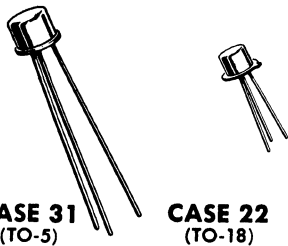


2N3133 thru 2N3136 (SILICON)



PNP silicon annular Star transistors for high-speed switching and DC to UHF amplifier applications.

CASE 31
(TO-5)

CASE 22
(TO-18)

2N3133
2N3134

2N3135
2N3136

Collector connected to case

MAXIMUM RATINGS

Rating	Symbol	2N3133 2N3134 (TO-5)	2N3135 2N3136 (TO-18)	Unit
Collector-Base Voltage	V_{CB}	50	50	Vdc
Collector-Emitter Voltage	V_{CEO}	35	35	Vdc
Emitter-Base Voltage	V_{EB}	4.0	4.0	Vdc
Collector Current	I_C	600	600	mA
Total Device Dissipation @ 25°C Case Temperature Derate Above 25°C	P_D	3 17.3	1.8 10.3	Watts mW/°C
Total Device Dissipation @ 25°C Ambient Temperature Derate Above 25°C	P_D	0.6 3.43	0.4 2.28	Watts mW/°C
Junction Temperature	T_J	-65 to +200		°C
Storage Temperature	T_{stg}	-65 to +200		°C

SWITCHING CHARACTERISTICS (At 25°C unless otherwise noted)

Characteristic	Symbol	Typ	Max	Unit
Turn-On Time ($V_{CC} = 30\text{ V}$, $I_{CS} = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$)	t_{on}	26	75	ns
Turn-Off Time ($V_{CC} = 6\text{ V}$, $I_{CS} = 150\text{ mA}$, $I_{B1} = I_{B2} = 15\text{ mA}$)	t_{off}	70	150	ns

2N3133 thru 2N3136 (Continued)

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

Characteristic	Symbol	Min	Max	Unit
Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$, $T_A = 150^\circ\text{C}$)	I_{CBO}	---	0.05 30	μAdc
Collector Cutoff Current ($V_{CE} = 30 \text{ V}$, $V_{BE} = 0.5 \text{ V}$)	I_{CEX}	---	0.1	μAdc
Base Cutoff Current ($V_{CE} = 30 \text{ V}$, $V_{BE} = 0.5 \text{ V}$)	I_{BL}	---	0.1	μAdc
Collector-Base Breakdown Voltage ($I_C = 10 \mu\text{Adc}$, $I_E = 0$)	BV_{CBO}	50	---	Vdc
Collector-Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 10 \text{ mAdc}$, $I_B = 0$)	BV_{CEO}	35	---	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}$, $I_C = 0$)	BV_{EBO}	4.0	---	Vdc
Collector Saturation Voltage ⁽¹⁾ ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$)	$V_{CE}(\text{sat})$	---	0.6	Vdc
Base-Emitter Saturation Voltage ⁽¹⁾ ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$)	$V_{BE}(\text{sat})$	---	1.5	Vdc
DC Forward Current Transfer Ratio ($I_C = 1.0 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) 2N3133, 2N3135 2N3134, 2N3136 ($I_C = 150 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ⁽¹⁾ 2N3133, 2N3135 2N3134, 2N3136	h_{FE}	25 50 40 100	--- --- 120 300	---
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 100 \text{ kHz}$)	C_{ob}	---	10	pF
Input Capacitance ($V_{BE} = 2 \text{ Vdc}$, $I_C = 0$, $f = 100 \text{ kHz}$)	C_{ib}	---	40	pF
Current-Gain — Bandwidth Product ($I_C = 50 \text{ mAdc}$, $V_{CE} = 20 \text{ Vdc}$, $f = 100 \text{ MHz}$)	f_T	200	---	MHz

⁽¹⁾ Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$