



## FEATURES

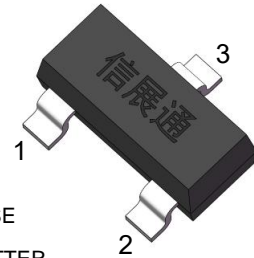
- Epitaxial planar die construction
- Complementary NPN Type available(MMBT2222A)

Marking: 2F

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

Symbol	Parameter	Value	Unit
V <sub>CB0</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

## SOT-23



1. BASE
2. EMITTER
3. COLLECTOR

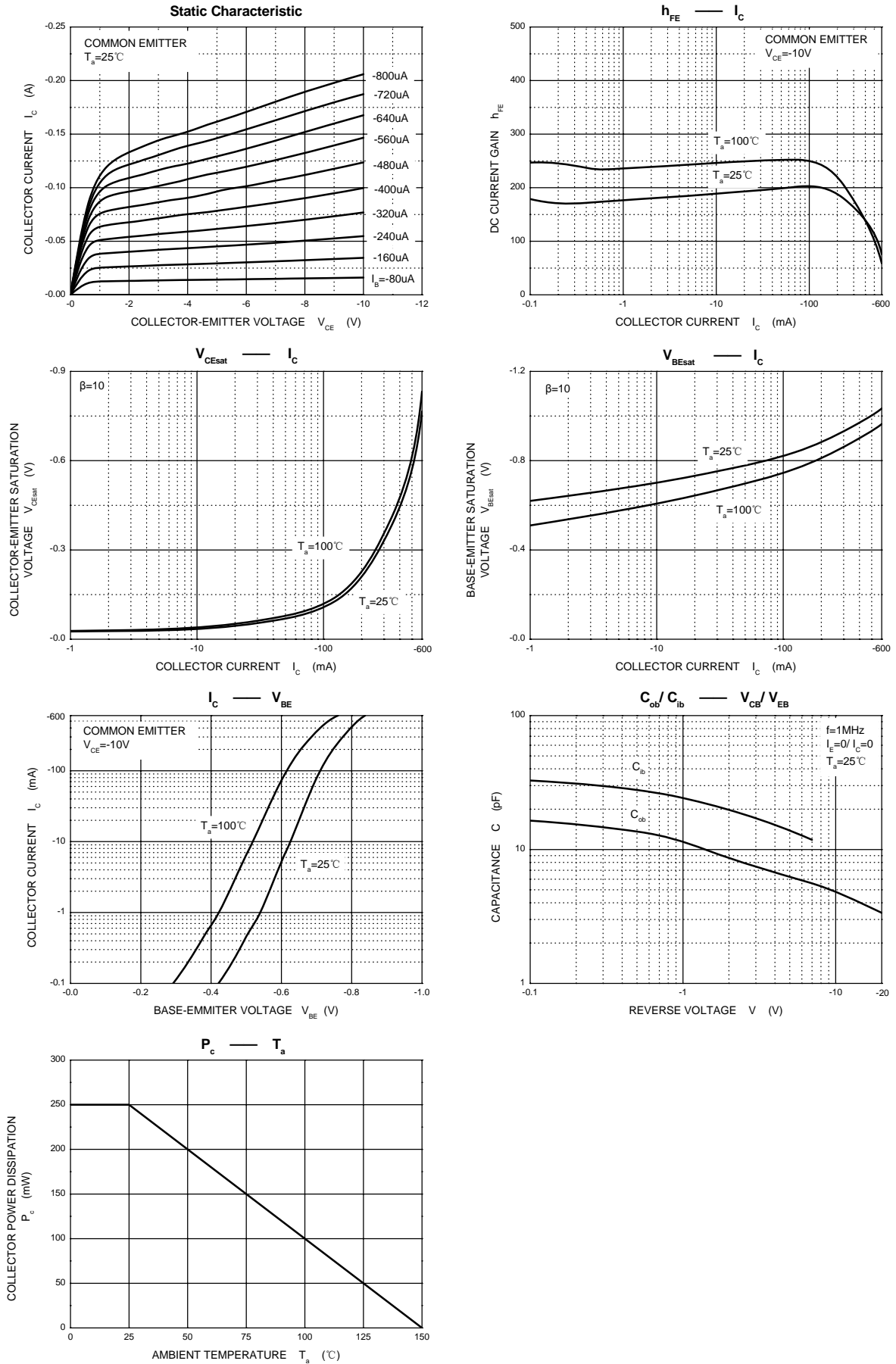
ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)

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>CB0</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> =-30V, 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, I <sub>B1</sub> =- I <sub>B2</sub> =- 15mA			225	ns
Fall time	t <sub>f</sub>				60	ns

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

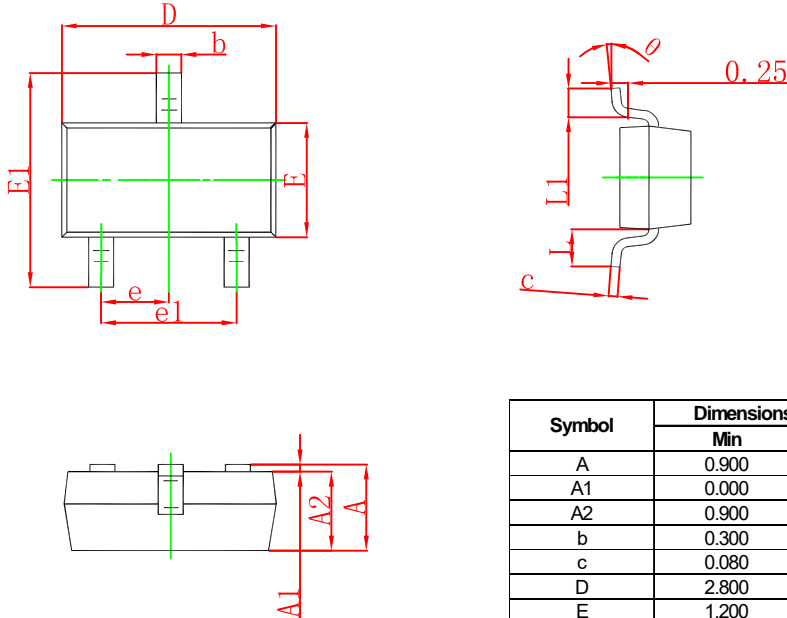


Typical Characteristics



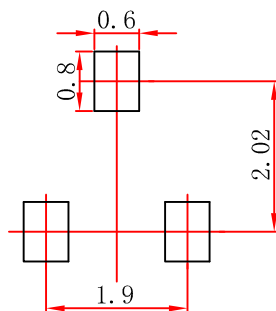


### SOT-23 Package Outline Dimensions



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.