Photo Detectors
Darlington Output

MRD360
MRD370

PHOTO DETECTORS
DARLINGTON OUTPUT
NPN SILICON

. . . designed for application in industrial inspection, processing and control, counters, sorters, switching and logic circuit or any design requiring very high radiation sensitivity at low light levels.

- Popular TO-18 Type Hermetic Package for Easy Handling and Mounting
- Sensitive Throughout Visible and Near Infrared Spectral Range for Wider Application
- Minimum Light Current 12 mA at H = 0.5 mW/cm^2 (MRD360)
- External Base for Added Control
- Switching Times —
  t_r @ I_L = 1 mA peak = 15 μs (Typ) — MRD370
  t_f @ I_L = 1 mA peak = 25 μs (Typ) — MRD370

CASE 82-05
METAL

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MAXIMUM RATINGS (T_A = 25°C *unless otherwise noted*)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Volts
Emitter-Base Voltage	V_{EBO}	10	Volts
Collector-Base Voltage	V_{CBO}	50	Volts
Light Current	I_L	250	mA
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	250 2.27	mW mW/°C
Operating Temperature Range	T_A	−55 to +125	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

STATIC ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	*Symbol*	*Min*	*Typ*	*Max*	*Unit*
Collector Dark Current (V_{CE} = 10 V, H = 0) T_A = 25°C	I_{CEO}	—	10	100	nA
Collector-Base Breakdown Voltage (I_C = 100 μA)	$V_{(BR)CBO}$	50	—	—	Volts
Collector-Emitter Breakdown Voltage (I_C = 100 μA)	$V_{(BR)CEO}$	40	—	—	Volts
Emitter-Base Breakdown Voltage (I_E = 100 μA)	$V_{(BR)EBO}$	10	—	—	Volts

OPTICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Light Current (V_{CC} = 5 V, R_L = 10 Ohms) Note 1	MRD360 MRD370	I_L	12 3	20 10	— —	mA
Collector-Emitter Saturation Voltage (I_L = 10 mA, H = 2 mW/cm^2 at 2870K)		$V_{CE(sat)}$	—	—	1	Volt
Photo Current Rise Time (Note 2) (R_L = 100 ohms, I_L = 1 mA peak)	MRD360 MRD370	t_r	— —	40 15	100 100	μs
Photo Current Fall Time (Note 2) (R_L = 100 ohms, I_L = 1 mA peak)	MRD360 MRD370	t_f	— —	60 25	150 150	μs
Wavelength of Maximum Sensitivity		λ_S	—	0.8	—	μm

NOTES: 1. Radiation flux density (H) equal to 0.5 mW/cm^2 emitted from a tungsten source at a color temperature of 2870 K.
2. For unsaturated response time measurements, radiation is provided by pulsed GaAs (gallium-arsenide) light-emitting diode (λ = 940 nm) with a pulse width equal to or greater than 500 microseconds (see Figure 6) I_L = 1 mA peak.

TYPICAL CHARACTERISTICS

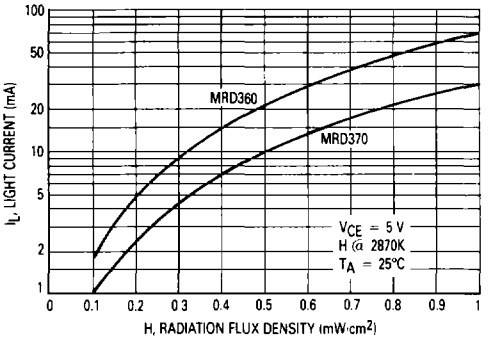


Figure 1. Light Current versus Irradiance

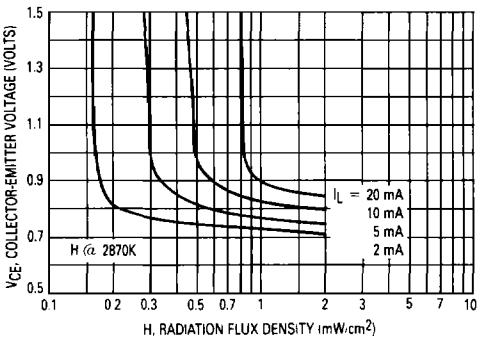


Figure 2. Collector-Emitter Saturation Characteristic

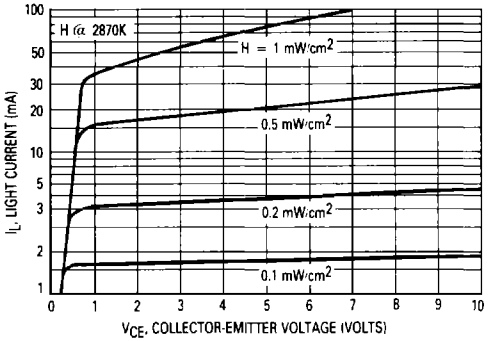


Figure 3. Collector Characteristics

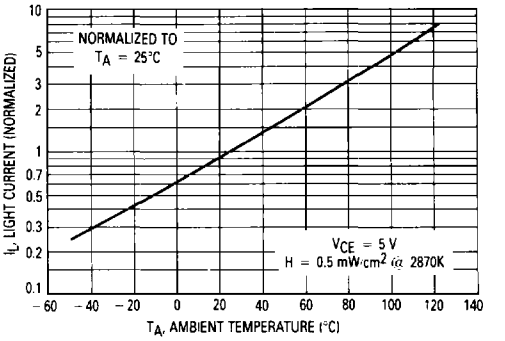


Figure 4. Normalized Light Current versus Temperature

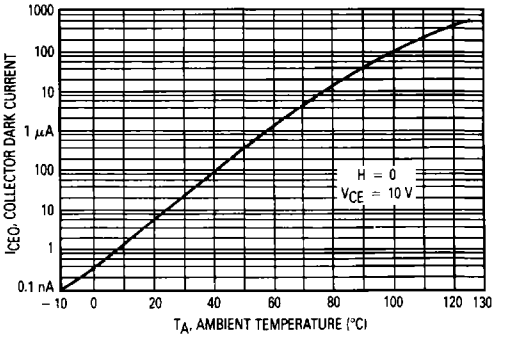


Figure 5. Dark Current versus Temperature

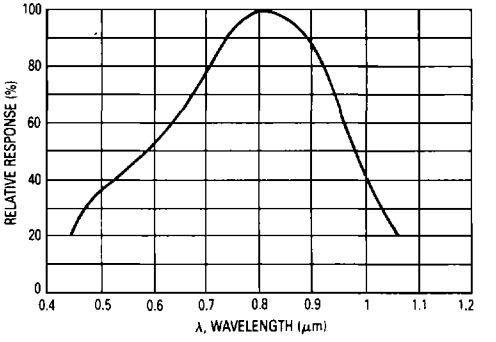


Figure 6. Constant Energy Spectral Response

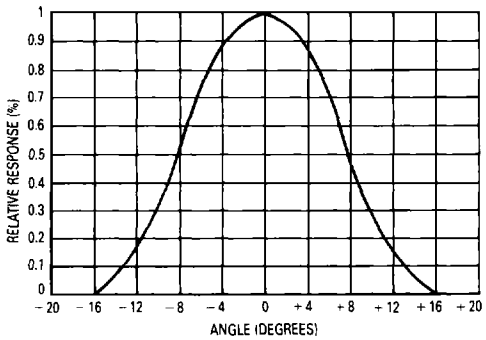


Figure 7. Angular Response

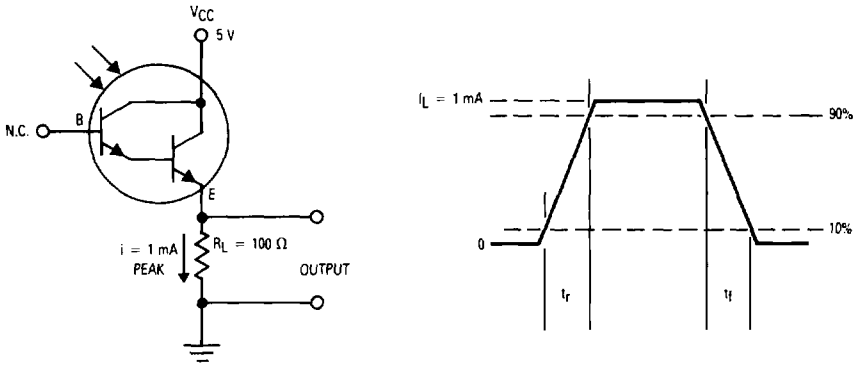
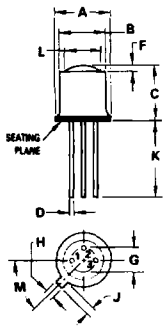


Figure 8. Pulse Response Test Circuit and Waveform

OUTLINE DIMENSIONS



NOTES
1. LEADS WITHIN .13 mm (.005) RADIUS OF TRUE POSITION AT SEATING PLANE, AT MAXIMUM MATERIAL CONDITION.
2. PIN 3 INTERNALLY CONNECTED TO CASE

STYLE 1
PIN 1 EMITTER
2 BASE
3 COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.57	6.48	0.180	0.255
D	0.41	0.48	0.016	0.019
F	—	1.14	—	0.045
G	2.54 BSC		0.100 BSC	
H	0.99	1.17	0.039	0.046
J	0.84	1.22	0.033	0.048
K	12.70	—	0.500	—
L	3.35	4.01	0.132	0.158
M	45° BSC		45° BSC	

CASE 82-05
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