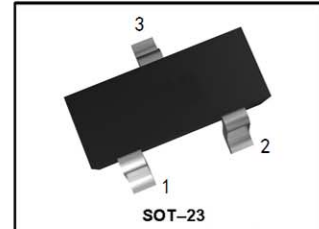
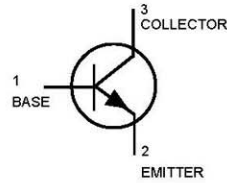


NPN Silicon



● MAXIMUM RATINGS

Rating	Symbol	Value		Unit
		MMBTA42	MMBTA43	
Collector–Emitter Voltage	V_{CE0}	300	200	Vdc
Collector–Base Voltage	V_{CBO}	300	200	Vdc
Emitter–Base Voltage	V_{EBO}	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°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°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

MMBTA42 = 1D; MMBTA43 = 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}			μAdc
MMBTA42		—	0.1	
MMBTA43		—	0.1	
Emitter Cutoff Current ($V_{EB} = 6.0\text{Vdc}, I_C = 0$)	I_{EBO}			μAdc
MMBTA42		—	0.1	
MMBTA43		—	0.1	

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

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

Characteristic	Symbol	Min	Max	Unit
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ON CHARACTERISTICS (3)

DC Current Gain (I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc})	Both Types	h _{FE}	25	—	—
(I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc})	Both Types		40	—	
	MMBTA42		40	—	
(I _C = 30 mA _{dc} , V _{CE} = 10 V _{dc})	MMBTA43		40	—	
Collector–Emitter Saturation Voltage (I _C = 20 mA _{dc} , I _B = 2.0 mA _{dc})	MMBTA42	V _{CE(sat)}	—	0.5	V _{dc}
	MMBTA43		—	0.5	
Base–Emitter Saturation Voltage (I _C = 20 mA _{dc} , I _B = 2.0 mA _{dc})		V _{BE(sat)}	—	0.9	V _{dc}

● **SMALL–SIGNAL CHARACTERISTICS**

Current–Gain–Bandwidth Product (V _{CE} = 20 V _{dc} , I _C = 10mA, f = 100 MHz)		f _T	50	—	MHz
Collector – Base Capacitance (V _{CB} = 20 V _{dc} , I _E = 0, f = 1.0 MHz)	MMBTA42	C _{cb}	—	3.0	pF
	MMBTA43		—	4.0	

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

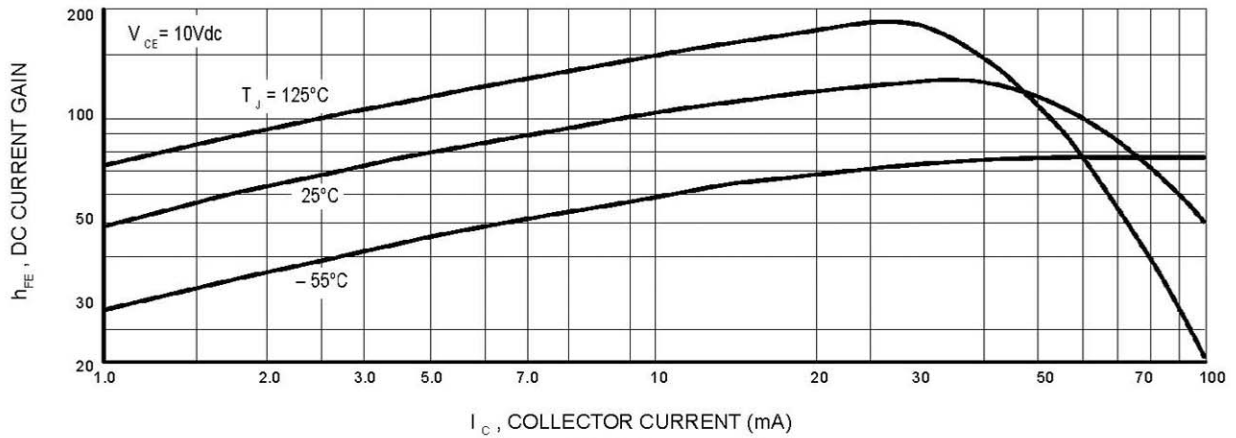


Figure 8. DC Current Gain

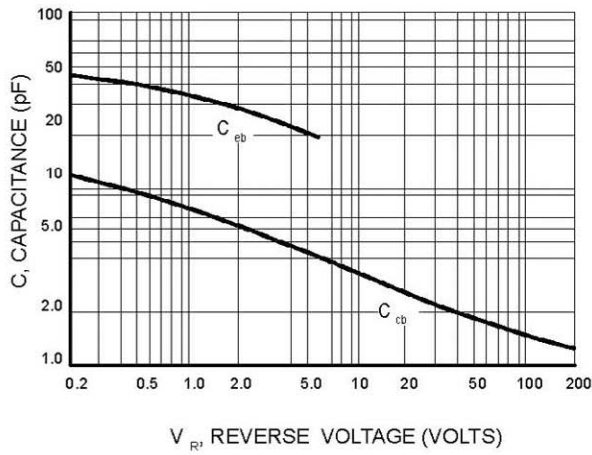


Figure 2. Capacitance

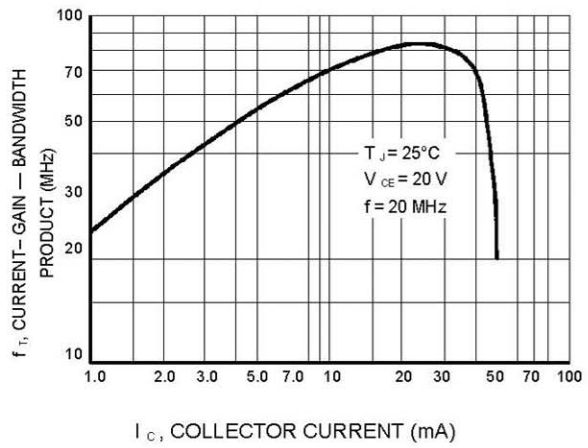


Figure 3. Current-Gain — Bandwidth Product

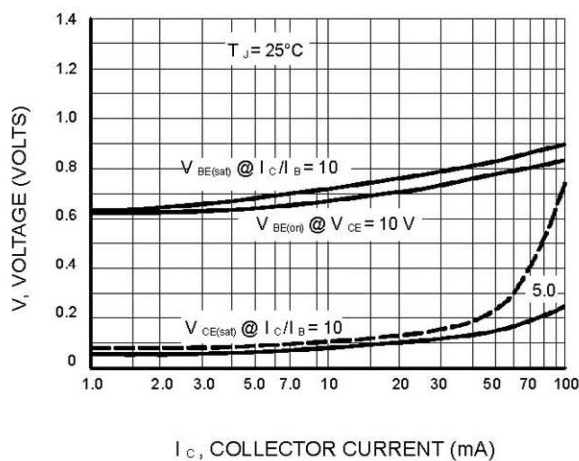
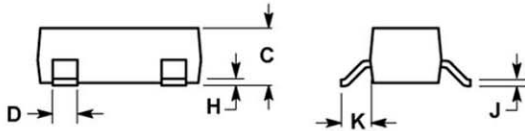
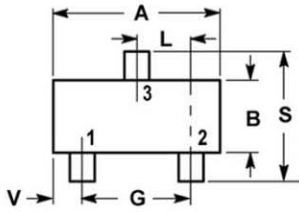


Figure 4. "On" Voltages

SOT-23



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

