



H2N3904

NPN EPITAXIAL PLANAR TRANSISTOR

Description

The H2N3904 is designed for general purpose switching and amplifier applications.

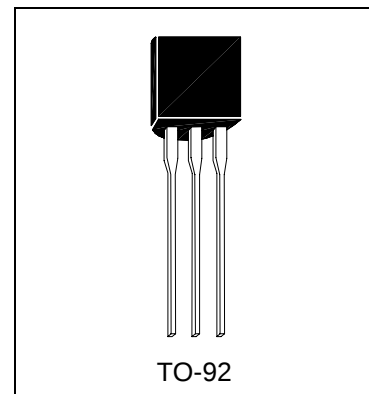
Absolute Maximum Ratings

- Maximum Temperatures
Storage Temperature..... -55 ~ +150 °C
Junction Temperature..... +150 °C Maximum
- Maximum Power Dissipation
Total Power Dissipation ($T_A=25^{\circ}\text{C}$)..... 625 mW
- Maximum Voltages and Currents ($T_A=25^{\circ}\text{C}$)
 V_{CBO} Collector to Base Voltage 60 V
 V_{CEO} Collector to Emitter Voltage 40 V
 V_{EBO} Emitter to Base Voltage 6 V
 I_C Collector Current 200 mA

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	60	-	-	V	$I_C=10\mu\text{A}$, $I_E=0$
BV_{CEO}	40	-	-	V	$I_C=1\text{mA}$, $I_B=0$
BV_{EBO}	6	-	-	V	$I_E=10\mu\text{A}$, $I_C=0$
I_{CEX}	-	-	50	nA	$V_{CE}=30\text{V}$, $V_{BE}=3\text{V}$
$*V_{CE(sat)1}$	-	-	200	mV	$I_B=1\text{mA}$, $I_C=10\text{mA}$
$*V_{CE(sat)2}$	-	-	300	mV	$I_B=5\text{mA}$, $I_C=50\text{mA}$
$*V_{BE(sat)1}$	650	-	850	mV	$I_B=1\text{mA}$, $I_C=10\text{mA}$
$*V_{BE(sat)2}$	-	-	950	mV	$I_B=5\text{mA}$, $I_C=50\text{mA}$
$*h_{FE1}$	40	-	-		$V_{CE}=1\text{V}$, $I_C=100\mu\text{A}$
$*h_{FE2}$	70	-	-		$V_{CE}=1\text{V}$, $I_C=1\text{mA}$
$*h_{FE3}$	100	-	300		$V_{CE}=1\text{V}$, $I_C=10\text{mA}$
$*h_{FE4}$	60	-	-		$V_{CE}=1\text{V}$, $I_C=50\text{mA}$
$*h_{FE5}$	30	-	-		$V_{CE}=1\text{V}$, $I_C=100\text{mA}$
f_T	300	-	-	MHz	$I_C=10\text{mA}$, $V_{CE}=20\text{V}$, $f=100\text{MHz}$
Cob	-	-	4	pF	$V_{CB}=5\text{V}$, $f=1\text{MHz}$, $I_E=0$

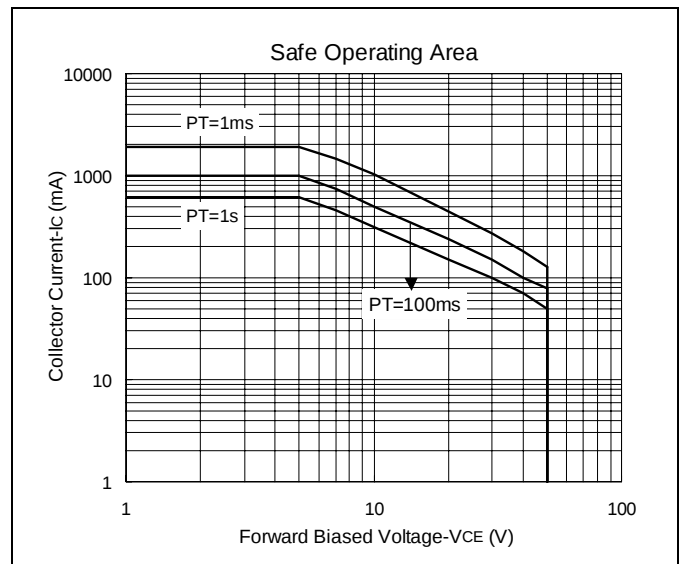
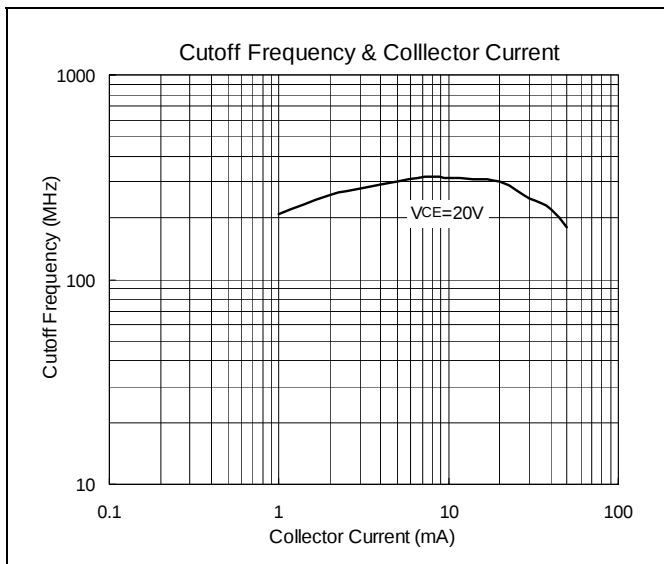
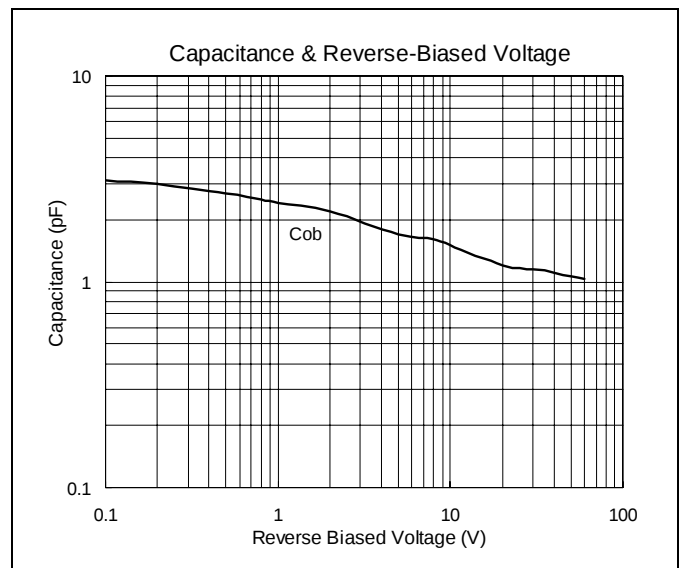
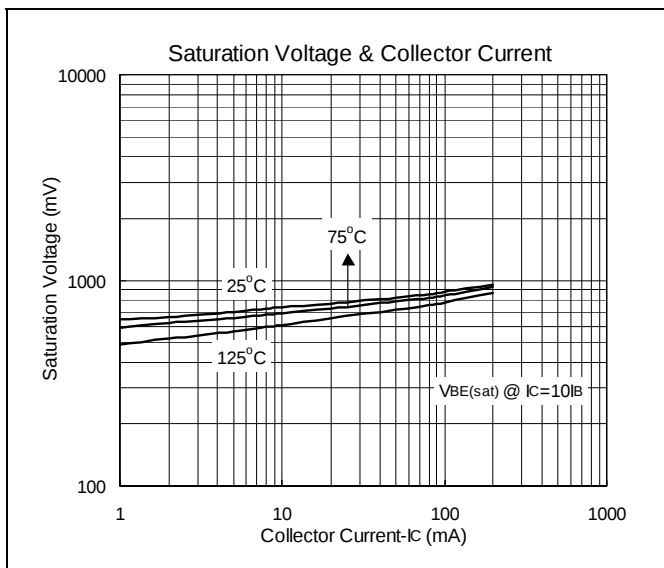
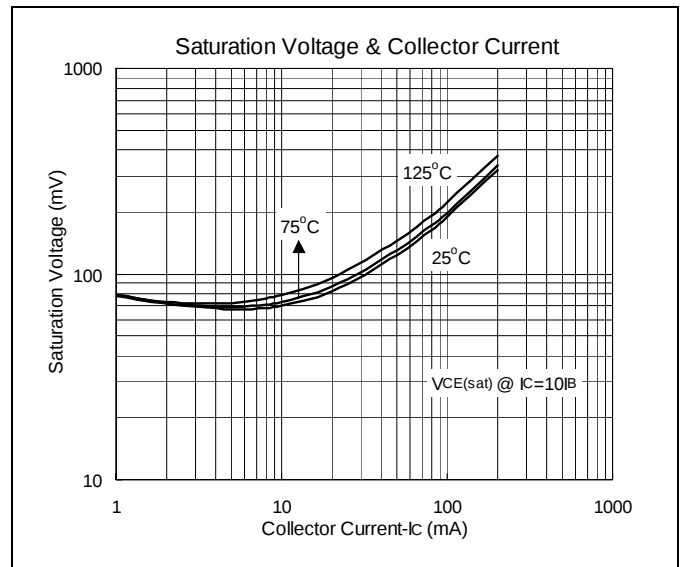
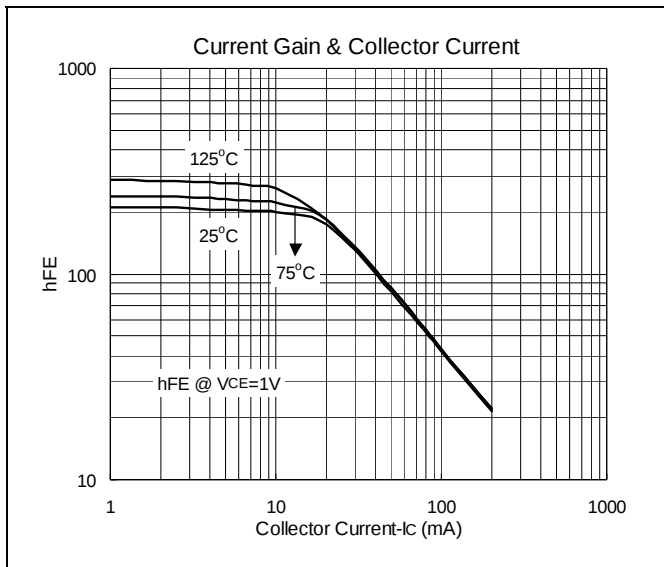
*Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$

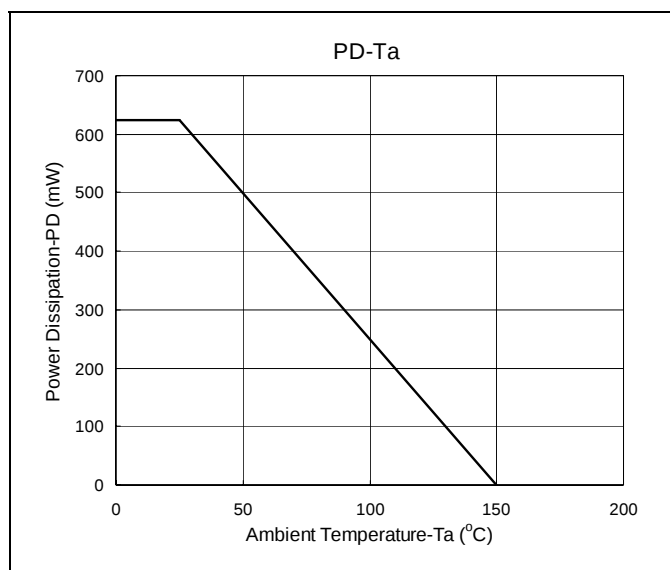


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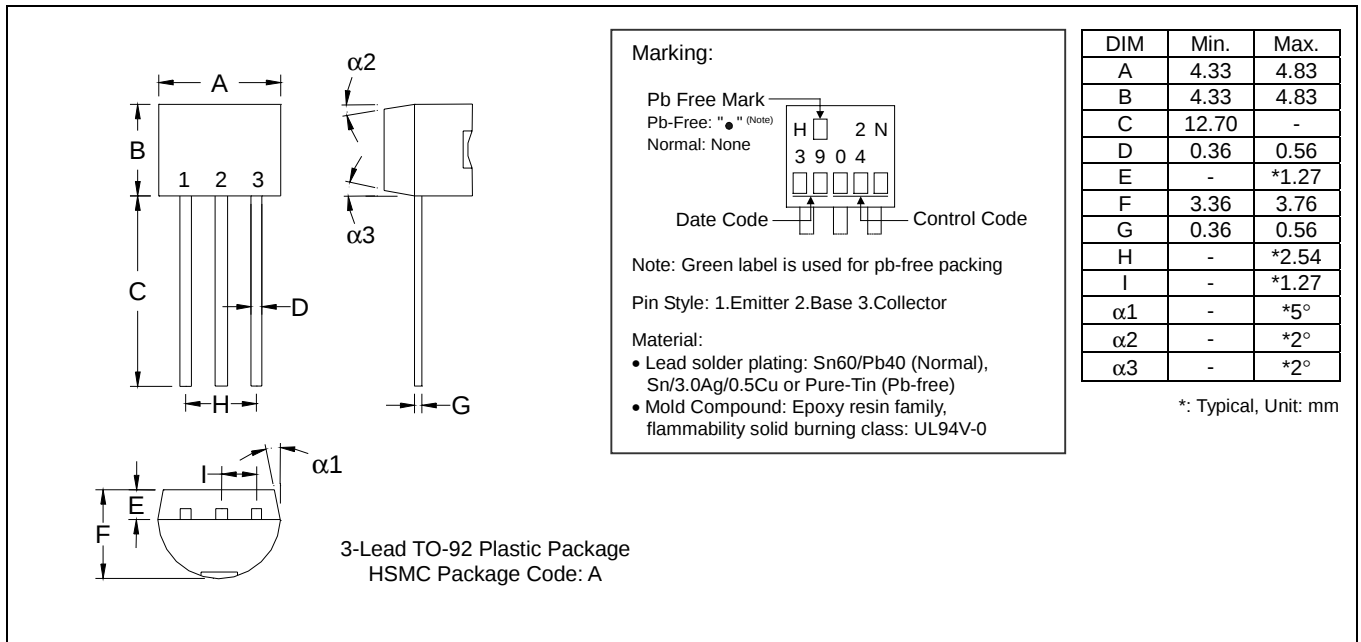
Characteristics Curve



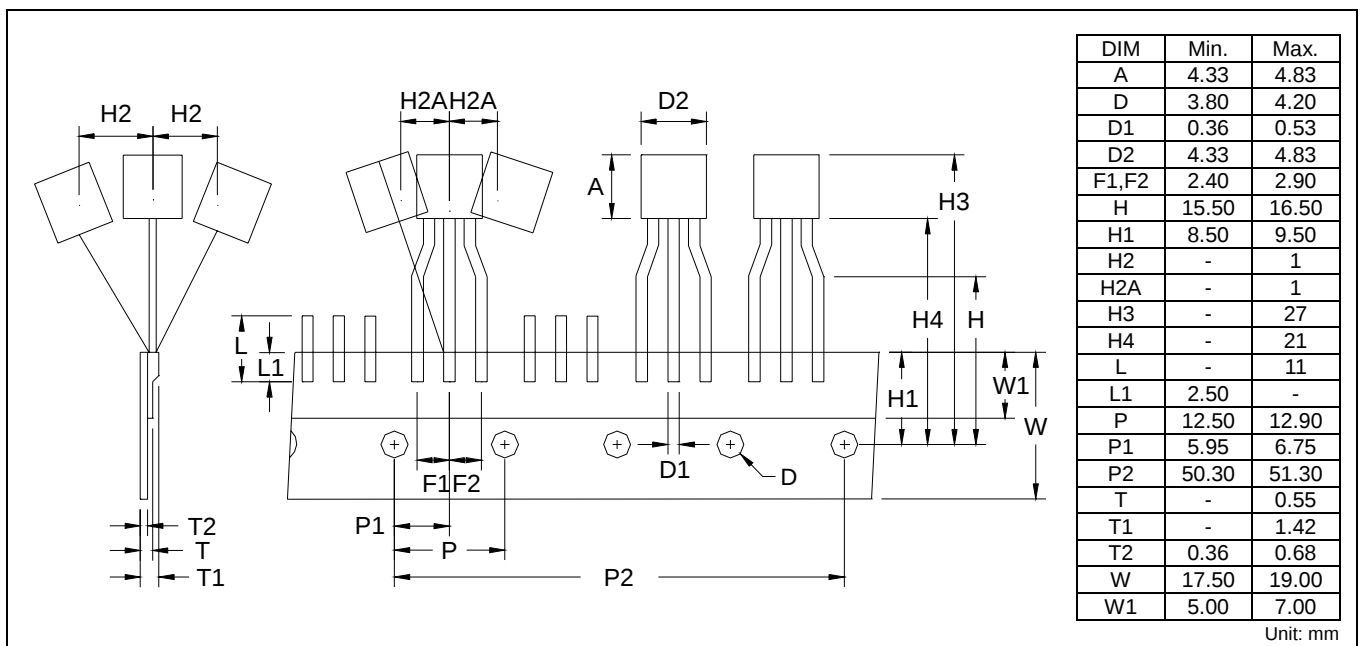




TO-92 Dimension



TO-92 Taping Dimension



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Head Office And Factory:

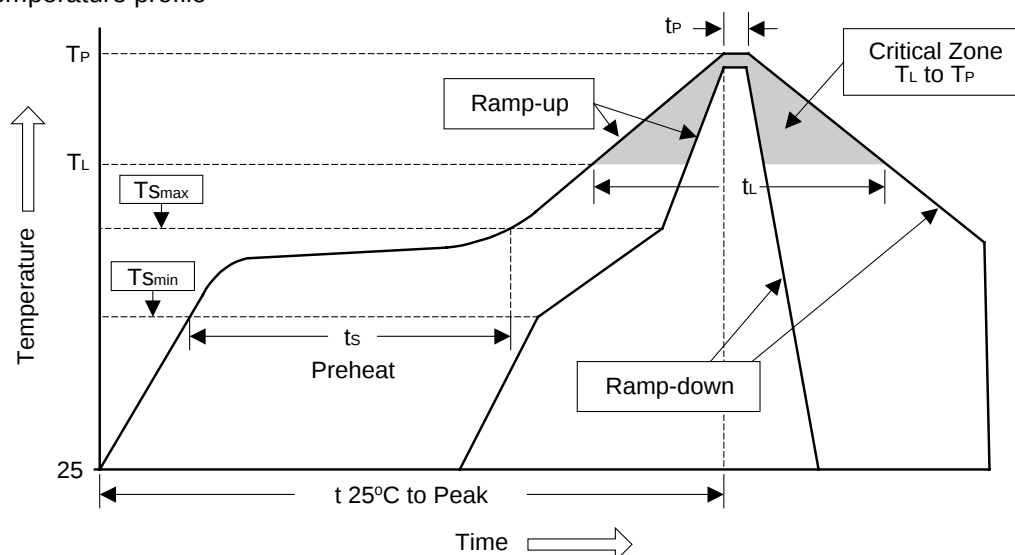
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Soldering Methods for HSMC's Products

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