

NPN General-Purpose Amplifier

MMBT5551

Description

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

Features

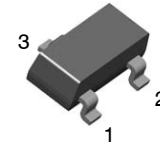
- This Device is Pb-Free, Halogen Free/BFR Free and is RoHS Compliant

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.

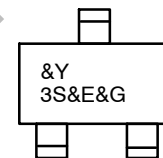
- These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.
- These ratings are based on a maximum junction temperature of 150°C. These are steady-state limits. onsemi should be consulted on applications involving pulsed or low-duty cycle operations.



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°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	μA
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 mm³ (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

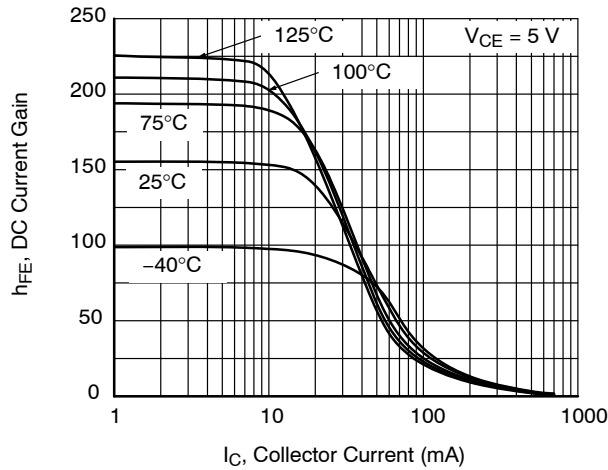


Figure 1. Typical Pulsed Current Gain vs. Collector Current

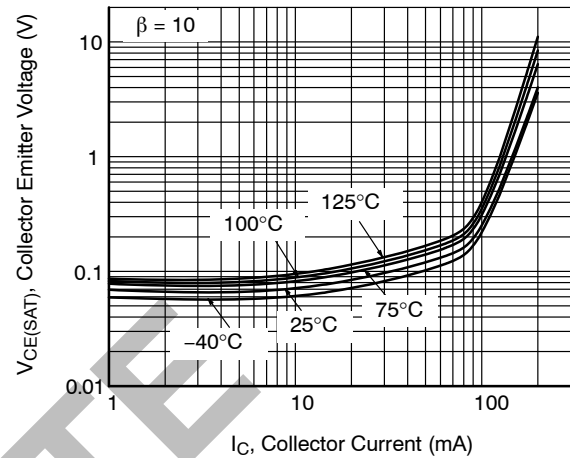


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

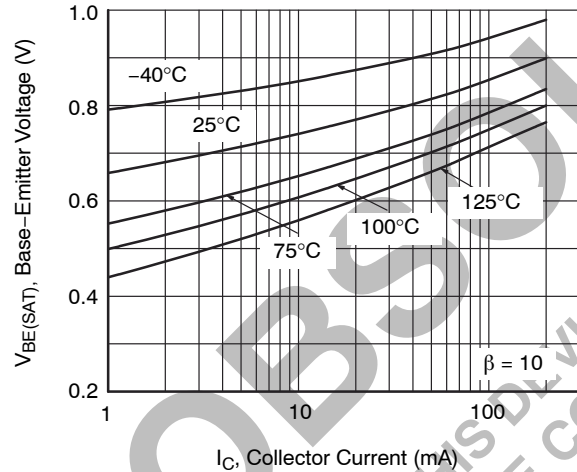


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

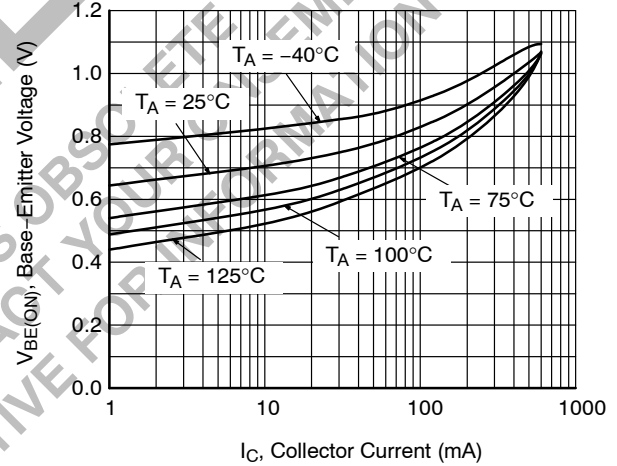


Figure 4. Base-Emitter On Voltage vs. Collector Current

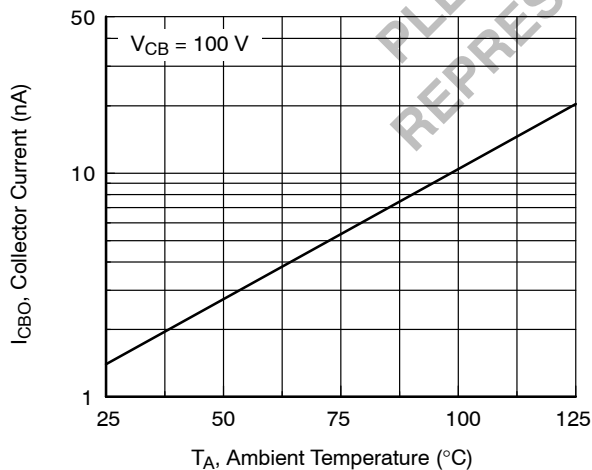


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

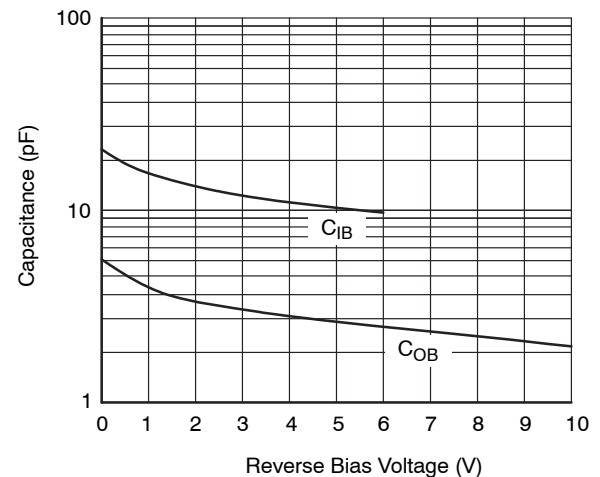


Figure 6. Input and Output Capacitance vs. Reverse Voltage

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

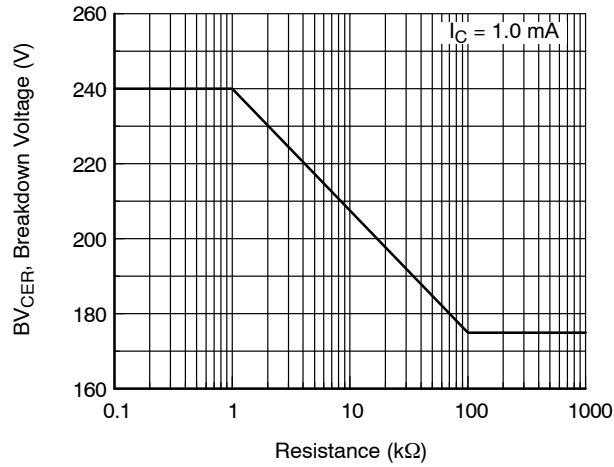


Figure 7. Collector-Emitter Breakdown Voltage with Resistance between Emitter-Base

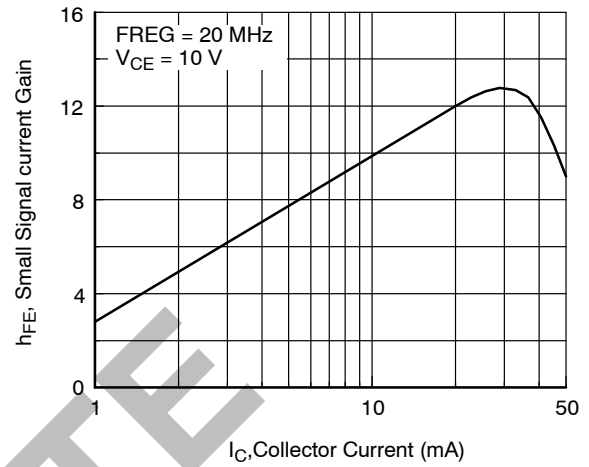


Figure 8. Small Signal Current Gain vs. Collector Current

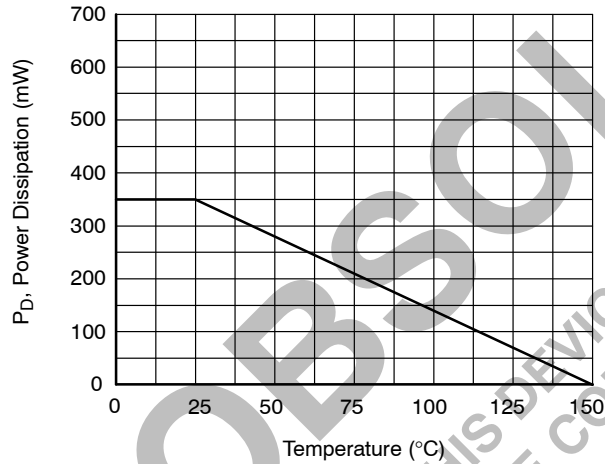


Figure 9. Power Dissipation vs. Ambient Temperature

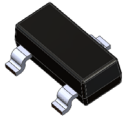
MMBT5551

ORDERING INFORMATION (Note 72)

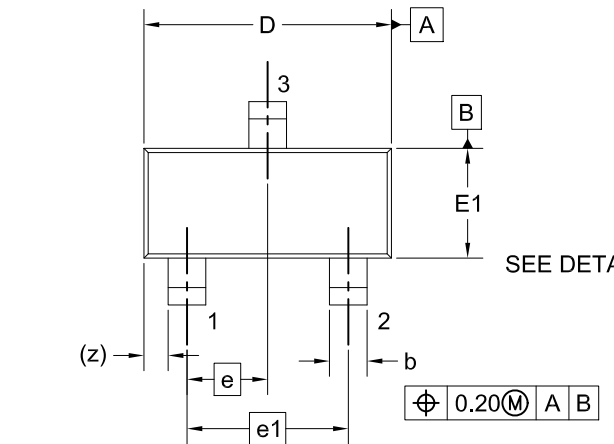
Part Number	Top Mark	Package	Shipping [†]
MMBT5551	3S	SOT-23-3 (Pb-Free)	3,000 / Tape & Reel

[†]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.

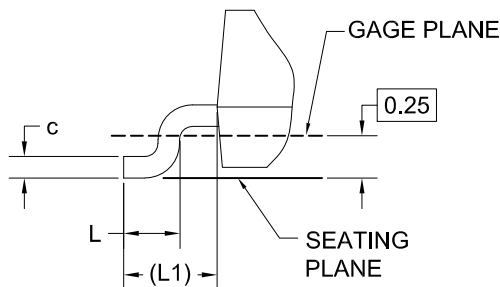
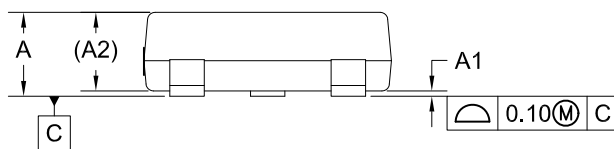
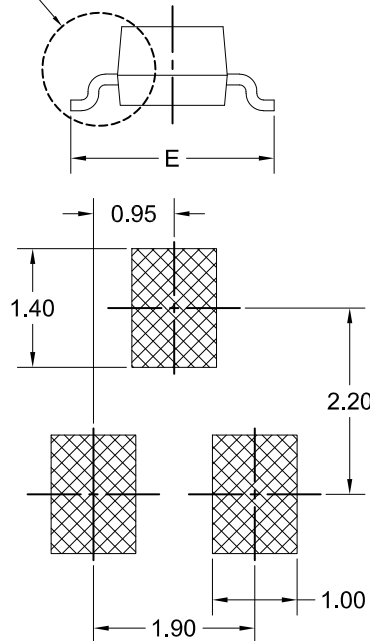
OBSOLETE
THIS DEVICE IS OBSOLETE
PLEASE CONTACT YOUR ONSEMI
REPRESENTATIVE FOR INFORMATION


SOT-23
CASE 318BM
ISSUE A

DATE 01 SEP 2021



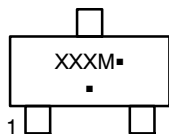
SEE DETAIL A


DETAIL A
SCALE: 2X

LAND PATTERN
RECOMMENDATION

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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