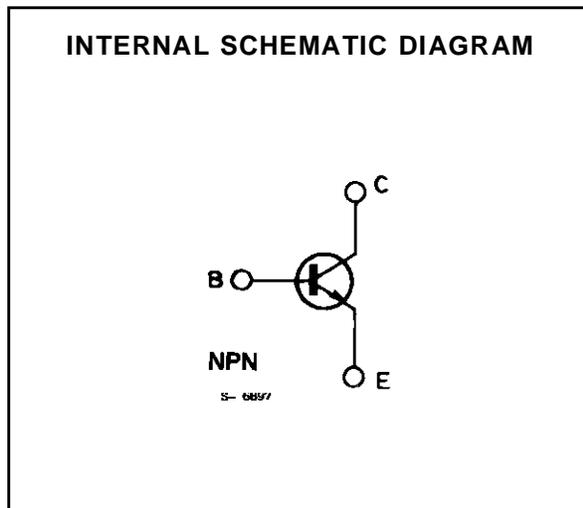
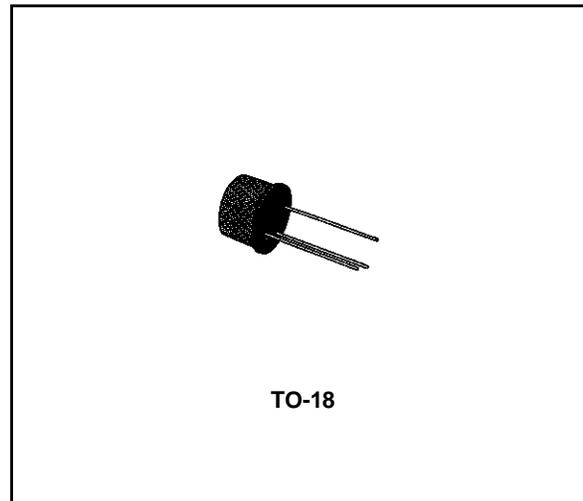


HIGH-VOLTAGE, HIGH-CURRENT SWITCH

DESCRIPTION

The BSX33 is a silicon planar epitaxial NPN transistor in Jedec TO-18 metal case, designed for high voltage and high current switching applications. It features useful current gain from 100 μ A to 500mA and a low saturation voltage allowing switching operation at 1A.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage ($I_E = 0$)	85	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)	55	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	7	V
I_C	Collector Current	1	A
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$ at $T_{case} \leq 25^\circ\text{C}$	0.5	W
		1.8	W
T_{stg}, T_j	Storage and Junction Temperature	- 55 to 200	$^\circ\text{C}$

BSX33

THERMAL DATA

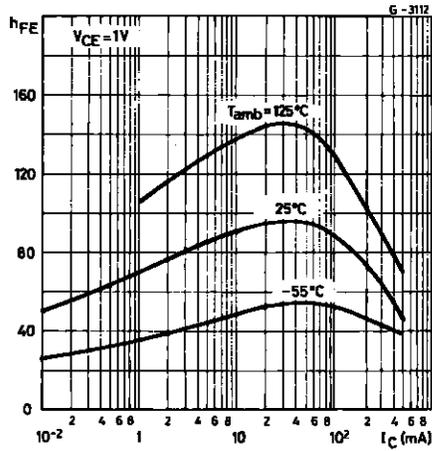
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	97	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	350	°C/W

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

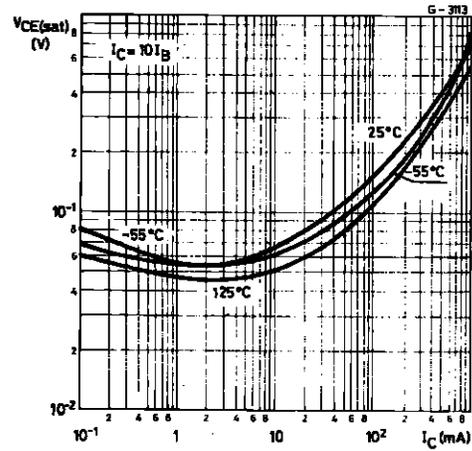
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = 60\text{ V}$			10	nA
		$V_{CB} = 60\text{ V}$ $T_{amb} = 150\text{ °C}$			10	μA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5\text{ V}$			10	nA
$V_{(BR)CBO}$	Collector-base Breakdown Voltage ($I_E = 0$)	$I_C = 100\text{ μA}$	85			V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ($I_B = 0$)	$I_C = 30\text{ mA}$	55			V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage ($I_C = 0$)	$I_E = 100\text{ μA}$	7			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 50\text{ mA}$ $I_B = 5\text{ mA}$		0.08		V
		$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$		0.15	0.3	V
		$I_C = 1\text{ A}$ $I_B = 0.1\text{ mA}$		0.6	1	V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 50\text{ mA}$ $I_B = 5\text{ mA}$		0.76		V
		$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$		0.85	1.1	V
		$I_C = 1\text{ A}$ $I_B = 0.1\text{ mA}$		1.2	1.6	V
h_{FE}^*	DC Current Gain	$I_C = 100\text{ μA}$ $V_{CE} = 1\text{ V}$	20	50		
		$I_C = 10\text{ mA}$ $V_{CE} = 1\text{ V}$	50	85		
		$I_C = 50\text{ mA}$ $V_{CE} = 1\text{ V}$	50	95		
		$I_C = 150\text{ mA}$ $V_{CE} = 1\text{ V}$	40	80		
		$I_C = 500\text{ mA}$ $V_{CE} = 1\text{ V}$	20	45		
h_{fe}	Small Signal Current Gain	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$ $f = 1\text{ kHz}$		85		
f_T	Transition Frequency	$I_C = 50\text{ mA}$ $V_{CE} = 10\text{ V}$ $f = 20\text{ MHz}$	60	90		MHz
C_{EBO}	Emitter-base Capacitance	$I_C = 0$ $V_{EB} = 0.5\text{ V}$ $f = 1\text{ MHz}$		50	80	pF
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$		12	20	pF
h_{ie}	Input Impedance	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$ $f = 1\text{ kHz}$		2		kΩ
h_{re}	Reverse Voltage Transfer Ratio	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$ $f = 1\text{ kHz}$		2.2×10^{-4}		
h_{oe}	Output Admittance	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$ $f = 1\text{ kHz}$		8		μS
t_{on}	Turn-on Time	$I_C = 150\text{ mA}$ $V_{CC} = 20\text{ V}$ $I_{B1} = 7.5\text{ mA}$		120	200	ns
t_{off}	Turn-off Time	$I_C = 150\text{ mA}$ $V_{CC} = 20\text{ V}$ $I_{B1} = - I_{B2} = 7.5\text{ mA}$		350	800	ns

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

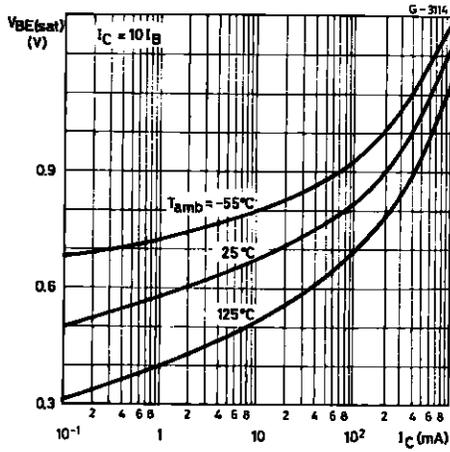
DC Current Gain.



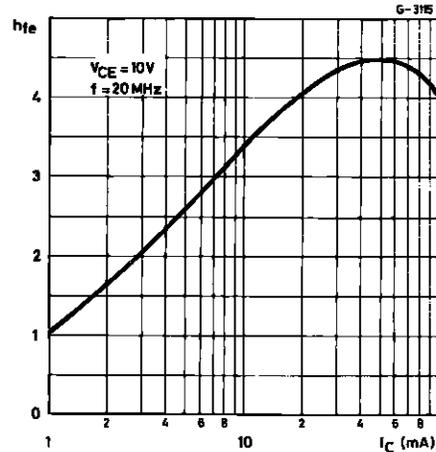
Collector-emitter Saturation Voltage.



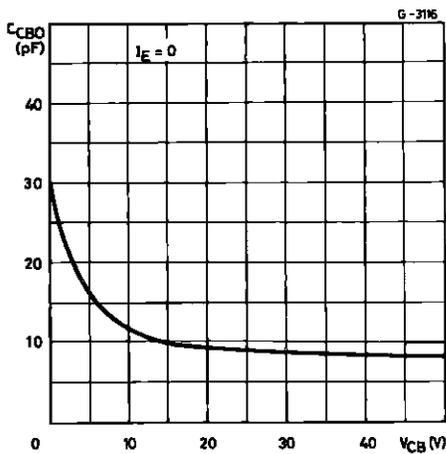
Base-emitter Saturation Voltage.



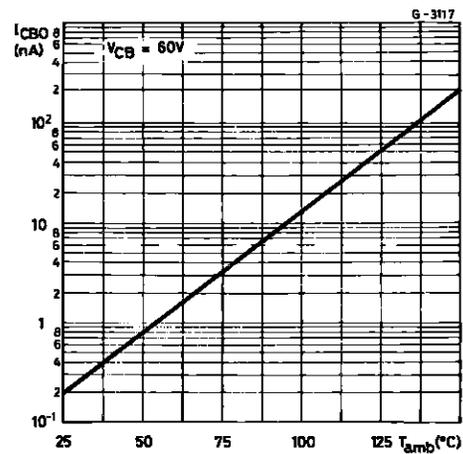
High Frequency Current Gain.



Collector-base Capacitance.

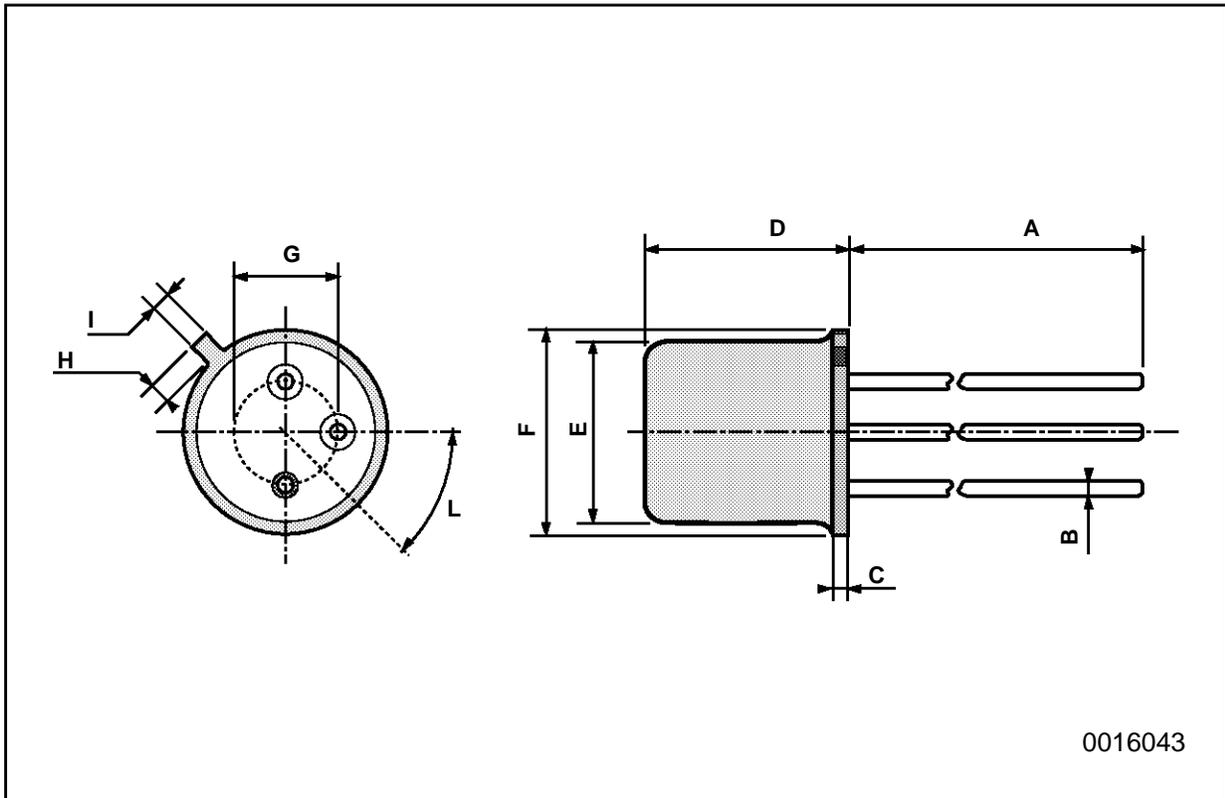


Collector Cutoff Current.



TO-18 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45°			45°		



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