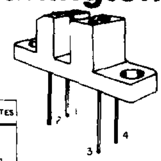
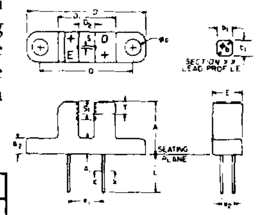
H21B4, H21B5, H21B6
Optointerrupter
GaAs Infrared Emitting Diode and NPN Silicon Photo-Darlington Amplifier Module with 1mm Aperture

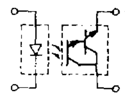


The H21B Interrupter Module is a gallium arsenide infrared emitting diode coupled to a silicon Darlington-connected phototransistor in a plastic housing. The packaging system is designed to optimize the mechanical resolution, coupling efficiency, ambient light rejection, cost, and reliability. The gap in the housing provides a means of interrupting the signal with an opaque material, switching the output from an "ON" into an "OFF" state.



SYMBOL	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX	NOTES
A	10.7	11.0	.422	.433	
A1	3.0	3.2	.119	.125	
A2	3.0	3.2	.119	.125	
φb	.600	.750	.024	.030	2
b1	.50 NOM		.020 NOM		2
D	24.3	24.7	.957	.972	
D1	11.6	12.0	.457	.472	
D2	3.0	3.3	.119	.129	
e1	6.9	7.5	.272	.295	
e2	2.5	2.8	.091	.110	
E	6.15	6.35	.243	.249	
L	8.00		.315		
φP	3.2	3.4	.126	.133	
Q	18.9	19.2	.745	.755	
S	.85	1.0	.034	.039	
S1	3.45	3.75	.136	.147	
T	2.6 NOM		.103 NOM		3

NOTES
1. INCH DIMENSIONS ARE DERIVED FROM MILLIMETERS
2. FOUR LEADS. LEAD CROSS SECTION IS CONTROLLED BETWEEN 1.27 MM (.050") FROM SEATING PLANE AND THE END OF THE LEADS
3. THE SENSING AREA IS DEFINED BY THE "S" DIMENSION AND BY DIMENSION "T" ±0.75 MM (±.030 INCH)



absolute maximum ratings: (25°C)

TOTAL DEVICE		
Storage Temperature	T_{STG}	-55°C to +100°C
Operating Temperature	T_J	-55°C to +100°C
Lead Soldering Temperature (5 seconds maximum)	T_L	260°C

INFRARED EMITTING DIODE			
Power Dissipation	P_E	*100	mW
Forward Current (Continuous)	I_F	60	mA
Forward Current (Peak) (Pulse Width ≤ 1 μs PRR ≤ 300 pps)	I_F	3	A
Reverse Voltage	V_R	6	V

*Derate 1.33 mW/°C above 25°C ambient.

DARLINGTON CONNECTED PHOTOTRANSISTOR			
Power Dissipation	P_D	**150	mW
Collector Current (Continuous)	I_C	100	mA
Collector-Emitter Voltage	V_{CEO}	55	V
Emitter-Collector Voltage	V_{ECO}	7	V

**Derate 2.0 mW/°C above 25°C ambient.

individual electrical characteristics:(25°C) (See Note 1)

EMITTER	MIN.	TYP.	MAX.	UNITS
Reverse Breakdown Voltage $V_{(BR)R}$ $I_R = 10\mu A$	6	–	–	V
Forward Voltage V_F $I_F = 60\,mA$	–	–	1.7	V
Reverse Current I_R $V_R = 3V$	–	–	1	μA
Capacitance C_i $V = 0, f = 1\,MHz$	–	30	–	pF

DETECTOR	MIN.	TYP.	MAX.	UNITS
Breakdown Voltage $V_{(BR)CEO}$ $I_C = 1\,mA$	55	–	–	V
Breakdown Voltage $V_{(BR)ECO}$ $I_E = 100\mu A$	7	–	–	V
Collector Dark Current I_{CEO} $V_{CE} = 45V$	–	–	100	nA
Capacitance C_{ce} $V_{CE} = 5V, f = 1\,MHz$	–	5	8	pF

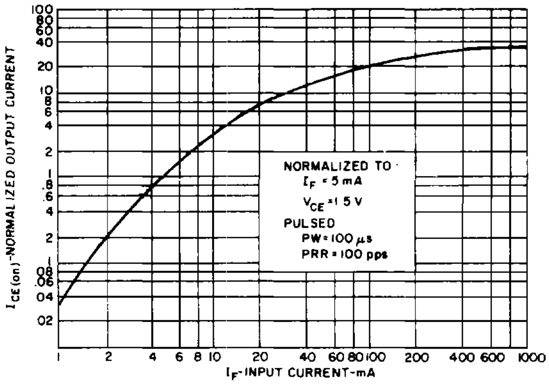
coupled electrical characteristics:(25°C) (See Note 1)

	H21B4			H21B5			H21B6			UNITS
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
$I_{CE(on)}$ $I_F = 2mA, V_{CE} = 1.5V$	0.5	–	–	1.0	–	–	2.0	–	–	mA
$I_{CE(on)}$ $I_F = 5mA, V_{CE} = 1.5V$	2.5	–	–	5.0	–	–	10	–	–	mA
$I_{CE(on)}$ $I_F = 10mA, V_{CE} = 1.5V$	7.5	–	–	14	–	–	25	–	–	mA
$V_{CE(sat)}$ $I_F = 10mA, I_C = 1.8mA$	–	–	1.0	–	–	1.0	–	–	1.0	V
$V_{CE(sat)}$ $I_F = 60mA, I_C = 50mA$	–	–	–	–	–	1.5	–	–	1.5	V
t_{on} $V_{CC} = 5V, I_F = 10mA, R_L = 750\Omega$	–	45	–	–	45	–	–	45	–	μs
$V_{CC} = 5V, I_F = 60mA, R_L = 75\Omega$	–	–	–	–	7	–	–	7	–	μs
t_{off} $V_{CC} = 5V, I_F = 10mA, R_L = 750\Omega$	–	250	–	–	250	–	–	250	–	μs
$V_{CC} = 5V, I_F = 60mA, R_L = 75\Omega$	–	–	–	–	45	–	–	45	–	μs

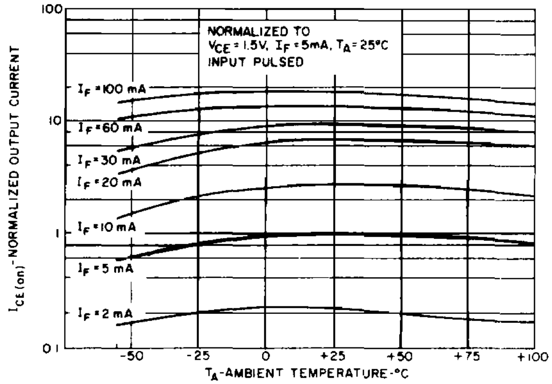
Note 1: Stray irradiation can alter values of characteristics. Adequate shielding should be provided.

H21B4, H21B5, H21B6

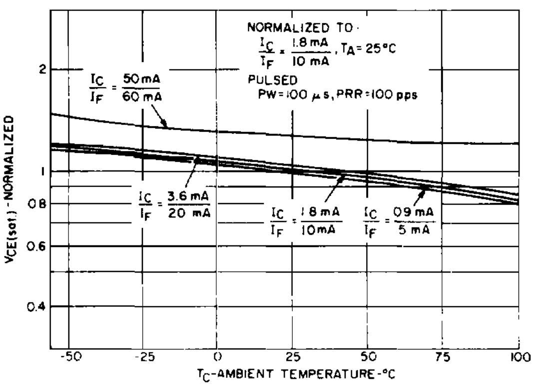
TYPICAL CHARACTERISTICS



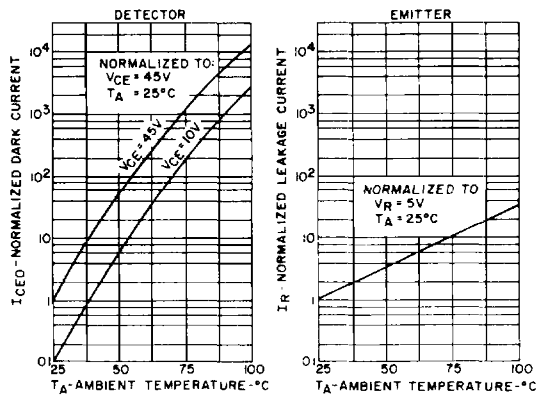
1. OUTPUT CURRENT VS. INPUT CURRENT



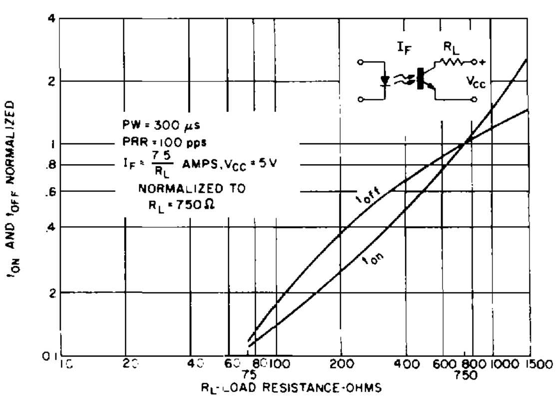
2. OUTPUT CURRENT VS. TEMPERATURE



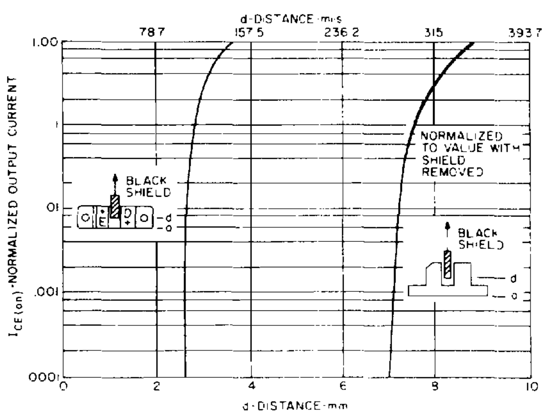
3. $V_{CE\,(sat)}$ VS. TEMPERATURE



4. LEAKAGE CURRENTS VS. TEMPERATURE



5. SWITCHING SPEED VS. R_L



6. OUTPUT CURRENT VS. SHIELD DISTANCE

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