

H21A1, H21A2, H21A3

Optointerrupter

GaAs Infrared Emitting Diode and NPN Silicon Phototransistor Module with 1mm Aperture

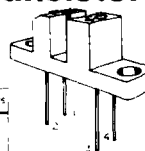
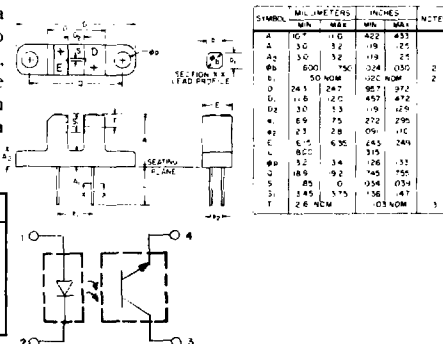
The H21A Interrupter Module is a gallium arsenide infrared emitting diode coupled to a silicon phototransistor in a plastic housing. The packaging system is designed to optimize the mechanical resolution, coupling efficiency, ambient light rejection, cost, and reliability. The gap in the housing provides a means of interrupting the signal with an opaque material, switching the output from an "ON" into an "OFF" state.

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_F	*100	mW
Forward Current (Continuous)	I_F	60	mA
Forward Current (Peak) (Pulse Width $\leq 1\mu s$ PRR ≤ 300 pps)	I_F	3	A
Reverse Voltage	V_R	6	V

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



NOTES:
1. ALL DIMENSIONS ARE DERIVED FROM MILLIMETERS
2. THE LEADS LEAD CROSS SECTION IS COMPROMISED BETWEEN 1.5MM TO 1.0MM FROM SEATING PLANE AND THE END OF THE LEADS
3. THE SENSING AREA IS DEFINED BY THE 5.0MM DIMENSION AND BY DIMENSION 1.0 TO 1.5MM (1.00 INCH)

PHOTOTRANSISTOR			
Power Dissipation	P_D	**150	mW
Collector Current (Continuous)	I_C	100	mA
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Collector Voltage	V_{ECO}	6	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 $V_R = 3$ V	—	—	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	30	—	—	V
Breakdown Voltage $V_{(BR)ECO}$ $I_F = 100\mu A$	6	—	—	V
Collector Dark Current I_{CEO} $V_{CE} = 25$ V	—	—	100	nA
Capacitance C_{ce} $V_{CE} = 5$ V, $f = 1$ MHz	—	3.3	5	pF

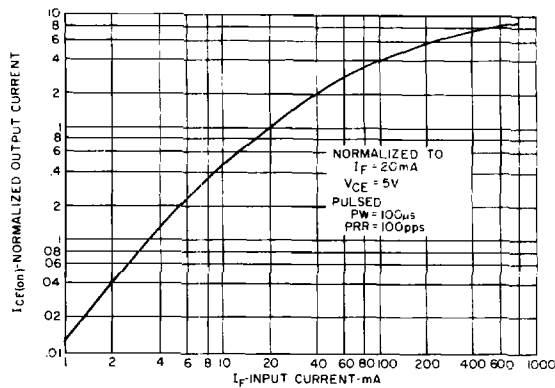
coupled electrical characteristics:(25°C) (See Note 1)

		H21A1			H21A2			H21A3			UNITS
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
$I_{CE(on)}$	$I_F = 5$ mA, $V_{CE} = 5$ V	0.15	—	—	0.30	—	—	0.60	—	—	mA
$I_{CE(on)}$	$I_F = 20$ mA, $V_{CE} = 5$ V	1.0	—	—	2.0	—	—	4.0	—	—	mA
$I_{CE(on)}$	$I_F = 30$ mA, $V_{CE} = 5$ V	1.9	—	—	3.0	—	—	5.5	—	—	mA
$V_{CE(sat)}$	$I_F = 20$ mA, $I_C = 1.8$ mA	—	—	—	—	—	0.40	—	—	0.40	V
$V_{CE(sat)}$	$I_F = 30$ mA, $I_C = 1.8$ mA	—	—	0.40	—	—	—	—	—	—	V
t_{on}	$V_{CC} = 5$ V, $I_F = 30$ mA, $R_L = 2.5$ K Ω	—	8	—	—	8	—	—	8	—	μs
t_{off}	$V_{CC} = 5$ V, $I_F = 30$ mA, $R_L = 2.5$ K Ω	—	50	—	—	50	—	—	50	—	μs

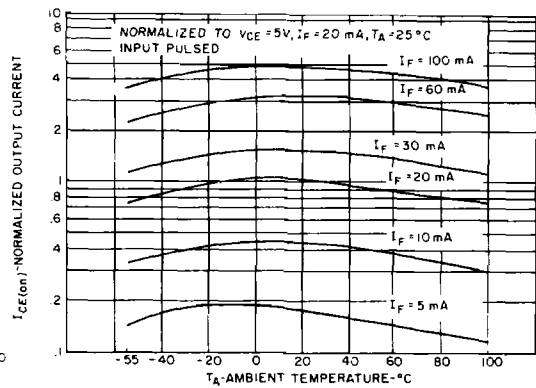
Note 1: Stray irradiation can alter values of characteristics. Adequate shielding should be provided.

H21A1, H21A2, H21A3

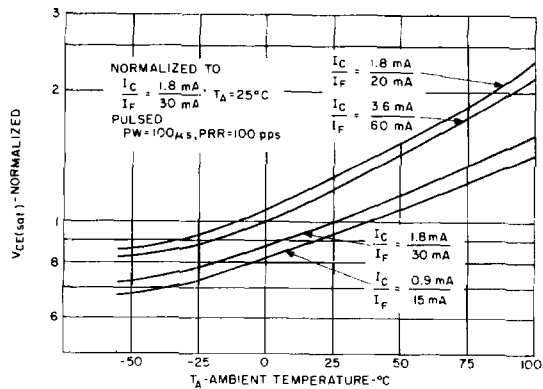
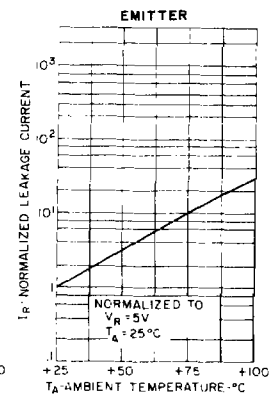
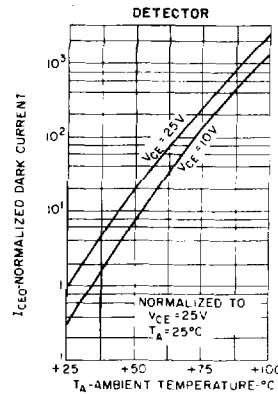
TYPICAL CHARACTERISTICS



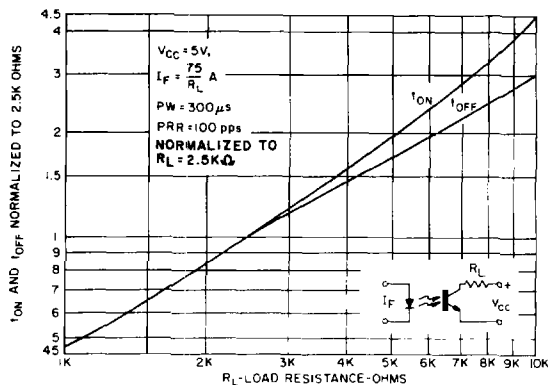
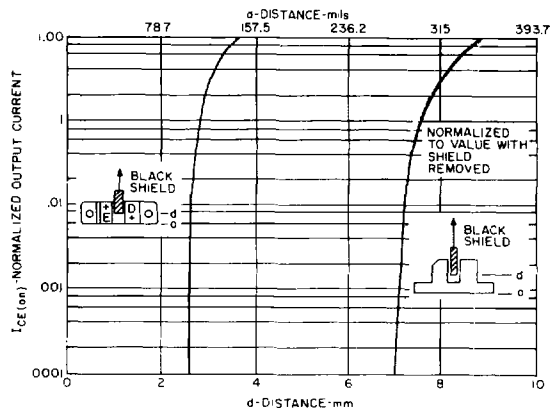
1. OUTPUT CURRENT VS. INPUT CURRENT



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. DISTANCE