# Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD
PART NUMBER: S3K60
MANUFACTURER: SHINDENGEN

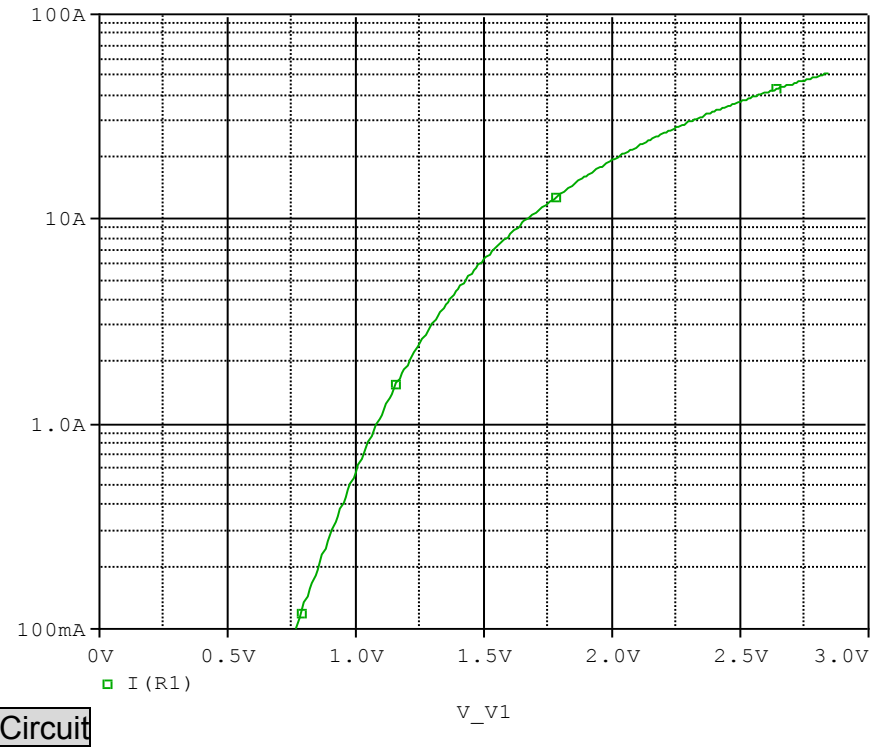
**Bee Technologies Inc.**

## DIODE MODEL PARAMETERS

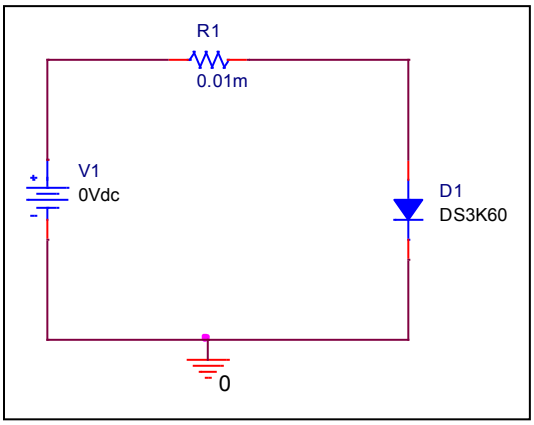
| PSpice model parameter | Model description |
|---|---|
| IS | Saturation Current |
| N | Emission Coefficient |
| RS | Series Resistance |
| IKF | High-injection Knee Current |
| CJO | Zero-bias Junction Capacitance |
| M | Junction Grading Coefficient |
| VJ | Junction Potential |
| ISR | Recombination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

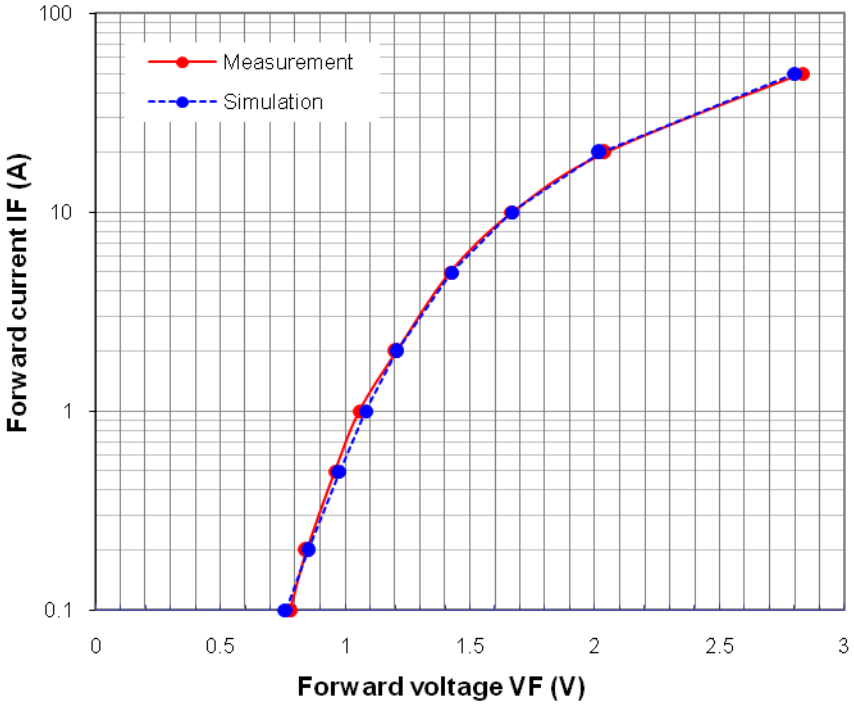



Evaluation Circuit



## Comparison Graph

Circuit Simulation Result

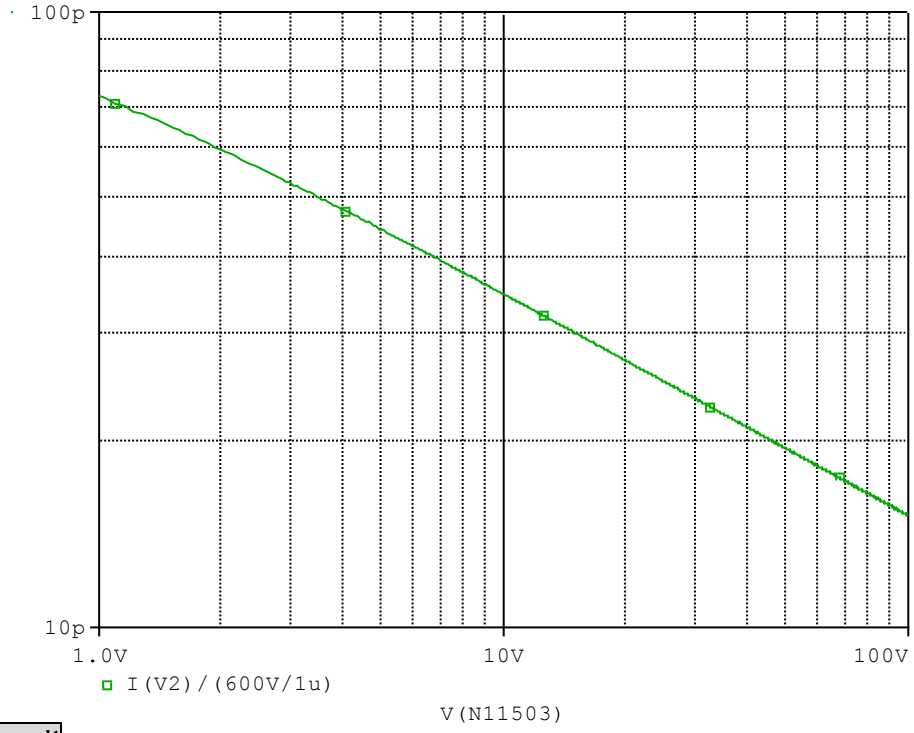



Simulation Result

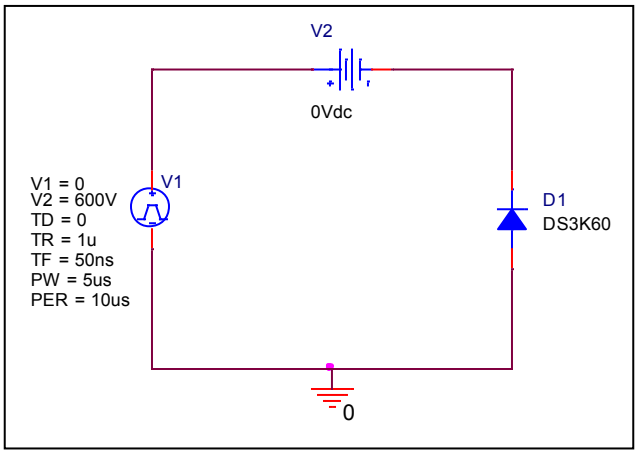
| Ifwd (A) | Vfwd (V) | | %Error |
|---|---|---|---|
| | Measurement | Simulation | |
| 0.1 | 0.780 | 0.763 | -2.21 |
| 0.2 | 0.845 | 0.852 | 0.83 |
| 0.5 | 0.960 | 0.977 | 1.77 |
| 1 | 1.058 | 1.082 | 2.27 |
| 2 | 1.204 | 1.205 | 0.08 |
| 5 | 1.421 | 1.426 | 0.32 |
| 10 | 1.670 | 1.668 | -0.12 |
| 20 | 2.040 | 2.019 | -1.03 |
| 50 | 2.834 | 2.806 | -1.00 |

## Capacitance Characteristic

Circuit Simulation Result

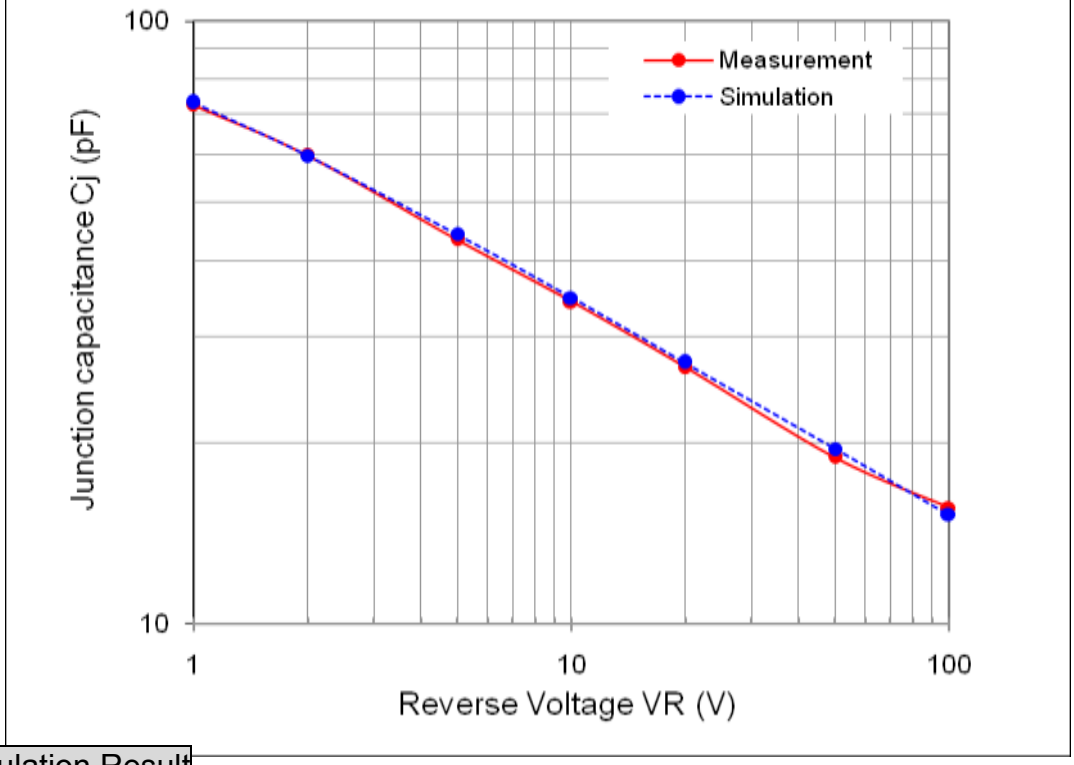



Evaluation Circuit



## Comparison Graph

Circuit Simulation Result

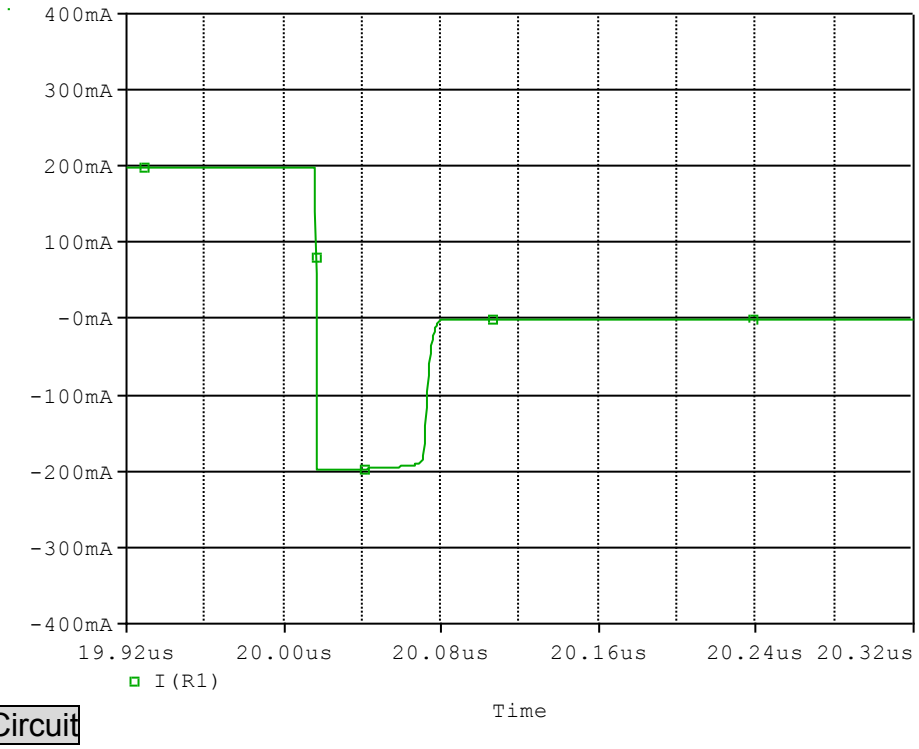



Simulation Result

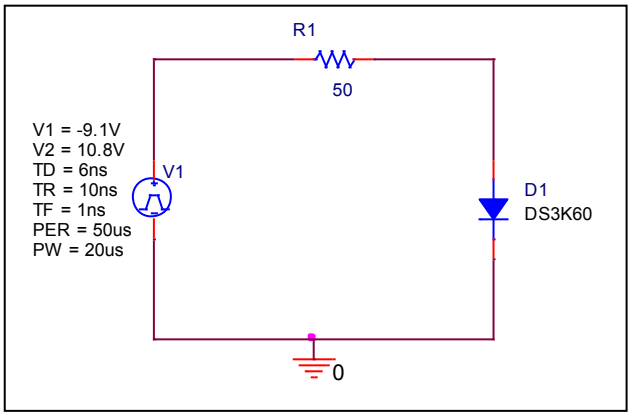
| Vrev (V) | Cj (pF) | | %Error |
|---|---|---|---|
| | Measurement | Simulation | |
| 1 | 72.500 | 72.978 | 0.66 |
| 2 | 60.000 | 59.755 | -0.41 |
| 5 | 43.400 | 44.261 | 1.98 |
| 10 | 34.200 | 34.808 | 1.78 |
| 20 | 26.700 | 27.174 | 1.78 |
| 50 | 18.900 | 19.497 | 3.16 |
| 100 | 15.600 | 15.200 | -2.56 |

## Reverse Recovery Characteristic

Circuit Simulation Result



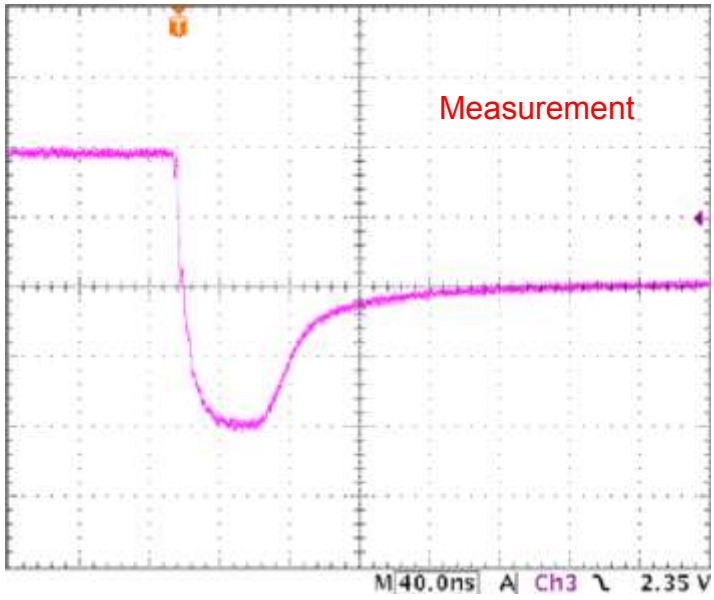

Evaluation Circuit



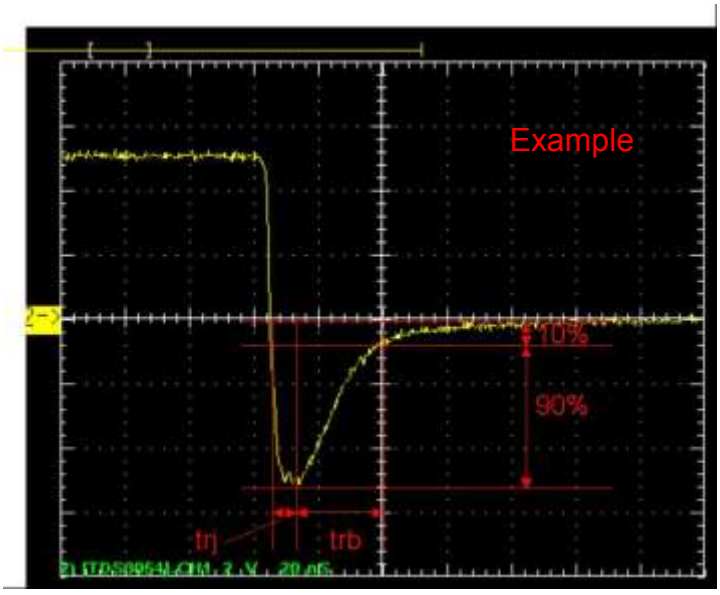

Compare Measurement vs. Simulation

| | | Measurement | Simulation | %Error |
|---|---|---|---|---|
| **trj** | **ns** | **29.60** | **29.11** | **-1.64** |

## Reverse Recovery Characteristic Reference




Trj =29.60(ns)
Trb= 68.80(ns)
Conditions: Ifwd=0.2A,Irev=0.2A, Rl=50




Relation between trj and trb