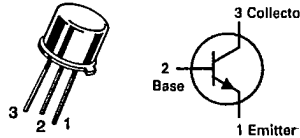


BSX59
BSX60CASE 79-04, STYLE 1
TO-39 (TO-205AD)**SWITCHING TRANSISTORS**

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	BSX 59	BSX 60	Unit
Collector-Emitter Voltage	V _{CEO}	45	30	V _{dc}
Collector-Emitter Voltage	V _{CES}	60	60	V _{dc}
Collector-Base Voltage	V _{CBO}	70	70	V _{dc}
Emitter-Base Voltage	V _{EBO}	5.0		V _{dc}
Collector Current - Continuous	I _C	1		A _{dc}
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

Refer to 2N3725 for graphs.

3

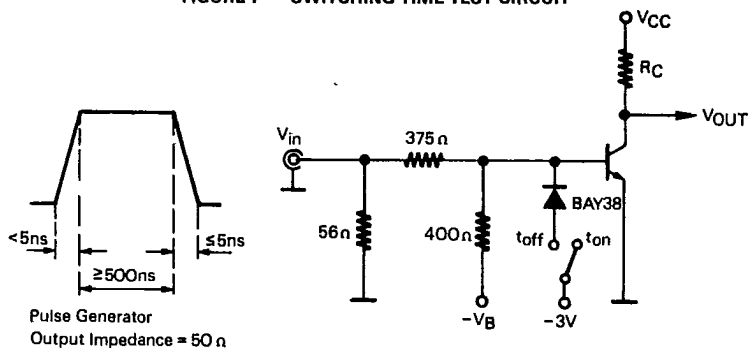
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (I _C = 10 mA, I _B = 0)	V _{(BR)CEO}	45		V
	[BSX59]	30		
	[BSX60]			
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)	I _{CBO}		500	nA
(V _{CB} = 40 V, I _E = 0, T _J = 150°C)			300	μA
Emitter Cutoff Current (V _{EB} = 4.0 V, I _C = 0)	I _{EBO}		300	nA
(V _{EB} = 4.0 V, I _E = 0, T _J = 150°C)			50	μA
Collector Cutoff Current (V _{CE} = 40 V, -V _{BE} = 4.0 V)	I _{CEX}		500	nA
(V _{CE} = 40 V, -V _{BE} = 4.0 V, T _J = 150°C)			300	μA
Emitter Cutoff Current (V _{CE} = 40 V, -V _{BE} = 4.0 V)	I _{BEX}		500	nA
(V _{CE} = 40 V, -V _{BE} = 4.0 V, T _J = 150°C)			300	μA
ON CHARACTERISTICS				
Collector-Emitter Saturation Voltage (I _C = 150 mA, I _B = 15 mA)	V _{CE(sat)}		0.3	V
(I _C = 500 mA, I _B = 50 mA)			0.5	
(I _C = 1.0 A, I _B = 100 mA)			1.0	
Base-Emitter Saturation Voltage (I _C = 150 mA, I _B = 15 mA)	V _{BE(sat)}		1.0	V
(I _C = 500 mA, I _B = 50 mA)	[BSX59]		1.2	
	[BSX60]		1.3	
(I _C = 1.0 A, I _B = 100 mA)			1.8	
DC Current Gain (I _C = 150 mA, V _{CE} = 1.0 V)	h _{FE}	30		
(I _C = 500 mA, V _{CE} = 1.0 V)	[BSX59]	25		
	[BSX60]	30	90	
(I _C = 1.0 A, V _{CE} = 5.0 V)	[BSX59]	20		
	[BSX60]	25		
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) ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

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

FIGURE 1 — SWITCHING TIME TEST CIRCUIT



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

