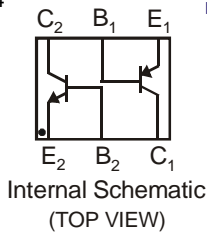


**Features**

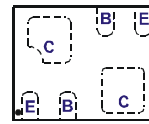
- Complementary Pair: One 3904 (NPN) and One 3906 (PNP)
- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- Lead Free by Design/RoHS Compliant (Note 1)
- "Green" Device (Note 2)

**Mechanical Data**

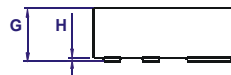
- Case: DFN1310H4-6
- Case Material: Molded Plastic. "Green Molding" Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish – NiPdAu over Copper leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Marking & Type Code Information: See Page 4
- Ordering Information: See Page 4



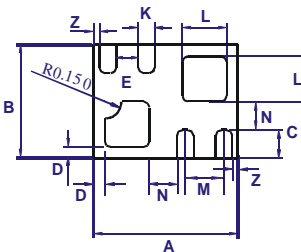
E<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub> = PNP3906 Section  
E<sub>2</sub>, B<sub>2</sub>, C<sub>2</sub> = NPN3904 Section



Top View



Side View



Bottom View

DFN1310H4-6			
Dim	Min	Max	Typ
A	1.25	1.38	1.30
B	0.95	1.08	1.00
C	0.20	0.30	0.25
D*	-	-	0.10
E**	-	-	0.20
G	-	0.40	-
H	0	0.05	0.02
K*	0.10	0.20	0.15
L*	0.30	0.50	0.40
M**	-	-	0.35
N*	-	-	0.25
Z**	-	-	0.05

All Dimensions in mm

\* Dimensions D, K, L, N Repeat 4X  
\*\* Dimensions E, M, Z Repeat 2X

**Maximum Ratings, NPN 3904 Section** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	60	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	V
Collector Current – Continuous	I <sub>c</sub>	200	mA
Power Dissipation (Notes 3, 4)	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient (Note 3)	R <sub>θJA</sub>	625	°C/W

**Maximum Ratings, PNP 3906 Section** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5.0	V
Collector Current - Continuous (Note 1)	I <sub>c</sub>	-200	mA
Power Dissipation (Notes 3, 4)	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient (Note 3)	R <sub>θJA</sub>	625	°C/W

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB.
  4. Maximum combined dissipation.

**Electrical Characteristics, NPN 3904 Section** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60	—	V	$I_C = 10\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40	—	V	$I_C = 1.0\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6.0	—	V	$I_E = 10\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CEX}$	—	50	nA	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Base Cutoff Current	$I_{BL}$	—	50	nA	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
<b>ON CHARACTERISTICS (Note 5)</b>					
DC Current Gain	$h_{FE}$	40	—	—	$I_C = 100\mu\text{A}, V_{CE} = 1.0\text{V}$
		70	—		
		100	300		
		60	—		
		30	—		
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.20 0.30	V	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.65 —	0.85 0.95	V	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	$C_{obo}$	—	4.0	pF	$V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$
Current Gain-Bandwidth Product	$f_T$	300	—	MHz	$V_{CE} = 20\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	$t_d$	—	35	ns	$V_{CC} = 3.0\text{V}, I_C = 10\text{mA}$
Rise Time	$t_r$	—	35	ns	$V_{BE(off)} = -0.5\text{V}, I_{B1} = 1.0\text{mA}$
Storage Time	$t_s$	—	200	ns	$V_{CC} = 3.0\text{V}, I_C = 10\text{mA}$
Fall Time	$t_f$	—	50	ns	$I_{B1} = I_{B2} = 1.0\text{mA}$

**Electrical Characteristics, PNP 3906 Section** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	—	V	$I_C = -10\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-40	—	V	$I_C = -1.0\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0	—	V	$I_E = -10\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CEX}$	—	-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -3.0\text{V}$
Base Cutoff Current	$I_{BL}$	—	-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -3.0\text{V}$
<b>ON CHARACTERISTICS (Note 5)</b>					
DC Current Gain	$h_{FE}$	60	—	—	$I_C = -100\mu\text{A}, V_{CE} = -1.0\text{V}$
		80	—		
		100	300		
		60	—		
		30	—		
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	-0.25 -0.40	V	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	-0.65 —	-0.85 -0.95	V	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	$C_{obo}$	—	4.5	pF	$V_{CB} = -5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$
Current Gain-Bandwidth Product	$f_T$	250	—	MHz	$V_{CE} = -20\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	$t_d$	—	35	ns	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA}$
Rise Time	$t_r$	—	35	ns	$V_{BE(off)} = 0.5\text{V}, I_{B1} = -1.0\text{mA}$
Storage Time	$t_s$	—	225	ns	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA}$
Fall Time	$t_f$	—	75	ns	$I_{B1} = I_{B2} = -1.0\text{mA}$

Notes: 5. Short duration test pulse used to minimize self-heating effect.

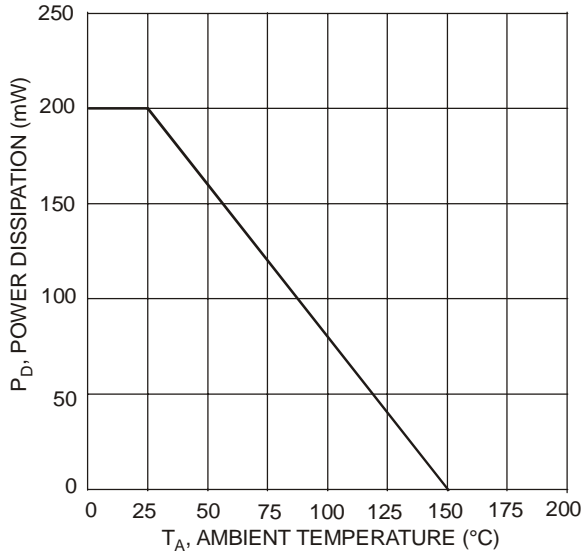


Fig. 1, Max Power Dissipation vs Ambient Temperature (Total Device) (Note 3)

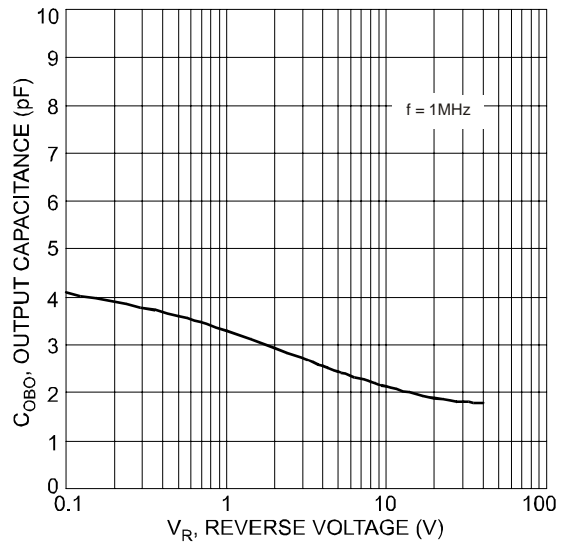


Fig. 2, Typical Output Capacitance Characteristics (NPN-3904)

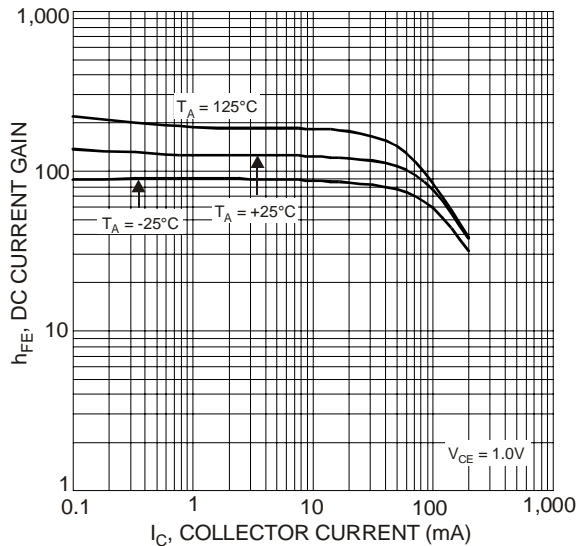


Fig. 3, Typical DC Current Gain vs Collector Current (NPN-3904)

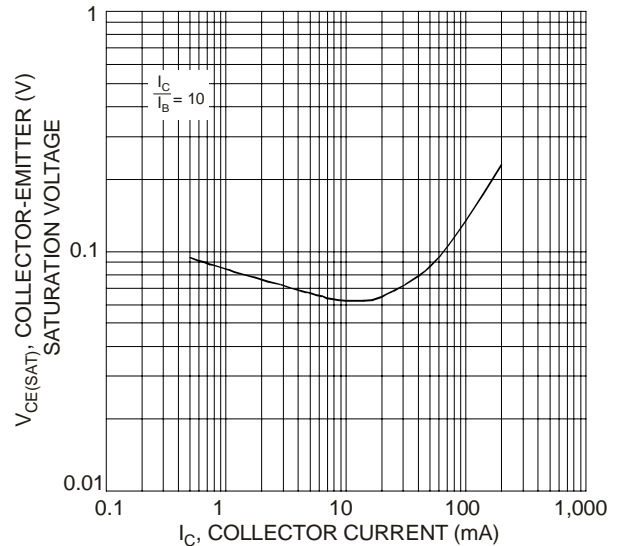


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current (NPN-3904)

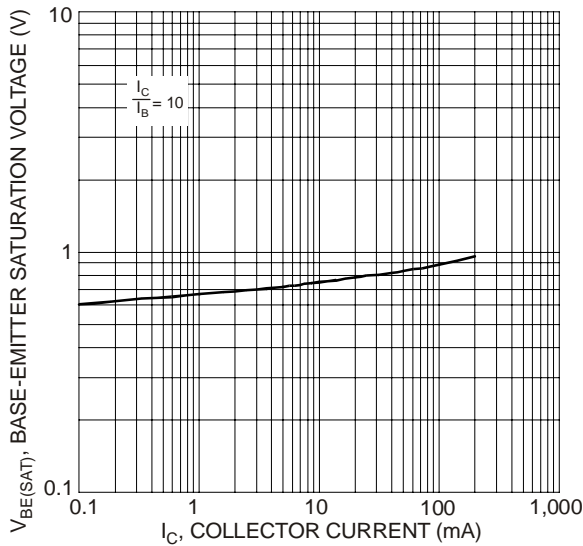


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current (NPN-3904)

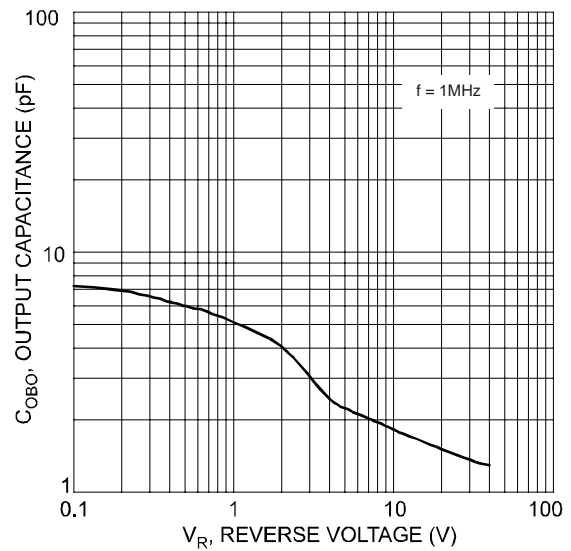


Fig. 6, Typical Output Capacitance Characteristics (PNP-3906)

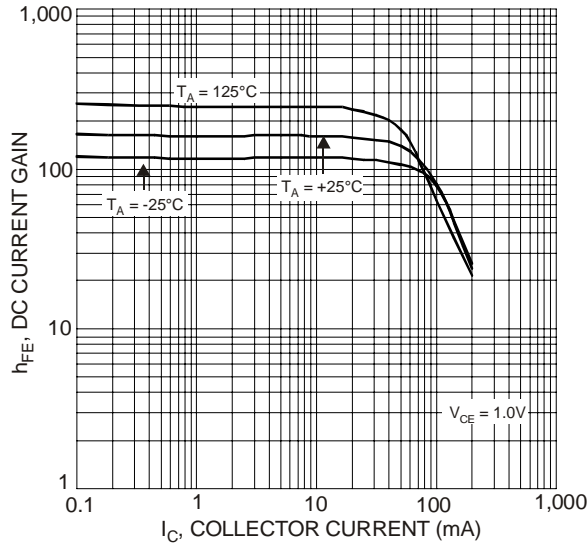


Fig. 7, Typical DC Current Gain vs Collector Current (PNP-3906)

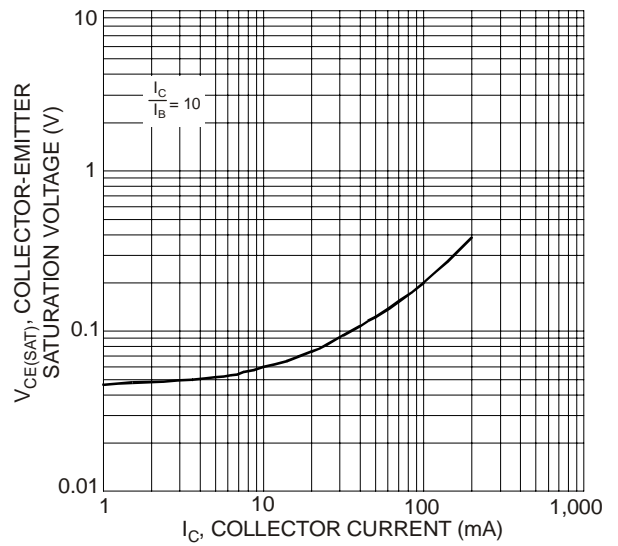


Fig. 8, Typical Collector-Emitter Saturation Voltage vs. Collector Current (PNP-3906)

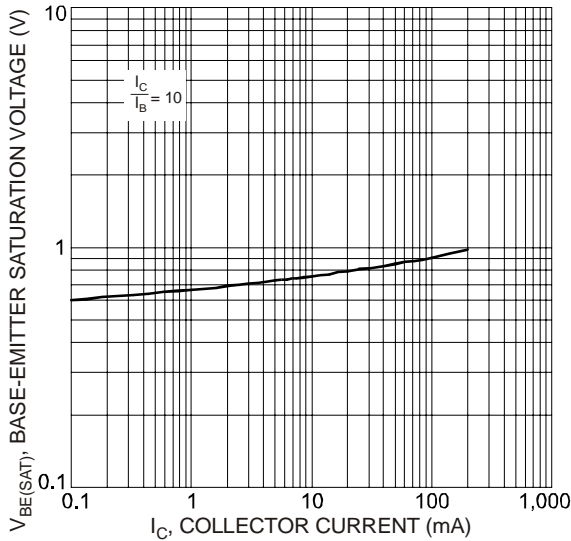


Fig. 9, Typical Base-Emitter Saturation Voltage vs. Collector Current (PNP-3906)

**Ordering Information** (Note 6)

Device	Packaging	Shipping
MMDT3946LP4-7	DFN1310H4-6	3000/Tape & Reel

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



46= Product Type Marking Code

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