## 2N3859A



## NPN General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 300 mA ．Sourced from Process 10．See PN100 for characteristics．

## Absolute Maximum Ratings＊TA $=25^{\circ} \mathrm{C}$ unesss ontemise noted

| Symbol | Parameter | Value | Units |
| :--- | :--- | :---: | :---: |
| $\mathrm{V}_{\text {CEO }}$ | Collector－Emitter Voltage | 60 | V |
| $\mathrm{~V}_{\text {CBO }}$ | Collector－Base Voltage | 60 | V |
| $\mathrm{~V}_{\text {EBO }}$ | Emitter－Base Voltage | 6.0 | V |
| $\mathrm{I}_{\mathrm{C}}$ | Collector Current－Continuous | 500 | mA |
| $\mathrm{~T}_{\mathrm{J}}, \mathrm{T}_{\mathrm{stg}}$ | Operating and Storage Junction Temperature Range | -55 to +150 | ${ }^{\circ} \mathrm{C}$ |

＊These ratings are limiting values above which the serviceability of any semiconductor device may be impaired．

## NOTES：

1）These ratings are based on a maximum junction temperature of 150 degrees $C$ ．
2）These are steady state limits．The factory should be consulted on applications involving pulsed or low duty cycle operations．

Thermal Characteristics $\mathrm{TA}=25^{\circ} \mathrm{C}$ unless otherwise noted

| Symbol | Characteristic | Max | Units |
| :--- | :---: | :---: | :---: |
|  |  | 2N3859A |  |
| $\mathrm{P}_{\mathrm{D}}$ | Total Device Dissipation | 625 | mW |
|  | Derate above 25 |  |  |
| $\mathrm{R}_{\text {өJC }}$ | Thermal Resistance，Junction to Case | 5.0 | $\mathrm{~mW} /{ }^{\circ} \mathrm{C}$ |
| $\mathrm{R}_{\text {өコA }}$ | Thermal Resistance，Junction to Ambient | 83.3 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

Electrical Characteristics

OFF CHARACTERISTICS

| $\mathrm{V}_{(\text {BR }) \text { CEO }}$ | Collector-Emitter Breakdown Voltage $^{*}$ | $\mathrm{I}_{\mathrm{C}}=1.0 \mathrm{~mA}, \mathrm{I}_{\mathrm{B}}=0$ | 60 |  | V |
| :--- | :--- | :--- | :---: | :---: | :---: |
| $\mathrm{~V}_{(\mathrm{BR}) \text { CBO }}$ | Collector-Base Breakdown Voltage | $\mathrm{I}_{\mathrm{C}}=100 \mu \mathrm{~A}, \mathrm{I}_{\mathrm{E}}=0$ | 60 |  | V |
| $\mathrm{~V}_{(\text {(BR) }} \mathrm{EBO}$ | Emitter-Base Breakdown Voltage | $\mathrm{I}_{\mathrm{E}}=100 \mu \mathrm{~A}, \mathrm{I}_{\mathrm{C}}=0$ | 6.0 |  | V |
| $\mathrm{I}_{\mathrm{CBO}}$ | Collector Cutoff Current | $\mathrm{V}_{\mathrm{CB}}=18 \mathrm{~V}, \mathrm{I}_{\mathrm{E}}=0$ |  | 0.5 | $\mu \mathrm{~A}$ |
| $\mathrm{I}_{\mathrm{EBO}}$ | Emitter Cutoff Current | $\mathrm{V}_{\mathrm{EB}}=4.0 \mathrm{~V}, \mathrm{I}_{\mathrm{C}}=0$ |  | 0.5 | $\mu \mathrm{~A}$ |

ON CHARACTERISTICS*

| $\mathrm{h}_{\mathrm{FE}}$ | DC Current Gain | $\mathrm{V}_{\mathrm{CE}}=1.0 \mathrm{~V}, \mathrm{I}_{\mathrm{C}}=1.0 \mathrm{~mA}$ <br> $\mathrm{~V}_{\mathrm{CE}}=1.0 \mathrm{~V}, \mathrm{I}_{\mathrm{C}}=10 \mathrm{~mA}$ | 75 | 200 |  |
| :--- | :--- | :--- | :---: | :---: | :---: |

SMALL SIGNAL CHARACTERISTICS

| $\mathrm{C}_{\mathrm{ob}}$ | Output Capacitance | $\mathrm{V}_{\mathrm{CB}}=10 \mathrm{~V}, \mathrm{f}=1.0 \mathrm{MHz}$ |  | 4 | pF |
| :--- | :--- | :--- | :---: | :---: | :---: |
| $\mathrm{f}_{\mathrm{T}}$ | Current Gain - Bandwidth Product | $\mathrm{I}_{\mathrm{C}}=2.0 \mathrm{~mA}, \mathrm{~V}_{\mathrm{CE}}=10 \mathrm{~V}$ | 90 | 250 | MHz |
| rb' $\mathrm{C}_{\mathrm{C}}$ | Collector - Base Time Constant | $\mathrm{V}_{\mathrm{CE}}=10 \mathrm{~V}, \mathrm{I}_{\mathrm{C}}=2.0 \mathrm{~mA}$, <br> $\mathrm{f}=31.9 \mathrm{MHz}$ |  | 150 | pS |

*Pulse Test: Pulse Width $\leq 300 \mu \mathrm{~s}$, Duty Cycle $\leq 2.0 \%$

