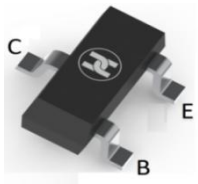
Hottech Semiconductor

MMBT2222A

BIPOLAR TRANSISTOR (NPN)

FEATURES

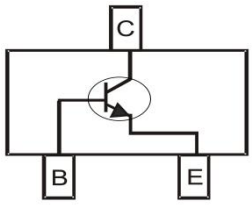
- Complementary to MMBT2907A
- Epitaxial planar die construction
- Surface Mount device



SOT-23

MECHANICAL DATA

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)



MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	600	mA
Collector Power Dissipation	P_C	300	mW
Thermal Resistance From Junction To Ambient	$R_{\theta JA}$	417	°C/W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 ~+150	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	75			V	I_C=10uA, I_E=0
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	40			V	I_C=10mA, I_B=0
Emitter-base breakdown voltage	$V_{(BR)EBO}$	6			V	I_E=10uA, I_C=0
Collector cut-off current	I_{CBO}			0.01	uA	V_{CB}=60V, I_E=0
Collector cut-off current	I_{CEX}			0.01	uA	V_{CE}=30V, $V_{BE(OFF)}$=3V
Emitter cut-off current	I_{EBO}			0.1	uA	V_{EB}=3V, I_C=0
DC current gain	h_{FE1}	100		300		V_{CE}=10V, I_C=150mA
	h_{FE2}	40				V_{CE}=10V, I_C=0.1mA
	h_{FE3}	42				V_{CE}=10V, I_C=500mA
Collector-emitter saturation voltage	$V_{CE(sat)}$			1	V	I_C=500mA, I_B=50mA
	$V_{CE(sat)}$			0.3	V	I_C=150mA, I_B=15mA
Base-emitter saturation voltage	$V_{BE(sat)}$			2.0	V	I_C=500mA, I_B=50mA
	$V_{BE(sat)}$			1.2	V	I_C=150mA, I_B=15mA
Transition frequency	f_T	150			MHz	V_{CE}=20V, I_C=20mA,f=100MHz
Delay time	t_d			10	ns	V_{CC}=30V, $V_{BE(OFF)}$=0.5V, I_C=150mA, I_{B1}=15mA
Rise time	t_r			25	ns	
Storage time	t_S			225	ns	V_{CC}=30V, I_C=150mA I_{B1}=I_{B2}=15mA
Fall time	t_f			60	ns	

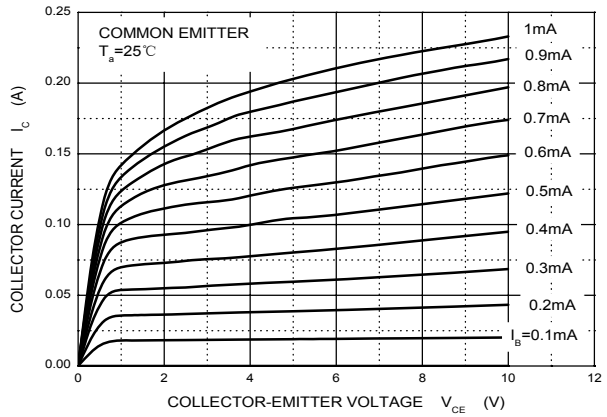
CLASSIFICATION OF h_{FE}

Rank	L	H
Range	100-200	200-300
Marking	1P	1P

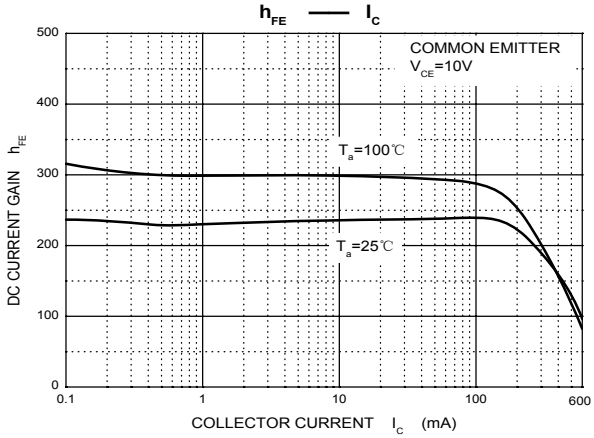
BIPOLAR TRANSISTOR (NPN)

Typical Characteristics

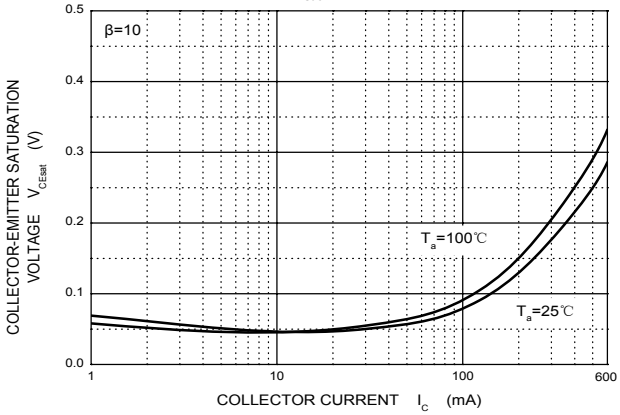
Static Characteristic



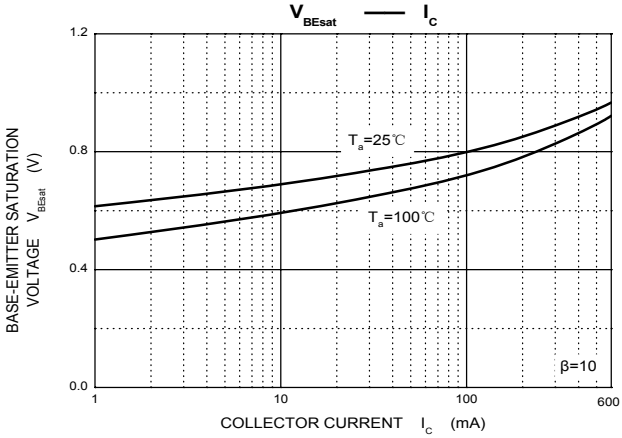
h_{FE} — I_C



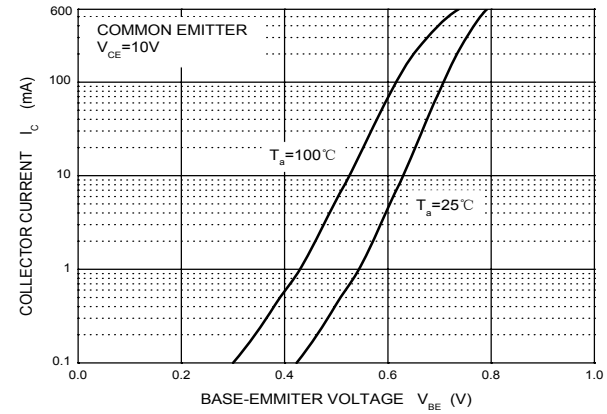
V_{CEsat} — I_C



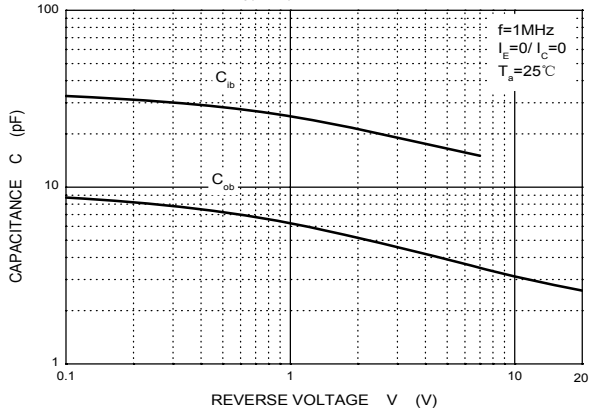
V_{BEsat} — I_C



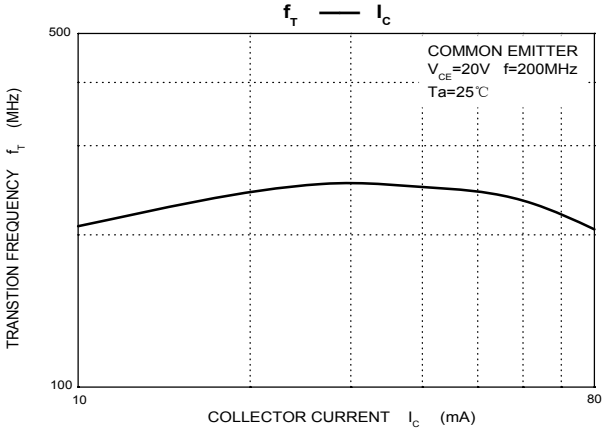
I_C — V_{BE}



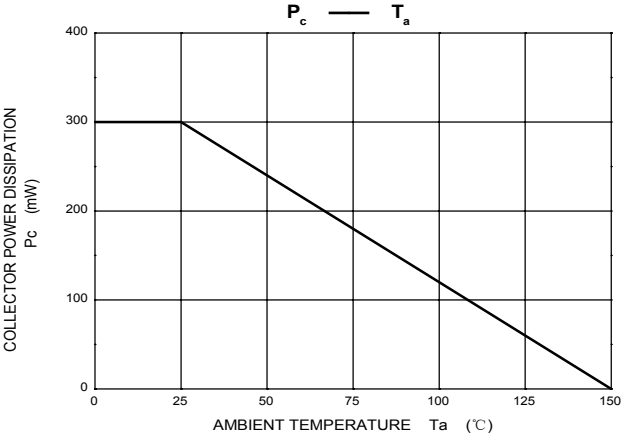
C_{ob} / C_{ib} — V_{CB} / V_{EB}



f_T — I_C

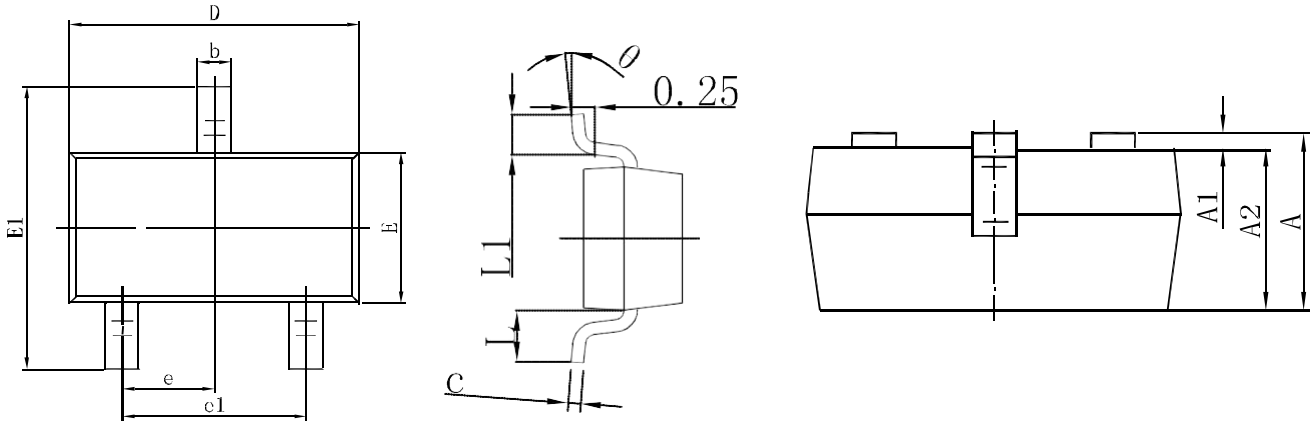


P_c — T_a



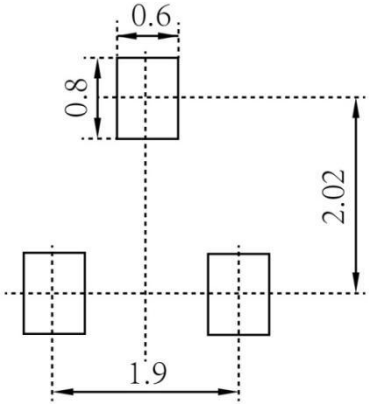
BIPOLAR TRANSISTOR (NPN)

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

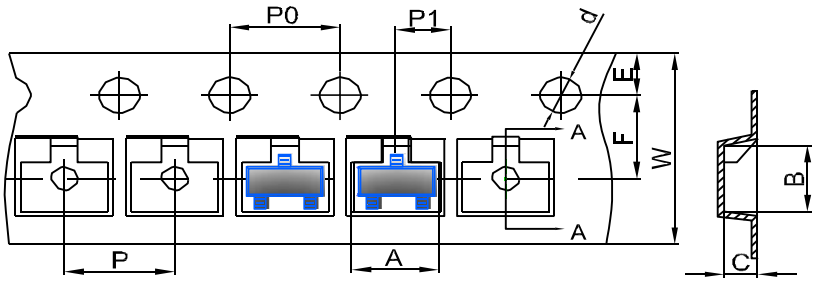
2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only

BIPOLAR TRANSISTOR (NPN)

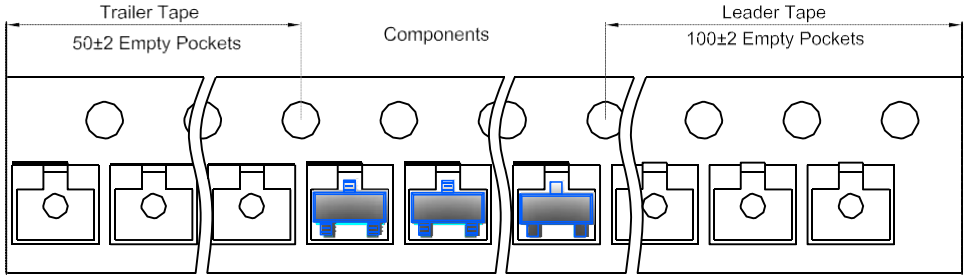
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

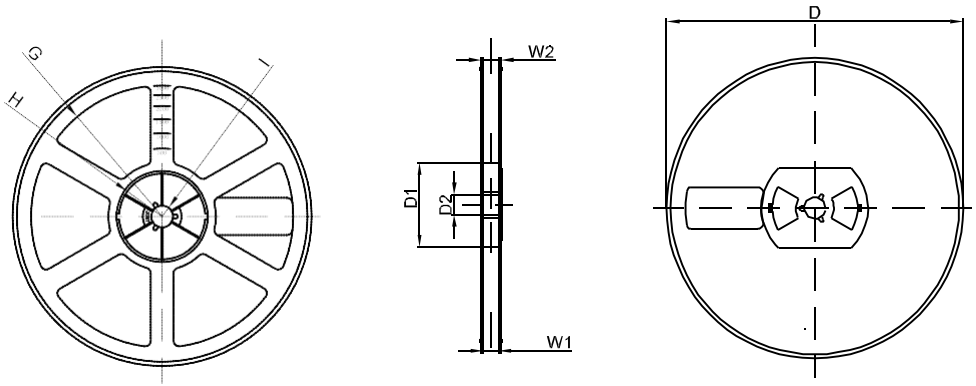


	DIMENSIONS ARE IN MILLIMETER									
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

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	54.40	13.00	R78	R25.60	R6.50	9.50	12.30
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1