

Device Modeling Report

COMPONENTS: VOLTAGE COMPARATOR
PART NUMBER: uPC393HA
MANUFACTURER: NEC



Bee Technologies Inc.

BJT MODEL

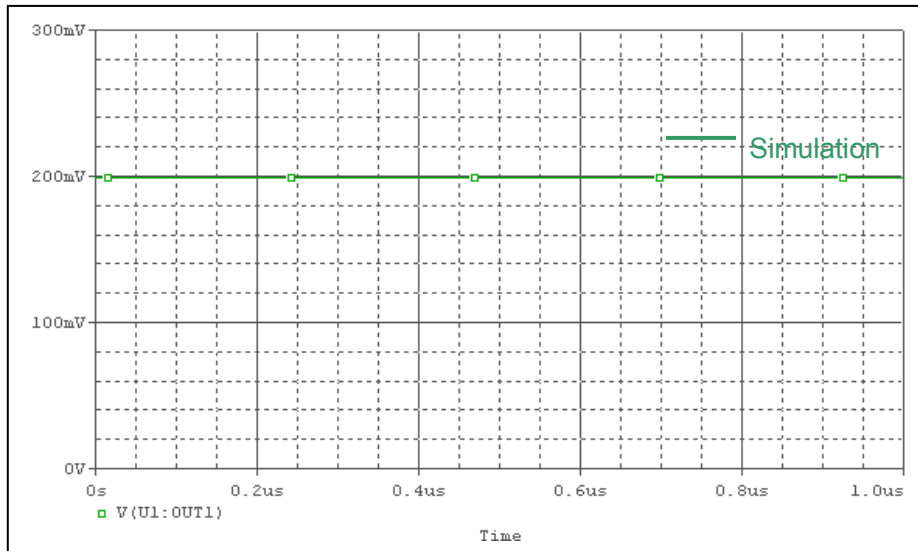
Pspice model parameter	Model description
IS	Saturation Current
BF	Ideal Maximum Forward Beta
CJC	Zero-bias Collector-Base Junction Capacitance
TF	Forward Transit Time
TR	Reverse Transit Time

DIODE MODEL

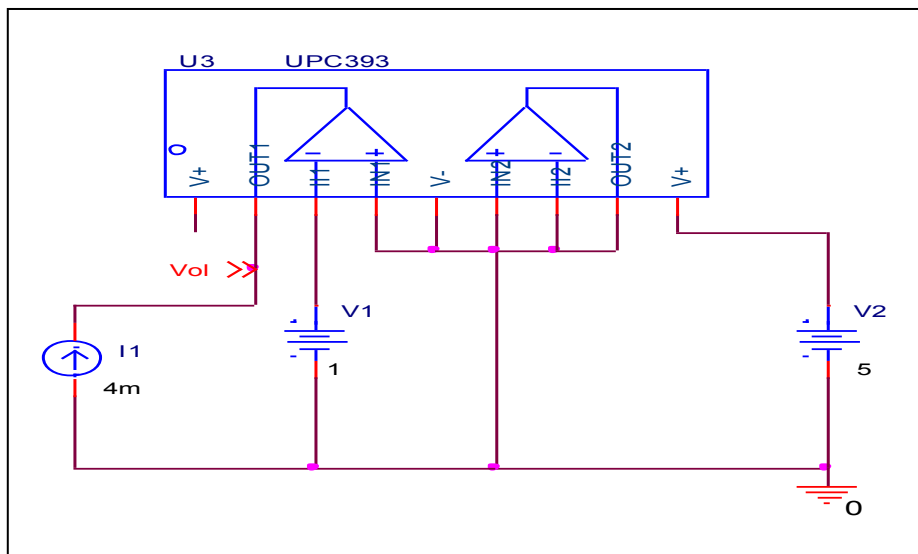
Pspice model parameter	Model description
IS	Saturation Current
RS	Series Resistance

Output Low Voltage

Simulation result



Evaluation Circuit

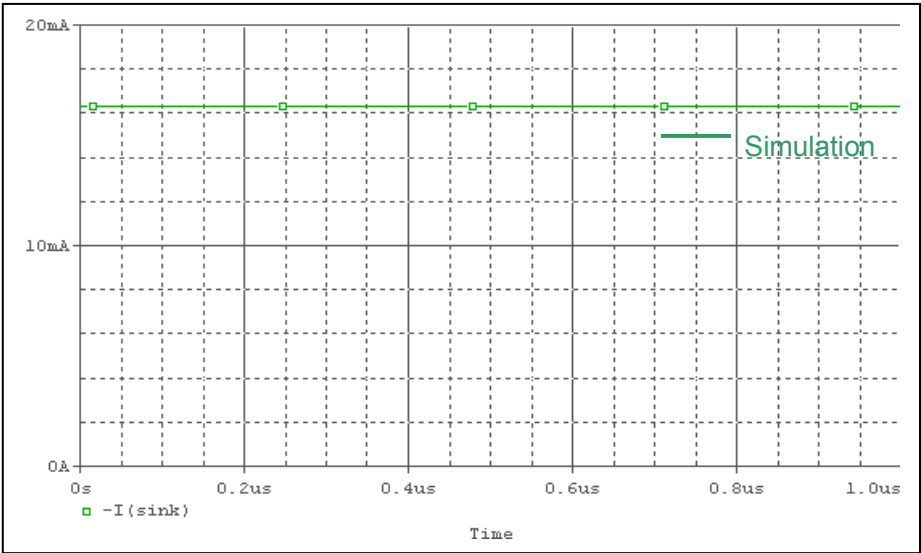


Comparison Table

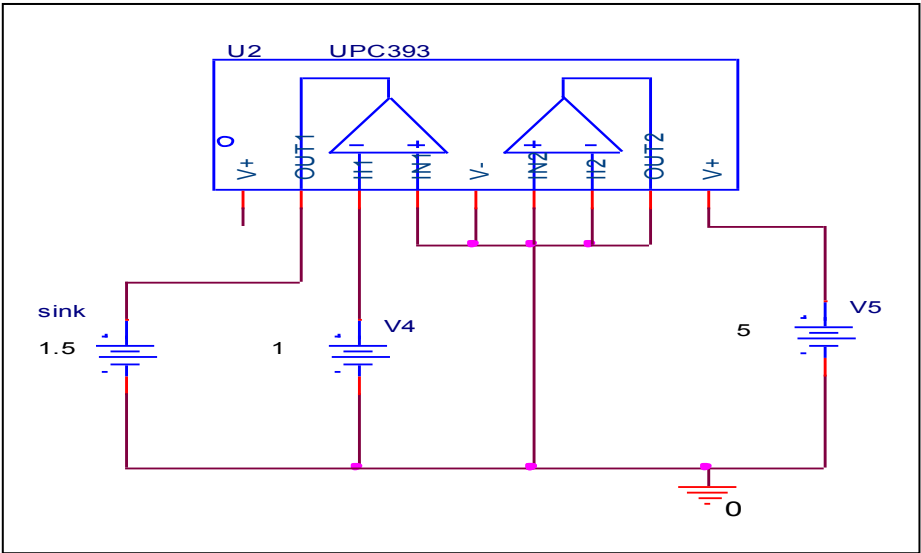
$I_{\text{sink}} = 4\text{mA}$	Measurement	Simulation	%Error
$V_{\text{ol}} \text{ (V)}$	0.2	0.199325	-0.338

Sink Current

Simulation result



Evaluation Circuit

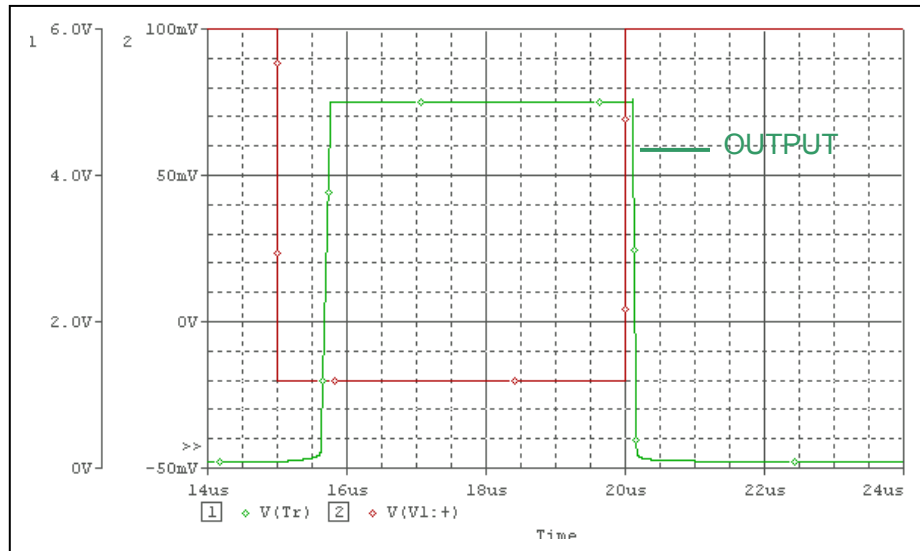


Comparison Table

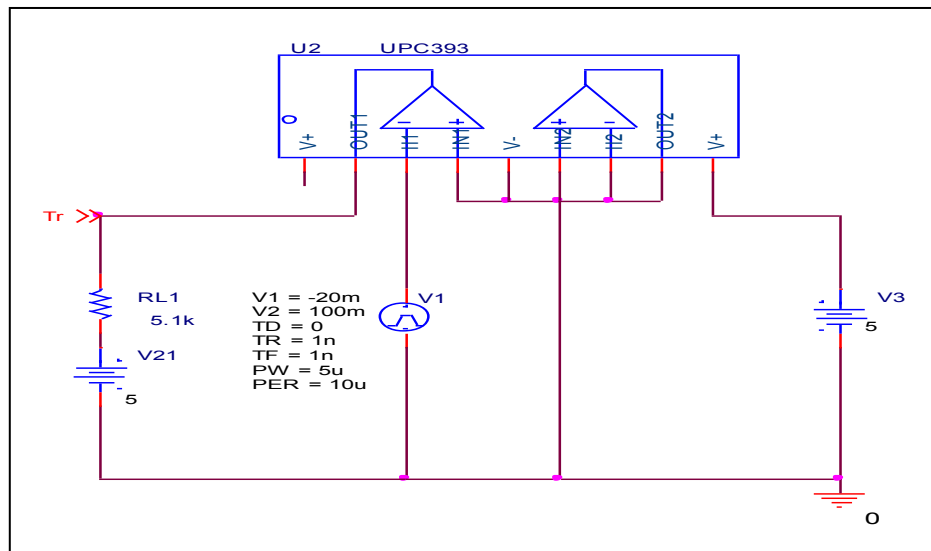
$V_{ol} = 1.5\text{ V}$	Measurement	Simulation	%Error
$I_{sink} \text{ (mA)}$	16	16.303	1.894

Response time (Rise time and Transition time)

Simulation result



Evaluation Circuit

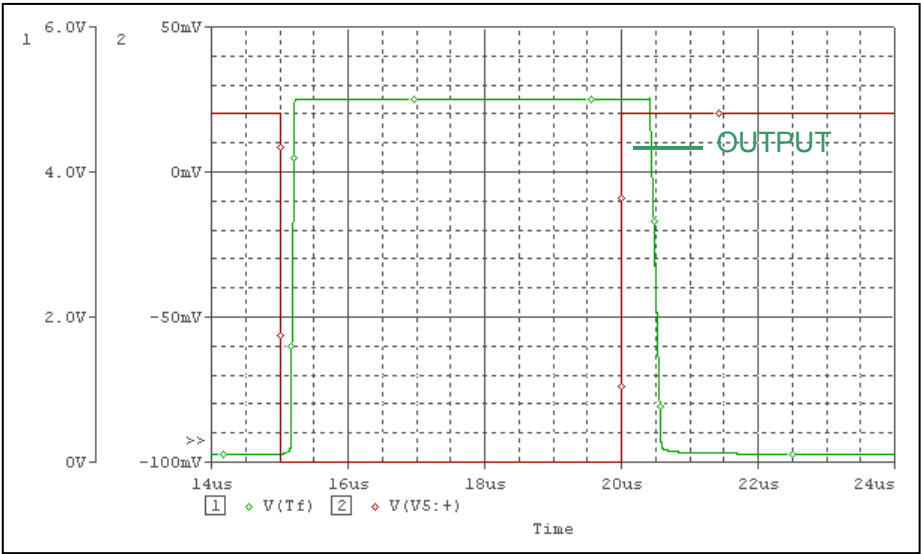


Comparison Table

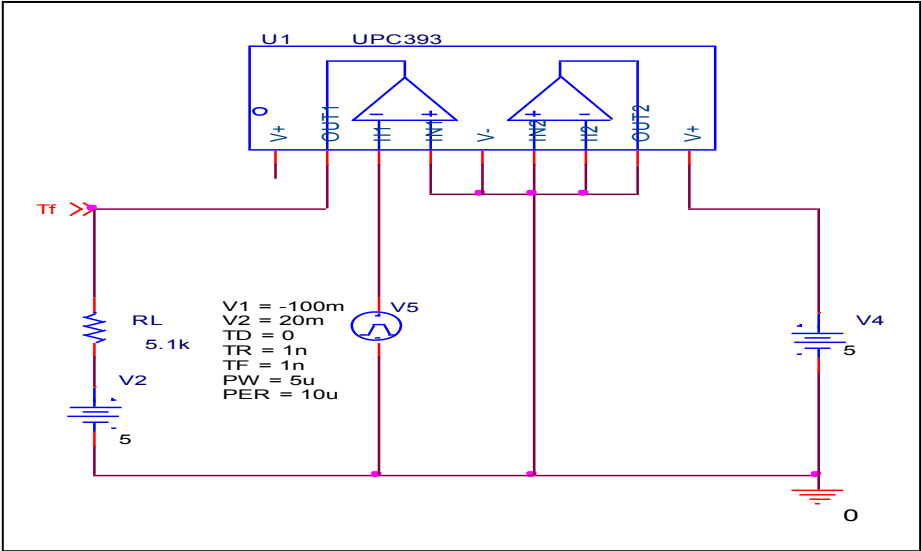
	Measurement	Simulation	% Error
Rising delay time (us)	0.63	0.633914	0.621
Transition time (us)	0.12	0.120899	0.749

Response time (Falling time)

Simulation result



Evaluation Circuit

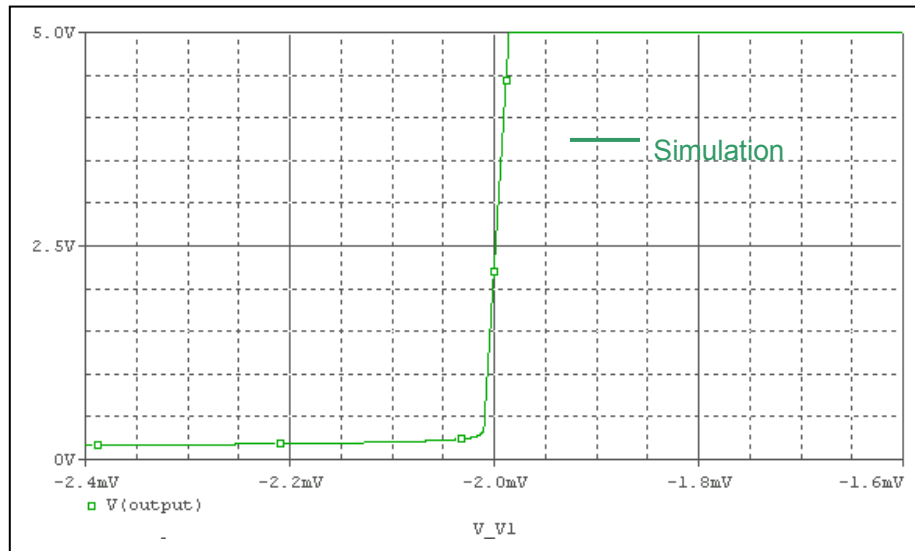


Comparision Table

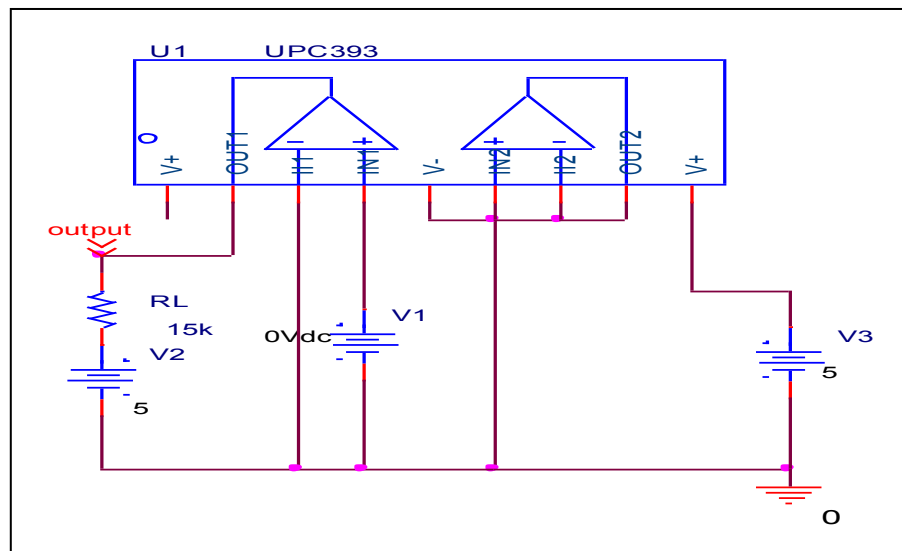
	Measurement	Simulation	% Error
Falling delay time (us)	0.43	0.430224	0.052

Input Offset Voltage Characteristics

Simulation result



Evaluation Circuit

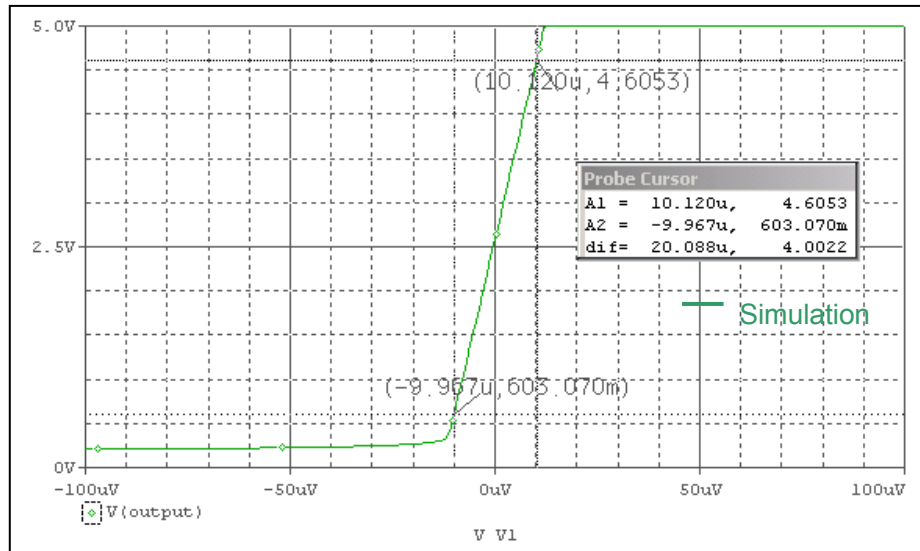


Comparision Table

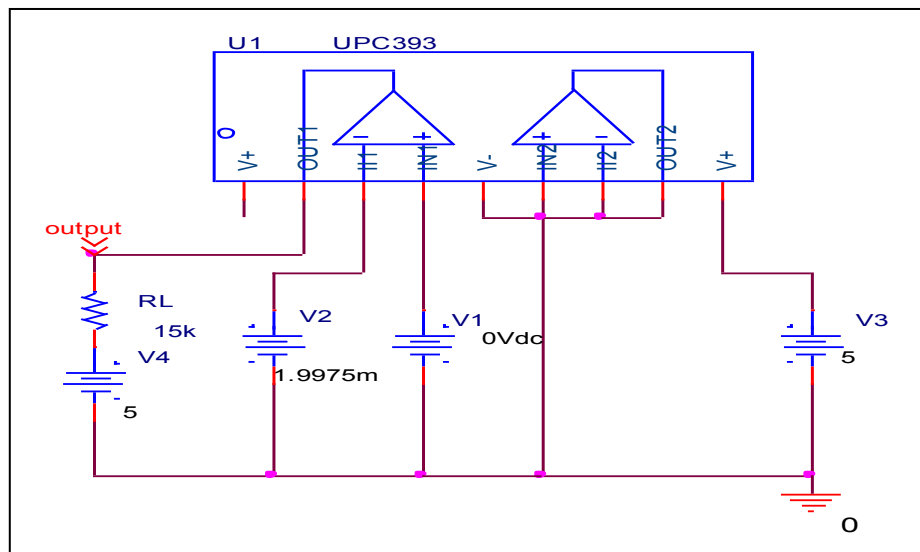
	Measurement	Simulation	%Error
$V_{io}(mV)$	-2	-1.9975	-0.125

Av Characteristics

Simulation result



Evaluation Circuit



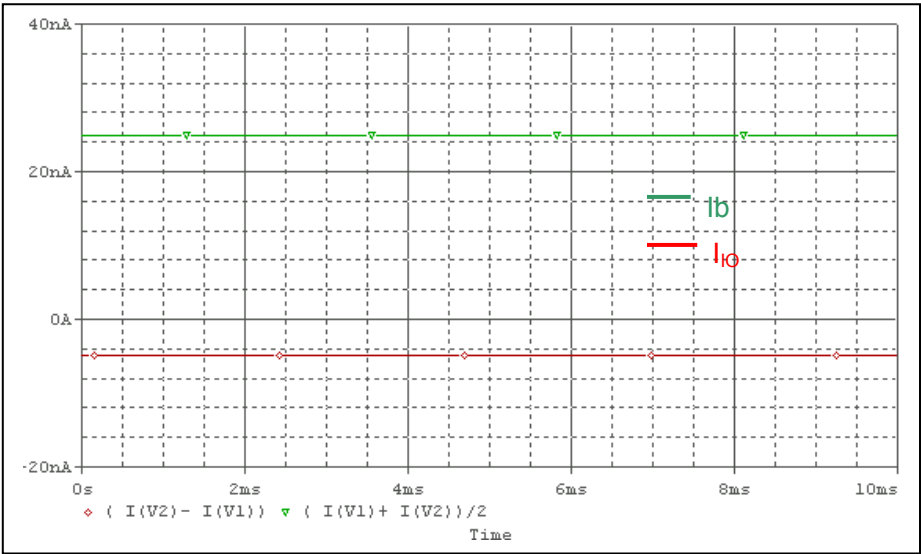
$$A_v = 4.0022 / 20.088u$$

Comparison Table

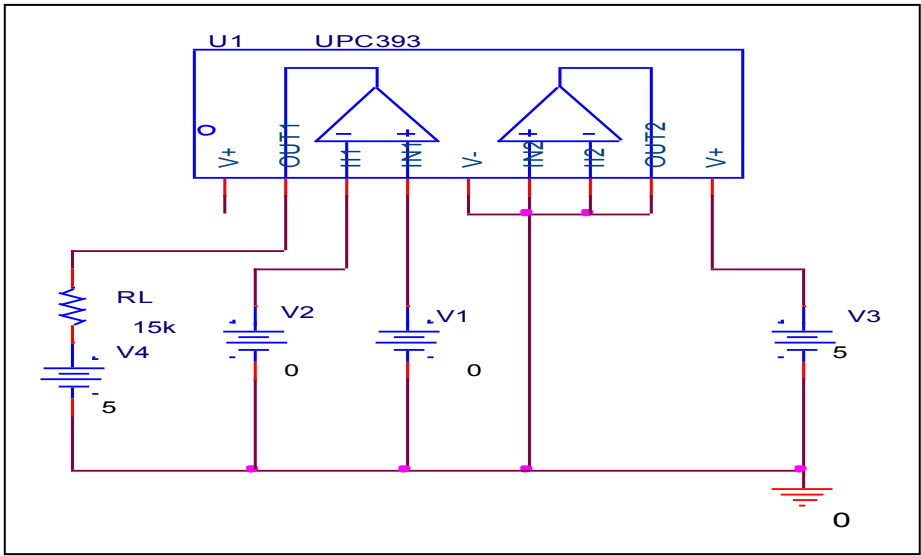
$R_L = 15k\Omega$	Measurement	Simulation	%Error
A_v (v/mV)	200	199.233	-0.383

Input Bias Current Characteristics

Simulation result



Evaluation Circuit



Comparison Table

	Measurement	Simulation	% Error
I_b (nA)	25	24.987	-0.052
I_{io} (nA)	-5	-4.8161	-3.678