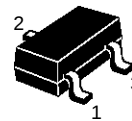


SMALL SIGNAL NPN TRANSISTORS

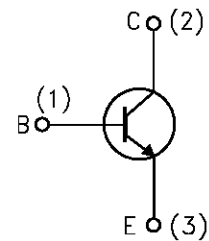
Type	Marking
BC847B	1F

- 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



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

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

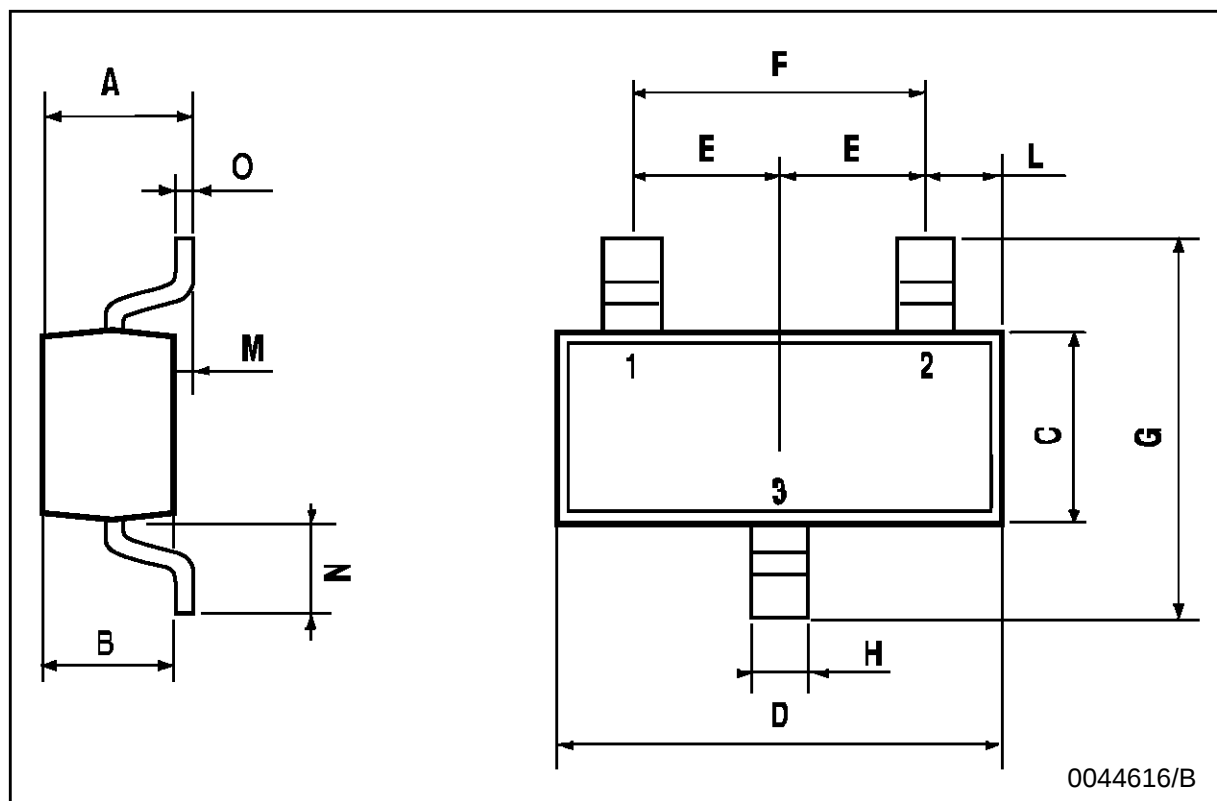
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

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 μA
$V_{(BR)CES}^*$	Collector-Emitter Breakdown Voltage ($V_{BE} = 0$)	$I_C = 10\text{ }\mu\text{A}$	50			V
$V_{(BR)CBO}^*$	Collector-Base Breakdown Voltage ($I_E = 0$)	$I_C = 10\text{ }\mu\text{A}$	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 ($I_C = 0$)	$I_C = 10\text{ }\mu\text{A}$	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	$I_C = 10\text{ }\mu\text{A}$ $V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}$ $V_{CE} = 5\text{ V}$	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	μS

* Pulsed: Pulse duration = 300 μs , 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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