BSX20

CASE 22-03, STYLE 1
TO-18 (TO-206AA)

TRANSISTOR

NPN SILICON

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MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	15	Vdc
Collector-Emitter Voltage (R_{BE} = 10 Ohms)	V_{CER}	20	Vdc
Collector-Base Voltage	V_{CBO}	40	Vdc
Emitter-Base Voltage	V_{EBO}	4.5	Vdc
Collector Current – Continuous	I_C		mAmp
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	360 2.06	mWatt mW/°C
Total Device Dissipation @ T_C = 25°C T_C = 100°C Derate above 25°C	P_D	1.2 6.85	Watt mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	146	°C/W

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) (I_C = 10 mAdc, R_{BE} = 10 Ω)	$V_{(BR)CEO}$ $V_{(BR)CER}$	15 20		Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	4.5		Vdc
Collector Cutoff Current (V_{CB} = 20 Vdc, I_E = 0) (V_{CB} = 20 Vdc, I_E = 0, T_j = 150°C)	I_{CBO}		400 30	nAdc μAdc
Collector Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = 0, T_j = 55°C) (V_{CE} = 40 Vdc, V_{BE} = 0)	I_{CES}		0.4 1.0	μAdc
Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = −3 V, T_j = 55°C)	I_{CEX} I_{BEX}		0.6 0.6	μAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 10 mAdc, V_{CE} = 1 Vdc) (I_C = 10 mAdc, V_{CE} = 1 Vdc, T_j = −55°C) (I_C = 100 mAdc, V_{CE} = 2 Vdc)	h_{FE}	40 20 10	120	
Base-Emitter On Voltage (I_C = 30 μAdc, V_{CE} = 20 Vdc, T_j = 100°C)	$V_{BE(on)}$		0.35	Vdc
Emitter-Collector Saturation Voltage (I_C = 10 mAdc, I_B = 0.3 mAdc) (I_C = 10 mAdc, I_B = 1 mAdc) (I_C = 100 mAdc, I_B = 10 mAdc)	$V_{CE(sat)}$		0.3 0.25 0.60	Vdc
Emitter-Base Saturation Voltage (I_C = 10 mAdc, I_B = 1 mAdc) (I_C = 100 mAdc, I_B = 10 mAdc)	$V_{BE(sat)}$	0.7	0.85 1.50	Vdc

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

Characteristic	Symbol	Min	Max	Unit
SMALL SIGNAL CHARACTERISTICS				
Current Gain Bandwidth Product (I_C = 10 mA, V_{CE} = 10 V)	f_T	500		MHz
Output Capacitance (V_{CB} = 5 V, I_E = 0, f = 1 MHz)	C_{obo}		4	pF
Input Capacitance (V_{EB} = 1 V, I_C = o, f = 1 MHz)	C_{ibo}		4.5	pF
Time (I_C = 10 mA, I_{B1} = I_{B2} = 10 mA)	t_s		13	ns
Turn-On Time (I_C = 10 mA, I_{B1} = 3 mA) (I_C = 100 mA, I_{B1} = 40 mA)	t_{on}		12 7	ns
Turn-Off Time (I_C = 10 mA, I_{B1} = 3 mA, I_{B2} = − 1.5 mA) (I_C = 100 mA, I_{B1} = 40 mA, I_{B2} = − 20 mA)	t_{off}		18 21	ns