LTspice Model
Single Comparators
ON Semiconductor
LM211DR2G

Model Information

Model	A macro model
Call Name	MDC_LM211DR2G_LT
Pin Assign	1:GND 2:Input+ 3:Input- 4:VEE 5:Balance 6:Balance/Strobe 7:Output 8:VCC
File List	Model Library MDC_LM211DR2G_LT01.lib
	Model Report MDC_LM211DR2G_LT.pdf(this file)

Verified Simulator Version   LTspice 17.1.8

Note

References
The information which was used for modeling is as follow:

[Data Sheet]
- ●Date/Version   August, 2012 − Rev. 6
- ●Product name   LM211/D
- ●Company name   ON Semiconductor

[Characteristics listed]
- ●Characteristics

   Input Offset Voltage
   Input Offset Current
   Voltage Gain
   Response Time
   Saturation Voltage
   Output Leakage Current
   Input Voltage Range
   Power Supply Current

Simulation Condition

This table shows the range of evaluated simulation range that was not occurs any convergence problems in this area.

Item	Condition			Unit
	Min	Typ	Max	
Temperature		25.0		deg C
Power Supply Voltage (Single)	5.0		30.0	V
Power Supply Voltage (Dual)	-15.0		15.0	V

Comparator

Model Functions Table

○ : Implemented
× : Not Implemented
— : Not applicable

Functions	RANK=1	
Functions	RANK	Implemented
Input Offset Voltage	1	○
Input Offset Current	1	○
Input Bias Current	1	−
Voltage Gain	1	○
Response Time	1	○
Saturation Voltage	1	○
Output Leakage Current	1	○
Input Voltage Range	1	○
Power Supply Current	1	○
Balance, Balance/Strobe	1	−

Input Offset Voltage Testbench

Referred to Data Sheet

Input Offset Voltage

```
.OPTION TNOM=25
.TEMP 25
.dc V2 -5m 5m 0.01m
```
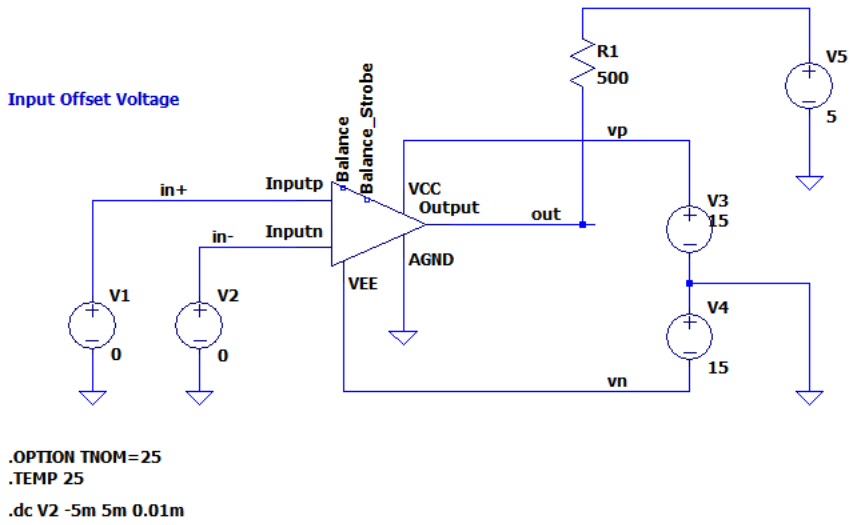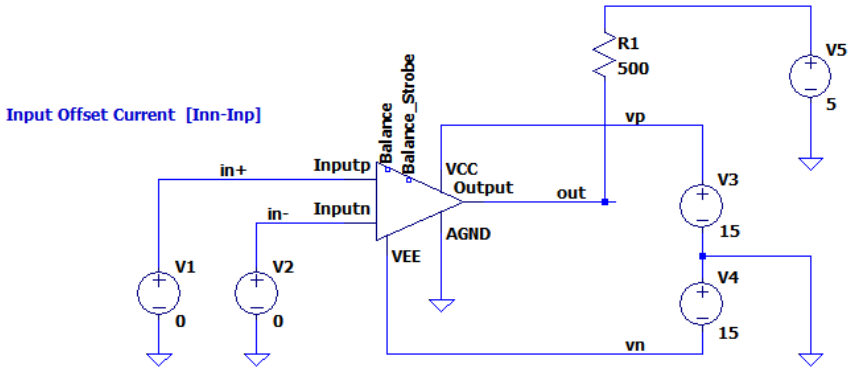
Simulation results are following.
Explanatory notes　　− : simulated

Input Offset Voltage

Input Offset Current Testbench
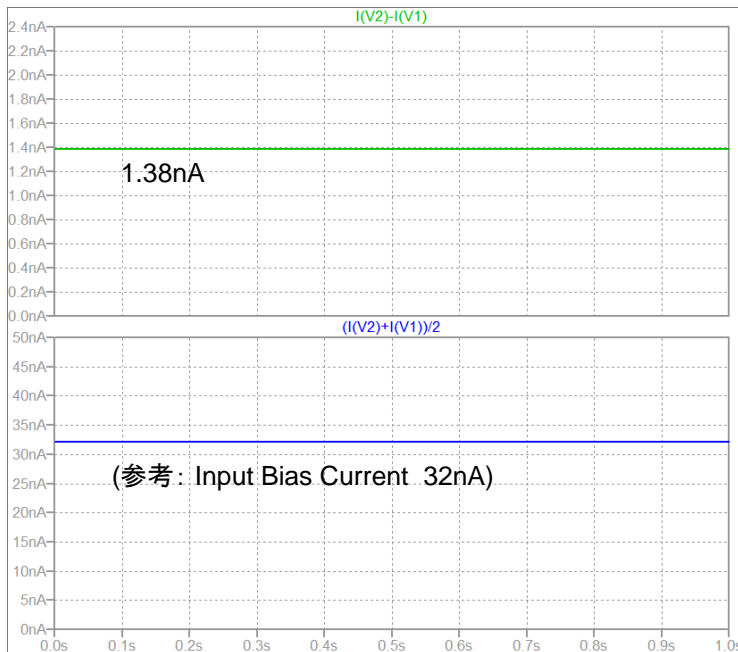
Referred to Data Sheet

Input Offset Current [Inn-Inp]

.OPTION TNOM=25
.TEMP 25
.tran 1

.measTRAN InputOffsetCurrent MAX I(V2)-I(V1)
.measTRAN InputBiasCurrent MAX (I(V2)+I(V1))/2

Simulation results are following.
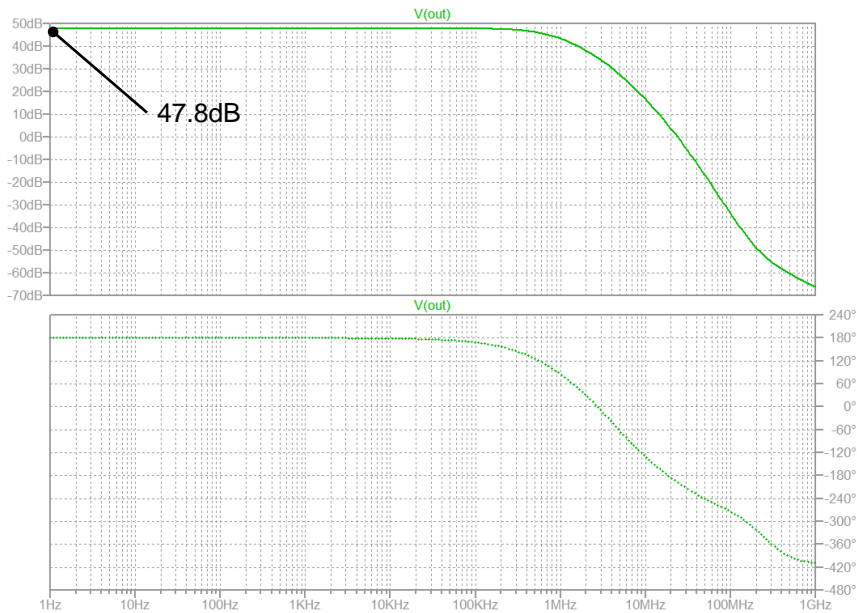Explanatory notes　－ : simulated

Input Offset Current

I(V2)-I(V1)

1.38nA

(I(V2)+I(V1))/2

(参考：Input Bias Current 32nA)

Voltage Gain Testbench

Referred to Data Sheet
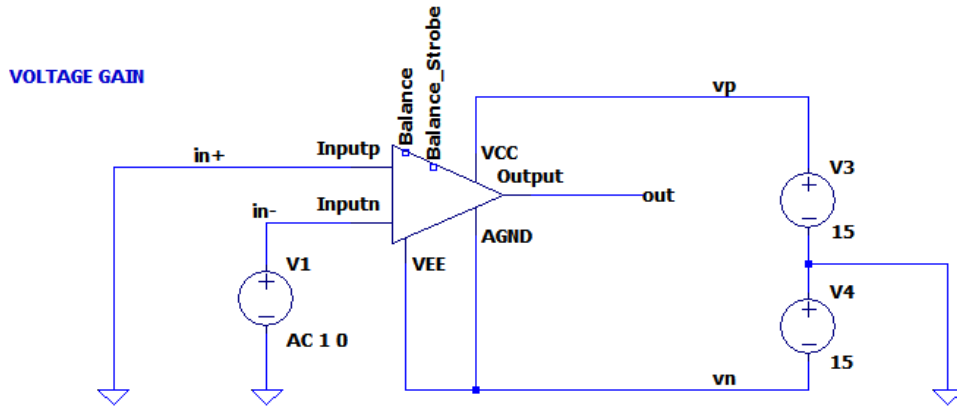
VOLTAGE GAIN

.OPTION TNOM=25
.TEMP 25
.ac dec 1 1 1G

Simulation results are following.
Explanatory notes   — : simulated

Voltage Gain

Response Time Testbench

Referred to Data Sheet

Simulation results are following.
Explanatory notes   — : simulated

Response Time

Response Time Testbench

Referred to Data Sheet
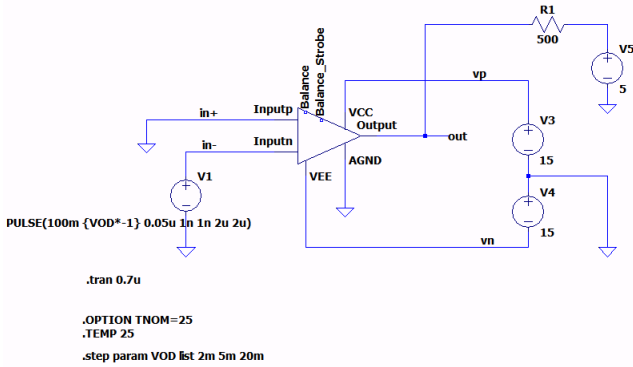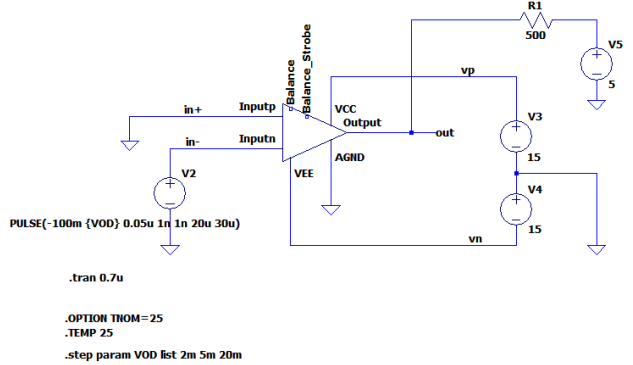
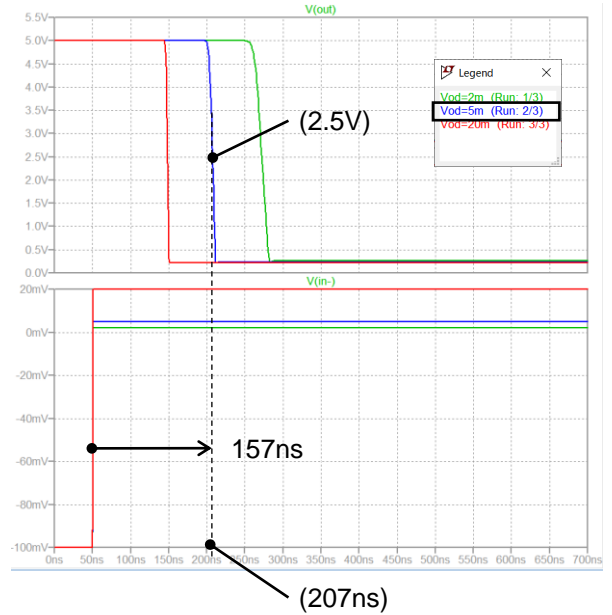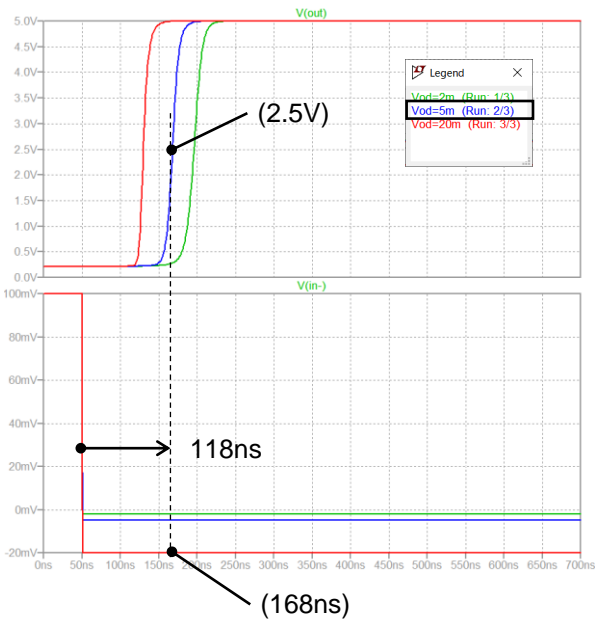Fiure9 Response Time for Various Input Overdrives (VEE base)

PULSE(-100m {VOD} 0.2u 1n 1n 10u 20u)
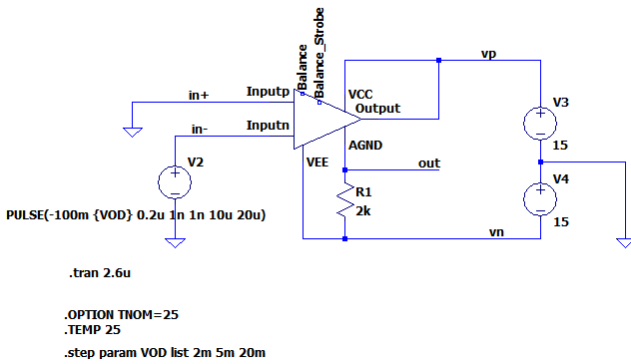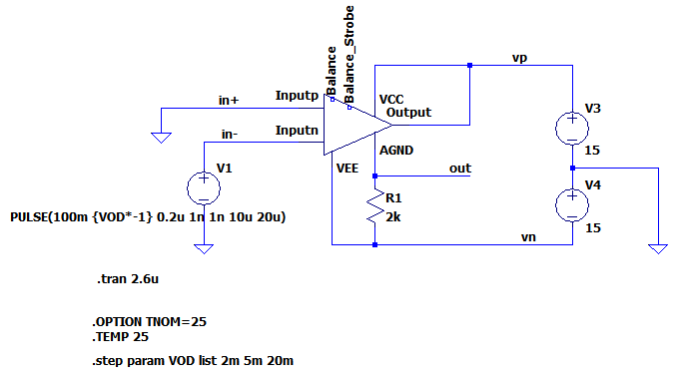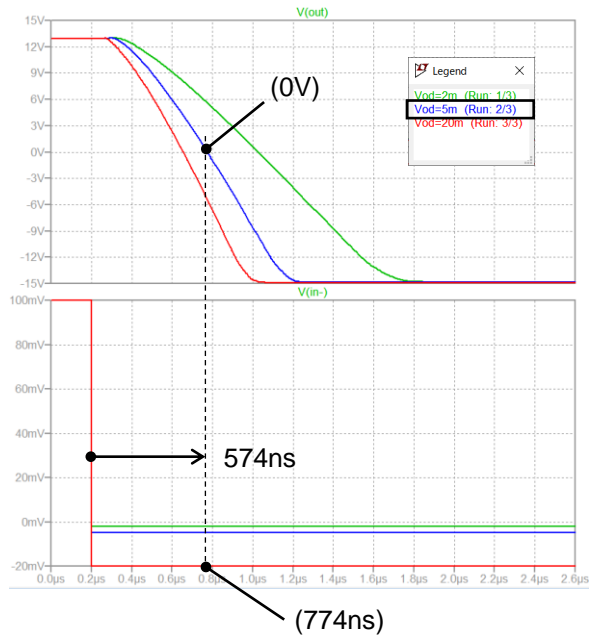
.tran 2.6u

.OPTION TNOM=25
.TEMP 25

.step param VOD list 2m 5m 20m
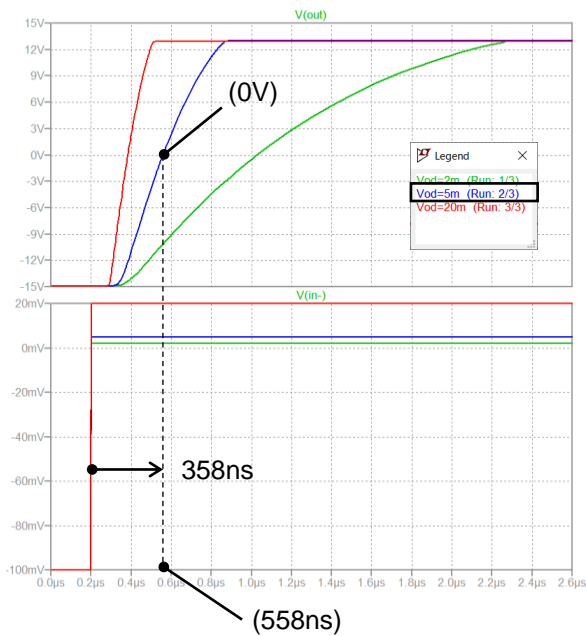
Fiure10 Response Time for Various Input Overdrives (VEE base)

PULSE(100m {VOD*-1} 0.2u 1n 1n 10u 20u)

.tran 2.6u

.OPTION TNOM=25
.TEMP 25

.step param VOD list 2m 5m 20m

Simulation results are following.
Explanatory notes　　－ : simulated

Response Time

358ns

(558ns)

574ns

(774ns)

Saturation Voltage Testbench

Referred to Data Sheet

Fiure12 Output Saturation Voltage versus Output Current
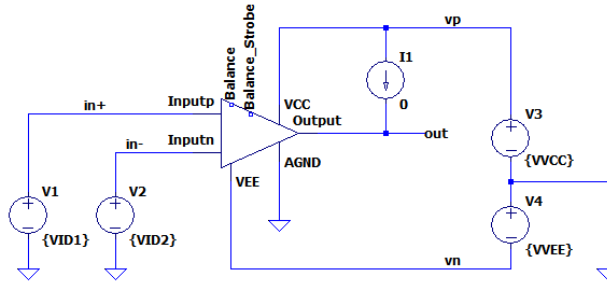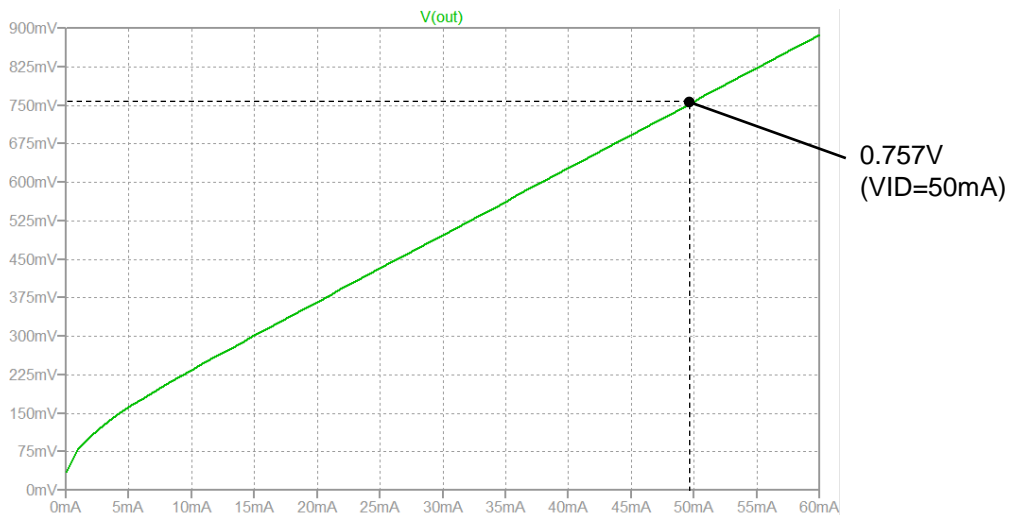

.dc I1 0 60m 1m

.OPTION TNOM=25
.TEMP 25

1. VID<=-5mV, Io=50mA ... Set V3=15, V4=15 V2=5m
   .param VID1=0 VID2=5m VVCC=15 VVEE=15
   .meas DC pVsat1 FIND V(out) WHEN I(I1)=50m

2. VID<<6mV ... Set V3=4.5, V4=0 V2=0, V1=6m
   .param {VVCC}=4.5 {VVEE}=0 {VID2}=6m
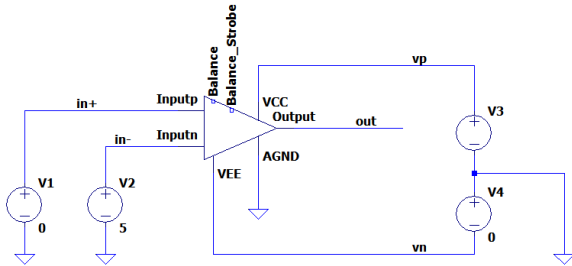   .meas DC pVsat2 FIND V(out) WHEN I(I1)=8m

Simulation results are following.
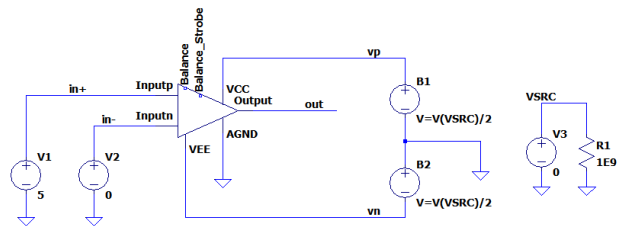Explanatory notes 　－ : simulated

Saturation Voltage

0.757V
(VID=50mA)

Power Supply Current Testbench

Referred to Data Sheet

Figure14. Power Supply Current versus Supply Voltage
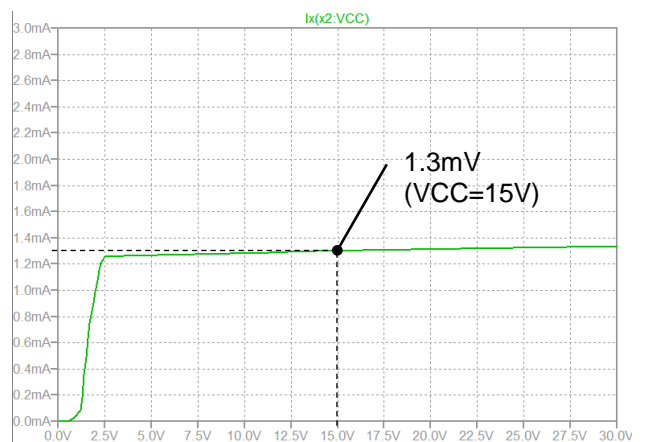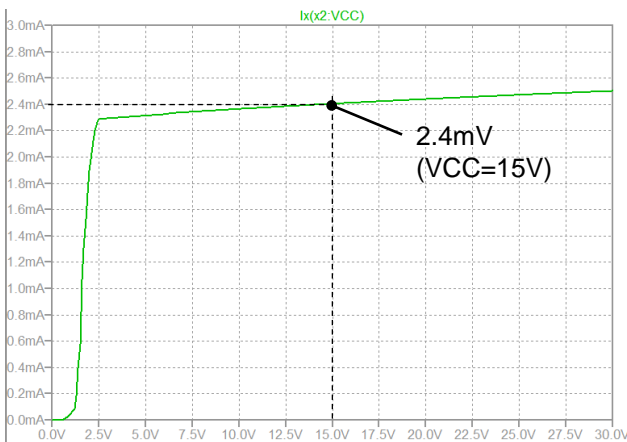Positive Supply - Output Low

.dc V3 0 30 0.1
.OPTION TNOM=25
.TEMP 25

Figure14. Power Supply Current versus Supply Voltage
Positive and Negative Power Supply - Output High

.dc V3 0 30 0.1
.OPTION TNOM=25
.TEMP 25

Simulation results are following.
Explanatory notes   — : simulated

Power Supply Current

Ix(x2:VCC)

2.4mV
(VCC=15V)

Ix(x2:VCC)

1.3mV
(VCC=15V)

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