

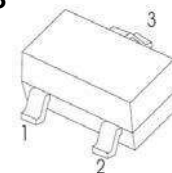
## SOT-23 Plastic Encapsulate Transistors

TRANSISTOR (PNP)

### Features:

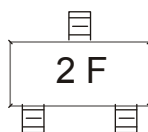
- Epitaxial planar die construction
- Complementary NPN Type available(MMBT2222A)
- ESD contact discharge typical 6KV, max 8KV
- ESD air discharge typical 8KV, max 12KV

SOT-23



1. BASE
2. EMITTER
3. COLLECTOR

### Marking: 2F



### MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)

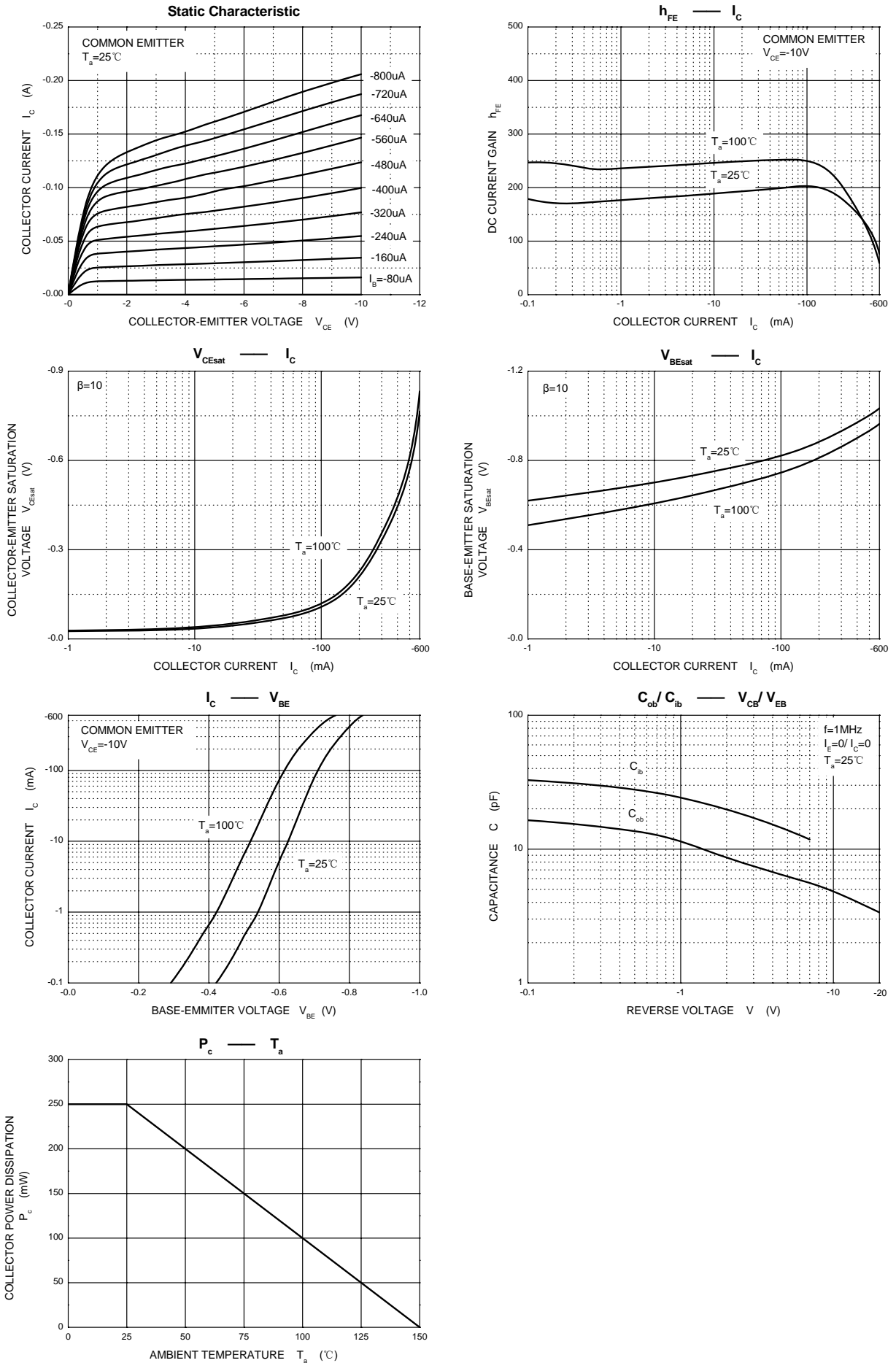
Symbol	Parameter	Value	Unit
V <sub>CBO</sub>	Collector-Base Voltage	-60	V
V <sub>CEO</sub>	Collector-Emitter Voltage	-60	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5	V
I <sub>c</sub>	Collector Current -Continuous	-600	mA
P <sub>D</sub>	Total Device Dissipation	250	mW
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient	500	°C/W
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55 to +150	°C

### ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)

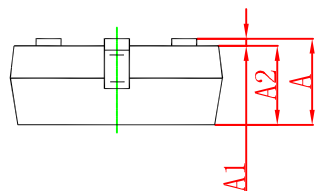
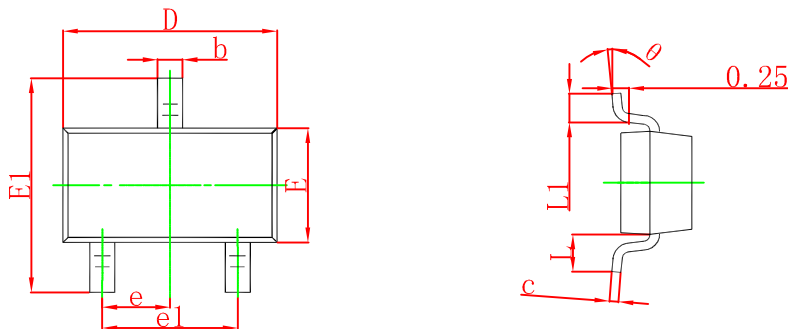
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>c</sub> =-10μA, I <sub>E</sub> =0	-60			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO*</sub>	I <sub>c</sub> =-10mA, I <sub>B</sub> =0	-60			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =-10μA, I <sub>c</sub> =0	-5			V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =-50V, I <sub>E</sub> =0			-20	nA
Base cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =-3V, I <sub>c</sub> =0			-10	nA
Collector cut-off current	I <sub>CEX</sub>	V <sub>CE</sub> =-30 V, V <sub>BE(off)</sub> =-0.5V			-50	nA
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> =-10V, I <sub>c</sub> =-150mA	100		300	
	h <sub>FE(2)</sub>	V <sub>CE</sub> =-10V, I <sub>c</sub> =-0.1mA	75			
	h <sub>FE(3)</sub>	V <sub>CE</sub> =-10V, I <sub>c</sub> =-1mA	100			
	h <sub>FE(4)</sub>	V <sub>CE</sub> =-10V, I <sub>c</sub> =-10mA	100			
	h <sub>FE(5)</sub>	V <sub>CE</sub> =-10V, I <sub>c</sub> =-500mA	50			
Collector-emitter saturation voltage	V <sub>CE(sat)*</sub>	I <sub>c</sub> =-150mA, I <sub>B</sub> =-15mA			-0.4	V
	V <sub>CE(sat)*</sub>	I <sub>c</sub> =-500mA, I <sub>B</sub> =-50mA			-1.6	V
Base-emitter saturation voltage	V <sub>BE(sat)*</sub>	I <sub>c</sub> =-150mA, I <sub>B</sub> =-15mA			-1.3	V
	V <sub>BE(sat)*</sub>	I <sub>c</sub> =-500mA, I <sub>B</sub> =-50mA			-2.6	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =-20V, I <sub>c</sub> =-50mA, f=100MHz	200			MHz
Delay time	t <sub>d</sub>	V <sub>CE</sub> =-30V, I <sub>c</sub> =-150mA, I <sub>B1</sub> =-15mA			10	ns
Rise time	t <sub>r</sub>				25	ns
Storage time	t <sub>s</sub>	V <sub>CE</sub> =-6V, I <sub>c</sub> =-150mA,			225	ns
Fall time	t <sub>f</sub>	I <sub>B1</sub> =- I <sub>B2</sub> =- 15mA			60	ns

\* pulse test: Pulse Width ≤300μs, Duty Cycle≤2.0%.

**Typical Characteristics**

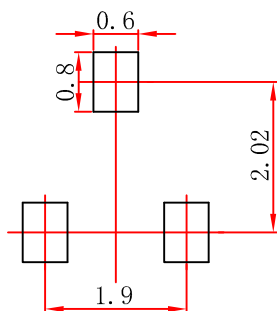


### SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

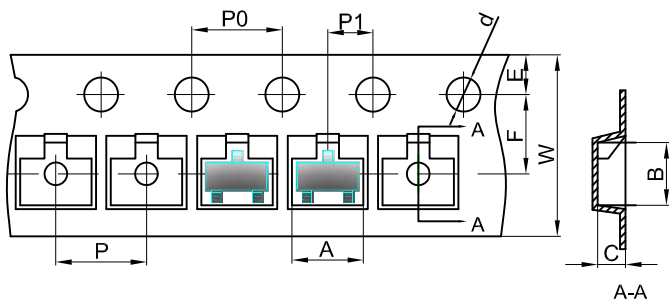
### SOT-23 Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance: ± 0.05mm.
  3. The pad layout is for reference purposes only.

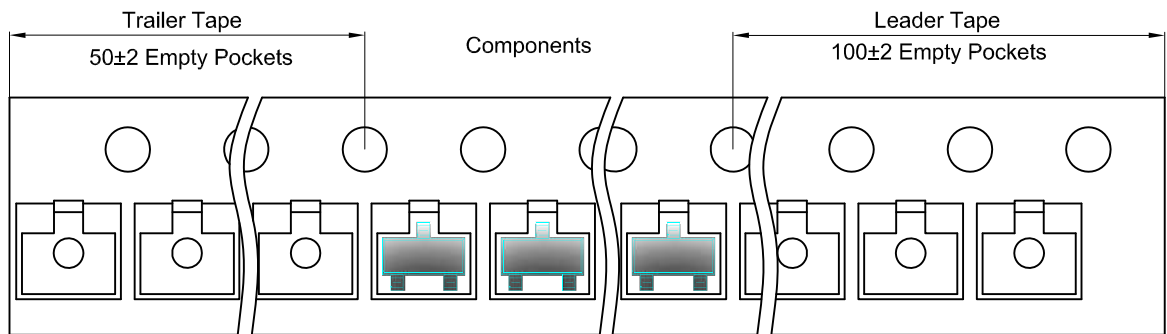
**SOT-23 Tape and Reel**

SOT-23 Embossed Carrier Tape

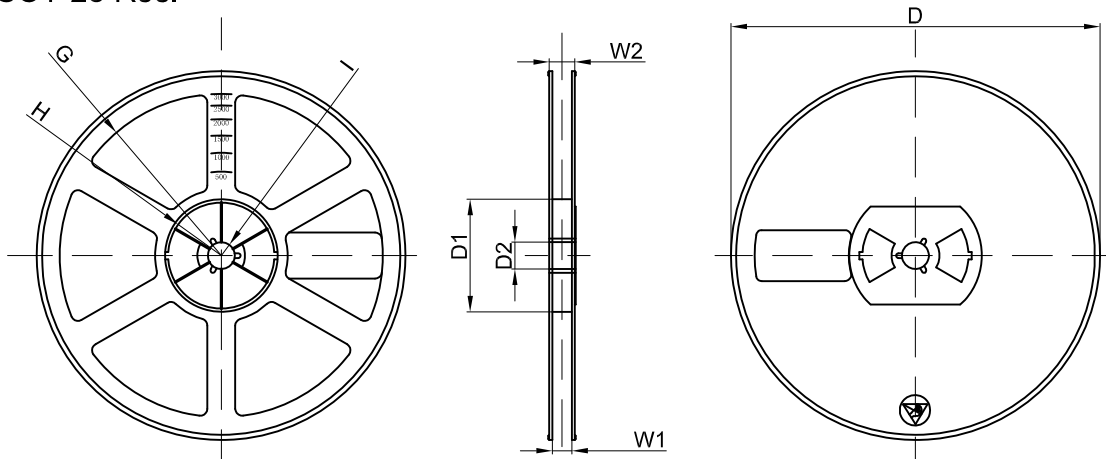


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

**SOT-23 Tape Leader and Trailer**



**SOT-23 Reel**



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	45,000 pcs	203×203×195	180,000 pcs	438×438×220	

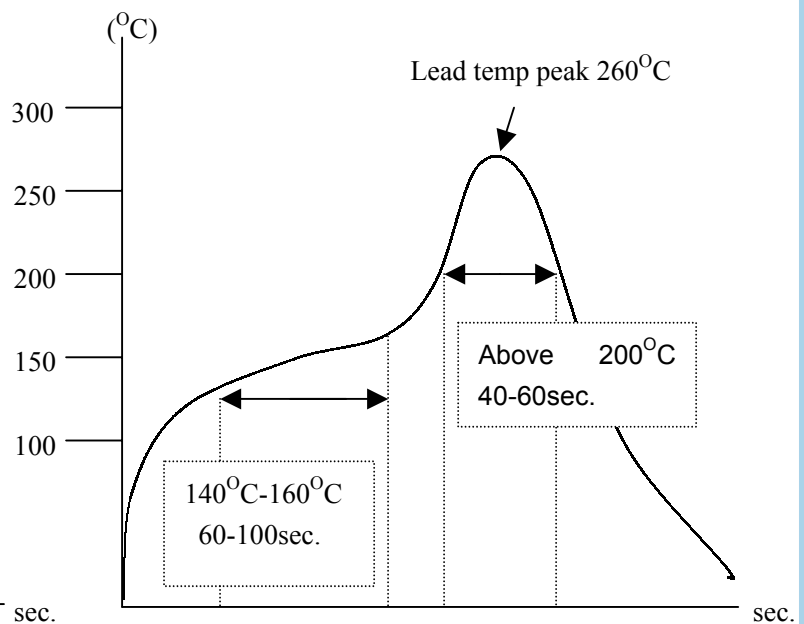
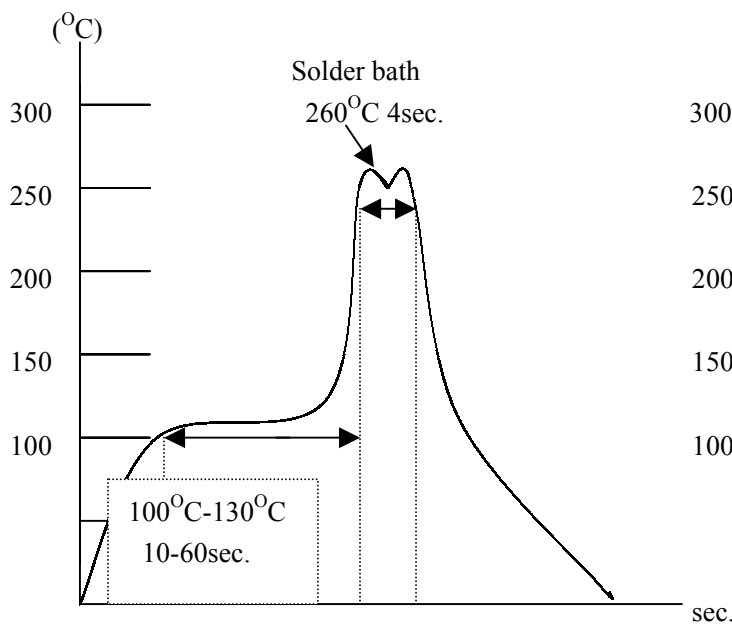
# Soldering Condition

1. (A). Recommended of flow soldering condition.

(B). Recommended of reflow Soldering condition.

Dip Time: 4sec.

Time: maximum of twice



## 2. Condition of hand Soldering

temperature: 370°C max.

Time: 3sec. max.