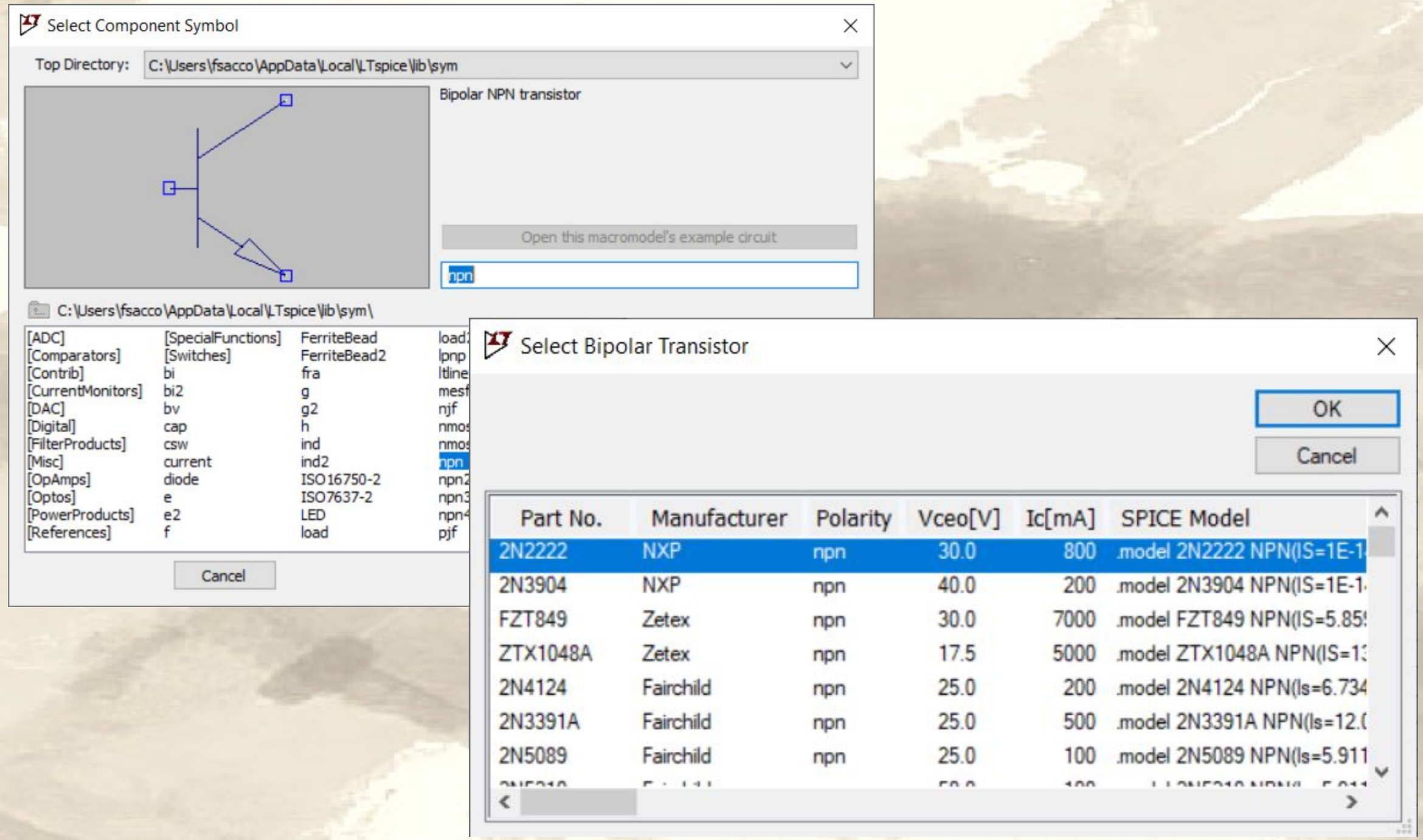
Drops of LTSpice

Adding new components in LTSpice

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



...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

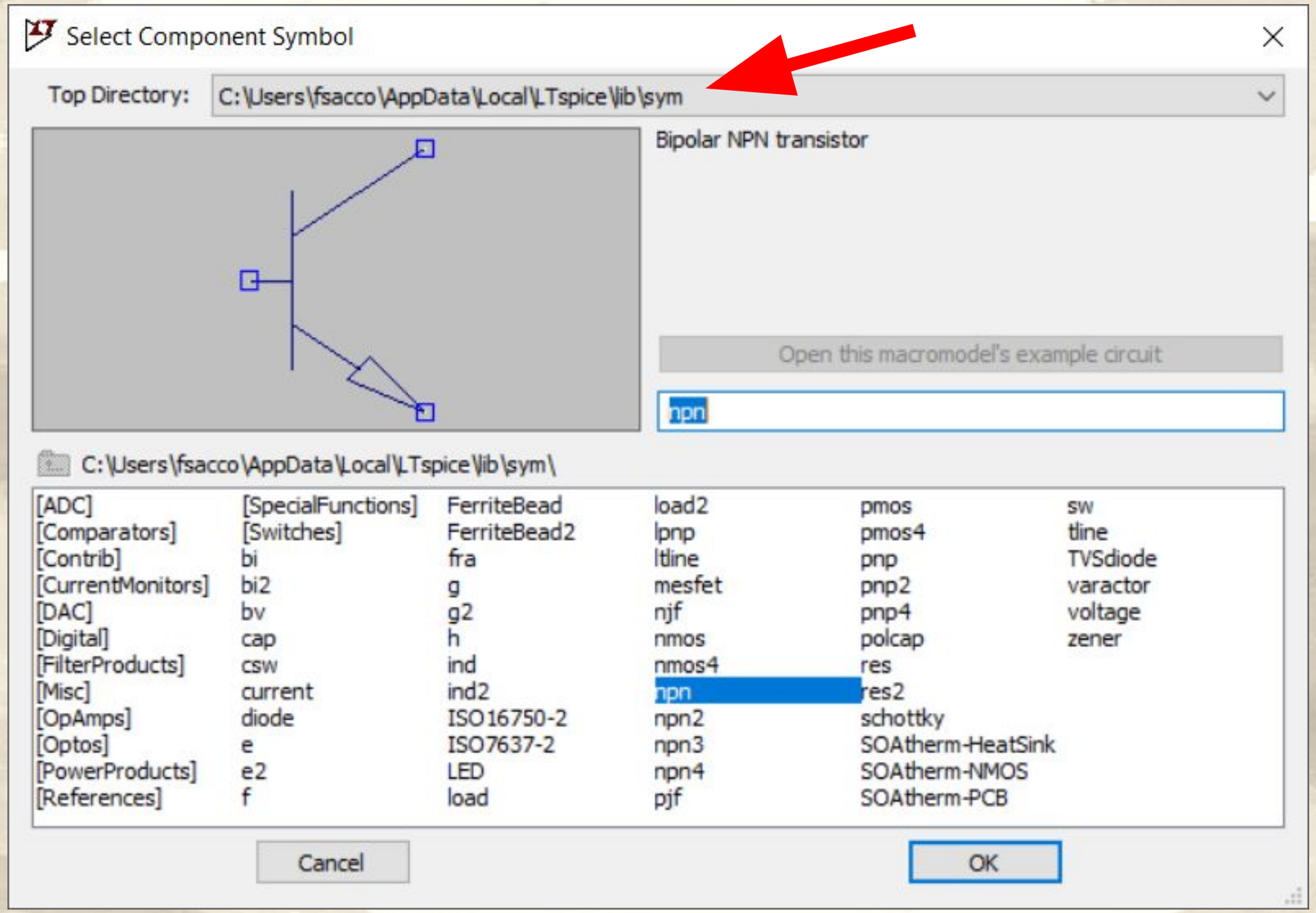
Description

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

SOT-32

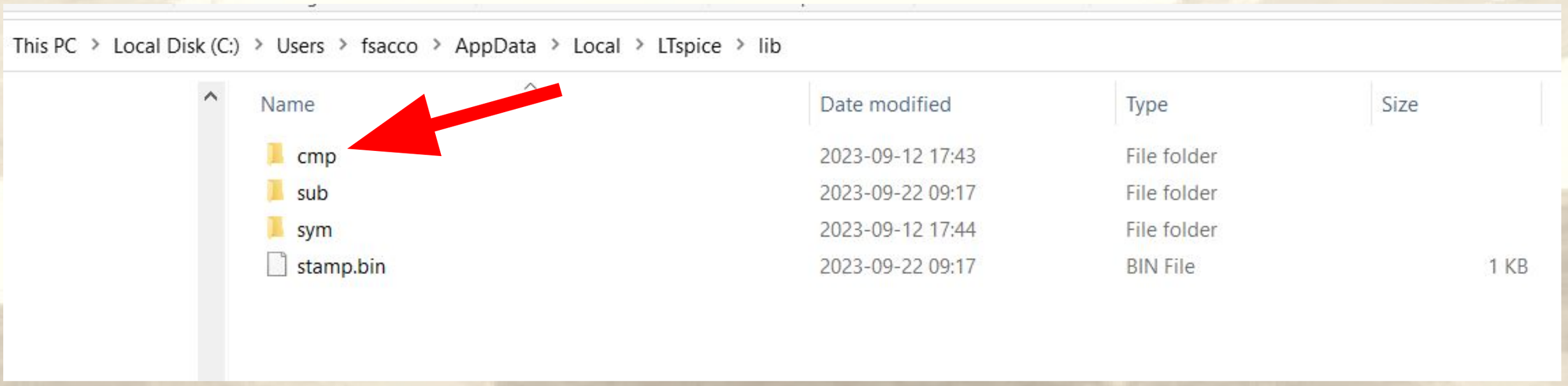
Right?

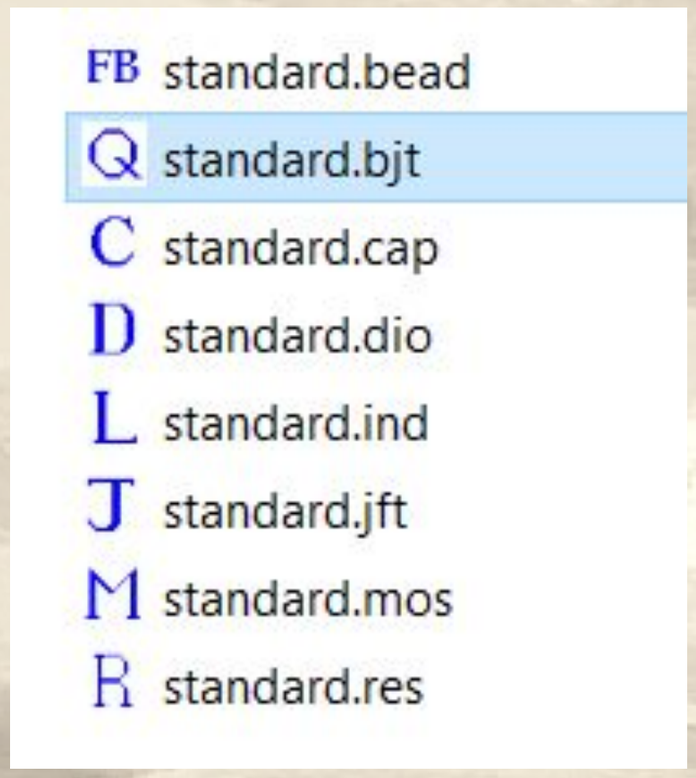
Yes, you can add new components to your LTSpice.



The secret is here.

The CMP directory contains the component templates.





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

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

You can open the file in LTSpice.

LTspice - [standard.bjt]

File Edit View Tools Window Help

Draft1.asc | standard.bjt

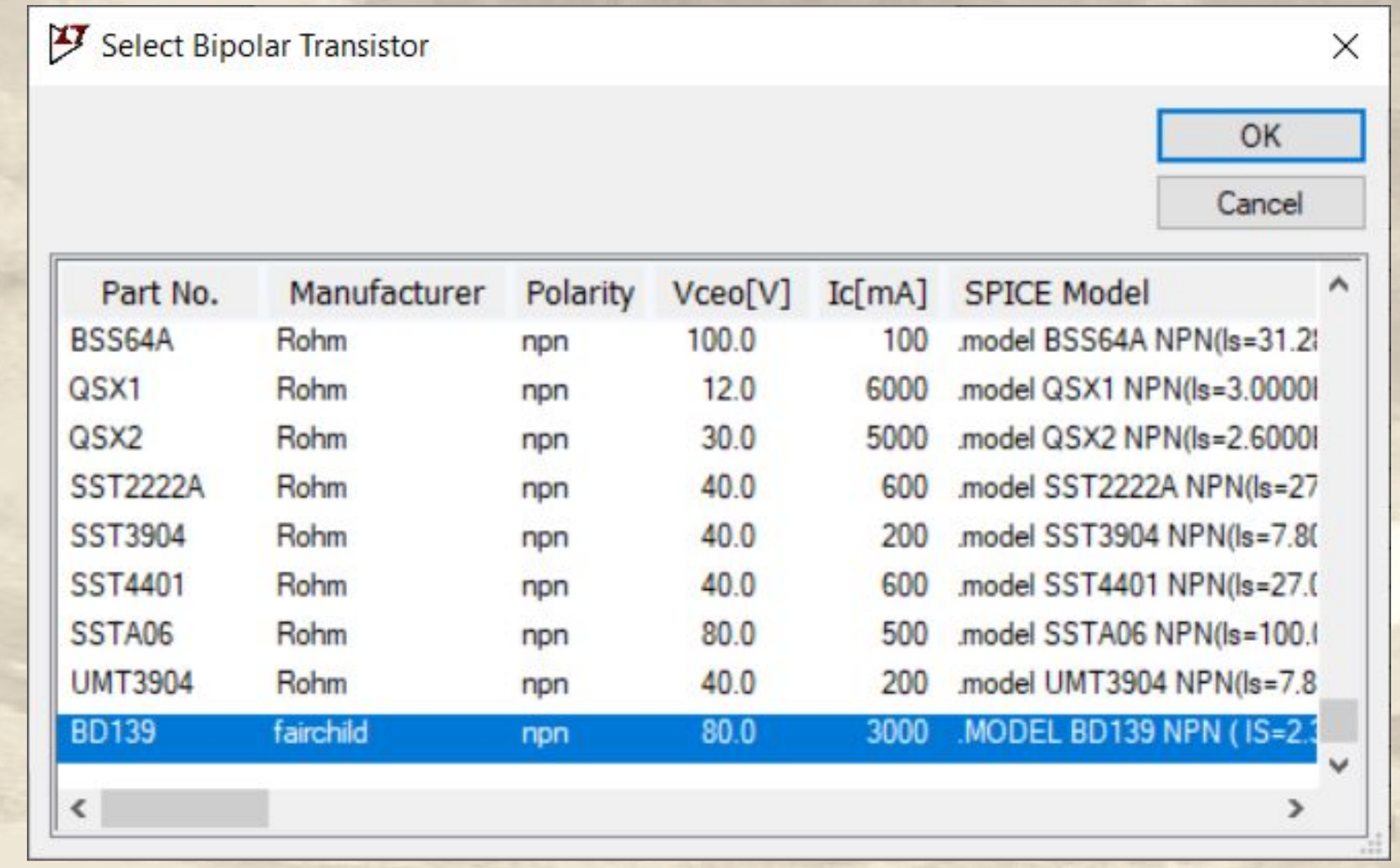
```
* Copyright © 2000 Linear Technology Corporation.   All rights reserved.
*
*
.model 2N2222 NPN(IS=1E-14 VAF=100
+    BF=200 IKF=0.3 XTB=1.5 BR=3
+    CJC=8E-12 CJE=25E-12 TR=100E-9 TF=400E-12
+    ITF=1 VTF=2 XTF=3 RB=10 RC=.3 RE=.2 Vceo=30 Icrating=800m  mfg=NXP)

.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=NXP)

.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=NXP)

.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=NXP)
```

You can already see that .model indicates a component.

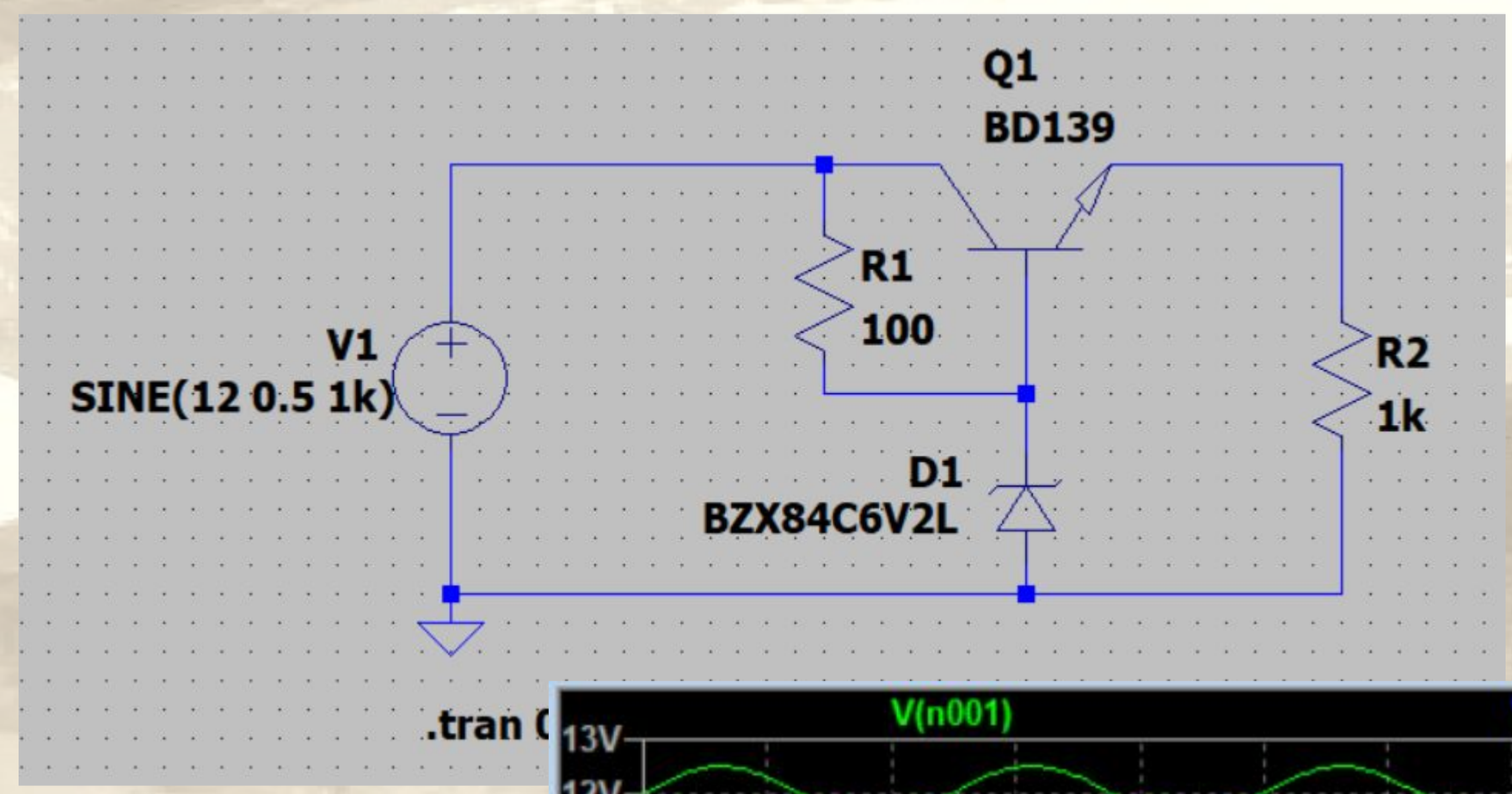
Once we added our BD139...

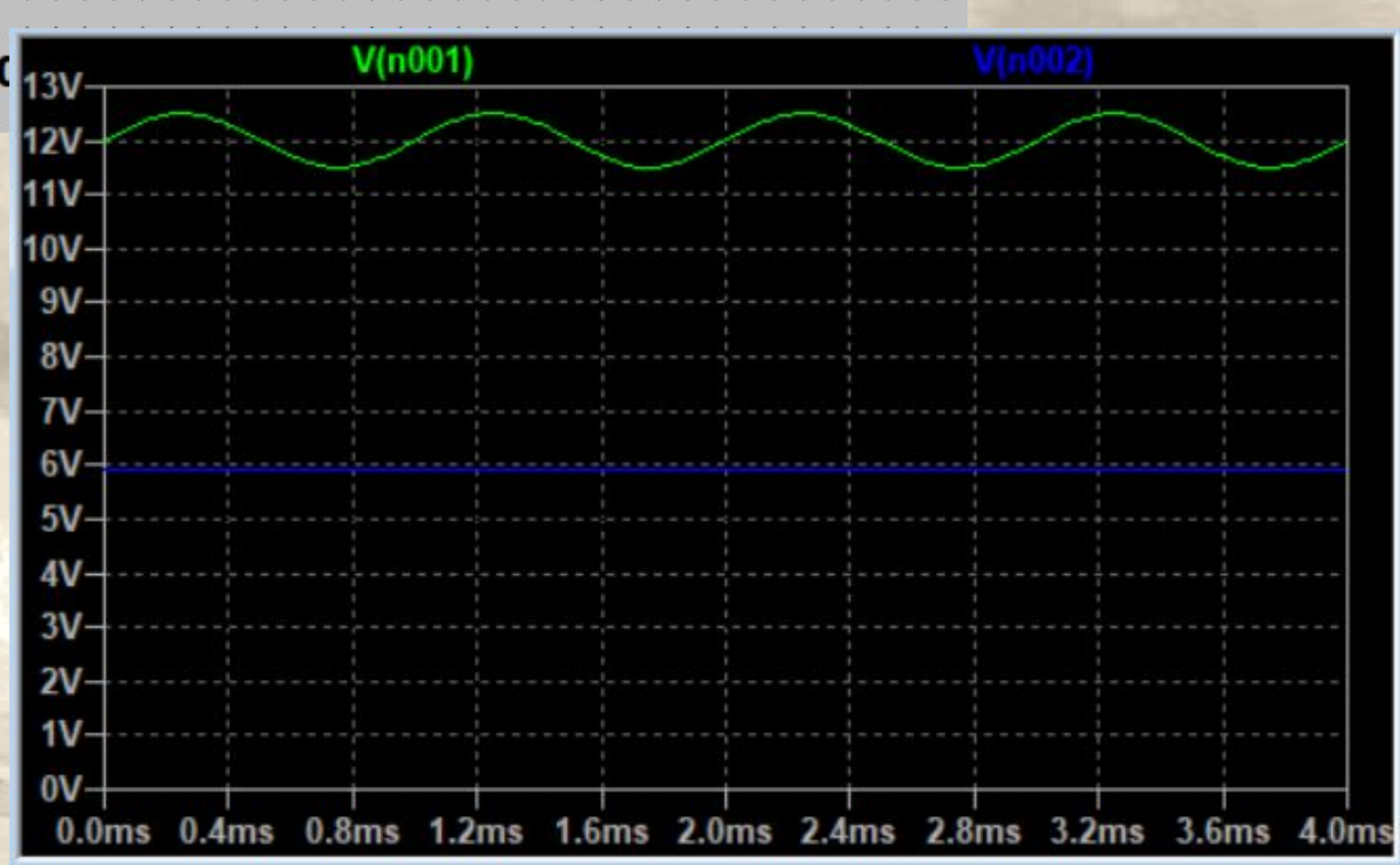
```
.MODEL BD139 NPN ( IS=2.3985E-13 BF=244.9 NF=1.0 BR=78.11 NR=1.007
+   ISE=1.0471E-14 NE=1.2 ISC=1.9314E-11 NC=1.45 VAF=98.5 VAR=7.46
+   IKF=1.1863 IKR=0.1445 RB=2.14 RBM=0.001 IRB=0.031 RE=0.0832
+   RC=0.01 CJE=2.92702E-10 VJE=0.67412 MJE=0.3300 FC=0.5 CJC=4.8831E-11
+   VJC=0.5258 MJC=0.3928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


Q1
BD139
R1
100
V1
SINE(12 0.5 1k)
R2
1k
D1
BZX84C6V2L
.tran 0


V(n001)
V(n002)
13V
12V
11V
10V
9V
8V
7V
6V
5V
4V
3V
2V
1V
0V
0.0ms
0.4ms
0.8ms
1.2ms
1.6ms
2.0ms
2.4ms
2.8ms
3.2ms
3.6ms
4.0ms

But you might be wondering:

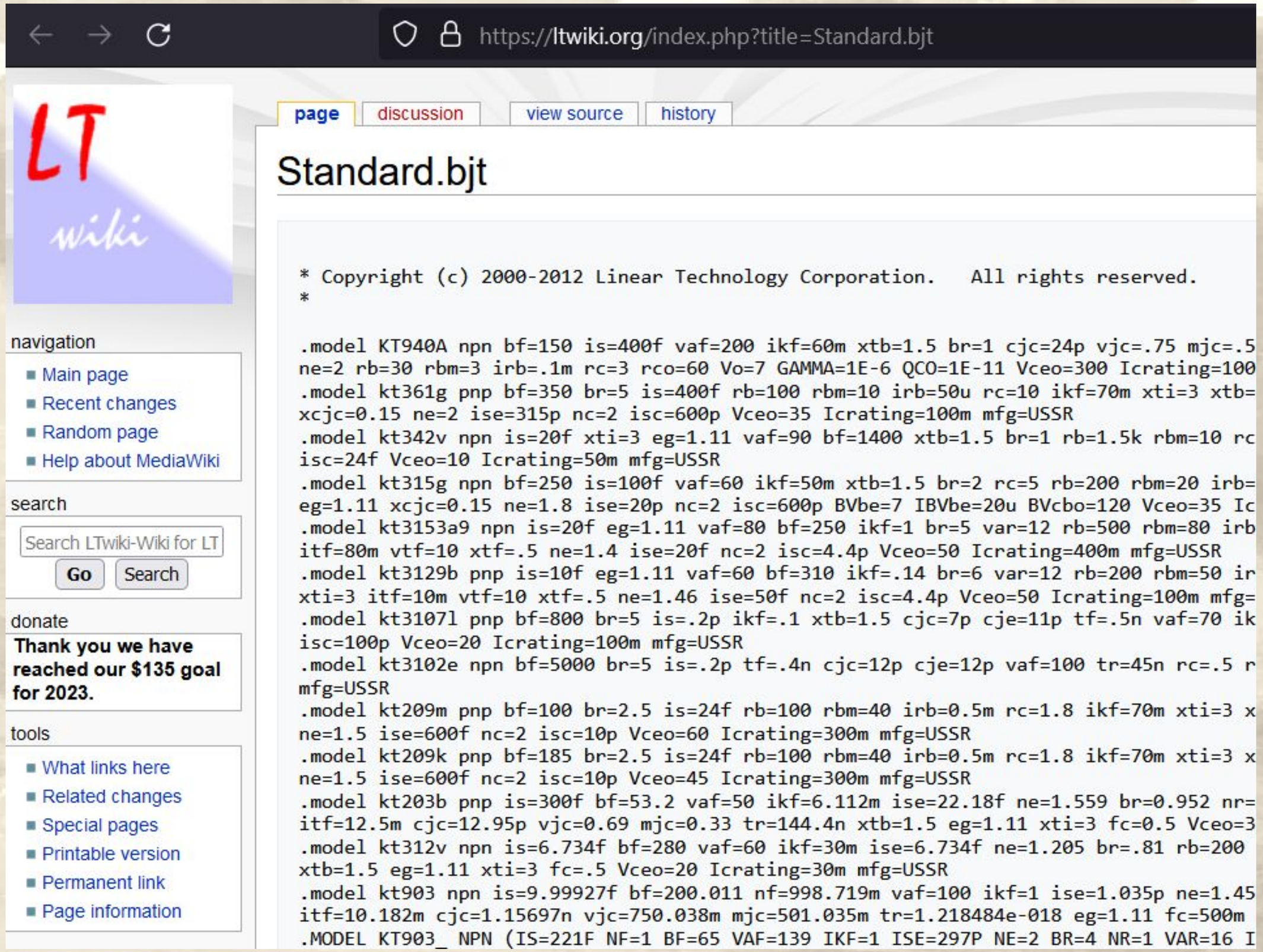
Where did you get the model data for the BD139?

```
.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!

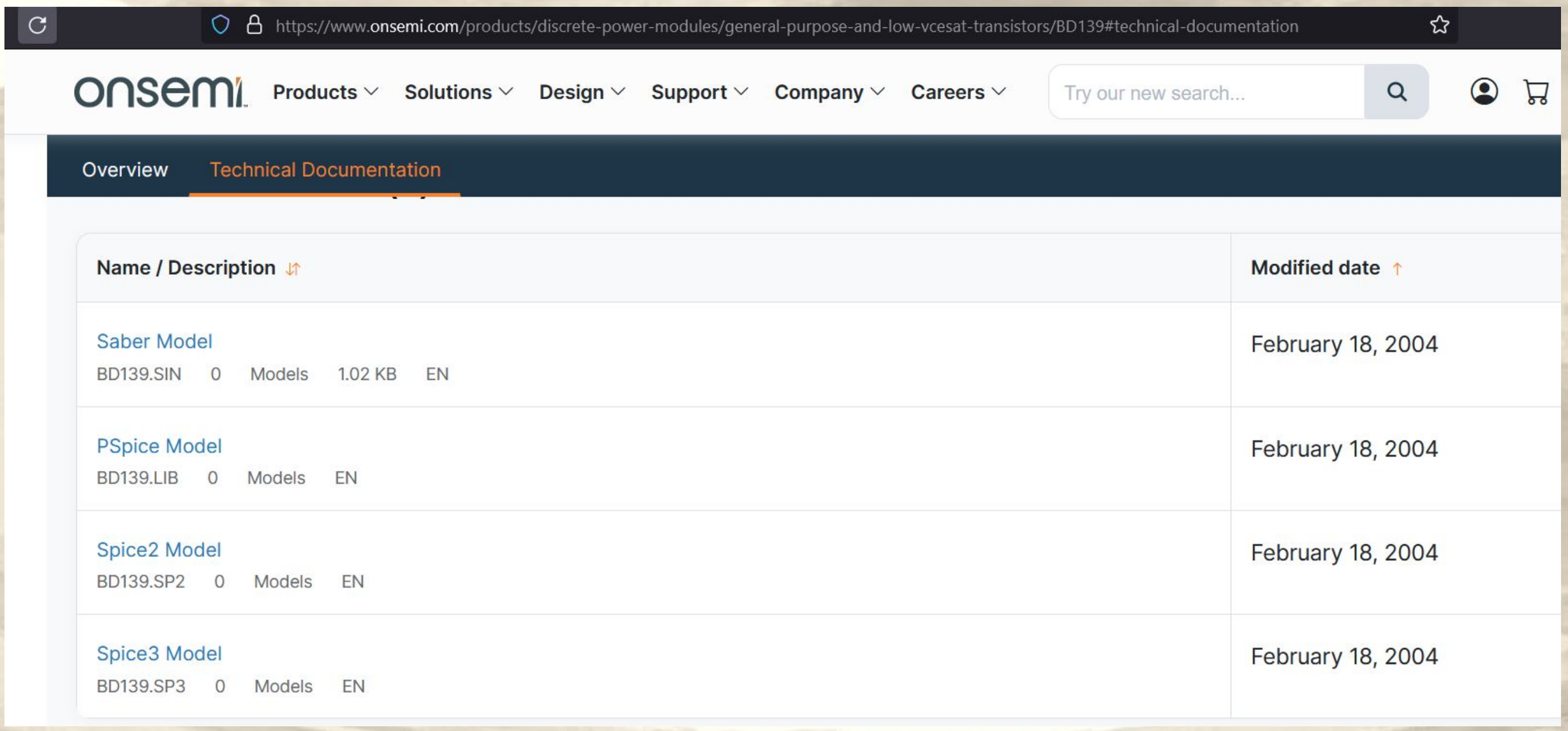
LTSpice has a very collaborative community.

http://www.ltwiki.org/



Additionally, many manufacturers offer Spice models.

http://www.onsemi.com/



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