



# MRD3050, MRD3051, MRD3054, MRD3055, MRD3056

## NPN SILICON PHOTOTRANSISTORS

... 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

## 30 VOLT PHOTOTRANSISTORS NPN SILICON



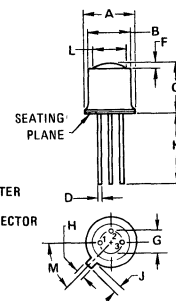
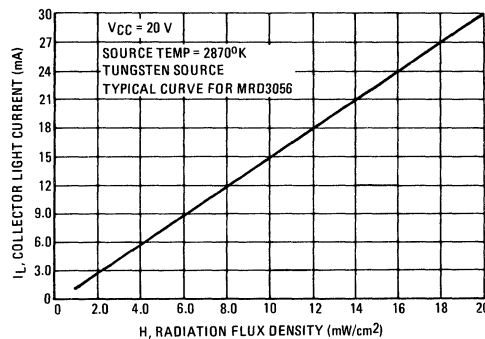
3

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

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	Volts
Emitter-Collector Voltage	$V_{ECO}$	5.0	Volts
Collector-Base Voltage	$V_{CBO}$	40	Volts
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	400 2.28	mW mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	438	$^\circ\text{C}/\text{W}$



STYLE 1:  
PIN 1. EMITTER  
PIN 2. BASE  
PIN 3. COLLECTOR

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

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

## MRD3050, MRD3051, MRD3054, MRD3055, MRD3056

3

### STATIC ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Collector Dark Current ( $V_{CC} = 20\text{ V}$ , $R_L = 1.0\text{ Megohm}$ , Note 2) $T_A = 25^\circ\text{C}$ $T_A = 85^\circ\text{C}$	$I_{CEO}$	—	0.02 5.0	0.1 —	$\mu\text{A}$
Collector-Base Breakdown Voltage ( $I_C = 100\ \mu\text{A}$ )	$V_{(BR)CBO}$	40	100	—	Volts
Collector-Emitter Breakdown Voltage ( $I_C = 100\ \mu\text{A}$ )	$V_{(BR)CEO}$	30	75	—	Volts
Emitter-Collector Breakdown Voltage ( $I_E = 100\ \mu\text{A}$ )	$V_{(BR)ECO}$	5.0	8.0	—	Volts

### OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Fig. No.	Symbol	Min	Typ	Max	Unit
Collector-Light Current ( $V_{CC} = 20\text{ V}$ , $R_L = 100\text{ ohms}$ , Note 1)	1	$I_L$	0.1 0.2 0.5 1.5 2.0	— — — — 8.0	— — — — —	$\text{mA}$
Photo Current Saturated Rise Time (Note 3)	4	$t_r(\text{sat})$	—	1.0	—	$\mu\text{s}$
Photo Current Saturated Fall Time (Note 3)	4	$t_f(\text{sat})$	—	1.0	—	$\mu\text{s}$
Photo Current Rise Time (Note 4)	4	$t_r$	—	2.0	—	$\mu\text{s}$
Photo Current Fall Time (Note 4)	4	$t_f$	—	2.5	—	$\mu\text{s}$
Wavelength of Maximum Sensitivity	—	$\lambda_s$	—	0.8	—	$\mu\text{m}$

#### NOTES:

- Radiation flux density (H) equal to  $5.0\text{ mW/cm}^2$  emitted from a tungsten source at a color temperature of  $2870^\circ\text{K}$ .
- Measured under dark conditions. ( $H \approx 0$ ).
- For saturated switching time measurements, radiation is provided by a pulsed xenon arc lamp with a pulse width of

approximately 1.0 microsecond (see Figure 4).

- For unsaturated switching time measurements, radiation is provided by a pulsed GaAs (gallium-arsenide) light-emitting diode ( $\lambda \approx 0.9\ \mu\text{m}$ ) with a pulse width equal to or greater than 10 microseconds (see Figure 4).