


530A & D

530G

 APPROX. SIZE
 (EXCLUDING LEAD LENGTH)

DATA SHEET

530A, D & G RED LIGHT-EMITTING DIODES

(DEVELOPMENT MODEL R3178R)

DESCRIPTION EPITAXIAL GALLIUM PHOSPHIDE

The 530A, 530D and 530G are red light-emitting diodes, each of which consists of a single gallium phosphide chip encapsulated in a clear plastic. The intended usage of these devices is as illuminators in such general purpose applications as back-lighting of alpha-numeric templates.

All the diodes can be circuit-board mounted. The 530A & 530D can also be panel mounted with a special socket, or adapter sleeve (see "Mounting & Connections").

While the three device codes are electrically the same, they differ physically.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

CHARACTERISTIC AND CONDITIONS		SYMBOL	APPLIED LIFE LIMITS †		MANUFACTURER'S SPECIFICATION LIMITS		
			MIN.	MAX.	MIN.	MAX.	UNIT
Breakdown Voltage	$I_R = 1.0 \text{ mAdc}$	$V_{(BR)}$	8.0	—	8.0	—	Vdc
Forward Voltage	$I_F = 10 \text{ mAdc}$	V_F	—	2.4	—	2.2	
Light Output			Φ	—	—	3.0	—

RECOMMENDED OPERATING CONDITION: FORWARD CURRENT SHOULD BE 10 mAdc NOMINAL. REFER TO FIGURES 3 AND 5 FOR TYPICAL FORWARD VOLTAGE AND LIGHT OUTPUT CHARACTERISTICS.

RATINGS ◇

CHARACTERISTIC	I_R	I_F	P^*	T_{stg}
UNIT	mAdc		mW	$^\circ\text{C}$
LIMIT	1.0	.30	60	-40 to +100

†. The applied life limits are intended as guides for the circuit and systems designer. They take into consideration both device variations with life and commonly encountered anomalies in circuit environments such as voltage, current, and temperature. The applied life limits represent the end of life criteria used in determining the failure rates quoted under "Reliability".

◇ The ratings specified are limiting values under all variations of circuit and environmental conditions beyond which the serviceability of the device may be impaired from the viewpoint of life and satisfactory performance. Ratings, as such, do not constitute a set of operating conditions and all values may not, therefore, be attained simultaneously.

★ Derate at $1.3 \text{ mW}/^\circ\text{C}$ for temperatures in excess of 35°C .

RELIABILITY

For the 530A, 530D, and 530G LED's a reasonable prediction of long term device failure under use conditions can be obtained from Figure 1 where the failure rate is shown as a function of temperature. The criterion for failure for this characterization is 50% degradation of the initial light output. The curves indicate the specified failure level in percent.

The time to failure at low temperature has been obtained by extrapolating elevated temperature aging results and agrees with extrapolations in time of low temperature degradation data.

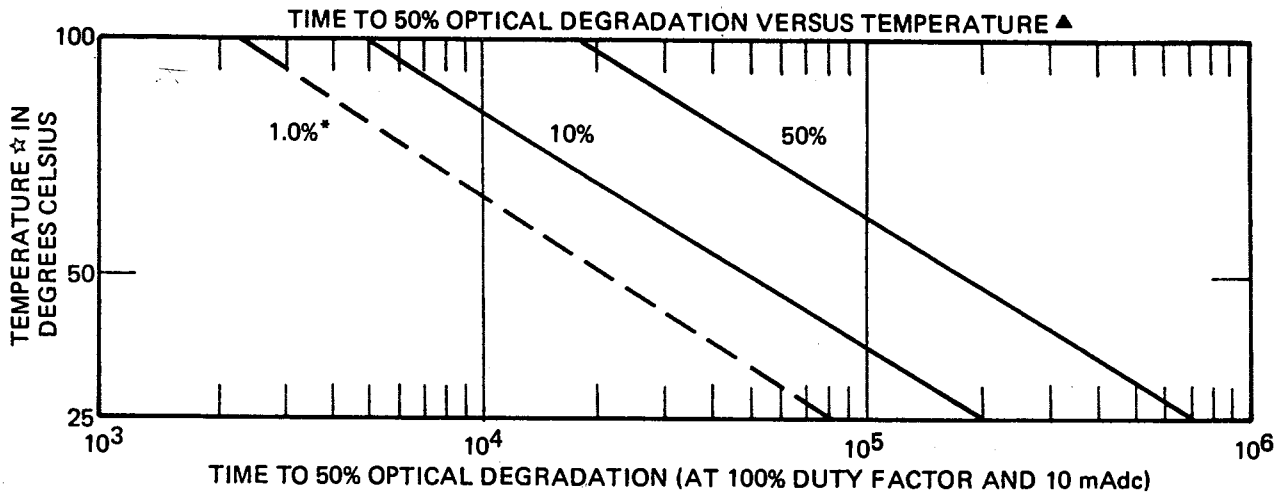


FIGURE 1

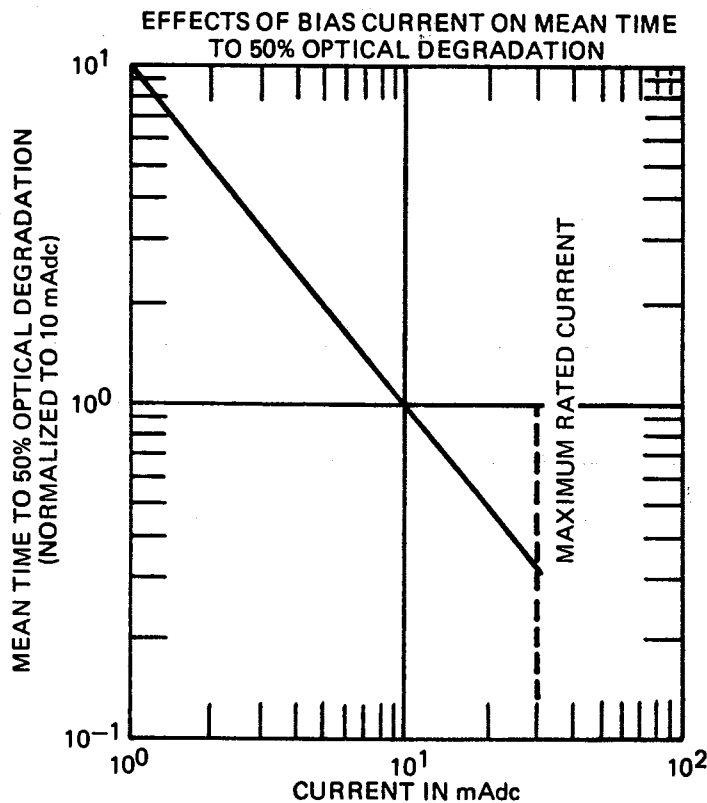


FIGURE 2

- ▲ Activation energy is approximately 0.5 electron volts (eV).
- ☆ Lead temperature at exit from plastic body.
- * Percent of population.

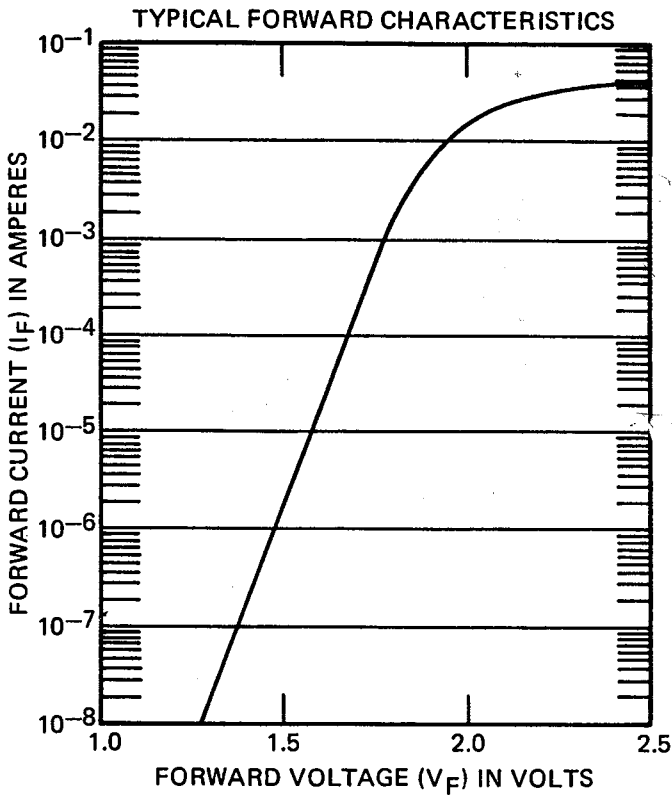


FIGURE 3

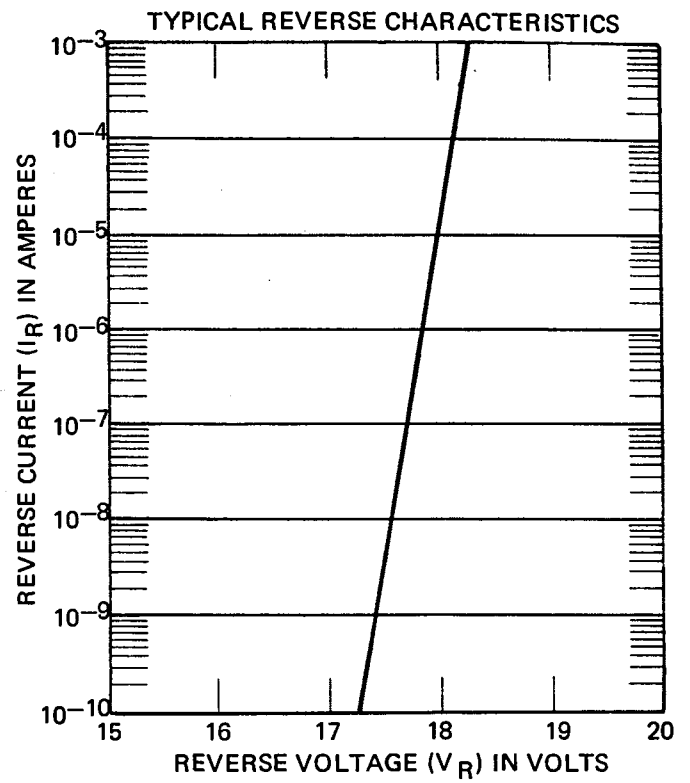


FIGURE 4

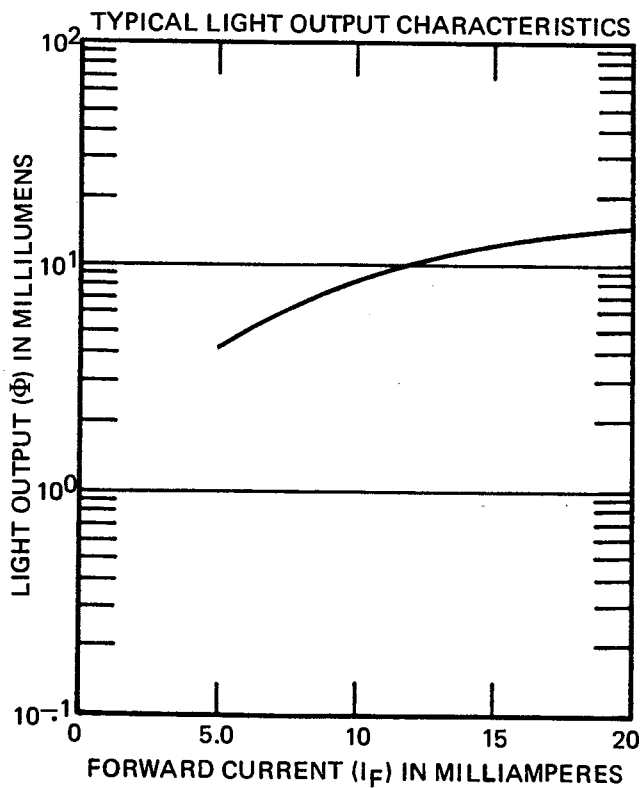


FIGURE 5

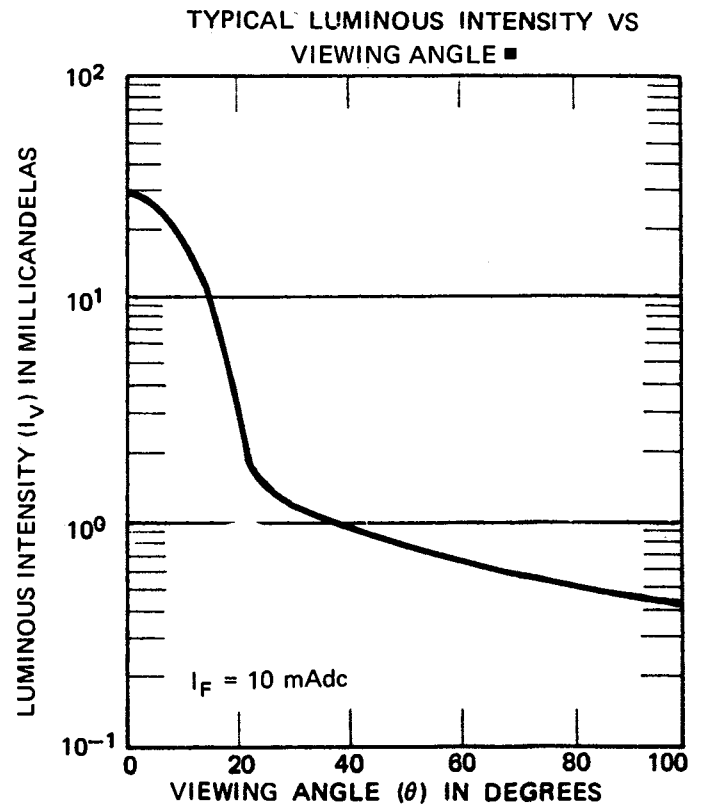


FIGURE 6

■ Angle measured with respect to line passing through symmetry axis of plastic encapsulation. This is a far field pattern with LED treated as point source with center located at LED chip and luminous intensity measured at a distance at least 6.0 cm from the LED encapsulation.

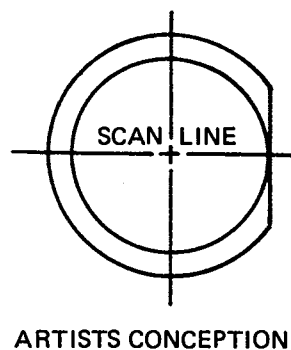
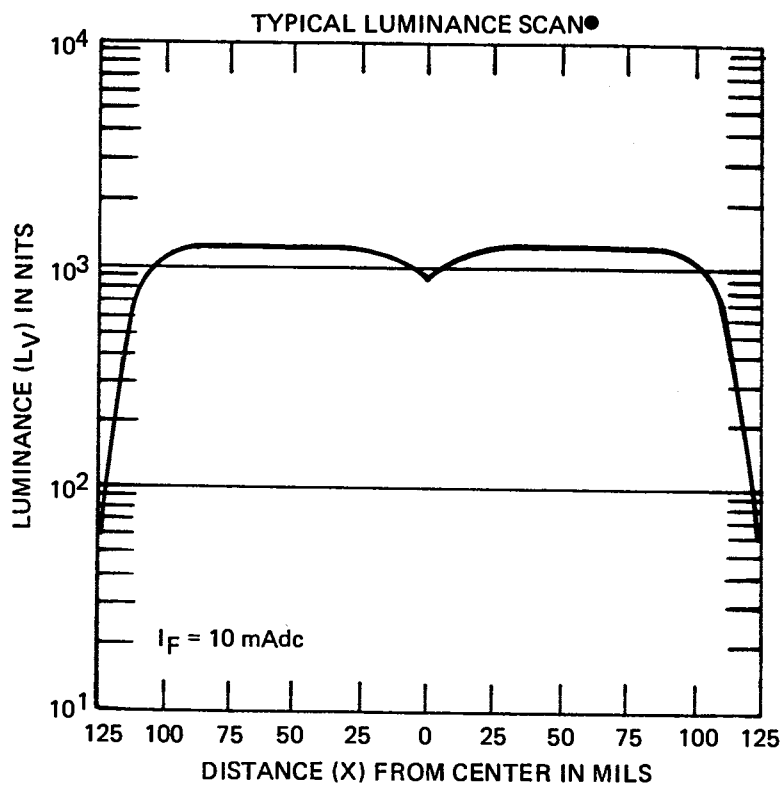


FIGURE 5

● Image plane is perpendicular to the beam axis.

TYPICAL NEAR FIELD LIGHT PATTERNS ▲

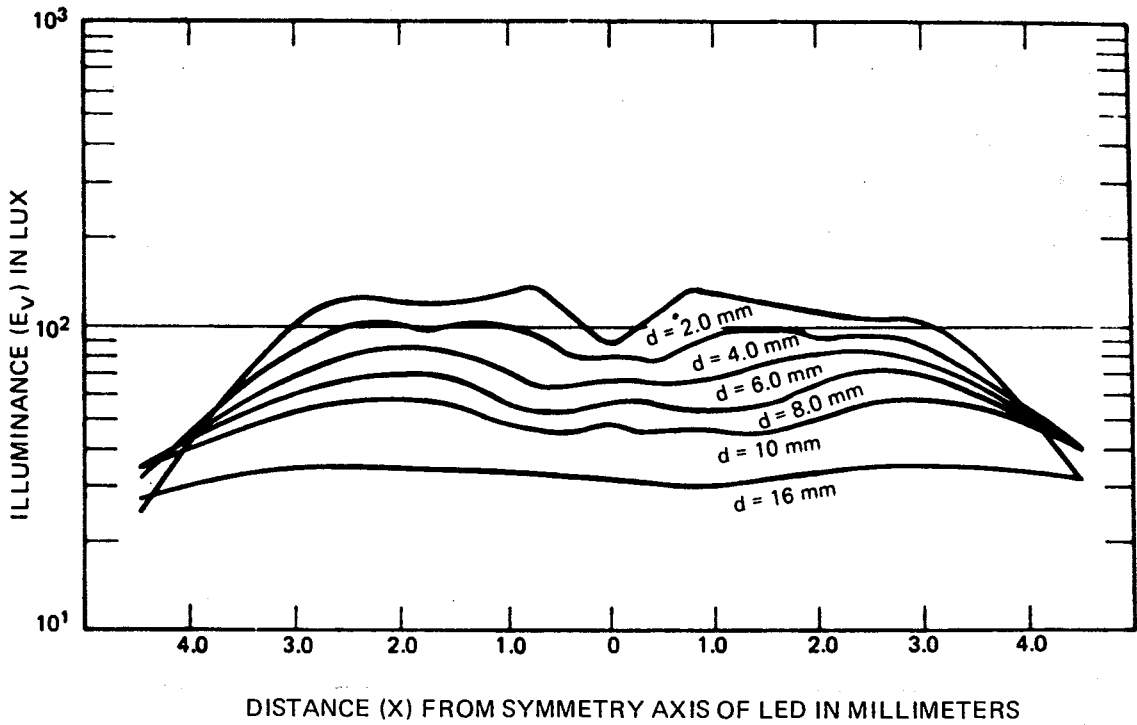


FIGURE 8

TYPICAL BEAM RADIUS ○ VS SOURCE-TO-SENSOR SEPARATION (NEAR FIELD)

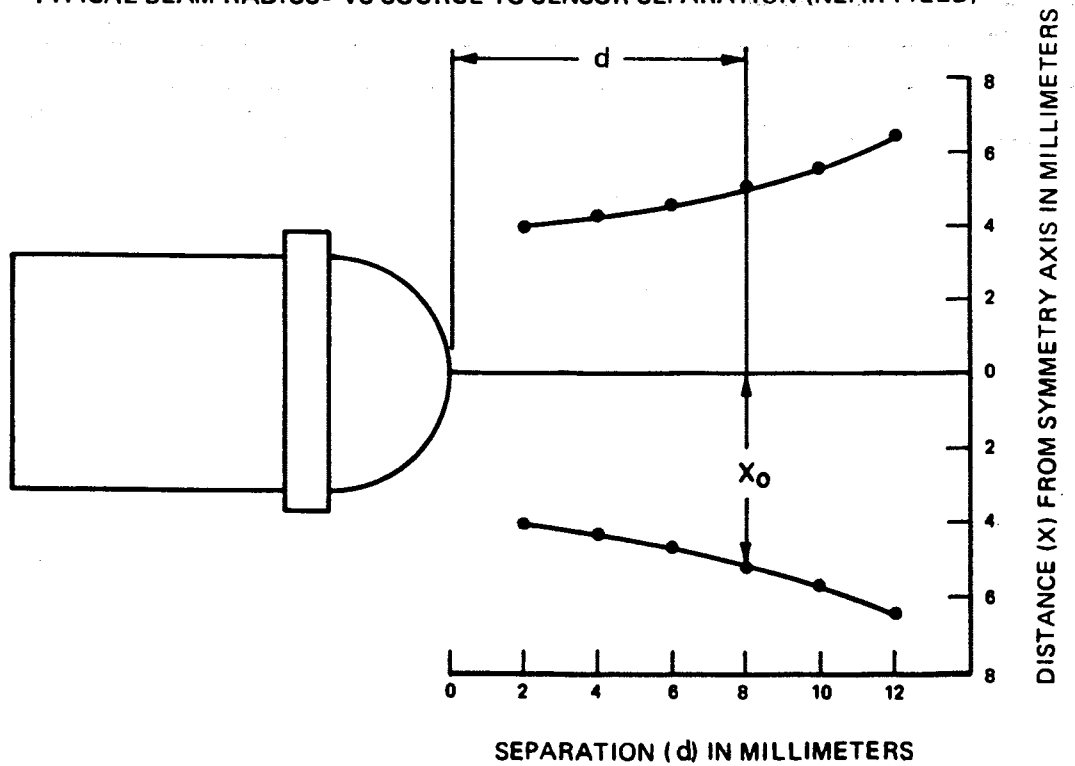


FIGURE 9

▲ Indicated distance from encapsulation as defined in Figure 9.

○ Beam radius (X₀) is defined as the distance from the symmetry axis where the illuminance falls to one half its maximum.

MOUNTING AND CONNECTIONS

These devices should be mounted in such a manner that no subsequent stresses (other than gravity) will exist between the plastic case and the external leads.

A shearing tool should be used for cutting the leads to avoid mechanical shock.

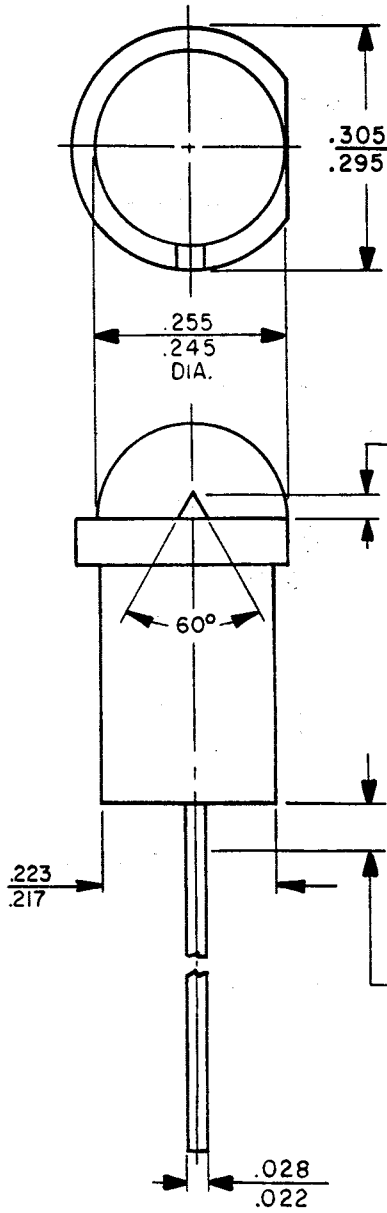
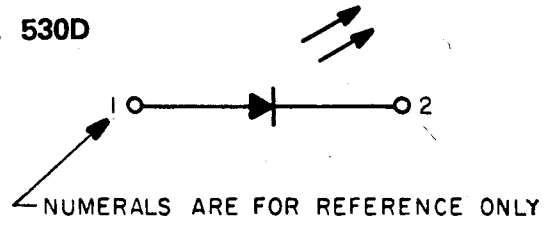
The leads may be soldered by dipping or reflow at a temperature of less than 270°C for a time period to 7.0 seconds.

The leads of these devices are approved for use as terminals to which wire-wrap connections may be made.

PANEL AND PRINTED WIRING BOARD MOUNTING INFORMATION						
KS-21320 ^Δ LIST NUMBER		COLOR	MOUNTING CENTERS		MOUNTING HOLE SIZE	
SOCKET	SLEEVE		RECM	MIN	SOCKET	SLEEVE
-2	-105	Black	0.402	0.390	0.332	0.332
-3 & -4	—	Black	0.500	0.500	PWB	—
-12	-106	Red	0.402	0.390	0.332	0.332
-13	-107	Green	0.402	0.390	0.332	0.332
-14	-108	Yellow	0.402	0.390	0.332	0.332

^Δ Sockets are used with short-leaded devices. Sleeves are used with long-leaded devices.

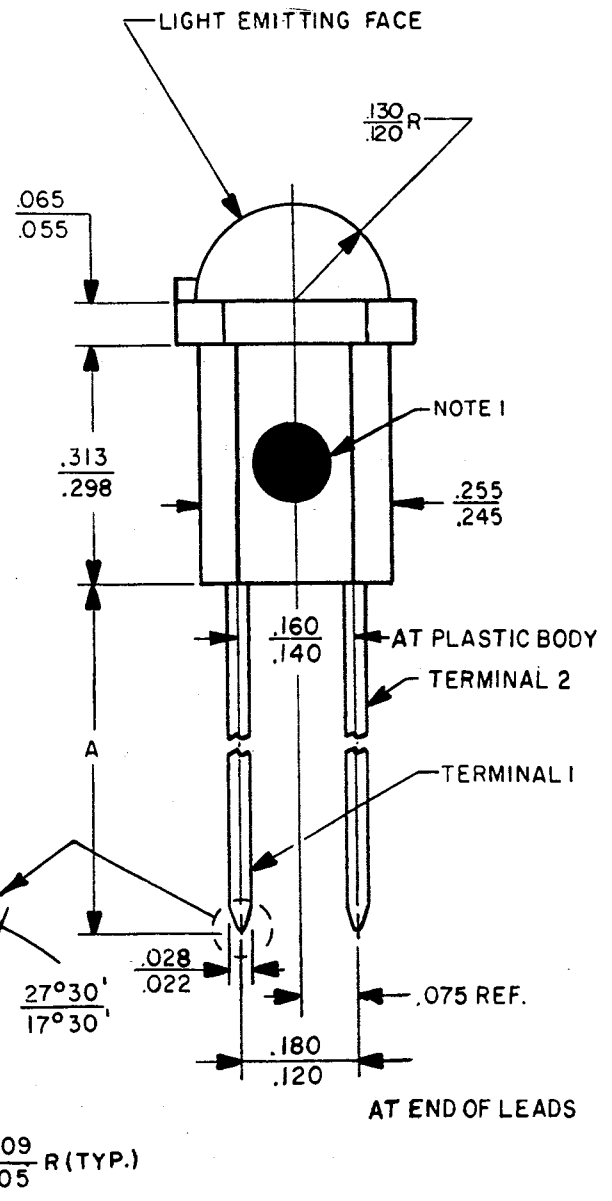
530A 530D



CODE	A
530A	.810/.770
530D	.360/.340

.030
.015 NOTE 2

.055 MAX NOTE 3



.065
.055

.313
.298

NOTE 1

.255
.245

.160
.140 AT PLASTIC BODY

TERMINAL 2

TERMINAL 1

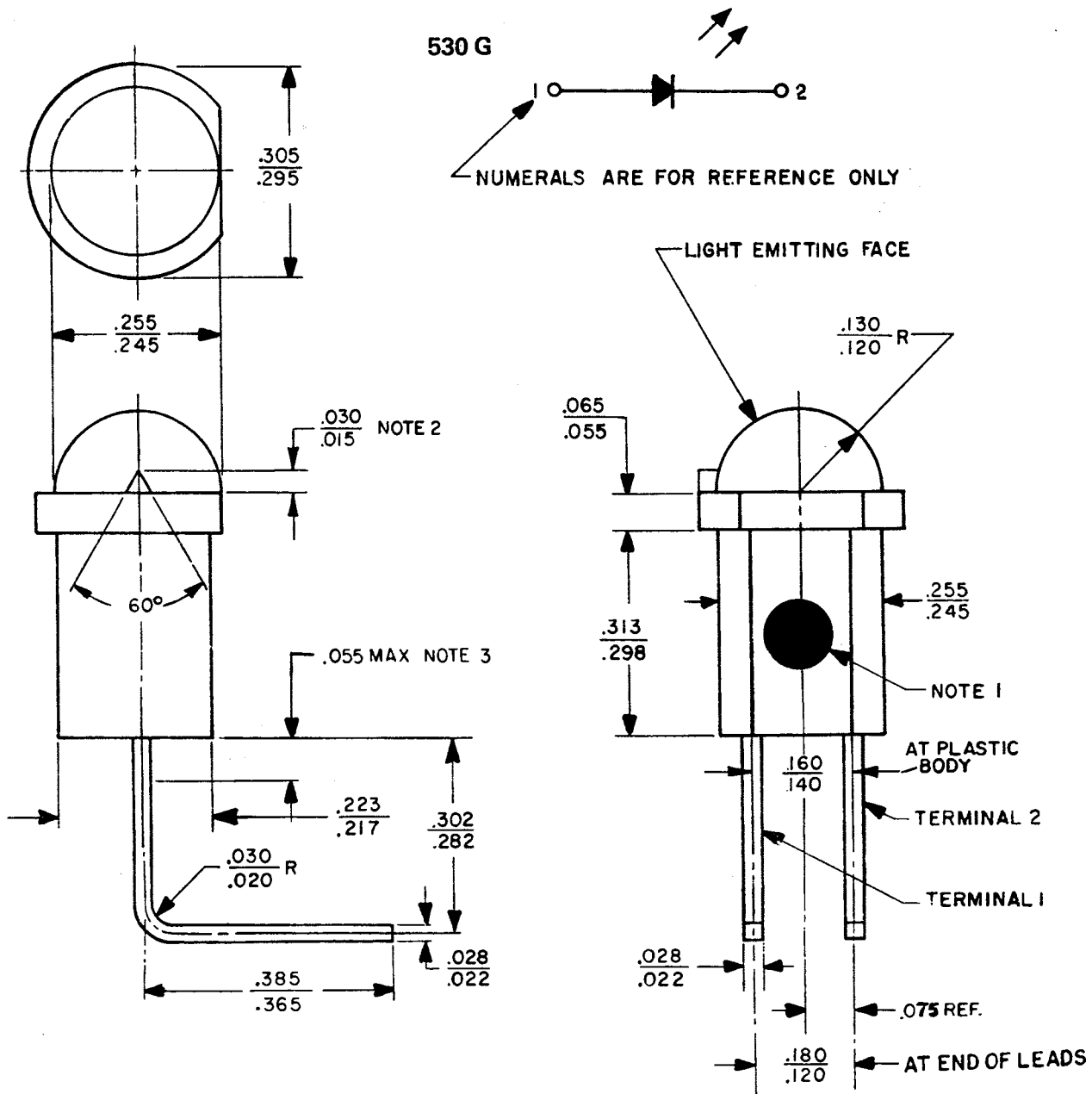
.075 REF.

AT END OF LEADS

.028
.022

27°30'
17°30'

.009
.005 R (TYP.)



NOTES:

1. COLOR MARK DENOTES COLOR OF LIGHT EMITTED. IN THE ABSENCE OF A COLOR MARK, IT SHALL BE THE COLOR OF THE BODY.
2. CORNERS OF KEY MAY BE ROUNDED AND IRREGULAR.
3. A .002 INCH UNDERCUT TO A .006 INCH PROJECTION RELATIVE TO THE EDGES OF THE LEAD IS PERMISSIBLE IN THIS AREA. THE LEAD THICKNESS IS .022/.028 INCH IN THIS AREA. PLASTIC COATING ON LEADS IS PERMISSIBLE IN THIS AREA.
4. ALL DIMENSIONS ARE IN INCHES.