



HI-SINCERITY
MICROELECTRONICS CORP.

Spec. No. : HN200213
Issued Date : 2002.08.01
Revised Date : 2004.09.01
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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 ($T_A=25^{\circ}\text{C}$) 225 mW
- Maximum Voltages and Currents ($T_A=25^{\circ}\text{C}$)
 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

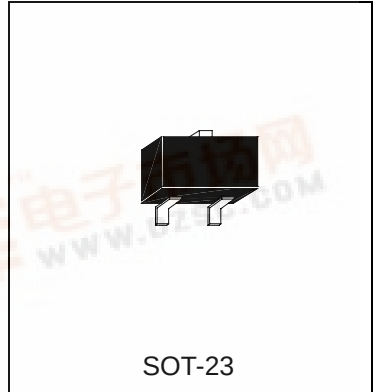
Electrical Characteristics ($T_A=25^{\circ}\text{C}$)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	40	-	-	V	$I_C=100\mu\text{A}$, $I_E=0$
BV_{CEO}	20	-	-	V	$I_C=1\text{mA}$, $I_B=0$
BV_{EBO}	6	-	-	V	$I_E=100\mu\text{A}$, $I_C=0$
I_{CBO}	-	-	100	nA	$V_{CB}=35\text{V}$, $I_E=0$
I_{EBO}	-	-	100	nA	$V_{EB}=6\text{V}$, $I_C=0$
$*V_{CE(sat)}$	-	-	0.55	V	$I_C=600\text{mA}$, $I_B=20\text{mA}$
$*h_{FE1}$	290	-	-		$V_{CE}=1\text{V}$, $I_C=1\text{mA}$
$*h_{FE2}$	300	-	1000		$V_{CE}=1\text{V}$, $I_C=0.1\text{A}$
h_{FE3}	300	-	-		$V_{CE}=1\text{V}$, $I_C=0.3\text{A}$
h_{FE4}	300	-	-		$V_{CE}=1\text{V}$, $I_C=0.5\text{A}$
f_T	100	-	-	MHz	$V_{CE}=10\text{V}$, $I_C=50\text{mA}$, $f=1\text{MHz}$
Cob	-	9	-	pF	$V_{CB}=10\text{V}$, $f=1\text{MHz}$, $I_E=0$

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

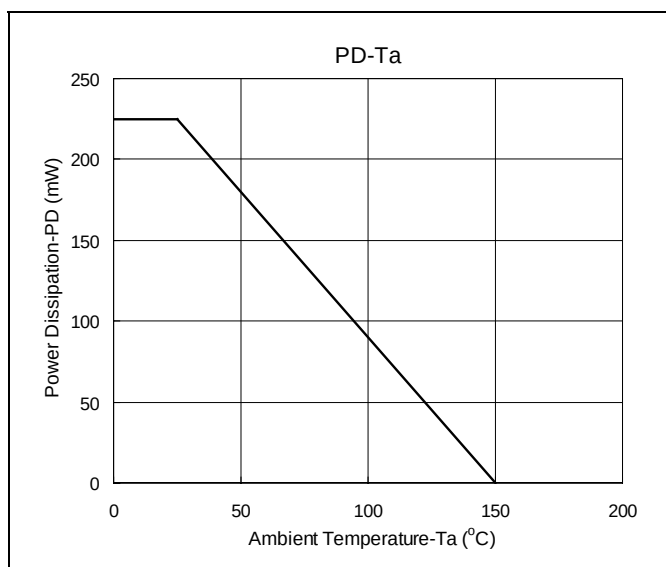
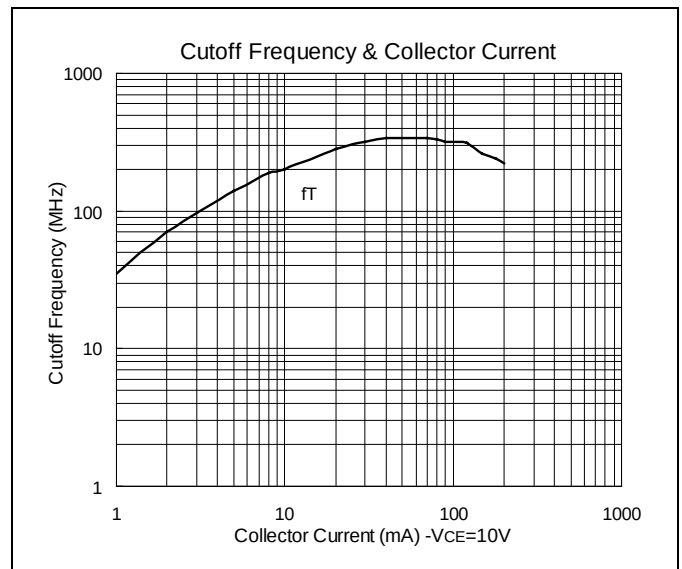
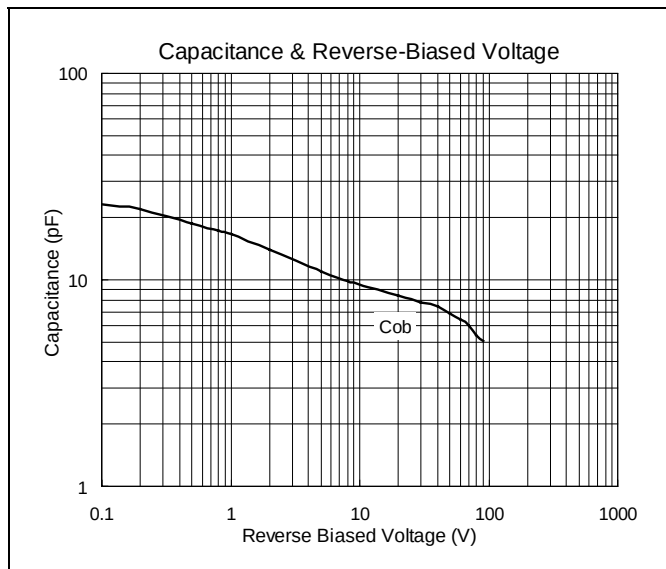
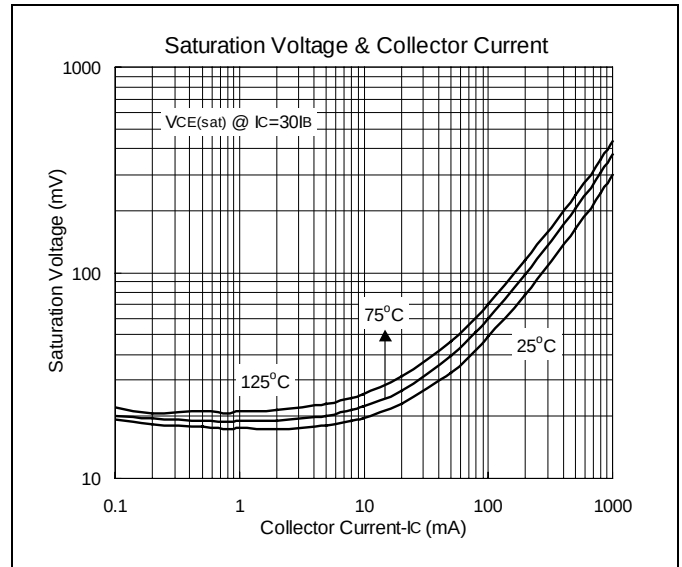
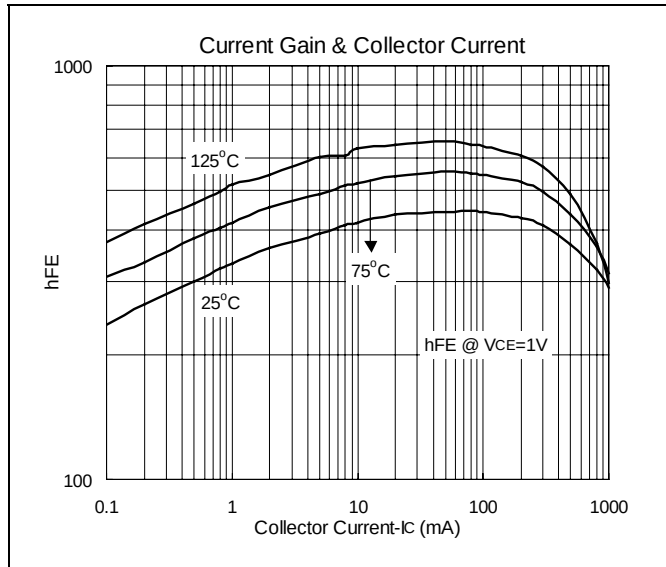
Classification of hFE2

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





Characteristics Curve



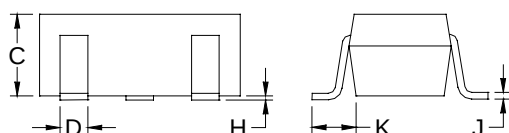
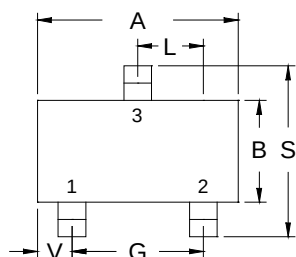


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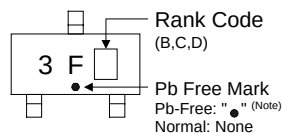
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SOT-23 Dimension



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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Head Office And Factory:

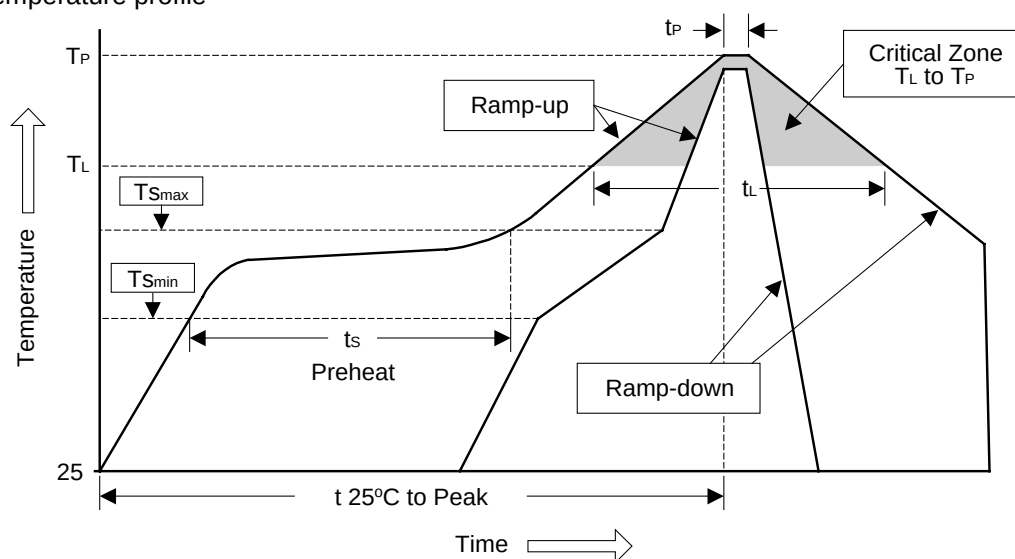
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Soldering Methods for HSMC's Products

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°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