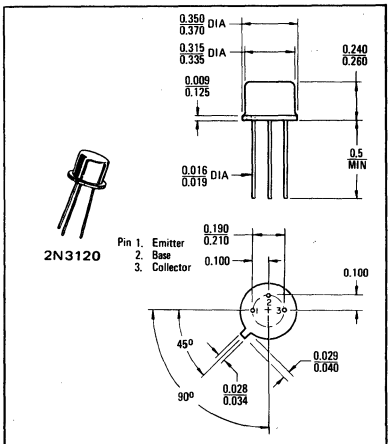
2N3120 (SILICON)
2N3121

PNP SILICON ANNULAR TRANSISTORS

. . . designed for general-purpose, medium-speed switching applications.

- Choice of Package and Power Ratings
- Low Collector-Emitter Saturation Voltage — $V_{CE(sat)}$ = 0.25 Vdc (Max) @ I_C = 50 mAdc
- DC Current Gain Specified From 50 mAdc to 300 mAdc

PNP SILICON TRANSISTORS

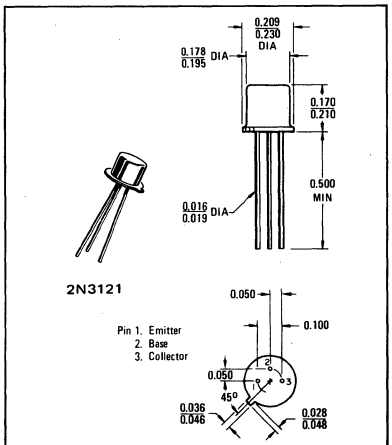


CASE 79
TO-39

*MAXIMUM RATINGS

Rating	Symbol	2N3120	2N3121	Unit
Collector-Emitter Voltage	V_{CEO}	45		Vdc
Collector-Base Voltage	V_{CB}	45		Vdc
Emitter-Base Voltage	V_{EB}	4.0		Vdc
Collector Current — Continuous	I_C	500		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	800 4.56	360 2.06	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	3.0 17.1	1.2 6.85	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J,T_{stg}	-65 to +200		°C

*Indicates JEDEC Registered Data



Collector Connected to Case
CASE 22(1)
TO-18

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage(1) (I_C = 30 mAdc, I_B = 0)	BV_{CEO}	45	–	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	BV_{CBO}	45	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	BV_{EBO}	4.0	–	Vdc
Collector Cutoff Current	I_{CES}			
(V_{CE} = 30 Vdc, V_{BE} = 0)		–	10	nAdc
(V_{CE} = 30 Vdc, V_{BE} = 0, T_A = 125°C)		–	10	μAdc
Emitter Cutoff Current (V_{EB} = 4.0 Vdc, I_C = 0)	I_{EBO}	–	100	μAdc
Base Current (V_{CE} = 30 Vdc, V_{BE} = 0)	I_B	–	10	nAdc
ON CHARACTERISTICS				
DC Current Gain(1)	h_{FE}			–
(I_C = 50 mAdc, V_{CE} = 1.0 Vdc)		30	130	
(I_C = 50 mAdc, V_{CE} = 1.0 Vdc, T_A = -55°C)		12	–	
(I_C = 300 mAdc, V_{CE} = 2.0 Vdc)		15	–	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 2.5 mAdc)		–	0.25	
(I_C = 300 mAdc, I_B = 30 mAdc)		–	0.5	
(I_C = 500 mAdc, I_B = 50 mAdc)		–	1.0	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 2.5 mAdc)		–	1.2	
(I_C = 500 mAdc, I_B = 50 mAdc)		–	2.0	
Base-Emitter On Voltage (I_C = 50 mAdc, V_{CE} = 1.0 Vdc)	$V_{BE(on)}$	–	1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain—Bandwidth Product(2) (I_C = 50 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	f_T	130	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 140 kHz)	C_{ob}	–	10	pF
Input Impedance (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{ie}	–	1.5	k ohms
Voltage Feedback Ratio (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{re}	–	26	X 10^{-4}
Small-Signal Current Gain (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{fe}	25	180	–
Output Admittance (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{oe}	–	1200	μmhos
SWITCHING CHARACTERISTICS (Figure 1)				
Turn-On Time ($I_C \approx$ 300 mAdc, $I_{B1} \approx$ 30 mAdc)	t_{on}	–	40	ns
Turn-Off Time ($I_C \approx$ 300 mAdc, $I_{B1} = I_{B2} \approx$ 30 mAdc)	t_{off}	–	100	ns

*Indicates JEDEC Registered Data.

(1)Pulse Test: Pulse Width = 300 μs, Duty Cycle = 1.0%.

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

FIGURE 1 – SWITCHING TIMES TEST CIRCUIT