



### BC856AT-BC860CT Silicon Epitaxial Transistor

for switching and amplifier applications



1.Base 2.Emitter 3.Collector  
SOT-523 Plastic Package

#### MARKING CODE

|         |        |       |       |       |       |       |       |       |       |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| TYPE    | 856AT  | 856BT | 856CT | 857AT | 857BT | 857CT | 858AT | 858BT | 858CT |
| MARKING | 3A     | 3B    | 3C    | 3E    | 3F    | 3G    | 3J    | 3K    | 3L    |
| TYPE    | 8459AT | 859BT | 859CT | 860AT | 860BT | 860CT |       |       |       |
| MARKING | 4A     | 4B    | 4C    | 4E    | 4F    | 4G    |       |       |       |

#### Absolute Maximum Ratings ( $T_a = 25\text{ }^{\circ}\text{C}$ )

| Parameter                 | Symbol                       | Value         | Unit               |
|---------------------------|------------------------------|---------------|--------------------|
| Collector Base Voltage    | BC856T<br>$-V_{CBO}$         | 80            | V                  |
|                           | BC857T, BC860T<br>$-V_{CBO}$ | 50            | V                  |
|                           | BC858T, BC859T<br>$-V_{CBO}$ | 30            | V                  |
| Collector Emitter Voltage | BC856T<br>$-V_{CEO}$         | 65            | V                  |
|                           | BC857T, BC860T<br>$-V_{CEO}$ | 45            | V                  |
|                           | BC858T, BC859T<br>$-V_{CEO}$ | 30            | V                  |
| Emitter Base Voltage      | $-V_{EBO}$                   | 5             | V                  |
| Collector Current         | $-I_C$                       | 100           | mA                 |
| Peak Collector Current    | $-I_{CM}$                    | 200           | mA                 |
| Power Dissipation         | $P_{tot}$                    | 200           | mW                 |
| Junction Temperature      | $T_j$                        | 150           | $^{\circ}\text{C}$ |
| Storage Temperature Range | $T_{stg}$                    | - 65 to + 150 | $^{\circ}\text{C}$ |



## Characteristics at $T_a = 25\text{ }^{\circ}\text{C}$

| Parameter                                                                                                                                     | Symbol         | Min. | Max. | Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------|------|------|------|
| DC Current Gain<br>at $-V_{CE} = 5\text{ V}$ , $-I_C = 2\text{ mA}$<br>Current Gain Group A<br>B<br>C                                         | $h_{FE}$       | 110  | 220  | -    |
|                                                                                                                                               | $h_{FE}$       | 200  | 450  | -    |
|                                                                                                                                               | $h_{FE}$       | 420  | 800  | -    |
|                                                                                                                                               |                |      |      |      |
| Collector Base Cutoff Current<br>at $-V_{CB} = 30\text{ V}$                                                                                   | $-I_{CBO}$     | -    | 15   | nA   |
| Collector Base Breakdown Voltage<br>at $-I_C = 10\text{ }\mu\text{A}$<br>BC856T<br>BC857T, BC860T<br>BC858T, BC859T                           | $-V_{(BR)CBO}$ | 80   | -    | V    |
|                                                                                                                                               | $-V_{(BR)CBO}$ | 50   | -    | V    |
|                                                                                                                                               | $-V_{(BR)CBO}$ | 30   | -    | V    |
|                                                                                                                                               |                |      |      |      |
| Collector Emitter Breakdown Voltage<br>at $-I_C = 10\text{ }\mu\text{A}$<br>BC856T<br>BC857T, BC860T<br>BC858T, BC859T                        | $-V_{(BR)CES}$ | 80   | -    | V    |
|                                                                                                                                               | $-V_{(BR)CES}$ | 50   | -    | V    |
|                                                                                                                                               | $-V_{(BR)CES}$ | 30   | -    | V    |
|                                                                                                                                               |                |      |      |      |
| Collector Emitter Breakdown Voltage<br>at $-I_C = 10\text{ mA}$<br>BC856T<br>BC857T, BC860T<br>BC858T, BC859T                                 | $-V_{(BR)CEO}$ | 65   | -    | V    |
|                                                                                                                                               | $-V_{(BR)CEO}$ | 45   | -    | V    |
|                                                                                                                                               | $-V_{(BR)CEO}$ | 30   | -    | V    |
|                                                                                                                                               |                |      |      |      |
| Emitter Base Breakdown Voltage<br>at $-I_E = 1\text{ }\mu\text{A}$                                                                            | $-V_{(BR)EBO}$ | 5    | -    | V    |
| Collector Emitter Saturation Voltage<br>at $-I_C = 10\text{ mA}$ , $-I_B = 0.5\text{ mA}$<br>at $-I_C = 100\text{ mA}$ , $-I_B = 5\text{ mA}$ | $-V_{CE(sat)}$ | -    | 0.3  | V    |
|                                                                                                                                               | $-V_{CE(sat)}$ | -    | 0.65 | V    |
| Base Emitter On Voltage<br>at $-I_C = 2\text{ mA}$ , $-V_{CE} = 5\text{ V}$<br>at $-I_C = 10\text{ mA}$ , $-V_{CE} = 5\text{ V}$              | $-V_{BE(on)}$  | 0.6  | 0.75 | V    |
|                                                                                                                                               | $-V_{BE(on)}$  | -    | 0.82 | V    |
| Current Gain Bandwidth Product<br>at $-V_{CE} = 5\text{ V}$ , $-I_C = 10\text{ mA}$ , $f = 100\text{ MHz}$                                    | $f_T$          | 100  | -    | MHz  |
| Output Capacitance<br>at $-V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$                                                                         | $C_{ob}$       | -    | 6    | pF   |

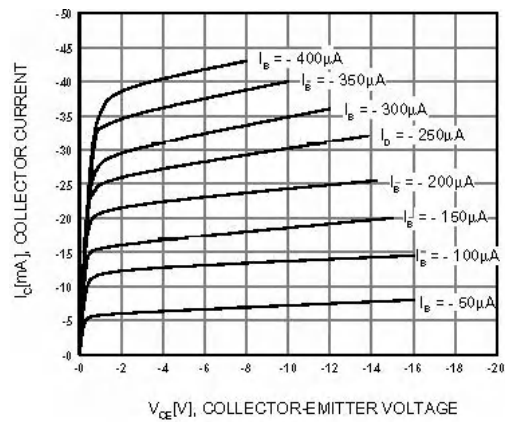


Figure 1. Static Characteristic

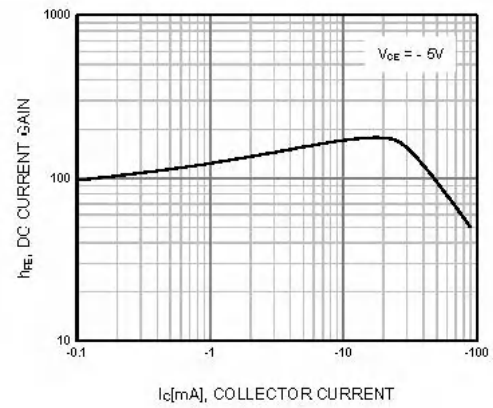


Figure 2. DC current Gain

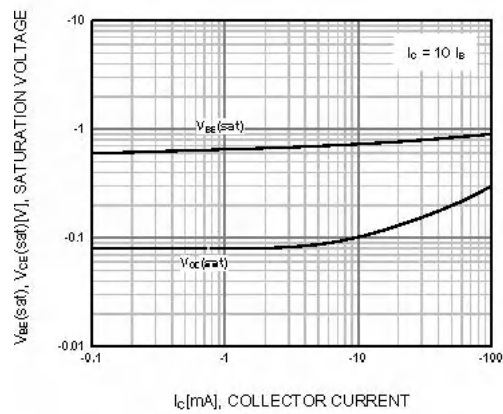


Figure 3. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

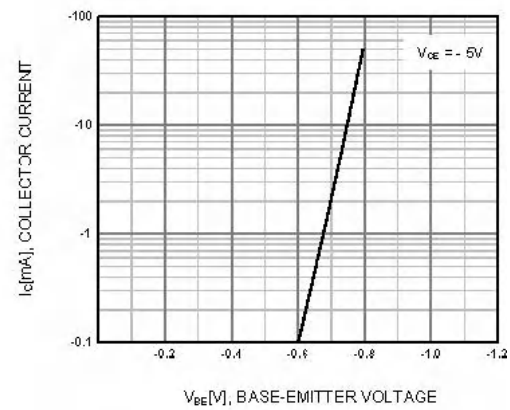


Figure 4. Base-Emitter On Voltage

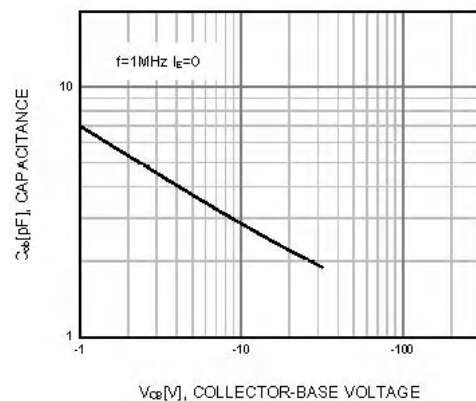


Figure 5. Collector Output Capacitance

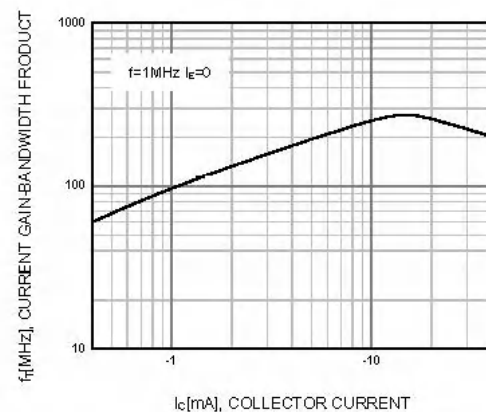
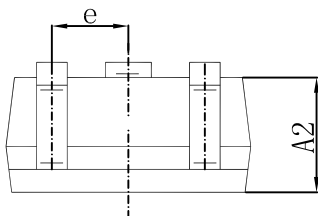
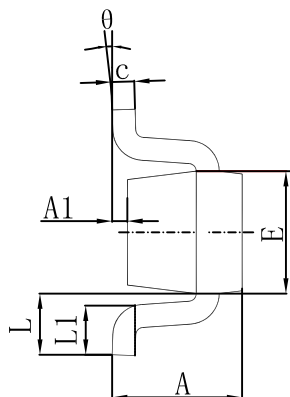
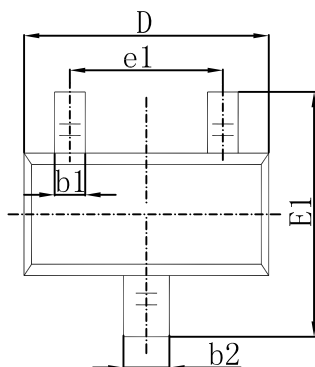


Figure 6. Current Gain Bandwidth Product

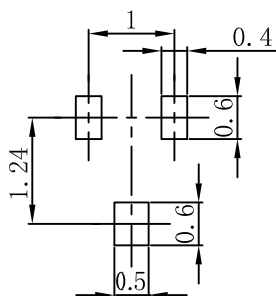


## SOT-523 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.700                     | 0.900 | 0.028                | 0.035 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.700                     | 0.800 | 0.028                | 0.031 |
| b1     | 0.150                     | 0.250 | 0.006                | 0.010 |
| b2     | 0.250                     | 0.350 | 0.010                | 0.014 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 0.700                     | 0.900 | 0.028                | 0.035 |
| E1     | 1.450                     | 1.750 | 0.057                | 0.069 |
| e      | 0.500 TYP.                |       | 0.020 TYP.           |       |
| e1     | 0.900                     | 1.100 | 0.035                | 0.043 |
| L      | 0.400 REF.                |       | 0.016 REF.           |       |
| L1     | 0.260                     | 0.460 | 0.010                | 0.018 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-523 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.