

# High Voltage Transistor

## PNP Silicon

### FEATURE

- High voltage.
- For Telephony or Professional communication equipment applications.
- NPN complement: LMBTA42LT1, LMBTA43LT1.
- Pb-Free Package is available.

### DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
LMBTA92LT1	2D	3000/Tape&Reel
LMBTA92LT1G	2D (Pb-Free)	3000/Tape&Reel
LMBTA93LT1	2E	3000/Tape&Reel
LMBTA93LT1G	2E (Pb-Free)	3000/Tape&Reel

### MAXIMUM RATINGS

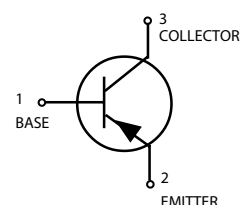
Rating	Symbol	Value		Unit
		LMBTA92	LMBTA93	
Collector–Emitter Voltage	$V_{CEO}$	-300	-200	Vdc
Collector–Base Voltage	$V_{CBO}$	-300	-200	Vdc
Emitter–Base Voltage	$V_{EB0}$	-5.0		Vdc
Collector Current — Continuous	$I_C$	-500		mAdc

### 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	$^\circ\text{C}$

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

**LMBTA92LT1**  
**LMBTA93LT1**



**LMBTA92LT1 LMBTA93LT1**
**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) ( $I_C = -1.0\text{ mA}$ , $I_B = 0$ )	LMBTA92 LMBTA93	$V_{(BR)CEO}$	-300 -200	— —	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = -100\ \mu\text{A}$ , $I_E = 0$ )	LMBTA92 LMBTA93	$V_{(BR)CBO}$	-300 -200	— —	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -100\ \mu\text{A}$ , $I_C = 0$ )		$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = -200\text{Vdc}$ , $I_E = 0$ )	LMBTA92	$I_{CBO}$	—	-0.25	nAdc
( $V_{CB} = -160\text{Vdc}$ , $I_E = 0$ )	LMBTA93		—	-0.25	
Collector Cutoff Current ( $V_{CB} = -3.0\text{Vdc}$ , $I_C = 0$ )		$I_{EBO}$	—	-0.1	$\mu\text{Adc}$

**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 ( $I_C = -1.0\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ )	Both Types	$h_{FE}$	25	—	—
( $I_C = -10\text{ mA}$ , $V_{CE} = -10\text{Vdc}$ )	Both Types		40	—	
( $I_C = -30\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ )	LMBTA92		25	—	
	LMBTA93		25	—	
Collector–Emitter Saturation Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )	LMBTA92 LMBTA93	$V_{CE(sat)}$	— —	-0.5 -0.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )		$V_{BE(sat)}$	—	-0.9	Vdc

**SMALL–SIGNAL CHARACTERISTICS**

Current–Gain — Bandwidth Product(3),(4) ( $I_C = -10\text{ mA}$ , $V_{CE} = -20\text{Vdc}$ , $f = 100\text{ MHz}$ )		$f_T$	50	—	MHz
Collector – Base Capacitance ( $V_{CB} = -20\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	LMBTA92 LMBTA93	$C_{cb}$	— —	6.0 8.0	pF

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

LMBTA92LT1 LMBTA93LT1

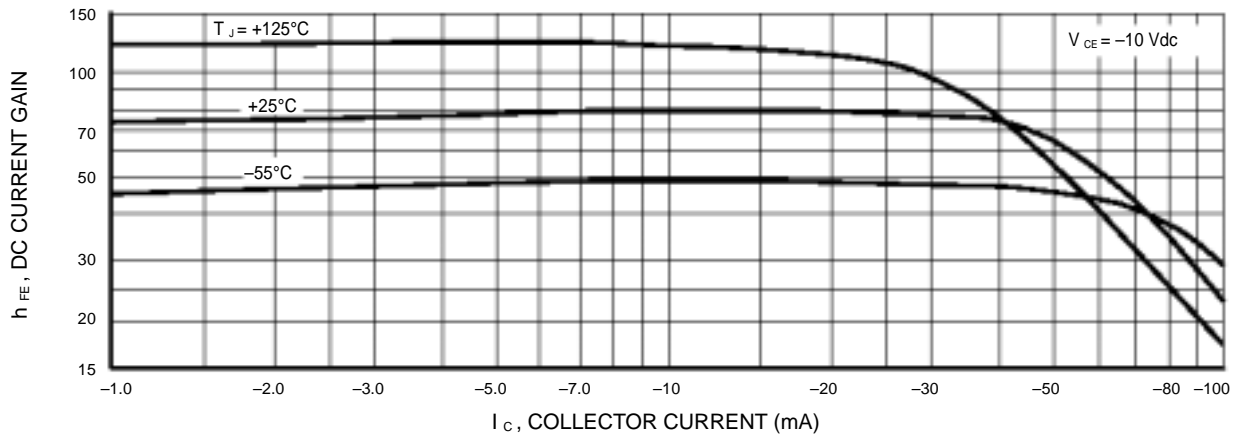


Figure 1. DC Current Gain

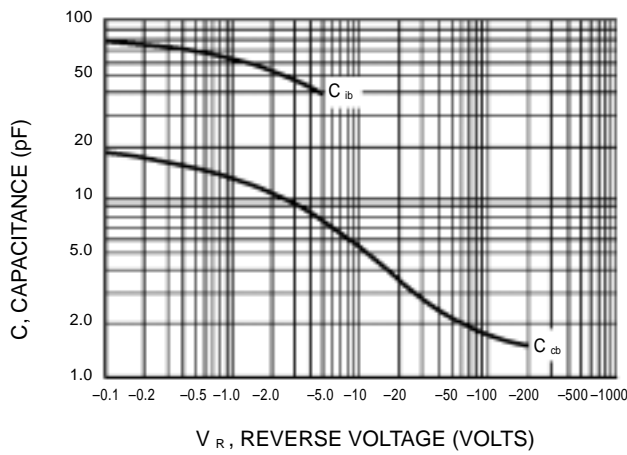


Figure 2. Capacitances

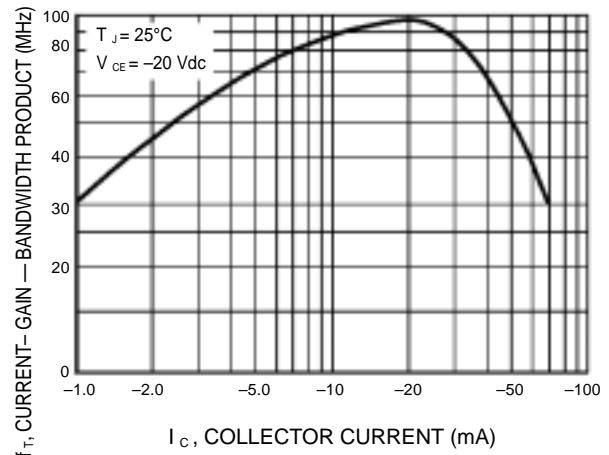


Figure 3. Current-Gain — Bandwidth Product

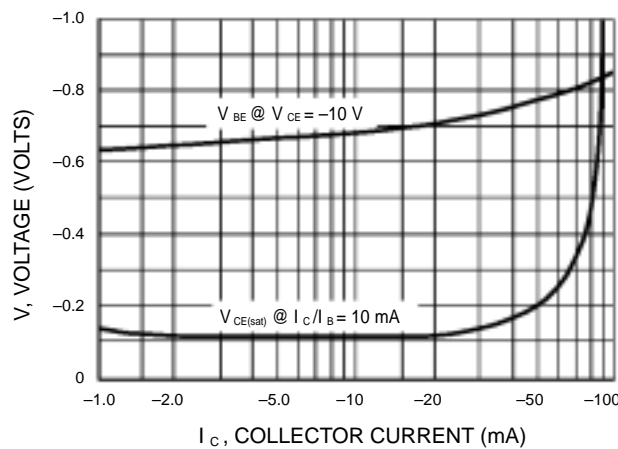
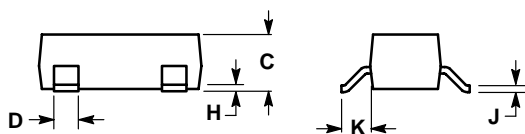
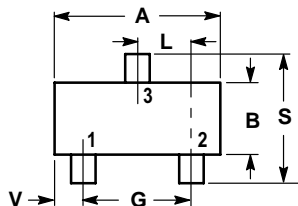


Figure 4. "On" Voltages

**LMBTA92LT1 LMBTA93LT1**

**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

