



1. Features

- High ICMax.ICMax. = 0.5mA
- Low VCE(sat).Optimal for low voltage operation
- Complements the 2SA1036

SOT-23



1 base
2 emitter
3 collector

2. Mechanical Data

- Case:Molded Plastic,SOT-23 .
- Epoxy:UL 94V-0 rate flame retardant.
- Terminals:Plated Leads Solderable per MIL-STD-750,Method-2026.
- Mounting Position : Any.

3. Maximum Ratings

Electrical Characteristics Rating at 25℃ ambient temperature unless otherwise specified.

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	32	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	500	mA
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_j	-55~+150	℃
Storage Temperature	T_{stg}	-55~+150	℃



4. Electrical Characteristics ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Condition	Min	TYP	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=-100\mu\text{A}, I_E=0$	40	-	-	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=-1\text{mA}, I_B=0$	32	-	-	V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=-100\mu\text{A}, I_C=0$	5	-	-	V
Collector cut-off current	I_{CBO}	$V_{CB}=-20\text{V}, I_E=0$	-	-	1	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=-4\text{V}, I_C=0$	-	-	1	μA
DC current gain	h_{FE}	$V_{CE}=-3\text{V}, I_C=-100\text{mA}$	82	-	390	-
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=500\text{mA}, I_B=50\text{mA}$	-	-	0.4	V
Collector output capacitance	C_{ob}	$V_{CB}=10\text{V}, f=1\text{MHz}, I_E=20\text{mA}$	-	6	-	MHz
Transition frequency	f_T	$V_{CE}=5\text{V}, I_C=-0\text{mA}, f=1\text{MHz}$	-	250	-	pF

CLASSIFICATION of h_{FE}

Rank	P	Q	R
Range	82-180	120-27	180-390
Marking	CP	CQ	CR



5. Rating And Characteristic Curves

Fig.1 Static Characteristic

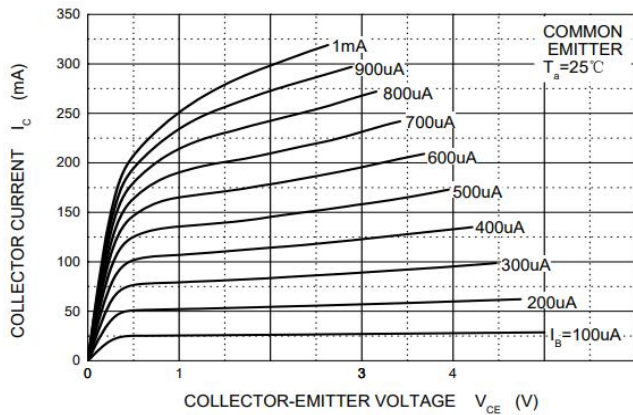


Fig.2 $h_{FE} \text{ --- } I_C$

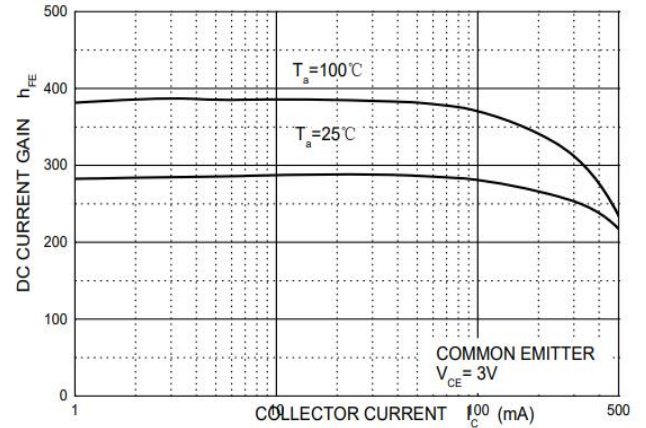


Fig.3 $V_{BEsat} \text{ --- } I_C$

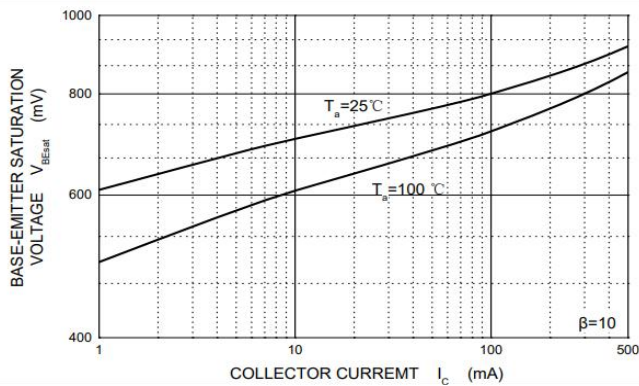


Fig.4 $V_{CEsat} \text{ --- } I_C$

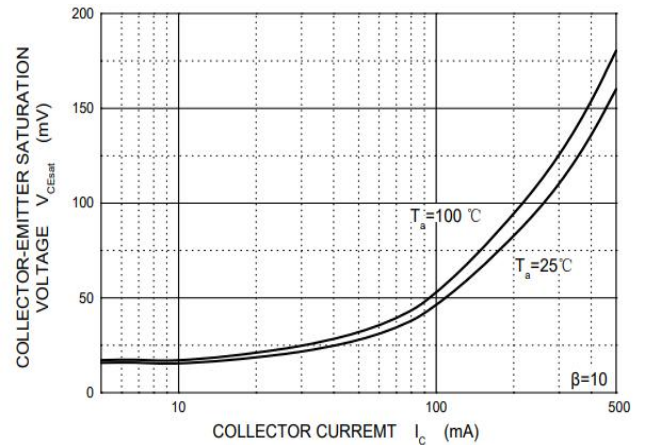


Fig.5 $I_C \text{ --- } V_{BE}$

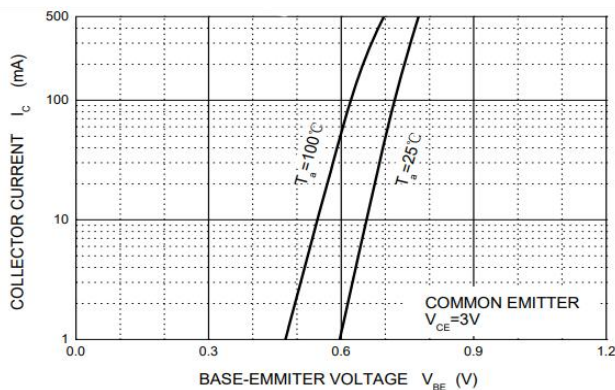
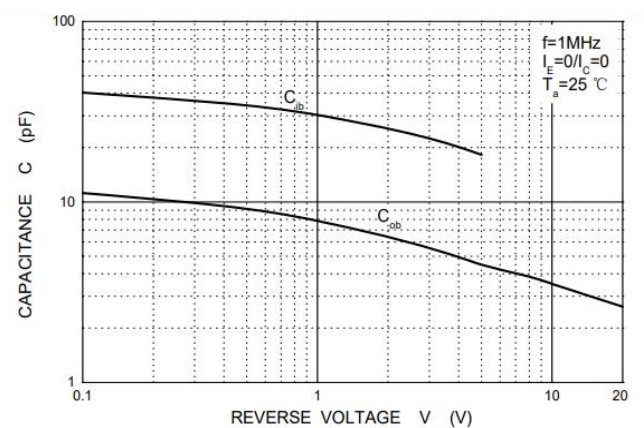


Fig.6 $C_{ob}/C_{ib} \text{ --- } V_{CB}/V_{EB}$





5. Rating And Characteristic Curves

Fig.7 f_T — I_C

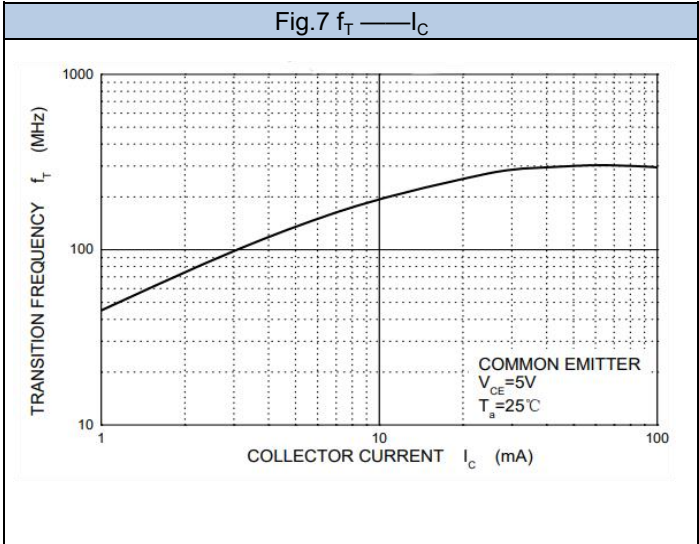
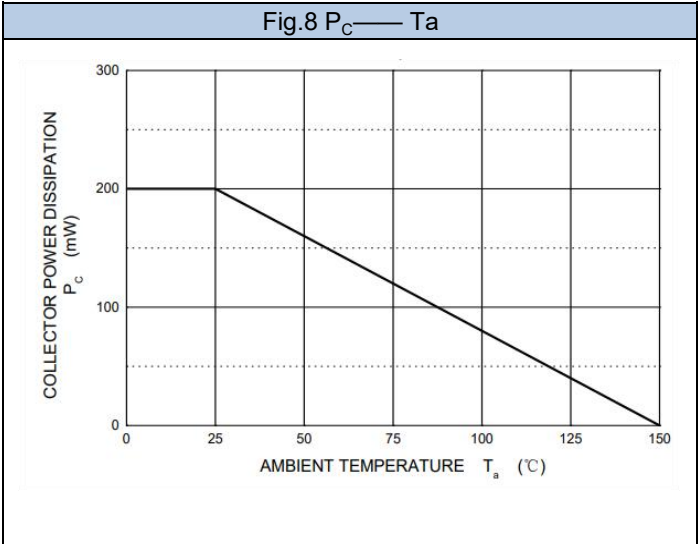
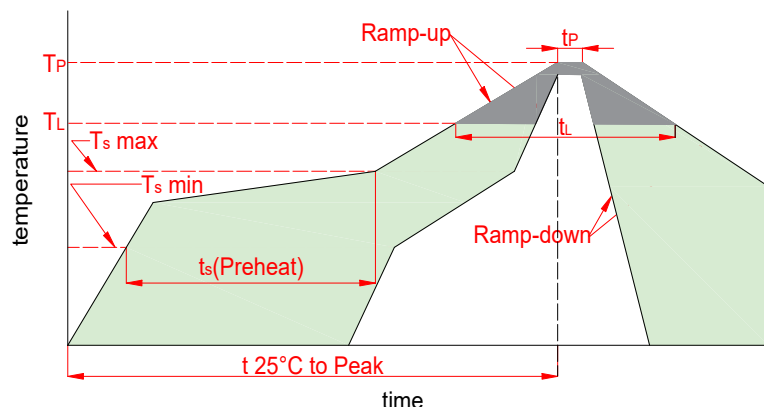


Fig.8 P_C — T_a



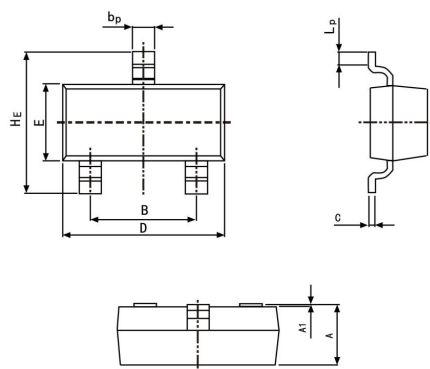


6. Soldering Parameters



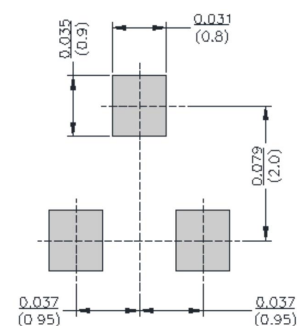
Reflow Condition		Lead-free
Pre Heat	Temp. min(T_s (min))	150℃
	Temp. max(T_s (min))	200℃
	Time(min to max)(t_s)	60~120s
Aver. ramp up rate(Liquidus Temp.)(T_L)to peak		3℃/s max
T_s (max) to T_L -Ramp-up Rate		3℃/s max
Reflow	Temp.(T_L)(Liquidus)	217℃
	Temp.(t_L)(Liquidus)	60~150s
Peak Temp.(T_P)		260 ^{+0/-5} ℃
Time within actual peak Temp.(t_p)		30s max
Ramp-down Rate		6℃/s max
Time 25℃ to peak Tempe.(T_p)		8 minutes max
Do not exceed		260℃

7. Dimensions

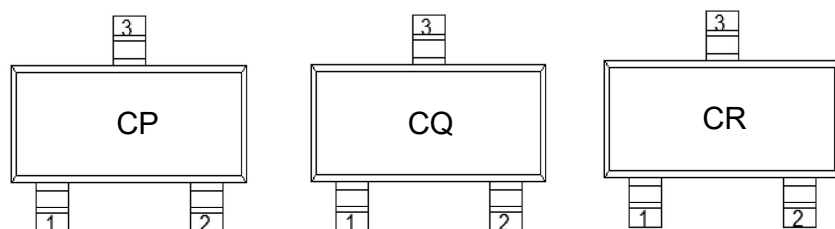


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.035	0.045	0.90	1.15
B	0.070	0.081	1.78	2.05
bp	0.012	0.020	0.30	0.51
C	0.003	0.007	0.08	0.18
D	0.110	0.118	2.80	3.00
E	0.047	0.055	1.20	1.40
HE	0.087	0.110	2.20	2.80
A1	0.000	0.004	0.00	0.10
LP	0.008	0.020	0.20	0.50

Mounting PAD Layout



8. Part Marking System



9. Package Information

Package	Part Number	Marking Code	Tape Width(mm)	Quantity(pcs)
SOT-23	MMBTSC2411-P	CP	8	3000
SOT-23	MMBTSC2412-Q	CQ	8	3000
SOT-23	MMBTSC2413-R	CR	8	3000



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