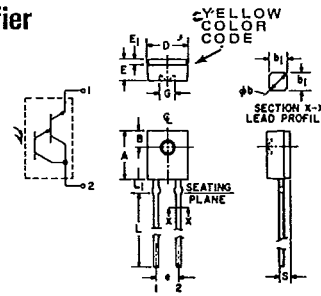


# Light Detector Planar Silicon Photo-Darlington Amplifier

## L14R1

The GE Solid State L14R1 Light Detector is a planar silicon Darlington-connected Photo-transistor. It is mounted in a side-looking clear epoxy encapsulated package.



absolute maximum ratings: (25°C) (unless otherwise specified)

VOLTAGE (Dark characteristics)	SYMBOL		UNITS
Collector to Emitter Voltage	$V_{CEO}$	30	V
Emitter to Collector Voltage	$V_{ECO}$	7	V

CURRENT			
Light Current (continuous)	$I_L$	100	mA

Dissipation			
Power Dissipation ( $T_A = 25^\circ\text{C}$ )*	$P_T$	150	mW

TEMPERATURES			
Junction Temperature	$T_J$	-55 to +100	°C
Storage Temperature	$T_{STG}$	-55 to +100	°C
Lead Soldering Temperature (5 seconds maximum 1.6mm from case)	$T_L$	260	°C

\*Derate 2.0mW/°C above 25°C ambient

SYM	MILLI-METERS		INCHES		NOTES
	MIN	MAX	MIN	MAX	
A	5.59	5.80	.220	.228	
B	1.78	NOM	.070	NOM	2
ob	.60	.75	.024	.030	1
b1	.51	NOM	.020	NOM	1
D	4.45	4.70	.175	.185	
E	2.41	2.67	.095	.105	
E1	.58	.59	.023	.027	
e	2.41	2.67	.095	.105	3
G	1.25	NOM	.038	NOM	
L	12.7	-	.500	-	
L1	1.40	1.65	.055	.065	
S	.83	.94	.033	.037	3

- NOTES
- Two leads. Lead cross section of element uncontrolled within 1.27 MM (.050") of seating plane.
  - Centrality of active element located within .25 MM (.010") of true position.
  - As measured at the seating plane.
  - Lead dimensions derived from millimeters.

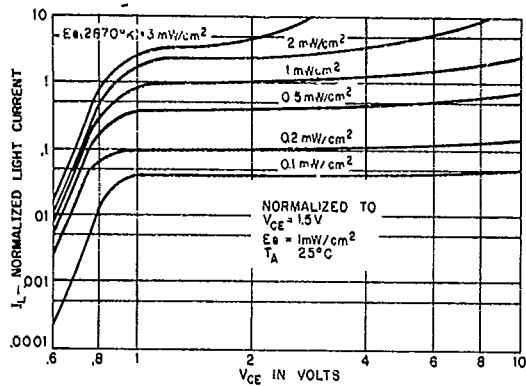
## electrical characteristics: (25°C)

DETECTOR ONLY	SYMBOL	MIN.	TYP.	MAX.	UNITS
<b>Light Current</b> ( $V_{CE} = 1.5V, E_e \uparrow = 1mW/cm^2 @ 2870^\circ K$ )	$I_L$	5	18	—	mA
<b>Dark Current</b> ( $V_{CE} = 25V, E_e = 0$ )	$I_D$	—	—	100	nA
<b>Beam Angle at Half Power Point</b> (Half Angle)	$\theta_H$	—	30	—	Deg.
<b>Saturation Voltage</b> ( $I_C = 20mA, E_e = 2mW/cm^2 @ 2870^\circ K$ )	$V_{CE(sat)}$	—	.9	1.2	V
<b>Collector-Emitter Breakdown Voltage</b> ( $I_C = 1mA$ )	$V_{(BR)CEO}$	30	—	—	V
<b>Emitter-Collector Breakdown Voltage</b> ( $I_E = 100\mu A$ )	$V_{(BR)ECO}$	7	—	—	V
<b>Collector-Emitter Capacitance</b> ( $V_{CE} = 5V, f = 1MHz$ )	$C_{ceo}$	—	5	8	pF

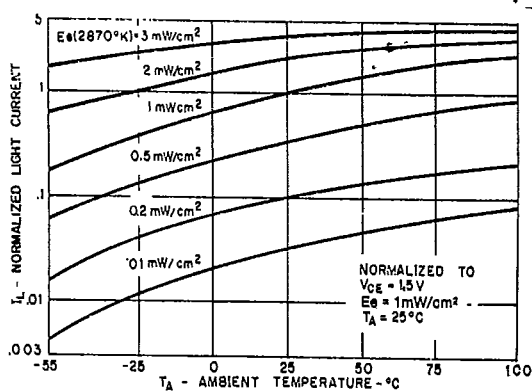
## coupled characteristics:

<b>Light Current</b> ( $V_{CE} = 1.5V, I_F = 5mA$ )	$I_L$	—	18	—	mA
<b>Turn On Time</b> ( $V_{CC} = 5V, I_F = 10mA, R_L = 750\Omega$ )	$t_{on}$	—	45	—	$\mu s$
<b>Turn Off Time</b> ( $V_{CC} = 5V, I_F = 10mA, R_L = 750\Omega$ )	$t_{off}$	—	250	—	$\mu s$

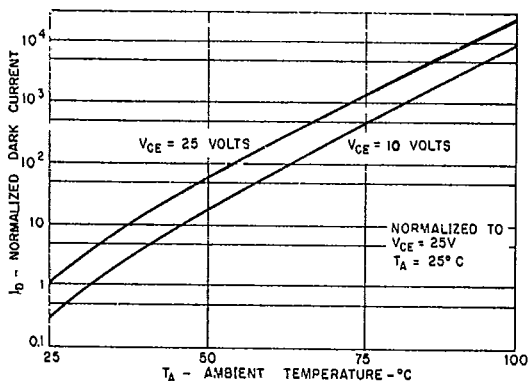
NOTE: Coupled electrical characteristics are measured using an F5F1 GaAs IRED at a separation distance of 4.0mm (.155 in.) with the lenses of the emitter and detector on a common axis within 0.1mm and parallel within 5°.  $E_e$  = Radiation flux density. Radiation source is an unfiltered tungsten filament bulb at 2870° K color temperature. The F5F940nm radiation is approximately 3 times more efficient than the 2870° K tungsten irradiance on this device. This means 0.3mW/cm² from the F5F is equivalent to the 1mW/cm² at 2870° K.



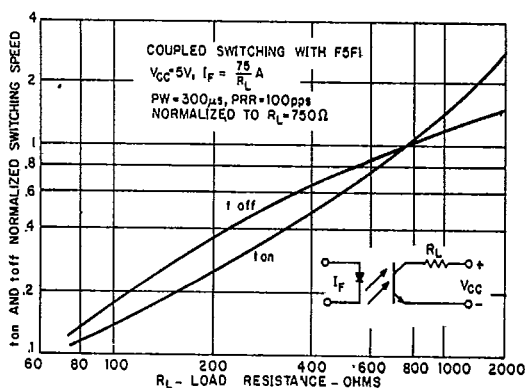
1. LIGHT CURRENT VS. COLLECTOR-EMITTER VOLTAGE



2. LIGHT CURRENT VS. AMBIENT TEMPERATURE

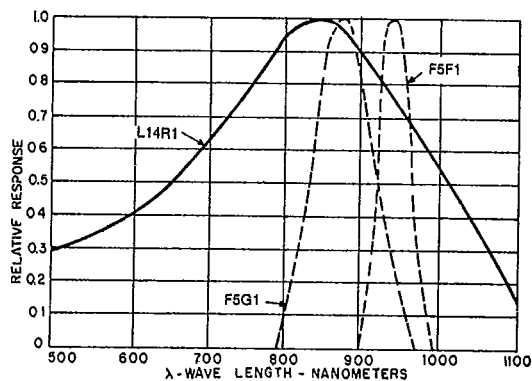


3. LEAKAGE CURRENT VS. TEMPERATURE

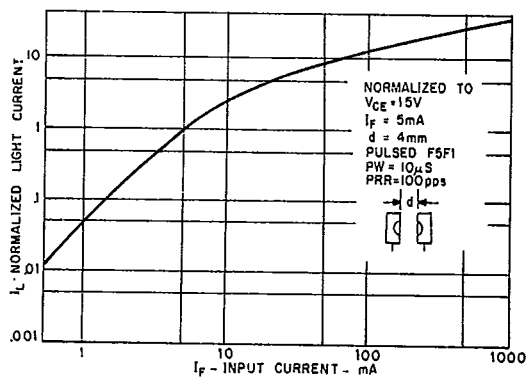


4. SWITCHING TIME VS. LOAD RESISTANCE

10



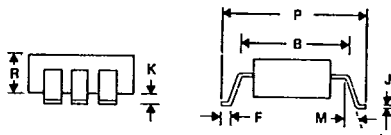
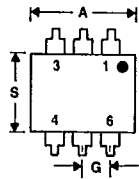
5. SPECTRAL RESPONSE



6. COUPLED LIGHT CURRENT VS. F5F1 INPUT CURRENT

T-91-20

# Surface-Mount Optoisolators



Surface-mount packaging for the entire 6-pin DIP optoisolator line!

Add the "SMA" or "SMB" suffix to any 6-pin optoisolator part number when ordering.

**DIMENSIONAL OUTLINE NO. 298**  
All Surface-Mount Types

**SMB (Standard)**  
Surface-Mount Package

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.330	0.350	8.38	8.89	
B	0.330 REF		8.38 REF		
F	0.020	0.040	0.508	1.02	
J	0.008	0.012	0.203	0.305	
K	0.0040	0.0098	0.102	0.249	
M	—	15°	—	15°	
P	0.375	0.395	9.53	10.03	
R	0.115	0.135	2.92	3.43	
S	0.240	0.270	6.10	6.86	
Coplanarity	0	0.002	0	0.051	1

92CS-42862

1. Coplanarity is the distance from a plane, defined by the end of the three longest legs to the end of the shortest leg.

**SMA (Low Profile)**  
Surface-Mount Package

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.330	0.350	8.38	8.89	
B	0.330 REF		8.38 REF		
F	0.020	0.040	0.508	1.02	
J	0.008	0.012	0.203	0.305	
K	0.0005	0.0040	0.013	0.102	
M	—	15°	—	15°	
P	0.373	0.393	9.47	9.98	
R	0.115	0.135	2.92	3.43	
S	0.240	0.270	6.10	6.86	
Coplanarity	0	0.002	0	0.051	1

92CS-42861

1. Coplanarity is the distance from a plane, defined by the end of the three longest legs to the end of the shortest leg.

