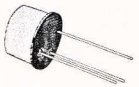
SGS-THOMSON MICROELECTRONICS

BSX93

HIGH-FREQUENCY SATURATED SWITCH

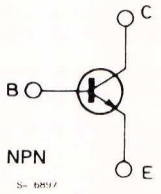
DESCRIPTION

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.



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)	5	V
I_C	Collector Current	150	mA
I_{CM}	Collector Peak Current (t = 10 µs)	500	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25$ °C at $T_{case} \leq 25$ °C	0.36 1	W W
T_{stg}, T_j	Storage and Junction Temperature	– 65 to 200	°C

THERMAL DATA

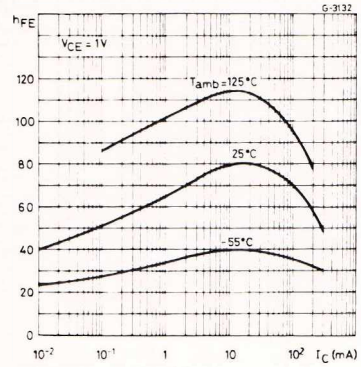
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	175	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	486	°C/W

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

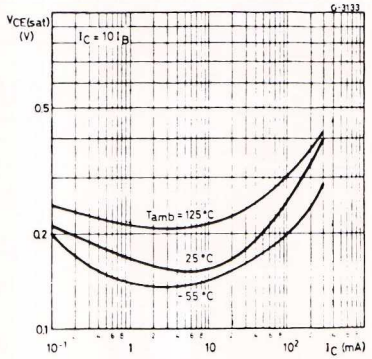
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = 20 V V_{CB} = 20 V T_{amb} = 150 °C			0.2 70	µA µA
$V_{(BR)CBO}$	Collector-base Breakdown Voltage (I_E = 0)	I_C = 10 µA	40			V
$V_{(BR)CES}$*	Collector-emitter Breakdown Voltage (V_{BE} = 0)	Ic =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

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

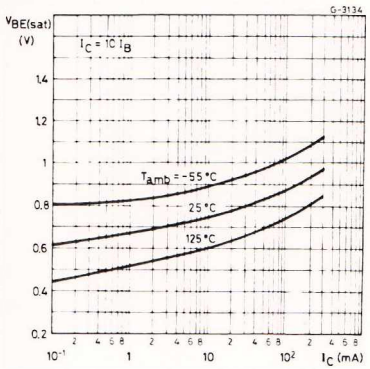
DC Current Gain.



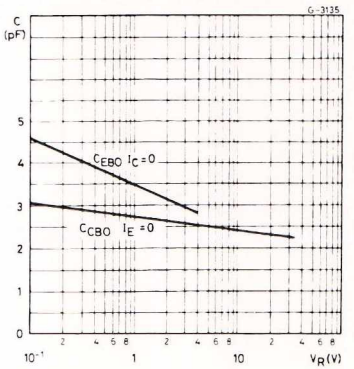
Collector-emitter Saturation Voltage.



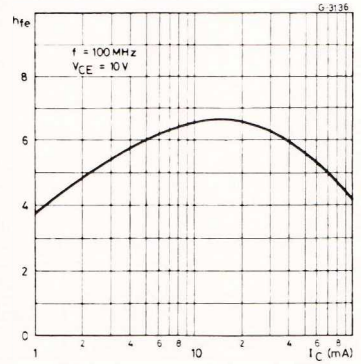
Base-emitter Saturation Voltage.



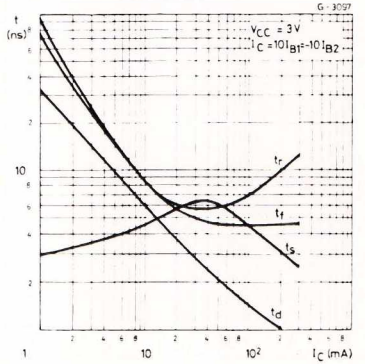
Emitter-base and Collector-base Capacitances.



High Frequency Current Gain.



Switching Characteristics.



TEST CIRCUIT

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