# Device Modeling Report

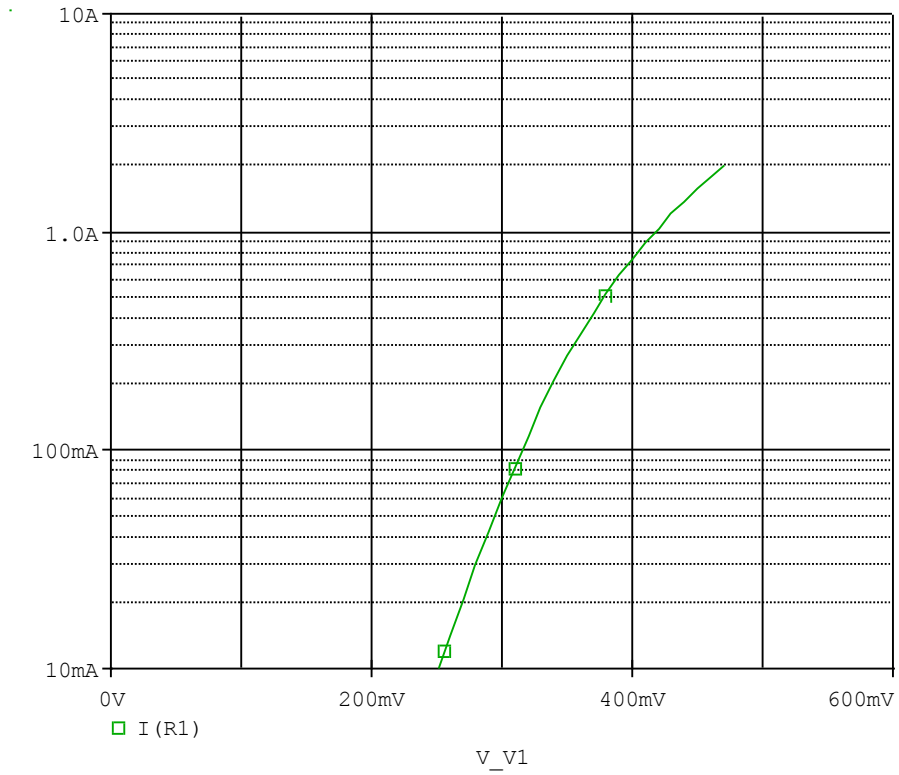
COMPONENTS:
DIODE/ SCHOTTKY RECTIFIER / PROFESSIONAL
PART NUMBER: XBS204S17R
MANUFACTURER: TOREX SEMICONDUCTOR

**Bee Technologies Inc.**

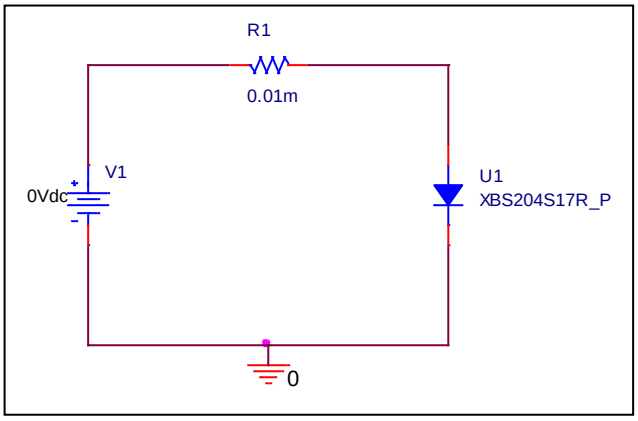
| PSpice model parameter | Model description |
|---|---|
| IS | Saturation Current |
| N | Emission Coefficient |
| RS | Series Resistance |
| IKF | High-injection Knee Current |
| CJO | Zero-bias Junction Capacitance |
| M | Junction Grading Coefficient |
| VJ | Junction Potential |
| ISR | Recombination 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

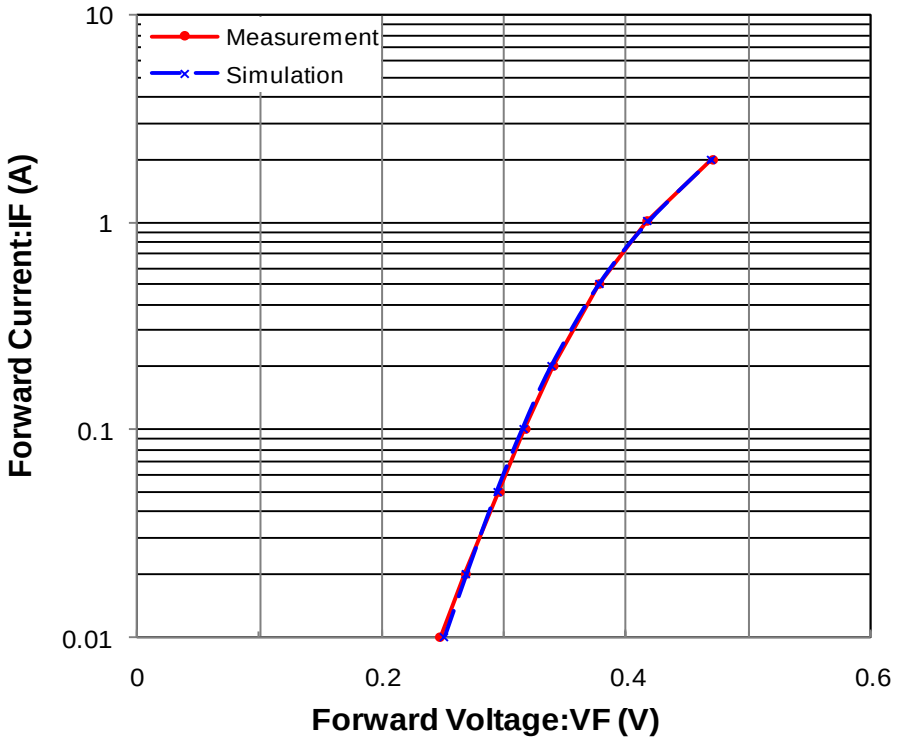



Evaluation Circuit



## Comparison Graph

Circuit Simulation Result

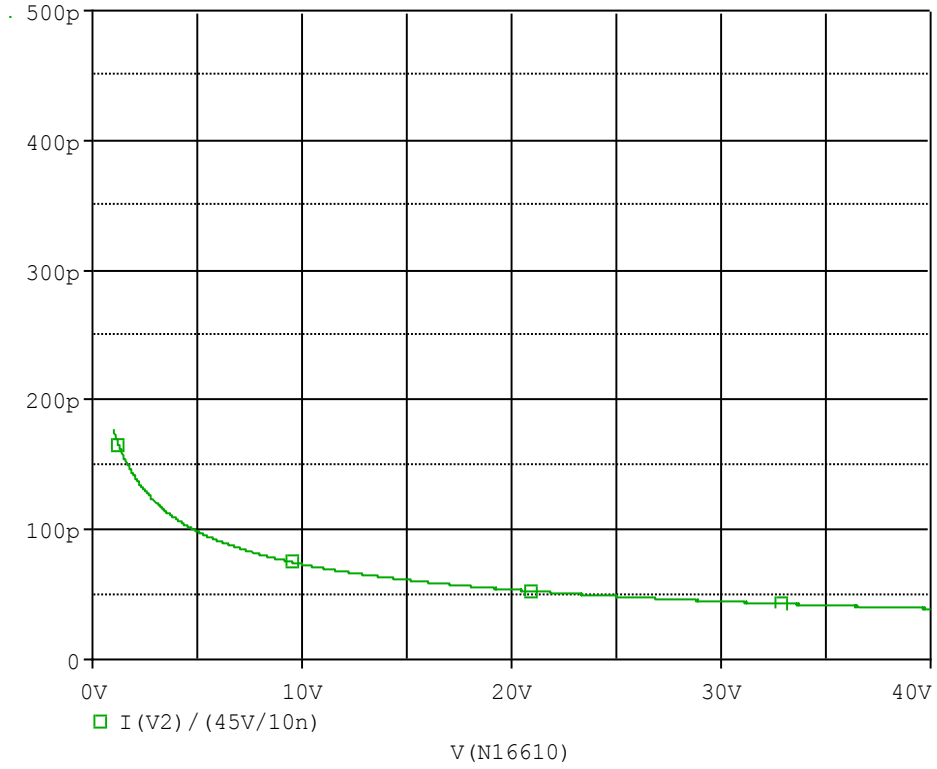



Simulation Result

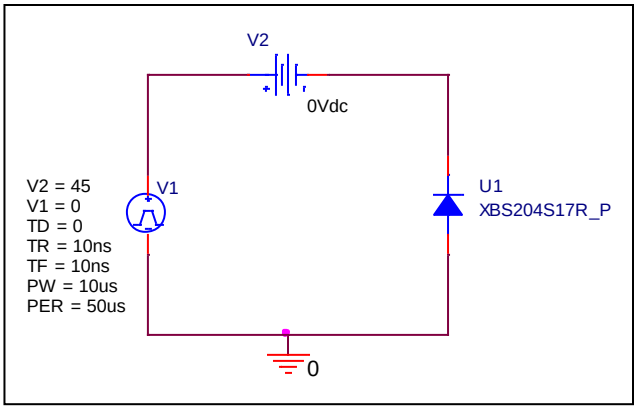
| $I_F$ (A) | $V_F$ (V) | | %Error |
|---|---|---|---|
| | Measurement | Simulation | |
| 0.01 | 0.248 | 0.251 | 1.06 |
| 0.02 | 0.268 | 0.269 | 0.41 |
| 0.05 | 0.296 | 0.294 | -0.61 |
| 0.1 | 0.317 | 0.315 | -0.65 |
| 0.2 | 0.340 | 0.338 | -0.45 |
| 0.5 | 0.377 | 0.378 | 0.14 |
| 1 | 0.416 | 0.417 | 0.31 |
| 2 | 0.470 | 0.470 | -0.10 |

## Capacitance Characteristic

Circuit Simulation Result

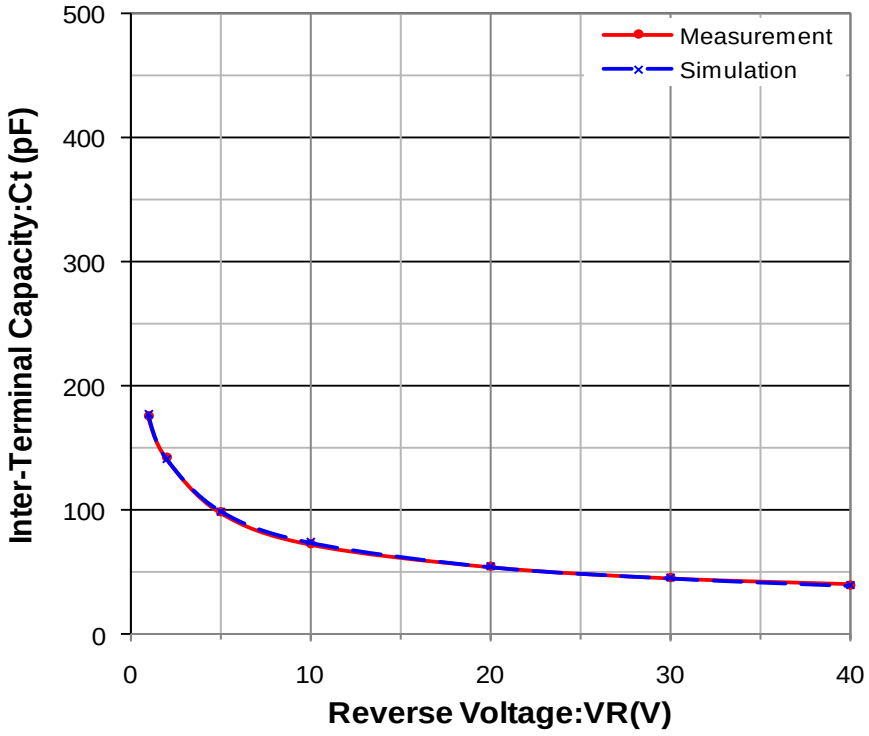



Evaluation Circuit



## Comparison Graph

Circuit Simulation Result

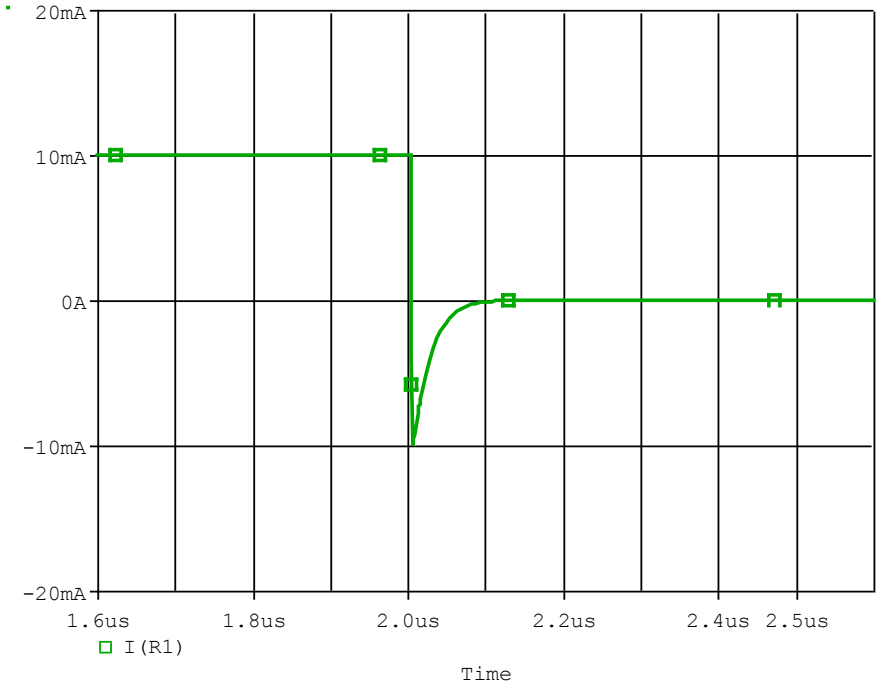



Simulation Result

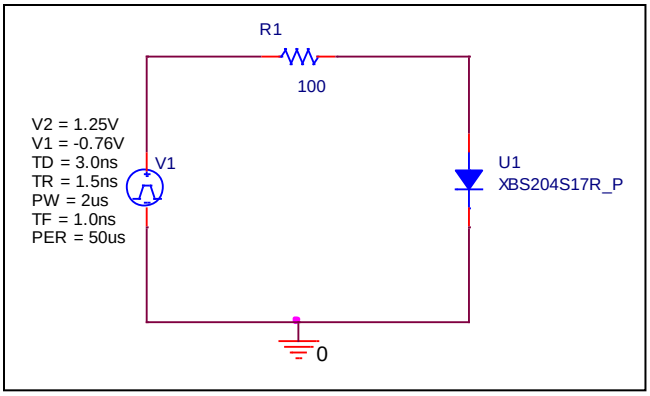
| $V_R$ (V) | Ct (pF) | | %Error |
|---|---|---|---|
| | Measurement | Simulation | |
| 1 | 175.000 | 176.945 | 1.11 |
| 2 | 142.000 | 141.176 | -0.58 |
| 5 | 98.000 | 98.738 | 0.75 |
| 10 | 72.000 | 73.398 | 1.94 |
| 20 | 54.000 | 53.797 | -0.38 |
| 30 | 45.000 | 44.720 | -0.62 |
| 40 | 40.000 | 39.184 | -2.04 |

## Reverse Recovery Characteristic

Circuit Simulation Result




Evaluation Circuit

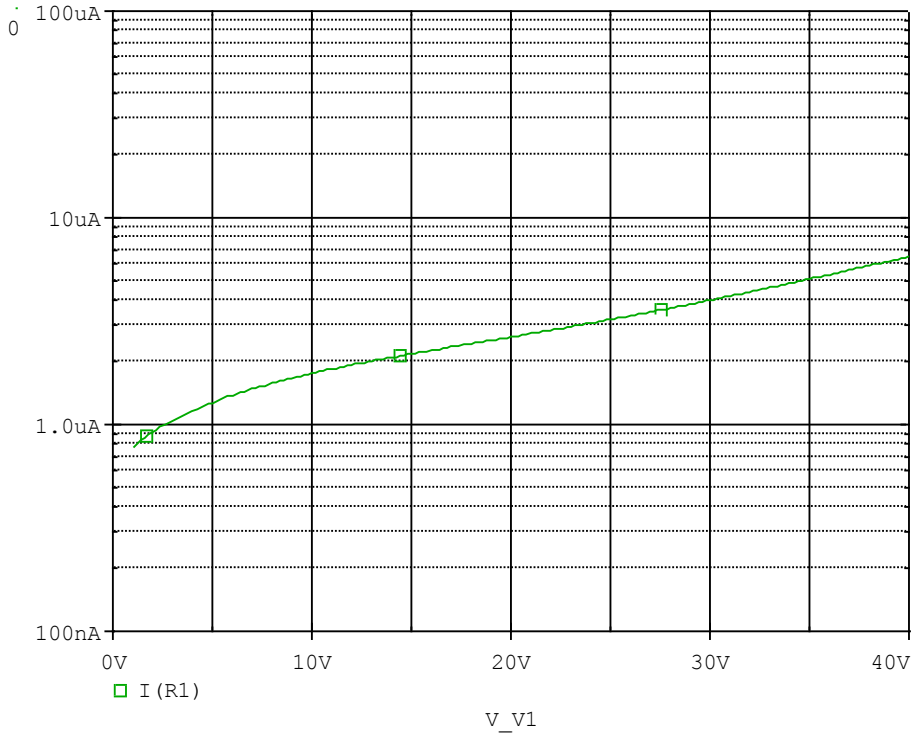



Compare Measurement vs. Simulation

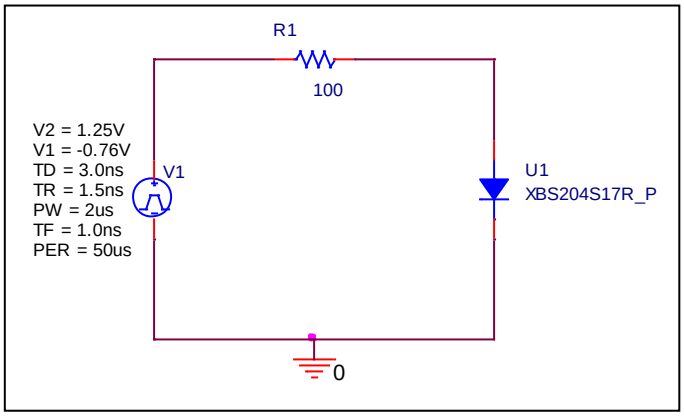
| Parameter | Unit | Measurement | Simulation | %Error |
|---|---|---|---|---|
| trr | ns | 51.000 | 52.313 | 2.57 |

## Reverse Characteristic

Circuit Simulation Result

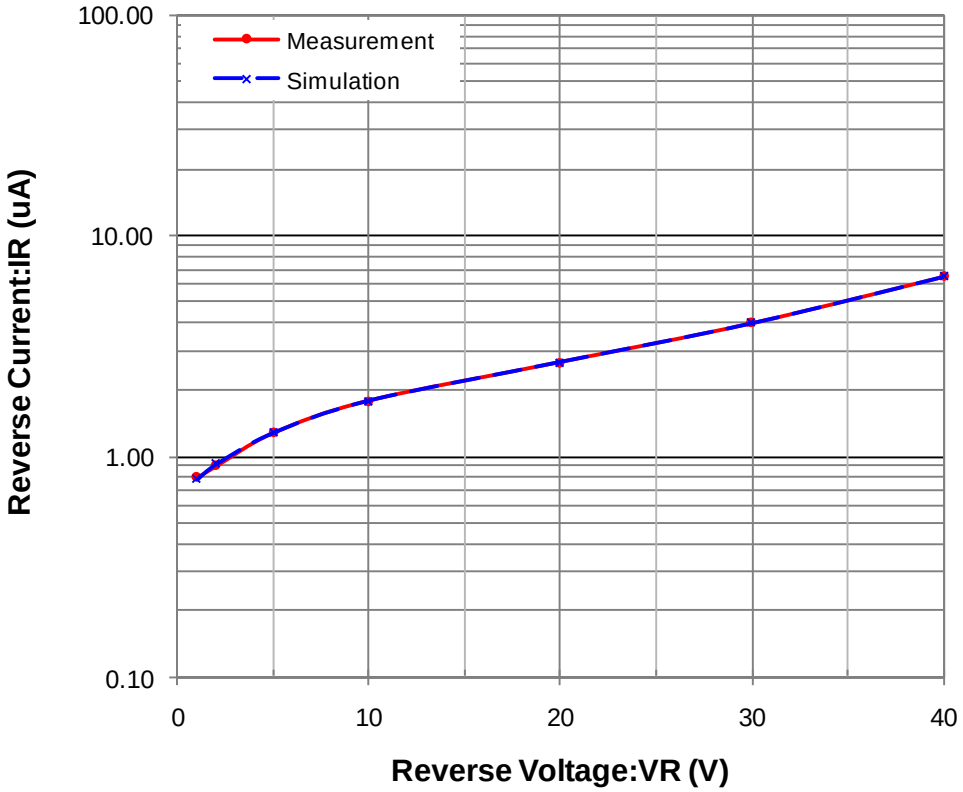



Evaluation Circuit



## Comparison Graph

Circuit Simulation Result




Simulation Result

| $V_R$ (V) | $I_R$ (uA) | | %Error |
|---|---|---|---|
| | Measurement | Simulation | |
| 1 | 0.800 | 0.782 | -2.20 |
| 2 | 0.900 | 0.918 | 1.95 |
| 5 | 1.270 | 1.278 | 0.59 |
| 10 | 1.780 | 1.768 | -0.69 |
| 20 | 2.650 | 2.654 | 0.16 |
| 30 | 4.000 | 3.998 | -0.05 |
| 40 | 6.500 | 6.501 | 0.01 |