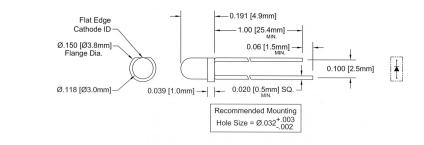
DISCRETE LEDS T-1 (3mm), T-1³/4 (5mm) UV LEDs



- Highly Efficient InGaN Materials Produce the Industry's Greatest Radiant Flux at 12mW
- Ideally Suited to Currency Validation, Medical, Test and Measurement and Security Applications
- Life: 1,000 Hours
- LEDs are Not Safe for Direct Viewing AEL Class 3 per IEC 825-1, EN-60825-1, EN60825-2 (Do not look directly at the light source)

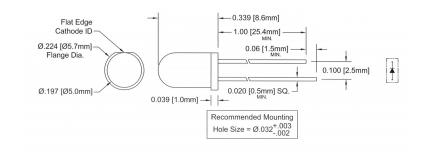
LED3-UV-XXX-30 Series			3mm Ultra	violet LED								
		Chip			Ab	solute I	Max. Ra	tings		ectro-O ata @20		Viewing
LED Part No.	LED Part No. Peak Wave			Lens					Vf		Iv	Angle
	Material	Length	Emitted Color	Appearance	Δλ	Pd	lf	Peak	(V)	(mcd)	2 θ 1/2
		λ p(nm)			(nm)	(mW)	(mA)	If (mA)	TYP	MAX	TYP	(deg)
LED3-UV-395-30	InGaN	395	BLUE UV	WATER CLEAR	60	100	30	100	3.7	4.0	11.0	30
LED3-UV-400-30	InGaN	400	BLUE UV	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30
LED3-UV-405-30	InGaN	405	BLUE UV	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30





LED5-UV-XXX-30 Series	5mm Ultraviolet LED

Chip					Ab	solute I	Max. Ra	atings		ctro-O ata @20		Viewing
LED Part No.	Material	Peak Wave Length λp(nm)	Emitted Color	Lens Appearance	Δλ (nm)	Pd (mW)	lf (mA)	Peak If (mA)	(/f V) MAX	lv (mcd) TYP	Angle 2 θ 1/2 (deg)
LED5-UV-395-30	InGaN	395	BLUE UV	WATER CLEAR	60	100	30	100	3.7	4.0	11.0	30
LED5-UV-400-30	InGaN	400	BLUE UV	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30
LED5-UV-405-30	InGaN	405	BLUE UV	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30



CAUTIONS: EMITS ULTRAVIOLET RADIATION

This device radiates intense ultraviolet (UV) light when operated. Exposure to UV radiation can be harmful to your health. Protect your eyes and skin during operation. Do not look directly at the device during operation. Exposure to UV light, even for a brief period, can damage your eyes. Do not operate the device unless you have had proper safety training and take appropriate precautions. **Do not permit children or untrained personnel to operate the device**.

Bivgf. Inc. *Complete UV Specifications*





Bivar, Inc. 4 Thomas Irvine, CA 92618 1-800-772-2377 www.bivar.com - info@bivar.com

Understanding a little more about UV

Ultraviolet radiation (UV) is only a small portion of the radiation we receive from the sun, but has a large impact on all biological activity here on Earth. BivarOpto solid state UV emitters can produce up to 12mW of 400nm UVA radiation for specialized applications that in the past relied upon large high-voltage incandescent/filament lamps. We have provided special cautions for users in order to avoid miss-use. Prolonged exposure or miss-use of any UV light source carries with it some potential health risks. Physical Definition

All radiation from our sun travels in the form of electromagnetic waves and is characterized as solar (originating with the Sun) radiation. Solar Radiation is measured in terms of wavelength with is the distance between two points of identical phase in a successive cycle of the wave and expressed in nanometers, one-billionth of a meter. Wavelengths just short of the visible spectrum (410nm-790nm) are classified as Ultraviolet (UV). UV is defined as all radiation between 100 and 400nm. Although there are other sources of UV radiation, such as welding arcs, incandescent lamps and LEDs, most UV Radiation that you will come in contact with is from our sun.

The UV portion of daylight accounts for less than 10% of the total energy output from our sun and the majority of this is absorbed or scattered back into space by the protective shield of our atmosphere. This results in very little UV radiation actually reaching the surface of the Earth.

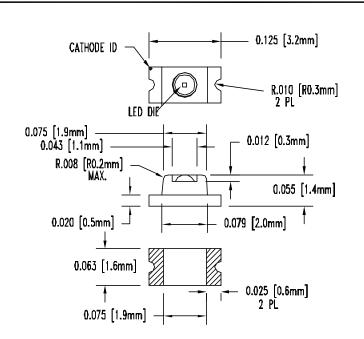
Ultraviolet radiation is classified in three groups:

- UVA 320-400nm: the most prevelant form of UV Radiation (and the dominant wavelength of BivarOpto UV LEDs)
- UVB 280-320nm: most of this energy is absorbed in our atmosphere. UVB can be generated with incandescent sources and has medical (germicidal) applications.
- UVC 100-280nm: nasty radiation and very little of it reaches the Earth's surface. (protect that ozone layer or we will all be growing extra limbs and learning to live in caves again!)

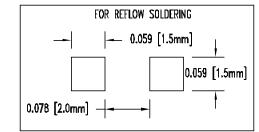
UV Effects

UV has a variety of effects on plants, animals, and materials here on Earth and frankly, most of them aren't good. UV is known to negatively affect commonly used materials such as plastics that we rely on to provide us everything from lighter cars to cheap lawn furniture. While stratospheric and tropospheric chemistry finds UV its main catalyst, the majority of UV's effects that have been studied involve the impact of UV on general biology. These effects can range from human health impacts to impacts on single cell organisms. Underlying many of these studies is the fact that each UV photon has more energy than most other photons normally encountered in nature. UV wavelengths, particularly those in the UVB range, can efficiently break DNA bonds. While some studies have shown that UVA, can actually assist in repairing some forms of DNA damage. The one thing for sure it that the shorter the wavelength the greater and more damaging are the potential effects.

According to a paper written by E. C. Weatherhead and A.R. Webb (from which most of this paper has been "borrowed"), the most well-known effects of UV on carbon based life forms (that's you and I) include the nefarious sunburn and snow blindness (photokeratitis). UV has also been linked to skin cancers, immune suppression, and cataract formation as well as a number of dermatological and ocular problems. These effects have been observed either in controlled laboratory experiments or from epidemiological studies. These studies can help to explain, for instance, the differences in skin cancer incidence by latitude.



REV	DESCRIPTION	DATE	APPROVED
A	ENGINEERING RELEASE.	05/19/03	MC



CAUTIONS: EMITS ULTRAVIOLET RADIATION !!

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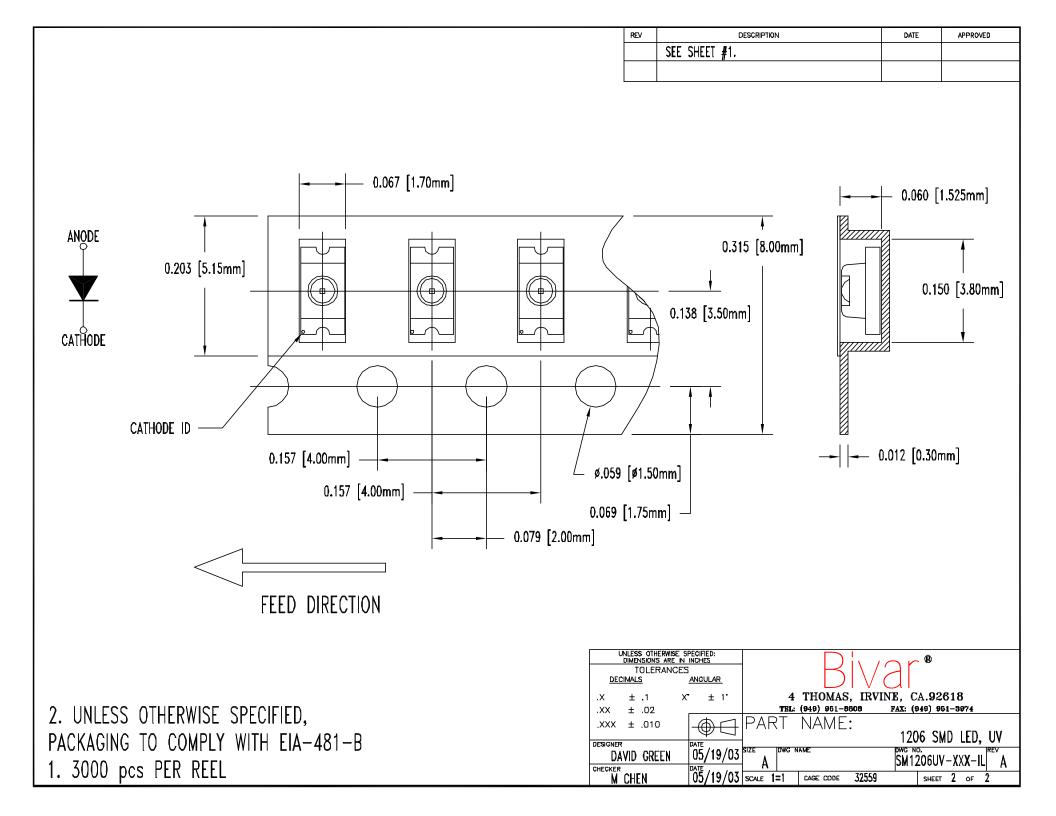
LED	LED Chip							Absol	ute Maxi	mum Ri	atings	Ele	Viewing Angle			
Part No.	Material			Wave Length Dom. Wave Length		Dom. Wave Length $\lambda d \langle \Pi m \rangle$	Lens Appearance	\bigtriangleup Pd If		lf (Typ)	lf (Typ) Peak(If)		Vf(V)		Radiant Optical Flux Rise Time	
		Color	Min.	Тур.	Max.	Тур.		(nm)	(mW)	(mA)	(mA)	Тур.	Max.	P(mW)	(t,ns)	(Deg.)
SM1206UV-395-IL	InGaN	BLUE UV	390	395	400	430	WATER CLEAR	60	100	30	100	3.7	4.0	11.0	30	70
SM1206UV-400-IL	InGaN	BLUE UV	390	400	410	430	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30	70
5M1206UV-405-IL	InGaN	BLUE UV	400	405	410	430	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30	70

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

ELECTROSTATIC DISCHARGE THRESHOLD (HBM)	1000V
ELECTROSTATIC DISCHARGE CLASSIFICATION (MIL-STD-883E)	CLASS 2 (CLASS 1 FOR UV)
LED JUNCTION TEMPERATURE	125°C
REVERSE VOLTAGE	5V
REVERSE CURRENT (V _R =5V)	10uA
OPERATING TEMPERATURE RANGE	-25°C ~ 85°C
STORAGE TEMPERATURE	-30° C \sim 100°C
LEAD SOLDERING TEMPERATURE(1/16" FROM BODY)	260°C FOR 5 SECONDS

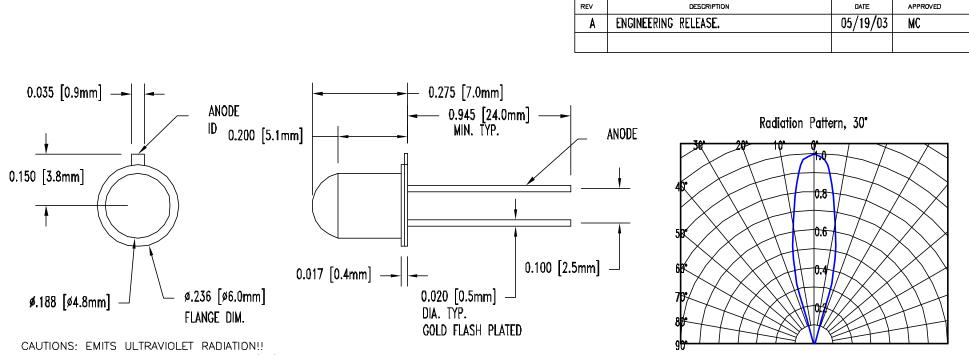
Product resistance to electrostatic discharge (ESD) is measured by simulating ESD using a rapid avalanche enrgy test (RAET). The RAET procedures are designed to approximate the maximum ESD ratings shown. Seller gives no other assurances regarding the ability of Products to withstand ESD.

UNLESS OTHERWISE S DIMENSIONS ARE IN		
TOLERANCES	5	H H / A
DECIMALS	ANGULAR	
.X ± .1 X	• ± 1•	4 THOMAS, IRVINE, CA.92618
.XX ± .02		TEL: (949) 951-8808 FAX: (949) 951-3974
.XXX ± .010	\square	PART NAME:
	∇	1206 SMD LED, UV
DESIGNER	DATE	
DAVID GREEN	05/19/03	
CHECKER	DATE	
M CHEN	05/19/03	SCALE 1=1 CAGE CODE 32559 SHEET 1 OF 2



									REV		DESCRIP				DATE	APPROVED
									A	ENGINEERIN	G RELEASE			05	/19/03	MC
FLAT EDGE CATHODE ID Ø.150 [Ø3.8mm] FLANGE DIM. CAUTIONS: EMITS This device rad	S ULTRAV	ø.118 [ø3. iolet radi	0.040 0mm] ATION!!	!	0.	M	[25.4mm] IN		.06 [1. CATH		45 55 55 75 80 90		Radiatio	on Pattern, 1-0 0.8 0.6 0.4	30'	
Exposure to UV Do not look dir	radiatior ectly at the devi	1 can be this device ce unless	harmfi durin you h	ıl to j g ope ave h	iour ł ration ad pr	iealth. Protect . Exposure to oper safety tra	your eyes and sk UV light, even for ining and take app ice.	a brief	f perio	d, can d	amage y	your ey	es.			
LED			C	Chip				Absoli	ute Ma	iximum Ro	atings	El	ectro-D @ 2	ptical Da OmA	ta	Viewing
Part No.		Emitted		Wave Le	ngth	Dom. Wave Length	Lens Appearance			If (Typ) Peak(If)		Vf(V) Ra		Radiant	Optical	Angle
	Material	Color	Min.	p (nm) Typ.	Max.	∖d (nm) Typ.		(nm)	(mW)		(mA)	Тур.	Max.	- Flux P(mW)	Rise Time (t.ns)	(Deg.)
LED3-UV-395-30	InGaN	BLUE UV	390	395	400	430	WATER CLEAR	60	100	30	100	3.7	4.0	11.0	30	30
LED3-UV-400-30	InGaN	BLUE UV	390	400	410	430	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30	30
LED3-UV-405-30	InGaN	BLUE UV	400	405	410	430	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30	30
ABSOLUTE electrostatic disc electrostatic disc	CHARGE TH	RESHOLD (HE	BM)			1000V		simulat procedu shown.	ing ES ures a Selle	tance to D using o re designe er gives n withstand	a rapid ed to ap o other	avalanci proximo	he enrgy ate the	y test (R maximun	AET). n ESD	The RAET ratings
LED JUNCTION TEMPERATURE 125°C								UN	IMENSIONS	RWISE SPECIFIED: ARE IN INCHES					∽ ®	
REVERSE VOLTAGE						•••		DEGIN	TOLER/ MALS	ANCES <u>ANGULAF</u>	2		Ы	ГЛД		
REVERSE CURRENT									± .1	X• ±	1•		HOMAS,	IRVINE,	CA.92 (949) 82	
OPERATING TEMPERA							~ 85°C		± .02 ± .010	\bigcirc			JAME:			_
STORAGE TEMPERAT							~ 100°C		יוה כפרי)/03 ^{SIZE} /	DWG NAM	E		GNO.	nm) LED, UV
LEAD SOLDERING TE	MPERATUR	E(1/16 FRO	M RODA)		260°C FOR	5 SECONDS	CHECKER	ID GREE	DATE	9/03 SCALE	<u> </u> 1=1 ~		L 32559		-XXX-30 A
								<u> </u>	CHEN		VUJ SCALE	= C	AGE CODE	72223	SHEET	1 of 1

								REV		DESCRIP	TION			DATE	APPROVED
								A	ENGINEERIN	G RELEASE			05	/19/03	NC
Do not look dire	ates inte radiation ectly at the devi	ø.197 (ø5.0) IOLET RADI Inse ultravi In can be h this device ce unless	ATION!! olet (l 1armfu durin you h	.040 [1.0mn JV) light w I to your I g operation ave had pr	hen operated. health. Protect n. Exposure to oper safety trai	1.00 [25.4mm] - MIN. 	in during a brief	g oper	d, can d	1] 45 59 69 89 90	your eye	22	tion Patter	n, 30°	
			C	hip			Absolu	ite Ma	ximum Ro	atings	Ele		otical Da	:0	Viewing
LED		Emitted		Vave Length	Dom, Wave Length	Lens Appearance	$\Delta\lambda$			Peak(If)	Vf	@ 20 (v)		Optical	Angle
Part No.	Material	Color		p (nm) Typ, Max.	λd (nm) Typ.	Lens Appearance	(nm)	(mW)	(mA)	(mA)	Тур.	Max.		lise Time (t,пs)	(Deg.)
LED5-UV-395-30	InGaN	BLUE UV	390	395 400	430	WATER CLEAR	60	100	30	100	3.7	4.0	11.0	30	30
LED5-UV-400-30	InGaN	BLUE UV	390	400 410	430	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30	30
LED5-UV-405-30	InGaN	BLUE UV	400	405 410	430	WATER CLEAR	60	100	30	100	3.7	4.0	12.0	30	30
ABSOLUTE electrostatic disc electrostatic disc	CHARGE TH	RESHOLD (HE	IM)		1000V		simulat procedu shown.	ing ES ures ar Selle	ance to D using a e designa r gives n vithstand	a rapid ed to ap o other	avalanch proxima	ie enrgy te the r	test (R. maximum	AET) <i>.</i> n ESD	The RAET ratings
LED JUNCTION TEMP	LED JUNCTION TEMPERATURE 125°C							LESS OTHER	WISE SPECIFIED: ARE IN INCHES			<u> </u>		B	
REVERSE VOLTAGE					5V		DECIM	TOLERA		<u>र</u>		ΗI	VА		
REVERSE CURRENT	(VR=5V) -				10uA		.x	± .1	X• ±	1'			IRVINE.		
OPERATING TEMPERA	ATURE RAN	GE			——————————————————————————————————————	- 85°C		± .02 ± .010	(A)			19) 951-860 IAME:	DA FAX	: (949) 9	61-3974
STORAGE TEMPERATI						∽ 100°C	DESIGNER	± .010					T-1 3	/ <mark>4 (</mark> 5m	m) LED, UV
LEAD SOLDERING TE	MPERATURI	E(1/16" FRO	M BODY)	260°C FOR	5 SECONDS	CHECKER	<u>id gree</u> :Hen	DATE .	9/03 ^{SIZE} 9/03 scale			DW Ll 32559		-XXX-30 A



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LED						Absol	ute Maxi	imum R	atings	Ele	Viewing					
Part No.	Material	Emitted	Peak \	Vave Le p (nm)		Dom. Wave Length \lambda d (nm)	Lens Appearance	\bigtriangleup	Pd	lf (Тур)	Peak(If)	Vf	(V)	Radiant Flux	Optical Rise Time	Angle
	Waterial	Color	Min.	Тур.	Max.	Тур.		(nm)	<pre>(mW)</pre>	(mA)	(mA)	Тур.	Max.	P(mW)	(t,ns)	(Deg.)
UV-395-T092	InGaN	BLUE UV	390	395	400	430	WATER CLEAR	60	100	30	100	3.7	4.0	5.0	30	30
UV-400-T092	InGaN	BLUE UV	390	400	410	430	WATER CLEAR	60	100	30	100	3.7	4.0	5.6	30	30
UV-405-T092	InGaN	BLUE UV	400	405	410	430	WATER CLEAR	60	100	30	100	3.7	4.0	5.6	30	30

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ELECTROSTATIC DISCHARGE CLASSIFICATION (MIL-STD-883E)	CLASS 2 (CLASS 1 FOR UV)
LED JUNCTION TEMPERATURE	125°C
REVERSE VOLTAGE	5V
REVERSE CURRENT (VR = 5V)	10uA
OPERATING TEMPERATURE RANGE	-25℃ ~ 85℃
STORAGE TEMPERATURE	-30°C ~ 100°C
LEAD SOLDERING TEMPERATURE(1/16" FROM BODY)	260°C FOR 5 SECONDS

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UNLESS OTHERWISE SI DIMENSIONS ARE IN					æ					
TOLERANCES			H	V/AL						
DECIMALS	ANGULAR	DVQ								
.X ± .1 X	' ± 1'	4	THOMAS,	IRVINE, C.	A.9261B					
.XX ± .02			(949) 951-88		49) 951-3974					
.XXX ± .010		PART	NAME:							
				T09	2 UV LED					
DESIGNER	DATE ,	SIZE DWG N	AN 200	DWG N		REV				
DAVID GREEN	05/19/03		MME		-XXX-T092	ĽΔ				
HECKER	DATE	A		01		_ n				
M CHEN	05/19/03	SCALE 1=1	CAGE CODE	32559	SHEET 1 OF	1				