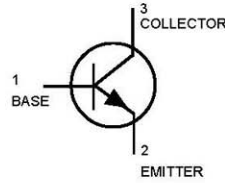
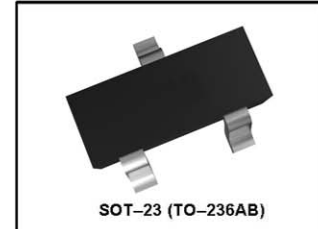


## NPN Silicon



### ● MAXIMUM RATINGS

Rating	Symbol	Value		Unit
		MMBTA42	MMBTA43	
Collector–Emitter Voltage	$V_{CE0}$	300	200	Vdc
Collector–Base Voltage	$V_{CB0}$	300	200	Vdc
Emitter–Base Voltage	$V_{EB0}$	6.0	6.0	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	$^\circ\text{C}$

### DEVICE MARKING

MMBTA42LT1 = 1D; MMBTA43LT1 = M1E

### ● 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) ( $I_C = 1.0\text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$			Vdc
MMBTA42		300	—	
MMBTA43		200	—	
Emitter–Base Breakdown Voltage ( $I_C = 100\ \mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$			Vdc
MMBTA42		300	—	
MMBTA43		200	—	
Emitter–Base Breakdown Voltage ( $I_E = 100\ \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$			Vdc
MMBTA42		6.0	—	
Collector Cutoff Current ( $V_{CB} = 200\text{Vdc}, I_E = 0$ )	$I_{CBO}$			$\mu\text{Adc}$
MMBTA42		—	0.1	
MMBTA43		—	0.1	
Emitter Cutoff Current ( $V_{EB} = 6.0\text{Vdc}, I_C = 0$ )	$I_{EBO}$			$\mu\text{Adc}$
MMBTA42		—	0.1	
MMBTA43		—	0.1	

1. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.

2. Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.

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



● **ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

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

DC Current Gain (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	Both Types	25	—	—
(I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	Both Types	40	—	—
(I <sub>C</sub> = 30 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	MMBTA42	40	—	—
	MMBTA43	40	—	—
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 20 mA <sub>dc</sub> , I <sub>B</sub> = 2.0 mA <sub>dc</sub> )	MMBTA42	—	0.5	V <sub>dc</sub>
	MMBTA43	—	0.5	V <sub>dc</sub>
Base–Emitter Saturation Voltage (I <sub>C</sub> = 20 mA <sub>dc</sub> , I <sub>B</sub> = 2.0 mA <sub>dc</sub> )		—	0.9	V <sub>dc</sub>

● **SMALL–SIGNAL CHARACTERISTICS**

Current–Gain–Bandwidth Product (V <sub>CE</sub> = 20 V <sub>dc</sub> , I <sub>C</sub> = 10mA, f = 100 MHz)		f <sub>T</sub>	50	—	MHz
Collector – Base Capacitance (V <sub>CB</sub> = 20 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	MMBTA42		—	3.0	pF
	MMBTA43		—	4.0	pF

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



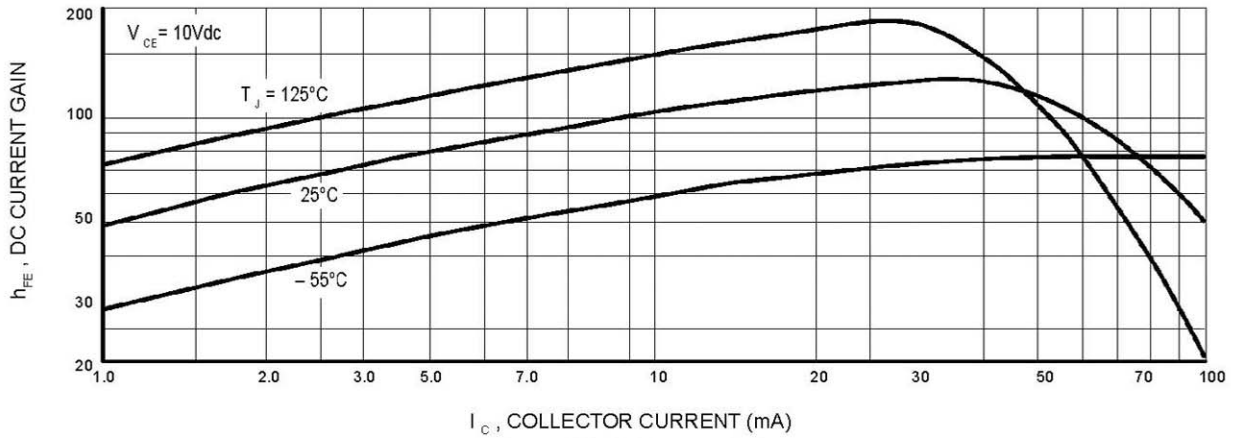


Figure 8. DC Current Gain

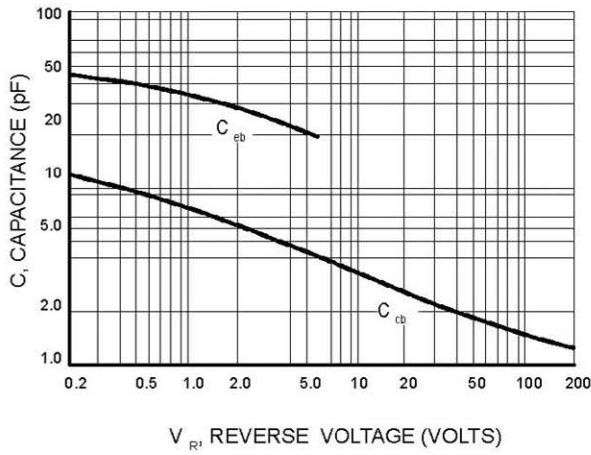


Figure 2. Capacitance

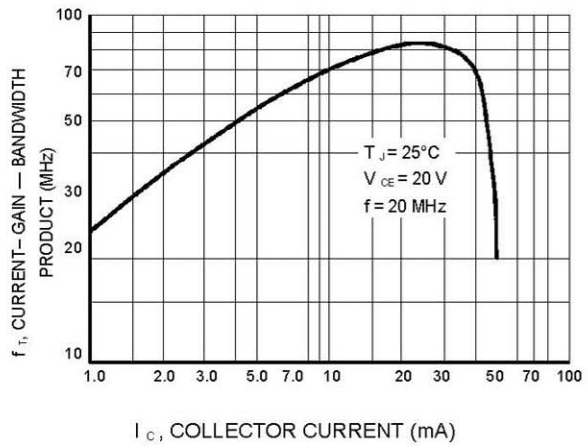


Figure 3. Current-Gain — Bandwidth Product

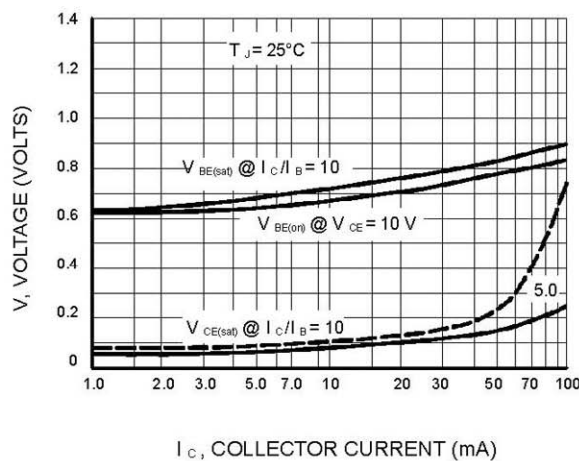


Figure 4. "On" Voltages

