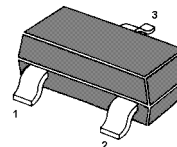


# MMBT5401-HAF

## PNP Silicon Epitaxial Planar Transistor

### Features

- Halogen and Antimony Free(HAF), RoHS compliant



1. Base 2. Emitter 3. Collector  
TO-236 Plastic Package

### Applications

- For high voltage amplifier applications

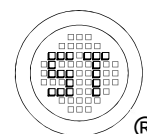
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CBO}$	160	V
Collector Emitter Voltage	$-V_{CEO}$	150	V
Emitter Base Voltage	$-V_{EBO}$	5	V
Collector Current Continuous	$-I_C$	600	mA
Power Dissipation	$P_{tot}$	200	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to + 150	$^\circ\text{C}$

### Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient <sup>1)</sup>	$R_{\theta JA}$	625	$^\circ\text{C/W}$

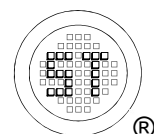
<sup>1)</sup> Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.



# MMBT5401-HAF

## Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $-V_{CE} = 5\text{ V}$ , $-I_C = 1\text{ mA}$ at $-V_{CE} = 5\text{ V}$ , $-I_C = 10\text{ mA}$ at $-V_{CE} = 5\text{ V}$ , $-I_C = 50\text{ mA}$	$h_{FE}$ $h_{FE}$ $h_{FE}$	50 60 50	- 240 -	- - -
Collector Base Cutoff Current at $-V_{CB} = 120\text{ V}$	$-I_{CBO}$	-	50	nA
Emitter Base Cutoff Current at $-V_{EB} = 3\text{ V}$	$-I_{EBO}$	-	50	nA
Collector Base Breakdown Voltage at $-I_C = 100\text{ }\mu\text{A}$	$-V_{(BR)CBO}$	160	-	V
Collector Emitter Breakdown Voltage at $-I_C = 1\text{ mA}$	$-V_{(BR)CEO}$	150	-	V
Emitter Base Breakdown Voltage at $-I_E = 10\text{ }\mu\text{A}$	$-V_{(BR)EBO}$	5	-	V
Collector Emitter Saturation Voltage at $-I_C = 10\text{ mA}$ , $-I_B = 1\text{ mA}$ at $-I_C = 50\text{ mA}$ , $-I_B = 5\text{ mA}$	$-V_{CE(sat)}$	- -	0.2 0.5	V
Base Emitter Saturation Voltage at $-I_C = 10\text{ mA}$ , $-I_B = 1\text{ mA}$ at $-I_C = 50\text{ mA}$ , $-I_B = 5\text{ mA}$	$-V_{BE(sat)}$	- -	1 1	V
Gain Bandwidth Product at $-V_{CE} = 10\text{ V}$ , $-I_C = 10\text{ mA}$ , $f = 100\text{ MHz}$	$f_T$	100	300	MHz
Output Capacitance at $-V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$	$C_{obo}$	-	6	pF



# MMBT5401-HAF

## Electrical Characteristics Curves

Fig. 1 Output Characteristics Curve

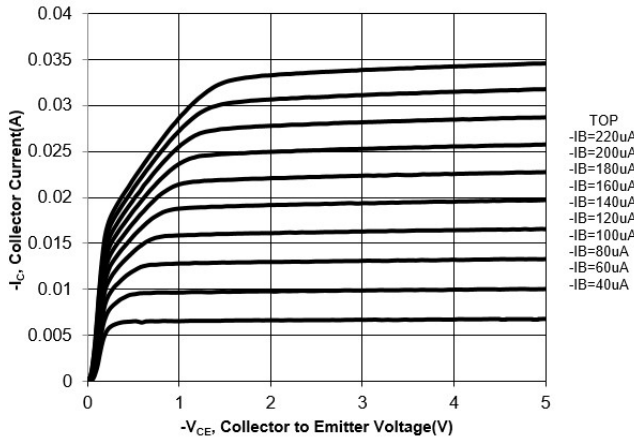


Fig. 2 Output Characteristics Curve

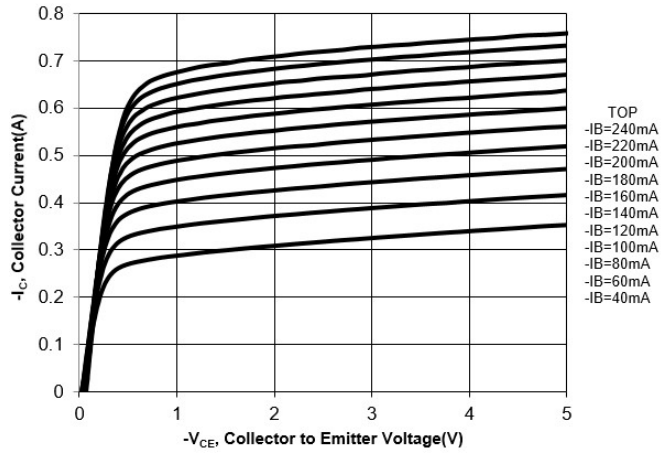


Fig. 3 Collector Current vs.  $V_{BE}$

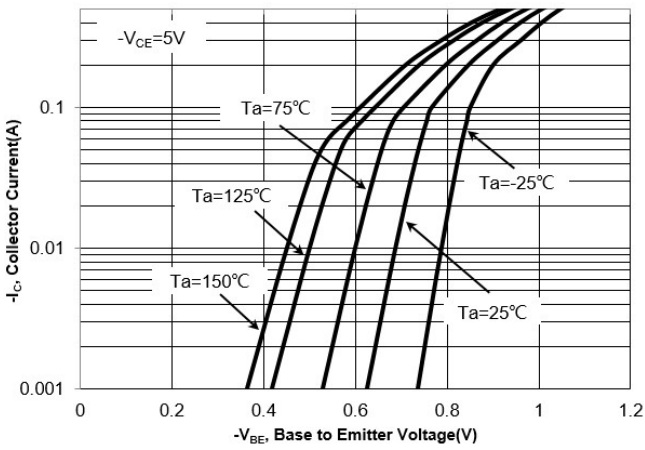
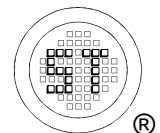
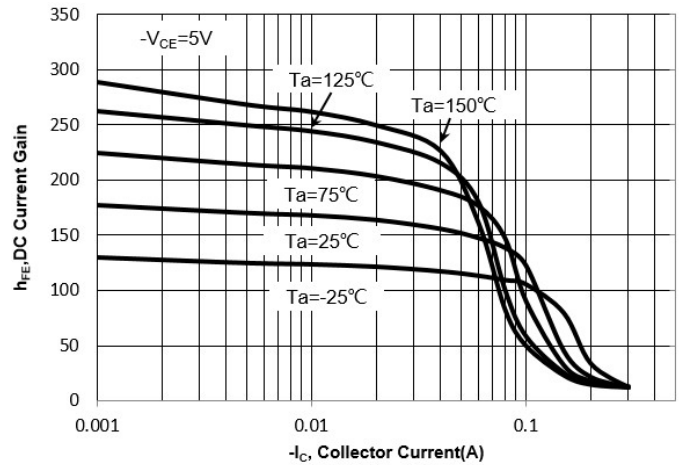


Fig. 4. DC Current Gain vs. Collector Current



## Electrical Characteristics Curves

Fig 5.  $V_{BE(sat)}$  vs. Collector Current

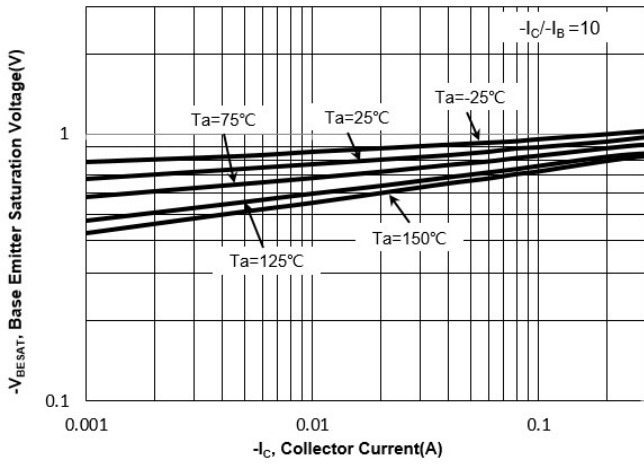


Fig 6.  $V_{CE(sat)}$  vs. Collector Current

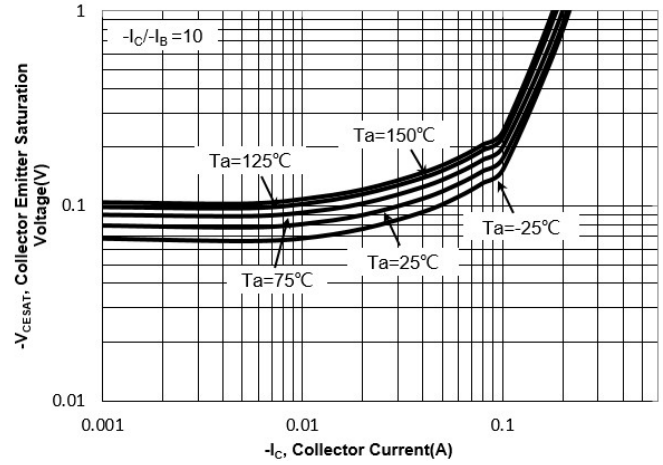


Fig 7. Capacitance Characteristics

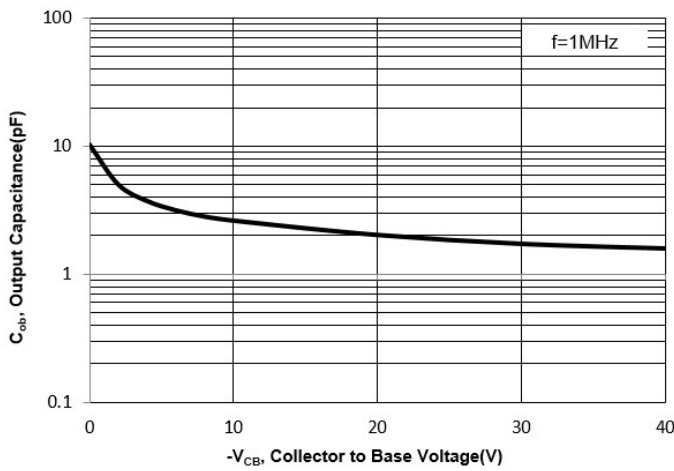
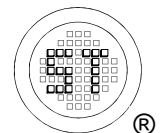
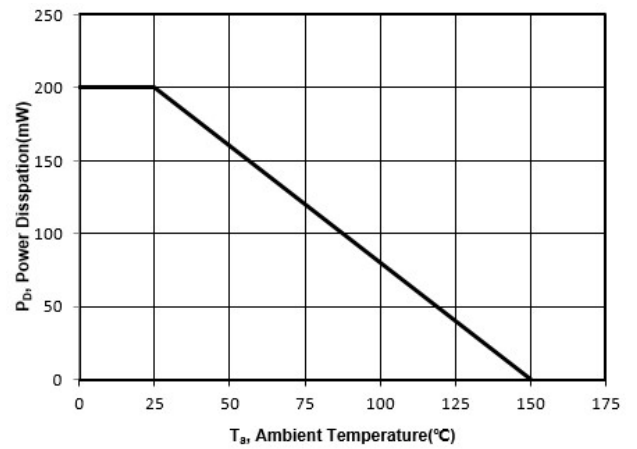


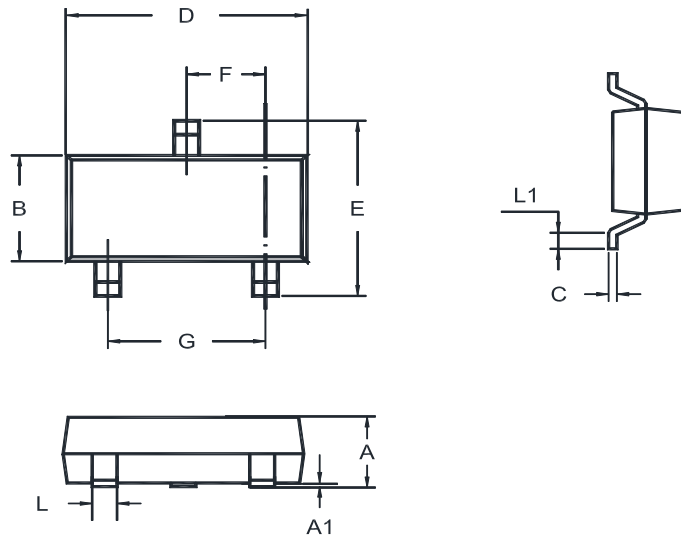
Fig 8. Power Derating Curve



# MMBT5401-HAF

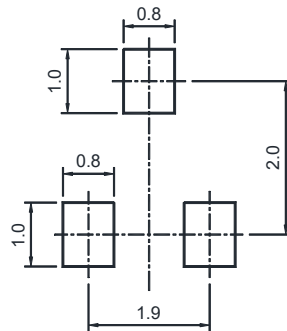
## Package Outline (Dimensions in mm)

TO-236



Unit	A	A1	B	C	D	E	F	G	L	L1
mm	1.20	0.100	1.40	0.19	3.04	2.6	1.02	2.04	0.51	0.2
	0.89	0.013	1.20	0.08	2.80	2.2	0.89	1.78	0.37	MIN

## Recommended Soldering Footprint

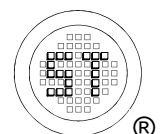
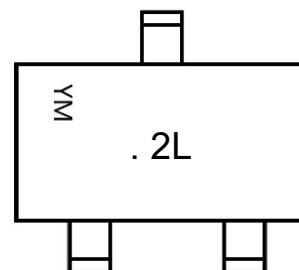


## Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
TO-236	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

## Marking information

- " 2L " = Part No.
- " • " = HAF (Halogen and Antimony Free)
- "YM" = Date Code Marking
- "Y" = Year
- "M" = Month
- Font type: Arial



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