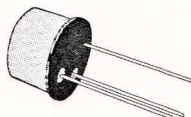




MEDIUM POWER AMPLIFIERS

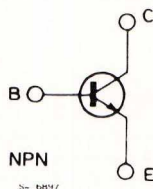
DESCRIPTION

The BSX45 and BSX46 are silicon planar epitaxial NPN transistors in Jedec TO-39 metal case, intended for use in medium power general industrial applications.



TO-39

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	BSX45	BSX46	Unit
V_{CES}	Collector-emitter Voltage ($V_{BE} = 0$)	80	100	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)	40	60	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	7		V
I_C	Collector Current	1		A
I_B	Base Current	0.2		A
P_{tot}	Total Power Dissipation at $T_{case} \leq 25^\circ C$	5		W
T_{sig}, T_j	Storage and Junction Temperature	- 65 to 200		$^\circ C$

THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	35	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	200	$^{\circ}C/W$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current ($V_{BE} = 0$)	$V_{CE} = 60\ V$ $V_{CE} = 60\ V$ $T_{amb} = 150^{\circ}C$			30 10	nA μA
I_{CEX}	Collector Cutoff Current ($V_{BE} = -0.2\ V$)	$V_{CE} = 60\ V$ $T_{amb} = 100^{\circ}C$			50	μA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5\ V$			10	nA
$V_{(BR)CES}$	Collector-emitter Breakdown Voltage ($V_{BE} = 0$)	$I_C = 100\ \mu A$ for BSX45 for BSX46	80 100			V V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ($I_B = 0$)	$I_C = 30\ mA$ for BSX45 for BSX46	40 60			V V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage ($I_C = 0$)	$I_E = 100\ \mu A$	7			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 1\ A$ $I_B = 0.1\ A$		0.7	1	V
V_{BE}^*	Base-emitter Voltage	$I_C = 0.1\ A$ $V_{CE} = 1\ V$ $I_C = 0.5\ A$ $V_{CE} = 1\ V$ $I_C = 1\ A$ $V_{CE} = 1\ V$	0.75	1.3	1 1.5 2	V V V
h_{FE}^*	DC Current Gain	$I_C = 0.1\ mA$ $V_{CE} = 1\ V$ Gr. 6 Gr. 10 Gr. 16 $I_C = 100\ mA$ $V_{CE} = 1\ V$ Gr. 6 Gr. 10 Gr. 16 $I_C = 500\ mA$ $V_{CE} = 1\ V$ Gr. 6 Gr. 10 Gr. 16 $I_C = 1\ A$ $V_{CE} = 1\ V$ Gr. 6 Gr. 10 Gr. 16	10 15 25 40 63 100 15 25 35 15 20 30	28 40 90 63 100 160 25 40 60 15 20 30	100 160 250	
f_T	Transition Frequency	$I_C = 50\ mA$ $V_{CE} = 10\ V$ $f = 20\ MHz$	50			MHz
C_{EBO}	Emitter-base Capacitance	$I_C = 0$ $V_{EB} = 0.5\ V$ $f = 1\ MHz$			80	pF

* Pulsed : pulse duration = 300 μs , duty cycle = 1%.

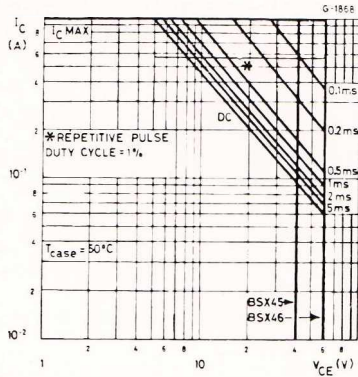
** See test circuit.

ELECTRICAL CHARACTERISTICS (continued)

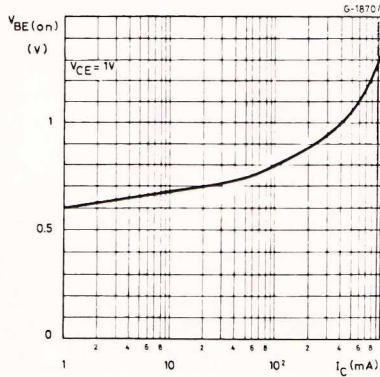
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $f = 1 \text{ MHz}$ $V_{CB} = 10 \text{ V}$ for BSX45 for BSX46			25 20	pF pF
NF	Noise Figure	$I_C = 100 \mu\text{A}$ $R_g = 1 \text{ k}\Omega$ $V_{CE} = 10 \text{ V}$ $f = 1 \text{ kHz}$		3.5		dB
t_{on}^{**}	Turn-on Time	$I_C = 100 \text{ mA}$ $I_{B1} = 5 \text{ mA}$ $V_{CC} = 20 \text{ V}$			200	ns
t_{off}^{**}	Turn-off Time	$I_C = 100 \text{ mA}$ $I_{B1} = -I_{B2} = 5 \text{ mA}$ $V_{CC} = 20 \text{ V}$			850	ns

* Pulsed : pulse duration = 300 μ s, duty cycle = 1%.
** See test circuit.

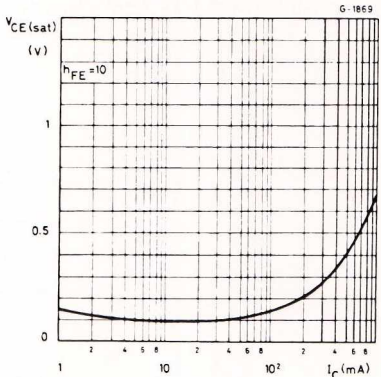
Safe operating areas



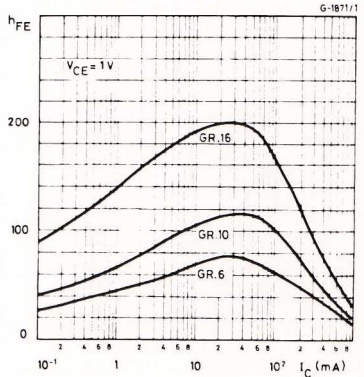
Base-emitter Saturation Voltage.



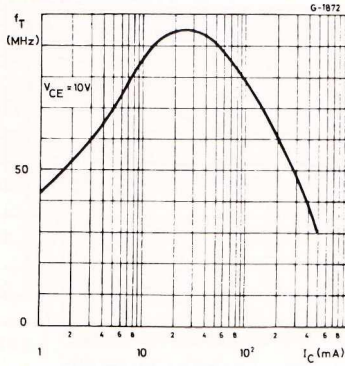
Collector-emitter Saturation Voltage.



DC Current Gain.



Transition Frequency.



Test circuit for t_{on} , t_{off} .

