

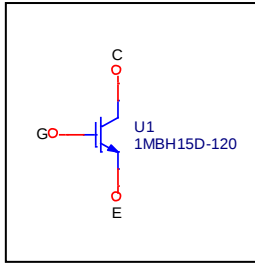
# Device Modeling Report

COMPONENTS: Insulated Gate Bipolar Transistor (IGBT)  
PART NUMBER: 1MBH15D-120  
MANUFACTURER: FUJI ELECTRIC



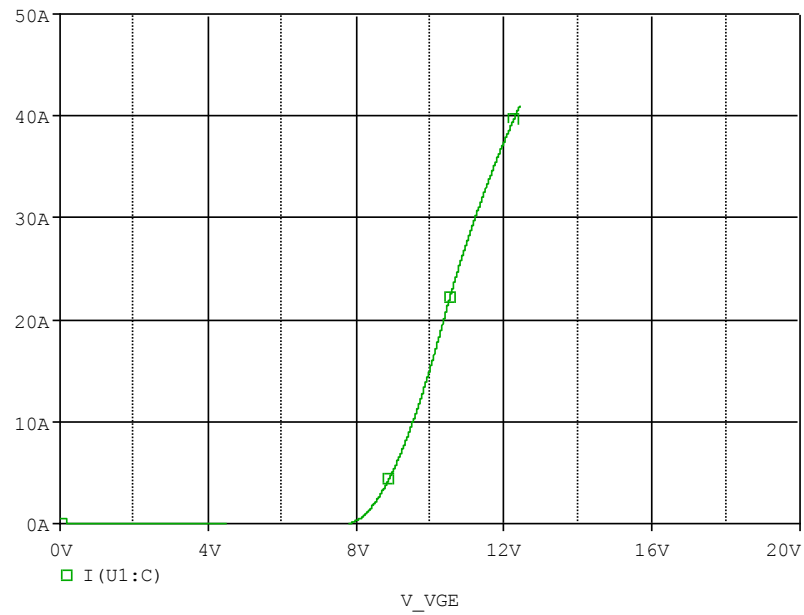
**Bee Technologies Inc.**

## Circuit Configuration

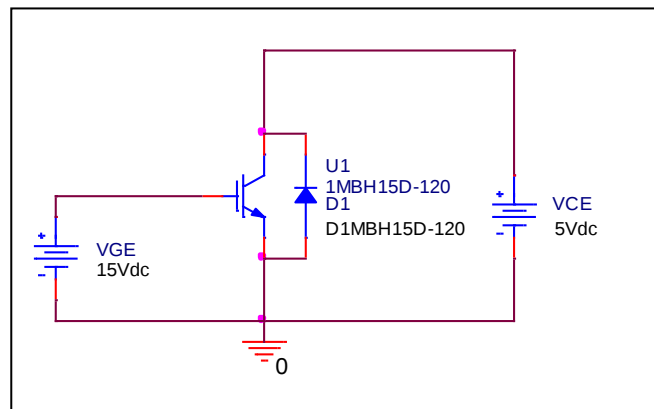


# Transfer Characteristics

## Circuit Simulation result

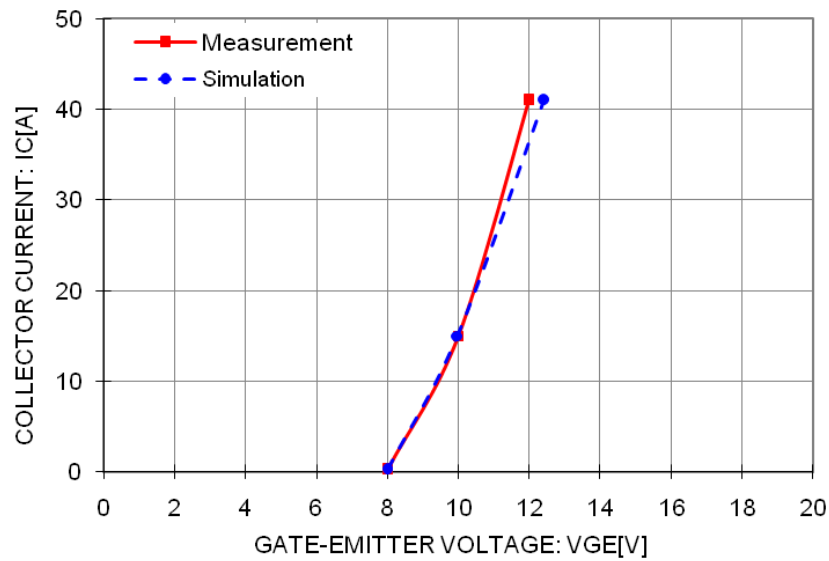


## Evaluation circuit



## Comparison Graph

Simulation result



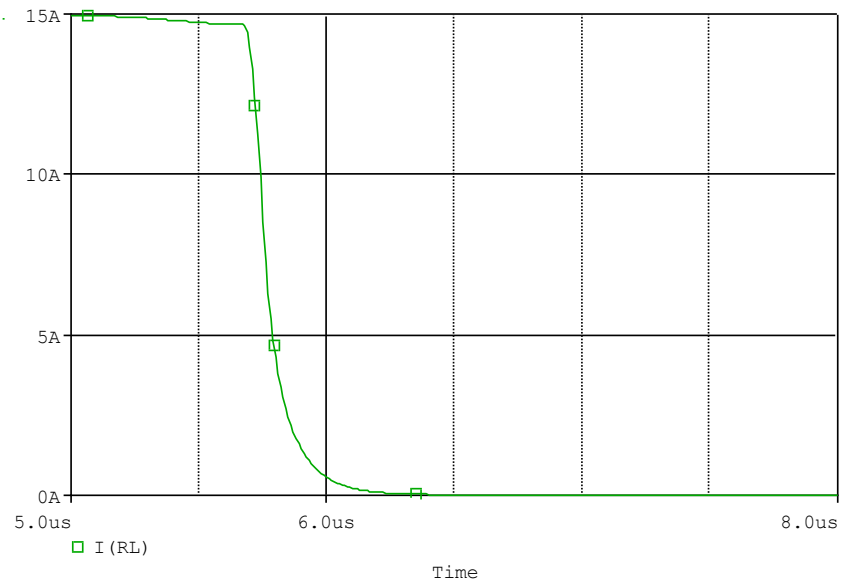
Comparison table

Test condition:  $V_{CE} = 5$  (V)

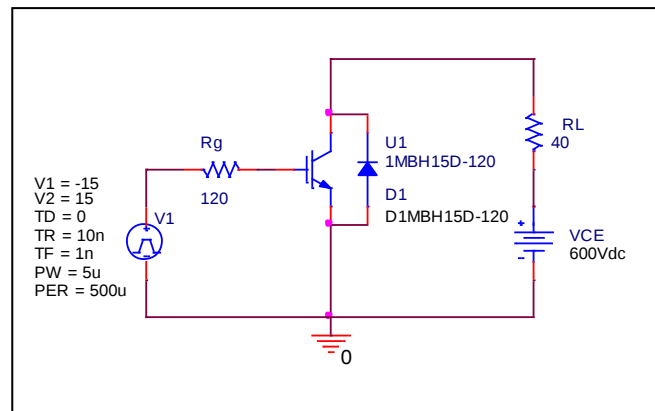
| IC (A) | VGE (V)     |            | %Error |
|--------|-------------|------------|--------|
|        | Measurement | Simulation |        |
| 0.250  | 8.000       | 7.997      | -0.04  |
| 15.000 | 10.000      | 9.984      | -0.16  |
| 41.000 | 12.000      | 12.430     | 3.58   |

# Fall Time Characteristics

## Circuit Simulation result



## Evaluation circuit

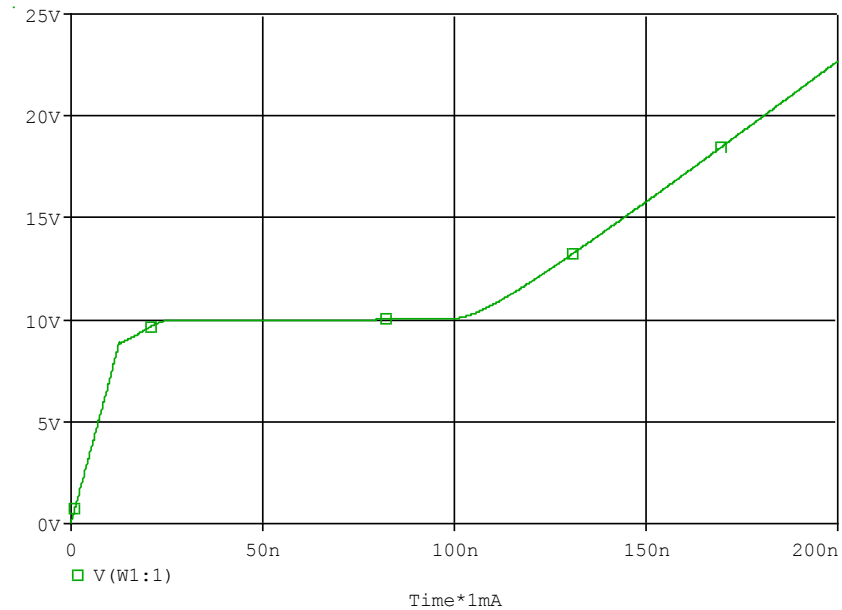


Test condition:  $I_C=15$  (A),  $V_{CC}=600$  (V)

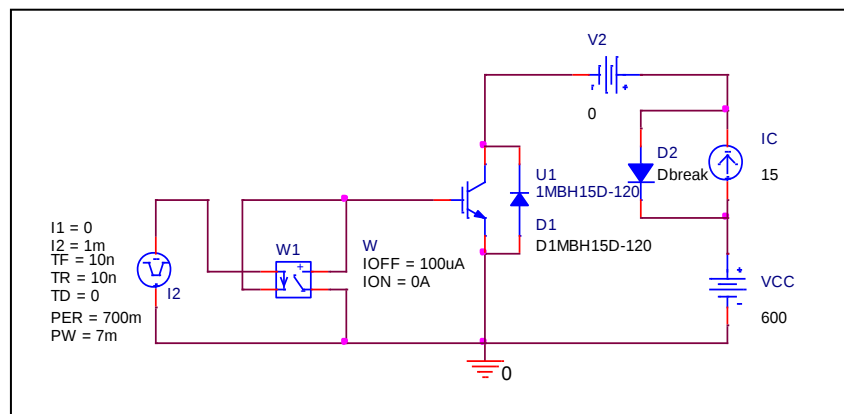
| Parameter | Unit | Measurement | Simulation | %Error |
|-----------|------|-------------|------------|--------|
| tf        | us   | 0.190       | 0.191      | 0.29   |

# Gate Charge Characteristics

## Circuit Simulation result



## Evaluation circuit

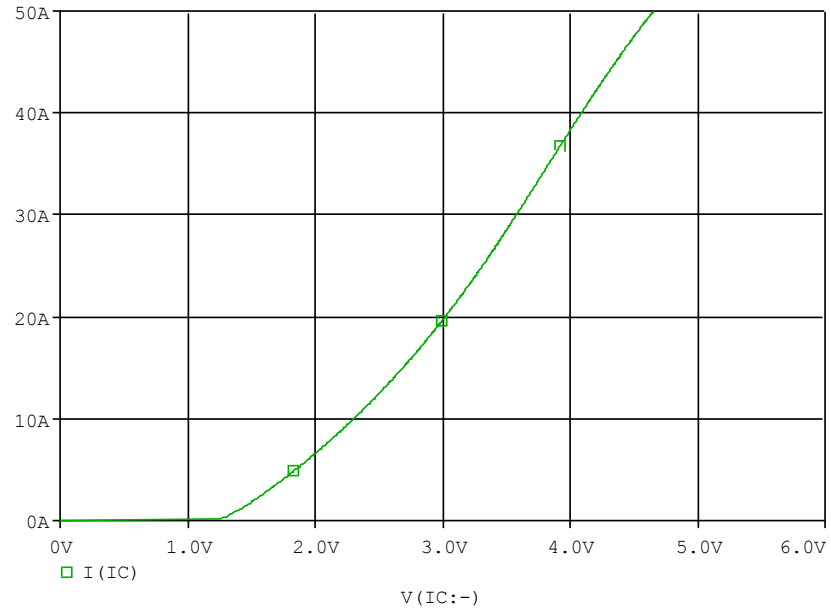


Test condition: VCC=600 (V), IC=15 (A), VGE=15 (V)

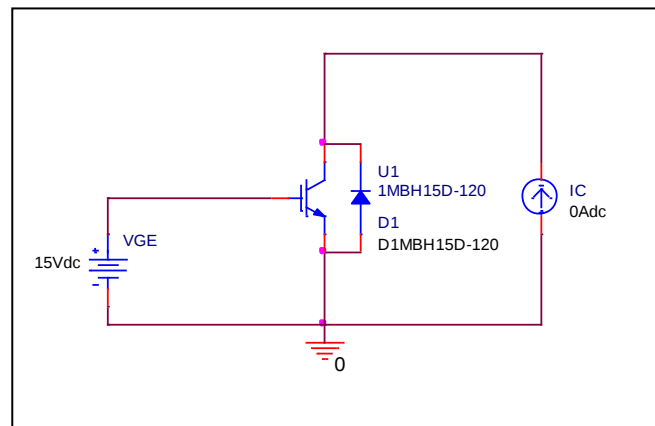
| Parameter | Unit | Measurement | Simulation | %Error |
|-----------|------|-------------|------------|--------|
| Qge       | nc   | 18.000      | 18.182     | 1.01   |
| Qgc       | nc   | 80.000      | 81.091     | 1.36   |
| Qg        | nc   | 140.000     | 142.738    | 1.96   |

## Saturation Characteristics

### Circuit Simulation result

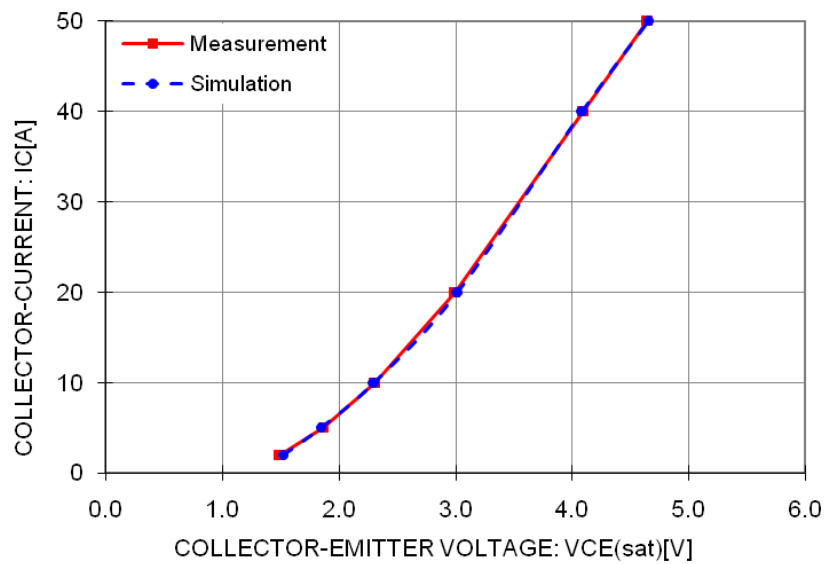


### Evaluation circuit



## Comparison Graph

### Simulation result



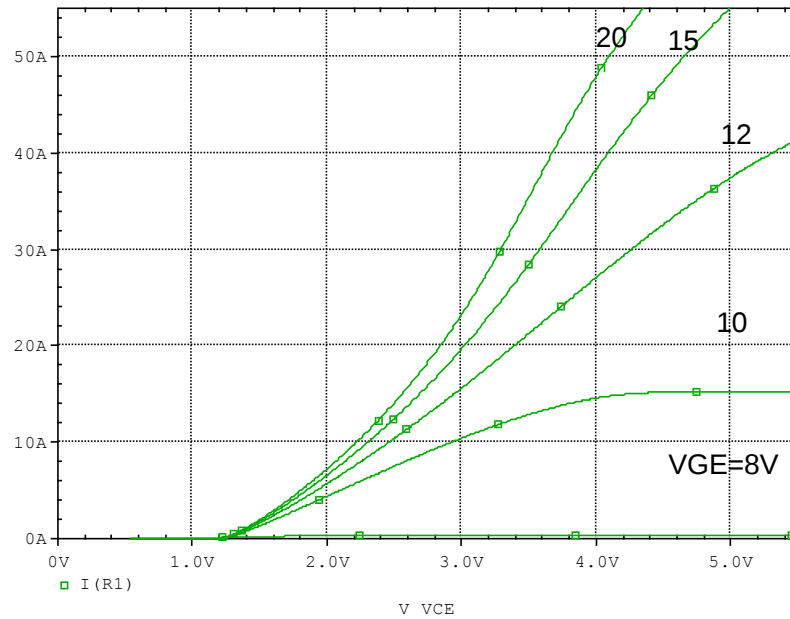
### Comparison table

Test condition:  $V_{GE} = 15$  (V)

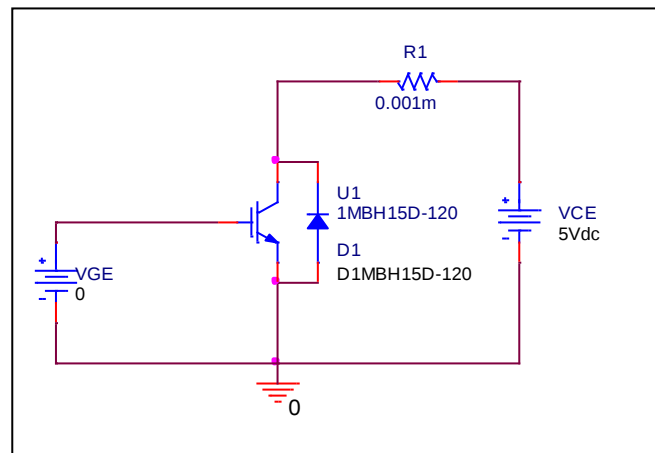
| IC(A) | VCE (V)     |            | %Error |
|-------|-------------|------------|--------|
|       | Measurement | Simulation |        |
| 2     | 1.500       | 1.521      | 1.42   |
| 5     | 1.870       | 1.846      | -1.26  |
| 10    | 2.315       | 2.303      | -0.51  |
| 20    | 3.000       | 3.020      | 0.67   |
| 40    | 4.100       | 4.089      | -0.28  |
| 50    | 4.650       | 4.654      | 0.09   |

## Output Characteristics

### Circuit Simulation result

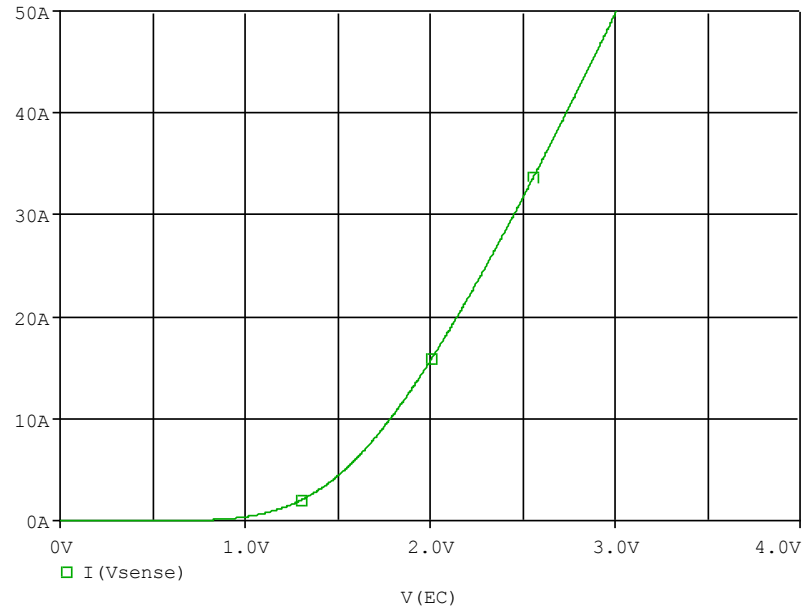


### Evaluation circuit

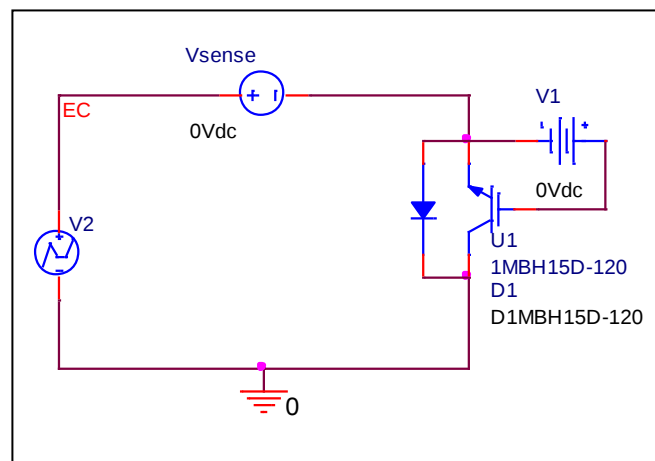


## FWD Forward Current Characteristics

### Circuit Simulation result

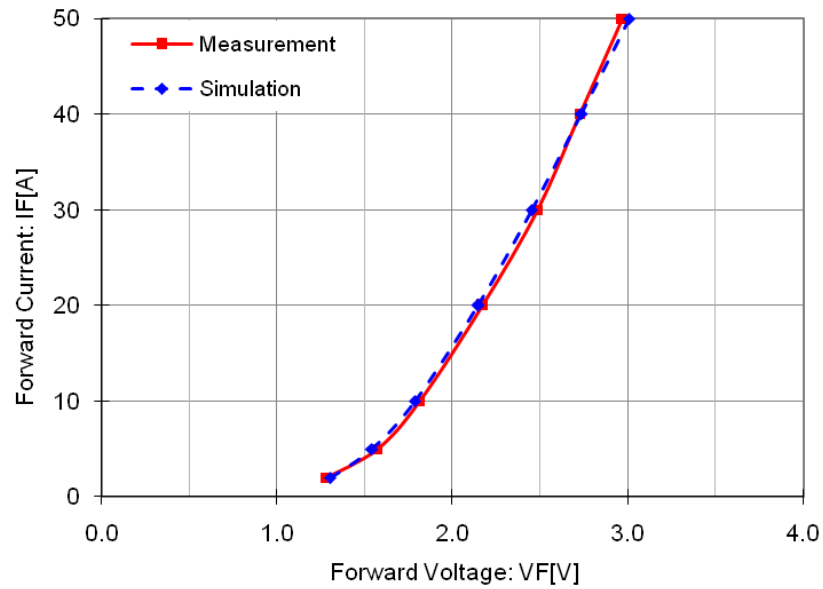


### Evaluation circuit



## Comparison Graph

Simulation result

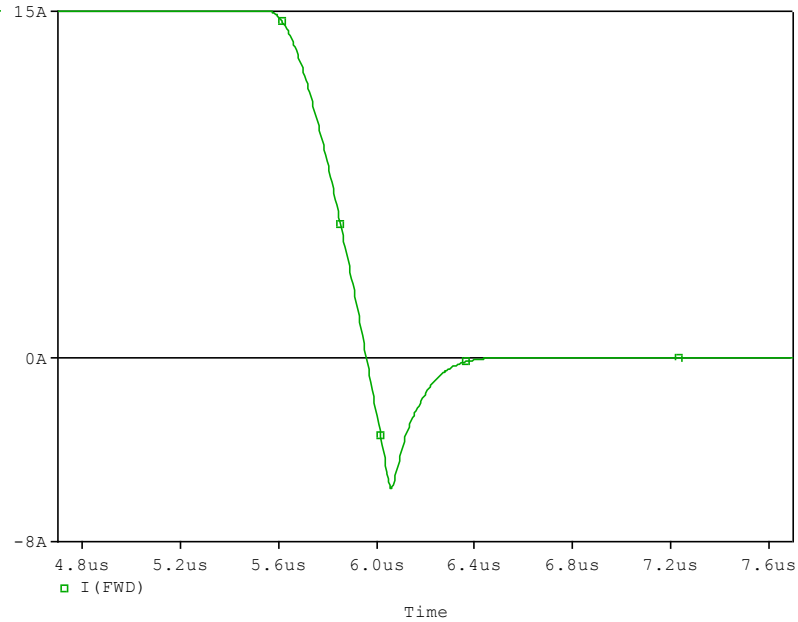


Comparison table

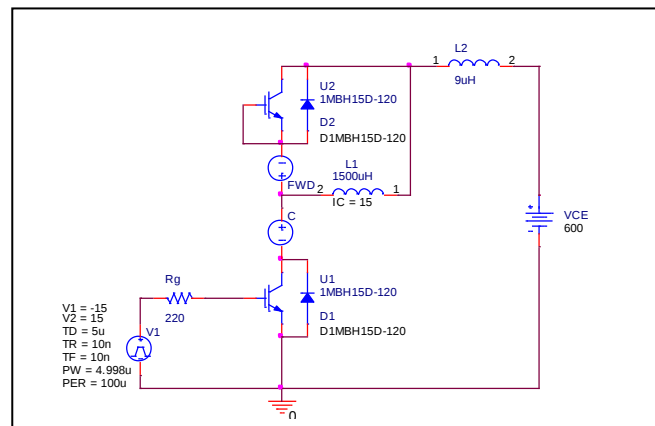
| IF(A) | VF (V)      |            | %Error |
|-------|-------------|------------|--------|
|       | Measurement | Simulation |        |
| 2     | 1.275       | 1.302      | 2.09   |
| 5     | 1.570       | 1.540      | -1.93  |
| 10    | 1.815       | 1.786      | -1.63  |
| 20    | 2.175       | 2.146      | -1.32  |
| 30    | 2.485       | 2.453      | -1.31  |
| 40    | 2.725       | 2.736      | 0.41   |
| 50    | 2.970       | 3.008      | 1.27   |

# Reverse Recovery Characteristics

## Circuit Simulation result



## Evaluation circuit



Test condition:  $V_{CC}=600$  (V),  $I_C=15$  (A),  $-di/dt=45$  (A/ $\mu s$ )

| Parameter | Unit | Measurement | Simulation | %Error |
|-----------|------|-------------|------------|--------|
| trr       | nsec | 290.000     | 328.862    | 13.40  |
| Irr       | A    | 5.700       | 5.698      | 0.04   |