


**SGS-THOMSON**  
 MICROELECTRONICS

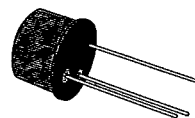
**BC139**

S G S-THOMSON

## AUDIO OUTPUT AMPLIFIER

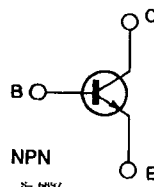
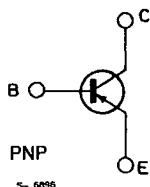
### DESCRIPTION

The BC139 is a silicon planar epitaxial PNP transistor in a TO-39 metal case. It is particularly designed for use in audio output and driver stages. The complementary NPN type is the BC119.



TO-39

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                                                                         | Value       | Unit             |
|-----------|---------------------------------------------------------------------------------------------------|-------------|------------------|
| $V_{CBO}$ | Collector-base Voltage ( $I_E = 0$ )                                                              | - 40        | V                |
| $V_{CEO}$ | Collector-emitter Voltage ( $I_B = 0$ )                                                           | - 40        | V                |
| $V_{EBO}$ | Emitter-base Voltage ( $I_C = 0$ )                                                                | - 5         | V                |
| $I_C$     | Collector Current                                                                                 | - 0.5       | A                |
| $P_{tot}$ | Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$<br>at $T_{case} \leq 25^\circ\text{C}$ | 0.7<br>3    | W<br>W           |
| $T_{stg}$ | Storage Temperature                                                                               | - 55 to 200 | $^\circ\text{C}$ |
| $T_J$     | Junction Temperature                                                                              | 200         | $^\circ\text{C}$ |

## THERMAL DATA

|                 |                                     |     |     |               |
|-----------------|-------------------------------------|-----|-----|---------------|
| $R_{th j-case}$ | Thermal Resistance Junction-case    | Max | 58  | $^{\circ}C/W$ |
| $R_{th j-amb}$  | Thermal Resistance Junction-ambient | Max | 250 | $^{\circ}C/W$ |

ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25^{\circ}C$  unless otherwise specified)

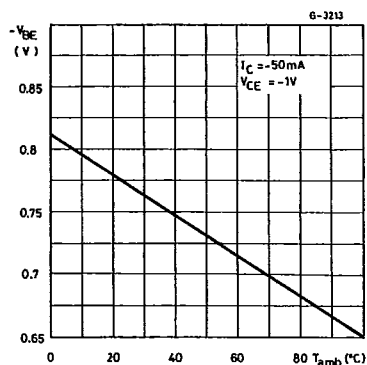
| Symbol          | Parameter                                         | Test Conditions                                                                                                                                       | Min.                     | Typ.                      | Max.          | Unit          |
|-----------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|---------------|---------------|
| $I_{CBO}$       | Collector Cutoff Current ( $I_E = 0$ )            | $V_{CB} = -30 V$<br>$V_{CB} = -30 V$ $T_{amb} = 75^{\circ}C$                                                                                          |                          |                           | - 100<br>- 50 | nA<br>$\mu A$ |
| $V_{(BR)CBO}$   | Collector-base Breakdown Voltage ( $I_E = 0$ )    | $I_C = -10 \mu A$                                                                                                                                     | - 40                     |                           |               | V             |
| $V_{(BR)CEO}^*$ | Collector-emitter Breakdown Voltage ( $I_B = 0$ ) | $I_C = -10 mA$                                                                                                                                        | - 40                     |                           |               | V             |
| $V_{(BR)EBO}$   | Emitter-base Breakdown Voltage ( $I_C = 0$ )      | $I_E = -10 \mu A$                                                                                                                                     | - 5                      |                           |               | V             |
| $V_{CE(sat)}^*$ | Collector-emitter Saturation Voltage              | $I_C = -300 mA$<br>$I_B = -30 mA$<br>$I_C = -500 mA$<br>$I_B = -50 mA$                                                                                |                          | - 0.45<br>- 1             | - 0.8         | V<br>V        |
| $V_{BE}^*$      | Base-emitter Voltage                              | $I_C = -10 mA$<br>$V_{CE} = -10 V$<br>$I_C = -100 mA$<br>$V_{CE} = -10 V$<br>$I_C = -300 mA$<br>$V_{CE} = -1 V$                                       |                          | - 0.7<br>- 0.77<br>- 0.97 |               | V<br>V<br>V   |
| $h_{FE}^*$      | DC Current Gain                                   | $I_C = -10 mA$<br>$V_{CE} = -10 V$<br>$I_C = -100 mA$<br>$V_{CE} = -10 V$<br>$I_C = -150 mA$<br>$V_{CE} = -1 V$<br>$I_C = -300 mA$<br>$V_{CE} = -1 V$ | 40<br><br><br><br><br>20 | 90<br>90<br>45<br>35      |               |               |
| $f_T$           | Transition Frequency                              | $I_C = -50 mA$ $V_{CE} = -10 V$                                                                                                                       |                          | 200                       |               | MHz           |
| $C_{CBO}$       | Collector-base Capacitance                        | $I_E = 0$ $V_{CB} = -10 V$<br>$f = 1 MHz$                                                                                                             |                          | 6                         |               | pF            |

\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle = 1 %.

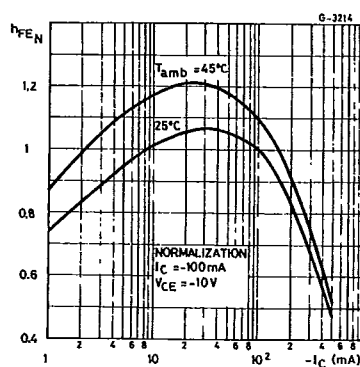
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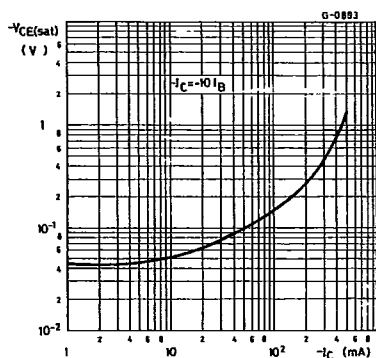
Base-emitter Voltage.



DC Normalized Current Gain.



Collector-emitter Saturation Voltage.



Power Rating Chart.

