



H2N5401

PNP EPITAXIAL PLANAR TRANSISTOR

Description

The H2N5401 is designed for general purpose applications requiring high breakdown voltages.

Features

- Complements to NPN Type H2N5551
- High Collector-Emitter Breakdown Voltage ($V_{CEO}=150V$ (@ $I_C=1mA$))

Absolute Maximum Ratings

- Maximum Temperatures
 - Storage Temperature -55 ~ +150 °C
 - Junction Temperature +150 °C Maximum
- Maximum Power Dissipation
 - Total Power Dissipation ($T_A=25^\circ C$) 625 mW
- Maximum Voltages and Currents ($T_A=25^\circ C$)
 - V_{CBO} Collector to Base Voltage -160 V
 - V_{CEO} Collector to Emitter Voltage -150 V
 - V_{EBO} Emitter to Base Voltage -5 V
 - I_C Collector Current -600 mA

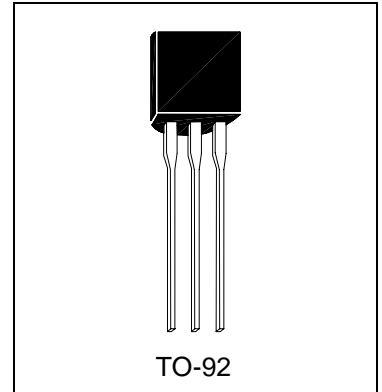
Electrical Characteristics ($T_A=25^\circ C$)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|------------------|------|------|------|------|------------------------------------|
| BV_{CBO} | -160 | - | - | V | $I_C=-100\mu A, I_E=0$ |
| BV_{CEO} | -150 | - | - | V | $I_C=-1mA, I_B=0$ |
| BV_{EBO} | -5 | - | - | V | $I_E=-10\mu A, I_C=0$ |
| I_{CBO} | - | - | -50 | nA | $V_{CB}=-120V, I_E=0$ |
| I_{EBO} | - | - | -50 | nA | $V_{EB}=-3V, I_C=0$ |
| * $V_{CE(sat)1}$ | - | - | -0.2 | V | $I_C=-10mA, I_B=-1mA$ |
| * $V_{CE(sat)2}$ | - | - | -0.5 | V | $I_C=-50mA, I_B=-5mA$ |
| * $V_{BE(sat)1}$ | - | - | -1 | V | $I_C=-10mA, I_B=-1mA$ |
| * $V_{BE(sat)2}$ | - | - | -1 | V | $I_C=-50mA, I_B=-5mA$ |
| * h_{FE1} | 50 | - | - | | $V_{CE}=-5V, I_C=-1mA$ |
| * h_{FE2} | 80 | 160 | 400 | | $V_{CE}=-5V, I_C=-10mA$ |
| * h_{FE3} | 50 | - | - | | $V_{CE}=-5V, I_C=-50mA$ |
| f_T | 100 | - | 300 | MHz | $V_{CE}=-10V, I_C=-10mA, f=100MHz$ |
| Cob | - | - | 6 | pF | $V_{CB}=-10V, f=1MHz, I_E=0$ |

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

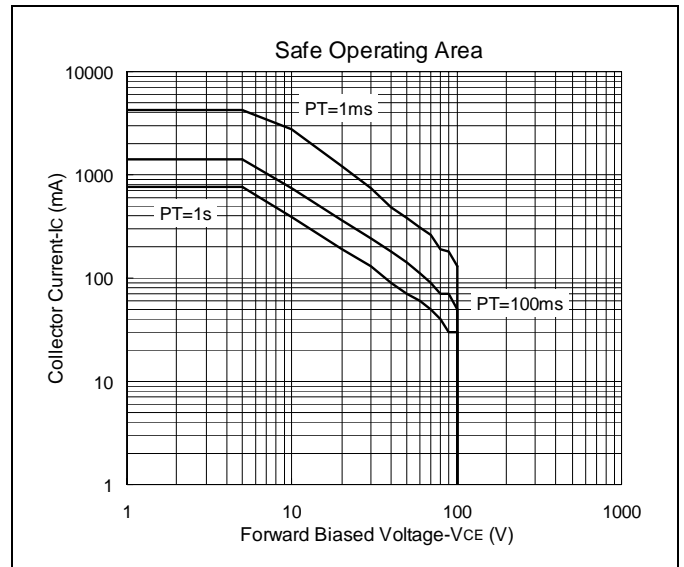
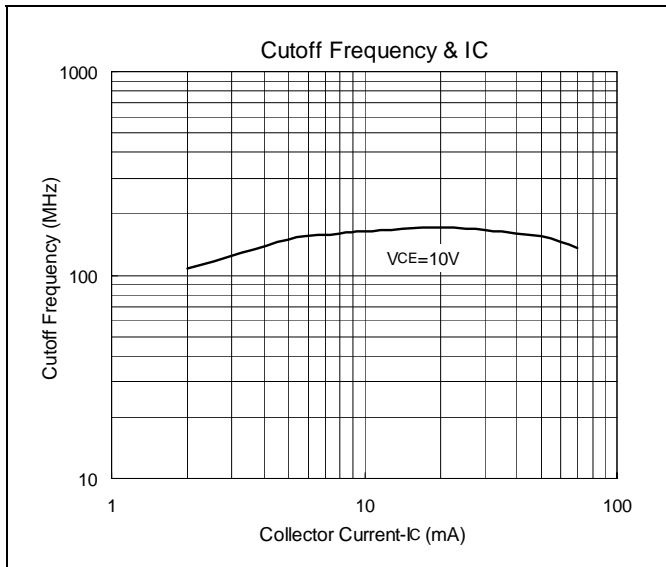
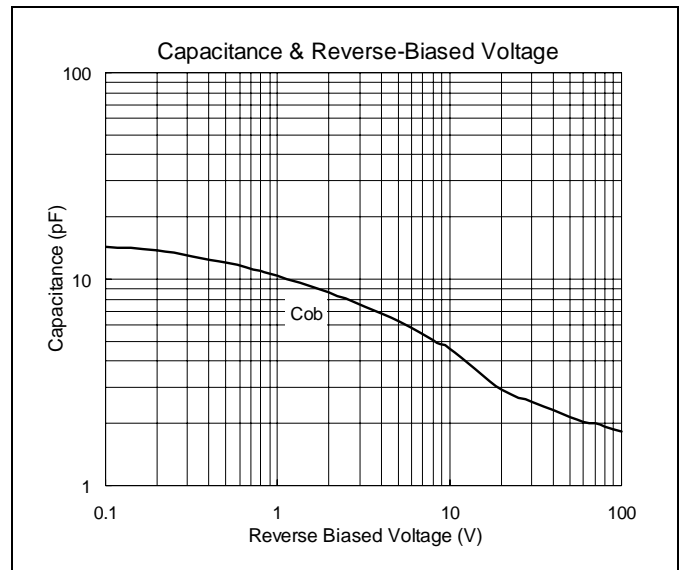
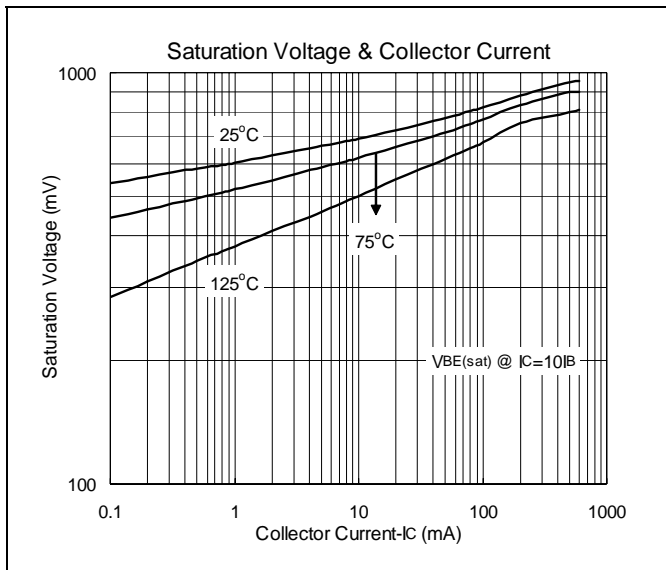
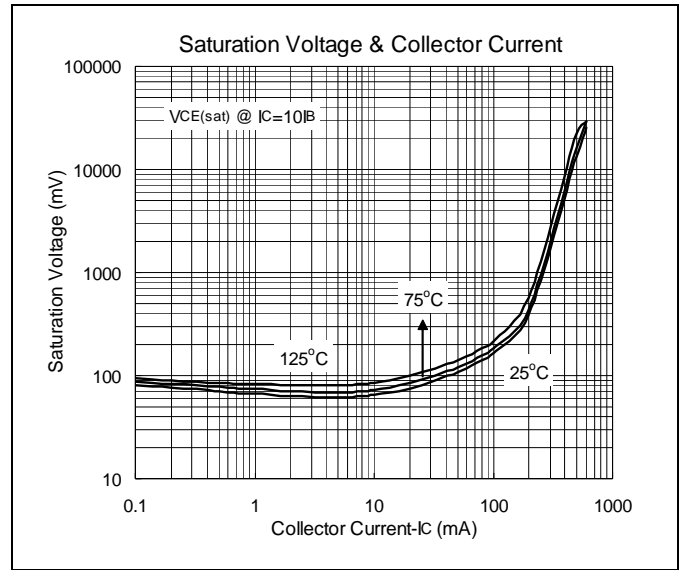
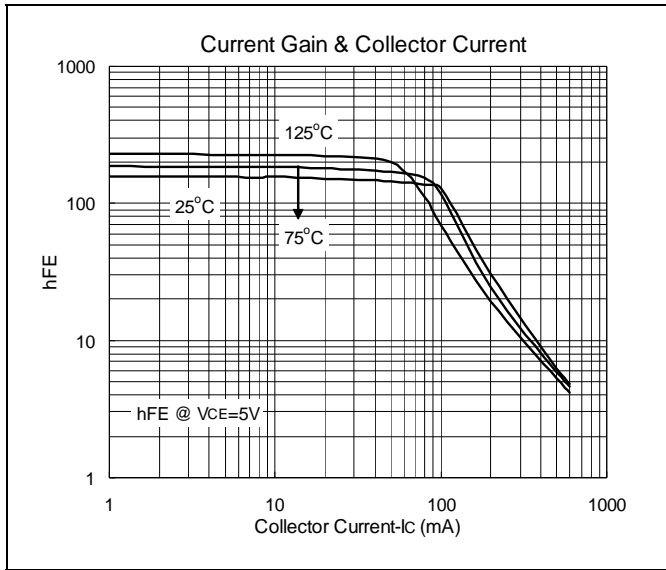
Classification of hFE2

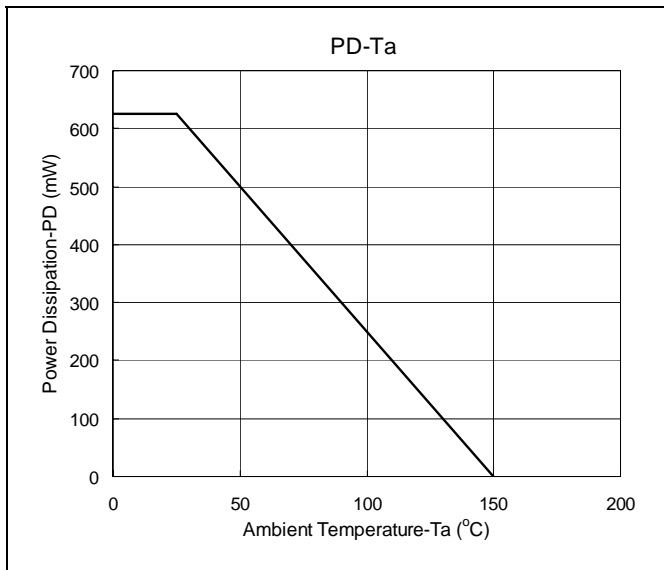
| Rank | A | N | C |
|-------|--------|---------|---------|
| Range | 80-200 | 100-240 | 160-400 |





Characteristics Curve







TO-92 Dimension

3-Lead TO-92 Plastic Package
HSMC Package Code: A

Marking:

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

H 2 N
5 4 0 1

Date Code Control Code

Note: Green label is used for pb-free packing

Pin Style: 1.Emitter 2.Base 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 | 4.33 | 4.83 |
| B | 4.33 | 4.83 |
| C | 12.70 | - |
| D | 0.36 | 0.56 |
| E | - | *1.27 |
| F | 3.36 | 3.76 |
| G | 0.36 | 0.56 |
| H | - | *2.54 |
| I | - | *1.27 |
| $\alpha 1$ | - | *5° |
| $\alpha 2$ | - | *2° |
| $\alpha 3$ | - | *2° |

*: Typical, Unit: mm

TO-92 Taping Dimension

| DIM | Min. | Max. |
|-------|-------|-------|
| A | 4.33 | 4.83 |
| D | 3.80 | 4.20 |
| D1 | 0.36 | 0.53 |
| D2 | 4.33 | 4.83 |
| F1,F2 | 2.40 | 2.90 |
| H | 15.50 | 16.50 |
| H1 | 8.50 | 9.50 |
| H2 | - | 1 |
| H2A | - | 1 |
| H3 | - | 27 |
| H4 | - | 21 |
| L | - | 11 |
| L1 | 2.50 | - |
| P | 12.50 | 12.90 |
| P1 | 5.95 | 6.75 |
| P2 | 50.30 | 51.30 |
| T | - | 0.55 |
| T1 | - | 1.42 |
| T2 | 0.36 | 0.68 |
| W | 17.50 | 19.00 |
| W1 | 5.00 | 7.00 |

Unit: mm

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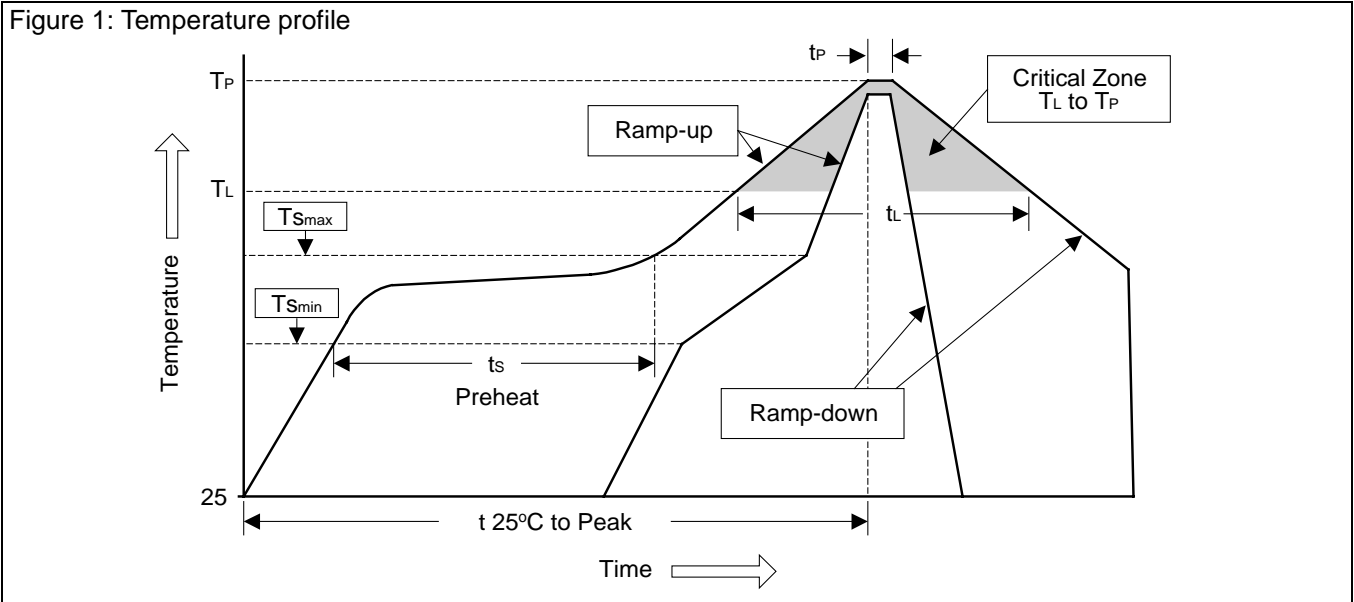
Head Office And Factory:

- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F.,No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.
Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454
- **Factory 1:** No. 38, Kuang Fu S. Rd., Fu-Kou Hsin-Chu Industrial Park Hsin-Chu Taiwan. R.O.C
Tel: 886-3-5983621~5 Fax: 886-3-5982931



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 |