

# NPN General-Purpose Amplifier

## 2N5551

### Description

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

### Features

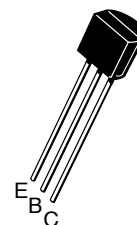
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### ABSOLUTE MAXIMUM RATINGS (Note 1)

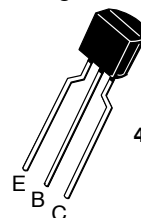
Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage	160	V
$V_{CBO}$	Collector-Base Voltage	180	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current – Continuous	600	mA
$T_J, T_{STG}$	Operating and Storage Temperature (Note 2)	-55 to +150	°C

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.

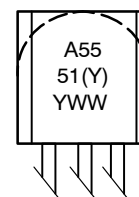


TO-92-3  
4.825x4.76  
CASE 135AN



TO-92-3  
4.83x4.76 LEADFORMED  
CASE 135AR

### MARKING DIAGRAM



A = Assembly Location  
5551(Y) = Specific Device Code  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

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

## 2N5551

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

Symbol	Characteristic	Max	Unit
$P_D$	Total Device Dissipation	625	mW
	Derate Above $25^\circ\text{C}$	5.0	mW/ $^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	$^\circ\text{C/W}$

### 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

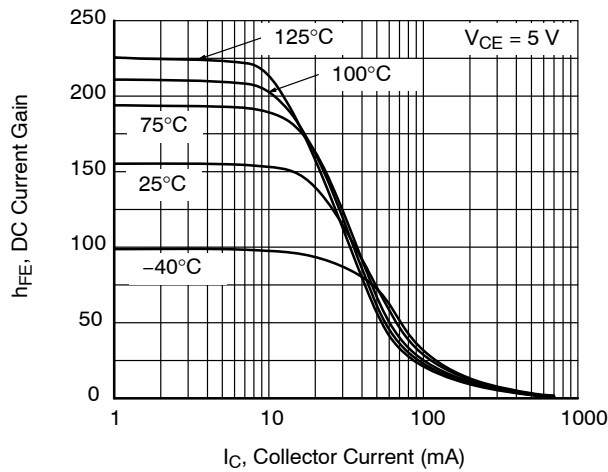
$f_T$	Current Gain Bandwidth Product	$I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 100\text{ MHz}$	100		MHz
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$		6.0	pF
$C_{ibo}$	Input Capacitance	$V_{BE} = 0.5\text{ V}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$		20	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.

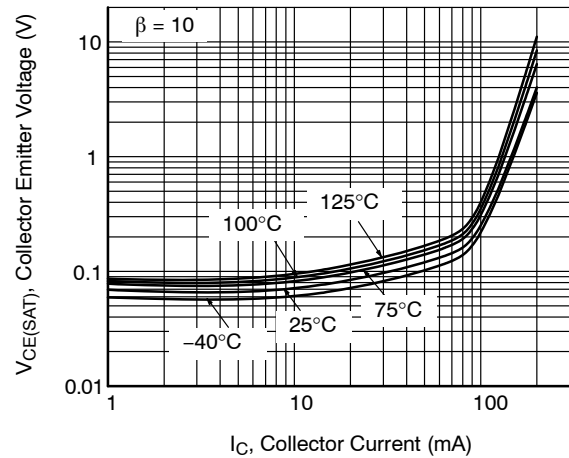
3. PCB board size FR–4  $76 \times 114 \times 0.6\text{ mm}^3$  (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

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

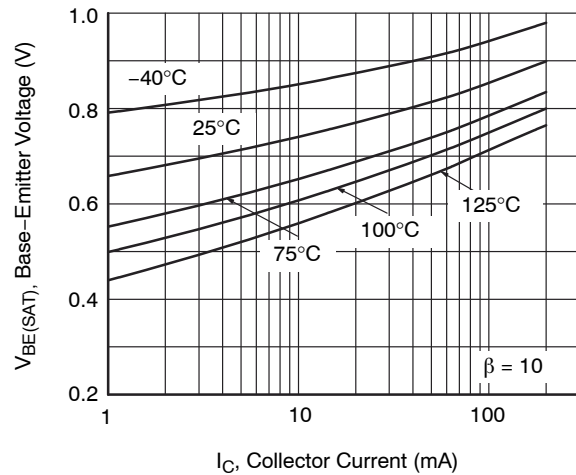
## TYPICAL PERFORMANCE CHARACTERISTICS



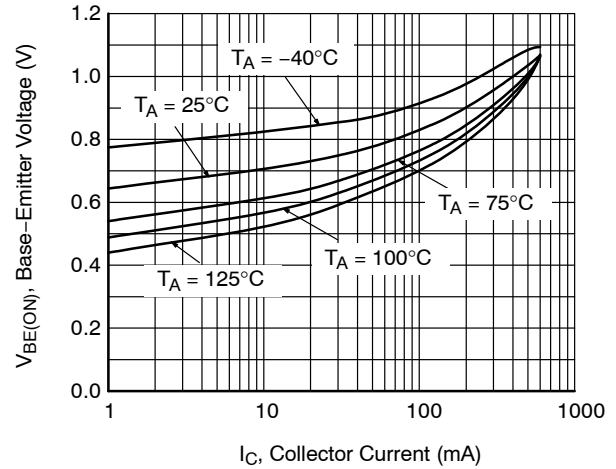
**Figure 1. Typical Pulsed Current Gain vs. Collector Current**



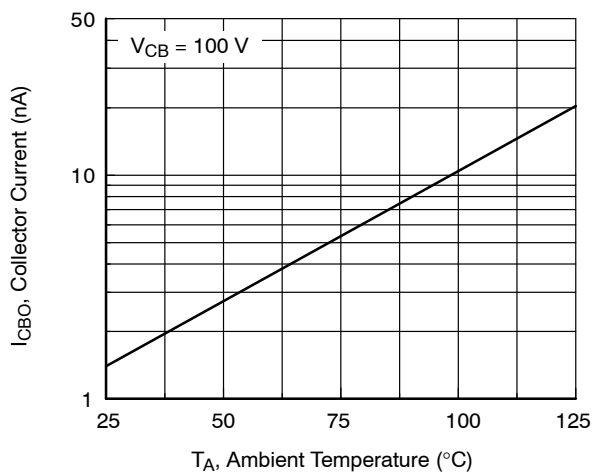
**Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current**



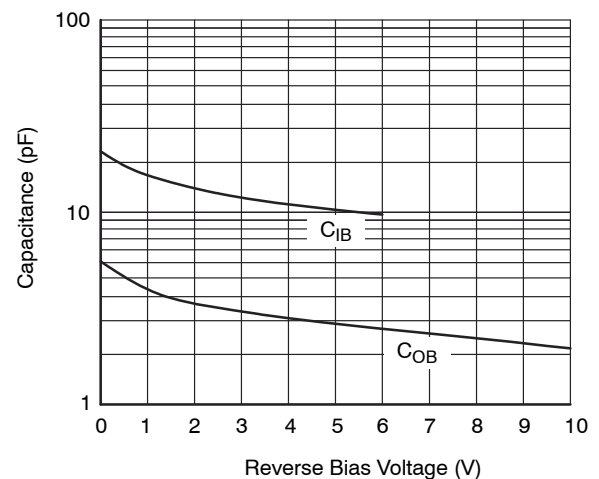
**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**



**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)

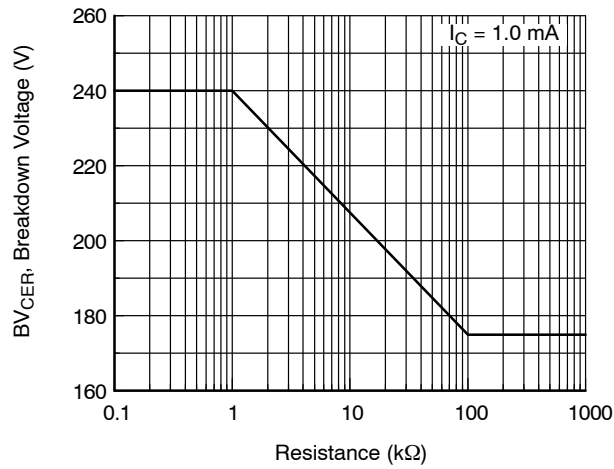


Figure 7. Collector-Emitter Breakdown Voltage with Resistance between Emitter-Base

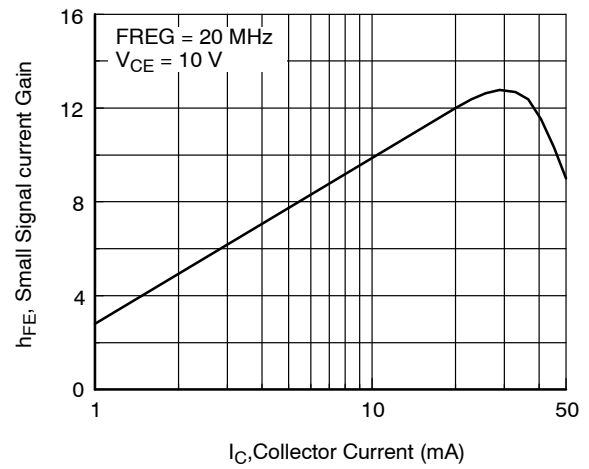


Figure 8. Small Signal Current Gain vs. Collector Current

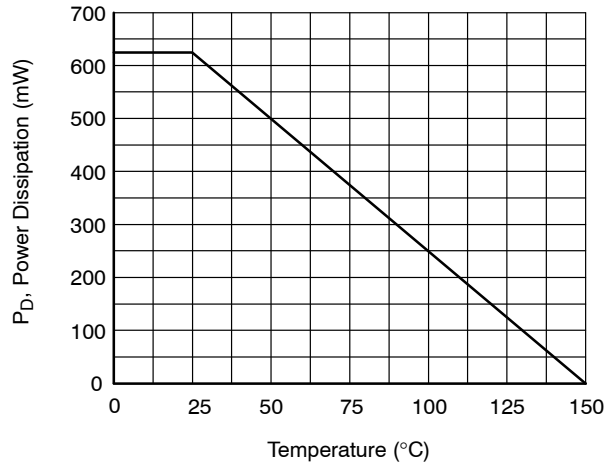


Figure 9. Power Dissipation vs. Ambient Temperature

## 2N5551

### ORDERING INFORMATION (Note 5)

Part Number	Top Mark	Package	Shipping <sup>†</sup>
2N5551TA	5551	TO-92-3, Case 135AR (Pb-Free)	2000 / Ammo Pack
2N5551TFR	5551	TO-92-3, Case 135AR (Pb-Free)	2000 / Tape & Reel
2N5551TF	5551	TO-92-3, Case 135AR (Pb-Free)	2000 / Tape & Reel
2N5551BU	5551	TO-92-3, Case 135AN (Pb-Free)	10000 / Bulk Bag
2N5551YBU	5551Y	TO-92-3, Case 135AN (Pb-Free)	10000 / Bulk Bag
2N5551YTA	5551Y	TO-92-3, Case 135AR (Pb-Free)	2000 / Ammo Pack

<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.

5. Suffix "-Y" means  $h_{FE}$  180~240 in 2N5551 (Test condition:  $I_C = 10\text{ mA}$ ,  $V_{CE} = 5.0\text{ V}$ )

# MECHANICAL CASE OUTLINE

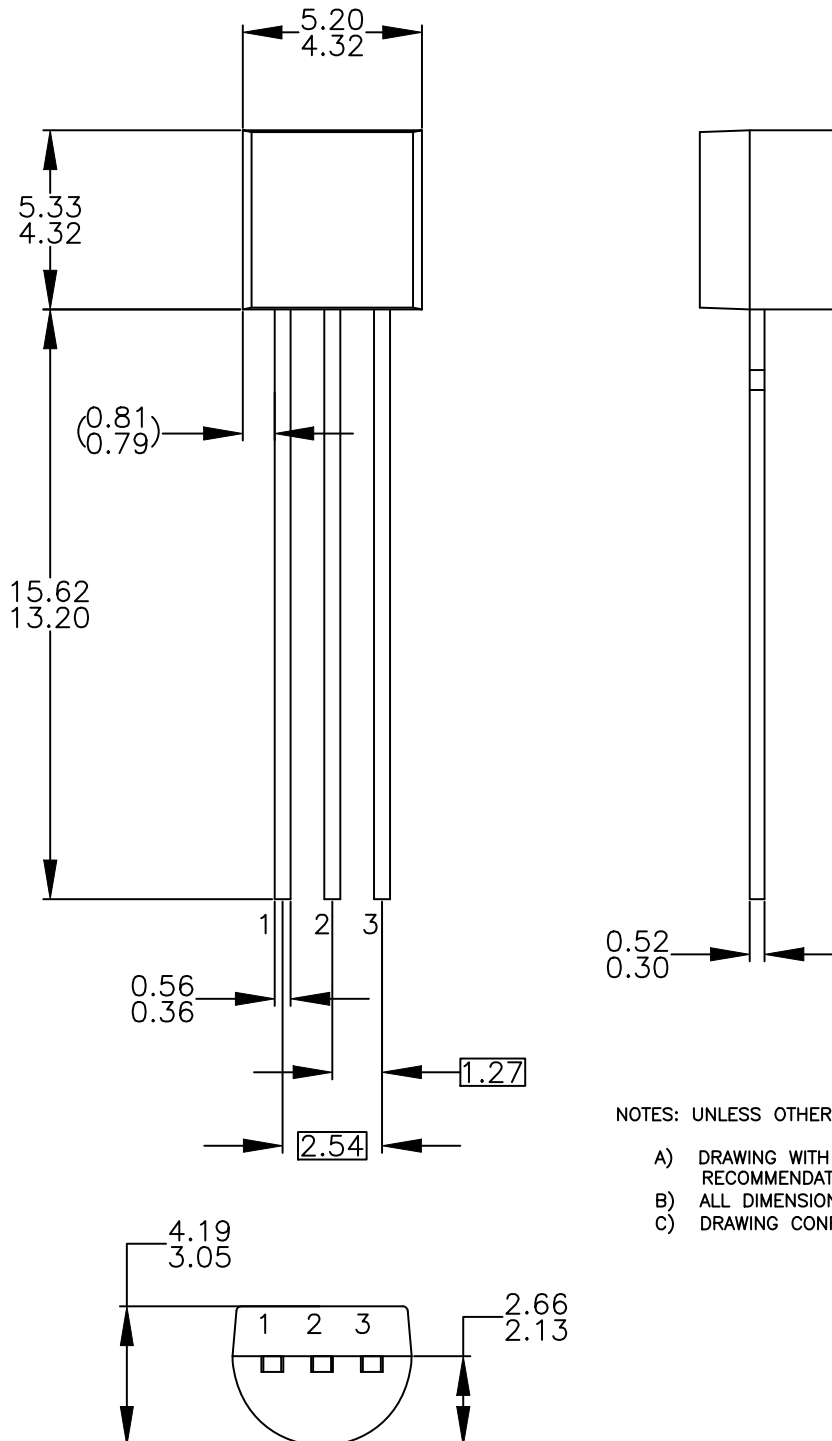
## PACKAGE DIMENSIONS

ON Semiconductor®

ON

TO-92 3 4.825x4.76  
CASE 135AN  
ISSUE O


DATE 31 JUL 2016



NOTES: UNLESS OTHERWISE SPECIFIED

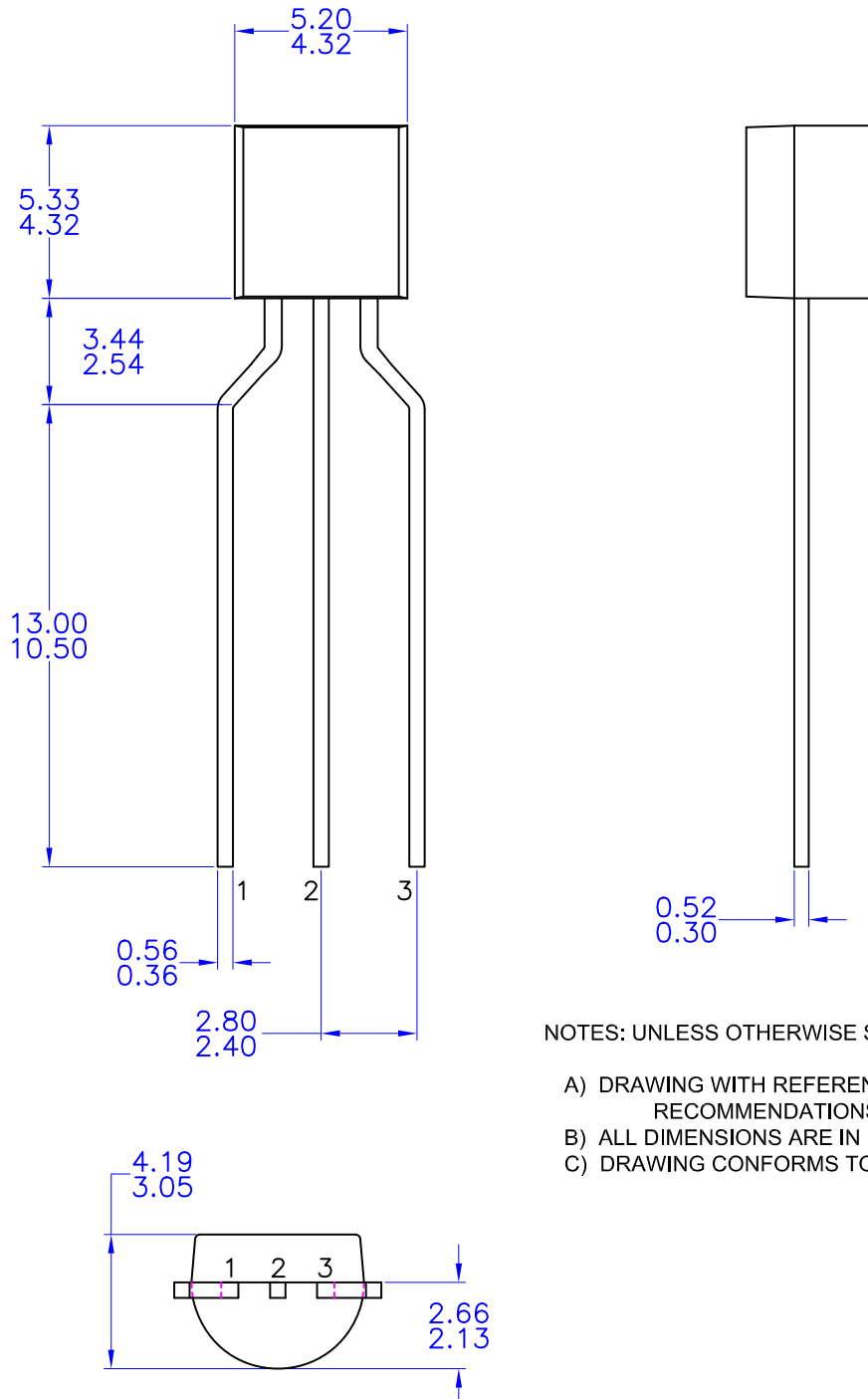
- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-2009.

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**TO-92 3 4.83x4.76 LEADFORMED**  
**CASE 135AR**  
**ISSUE O**

DATE 30 SEP 2016



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