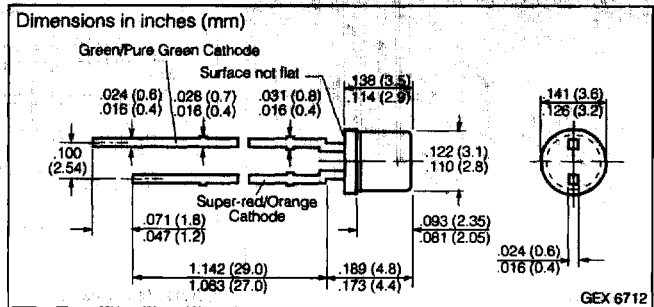
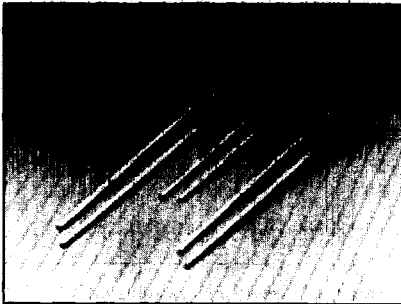


# SIEMENS

**SUPER-RED LS K380**  
**ORANGE LO K380**  
**YELLOW LY K380**  
**GREEN LG K380**  
**PURE GREEN LP K380**  
**Flat Top T1 (3 mm) ARGUS LED Lamp**



## FEATURES

- Colored, clear package
  - LS: super-red
  - LO: orange
  - LY: yellow
  - LG: green
  - LP: pure green
- With an additional, custom built reflector suitable for backlighting display panels
- For optical coupling into light pipes
- Uniform illumination of a diffuser screen in front of the custom built reflector
- Solder leads with stand-off
- Available taped on reel
- Load dump resisant per DIN 40839

## Note

If the diffuser screen is tinted, the spectral transmission must be adjusted to the wavelength emitted by the LED.

## DESCRIPTION

ARGUS lamps can be used only with an additional, customer supplied reflector (i.e., white plastic, such as Pocaan B7375). The front end of the reflector is covered by a diffuser (see package dimensions). Uniform illumination can be enhanced by the reflector design tailored to the LED and/or by the use of appropriate diffuser material. If the diffuser is tinted, the spectral transmission must be adjusted to the wavelength emitted by the LED.

## Maximum Ratings

Operating and Storage Temperature Range ( $T_{OP}$ $T_{STG}$ )	.....	-55°C to +100°C
Junction Temperature ( $T_J$ )	.....	100°C
Forward Current ( $I_F$ )	.....	40 mA
LS, LO, LY, LG	.....	40 mA
LP	.....	30 mA
Surge Current ( $I_{FM}$ ) $t < 10 \mu s$ , $D=0.005$	.....	0.5 A
Reverse Voltage ( $V_R$ )	.....	5 V
Power Dissipation ( $P_{TOT}$ ) $T_A \leq 25^\circ C$	.....	140 mW
LS, LO, LY, LG	.....	140 mW
LP	.....	100 mW
Thermal Resistance, Junction/Air ( $R_{THJA}$ )	.....	400 K/W

## Characteristics $T_A=25^\circ C$ , all values typical unless otherwise noted

Parameter	Sym.	LS	LO	LY	LG	LP	Unit	Condition
Peak Wavelength	$\lambda_{PEAK}$	635	610	586	565	557	nm	$I_F=20 \text{ mA}$
Dominant Wavelength	$\lambda_{DOM}$	628	605	590	570	560		
Spectral Bandwidth 50% $\Phi_V$	$\Delta\lambda$	45	40	45	25	22		$I_F=20 \text{ mA}$
Forward Voltage	$V_F$	2.1 ( $\leq 2.6$ )					V	$I_F=15 \text{ mA}$
Reverse Current	$I_R$	0.01 ( $\leq 10$ )					$\mu A$	$V_R=5 \text{ V}$
Capacitance	$C_D$	12	8	10	15		pF	$V_R=0 \text{ V}$ , $f=1 \text{ MHz}$
Switching Times, $I_V$	$t_R$	300				450	ns	$I_F=100 \text{ mA}$
	$t_F$	150				200	ns	$t_D=10 \mu s$ $R_L=50 \Omega$

See graph numbers OHL01697, OHL01277, OHL01625, OHL02103, OHL01162, OHL01686, OHL01170, OHL02104, OHL02105, OHL02149, OHL02107 beginning on page 4-92.

**Characteristics (continued)**

Luminous Flux*, $\Phi_v$ , mlm, $I_F = 15$ mA					
Part Number	Min.	Max.	Part Number	Min.	Max.
LS/LG K380-LP	10	80	LO/LY K380-Q	63	125
LS/LG K380-N	25	50	LO/LY K380-NR	25	200
LS/LG K380-P	40	80	LP K380-KN	6.3	50
LS/LG K380-Q	63	125	LP K380-L	10	20
LS/LG K380-NR	25	200	LP K380-M	16	32
LO/LY K380-LP	16	125	LP K380-N	25	50
LO/LY K380-N	25	50	LP K380-LP	10	80
LO/LY K380-P	40	80			

\* Luminous flux ratio of one packaging unit  $\Phi_{VMAX} / \Phi_{VMIN} \leq 2$

**Back Lighting Using ARGUS LEDs**

Siemens developed ARGUS® LEDs for applications requiring uniform light over large areas. Their light emission covers a fairly large solid angle versus conventional LEDs which concentrate their radiation in the axial direction.

**Construction**

ARGUS diodes are fabricated on the same production line and with the same design concepts as Siemens standard LEDs. The difference between the two is the radiation characteristic. The radiation from standard LEDs is focused in the axial direction (Fig. 1a). The chip is mounted into a reflector cup. The leadframe is placed into a mold and the body is formed with a spherical lens.

The ARGUS LED, however, is designed to produce light over an enlarged viewing angle (Fig. 1b). This is done by eliminating the reflector cup and molding a concave shaped lens into the body instead of the normal spherical type. To avoid hot spots within the illuminated area, the light emitted in the axial direction is reduced to about 20% of the maximum luminous intensity.

**Applications and Benefits of ARGUS LEDs**

The full benefit of ARGUS LEDs is achieved when used with an external reflector and diffuser. When properly configured, a large area of evenly distributed light is produced (1cm<sup>2</sup>/lamp) that can be used to back light symbols, characters, and LCD displays.

- No longer will designers of systems such as dashboard instrumentation and car radios have to provide access for replacing incandescent bulbs. With extended warranties being offered by most auto makers, the labor cost to replace an incandescent bulb makes the ARGUS LED a cost effective alternative.
- With its ability to evenly illuminate a large area and its low heat generation, ARGUS LEDs provide an excellent source of light for LCD displays.
- ARGUS' compact size, large light area, low heat generation and reliability make it an ideal choice for illuminated switches instead of incandescent bulbs.

- ARGUS LEDs can be supplied on tape and reel for auto-insertion, eliminating the need to hand insert odd shaped light bars for large area back lighting applications.
- Reflectors for ARGUS LEDs can be designed to have a height from the board that equals the height of most seven-segment displays, so that panels with mechanically matched components can be built.

**ARGUS LEDs as Substitutes for Lamps**

In many cases incandescent lamps are easily replaced directly by ARGUS LEDs, but for best results, an appropriately shaped reflector (Figure 2) with a high diffuse reflection characteristic (above 90%) should be used. Pocan B7375 and Pocan B7376 thermoplastics have been used successfully in many applications. Requirements differ for individual applications. For optimum results, reflectors and diffusers must be matched.

**Lumens (lm) Versus Candela (cd)\***

One major difference between the ARGUS LED standard LEDs is that the light output for ARGUS is measured in millilumens (mlm) while standard LEDs are measured in millicandela (mcd). The ARGUS is designed to use almost all of the light produced over a large area while standard LEDs have a focusing lens and for most applications is a point source.

See Appnote 1, "LEDs and Photometry" for detailed information.

LED Lamps

Figure 1. ARGUS LEDs emit their light over an enlarged solid angle. Both graphs show polar coordinates on the left and rectangular coordinates on the right. a) Standard LED-viewing angle b) ARGUS LED-radiation characteristic: Relative spatial emission vs. half angle.

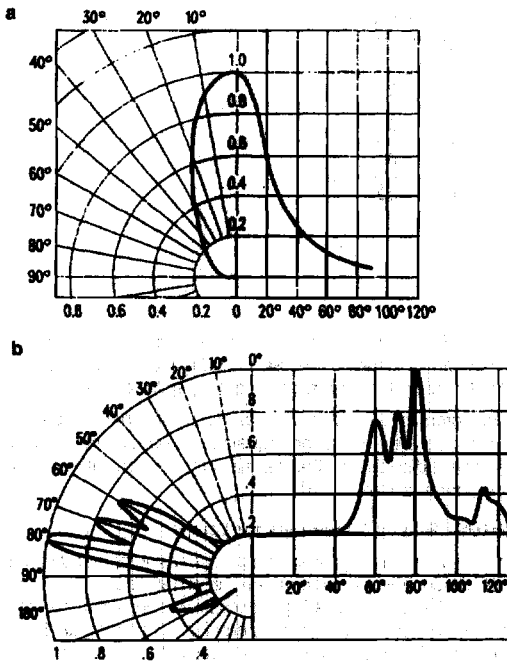


Figure 2. Section through a reflector with an ARGUS LED

