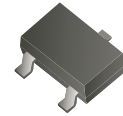


## MMBTA44-HF (NPN)

RoHS Device

Halogen Free



### Features

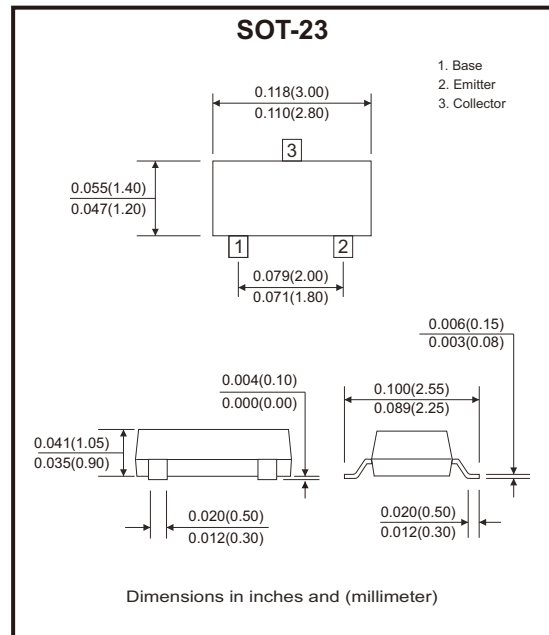
- High collector-emitter voltage.
- Ultra small surface mount package.

### Mechanical data

- Case: SOT-23, molded plastic.
- Mounting position: Any.

### Circuit Diagram

1. Base
2. Emitter
3. Collector



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

Parameter	Symbol	Value	Unit
Collector-base voltage	V <sub>CB0</sub>	400	V
Collector-emitter voltage	V <sub>CEO</sub>	400	V
Emitter-base voltage	V <sub>EB0</sub>	6	V
Collector current-continuous	I <sub>C</sub>	200	mA
Collector current-pulsed	I <sub>CM</sub>	300	mA
Collector power dissipation	P <sub>C</sub>	350	mW
Thermal resistance from junction to ambient	R <sub>θJA</sub>	357	°C/W
Operation junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## Electrical Characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}, I_E = 0$	400		V
Collector-emitter breakdown voltage (Note 1)	$V_{(BR)CEO}$	$I_C = 1\text{mA}, I_B = 0$	400		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}, I_C = 0$	6		V
Collector cut-off current	$I_{CBO}$	$V_{CB} = 400\text{V}, I_E = 0$		0.1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 4\text{V}, I_C = 0$		0.1	$\mu\text{A}$
DC current gain (Note 1)	$h_{FE(1)}$	$V_{CE} = 10\text{V}, I_C = 1\text{mA}$	40		
	$h_{FE(2)}$	$V_{CE} = 10\text{V}, I_C = 10\text{mA}$	50	200	
	$h_{FE(3)}$	$V_{CE} = 10\text{V}, I_C = 50\text{mA}$	45		
	$h_{FE(4)}$	$V_{CE} = 10\text{V}, I_C = 100\text{mA}$	40		
Collector-emitter saturation voltage (Note 1)	$V_{CE(sat)1}$	$I_C = 1\text{mA}, I_B = 0.1\text{mA}$		0.4	V
	$V_{CE(sat)2}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$		0.5	
	$V_{CE(sat)3}$	$I_C = 50\text{mA}, I_B = 5\text{mA}$		0.75	
Base-emitter saturation voltage (Note 1)	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$		0.75	V
Collector output capacitance	$C_{ob}$	$V_{CB} = 20\text{V}, I_E = 0, f = 1\text{MHz}$		7	pF
Emitter input capacitance	$C_{ib}$	$V_{EB} = 0.5\text{V}, I_C = 0, f = 1\text{MHz}$		130	pF
Transition frequency	$f_T$	$V_{CE} = 20\text{V}, I_C = 10\text{mA}, f = 30\text{MHz}$	50		MHz

Notes: 1. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

## Rating and Characteristic Curves (MMBTA44-HF)

Fig.1 - Static Characteristic

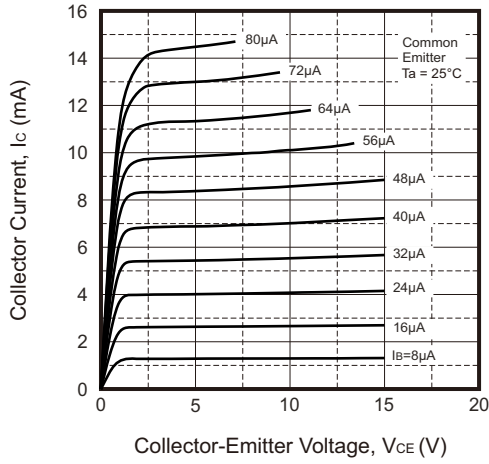


Fig.2 -  $h_{FE}$  —  $I_c$

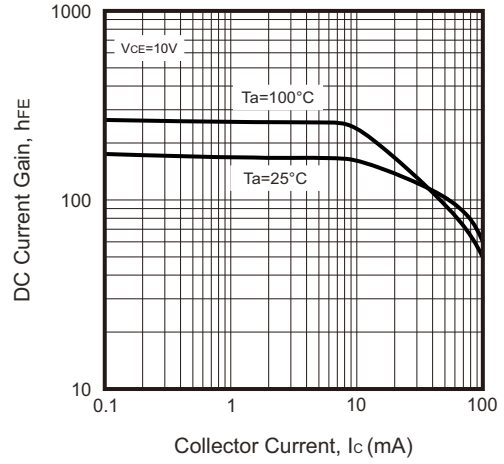


Fig.3 -  $V_{BEsat}$  —  $I_c$

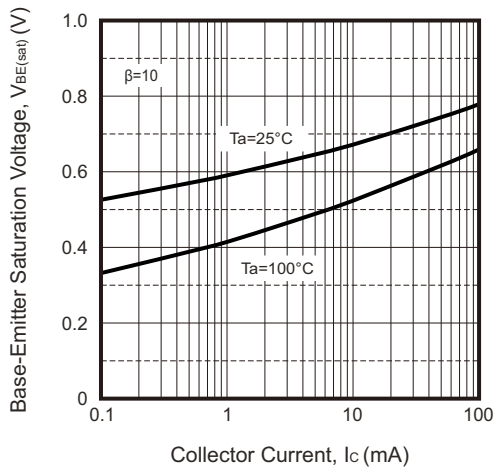


Fig.4 -  $V_{CEsat}$  —  $I_c$

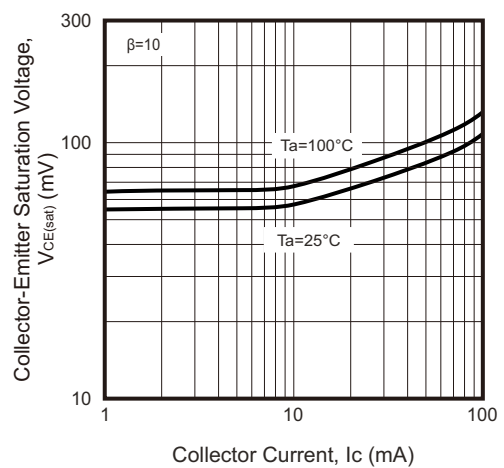


Fig.5 -  $C_{ob}/C_{ib}$  —  $V_{CB}/V_{EB}$

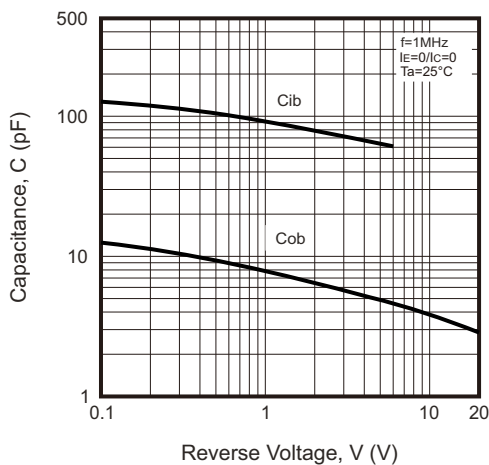
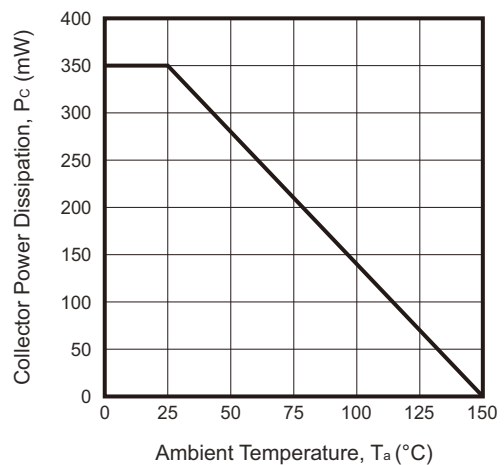
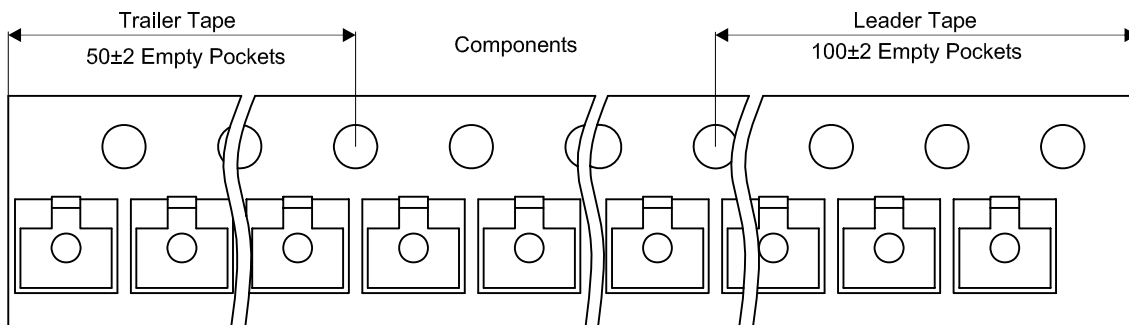
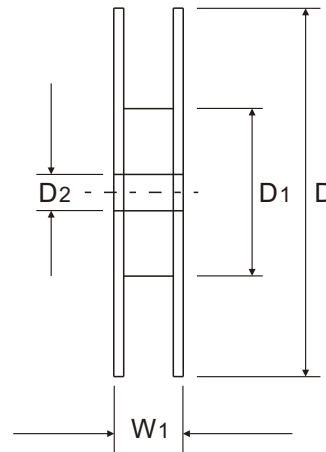
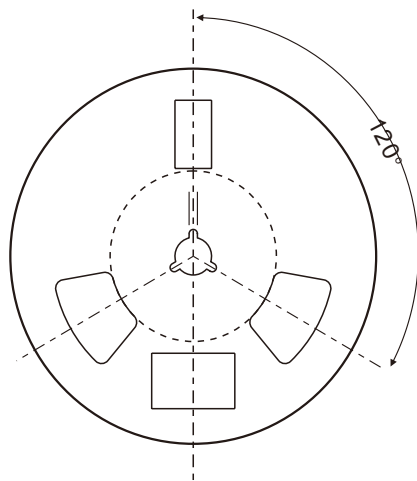
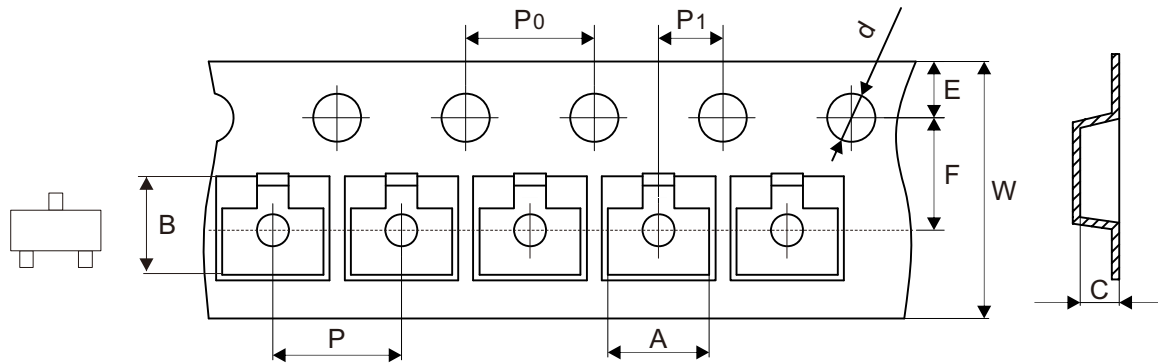


Fig.6 -  $P_c$  —  $T_a$



## Reel Taping Specification

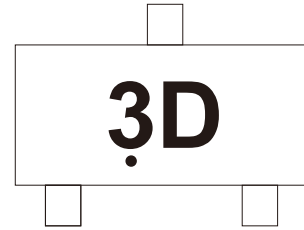


SOT-23	SYMBOL	A	B	C	d	D	D <sub>1</sub>	D <sub>2</sub>
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 ± 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

SOT-23	SYMBOL	E	F	P	P <sub>0</sub>	P <sub>1</sub>	W	W <sub>1</sub>
	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	8.00 + 0.30 - 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.315 + 0.012 - 0.004	0.484 ± 0.039

## Marking Code

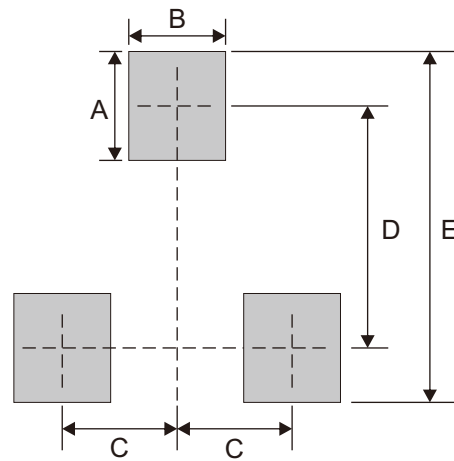
Part Number	Marking Code
MMBTA44-HF	3D



Solid dot = Control code

## Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	0.95	0.037
D	2.00	0.079
E	2.90	0.114



Note: 1. The pad layout is for reference purposes only.

## Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7