

# Device Modeling Report

COMPONENTS:

DIODE/GENERAL PURPOSE RECTIFIER/ PROFESSIONAL

PART NUMBER: SF20LC30

MANUFACTURER: SHINDENGEN

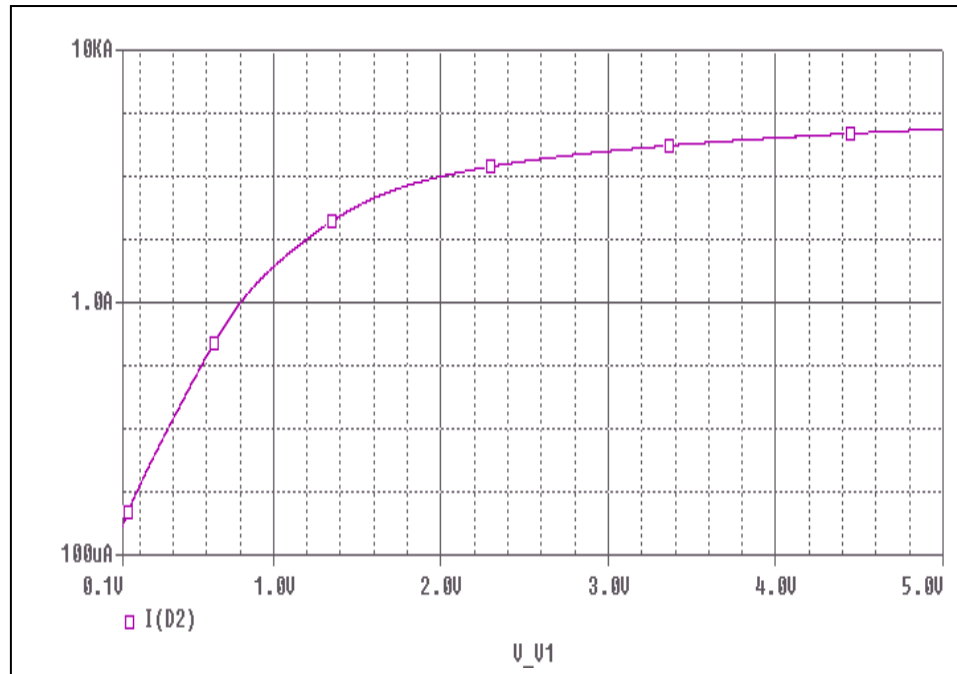
REMARK: TC=25C



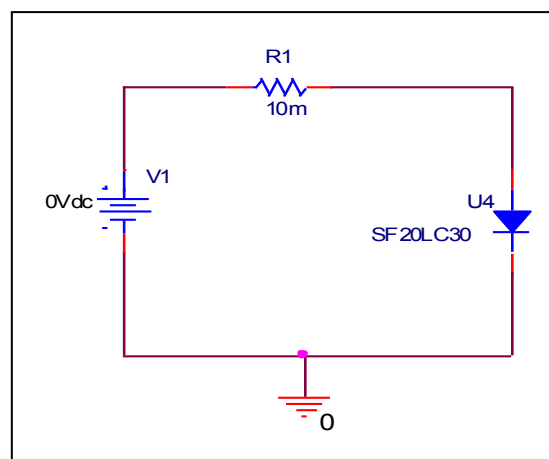
**Bee Technologies Inc.**

## Forward Current Characteristic

### Circuit Simulation Result

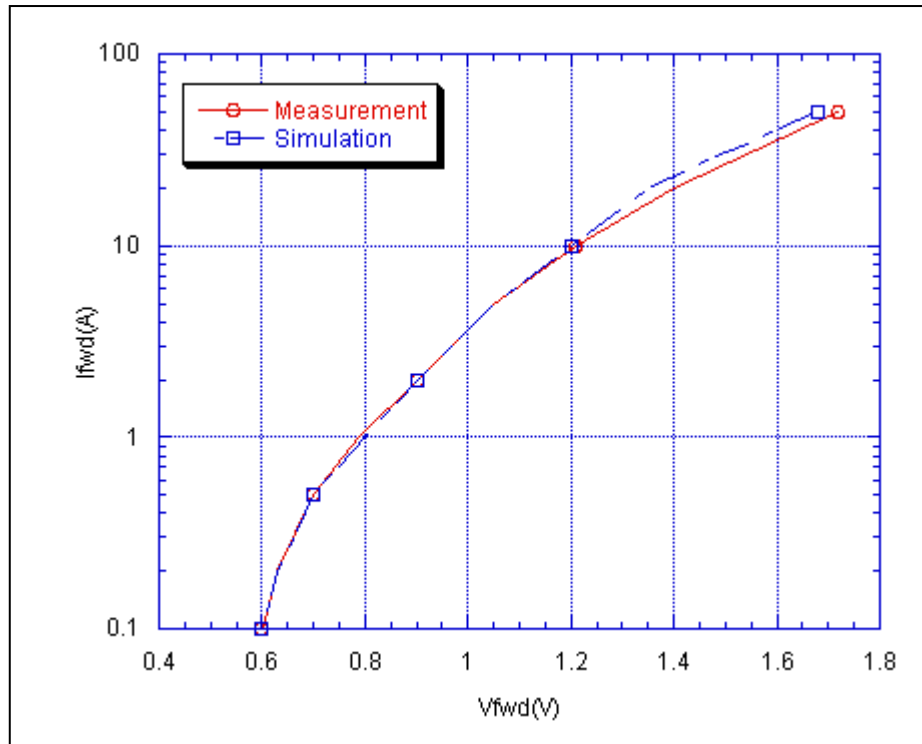


### Evaluation circuit



## Comparison graph

### Circuit Simulation Result

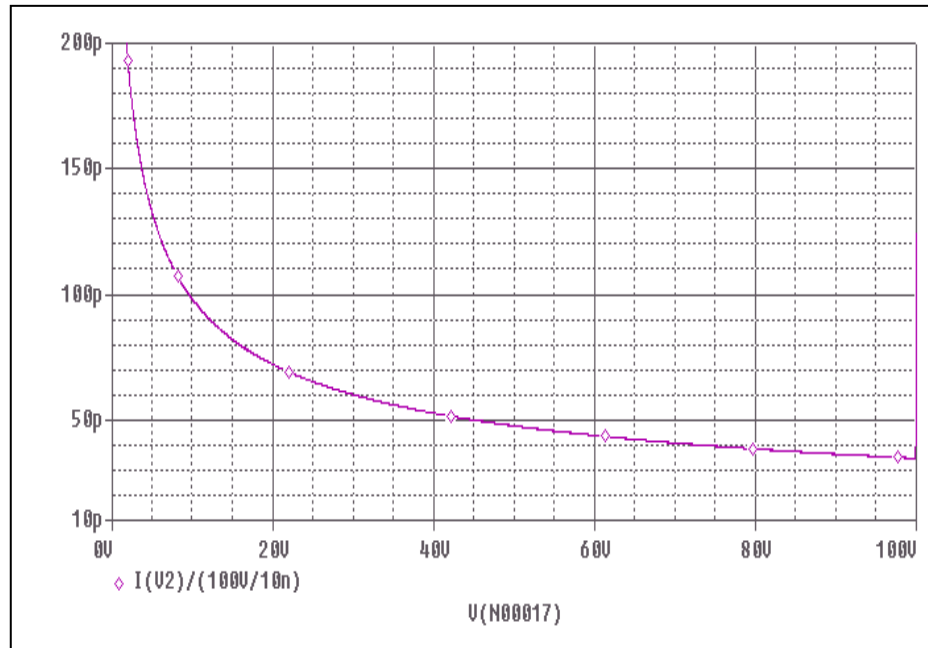


### Simulation Result

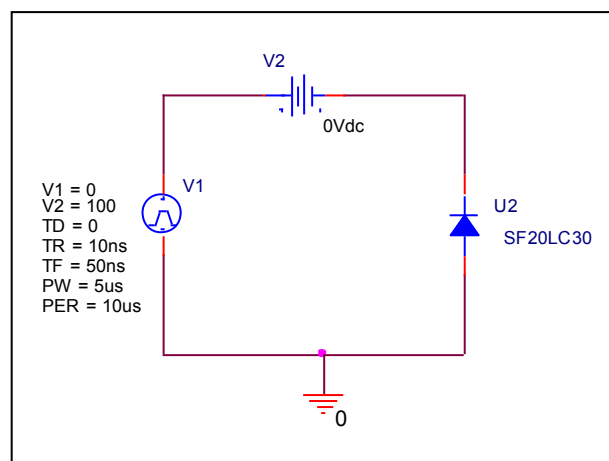
| <b><math>I_{fwd}</math> (A)</b> | <b><math>V_{fwd}</math> (V)<br/>Measurement</b> | <b><math>V_{fwd}</math> (V)<br/>Simulation</b> | <b>%Error</b> |
|---------------------------------|-------------------------------------------------|------------------------------------------------|---------------|
| 0.1                             | 0.600                                           | 0.600                                          | 0.00          |
| 0.2                             | 0.630                                           | 0.630                                          | 0.00          |
| 0.5                             | 0.700                                           | 0.700                                          | 0.00          |
| 1                               | 0.790                                           | 0.800                                          | -1.27         |
| 2                               | 0.900                                           | 0.900                                          | 0.00          |
| 5                               | 1.050                                           | 1.050                                          | 0.00          |
| 10                              | 1.210                                           | 1.200                                          | 0.83          |
| 20                              | 1.400                                           | 1.350                                          | 3.57          |
| 50                              | 1.720                                           | 1.680                                          | 2.33          |

# Junction Capacitance Characteristic

## Circuit Simulation Result

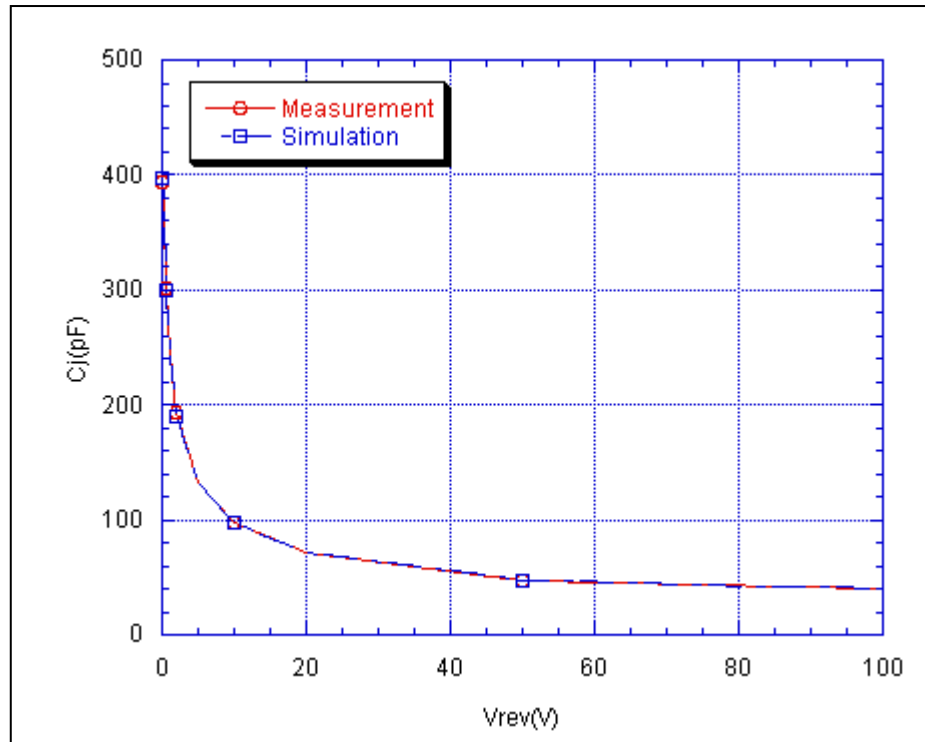


## Evaluation circuit



## Comparison graph

### Circuit Simulation Result

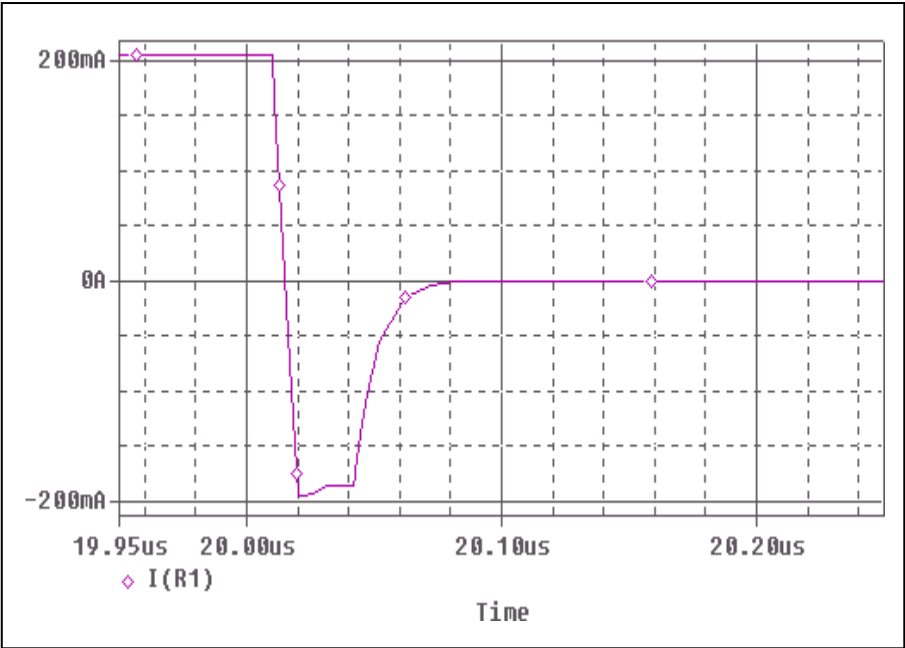


### Simulation Result

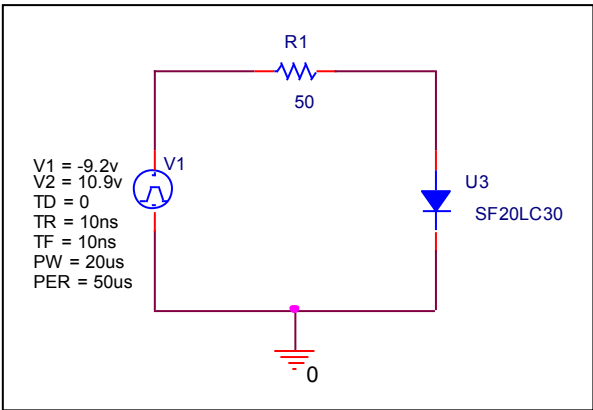
| <b>Vrev (V)</b> | <b>Cj(pF)<br/>Measurement</b> | <b>Cj(pF)<br/>Simulation</b> | <b>%Error</b> |
|-----------------|-------------------------------|------------------------------|---------------|
| 0               | 437.320                       | 437.320                      | 0.00          |
| 0.1             | 393.370                       | 396.850                      | -0.88         |
| 0.2             | 369.930                       | 365.148                      | 1.29          |
| 0.5             | 301.080                       | 299.224                      | 0.62          |
| 1               | 244.790                       | 247.844                      | -1.25         |
| 2               | 192.800                       | 190.064                      | 1.42          |
| 5               | 133.090                       | 132.941                      | 0.11          |
| 10              | 97.618                        | 98.170                       | -0.57         |
| 20              | 71.454                        | 71.454                       | 0.00          |
| 50              | 46.989                        | 47.535                       | -1.16         |
| 100             | 38.119                        | 37.734                       | 1.01          |

# Reverse Recovery Characteristic

## Circuit Simulation Result



## Evaluation circuit

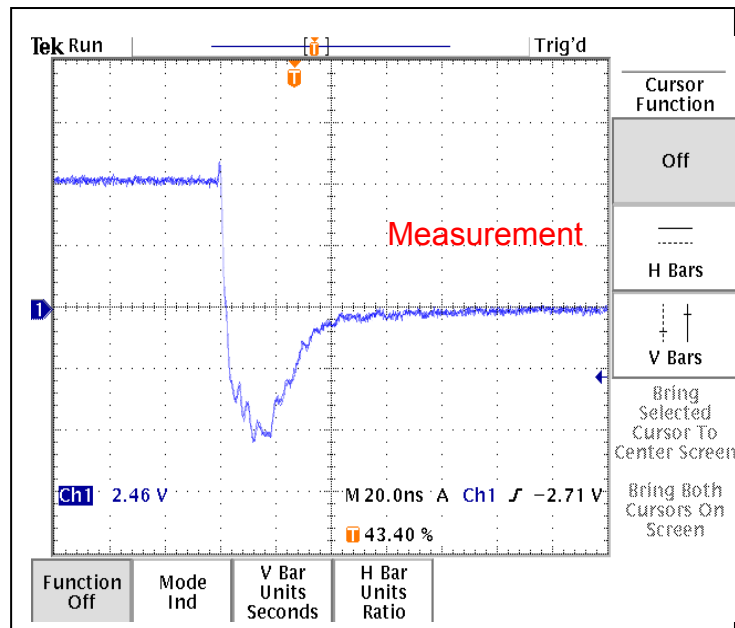


## Compare Measurement vs. Simulation

|     | Measurement |    | Simulation |    | Error (%) |
|-----|-------------|----|------------|----|-----------|
| trj | 14.8        | ns | 14.95      | ns | 1.03      |
| trb | 30.00       | ns | 29.92      | ns | 0.23      |

## Reverse Recovery Characteristic

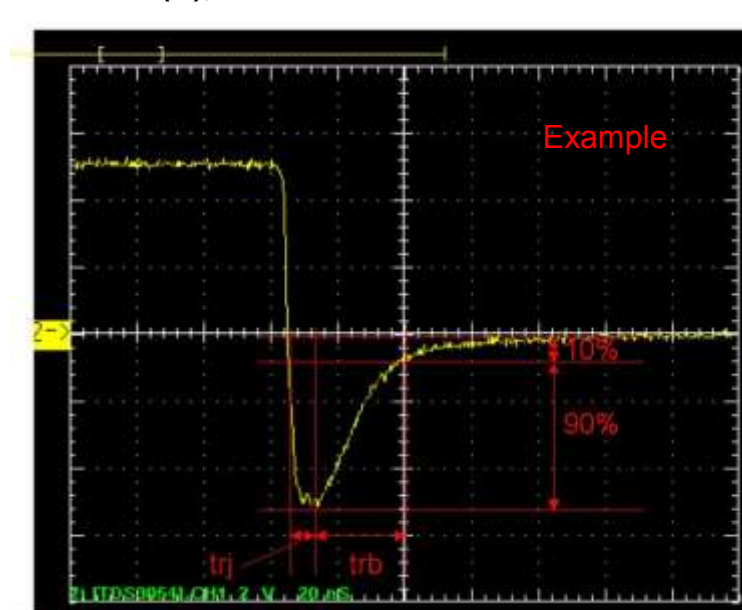
## Reference



$tr_j = 14.8(\text{ns})$

$tr_b = 30(\text{ns})$

Conditions:  $I_{fwd} = I_{rev} = 0.2(\text{A})$ ,  $R_I = 50$



Relation between  $tr_j$  and  $tr_b$