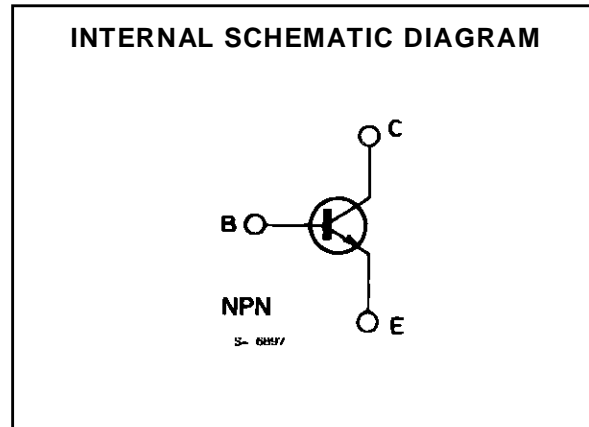
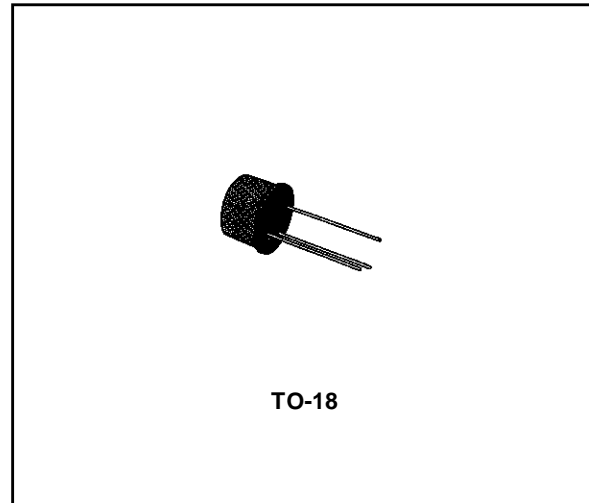


HIGH-FREQUENCY SATURATED SWITCH

DESCRIPTION

The BSX93 is a silicon planar epitaxial NPN transistor in Jedec TO-18 metal case. It is designed specifically for 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 ($I_C = 0$)	5	V
I_C	Collector Current	150	mA
I_{CM}	Collector Peak Current ($t = 10 \mu s$)	500	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25 \text{ }^\circ C$ at $T_{case} \leq 25 \text{ }^\circ C$	0.36	W
		1	W
T_{stg}, T_j	Storage and Junction Temperature	- 65 to 200	$^\circ C$

BSX93

THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	175	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	486	°C/W

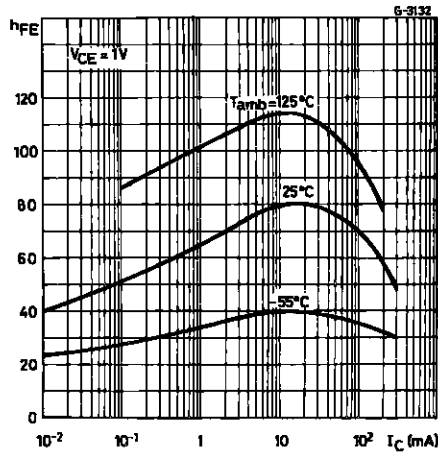
ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = 20\text{ V}$ $V_{CB} = 20\text{ V}$ $T_{amb} = 150\text{ °C}$			0.2 70	μA μA
$V_{(BR)CBO}$	Collector-base Breakdown Voltage ($I_E = 0$)	$I_C = 10\ \mu\text{A}$	40			V
$V_{(BR)CES}^*$	Collector-emitter Breakdown Voltage ($V_{BE} = 0$)	$I_C = 10\ \mu\text{A}$	40			V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10\ \text{mA}$	15			V
$V_{(BR)EBO}$	Collector-emitter Breakdown Voltage ($I_C = 0$)	$I_E = 10\ \mu\text{A}$	5			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 10\ \text{mA}$ $I_B = 1\ \text{mA}$		0.15	0.2	V
V_{BE}^*	Base-emitter Voltage	$I_C = 10\ \text{mA}$ $V_{CE} = 1\ \text{V}$		0.7		V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 10\ \text{mA}$ $I_B = 1\ \text{mA}$	0.72	0.75	0.85	V
h_{FE}^*	DC Current Gain	$I_C = 10\ \text{mA}$ $V_{CE} = 1\ \text{V}$ $I_C = 100\ \text{mA}$ $V_{CE} = 1\ \text{V}$ $I_C = 10\ \text{mA}$ $V_{CE} = 1\ \text{V}$ $T_{amb} = -55\text{ °C}$	40 20 20	80 70 40	120	
f_T	Transition Frequency	$I_C = 10\ \text{mA}$ $V_{CE} = 10\ \text{V}$ $f = 100\ \text{MHz}$	400	650		MHz
C_{EBO}	Emitter-base Capacitance	$I_C = 0$ $V_{EB} = 0.5\ \text{V}$ $f = 1\ \text{MHz}$		3.8	6	pF
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 5\ \text{V}$ $f = 1\ \text{MHz}$		2.5	4	pF
t_s	Storage Time	$I_C = 10\ \text{mA}$ $V_{CC} = 10\ \text{V}$ $I_{B1} = -I_{B2} = 10\ \text{mA}$		6	13	ns
t_{on}^{**}	Turn-on Time	$I_C = 10\ \text{mA}$ $V_{CC} = 3\ \text{V}$ $I_{B1} = 3\ \text{mA}$		9	12	ns
t_{off}^{**}	Turn-off Time	$I_C = 10\ \text{mA}$ $V_{CC} = 3\ \text{V}$ $I_{B1} = 3\ \text{mA}$ $I_{B2} = -1.5\ \text{mA}$		13	18	ns

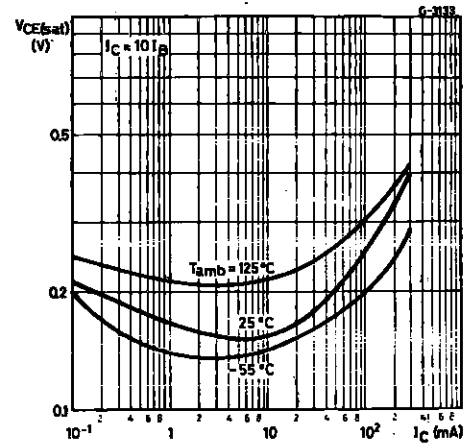
* Pulsed : pulse duration = 300 μs , duty cycle = 1 %

** See test circuit.

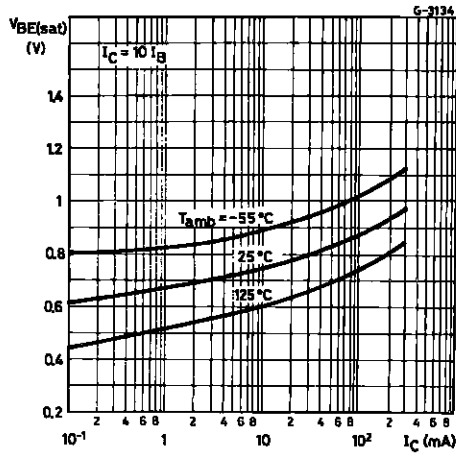
DC Current Gain.



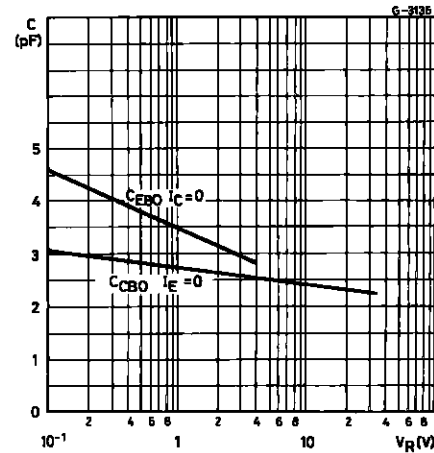
Collector-emitter Saturation Voltage.



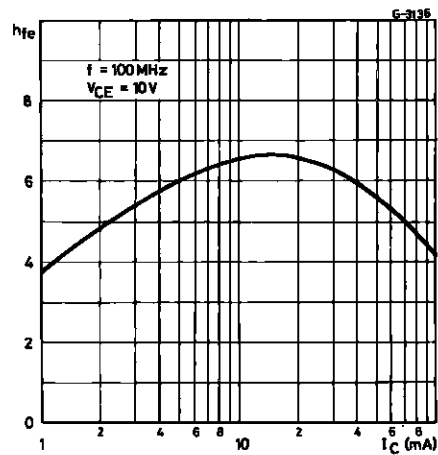
Base-emitter Saturation Voltage.



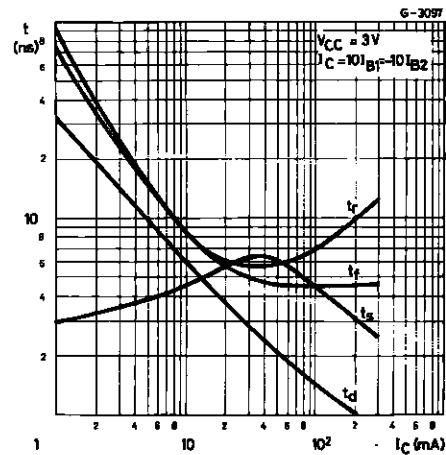
Emitter-base and Collector-base Capacitances.



High Frequency Current Gain.



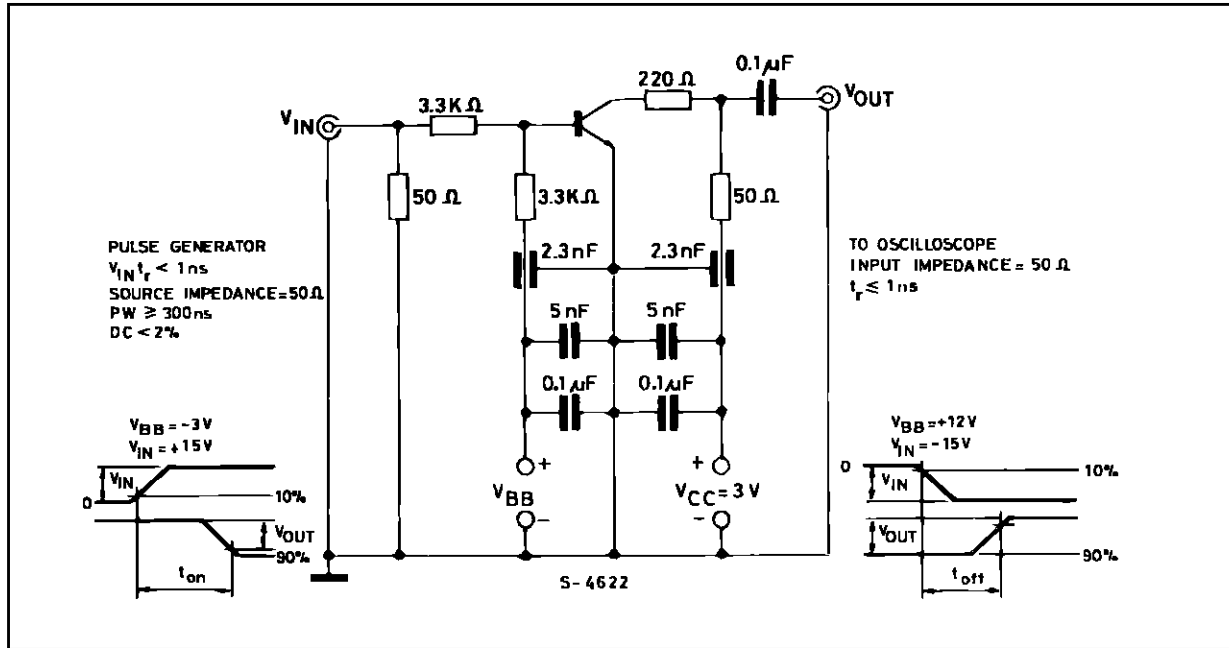
Switching Characteristics.



BSX93

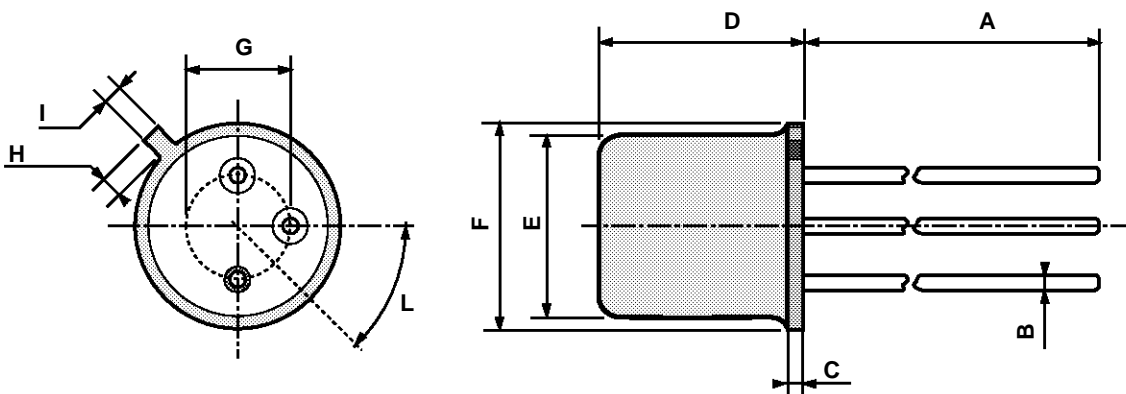
TEST CIRCUIT

Test Circuit for t_{on} , t_{off} .



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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