

T-41-63

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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 by 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_{CEO} Collector to Base Voltage | 60 volts | 60 volts | 60 volts |
| V_{CEO} Collector to Emitter Voltage | 40 volts | 40 volts | 40 volts |
| V_{EBO} Emitter to Base Voltage | 10 volts | 10 volts | 10 volts |

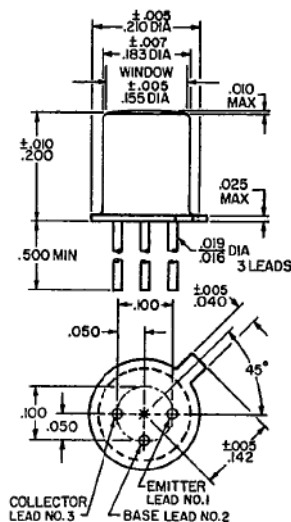
Maximum Current: Note 3

 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. | |
| $I_L (I_{CEO})$ | 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 |
| $I_L (I_{CEO})$ | Light Current | $V_{CE} = 5\text{v}$, $H = 2.0\text{mW/cm}^2$, Note 1 | 2.0 | | 6.0 | | 14.0 | | ma |
| $I_D (I_{CEO})$ | 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) | $R_L = 100\ \Omega$, $I_C = 0.5\text{ma}$, $V_{CC} = 5.0\text{ volts}$ | 100 Typical | | 100 Typical | | 100 Typical | | μsec |
| t_f | Light Current Fall Time (unsaturated) | Note 2 | 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 $< 0.3\ \mu\text{sec}$.Note 3: Pulsed conditions: 300 μsec , 2% duty cycle.

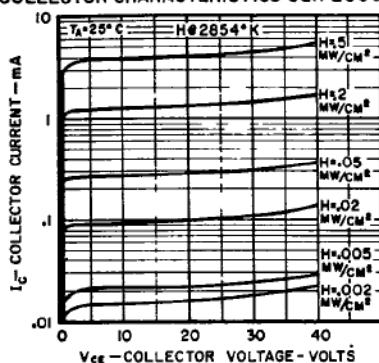
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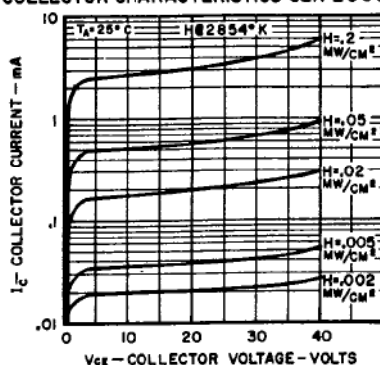
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Typical Electrical Characteristics

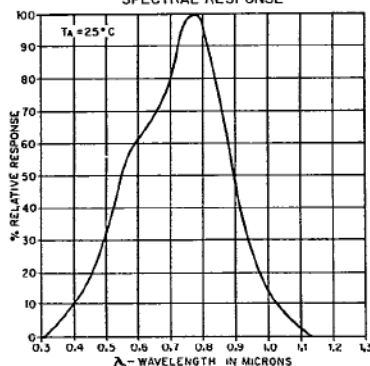
COLLECTOR CHARACTERISTICS CLR 2050



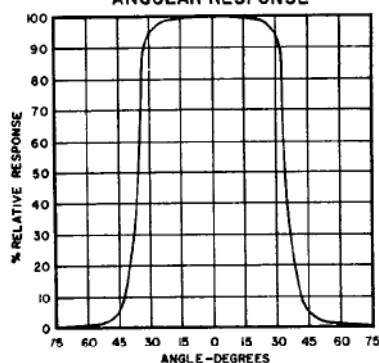
COLLECTOR CHARACTERISTICS CLR 2060



SPECTRAL RESPONSE



ANGULAR RESPONSE



LIGHT CURRENT vs. IRRADIATION

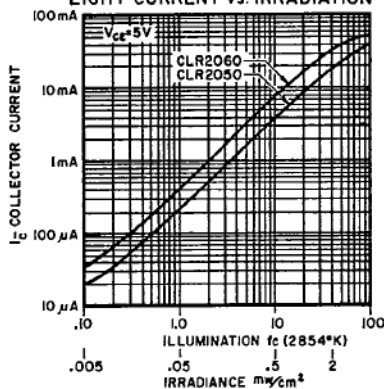


PHOTO-DARLINGTON CIRCUIT

