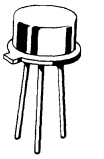
2N5864 (SILICON)

PNP SILICON ANNULAR TRANSISTOR

. . . designed for use in general-purpose amplifier and medium-speed switching applications.

- High Collector-Emitter Breakdown Voltage — BV_{CEO} = 70 Vdc (Min) @ I_C = 10 mAdc
- DC Current Gain Specified — 10 mA to 500 mA
- High Collector Current — I_C = 1.5 Adc Continuous

PNP SILICON GENERAL-PURPOSE TRANSISTOR

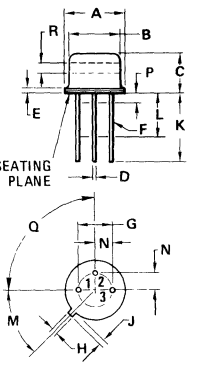


*MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	70	Vdc
Collector-Base Voltage	V_{CB}	90	Vdc
Emitter-Base Voltage	V_{EB}	5.0	Vdc
Collector Current — Continuous	I_C	1.5	Adc
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	1.25 7.15	Watts mW/°C
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	8.75 50	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	°C

*Indicates JEDEC Registered Data
**Motorola Guarantees this data in addition to JEDEC Registered Data.

Pin 1. Emitter
2. Base
3. Collector



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0.240	0.260
D	0.406	0.533	0.016	0.021
E	0.229	3.18	0.009	0.125
F	0.406	0.483	0.016	0.019
G	4.83	5.33	0.190	0.210
H	0.711	0.864	0.028	0.034
J	0.737	1.02	0.029	0.040
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
Q	90° NOM		90° NOM	
R	2.54	–	0.100	–

All JEDEC dimensions and notes apply.

CASE 79-02
TO-39

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

Characteristic	Symbol	Min	Max	Unit
***OFF CHARACTERISTICS**				
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	BV_{CEO}	70	–	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	BV_{CBO}	90	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	BV_{EBO}	5.0	–	Vdc
Collector Cutoff Current (V_{CB} = 45 Vdc, I_E = 0)	I_{CBO}	–	0.5	μAdc
Emitter Cutoff Current (V_{BE} = 3.0 Vdc, I_C = 0)	I_{EBO}	–	0.5	μAdc
ON CHARACTERISTICS				
*DC Current Gain	h_{FE}			–
(I_C = 10 mAdc, V_{CE} = 10 Vdc)		50	–	
(I_C = 30 mAdc, V_{CE} = 10 Vdc)		50	–	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)		50	500	
(I_C = 300 mAdc, V_{CE} = 10 Vdc)		35	–	
(I_C = 500 mAdc, V_{CE} = 10 Vdc)		25	–	
*Collector-Emitter Saturation Voltage (I_C = 300 mAdc, I_B = 30 mAdc)	$V_{CE(sat)}$		0.9	Vdc
Base-Emitter Saturation Voltage (I_C = 300 mAdc, I_B = 30 mAdc)	$V_{BE(sat)}$	–	1.25	Vdc
*Base-Emitter On Voltage (I_C = 150 mAdc, V_{CE} = 10 Vdc)	$V_{BE(on)}$	–	1.0	Vdc
SMALL-SIGNAL CHARACTERISTICS				
*Current-Gain–Bandwidth Product (1) (I_C = 50 mAdc, V_{CE} = 20 Vdc, f = 20 MHz)	f_T	50	–	MHz
*Collector-Base Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)	C_{cb}	–	25	pF
Emitter-Base Capacitance (V_{BE} = 1.0 Vdc, I_C = 0, f = 100 kHz)	C_{eb}	–	150	pF
*Input Impedance (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{ie}	200	1500	Ohms
*Voltage Feedback Ratio (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{re}	–	5.0	$X10^{-4}$
*Small-Signal Current Gain (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{fe}	50	500	–
*Output Admittance (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{oe}	10	200	μmhos
SWITCHING CHARACTERISTICS (See Figure 1)				
Delay Time	(V_{CC} = 10 Vdc, I_C = 300 mAdc, I_{B1} = 30 mAdc)	t_d	–	30 ns
Rise Time		t_r	–	100 ns
Storage Time	(V_{CC} = 10 Vdc, I_C = 300 mAdc, I_{B1} = I_{B2} = 30 mAdc)	t_s	–	500 ns
Fall Time		t_f	–	250 ns

*Indicates JEDEC Registered Data.

(1) f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

FIGURE 1 – SWITCHING TIME TEST CIRCUIT