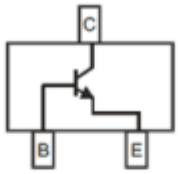
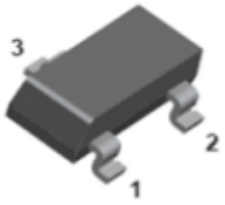
MMBT4401

NPN General Purpose Amplifier





SOT-23

Features

- Moisture sensitivity level 1
- Halogen free and RoHS compliant
- Surface mount package ideally suited for automatic insertion

Application

- Signal amplification
- Switching circuit

Mechanical data

- **Package**: SOT-23
- **Terminals**: Tin plated leads, solderable per J-STD-002 and JESD22-B102

■ **Maximum Ratings** (T_a=25℃ Unless otherwise specified)

Item	Symbol	Unit	Conditions	Value
Device marking code				2X
Collector-base voltage	V_{CBO}	V	I_C=10mA,I_E=0	60
Collector-emitter voltage	V_{CEO}	V	I_C =1mA,I_B=0	40
Emitter-base voltage	V_{EBO}	V	I_E=100μA,I_C=0	6
Collector current	I_C	mA		600
Power dissipation	P_D	mW		300
Junction temperature	T_J	℃		-55 to +150
Storage temperature	T_{STG}	℃		-55 to +150

MMBT4401

■ Electrical Characteristics (Ta=25℃ Unless otherwise specified)

Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-base breakdown voltage	$V_{(BR)CBO}$	V	I_C=10mA,I_E=0	60		
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	V	I_C =1mA,I_B=0	40		
Emitter-base breakdown voltage	$V_{(BR)EBO}$	V	I_E=100μA,I_C=0	6		
Collector-base cut-off current	I_{CBO}	nA	V_{CB}=60V			100
Collector-emitter cut-off current	I_{CEO}	nA	V_{CE}=35V			100
Emitter-base cut-off current	I_{EBO}	nA	V_{EB}=3V			100
DC current gain	h_{FE}		V_{CE}=1V,I_C=150mA	100		300
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C=150mA,I_B=15mA			0.4
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C=150mA,I_B=15mA			0.95
Transition frequency	f_T	MHz	V_{CE}=10V,I_C=20mA,f=100MHz	250		
Delay time	td	ns	V_{CC}=30V, I_C=150mA, V_{BE}=0.2V, I_{B1}=15mA			15
Rise time	tr	ns				20
Storage time	ts	ns	V_{CC}=30V, I_C=150mA, I_{B1}=-I_{B2}=15mA			225
Fall time	tf	ns				60

■ Thermal Characteristics

Parameter	Symbol	Unit	Value
Thermal resistance, junction-to-ambient	$R_{\theta J-A}$(1)	℃/W	417
Thermal resistance, junction-to-case	$R_{\theta J-C}$(1)	℃/W	334

Note:

（1）Device mounted on PCB, single-sided copper， with standard footprint

■Characteristics

Fig 1：Static Characteristics

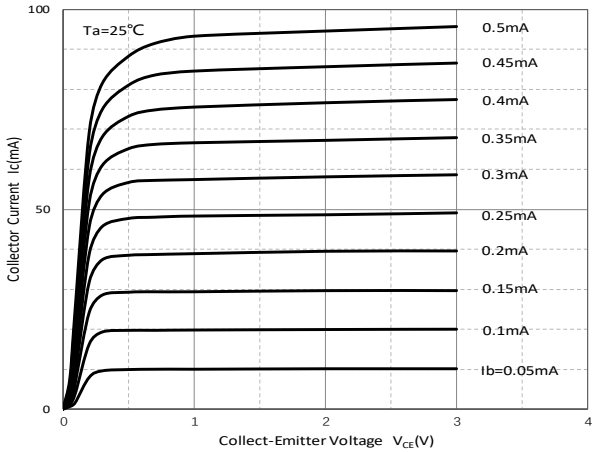


Fig 2：DC Current Gain

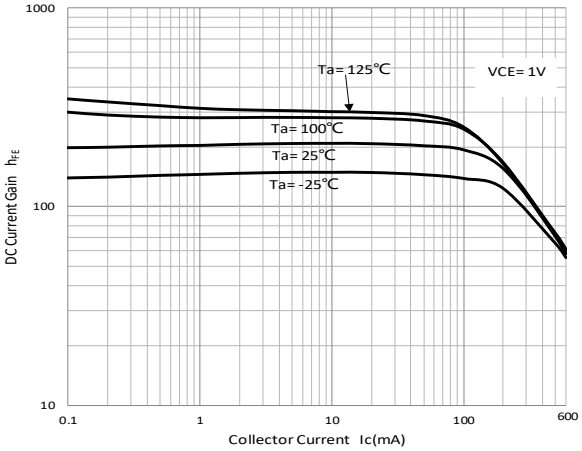


Fig 3：Collector-Emitter Saturation Voltage

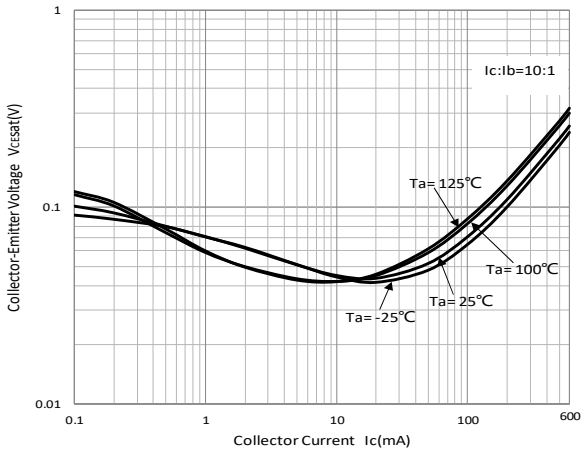


Fig 4：Base-Emitter Saturation Voltage

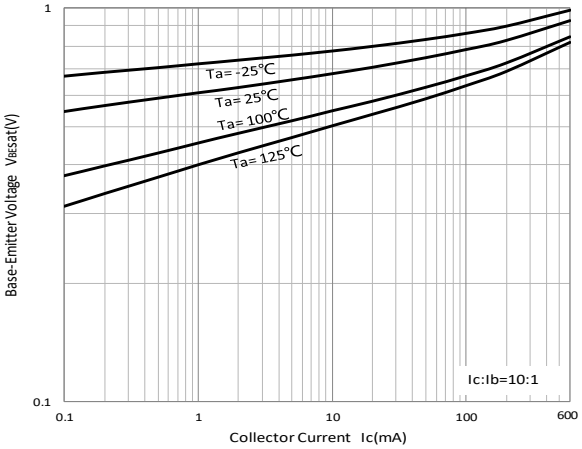


Fig 5：Base-Emitter On Voltage

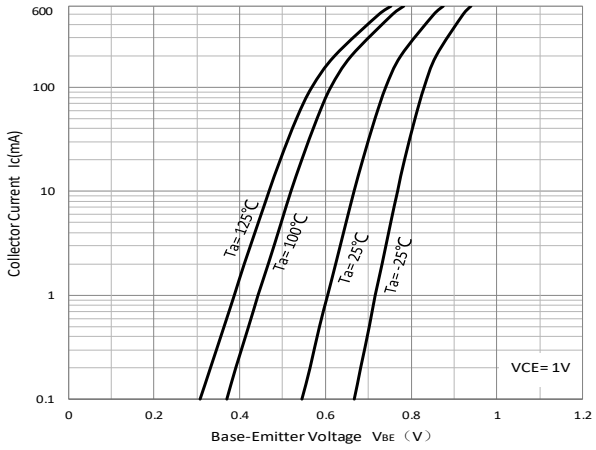


Fig 6：Cob/Cib-V_{CB}/V_{EB}

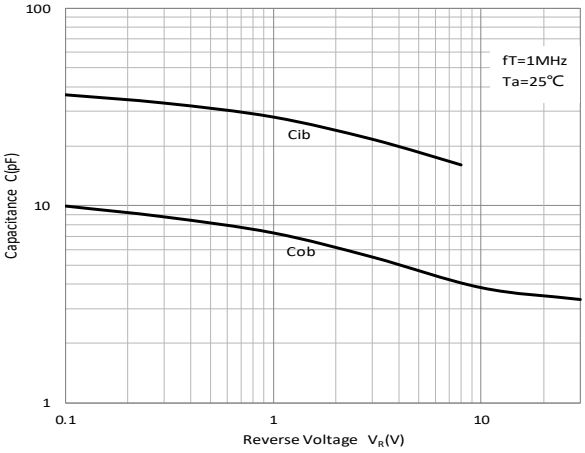
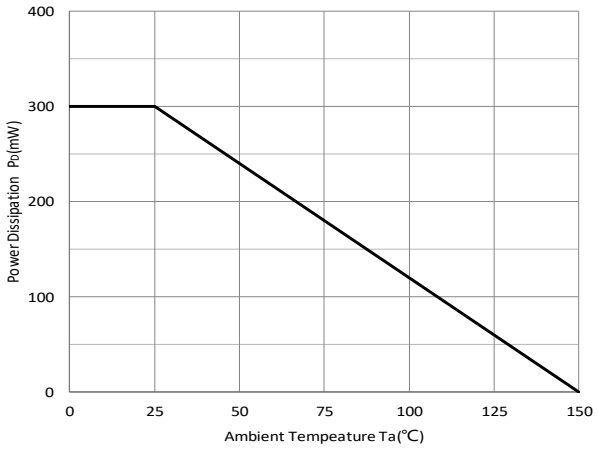


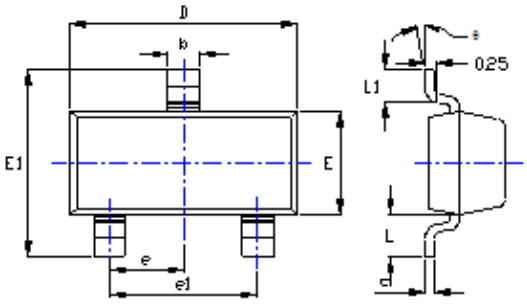
Fig 7：P_D-Ta Curve

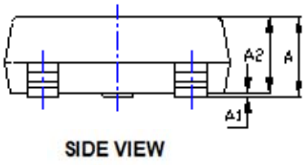


■Ordering Information

Preferred P/N	Packing code	Unit weight(g)	Minimum package(pcs)	Inner box quantity(pcs)	Outer carton quantity(pcs)	Delivery mode
MMBT4401	F2	Approximate 0.008	3000	30000	120000	7” reel
MMBT4401	F4	Approximate 0.008	10000	/	210000	13” reel

■ Outline Dimensions

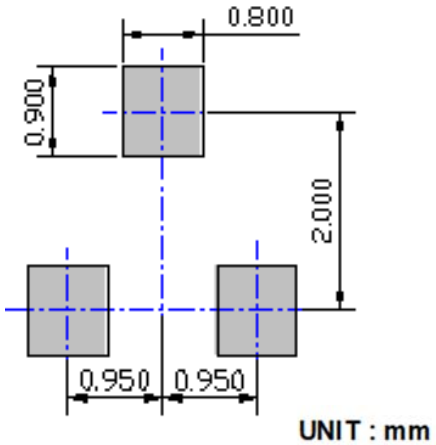




DIMENSIONS				
SYMBOL	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.045	0.900	1.150
A1	0.000	0.004	0.000	0.100
A2	0.035	0.041	0.900	1.050
b	0.012	0.020	0.300	0.500
c	0.004	0.008	0.100	0.200
D	0.110	0.118	2.800	3.000
E	0.047	0.055	1.200	1.400
E1	0.089	0.100	2.250	2.550
e	0.037TYP		0.950TYP	
e1	0.071	0.079	1.800	2.000
L	0.022REF		0.550REF	
L1	0.012	0.020	0.300	0.500
θ	0°	8°	0°	8°

Note:
1. All dimensions are in millimeters (mm) unless otherwise specified.
[所有尺寸均以毫米为单位，除非另有说明]
2. General tolerances: ±0.10mm unless otherwise specified.
[通用公差为±0.10mm，除非另有说明]
3. Dimensions and tolerances per ASME Y14.5M–2018.
[尺寸和公差遵循 ASME Y14.5M–2018 标准]
4.All dimensions shown are exclusive of burrs and gate residues. Burrs and gate vestiges shall not exceed 0.15 mm in maximum.
[所有尺寸均不包括毛刺和浇口残留。毛刺与浇口残留的尺寸最大不得超过 0.15mm]
5.Dimension b does not include dambar protrusion of max 0.100 mm per side.
[尺寸b不包括单边最大0.100 MM的中筋凸出部分]
6.Dimensions D and E are the overall extreme outer dimensions of the mold compound. These dimensions exclude mold flash, lead flash, protrusions and burrs but include the maximum allowable mold mismatch.
[D和E是塑封体的外部极限尺寸，不包括包封溢料、内引线溢料、凸出部分以及胶体毛刺，但是包含了包封错位的最大尺寸]
7.Formed leads shall be planar with respect to one another within a maximum of 0.076 mm relative to the seating plane.
[成型的管脚应为同一平面，共面性最大为0.1mm]

■ Suggested Pad Layout



Notice

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