MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

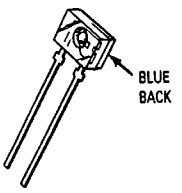
Photo Detector
PIN Diode Output

MRD721

**PHOTO DETECTOR
DIODE OUTPUT
100 VOLTS**

. . . designed for application in laser detection, light demodulation, detection of visible and near infrared light-emitting diodes, shaft or position encoders, switching and logic circuits, or any design requiring radiation sensitivity, ultra high-speed, and stable characteristics.

- Ultra Fast Response — (<1 ns Typ)
- Sensitive Throughout Visible and Near Infrared Spectral Range for Wide Application
- Annular Passivated Structure for Stability and Reliability
- Economical, Low Profile, Miniature Plastic Package
- Lens Molded Into Package
- Designed for Automatic Handling and Accurate Positioning



**CASE 349-01
PLASTIC**

4

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

Rating	Symbol	Value	Unit
Reverse Voltage	V_R	100	Volts
Total Power Dissipation @ T_A = 25°C Derate above 25°C (Note 1)	P_D	150 2	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−40 to +100	°C
Lead Soldering Temperature (5 sec. max, 1/16" from case) (Note 2)	—	260	°C

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

Characteristic	Fig. No.	Symbol	Min	Typ	Max	Unit
Dark Current (V_R = 20 V, R_L = 1 MΩ; Note 3) T_A = 25°C T_A = 100°C	3 and 4	I_D	 — —	 0.06 14	 10 —	nA
Reverse Breakdown Voltage (I_R = 10 μA)	—	$V_{(BR)R}$	100	200	—	Volts
Forward Voltage (I_F = 50 mA)	—	V_F	—	—	1.1	Volts
Series Resistance (I_F = 50 mA)	—	R_S	—	8	—	Ohms
Total Capacitance (V_R = 20 V; f = 1 MHz)	5	C_T	—	3	—	pF

OPTICAL CHARACTERISTICS (T_A = 25°C)

Light Current (V_R = 20 V, Note 4)	2	I_L	1.5	4	—	μA
Sensitivity (V_R = 20 V, Note 5)	— —	S(λ = 0.8 μm) S(λ = 0.94 μm)	— —	5 1.2	— —	μA/mW/cm²
Response Time (V_R = 20 V, R_L = 50 Ω)	—	$t_{(resp)}$	—	1	—	ns
Wavelength of Peak Spectral Response	6	λ_S	—	0.8	—	μm

Notes: 1. Measured with the device soldered into a typical printed circuit board.
2. Heat sink should be applied to leads during soldering to prevent case temperature from exceeding 100°C.
3. Measured under dark conditions. (H ≈ 0).
4. Radiation Flux Density (H) equal to 5 mW/cm² emitted from a tungsten source at a color temperature of 2870 K.
5. Radiation Flux Density (H) equal to 0.5 mW/cm².

TYPICAL CHARACTERISTICS

T-41-53

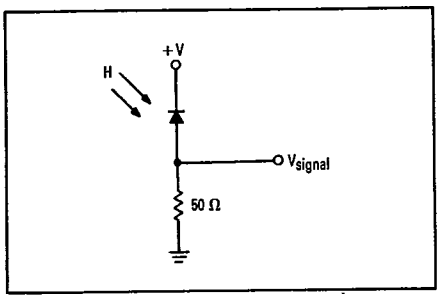


Figure 1. Operating Circuit

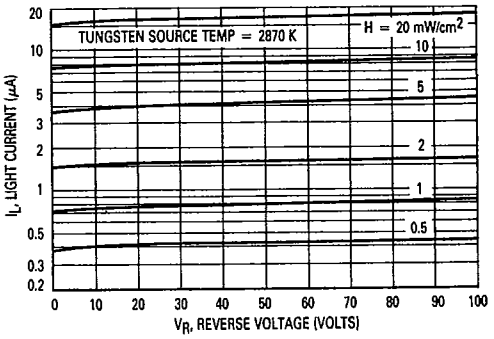


Figure 2. Irradiated Voltage — Current Characteristic

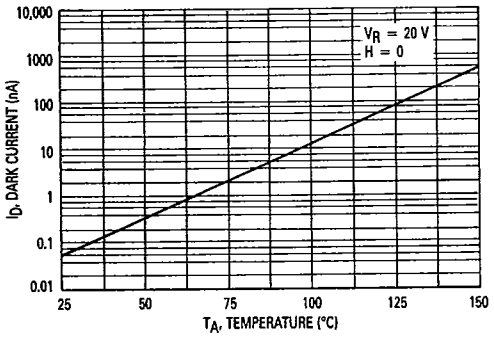


Figure 3. Dark Current versus Temperature

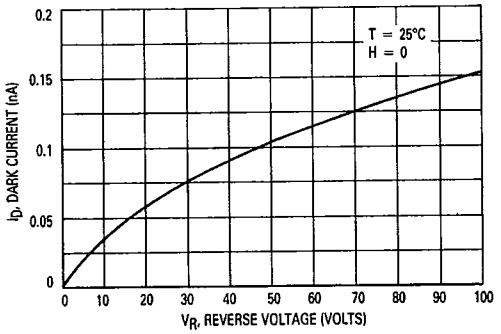


Figure 4. Dark Current versus Reverse Voltage

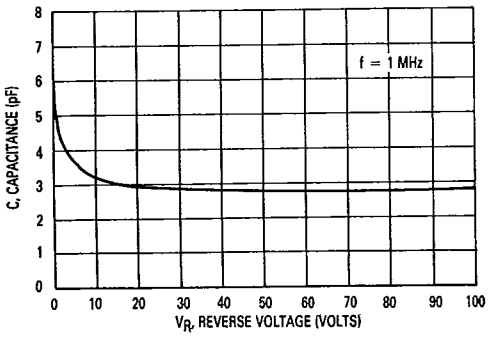


Figure 5. Capacitance versus Voltage

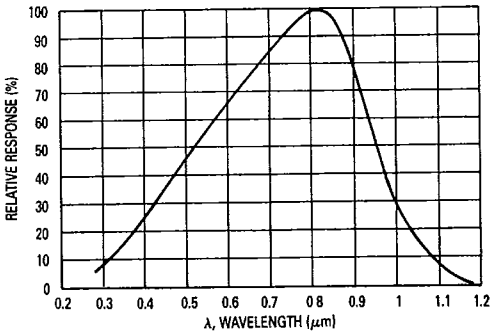
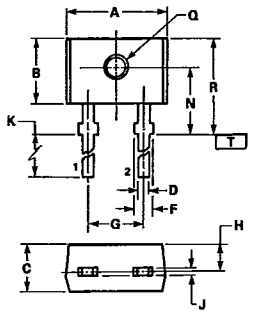


Figure 6. Relative Spectral Response

OUTLINE DIMENSIONS

CASE 349-01
PLASTIC



NOTES:
1. DIMENSIONS A, B AND C ARE DATUMS
2. POSITIONAL TOLERANCE FOR D DIMENSION.
   ⌖ | 0.25 (0.010) Ⓜ | -T- | A Ⓜ | C Ⓜ
3. POSITIONAL TOLERANCE FOR Q DIAMETER:
   ⌖ | 0.25 (0.010) Ⓜ | A Ⓜ | B Ⓜ
4. -T- IS SEATING PLANE.
5. DIMENSIONING AND TOLERANCING PER ANSI Y14.5, 1973.

STYLE 1:
PIN 1. CATHODE
2. ANODE

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	3.43	4.60	0.135	0.185
B	2.79	3.30	0.110	0.130
C	2.03	3.18	0.080	0.125
D	0.43	0.60	0.017	0.024
F	1.14	1.40	0.045	0.055
G	2.54 BSC		0.100 BSC	
H	1.52 BSC		0.060 BSC	
J	0.23	0.56	0.009	0.022
K	12.83	19.05	0.505	0.750
N	3.05	3.30	0.120	0.130
Q	0.76	1.52	0.030	0.060
R	3.81	4.60	0.150	0.185

4