

# 2N5777 thru 2N5780 (SILICON) MRD14B

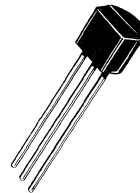
## PLASTIC NPN SILICON PHOTO DARLINGTON AMPLIFIERS

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

- Economical Plastic Package
- Sensitive Throughout Visible and Near Infra-Red Spectral Range for Wide Application
- Range of Radiation Sensitivities and Voltages for Design Flexibility
- TO-92 Clear Plastic Package for Standard Mounting
- Annular Passivated Structure for Stability and Reliability
- Precision Die Placement

## 12, 25, 40 VOLT PHOTO DARLINGTON AMPLIFIERS NPN SILICON

200 MILLIWATTS

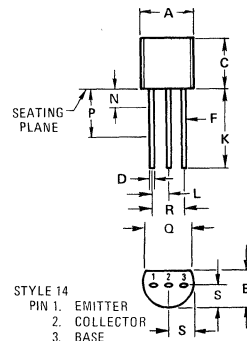


### MAXIMUM RATINGS

Rating	Symbol	MRD14B	2N5777* 2N5779	2N5778* 2N5780	Unit
Collector-Emitter Voltage	$V_{CE0}$	12	25	40	Volts
Collector-Base Voltage	$V_{CB0}$	18	25	40	Volts
Emitter-Base Voltage	$V_{EB0}$	8.0	8.0	12	Volts
Light Current	$I_L$	← 250 →			mA
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	← 200 →			mW
		← 2.67 →			mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}^{(1)}$	-65 to +100			$^\circ\text{C}$

\*Indicates JEDEC Registered Data.

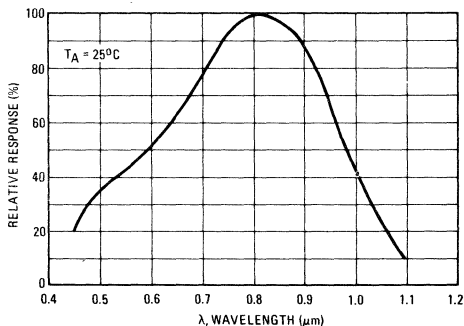
(1) Heat Sink should be applied to leads during soldering to prevent case temperature from exceeding  $100^\circ\text{C}$ .



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.450	5.200	0.175	0.205
B	3.180	4.190	0.125	0.165
C	4.320	5.330	0.170	0.210
D	0.407	0.533	0.016	0.021
F	0.407	0.482	0.016	0.019
K	12.700	—	0.500	—
L	1.150	1.390	0.045	0.055
N	—	1.270	—	0.050
P	6.350	—	0.250	—
Q	3.430	—	0.135	—
R	2.410	2.670	0.095	0.105
S	2.030	2.670	0.080	0.105

CASE 29-02  
TO-92

FIGURE 1 — CONSTANT ENERGY SPECTRAL RESPONSE



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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector Dark Current (Note 2) ( $V_{CE} = 12\text{ V}$ )	$I_{CEO}$	—	—	0.1	$\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 2) ( $I_C = 10\text{ mA}$ )	$BV_{CEO}$	12 25 40	— — —	— — —	Volts
Collector-Base Breakdown Voltage (Note 2) ( $I_C = 100\ \mu\text{A}$ )	$BV_{CBO}$	18 25 40	— — —	— — —	Volts
Emitter-Base Breakdown Voltage (Note 2) ( $I_E = 100\ \mu\text{A}$ )	$BV_{EBO}$	8.0 8.0 12	— — —	— — —	Volts

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

Characteristic	Fig. No.	Symbol	Min	Typ	Max	Unit
Collector Light Current (Notes 1,4,5) ( $V_{CE} = 5.0\text{ V}$ )	—	$I_L$	0.5 0.5 2.0	2.0 4.0 8.0	— — —	mA
DC Current Gain (Note 2) ( $V_{CE} = 5.0\text{ V}$ , $I_C = 0.5\text{ mA}$ )	—	$h_{FE}$	2.5 k 5.0 k	— —	— —	—
Wave Length of Maximum Sensitivity	1	$\lambda_s$	0.7	0.8	1.0	$\mu\text{m}$
Turn-On Delay Time (Notes 3, 4)	2,3	$t_{d1}$	—	—	100	$\mu\text{s}$
Rise Time (Notes 3, 4)	2,3	$t_r$	—	—	250	$\mu\text{s}$
Turn-Off Delay Time (Notes 3, 4)	2,3	$t_{d2}$	—	—	5.0	$\mu\text{s}$
Fall Time (Notes 3, 4)	2,3	$t_f$	—	—	150	$\mu\text{s}$
Collector-Base Capacitance ( $V_{CB} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ , $I_E = 0$ )	—	$C_{cb}$	—	—	10	pF

\*Indicates JEDEC Registered Data.

NOTES:

1. Radiation Flux Density (H) equal to 2.0 mW/cm<sup>2</sup> emitted from a tungsten source at a color temperature of 2870 K.
2. Measured under dark conditions. ( $H \approx 0$ ).
3. For unsaturated rise 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 500 microseconds (see Figures 2 and 3).

4. Measurement mode with no electrical connection to the base lead.
5. Die faces curved side of package.

FIGURE 2 – PULSE RESPONSE TEST CIRCUIT

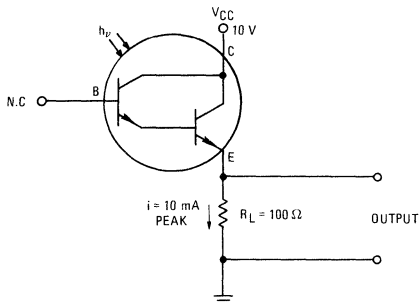


FIGURE 3 – PULSE RESPONSE TEST WAVEFORM

