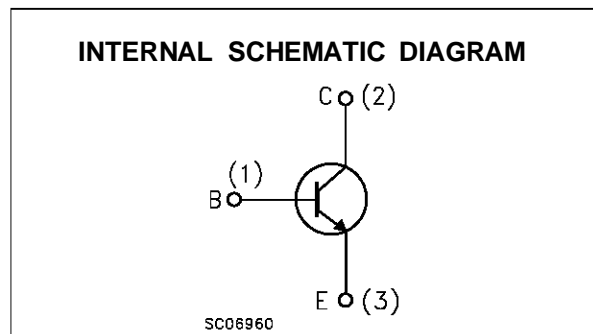
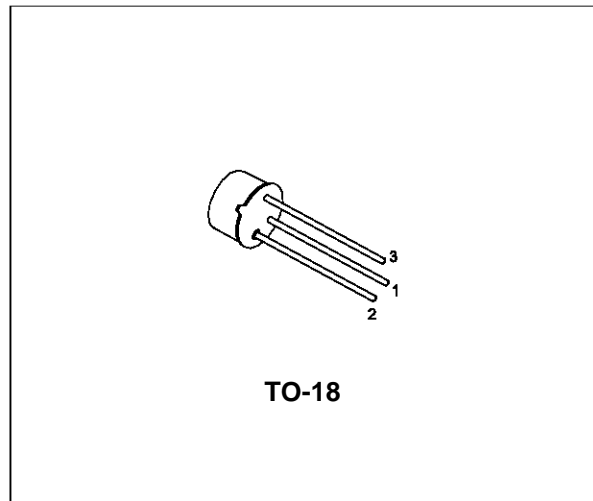


HIGH SPEED SATURATED SWITCHES

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	$^{\circ}C/W$

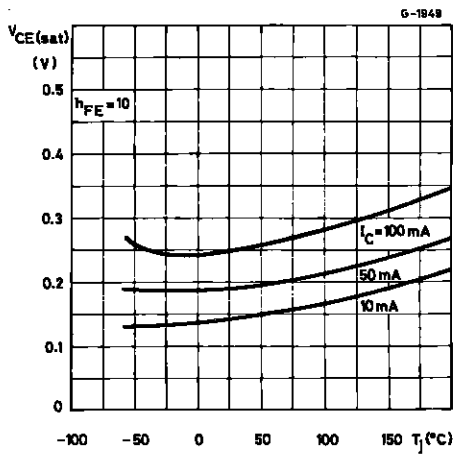
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current ($I_E = 0$)	$V_{CB} = 20 V$ $V_{CB} = 20 V$ $T_{amb} = 150^{\circ}C$			0.4 30	μA μA
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 15 V$ $T_{amb} = 55^{\circ}C$ $V_{CE} = 40 V$			0.4 1	μA μA
I_{CEX}	Collector Cut-off Current ($V_{BE} = -3V$)	$V_{CE} = 15 V$ $T_{amb} = 55^{\circ}C$			0.6	μA
I_{BEX}	Base Cut-off Current ($V_{BE} = -3V$)	$V_{CE} = 15 V$ $T_{amb} = 55^{\circ}C$			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	$I_C = 10 mA$ $I_B = 1 mA$ $I_C = 100 mA$ $I_B = 10 mA$ $I_C = 10 mA$ $I_B = 0.3 mA$			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	$I_C = 30 \mu A$ $V_{CE} = 20 V$ $T_{amb} = 100^{\circ}C$	350			mV
h_{FE*}	DC Current Gain	$I_C = 10 mA$ $V_{CE} = 1 V$ $I_C = 100 mA$ $V_{CE} = 2 V$ $I_C = 10 mA$ $V_{CE} = 1 V$ $T_{amb} = -55^{\circ}C$	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

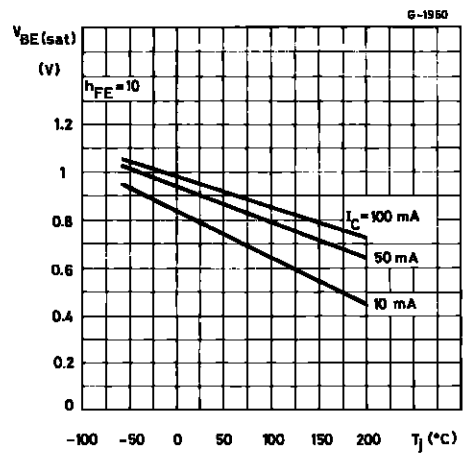
* Pulsed: Pulse duration = 300 μs , duty cycle $\leq 1\%$

** See test circuit

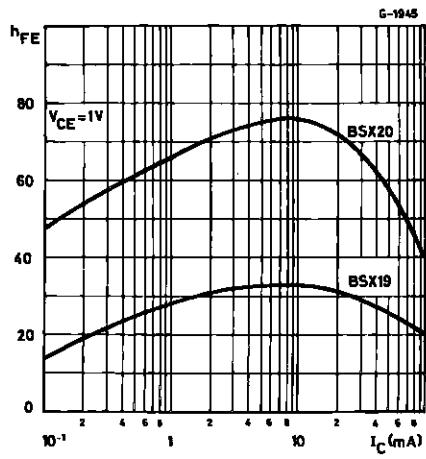
Collector-emitter Saturation Voltage



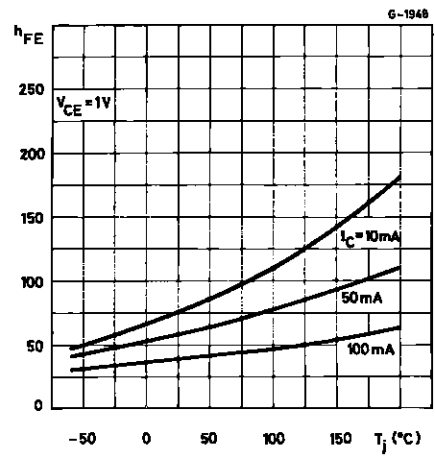
Base-emitter Saturation Voltage



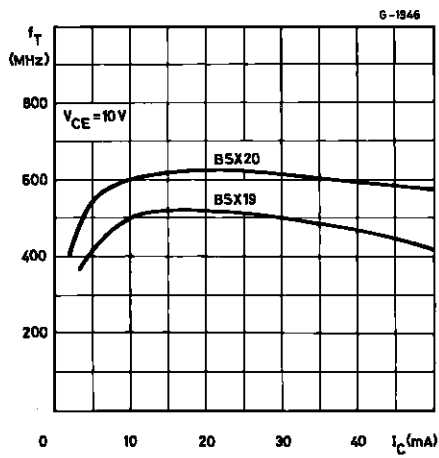
DC Current Gain



DC Current Gain

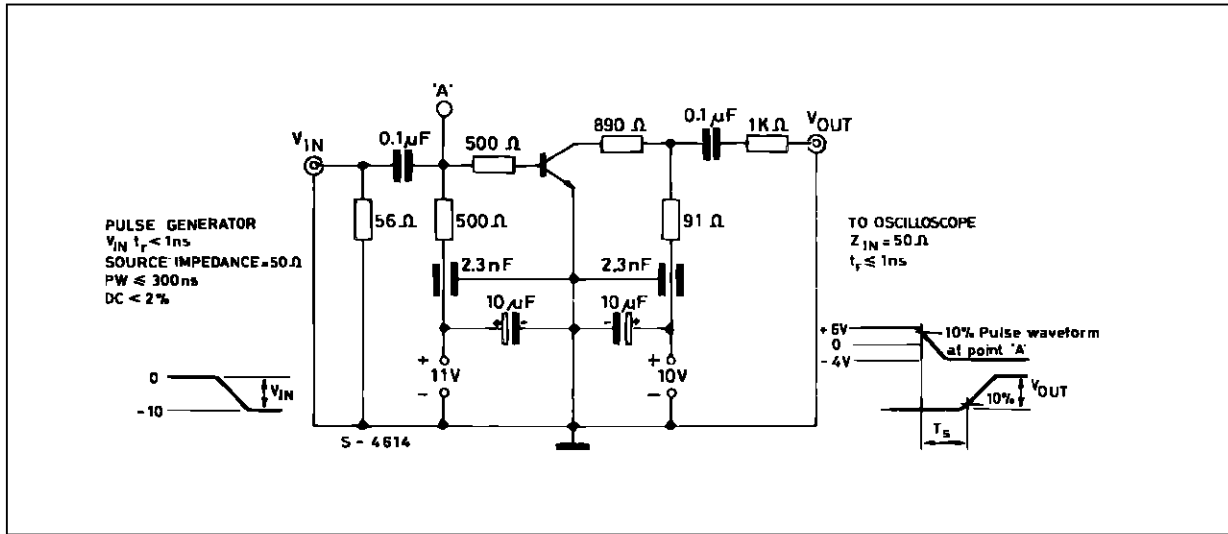


Transition Frequency



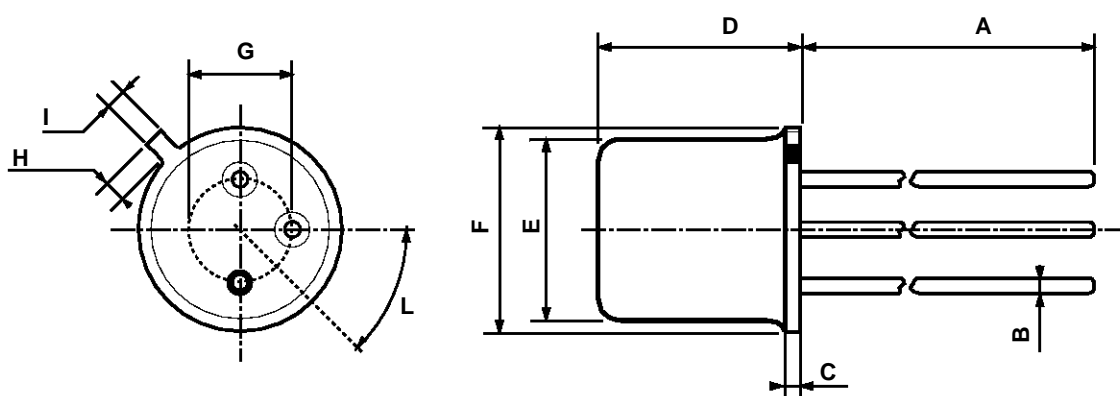
BSX20

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°		



0016043

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1997 SGS-THOMSON Microelectronics - Printed in Italy - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A

...