annunciator panels, and cartridge indicators.

High output emitters are ideally suited for use in: smoke detectors, optical encoders and transducers, process controls, intrusion alarms, tape readers, door openers, level indicators, and fiber optic drivers.

We respond to customer inquiries with the following important services:

- A worldwide network of distributors and technical representatives.
- Accessible technical, marketing, and management people at Xciton who respond to **your** needs and inquiries.
- Factory applications engineering support to assist you in **your** engineering design requirements.
- Prompt quotations, rapid inquiry responses, and promptly delivered samples to assure timely "design-in" and qualification.

We look forward to responding to your request!



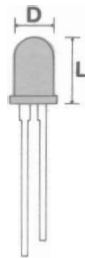
**XCITON CORPORATION**  
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TWX: 710-444-4962

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# HIGH EFFICIENCY GREEN LED LAMPS



## WORLD'S BRIGHTEST GREEN/TRULY SUPERIOR

- 565 nm GaP/GaP liquid EPI green LED's
- Use interchangeably with red/yellow lamps without change in drive current
- Popular T-1 and T-1¾ package styles
- Guaranteed brightness categories available
- Compatible with TTL, CMOS and MOS circuits
- Rugged and reliable

Package Outline Inch (mm)	Xciton Part Number	Use	Plastic Lens Type	* Typ. View. Ang.	Luminous Intensity		** Pack. Style	*** Elect. Specs.	Matching Devices in Red/Yellow
					mcd @ 10 mA/20 Min	Typ			
 D=.125 (3,18) L=.210 (5,33)	XC-209-G	Miniat. Ind.	Grn. Diff.	75	.6	1.5/3.0	B	B-5/ C-5	XC-209-R/209-Y
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-554-G XC-554-G6 XC-554-G15 XC-554-G24 XC-556-G XC-556-G2 XC-556-G3 XC-5053-G	Illuminator Illuminator Illuminator Illum./Hi Bright Indicat./Illum. Indicat./Illum. Indicat./Illum. Wide Angl. Ind.	Grn. Clr. Grn. Clr. Grn. Clr. Grn. Clr. Grn. Diff. Grn. Diff. Grn. Diff. Grn. Diff.	24 24 24 24 30 30 30 80	2.0 6.0 15.0 24.0 .6 2.0 3.0 .4	6.0/12.0 8.0/16.0 17.0/34.0 27.0/54.0 1.8/3.6 2.8/5.6 3.8/7.6 1.2/2.4	E	B-5/ C-5	XC-554-R/554-Y XC-554-R9/554-Y6 XC-554-R12/554-Y12 XC-554-R12/554-Y12 XC-556-R/556-Y XC-556-R2/556-Y2 XC-556-R3/556-Y3 XC-5053-R/5053-Y
 D=.190 (4,83) L=.340 (8,64) Use C200 R/C†	XC-4850-G	Wide Angl. Ind.	Grn. Diff.	80	.6	1.8/3.6	GG	B-5/ C-5	XC-4850-R/4850-Y
 D=.190 (4,83) L=.285 (7,24)	XC-1100-G	Indicator	Grn. Diff.	50	.5	1.5/3.0	M	B-5/ C-10	XC-1100-R/1100-Y
 D=.200 (5,08) L=.240 (6,10)	XC-210-G XC-220-G	Illuminator Indicator	Grn. Clr. Grn. Diff.	50 80	.6 .6	2.0/4.0 1.5/3.0	L	B-5/ C-10	XC-210-R/210-Y XC-220-R/220-Y
 D=.190 (4,83) L=.340 (8,64) Use C190 R/C†	XC-4950 XC-4955	Indicator Ind./Hi Bright	Grn. Diff. Grn. Diff.	90 90	1.0 2.0	2.0/4.0 3.0/6.0	N	B-5/ C-10	XC-4650/4550 XC-4655/4555
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-5059-G XC-5549-G XC-5549-G6 XC-5549-G15 XC-5549-G24 XC-5569-G XC-5569-G2 XC-5569-G3	Wide Angl. Ind. Illuminator Illuminator Illuminator Illum./Hi Bright Indicat./Illum. Indicat./Illum. Indicat./Illum.	Grn. Diff. Grn. Clr. Grn. Clr. Grn. Clr. Grn. Clr. Grn. Diff. Grn. Diff. Grn. Diff.	80 24 24 24 24 30 30 30	.6 2.0 6.0 15.0 24.0 .6 2.0 3.0	2.0/4.0 6.0/12.0 8.0/16.0 17.0/34.0 27.0/54.0 2.5/5.0 2.8/5.6 6.0/12.0	P	B-5/ C-10	XC-5059-R/5059-Y XC-5549-R/5549-Y XC-5549-R9/5549-Y6 XC-5549-R12/5549-Y12 XC-5549-R12/5549-Y12 XC-5569-R/5569-Y XC-5569-R2/5569-Y2 XC-5569-R3/5569-Y3
 D=.185 (4,70) L=.340 (8,64) Use C160 R/C†	XC-522-G XC-526-G XC-526-G2	Pt. Indicator Indicator Indicator	Grn. Clr. Grn. Diff. Grn. Diff.	55 70 70	1.0 .5 2.0	3.0/6.0 1.5/3.0 2.8/5.6	C	B-5/ C-5	XC-522-R/- XC-526-R/526-Y XC-526-R2/526-Y2

# HIGH EFFICIENCY/ LOW CURRENT RED LED LAMPS



## THE IDEAL LED FOR ALL LOW CURRENT APPLICATIONS

- 697 nm GaP/GaP red LED's
- Excellent coupler to Si and CdS photocells
- Popular T-1 and T-1½ package styles
- Light output categories available
- Compatible with very low current TTL, CMOS and MOS circuits
- Solid state reliability

Package Outline Inch (mm)	Xciton Part Number	Use	Plastic Lens Type	* Typ. View. Ang.	Luminous Intensity mcd @ 10 mA		** Pack. Style	*** Elect. Specs.	Matching Devices in Green/Yellow
					Min	Typ			
 D=.125 (3,18) L=.210 (5,33)	XC-209-R	Miniat. Ind.	Red Diff.	75	.6	1.5	B	B-2/ C-2	XC-209-G/209-Y
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-554-R XC-554-R9 XC-554-R12 XC-556-R XC-556-R2 XC-556-R3 XC-5053-R	Illuminator Illuminator Illum./Hi Bright Indicat./Illum. Indicat./Illum. Indicat./Illum. Wide Angl. Ind.	Red Clr. Red Clr. Red Clr. Red Diff. Red Diff. Red Diff. Red Diff.	24 24 24 30 30 30 80	2.0 9.0 12.0 .6 2.0 3.0 .4	6.0 12.0 15.0 1.8 2.8 3.8 1.2	E	B-2/ C-2	XC-554-G/554-Y XC-554-G6/554-Y6 XC-554-G15/554-Y12 XC-556-G/556-Y XC-556-G2/556-Y2 XC-556-G3/556-Y3 XC-5053-G/5053-Y
 D=.190 (4,83) L=.285 (7,24)	XC-1100-R	Indicator	Red Diff.	50	.5	1.5	M	B-2/ C-7	XC-1100-G/1100-Y
 D=.200 (5,08) L=.240 (6,10)	XC-210-R XC-220-R	Illuminator Indicator	Red Clr. Red Diff.	50 80	.6 .6	2.0 1.5	L	B-2/ C-7	XC-210-G/210-Y XC-220-G/220-Y
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-5059-R XC-5549-R XC-5549-R9 XC-5549-R12 XC-5569-R XC-5569-R2 XC-5569-R3	Wide Angl. Ind. Illuminator Illuminator Illum./Hi Bright Indicat./Illum. Indicat./Illum. Indicat./Illum.	Red Diff. Red Clr. Red Clr. Red Clr. Red Diff. Red Diff. Red Diff.	80 24 24 24 30 30 30	.6 2.0 9.0 12.0 .6 2.0 3.0	2.0 6.0 12.0 15.0 2.5 2.8 3.8	P	B-2/ C-7	XC-5059-G/5059-Y XC-5549-G/5549-Y XC-5549-G6/5549-Y6 XC-5549-G15/5549-Y12 XC-5569-G/5569-Y XC-5569-G2/5569-Y2 XC-5569-G3/5569-Y3
 D=.185 (4,70) L=.340 (8,64) Use C160 R/C†	XC-520-R XC-521-R XC-522-R XC-526-R XC-526-R2	Pt. Indicator Indicator Pt. Indicator Indicator Indicator	Water Clr. White Diff. Red Clr. Red Diff. Red Diff.	55 70 55 70 70	1.0 .5 1.0 .5 2.0	3.0 1.5 3.0 1.5 2.8	C	B-2/ C-2	— — XC-522-G/— XC-526-G/526-Y XC-526-G2/526-Y2

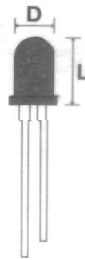
\*Total included viewing angle between half power points, measured in degrees.

\*\*See Pages 15 and 16 for Package Dimensions.


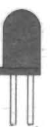
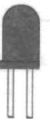
\*\*\*See Page 9 for Table of Characteristics for LED Lamps.

†C-200 R/C, C-190 R/C, C-160 R/C are Rings and Clips. See Page 16 for Package Dimensions.

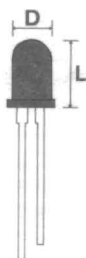
# HIGH EFFICIENCY/ HIGH CURRENT RED LED LAMPS






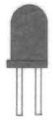
- 635 nm GaAsP/GaP red LED's
- Superior brightness at pulse drives above 15 mA
- Popular T-1 and T-1 $\frac{3}{4}$  package styles
- Guaranteed brightness categories available
- Rugged and reliable

Package Outline Inch (mm)	Xciton Part Number	Use	Plastic Lens Type	* Typ. View. Ang.	Luminous Intensity mcd @ 10 mA		** Pack. Style	*** Elect. Specs.	Matching Devices in Green/Yellow
					Min	Typ			
 D=.190 (4,83) L=.285 (7,24)	XC-1510	Hi Intensity Indicator	Red Diff.	50	1.2	3.0	M	B-3/ C-8	XC-1100-G/1100-Y
 D=.190 (4,83) L=.340 (8,64) Use C190 R/C†	XC-4650 XC-4655	Indicator Ind./Hi Bright	Red Diff. Red Diff.	90 90	1.0 3.0	2.0 4.0	N	B-3/ C-8	XC-4950/4550 XC-4955/4555
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-5057-R XC-5057-R3  XC-5547-R XC-5547-R9 XC-5547-R15 XC-5567-R XC-5567-R2 XC-5567-R3	Wide Angl. Ind. Wide Angl. Ind./ Hi Intensity Illuminator Illuminator Illum./Hi Bright Indicat./Illum. Indicat./Illum. Indicat./Illum.	Red Diff. Red Diff.  Red Clr. Red Clr. Red Clr. Red Diff. Red Diff. Red Diff.	80 80  24 24 24 30 30 30	1.0 3.0  2.0 9.0 15.0 1.0 2.0 3.0	1.7 4.0  6.0 12.0 24.0 1.8 2.8 4.0	P	B-3/ C-8	XC-5059-G/5059-Y XC-5059-G/5059-Y  XC-5549-G/5549-Y XC-5549-G6/5549-Y6 XC-5549-G15/5549-Y12 XC-5569-G/5569-Y XC-5569-G2/5569-Y2 XC-5569-G3/5569-Y3

# STANDARD RED LED LAMPS



- 655 nm standard GaAsP/GaAs red LED's
- General purpose indicators
- Low Cost
- Popular T-1 and T-1½ package styles
- Solid state reliability

Package Outline Inch (mm)	Xciton Part Number	Use	Plastic Lens Type	* Typ. View. Ang.	Luminous Intensity mcd @ 20 mA		** Pack. Style	*** Elect. Specs.	Matching Devices in Green/Yellow
					Min	Typ			
 D=.125 (3,18) L=.210 (5,33)	XC-2090	Miniat. Ind.	Red Diff.	70	.6	1.2	BB	B-1/ C-1	XC-209-G/209-Y
 D=.190 (4,83) L=.340 (8,64) Use C200 R/C†	XC-4850-R	Wide Angl. Ind.	Red Diff.	80	.6	1.3	GG	B-1/ C-1	XC-4850-G/4850-Y
 D=.190 (4,83) L=.285 (7,24)	XC-1011 XC-1017	Illuminator Gen. Purpose/ Indicator	Red Clr. Red Diff.	40 50	.5 .5	1.5 1.0	M	B-1/ C-6	— XC-1100-G/1100-Y
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-5535 XC-5565	Wide Angl. Diff. Indicator Narrow Angl. Diff. Indicator	Red Diff. Red Diff.	75 30	.6 .6	1.5 2.0	P	B-1/ C-6	XC-5059-G/5059-Y XC-5569-G/5569-Y

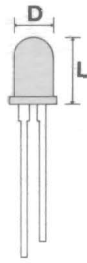
\*Total included viewing angle between half power points, measured in degrees.

\*\*See Pages 15 and 16 for Package Dimensions.

\*\*\*See Page 9 for Table of Characteristics for LED Lamps.

†C-200 R/C, C-190 R/C, C-160 R/C are Rings and Clips. See Page 16 for Package Dimensions.

# YELLOW LED LAMPS

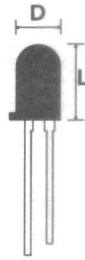
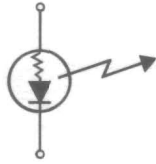


- 585 nm GaAsP/GaP yellow LED's
- Industry standard yellow
- Popular T-1 and T-1¼ package styles
- Guaranteed brightness categories available
- Compatible with TTL, CMOS and MOS circuits
- Solid state reliability and ruggedness

Package Outline Inch (mm)	Xciton Part Number	Use	Plastic Lens Type	* Typ. View. Ang.	Luminous Intensity mcd @ 10 mA		** Pack. Style	*** Elect. Specs.	Matching Devices in Red/Green
					Min	Typ			
 D=.125 (3,18) L=.210 (5,33)	XC-209-Y	Miniat. Ind.	Yel. Diff.	75	.6	1.5	B	B-4/ C-4	XC-209-R/209-G
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-554-Y XC-554-Y6 XC-554-Y12 XC-556-Y XC-556-Y2 XC-556-Y3 XC-5053-Y	Illuminator Illuminator Illum./Hi Bright Indicat./Illum. Indicat./Illum. Indicat./Illum. Wide Angl. Ind.	Yel. Clr. Yel. Clr. Yel. Clr. Yel. Diff. Yel. Diff. Yel. Diff. Yel. Diff.	24 24 24 30 30 30 80	2.0 6.0 12.0 .6 2.0 3.0 .4	6.0 8.0 15.0 1.8 2.8 3.8 1.2	E	B-4/ C-4	XC-554-R/554-G XC-554-R9/554-G6 XC-554-R12/554-G15 XC-556-R/556-G XC-556-R2/556-G2 XC-556-R3/556-G3 XC-5053-R/5053-G
 D=.190 (4,83) L=.340 (8,64) Use C200 R/C†	XC-4850-Y	Wide Angl. Ind.	Yel. Diff.	80	.6	1.5	GG	B-4/ C-4	XC-4850-R/4850-G
 D=.190 (4,83) L=.285 (7,24)	XC-1100-Y	Indicator	Yel. Diff.	50	.5	1.5	M	B-4/ C-9	XC-1100-R/1100-G
 D=.200 (5,08) L=.240 (6,10)	XC-210-Y XC-220-Y	Illuminator Indicator	Yel. Clr. Yel. Diff.	50 80	.6 .6	2.0 1.5	L	B-4/ C-9	XC-210-R/210-G XC-220-R/220-G
 D=.190 (4,83) L=.340 (8,64) Use C190 R/C†	XC-4550 XC-4555	Indicator Ind./Hi Bright	Yel. Diff. Yel. Diff.	90 90	.7 1.5	1.2 2.0	N	B-4/ C-9	XC-4650/4950 XC-4655/4955
 D=.200 (5,08) L=.340 (8,64) Use C200 R/C†	XC-5059-Y XC-5549-Y XC-5549-Y6 XC-5549-Y12 XC-5569-Y XC-5569-Y2 XC-5569-Y3	Wide Angl. Ind. Illuminator Illuminator Illum./Hi Bright Indicat./Illum. Indicat./Illum. Indicat./Illum.	Yel. Diff. Yel. Clr. Yel. Clr. Yel. Clr. Yel. Diff. Yel. Diff. Yel. Diff.	80 24 24 24 30 30 30	.6 2.0 6.0 12.0 .6 2.0 3.0	2.0 6.0 8.0 15.0 2.0 2.8 3.8	P	B-4/ C-9	XC-5059-R/5059-G XC-5549-R/5549-G XC-5549-R9/5549-G6 XC-5549-R12/5549-G15 XC-5569-R/5569-G XC-5569-R2/5569-G2 XC-5569-R3/5569-G3
 D=.185 (4,70) L=.340 (8,64) Use C160 R/C†	XC-526-Y XC-526-Y2	Indicator Indicator	Yel. Diff. Yel. Diff.	70 70	.5 2.0	1.5 2.8	C	B-4/ C-4	XC-526-R/526-G XC-526-R2/526-G2



# 5-VOLT AND 12-VOLT RESISTOR LED LAMPS

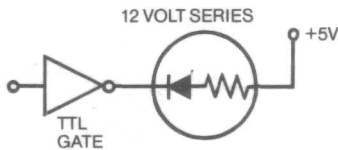


- Self contained, internal current limiting resistor
- Choice of red, yellow, green in popular T-1 and T-1½ package styles
- Wide angle/diffused lens type
- Designed to operate directly from 5 volt and 12 volts DC
- Provide savings in PC board real estate, assembly costs, and parts inventories
- High brightness with long life. Solid state reliability.

Package Outline Inch (mm)	Xciton Part Number	Use	Plastic Lens Type	Dice Type	* Typ. View. Ang.	Luminous Intensity at 5V		** Pack. Style	*** Elect. Specs.
						Min	Typ		
 D=.125 (3,18) L=.210 (5,33)	XC-209-5VR XC-209-5VY XC-209-5VG	Indicator	Red Diff. Yel. Diff. Grn. Diff.	GaP/GaP GaAsP/GaP GaP/GaP	75	.6	1.5	B	B-2/C-2 B-4/C-4 B-5/C-5
 D=.190 (4,83) L=.340 (8,64) Use C200 R/C†	XC-4850-5VR XC-4850-5VY XC-4850-5VG XC-4850-12VR XC-4850-12VY XC-4850-12VG	Indicator	Red Diff. Yel. Diff. Grn. Diff. Red Diff. Yel. Diff. Grn. Diff.	GaAsP/GaAs GaAsP/GaP GaP/GaP GaP/GaP GaAsP/GaP GaP/GaP	80	.4 .4 .4 .6 @ 12V .6 @ 12V .6 @ 12V	1.3 1.3 1.3 2.0 2.0 2.0	GG	B-1/C-1 B-4/C-4 B-5/C-5 B-2/C-2 B-4/C-4 B-5/C-5

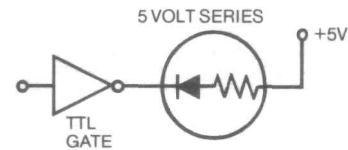
## APPLICATION CIRCUITS

FIGURE 1: LOW CURRENT LOGIC STATUS INDICATOR



When operated in this fashion 12 volt Resistor Lamps provide high visibility indicators draining 1.75 mA. (Nom)

FIGURE 2: LOGIC STATUS INDICATOR



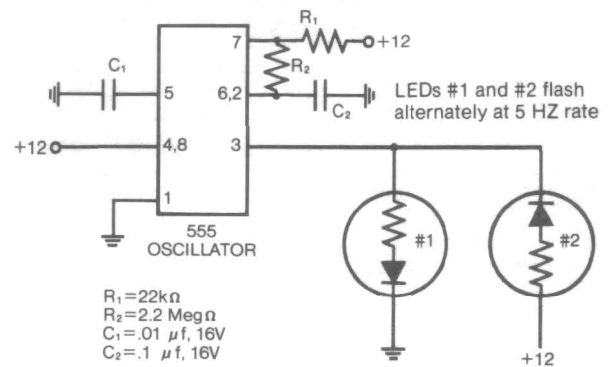
When operated in this fashion 5 volt Resistor Lamps provide nominal 10 mA operation direct from logic. Note: due to worst case current drain an uncommitted output is suggested.

FIGURE 3: AC OPERATION FROM 24 VAC



1N4001 protects LED in reverse and eliminates ½ cycle to reduce LED current to 12 volt level.

FIGURE 4: WARNING FLASHER



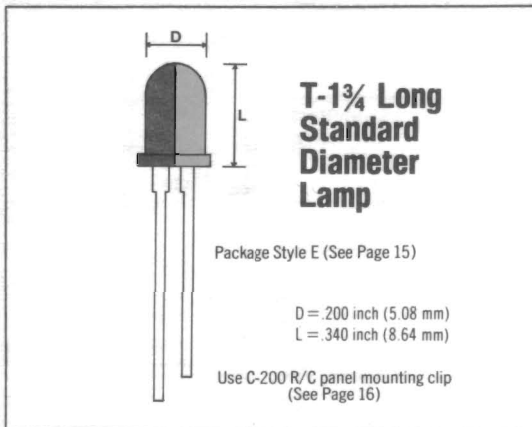
\*Total included viewing angle between half power points, measured in degrees.

\*\*See Pages 15 and 16 for Package Dimensions.

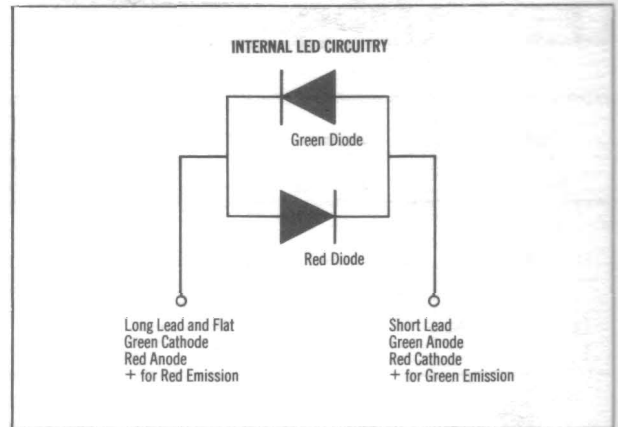
\*\*\*See Page 9 for Table of Characteristics for LED Lamps.

†C-200 R/C, C-190 R/C, C-160 R/C are Rings and Clips. See Page 16 for Package Dimensions.

# TRI-STATE LED LAMP XC-5491



# RED — GREEN — OFF IN ONE PACKAGE



## FEATURES — ADVANTAGES — BENEFITS

- Red and Green Light output — in same package
- Uniform Color Brightness
- A New Dimension in Front Panel Design
- Reduced Space Requirements
- Simplification of Product Design
- Operation on Standard Circuitry
- Reduced Inventory Count Requirements
- Reduced Total System Cost

ELECTRICAL/OPTICAL CHARACTERISTICS AT 25°C			
Forward Voltage at 10 mA	Typ	Volts	2.2
	Max	Volts	2.8
Dynamic Resistance	Typ	Ohms	25
	Capacitance, V = 0	Typ	pf
Peak Wavelength	Red	nm	697
	Grn	nm	565
Light Output (Red and Green) at 10 mA	Min	mcd	0.6
	Typ	mcd	1.8
ABSOLUTE MAXIMUM RATINGS at 25°C			
Maximum Continuous Current (Red and Green)		mA	25
Peak Pulse Current 0.5 mS, 500 Hz		mA	60
Maximum Power Dissipation		mW	115
Derate Linearly From 25°C		mW/°C	1.5
Storage and Operating Temp Range		°C	-55 to +100
Max Lead Solder Temperature (5 sec. immersion, 1/16 inch from plastic)		°C	260

Xciton cannot assume responsibility for any circuits shown or represent that they are free from patent infringement.

## APPLICATION CIRCUITS

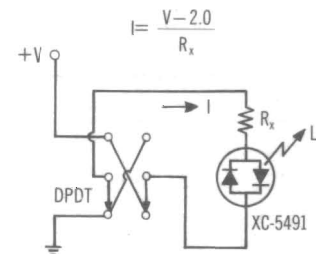


FIGURE 1: COLOR CHANGING WITH A DPDT SWITCH.

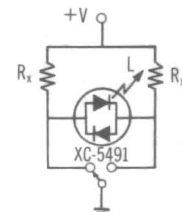


FIGURE 2: COLOR CHANGING WITH A SPDT SWITCH OR ONE SPARE POLE OF A GANGED POLE SWITCH.

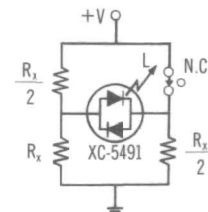


FIGURE 3: OPENING OF ONE CONTACT CHANGES COLOR — EXAMPLE, A BIMETAL ELEMENT.

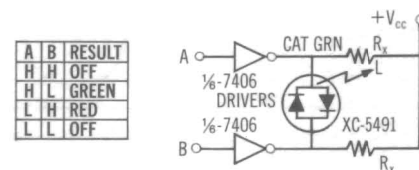


FIGURE 4: INTERFACE TO TTL LOGIC.

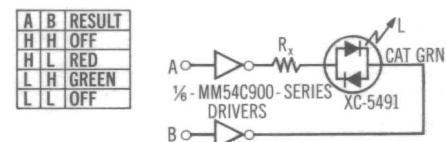


FIGURE 5: INTERFACE TO CMOS, PMOS LOGIC.

# TABLE OF CHARACTERISTICS FOR LED LAMPS

Electrical/Optical Characteristics at 25° C		Units	B-1 GaAsP/GaAs Red	B-2 GaP/GaP Red	B-3 GaAsP/GaP Red	B-4 GaAsP/GaP Yellow	B-5 GaP/GaP Green
Peak Wavelength		nm	655	697	635	585	565
Line Half Width		nm	40	95	40	40	30
Temperature Coefficient of Luminous Intensity		%/°C	-2.0	-2.0	-1.0	-1.0	-1.0
Response Time, 10%–90%		ns	15	500	100	100	100
* Forward Voltage Drop at Current Indicated	TYP	Volts @ mA	1.6 @ 20	2.0 @ 10	2.0 @ 10	2.0 @ 10	2.0 @ 10
	MAX	Volts @ mA	2.0 @ 20	2.8 @ 10	2.8 @ 10	2.8 @ 10	2.8 @ 10
Forward Current at 5.0 Volts/12.0 Volts for Resistor LEDs Only	TYP	mA	12/N.A.	12/8.5	N.A.	12/8.5	12/8.5
	MAX	mA	20/N.A.	20/15.0	N.A.	20/15.0	20/15.0
** Approximate Forward Dynamic Resistance		Ohms	5	20	30	30	25
Maximum Reverse Leakage Current, at -3.0 Volt		μA	10	10	10	10	10
Capacitance at V = 0		pf	200	50	50	50	50

Absolute Maximum Ratings at 25° C		Units	C-1 GaAsP/GaAs Red	C-2 GaP/GaP Red	C-3 GaAsP/GaP Red	C-4 GaAsP/GaP Yellow	C-5 GaP/GaP Green
Storage Temp Range		°C Min/Max	-55/+100	-55/+100	-55/+100	-55/+100	-55/+100
Operating Temp Range		°C Min/Max	-55/+100	-55/+100	-55/+100	-55/+100	-55/+100
* Max. Continuous Forward Current		mA	50	40	40	30	40
Maximum Applied Voltage, for 5 Volts/12.0 Volts Resistor LEDs Only		Volts	7.5/N.A.	7.5/15.0	7.5/N.A.	7.5/15.0	7.5/15.0
Maximum Continuous Power Dissipation		mW	100	100	115	115	115
Maximum Continuous Power Dissipation for 12 Volt Resistor LEDs Only		mW	N.A.	100	N.A.	100	100
Derate Linearly From 25° C		mW/°C	1.5	1.3	1.5	1.5	1.5
Peak Forward Current at 1μs, 300 pps		A	1.0	1.0	1.0	1.0	1.0
Peak Reverse Voltage		Volts	5.0	5.0	5.0	5.0	5.0
Lead Solder Temperature, 5 Sec. Immersion 1/16 Inch from Case		°C	260	260	260	260	260

Absolute Maximum Ratings at 25° C		Units	C-6 GaAsP/GaAs Red	C-7 GaP/GaP Red	C-8 GaAsP/GaP Red	C-9 GaAsP/GaP Yellow	C-10 GaP/GaP Green
Storage Temp Range		°C Min/Max	-55/+100	-55/+100	-55/+100	-55/+100	-55/+100
Operating Temp Range		°C Min/Max	-55/+100	-55/+100	-55/+100	-55/+100	-55/+100
Max. Continuous Forward Current		mA	50	30	30	30	30
Maximum Continuous Power Dissipation		mW	100	100	100	100	100
Derate Linearly From 25° C		mW/°C	1.5	1.5	1.5	1.5	1.5
Peak Forward Current, at 1μs, 300 pps		A	1.0	1.0	1.0	1.0	1.0
Peak Reverse Voltage		Volts	5.0	5.0	5.0	5.0	5.0
Lead Solder Temperature, 5 Sec. Immersion 1/16 Inch from Case		°C	260	260	260	260	260

\*Applies only to standard LED lamps. Does not apply to resistor LEDs.

See Page 14 for Typical Characteristic Curves.

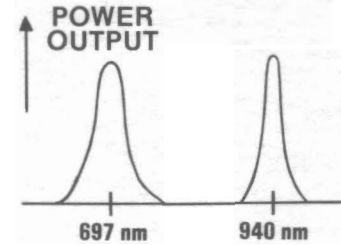
\*\*Does not apply to Resistor Lamps.

# HIGH OUTPUT INFRARED AND VISIBLE EMITTERS

Xciton offers a variety of high power output LED emitters in both the visible (697 nm) and infrared (940 nm) regions of the optical spectrum. These emitters are optically, electrically, and physically optimized for use in applications that require rugged, solid state sources of optical radiation.

These devices are used to advantage in:

- |                       |                        |                  |
|-----------------------|------------------------|------------------|
| SOLID STATE RELAYS    | OPTICAL ENCODERS       | DOOR OPENERS     |
| SMOKE DETECTORS       | HIGH VOLTAGE ISOLATORS | INTRUSION ALARMS |
| SILICON COUPLERS      | OPTICAL SWITCHES       | LEVEL INDICATORS |
| CdS and CdSe COUPLERS | REFLECTIVE TRANSDUCERS | REMOTE CONTROLS  |



## 1. INFRARED EMITTERS (See Page 14 for Typical Characteristic Curves)

The Xciton IR emitters are constructed from liquid phase epitaxial (LPE) Gallium Arsenide. They emit at 940 nm and are characterized by:

- High power output—up to 8 mW at 100 mA drive.
- Low forward voltage drop—1.75 Volts Maximum at 100 mA.
- An excellent spectral match to silicon photodetectors.

The following package styles are available:

### Plastic Lens/Lead Frame Construction

Application Features:

- Cost effective.
- Maximum output power. The plastic lens maximizes optical efficiency.
- Moderate power dissipation.
- Commercial environmental specs.
- $\pm 12^\circ$  alignment of optical and mechanical axes.

#### XC-940

- T-1 $\frac{1}{2}$  outline, plastic lens with internal LED die reflector cup.
- Narrow output beam angle—typically  $24^\circ$

#### XC-941

- T-1 $\frac{1}{2}$  outline, plastic lens with internal LED die reflector cup.
- Moderately wide output beam angle—typically  $50^\circ$  Optimized for use with external optics.

### Hermetic TO-46 Construction

#### XC-55-P Series

- High dome, focused lens—narrow beam pattern
- Large IR LED dice are used to maximize power dissipation capability.
- Standard units are supplied sorted by total power output at 100 mA drive.
- Available sorted by on-axis peak radiant intensity on special order.

#### XC-55-F Series

- Flat window, no focus lens—wide beam pattern.
- Generally used with external optics.
- Large IR LED dice are used to maximize power dissipation capability.
- Standard units are supplied sorted by total power output at 100 mA drive.

## 2. VISIBLE EMITTERS

The Xciton visible emitters are constructed from liquid phase epitaxial (LPE) Gallium Phosphide. They emit red light at 697 nm and are characterized by:

- High visible power output—up to  $300 \mu\text{W}$  at 10 mA drive.
- Useful power output at very low drive levels.
- Effective spectral coupling to CdS and CdSe photoconductors.
- Excellent coupling to silicon photodetectors.

The following package styles are available:

### Plastic Lens/Lead Frame Construction

#### XC-02

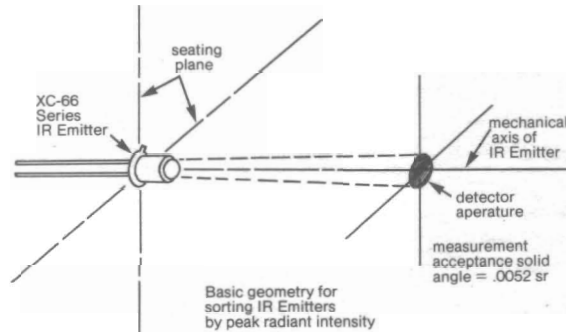
- T-1 miniature outline, plastic lens. Typical body diameter of .125 inch (3.18 mm).

#### XC-06

- T-1 $\frac{1}{2}$  plastic lens with truncated, .190 inch (4.83 mm) overall height.
- Designed for encapsulation when closely coupled to photoconductive detectors.
- Ideal for module and solid state relay applications.

#### XC-1209

- T-1 miniature outline, plastic lens. Typical body diameter of .125 inch (3.18 mm).
- Useful in those applications where space is at a premium. Moderate power outputs are attainable.



#### XC-66 Series

- Specially constructed to maximize on-axis peak radiant intensity.
- Special IR LED dice are used to maximize peak radiant intensity.
- Moderate power dissipation capability.
- XC-66-25, sorted to a minimum on-axis radiant intensity of 25mW/steradian at 100 mA.
- XC-66-10, sorted to a minimum on-axis radiant intensity of 10 mW/steradian at 100 mA.

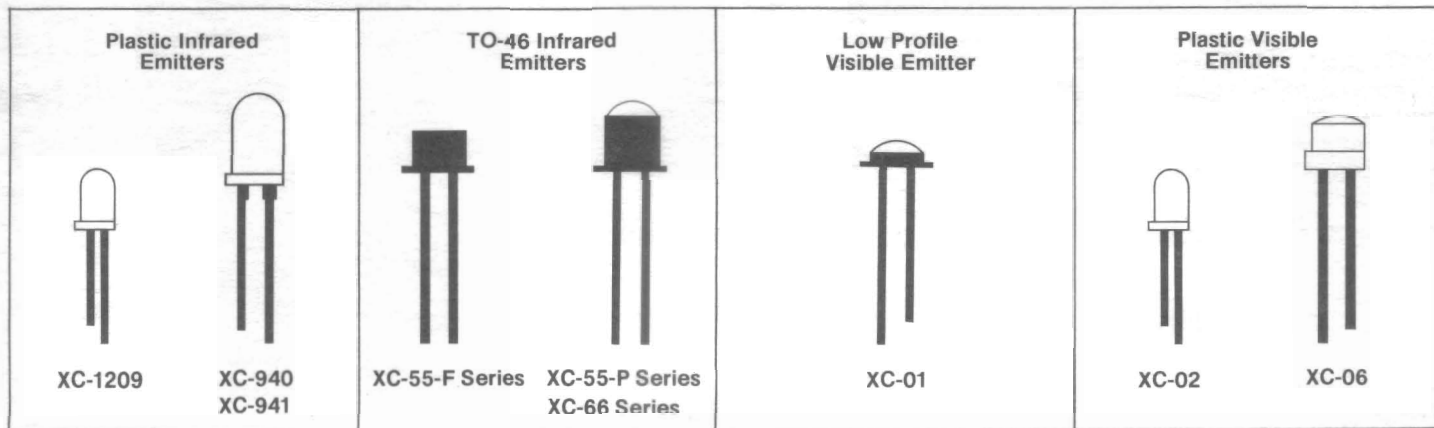
### Header Construction/Plastic Lens

#### XC-01

- TO-46 Header, non-hermetic plastic lens.
- Low profile—.105 inch (2.67 mm) maximum height.
- Excellent coupling efficiency to photoconductive films.
- Flexible wire leads.

*CUSTOM SERVICE: Custom power output grading, radiant intensity grading, environmental stressing, burn-in, and custom packages are available. Xciton can supply custom engineered units for those applications that require non-standard emitters.*

# HIGH OUTPUT INFRARED AND VISIBLE EMITTERS



OPTOELECTRONIC CHARACTERISTICS @ 25° C		UNITS	940 nm INFRARED EMITTERS						697 nm VISIBLE EMITTERS		
			Plastic Package		TO-46 Hermetic Package				Plastic Package		
			XC-1209	XC-940 XC-941	XC-55-PA XC-55-FA	XC-55-PB XC-55-FB	XC-55-PC XC-55-FC	XC-66-10 XC-66-25	XC-01	XC-02	XC-06
Package Outline See Pages 15 & 16			B	E	K Q	K Q	K Q	K	J	B	R
Power Output: XC-66 measured in mW/SR. All others measured in mW.	MIN	mW @ mA	.5 @ 20	.5 @ 20	1.0 @ 100	2.5 @ 100	3.3 @ 100	10 @ 100 <sup>2</sup> 25 @ 100 <sup>3</sup>	.05 @ 10	.05 @ 10	.05 @ 10
	TYP	mW @ mA	1.5 @ 20	1.5 @ 20 <sup>1</sup> 8.0 @ 100 <sup>1</sup>	3.0 @ 100	5.0 @ 100	6.0 @ 100	17 @ 100 <sup>2</sup> 30 @ 100 <sup>3</sup>	.30 @ 10	.30 @ 10	.30 @ 10
Temp Coef of Power Output, 25°C		%/°C	-.53	-.53	-.53	-.53	-.53	-.53	-1.0	-1.0	-1.0
Forward Voltage	TYP	V @ mA	1.2 @ 20	1.2 @ 20	1.35 @ 100	1.35 @ 100	1.35 @ 100	1.35 @ 100	2.0 @ 10	2.0 @ 10	2.0 @ 10
	MAX	V @ mA	1.6 @ 20	1.6 @ 20	1.75 @ 100	1.75 @ 100	1.75 @ 100	1.7 @ 100	2.4 @ 10	2.4 @ 10	2.8 @ 10
Temp Coef of Forward Voltage	TYP	mV/°C	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8
Dynamic Resistance	TYP	Ohms	1.0	1.0	.6	.6	.6	1.0	15	15	30
Angle Between Half Power Intensity Points	TYP	Degrees	45°	24°	10°	10°	10°	10°	80°	45°	75°
				50°	65°	65°	65°				
Peak Wavelength/Line Half Width	TYP	nm	940/50	940/50	940/50	940/50	940/50	940/50	697/95	697/95	697/95
Reverse Current	MAX	μ A @ V	10 @ -3.0	10 @ -3.0	10 @ -2.0	10 @ -2.0	10 @ -2.0	10 @ -2.0	10 @ -5.0	10 @ -3.0	10 @ -3.0
Response Time (10% to 90%)	RISE	ns	300	300	300	300	300	300	500	500	500
	FALL	ns	200	200	200	200	200	200	500	500	500
<b>ABSOLUTE MAXIMUM RATINGS @ 25° C</b>											
Average Power Dissipation		mW	75	100	250	250	250	150	150	90	100
Derate Linearly from 25° C		mW/°C	-1.0	-1.5	-2.5	-2.5	-2.5	-1.5	-2.2	-1.2	-1.3
Average Forward Current		mA	45	60	150	150	150	100	50	30	30
Reverse Voltage		V	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0
Operating, Storage, or Process Temp. Range		°C	-55/+85	-40/+85	-65/+125	-65/+125	-65/+125	-65/+125	-40/+85	-55/+85	-55/+85
Solder Temp: 5 sec, 1/16" From Case		°C	260	260	260	260	260	260	260	260	260
Peak Pulse Current 1.0 μ sec Duration, 300 pps		A	1.0	1.5	10.0	10.0	10.0	4.0	1.0	1.0	1.0

Typical Characteristic Curves of High Output Infrared Emitters on Page 14.

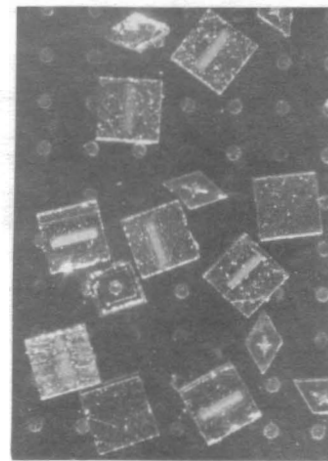
1. Applies to Both XC-940 and XC-941.
2. Applies Only to XC-66-10.
3. Applies Only to XC-66-25.

# LIGHT EMITTING MATERIALS

## EPITAXIAL WAFERS AND DICE

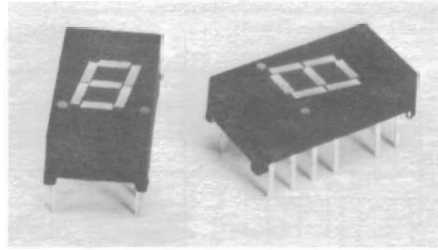
Xciton is a volume supplier of light emitting materials. Popular forms are epitaxial wafers and finished LED dice. Tens of millions of units have been sold worldwide. These are the same materials that are used in finished Xciton LED indicators and numerics. They fit the important criteria of predictability and yield.

Contact Xciton for detailed information, price, delivery, and support.



TYPE OF LIGHT EMISSION	DICE DESCRIPTION
<b>Infrared</b> <i>High Power</i>	<p><b>Gallium Arsenide</b> infrared emitting LED dice fabricated by Liquid Phase Epitaxy (LPE). High output power at 940 nm. Particularly useful in high performance couplers, reflective transducers, optical switches, and encoders.</p> <p>CXC-1210-IRM Die Size .012 x .010 inch (.305 x .254 mm) Wire bonding pad is cathode (-).</p> <p>CXC-1212-IRM Die Size .012 x .012 inch (.305 x .305 mm) Wire bonding pad is anode (+).</p> <p>CXC-1818-IRM Die size .018 x .018 inch (.457 x .457 mm) Wire bonding pad is cathode (-).</p>
<b>Red</b> <i>Superior Output at Low Drive Currents</i>	<p><b>Gallium Phosphide</b> LED dice fabricated by Liquid Phase Epitaxy (LPE). High radiometric output power at 697 nm. Used to advantage in constructing photocouplers with CdS detectors. Also used to make high luminous output LED lamps and numerics that operate at low drive currents. Red GaP is a good driver for silicon detectors in applications that require a visible beam.</p> <p>CXC-1012-R Die size: rhomboid, nominal 120 sq. mil junction area. Wire bonding pad is anode (+). For ultrasonic wire bonding.</p> <p>CXC-1012-RM Die size: rhomboid, nominal 120 sq. mil junction area. Wire bonding pad is anode (+). For thermocompression wire bonding.</p> <p>CXC-1515-R Die size: nominal .015 x .015 inch (.381 x .381 mm). Wire bonding pad is anode (+). For ultrasonic wire bonding.</p> <p>CXC-1515-RM Die size: nominal .015 x .015 inch (.381 x .381 mm). Wire bonding pad is anode (+). For thermocompression wire bonding.</p>
<b>Green</b> <i>The World's Brightest</i>	<p><b>Gallium Phosphide</b> on GaP substrate; liquid phase epitaxy. This is the world's highest output green emitting material. Used to make high photometric output LED lamps and displays. Emission is at 565 nm.</p> <p>CXC-1012-G Die size: rhomboid, nominal 120 sq. mil junction area. Wire bonding pad is anode (+). For ultrasonic wire bonding.</p> <p>CXC-1012-GM Die size: rhomboid, nominal 120 sq. mil junction area. Wire bonding pad is anode (+). For thermocompression wire bonding.</p> <p>CXC-1414-G Die size: square, nominal .014 x .014 inch (.356 x .356 mm). Wire bonding pad is anode (+). For thermocompression wire bonding.</p>
<b>Custom LED Dice</b>	<p>Xciton is a volume supplier of many types of custom designed dice. Contact Xciton for applications assistance and quotations.</p>
<b>Epitaxial Wafers</b>	<p>The epitaxial wafers, which are used to construct most of the above types of dice, are available from Xciton.</p>

# LED NUMERIC DISPLAYS



- Industry standard
- Compact size (see page 16), mechanically rugged
- Choice of 2 colors; High Efficiency Green Standard Red 655 nm GaAsP/GaAs
- Brightness category selection available (see page 17)
- Easy mounting on PC Board or in sockets
- Designed for use in Instruments, Point Of Sale Terminals, Process Control Read-Outs.
- Other display sizes available. Consult Xciton.

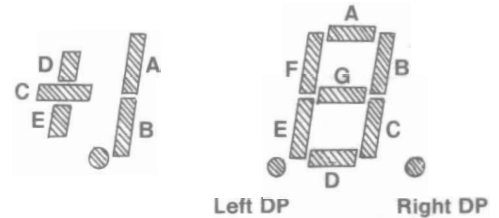
## .3 INCH (7,6 mm) LED NUMERIC DISPLAYS

ELECTRICAL/OPTICAL CHARACTERISTICS AT 25° C		Units	High Efficiency Green GaP/GaP		Std Red GaAsP/GaAs		
			XAN-3051 3052		XAN-3061 3062		
			3053 3054		3063 3064		
Peak Wavelength		nm	565		655		
Line Halfwidth		nm	30		40		
Luminous Intensity Per Seg (Digit Ave) (1)	Min	μcd @ mA	130 10		130 20		
	Typ	μcd @ mA	500 10		450 20		
Luminous Intensity with all Segments Lighted (2)		Typ	mcd @ mA	3.5 10		3.1 20	
Temperature Coefficient of Luminous Intensity			%/°C	-1.0		-2.0	
Forward Volt per Segment or D.P. (3)	Typ	Volts @ mA	2.2 10		1.7 20		
	Max	Volts @ mA	2.8 10		2.0 20		
Dynamic Resistance		Typ	Ohms	25		5	
Temp. Coef of Fwd Voltage			mV/°C	-2.0		-2.0	
Maximum Reverse Current per Segment or D.P., at -3 Volts			μA	10		10	
Response Time (Nominal) 10%-90%			ns	100		15	

## ABSOLUTE MAXIMUM RATINGS AT 25° C

Operating and Storage Temp Range	°C	-30 to +85
D.C. Power Dissipation per Segment or D.P.	mW	50
Derate Linearly from 25°C (per Seg or D.P.)	mW/°C	6
Maximum Average Forward Current per Segment or D.P.	mA	25
Maximum Peak Forward Current per Segment or D.P., 200 μsec Maximum	mA	120
Peak Reverse Volt per Segment or D.P.	Volts	5

See Page 16 for Package Dimensions and Page 17 for Brightness Categories.

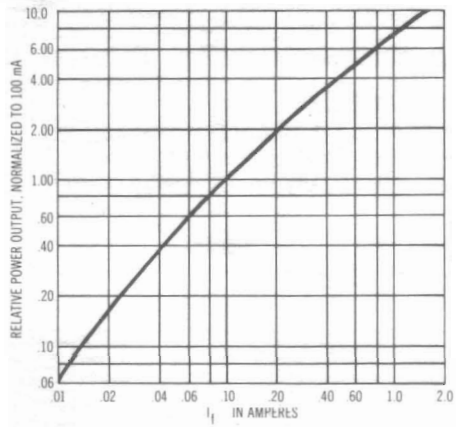


Pin	.3" NUMERICS			.3" OVERFLOW *
	Common Anode Left Decimal	Common Anode Right Decimal	Common Cathode Right Decimal	Common Anode Left Decimal
	XAN-3052 XAN-3062	XAN-3051 XAN-3061	XAN-3054 XAN-3064	XAN-3053 XAN-3063
1	Cathode A	Cathode A	Anode F	Anode C, D
2	Cathode F	Cathode F	Anode G	No Pin
3	Common Anode	Common Anode	No Pin	No Pin
4	No Pin	No Pin	Common Cathode	Internal Conn.
5	No Pin	No Pin	No Pin	No Pin
6	Cathode DP	NC	Anode E	No Pin
7	Cathode E	Cathode E	Anode D	Cathode E
8	Cathode D	Cathode D	Anode C	Cathode C
9	NC	Cathode DP	Anode DP	Cathode DP
10	Cathode C	Cathode C	No Pin	Cathode B
11	Cathode G	Cathode G	No Pin	Cathode A
12	No Pin	No Pin	Common Cathode	No Pin
13	Cathode B	Cathode B	Anode B	No Pin
14	Common Anode	Common Anode	Anode A	Anode A, B, DP

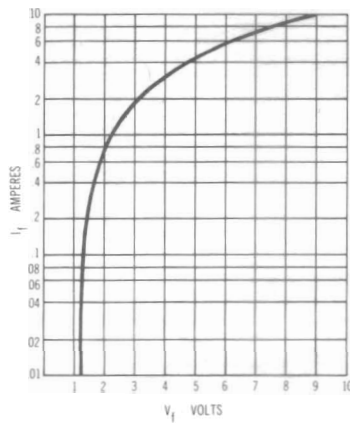
\*.3 Overflow Segments D and E are Electrically Connected in Series.

- (1) The Luminous Intensity of Decimal Points and Overflow Digit C, D, E Segments is typ. 1/5 to 1/3 of the Luminous Intensity of a Segment.
- (2) Maximum variation in seg to seg brightness is 2.5:1 within a digit.
- (3) Segments D and E of the overflow digit are operated in series. The typ. and max. forward voltages are, therefore, two times greater than the table values.
- (4) Lead soldering temperature: 260°C maximum for 5 seconds, 1/16 inch from plastic.

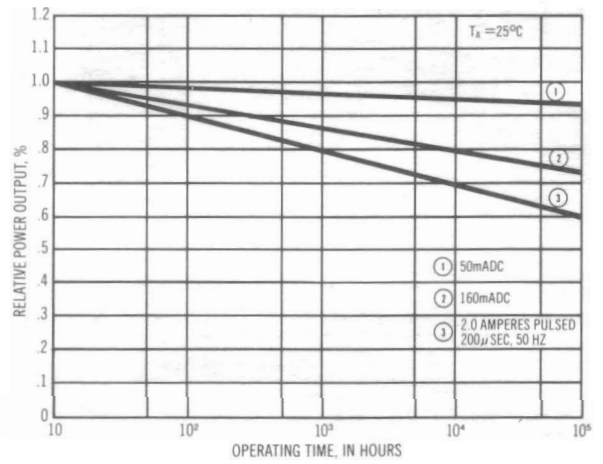
# TYPICAL CHARACTERISTIC CURVES



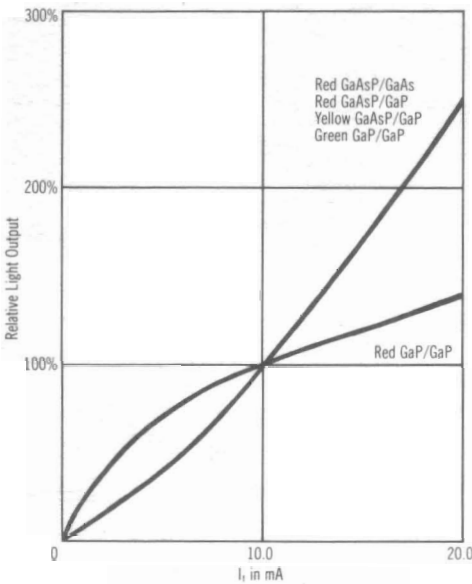
TYPICAL INSTANTANEOUS POWER OUTPUT VS FORWARD CURRENT @ 25°C  
XC-55-F AND XC-55-P SERIES



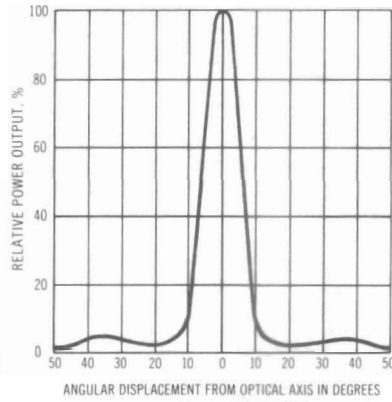
TYPICAL FORWARD VOLTAGE VS FORWARD CURRENT AT 25°C  
XC-55-F AND XC-55-P SERIES



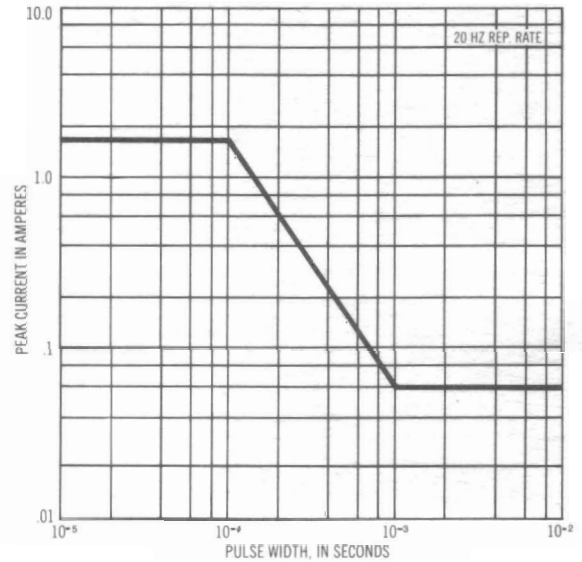
TYPICAL POWER OUTPUT DEGRADATION VS TIME,  
XC-55-P SERIES



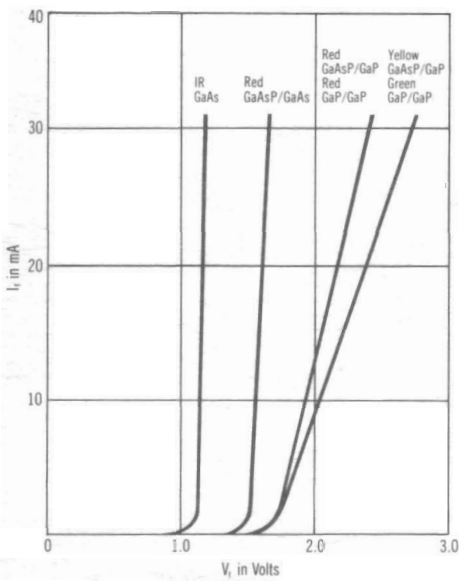
RELATIVE LIGHT OUTPUT VS. FORWARD CURRENT  
NORMALIZED TO 10 mA.



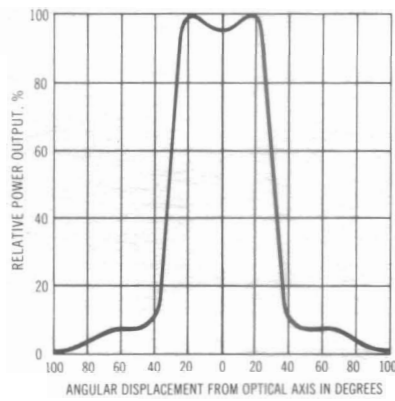
TYPICAL RADIATION PATTERN  
XC-55-P SERIES



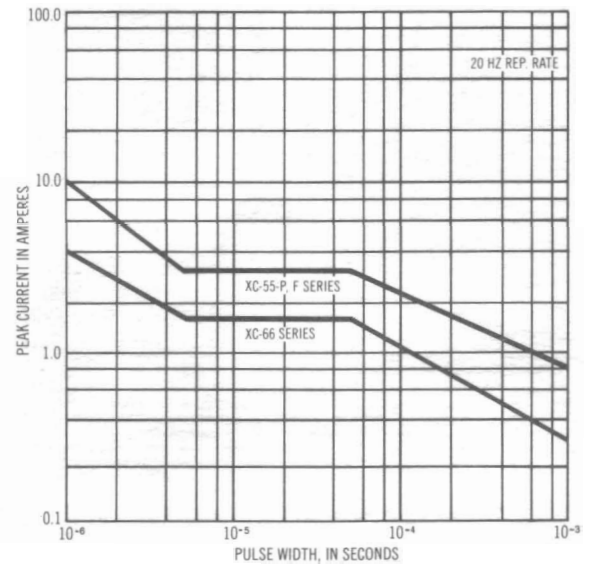
MAXIMUM PEAK PULSE CURRENT VS PULSE WIDTH,  
XC-940/XC-941



APPROXIMATE FORWARD CURRENT VS. FORWARD VOLTAGE.



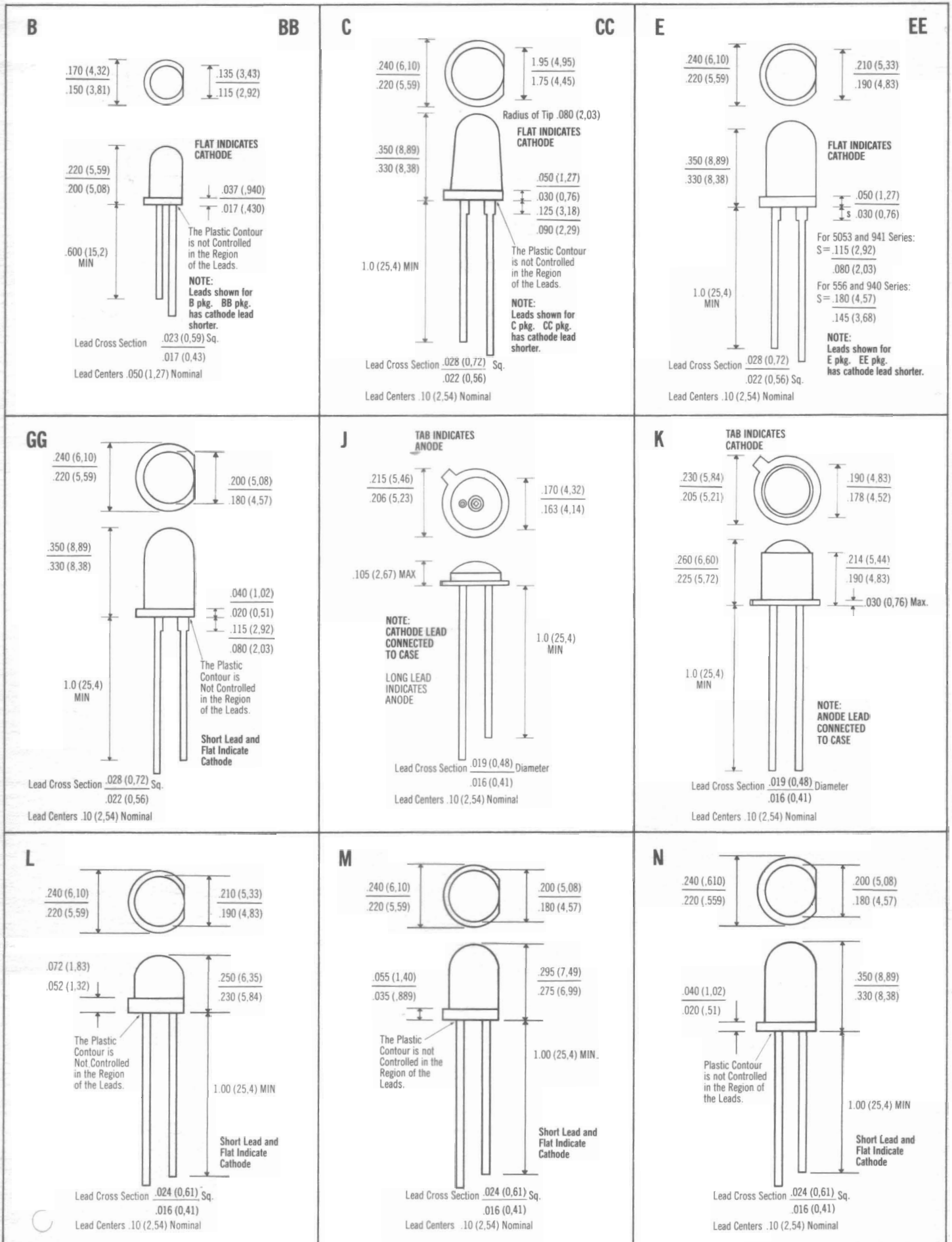
TYPICAL RADIATION PATTERN  
XC-55-F SERIES



MAXIMUM PEAK PULSE CURRENT VS PULSE WIDTH,  
TO-46 IR PACKAGE

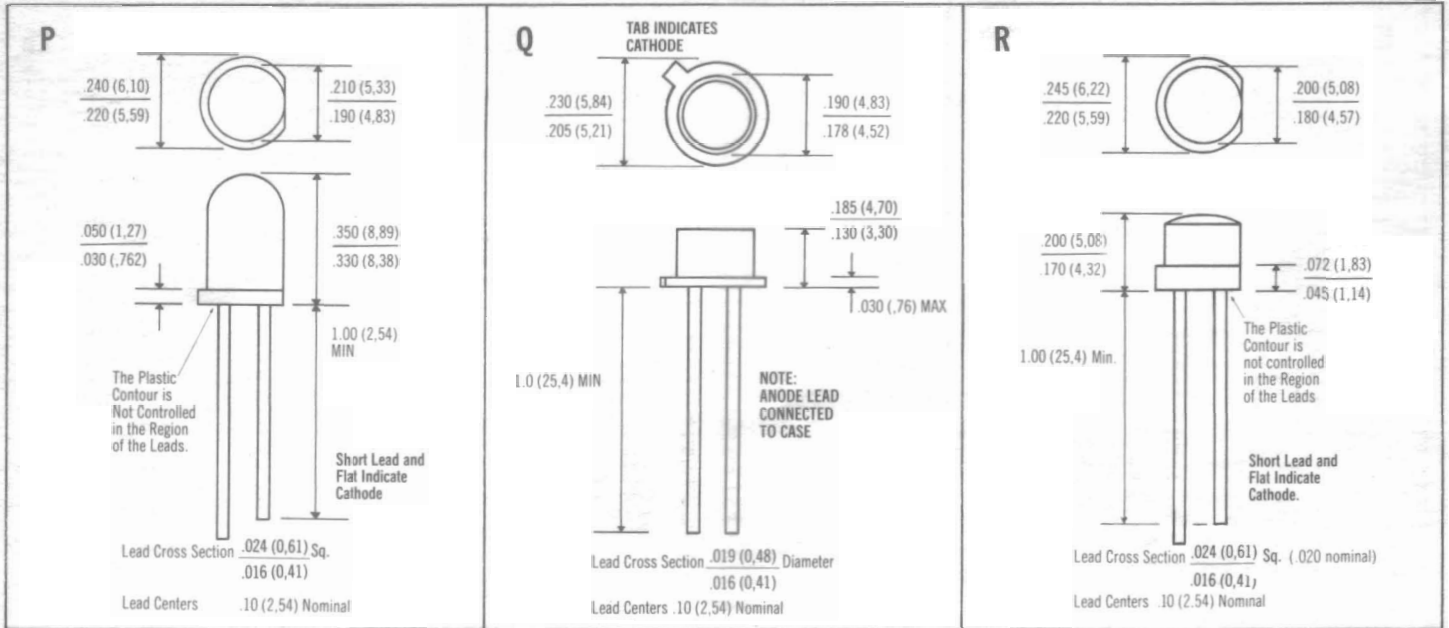


# PACKAGE DIMENSIONS

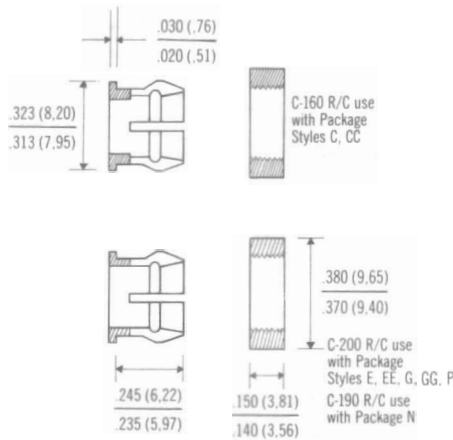


DIMENSIONS IN INCHES (mm)

# PACKAGE DIMENSIONS

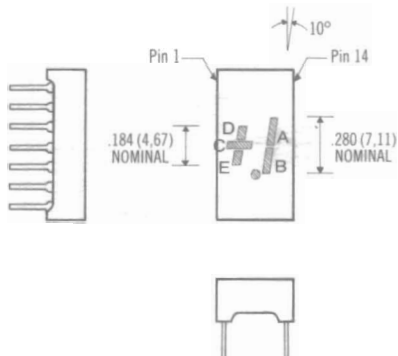


## MOUNTING RINGS (R) AND CLIPS (C)

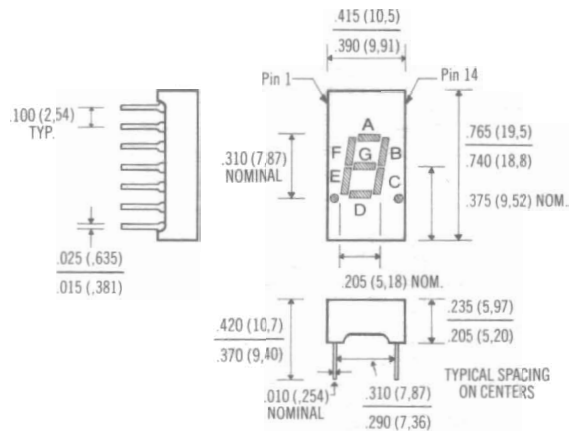


C-160, C-190 AND C-200 R/C CAN BE USED WITH PANELS UP TO .125 INCH (3.18 mm) THICK. DRILL .257 INCH DIA. (6.53 mm) HOLE ("F" DRILL).

## .3 INCH (7.6mm) OVERFLOW



## .3 INCH (7.6mm) NUMERIC



DIMENSIONS IN INCHES (mm)

# BRIGHTNESS CATEGORIES FOR XCITON LED NUMERIC DISPLAYS

XAN-3000 numerics have the brightness category ("bin") indicated by a color dot on the top side of the numeric case.

.3 Inch, XAN-3000 Series Color Dot	Average Luminous Intensity Per Segment, Microcandela (2)
Red	130- 220
Orange	182- 308
Yellow	255- 431
Green	356- 604
Blue	499- 845
White	698-1184

Notes: (1) High performance Green GaP chip numerics are measured at a D.C. drive current of 10 mA/segment. Standard Red GaAsP chip numerics are measured at a D.C. drive current of 20 mA/segment.

- (2) The quoted average luminous intensity/segment is measured by driving all seven (7) segments at the indicated D.C. current, measuring the total luminous intensity and arithmetically dividing the total value by seven (7).  
 (3) Because of its substantially smaller area, the decimal point has a lower luminous intensity than a typical segment. Typically, the D.P. intensity is 1/4 of the segment intensity.  
 (4) Typical maximum/minimum segment luminous intensity ratio with a digit is 1.7:1 or better. The maximum value of this ratio is 2.5:1.  
 (5) Generally, any two adjacent brightness categories can be mixed when combining digits into arrays.

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1. *Payment terms:* Net 30 days.

2. *FOB point and title passage:* Latham, NY

3. *Minimum billing:* \$100.00

4. *Warranty:*

Xciton's optoelectronic components are warranted against defects in material and workmanship for a period of one year from the date of shipment. Xciton will replace components that prove to be defective in material or workmanship under proper use during the warranty period. This warranty extends only to Xciton customers.

**No other warranties are expressed or implied, including but not limited to, the implied warranties or merchantability and fit-**

**ness for a particular purpose. Xciton is not liable for consequential damages.**

5. *Buyer Inspection:*

Buyer has 30 days from date of receipt of the product in which to perform an inspection. Unless the buyer so notifies Xciton in writing within 30 days of the nature of claims and adjustments, the buyer will have waived the right to return product, except for defects in material and workmanship expressed within the warranty. Returned product shall be subject to a 15% restocking charge, FOB destination, and prepaid.

6. Xciton reserves the right to make changes at any time to improve design and to supply the best product available. Xciton cannot assume responsibility for any circuits shown or represent that they are free from patent infringement.

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