

# Drops of LTSpice



Adding new components in  
LTSpice



# If you've ever chosen a transistor on LTSpice...

The first screenshot shows the 'Select Component Symbol' dialog box. The 'Top Directory' is set to 'C:\Users\fsacco\AppData\Local\LTspice\lib\sym'. The 'Bipolar NPN transistor' is selected, and its symbol is shown. A button 'Open this macromodel's example circuit' is visible. Below the dialog, a list of components is shown, including 'nnp'.

The second screenshot shows the 'Select Bipolar Transistor' dialog box. It contains a table of transistor options with columns: Part No., Manufacturer, Polarity, Vceo[V], Ic[ma], and SPICE Model.

Part No.	Manufacturer	Polarity	Vceo[V]	Ic[ma]	SPICE Model
2N2222	NXP	nnp	30.0	800	.model 2N2222 NPN(Is=1E-1
2N3904	NXP	nnp	40.0	200	.model 2N3904 NPN(Is=1E-1
FZT849	Zetex	nnp	30.0	7000	.model FZT849 NPN(Is=5.85
ZTX1048A	Zetex	nnp	17.5	5000	.model ZTX1048A NPN(Is=1
2N4124	Fairchild	nnp	25.0	200	.model 2N4124 NPN(Is=6.734
2N3391A	Fairchild	nnp	25.0	500	.model 2N3391A NPN(Is=12.0
2N5089	Fairchild	nnp	25.0	100	.model 2N5089 NPN(Is=5.911

# ...you know that there is a limited set of options.



# I like to use BD139 in my project, but LTSpice doesn't have this model.



**BD135 - BD136**  
**BD139 - BD140**

Complementary low voltage transistor

## Features

- Products are pre-selected in DC current gain

## Application

- General purpose

## Description

These epitaxial planar transistors are mounted in the SOT-32 plastic package. They are designed for audio amplifiers and drivers utilizing

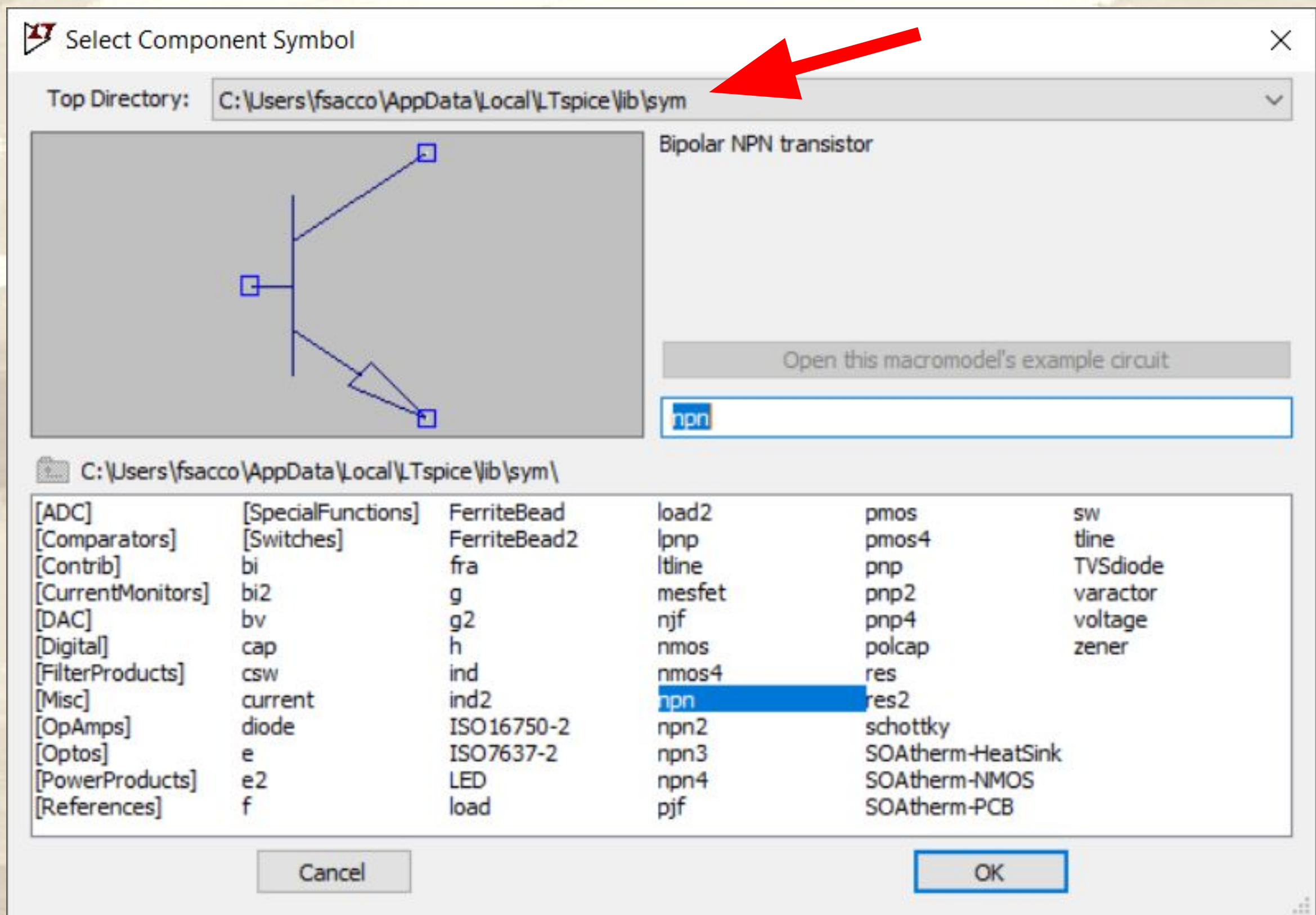


SOT-32

# Right?



Yes, you can add new components to your LTSpice.



The secret is here.



# The CMP directory contains the component templates.

This PC > Local Disk (C:) > Users > fsacco > AppData > Local > LTspice > lib

Name	Date modified	Type	Size
cmp	2023-09-12 17:43	File folder	
sub	2023-09-22 09:17	File folder	
sym	2023-09-12 17:44	File folder	
stamp.bin	2023-09-22 09:17	BIN File	1 KB

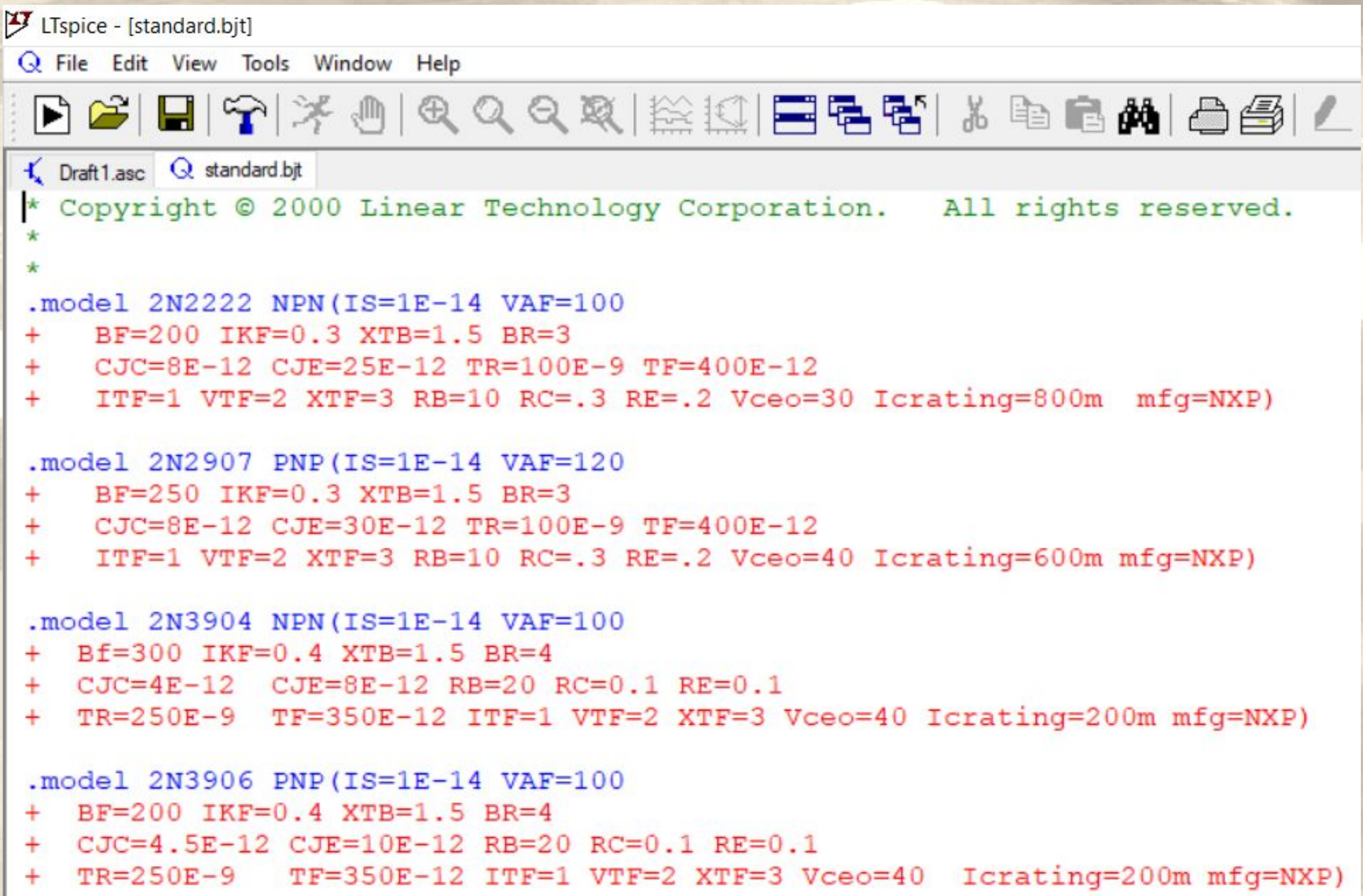
And the file extension indicates what type of component it is.

Our BD139 is a BJT, so this is our file.

FB	standard.bead
Q	standard.bjt
C	standard.cap
D	standard.dio
L	standard.ind
J	standard.jft
M	standard.mos
R	standard.res



# You can open the file in LTSpice.



```
* Copyright © 2000 Linear Technology Corporation. All rights reserved.
*
*
.model 2N2222 NPN(IS=1E-14 VAF=100
+ BF=200 IKF=0.3 XTB=1.5 BR=3
+ CJC=8E-12 CJE=25E-12 TR=100E-9 TF=400E-12
+ ITF=1 VTF=2 XTF=3 RB=10 RC=.3 RE=.2 Vceo=30 Icrating=800m mfg=NXF)

.model 2N2907 PNP(IS=1E-14 VAF=120
+ BF=250 IKF=0.3 XTB=1.5 BR=3
+ CJC=8E-12 CJE=30E-12 TR=100E-9 TF=400E-12
+ ITF=1 VTF=2 XTF=3 RB=10 RC=.3 RE=.2 Vceo=40 Icrating=600m mfg=NXF)

.model 2N3904 NPN(IS=1E-14 VAF=100
+ Bf=300 IKF=0.4 XTB=1.5 BR=4
+ CJC=4E-12 CJE=8E-12 RB=20 RC=0.1 RE=0.1
+ TR=250E-9 TF=350E-12 ITF=1 VTF=2 XTF=3 Vceo=40 Icrating=200m mfg=NXF)

.model 2N3906 PNP(IS=1E-14 VAF=100
+ BF=200 IKF=0.4 XTB=1.5 BR=4
+ CJC=4.5E-12 CJE=10E-12 RB=20 RC=0.1 RE=0.1
+ TR=250E-9 TF=350E-12 ITF=1 VTF=2 XTF=3 Vceo=40 Icrating=200m mfg=NXF)
```

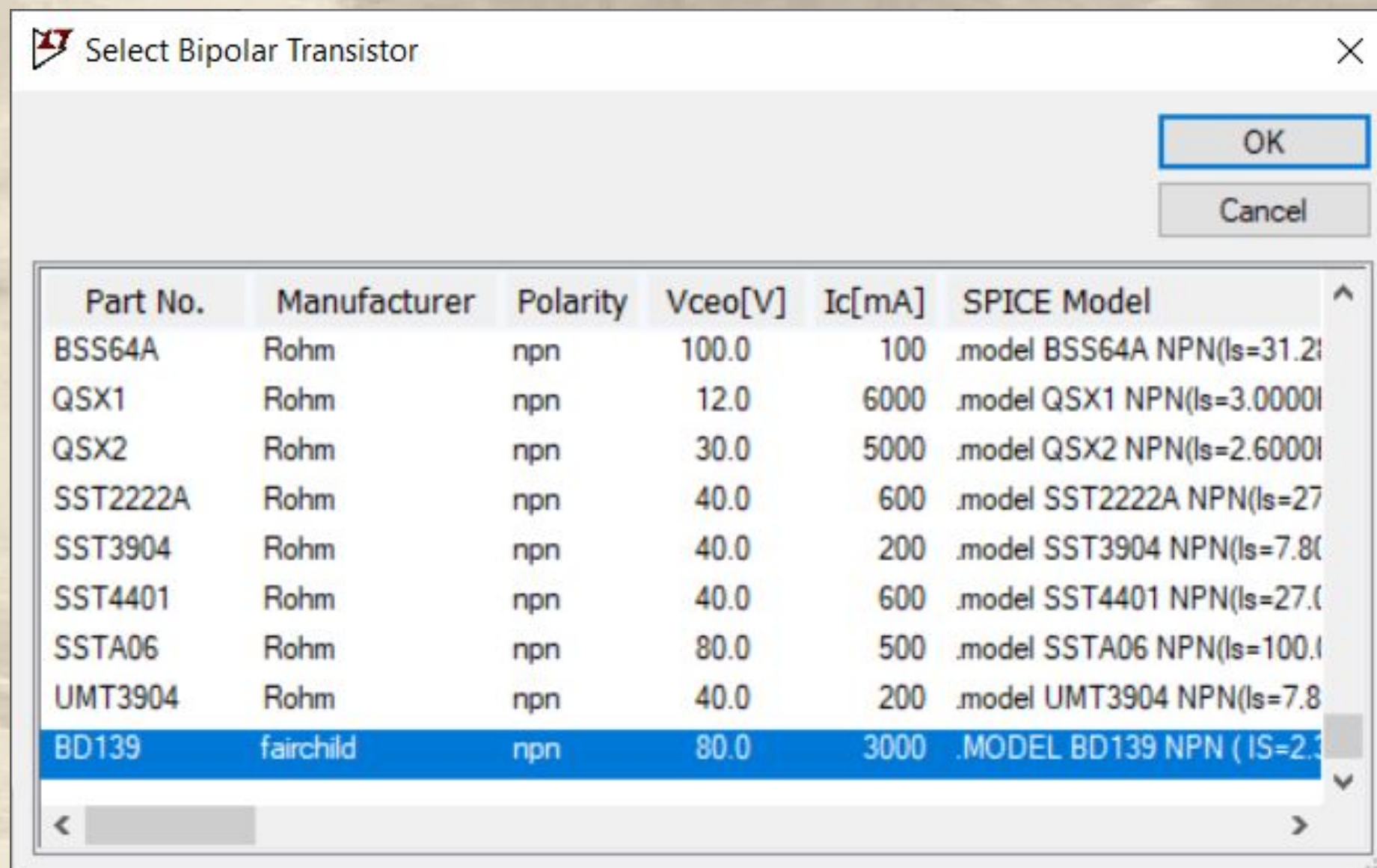
# You can already see that .model indicates a component.



# Once we added our BD139...

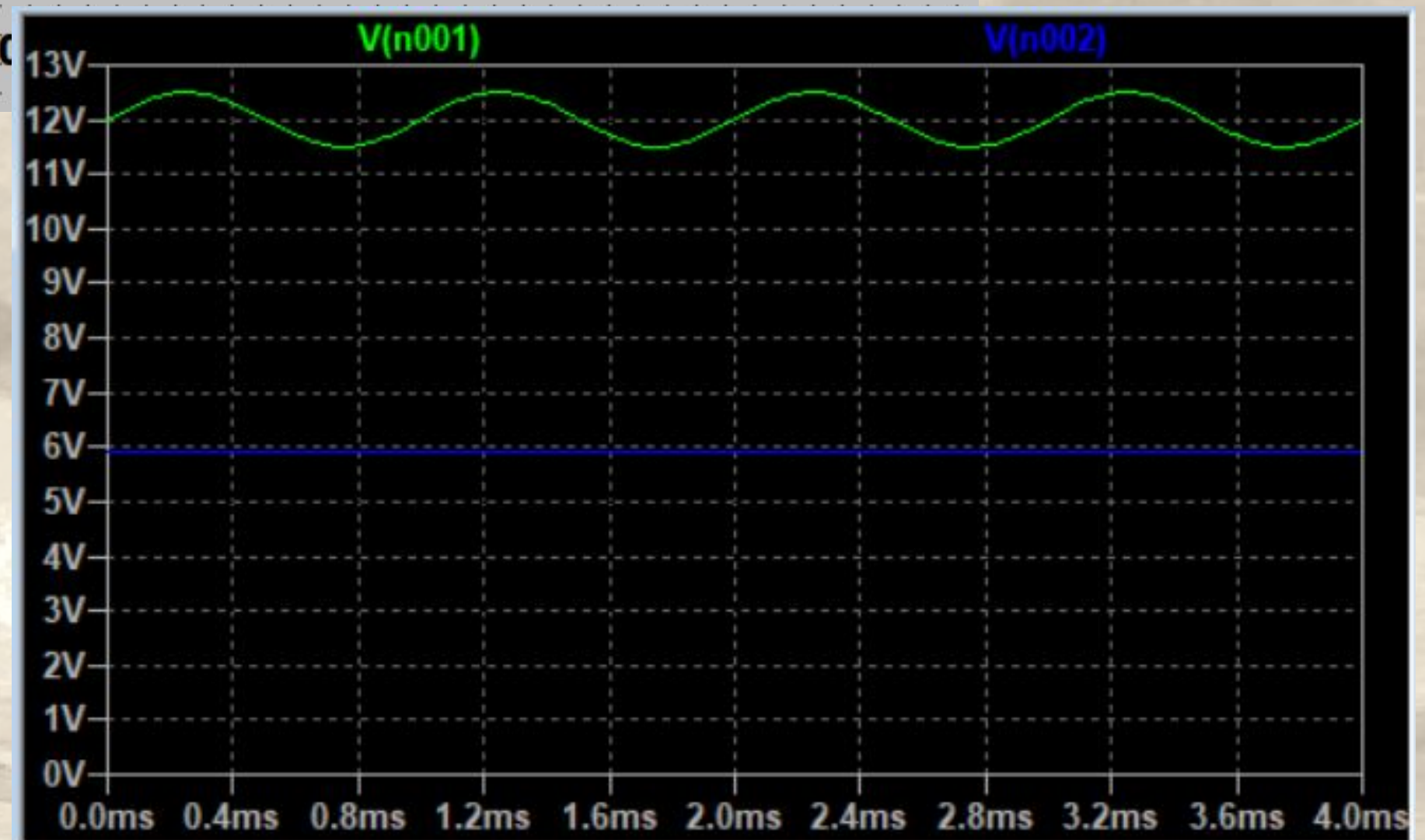
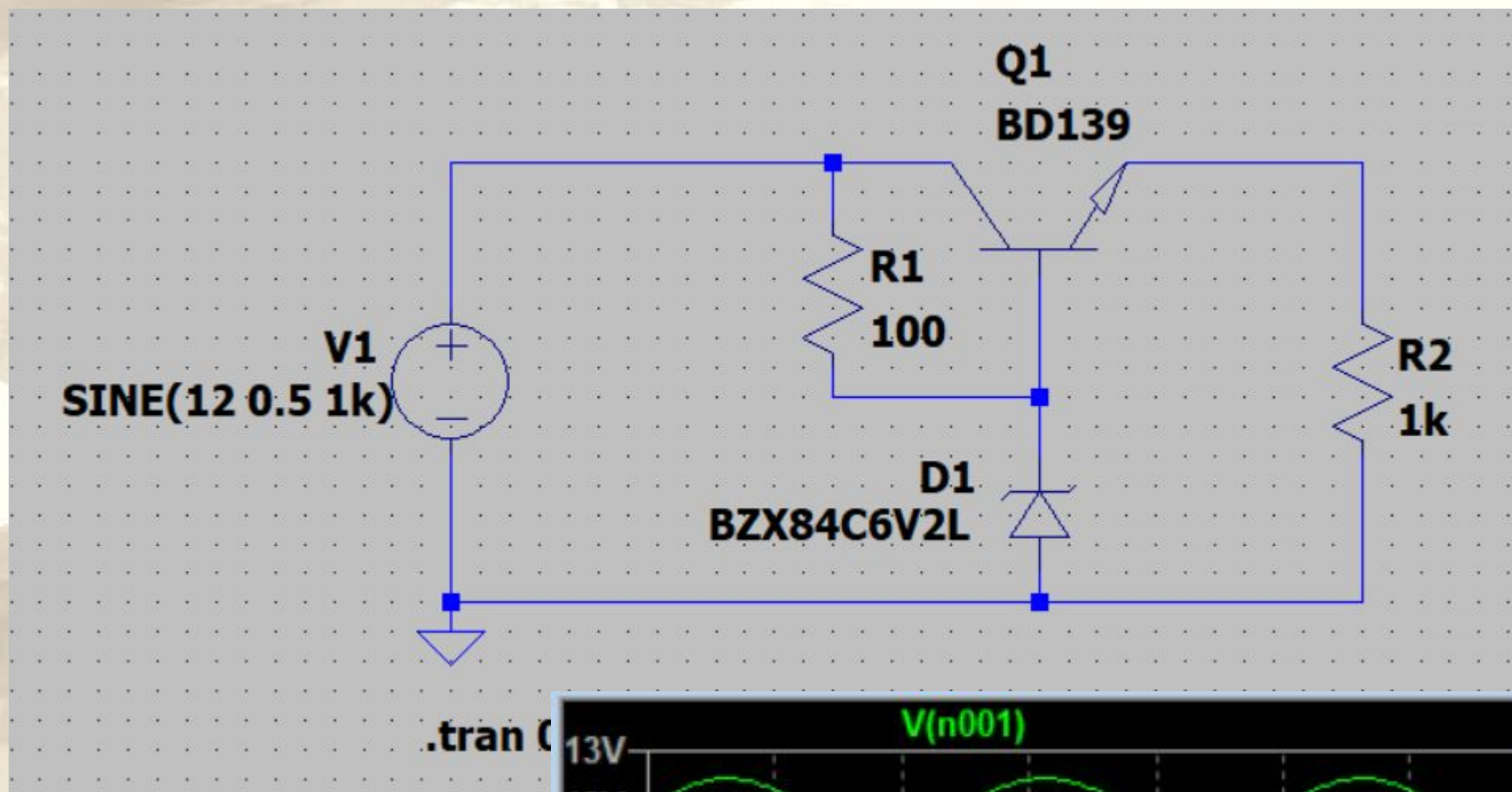
```
.MODEL BD139 NPN ( IS=2.3985E-13 BF=244.9 NF=1.0 BR=78.11 NR=1.007
+ ISE=1.0471E-14 NE=1.2 ISC=1.9314E-11 NC=1.45 VAF=98.5 VAR=7.46
+ IKF=1.1863 IKR=0.1445 RB=2.14 RBM=0.001 IRB=0.031 RE=0.0832
+ RC=0.01 CJE=2.92702E-10 VJE=0.67412 MJE=0.3300 FC=0.5 CJC=4.8831E-11
+ VJC=0.5258 MJC=0.3928 XCJC=0.5287 XTB=1.1398 EG=1.2105 XTI=3.0
+ Vceo=80 Icrating=3 mfg=fairchild)
```

# ...the component will be there.





# And it works!





But you might be wondering:

*Where did you get the model data  
for the BD139?*

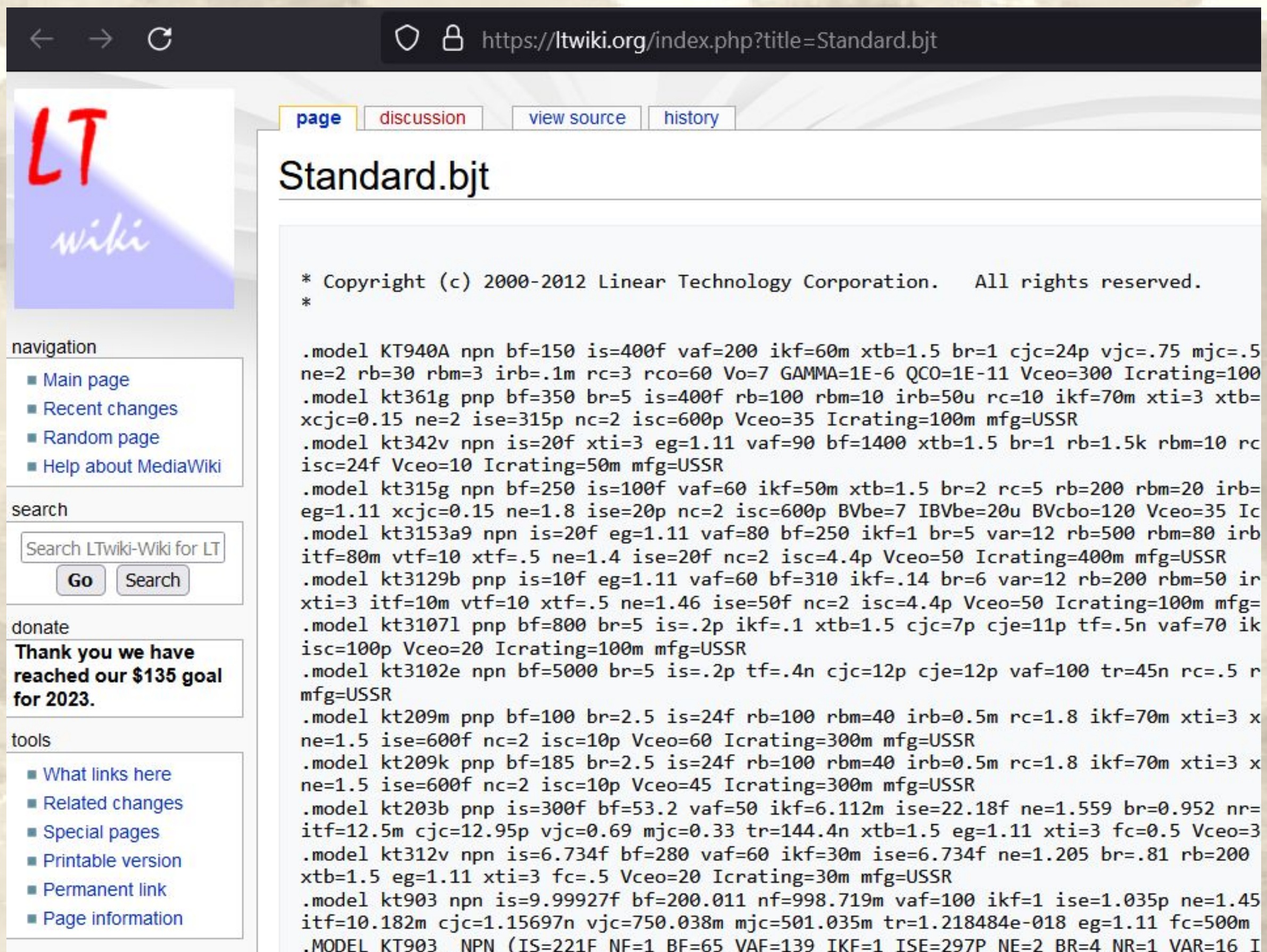
```
.MODEL BD139 NPN ( IS=2.3985E-13 BF=244.9 NF=1.0 BR=78.11 NR=1.007  
+ ISE=1.0471E-14 NE=1.2 ISC=1.9314E-11 NC=1.45 VAF=98.5 VAR=7.46  
+ IKF=1.1863 IKR=0.1445 RB=2.14 RBM=0.001 IRB=0.031 RE=0.0832  
+ RC=0.01 CJE=2.92702E-10 VJE=0.67412 MJE=0.3300 FC=0.5 CJC=4.8831E-11  
+ VJC=0.5258 MJC=0.3928 XCJC=0.5287 XTB=1.1398 EG=1.2105 XTI=3.0  
+ Vceo=80 Icrating=3 mfg=fairchild)
```

And this is the most important  
information!



# LTSpice has a very collaborative community.

<http://www.ltwiki.org/>



The screenshot shows a web browser window displaying the LTSpice Wiki page for the 'Standard.bjt' model. The browser's address bar shows the URL 'https://ltwiki.org/index.php?title=Standard.bjt'. The page features a sidebar on the left with navigation links, a search bar, a donation notice, and a tools section. The main content area displays the title 'Standard.bjt' and a list of model parameters for various bipolar junction transistors, including KT940A, kt361g, kt342v, kt315g, kt3153a9, kt3129b, kt3107l, kt3102e, kt209m, kt209k, kt203b, kt312v, kt903, and a final line for .MODEL KT903\_ NPN.

← → ↺ <https://ltwiki.org/index.php?title=Standard.bjt>

**LT**  
wiki

[page](#) [discussion](#) [view source](#) [history](#)

## Standard.bjt

\* Copyright (c) 2000-2012 Linear Technology Corporation. All rights reserved.  
\*

```
.model KT940A npn bf=150 is=400f vaf=200 ikf=60m xtb=1.5 br=1 cjc=24p vjc=.75 mjc=.5  
ne=2 rb=30 rbm=3 irb=.1m rc=3 rco=60 Vo=7 GAMMA=1E-6 QCO=1E-11 Vceo=300 Icrating=100  
.model kt361g pnp bf=350 br=5 is=400f rb=100 rbm=10 irb=50u rc=10 ikf=70m xti=3 xtb=  
xcjc=0.15 ne=2 ise=315p nc=2 isc=600p Vceo=35 Icrating=100m mfg=USSR  
.model kt342v npn is=20f xti=3 eg=1.11 vaf=90 bf=1400 xtb=1.5 br=1 rb=1.5k rbm=10 rc  
isc=24f Vceo=10 Icrating=50m mfg=USSR  
.model kt315g npn bf=250 is=100f vaf=60 ikf=50m xtb=1.5 br=2 rc=5 rb=200 rbm=20 irb=  
eg=1.11 xcjc=0.15 ne=1.8 ise=20p nc=2 isc=600p BVbe=7 IBVbe=20u BVcbo=120 Vceo=35 Ic  
.model kt3153a9 npn is=20f eg=1.11 vaf=80 bf=250 ikf=1 br=5 var=12 rb=500 rbm=80 irb  
itf=80m vtf=10 xtf=.5 ne=1.4 ise=20f nc=2 isc=4.4p Vceo=50 Icrating=400m mfg=USSR  
.model kt3129b pnp is=10f eg=1.11 vaf=60 bf=310 ikf=.14 br=6 var=12 rb=200 rbm=50 ir  
xti=3 itf=10m vtf=10 xtf=.5 ne=1.46 ise=50f nc=2 isc=4.4p Vceo=50 Icrating=100m mfg=  
.model kt3107l pnp bf=800 br=5 is=.2p ikf=.1 xtb=1.5 cjc=7p cje=11p tf=.5n vaf=70 ik  
isc=100p Vceo=20 Icrating=100m mfg=USSR  
.model kt3102e npn bf=5000 br=5 is=.2p tf=.4n cjc=12p cje=12p vaf=100 tr=45n rc=.5 r  
mfg=USSR  
.model kt209m pnp bf=100 br=2.5 is=24f rb=100 rbm=40 irb=0.5m rc=1.8 ikf=70m xti=3 x  
ne=1.5 ise=600f nc=2 isc=10p Vceo=60 Icrating=300m mfg=USSR  
.model kt209k pnp bf=185 br=2.5 is=24f rb=100 rbm=40 irb=0.5m rc=1.8 ikf=70m xti=3 x  
ne=1.5 ise=600f nc=2 isc=10p Vceo=45 Icrating=300m mfg=USSR  
.model kt203b pnp is=300f bf=53.2 vaf=50 ikf=6.112m ise=22.18f ne=1.559 br=0.952 nr=  
itf=12.5m cjc=12.95p vjc=0.69 mjc=0.33 tr=144.4n xtb=1.5 eg=1.11 xti=3 fc=0.5 Vceo=3  
.model kt312v npn is=6.734f bf=280 vaf=60 ikf=30m ise=6.734f ne=1.205 br=.81 rb=200  
xtb=1.5 eg=1.11 xti=3 fc=.5 Vceo=20 Icrating=30m mfg=USSR  
.model kt903 npn is=9.99927f bf=200.011 nf=998.719m vaf=100 ikf=1 ise=1.035p ne=1.45  
itf=10.182m cjc=1.15697n vjc=750.038m mjc=501.035m tr=1.218484e-018 eg=1.11 fc=500m  
.MODEL KT903_ NPN (IS=221F NF=1 BF=65 VAF=139 IKF=1 ISE=297P NE=2 BR=4 NR=1 VAR=16 I
```



Additionally, many manufacturers offer Spice models.

<http://www.onsemi.com/>

onsemi

Products Solutions Design Support Company Careers

Try our new search...

Overview		Technical Documentation	
Name / Description		Modified date	
Saber Model		February 18, 2004	
BD139.SIN	0 Models 1.02 KB EN		
PSpice Model		February 18, 2004	
BD139.LIB	0 Models EN		
Spice2 Model		February 18, 2004	
BD139.SP2	0 Models EN		
Spice3 Model		February 18, 2004	
BD139.SP3	0 Models EN		

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