



MMBT5401

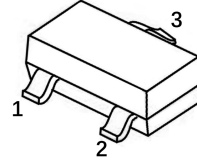
PNP Plastic-Encapsulate Transistors

Product data sheet

1. General description

PNP Transistor encapsulated in a small SOT-23 Surface- Mounted Device (SMD) plastic package.

SOT-23



2. Features

- Ideal for Medium Power Amplification and Switching
- Complementary to MMBT5551

3. Applications

- Surface Mount Package Ideally Suited for Automatic Insertion
- For General Purpose Switching Applications

4. Quick reference data

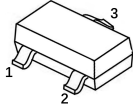
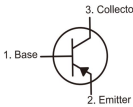
Table 1. Quick reference data

$T_a=25^{\circ}\text{C}$

Symbol	Parameter	Value	Unit
V_{CB0}	Collector-Base Voltage	-160	V
V_{CE0}	Collector-Emitter Voltage	-150	V
V_{EB0}	Emitter-Base Voltage	-5	V
I_C	Collector Current	-0.6	A
P_C	Collector Power Dissipation	300	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	416	$^{\circ}\text{C}/\text{W}$
T_J, T_{stg}	Operation Junction and Storage Temperature Range	-55 ~ +150	$^{\circ}\text{C}$

5. Pinning information

Table 2. Pinning information

Pin	Name	SOT-23 Simplified outline	Graphic symbol
1	Base		
2	Emitter		
3	Collector		

6. Ordering information

Table 3. Ordering information

Part number	Package	Material	Packing	Quantity per reel	Flammability rating	Reel size
MMBT5401	SOT-23	halogen free	tape & reel	3,000pcs	UL 94V-0	7 inches

7. Marking

Table 4. Marking codes

Part number	Marking code
MMBT5401	2L

8. MAXIMUM RATINGS (Ta=25℃ unless otherwise noted)

Table 5. Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	-160	V
V_{CEO}	Collector-Emitter Voltage	-150	V
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current	-0.6	A
P_C	Collector Power Dissipation	300	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	416	℃/W
T_J, T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	℃

9. ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

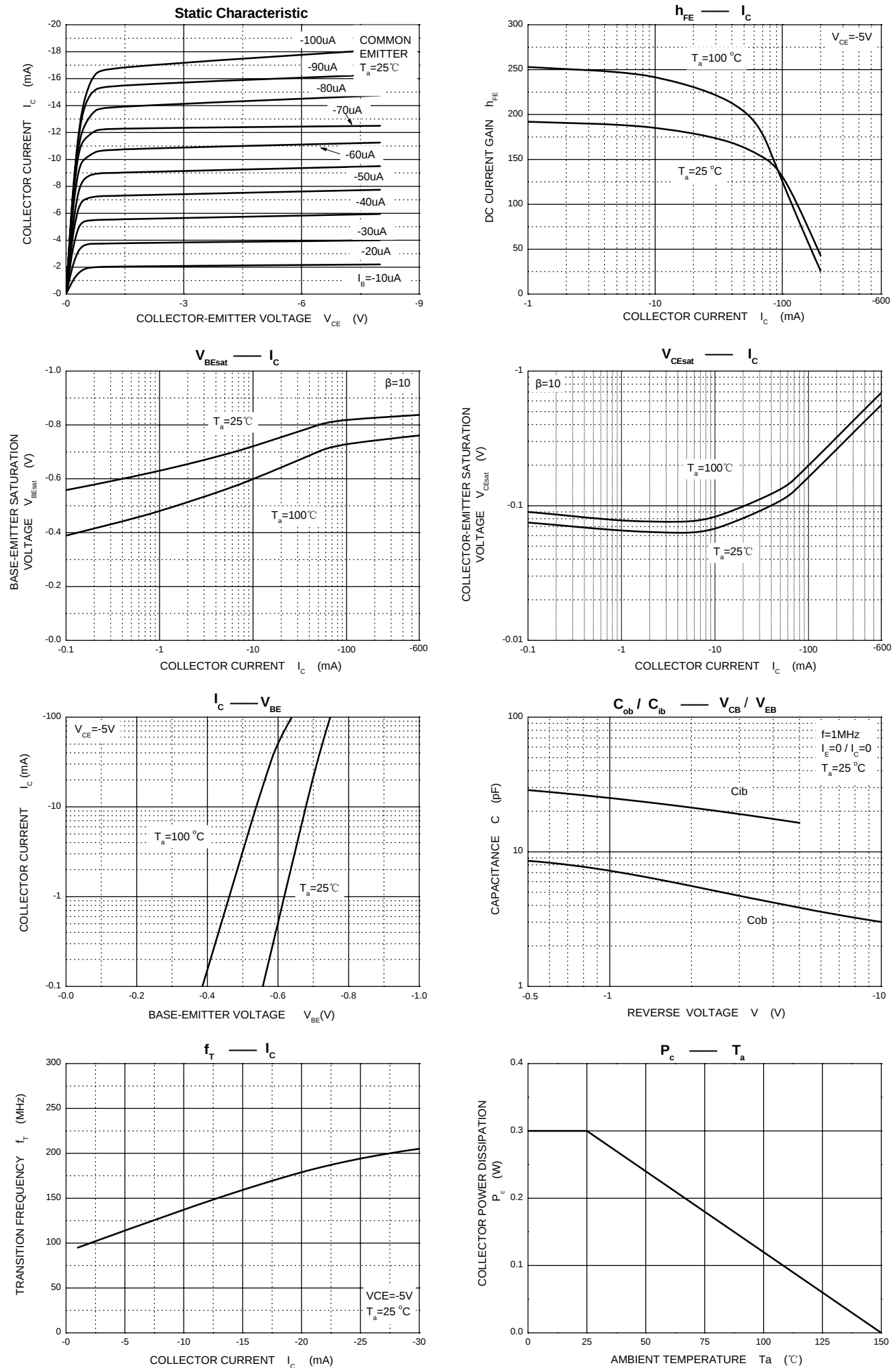
Table 6. Electrical Characteristics

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = -100\mu A, I_E = 0$	-160			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -1mA, I_B = 0$	-150			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = -100\mu A, I_C = 0$	-5			V
Collector cut-off current	I_{CBO}	$V_{CB} = -60V, I_E = 0$			-0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = -5V, I_C = 0$			-0.1	μA
DC current gain	$h_{FE(1)}^*$	$V_{CE} = -5V, I_C = -1mA$	80			
	$h_{FE(2)}^*$	$V_{CE} = -5V, I_C = -10mA$	100		300	
	$h_{FE(3)}^*$	$V_{CE} = -5V, I_C = -50mA$	50			
Collector-emitter saturation voltage	$V_{CE(sat)1}^*$	$I_C = -10mA, I_B = -1mA$			-0.2	V
	$V_{CE(sat)2}^*$	$I_C = -50mA, I_B = -5mA$			-0.5	V
Base-emitter saturation voltage	$V_{BE(sat)1}$	$I_C = -10mA, I_B = -1mA$			-1	V
	$V_{BE(sat)2}$	$I_C = -50mA, I_B = -5mA$			-1	V
Transition frequency	f_T	$V_{CE} = -5V, I_C = -10mA$ $f = 30MHz$	100			MHz

Table 7. CLASSIFICATION OF h_{FE}

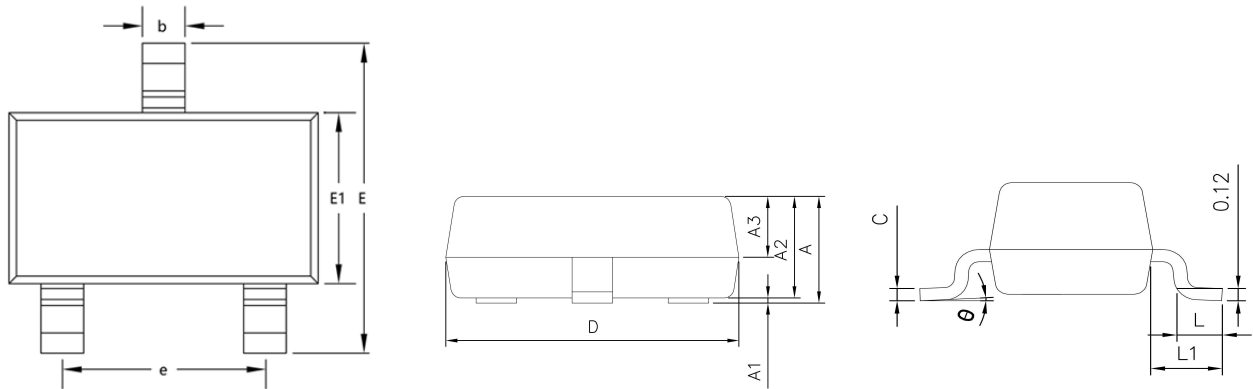
Rank	L	H
Range	100-200	200-300

10. Typical characteristics



11. Package outline

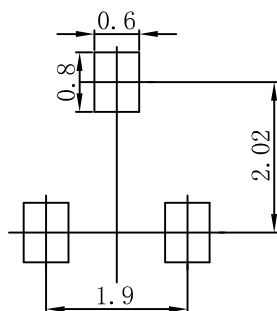
Table 8. SOT-23 Package outline



Symbol	Dimension in millimeter		
	Min	Nom	Max
A	0.9	1.05	1.2
A1	0.0	0.05	0.1
A2	0.9	1.00	1.10
A3	0.55	0.60	0.65
b	0.30	0.40	0.50
c	0.10	0.11	0.12
D	2.80	2.90	3.0
E	2.25	2.40	2.55
E1	1.20	1.30	1.40
e	1.8	1.9	2.0
L	0.30	0.40	0.50
L1	0.475	0.55	0.625
θ	0°	3°	6°

12. Suggested pad layout

Table 9. Suggested pad layout



Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

13.Disclaimer

CCX PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with CCX products. You are solely responsible for

- (1) selecting the appropriate CCX products for your application;
- (2) designing, validating and testing your application;
- (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements.

These resources are subject to change without notice. CCX grants you permission to use these resources only for development of an application that uses the CCX products described in the resource. Other reproduction and display of these resources are prohibited. No license is granted to any other CCX intellectual property right or to any third party intellectual property right. CCX disclaims responsibility for, and you will fully indemnify CCX and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources. CCX's products are provided subject to CCX's Terms of Sale or other applicable terms available either on www.CCX.com or provided in conjunction with such CCX products. CCX's provision of these resources does not expand or otherwise alter CCX's applicable warranties or warranty disclaimers for CCX products.