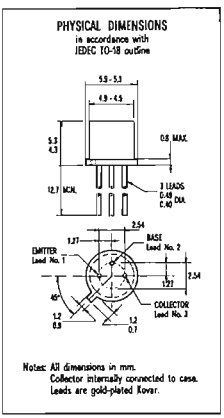
BSX 26

HIGH-SPEED SATURATED SWITCH

NPN DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTOR

GENERAL DESCRIPTION - The BSX 26 is an NPN silicon PLANAR epitaxial transistor designed for memory applications up to 500 milliamperes. It features the unique combination of 350 Mc/s f_T minimum with a guaranteed 300 milliampere collector saturation voltage of 0.5 volt.



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 Case Temperature (Notes 2 and 3)	1.2 Watts
at 100°C Case Temperature (Notes 2 and 3)	0.68 Watt
at 25°C Ambient Temperature (Notes 2 and 3)	0.36 Watt

Maximum Voltages

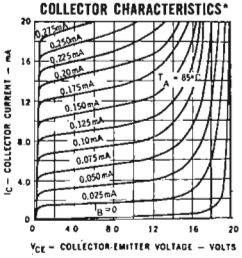
V_{CBO}	Collector to Base Voltage	40 Volts
V_{CES}	Collector to Emitter Voltage	40 Volts
V_{CEO}	Collector to Emitter Voltage	15 Volts
V_{EBO}	Emitter to Base Voltage	4.0 Volts

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

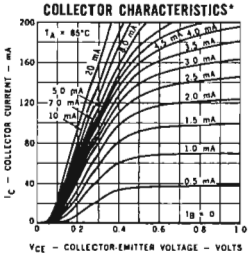
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
h_{FE}	DC Pulse Current Gain (Note 4)	30	60	120		I_C = 30 mA	V_{CE} = 0.4 V
h_{FE}	DC Pulse Current Gain (Note 4)	25	55			I_C = 100 mA	V_{CE} = 0.5 V
h_{FE}	DC Pulse Current Gain (Note 4)	15				I_C = 300 mA	V_{CE} = 1.0 V
V_{BE} (sat)	Base Saturation Voltage	0.75	0.82	0.95	V	I_C = 30 mA	I_B = 3.0 mA
V_{BE} (sat)	Base Saturation Voltage		0.97	1.2	V	I_C = 100 mA	I_B = 10 mA
V_{BE} (sat)	Base Saturation Voltage		1.3	1.7	V	I_C = 300 mA	I_B = 30 mA
V_{CE} (sat)	Collecror Saturation Volrage		0.16	0.18	V	I_C = 30 mA	I_B = 3.0 mA
V_{CE} (sat)	Collector Saturation Voltage		0.18	0.28	V	I_C = 100 mA	I_B = 10 mA
V_{CE} (sat)	Collector Saturation Voltage		0.39	0.5	V	I_C = 300 mA	I_B = 30 mA
V_{CE} (sat)	Collector Saturation Voltage (+85°C)		0.18	0.3	V	I_C = 30 mA	I_B = 3.0 mA
I_{CES}	Collector Reverse Current		0.04	0.5	µA	V_{CE} = 20 V	V_{BE} = 0
I_{CES} (85°C)	Collecror Reverse Current		0.5	15	µA	V_{CE} = 20 V	V_{BE} = 0
BV_{CBO}	Collector to Base Breakdown Voltage	40			V	I_C = 100 µA	I_E = 0
BV_{CES}	Collector to Emitter Breakdown Voltage	40			V	I_C = 100 µA	V_{EB} = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	4.0			V	I_E = 100 µA	I_C = 0
V_{CEO} (sust)	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	15			V	I_C = 10 mA (pulsed)	I_B = 0
h_{fe}	High Frequency Current Gain (f = 100 Mc/s)	3.5	5.5			I_C = 30 mA	V_{CE} = 10 V
C_{ob}	Output Capacitance		3.3	5.0	pF	I_E = 0	V_{CB} = 5.0 V
C_{TE}	Emitter Transition Capacitance		6.5	8.0	pF	I_C = 0	V_{EB} = 0.5 V
τ_s	Charge Storage Time Constant (Note 6)		8.0	18	nsec	$I_C = I_{B1}$ = 10 mA	I_{B2} = -10 mA
t_{on}	Turn On Time (Note 6)		9.0	15	nsec	I_C = 300 mA	I_{B1} = 30 mA
t_{off}	Turn Off Time (Note 6)		15	25	nsec	I_C = 300 mA	I_{B1} = 30 mA I_{B2} = -30 mA

TYPICAL ELECTRICAL CHARACTERISTICS

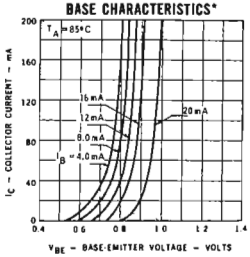
COLLECTOR CHARACTERISTICS*



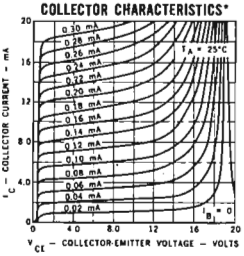
COLLECTOR CHARACTERISTICS*



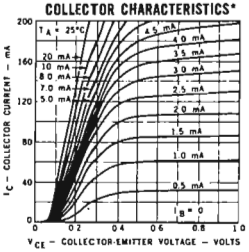
BASE CHARACTERISTICS*



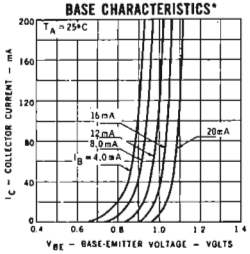
COLLECTOR CHARACTERISTICS*



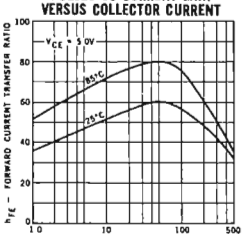
COLLECTOR CHARACTERISTICS*



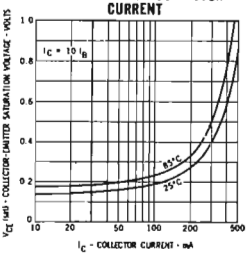
BASE CHARACTERISTICS*



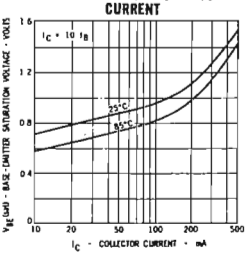
PULSED DC CURRENT GAIN VERSUS COLLECTOR CURRENT



COLLECTOR-EMITTER SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



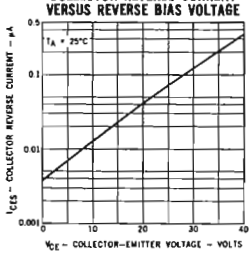
BASE-EMITTER SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



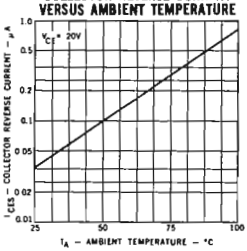
* Single family characteristics on Transistor Curve Tracer.

TYPICAL ELECTRICAL CHARACTERISTICS

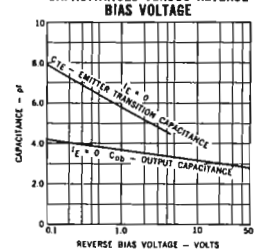
COLLECTOR REVERSE CURRENT VERSUS REVERSE BIAS VOLTAGE



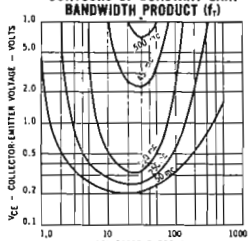
COLLECTOR REVERSE CURRENT VERSUS AMBIENT TEMPERATURE



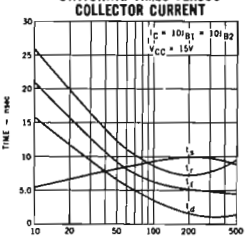
EMITTER TRANSITION AND OUTPUT CAPACITANCES VERSUS REVERSE BIAS VOLTAGE



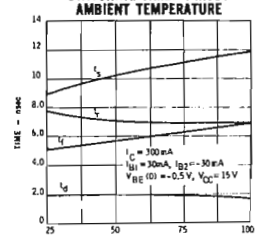
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



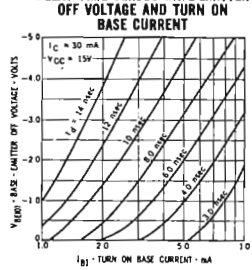
SWITCHING TIMES VERSUS COLLECTOR CURRENT



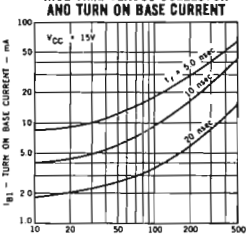
SWITCHING TIMES VERSUS AMBIENT TEMPERATURE



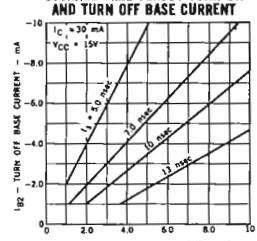
DELAY TIME VERSUS BASE-EMITTER OFF VOLTAGE AND TURN ON BASE CURRENT



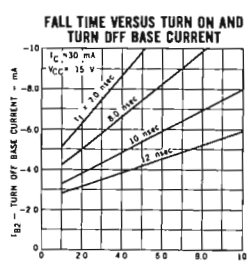
RISE TIME VERSUS COLLECTOR AND TURN ON BASE CURRENT



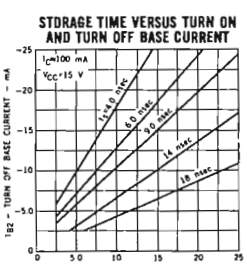
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENT



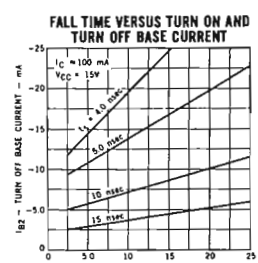
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENT

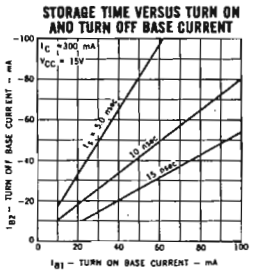


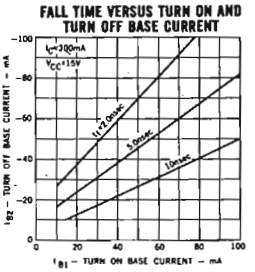
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENT



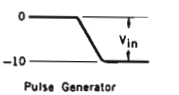
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENT



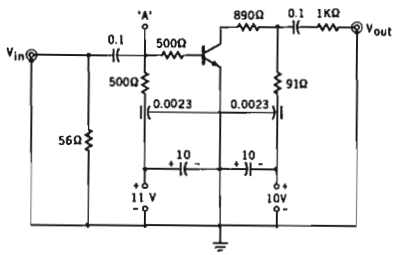


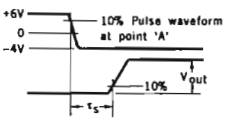


CHARGE STORAGE TIME MEASUREMENT CIRCUIT



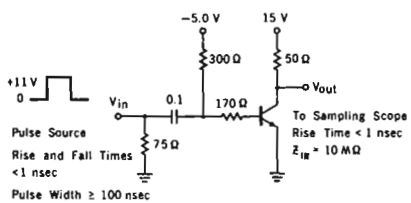
Pulse Generator
Vin Rise Time < 1 nsec
Source Impedance = 50Ω
PW ≥ 300 nsec
Duty Cycle < 2%





To Sampling Oscilloscope
$Z_{IN} \approx 50\,\Omega$
Rise Time ≤ 1 nsec

t_{on}-t_{off} MEASUREMENT CIRCUIT



Pulse Source
Rise and Fall Times <1 nsec
Pulse Width ≥ 100 nsec
Z_{IN} = 50 Ω

To Sampling Scope
Rise Time < 1 nsec
Z_{IN} = 10 MΩ

NOTES:

(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.

(2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

(3) These ratings give a maximum junction temperature of 200°C and junction-to-case thermal resistance of 146°C/watt (derating factor of 6.85 mW/°C). Junction-to-ambient thermal resistance of 486°C/watt (derating factor of 2.06 mW/°C).

(4) Pulse Conditions: length = 300μsec; duty cycle = 1%.

(5) Rating refers to a high-current point where collector-to-emitter voltage is lowest. For more information send for SGS Publication AR 5.

(6) See switching circuits for exact values of I_C, I_{B1}, and I_{B2}.