

# Device Modeling Report

COMPONENTS:  
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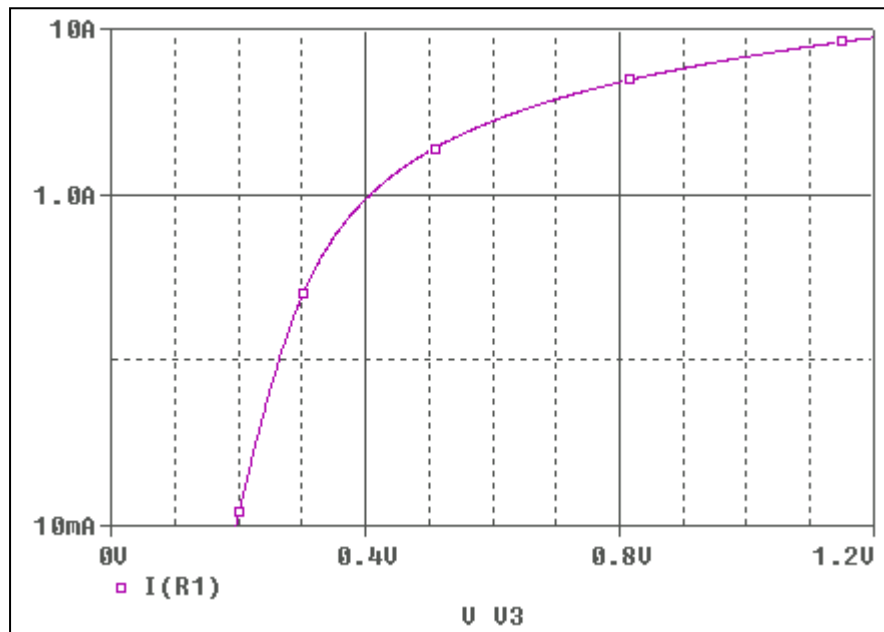


**Bee Technologies Inc.**

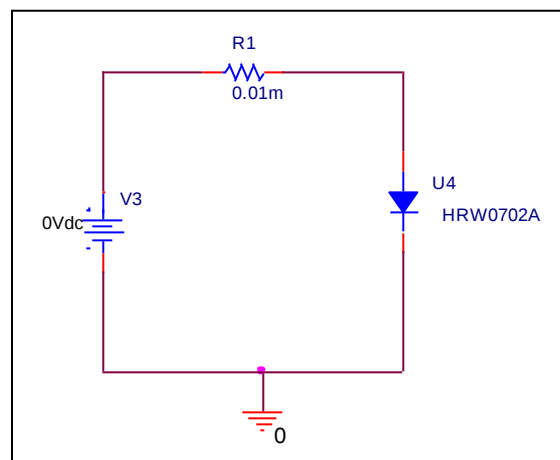
| PSpice model parameter | Model description                           |
|------------------------|---------------------------------------------|
| IS                     | Saturation Current                          |
| N                      | Emission Coefficient                        |
| RS                     | Series Resistance                           |
| IKF                    | High-injection Knee Current                 |
| CJO                    | Zero-bias Junction Capacitance              |
| M                      | Junction Grading Coefficient                |
| VJ                     | Junction Potential                          |
| ISR                    | Recombination Current Saturation Value      |
| BV                     | Reverse Breakdown Voltage(a positive value) |
| IBV                    | Reverse Breakdown Current(a positive value) |
| TT                     | Transit Time                                |
| EG                     | Energy-band Gap                             |

## Forward Current Characteristic

### Circuit Simulation Result

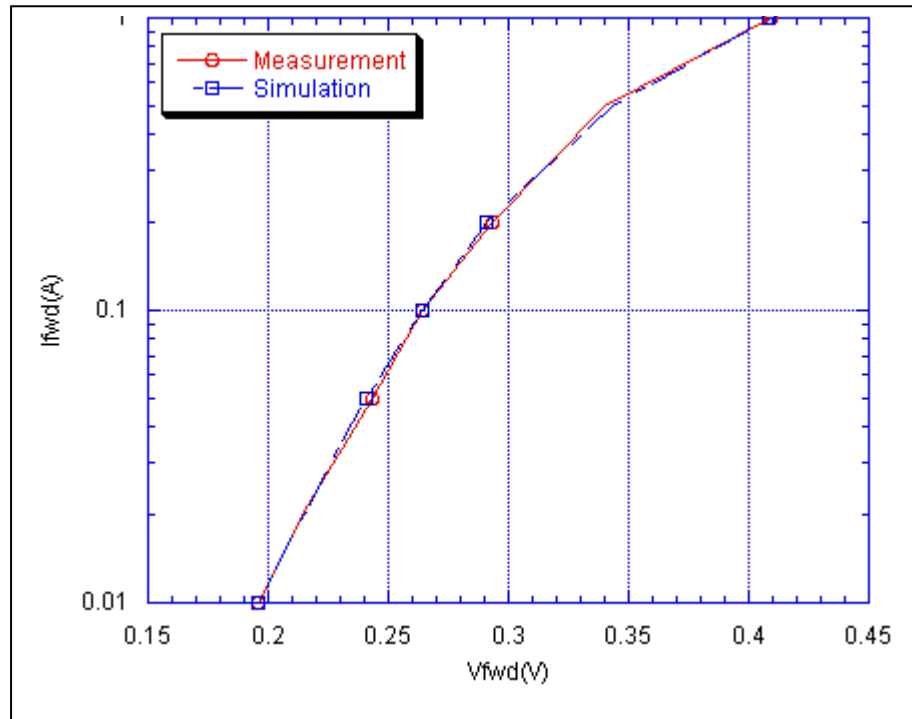


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

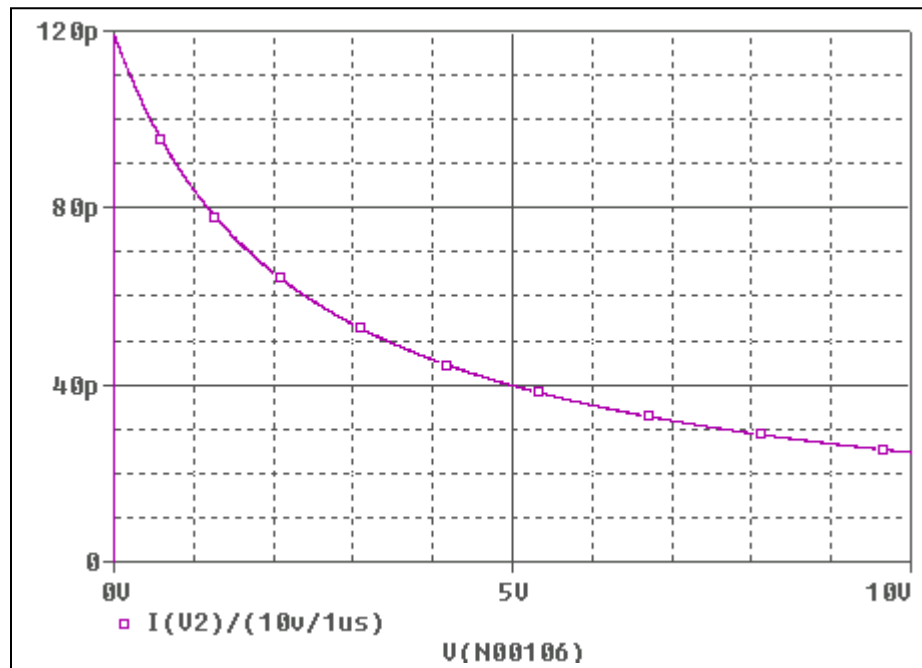


### Simulation Result

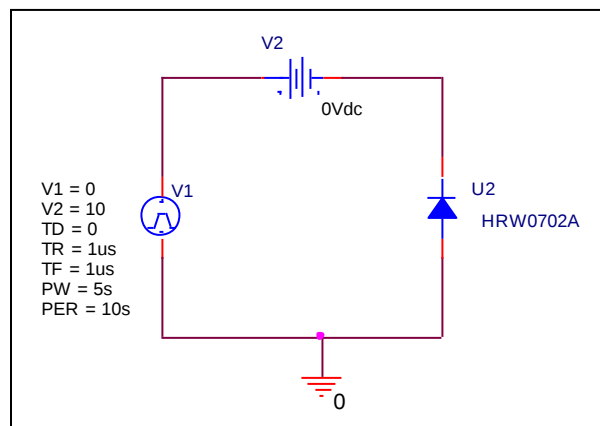
| Ifwd(A) | Vfwd(V)<br>Measurement | Vfwd(V)<br>Simulation | %Error |
|---------|------------------------|-----------------------|--------|
| 0.01    | 0.196                  | 0.195                 | -0.513 |
| 0.02    | 0.214                  | 0.215                 | 0.465  |
| 0.05    | 0.243                  | 0.241                 | -0.830 |
| 0.1     | 0.264                  | 0.263                 | -0.380 |
| 0.2     | 0.293                  | 0.291                 | -0.687 |
| 0.5     | 0.340                  | 0.343                 | 0.875  |
| 1       | 0.409                  | 0.408                 | -0.245 |

## Junction Capacitance Characteristic

### Circuit Simulation Result

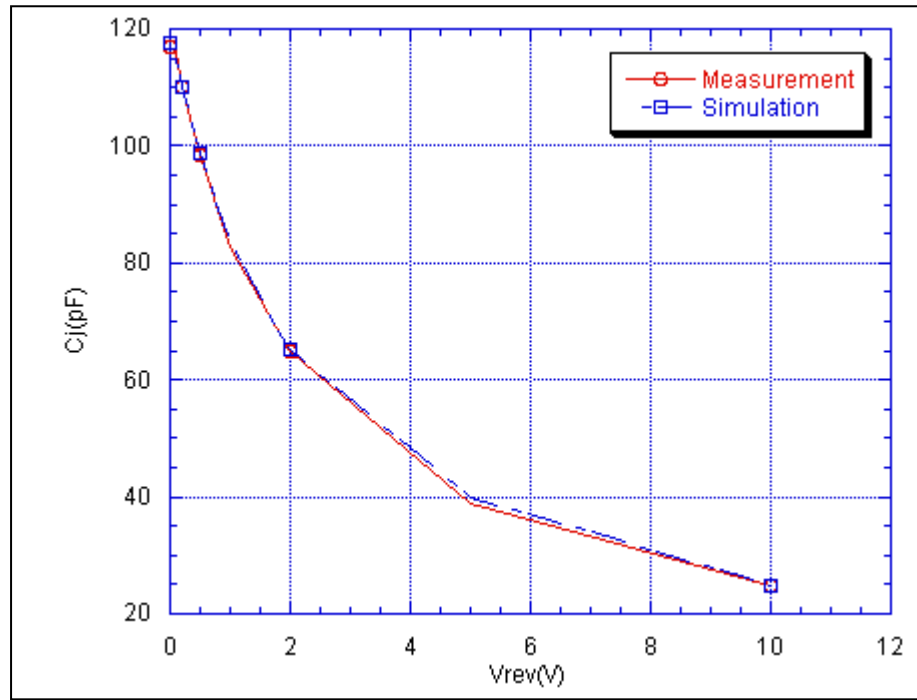


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

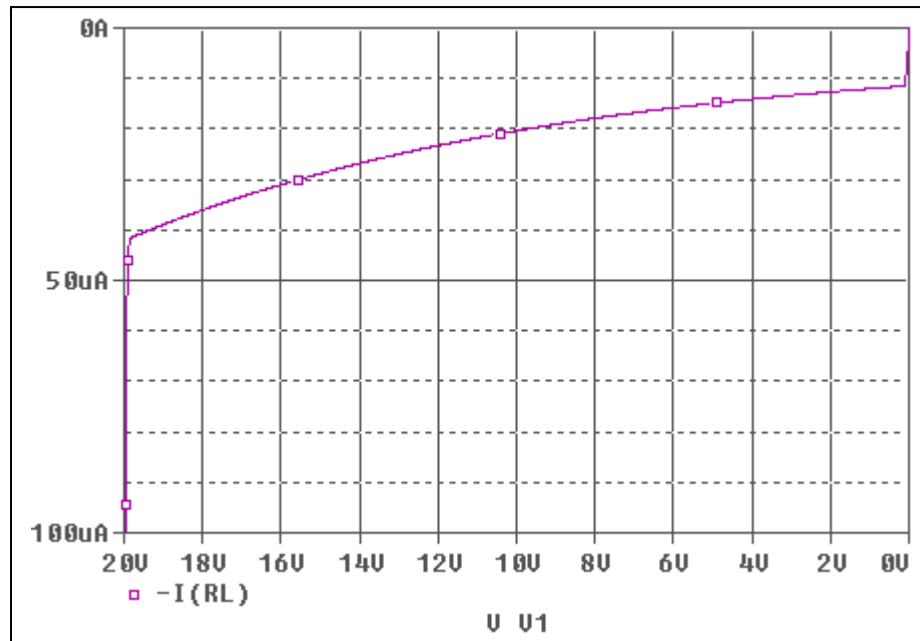


### Simulation Result

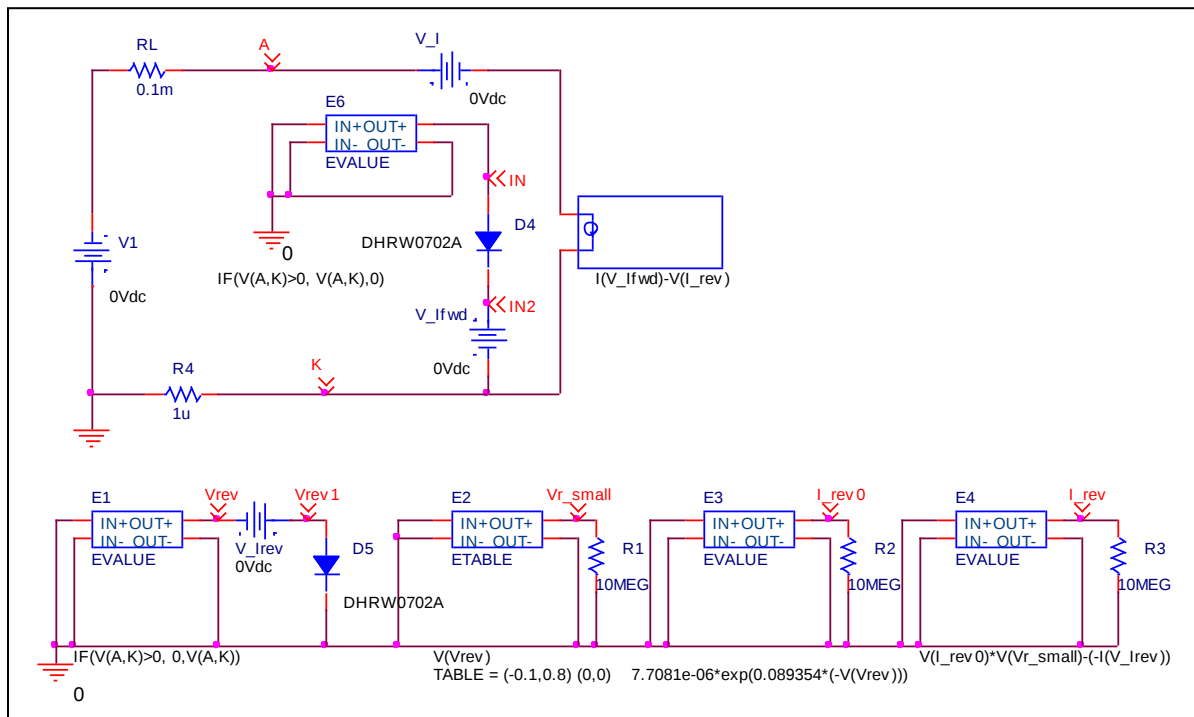
| $V_{rev}$ (V) | $C_j$ (pF)<br>Measurement | $C_j$ (pF)<br>Simulation | %Error |
|---------------|---------------------------|--------------------------|--------|
| 0             | 116.795                   | 118.621                  | 1.539  |
| 0.1           | 115.964                   | 115.204                  | -0.660 |
| 0.2           | 110.035                   | 110.621                  | 0.530  |
| 0.5           | 98.461                    | 99.277                   | 0.822  |
| 1             | 82.650                    | 84.692                   | 2.411  |
| 2             | 64.941                    | 66.063                   | 1.698  |
| 5             | 38.807                    | 40.838                   | 4.973  |
| 10            | 24.723                    | 26.188                   | 5.594  |

## Reverse Characteristic

### Circuit Simulation Result

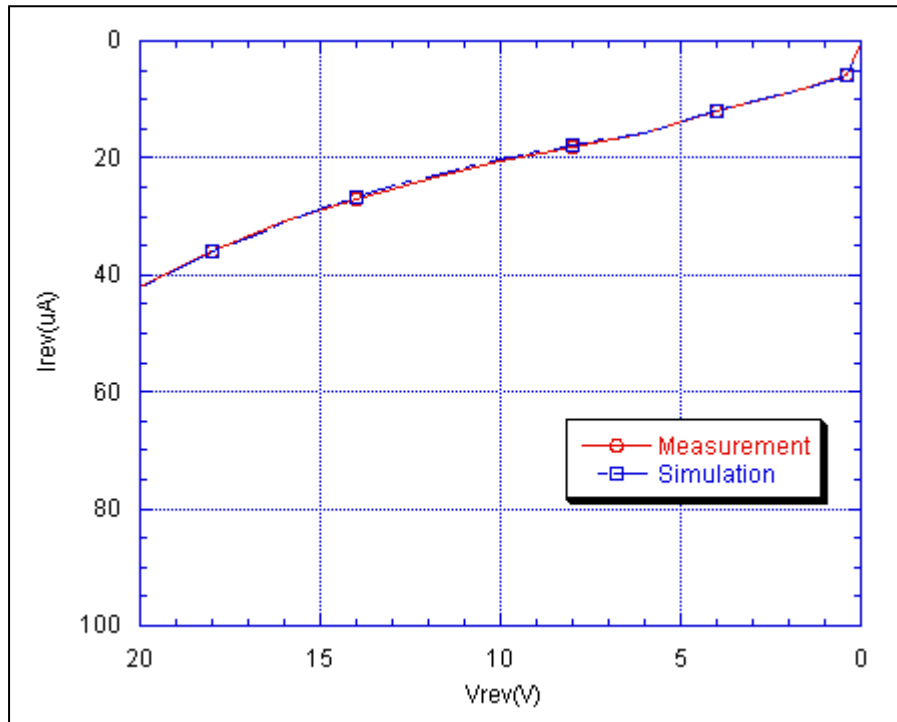


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result



### Simulation Result

| $V_{rev}(V)$ | $I_{rev}(\mu A)$<br>Measurement | $I_{rev}(\mu A)$<br>Simulation | %Error |
|--------------|---------------------------------|--------------------------------|--------|
| 6            | 15.600                          | 15.820                         | 1.391  |
| 8            | 18.000                          | 17.880                         | -0.671 |
| 10           | 20.500                          | 20.350                         | -0.737 |
| 12           | 23.500                          | 23.290                         | -0.902 |
| 14           | 27.000                          | 26.820                         | -0.671 |
| 16           | 31.000                          | 31.030                         | 0.097  |
| 18           | 36.000                          | 36.110                         | 0.305  |

Reverse Characteristic

Reference

