

CLT5160 CLT5170

Silicon NPN Planar Epitaxial Phototransistors

GENERAL DESCRIPTION — The Clairex CLT5160 and CLT5170 are silicon planar epitaxial phototransistors in a lensed-window, miniature, hermetic package. The 0.077" outside diameter enables high device density with modest mounting tolerances. The package design is ideally suited for mounting in printed circuit boards. The series is characterized by a narrow acceptance angle, fast switching and narrow tolerance ranges of sensitivity. The lensed window unit reduces optical cross-talk from stray light present in many applications.

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

Storage Temperature – 65°C to + 180°C

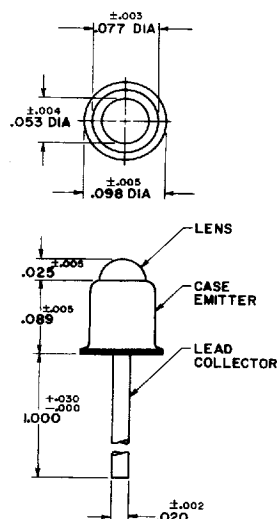
Operating Junction Temperature + 150°C

Maximum Power Dissipation

Total Dissipation

at 25°C Ambient Temperature $P_T = 50\text{mW}$ derate
0.5mW/°C

at 100°C Ambient Temperature $P_T = 12.5\text{mW}$



Maximum Voltages	CLT5160	CLT5170
V_{CE} Collector to Emitter Voltage	40 volts	40 volts
V_{EC} Emitter to Collector Voltage	5 volts	5 volts

Maximum Current: Note 3

I_C Collector Current 200ma

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

Symbol	Characteristics	Test Conditions	CLT5160		CLT5170		Unit
			Min.	Max.	Min.	Max.	
$I_L (I_{CE})$	Light Current	$V_{CE} = 5\text{v}$, $H = 5\text{mW/cm}^2$, Note 1	0.5		1.4		ma
$I_L (I_{CE})$	Light Current	$V_{CE} = 5\text{v}$, $H = 20\text{mW/cm}^2$, Note 1	2.0	7.0	6.0		ma
$I_D (I_{CE})$	Dark Current	$V_{CE} = 10\text{ volts}$, $H = 0$		25		25	na
BV_{CEO}	Collector to Emitter Breakdown Voltage	$I_C = 0.1\text{ma}$	40		40		volts
BV_{ECO}	Emitter to Collector Breakdown Voltage	$I_{EC} = 0.1\text{ma}$	5.0		5.0		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	1.5 Typical		1.5 Typical		μsec
t_f	Light Current Fall Time (unsaturated)		1.5 Typical		1.5 Typical		μsec
$V_{CE (SAT)}$	Collector to Emitter Saturation Voltage	$I_C = 0.4\text{ma}$, $H = 20\text{mW/cm}^2$	0.3 Typical		0.3 Typical		volts

Note 1: The light source is a frosted tungsten incandescent lamp at 2854°K.

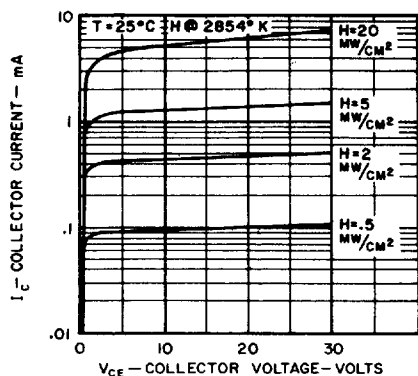
Note 2: The light source is a gallium arsenide LED pulsed with a rise and fall time of < 0.3 μsec .

Note 3: Pulsed conditions: 300 μ sec., 2% duty cycle.

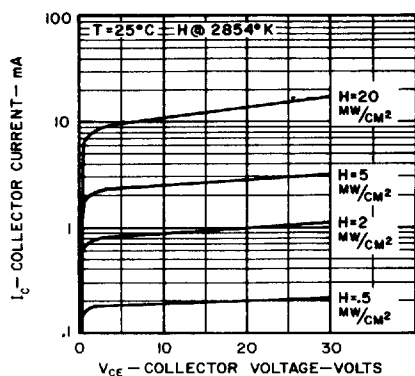
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Typical Electrical Characteristics

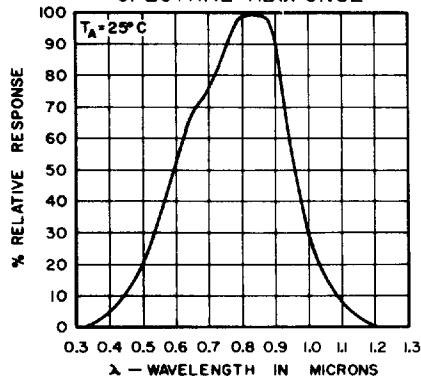
COLLECTOR CHARACTERISTICS CLT 5160



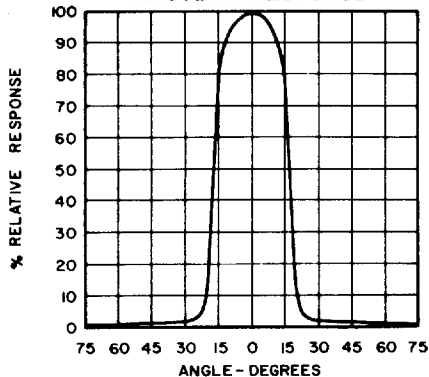
COLLECTOR CHARACTERISTICS CLT 5170



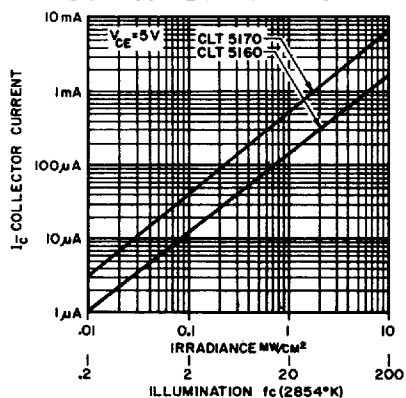
SPECTRAL RESPONSE



ANGULAR RESPONSE



LIGHT CURRENT vs. IRRADIATION



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