



HMBTA94

PNP EPITAXIAL PLANAR TRANSISTOR

Description

The HMBTA94 is designed for application that requires high voltage.

Features

- High Breakdown Voltage: $V_{CEO}=400(\text{Min.})$ at $I_C=1\text{mA}$
- Complementary to HMBTA44

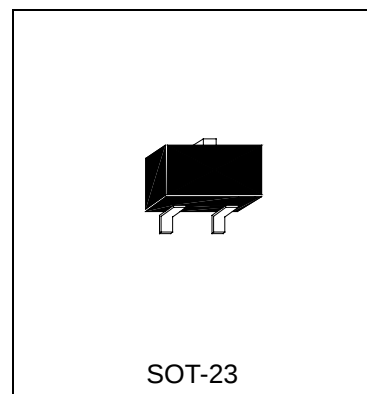
Absolute Maximum Ratings

- Maximum Temperatures
Storage Temperature -55 ~ +150 °C
Junction Temperature +150 °C Maximum
- Maximum Power Dissipation
Total Power Dissipation ($T_A=25^\circ\text{C}$) 350 mW
- Maximum Voltages and Currents ($T_A=25^\circ\text{C}$)
 V_{CBO} Collector to Base Voltage -400 V
 V_{CEO} Collector to Emitter Voltage -400 V
 V_{EBO} Emitter to Base Voltage -6 V
 I_C Collector Current -150 mA

Electrical Characteristics ($T_A=25^\circ\text{C}$)

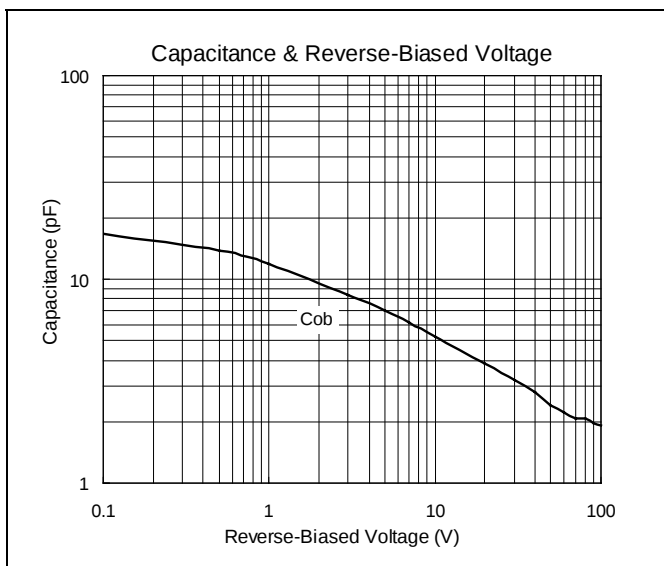
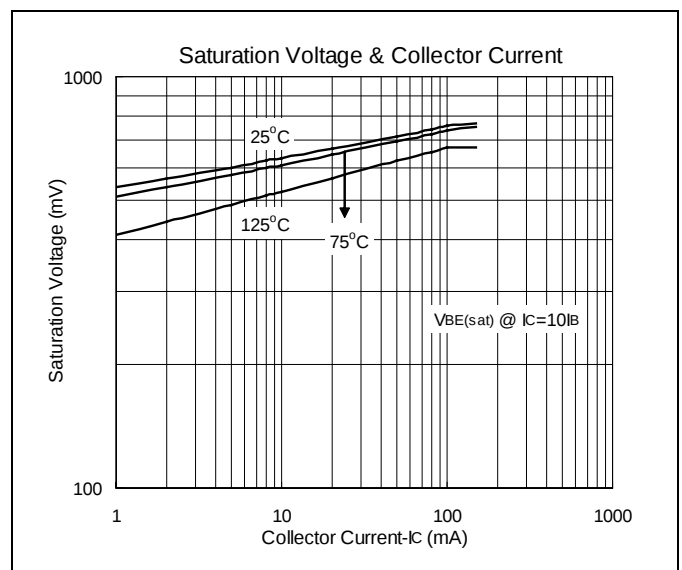
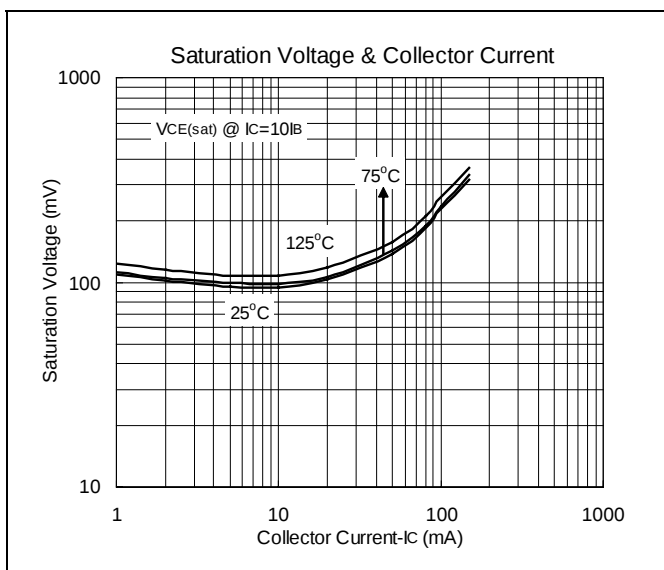
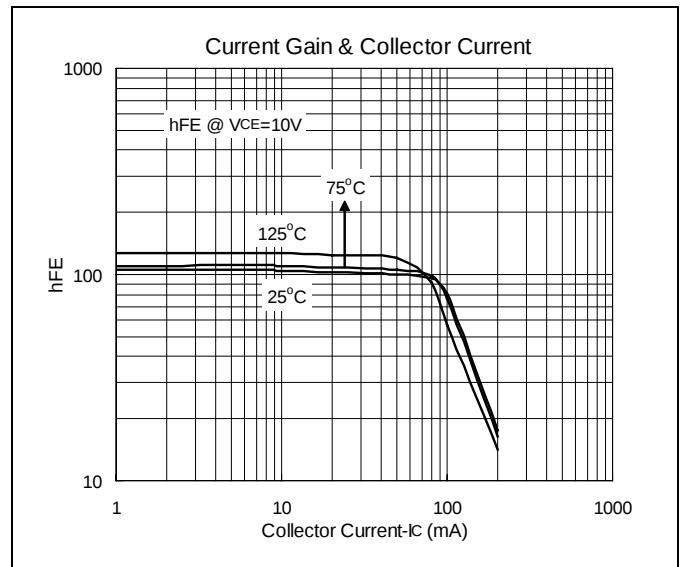
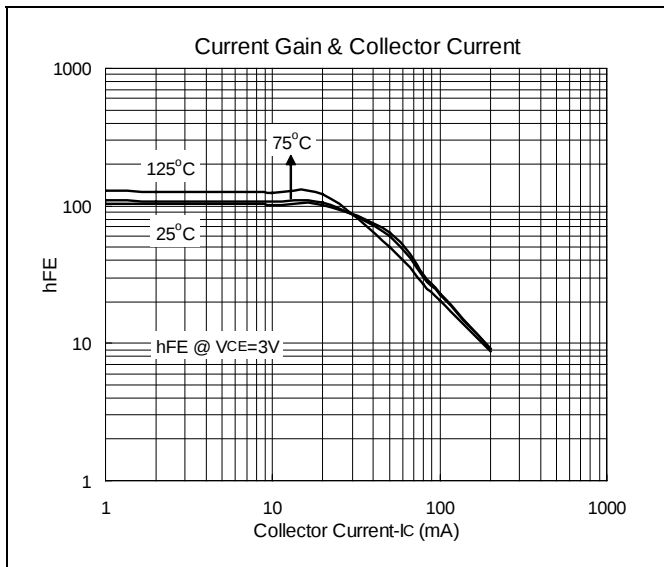
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-400	-	-	V	$I_C=-100\mu\text{A}$, $I_E=0$
BV_{CEO}	-400	-	-	V	$I_C=-1\text{mA}$, $I_B=0$
BV_{EBO}	-6	-	-	V	$I_E=-10\mu\text{A}$, $I_C=0$
I_{CBO}	-	-	-100	nA	$V_{CB}=-400\text{V}$, $I_E=0$
I_{EBO}	-	-	-100	nA	$V_{EB}=-6\text{V}$, $I_C=0$
I_{CES}	-	-	-500	nA	$V_{CE}=-400\text{V}$, $V_{BE}=0$
* $V_{CE(sat)1}$	-	-	-200	mV	$I_C=-1\text{mA}$, $I_B=-0.1\text{mA}$
* $V_{CE(sat)2}$	-	-	-300	mV	$I_C=-10\text{mA}$, $I_B=-1\text{mA}$
* $V_{CE(sat)3}$	-	-	-600	mV	$I_C=-50\text{mA}$, $I_B=-5\text{mA}$
* $V_{BE(sat)}$	-	-	-900	mV	$I_C=-10\text{mA}$, $I_B=-1\text{mA}$
* h_{FE1}	50	-	-		$V_{CE}=-10\text{V}$, $I_C=-1\text{mA}$
* h_{FE2}	50	-	250		$V_{CE}=-10\text{V}$, $I_C=-10\text{mA}$
* h_{FE3}	60	-	-		$V_{CE}=-10\text{V}$, $I_C=-50\text{mA}$
* h_{FE4}	40	-	-		$V_{CE}=-10\text{V}$, $I_C=-100\text{mA}$
Cob	-	4	6	pF	$V_{CE}=-10\text{V}$, $f=1\text{MHz}$

*Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$



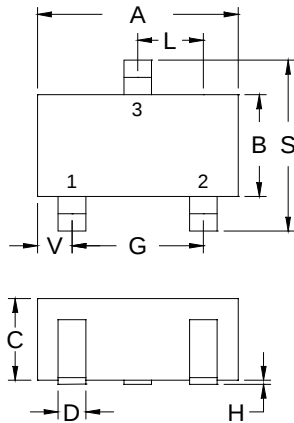


Characteristics Curve



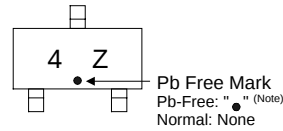


SOT-23 Dimension



3-Lead SOT-23 Plastic
Surface Mounted Package
HSMC Package Code: N

Marking:



Note: Pb-free product can distinguish by the green label or the extra description on the right side of the label.

Pin Style: 1.Base 2.Emitter 3.Collector

Material:

- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

DIM	Min.	Max.
A	2.80	3.04
B	1.20	1.60
C	0.89	1.30
D	0.30	0.50
G	1.70	2.30
H	0.013	0.10
J	0.085	0.177
K	0.32	0.67
L	0.85	1.15
S	2.10	2.75
V	0.25	0.65

*: Typical, Unit: mm

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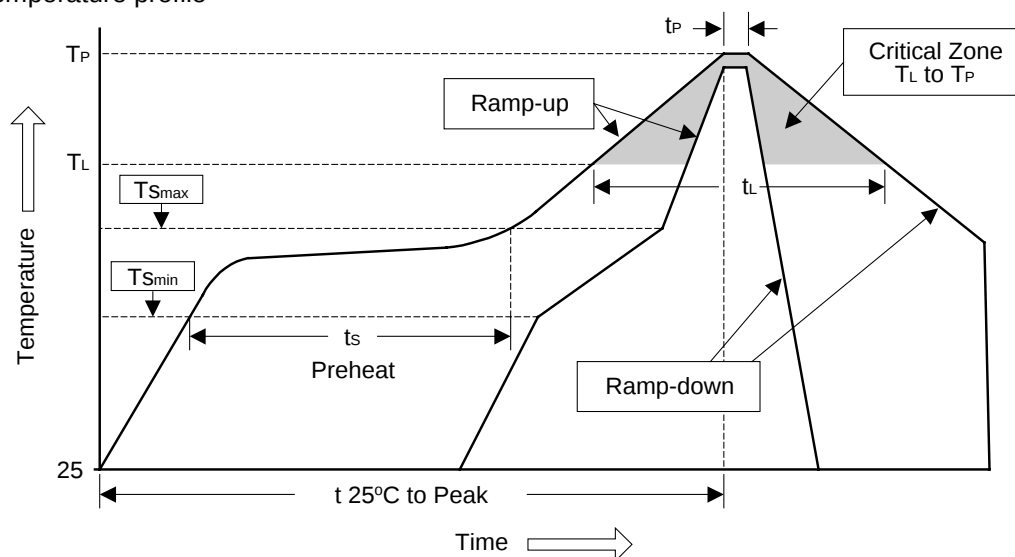


Soldering Methods for HSMC's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%

2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$	$<3^{\circ}\text{C}/\text{sec}$
Preheat		
- Temperature Min (T_{smin})	100°C	150°C
- Temperature Max (T_{smax})	150°C	200°C
- Time (min to max) (t_s)	60~120 sec	60~180 sec
T_{smax} to T_L		
- Ramp-up Rate	$<3^{\circ}\text{C}/\text{sec}$	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above:		
- Temperature (T_L)	183°C	217°C
- Time (t_l)	60~150 sec	60~150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_p)	10~30 sec	20~40 sec
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak temperature	Dipping time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec