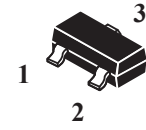
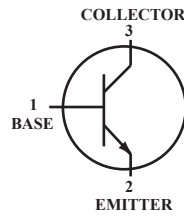


### High-Voltage NPN Transistor Surface Mount

 Lead(Pb)-Free



SOT-23

#### Maximum Ratings (T<sub>A</sub>=25°C Unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	MMBTA42 MMBTA43	V <sub>CEO</sub> 300 200	V
Collector-Base Voltage	MMBTA42 MMBTA43	V <sub>CB0</sub> 300 200	V
Emitter-Base Voltage	MMBTA42 MMBTA43	V <sub>EB0</sub> 6.0 6.0	V
Collector Current-Continuous	I <sub>C</sub>	500	mA

#### Thermal Characteristics

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note.1) T <sub>A</sub> =25°C Derate above 25°C	P <sub>D</sub>	225 1.8	mW mW/°C
Thermal Resistance, Junction to Ambient (Note.1)	R <sub>θJA</sub>	556	°C/W
Total Device Dissipation Alumina Substrate (Note.2) T <sub>A</sub> =25°C Derate above 25°C	P <sub>D</sub>	300 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient (Note.1)	R <sub>θJA</sub>	417	°C/W
Junction and Temperature Range	T <sub>J</sub>	+150	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	°C

#### Device Marking

MMBTA42 = 1D , MMBTA43 = M1E

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.

**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  Unless Otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
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**Off Characteristics<sup>3</sup>**

Collector-Emitter Breakdown Voltage ( $I_C=1.0\text{mA}$ , $I_B=0$ )	MMBTA42 MMBTA43	$V_{(BR)CEO}$	300 200	- -	- -	V
Collector-Base Breakdown Voltage ( $I_C=10\mu\text{A}$ , $I_E=0$ )	MMBTA42 MMBTA43	$V_{(BR)CBO}$	300 200	- -	- -	V
Emitter-Base Breakdown Voltage ( $I_E=100\mu\text{A}$ , $I_C=0$ )	MMBTA42 MMBTA43	$V_{(BR)EBO}$	6.0 6.0	- -	- -	V
Collector Cutoff Current ( $V_{CB}=200\text{V}$ , $I_E=0$ ) ( $V_{CB}=160\text{V}$ , $I_E=0$ )		$I_{CBO}$	- -	- -	0.1 0.1	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB}=6.0\text{V}$ , $I_C=0$ ) ( $V_{EB}=4.0\text{V}$ , $I_C=0$ )		$I_{EBO}$	- -	- -	0.1 0.1	$\mu\text{A}$

**On Characteristics<sup>3</sup>**

DC Current Gain ( $I_C=1.0\text{mA}$ , $V_{CE}=10\text{V}$ ) ( $I_C=10\text{mA}$ , $V_{CE}=10\text{V}$ ) ( $I_C=30\text{mA}$ , $V_{CE}=10\text{V}$ )		$h_{FE}$	25 40 40	- - -	- - -	-
Collector-Emitter Saturation Voltage ( $I_C=20\text{mA}$ , $I_B=2.0\text{mA}$ )		$V_{CE(sat)}$	-	-	0.5	V
Base-Emitter Saturation Voltage ( $I_C=10\text{mA}$ , $I_B=0.5\text{mA}$ ) ( $I_C=100\text{mA}$ , $I_B=5.0\text{mA}$ )		$V_{BE(sat)}$	-	-	0.9	V

**Small-signal Characteristics**

Current-Gain-Bandwidth Product ( $I_C=10\text{mA}$ , $V_{CE}=20\text{V}$ , $f=100\text{MHz}$ )		$f_T$	50	-	-	MHz
Output Capacitance ( $V_{CB}=20\text{V}$ , $I_E=0$ , $f=1.0\text{MHz}$ )	MMBTA42 MMBTA43	$C_{cb}$	-	-	3.0 4.0	pF

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

### Typical Characteristics

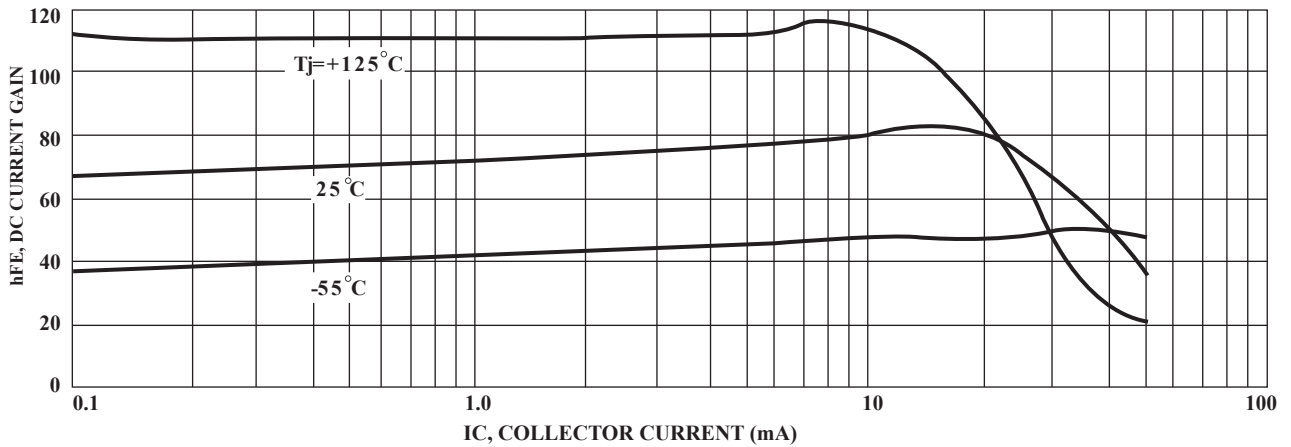
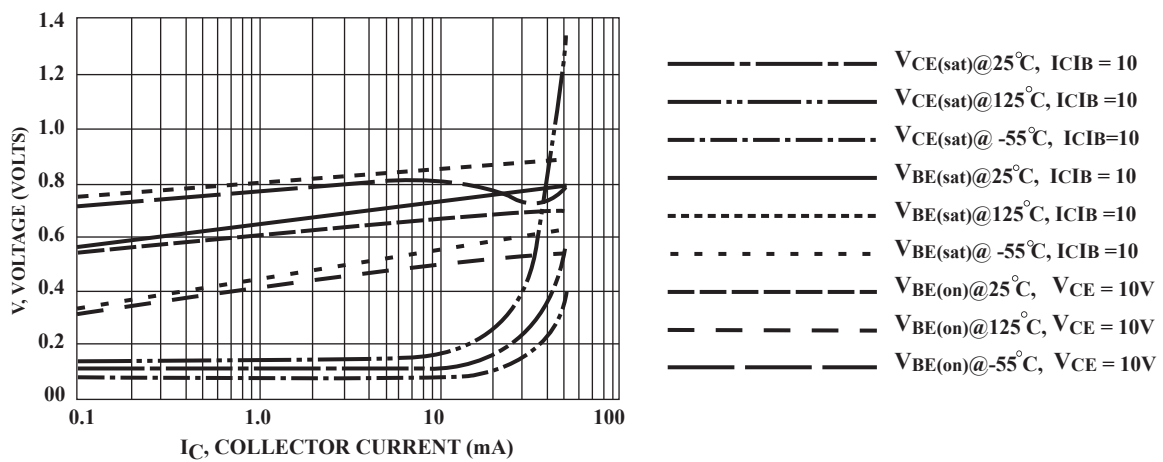


Figure ,1 DC Current Gain



Figure,2 "On" Voltages

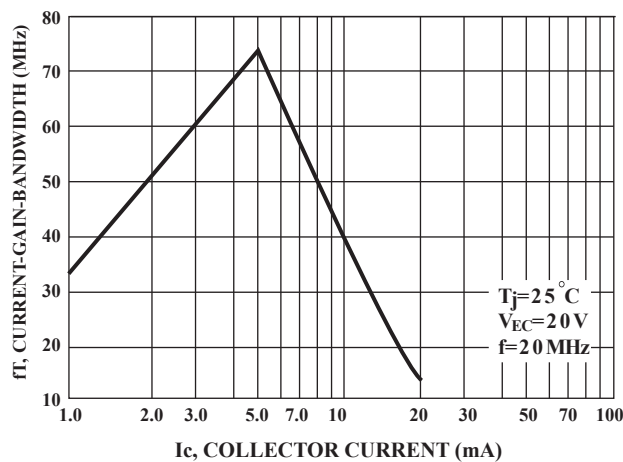
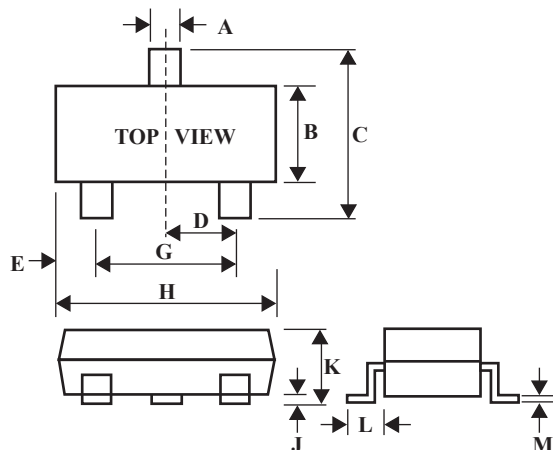


Figure ,3 Current-Gain-Bandwidth

## SOT-23 Outline Dimension



SOT-23		
Dim	Min	Max
A	0.35	0.51
B	1.19	1.40
C	2.10	3.00
D	0.85	1.05
E	0.46	1.00
G	1.70	2.10
H	2.70	3.10
J	0.01	0.13
K	0.89	1.10
L	0.30	0.61
M	0.076	0.25