

# Device Modeling Report

COMPONENTS:  
DIODE/ GENERAL PURPOSE RECTIFIER / PROFESSIONAL  
PART NUMBER: 1SR154-400  
MANUFACTURER: ROHM  
REMARK: TC=80C

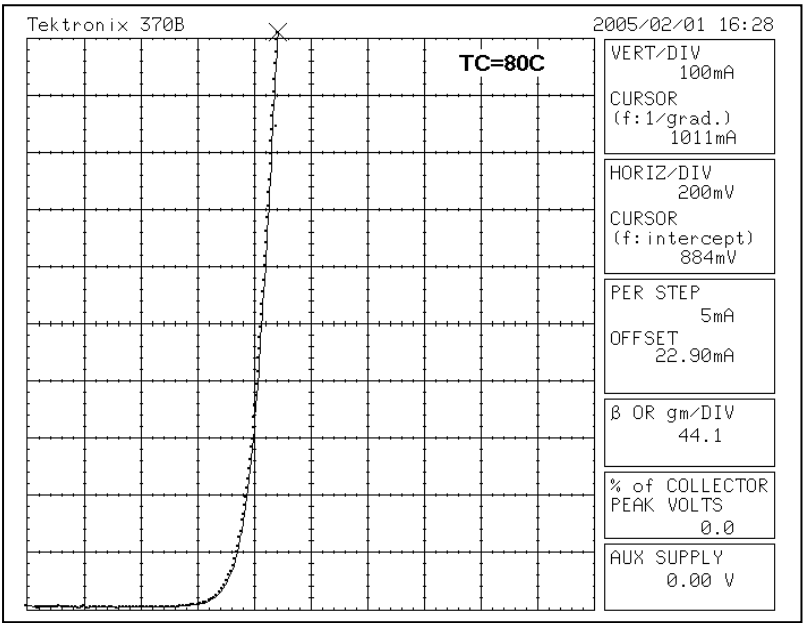


**Bee Technologies Inc.**

| 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                             |

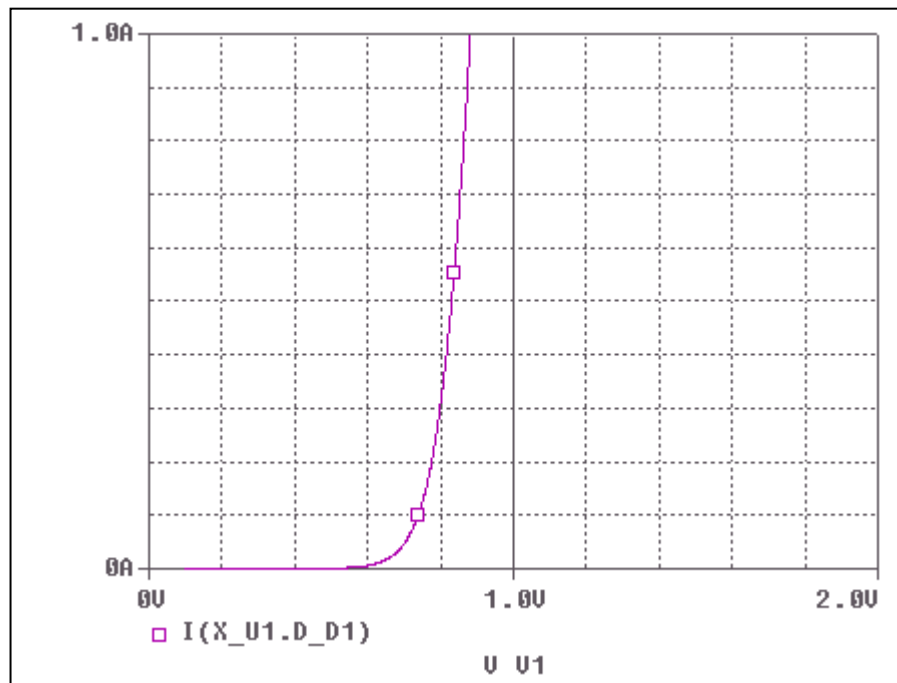
Forward Current Characteristic

Reference

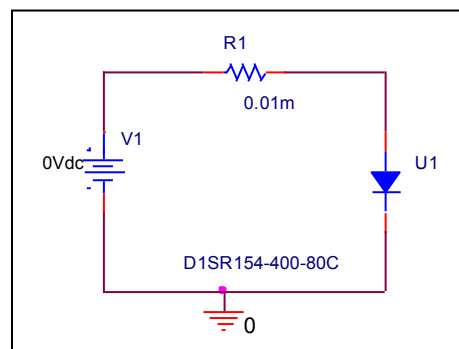


## Forward Current Characteristic

### Circuit Simulation Result

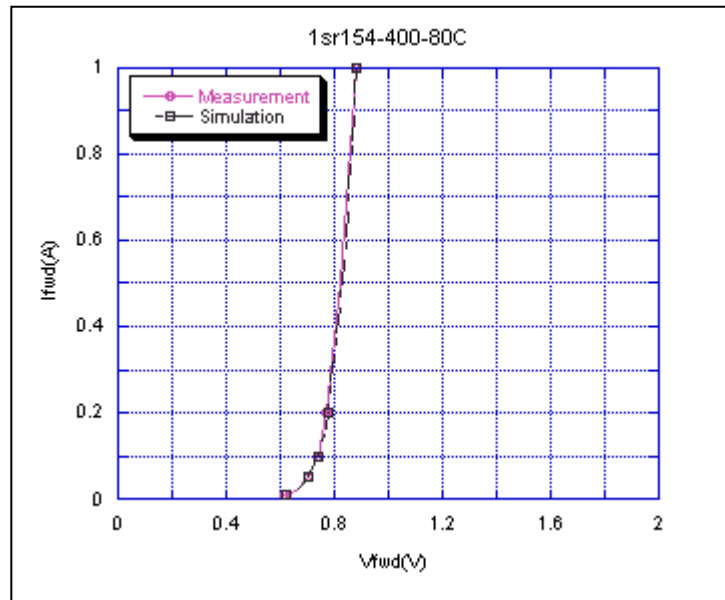


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

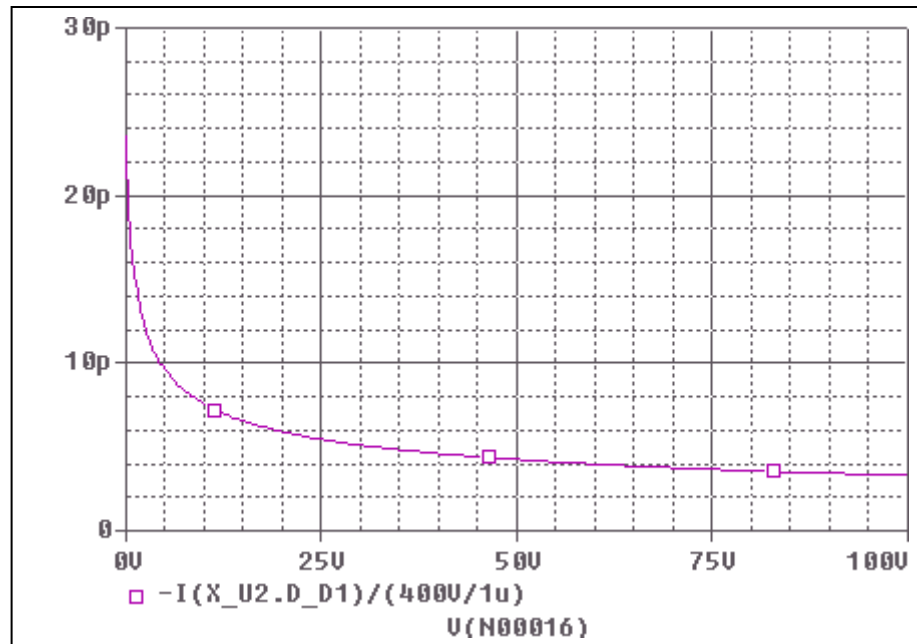


### Simulation Result

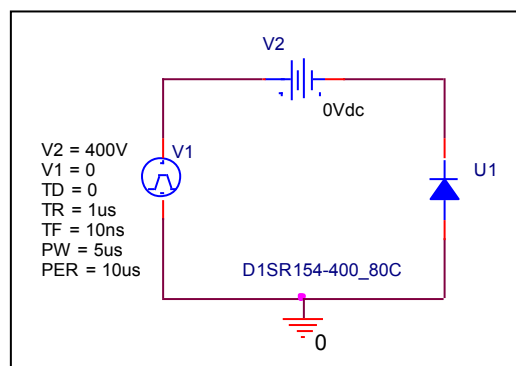
| Ifwd(A) | Vfwd(V)<br>Measurement | Vfwd(V)<br>Simulation | %Error |
|---------|------------------------|-----------------------|--------|
| 0.01    | 0.612                  | 0.625                 | -2.12  |
| 0.02    | 0.662                  | 0.658                 | 0.60   |
| 0.05    | 0.706                  | 0.703                 | 0.42   |
| 0.1     | 0.742                  | 0.738                 | 0.54   |
| 0.2     | 0.772                  | 0.775                 | -0.39  |
| 0.5     | 0.826                  | 0.830                 | -0.48  |
| 1       | 0.884                  | 0.881                 | 0.34   |

## Capacitance Characteristic

### Circuit Simulation Result

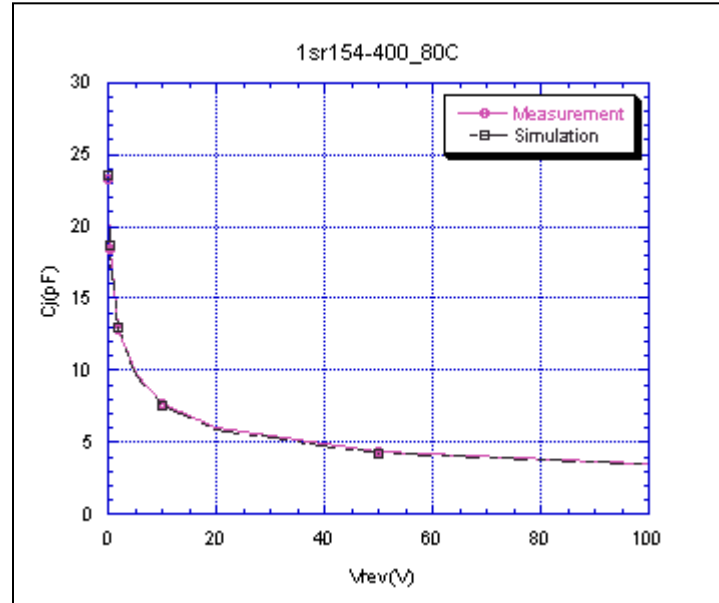


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

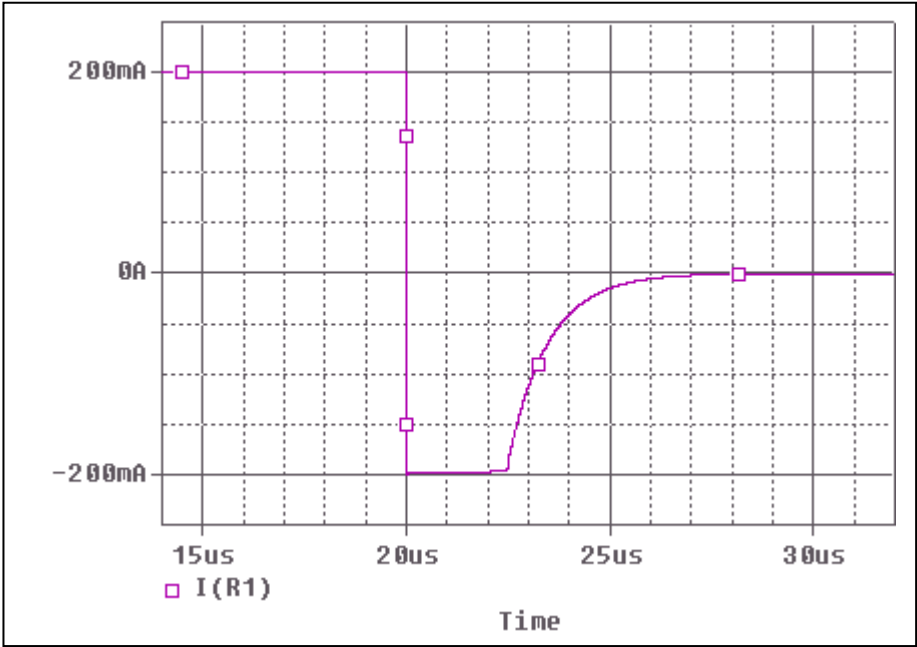


### Simulation Result

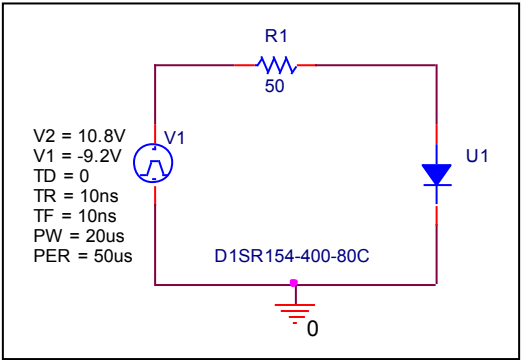
| Vrev(V) | Cj(pF)<br>Measurement | Cj(pF)<br>Simulation | %Error |
|---------|-----------------------|----------------------|--------|
| 0       | 25.593                | 25.593               | 0.00   |
| 0.1     | 23.299                | 23.521               | -0.95  |
| 0.2     | 21.684                | 21.851               | -0.77  |
| 0.5     | 18.397                | 18.730               | -1.81  |
| 1       | 15.670                | 15.870               | -1.28  |
| 2       | 12.888                | 12.974               | -0.67  |
| 5       | 9.715                 | 9.629                | 0.89   |
| 10      | 7.701                 | 7.588                | 1.47   |
| 20      | 6.045                 | 5.930                | 1.90   |
| 50      | 4.363                 | 4.250                | 2.59   |
| 100     | 3.429                 | 3.303                | 3.67   |

# Reverse Recovery Characteristic

## Circuit Simulation Result



## Evaluation Circuit

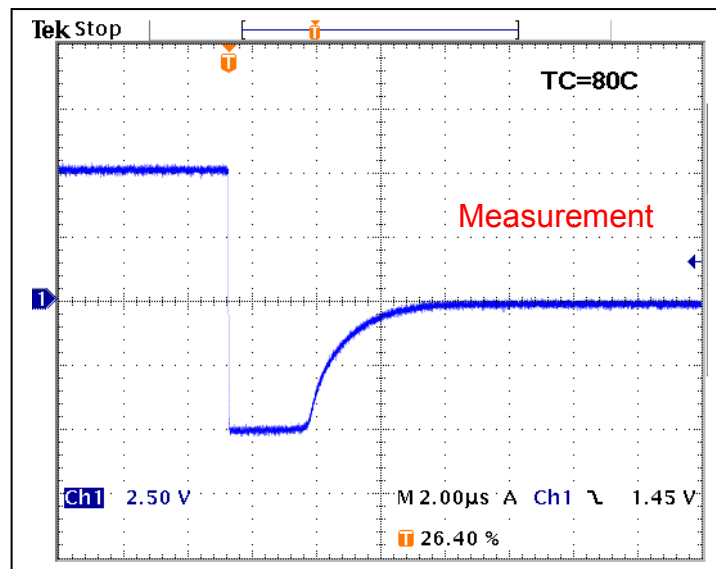


## Compare Measurement vs. Simulation

|     | Measurement |    | Simulation |    | %Error |
|-----|-------------|----|------------|----|--------|
| trj | 2.48        | us | 2.46       | us | 0.60   |
| trb | 2.20        | us | 2.22       | us | 0.90   |

## Reverse Recovery Characteristic

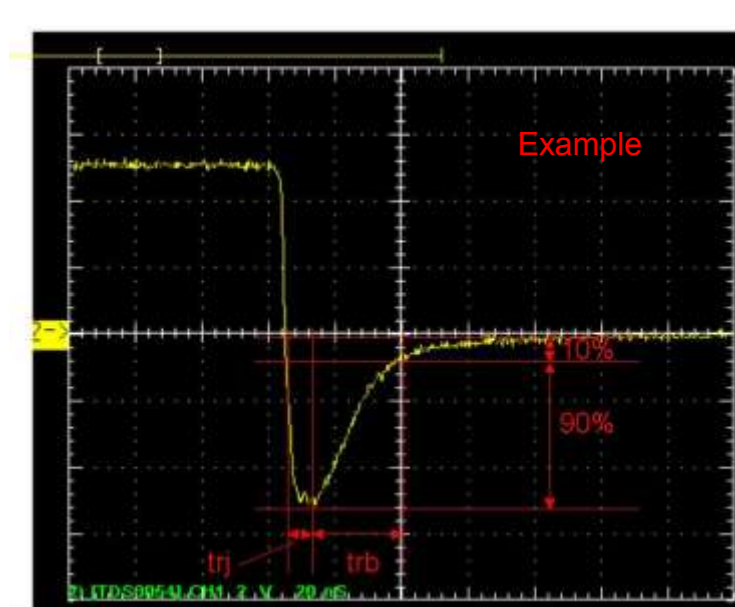
## Reference



$T_{rj} = 2.48(\mu s)$

$T_{rb} = 2.20(\mu s)$

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



Relation between  $t_{rj}$  and  $t_{rb}$