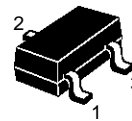


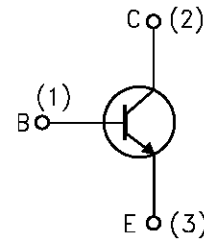
## SMALL SIGNAL NPN TRANSISTORS

Type	Marking
BC847B	1F

- SILICON EPITAXIAL PLANAR NPN TRANSISTORS
- MINIATURE PLASTIC PACKAGE FOR APPLICATION IN SURFACE MOUNTING CIRCUITS
- LOW LEVEL GENERAL PURPOSE
- PNP COMPLEMENT IS BC857


**SOT-23**

### INTERNAL SCHEMATIC DIAGRAM



SC08960

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	50	V
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	50	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	45	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	6	V
$I_C$	Collector Current	0.1	A
$I_{CM}$	Collector Peak Current	0.2	A
$I_{BM}$	Base Peak Current	0.2	A
$I_{EM}$	Emitter Peak Current	0.2	A
$P_{tot}$	Total Dissipation at $T_c = 25^\circ\text{C}$	300	mW
$T_{stg}$	Storage Temperature	-65 to 150	$^\circ\text{C}$
$T_j$	Max. Operating Junction Temperature	150	$^\circ\text{C}$

**THERMAL DATA**

$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	420	$^{\circ}\text{C}/\text{W}$
$R_{thj-SR}$	Thermal Resistance Junction-Substrate	Max	330	$^{\circ}\text{C}/\text{W}$

• Mounted on a ceramic substrate area = 10 x 8 x 0.6 mm

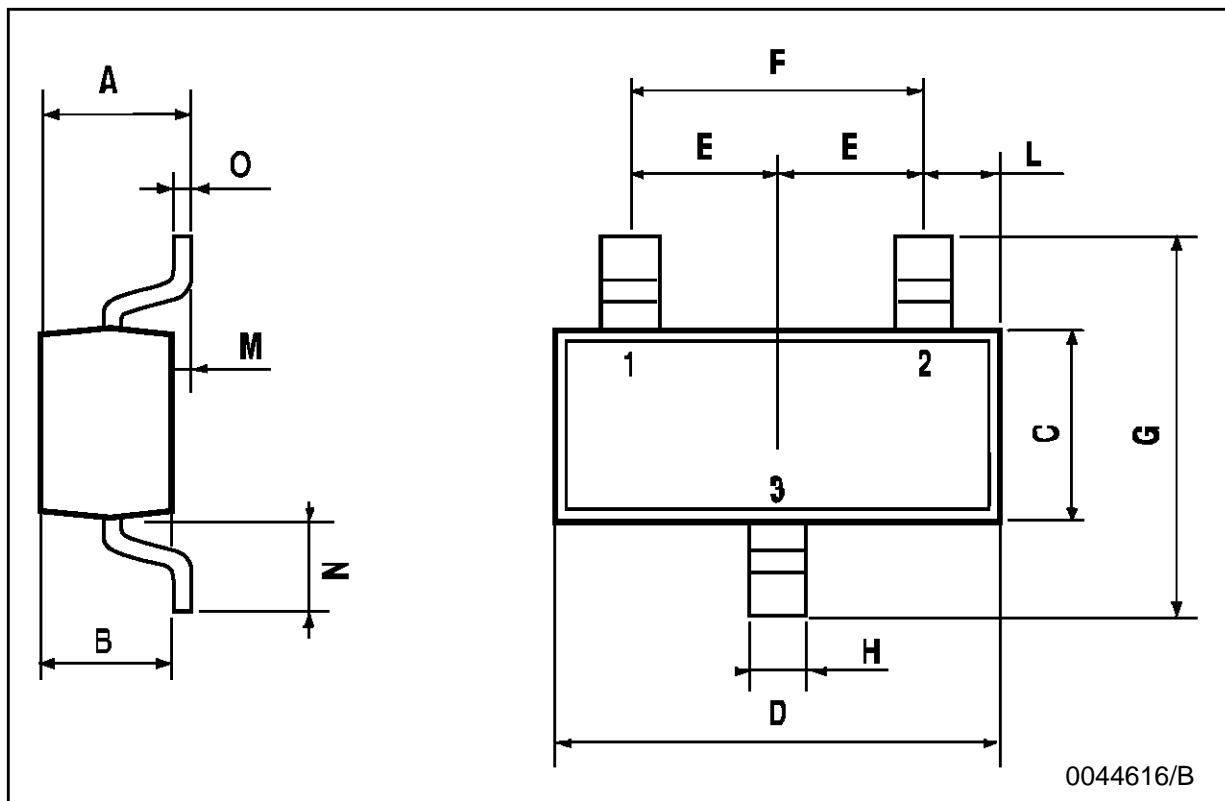
**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cut-off Current ( $I_E = 0$ )	$V_{CE} = 30\text{ V}$ $V_{CE} = 30\text{ V}$ $T_{amb} = 150^{\circ}\text{C}$			15 5	nA $\mu\text{A}$
$V_{(BR)CES}^*$	Collector-Emitter Breakdown Voltage ( $V_{BE} = 0$ )	$I_C = 10\ \mu\text{A}$	50			V
$V_{(BR)CBO}^*$	Collector-Base Breakdown Voltage ( $I_E = 0$ )	$I_C = 10\ \mu\text{A}$	50			V
$V_{(BR)CEO}^*$	Collector-Emitter Breakdown Voltage ( $I_B = 0$ )	$I_C = 2\ \text{mA}$	45			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_C = 0$ )	$I_C = 10\ \mu\text{A}$	6			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 10\ \text{mA}$ $I_B = 0.5\ \text{mA}$ $I_C = 100\ \text{mA}$ $I_B = 5\ \text{mA}$		0.09 0.2	0.25 0.6	V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 10\ \text{mA}$ $I_B = 0.5\ \text{mA}$ $I_C = 100\ \text{mA}$ $I_B = 5\ \text{mA}$		0.75 0.9		V V
$V_{BE(on)}^*$	Base-Emitter On Voltage	$I_C = 2\ \text{mA}$ $V_{CE} = 5\ \text{V}$ $I_C = 10\ \text{mA}$ $V_{CE} = 5\ \text{V}$	0.58	0.63 0.7	0.7 0.77	V V
$h_{FE}^*$	DC Current Gain	$I_C = 10\ \mu\text{A}$ $V_{CE} = 5\ \text{V}$ $I_C = 2\ \text{mA}$ $V_{CE} = 5\ \text{V}$	200	150 290	450	
$f_T$	Transition Frequency	$I_C = 10\ \text{mA}$ $V_{CE} = 5\ \text{V}$ $f = 100\text{MHz}$		300		MHz
$C_{CB}$	Collector Base Capacitance	$I_E = 0$ $V_{CB} = 10\ \text{V}$ $f = 1\ \text{MHz}$			4.5	pF
$C_{EB}$	Collector Emitter Capacitance	$I_C = 0$ $V_{EB} = 0.5\ \text{V}$ $f = 1\ \text{MHz}$		9		pF
NF	Noise Figure	$V_{CE} = 5\ \text{V}$ $I_C = 0.2\ \text{mA}$ $f = 1\text{KHz}$ $\Delta f = 200\ \text{Hz}$ $R_G = 2\ \text{K}\Omega$		2	10	dB
$h_{ie}^*$	Input Impedance	$V_{CE} = 5\ \text{V}$ $I_C = 2\ \text{mA}$ $f = 1\text{KHz}$	3.2	4.5	8.5	$\text{K}\Omega$
$h_{re}^*$	Reverse Voltage Ratio	$V_{CE} = 5\ \text{V}$ $I_C = 2\ \text{mA}$ $f = 1\text{KHz}$		2		$10^{-4}$
$h_{fe}^*$	Small Signal Current Gain	$V_{CE} = 5\ \text{V}$ $I_C = 2\ \text{mA}$ $f = 1\text{KHz}$		330		
$h_{oe}^*$	Output Admittance	$V_{CE} = 5\ \text{V}$ $I_C = 2\ \text{mA}$ $f = 1\text{KHz}$		30	60	$\mu\text{s}$

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 2\%$

## SOT-23 MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.85		1.1	33.4		43.3
B	0.65		0.95	25.6		37.4
C	1.20		1.4	47.2		55.1
D	2.80		3	110.2		118
E	0.95		1.05	37.4		41.3
F	1.9		2.05	74.8		80.7
G	2.1		2.5	82.6		98.4
H	0.38		0.48	14.9		18.8
L	0.3		0.6	11.8		23.6
M	0		0.1	0		3.9
N	0.3		0.65	11.8		25.6
O	0.09		0.17	3.5		6.7



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