

BSX 27**HIGH-SPEED SATURATED SWITCH****NPN DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTOR**

GENERAL DESCRIPTION- The BSX 27 is an NPN silicon PLANAR epitaxial transistor designed specifically for high-speed saturated switching applications in the 50-100 Mc/s range at power levels from 100 microwatts to 300 milliwatts. This device is suitable for most small-signal, RF, and digital type circuits.

ABSOLUTE MAXIMUM RATINGS (Note 1)**Maximum Temperatures**

Storage Temperature	-65°C to +200°C
Operating Junction Temperature	200°C Maximum
Lead Temperature (Soldering, 60 sec Time Limit)	300°C Maximum

Maximum Power Dissipation

Total Dissipation at 25°C Ambient Temperature (Notes 2 and 3)	0.3 Watt
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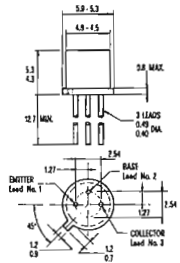
Maximum Voltages

V _{CBO} Collector to Base Voltage	15 Volts
V _{CEs} Collector to Emitter Voltage	11 Volts
V _{CEO} Collector to Emitter Voltage (Note 4)	6.0 Volts
V _{EBO} Emitter to Base Voltage	4.0 Volts

ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

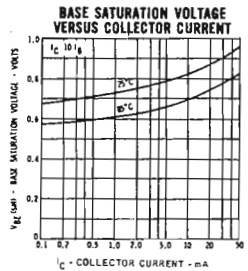
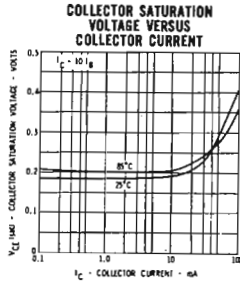
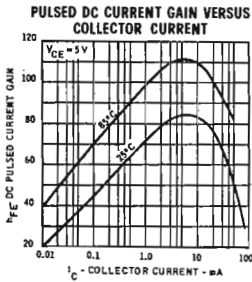
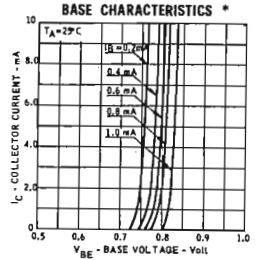
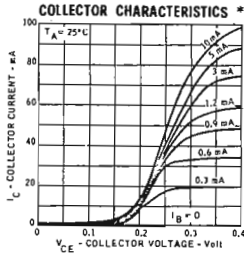
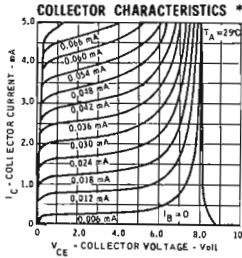
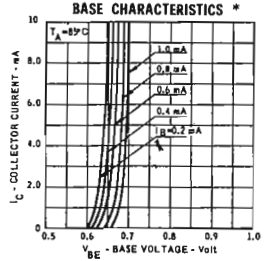
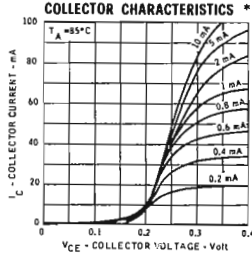
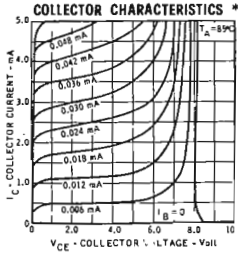
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
h _{FE}	DC Current Gain	15				I _C = 1.0 mA, V _{CE} = 0.4 V
h _{FE}	DC Pulse Current Gain (Note 5)	25	80	125		I _C = 10 mA, V _{CE} = 0.4 V
h _{FE}	DC Pulse Current Gain (Note 5)	15	60			I _C = 30 mA, V _{CE} = 0.4 V
V _{BE} (sat)	Base Saturation Voltage	0.68	0.74	0.85	V	I _C = 1.0 mA, I _B = 0.1 mA
V _{BE} (sat)	Base Saturation Voltage	0.75	0.84	0.95	V	I _C = 10 mA, I _B = 1.0 mA
V _{BE} (sat)	Base Saturation Voltage	0.93	1.3		V	I _C = 30 mA, I _B = 3.0 mA
V _{CE} (sat)	Collector Saturation Voltage	0.18	0.25		V	I _C = 1.0 mA, I _B = 0.1 mA
V _{CE} (sat)	Collector Saturation Voltage	0.19	0.25		V	I _C = 10 mA, I _B = 1.0 mA
V _{CE} (sat)	Collector Saturation Voltage	0.23	0.38		V	I _C = 30 mA, I _B = 3.0 mA
V _{CE} (sat) (85°C)	Collector Saturation Voltage	0.2	0.4		V	I _C = 10 mA, I _B = 1.0 mA
I _{CES}	Collector Reverse Current	4.0	100		nA	V _{CE} = 5.0 V, V _{EB} = 0
I _{CES}	Collector Reverse Current	0.013	10		μA	V _{CE} = 11 V, V _{EB} = 0
I _{CES} (85°C)	Collector Reverse Current	0.2	5.0		μA	V _{CE} = 5.0 V, V _{EB} = 0
BV _{CBO}	Collector to Base Breakdown Voltage	15			V	I _C = 10 μA, I _E = 0
BV _{CES}	Collector to Emitter Breakdown Voltage	11			V	I _C = 10 μA, V _{EB} = 0
BV _{EBO}	Emitter to Base Breakdown Voltage	4.0			V	I _E = 10 μA, I _C = 0
V _{CEO} (sust)	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	6.0			V	I _C = 10 mA, I _B = 0 (pulsed)
h _{fe}	High Frequency Current Gain (f = 100 Mc/s)	6.0	8.0			I _C = 10 mA, V _{CE} = 4.0 V
C _{ob}	Output Capacitance		2.3	3.0	pF	I _E = 0, V _{CB} = 5.0 V, V _{BE} = 0
C _{TE}	Emitter Transition Capacitance		1.7	2.0	pF	I _C = 0, V _{EB} = 0.5 V
τ _s	Charge Storage Time Constant (Note 6)		3.0	6.0	nsec	I _C = I _{B1} = 5.0 mA, I _{B2} = -5.0 mA
t _{on}	Turn On Time (Note 6)			12	nsec	I _C = 10 mA, I _{B1} = 2.0 mA
t _{off}	Turn Off Time (Note 6)			12	nsec	I _C = 10 mA, I _{B1} = 1.0 mA, I _{B2} = -1.0 mA

PHYSICAL DIMENSIONS
in accordance with
JEDEC TO-18 outline



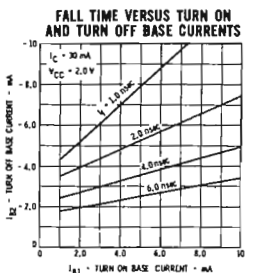
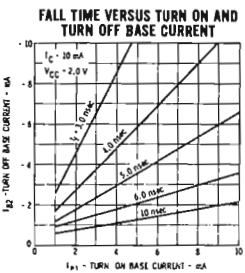
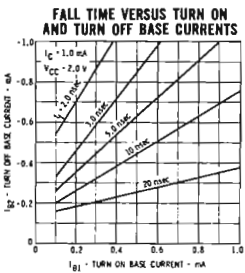
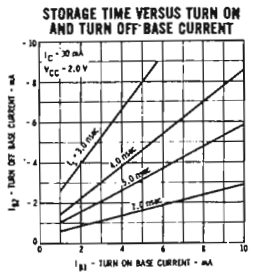
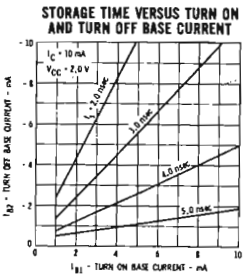
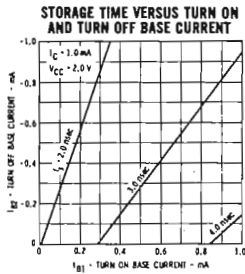
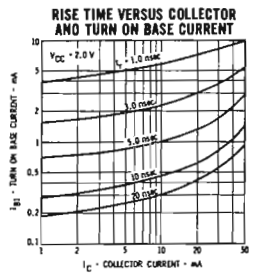
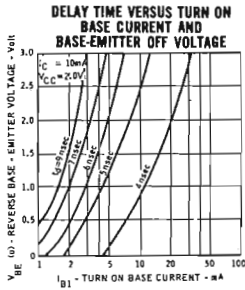
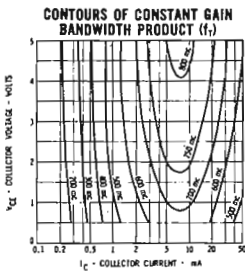
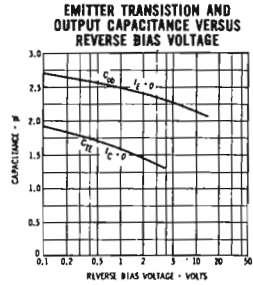
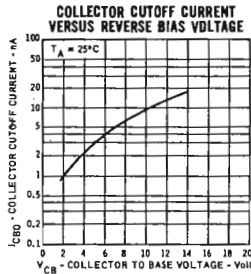
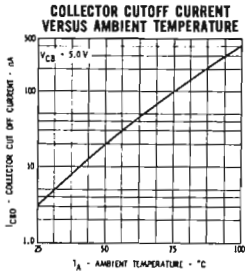
Note: All dimensions in mm.
Collector internally connected to case.
Leads are gold-plated Kovar.

TYPICAL ELECTRICAL CHARACTERISTICS

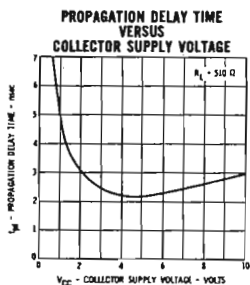
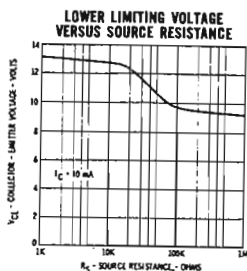
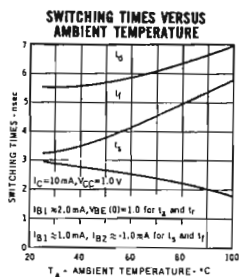
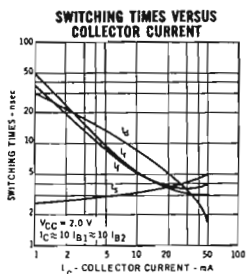


* Single family characteristics on Transistor Curve Tracer.

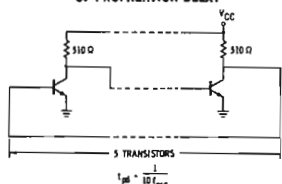
TYPICAL ELECTRICAL CHARACTERISTICS



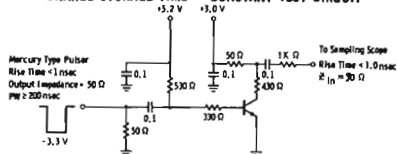
TYPICAL ELECTRICAL CHARACTERISTICS



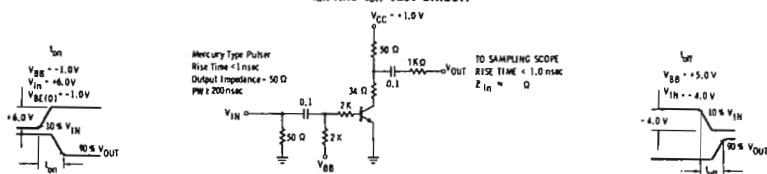
FIVE STAGE RING OSCILLATOR FOR MEASUREMENT OF PROPAGATION DELAY



CHARGE STORAGE TIME - CONSTANT TEST CIRCUIT



t_{ON} AND t_{OFF} TEST CIRCUIT



NOTES:

- (1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
- (2) This is a steady state limit. The factory should be consulted on applications involving pulsed or low duty cycle operation.
- (3) This rating gives a maximum junction temperature of 200°C and junction-to-ambient thermal resistance of 58³°C/watt (derating factor of 1.71 mW/°C).
- (4) Rating refers to a high-current point where collector-to-emitter voltage is lowest. For more information send for SGS Publication AR 5.
- (5) Pulse Conditions: length = 300 μ sec; duty cycle = 1%.
- (6) See switching circuits for exact values of I_C , I_{B1} , and I_{B2} .