

# Device Modeling Report

COMPONENTS:  
DIODE/ GENERAL PURPOSE RECTIFIER / STANDARD  
PART NUMBER: 1SR153-400  
MANUFACTURER: ROHM  
RMARK: TC=150C

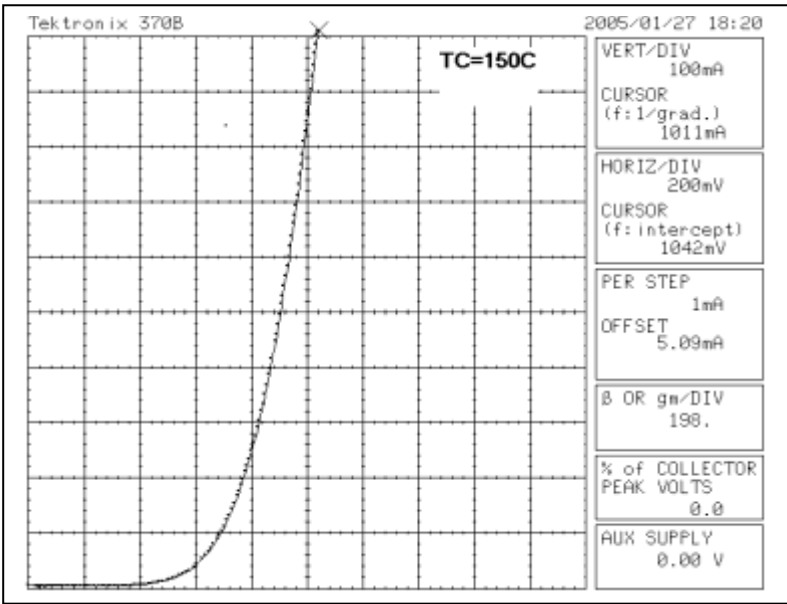


**Bee Technologies Inc.**

| 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                             |

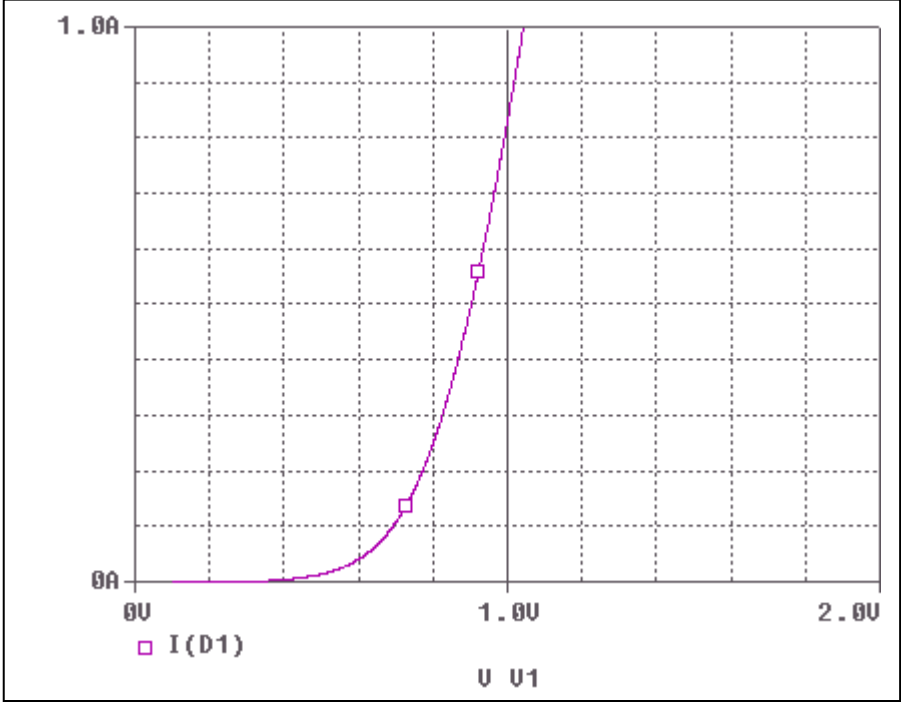
# Forward Current Characteristic

# Reference

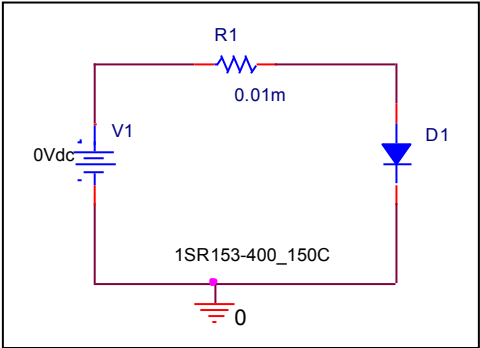


# Forward Current Characteristic

## Circuit Simulation Result

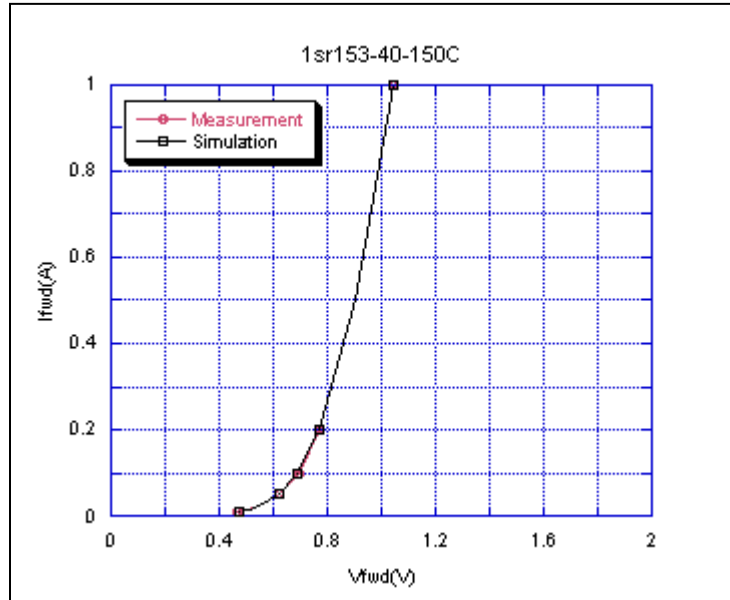


## Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

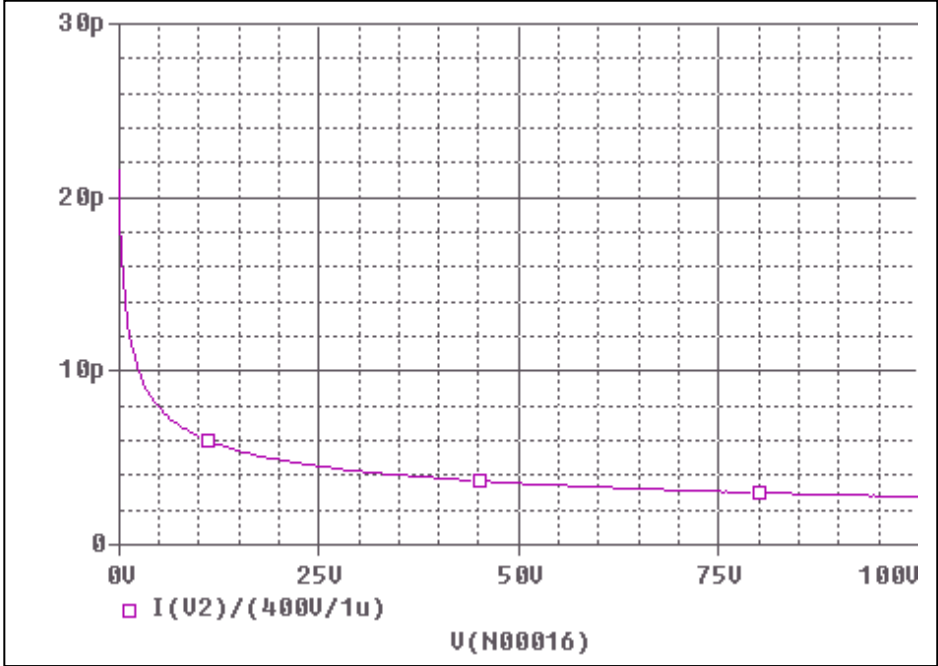


### Simulation Result

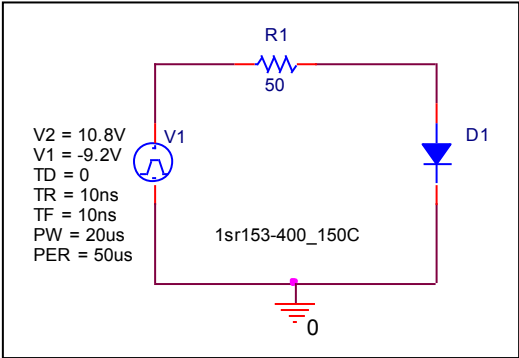
| Ifwd(A) | Vfwd(V) Measurement | Vfwd(V) Simulation | %Error |
|---------|---------------------|--------------------|--------|
| 0.01    | 0.464               | 0.472              | -1.72  |
| 0.02    | 0.532               | 0.533              | -0.19  |
| 0.05    | 0.626               | 0.620              | 0.96   |
| 0.1     | 0.698               | 0.692              | 0.86   |
| 0.2     | 0.770               | 0.771              | -0.13  |
| 0.5     | 0.904               | 0.903              | 0.11   |
| 1       | 1.042               | 1.041              | 0.10   |

# Capacitance Characteristic

## Circuit Simulation Result

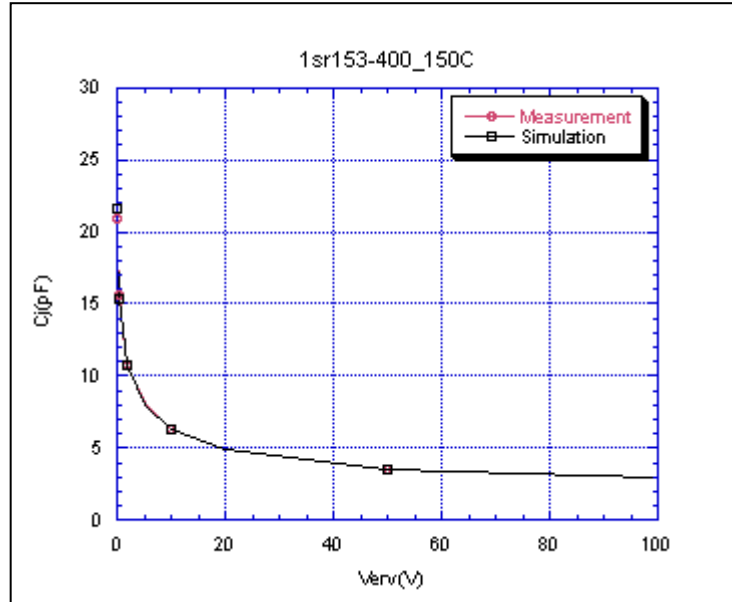


## Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

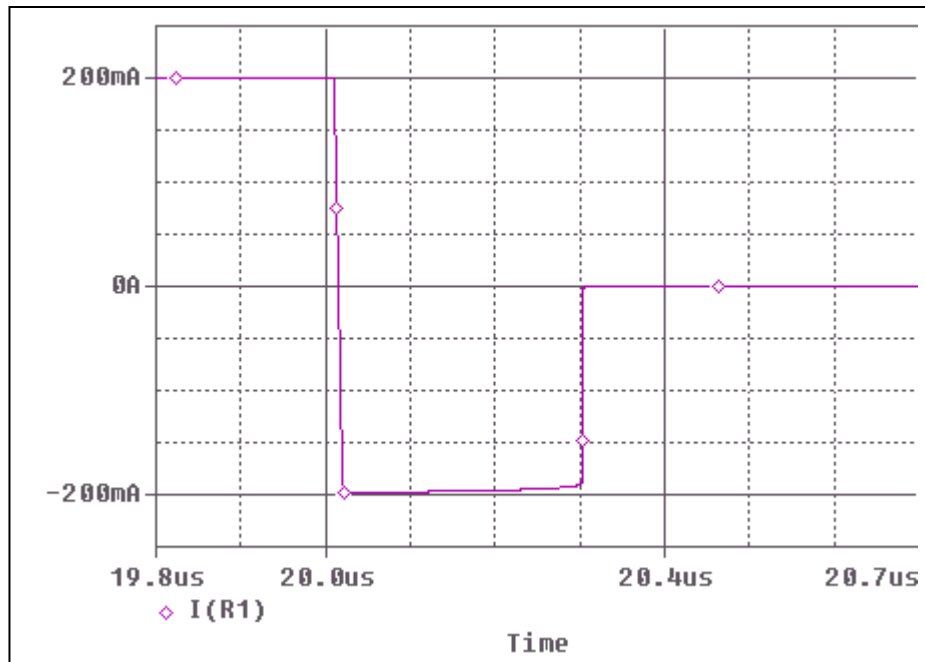


### Simulation Result

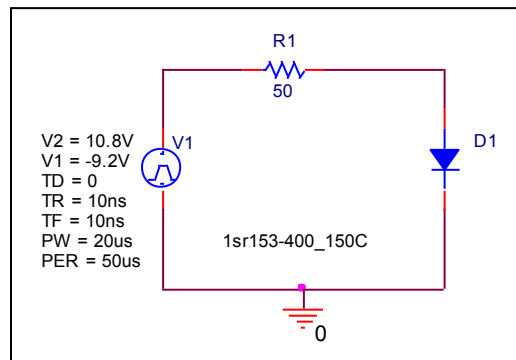
| $V_{rev}$ (V) | $C_j$ (pF)<br>Measurement | $C_j$ (pF)<br>Simulation | %Error |
|---------------|---------------------------|--------------------------|--------|
| 0             | 22.998                    | 22.998                   | 0.00   |
| 0.1           | 20.965                    | 21.635                   | -3.20  |
| 0.2           | 19.136                    | 19.021                   | 0.60   |
| 0.5           | 15.664                    | 15.298                   | 2.34   |
| 1             | 13.075                    | 13.276                   | -1.54  |
| 2             | 10.685                    | 10.778                   | -0.87  |
| 5             | 8.039                     | 7.974                    | 0.81   |
| 10            | 6.349                     | 6.257                    | 1.45   |
| 20            | 4.944                     | 4.935                    | 0.18   |
| 50            | 3.517                     | 3.532                    | -0.43  |
| 100           | 2.748                     | 2.751                    | -0.11  |

# Reverse Recovery Characteristic

## Circuit Simulation Result



## Evaluation Circuit

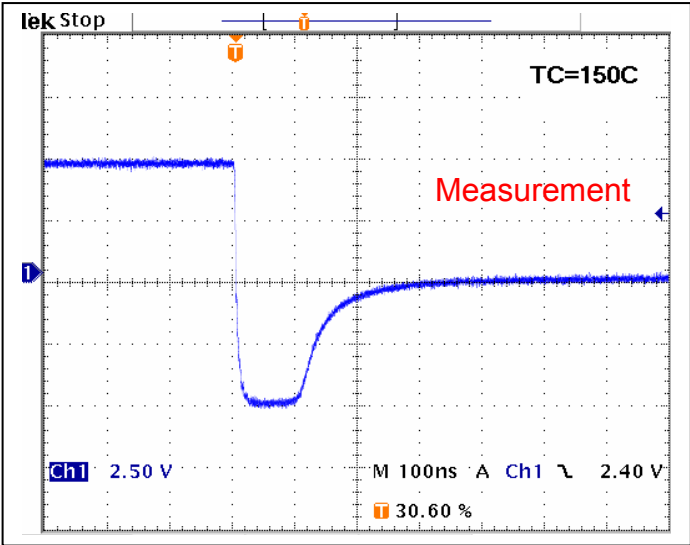


## Compare Measurement vs. Simulation

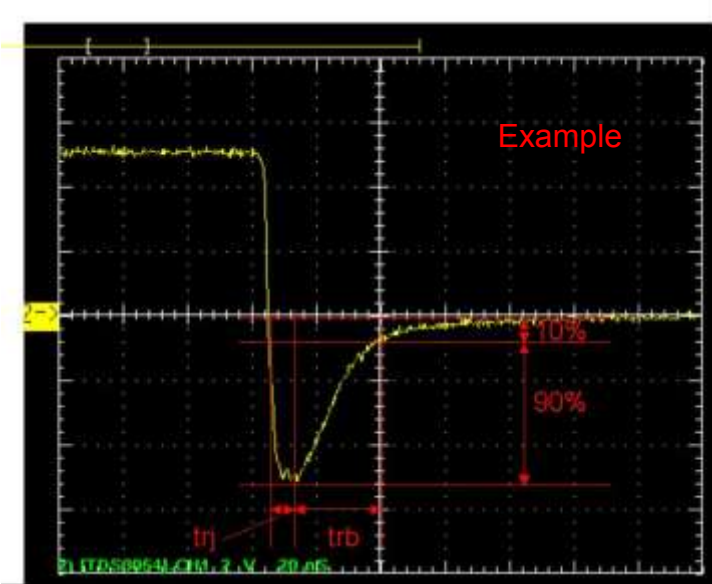
|     | Measurement |    | Simulation |    | %Error |
|-----|-------------|----|------------|----|--------|
| trr | 288.00      | ns | 288.15     | ns | 0.05   |

# Reverse Recovery Characteristic

# Reference



Trj =96(ns)  
Trb=192(ns)  
Conditions: Ifwd=Irev=0.2(A), RI=50



Relation between trj and trb