

# 2N5551 / MMBT5551

## NPN General Purpose Amplifier

### Features

- This device is designed for general purpose high voltage amplifiers and gas discharge display drivers.
- Suffix “-C” means Center Collector in 2N5551 (1. Emitter 2. Collector 3. Base)
- Suffix “-Y” means  $h_{FE}$  180~240 in 2N5551 (Test condition :  $I_C = 10\text{mA}$ ,  $V_{CE} = 5.0\text{V}$ )



### Absolute Maximum Ratings \* $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	160	V
$V_{CBO}$	Collector-Base Voltage	180	V
$V_{EBO}$	Emitter-Base Voltage	6.0	V
$I_C$	Collector current - Continuous	600	mA
$T_J, T_{stg}$	Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

1. These ratings are based on a maximum junction temperature of 150 degrees C.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Max		Units
		2N5551	*MMBT5551	
$P_D$	Total Device Dissipation	625	350	mW
	Derate above $25^\circ\text{C}$	5.0	2.8	$\text{mW}/^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3		$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	$^\circ\text{C}/\text{W}$

\* Device mounted on FR-4 PCB  $1.6'' \times 1.6'' \times 0.06''$

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
<b>Off Characteristics</b>					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = 1.0\text{mA}, I_B = 0$	160		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}, I_E = 0$	180		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\mu\text{A}, I_C = 0$	6.0		V
$I_{CBO}$	Collector Cutoff Current	$V_{CB} = 120\text{V}, I_E = 0$ $V_{CB} = 120\text{V}, I_E = 0, T_A = 100^\circ\text{C}$		50 50	nA $\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 4.0\text{V}, I_C = 0$		50	nA
<b>On Characteristics</b>					
$h_{FE}$	DC Current Gain	$I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$	80 80 30	250	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$		0.15 0.20	V V
$V_{BE(sat)}$	Base-Emitter On Voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$		1.0 1.0	V V
<b>Small Signal Characteristics</b>					
$f_T$	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	$I_C = 250\mu\text{A}, V_{CE} = 5.0\text{V},$ $R_S = 1.0\text{k}\Omega, f = 10\text{Hz to } 15.7\text{kHz}$		8.0	dB

**Spice Model**

NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Ibf=50m Vtf=5 Xtf=8 Rb=10)

Typical Performance Characteristics

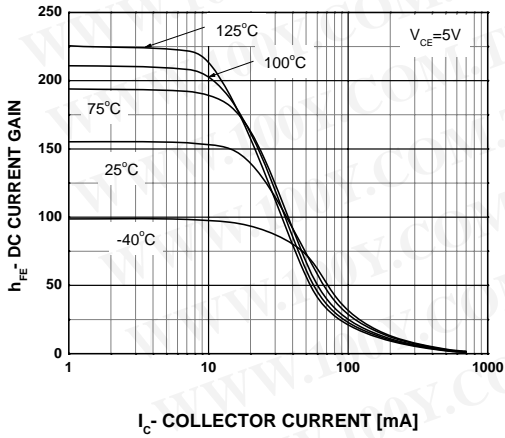


Figure 1. Typical Pulsed Current Gain vs Collector Current

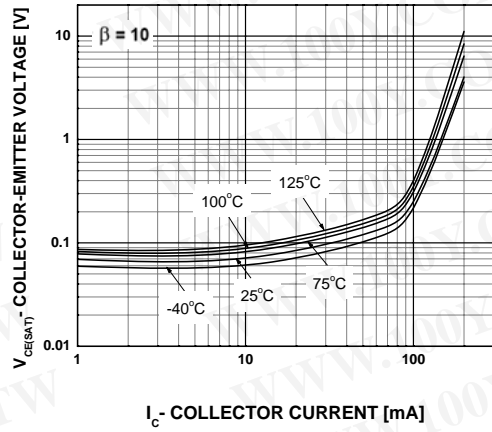


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

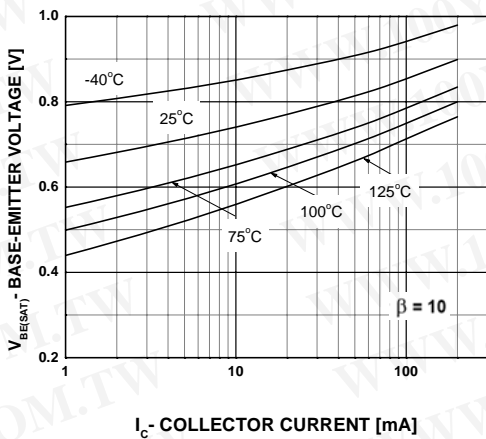


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

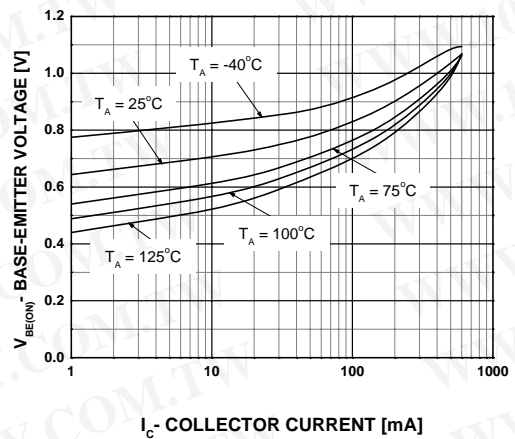


Figure 4. Base-Emitter On Voltage vs Collector Current

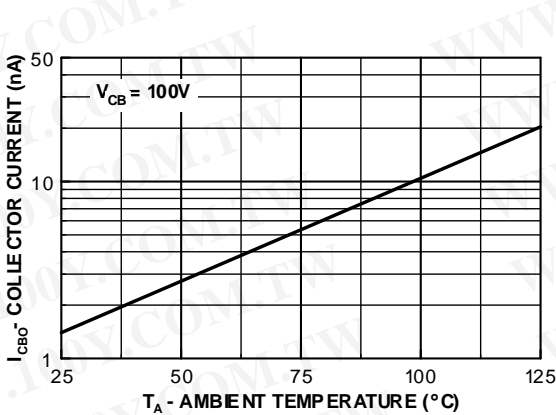


Figure 5. Collector Cutoff Current vs Ambient Temperature

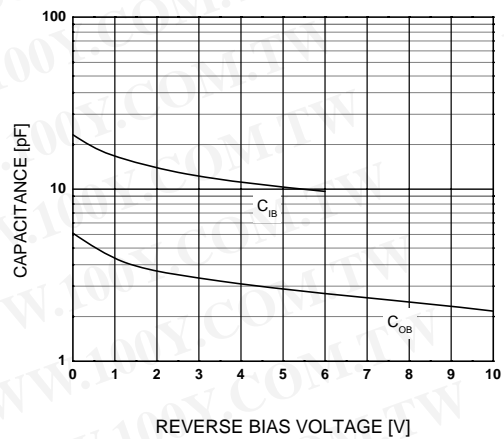


Figure 6. Input and Output Capacitance vs Reverse Voltage

Typical Performance Characteristics (Continued)

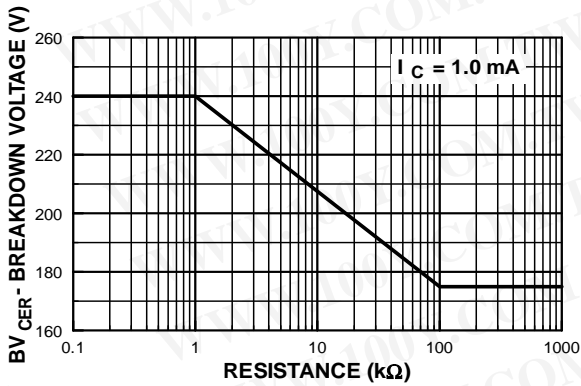


Figure 7. Collector- Emitter Breakdown Voltage with Resistance Between Emitter-Base

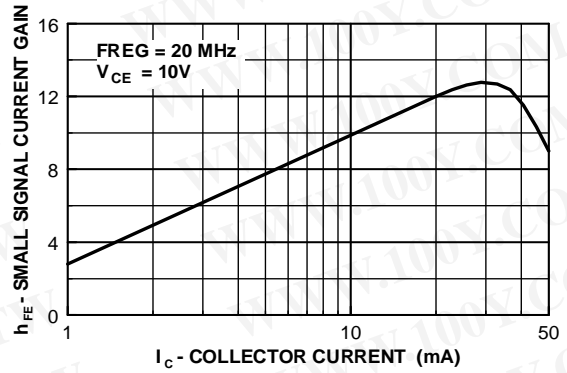


Figure 8. Small Signal Current Gain vs Collector Current

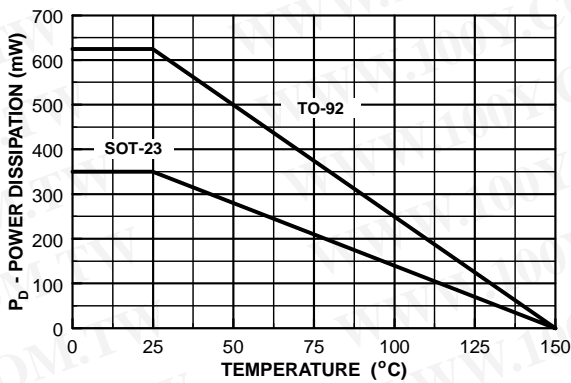







Figure 7. Power Dissipation vs Ambient Temperature

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



**TRADEMARKS**

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

- |  |                        |  |   |
|--|------------------------|--|---|
| Auto-SPM™  | F-PFS™                 | PowerTrench®   | The Power Franchise®  |
| Build it Now™  | FRFET®                 | PowerXS™   | the <b>power</b> franchise™   |
| CorePLUS™  | Global Power Resource™ | Programmable Active Droop™   | TinyBoost™  |
| CorePOWER™   | Green FPS™             | QFET®  | TinyBuck™   |
| CROSSVOLT™   | Green FPS™ e-Series™   | QS™  | TinyLogic®  |
| CTL™   | Gmax™                  | Quiet Series™  | TINYOPTO™   |
| Current Transfer Logic™  | GTO™                   | RapidConfigure™  | TinyPower™  |
| EcoSPARK®  | IntelliMAX™            |  ™  | TinyPWM™  |
| EfficientMax™  | ISOPLANAR™             | Saving our world, 1mW/W/kW at a time™  | TinyWire™   |
| EZSWITCH™*   | MegaBuck™              | SmartMax™  | TriFault Detect™  |
|  ™* | MICROCOUPLER™          | SMART START™   | TRUECURRENT™*   |
|  ™  | MicroFET™              | SPM®   | µSerDes™  |
| Fairchild®   | MicroPak™              | STEALTH™   |  ™ |
| Fairchild Semiconductor®   | MillerDrive™           | SuperFET™  | UHC®  |
| FACT Quiet Series™   | MotionMax™             | SuperSOT™-3  | Ultra FRFET™  |
| FACT®  | Motion-SPM™            | SuperSOT™-6  | UniFET™   |
| FAST®  | OPTOLOGIC®             | SuperSOT™-8  | VCC™  |
| FAST®  | OPTOPLANAR®            | SupreMOS™  | VisualMax™  |
| FastvCore™   |                        | SyncFET™   | XS™   |
| FETBench™  | PDP SPM™               | Sync-Lock™   |   |
| FlashWriter®*  | Power-SPM™             |  ™* |   |
| FPS™   |                        |  |   |

\* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

- Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
- A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

**ANTI-COUNTERFEITING POLICY**

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

**PRODUCT STATUS DEFINITIONS**

**Definition of Terms**

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. 140