

COMPLEMENTARY NPN / PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR
Features

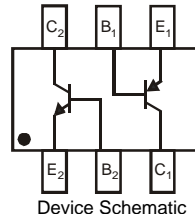
- Complementary Pair One 4124-Type NPN
 One 4126-Type PNP
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Lead Free/RoHS Compliant (Note 3)**
- "Green" Device (Note 4 and 5)**



Top View

Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic, "Green" Molding Compound, Note 5. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.006 grams (approximate)


 E1, B1, C1 = PNP4126 Section
 E2, B2, C2 = NPN4124 Section

Maximum Ratings, NPN 4124 Section @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current – Continuous (Note 1)	I _C	200	mA

Maximum Ratings, PNP 4126 Section @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-25	V
Collector-Emitter Voltage	V _{CEO}	-25	V
Emitter-Base Voltage	V _{EBO}	-4	V
Collector Current - Continuous (Note 1)	I _C	-200	mA

Thermal Characteristics – Total Device

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1, 2)	P _D	200	mW
Thermal Resistance, Junction to Ambient (Note 1)	R _{θJA}	625	°C/W

- Notes:
- Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 - Maximum combined dissipation.
 - No purposefully added lead.
 - Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 - Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

Electrical Characteristics, NPN 4124 Section @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)					
Collector-Base Breakdown Voltage	V _{(BR)CBO}	30	—	V	I _C = 10μA, I _E = 0
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	25	—	V	I _C = 1.0mA, I _B = 0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	5.0	—	V	I _E = 10μA, I _C = 0
Collector Cutoff Current	I _{CBO}	—	50	nA	V _{CB} = 20V, I _E = 0V
Emitter Cutoff Current	I _{EBO}	—	50	nA	V _{EB} = 3.0V, I _C = 0V
ON CHARACTERISTICS (Note 6)					
DC Current Gain	h _{FE}	120 60	360 —	—	I _C = 2.0mA, V _{CE} = 1.0V I _C = 50mA, V _{CE} = 1.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	0.30	V	I _C = 50mA, I _B = 5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	0.95	V	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}	—	8.0	pF	V _{EB} = 0.5V, f = 1.0MHz, I _C = 0
Small Signal Current Gain	h _{fe}	120	480	—	V _{CE} = 1.0V, I _C = 2.0mA, f = 1.0kHz
Current Gain-Bandwidth Product	f _T	300	—	MHz	V _{CE} = 20V, I _C = 10mA, f = 100MHz
Noise Figure	NF	—	5.0	dB	V _{CE} = 5.0V, I _C = 100μA, R _S = 1.0kΩ, f = 1.0kHz

Electrical Characteristics, PNP 4126 Section @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)					
Collector-Base Breakdown Voltage	V _{(BR)CBO}	-25	—	V	I _C = -10μA, I _E = 0
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	-25	—	V	I _C = -1.0mA, I _B = 0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	-4.0	—	V	I _E = -10μA, I _C = 0
Collector Cutoff Current	I _{CBO}	—	-50	nA	V _{CB} = -20V, I _E = 0V
Emitter Cutoff Current	I _{EBO}	—	-50	nA	V _{EB} = -3.0V, I _C = 0V
ON CHARACTERISTICS (Note 6)					
DC Current Gain	h _{FE}	120 60	360 —	—	I _C = -2.0mA, V _{CE} = -1.0V I _C = -50mA, V _{CE} = -1.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	-0.40	V	I _C = -50mA, I _B = -5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	-0.95	V	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
Small Signal Current Gain	h _{fe}	120	480	—	V _{CE} = -1.0V, I _C = -2.0mA, f = 1.0kHz
Current Gain-Bandwidth Product	f _T	250	—	MHz	V _{CE} = -20V, I _C = -10mA, f = 100MHz
Noise Figure	NF	—	4.0	dB	V _{CE} = -5.0V, I _C = -100μA, R _S = 1.0kΩ, f = 1.0kHz

Notes: 6. Short duration pulse test used to minimize self-heating effect.

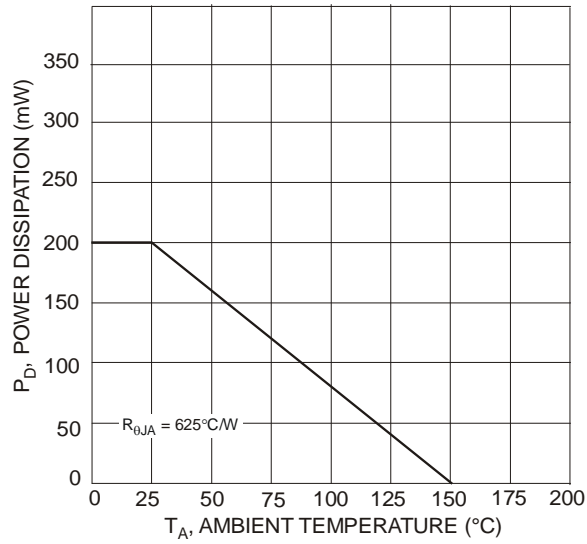


Fig. 1 Power Dissipation vs. Ambient Temperature (Total Device, Note 1)

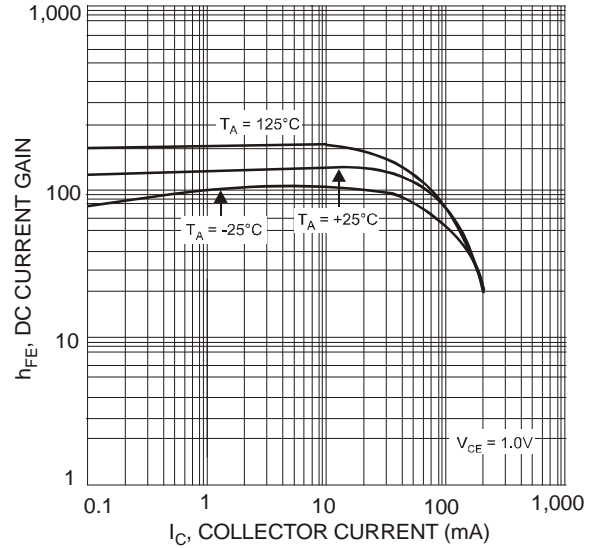


Fig. 2 Typical DC Current Gain vs. Collector Current (PNP-4126)

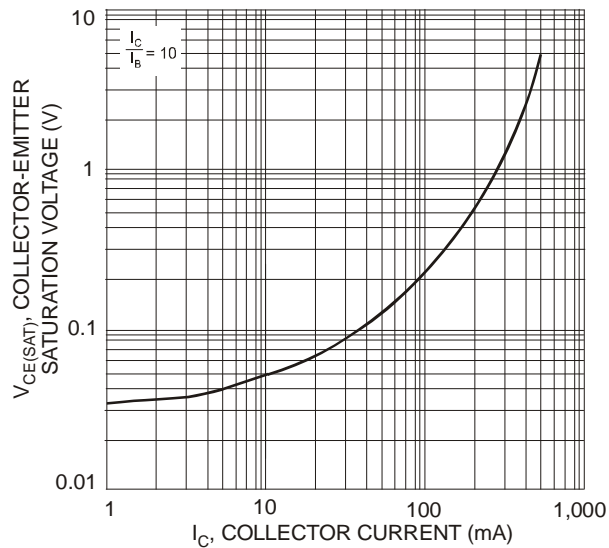


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current (PNP-4126)

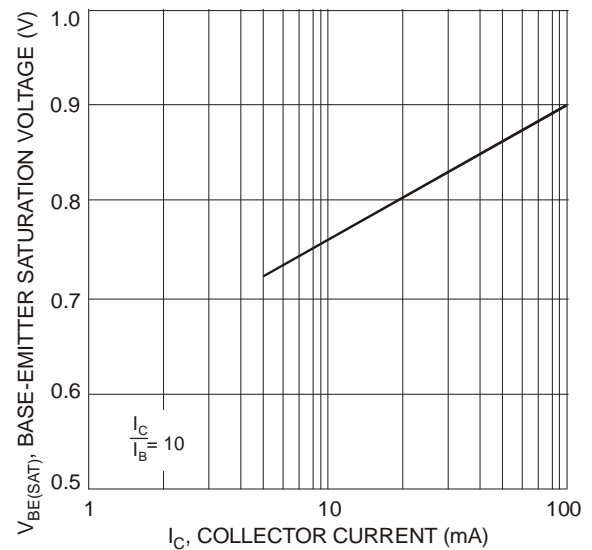


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current (PNP-4126)

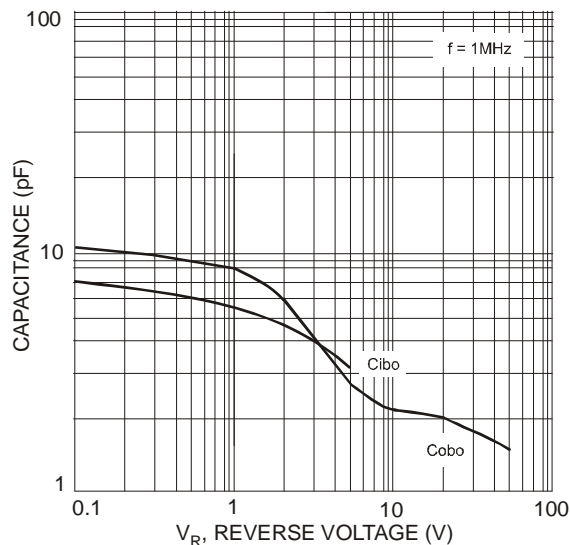


Fig. 5 Typical Capacitance Characteristics (PNP-4126)

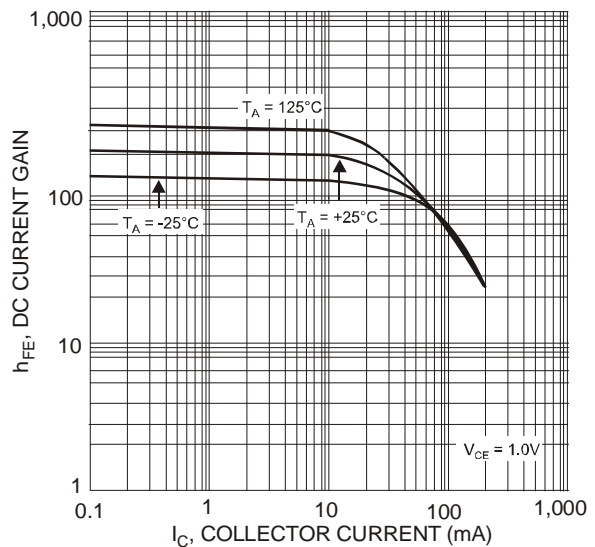


Fig. 6 Typical DC Current Gain vs. Collector Current (NPN-4124)

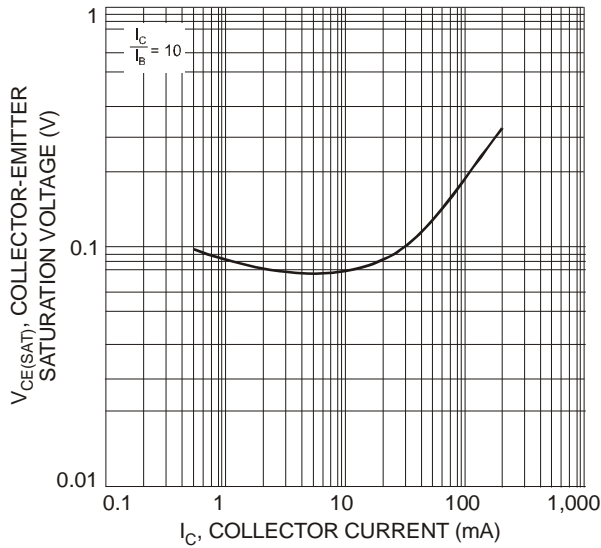


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current (NPN-4124)

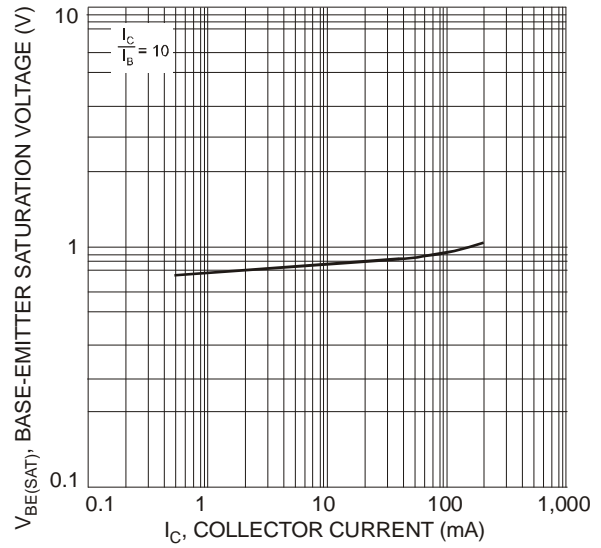


Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current (NPN-4124)

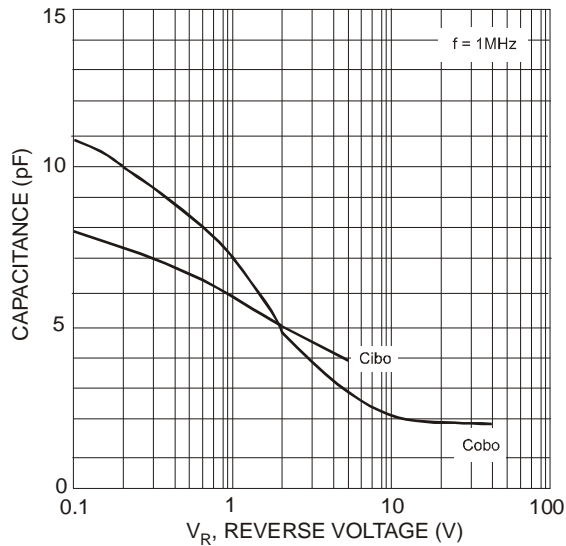


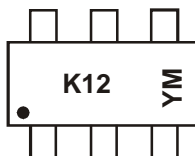
Fig. 9 Typical Capacitance Characteristics (NPN-4124)

Ordering Information (Note 7)

Part Number	Case	Packaging
MMDT4146-7-F	SOT-363	3000/Tape & Reel

Notes: 7. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information

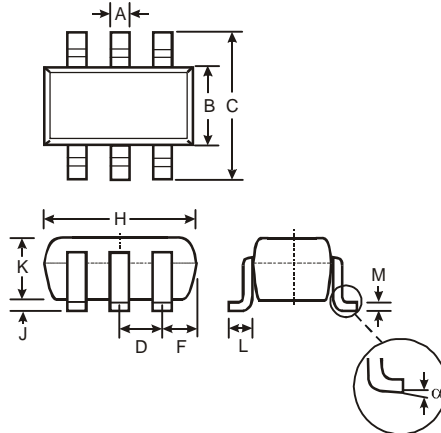


K12 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: N = 2002)
M = Month (ex: 9 = September)

Date Code Key

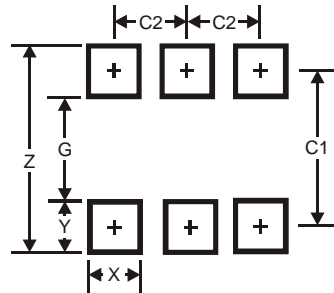
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Code	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z	A	B	C
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec						
Code	1	2	3	4	5	6	7	8	9	O	N	D						

Package Outline Dimensions



SOT-363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
α	0°	8°
All Dimensions in mm		

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

IMPORTANT NOTICE

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products 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 our website, harmless against all damages.

LIFE SUPPORT

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Diodes Inc.:](#)

[MMDT4146-7-F](#)

[Diodes Incorporated:](#)

[MMDT4146-7](#)