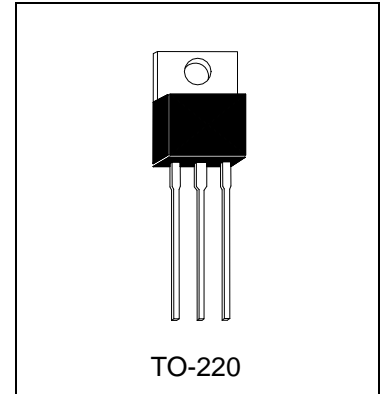




# HMJE13003E

NPN Epitaxial Planar Transistor



## Description

- High Voltage, High Speed Power Switch
- Switch Regulators
- PWM Inverters and Motor Controls
- Solenoid and Relay Drivers
- Deflection Circuits

## Absolute Maximum Ratings (T<sub>A</sub>=25°C)

- Maximum Temperatures  
 Storage Temperature ..... -50 ~ +150 °C  
 Junction Temperature ..... 150 °C Maximum
- Maximum Power Dissipation  
 Total Power Dissipation (T<sub>C</sub>=25°C) ..... 35 W
- Maximum Voltages and Currents (T<sub>A</sub>=25°C)  
 V<sub>CEX</sub> Collector to Emitter Voltage ..... 700 V  
 V<sub>CEO</sub> Collector to Emitter Voltage ..... 400 V  
 V<sub>EBO</sub> Emitter to Base Voltage ..... 9 V  
 I<sub>C</sub> Collector Current ..... Continuous 1.5 A  
 I<sub>B</sub> Base Current ..... Continuous 0.75 A

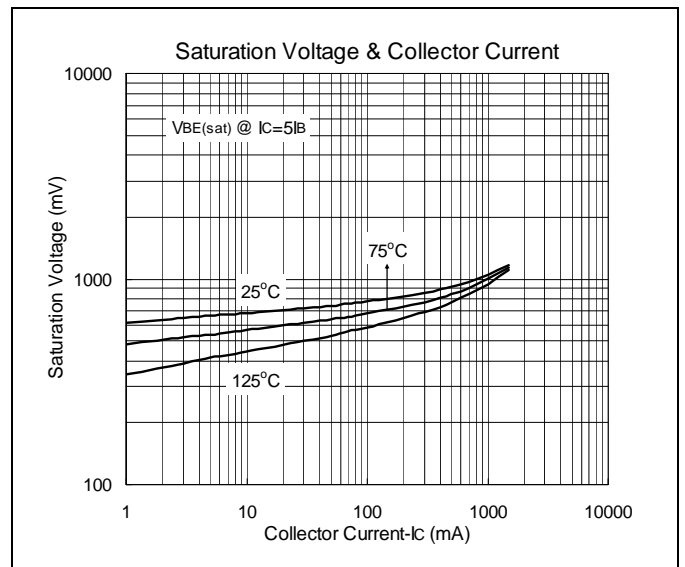
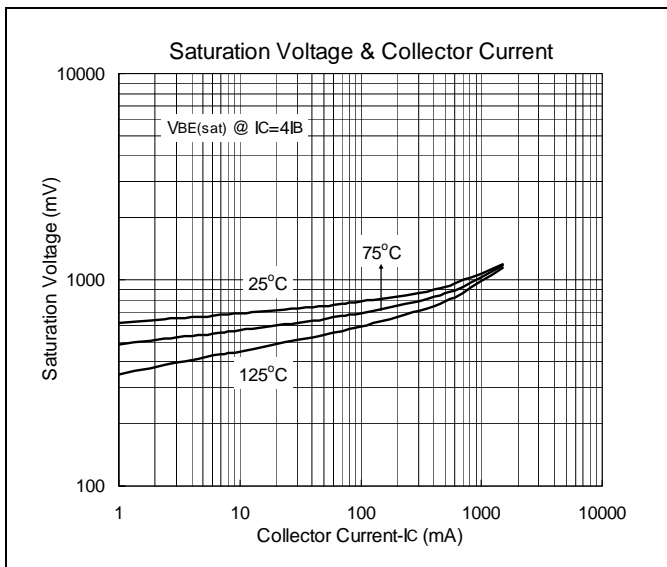
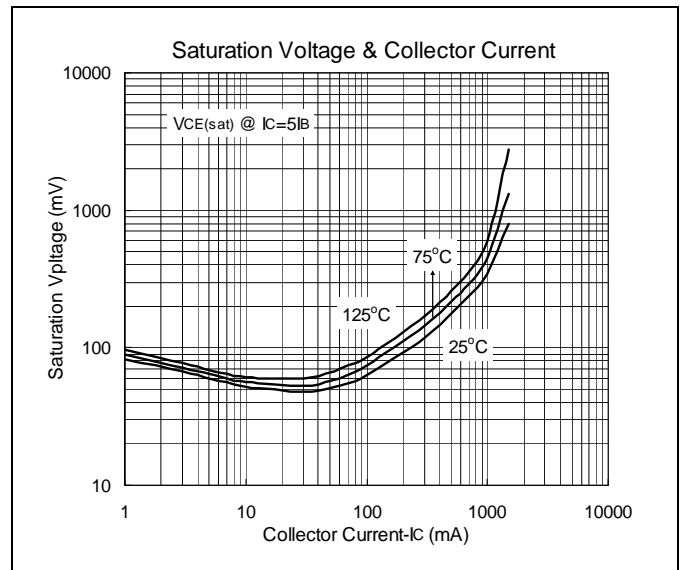
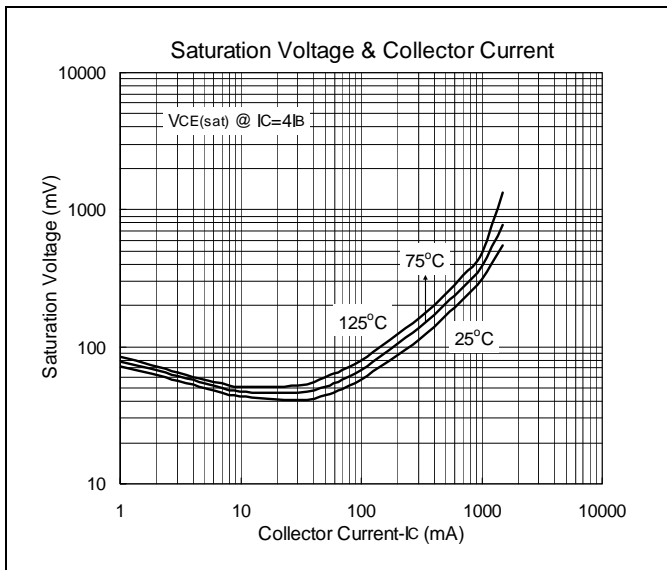
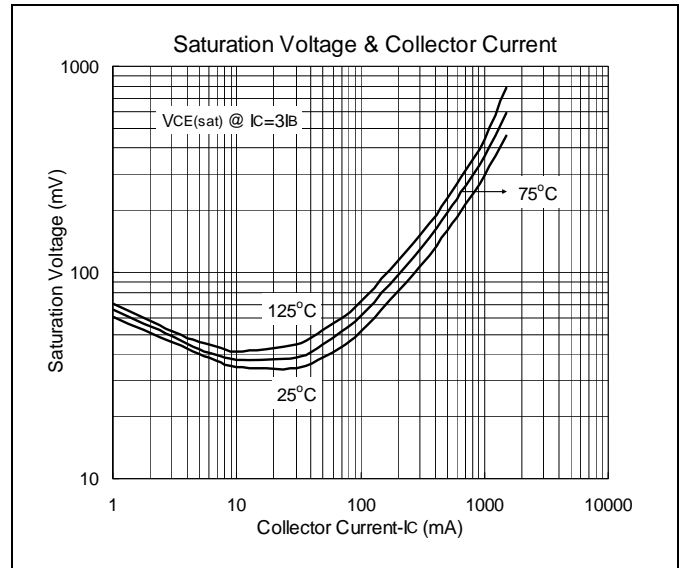
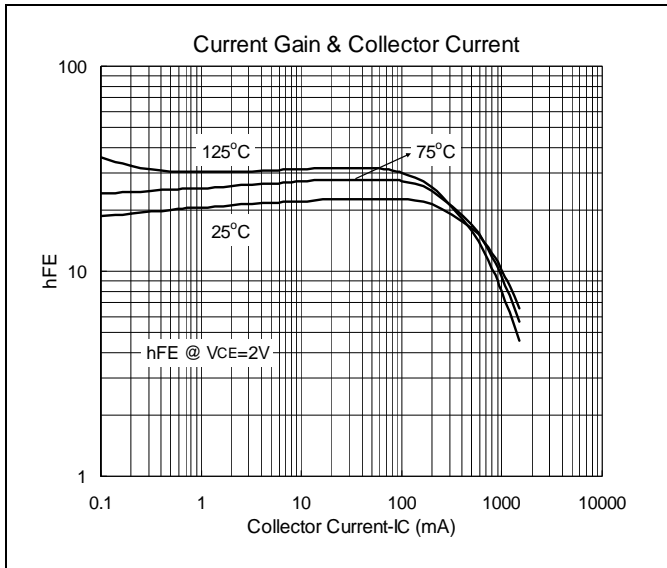
## Electrical Characteristics (T<sub>A</sub>=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CEX</sub>	700	-	-	V	I <sub>C</sub> =1mA, V <sub>BE(off)</sub> =1.5V
BV <sub>CEO</sub>	400	-	-	V	I <sub>C</sub> =10mA
I <sub>EBO</sub>	-	-	1	mA	V <sub>EB</sub> =9V
I <sub>CEX</sub>	-	-	1	mA	V <sub>CE</sub> =700V, V <sub>BE(off)</sub> =1.5V
*V <sub>CE(sat)1</sub>	-	-	500	mV	I <sub>C</sub> =0.5A, I <sub>B</sub> =0.1A
*V <sub>CE(sat)2</sub>	-	-	1	V	I <sub>C</sub> =1A, I <sub>B</sub> =0.25A
*V <sub>CE(sat)3</sub>	-	-	3	V	I <sub>C</sub> =1.5A, I <sub>B</sub> =0.5A
*V <sub>BE(sat)</sub>	-	-	1	V	I <sub>C</sub> =0.5A, I <sub>B</sub> =0.1A
*V <sub>BE(sat)</sub>	-	-	1.2	V	I <sub>C</sub> =1A, I <sub>B</sub> =0.25A
*h <sub>FE1</sub>	8	-	40		I <sub>C</sub> =0.5A, V <sub>CE</sub> =2V
*h <sub>FE2</sub>	5	-	25		I <sub>C</sub> =1A, V <sub>CE</sub> =2V

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



### Characteristics Curve





### TO-220AB Dimension

3-Lead TO-220AB  
 Plastic Package  
 HSMC Package Code: E

**Marking:**

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

Date Code      Control Code

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	5.58	7.49
B	8.38	8.90
C	4.40	4.70
D	1.15	1.39
E	0.35	0.60
F	2.03	2.92
G	9.66	10.28
H	-	*16.25
I	-	*3.83
J	3.00	4.00
K	0.75	0.95
L	2.54	3.42
M	1.14	1.40
N	-	*2.54
O	12.70	14.27
P	14.48	15.87

\*: Typical, Unit: mm

**Important Notice:**

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of HSMC.
- HSMC reserves the right to make changes to its products without notice.
- **HSMC semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- HSMC assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.

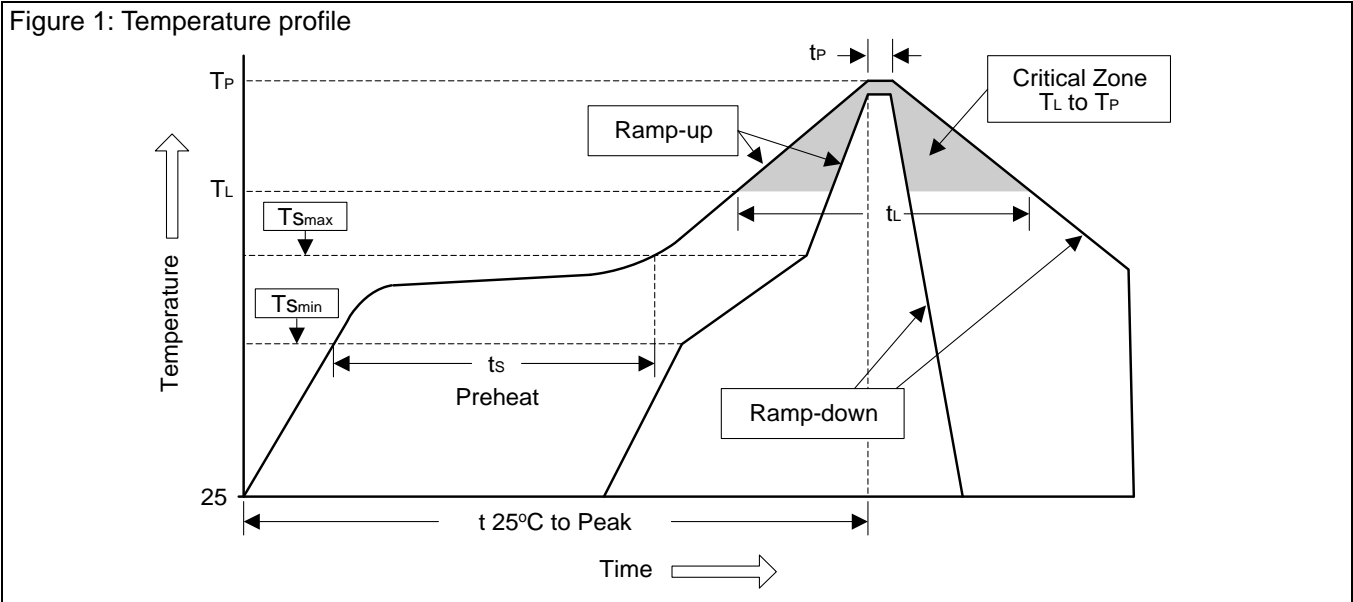
**Head Office**

• **Head Office** (Hi-Sincerity Microelectronics Corp.): 5/F., Golden Harvest Building 15 Wang Chiu Road, Kowloon Bay, Hong Kong  
 Tel: +852-2755-7162 Fax: +852-2755- 7795  
 AVANTICS : Shanghai Address: No.399, Cai Lum Rd. Zhangjiang Technology Industrial Park Pudong, Shanghai 201210, Chin  
 Tel: +86(21) 61637118 Fax: +86(21)61637006



### 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