

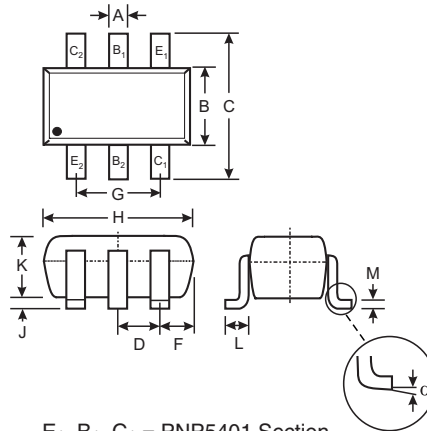
COMPLEMENTARY NPN / PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR

Features

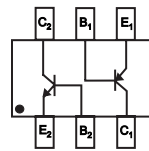
- Complementary Pair
- One 5551-Type NPN,
One 5401-Type PNP
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 3)**

Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking (See Page 3): KNM
- Ordering & Date Code Information: See Page 3
- Weight: 0.006 grams (approx.)



E₁, B₁, C₁ = PNP5401 Section
E₂, B₂, C₂ = NPN5551 Section



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

Maximum Ratings, NPN 5551 Section @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	NPN5551	Unit
Collector-Base Voltage	V _{CBO}	180	V
Collector-Emitter Voltage	V _{CEO}	160	V
Emitter-Base Voltage	V _{EBO}	6.0	V
Collector Current - Continuous (Note 1)	I _C	200	mA
Power Dissipation (Note 1, 2)	P _d	200	mW
Thermal Resistance, Junction to Ambient (Note 1)	R _{θJA}	625	K/W
Operating and Storage and Temperature Range	T _j , T _{STG}	-55 to +150	°C

Maximum Ratings, PNP 5401 Section @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	PNP5401	Unit
Collector-Base Voltage	V _{CBO}	-160	V
Collector-Emitter Voltage	V _{CEO}	-150	V
Emitter-Base Voltage	V _{EBO}	-5.0	V
Collector Current - Continuous (Note 1)	I _C	-200	mA
Power Dissipation (Note 1, 2)	P _d	200	mW
Thermal Resistance, Junction to Ambient (Note 1)	R _{θJA}	625	K/W
Operating and Storage and Temperature Range	T _j , T _{STG}	-55 to +150	°C

- Notes:
1. 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>.
 2. Maximum combined dissipation.
 3. No purposefully added lead.

Electrical Characteristics, NPN 5551 Section

 @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)					
Collector-Base Breakdown Voltage	V _{(BR)CBO}	180	—	V	I _C = 100μA, I _E = 0
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	160	—	V	I _C = 1.0mA, I _B = 0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	6.0	—	V	I _E = 10μA, I _C = 0
Collector Cutoff Current	I _{CBO}	—	50	nA μA	V _{CB} = 120V, I _E = 0 V _{CB} = 120V, I _E = 0, T _A = 100°C
Emitter Cutoff Current	I _{EBO}	—	50	nA	V _{EB} = 4.0V, I _C = 0
ON CHARACTERISTICS (Note 4)					
DC Current Gain	h _{FE}	80 80 30	— 250 —	—	I _C = 1.0mA, V _{CE} = 5.0V I _C = 10mA, V _{CE} = 5.0V I _C = 50mA, V _{CE} = 5.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	0.15 0.20	V	I _C = 10mA, I _B = 1.0mA I _C = 50mA, I _B = 5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	1.0	V	I _C = 10mA, I _B = 1.0mA I _C = 50mA, I _B = 5.0mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C _{obo}	—	6.0	pF	V _{CB} = 10V, f = 1.0MHz, I _E = 0
Small Signal Current Gain	h _{fe}	50	250	—	V _{CE} = 10V, I _C = 1.0mA, f = 1.0kHz
Current Gain-Bandwidth Product	f _T	100	300	MHz	V _{CE} = 10V, I _C = 10mA, f = 100MHz
Noise Figure	NF	—	8.0	dB	V _{CE} = 5.0V, I _C = 200μA, R _S = 1.0kΩ, f = 1.0kHz

Electrical Characteristics, PNP 5401 Section

 @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)					
Collector-Base Breakdown Voltage	V _{(BR)CBO}	-160	—	V	I _C = -100μA, I _E = 0
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	-150	—	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 μA	V _{CB} = -120V, I _E = 0 V _{CB} = -120V, I _E = 0, T _A = 100°C
Emitter Cutoff Current	I _{EBO}	—	-50	nA	V _{EB} = -3.0V, I _C = 0
ON CHARACTERISTICS (Note 4)					
DC Current Gain	h _{FE}	50 60 50	— 240 —	—	I _C = -1.0mA, V _{CE} = -5.0V I _C = -10mA, V _{CE} = -5.0V I _C = -50mA, V _{CE} = -5.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	-0.2 -0.5	V	I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	-1.0	V	I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C _{obo}	—	6.0	pF	V _{CB} = -10V, f = 1.0MHz, I _E = 0
Small Signal Current Gain	h _{fe}	40	200	—	V _{CE} = -10V, I _C = -1.0mA, f = 1.0kHz
Current Gain-Bandwidth Product	f _T	100	300	MHz	V _{CE} = -10V, I _C = -10mA, f = 100MHz
Noise Figure	NF	—	8.0	dB	V _{CE} = -5.0V, I _C = -200μA, R _S = 10Ω, f = 1.0kHz

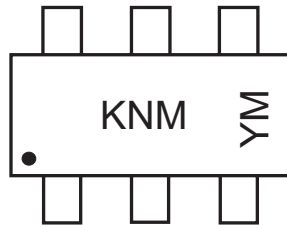
Notes: 4. Short duration test pulse used to minimize self-heating effect.

Ordering Information (Note 5)

Device	Packaging	Shipping
MMDT5451-7-F	SOT-363	3000/Tape & Reel

Notes: 5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



KNM= 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
Code	J	K	L	M	N	P	R	S	T	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

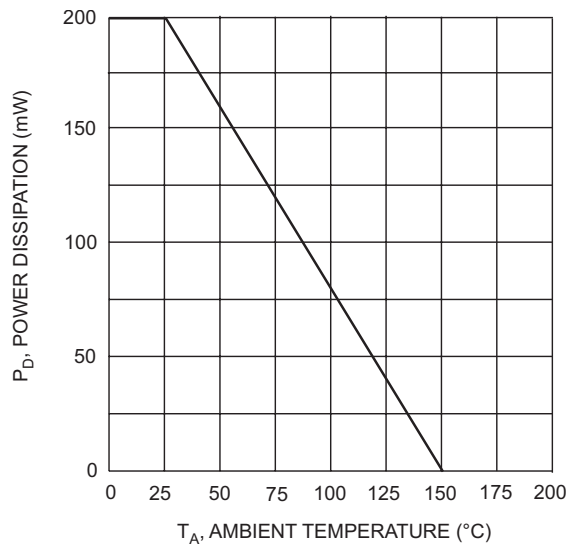


Fig. 1, Max Power Dissipation vs Ambient Temperature (Total Device)

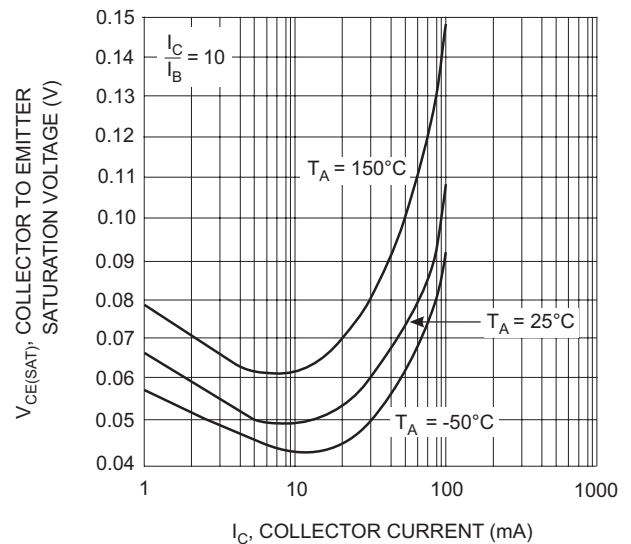


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current (NPN5551)

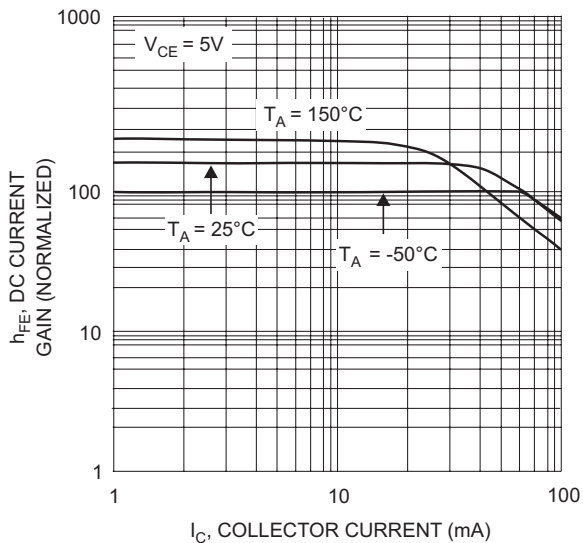


Fig. 3, DC Current Gain vs Collector Current (NPN5551)

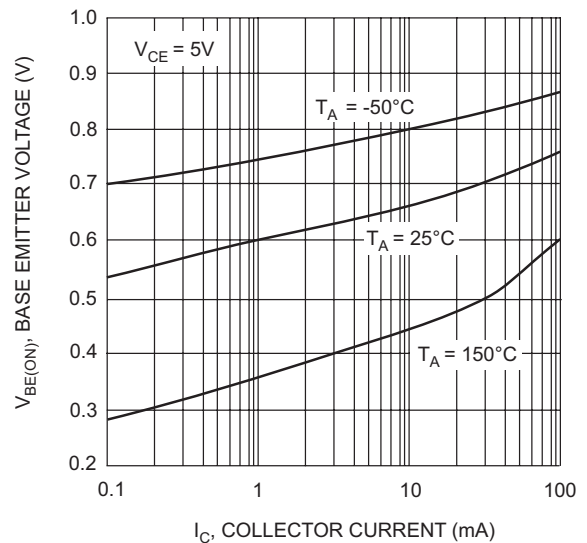
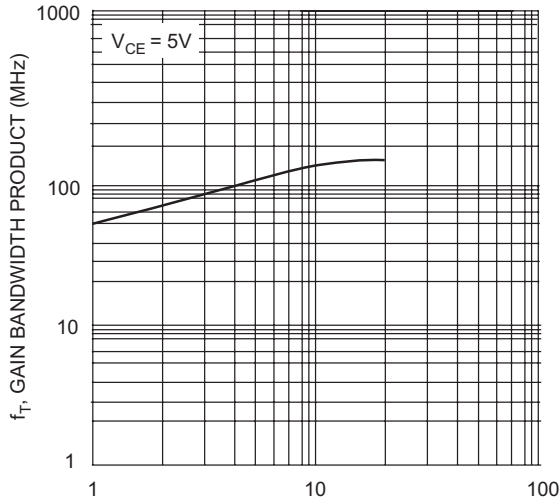
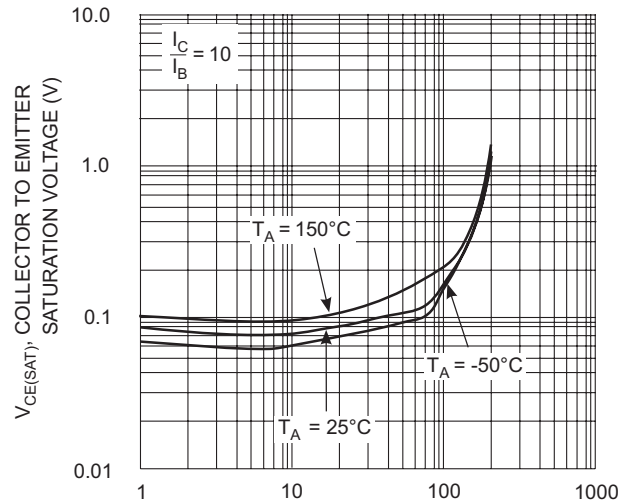


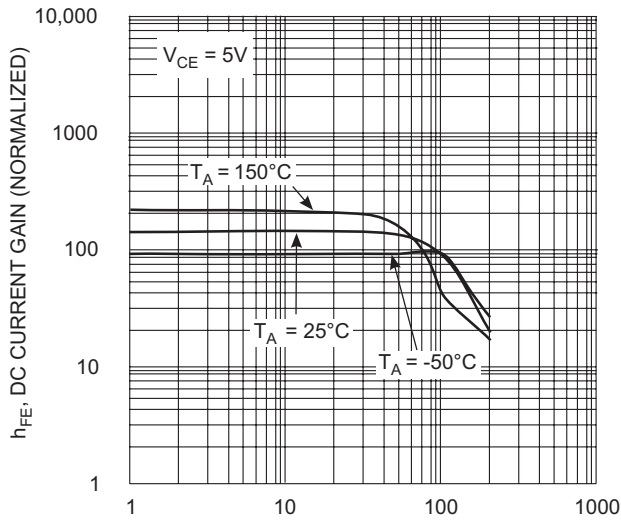
Fig. 4, Base Emitter Voltage vs. Collector Current (NPN5551)



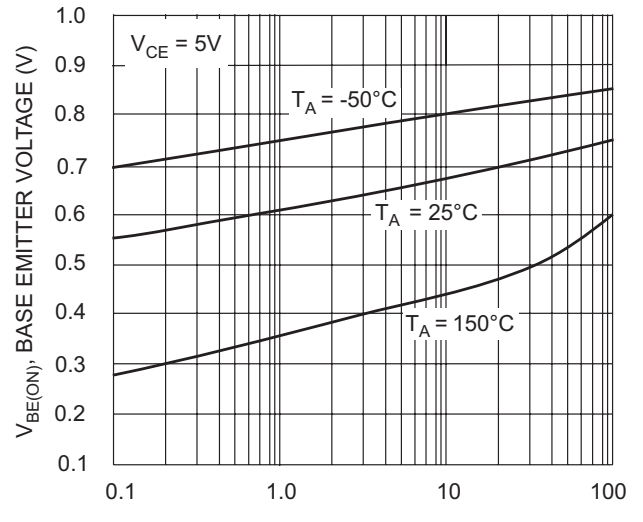
I_C , COLLECTOR CURRENT (mA)
Fig. 5. Gain Bandwidth Product vs. Collector Current (NPN5551)



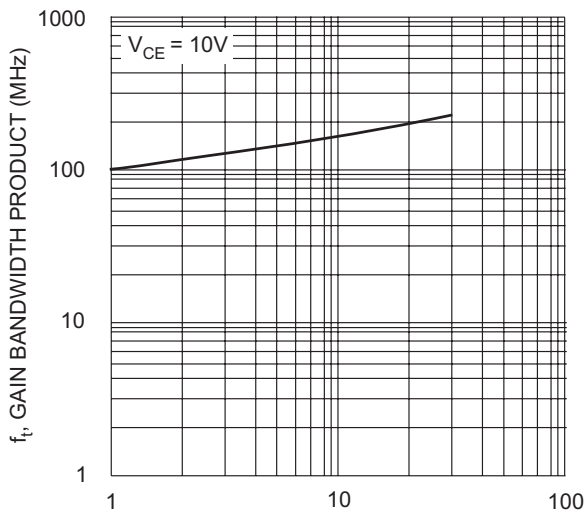
I_C , COLLECTOR CURRENT (mA)
Fig. 6. Collector Emitter Saturation Voltage vs. Collector Current (PNP5401)



I_C , COLLECTOR CURRENT (mA)
Fig. 7. DC Current Gain vs. Collector Current (PNP5401)



I_C , COLLECTOR CURRENT (mA)
Fig. 8. Base Emitter Voltage vs. Collector Current (PNP5401)



I_C , COLLECTOR CURRENT (mA)
Fig. 9. Gain Bandwidth Product vs Collector Current (PNP5401)

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