

NPN Type Bipolar Transistor

Features

- Low profile package
- Power Dissipation of 350mW
- Ideal for automated placement
- Complementary to MMBTA93 (PNP)
- High Stability and High Reliability
- RoHS Compliant

Applications

- Amplifying signal
- Electronic switch
- Oscillating circuit
- Variable resistance

Mechanical Characteristics

- Package: SOT-23
- Lead Finish: Matte Tin
- Case Material: "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020

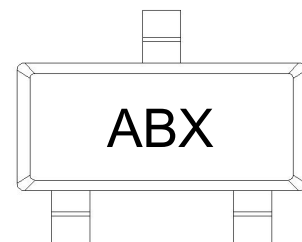


RoHS
COMPLIANT

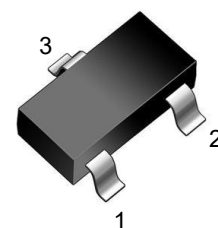


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SOT - 23

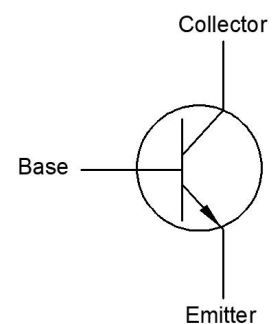


Pin definition



- 1: Base
- 2: Emitter
- 3: Collector

Equivalent circuit



Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V _{CBO}	200	V
Collector-Emitter Voltage	V _{CEO}	200	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current - Continuous	I _C	500	mA
Collector Power Dissipation	P _C	350	mW
Thermal Resistance From Junction to Ambient	R _{θJA}	357	°C/W
Junction Temperature	T _J	-55 to +150	°C
Junction and Storage Temperature	T _{STG}	-55 to +150	°C

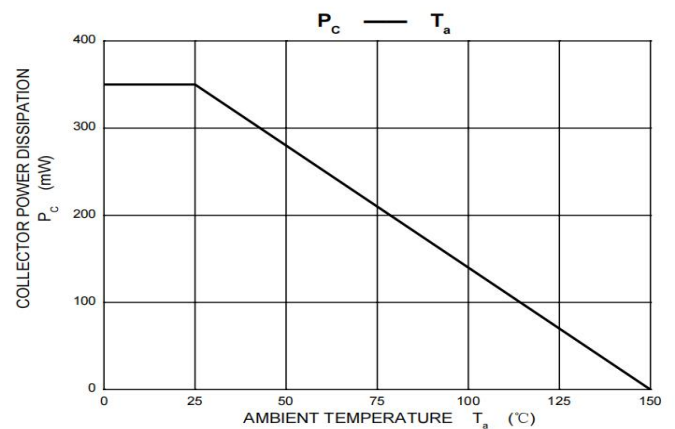
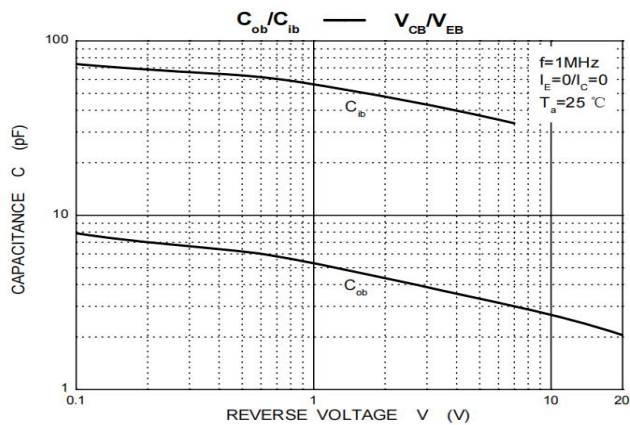
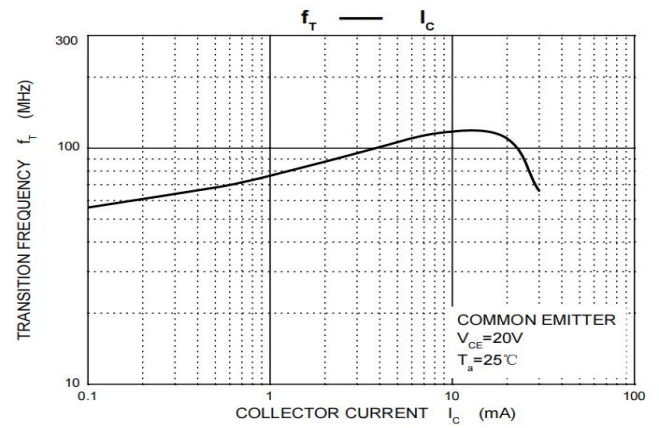
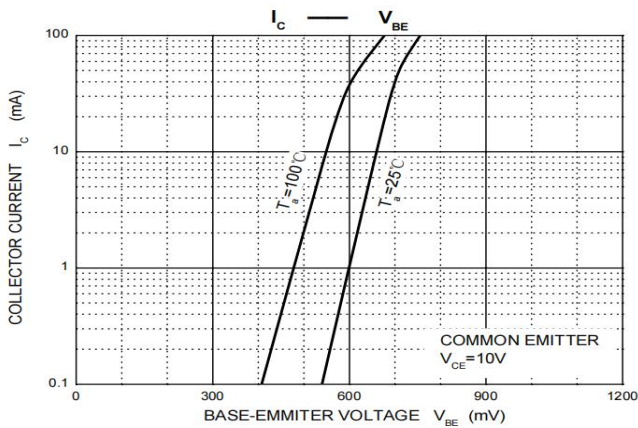
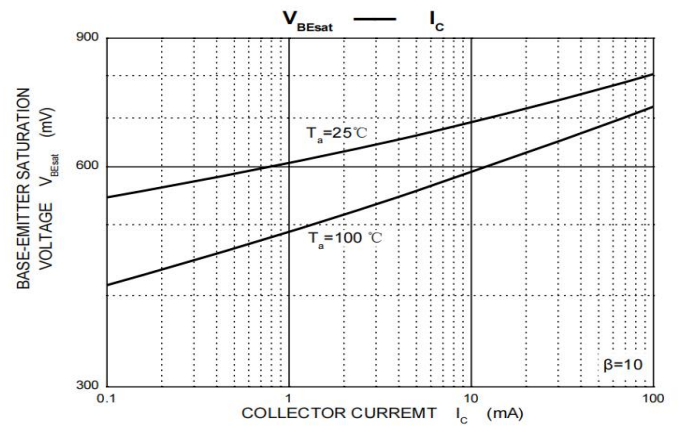
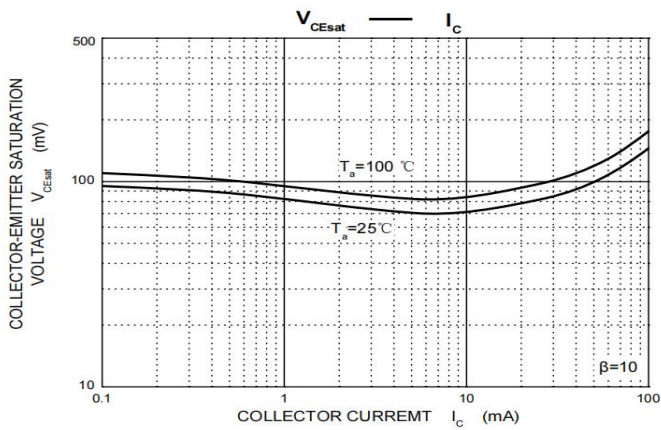
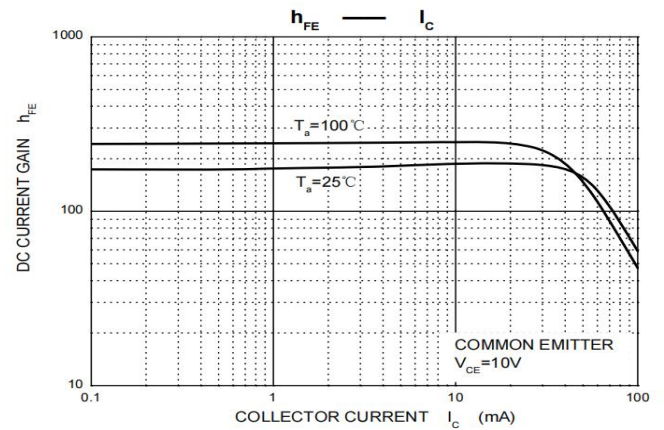
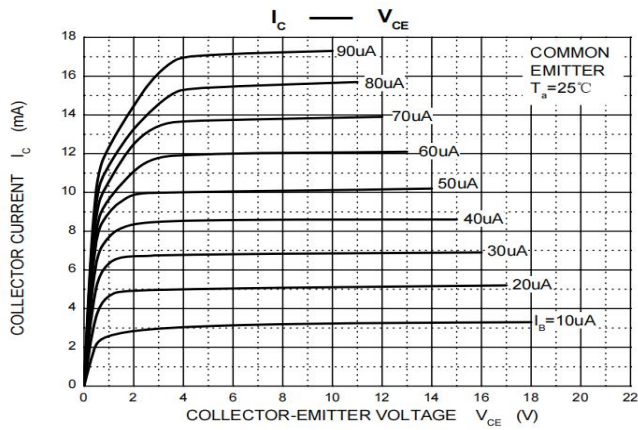
Electrical Specifications (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Max	Unit
Collector-base breakdown voltage	V _{(BR)CBO}	I _C =100μA, I _E =0	200		V
Collector-emitter breakdown voltage	V _{(BR)CEO}	I _C =1mA, I _B =0	200		V
Emitter-base breakdown voltage	V _{(BR)EBO}	I _E =100μA, I _C =0	5		V
Collector cut-off current	I _{CBO}	V _{CB} =100V, I _E =0		250	nA
Emitter cut-off current	I _{EBO}	V _{EB} =5V, I _C =0		100	nA
DC current gain	hFE(1)	V _{CE} =10V, I _C =10mA	40		
	hFE(2)	V _{CE} =10V, I _C =1mA	40		
	hFE(3)	V _{CE} =10V, I _C =30mA	40		
Collector-emitter saturation voltage	V _{CE(sat)}	I _C =20mA, I _B =2mA		0.5	V
Base -emitter saturation voltage	V _{BE(sat)}	I _C =20mA, I _B =2mA		0.9	V
Transition frequency	f _T	V _{CE} =20V, I _C =10mA, f=100MHz	50		MHz
Collector output capacitance	C _{ob}	V _{CB} =20V, I _E =0, f=1MHz		4	pF

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

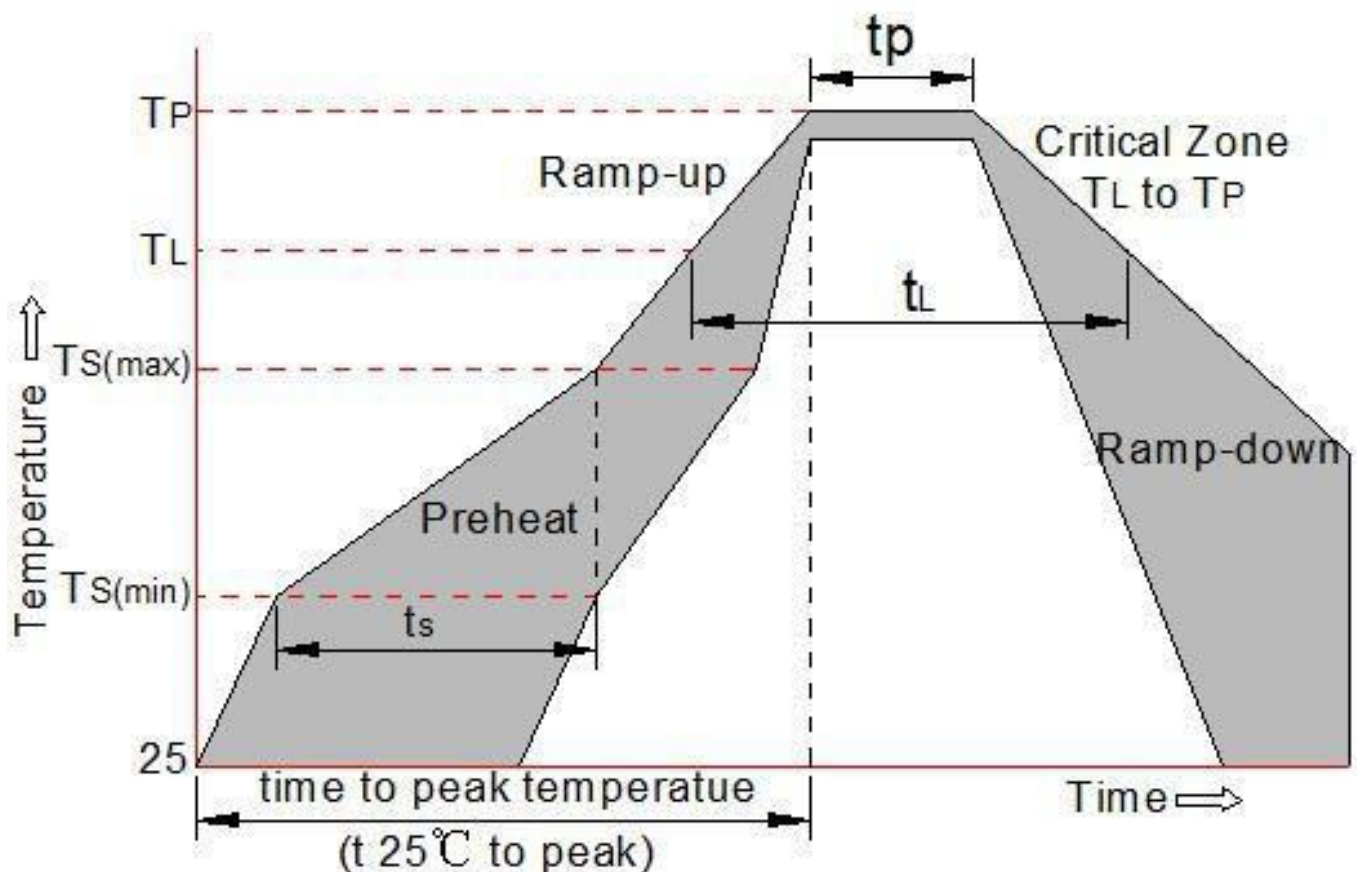
Ratings and Characteristics Curves

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



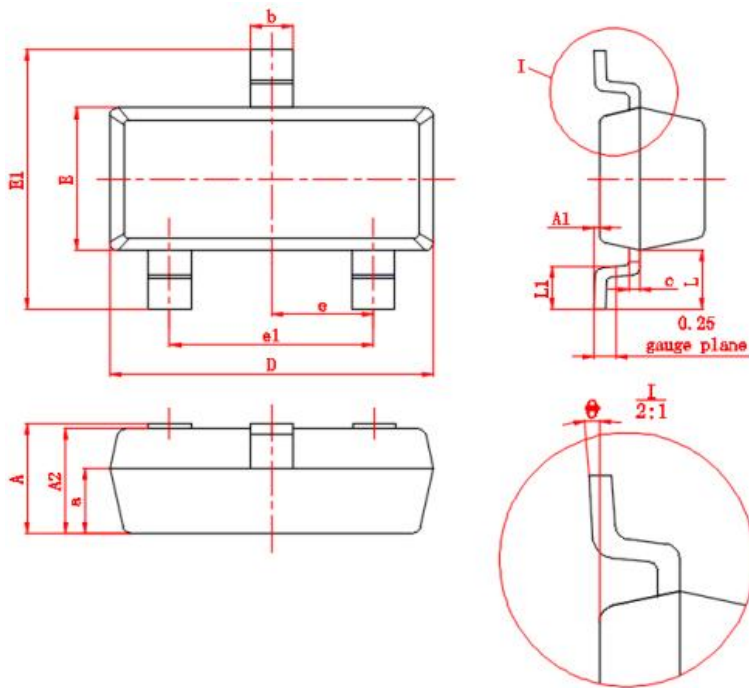
Soldering Parameters

Reflow Condition		Pb -Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150 °C
	-Temperature Max($T_{s(max)}$)	+200 °C
	-Time (Min to Max) (t_s)	60 -180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3 °C /sec. Max
$T_{s(max)}$ to T_L - Ramp -up Rate		3 °C /sec. Max
Reflow	-Temperature(T_L) (Liquid us)	+217 °C
	-Temperature(t_L)	60 -150 secs.
Peak Temp (T_p)		+260(+0/ -5) °C
Time within 5 °C of actual Peak Temp (t_p)		30 secs. Max
Ramp -down Rate		6 °C /sec. Max
Time 25 °C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260 °C



Package Outline Dimensions

millimeters



Symbol	Dimensional	
	Millimeters	
	min	max
A	0.9	1.15
A1	0	0.1
A2	0.9	1.05
a	(0.6)	
D	2.8	3.0
E	1.2	1.4
E1	2.25	2.55
e	(0.95)	
e1	1.8	2.0
b	0.3	0.5
c	0.08	0.15
L	(0.55)	
L1	0.3	0.5
θ	0°	8°

Revision History

Document Version	Date of release	Description of changes
Rev.A	2022.05.10	First issue

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