

# NPN General-Purpose Amplifier

## MMBT5551

### Description

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

### Features

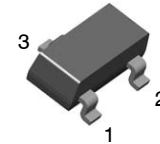
- This Device is Pb-Free, Halogen Free/BFR Free and is RoHS Compliant

### 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.

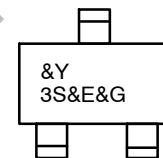
- These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.
- These ratings are based on a maximum junction temperature of 150°C. These are steady-state limits. onsemi should be consulted on applications involving pulsed or low-duty cycle operations.



1. Base 2. Emitter 3. Collector

**SOT-23-3**  
**CASE 318BM**

### MARKING DIAGRAM



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

### ORDERING INFORMATION

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

# MMBT5551

## THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) (Note 3)

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

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) (Note 4)

Symbol	Parameter	Test Conditions	Min	Max	Unit
$V_{(BR)CEO}$	Collector–Emitter Breakdown Voltage	$I_C = 1.0\text{ mA}$ , $I_B = 0$	160		V
$V_{(BR)CBO}$	Collector–Base Breakdown Voltage	$I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$	180		V
$V_{(BR)EBO}$	Emitter–Base Breakdown Voltage	$I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$	6.0		V
$I_{CBO}$	Collector Cut–Off Current	$V_{CB} = 120\text{ V}$ , $I_E = 0$		50	nA
		$V_{CB} = 120\text{ V}$ , $I_E = 0\text{ V}$ , $T_A = 100^\circ\text{C}$		50	$\mu\text{A}$
$I_{EBO}$	Emitter Cut–Off Current	$V_{EB} = 4.0\text{ V}$ , $I_C = 0$		50	nA

## ON CHARACTERISTICS

$h_{FE}$	DC Current Gain	$I_C = 1.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$	80		
		$I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$	80	250	
		$I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ (for 2N5551YBU, 2N5551YTA)	180	240	
		$I_C = 50\text{ mA}$ , $V_{CE} = 5.0\text{ V}$	30		
$V_{CE(sat)}$	Collector–Emitter Saturation Voltage	$I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$		0.15	V
		$I_C = 50\text{ mA}$ , $I_B = 5.0\text{ mA}$		0.20	V
$V_{BE(sat)}$	Base–Emitter On Voltage	$I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$		1.0	V
		$I_C = 50\text{ mA}$ , $I_B = 5.0\text{ mA}$		1.0	V

## SMALL–SIGNAL CHARACTERISTICS

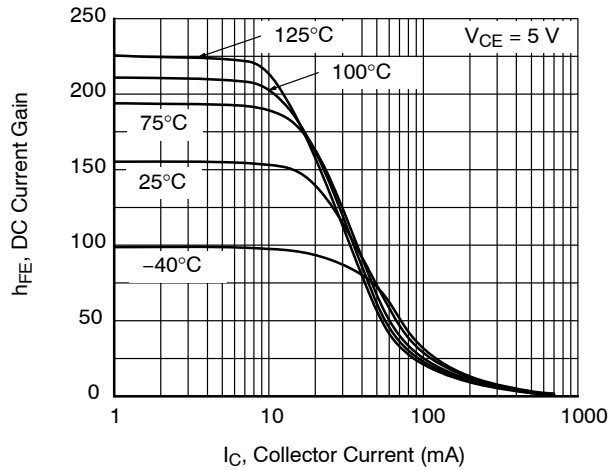
$f_T$	Current Gain Bandwidth Product	$I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 100\text{ MHz}$	100		MHz
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$		6.0	pF
$C_{ibo}$	Input Capacitance	$V_{BE} = 0.5\text{ V}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$		20	pF
$H_{fe}$	Small–Signal Current Gain	$I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ kHz}$	50	250	
NF	Noise Figure	$I_C = 250\text{ }\mu\text{A}$ , $V_{CE} = 5.0\text{ V}$ , $R_S = 1.0\text{ k}\Omega$ , $f = 10\text{ Hz to }15.7\text{ kHz}$		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.

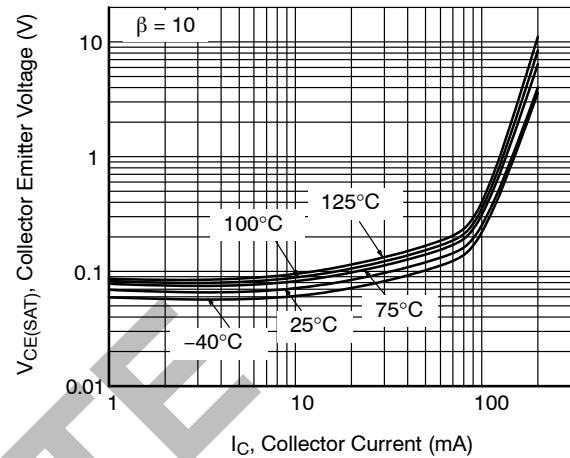
3. PCB board size FR–4 76 x 114 x 0.6 T mm<sup>3</sup> (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

4. Pulse test: pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

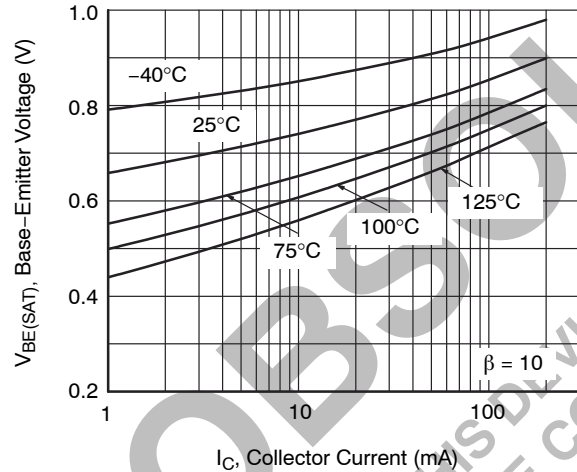
## TYPICAL PERFORMANCE CHARACTERISTICS



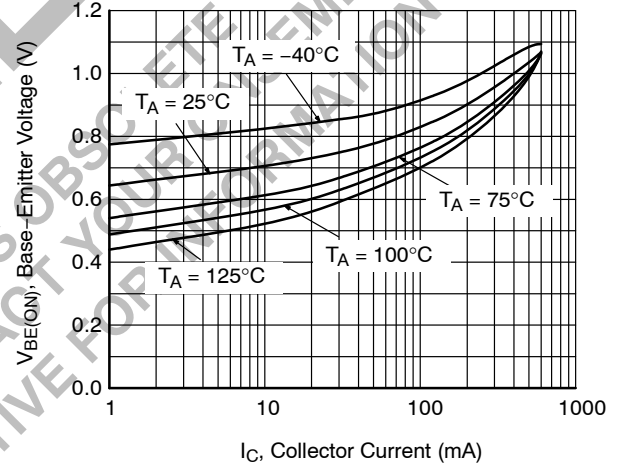
**Figure 1. Typical Pulsed Current Gain vs. Collector Current**



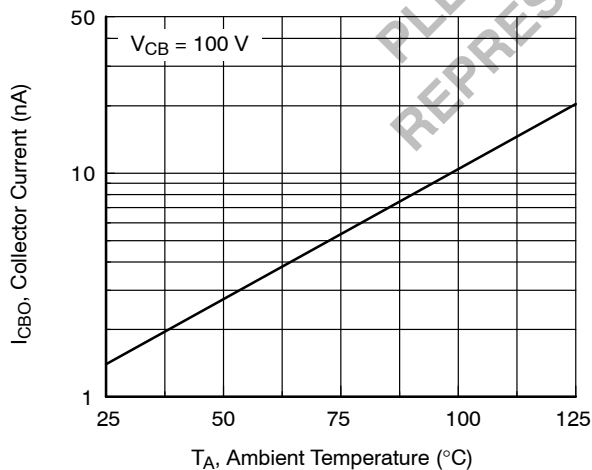
**Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current**



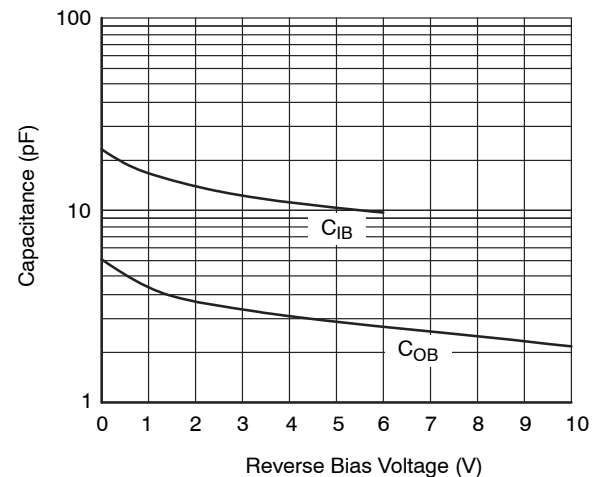
**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**



**Figure 4. Base-Emitter On Voltage vs. Collector Current**

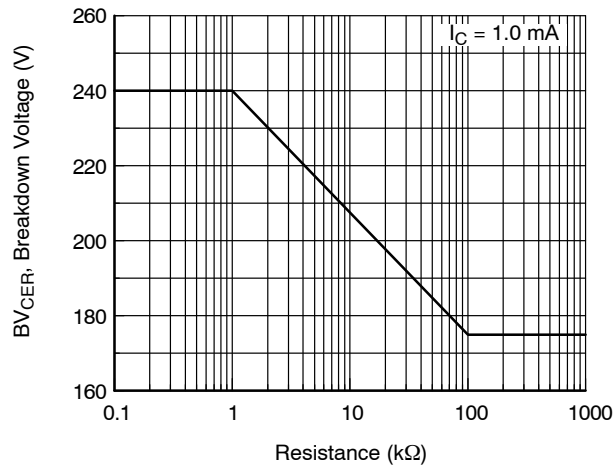


**Figure 5. Collector Cut-Off Current vs. Ambient Temperature**

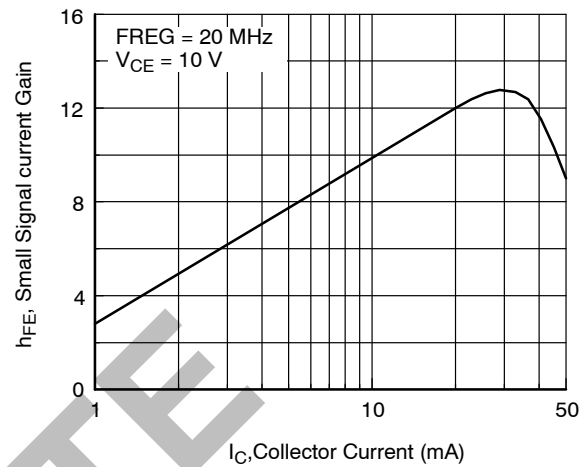


**Figure 6. Input and Output Capacitance vs. Reverse Voltage**

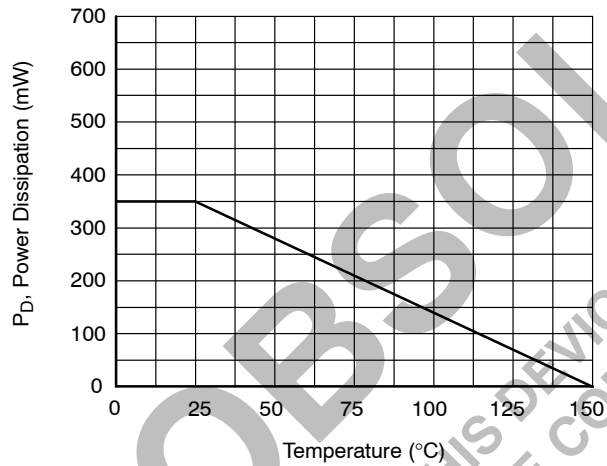
## TYPICAL PERFORMANCE CHARACTERISTICS (continued)



**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**

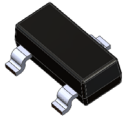
## MMBT5551

### ORDERING INFORMATION (Note 72)

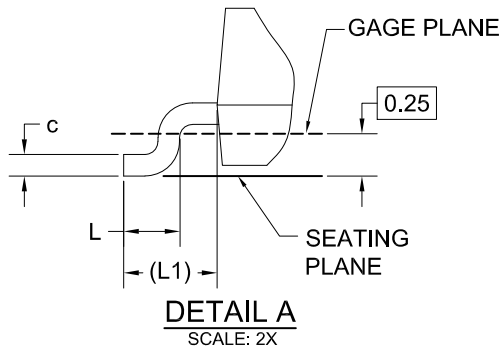
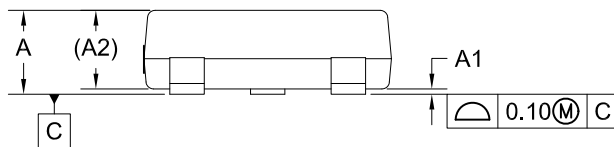
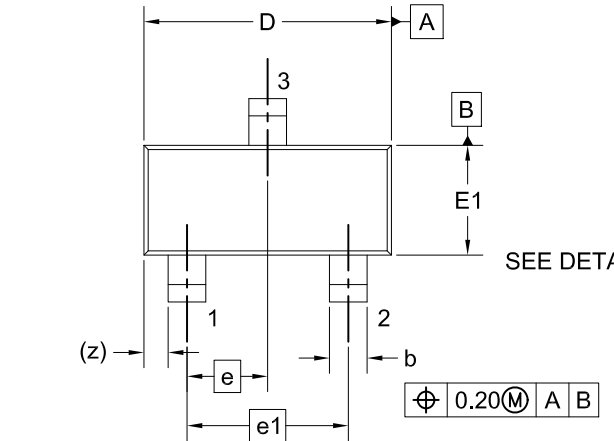
Part Number	Top Mark	Package	Shipping <sup>†</sup>
MMBT5551	3S	SOT-23-3 (Pb-Free)	3,000 / Tape & Reel

<sup>†</sup>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.

**OBSOLETE**  
THIS DEVICE IS OBSOLETE  
PLEASE CONTACT YOUR ONSEMI  
REPRESENTATIVE FOR INFORMATION


**SOT-23**  
**CASE 318BM**  
**ISSUE A**

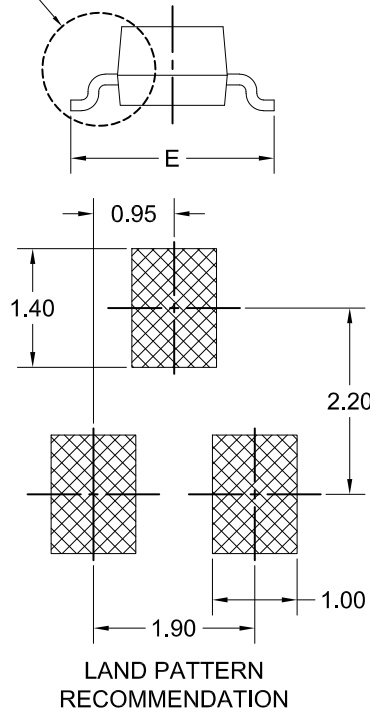
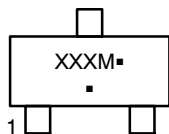
DATE 01 SEP 2021



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		


**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.

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

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