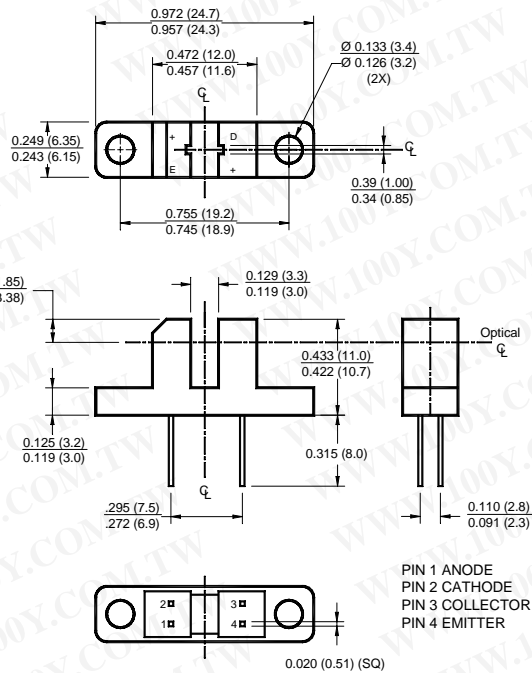


H21A1 / H21A2 / H21A3

PHOTOTRANSISTOR OPTICAL INTERRUPTER SWITCH

PACKAGE DIMENSIONS

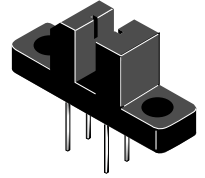


NOTES:

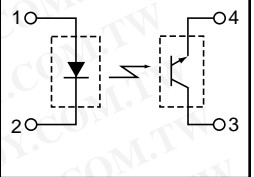
1. Dimensions for all drawings are in inches (mm).
2. Tolerance of $\pm .010$ (.25) on all non-nominal dimensions unless otherwise specified.

DESCRIPTION

The H21A1, H21A2 and H21A3 consist of a gallium arsenide infrared emitting diode coupled with 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" to an "OFF" state.



SCHEMATIC



FEATURES

- Opaque housing
- Low cost
- .035" apertures
- High $I_{C(ON)}$

1. Derate power dissipation linearly 1.33 mW/°C above 25°C.
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron tip 1/16" (1.6mm) minimum from housing.

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Unit
Operating Temperature	T_{OPR}	-55 to +100	°C
Storage Temperature	T_{STG}	-55 to +100	°C
Soldering Temperature (Iron) ^(2,3 and 4)	T_{SOL-I}	240 for 5 sec	°C
Soldering Temperature (Flow) ^(2 and 3)	T_{SOL-F}	260 for 10 sec	°C
INPUT (EMITTER)			
Continuous Forward Current	I_F	50	mA
Reverse Voltage	V_R	6	V
Power Dissipation ⁽¹⁾	P_D	100	mW
OUTPUT (SENSOR)			
Collector to Emitter Voltage	V_{CEO}	30	V
Emitter to Collector Voltage	V_{ECO}	4.5	V
Collector Current	I_C	20	mA
Power Dissipation ($T_C = 25^\circ\text{C}$) ⁽¹⁾	P_D	150	mW

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H21A1 / H21A2 / H21A3

PHOTOTRANSISTOR

OPTICAL INTERRUPTER SWITCH

ELECTRICAL / OPTICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)(All measurements made under pulse condition)							
PARAMETER	TEST CONDITIONS	SYMBOL	DEVICES	MIN	TYP	MAX	UNITS
INPUT (EMITTER)							
Forward Voltage	$I_F = 60 \text{ mA}$	V_F	All	—	—	1.7	V
Reverse Breakdown Voltage	$I_R = 10 \mu\text{A}$	V_R	All	6.0	—	—	V
Reverse Leakage Current	$V_R = 3 \text{ V}$	I_R	All	—	—	1.0	μA
OUTPUT (SENSOR)							
Emitter to Collector Breakdown	$I_F = 100 \mu\text{A}, E_e = 0$	BV_{ECO}	All	6.0	—	—	V
Collector to Emitter Breakdown	$I_C = 1 \text{ mA}, E_e = 0$	BV_{CEO}	All	30	—	—	V
Collector to Emitter Leakage	$V_{CE} = 25 \text{ V}, E_e = 0$	I_{CEO}	All	—	—	100	nA
COUPLED							
On-State Collector Current	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$	$I_{C(ON)}$	H21A1	0.15	—	—	mA
			H21A2	0.30	—	—	
			H21A3	0.60	—	—	
	$I_F = 20 \text{ mA}, V_{CE} = 5 \text{ V}$		H21A1	1.0	—	—	
			H21A2	2.0	—	—	
			H21A3	4.0	—	—	
	$I_F = 30 \text{ mA}, V_{CE} = 5 \text{ V}$		H21A1	1.9	—	—	
			H21A2	3.0	—	—	
			H21A3	5.5	—	—	
Saturation Voltage	$I_F = 20 \text{ mA}, I_C = 1.8 \text{ mA}$	$V_{CE(SAT)}$	H21A2/3	—	—	0.40	V
	$I_F = 30 \text{ mA}, I_C = 1.8 \text{ mA}$		H21A1	—	—	0.40	V
Turn-On Time	$I_F = 30 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 2.5 \text{ K}\Omega$	t_{on}	All	—	8	—	μs
Turn-Off Time	$I_F = 30 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 2.5 \text{ K}\Omega$	t_{off}	All	—	50	—	μs

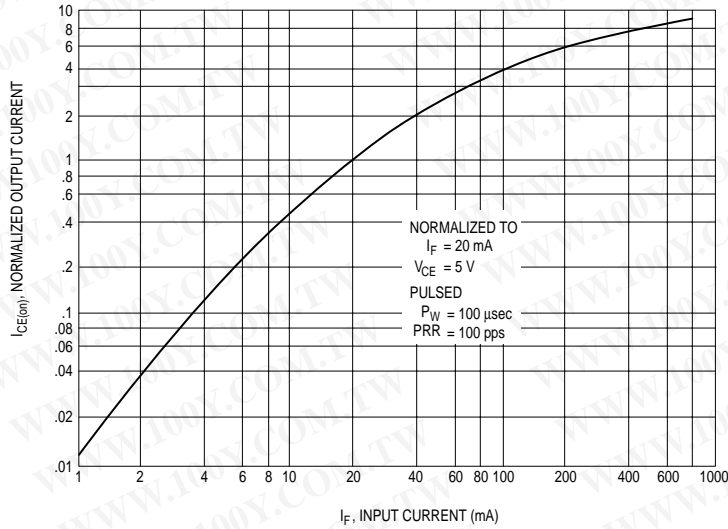
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OPTICAL INTERRUPTER SWITCH

Figure 1. Output Current vs. Input Current



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Figure 2. Output Current vs. Temperature

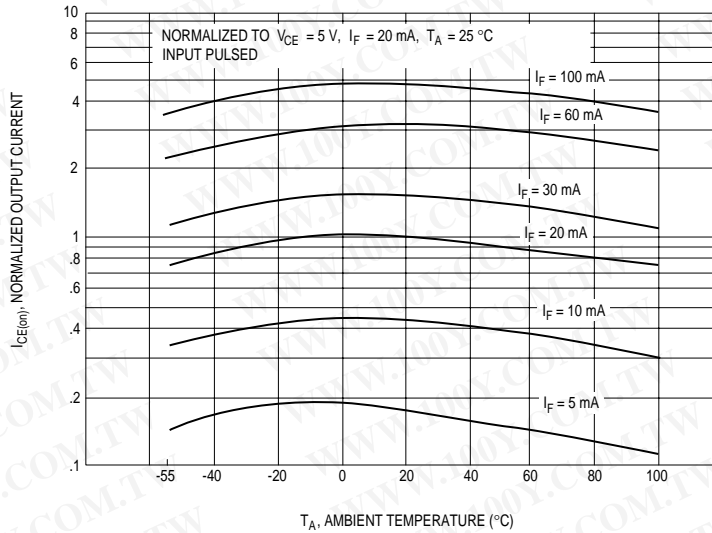


Figure 3. $V_{CE(SAT)}$ vs. Temperature

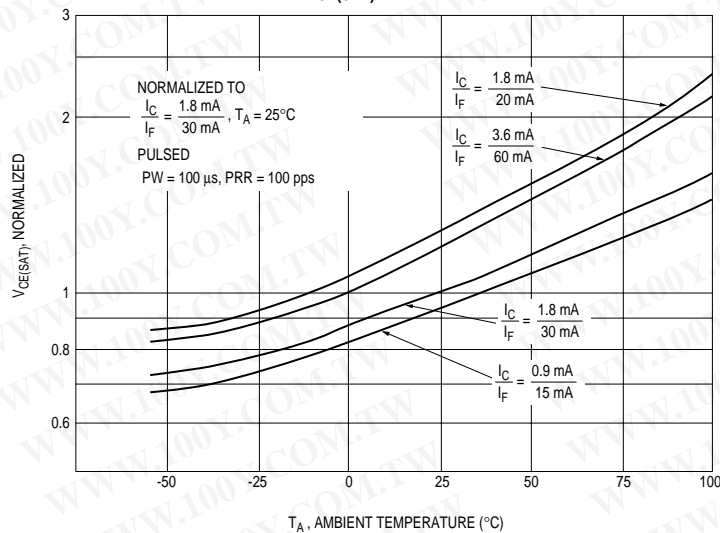


Figure 4. Leakage Current vs. Temperature

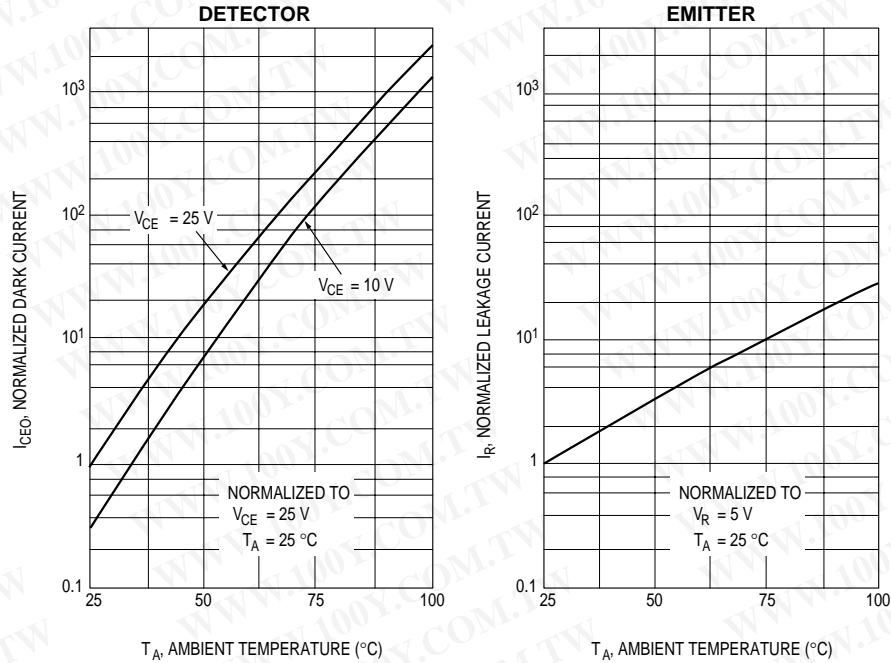


Figure 5. Switching Speed vs. R_L

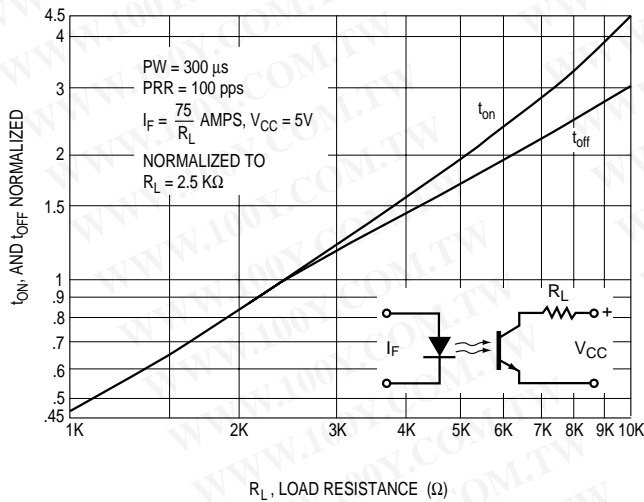
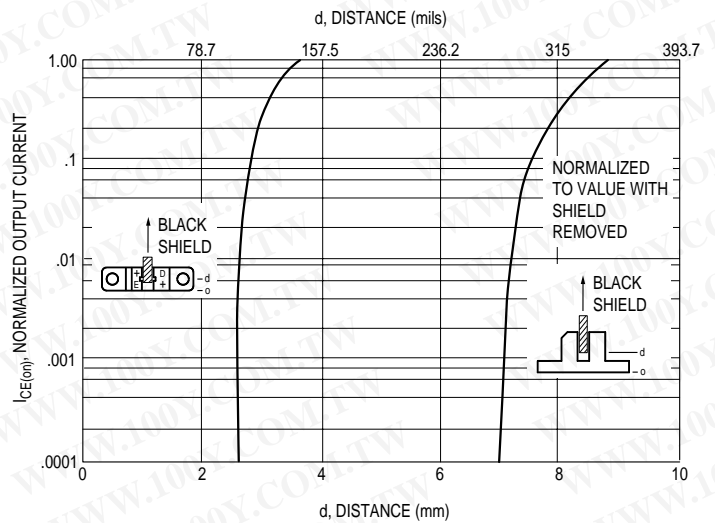


Figure 6. Output Current vs. Distance



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