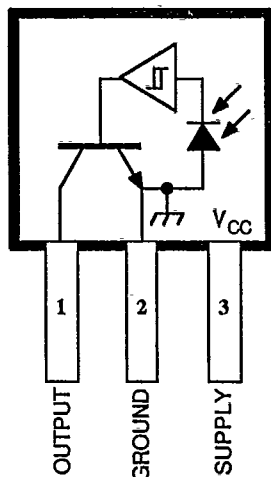


3390

T-41-67

OPTOELECTRONIC SWITCH —TWILIGHT SENSOR



Dwg. PH-009

Designed for use in twilight sensing applications and in emergency and outdoor lighting, the ULN3390T optoelectronic switch is a monolithic integrated circuit containing a photodiode, low-level amplifier, comparator, voltage regulator, and output driver. The comparator is fabricated to give the sensor a built-in typical hysteresis value of 50 percent.

With temperature-compensated trip points, protection against damage by bright light, and increased hysteresis values, the ULN3390T represents a significant design improvement over previous optoelectronic switches. The integrated sensor is more stable over time and temperature than cadmium sulfide cell assemblies, requires fewer components, and has calibrated switching characteristics.

The ULN3390T switch typically turns ON as illumination falls below $10 \mu\text{W}/\text{cm}^2$ at 880 nm. Internal hysteresis prevents deactivation until illumination exceeds $20 \mu\text{W}/\text{cm}^2$. The switching points can be factory-adjusted to customer specifications.

FEATURES

- Photodiode with On-Chip Amplifier
- Comparator
- Output Driver
- Voltage Regulator
- 50% Hysteresis
- Temperature Compensation

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{CC}	25 V
Output Voltage, V_{OUT}	25 V
Output Current, I_{OUT}	25 mA
Operating Temperature Range, T_A	-40°C to +85°C
Storage Temperature Range, T_S	-55°C to +110°C

Always order by complete part number: **ULN3390T**.

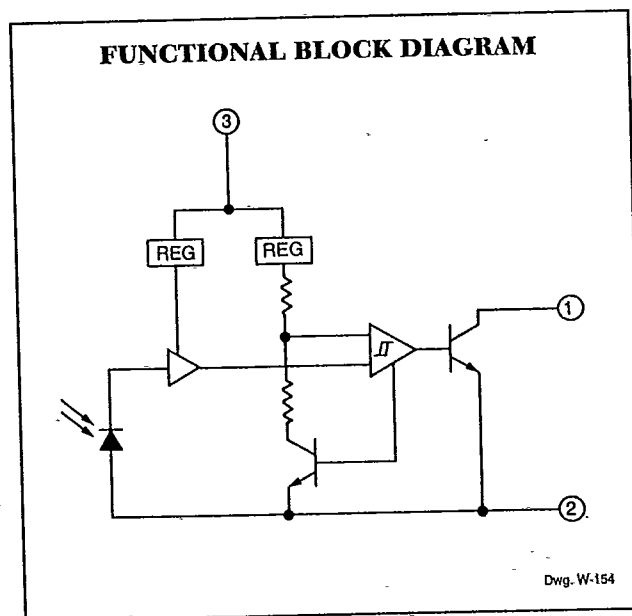
3390 OPTOELECTRONIC SWITCH

T-41-67

ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$, $V_{CC} = 6\text{ V}$ (unless otherwise noted).

Characteristic	Symbol	Test Conditions	Limits			Units
			Min.	Typ.	Max.	
Supply Voltage Range	V_{CC}	Operating	4.0	—	16	V
Supply Current	I_{CC}	$E > E_{OFF}$	—	3.0	10	mA
Output Saturation Voltage	$V_{OUT(sat)}$	$I_{OUT} = 15\text{ mA}$, $E \leq 6\text{ }\mu\text{W}/\text{cm}^2$	—	300	500	mV
Output Leakage Current	I_{OFF}	$V_{OUT} = 15\text{ V}$, $E > E_{OFF}$	—	0.1	10	μA
Output Rise Time	t_r	10% to 90%	—	200	500	ns
Output Fall Time	t_f	90% to 10%	—	200	500	ns
Light Threshold Level	E_{ON}	$\lambda = 880\text{ nm}$	6.0	10	14	$\mu\text{W}/\text{cm}^2$
	E_{OFF}	$\lambda = 880\text{ nm}$	—	20	—	$\mu\text{W}/\text{cm}^2$
Hysteresis	ΔE	$(E_{OFF} - E_{ON})/E_{OFF}$	45	50	65	%

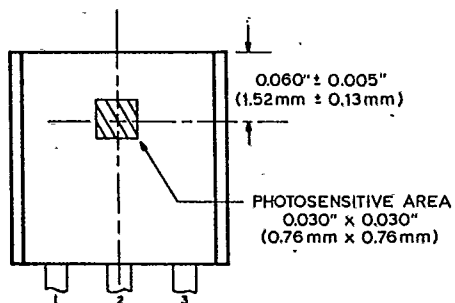
FUNCTIONAL BLOCK DIAGRAM



3390 OPTOELECTRONIC SWITCH

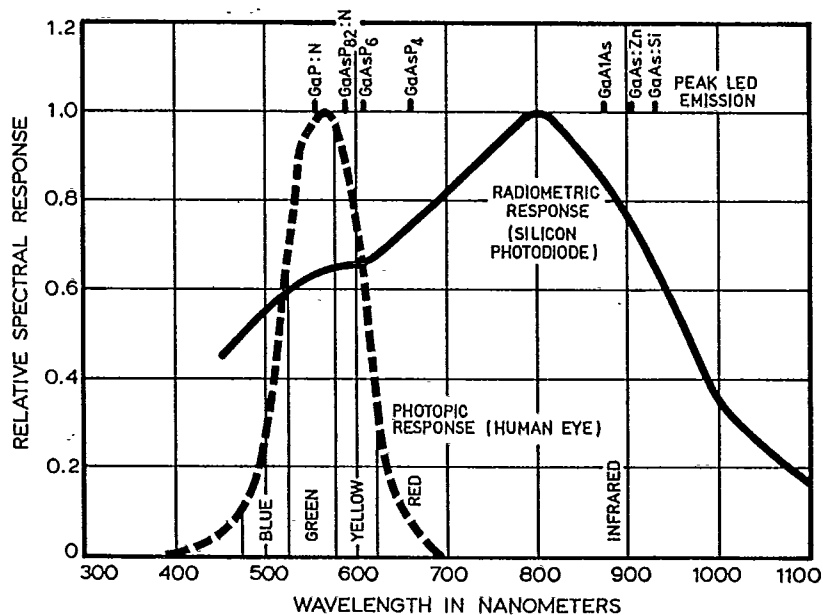
T-41-67

SENSOR-CENTER LOCATION



Dwg. No. A-13,301

RELATIVE SPECTRAL RESPONSE AT $T_A = +25^\circ\text{C}$ AS A FUNCTION OF WAVELENGTH OF LIGHT



Dwg No. A-12,135A