



HMP5A94

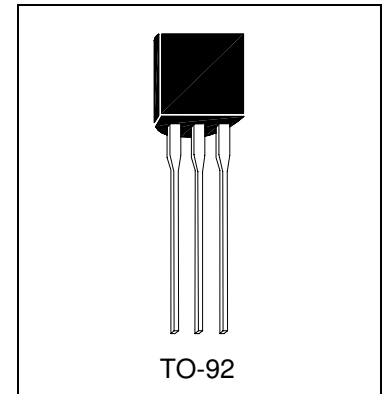
PNP EPITAXIAL PLANAR TRANSISTOR

Description

The HMP5A94 is designed for application that requires high voltage.

Features

- High Breakdown Voltage: 400V(Min.) at $I_C=1\text{mA}$
- High Current: $I_C=300\text{mA}$ at 25°C
- Complementary to HMP5A44



Absolute Maximum Ratings

- Maximum Temperatures
 - Storage Temperature $-55 \sim +150^\circ\text{C}$
 - Junction Temperature $+150^\circ\text{C}$ 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 -400 V
 - V_{CEO} Collector to Emitter Voltage -400 V
 - V_{EBO} Emitter to Base Voltage -6 V
 - I_C Collector Current -500 mA

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-400	-	-	V	$I_C=-100\mu\text{A}, I_E=0$
BV_{CEO}	-400	-	-	V	$I_C=-1\text{mA}, I_B=0$
BV_{EBO}	-6	-	-	V	$I_E=-10\mu\text{A}, I_C=0$
I_{CBO}	-	-	-100	nA	$V_{CB}=-400\text{V}, I_E=0$
I_{EBO}	-	-	-100	nA	$V_{EB}=-4\text{V}, I_C=0$
I_{CES}	-	-	-500	nA	$V_{CE}=-400\text{V}, V_{BE}=0$
* $V_{CE(sat)1}$	-	-	-350	mV	$I_C=-1\text{mA}, I_B=-0.1\text{mA}$
* $V_{CE(sat)2}$	-	-	-500	mV	$I_C=-20\text{mA}, I_B=-2\text{mA}$
* $V_{CE(sat)3}$	-	-	-750	mV	$I_C=-50\text{mA}, I_B=-5\text{mA}$
* $V_{BE(sat)}$	-	-	-750	mV	$I_C=-10\text{mA}, I_B=-1\text{mA}$
* h_{FE1}	40	-	-		$V_{CE}=-10\text{V}, I_C=-1\text{mA}$
* h_{FE2}	50	-	300		$V_{CE}=-10\text{V}, I_C=-10\text{mA}$
* h_{FE3}	45	-	-		$V_{CE}=-10\text{V}, I_C=-50\text{mA}$
* h_{FE4}	40	-	-		$V_{CE}=-10\text{V}, I_C=-100\text{mA}$

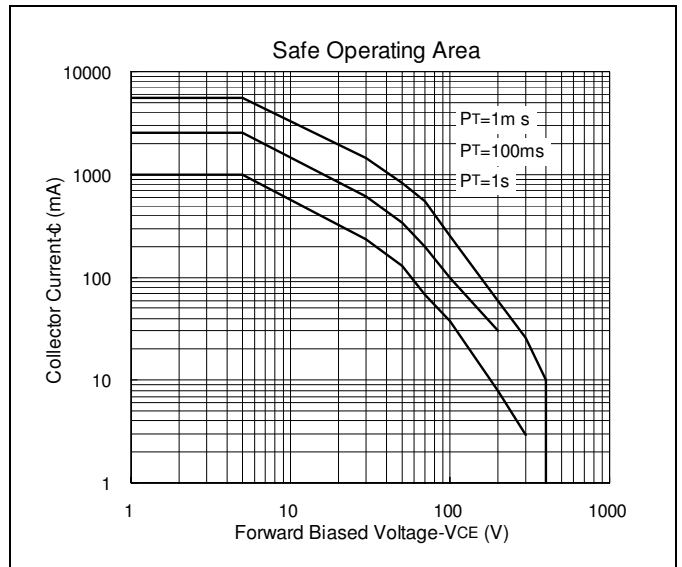
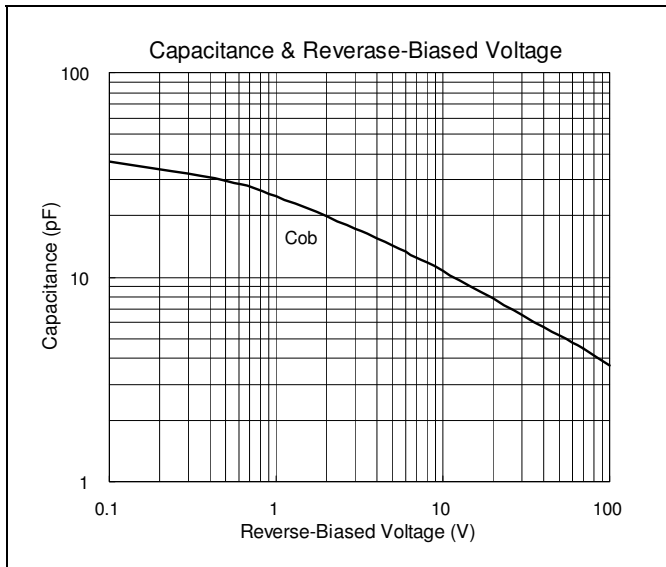
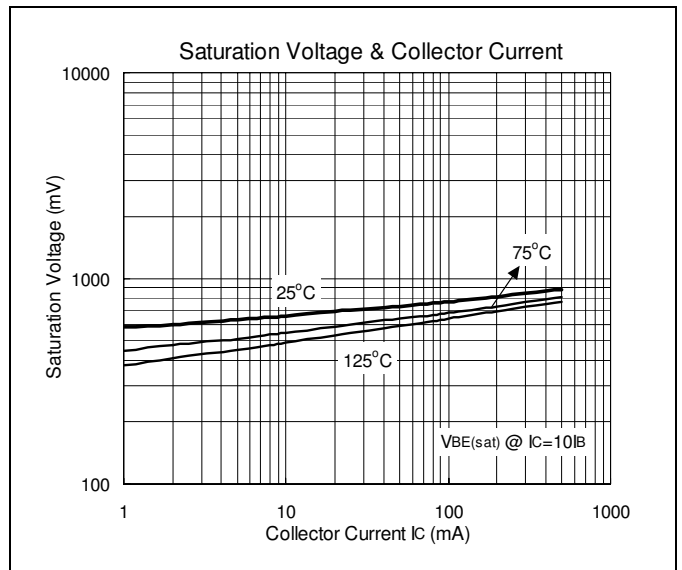
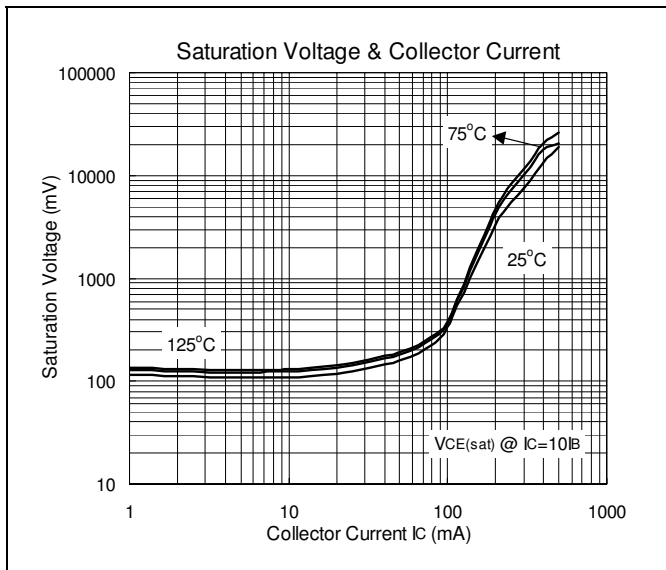
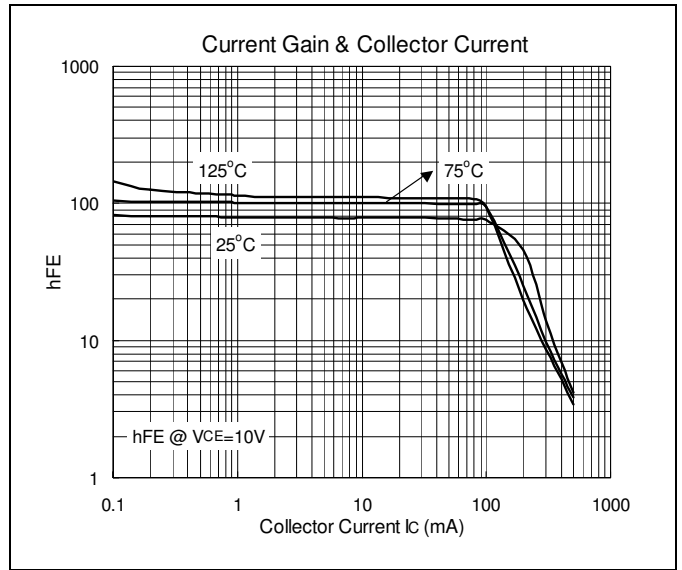
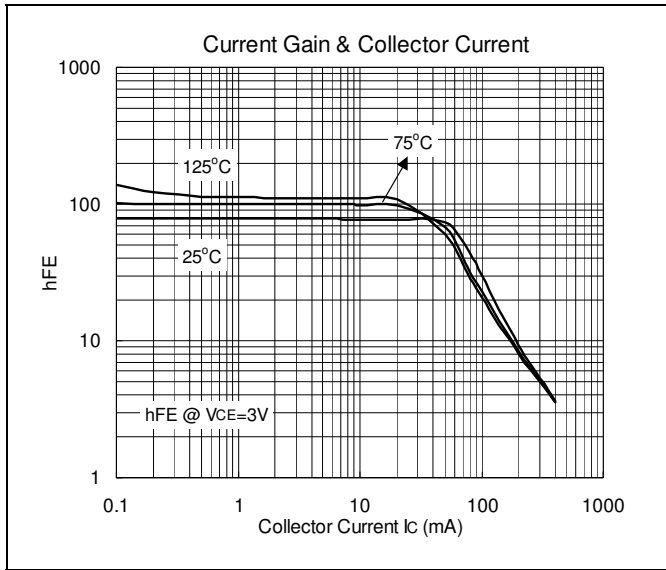
*Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$

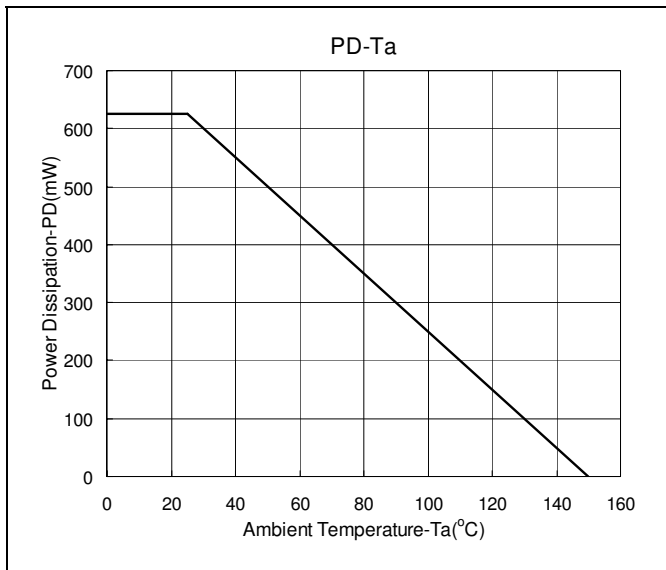
Classification Of h_{FE2}

Rank	SD	N
$h_{FE}@V_{CE}=-3\text{V}, I_C=-100\text{mA}$	-	-
$h_{FE2}@V_{CE}=-10\text{V}, I_C=-10\text{mA}$	70-200	50-300
$V_{CE(sat)}@I_C=-20\text{mA}, I_B=-2\text{mA}$	<200mV	<500mV



Characteristics Curve







TO-92 Dimension

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

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.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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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) (ts)	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