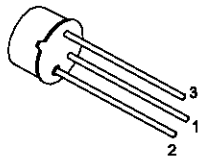
SGS-THOMSON MICROELECTRONICS

BSX20

HIGH SPEED SATURATED SWITCHES

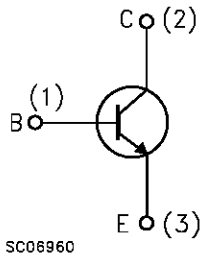
DESCRIPTION

The BSX20 is a silicon planar epitaxial NPN transistors in Jedec TO-18 metal case. They are primarily intended for veery high speed saturated switching applications.



TO-18

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage (I_E = 0)	40	V
V_{CES}	Collector-Emitter Voltage (V_{BE} = 0)	40	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	15	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	4.5	V
I_C	Collector Current (t = 10 µs)	0.5	A
P_{tot}	Total Dissipation at $T_{amb} \leq 25\ ^oC$ at $T_{case} \leq 25\ ^oC$	0.36 1.2	W W
T_{stg}	Storage Temperature	-65 to 200	^oC
T_j	Max. Operating Junction Temperature	200	^oC

THERMAL DATA

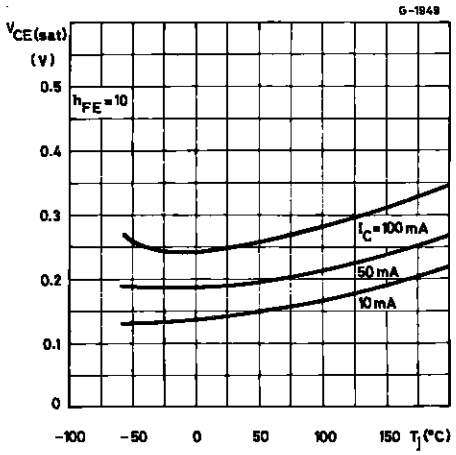
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case Max	146	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient Max	486	°C/W

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

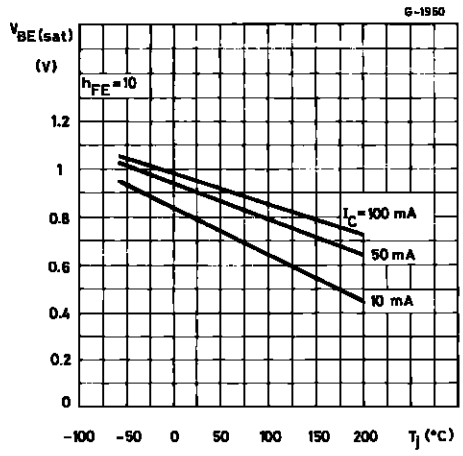
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current (I_E = 0)	V_{CB} = 20 V V_{CB} = 20 V T_{amb} = 150 °C			0.4 30	µA µA
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 15 V T_{amb} = 55 °C V_{CE} = 40 V			0.4 1	µA µA
I_{CEX}	Collector Cut-off Current (V_{BE} = -3V)	V_{CE} = 15 V T_{amb} = 55 °C			0.6	µA
I_{BEX}	Base Cut-off Current (V_{BE} = -3V)	V_{CE} = 15 V T_{amb} = 55 °C			0.6	µA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 4.5 V			10	µA
$V_{CER(sus)}$*	Collector-Emitter Sustaining Voltage (R_{BE} = 10Ω)	I_C = 10 mA	20			V
$V_{(BR)CEO}$*	Collector-Emitter Breakdown Voltage (I_B = 0)	I_C = 10 mA	15			V
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 10 mA I_B = 1 mA I_C = 100 mA I_B = 10 mA I_C = 10 mA I_B = 0.3 mA			0.25 0.6 0.3	V V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 10 mA I_B = 1 mA I_C = 100 mA I_B = 10 mA	0.7		0.85 1.5	V V
$V_{BE(on)}$*	Base-Emitter On Voltage	I_C = 30 µA V_{CE} = 20 V T_{amb} = 100 °C	350			mV
h_{FE}*	DC Current Gain	I_C = 10 mA V_{CE} = 1 V I_C = 100 mA V_{CE} = 2 V I_C = 10 mA V_{CE} = 1 V T_{amb} = -55 °C	40 20 20		60	
f_T	Transition Frequency	I_C = 10 mA V_{CE} = 10 V	500	600		MHz
C_{CBO}	Collector Base Capacitance	I_E = 0 V_{CB} = 5 V			4	pF
C_{EBO}	Emitter Base Capacitance	I_C = 0 V_{EB} = 1 V			4.5	pF
t_s**	Storage Time	V_{CC} = 10 V I_C = 10 mA I_{B1} = -I_{B2} = 10 mA		6	13	ns
t_{on}**	Turn-on Time	V_{CC} = 3 V I_C = 10 mA I_{B1} = 3 mA V_{CC} = 6 V I_C = 100 mA I_{B1} = 40 mA			 12 7	 ns ns
t_{off}**	Turn-off Time	V_{CC} = 3 V I_C = 10 mA I_{B1} = 3 mA I_{B2} = -1.5 mA V_{CC} = 6 V I_C = 100 mA I_{B1} = 40 mA I_{B2} = -20 mA			 18 21	 ns ns

* Pulsed: Pulse duration = 300 µs, duty cycle ≤ 1 %
** See test circuit

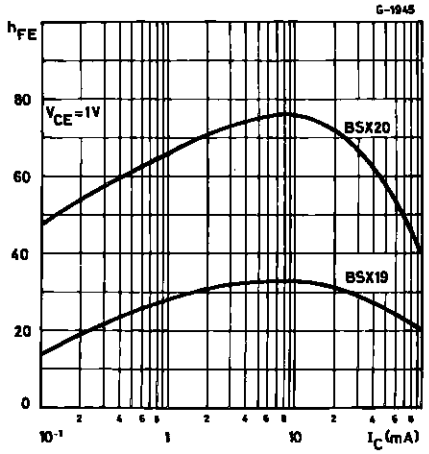
Collector-emitter Saturation Voltage



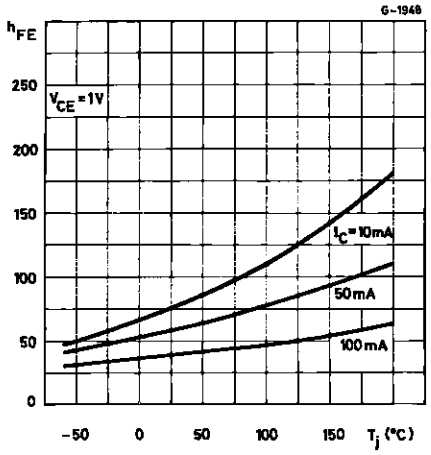
Base-emitter Saturation Voltage.



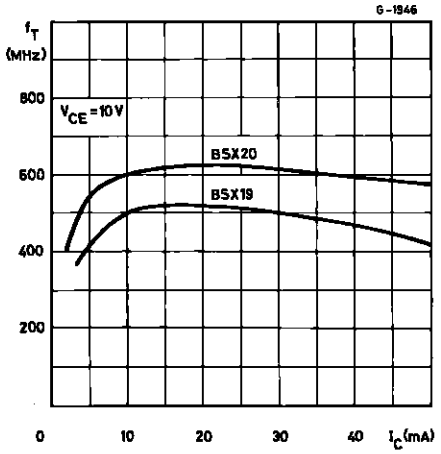
DC Current Gain



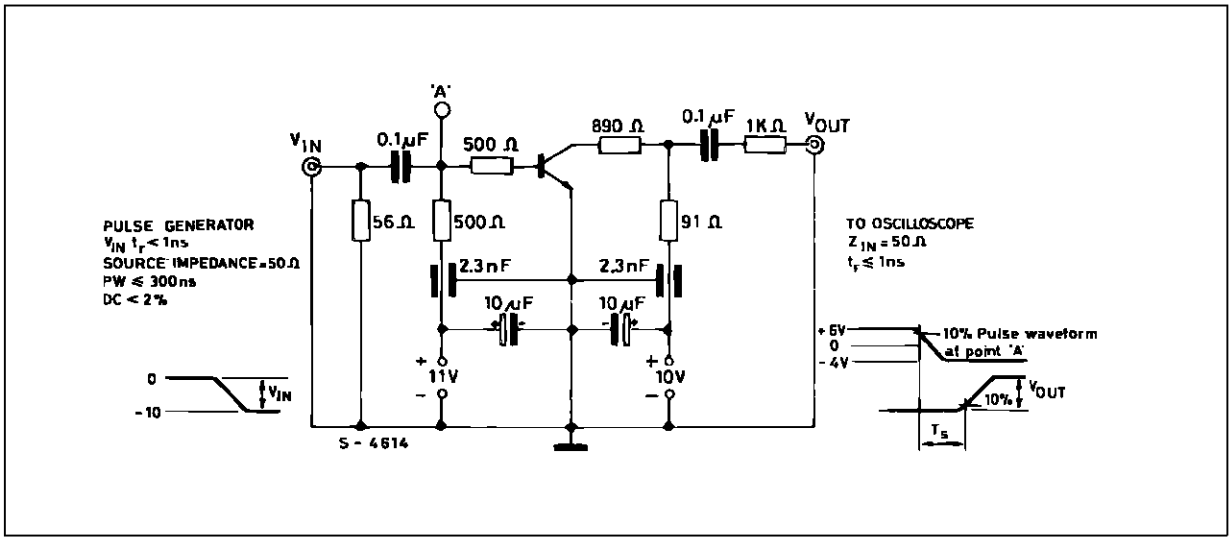
DC Current Gain



Transition Frequency.

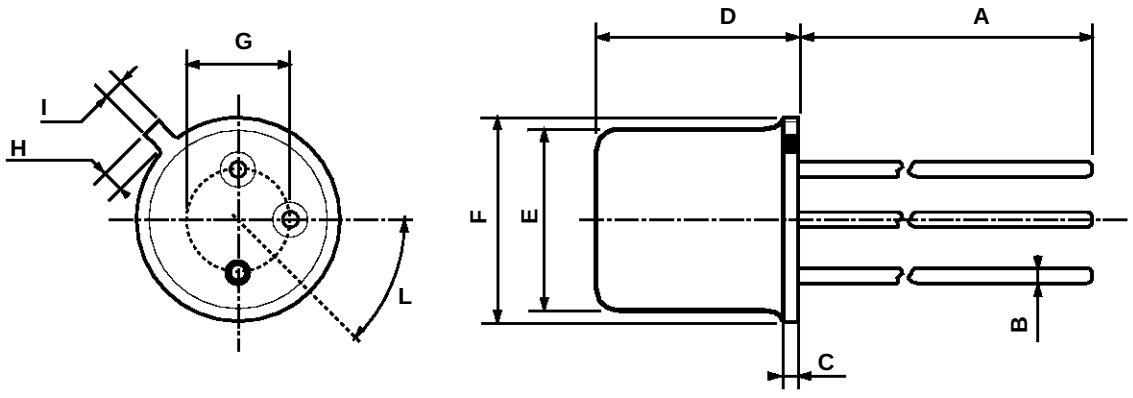


Test circuit for t_S.



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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