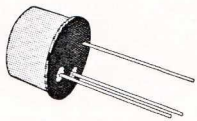
SGS-THOMSON
MICROELECTRONICS

BSX45
BSX46

MEDIUM POWER AMPLIFIERS

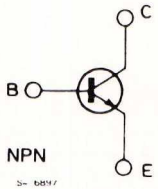
DESCRIPTION

The BSX45 and BSX46 are silicon planar epitaxial NPN transistors in Jedec TO-39 metal case, intended for use in medium power general industrial applications.



TO-39

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	BSX45	BSX46	Unit
V_{CES}	Collector-emitter Voltage (V_{BE} = 0)	80	100	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	40	60	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	7		V
I_C	Collector Current	1		A
I_B	Base Current	0.2		A
P_{tot}	Total Power Dissipation at $T_{case} \leq 25$ °C	5		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	35	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	200	°C/W

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

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	V_{CE} = 60 V V_{CE} = 60 V	 T_{amb} = 150 °C			30 10	nA µA
I_{CEX}	Collector Cutoff Current (V_{BE} = – 0.2 V)	V_{CE} = 60 V	T_{amb} = 100 °C			50	µA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5 V				10	nA
$V_{(BR)CES}$	Collector-emitter Breakdown Voltage (V_{BE} = 0)	I_C = 100 µA	 for **BSX45** for **BSX46**	 80 100			 V V
$V_{(BR)CEO}$ *	Collector-emitter Breakdown Voltage (I_B = 0)	I_C = 30 mA	 for **BSX45** for **BSX46**	 40 60			 V V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage (I_C = 0)	I_E = 100 µA		7			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 1 A	I_B = 0.1 A		0.7	1	V
V_{BE} *	Base-emitter Voltage	I_C = 0.1 A I_C = 0.5 A I_C = 1 A	V_{CE} = 1 V V_{CE} = 1 V V_{CE} = 1 V	 0.75	 1.3	1 1.5 2	V V V
h_{FE} *	DC Current Gain	I_C = 0.1 mA	V_{CE} = 1 V				
			Gr. 6	10	28		
			Gr. 10	15	40		
			Gr. 16	25	90		
		I_C = 100 mA	V_{CE} = 1 V				
			Gr. 6	40	63	100	
			Gr. 10	63	100	160	
			Gr. 16	100	160	250	
		I_C = 500 mA	V_{CE} = 1 V				
			Gr. 6	15	25		
			Gr. 10	25	40		
			Gr. 16	35	60		
		I_C = 1 A	V_{CE} = 1 V				
			Gr. 6		15		
			Gr. 10		20		
			Gr. 16		30		
f_T	Transition Frequency	I_C = 50 mA f = 20 MHz	V_{CE} = 10 V	 50			 MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0 f = 1 MHz	V_{EB} = 0.5 V			80	pF

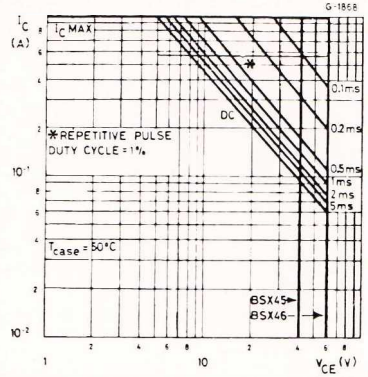
* Pulsed : pulse duration = 300µs, duty cycle = 1%.
** See test circuit.

ELECTRICAL CHARACTERISTICS (continued)

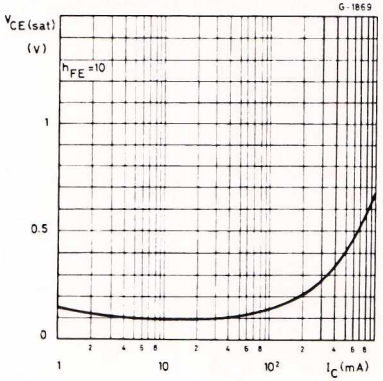
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10$ V f = 1 MHz				
		for **BSX45**			25	pF
		for **BSX46**			20	pF
NF	Noise Figure	$I_C = 100\ \mu A$ $V_{CE} = 10$ V $R_g = 1\ k\Omega$ f = 1 kHz		3.5		dB
t_{on} **	Turn–on Time	$I_C = 100$ mA $V_{CC} = 20$ V $I_{B1} = 5$ mA			200	ns
t_{off} **	Turn–off Time	$I_C = 100$ mA $V_{CC} = 20$ V $I_{B1} = -I_{B2} = 5$ mA			850	ns

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

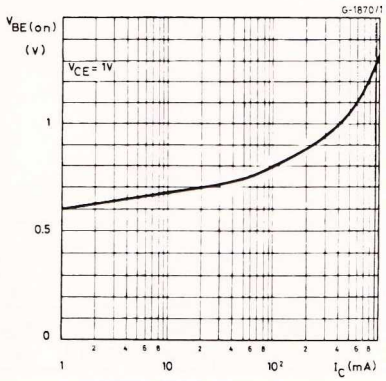
Safe operating areas



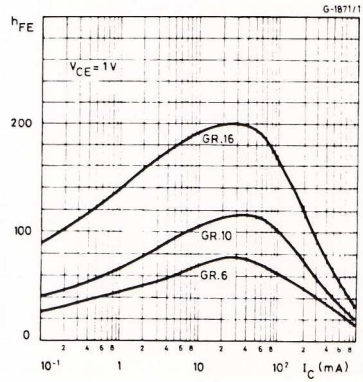
Collector-emitter Saturation Voltage.



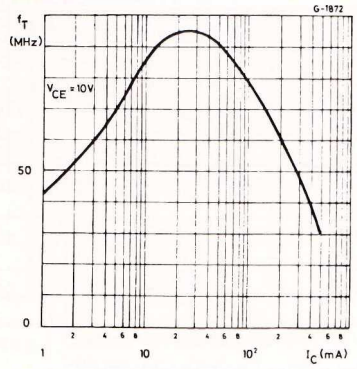
Base-emitter Saturation Voltage.



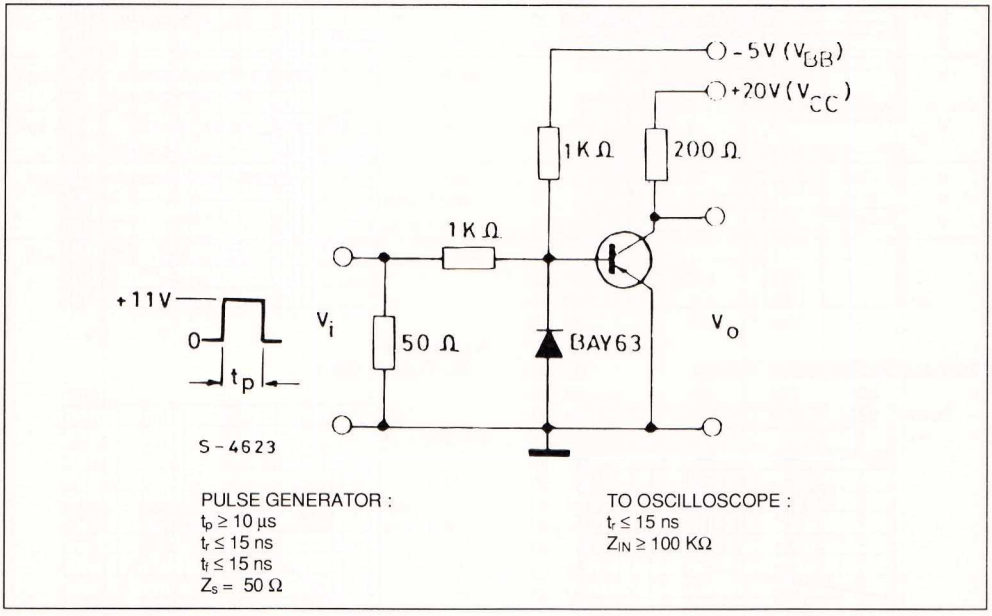
DC Current Gain.



Transition Frequency.



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



PULSE GENERATOR :
$t_p \geq 10\ \mu s$
$t_r \leq 15$ ns
$t_f \leq 15$ ns
$Z_s = 50\ \Omega$

TO OSCILLOSCOPE :
$t_r \leq 15$ ns
$Z_{IN} \geq 100\ K\Omega$