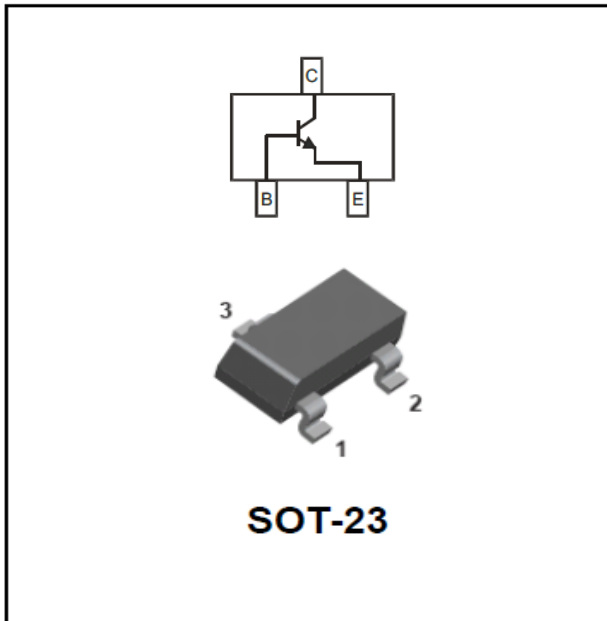


NPN Transistor



Features

- Epoxy meets UL-94 V-0 flammability rating
- Halogen free available upon request by adding suffix "HF"
- Moisture Sensitivity Level 1
- High Conductance
- Surface mount package ideally Suited for Automatic Insertion

Mechanical Data

- **Package:** SOT-23
- Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** 1P

■ Maximum Ratings (Ta=25°C unless otherwise noted)

Item	Symbol	Unit	Value
Collector-Base Voltage	V_{CBO}	V	75
Collector-Emitter Voltage	V_{CEO}	V	40
Emitter-Base Voltage	V_{EBO}	V	6
Collector Current	I_C	mA	600
Collector Power Dissipation	P_C	mW	300
Junction Temperature	T_j	°C	150
Storage Temperature	T_{stg}	°C	-55 to +150

■ Electrical Characteristics (Ta=25°C unless otherwise noted)

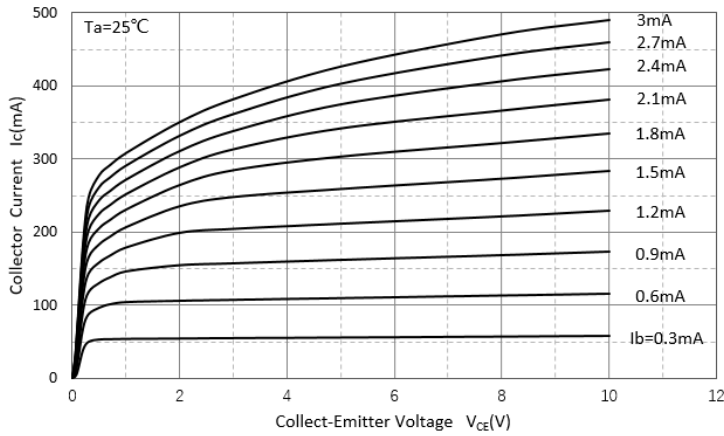
Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-base breakdown voltage	V_{CBO}	V	$I_C=10mA, I_E=0$	75		
Collector-emitter breakdown voltage	V_{CEO^*}	V	$I_C=1mA, I_B=0$	40		
Emitter-base breakdown voltage	V_{EBO}	V	$I_E=100\mu A, I_C=0$	6		
Collector-emitter cut-off current	I_{CEX}	nA	$V_{CE}=60V, V_{BE}=3V$			10
Collector-base cut-off current	I_{CBO}	nA	$V_{CB}=60V, I_E=0$			100
Emitter-base cut-off current	I_{EBO}	nA	$V_{EB}=3V, I_C=0$			100
DC current gain	h_{FE}		$V_{CE}=1V, I_C=0.1mA$	20		
	h_{FE}		$V_{CE}=1V, I_C=1mA$	40		
	h_{FE}		$V_{CE}=1V, I_C=10mA$	80		
	h_{FE}		$V_{CE}=1V, I_C=150mA$	100		300
	h_{FE}		$V_{CE}=1V, I_C=500mA$	40		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	$I_C=150mA, I_B=15mA$			0.3
Base-emitter saturation voltage	$V_{BE(sat)}$	V	$I_C=150mA, I_B=15mA$	0.6		1.2
Transition frequency	f_T	MHz	$V_{CE}=20V, I_C=20mA, f=100MHz$	300		
Delay time	t_d	ns	$V_{CC}=30V, V_{BE(off)}=-0.5V$ $I_C=150mA, I_{B1}=15mA$			15
Rise time	t_r	ns				25
Storage time	t_s	ns	$V_{CC}=30V, I_C=150mA, I_{B1}=I_{B2}=15mA$			225
Fall time	t_f	ns				60

■ Ordering Information (Example)

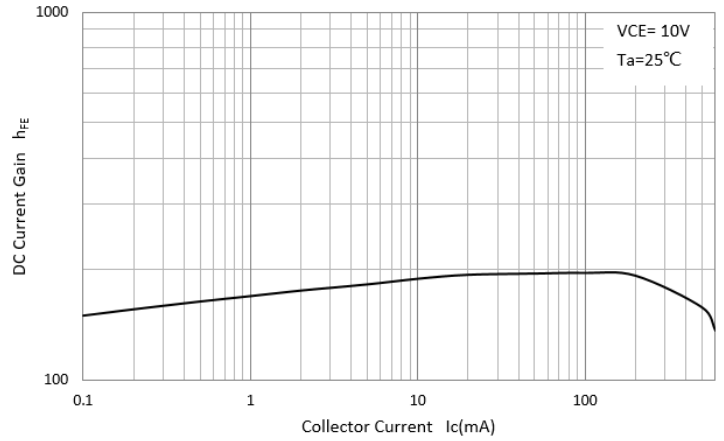
PREFERRED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
MMBT2222A	F2	Approximate 0.008	3000	30000	120000	7" reel

■ Characteristics (Typical)

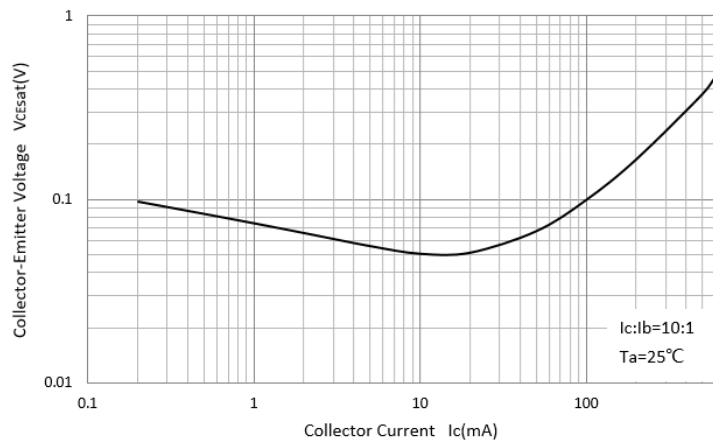
Static Characteristic



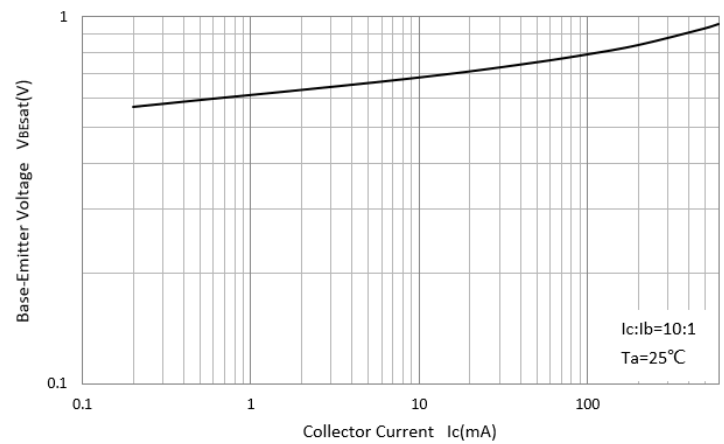
DC Current Gain



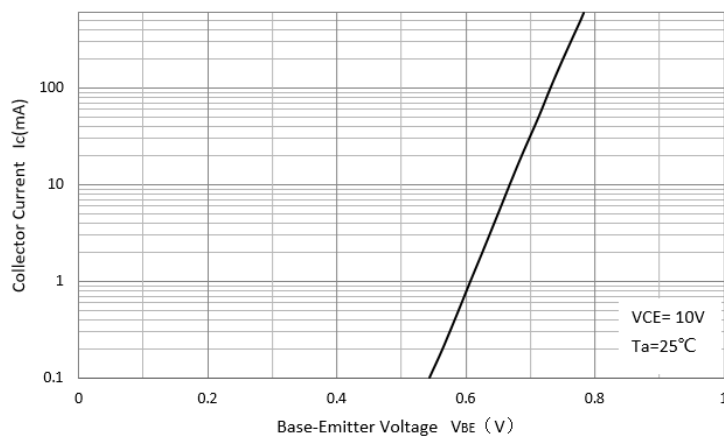
Collector-Emmitter Saturation Voltage



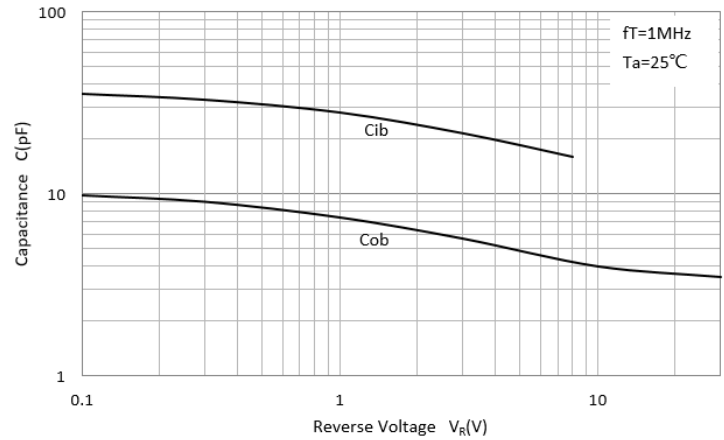
Base-Emmitter Saturation Voltage



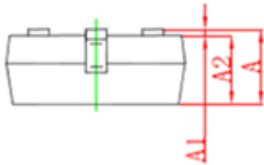
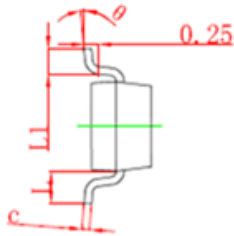
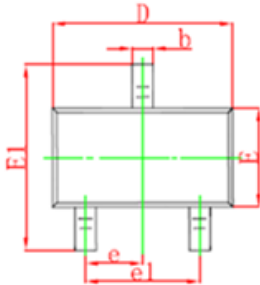
Base-Emmitter On Voltage



$C_{ob}/C_{ib}-V_{CB}/V_{EB}$



■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	0.100	0.200	0.004	0.008
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	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

■SOT-23 Soldering Footprint