



**THE DATASHEET OF
MMDT5451-7-F**




COMPLEMENTARY NPN / PNP SMALL SIGNAL TRANSISTOR IN SOT363

Features

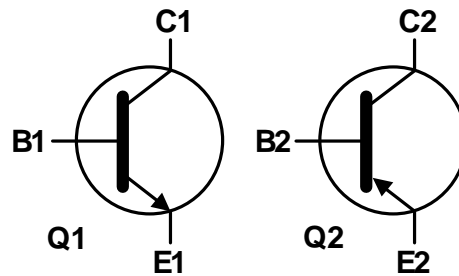
- Epitaxial Planar Die Construction
- Complementary Pair: 1 5551 Type NPN
1 5401 Type PNP
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

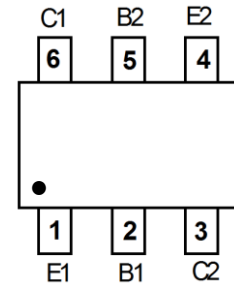
- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol



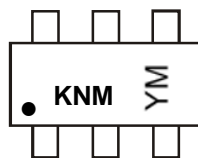
Top View Pin-Out

Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
MMDT5451-7-F	AEC-Q101	KNM	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



KNM = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: F = 2018)
 M = Month (ex: 9 = September)

Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	E	F	G	H	I	J	K	L	M

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

Absolute Maximum Ratings – NPN 5551 Section (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	180	V
Collector-Emitter Voltage	V _{CEO}	160	V
Emitter-Base Voltage	V _{EBO}	6	V
Continuous Collector Current	I _C	200	mA

Absolute Maximum Ratings – PNP 5401 Section (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-160	V
Collector-Emitter Voltage	V _{CEO}	-150	V
Emitter-Base Voltage	V _{EBO}	-6	V
Continuous Collector Current	I _C	-200	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 5)	200
		(Notes 6 & 7)	320
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 5)	625
		(Notes 6 & 7)	390
Thermal Resistance, Junction to Case	R _{θJC}	140	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	

- Notes:
5. For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Same as Note 5, except the device is mounted on 25mm X 25mm 2oz copper.
 7. Maximum combined dissipation.
 8. Thermal resistance from junction to the top of package.

Electrical Characteristics – NPN 5551 Section (@T_A = +25°C, unless otherwise specified.)

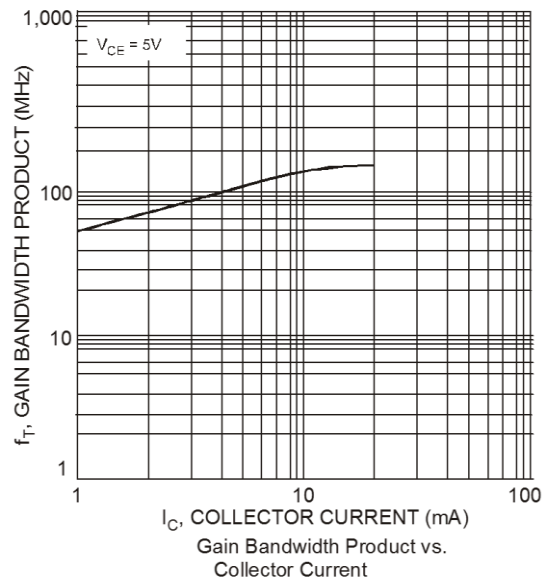
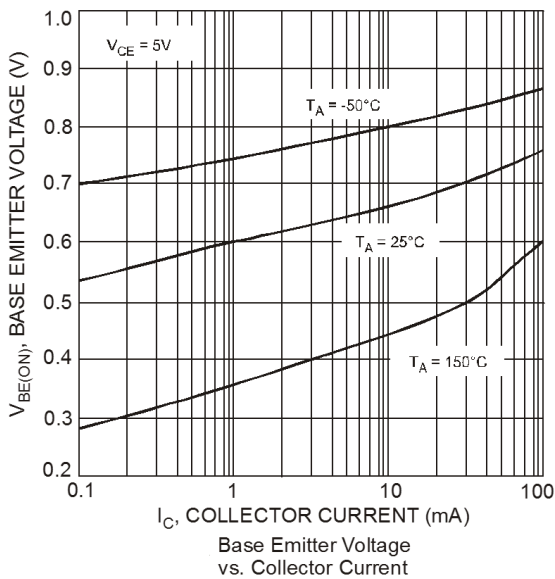
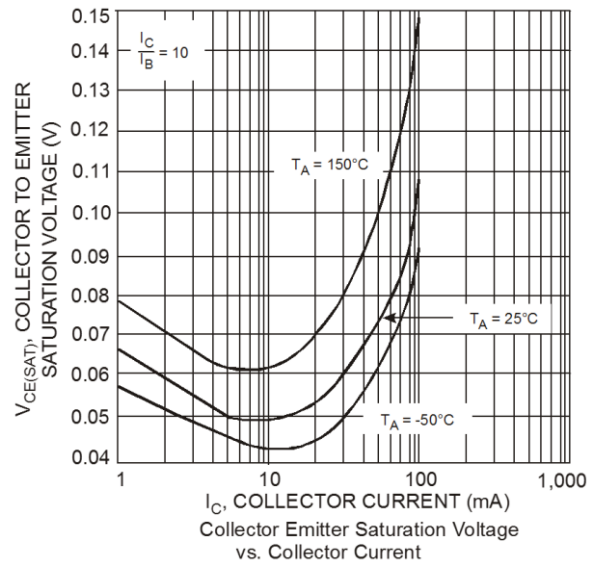
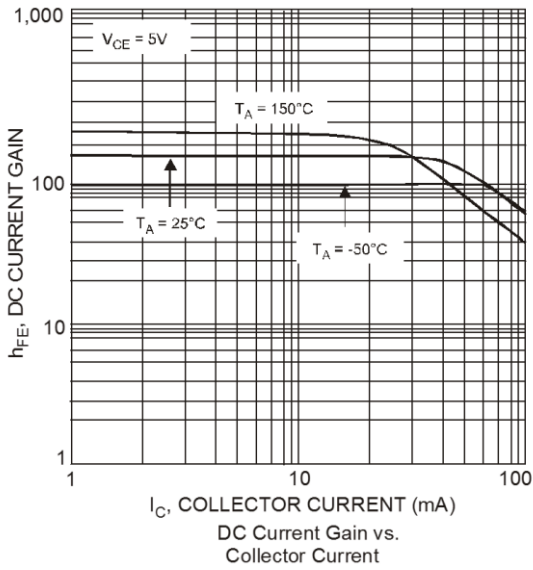
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	180	—	—	V	I _C = 100μA, I _E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	160	—	—	V	I _C = 1mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	6	—	—	V	I _E = 10μA, I _C = 0
Collector-Base Cutoff Current	I _{CBO}	—	—	50	nA	V _{CB} = 120V, I _E = 0
		—	—	50	μA	V _{CB} = 120V, I _E = 0, T _A = +100°C
Base-Emitter Cutoff Current	I _{EBO}	—	—	50	nA	V _{EB} = 4V, I _C = 0
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h _{FE}	80	—	—	—	I _C = 1.0mA, V _{CE} = 5.0V
		80	—	250	—	I _C = 10mA, V _{CE} = 5.0V
		30	—	—	—	I _C = 50mA, V _{CE} = 5.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	0.15	V	I _C = 10mA, I _B = 1.0mA
		—	—	0.20	V	I _C = 50mA, I _B = 5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	—	1.0	V	I _C = 10mA, I _B = 1.0mA
		—	—	—	V	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	—	I _C = 1mA, V _{CE} = 10V, f = 1.0MHz
Current Gain-Bandwidth Product	f _T	100	—	300	MHz	I _C = 10mA, V _{CE} = 10V, f = 100MHz
Noise Figure	NF	—	—	8.0	dB	V _{CE} = 5.0V, I _C = 200μA, R _S = 1kΩ, f = 1.0kHz

Electrical Characteristics – PNP 5401 Section (@T_A = +25°C, unless otherwise specified.)

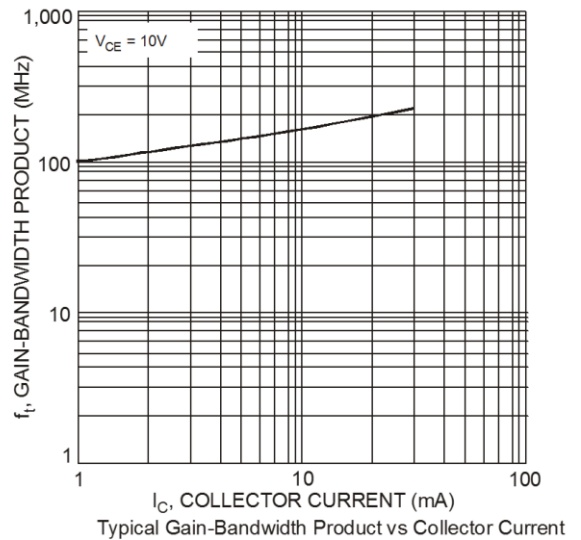
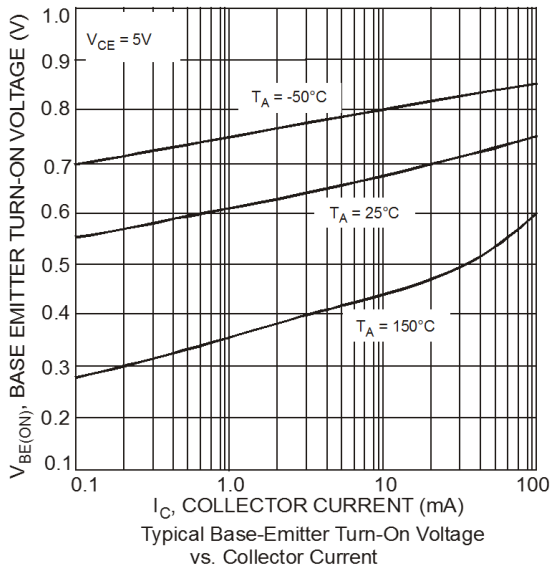
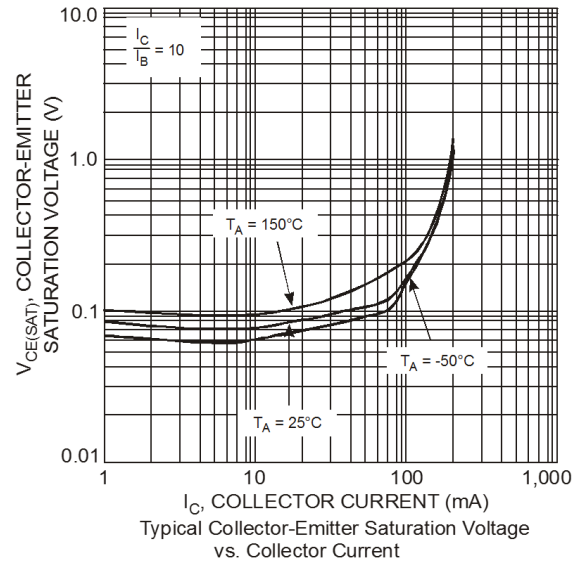
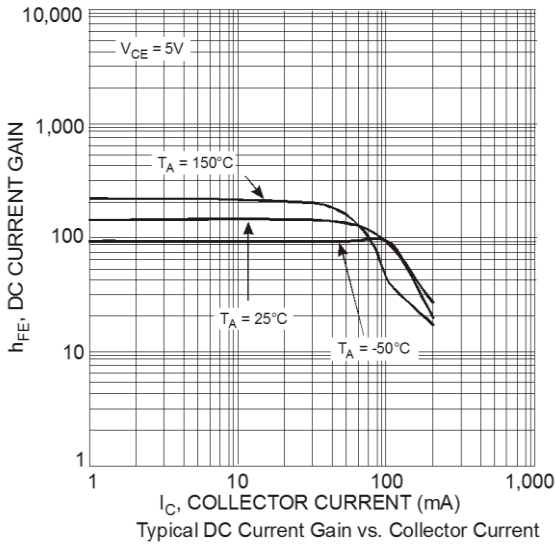
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	-160	—	—	V	I _C = -100μA, I _E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	-150	—	—	V	I _C = -1mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	-6	—	—	V	I _E = -10μA, I _C = 0
Collector-Base Cutoff Current	I _{CBO}	—	—	-50	nA	V _{CB} = -120V, I _E = 0
		—	—	-50	μA	V _{CB} = -120V, I _E = 0, T _A = +100°C
Base-Emitter Cutoff Current	I _{EBO}	—	—	-50	nA	V _{EB} = -4V, I _C = 0
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h _{FE}	50	—	—	—	I _C = -1.0mA, V _{CE} = -5.0V
		60	—	240	—	I _C = -10mA, V _{CE} = -5.0V
		50	—	—	—	I _C = -50mA, V _{CE} = -5.0V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	-0.20	V	I _C = -10mA, I _B = -1.0mA
		—	—	-0.50	V	I _C = -50mA, I _B = -5.0mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	—	-1.0	V	I _C = -10mA, I _B = -1.0mA
		—	—	—	V	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	—	260	—	I _C = -1mA, V _{CE} = -10V, f = 1.0MHz
Current Gain-Bandwidth Product	f _T	100	—	300	MHz	I _C = -10mA, V _{CE} = -10V, f = 100MHz
Noise Figure	NF	—	—	8.0	dB	V _{CE} = -5.0V, I _C = -200μA, R _S = 1Ω, f = 1.0kHz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics – NPN 5551 Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



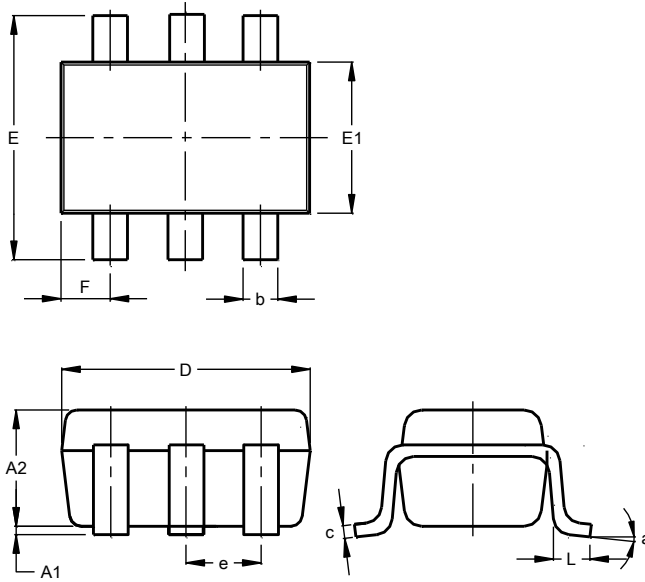
Typical Electrical Characteristics – PNP 5401 Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT363

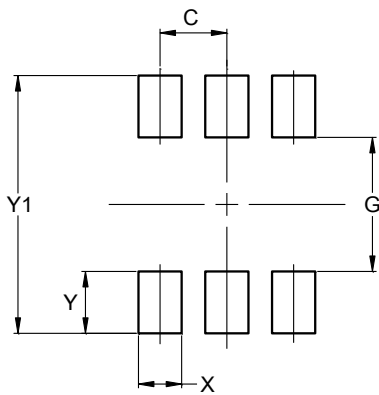


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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