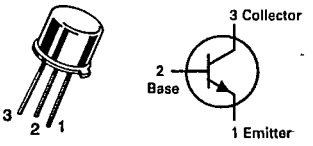
BSX59
BSX60

CASE 79-04, STYLE 1
TO-39 (TO-205AD)



SWITCHING TRANSISTORS

NPN SILICON

3

Refer to 2N3725 for graphs.

MAXIMUM RATINGS

Rating	Symbol	BSX 59	BSX 60	Unit
Collector-Emitter Voltage	V_{CEO}	45	30	Vdc
Collector-Emitter Voltage	V_{CES}	60	60	Vdc
Collector-Base Voltage	V_{CBO}	70	70	Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current – Continuous	I_C	1		Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.8 4.57		Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	3.5 20		Watt mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		°C

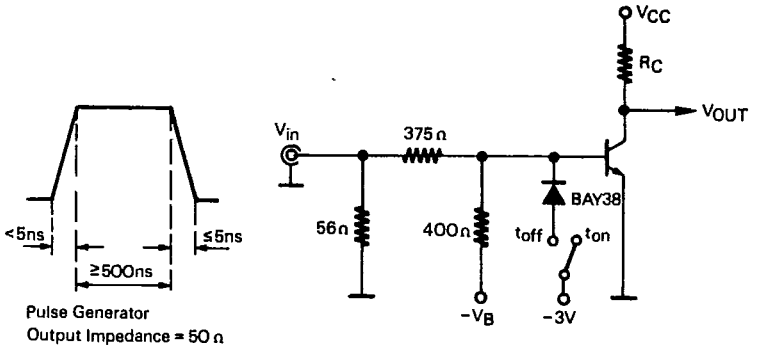
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	[BSX59] [BSX60]	$V_{(BR)CEO}$	45 30		V
Collector-Base Breakdown Voltage (I_C = 10 μA, I_E = 0)		$V_{(BR)CBO}$	70		V
Collector Cutoff Current (V_{CB} = 40 V, I_E = 0) (V_{CB} = 40 V, I_E = 0, T_J = 150°C)		I_{CBO}		500 300	nA μA
Emitter Cutoff Current (V_{EB} = 4.0 V, I_C = 0) (V_{EB} = 4.0 V, I_E = 0, T_J = 150°C)		I_{EBO}		300 50	nA μA
Collector Cutoff Current (V_{CE} = 40 V, $-V_{BE}$ = 4.0 V) (V_{CE} = 40 V, $-V_{BE}$ = 4.0 V, T_J = 150°C)		I_{CEX}		500 300	nA μA
Emitter Cutoff Current (V_{CE} = 40 V, $-V_{BE}$ = 4.0 V) (V_{CE} = 40 V, $-V_{BE}$ = 4.0 V, T_J = 150°C)		I_{BEX}		500 300	nA μA
ON CHARACTERISTICS					
Collector-Emitter Saturation Voltage (I_C = 150 mA, I_B = 15 mA) (I_C = 500 mA, I_B = 50 mA) (I_C = 1.0 A, I_B = 100 mA)		$V_{CE(sat)}$		0.3 0.5 1.0	V
Base-Emitter Saturation Voltage (I_C = 150 mA, I_B = 15 mA) (I_C = 500 mA, I_B = 50 mA) (I_C = 1.0 A, I_B = 100 mA)	 [BSX59] [BSX60] 	$V_{BE(sat)}$		 1.0 1.2 1.3 1.8	V
DC Current Gain (I_C = 150 mA, V_{CE} = 1.0 V) (I_C = 500 mA, V_{CE} = 1.0 V) (I_C = 1.0 A, V_{CE} = 5.0 V)	 [BSX59] [BSX60] [BSX59] [BSX60]	h_{FE}	 30 25 30 20 25	 90 	
SMALL SIGNAL CHARACTERISTICS					
Small Signal Current Gain (I_C = 50 mA, V_{CE} = 10 V, f = 100 MHz)		h_{fe}	2.5		
Input Capacitance ($-V_{BE}$ = 0.5 V, I_C = 0, f = 1.0 MHz)		C_{ib}		60	pF

ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
Output Capacitance (V_{CB} = 10 V, I_E = 0, f = 1.0 MHz)	C_{ob}		10	pF
Turn On Time (See Figure 1) (I_C = 500 mA, I_B = 50 mA, $-V_{BE}$ = 2.0 V)	t_{on}			ns
(V_{CC} = 50 V) [BSX59]			35	
(V_{CC} = 30 V) [BSX60]			40	
Turn Off Time (See Figure 1) (I_C = 500 mA, I_{B1} = I_{B2} = 50 mA)	T_{off}			ns
(V_{CC} = 50 V) [BSX59]			60	
(V_{CC} = 30 V) [BSX60]			70	

FIGURE 1 — SWITCHING TIME TEST CIRCUIT



Measurement		BSX59 BSX61	BSX60	
	V_{CC}	50	30	V
	R_C	100	60	Ω
t_{on}	$-V_B$	4.0		V
	V_{in}	24.75		V
t_{off}	$-V_B$	16.7		V
	V_{in}	37.5		V