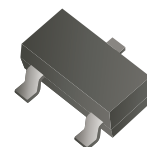


## MMBTA13/14-HF (NPN)

RoHS Device  
Halogen Free



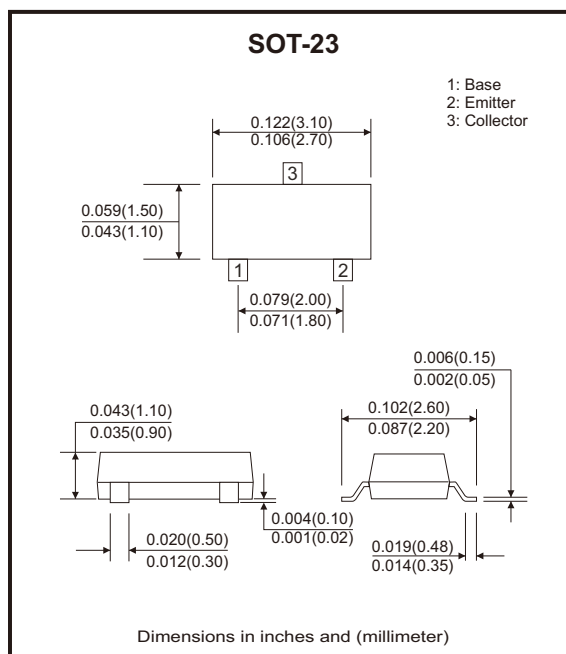
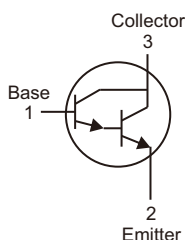
### Features

- Epitaxial planar die construction.
- High current gain.

### Mechanical data

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

### Circuit Diagram



### Maximum Ratings (at Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Units
Collector-base voltage	V <sub>CBO</sub>	30	V
Collector-emitter voltage	V <sub>CEO</sub>	30	V
Emitter-base voltage	V <sub>EBO</sub>	10	V
Collector current (DC)	I <sub>C</sub>	0.3	A
Collector dissipation	P <sub>C</sub>	0.3	W
Thermal resistance, junction to ambient	R <sub>θJA</sub>	417	°C/W
Junction and storage temperature	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## Electrical Characteristics (at Ta=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Collector-base breakdown voltage	$I_C = 100\mu A, I_E = 0$	$V_{(BR)CBO}$	30			V
Collector-emitter breakdown voltage	$I_C = 0.1mA, I_B = 0$	$V_{(BR)CEO}$	30			V
Emitter-base breakdown voltage	$I_E = 100\mu A, I_C = 0$	$V_{(BR)EBO}$	10			V
Collector cut-off current	$I_E = 0, V_{CB} = 30V$	$I_{CBO}$			0.1	$\mu A$
Collector cut-off current	$I_E = 0, V_{CE} = 10V$	$I_{CEO}$			0.1	$\mu A$
DC current gain	MMBTA13-HF $V_{CE} = 5V, I_C = 10mA$	$h_{FE}$	5000			
	MMBTA14-HF $V_{CE} = 5V, I_C = 10mA$	$h_{FE}$	10000			
	MMBTA13-HF $V_{CE} = 5V, I_C = 100mA$	$h_{FE}$	10000			
	MMBTA14-HF $V_{CE} = 5V, I_C = 100mA$	$h_{FE}$	20000			
Collector-emitter saturation voltage	$I_C = 100mA, I_B = 0.1mA$	$V_{CE(sat)}$			1.5	V
Base-emitter on voltage	$I_C = 100mA, V_{CE} = 5V$	$V_{BE}$			2.0	V
Transition frequency	$I_C = 10mA, V_{CE} = 5V, f = 100MHz$	$f_T$	125			MHz

## Rating and Characteristic Curves (MMBTA13/14-HF)

Fig.1 - Max Power Dissipation vs Ambient Temperature

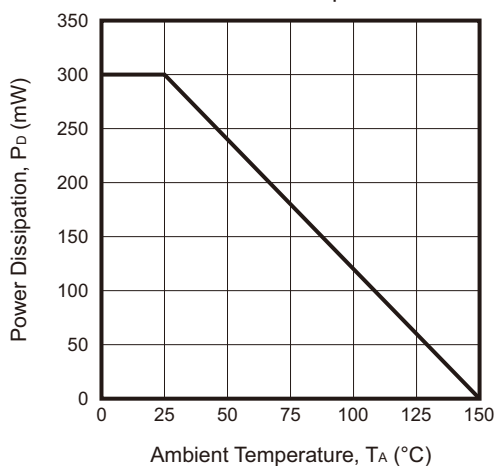
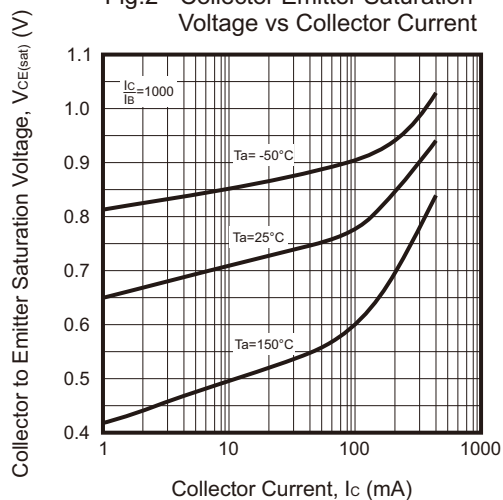
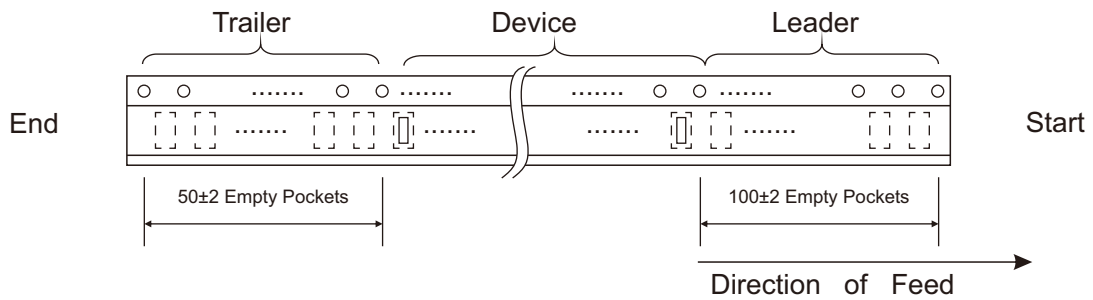
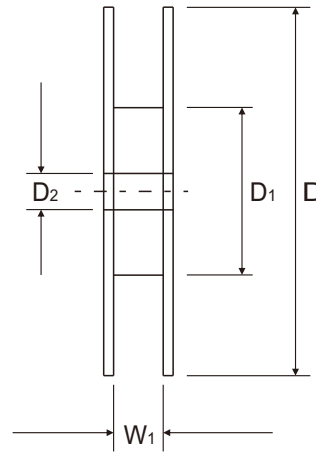
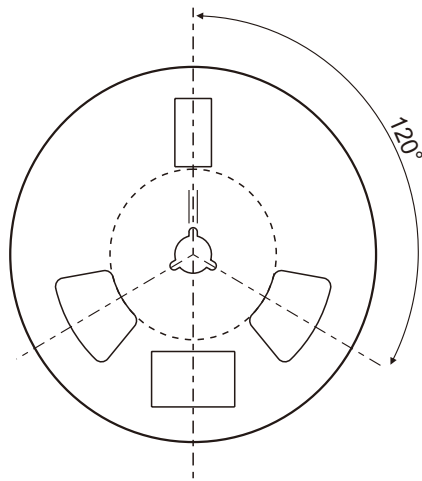
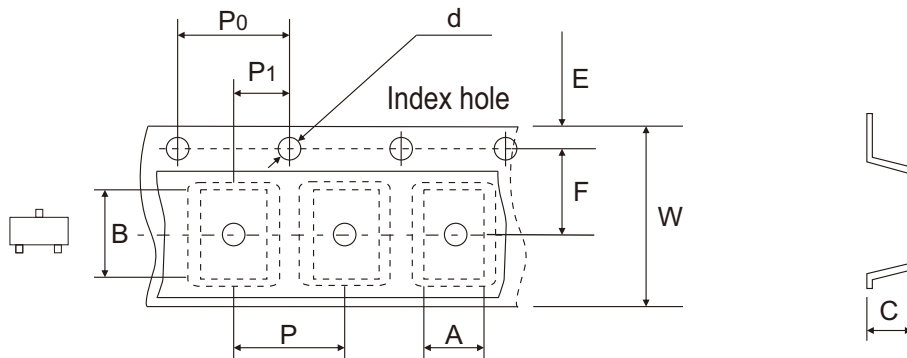


Fig.2 - Collector Emitter Saturation Voltage vs Collector Current



## Reel Taping Specification

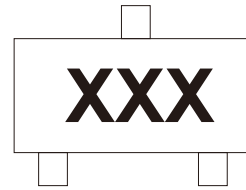


SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 ± 0.10	178.00 ± 1.00	54.00 ± 0.50	13.00 ± 0.50
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 ± 0.004	7.008 ± 0.039	2.126 ± 0.020	0.512 ± 0.020

SOT-23	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	8.00 + 0.30 - 0.10	9.50 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.315 + 0.012 - 0.004	0.374 ± 0.039

## Marking Code

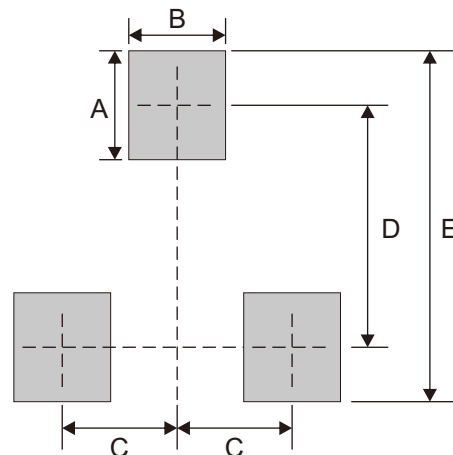
Part Number	Marking Code
MMBTA13-HF	K2D
MMBTA14-HF	K3D



xxx = Product type marking 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



## Standard Packaging

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