

## Features

- Complementary to MMST3906



SOT-323

1. BASE
2. EMITTER
3. COLLECTOR

## Absolute Maximum Ratings (T<sub>A</sub> = 25 °C unless otherwise noted)

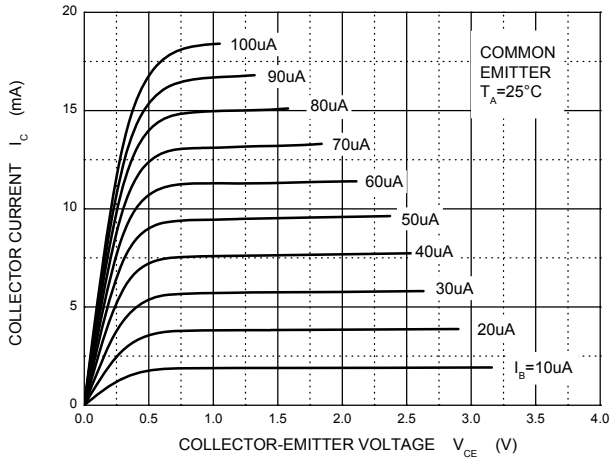
Parameter	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	60	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	5	V
Collector Current	I <sub>C</sub>	200	mA
Collector Power Dissipation	P <sub>C</sub>	200	mW
Thermal Resistance from Junction to Ambient	R <sub>θJA</sub>	625	°C/W
Junction Temperature	T <sub>J</sub>	-55 to +150	°C
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C

## Electrical Characteristics (T<sub>A</sub> = 25 °C unless otherwise noted)

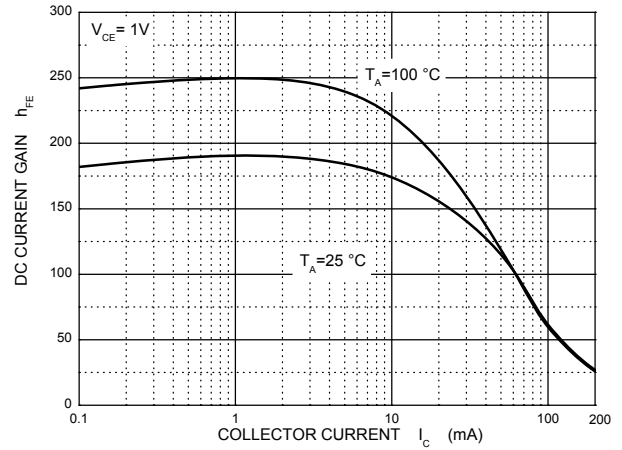
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub> *	I <sub>C</sub> =10μA, I <sub>E</sub> =0	60	-	-	V
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub> *	I <sub>C</sub> =1mA, I <sub>B</sub> =0	40	-	-	V
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub> *	I <sub>E</sub> =10μA, I <sub>C</sub> =0	5	-	-	V
Collector Cut-off Current	I <sub>CBO</sub> *	V <sub>CB</sub> =60V, I <sub>E</sub> =0	-	-	60	nA
Collector Cut-off Current	I <sub>CE</sub>	V <sub>CE</sub> =30V, V <sub>BE(off)</sub> =3V	-	-	50	nA
DC Current Gain	h <sub>FE</sub> *	V <sub>CE</sub> =1V, I <sub>C</sub> =100μA	40	-	-	-
		V <sub>CE</sub> =1V, I <sub>C</sub> =1mA	70	-	-	-
		V <sub>CE</sub> =1V, I <sub>C</sub> =10mA	100	-	300	-
		V <sub>CE</sub> =1V, I <sub>C</sub> =50mA	60	-	-	-
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub> *	I <sub>C</sub> =10mA, I <sub>B</sub> =1mA	-	-	0.25	V
		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> =10mA, I <sub>B</sub> =1mA	-	-	0.85	V
		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
Collector Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =5V, I <sub>E</sub> =0, f=1MHz	-	-	4	pF
Collector Output Capacitance	C <sub>ib</sub>	V <sub>EB</sub> =0.5V, I <sub>E</sub> =0, f=1MHz	-	-	8	pF
Delay Time	t <sub>d</sub>	V <sub>CC</sub> =3V, V <sub>BE(off)</sub> =0.5V, I <sub>C</sub> =10mA,	-	-	35	nS
Rise Time	t <sub>r</sub>	I <sub>B1</sub> =1mA	-	-	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

\*Pulse test: pulse width ≤300μs, duty cycle ≤ 2.0%.

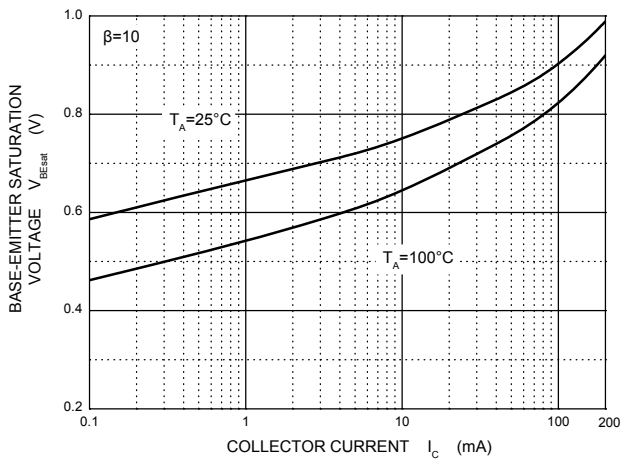
**Typical Characteristic Curves**



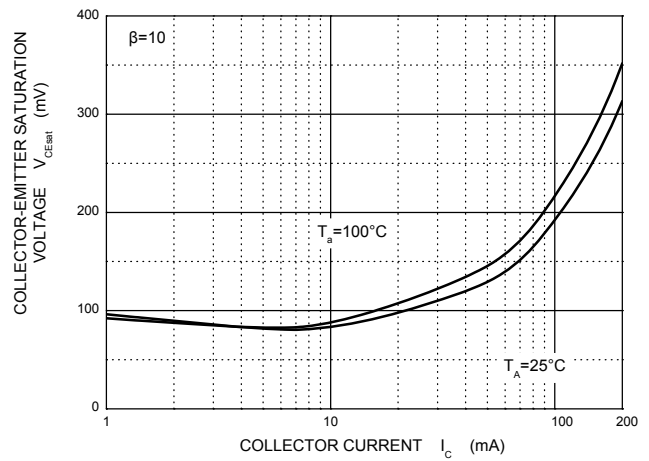
**Static Characteristic**



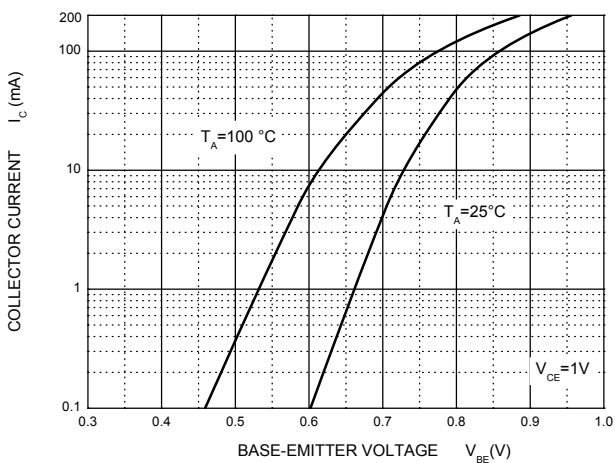
**$h_{FE} - I_C$**



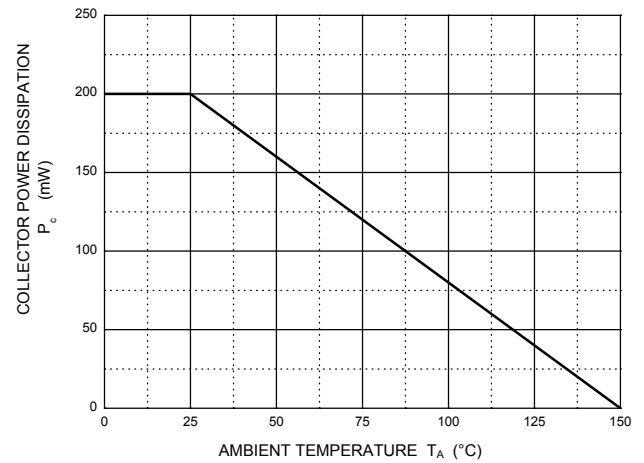
**$V_{BEsat} - I_C$**



**$V_{CEsat} - I_C$**

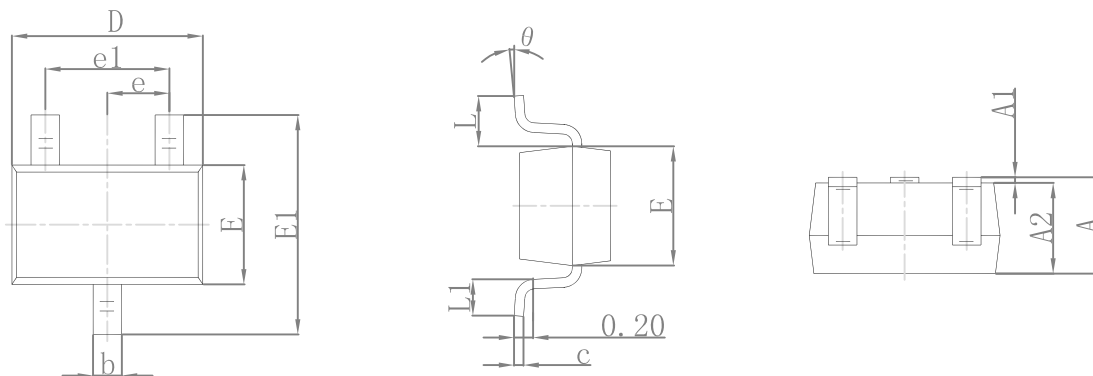


**$I_C - V_{BE}$**



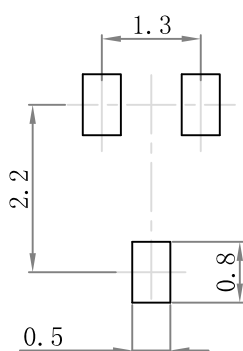
**$P_C - T_A$**

**Package Outline Dimensions SOT-323**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

**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.

**Marking and Ordering Information**

Device	Package	Marking	Quantity	HSF Status
MMST3904	SOT-323	K2N	3000pcs / Reel	RoHS Compliant