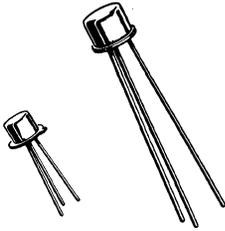


# 2N2537 thru 2N2540 (SILICON)



NPN silicon annular Star transistors for high-speed switching.

**CASE 22** (TO-18)      **CASE 31** (TO-5)

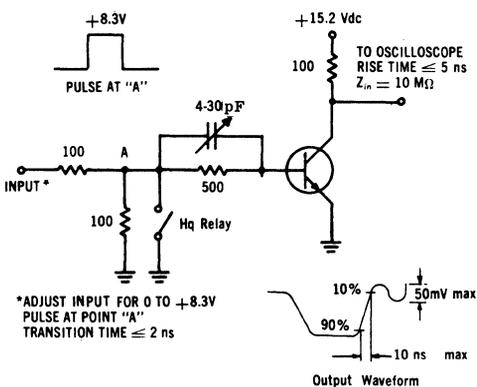
2N2539      2N2537  
2N2540      2N2538

Collector connected to case

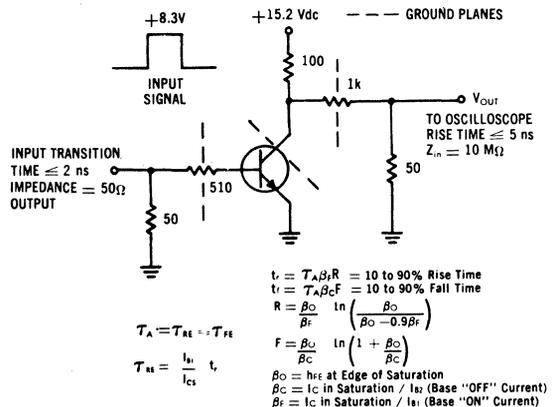
## MAXIMUM RATINGS

Rating	Symbol	2N2537 2N2538 (TO-5)	2N2539 2N2540 (TO-18)	Unit
Collector-Base Voltage	$V_{CB}$	60	60	Vdc
Collector-Emitter Voltage	$V_{CEO}$	30	30	Vdc
Collector-Emitter Voltage	$V_{CER}$	40	40	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0	5.0	Vdc
Total Device Dissipation 25°C Case Temperature Derate above 25°C	$P_D$	3 17.2	1.8 10.3	Watts mW/°C
Total Device Dissipation 25°C Ambient Temperature Derate above 25°C	$P_D$	0.8 4.57	0.5 2.86	Watts mW/°C
Junction Temperature	$T_J$	-65 to +200		°C
Storage Temperature	$T_{stg}$	-65 to +200		°C

### TOTAL CONTROL CHARGE TEST CIRCUIT



### ACTIVE REGION TIME CONSTANT TEST CIRCUIT



## 2N2537 thru 2N2540 (continued)

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

Characteristic	Symbol	Min	Max	Unit
Collector Cutoff Current ( $V_{CB} = 40\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 40\text{ Vdc}$ , $I_E = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{CBO}$	—	0.250 200	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = 3\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	0.05	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{BE} = 0.2\text{ Vdc}$ , $V_{CE} = 20\text{ Vdc}$ )	$I_{CEX}$	—	0.250	$\mu\text{Adc}$
Base Cutoff Current ( $V_{BE} = 0.2\text{ Vdc}$ , $V_{CE} = 20\text{ Vdc}$ ) ( $V_{BE} = 0.2\text{ Vdc}$ , $V_{CE} = 20\text{ Vdc}$ , $T_A = 150^\circ\text{C}$ )	$I_{BL}$	—	0.250 200	$\mu\text{Adc}$
Collector-Base Breakdown Voltage ( $I_C = 10\ \mu\text{Adc}$ , $I_E = 0$ )	$BV_{CBO}$	60	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 100\text{ mAdc}$ , pulsed, $I_B = 0$ )	$BV_{CEO}$	30	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 100\text{ mAdc}$ , pulsed, $R_{BE} \leq 10\ \Omega$ )	$BV_{CER}$	40	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10\ \mu\text{Adc}$ , $I_C = 0$ )	$BV_{EBO}$	5.0	—	Vdc
Collector Saturation Voltage* ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ ) ( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ )	$V_{CE(sat)}$	—	0.45 1.6	Vdc
Base-Emitter Saturation Voltage ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ ) <sup>(1)</sup> ( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ )	$V_{BE(sat)}$	—	1.3 2.6	Vdc
DC Forward Current Transfer Ratio ( $I_C = 1\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )  ( $I_C = 150\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) <sup>(1)</sup>  ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) <sup>(1)</sup>	$h_{FE}$	20 35 30 50 50 100 20 30	— — — — 150 300 — —	—
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 100\text{ kHz}$ )	$C_{ob}$	—	8.0	pF
Input Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $f = 100\text{ kHz}$ )	$C_{ib}$	—	25	pF
Small Signal Forward Current Transfer Ratio ( $V_{CE} = 20\text{ Vdc}$ , $I_C = 20\text{ mAdc}$ , $f = 100\text{ MHz}$ )	$h_{fe}$	2.5	—	—

<sup>(1)</sup> Pulse Test: Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$

## SWITCHING CHARACTERISTICS

Characteristic	Symbol	Max.	Unit
Total Control Charge	$Q_T$	750	pC
Storage Time ( $I_C = I_{B1} = I_{B2} = 20\text{ mAdc}$ , $V_{CC} = 5\text{ V}$ )	$\tau_S$	20	ns
Active Region Time Constant	$\tau_A$	2.0	ns
Turn-on Time ( $I_{B1} = I_{B2} = 15\text{ mAdc}$ , $I_C = 150\text{ mAdc}$ , $V_{CC} = 7\text{ Vdc}$ , $R_L = 40\ \Omega$ )	$t_{on}$	40	ns
Turn-off Time ( $I_{B1} = I_{B2} = 15\text{ mAdc}$ , $I_C = 150\text{ mAdc}$ , $V_{CC} = 7\text{ Vdc}$ , $R_L = 40\ \Omega$ )	$t_{off}$	40	ns