

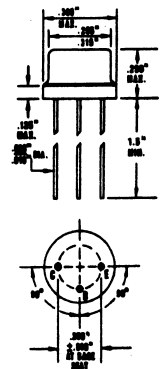
2N439 - 2N439A

NPN HIGH FREQUENCY COMPUTER TRANSISTORS

CBS-Hytron types 2N439 and 2N439A are NPN alloy-junction germanium transistors. Their basic NPN nature (high mobility electron flow) renders these transistors capable of very fast response under transient pulse operation. Their design is ideal for switching and flip-flop circuits. They are contained in a welded package equipped with flexible plated leads designed for connection by soldering, welding or socketing. This package has the mechanical dimensions of JETEC outline TO-9. The 2N439A has the base connected to the case internally to provide greater dissipation.

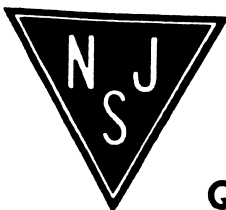
MECHANICAL DATA

| | |
|-----------------------|------------|
| JETEC outline | TO-9 |
| JETEC base | E3-51 |
| Case material | Metal |
| Maximum case length | 0.250 inch |
| Maximum case diameter | 0.360 inch |
| Minimum lead length | 1.5 inches |
| Lead diameter | 0.017 inch |



ELECTRICAL DATA

| RATINGS, ABSOLUTE MAXIMUM AT 25°C | <u>2N439</u> | <u>2N439A</u> |
|---|--------------|---------------|
| Collector to base voltage, V_{CB} | 30 | 30 Vdc |
| Emitter to base voltage, V_{EB} | 25 | 25 Vdc |
| Collector to emitter voltage, V_{CE} | 20 | 20 Vdc |
| Total dissipation, P | 100 | 150 mW |
| Derating per °C increase in ambient temperature | 1.7 | 2.5 mW |
| Operating and storage temperature, T_j | | -55 to +85°C |



Quality Semi-Conductors

ELECTRICAL DATA

| | <u>Min.</u> | <u>Mode</u> | <u>Max.</u> | <u>Units</u> |
|---|-------------|-------------|-------------|------------------|
| STATIC AND LARGE SIGNAL PARAMETERS | | | | |
| Collector cutoff current, I_{CBO} $V_{CB} = 25 \text{ V}$ | | 2 | 10 | $\mu\text{A dc}$ |
| Collector cutoff current, I_{CBO} $V_{CB} = 6 \text{ V}, T_A = 75^\circ\text{C}$ | | | 150 | $\mu\text{A dc}$ |
| Emitter cutoff current, I_{EBO} $V_{EB} = 25 \text{ V}$ | | 2 | 10 | $\mu\text{A dc}$ |
| Emitter cutoff current, I_{EBO} $V_{EB} = 6 \text{ V}, T_A = 75^\circ\text{C}$ | | | 150 | $\mu\text{A dc}$ |
| Collector-base breakdown voltage, BV_{CBO} $I_C = 100 \mu\text{A}$ | 30 | | | V dc |
| Collector-emitter breakdown voltage, BV_{CEO} $I_C = 300 \mu\text{A}$ | 20 | | | V dc |
| Current gain, h_{FE} $I_C = 50 \text{ mA}, V_{CE} = 1.0 \text{ V}$ | 30 | 45 | | |
| Input voltage, V_{EB} $I_C = 50 \text{ mA}, V_{CE} = 1.0 \text{ V}$ | | .32 | .7 | V dc |
| Saturation resistance, R_S $I_C = 50 \text{ mA}$ | | 3 | 5 | ohms |
| TYPICAL SWITCHING CHARACTERISTICS (Note 3) | | | | |
| Rise time, t_r | | .5 | | μs |
| Fall time, t_f | | .3 | | μs |
| Storage time, t_s | | .7 | | μs |
| LOW FREQUENCY, SMALL SIGNAL PARAMETERS (Note 1) | | | | |
| Current gain, h_{fe} | | 35 | | |
| Input resistance, h_{ib} | | 27 | | ohms |
| Input resistance, h_{ie} | | 1500 | | ohms |
| HIGH FREQUENCY, SMALL SIGNAL PARAMETERS (Note 2) | | | | |
| Cutoff frequency, $f_{\alpha b}$ | 5.0 | | | mc |
| Collector capacitance, C_C | | 9 | 20 | $\mu\mu\text{f}$ |
| Collector base time constant, $r_b' C_C$ | | 2300 | | $\mu\mu\text{s}$ |
| Extrinsic base resistance, r_b' | | 220 | | ohms |

ENVIRONMENTAL

Hermetic seal - detergent and water at 60 psi for 1/2 hour.

Drop - 30 inches to maple block, 3 drops.

Shock - 500 g, 7 ms.

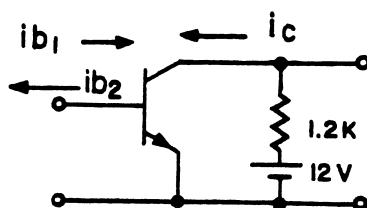
Vibration - 10 g, 100 - 1000 cps.

Lead bend - 3-180 degree bends on leads.

Note 1: $V_{CB} = 6.0$ Vdc, $I_E = 1.0$ mA, $f = 270$ cps

Note 2: $V_{CB} = 6.0$ Vdc, $I_E = 1.0$ mA, $f = 455$ kc

Note 3:



turn-on current $ib_1 = 1$ mA
turn-off current $ib_2 = 1$ mA
collector current $i_c = 10$ mA

TYPICAL COLLECTOR CHARACTERISTICS
TYPE 2N439 NPN HIGH FREQUENCY TRANSISTOR

