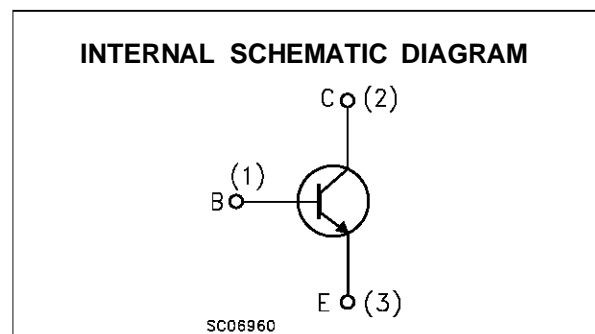
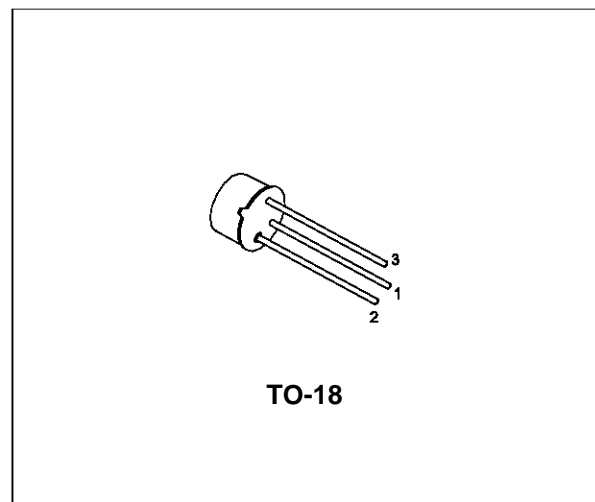


HIGH SPEED SATURATED SWITCHES

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.


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 ($t = 10 \mu s$)	0.5	A
P_{tot}	Total Dissipation at $T_{amb} \leq 25^\circ C$ at $T_{case} \leq 25^\circ C$	0.36	W
		1.2	W
T_{stg}	Storage Temperature	-65 to 200	$^\circ C$
T_j	Max. Operating Junction Temperature	200	$^\circ C$

BSX20

THERMAL DATA

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

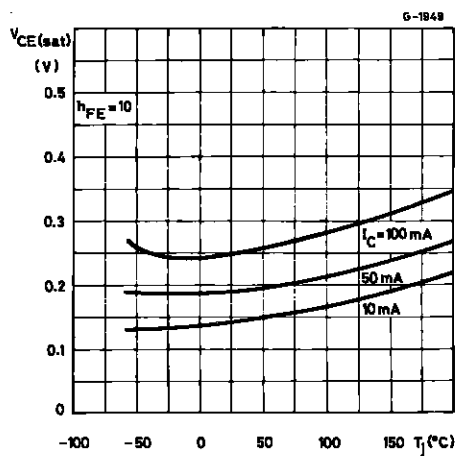
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

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

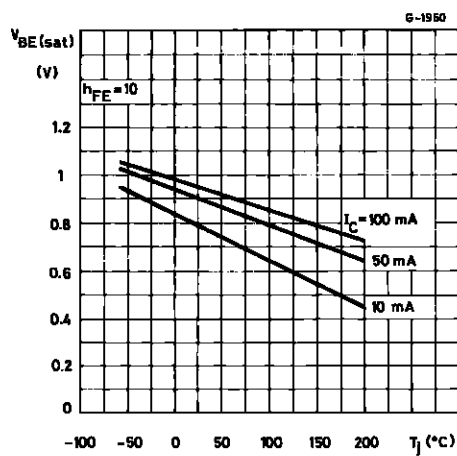
* Pulsed: Pulse duration = 300 μs , duty cycle $\leq 1\%$

** See test circuit

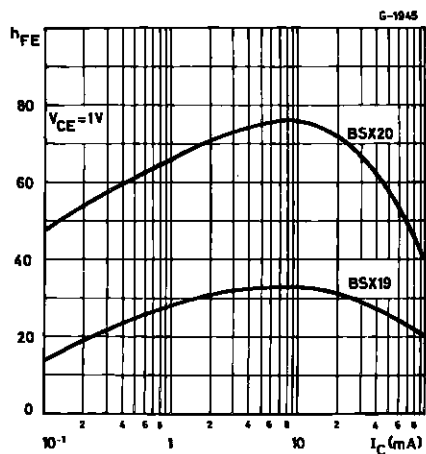
Collector-emitter Saturation Voltage



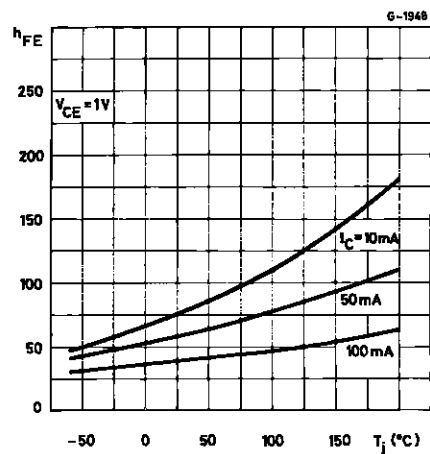
Base-emitter Saturation Voltage



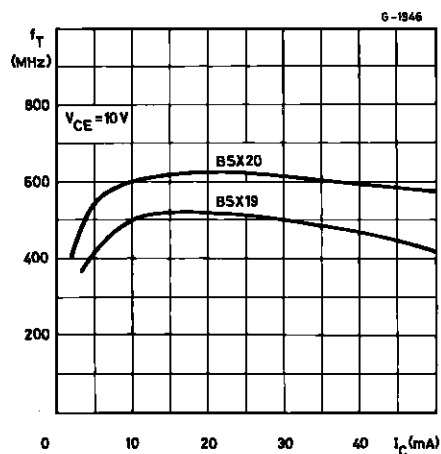
DC Current Gain



DC Current Gain

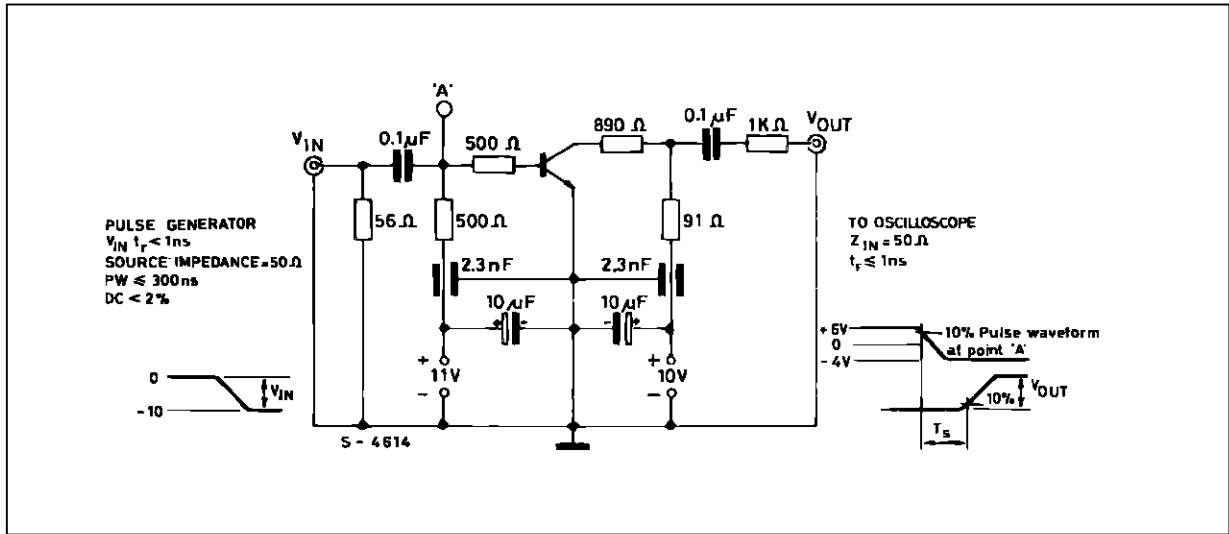


Transition Frequency



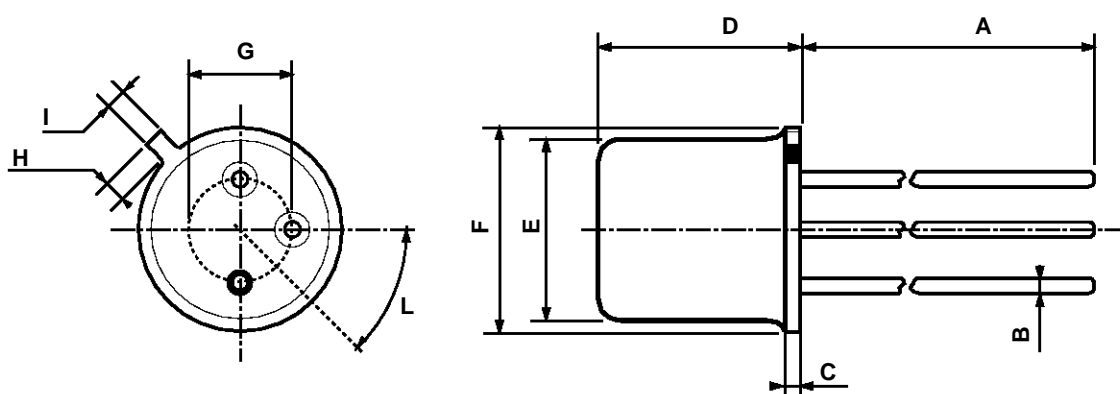
BSX20

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°			45°		



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