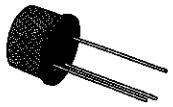
SGS-THOMSON MICROELECTRONICS

BSX33

HIGH-VOLTAGE, HIGH-CURRENT SWITCH

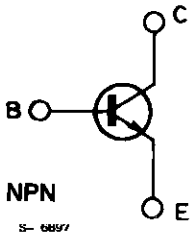
DESCRIPTION

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



TO-18

INTERNAL SCHEMATIC DIAGRAM



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 $T_{amb} \leq 25$ °C at $T_{case} \leq 25$ °C	0.5 1.8	W W
T_{stg}, T_j	Storage and Junction Temperature	– 55 to 200	°C

THERMAL DATA

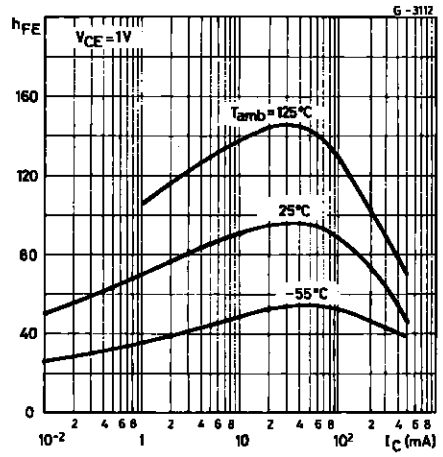
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	97	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	350	°C/W

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

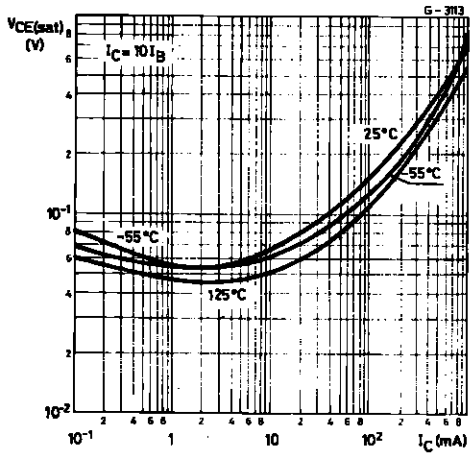
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = 60 V V_{CB} = 60 V T_{amb} = 150 °C			10 10	nA µA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5 V			10	nA
$V_{(BR)CBO}$	Collector-base Breakdown Voltage (I_E = 0)	I_C = 100 µA	85			V
$V_{(BR)CEO}$ *	Collector–emitter Breakdown Voltage (I_B = 0)	I_C = 30 mA	55			V
$V_{(BR)EBO}$	Emitter–base Breakdown Voltage (I_C = 0)	I_E = 100 µA	7			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 50 mA I_B = 5 mA I_C = 150 mA I_B = 15 mA I_C = 1 A I_B = 0.1 mA		0.08 0.15 0.6	 0.3 1	V V V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 50 mA I_B = 5 mA I_C = 150 mA I_B = 15 mA I_C = 1 A I_B = 0.1 mA		0.76 0.85 1.2	 1.1 1.6	V V V
h_{FE}*	DC Current Gain	I_C = 100 µA V_{CE} = 1 V I_C = 10 mA V_{CE} = 1 V I_C = 50 mA V_{CE} = 1 V I_C = 150 mA V_{CE} = 1 V I_C = 500 mA V_{CE} = 1 V	20 50 50 40 20	50 85 95 80 45		
h_{fe}	Small Signal Current Gain	I_C = 1 mA V_{CE} = 5 V f = 1 kHz		85		
f_T	Transition Frequency	I_C = 50 mA V_{CE} = 10 V f = 20 MHz	60	90		MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0 V_{EB} = 0.5 V f = 1 MHz		50	80	pF
C_{CBO}	Collector-base Capacitance	I_E = 0 V_{CB} = 10 V f =1 MHz		12	20	pF
h_{ie}	Input Impedance	I_C = 1 mA V_{CE} = 5 V f = 1 kHz		2		kΩ
h_{re}	Reverse Voltage Transfer Ratio	I_C = 1 mA V_{CE} = 5 V f = 1 kHz		2.2×10^{-4}		
h_{oe}	Output Admittance	I_C = 1 mA V_{CE} = 5 V f = 1 kHz		8		µs
t_{on}	Turn-on Time	I_C = 150 mA V_{CC} = 20 V I_{B1} = 7.5 mA		120	200	ns
t_{off}	Turn-off Time	I_C = 150 mA V_{CC} = 20 V IB1 = – IB2 = 7.5 mA		350	800	ns

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

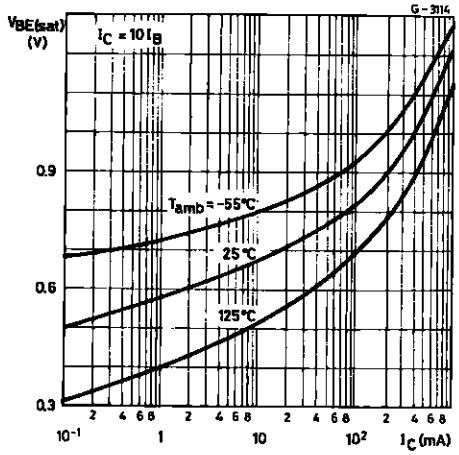
DC Current Gain.



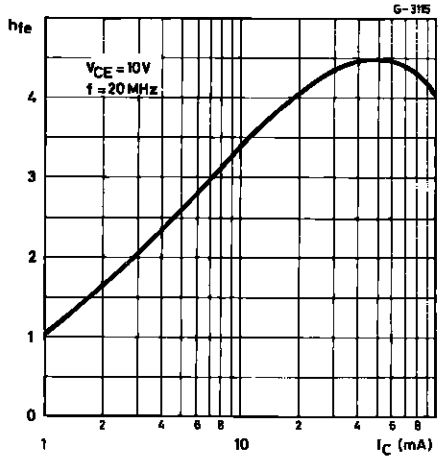
Collector-emitter Saturation Voltage .



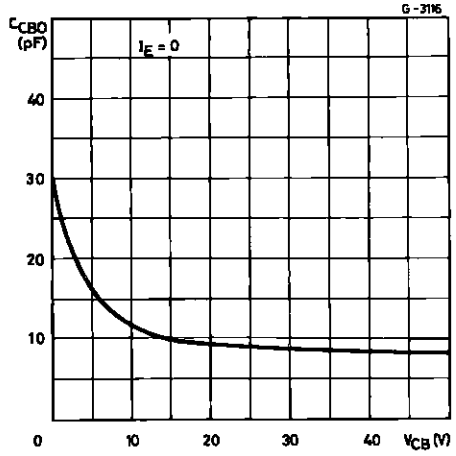
Base-emitter Saturation Voltage.



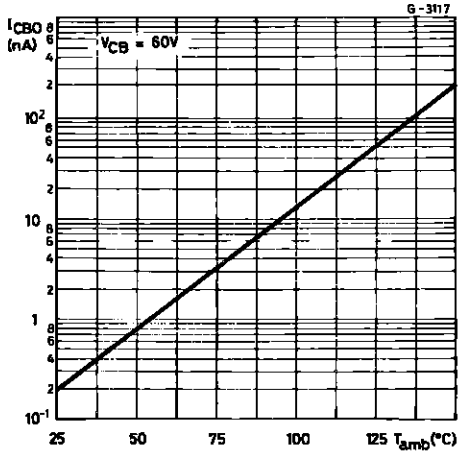
High Frequency Current Gain.



Collector-base Capacitance.

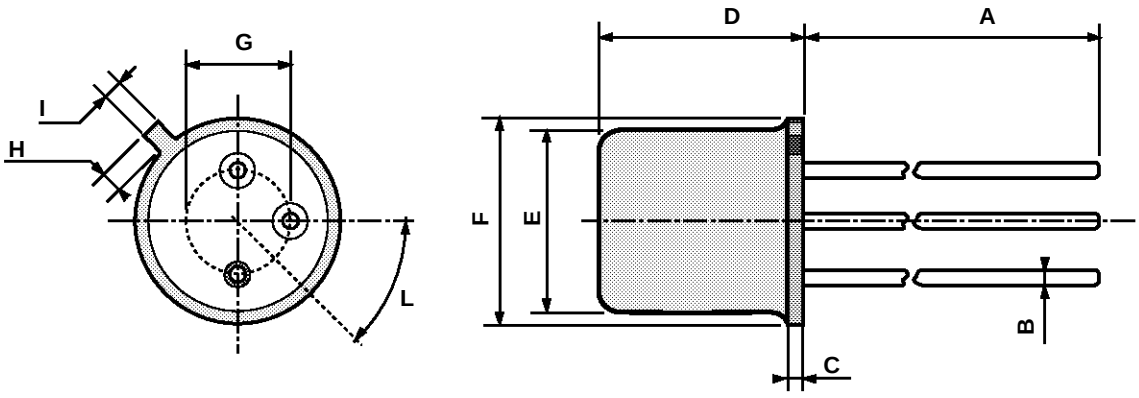


Collector Cutoff Current.



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^o			45^o		



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