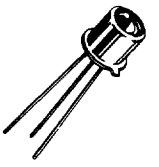
Photo Detectors
Transistor Output

MRD3050
MRD3051
MRD3054
MRD3055
MRD3056

PHOTO DETECTORS
TRANSISTOR OUTPUT
NPN SILICON
30 VOLTS

. . . designed for application in industrial inspection, processing and control, counters, sorters, switching and logic circuits or any design requiring radiation sensitivity, and stable characteristics.

- Hermetic Package at Economy Prices
- Popular TO-18 Type Package for Easy Handling and Mounting
- Sensitive Throughout Visible and Near Infrared Spectral Range for Wider Application
- Range of Radiation Sensitivities for Design Flexibility
- External Base for Added Control
- Annular Passivated Structure for Stability and Reliability



CASE 82-05
METAL

4

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

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Volts
Emitter-Collector Voltage	V_{ECO}	5	Volts
Collector-Base Voltage	V_{CBO}	40	Volts
Total Power 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_{CC} = 20 V, R_L = 1 Megohm, Note 2) T_A = 25°C T_A = 85°C	I_{CEO}	— —	— 5	0.1 —	μA
Collector-Base Breakdown Voltage (I_C = 100 μA)	$V_{(BR)CBO}$	40	—	—	Volts
Collector-Emitter Breakdown Voltage (I_C = 100 μA)	$V_{(BR)CEO}$	30	—	—	Volts
Emitter-Collector Breakdown Voltage (I_E = 100 μA)	$V_{(BR)ECO}$	5	—	—	Volts

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

Characteristic		Fig. No.	Symbol	Min	Typ	Max	Unit
Collector-Light Current (V_{CC} = 20 V, R_L = 100 Ohms, Note 1)	MRD3050	1	I_L	0.1	—	—	mA
	MRD3051			0.2	—	—	
	MRD3054			0.5	—	—	
	MRD3055			1.5	—	—	
	MRD3056			2	—	—	
Photo Current Saturated Rise Time (Note 3)		5	$t_{r(sat)}$	—	1	—	μs
Photo Current Saturated Fall Time (Note 3)		5	$t_{f(sat)}$	—	10	—	μs
Photo Current Rise Time (Note 4)		5	t_r	—	2	—	μs
Photo Current Fall Time (Note 4)		5	t_f	—	3.5	—	μs
Wavelength of Maximum Sensitivity		—	λ_S	—	0.8	—	μm

NOTES: 1. Radiation flux density (H) equal to 5 mW/cm^2 emitted from a tungsten source at a color temperature of 2870 K.
2. Measured under dark conditions. (H ≈ 0).
3. For saturated switching time measurements, radiation is provided by a pulsed xenon arc lamp with a pulse width of approximately 1 microsecond (see Figure 5).
4. For unsaturated switching time measurements, radiation is provided by a pulsed GaAs (gallium-arsenide) light-emitting diode (λ = 940 nm) with a pulse width equal to or greater than 10 microseconds (see Figure 5).

TYPICAL CHARACTERISTICS

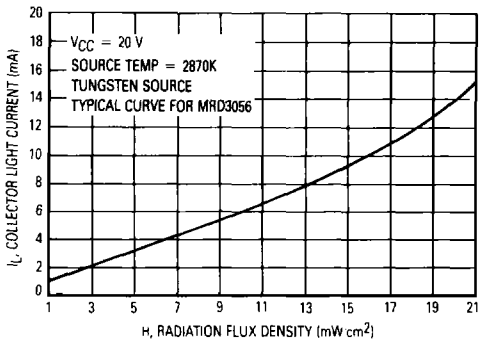


Figure 1. Collector Light Current

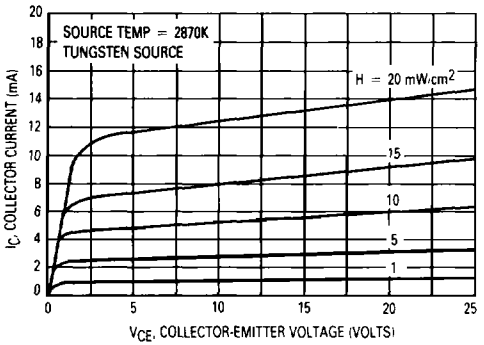


Figure 2. Collector Emitter Characteristics — MRD3056

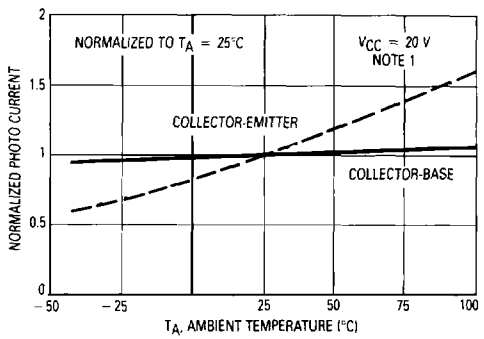


Figure 3. Photo Current versus Temperature

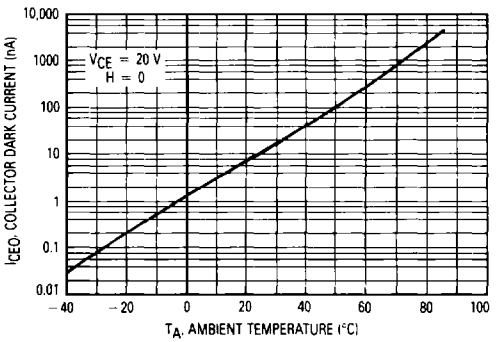
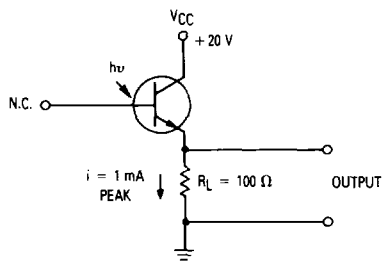


Figure 4. Dark Current versus Temperature



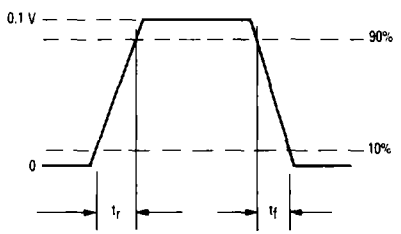


Figure 5. Pulse Response Test Circuit and Waveform

TYPICAL CIRCUIT APPLICATIONS

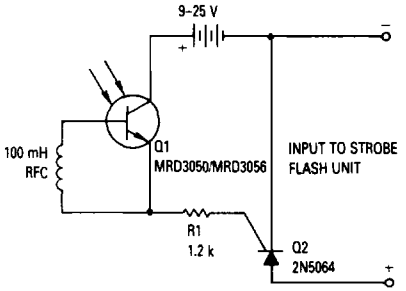


Figure 6. Strobeflash Slave Adapter

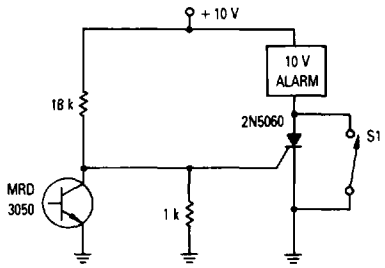
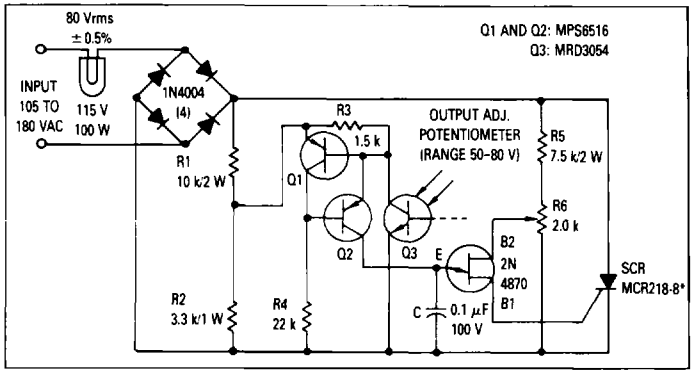


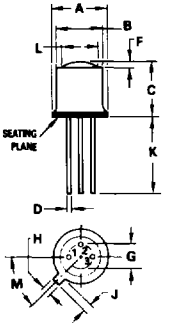
Figure 7. Light Operated SCR Alarm Using Sensitive-Gate SCR



*MCR218-8 to be used with a heat sink.

Figure 8. Circuit Diagram of Voltage Regulator for Projection Lamp

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

CASE 82-05
METAL

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES 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	