

## Features

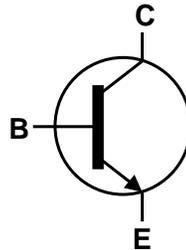
- $BV_{CE0} > 160V$
- Ideal for Low Power Amplification and Switching
- Complementary PNP Type Available (MMBT5401)
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

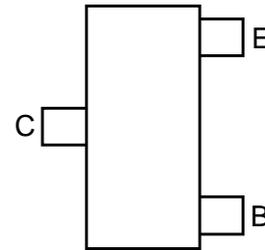
- Case: SOT-23
- Case Material: Molded Plastic, "Green" molding compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish-Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.008 grams (approximate)



Top View



Device Symbol

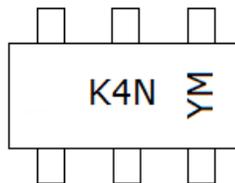

 Top View  
Pin-Out

## Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
MMBT5551-7-F	AEC-Q101	K4N	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](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



K4N = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: B = 2014)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017
Code	X	Y	Z	A	B	C	D	E

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 (@T<sub>A</sub> = +25°C unless otherwise specified)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	180	V
Collector-Emitter Voltage	V <sub>CEO</sub>	160	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	V
Collector Current - Continuous (Note 1)	I <sub>C</sub>	600	mA

### Thermal Characteristics (@T<sub>A</sub> = +25°C unless otherwise specified)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	417	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°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	400	V	C

- Notes:
- For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

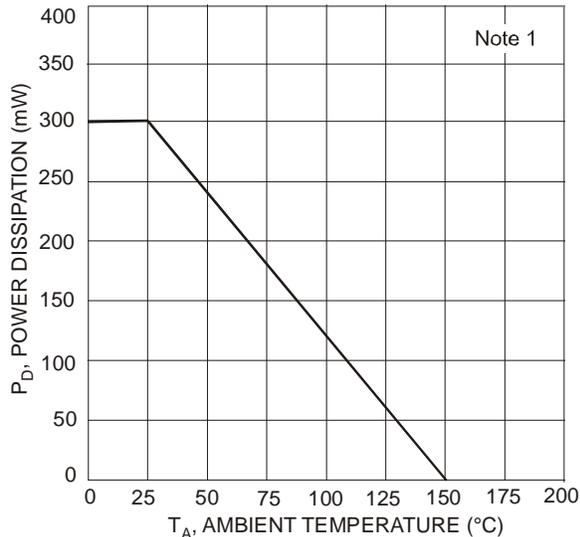


Fig. 1 Power Dissipation vs. Ambient Temperature

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>					
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	180	—	V	I <sub>C</sub> = 100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	160	—	V	I <sub>C</sub> = 1.0mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	6.0	—	V	I <sub>E</sub> = 10μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CBO</sub>	—	50	nA μA	V <sub>CB</sub> = 120V, I <sub>E</sub> = 0 V <sub>CB</sub> = 120V, I <sub>E</sub> = 0, T <sub>A</sub> = 100°C
Emitter Cutoff Current	I <sub>EBO</sub>	—	50	nA	V <sub>EB</sub> = 4.0V, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 7)</b>					
DC Current Gain	h <sub>FE</sub>	80 80 30	— 250 —	—	I <sub>C</sub> = 1.0mA, V <sub>CE</sub> = 5.0V I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5.0V I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5.0V
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	0.15 0.20	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1.0mA I <sub>C</sub> = 50mA, I <sub>B</sub> = 5.0mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	1.0	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1.0mA I <sub>C</sub> = 50mA, I <sub>B</sub> = 5.0mA
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	C <sub>obo</sub>	—	6.0	pF	V <sub>CB</sub> = 10V, f = 1.0MHz, I <sub>E</sub> = 0
Small Signal Current Gain	h <sub>fe</sub>	50	250	—	V <sub>CE</sub> = 10V, I <sub>C</sub> = 1.0mA, f = 1.0kHz
Current Gain-Bandwidth Product	f <sub>T</sub>	100	300	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 10mA, f = 100MHz
Noise Figure	nF	—	8.0	dB	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 200μA, R <sub>S</sub> = 1.0kΩ, f = 1.0kHz

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

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

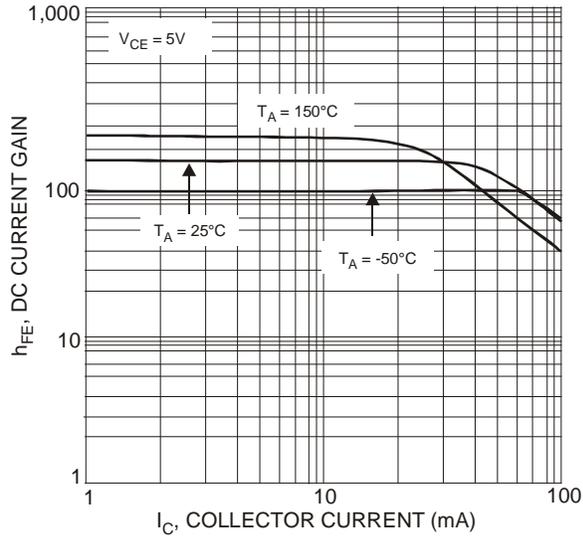


Fig. 2 Typical DC Current Gain vs. Collector Current

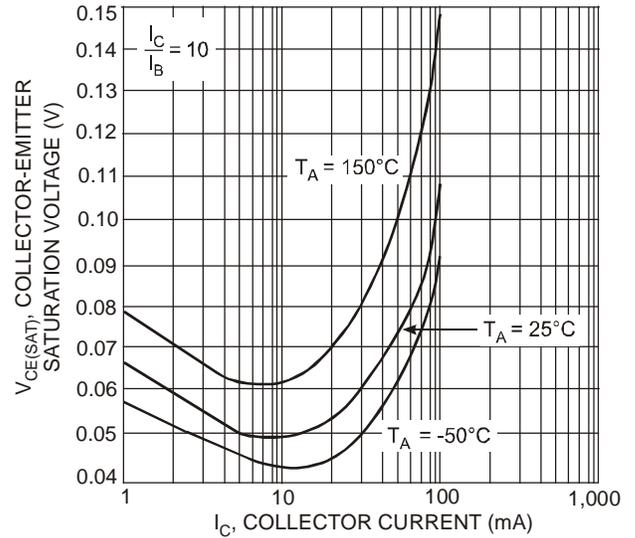


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

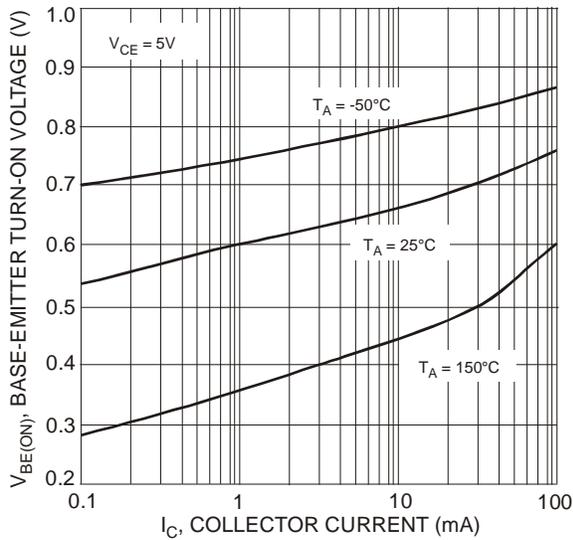


Fig. 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

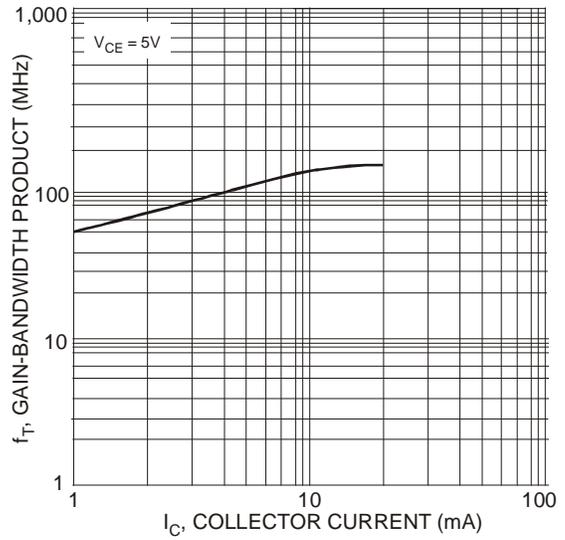
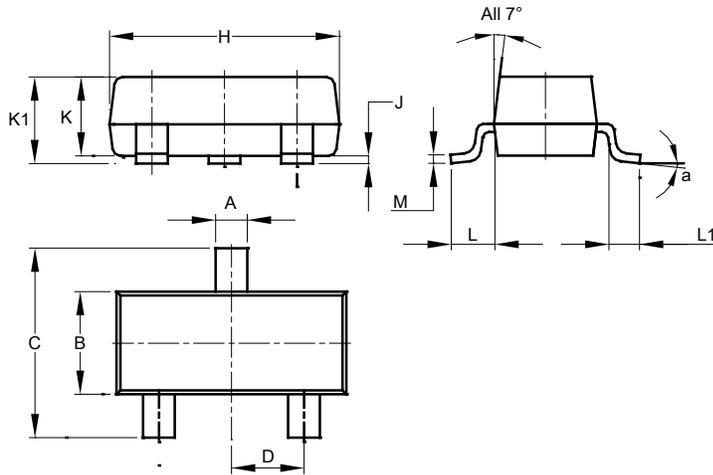


Fig. 5 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

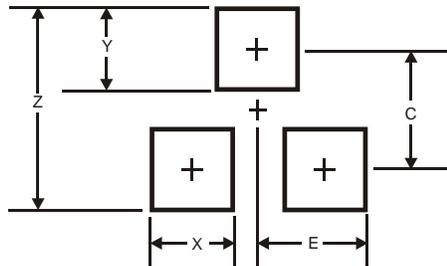
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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