

T-41-63

**CLR2049
CLR2050
CLR2060**

**Silicon NPN Planar Epitaxial
Darlington Phototransistors**

GENERAL DESCRIPTION — The Clairex CLR2049, CLR2050, and CLR2060 are three-lead, silicon planar epitaxial Darlington phototransistors in a flat-window, hermetic TO-18 package. The initial stage base lead is provided for those applications where circuitry biasing permits additional gain and switching control. The series is characterized for controlled, high sensitivity at low irradiance levels. The flat window eliminates the need for critical sensor positioning in applications with low irradiance.

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

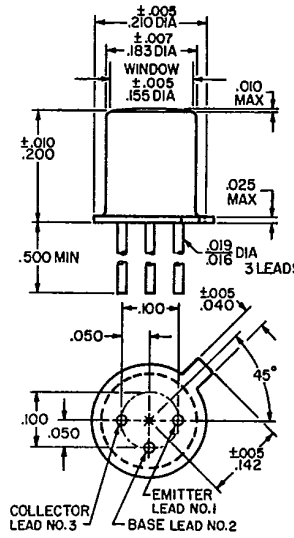
- Storage Temperature - 65°C to + 200°C
- Operating Junction Temperature + 150°C

Maximum Power Dissipation

- Total Dissipation at 25°C Ambient Temperature $P_T = 250\text{mW}$ derate 2mW/°C
- at 100°C Ambient Temperature $P_T = 100\text{mW}$

Maximum Voltages	CLR2049	CLR2050	CLR2060
V_{CE0} Collector to Base Voltage	60 volts	60 volts	60 volts
V_{CE0} Collector to Emitter Voltage	40 volts	40 volts	40 volts
V_{EB0} Emitter to Base Voltage	10 volts	10 volts	10 volts

Maximum Current: Note 3
 I_C Collector Current 200ma



ELECTRICAL CHARACTERISTICS (25°C Free Air unless otherwise designated.)

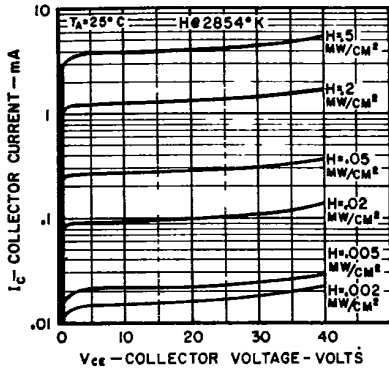
Symbol	Characteristics	Test Conditions	CLR2049		CLR2050		CLR2060		Unit
			Min.	Max.	Min.	Max.	Min.	Max.	
$I_L (I_{CE0})$	Light Current	$V_{CE} = 5\text{v}$, $H = 0.2\text{mW/cm}^2$, Note 1	.2	.6	0.6	1.8	1.4	4.0	ma
$I_L (I_{CE0})$	Light Current	$V_{CE} = 5\text{v}$, $H = 2.0\text{mW/cm}^2$, Note 1	2.0		6.0		14.0		ma
$I_D (I_{CE0})$	Dark Current	$V_{CE} = 10\text{ volts}$, $H = 0$		100		100		100	na
BV_{CEO}	Collector to Emitter Breakdown Voltage	$I_C = 0.1\text{ma}$	40		40		40		volts
BV_{CBO}	Collector to Base Breakdown Voltage	$I_C = 0.1\text{ma}$	60		60		60		volts
BV_{EBO}	Emitter to Base Breakdown Voltage	$I_E = 0.1\text{ma}$	10		10		10		volts
t_r	Light Current Rise Time (unsaturated)	$R_L = 100 \Omega$, $I_C = 0.5\text{ma}$, $V_{CC} = 5.0\text{ volts}$, Note 2	100 Typical		100 Typical		100 Typical		μsec
t_f	Light Current Fall Time (unsaturated)		150 Typical		150 Typical		150 Typical		μsec
$V_{CE (SAT)}$	Collector to Emitter Saturation Voltage	$I_C = 10\text{ma}$, $I_B = 0.05\text{ma}$, $H = 0$		1.2		1.2		1.2	volts

Note 1: The light source is a frosted tungsten incandescent lamp at 2854°K.
 Note 2: The light source is a gallium arsenide LED pulsed with a rise and fall time of < 0.3 μsec .
 Note 3: Pulsed conditions : 300 μ sec., 2% duty cycle.

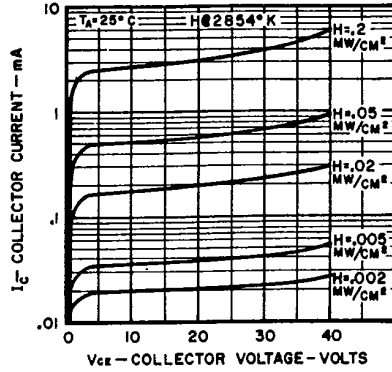
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Typical Electrical Characteristics

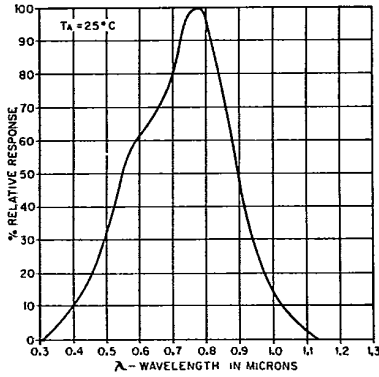
COLLECTOR CHARACTERISTICS CLR 2050



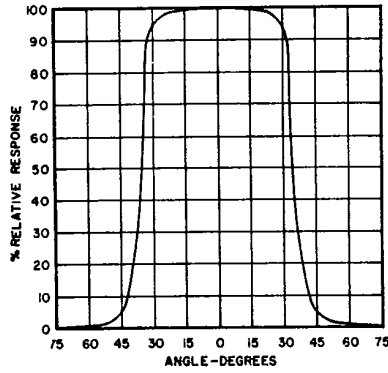
COLLECTOR CHARACTERISTICS CLR 2060



SPECTRAL RESPONSE



ANGULAR RESPONSE



LIGHT CURRENT vs. IRRADIATION

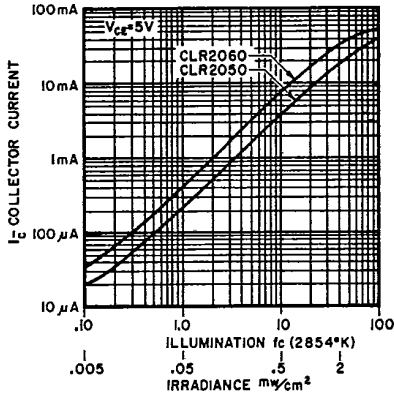


PHOTO-DARLINGTON CIRCUIT

