COMPLEMENTARY NPN / PNP SMALL SIGNAL TRANSISTOR IN SOT363

Features

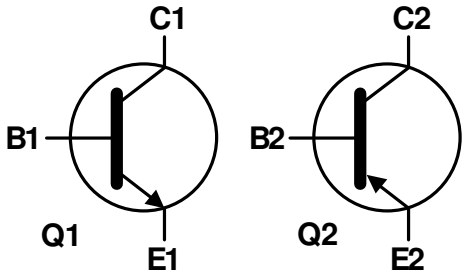
- Epitaxial Planar Die Construction
- Complementary Pair: 1 5551 Type NPN
  1 5401 Type PNP
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
-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

Mechanical Data

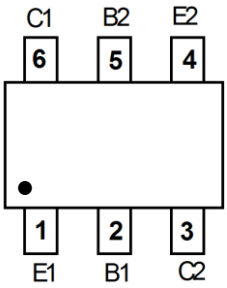
- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.006 grams (Approximate)

SOT363

Top View



Device Symbol



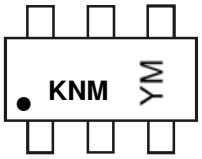
Top View
Pin-Out

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_{CBO}	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_{CBO}	-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	(Note 5)	P_D	200	mW
	(Notes 6 & 7)		320	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	625	°C/W
	(Notes 6 & 7)		390	
Thermal Resistance, Junction to Case	(Note 8)	$R_{\theta JC}$	140	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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.)

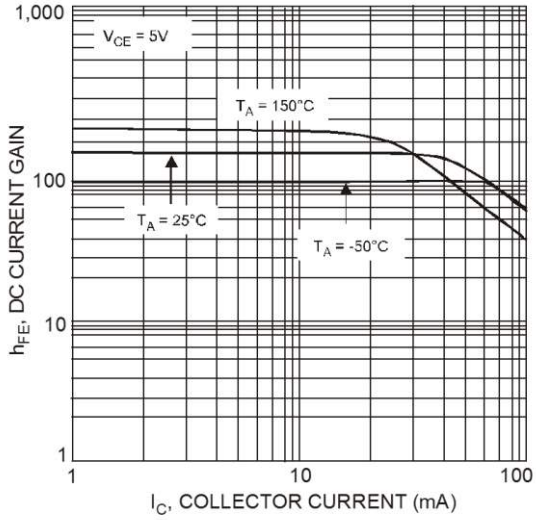
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	180	—	—	V	I_C = 100µA, I_E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	160	—	—	V	I_C = 1mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	6	—	—	V	I_E = 10µA, I_C = 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		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	—	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.)

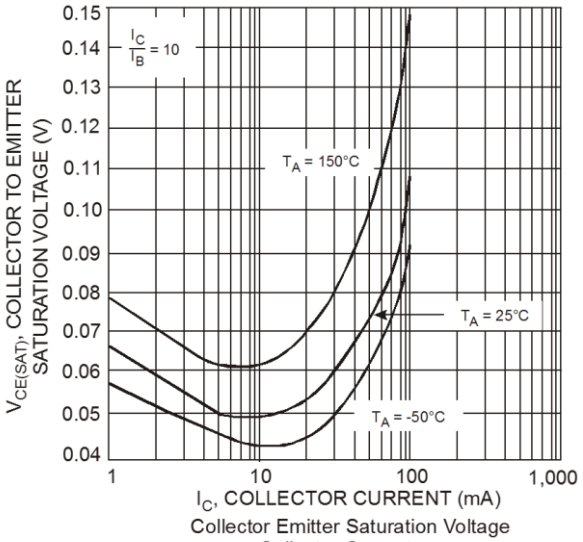
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-160	—	—	V	I_C = -100µA, I_E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-150	—	—	V	I_C = -1mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	-6	—	—	V	I_E = -10µA, 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		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	—	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%.

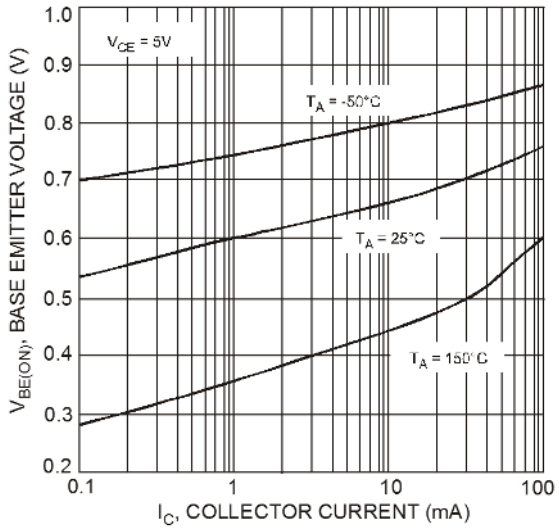
Typical Electrical Characteristics – NPN 5551 Section (@T_A = +25°C, unless otherwise specified.)



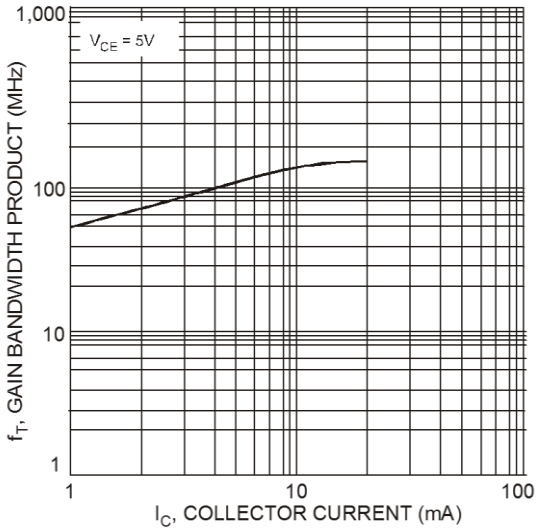
DC Current Gain vs.
Collector Current



Collector Emitter Saturation Voltage
vs. Collector Current

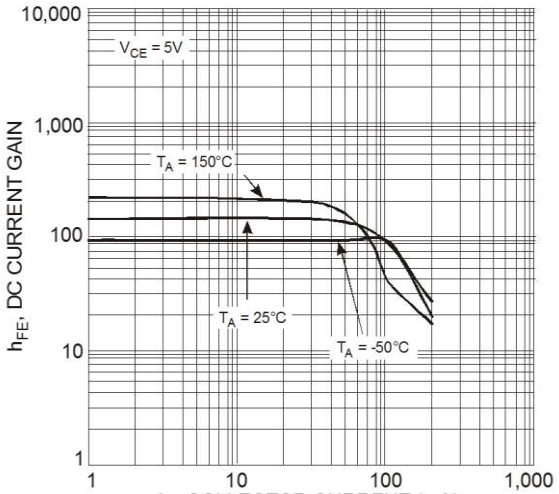


Base Emitter Voltage
vs. Collector Current

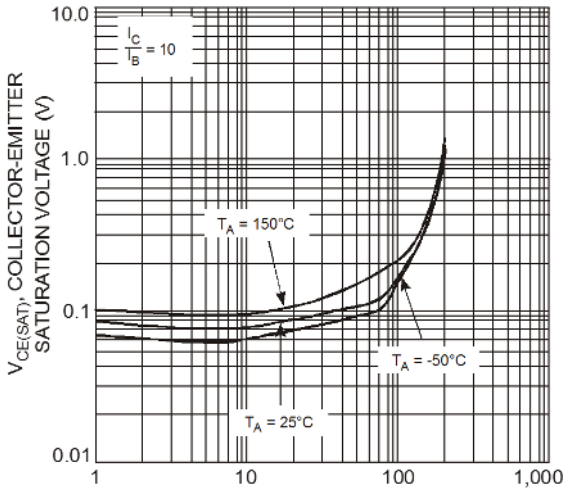


Gain Bandwidth Product vs.
Collector Current

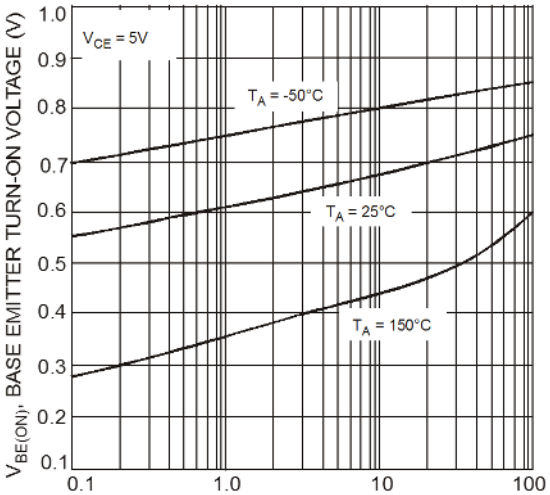
Typical Electrical Characteristics – PNP 5401 Section (@T_A = +25°C, unless otherwise specified.)



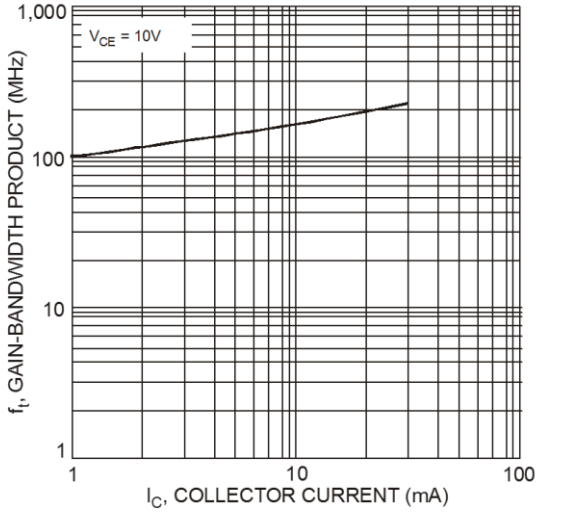
Typical DC Current Gain vs. Collector Current



Typical Collector-Emitter Saturation Voltage vs. Collector Current



Typical Base-Emitter Turn-On Voltage vs. Collector Current



Typical Gain-Bandwidth Product vs Collector Current

Package Outline Dimensions

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

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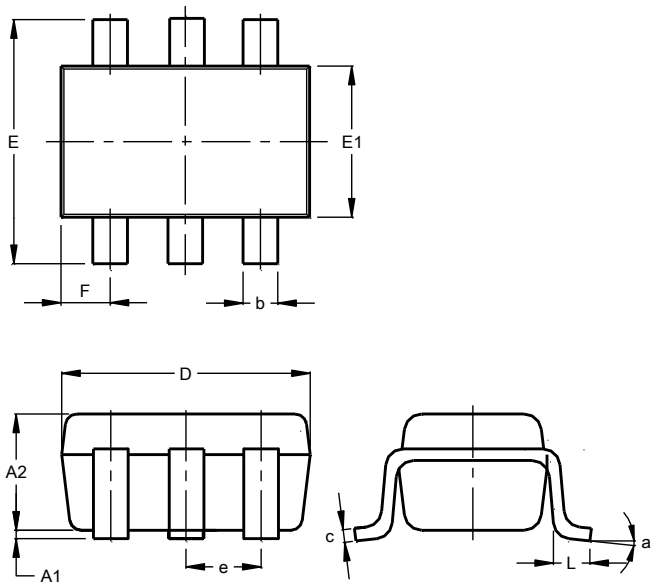

SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

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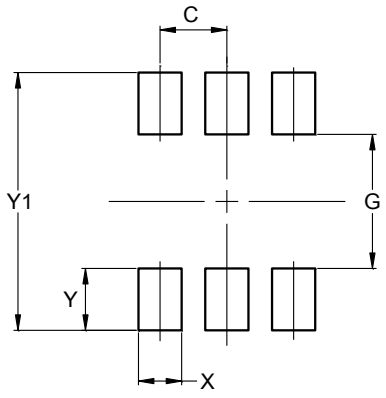

Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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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