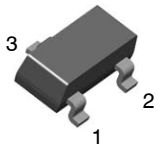
NPN General-Purpose Amplifier

MMBT5551



1. Base 2. Emitter 3. Collector

SOT−23−3
CASE 318BM

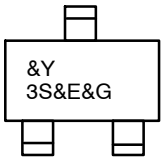
Description

This device is designed for general−purpose high−voltage amplifiers and gas discharge display drivers.

Features

- This Devices is Pb−Free, Halogen Free/BFR Free and is RoHS Compliant

MARKING DIAGRAM



&Y = **onsemi** Logo
3S = Specific Device Code
&E = Designated Space
&G = Pb−Free Package

ABSOLUTE MAXIMUM RATINGS (Note 1)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector−Emitter Voltage	160	V
V_{CBO}	Collector−Base Voltage	180	V
V_{EBO}	Emitter−Base Voltage	6	V
I_C	Collector Current − Continuous	600	mA
T_J, T_{STG}	Operating and Storage Temperature (Note 2)	−55 to + 150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.
2. These ratings are based on a maximum junction temperature of 150°C. These are steady−state limits. **onsemi** should be consulted on applications involving pulsed or low−duty cycle operations.

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

THERMAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Note 3)

Symbol	Characteristic	Max	Unit
P_D	Total Device Dissipation	350	mW
	Derate Above 25°C	2.8	mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Note 4)

Symbol	Parameter	Test Conditions	Min	Max	Unit
$V_{(BR)CEO}$	Collector−Emitter Breakdown Voltage	I_C = 1.0 mA, I_B = 0	160		V
$V_{(BR)CBO}$	Collector−Base Breakdown Voltage	I_C = 100 μA, I_E = 0	180		V
$V_{(BR)EBO}$	Emitter−Base Breakdown Voltage	I_E = 10 μA, I_C = 0	6.0		V
I_{CBO}	Collector Cut−Off Current	V_{CB} = 120 V, I_E = 0		50	nA
		V_{CB} = 120 V, I_E = 0 V, T_A = 100°C		50	μA
I_{EBO}	Emitter Cut−Off Current	V_{EB} = 4.0 V, I_C = 0		50	nA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 1.0 mA, V_{CE} = 5.0 V	80		
		I_C = 10 mA, V_{CE} = 5.0 V	80	250	
		I_C = 10 mA, V_{CE} = 5.0 V (for 2N5551YBU, 2N5551YTA)	180	240	
		I_C = 50 mA, V_{CE} = 5.0 V	30		
$V_{CE(sat)}$	Collector−Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA		0.15	V
		I_C = 50 mA, I_B = 5.0 mA		0.20	V
$V_{BE(sat)}$	Base−Emitter On Voltage	I_C = 10 mA, I_B = 1.0 mA		1.0	V
		I_C = 50 mA, I_B = 5.0 mA		1.0	V
SMALL−SIGNAL CHARACTERISTICS					
f_T	Current Gain Bandwidth Product	I_C = 10 mA, V_{CE} = 10 V, f = 100 MHz	100		MHz
C_{obo}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz		6.0	pF
C_{ibo}	Input Capacitance	V_{BE} = 0.5 V, I_C = 0, f = 1.0 MHz		20	pF
H_{fe}	Small−Signal Current Gain	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	50	250	
NF	Noise Figure	I_C = 250 μA, V_{CE} = 5.0 V, R_S = 1.0 kΩ, f = 10 Hz to 15.7 kHz		8.0	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. PCB board size FR−4 76 x 114 x 0.6 T mm^3 (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.
4. Pulse test: pulse width ≤ 300 μs, duty cycle ≤ 2.0%.

TYPICAL PERFORMANCE CHARACTERISTICS

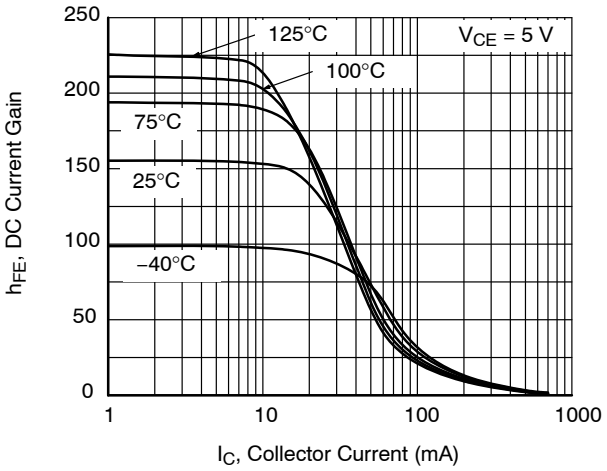


Figure 1. Typical Pulsed Current Gain vs. Collector Current

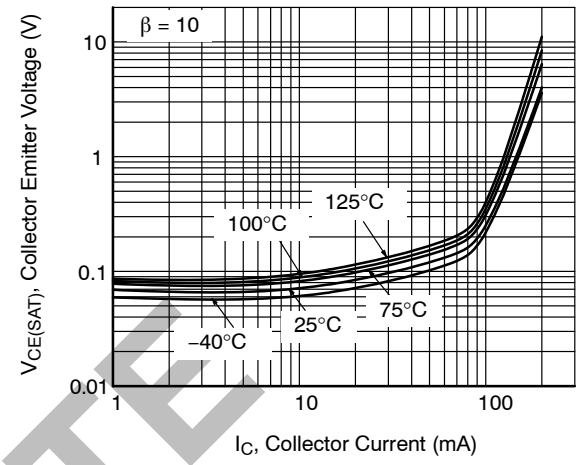


Figure 2. Collector− Emitter Saturation Voltage vs. Collector Current

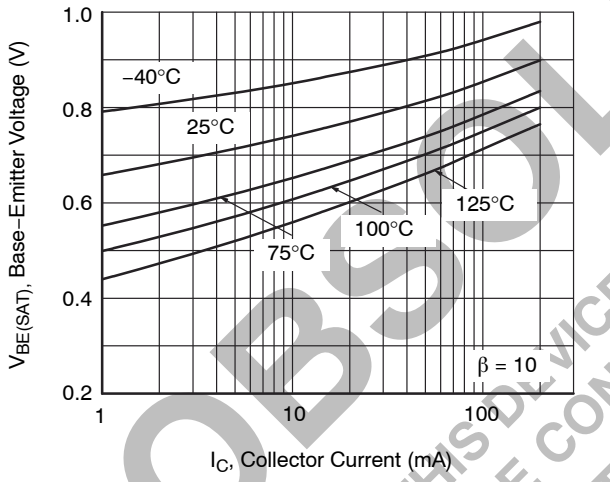


Figure 3. Base−Emitter Saturation Voltage vs. Collector Current

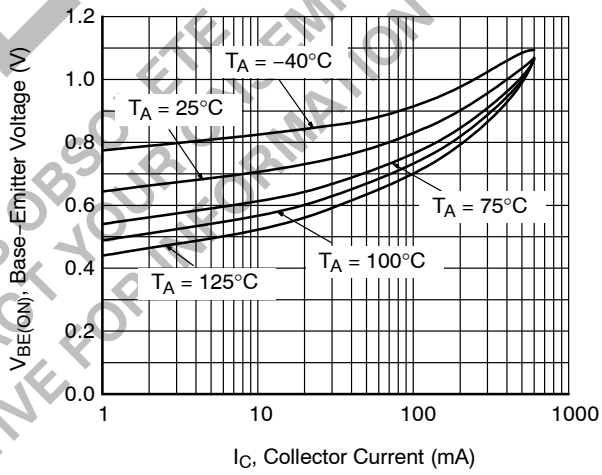


Figure 4. Base−Emitter On Voltage vs. Collector Current

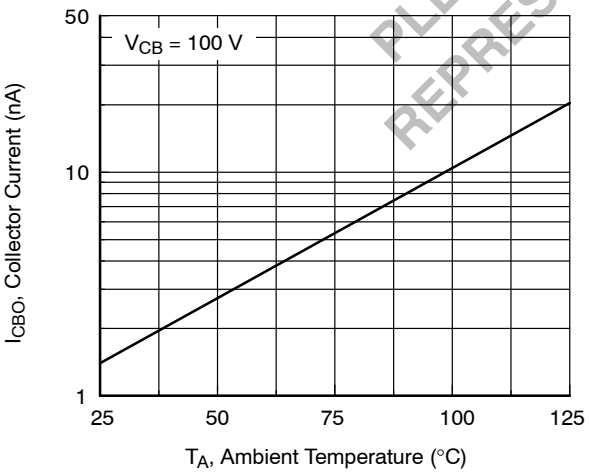


Figure 5. Collector Cut−Off Current vs. Ambient Temperature

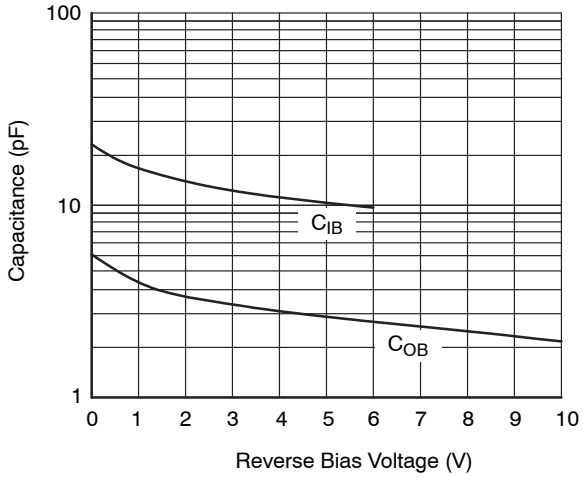


Figure 6. Input and Output Capacitance vs. Reverse Voltage

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

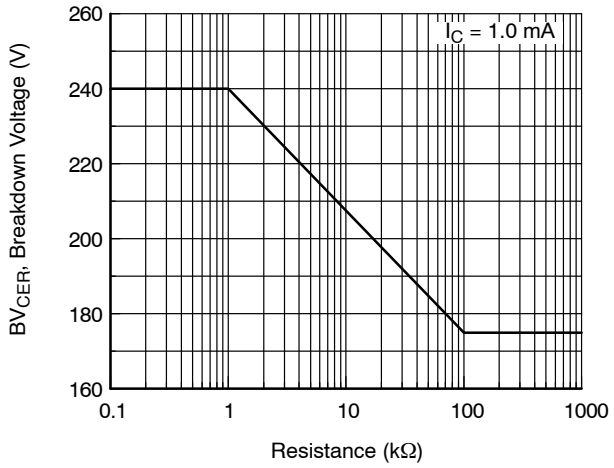


Figure 7. Collector−Emitter Breakdown Voltage with Resistance between Emitter−Base

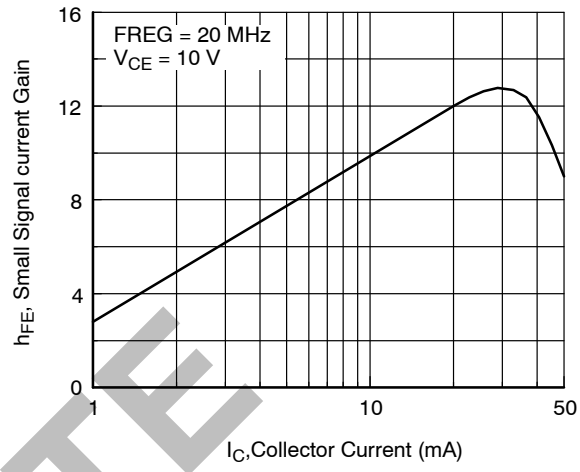


Figure 8. Small Signal Current Gain vs. Collector Current

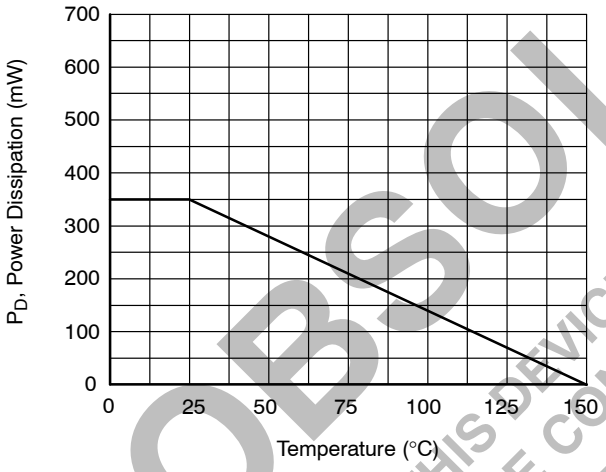


Figure 9. Power Dissipation vs. Ambient Temperature

ORDERING INFORMATION (Note 72)

Part Number	Top Mark	Package	Shipping†
MMBT5551	3S	SOT−23−3 (Pb−Free)	3,000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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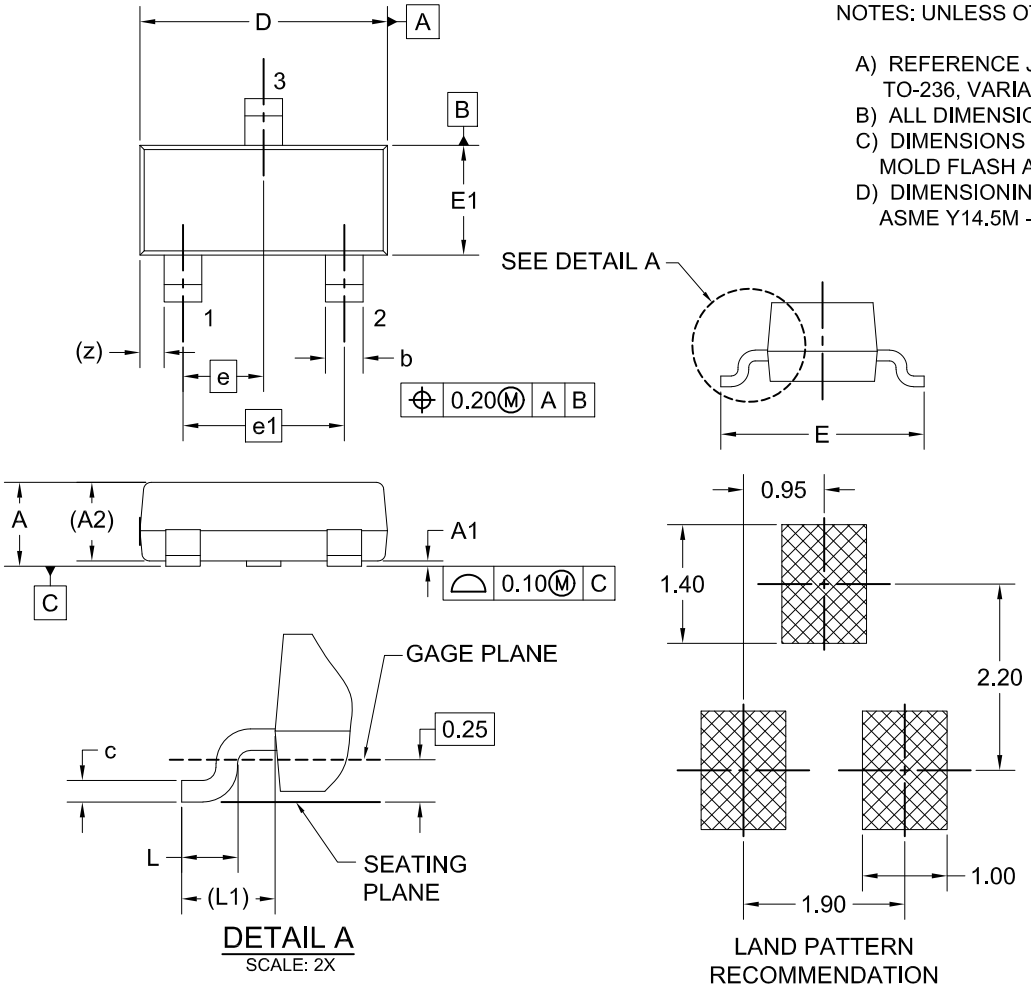
DATE 01 SEP 2021



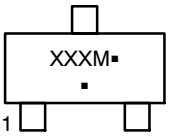
NOTES: UNLESS OTHERWISE SPECIFIED

A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.20
A1	0.00	0.05	0.10
A2		0.93 REF	
b	0.37	0.44	0.60
c	0.08	0.15	0.23
D	2.72	2.92	3.12
E	2.10	2.40	2.70
E1	1.15	1.30	1.50
e		0.95 BSC	
e1		1.90 BSC	
L	0.20	---	---
L1		0.55 REF	
z		0.29 REF	

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	98AON13784G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	SOT−23	PAGE 1 OF 1

ADDITIONAL INFORMATION

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ONLINE SUPPORT: www.onsemi.com/support
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