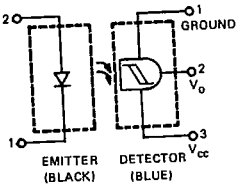
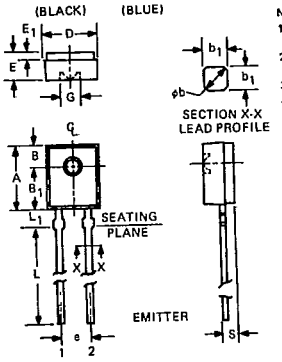
Matched Emitter-Detector Pair H23L1

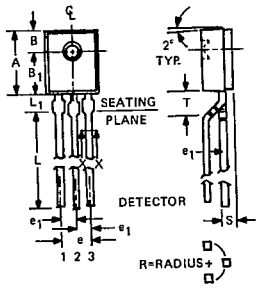
The GE Solid State H23L1 is a matched emitter-detector pair which consists of a gallium arsenide, infrared emitting diode and a high speed integrated circuit detector. The output incorporates a Schmitt Trigger which provides hysteresis for noise immunity and pulse shaping. The detector circuit is optimized for simplicity of operation and utilizes an open collector output for maximum application flexibility. The clear epoxy packaging system is designed to optimize the mechanical resolution, coupling efficiency, cost, and reliability. The devices are marked with a color dot for easy identification of the emitter and detector.



SYM.	MILLIMETERS MIN.	MILLIMETERS MAX.	INCHES MIN.	INCHES MAX	NOTES
A	5 59	5 80	220	228	
B	1 78	NOM	070	NOM	2
B_1	3 68	3 94	145	155	
ϕb	60	75	024	030	1
b_1	51	NOM	020	NOM	1
D	4 45	4 70	175	185	
E	2 41	2 67	095	105	
E_1	58	69	023	.027	
e	2 41	2 67	095	105	3
e_1	1 14	1 40	045	055	3
G	1 98	NOM	078	NOM	
L	12 7	—	500	—	
L_1	1 40	1 65	055	065	1
R	1 27	NOM	050	NOM	
S	83	94	033	037	3
T	—	1 65	—	065	

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





absolute maximum ratings: (25° C)

EMITTER-DETECTOR PAIR		
Storage Temperature	T_{STG}	-55°C to +85°C
Operating Temperature	T_J	-55°C to +85°C
Lead Soldering Temperature (5 seconds maximum) ⩾ 1/16" (1.6 mm) from Case	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.

PHOTO DETECTOR			
Power Dissipation	P_D	**150	mW
Output Current	I_2	50	mA
Allowed Range	V_{CC}	0 to 16	V
Allowed Range	V_{21}	0 to 16	V

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

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individual electrical characteristics (0-70° C)

T-41-71

EMITTER		MIN.	TYP.	MAX.	UNITS
Forward Voltage (I_F = 20 mA)	V_F	—	1.10	1.50	volts
Reverse Current (V_R = 3V)	I_R	—	—	10	micro-ampere
Capacitance (V = 0, f = 1 MHz)	C_J	—	—	100	pico-farads

DETECTOR (E_e = 0)		MIN.	TYP.	MAX.	UNITS
Operating Voltage Range	V_{CC}	4	—	15	volts
Supply Current (I_F = 0, V_{CC} = 5V)	$I_{3(off)}$	—	1.0	5.0	milli-ampere
Output Current, High (I_F = 0, V_{cc} = V_o = 15V)	I_{OH}	—	—	100	micro-ampere

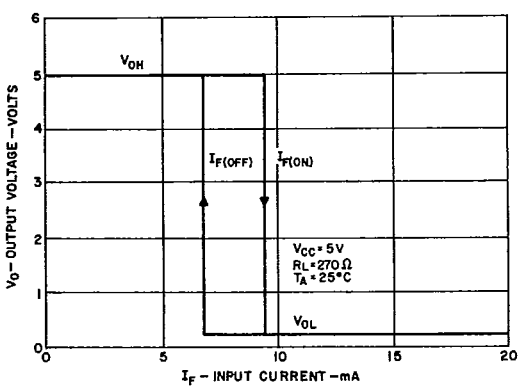
coupled electrical characteristics (0-70° C)

Note: Coupled electrical characteristics are measured at a separation distance of 4mm (.155 inches) with the lenses of the emitter and detector on a common axis within 0.1mm and parallel within 5°.

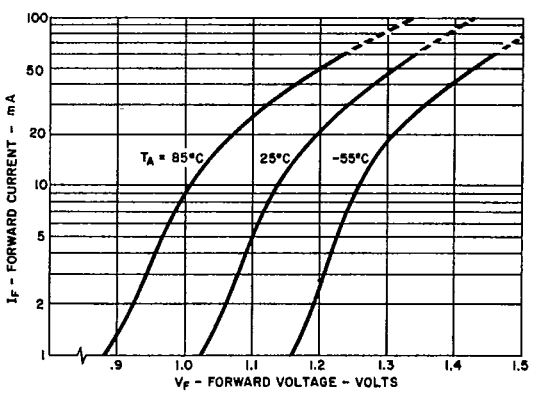
		MIN.	TYP.	MAX.	UNITS
Supply Current (I_F = 5 mA, V_{CC} = 5V)	$I_{3(on)}$	—	1.6	5.0	milliampere
Output Voltage, Low (R_L = 270Ω, V_{CC} = 5V)	V_{OL}	—	0.2	0.4	volts
Turn-On Threshold Current (R_L = 270Ω, V_{CC} = 5V)	$I_{F(on)}$	—	10.0	20.0	milliampere
Turn-Off Threshold Current (R_L = 270Ω, V_{CC} = 5V)	$I_{F(off)}$	1.0	7.5	—	milliampere
Hysteresis Ratio (R_L = 270Ω, V_{CC} = 5V)	$I_{F(off)}/I_{F(on)}$	0.50	0.75	0.90	—
Switching Speeds: (R_L = 270Ω, V_{CC} = 5V, T_A = 25°C					
Rise Time	t_r	—	0.1	—	μsec.
Fall Time	t_f	—	0.1	—	μsec.

10

TYPICAL CHARACTERISTICS



1. TRANSFER CHARACTERISTICS



2. FORWARD VOLTAGE VS. FORWARD CURRENT

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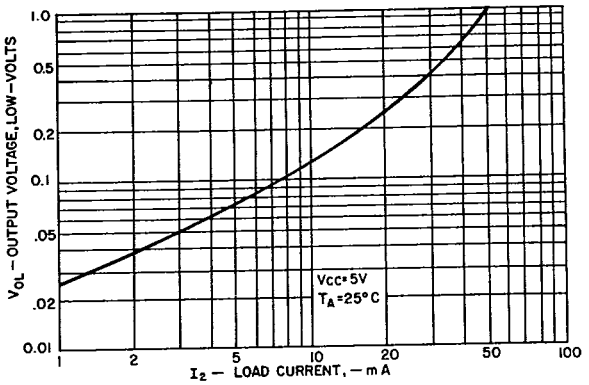
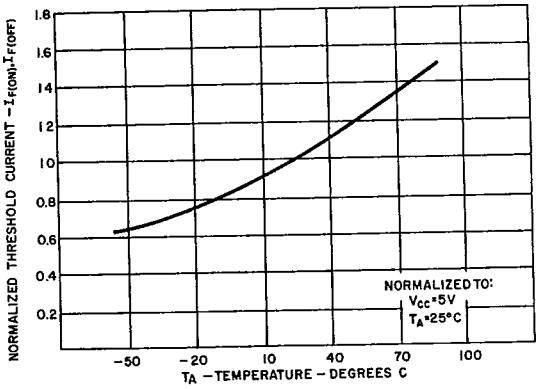
TYPICAL CHARACTERISTICS

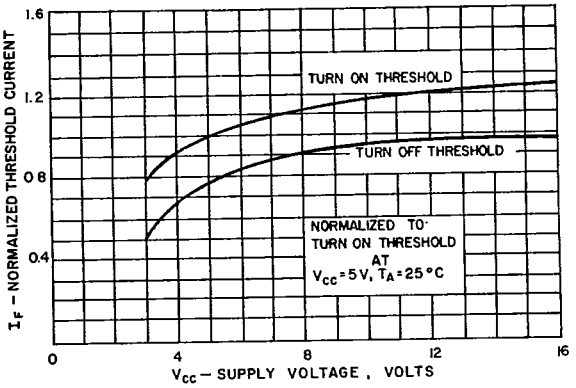
T-41-71



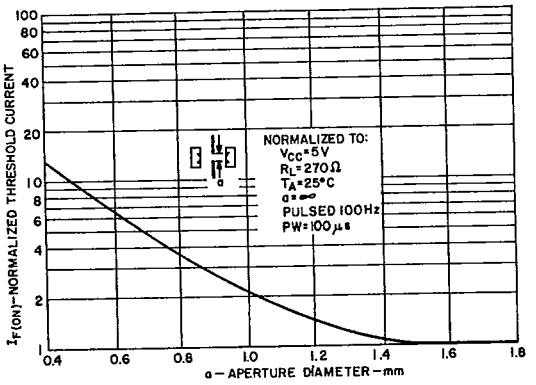
3. ON VOLTAGE VS. LOAD CURRENT



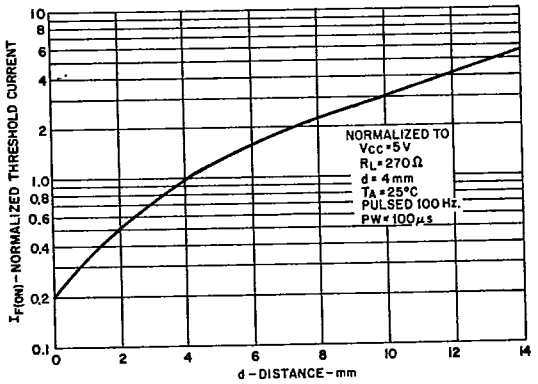
4. THRESHOLD CURRENTS VS. TEMPERATURE



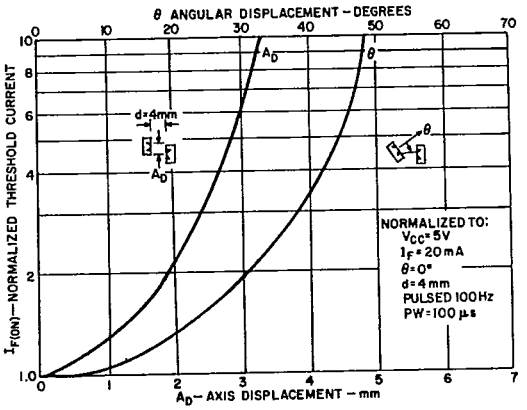
5. THRESHOLD CURRENT VS. SUPPLY VOLTAGE



6. THRESHOLD CURRENT VS. APERTURE DIAMETER



7. THRESHOLD CURRENT VS. DISTANCE



8. THRESHOLD CURRENT VS. DISPLACEMENT (ANGULAR AND AXIS)

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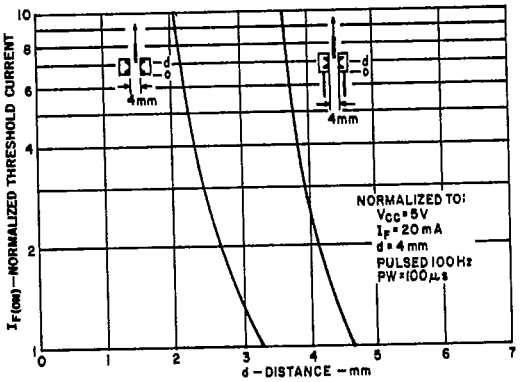
TYPICAL CHARACTERISTICS



9. THRESHOLD CURRENT VS. SHIELD DISTANCE

10

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