



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



40V COMPLEMENTARY NPN-PNP SMALL SIGNAL TRANSISTOR IN DFN1310-6
Features

- Complementary Pair One 3904-Type NPN
One 3906-Type PNP
- Ultra-Small Surface Mount Package
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

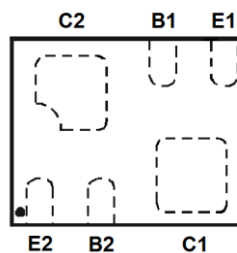
Mechanical Data

- Case: X2-DFN1310-6 (Type B)
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu, Solderable per MIL-STD-202,
Method 208 (e4)
- Weight: 0.006 grams (Approximate)

X2-DFN1310-6 (Type B)



Top View


 Pinout
Top View

 E1, B1, C1 = PNP 3906
 E2, B2, C2 = NPN 3904

Ordering Information (Note 4)

Product	Standard	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
MMDT3946FL3-7	AEC-Q101	47	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


47 = Product Type Marking Code

Absolute Maximum Ratings, NPN 3904 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current	I_C	200	mA

Absolute Maximum Ratings, PNP 3906 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-6.0	V
Collector Current	I_C	-200	mA

Thermal Characteristics, Total Device (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	370	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	339	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

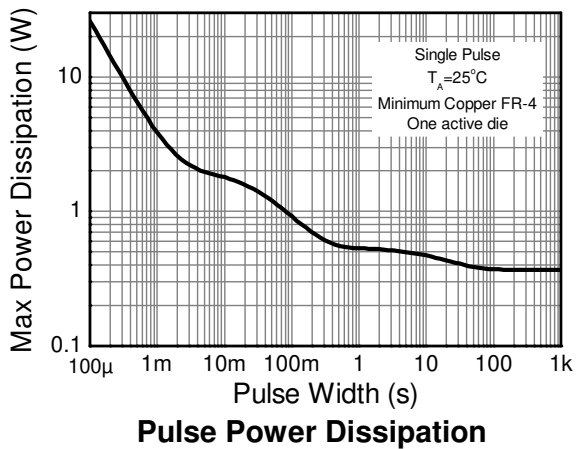
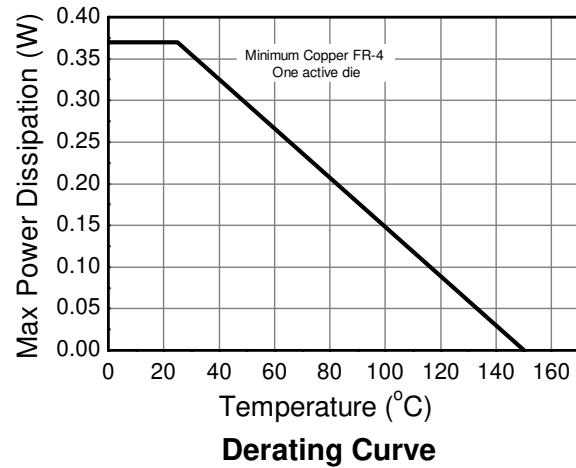
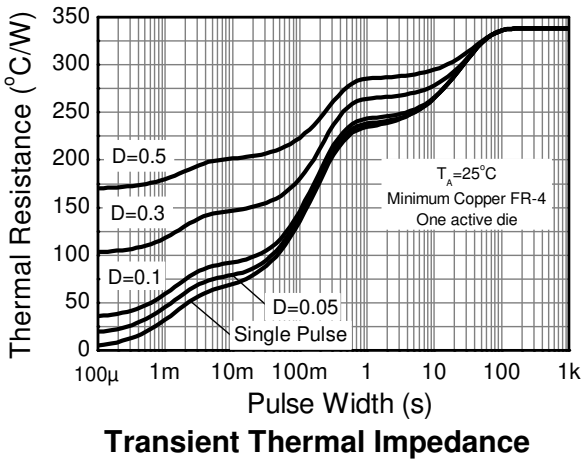
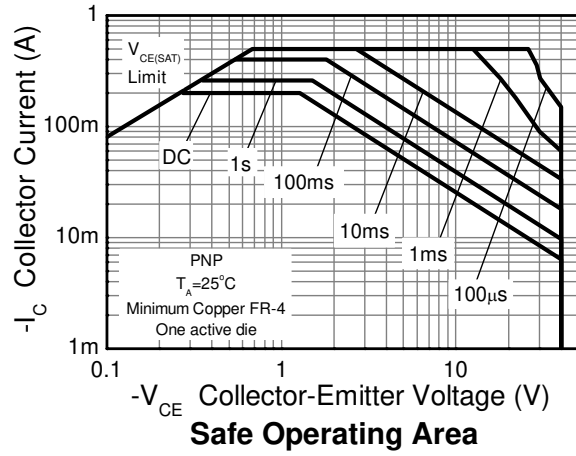
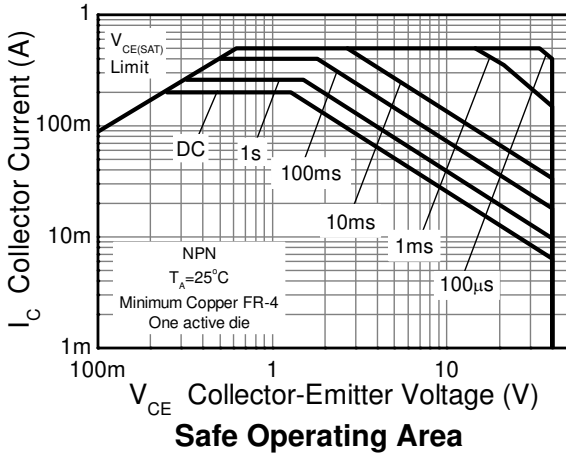
ESD Ratings (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

Notes: 5. For a device mounted on minimum recommended pad layout that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.

6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

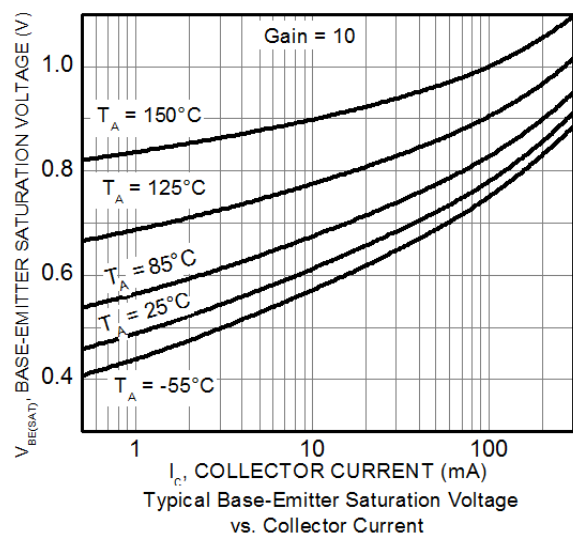
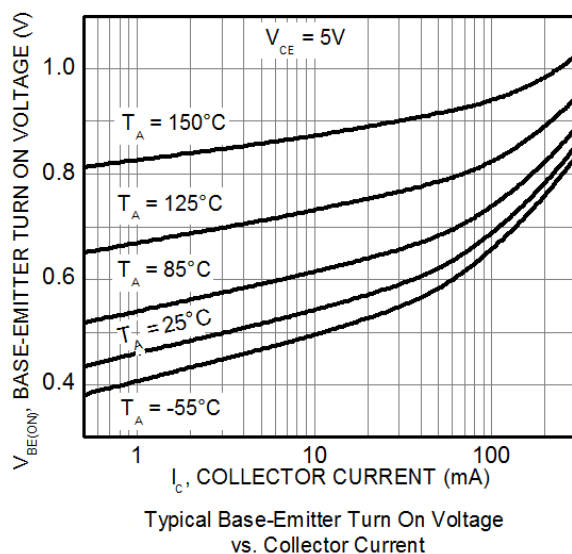
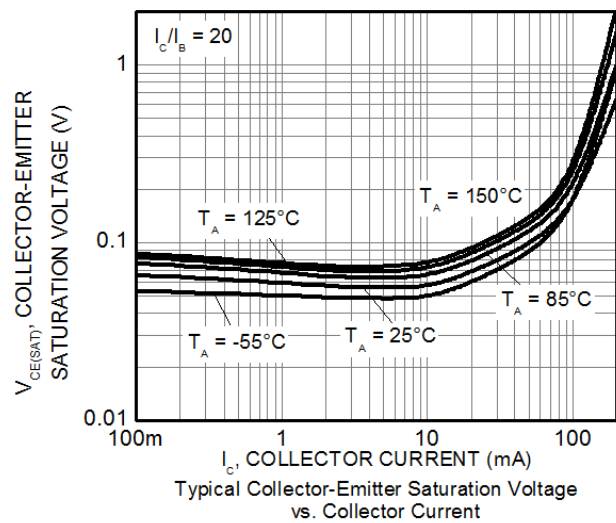
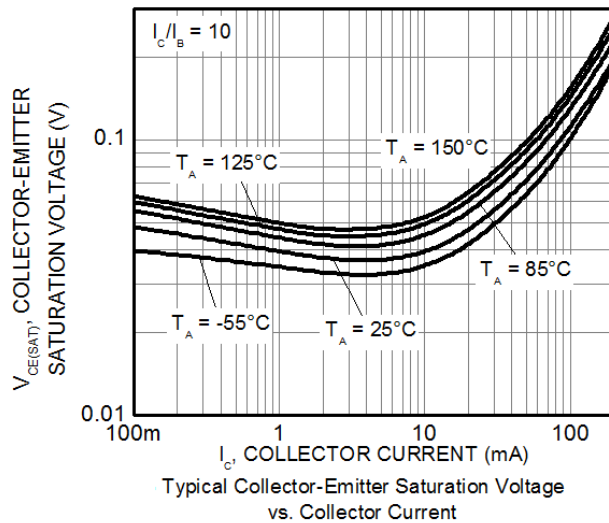
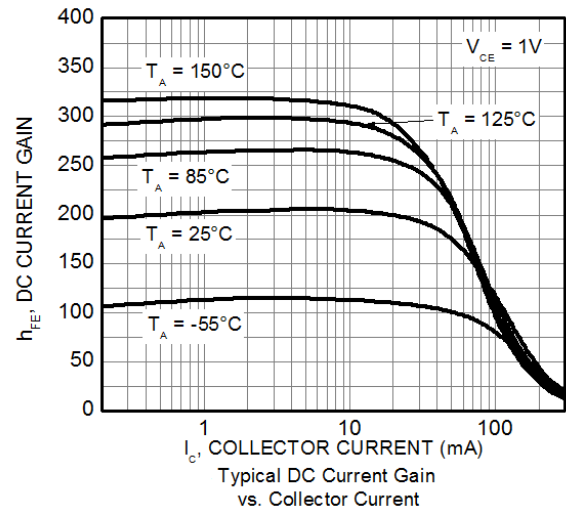
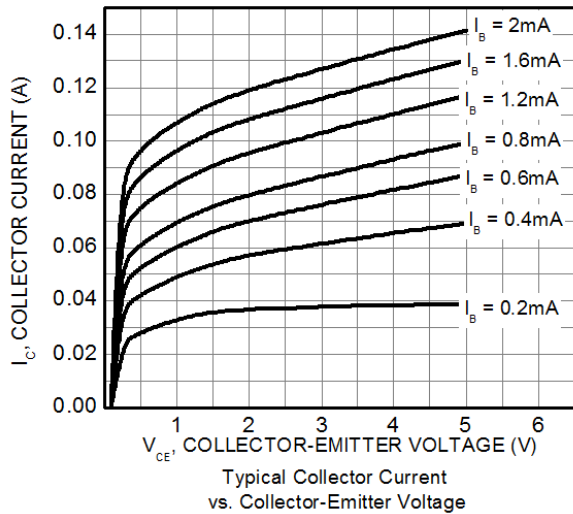


Electrical Characteristics, NPN 3904 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Collector-Base Breakdown Voltage	BV _{CBO}	60	—	—	V	I _C = 100μA, I _E = 0
Collector-Emitter Breakdown Voltage	BV _{CEO}	40	—	—	V	I _C = 1.0mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	6.0	—	—	V	I _E = 100μA, I _C = 0
Collector Cutoff Current	I _{CEX}	—	—	50	nA	V _{CE} = 30V, V _{EB(OFF)} = 3.0V
Base Cutoff Current	I _{BL}	—	—	50	nA	V _{CE} = 30V, V _{EB(OFF)} = 3.0V
ON CHARACTERISTICS (Note 7)						
Static Forward Current Transfer Ratio	h _{FE}	40 70 100 60 30	—	— — 300 — —	—	I _C = 100μA, V _{CE} = 1.0V I _C = 1.0mA, V _{CE} = 1.0V I _C = 10mA, V _{CE} = 1.0V I _C = 50mA, V _{CE} = 1.0V I _C = 100mA, V _{CE} = 1.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	0.20 0.30	V	I _C = 10mA, I _B = 1.0mA I _C = 50mA, I _B = 5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	0.65 —	—	0.85 0.95	V	I _C = 10mA, I _B = 1.0mA I _C = 50mA, I _B = 5.0mA
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C _{obo}	—	—	4.0	pF	V _{CB} = 5.0V, f = 1.0MHz, I _E = 0
Input Capacitance	C _{ibo}	—	—	9.5	pF	V _{EB} = 0.5V, f = 1.0MHz, I _C = 0
Current Gain-Bandwidth Product	f _T	—	300	—	MHz	V _{CE} = 20V, I _C = 20mA, f = 100MHz
SWITCHING CHARACTERISTICS						
Delay Time	t _D	—	—	35	ns	V _{CC} = 3.0V, I _C = 10mA, V _{BE} = 0.5V, I _{B1} = 1.0mA
Rise Time	t _R	—	—	35	ns	
Storage Time	t _S	—	—	200	ns	V _{CC} = 3.0V, I _C = 10mA, I _{B1} = 1.0mA, I _{B2} = -1.0mA
Fall Time	t _F	—	—	50	ns	

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics, NPN 3904 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

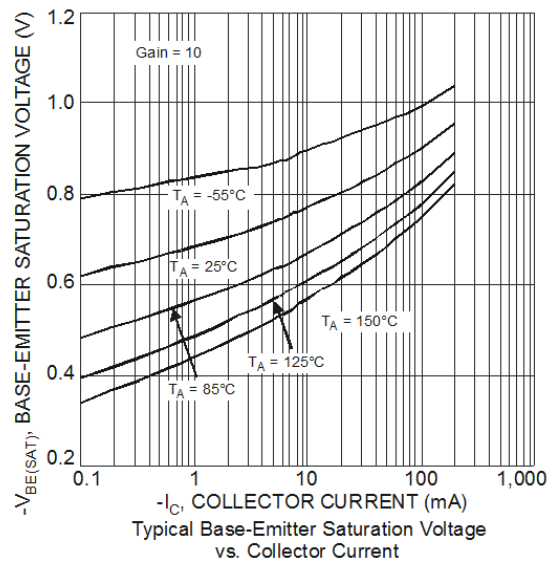
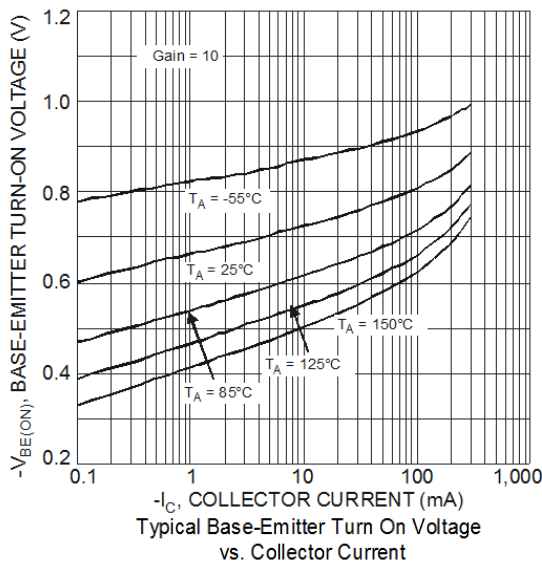
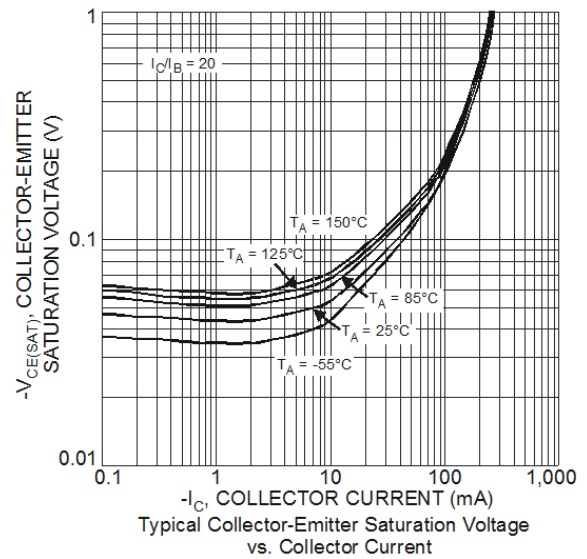
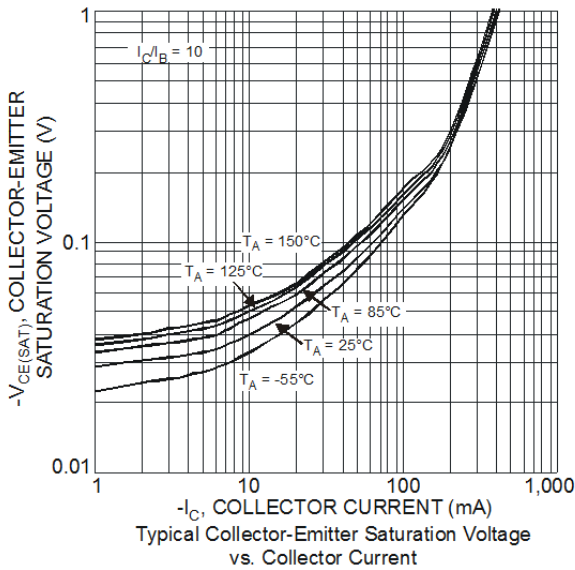
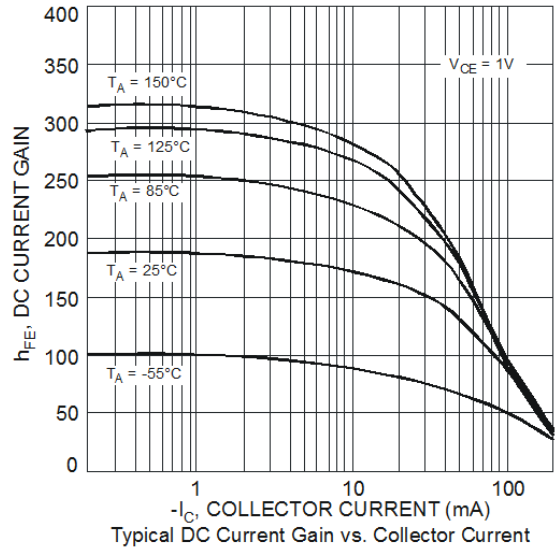
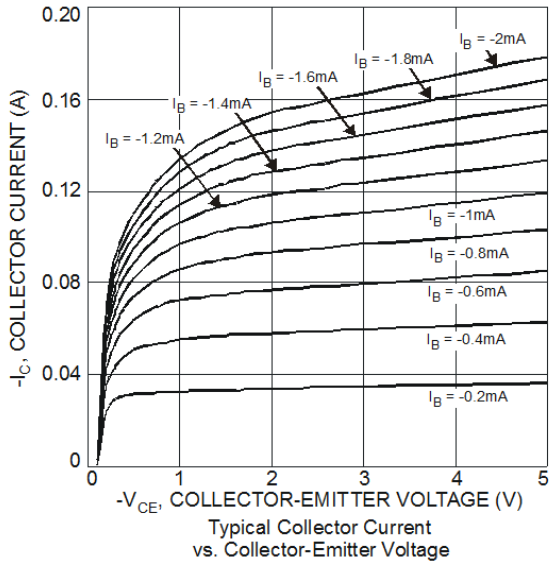


Electrical Characteristics, PNP 3906 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Collector-Base Breakdown Voltage	BV _{CBO}	-40	—	—	V	I _C = -100μA, I _E = 0
Collector-Emitter Breakdown Voltage	BV _{CEO}	-40	—	—	V	I _C = -1.0mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	-6.0	—	—	V	I _E = -100μA, I _C = 0
Collector Cutoff Current	I _{CEX}	—	—	-50	nA	V _{CE} = -30V, V _{EB(OFF)} = -3.0V
Base Cutoff Current	I _{BL}	—	—	-50	nA	V _{CE} = -30V, V _{EB(OFF)} = -3.0V
ON CHARACTERISTICS (Note 7)						
Static Forward Current Transfer Ratio	h _{FE}	60 80 100 60 30	—	— — 300 — —	—	I _C = -100μA, V _{CE} = -1.0V I _C = -1.0mA, V _{CE} = -1.0V I _C = -10mA, V _{CE} = -1.0V I _C = -50mA, V _{CE} = -1.0V I _C = -100mA, V _{CE} = -1.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	-0.25 -0.40	V	I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	-0.65 —	—	-0.85 -0.95	V	I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C _{obo}	—	—	4.5	pF	V _{CB} = -5.0V, f = 1.0MHz, I _E = 0
Input Capacitance	C _{ibo}	—	—	10	pF	V _{EB} = -0.5V, f = 1.0MHz, I _C = 0
Current Gain-Bandwidth Product	f _T	—	300	—	MHz	V _{CE} = -20V, I _C = -10mA, f = 100MHz
SWITCHING CHARACTERISTICS						
Delay Time	t _D	—	—	35	ns	V _{CC} = -3.0V, I _C = -10mA, V _{BE} = -0.5V, I _{B1} = -1.0mA
Rise Time	t _R	—	—	35	ns	
Storage Time	t _S	—	—	225	ns	V _{CC} = -3.0V, I _C = -10mA, I _{B1} = -1.0mA, I _{B2} = 1.0mA
Fall Time	t _F	—	—	75	ns	

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

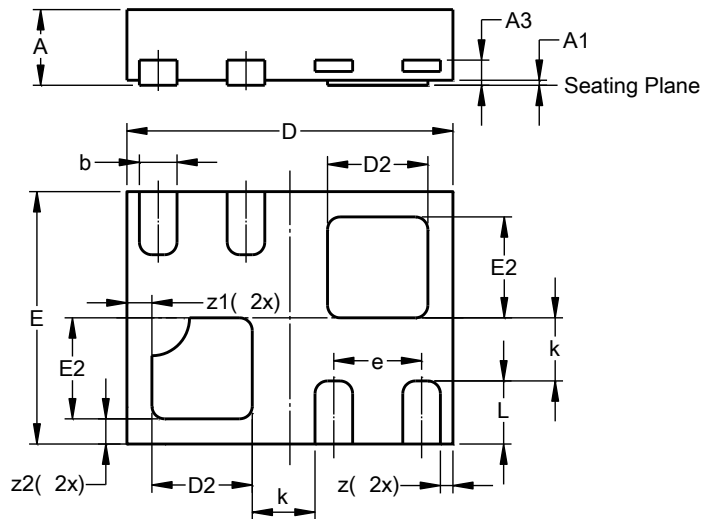
Typical Electrical Characteristics, PNP 3906 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN1310-6 (Type B)

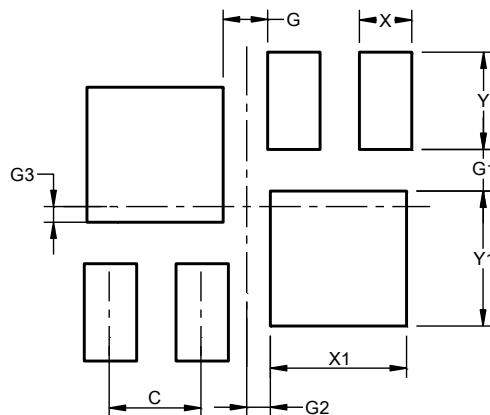


X2-DFN1310-6 (Type B)			
Dim	Min	Max	Typ
A	0.25	0.35	0.30
A1	0	0.05	0.02
A3	--	--	0.100
b	0.10	0.20	0.15
D	1.25	1.35	1.30
D2	0.30	0.50	0.40
E	0.95	1.05	1.00
E2	0.30	0.50	0.40
e	--	--	0.35
k	0.15	--	--
L	0.20	0.30	0.25
z	--	--	0.05
z1	--	--	0.10
z2	--	--	0.10
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN1310-6 (Type B)



Dimensions	Value (in mm)
C	0.350
G	0.17
G1	0.16
G2	0.09
G3	0.06
X	0.20
X1	0.52
Y	0.375
Y1	0.52

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2016, Diodes Incorporated

www.diodes.com