

# Device Modeling Report

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PART NUMBER: 3P4MH  
MANUFACTURER: NEC



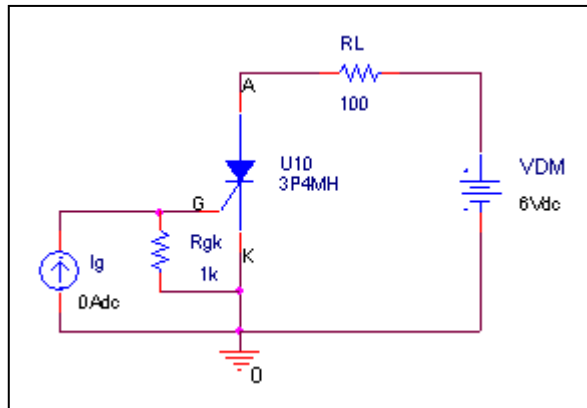
**Bee Technologies Inc.**

## DIODE MODEL

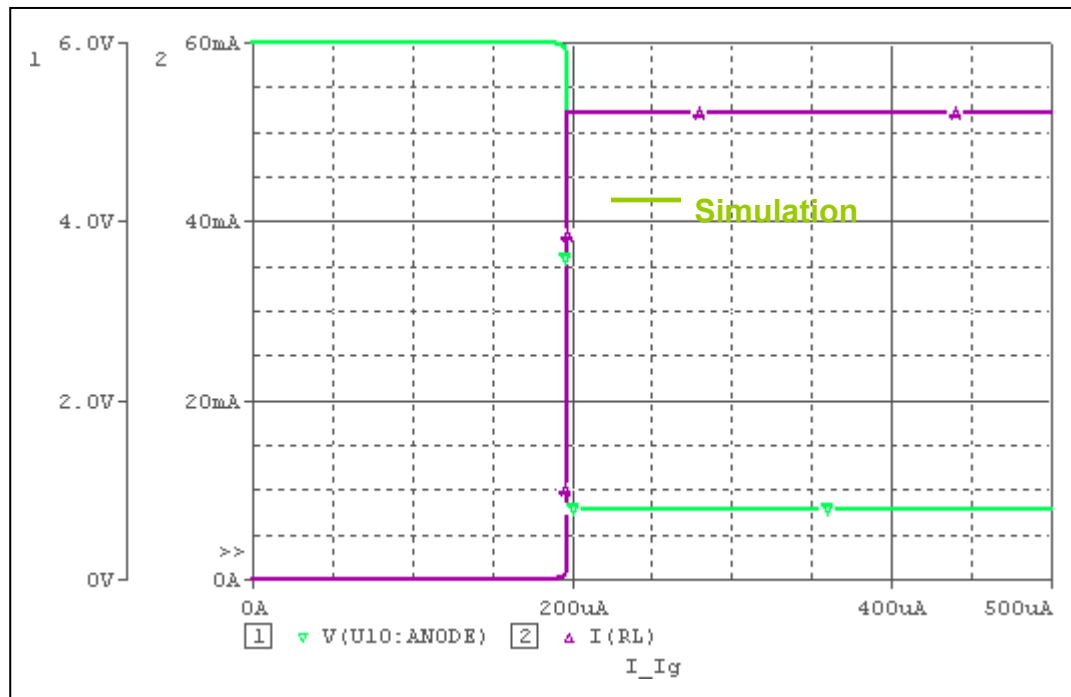
| Pspice model Parameter | Model description                           |
|------------------------|---|
| IS                     | Saturation Current                          |
| N                      | Emission Coefficient                        |
| RS                     | Series Resistance                           |
| 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                                |

# IG-VT Characteristic

## Evaluation Circuit



## Simulation result

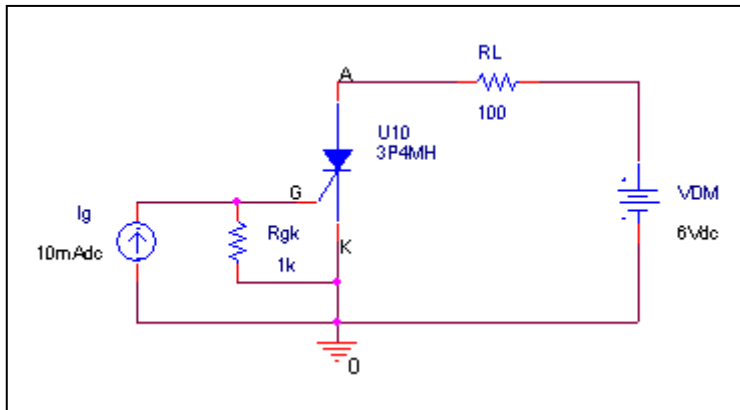


## Comparison Table

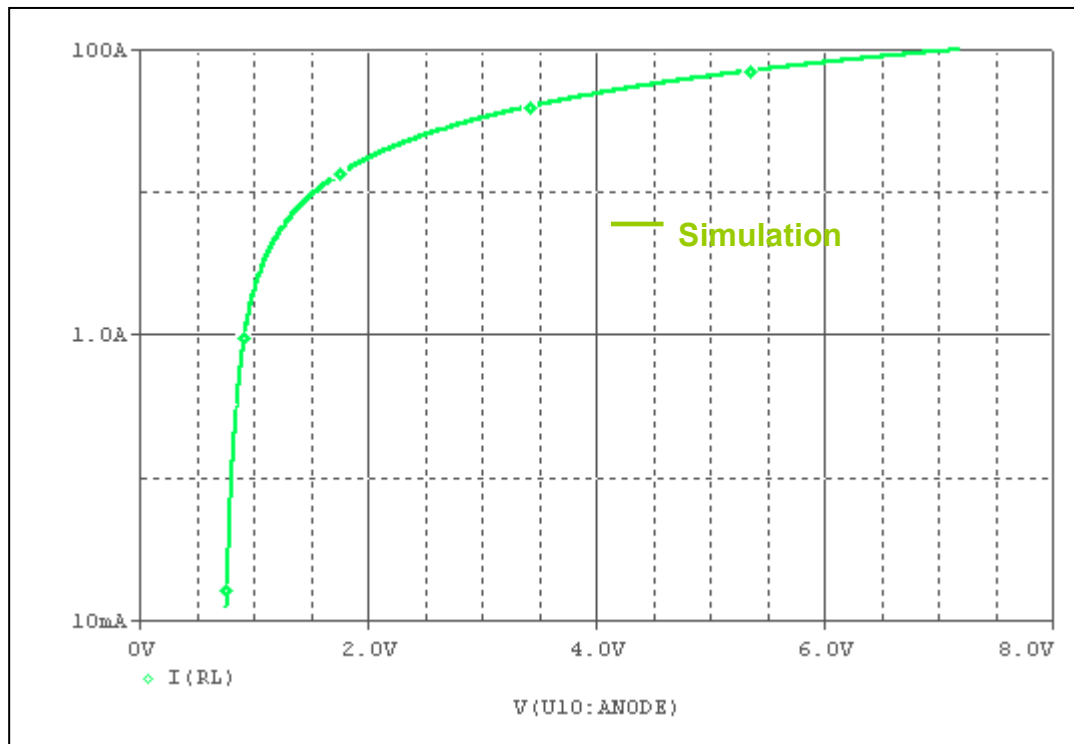
|                            | Measurement     | Simulation      | % Error       |
|----------------------------|-----------------|-----------------|---------------|
| <b>IG<sub>T</sub> (mA)</b> | <b>0.2(max)</b> | <b>0.196006</b> | <b>1.9970</b> |
| <b>V<sub>GT</sub> (V)</b>  | <b>0.8(max)</b> | <b>0.786130</b> | <b>1.7338</b> |

# ITM-VTM Characteristic

## Evaluation Circuit



## Simulation result

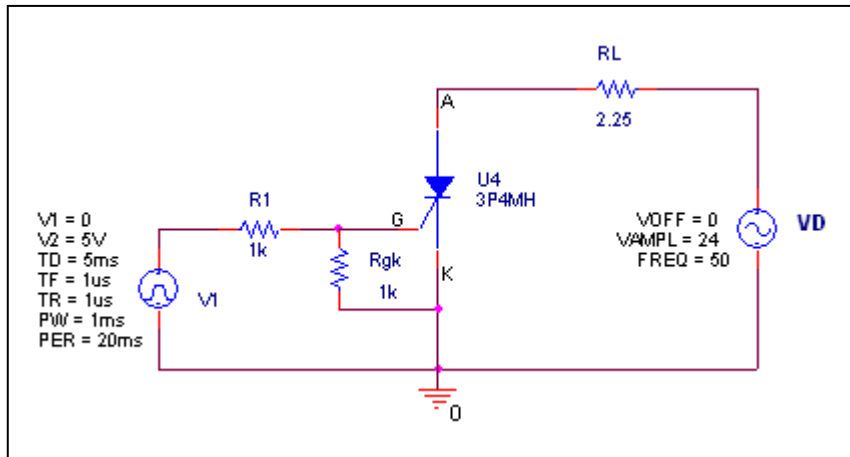


## Comparison Table

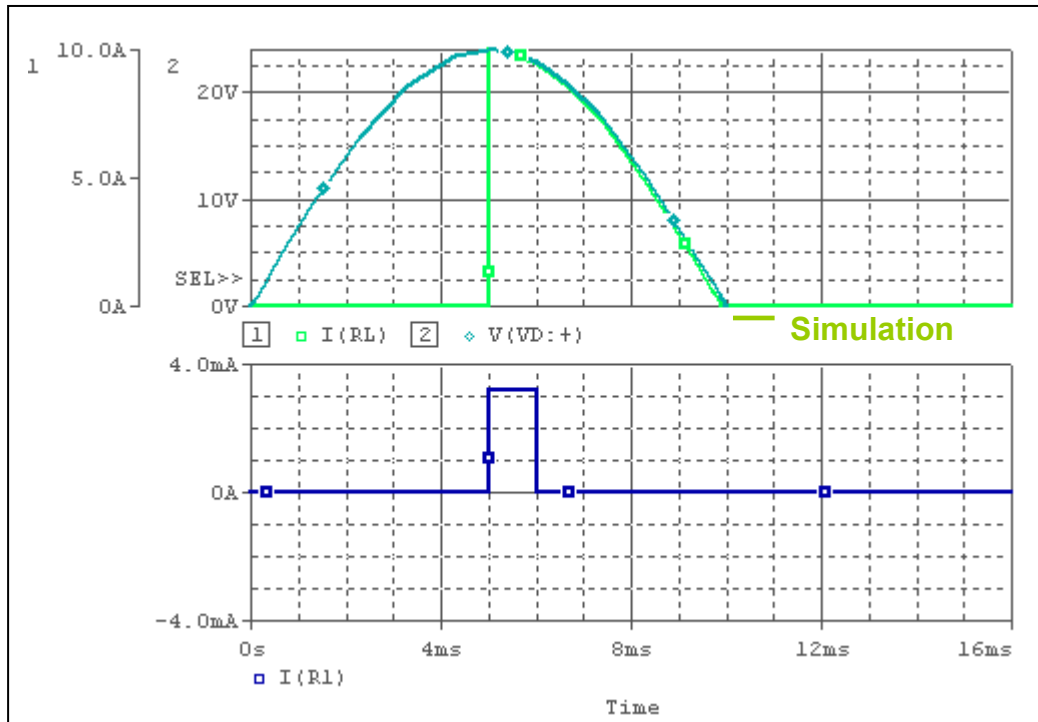
| At ITM=10A | Measurement | Simulation | % Error |
|------------|-------------|------------|---------|
| VTM(V)     | 1.6(max)    | 1.5422     | 3.6125  |

# Holding Characteristic (IH)

## Evaluation Circuit



## Simulation result

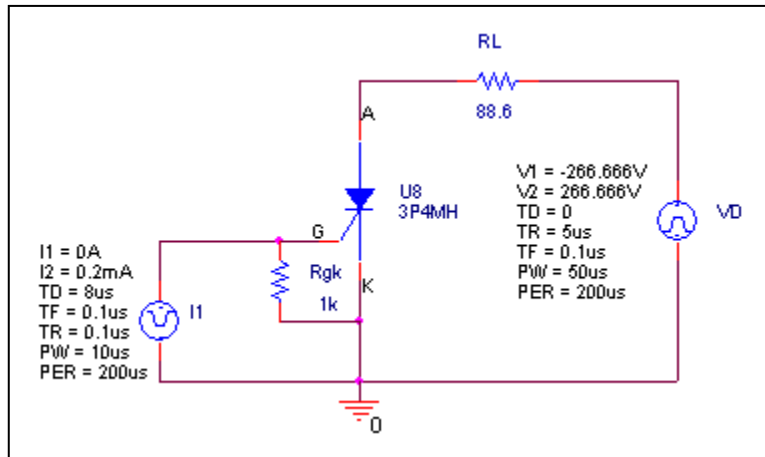


## Comparison Table

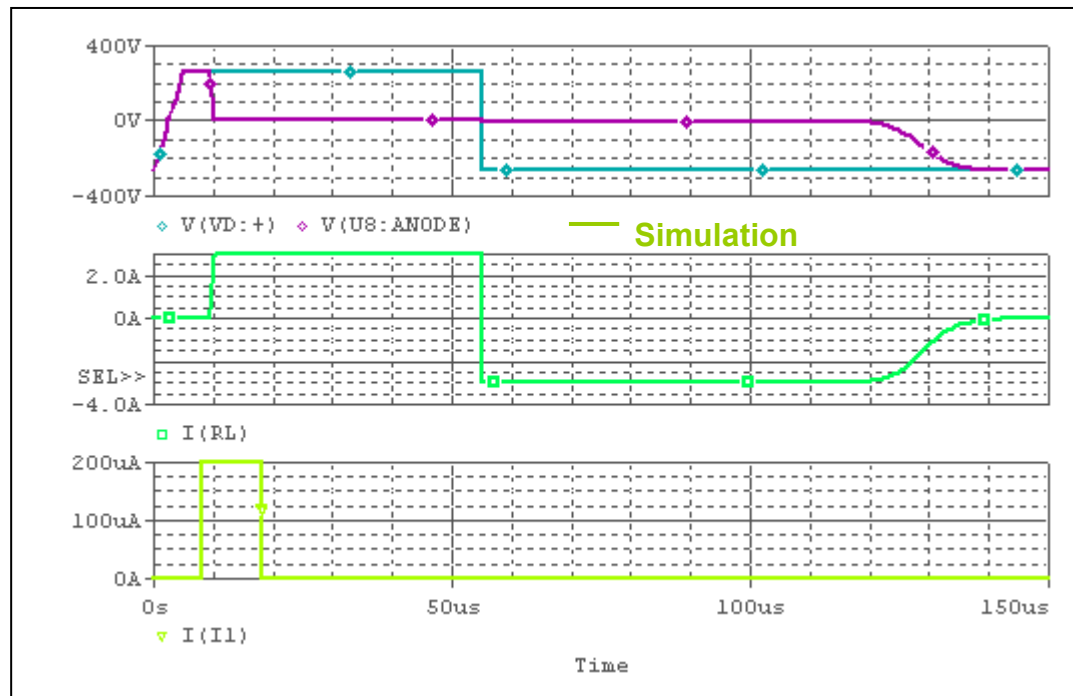
| $V_{DM}=24V, I_{TM}=10A$ | Measurement | Simulation | % Error |
|--------------------------|-------------|------------|---------|
| IH(mA)                   | 5(max)      | 4.9633     | 0.7340  |

# Switching Time Characteristic

## Evaluation Circuit



## Simulation result



## Comparison Table

|          | Measurement | Simulation | %Error  |
|----------|-------------|------------|---------|
| Toff(us) | 80          | 80.001     | -0.0013 |