
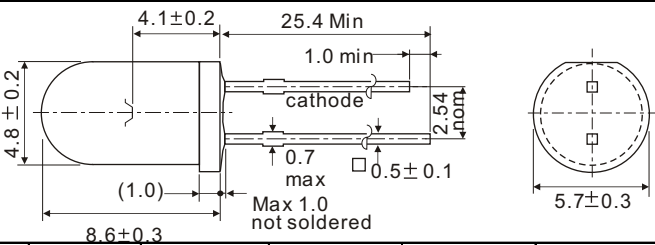



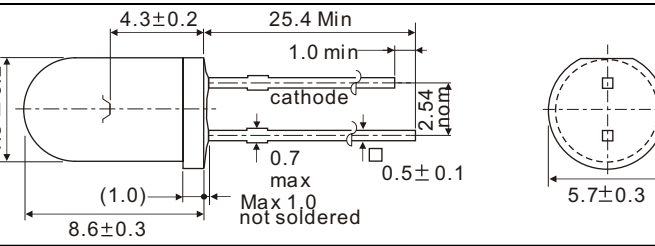
# Extra Bright LEDs

Lamps For Traffic Signal Use.

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	

φ 5									
	HB5d-433BG-C	yellow green	water clear	575	572	2.20	800	1800	24
	HB5d-433BA-C	bluish green	water clear	502	505	3.50	3500	6000	26
	HB5d-433AGCA-C	pure green	water clear	523	525	3.50	4000	6500	26
	HB5d-433AGD-C	pure green	water clear	523	525	3.50	4500	7000	26
	HB5d-434FY-C	yellow	water clear	592	590	2.00	1800	3800	24
	*HB5d-434SY-C	yellow	water clear	592	590	2.00	3000	4800	24
	HB5d-435FO-C	orange	water clear	620	615	2.00	2000	3800	24
	HB5d-435AOR-C	fresh red	water clear	635	626	2.00	1300	3300	24
	*HB5d-435SOR-C	fresh red	water clear	638	629	2.00	4000	4800	24
	HB5d-437FA-C	amber	water clear	607	605	2.00	2400	3800	24
	HB5d-438ABCA-C	blue	water clear	465	470	3.50	2200	2200	26
	HB5d-438ABD-C	blue	water clear	465	470	3.50	2600	2600	26


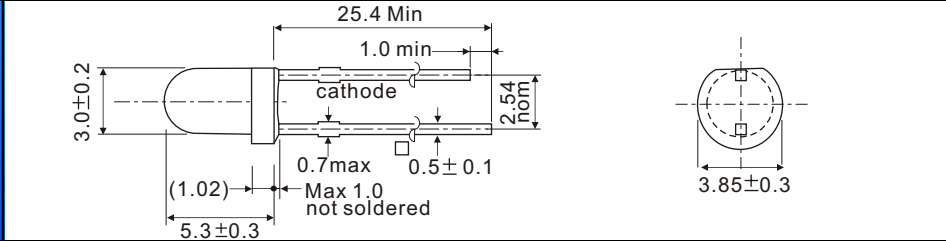
φ 5									
	HB5d-433BG-D	yellow green	water clear	575	572	2.20	600	1500	30
	HB5d-433BA-D	bluish green	water clear	502	505	3.50	2800	5500	33
	HB5d-433AGCA-D	pure green	water clear	523	525	3.50	3000	5400	33
	HB5d-433AGD-D	pure green	water clear	523	525	3.50	3500	6000	33
	HB5d-434FY-D	yellow	water clear	592	590	2.00	1200	3000	30
	*HB5d-434SY-D	yellow	water clear	592	590	2.00	2700	4000	30
	HB5d-435FO-D	orange	water clear	620	615	2.00	1400	3000	30
	HB5d-435AOR-D	fresh red	water clear	635	626	2.00	1100	2800	30
	*HB5d-435SOR-D	fresh red	water clear	638	629	2.00	3000	4000	30
	HB5d-437FA-D	amber	water clear	607	605	2.00	1600	3000	30
	HB5d-438ABCA-D	blue	water clear	465	470	3.50	1600	1800	33
	HB5d-438ABD-D	blue	water clear	465	470	3.50	2000	2200	33

\*:TS type LED lamps. IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	


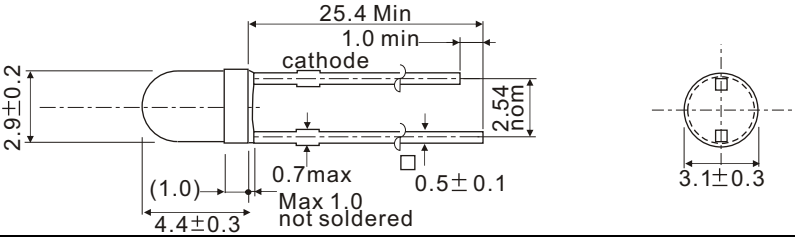
								
HB3b-443DG	yellow green	water clear	570	567	2.15	180	400	18
HB3b-443CG	yellow green	water clear	570	567	2.15	220	700	18
HB3b-443BG	yellow green	water clear	575	572	2.20	850	1600	14
HB3b-443BA	cyan	water clear	502	505	3.50	3500	4000	14
HB3b-443AGCA	pure green	water clear	523	525	3.50	4000	4500	14
HB3b-443AGD	pure green	water clear	523	525	3.50	4500	5000	14
HB3b-444AY	yellow	water clear	592	590	2.00	1500	1800	10
HB3b-444FY	yellow	water clear	592	590	2.00	2000	2500	10
HB3b-444SY	yellow	water clear	592	590	2.25	2500	3200	14
HB3b-445AO	orange	water clear	620	615	2.00	1800	1800	10
HB3b-445FO	orange	water clear	620	615	2.00	2000	2500	10
HB3b-445AOR	fresh red	water clear	635	626	2.00	1800	2000	10
HB3b-445SOR	fresh red	water clear	638	629	2.25	2500	3200	14
HB3b-446DR	deep red	water clear	660	643	1.80	230	500	14
HB3b-446CR	deep red	water clear	660	643	1.80	300	900	14
HB3b-446BR	soft red	water clear	655	638	2.10	280	1000	10
HB3b-446AR	deep red	water clear	660	645	1.86	350	1800	19
HB3b-446ARA	deep red	water clear	660	645	1.86	450	2000	19
HB3b-447FA	amber	water clear	607	605	2.00	2000	2500	10
HB3b-448ABD	blue	water clear	468	470	3.50	2200	3000	15
HB3b-448ABD-B	blue	water clear	468	470	3.50	800	1500	30

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	


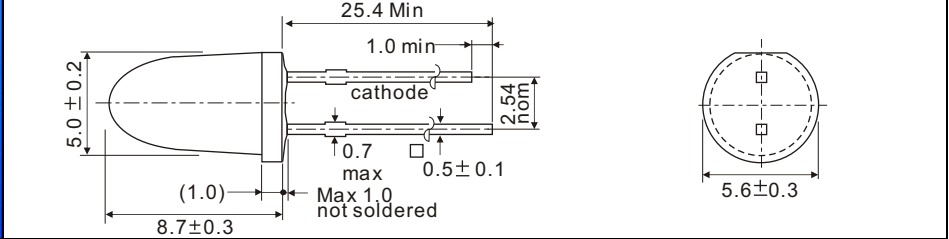
φ 3									40
	HB3J-443CG	yellow green	water clear	570	567	2.15	250	500	
	HB3J-443BG	yellow green	water clear	575	572	2.20	450	800	
	HB3J-443BA	cyan	water clear	502	505	3.50	1500	1800	
	HB3J-443AGCA	pure green	water clear	523	525	3.50	1600	2200	
	HB3J-443AGD	pure green	water clear	523	525	3.50	1800	2500	
	HB3J-444AY	yellow	water clear	592	590	2.00	800	1200	
	HB3J-444FY	yellow	water clear	592	590	2.00	1200	2000	
	HB3J-445AO	orange	water clear	620	615	2.00	800	1200	
	HB3J-445FO	orange	water clear	620	615	2.00	1300	1600	
	HB3J-445AOR	fresh red	water clear	635	626	2.00	900	1000	
	HB3J-446DR	deep red	water clear	660	643	1.80	120	250	
	HB3J-446CR	deep red	water clear	660	643	1.80	200	400	
	HB3J-446BR	soft red	water clear	655	638	2.10	200	500	
	HB3J-446AR	deep red	water clear	660	645	1.86	400	1000	
	HB3J-446ARA	deep red	water clear	660	645	1.86	450	1300	
	HB3J-447FA	amber	water clear	607	605	2.00	1200	1600	
	HB3J-448ABCA	blue	water clear	468	470	3.50	1300	1320	
HB3J-448ABD	blue	water clear	468	470	3.50	1500	1500		

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	

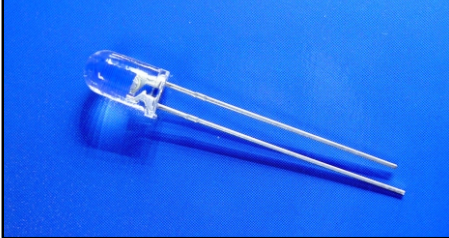
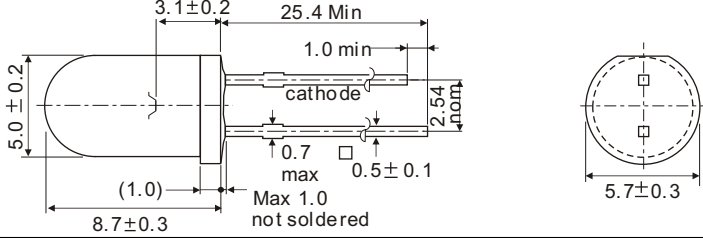
								
HB5b-433DG	yellow green	water clear	570	567	2.15	320	850	12
HB5b-433CG	yellow green	water clear	570	567	2.15	540	1200	12
HB5b-433BG	yellow green	water clear	575	572	2.20	1500	2800	10
HB5b-433BA	cyan	water clear	502	505	3.50	7500	9000	10
HB5b-433AGCA	pure green	water clear	523	525	3.50	8000	9000	10
HB5b-433AGD	pure green	water clear	523	525	3.50	9000	10000	10
HB5b-434AY	yellow	water clear	592	590	2.00	2500	3500	9
HB5b-434FY	yellow	water clear	592	590	2.00	3300	6000	7
HB5b-434SY	yellow	water clear	592	590	2.25	4000	8500	7
HB5b-435AO	orange	water clear	620	615	2.00	3500	3500	9
HB5b-435FO	orange	water clear	620	615	2.00	4000	6000	7
HB5b-435AOR	fresh red	water clear	635	626	2.00	3500	5500	7
HB5b-435SOR	fresh red	water clear	639	629	2.25	4000	7000	10
HB5b-436DR	deep red	water clear	660	643	1.80	400	800	6
HB5b-436CR	deep red	water clear	660	643	1.80	750	1400	6
HB5b-436BR	soft red	water clear	655	638	2.10	500	1500	7
HB5b-436AR	deep red	water clear	660	643	1.86	1300	3000	7
HB5b-436ARA	deep red	water clear	660	645	1.86	1500	4000	7
HB5b-437FA	amber	water clear	607	605	2.00	3500	6000	7
HB5b-438ABCA	blue	water clear	468	470	3.50	3000	3200	10
HB5b-438ABD	blue	water clear	468	470	3.50	3500	3600	10

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	


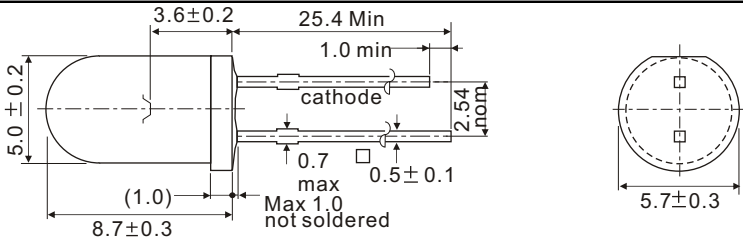
								
HB5-433DG	yellow green	water clear	570	567	2.15	320	800	14
HB5-433CG	yellow green	water clear	570	567	2.15	400	1200	14
HB5-433BG	yellow green	water clear	575	572	2.20	1500	2500	12
HB5-433BA	cyan	water clear	502	505	3.50	6500	8000	15
HB5-433AGCA	green	water clear	523	525	3.50	7000	9500	15
HB5-433AGD	green	water clear	523	525	3.50	8000	10500	15
HB5-434AY	yellow	water clear	592	590	2.00	2000	3000	12
HB5-434FY	yellow	water clear	592	590	2.00	2800	5500	12
HB5-434VY	yellow	water clear	592	590	2.00	3000	6500	12
HB5-434SY	yellow	water clear	592	590	2.25	3500	7000	12
HB5-435AO	orange	water clear	620	615	2.00	2400	3000	12
HB5-435FO	orange	water clear	620	615	2.00	3200	5500	12
HB5-435AOR	fresh red	water clear	635	626	2.00	3000	4500	12
HB5-435SOR	fresh red	water clear	638	629	2.25	4000	7000	12
HB5-436DR	deep red	water clear	660	643	1.80	350	800	12
HB5-436CR	deep red	water clear	660	643	1.80	700	1200	12
HB5-436BR	soft red	water clear	655	638	2.10	450	1300	12
HB5-436AR	deep red	water clear	660	645	1.86	1250	2400	12
HB5-436ARA	deep red	water clear	660	645	1.86	1400	3500	12
HB5-437FA	amber	water clear	607	605	2.00	3000	5500	12
HB5-438ABCA	blue	water clear	468	470	3.50	2600	3000	12
HB5-438ABD	blue	water clear	468	470	3.50	3000	3500	12

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	

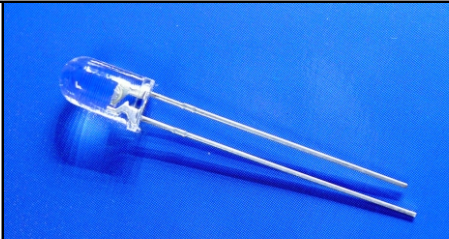
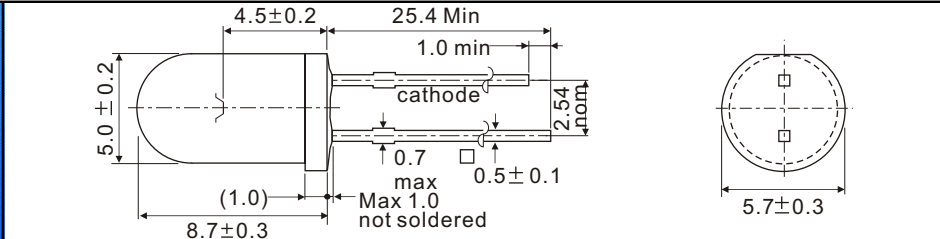
								
		HB5-433DG-B	yellow green	water clear	570	567	2.15	200
HB5-433CG-B	yellow green	water clear	570	567	2.15	250	900	15
HB5-433BG-B	yellow green	water clear	575	572	2.20	800	2000	
HB5-433BA-B	cyan	water clear	502	505	3.50	5000	7000	18
HB5-433AGCA-B	pure green	water clear	523	525	3.50	5200	7000	
HB5-433AGD-B	pure green	water clear	523	525	3.50	6000	8500	15
HB5-434AY-B	yellow	water clear	592	590	2.00	1200	2800	
HB5-434FY-B	yellow	water clear	592	590	2.00	2000	5000	15
HB5-434VY-B	yellow	water clear	592	590	2.00	2500	6000	
HB5-434SY-B	super yellow	water clear	592	590	2.45	4000	6500	15
HB5-435AO-B	orange	water clear	620	615	2.00	1200	2800	
HB5-435FO-B	orange	water clear	620	615	2.00	2200	5000	15
HB5-435AOR-B	fresh red	water clear	635	626	2.00	2000	4000	
HB5-435SOR-B	fresh red	water clear	638	629	2.25	2500	6000	15
HB5-436DR-B	deep red	water clear	660	643	1.80	250	450	
HB5-436CR-B	deep red	water clear	660	643	1.80	400	900	15
HB5-436BR-B	soft red	water clear	655	638	2.10	320	950	
HB5-436AR-B	deep red	water clear	660	645	1.86	800	2200	15
HB5-436ARA-B	deep red	water clear	660	645	1.86	1080	3300	
HB5-437FA-B	amber	water clear	607	605	2.00	2400	5000	15
HB5-438ABCA-B	blue	water clear	468	470	3.50	2000	2500	
HB5-438ABD-B	blue	water clear	468	470	3.50	2400	2700	15

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	

								
HB5-433DG-C	yellow green	water clear	570	567	2.15	100	300	30
HB5-433CG-C	yellow green	water clear	570	567	2.15	150	500	30
HB5-433BG-C	yellow green	water clear	575	572	2.20	500	900	40
HB5-433BA-C	cyan	water clear	502	505	3.50	3000	4500	45
HB5-433AGCA-C	pure green	water clear	523	525	3.50	3500	4300	45
HB5-433AGD-C	pure green	water clear	523	525	3.50	3800	4700	45
HB5-434AY-C	yellow	water clear	592	590	2.00	800	1000	40
HB5-434FY-C	yellow	water clear	592	590	2.00	1200	2400	40
HB5-434VY-C	yellow	water clear	592	590	2.00	1400	2700	40
HB5-434SY-C	yellow	water clear	592	590	2.25	1800	3000	45
HB5-435AO-C	orange	water clear	620	615	2.00	800	1000	40
HB5-435FO-C	orange	water clear	620	615	2.00	1400	2400	40
HB5-435AOR-C	fresh red	water clear	635	626	2.00	1000	1500	40
HB5-435SOR-C	fresh red	water clear	638	629	2.25	2000	3000	40
HB5-436DR-C	deep red	water clear	660	643	1.80	120	250	30
HB5-436CR-C	deep red	water clear	660	643	1.80	175	600	30
HB5-436BR-C	soft red	water clear	655	638	2.10	160	500	40
HB5-436AR-C	deep red	water clear	660	645	1.86	600	1800	30
HB5-436ARA-C	deep red	water clear	660	645	1.86	750	2800	30
HB5-437FA-C	amber	water clear	607	605	2.00	1200	2400	40
HB5-438ABCA-C	blue	water clear	468	470	3.50	1000	1400	45
HB5-438ABD-C	blue	water clear	468	470	3.50	1200	1800	45

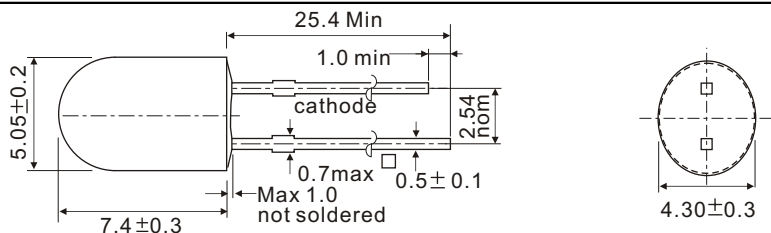
IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

## Oval Type

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	



HB4Q-433CG	yellow green	water clear	570	567	2.15	175	600	40/20
HB4Q-433BA	cyan	water clear	502	505	3.50	4500	5000	
HB4Q-433AGCA	pure green	water clear	523	525	3.50	4000	4500	
HB4Q-433AGD	pure green	water clear	523	525	3.50	4800	5500	
HB4Q-434FY	yellow	water clear	592	590	2.00	1500	4000	
HB4Q-434SY	yellow	water clear	592	590	2.25	2400	5700	
HB4Q-435FO	orange	water clear	620	615	2.00	1800	4000	
HB4Q-435AOR	fresh red	water clear	635	626	2.00	1300	3400	
HB4Q-435SOR	fresh red	water clear	638	629	2.25	3500	6000	
HB4Q-436ARA	deep red	water clear	660	645	1.86	600	2800	
HB4Q-438ABCA	blue	water clear	465	470	3.50	1400	1500	
HB4Q-438ABD	blue	water clear	465	470	3.50	1800	2000	
HB4Q-433CG-C	yellow green	water clear	570	567	2.15	75	200	100/40
HB4Q-433BA-C	cyan	water clear	502	505	3.50	1500	1850	
HB4Q-433AGCA-C	pure green	water clear	523	525	3.50	1300	1800	
HB4Q-433AGD-C	pure green	water clear	523	525	3.50	1800	2500	
HB4Q-434FY-C	yellow	water clear	592	590	2.00	500	1200	
HB4Q-434SY-C	yellow	water clear	592	590	2.25	800	1800	
HB4Q-435FO-C	orange	water clear	620	615	2.00	600	1200	
HB4Q-435AOR-C	fresh red	water clear	635	626	2.00	450	1000	
HB4Q-435SOR-C	fresh red	water clear	638	629	2.25	1200	2500	
HB4Q-436ARA-C	deep red	water clear	660	645	1.86	200	900	
HB4Q-438ABCA-C	blue	water clear	465	470	3.50	280	500	
HB4Q-438ABD-C	blue	water clear	465	470	3.50	350	750	

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

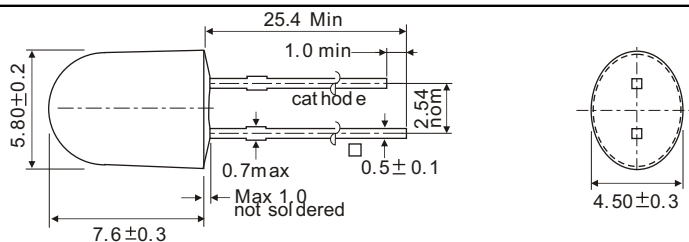


# Extra Bright LEDs

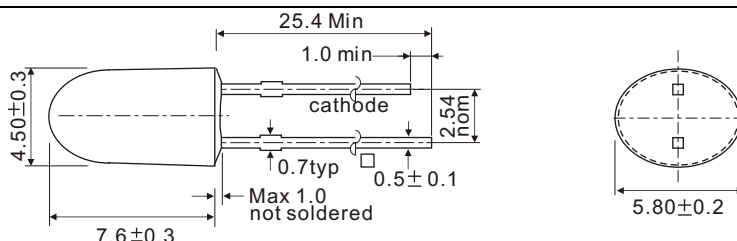
Oval Type

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	



oval φ	HB5RH-433CG	yellow green	water clear	570	567	2.15	175	600	70/25
	HB5RH-433BA	bluish green	water clear	502	505	3.50	4500	5000	70/25
	HB5RH-433AGCA	pure green	water clear	523	525	3.50	4000	4000	70/25
	HB5RH-433AGD	pure green	water clear	523	525	3.50	5000	6000	70/25
	HB5RH-434FY	Yellow	water clear	592	590	2.00	1500	3800	70/25
	HB5RH-434SY	Yellow	water clear	592	590	2.25	2400	5200	70/25
	HB5RH-435FO	orange	water clear	620	615	2.00	1800	3800	70/25
	HB5RH-435AOR	fresh red	water clear	635	626	2.00	1300	3300	70/25
	HB5RH-435SOR	fresh red	water clear	638	629	2.20	3500	4300	70/25
	HB5RH-436ARA	deep red	water clear	660	645	1.86	600	2700	70/25
	HB5RH-438ABCA	blue	water clear	465	470	3.50	1400	1400	70/25
	HB5RH-438ABD	blue	water clear	465	470	3.50	1800	1800	70/25



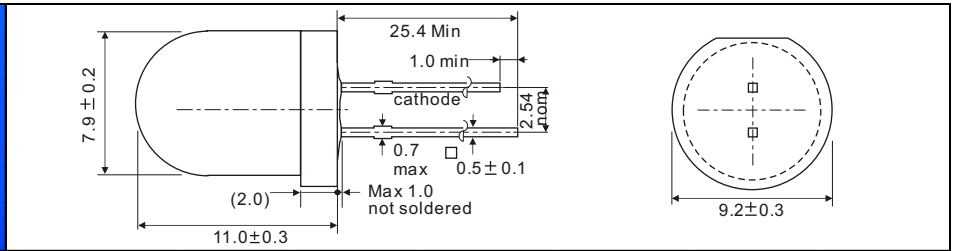
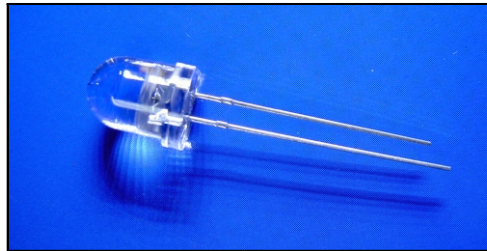
oval φ	HB5RV-433CG	yellow green	water clear	570	567	2.15	175	600	25/70
	HB5RV-433BA	bluish green	water clear	502	505	3.50	4500	5000	25/70
	HB5RV-433AGCA	pure green	water clear	523	525	3.50	4000	4000	25/70
	HB5RV-433AGD	pure green	water clear	523	525	3.50	5000	6000	25/70
	HB5RV-434FY	yellow	water clear	592	590	2.00	1500	3800	25/70
	HB5RV-434SY	Yellow	water clear	592	590	2.25	2400	5200	25/70
	HB5RV-435FO	orange	water clear	620	615	2.00	1800	3800	25/70
	HB5RV-435AOR	fresh red	water clear	635	626	2.00	1300	3300	25/70
	HB5RV-435SOR	fresh red	water clear	638	629	2.20	3500	4300	25/70
	HB5RV-436ARA	deep red	water clear	660	645	1.86	600	2700	25/70
	HB5RV-438ABCA	blue	water clear	465	470	3.50	1400	1400	25/70
	HB5RV-438ABD	blue	water clear	465	470	3.50	1800	1800	25/70

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

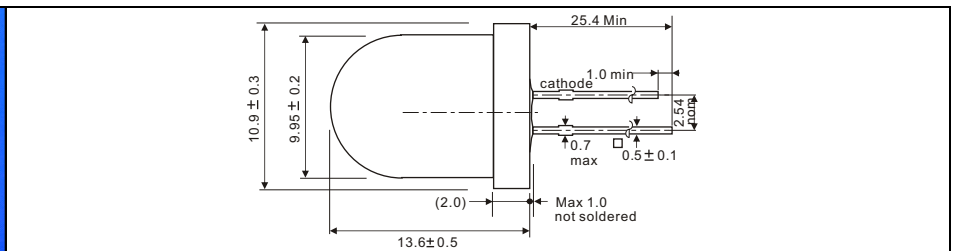
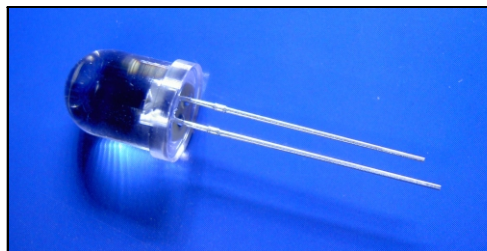
# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	



φ 8	HB8a-433CG	yellow green	water clear	570	567	2.15	160	600	30
	HB8a-433BG	yellow green	water clear	575	572	2.20	600	1600	25
	HB8a-433BA	cyan	water clear	502	505	3.50	3500	4000	30
	HB8a-433AGCA	pure green	water clear	523	525	3.50	4000	4500	30
	HB8a-434FY	yellow	water clear	592	590	2.00	1300	3600	25
	HB8a-435FO	orange	water clear	620	615	2.00	1500	3600	25
	HB8a-435AOR	fresh red	water clear	635	626	2.00	1000	3000	25
	HB8a-436ARA	deep red	water clear	660	645	1.86	850	2200	30
	HB8a-438ABD	blue	water clear	465	470	3.50	1200	1500	35
	HB8a-439AWD	white	water clear	(0.30,0.29)		3.50	2800	4000	30



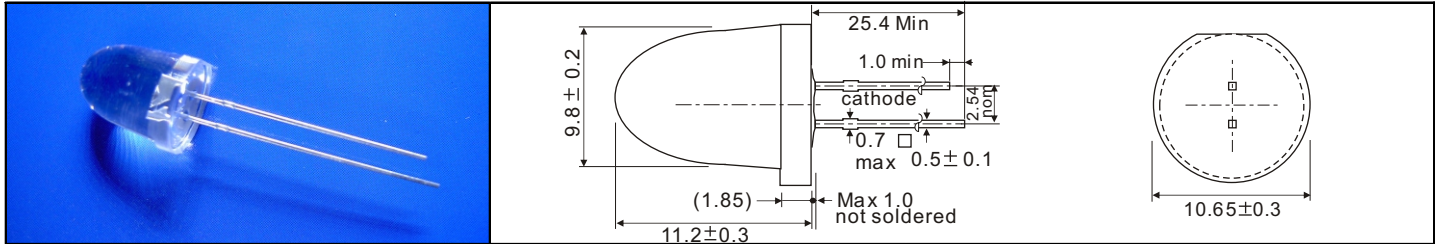
φ 10	HB10-433CG	yellow green	water clear	570	567	2.15	150	500	40
	HB10-433BG	yellow green	water clear	575	572	2.20	500	1300	40
	HB10-433BA	cyan	water clear	502	505	3.50	3000	3000	40
	HB10-433AGCA	pure green	water clear	523	525	3.50	3500	3500	40
	HB10-434FY	yellow	water clear	592	590	2.00	1200	2000	40
	HB10-435FO	orange	water clear	620	615	2.00	1400	2000	40
	HB10-435AOR	fresh red	water clear	635	626	2.00	1000	1800	40
	HB10-436ARA	deep red	water clear	660	645	1.86	7500	3000	40
	HB10-438ABD	blue	water clear	465	470	3.50	1000	1200	40
	HB10-439AWD	white	water clear	(0.29,0.30)		3.60	2500	4000	40

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.

# Extra Bright LEDs

IF=20mA Ta=25°C

Device No	Color		Wavelength (nm)		VF Typical (V)	Brightness (mcd)		View Angle 2θ1/2
	Emitter	Lens	λp	λd		IV1	IV2	



φ 1 0	HB10b-433CG	yellow green	water clear	570	567	2.15	1300	1500	10
	HB10b-433BG	yellow green	water clear	575	572	2.20	2700	4000	7
	HB10b-433BA	cyan	water clear	502	505	3.50	10000	10000	7
	HB10b-433AGCA	pure green	water clear	523	525	3.50	12500	12500	8
	HB10b-434FY	yellow	water clear	592	590	2.00	11200	11200	7
	HB10b-435FO	orange	water clear	620	615	2.00	11200	11200	7
	HB10b-435AOR	fresh red	water clear	635	626	2.00	16500	16500	7
	HB10b-436ARA	deep red	water clear	660	645	1.86	2500	8500	10
	HB10b-438ABD	blue	water clear	465	470	3.50	6000	8000	8
	HB10b-439AWD	white	water clear	(0.29,0.30)		3.60	9000	18000	6

IV1:Labsphere LED-1100 IV2:EXELTRON 2001.