

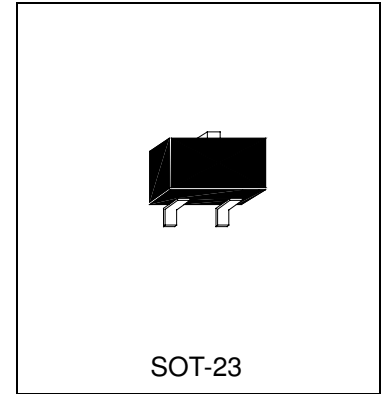


HMBT3904

NPN EPITAXIAL PLANAR TRANSISTOR

Description

The HMBT3904 is designed for general purpose switching amplifier applications.



Absolute Maximum Ratings

- Maximum Temperatures
 - Storage Temperature..... -65 ~ +150 °C
 - Junction Temperature..... +150 °C
- Maximum Power Dissipation
 - Total Power Dissipation (T_A=25°C)..... 225 mW
- Maximum Voltages and Currents (T_A=25°C)
 - V_{CBO} Collector to Base Voltage 60 V
 - V_{CEO} Collector to Emitter Voltage 40 V
 - V_{EBO} Emitter to Base Voltage 6 V
 - I_C Collector Current 200 mA

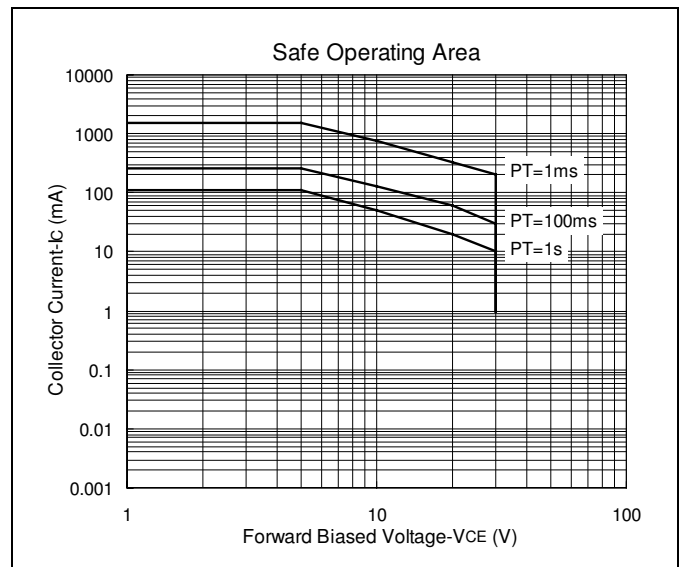
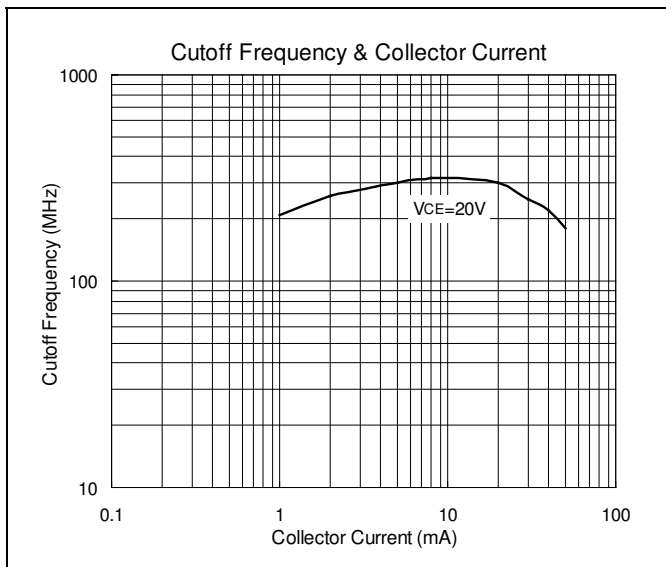
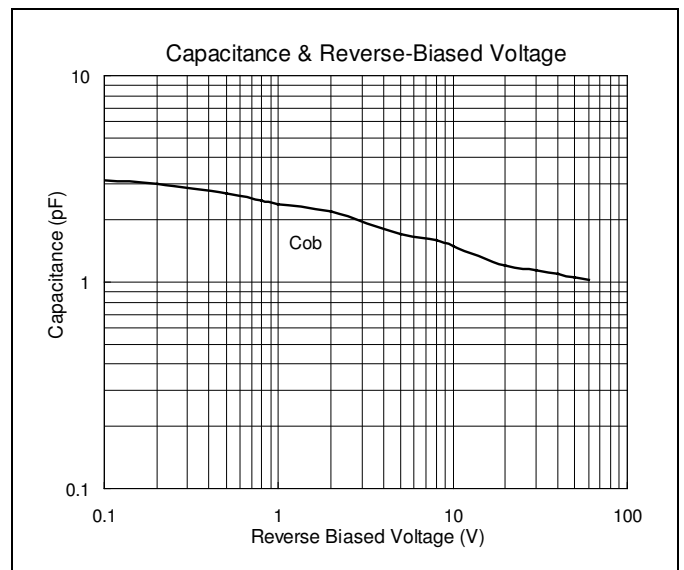
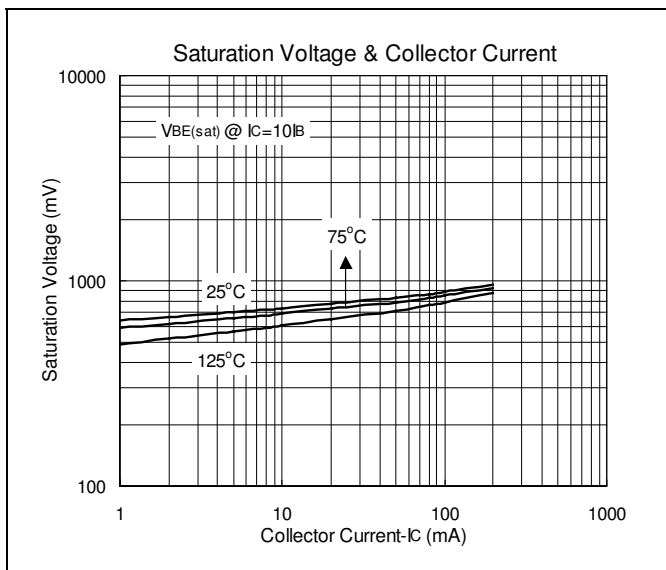
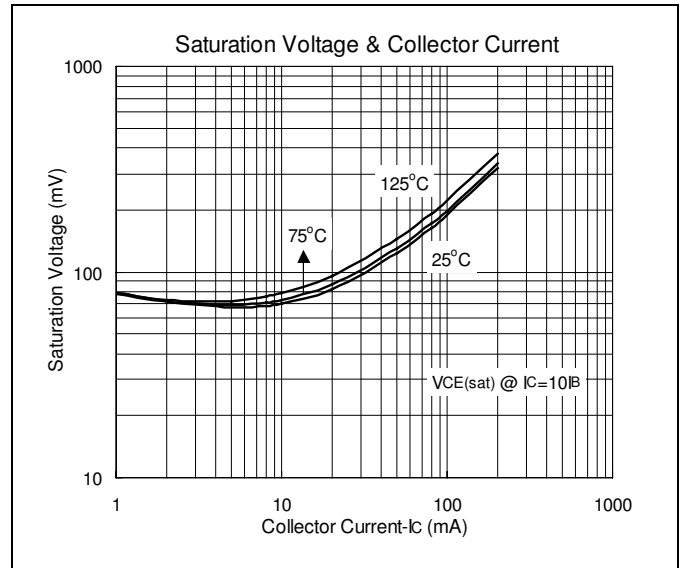
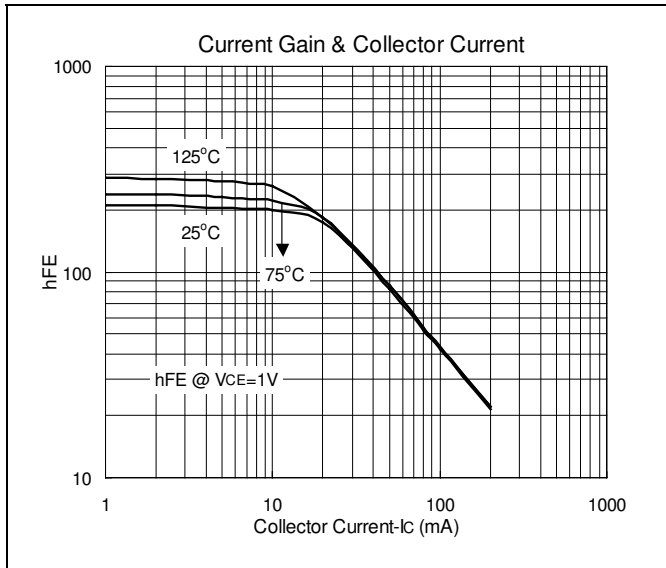
Electrical Characteristics (T_A=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CBO}	60	-	-	V	I _C =10uA
BV _{CEO}	40	-	-	V	I _C =1mA
BV _{EBO}	6	-	-	V	I _C =10uA
I _{CEX}	-	-	50	nA	V _{CE} =30V, V _{BE} =-3V
*V _{CE(sat)1}	-	-	200	mV	I _C =10mA, I _B =1mA
*V _{CE(sat)2}	-	-	300	mV	I _C =50mA, I _B =5mA
*V _{BE(sat)1}	650	-	850	mV	I _C =10mA, I _B =1mA
*V _{BE(sat)2}	-	-	950	mV	I _C =50mA, I _B =5mA
*h _{FE1}	40	-	-		V _{CE} =1V, I _C =0.1mA
*h _{FE2}	70	-	-		V _{CE} =1V, I _C =1mA
*h _{FE3}	100	-	300		V _{CE} =1V, I _C =10mA
*h _{FE4}	60	-	-		V _{CE} =1V, I _C =50mA
*h _{FE5}	30	-	-		V _{CE} =1V, I _C =100mA
f _T	300	-	-	MHz	V _{CE} =20V, I _C =10mA, f=100MHz
Cob	-	-	4	pF	V _{CB} =5V, f=1MHz

*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%



Characteristics Curve





SOT-23 Dimension

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

Marking:

Pb Free Mark
 Pb-Free: "●" (Note)
 Normal: None

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



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/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°C/sec	<3°C/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°C/sec	<6°C/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