

# MSKSEMI

SEMICONDUCTOR



ESD



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MOV

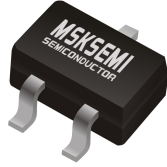


GDT

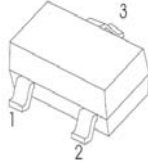


PLED

Product data sheet



SOT - 23



- 1. BASE
- 2. EMITTER
- 3. COLLECTOR

TRANSISTOR (PNP)

**FEATURES**

- As complementary type, the NPN transistor MMBT3904-MS is Recommended
- Epitaxial planar die construction

MARKING: 2A

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

Symbol	Parameter	Value	Unit
V <sub>CB0</sub>	Collector-Base Voltage	-40	V
V <sub>CEO</sub>	Collector-Emitter Voltage	-40	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5	V
I <sub>C</sub>	Collector Current -Continuous	-0.2	A
P <sub>C</sub>	Collector Dissipation	0.2	W
R <sub>θJA</sub>	Thermal resistance junction to ambient	625	°C/W
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55~+150	°C

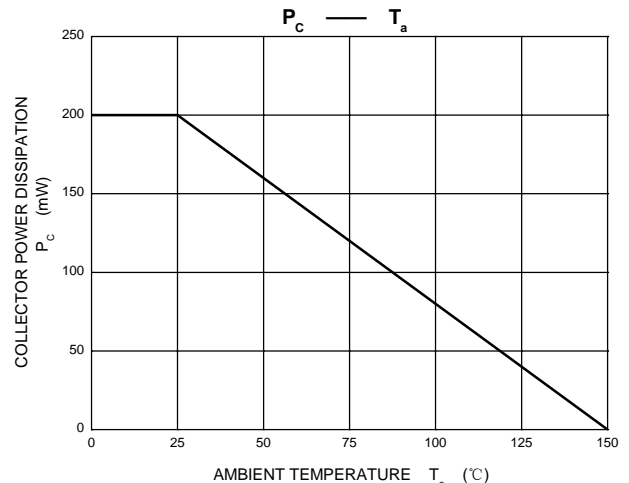
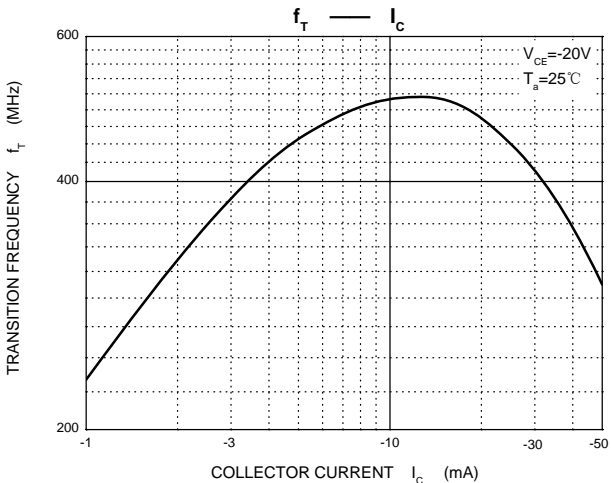
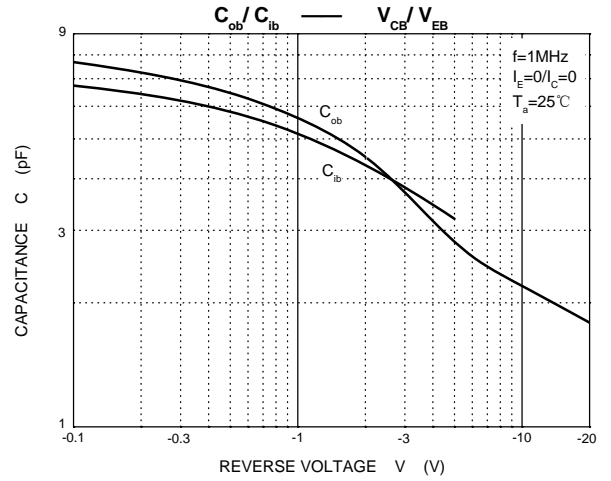
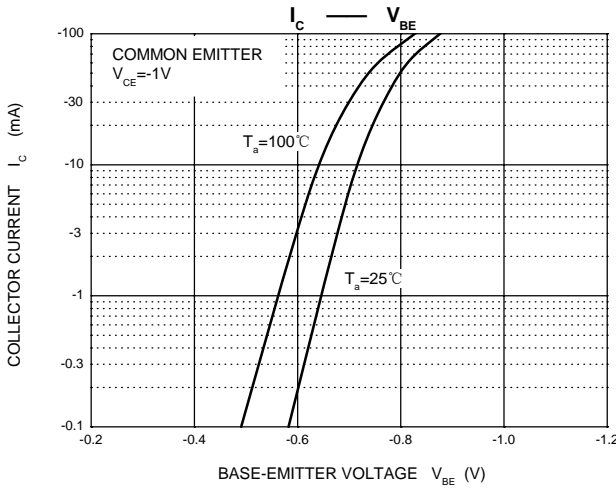
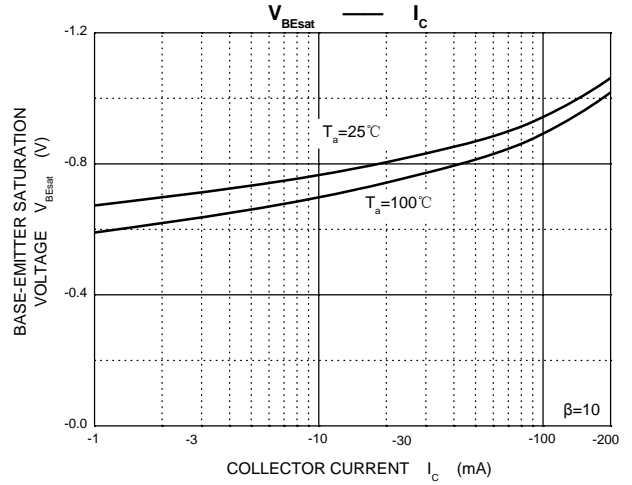
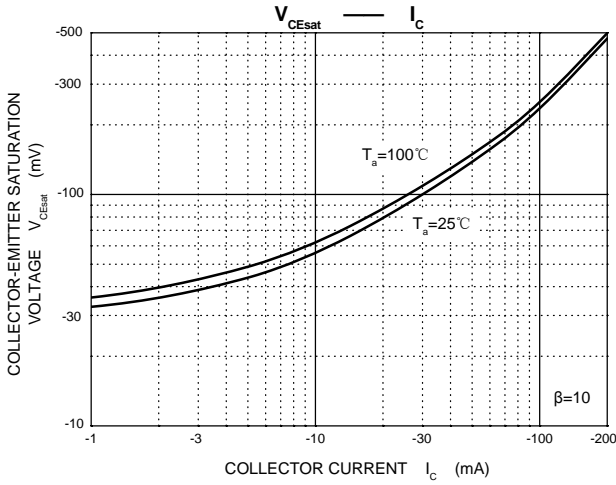
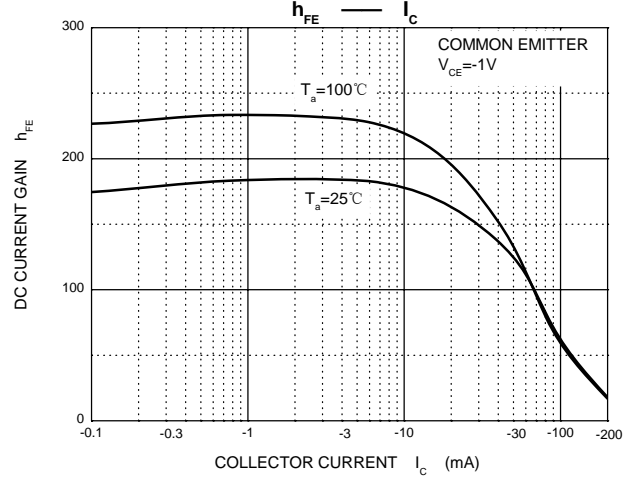
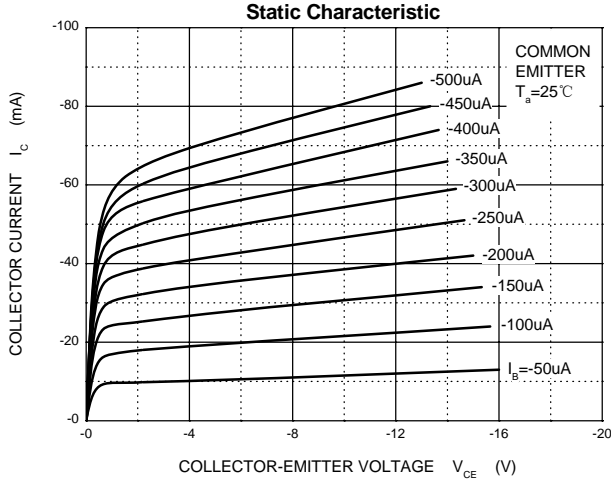
**ELECTRICAL CHARACTERISTICS (T<sub>amb</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =-10μA, I <sub>E</sub> =0	-40		V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = -1mA, I <sub>B</sub> =0	-40		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> = -40 V, I <sub>E</sub> =0		-100	nA
Collector cut-off current	I <sub>CEX</sub>	V <sub>CE</sub> =-30V, V <sub>BE(off)</sub> =-3V		-50	nA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = -5V, I <sub>C</sub> =0		-100	nA
DC current gain	h <sub>FE1</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> = -10mA	100	300	
	h <sub>FE2</sub>	V <sub>CE</sub> = -1V, I <sub>C</sub> =-50mA	60		
	h <sub>FE3</sub>	V <sub>CE</sub> = -2V, I <sub>C</sub> =-100mA	30		
Collector-emitter saturation voltage	V <sub>CE(sat)1</sub>	I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA		-0.3	V
Base-emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = -50mA, I <sub>B</sub> =-5mA		-0.95	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =-20V, I <sub>C</sub> =-10mA, f=100MHz	300		MHz
Delay Time	t <sub>d</sub>	V <sub>CC</sub> =-3V, V <sub>BE</sub> =-0.5V I <sub>C</sub> =-10mA, I <sub>B1</sub> =I <sub>B2</sub> =-1mA		35	nS
Rise Time	t <sub>r</sub>			35	nS
Storage Time	t <sub>s</sub>	V <sub>CC</sub> =-3V, I <sub>C</sub> =-10mA I <sub>B1</sub> =I <sub>B2</sub> =-1mA		225	nS
Fall Time	t <sub>f</sub>			75	nS

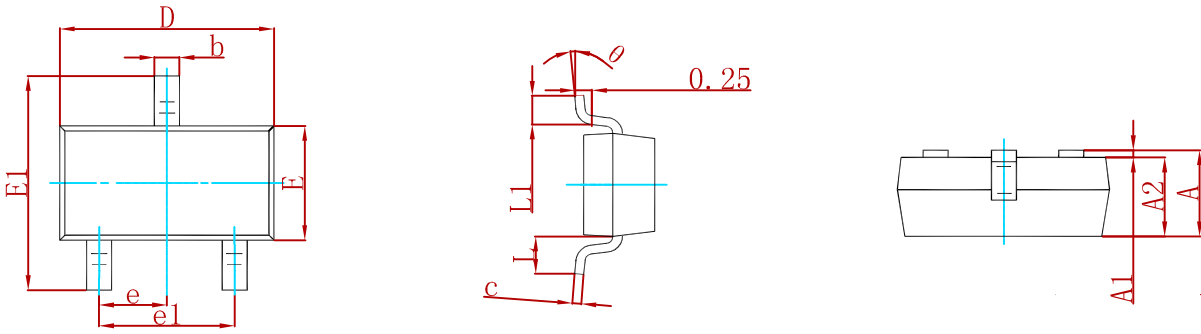
**CLASSIFICATION OF h<sub>FE(1)</sub>**

HFE	100-300	
RANK	L	H
RANGE	100 - 200	200 - 300

**Typical Characteristics**

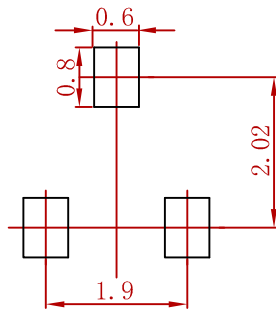


**PACKAGE MECHANICAL DATA**



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°

**Suggested Pad Layout**



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

**REEL SPECIFICATION**

P/N	PKG	QTY
MMBT3906-MS	SOT-23	3000

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