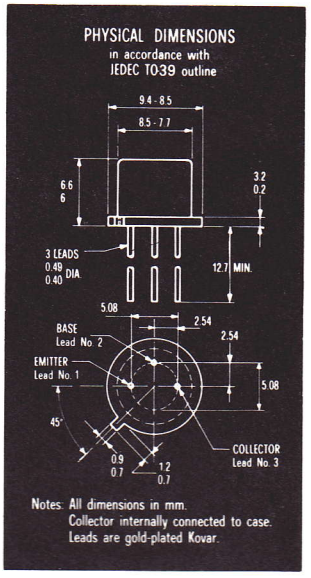
BSW 93

HIGH VOLTAGE, HIGH CURRENT SWITCH

PNP DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTOR

- FAST SWITCHING..... t_{on} = 25ns, t_{off} = 65ns AT 500mA
- LOW SATURATION VOLTAGE..... V_{CEsat} = 0.5V (MAX) AT 500mA
- HIGH FREQUENCY..... f_T = 230MHz (TYP) AT 50mA
- GAIN SPECIFIED.....THREE POINTS 100mA TO 1A



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

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

T_{STG}	Storage Temperature Range	- 55°C to 200°C
T_J	Operating Junction Temperature	200°C
T_L	Lead Temperature (Soldering, 10 s time limit)	260°C

Maximum Power Dissipations (Notes 2 and 3)

P_D	Total Dissipation at 25°C Case Temperature	4 W
	at 25°C Ambient Temperature	1 W

Maximum Voltages and Current (25°C free air temperature)

V_{CBO}	Collector to Base Voltage	-30 V
V_{CEO}	Collector to Emitter Voltage (Note 4)	-30 V
V_{EBO}	Emitter to Base Voltage	-5 V
I_C	Collector Current	1 A

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

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
h_{FE}	DC Current Gain (Note 5)	15	45			I_C = 100 mA	V_{CE} = -1 V
h_{FE}	DC Current Gain (Note 5)	25	50			I_C = 500 mA	V_{CE} = -1 V
h_{FE}	DC Current Gain (Note 5)	25	50			I_C = 1 A	V_{CE} = -5 V
h_{FE} (-55°C)	DC Current Gain (Note 5)	10	30			I_C = 500 mA	V_{CE} = -1 V
V_{BEsat}	Base Saturation Voltage (Note 5)	-0.9	-1.1	V		I_C = 100 mA	I_B = 10 mA
V_{BEsat}	Base Saturation Voltage (Note 5)	-1.1	-1.5	V		I_C = 500 mA	I_B = 50 mA
V_{BEsat}	Base Saturation Voltage (Note 5)	-1.3	-1.9	V		I_C = 1 A	I_B = 100 mA
V_{CEsat}	Collector Saturation Voltage (Note 5)	-0.15	-0.25	V		I_C = 100 mA	I_B = 10 mA
V_{CEsat}	Collector Saturation Voltage (Note 5)	-0.25	-0.5	V		I_C = 500 mA	I_B = 50 mA
V_{CEsat}	Collector Saturation Voltage (Note 5)	-0.4	-0.95	V		I_C = 1 A	I_B = 100 mA
I_{CES}	Collector Reverse Current	10	100	nA		V_{CE} = -20 V	V_{EB} = 0
I_{CES} (100°C)	Collector Reverse Current	1.5	15	μA		V_{CE} = -20 V	V_{EB} = 0
BV_{CBO}	Collector to Base Breakdown Voltage	-30		V		I_C = 100 μA	I_E = 0

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SGS FAIRCHILD

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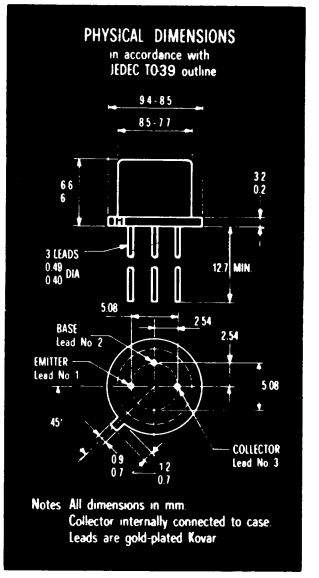
- o FAST SWITCHING..... t_{on} = 25ns, t_{off} = 65ns AT 500mA
- o LOW SATURATION VOLTAGE..... V_{CEsat} = 0.5V (MAX) AT 500mA
- o HIGH FREQUENCY..... f_T = 230MHz (TYP) AT 50mA
- o GAIN SPECIFIED.....THREE POINTS 100mA TO 1A



ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

T_{STG}	Storage Temperature Range	- 55°C to 200°C
T_J	Operating Junction Temperature	200°C
T_L	Lead Temperature (Soldering, 10 s time limit)	260°C

Maximum Power Dissipations (Notes 2 and 3)

P_D	Total Dissipation at 25°C Case Temperature	4 W
	at 25°C Ambient Temperature	1 W

Maximum Voltages and Current (25°C free air temperature)

V_{CBO}	Collector to Base Voltage	-30 V
V_{CEO}	Collector to Emitter Voltage (Note 4)	-30 V
V_{EBO}	Emitter to Base Voltage	-5 V
I_C	Collector Current	1 A

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

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
h_{FE}	DC Current Gain (Note 5)	15	45			I_C = 100 mA	V_{CE} = -1 V
h_{FE}	DC Current Gain (Note 5)	25	50			I_C = 500 mA	V_{CE} = -1 V
h_{FE}	DC Current Gain (Note 5)	25	50			I_C = 1 A	V_{CE} = -5 V
h_{FE} (-55°C)	DC Current Gain (Note 5)	10	30			I_C = 500 mA	V_{CE} = -1 V
V_{BEsat}	Base Saturation Voltage (Note 5)	-0.9	-1.1	V		I_C = 100 mA	I_B = 10 mA
V_{BEsat}	Base Saturation Voltage (Note 5)	-1.1	-1.5	V		I_C = 500 mA	I_B = 50 mA
V_{BEsat}	Base Saturation Voltage (Note 5)	-1.3	-1.9	V		I_C = 1 A	I_B = 100 mA
V_{CEsat}	Collector Saturation Voltage (Note 5)	-0.15	-0.25	V		I_C = 100 mA	I_B = 10 mA
V_{CEsat}	Collector Saturation Voltage (Note 5)	-0.25	-0.5	V		I_C = 500 mA	I_B = 50 mA
V_{CEsat}	Collector Saturation Voltage (Note 5)	-0.4	-0.95	V		I_C = 1 A	I_B = 100 mA
I_{CES}	Collector Reverse Current	10	100	nA		V_{CE} = -20 V	V_{EB} = 0
I_{CES} (100°C)	Collector Reverse Current	1.5	15	μA		V_{CE} = -20 V	V_{EB} = 0
BV_{CBO}	Collector to Base Breakdown Voltage	-30		V		I_C = 100 μA	I_E = 0

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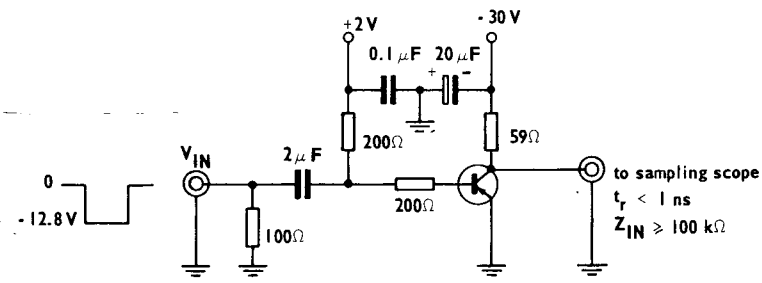
BSW 93 SGS-Fairchild Silicon Planar Transistor

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

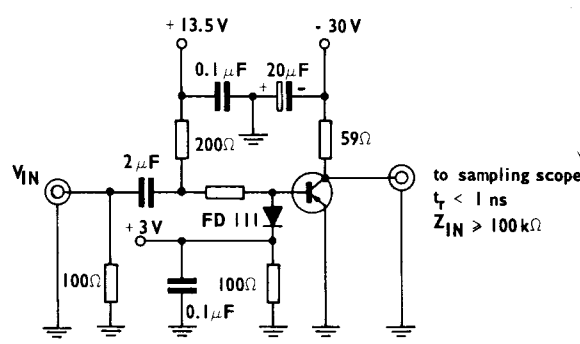
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
BV_{EBO}	Emitter to Base Breakdown Voltage	-5			V	I_E = 100 μA, I_C = 0
LV_{CEO}	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	-30			V	I_C = 10 mA, I_B = 0
h_{fe}	High Frequency Current Gain	1.5	2.3			I_C = 50 mA, V_{CE} = -10 V, f = 100 MHz
C_{TE}	Emitter Transition Capacitance		80	100	pF	I_C = 0, V_{EB} = -0.5 V, f = 1 MHz
C_{obo}	Base-Collector Capacitance		20	25	pF	I_E = 0, V_{CB} = -10 V, f = 1 MHz
t_{on}	Turn On Time (Note 6)		25	50	ns	$I_C \approx$ 500 mA, $I_{B1} \approx$ 50 mA
t_{off}	Turn Off Time (Note 6)		65	100	ns	$I_C \approx$ 500 mA, $I_{B1} \approx$ 50 mA, $I_{B2} \approx$ 50 mA

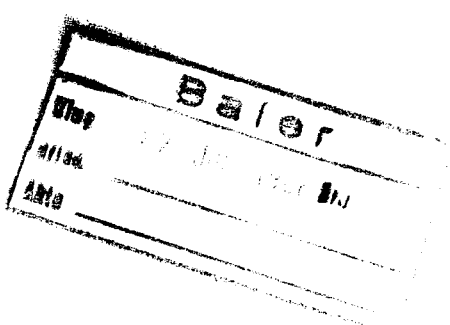
t_{on} TEST CIRCUIT



t_r ≤ 1 ns
PW = 250 ns
Z = 50 Ω
Duty cycle < 2%

t_{off} TEST CIRCUIT





0
-20 V

PW = 2 μs
t_r, t_f ≤ 5.5 ns
Z = 50Ω
Duty Cycle < 2%

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 43.8°C/W (derating factor of 22.8 mW/°C); junction-to-ambient thermal resistance of 175°C/W (derating factor of 5.7 mW/°C).

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

(5) Measured under pulse conditions: pulse length = 300 μsec; duty cycle = 1%.

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