

High-speed saturated switch

The BSV 59 is an NPN double-diffused silicon planar epitaxial transistor designed primarily for high-speed switching applications at collector currents up to 500 mA. This is excellent driver, featuring 20 nano second transition times for rod and magnetic memory, clock driver for magnetic logic circuits, and general purpose circuitry. This device is also useful as high frequency DC to DC converter.

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted)

Symbol	Characteristic and test conditions	Min.	Typ.	Max.	Unit
h _{FE}	DC Current Gain (5)				
	I _C = 50 mA V _{CE} = 10 V		60		
	I _C = 150 mA V _{CE} = 10 V	30	60	140	
	I _C = 500 mA V _{CE} = 10 V	20	50		
	I _C = 500 mA V _{CE} = 1 V	10	30		
V _{BE sat}	Base Saturation Voltage (5)				
	I _C = 150 mA I _B = 15 mA	0.85	1.2		V
	I _C = 500 mA I _B = 50 mA	1.12	1.6		V
	I _C = 60 mA I _B = 5 mA	0.78			V
V _{CE sat}	Collector Saturation Voltage (5)				
	I _C = 150 mA I _B = 15 mA	0.22	0.4		V
	I _C = 500 mA I _B = 50 mA	0.48	1		V
	I _C = 50 mA I _B = 5 mA	0.16			V
I _{CBO}	Collector Reverse Current				
	V _{CB} = 30 V I _E = 0	40	200		nA
BV _{CBO}	Collector to Base Breakdown Voltage				
	V _{CB} = 30 V I _E = 0	20	200		μA
BV _{EBO}	Collector to Base Breakdown Voltage				
	I _C = 0.1 mA I _E = 0	60			V
LV _{EBO}	Emitter to Base Breakdown Voltage				
	I _E = 0.1 mA I _C = 0	5			V
LV _{CEO}	Collector to Emitter Sustaining Voltage (4 and 5)				
	I _C = 30 mA I _B = 0	30			V
h _{fe}	High Freq. Current Gain				
	I _C = 50 mA V _{CE} = 10 V f = 100 MHz	2.5	3.5		
C _{TE}	Emitter Transition Capacitance				
	I _C = 0 V _{EB} = 0.5 V f = 1 MHz	38			pF
C _{obo}	Base-Collector Capacitance				
	I _E = 0 V _{CB} = 10 V f = 1 MHz	8	8		pF
t _{on}	Turn On Time (6)				
	I _C = 150 mA I _{B1} = 15 mA	18	40		ns
t _{off}	Turn Off Time (6)				
	I _C = 150 mA I _{B1} = 15 mA I _{B2} = 15 mA	25	40		ns

NOTES:

- These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
- These ratings give a maximum junction temperature of 200°C and junction - to - case thermal resistance of 146°C/W (derating factor of 6.9 mW/°C); junction - to - ambient thermal resistance of 486°C/W (derating factor of 2.1 mW/°C).
- These ratings refer to a high - current point where collector - to - emitter voltage is lowest. For more information send for SGS-AR 5.
- Measured under pulse conditions: pulse length = 300 μsec; duty cycle = 1%.
- See switching circuits for exact values of I_C, I_{B1} and I_{B2}.

ABSOLUTE MAXIMUM RATINGS (1)

(T_A = 25°C unless otherwise noted)

Voltages

Collector to Base	V _{CBO}	60 V
Collector to Emitter (4)	V _{CEO}	30 V
Emitter to Base	V _{EBO}	5 V

Temperatures

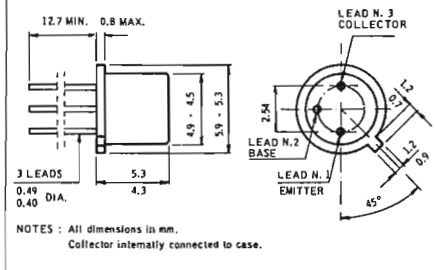
Storage Temperature Range	T _{STG}	- 55°C to 200°C
Junction Temperature	T _J	200°C
Lead Temperature (Soldering, 10 sec. time limit)	T _L	260°C

Power (2 - 3)

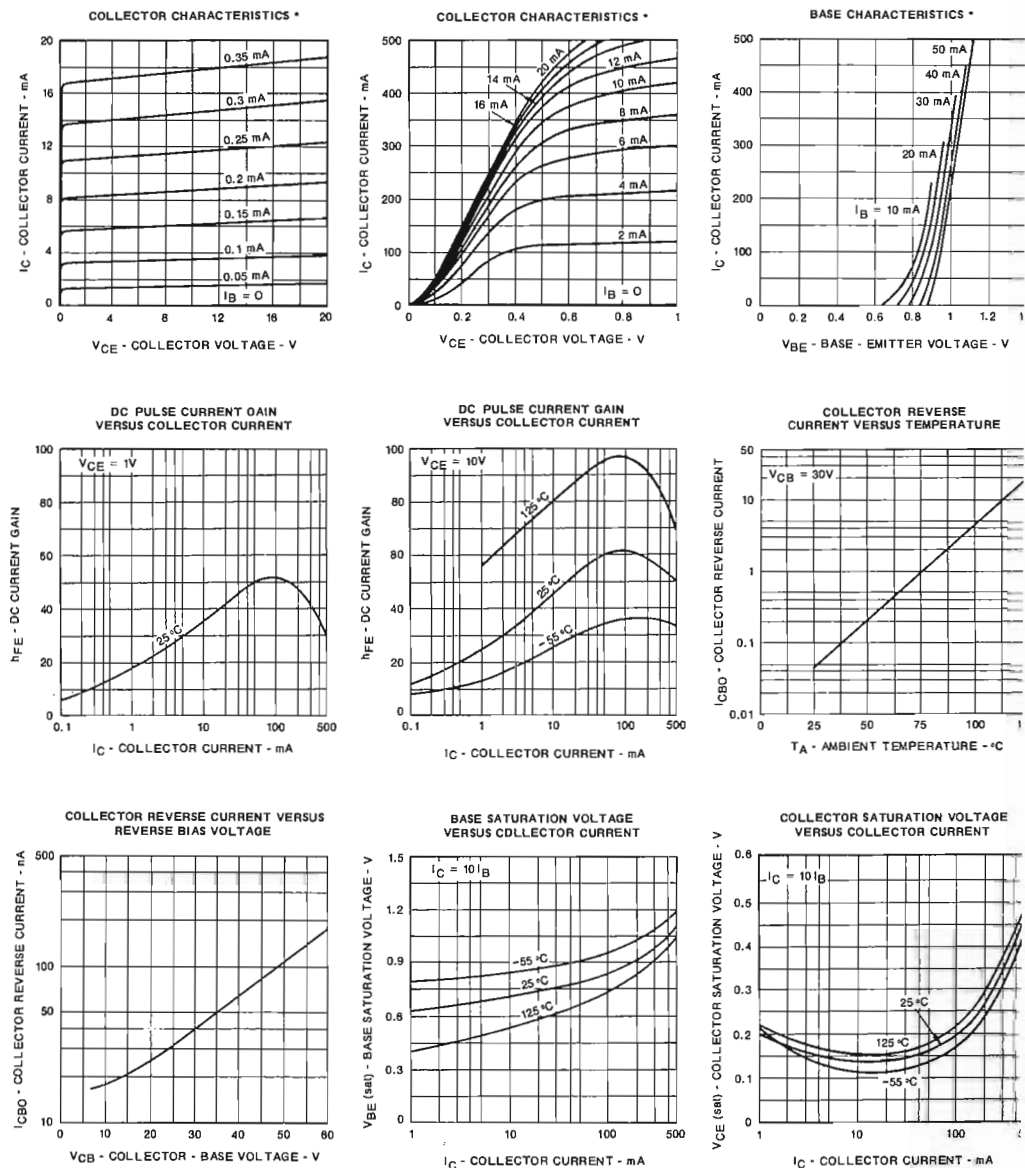
Dissipation at 25°C		
Case Temperature	P _D	1.2 W
Dissipation at 100°C		
Case Temperature	P _D	0.68 W
Dissipation at 25°C		
Ambient Temperature	P _D	0.36 W

PHYSICAL DIMENSIONS

In accordance with JEDEC TO-18 outline

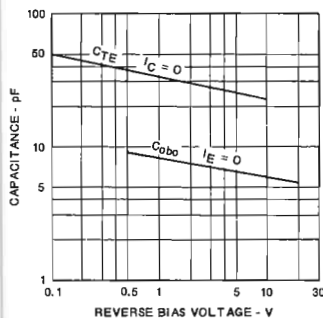
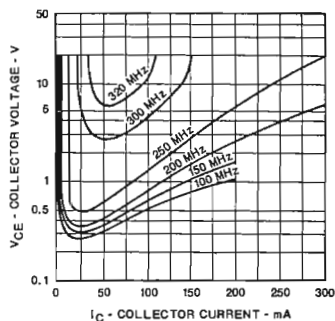
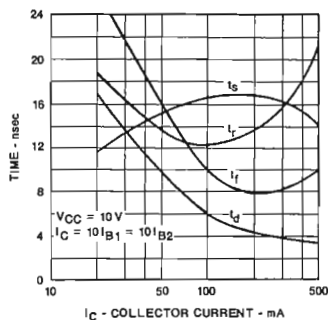
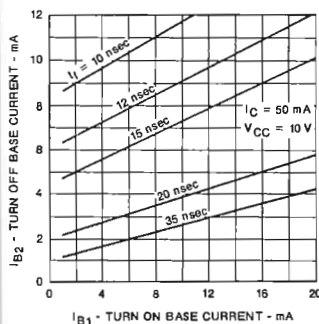
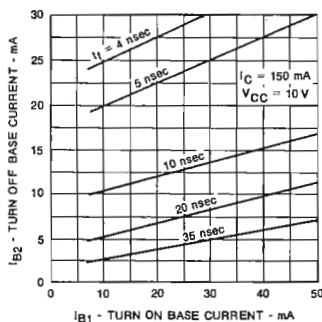
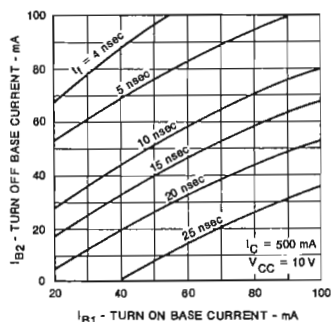
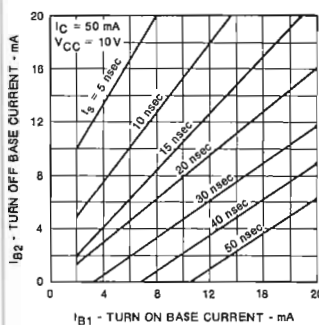
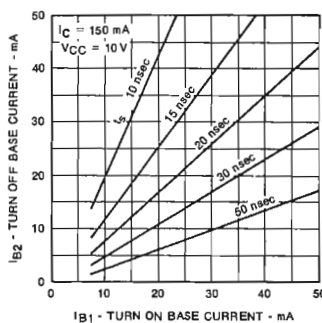
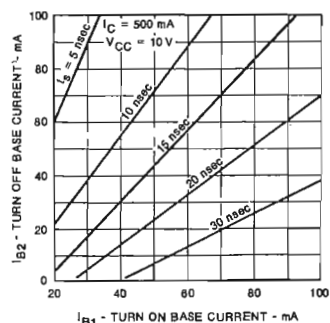


TYPICAL ELECTRICAL CHARACTERISTICS (25° C free air temperature unless otherwise noted)

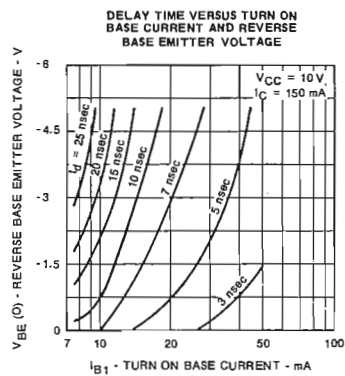
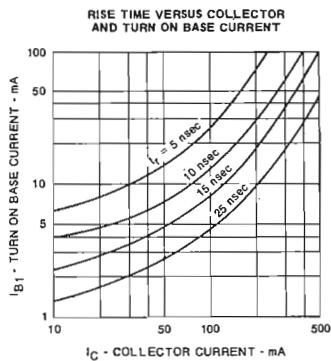
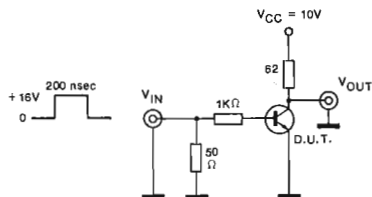


* Single family characteristics on Transistor Curve Tracer.

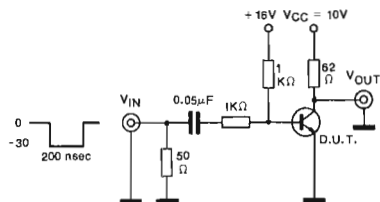
TYPICAL ELECTRICAL CHARACTERISTICS (25° C free air temperature unless otherwise noted)

INPUT AND OUTPUT CAPACITANCE
VERSUS REVERSE BIAS VOLTAGECONTOURS OF CONSTANT GAIN
BANDWIDTH PRODUCT (f_T)SWITCHING TIMES VERSUS
COLLECTOR CURRENTFALL TIME VERSUS TURN ON
AND TURN OFF BASE CURRENTFALL TIME VERSUS TURN ON
AND TURN OFF BASE CURRENTFALL TIME VERSUS TURN ON
AND TURN OFF BASE CURRENTSTORAGE TIME VERSUS TURN ON
AND TURN OFF BASE CURRENTSTORAGE TIME VERSUS TURN ON
AND TURN OFF BASE CURRENTSTORAGE TIME VERSUS TURN ON
AND TURN OFF BASE CURRENT

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

**T_{on}** TEST CIRCUIT

Rise Time of input pulse <2 nsec.

T_{off} TEST CIRCUIT

Rise Time of input pulse <2 nsec.