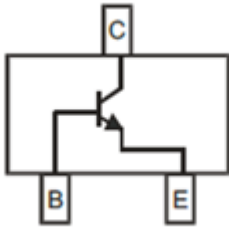


## NPN General Purpose Amplifier



**SOT-23**

### Features

- Epoxy meets UL-94 V-0 flammability rating and halogen free
- Moisture Sensitivity Level 1
- High Conductance
- Part no. with suffix "Q" means AEC-Q101 qualified

### Applications

- Switching and linear amplification

### Mechanical Data

- Case: SOT-23
- 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 -Continuous	$I_C$	mA	600
Total Device Dissipation (*)	$P_D$	mW	300
Thermal Resistance Junction to Ambient (*)	$R_{thJA}$	K/W	417
Junction Temperature	$T_j$	°C	-55 to +150
Storage Temperature	$T_{STG}$	°C	-55 to +150

(\*) Device mounted on FR-4 PCB 1.0 x 1.0 x 0.06 inch.



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

Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-base breakdown voltage	$V_{(BR)CBO}$	V	$I_C=10\mu A, I_E=0$	75		
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	V	$I_C=10mA, I_B=0$	40		
Emitter-base breakdown voltage	$V_{(BR)EBO}$	V	$I_E=10\mu A, I_C=0$	6		
Collector cut-off current	$I_{CEX}$	nA	$V_{CE}=60V, V_{EB}=3V$			10
Base cut-off current	$I_{CBO}$	nA	$V_{CB}=60V, I_E=0$			100
Emitter cut-off current	$I_{EBO}$	nA	$V_{EB}=3V, I_C=0$			100
DC current gain	$h_{FE}$		$V_{CE}=10V, I_C=0.1mA$	35		
	$h_{FE}$		$V_{CE}=10V, I_C=1mA$	50		
	$h_{FE}$		$V_{CE}=10V, I_C=10mA$	75		
	$h_{FE}$		$V_{CE}=10V, I_C=150mA$	100		300
	$h_{FE}$		$V_{CE}=10V, I_C=500mA$	40		
	$h_{FE}$		$V_{CE}=1V, I_C=150mA$	50		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	$I_C=150mA, I_B=15mA$			0.3
	$V_{CE(sat)}$	V	$I_C=500mA, I_B=50mA$			1.0
Base-emitter saturation voltage	$V_{BE(sat)}$	V	$I_C=150mA, I_B=15mA$	0.6		1.2
	$V_{BE(sat)}$	V	$I_C=500mA, I_B=50mA$			2.0
Transition frequency	$f_T$	MHz	$V_{CE}=20V, I_C=20mA, f=100MHz$	300		
Delay time	$t_d$	ns	$V_{CC}=30V, V_{BE(off)}=-0.5V$ $I_C=150mA, I_{B1}=15mA$			10
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
MMBT2222AQ	F2	Approximate 0.01	3000	30000	120000	7" reel



## ■ Characteristics (Typical)

Fig.1-Static Characteristic

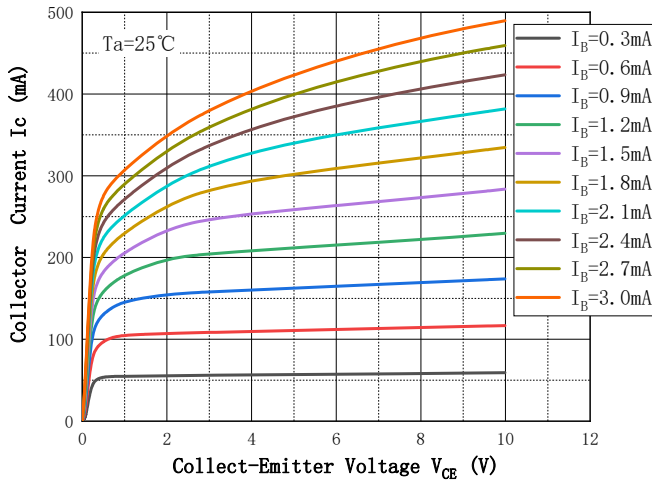


Fig.2 - DC Current Gian

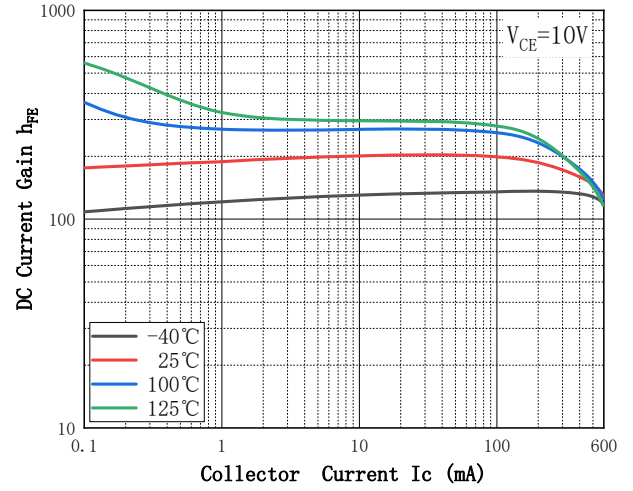


Fig.3 - Collect-Emittor Saturation Voltage

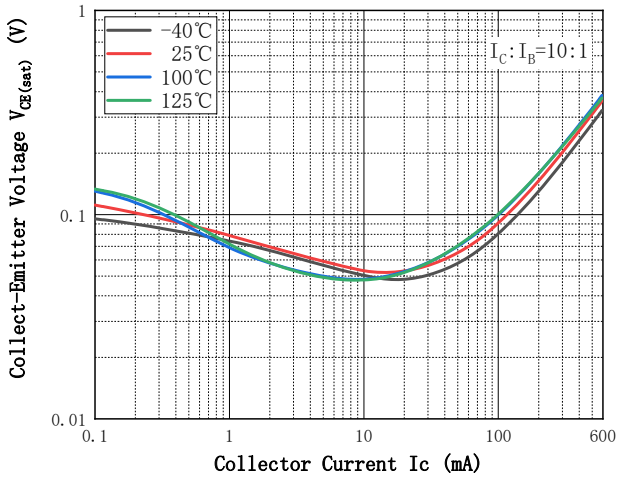


Fig.4 - Base-Emittor Voltage

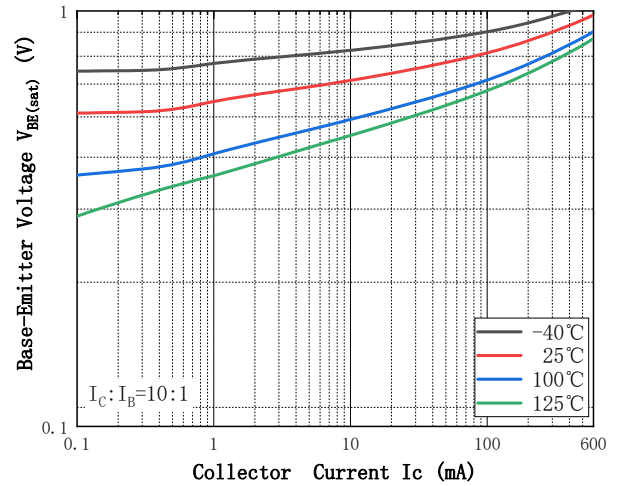


Fig.5 - Base-Emittor On Voltage

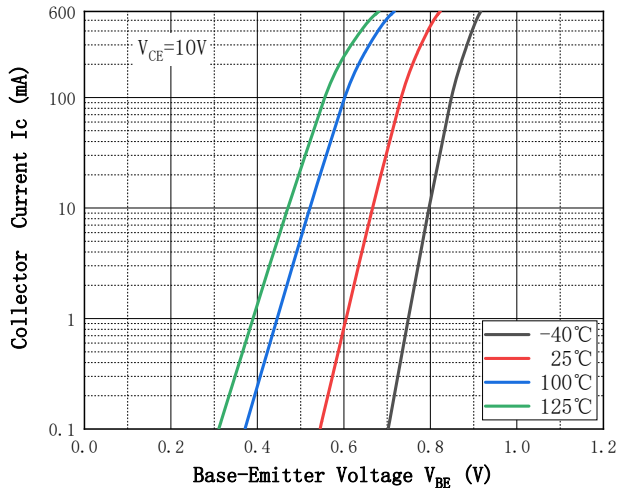
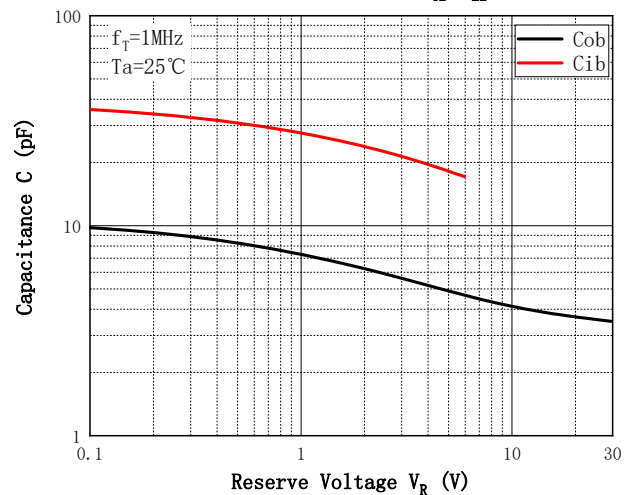
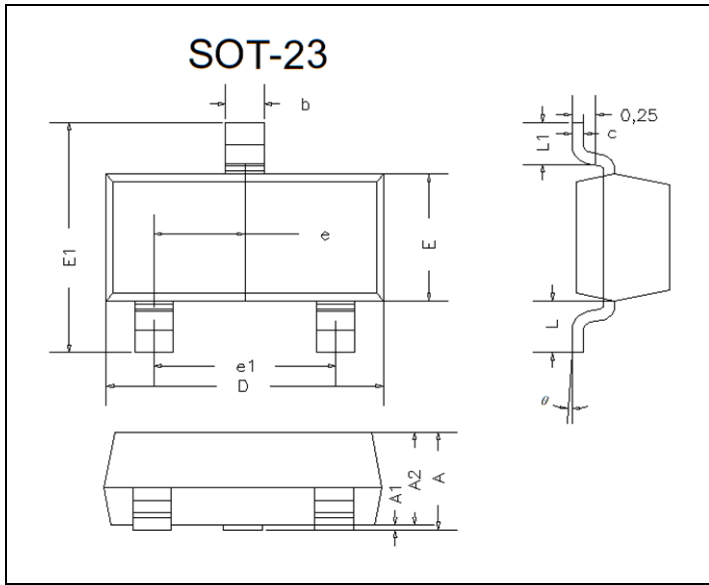


Fig.6 - Cob/Cib— $V_{CB}/V_{EB}$

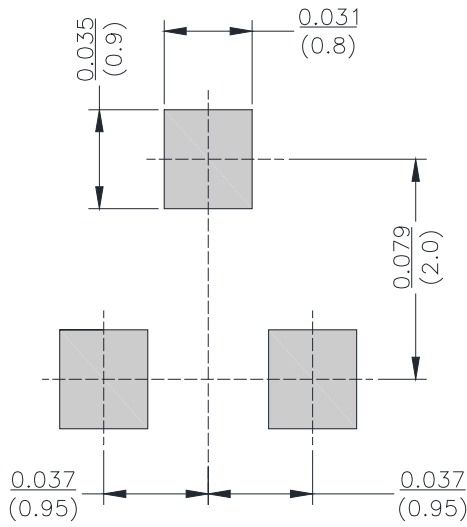


## ■ SOT-23 Package Outline Dimensions



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.035	0.045	0.90	1.15	
A1	0.000	0.004	0.00	0.10	
A2	0.035	0.041	0.90	1.05	
b	0.012	0.020	0.30	0.50	
c	0.004	0.008	0.10	0.20	
D	0.110	0.118	2.80	3.00	
E	0.047	0.055	1.20	1.40	
E1	0.089	0.100	2.25	2.55	
e	0.370TYP		0.95TYP		
e1	0.071	0.079	1.80	2.00	
L	0.220REF		0.55REF		
L1	0.012	0.020	0.30	0.50	
θ	0°	8°	0°	8°	

## ■ SOT-23 Suggested Pad Layout



Unit:  $\frac{\text{inch}}{\text{mm}}$



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