High Voltage Transistors

NPN Silicon

COLLECTOR
3

2
BASE

1
EMITTER
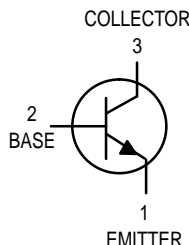
BSS71
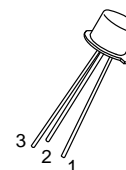
CASE 22–03, STYLE 1
TO–18 (TO–206AA)

3 2 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	200	Vdc
Collector–Base Voltage	V_{CBO}	200	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	Vdc
Collector Current — Continuous	I_C	0.5	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.5 2.86	Watts mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	2.5 14.3	Watts 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	$R_{\theta JC}$	70	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)[1]	$V_{(BR)CEO}$	200	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	$V_{(BR)CBO}$	200	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	$V_{(BR)EBO}$	6.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 150 Vdc, I_E = 0)	I_{CBO}	—	—	50	nAdc
Collector–Emitter Cutoff Current (V_{CE} = 150 Vdc, I_B = 0)	I_{CEO}	—	—	500	nAdc
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)	I_{EBO}	—	—	50	nAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 0.1 mAdc, V_{CE} = 1.0 Vdc) (I_C = 1.0 mAdc, V_{CE} = 10 Vdc) (I_C = 10 mAdc, V_{CE} = 10 Vdc)[1] (I_C = 30 mAdc, V_{CE} = 10 Vdc)[1]	h_{FE}	 20 30 50 40	 40 45 120 140	 — — — 250	—
Collector–Emitter Saturation Voltage[1] (I_C = 10 mAdc, I_B = 1.0 mAdc) (I_C = 30 mAdc, I_B = 3.0 mAdc) (I_C = 50 mAdc, I_B = 5.0 mAdc)	$V_{CE(sat)}$	 — — —	 0.15 0.25 0.35	 0.3 0.4 0.5	Vdc
Base–Emitter Saturation Voltage[1] (I_C = 10 mAdc, I_B = 1.0 mAdc) (I_C = 30 mAdc, I_B = 3.0 mAdc) (I_C = 50 mAdc, I_B = 5.0 mAdc)	$V_{BE(sat)}$	 — — —	 0.7 0.8 0.85	 0.8 0.9 1.0	Vdc

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

REV 1

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

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Current–Gain — Bandwidth Product (I_C = 20 mAdc, V_{CE} = 20 Vdc, f = 20 MHz)	f_t	50	70	200	MHz
Output Capacitance (I_E = 0, V_{CB} = 20 Vdc, f = 1.0 MHz)	C_{ob}	—	3.5	—	pF
Input Capacitance (I_C = 0, V_{EB} = 0.5 Vdc, f = 1.0 MHz)	C_{ib}	—	45	—	pF
Turn–On Time (I_{B1} = 10 mAdc, I_C = 50 mAdc, V_{CC} = 100 Vdc)	t_{on}	—	100	—	ns
Turn–Off Time (I_{B2} = 10 mAdc, I_C = 50 mAdc, V_{CC} = 100 Vdc)	t_{off}	—	400	—	ns
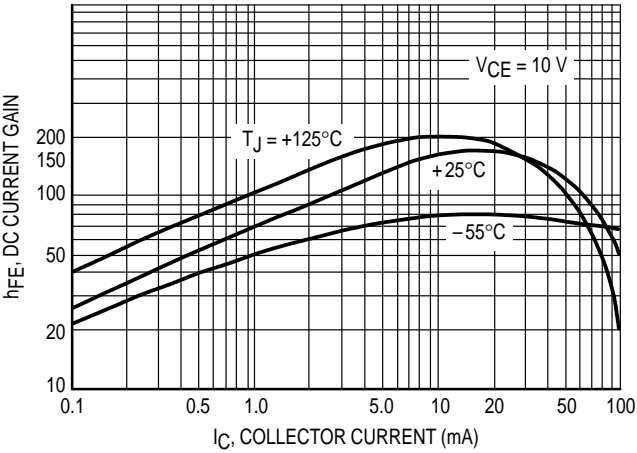
Figure 1. DC Current Gain
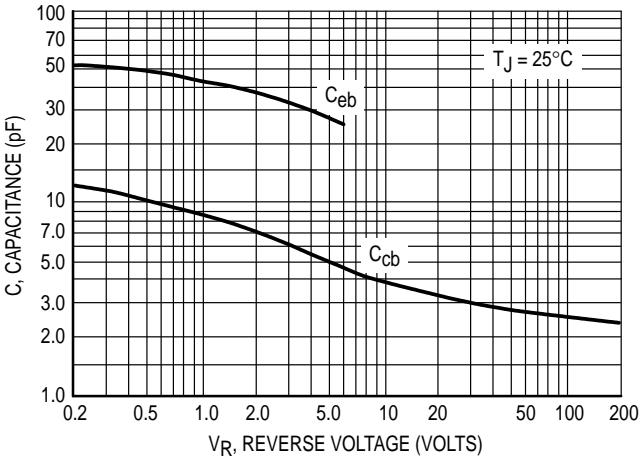
Figure 2. Capacitances
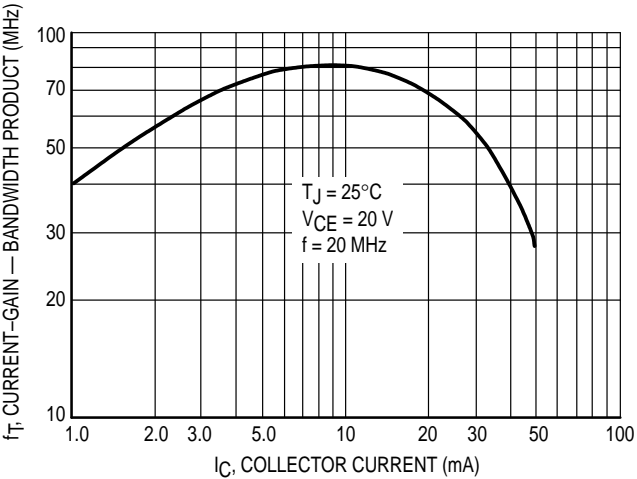
Figure 3. Current–Gain — Bandwidth Product
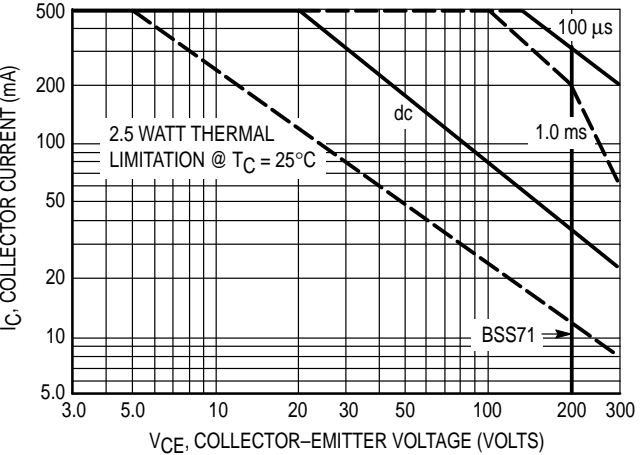
Figure 4. Active–Region Safe Operating Area
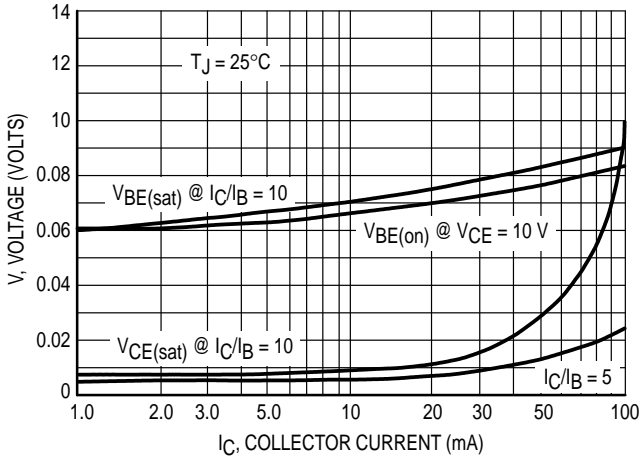
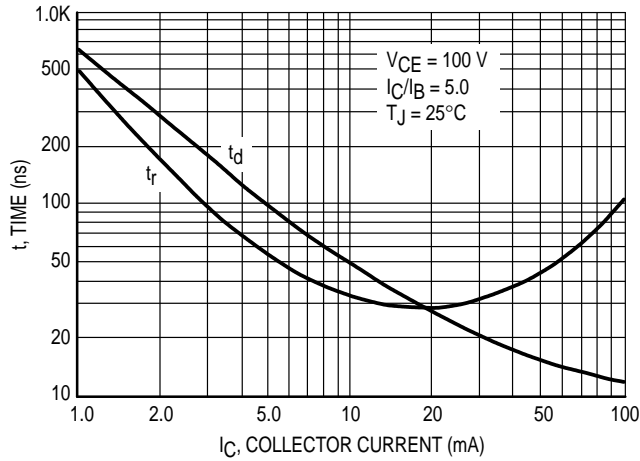Figure 5. "On" Voltages
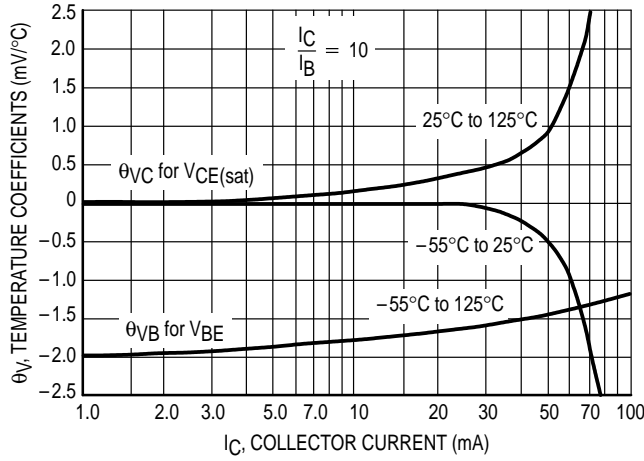
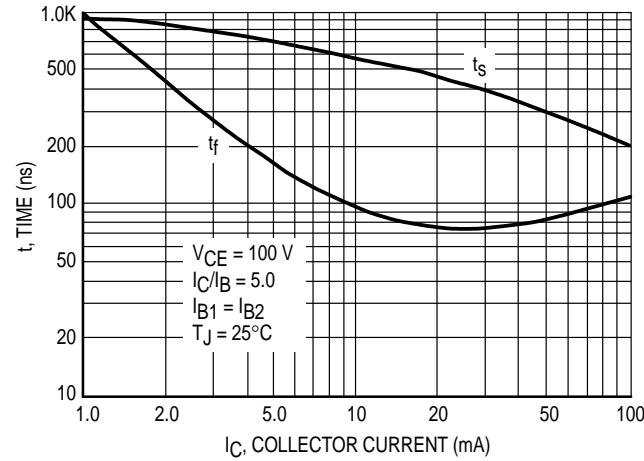Figure 6. Temperature Coefficients

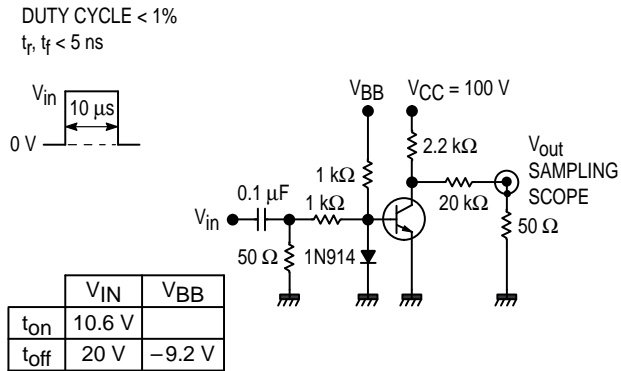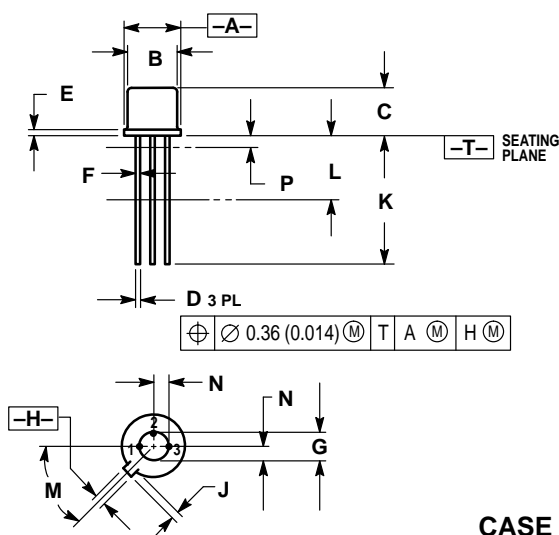Figure 7. Turn–On Time

Figure 8. Turn–Off Time

DUTY CYCLE < 1%
t_r, t_f < 5 ns

	V_{IN}	V_{BB}
t_{on}	10.6 V	
t_{off}	20 V	−9.2 V

Figure 9. Switching Time Test Circuit

PACKAGE DIMENSIONS

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION J MEASURED FROM DIMENSION A MAXIMUM.
4. DIMENSION F APPLIES BETWEEN DIMENSION P AND L. DIMENSION D APPLIES BETWEEN DIMENSION L AND K MINIMUM. LEAD DIAMETER IS UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.
5. DIMENSION E INCLUDES THE TAB THICKNESS. (TAB THICKNESS IS 0.51(0.002) MAXIMUM).

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.209	0.230	5.31	5.84
B	0.178	0.195	4.52	4.95
C	0.170	0.210	4.32	5.33
D	0.016	0.021	0.406	0.533
E	—	0.030	—	0.762
F	0.016	0.019	0.406	0.483
G	0.100 BSC		2.54 BSC	
H	0.036	0.046	0.914	1.17
J	0.028	0.048	0.711	1.22
K	0.500	—	12.70	—
L	0.250	—	6.35	—
M	45°BSC		45°BSC	
N	0.050 BSC		1.27 BSC	
P	—	0.050	—	1.27

CASE 22–03
(TO–206AA)
ISSUE R

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