

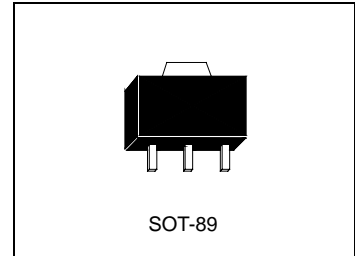


# HM112

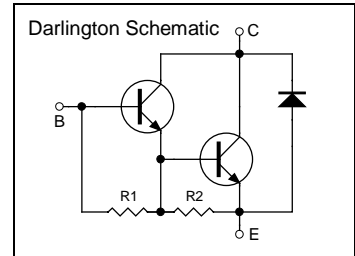
NPN EPITAXIAL PLANAR TRANSISTOR

## Description

The HM112 is designed for use in general purpose amplifier and low-speed switching applications.



SOT-89



## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ )

- Maximum Temperatures
  - Storage Temperature ..... -55 ~ +150 °C
  - Junction Temperature ..... +150 °C Maximum
- Maximum Power Dissipation
  - Total Power Dissipation ( $T_A=25^\circ\text{C}$ ) ..... 1.2 W
  - Total Power Dissipation  
(Printed circuit board 2mm thick, collector plating 1cm<sup>2</sup> square or larger) ..... 1.6 W
- Maximum Voltages and Currents
  - $BV_{CBO}$  Collector to Base Voltage ..... 100 V
  - $BV_{CEO}$  Collector to Emitter Voltage ..... 100 V
  - $BV_{EBO}$  Emitter to Base Voltage ..... 5 V
  - $I_C$  Collector Current (Continue) ..... 4 A
  - $I_C$  Collector Current (Peak) ..... 6 A

## Thermal Characteristic

Symbol	Characteristic	Max.	Unit
$R_{\theta ja}$	Thermal Resistance, junction to ambient ( $T_A=25^\circ\text{C}$ )	104	°C/W

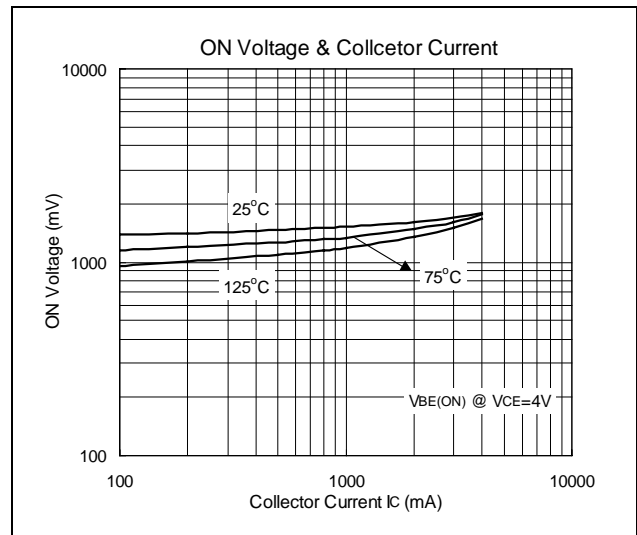
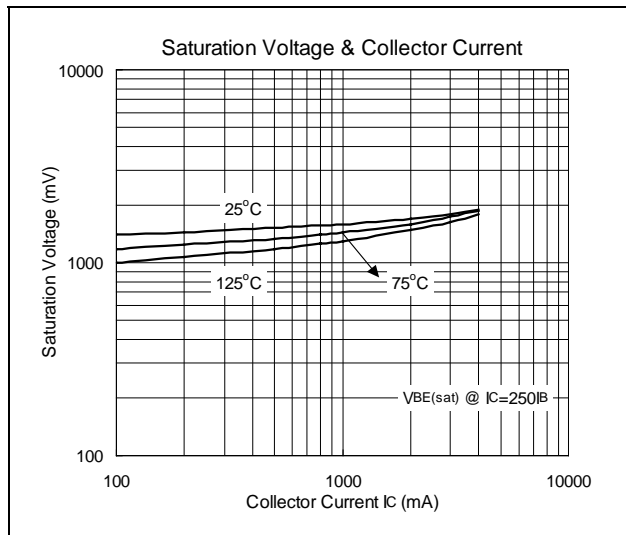
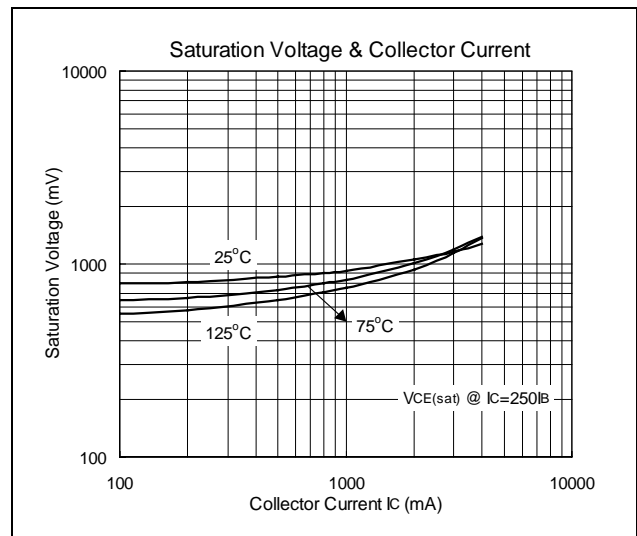
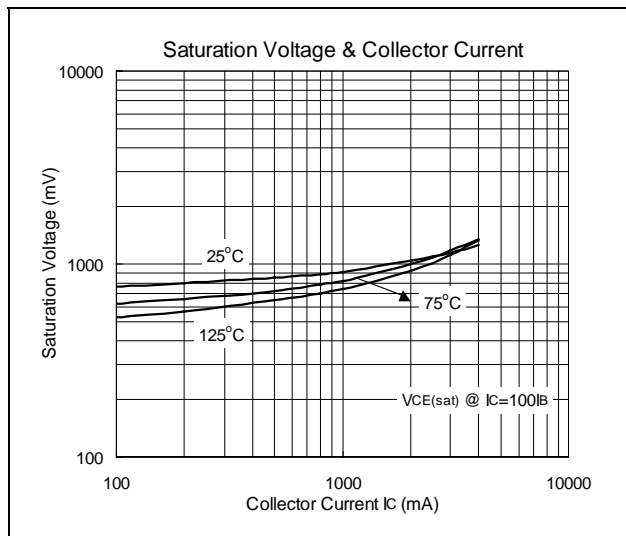
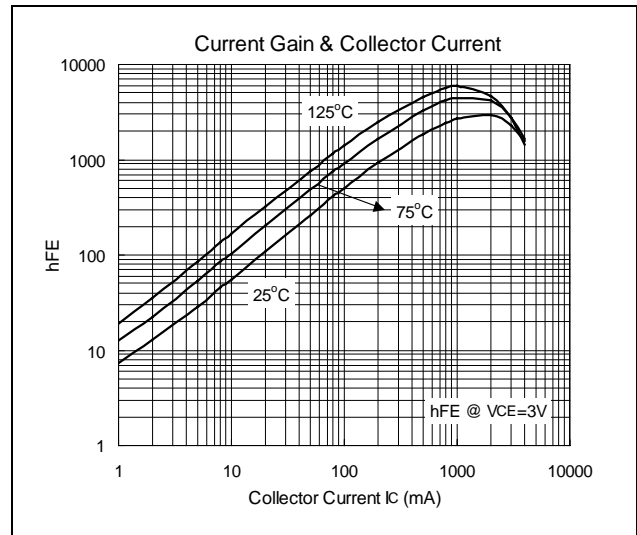
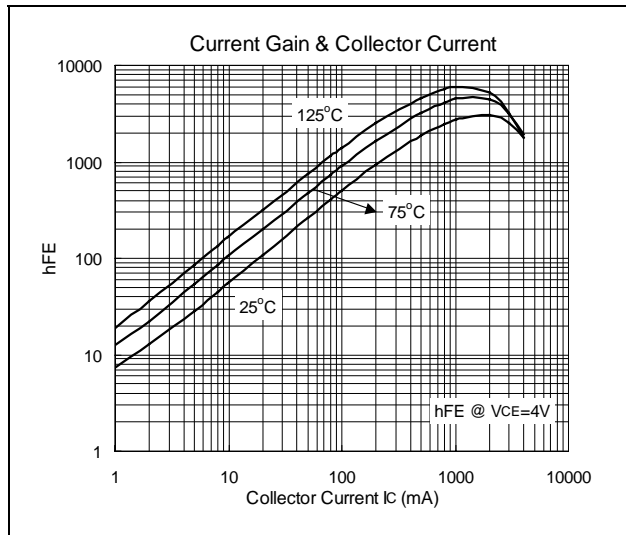
## Electrical Characteristics ( $T_A=25^\circ\text{C}$ )

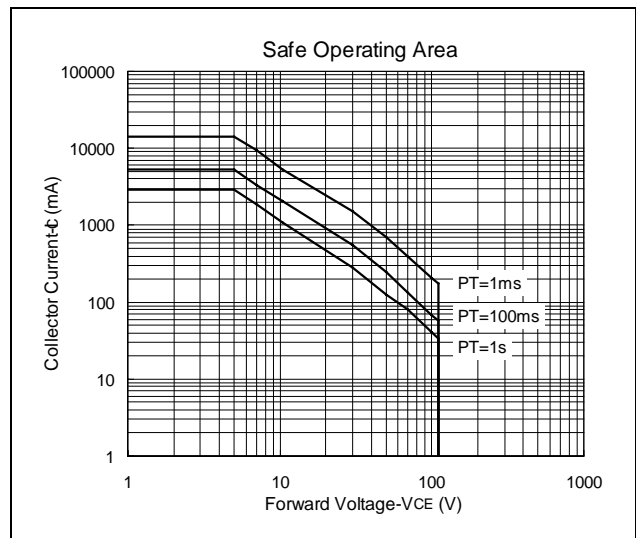
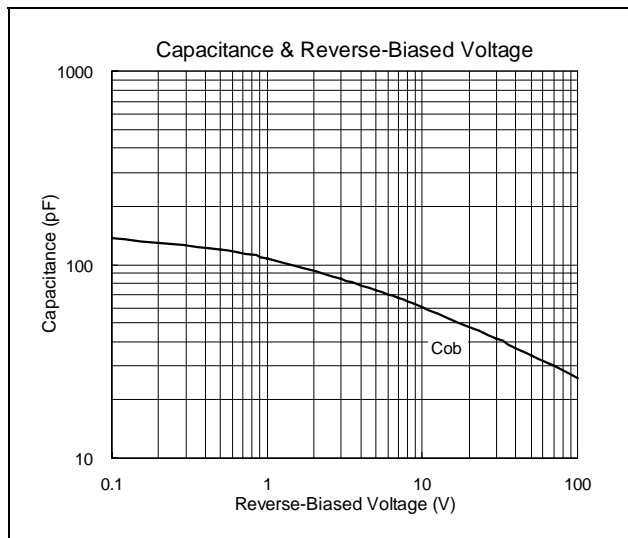
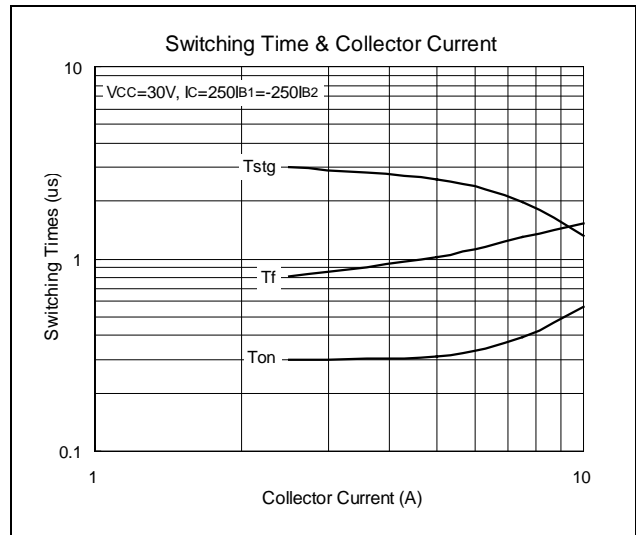
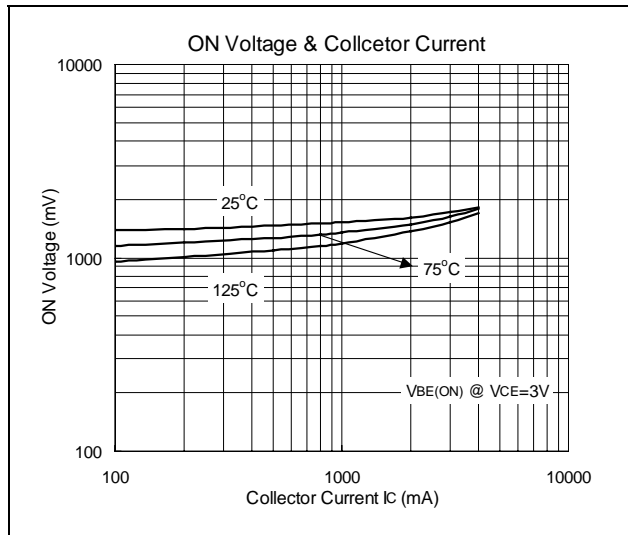
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
$BV_{CBO}$	100	-	-	V	$I_C=1\text{mA}$
$BV_{CEO}$	100	-	-	V	$I_C=30\text{mA}$
$I_{CBO}$	-	-	1	mA	$V_{CB}=100\text{V}$
$I_{CEO}$	-	-	2	mA	$V_{CE}=50\text{V}$
$I_{EBO}$	-	-	2	mA	$V_{EB}=5\text{V}$
* $V_{CE(sat)}$	-	-	2.5	V	$I_C=2\text{A}, I_B=8\text{mA}$
* $V_{BE(on)}$	-	-	2.8	V	$I_C=2\text{A}, V_{CE}=4\text{V}$
* $h_{FE1}$	1	-	-	K	$I_C=1\text{A}, V_{CE}=4\text{V}$
* $h_{FE2}$	500	-	-		$I_C=2\text{A}, V_{CE}=4\text{V}$
$C_{ob}$	-	-	200	pF	$V_{CB}=10\text{V}, f=0.1\text{MHz}$

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



### Characteristics Curve







### SOT-89 Dimension

3-Lead SOT-89 Plastic  
Surface Mounted Package  
HSMC Package Code: M

**Marking:**

Date Code      Control Code

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

Note: Green label is used for pb-free packing

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

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	4.40	4.60
B	4.05	4.25
C	1.50	1.70
D	2.40	2.60
E	0.36	0.51
F	*1.50	-
G	*3.00	-
H	1.40	1.60
I	0.35	0.41

\*: Typical, Unit: mm

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**Head Office And Factory:**

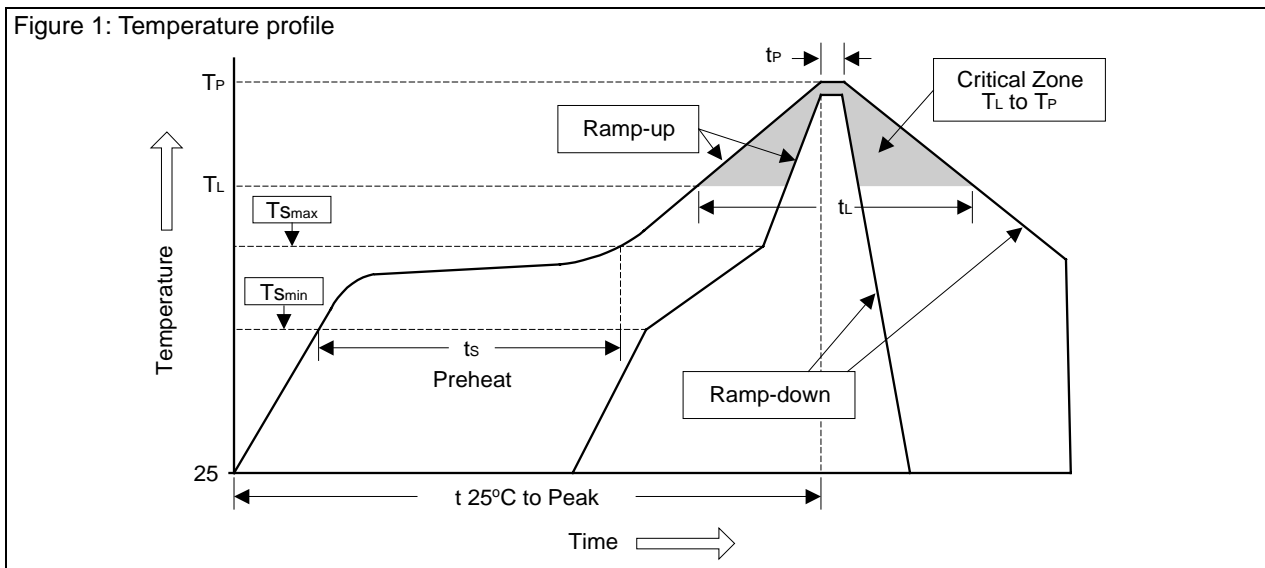
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## Soldering Methods for HSMC's Products

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

2. Reflow soldering of surface-mount devices



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