

# High Voltage Transistor

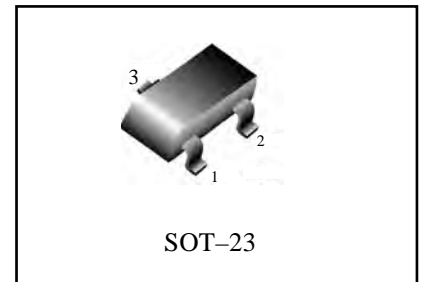
## PNP Silicon

### FEATURE

- High voltage.
- For Telephony or Professional communication equipment applications.
- We declare that the material of product compliance with RoHS requirements.

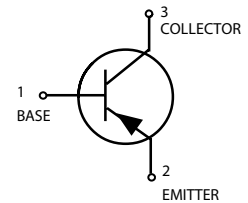
### DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
MMBTA92	2D	3000/Tape&Reel
MMBTA93	2E	3000/Tape&Reel



### MAXIMUM RATINGS

Rating	Symbol	Value		Unit
		MMBTA92	MMBTA93	
Collector-Emitter Voltage	$V_{CEO}$	-300	-200	Vdc
Collector-Base Voltage	$V_{CBO}$	-300	-200	Vdc
Emitter-Base Voltage	$V_{EBO}$	-5.0		Vdc
Collector Current — Continuous	$I_C$	-500		mAdc



### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (1) $T_A = 25^\circ\text{C}$	$P_D$	225	mW
Derate above $25^\circ\text{C}$		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Derate above $25^\circ\text{C}$		2.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

1. FR-5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
3. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



# MMBTA92/93

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage(3) ( $I_C = -1.0\text{ mAdc}$ , $I_B = 0$ )	MMBTA92 MMBTA93	$V_{(BR)CEO}$	-300 -200	— —	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = -100\ \mu\text{Adc}$ , $I_E = 0$ )	MMBTA92 MMBTA93	$V_{(BR)CBO}$	-300 -200	— —	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -100\ \mu\text{Adc}$ , $I_C = 0$ )		$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = -200\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = -300\text{ Vdc}$ , $I_E = 0$ )		$I_{CBO}$	— —	-0.1 -100	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{EB} = -6.0\text{ Vdc}$ , $I_C = 0$ ) ( $V_{EB} = -5.0\text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	— —	-0.05 -100	$\mu\text{Adc}$

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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### ON CHARACTERISTICS (3)

DC Current Gain ( $I_C = -1.0\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -10\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -30\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )	Both Types Both Types MMBTA92 MMBTA93	$h_{FE}$	25 40 25 25	— — — —	—
Collector–Emitter Saturation Voltage ( $I_C = -20\text{ mAdc}$ , $I_B = -2.0\text{ mAdc}$ )	MMBTA92 MMBTA93	$V_{CE(sat)}$	— —	-0.5 -0.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = -20\text{ mAdc}$ , $I_B = -2.0\text{ mAdc}$ )		$V_{BE(sat)}$	—	-0.9	Vdc

### SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product(3),(4) ( $I_C = -10\text{ mAdc}$ , $V_{CE} = -20\text{ Vdc}$ , $f = 100\text{ MHz}$ )		$f_T$	50	—	MHz
Collector – Base Capacitance ( $V_{CB} = -20\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	MMBTA92 MMBTA93	$C_{cb}$	— —	6.0 8.0	pF

3. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

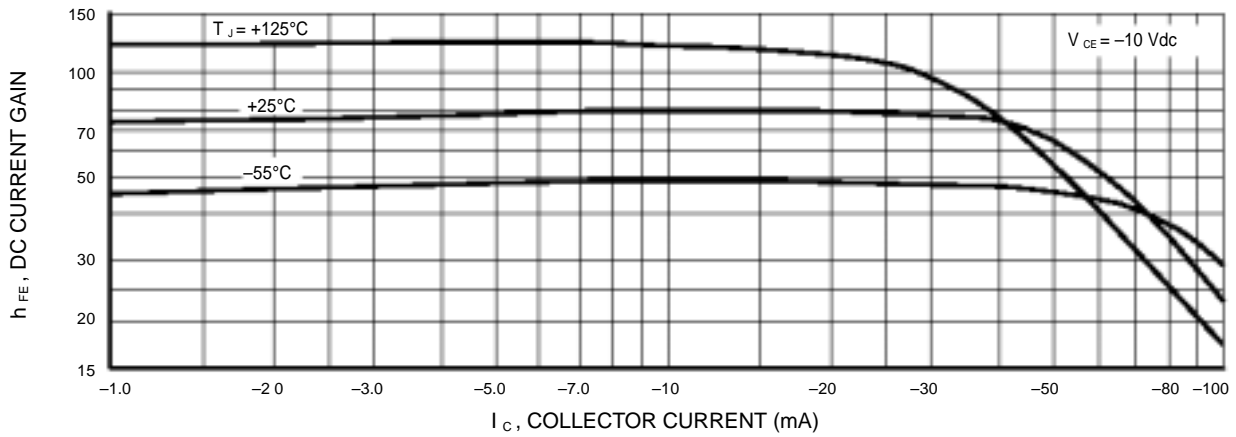


Figure 1. DC Current Gain

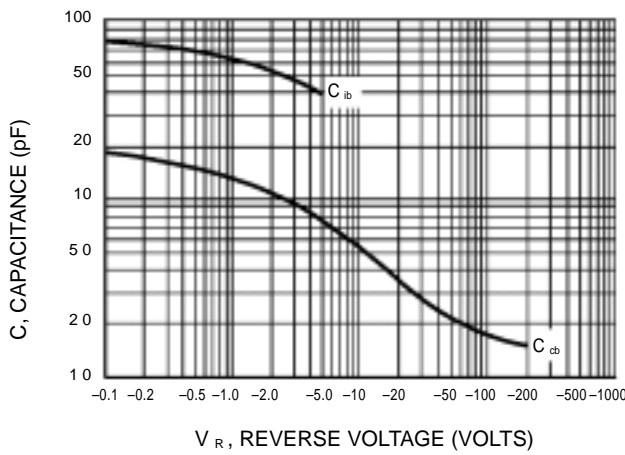


Figure 2. Capacitances

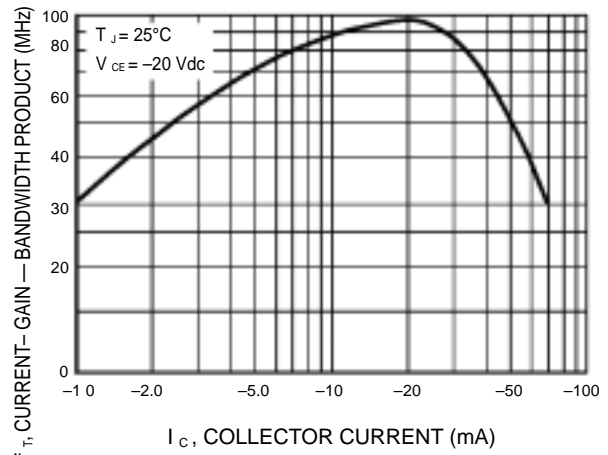


Figure 3. Current-Gain — Bandwidth Product

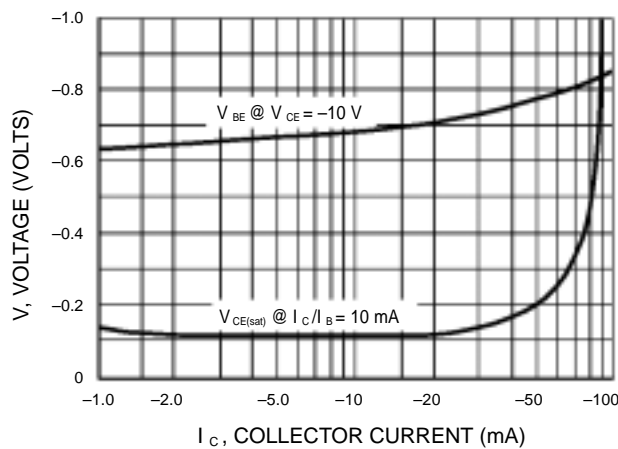
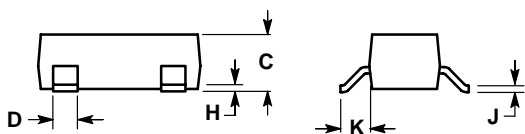
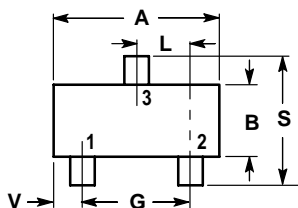


Figure 4. "On" Voltages

## SOT-23



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

