



HMBT28S

NPN EPITAXIAL PLANAR TRANSISTOR

Description

The HMBT28S is a NPN silicon transistor, designed for use in general-purpose SPEECH SYNTHSIZER (Voice Rom) IC audio output driver stage amplifier applications.

Features

- Excellent hFE Linearity
- High DC Current Gain
- High Power Dissipation

Absolute Maximum Ratings

- Maximum Temperatures
Storage Temperature -55 ~ +150 °C
Junction Temperature 150 °C Maximum
- 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 40 V
V_{CEO} Collector to Emitter Voltage 20 V
V_{EBO} Emitter to Base Voltage 6 V
I_C Collector Current 1.25 A
I_B Base Current 0.4 A

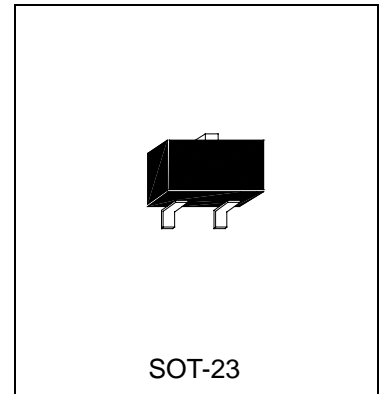
Electrical Characteristics (T_A=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CBO}	40	-	-	V	I _C =100uA, I _E =0
BV _{CEO}	20	-	-	V	I _C =1mA, I _B =0
BV _{EBO}	6	-	-	V	I _E =100uA, I _C =0
I _{CBO}	-	-	100	nA	V _{CB} =35V, I _E =0
I _{EBO}	-	-	100	nA	V _{EB} =6V, I _C =0
*V _{CE(sat)}	-	-	0.55	V	I _C =600mA, I _B =20mA
*h _{FE1}	290	-	-		V _{CE} =1V, I _C =1mA
*h _{FE2}	300	-	1000		V _{CE} =1V, I _C =0.1A
h _{FE3}	300	-	-		V _{CE} =1V, I _C =0.3A
h _{FE4}	300	-	-		V _{CE} =1V, I _C =0.5A
f _T	100	-	-	MHz	V _{CE} =10V, I _C =50mA, f=1MHz
Cob	-	9	-	pF	V _{CB} =10V, f=1MHz, I _E =0

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

Classification of hFE2

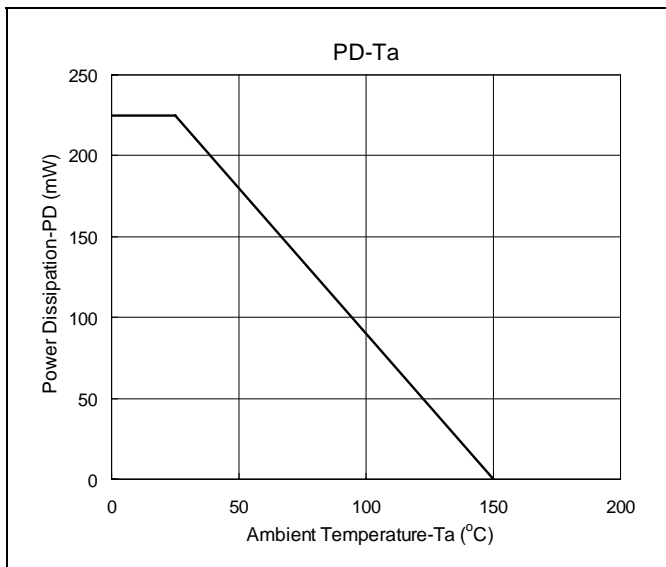
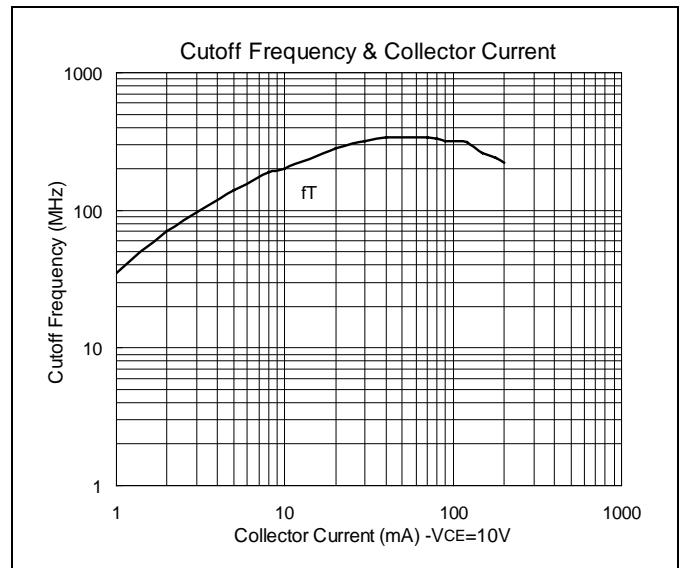
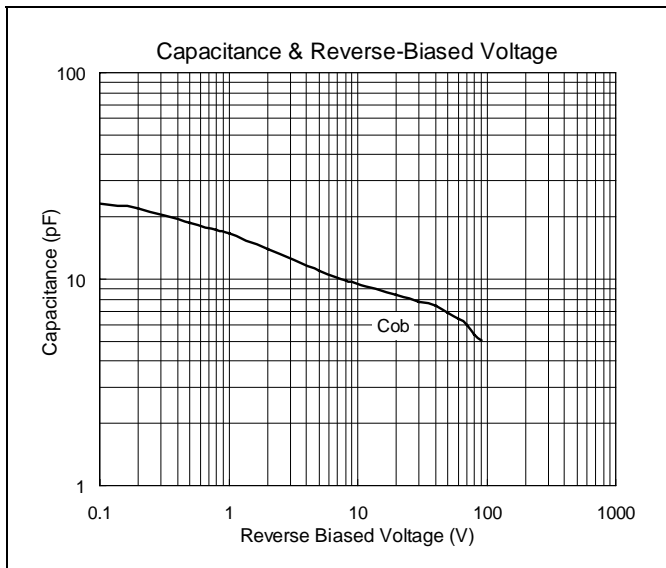
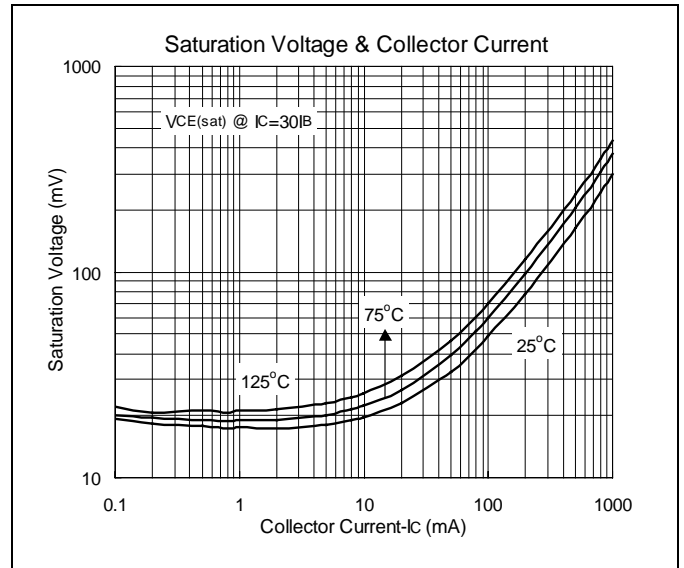
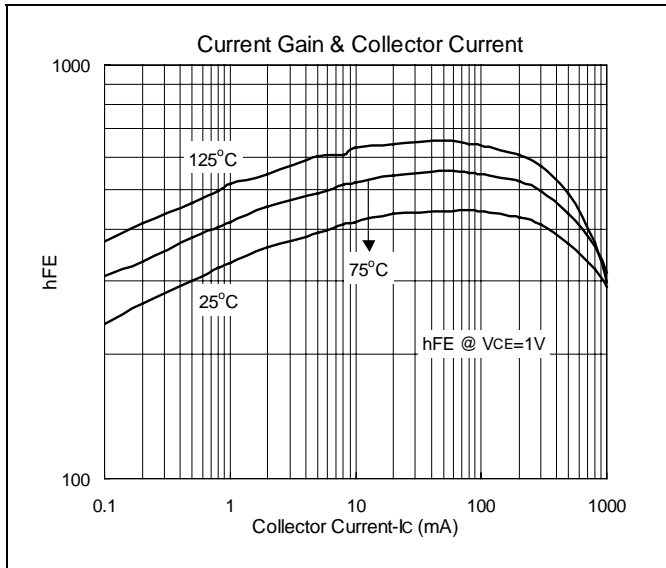
Rank (Marking Code)	B (3FB)	C (3FC)	D (3FD)
Range	300-550	500-700	650-1000



SOT-23



Characteristics Curve





SOT-23 Dimension

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

Marking:

Rank Code (B,C,D)
 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)	$<3^{\circ}\text{C}/\text{sec}$	$<3^{\circ}\text{C}/\text{sec}$
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