

# Device Modeling Report

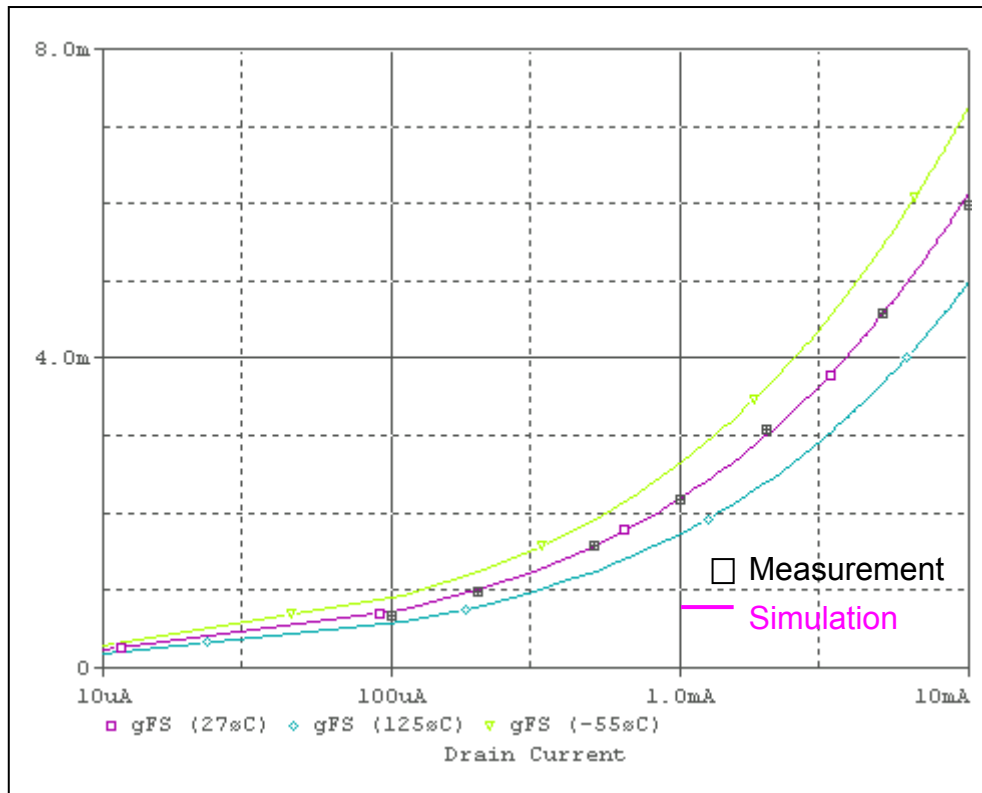
COMPONENTS: Junction Field Effect Transistor (JFET)  
PART NUMBER: 2N5486  
MANUFACTURER: Vishay Siliconix



**Bee Technologies Inc.**

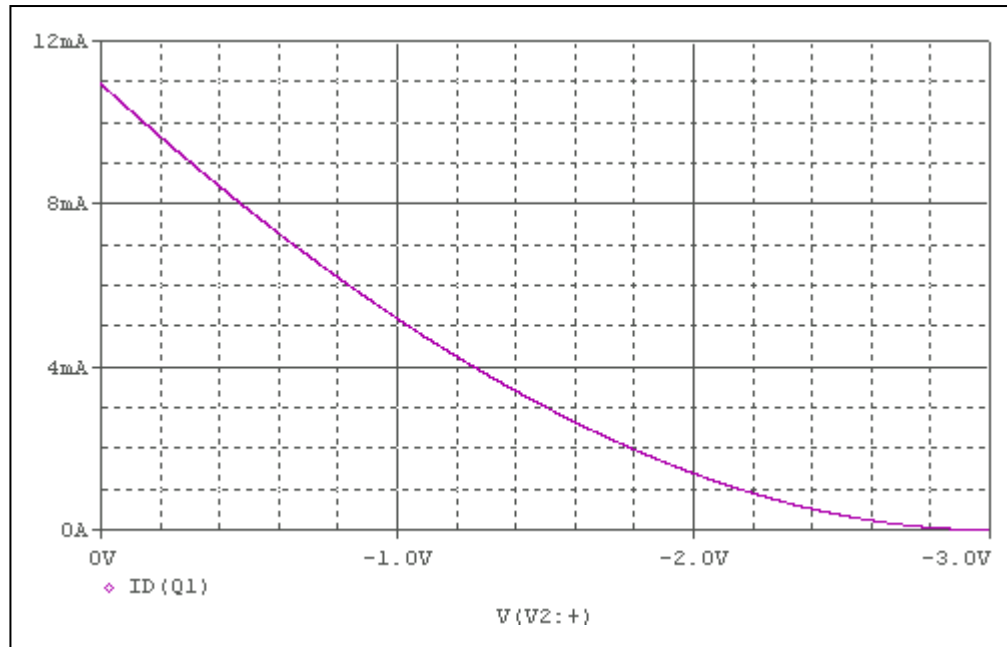
| PSpice model parameter | Model description                          |
|------------------------|--------------------------------------------|
| BETA                   | Transconductance coefficient               |
| RD                     | Drain resistance                           |
| RS                     | Source resistance                          |
| BETATCE                | Temperature coefficient for BETA           |
| LAMBDA                 | Channel-length modulation                  |
| VTO                    | Threshold voltage                          |
| VTOTC                  | Temperature coefficient for VTO            |
| CGD                    | Zero-bias gate-drain capacitance           |
| M                      | Junction grading factor                    |
| PB                     | Built-in potential                         |
| FC                     | Forward-bias coefficient                   |
| CGS                    | Zero-bias gate-source capacitance          |
| ISR                    | Recombination current saturation value     |
| NR                     | Recombination current emission coefficient |
| IS                     | Junction saturation current                |
| N                      | Junction emission coefficient              |
| XTI                    | IS temperature coefficient                 |
| ALPHA                  | Impact ionization coefficient              |
| VK                     | Ionization “knee” voltage                  |
| KF                     | Flicker noise coefficient                  |
| AF                     | Flicker noise exponent                     |

## Transconductance Characteristic

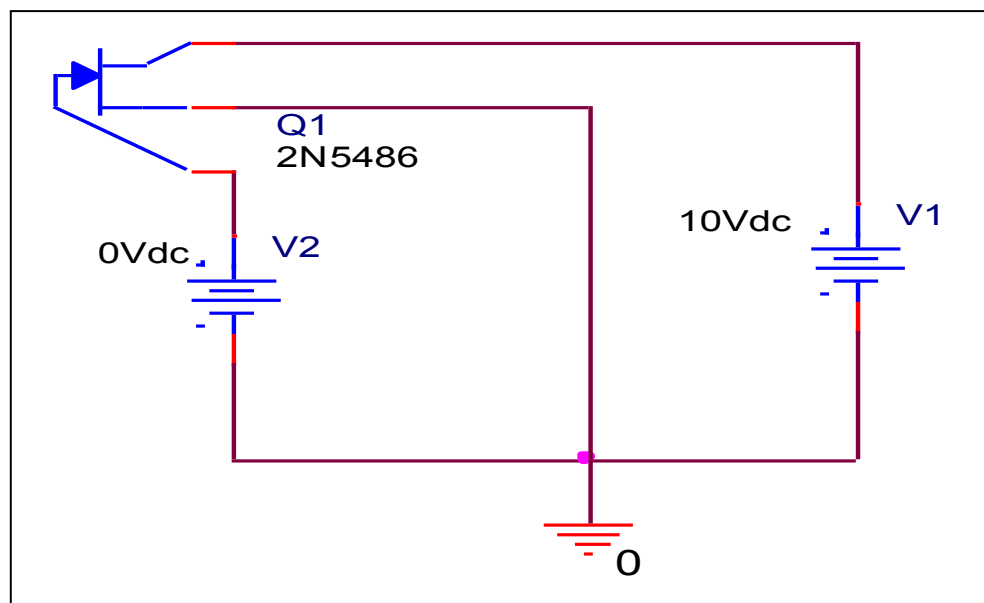


## Transfer Curve Characteristic

### Circuit Simulation Result

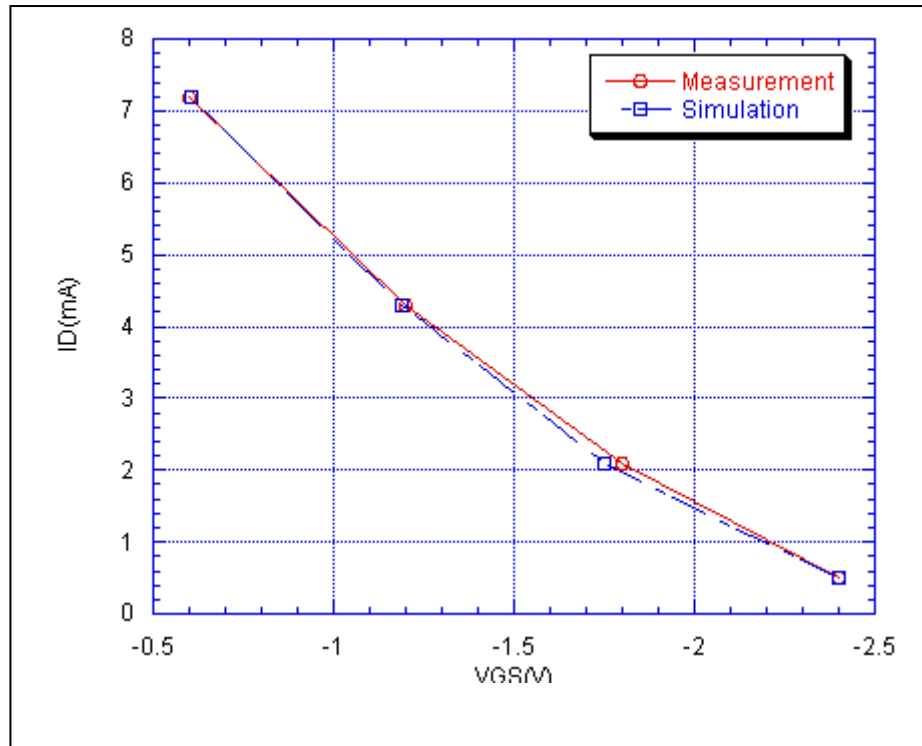


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

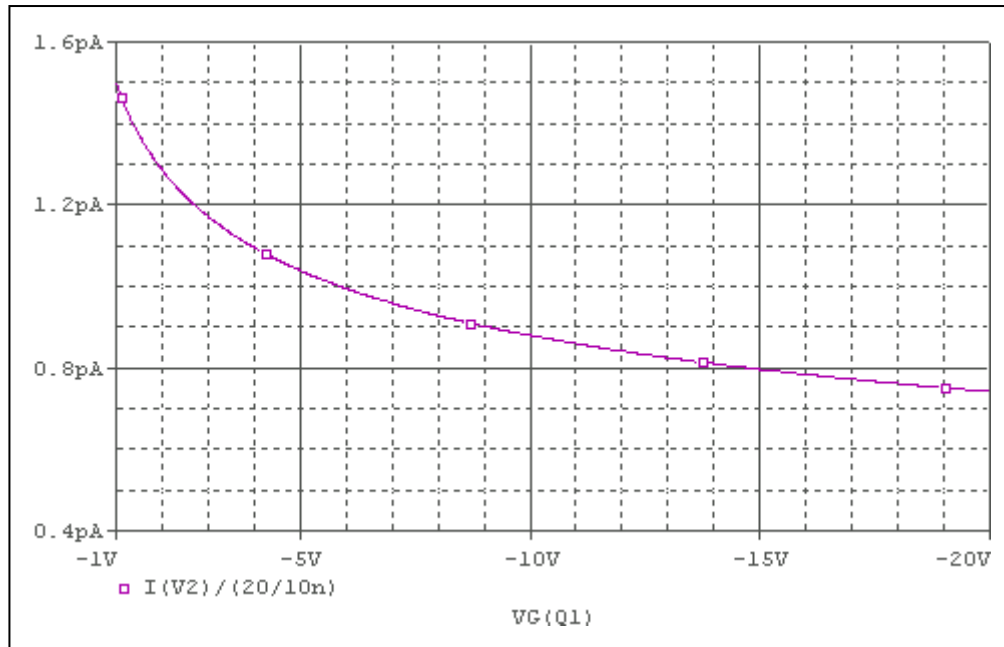


### Simulation Result

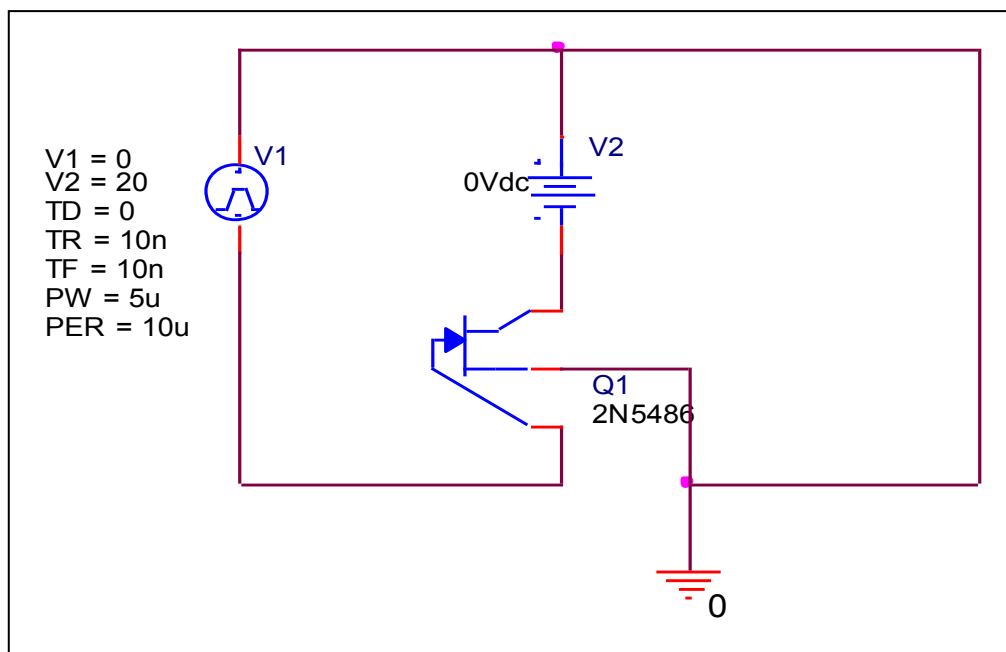
| ID (mA) | VGS (V)     |            | Error (%) |
|---------|-------------|------------|-----------|
|         | Measurement | Simulation |           |
| 7.2     | -0.6        | -0.608     | 1.333     |
| 4.3     | -1.2        | -1.19      | -0.833    |
| 2.1     | -1.8        | -1.75      | -2.777    |
| 0.5     | -2.4        | -2.4       | 0         |

## Reverse Transfer Capacitance

### Circuit Simulation Result

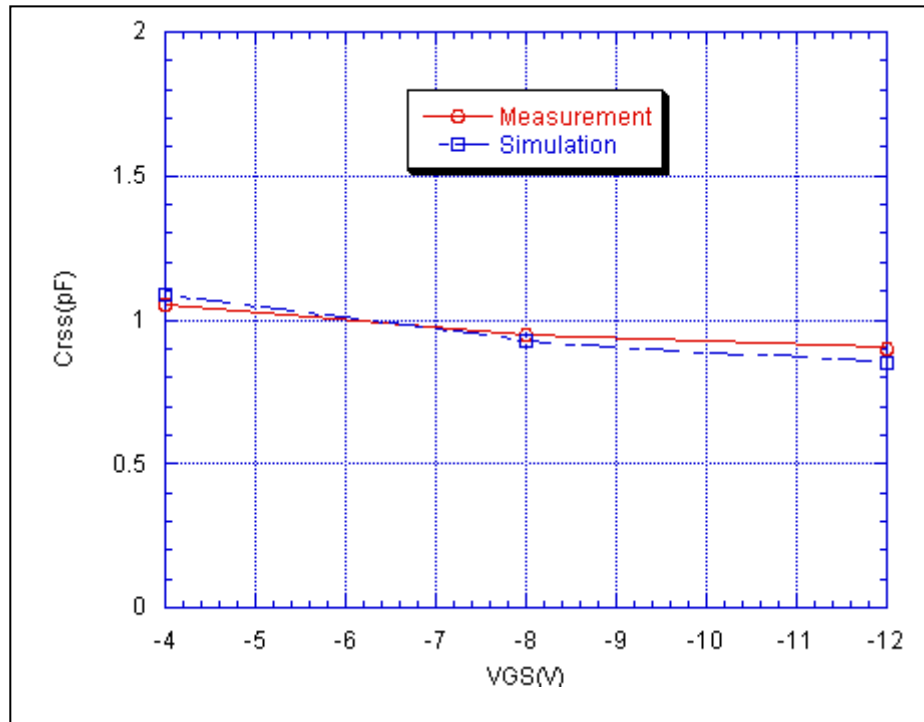


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

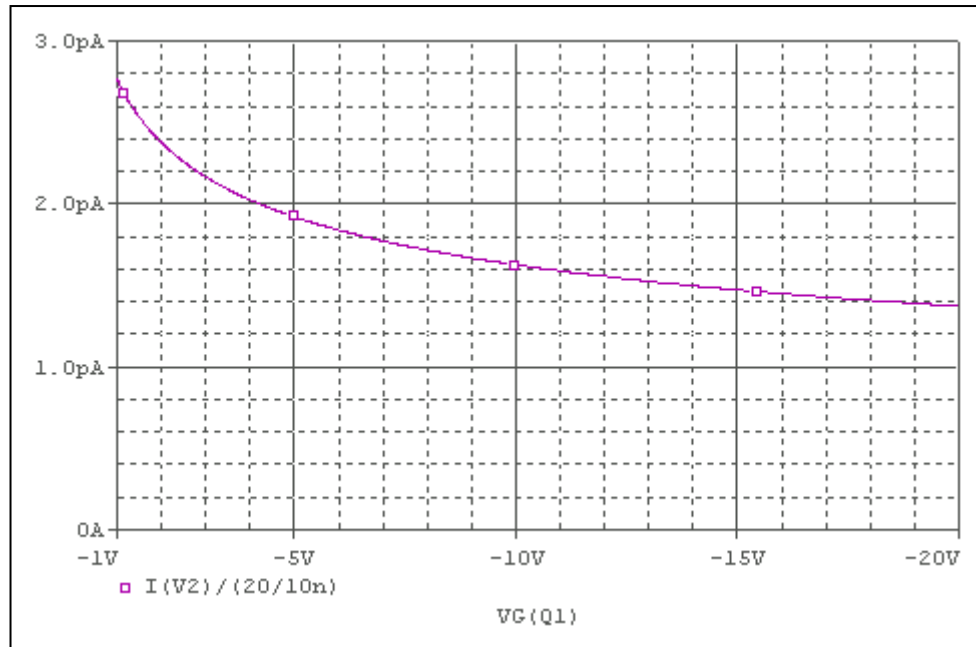


### Simulation Result

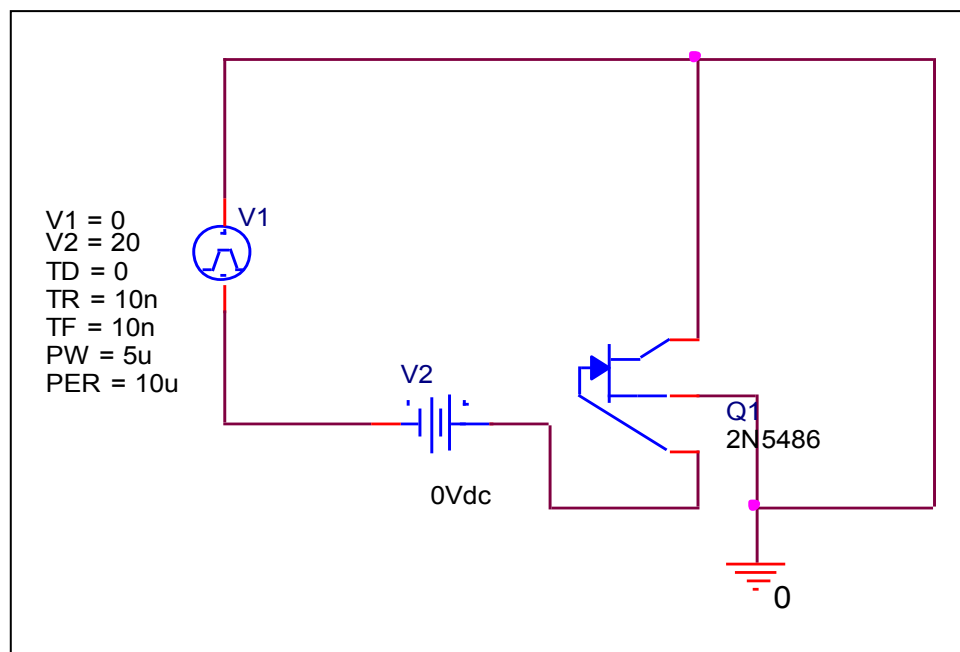
| VGS (V) | Crss (pF)   |            | Error(%) |
|---------|-------------|------------|----------|
|         | Measurement | Simulation |          |
| -4      | 1.05        | 1.09       | 3.809    |
| -8      | 0.95        | 0.93       | -2.105   |
| -12     | 0.9         | 0.87       | -3.333   |

## Input Capacitance

### Circuit Simulation Result



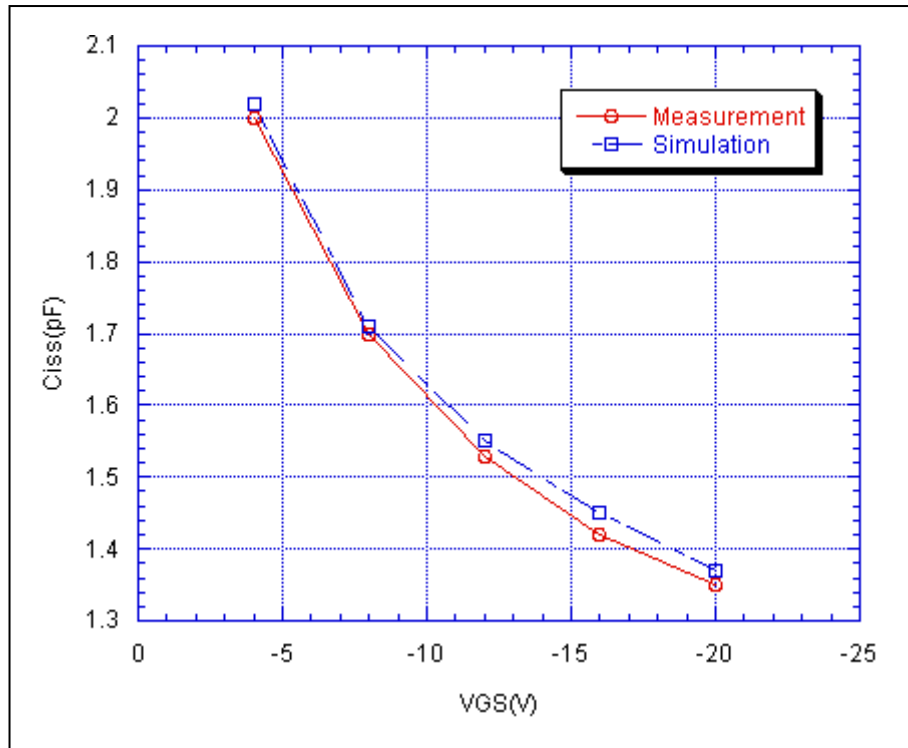
### Evaluation Circuit





## Comparison Graph

### Circuit Simulation Result

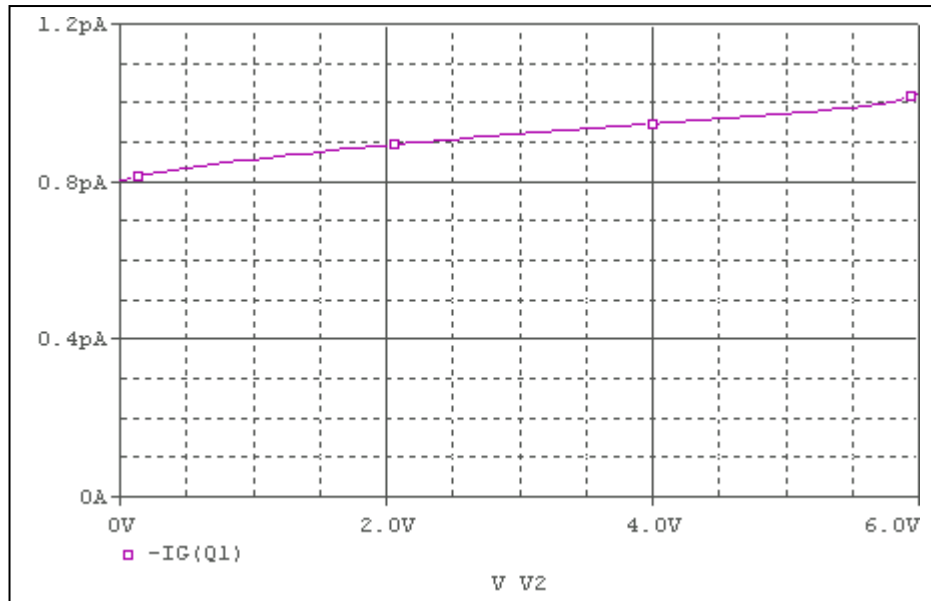


### Simulation Result

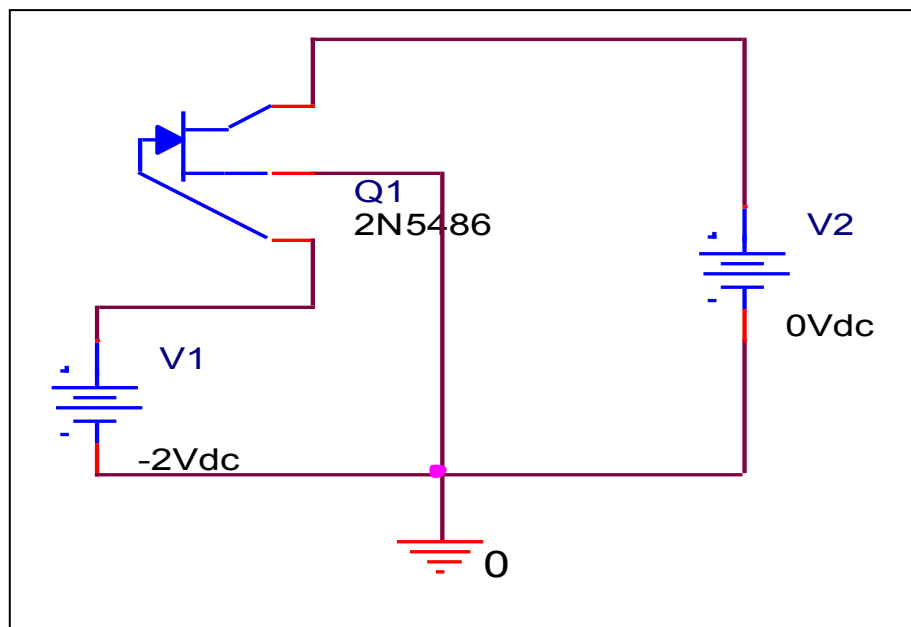
| VGS (V) | Ciss (pF)   |            | Error(%) |
|---------|-------------|------------|----------|
|         | Measurement | Simulation |          |
| -4      | 2           | 2.02       | 1        |
| -8      | 1.7         | 1.71       | 0.588    |
| -12     | 1.53        | 1.55       | 1.307    |
| -16     | 1.42        | 1.45       | 2.112    |
| -20     | 1.35        | 1.37       | 1.481    |

## Passive Gate Leakage

### Circuit Simulation Result

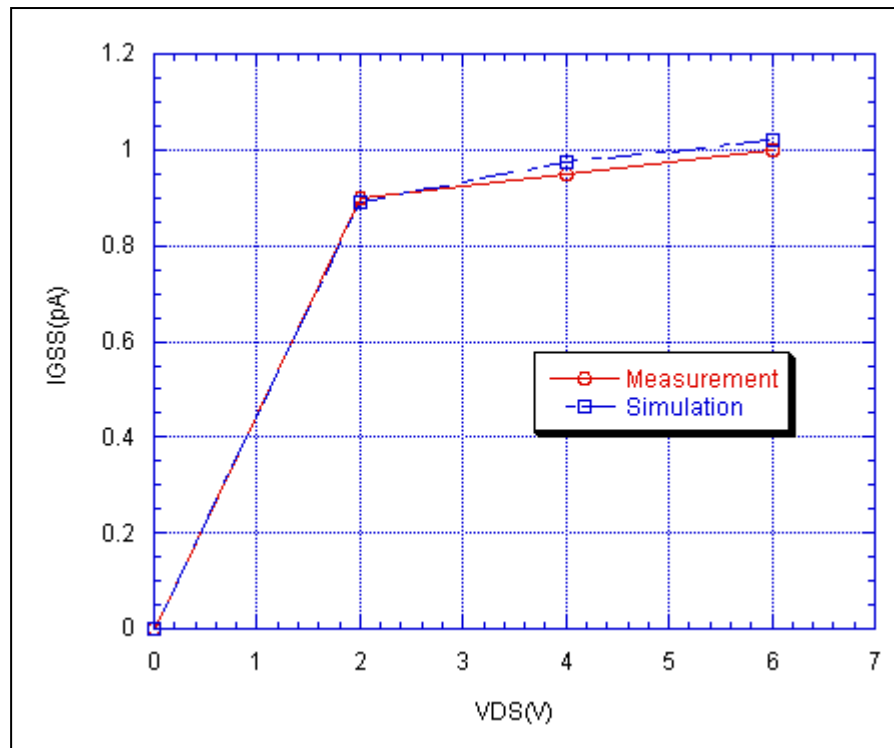


### Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

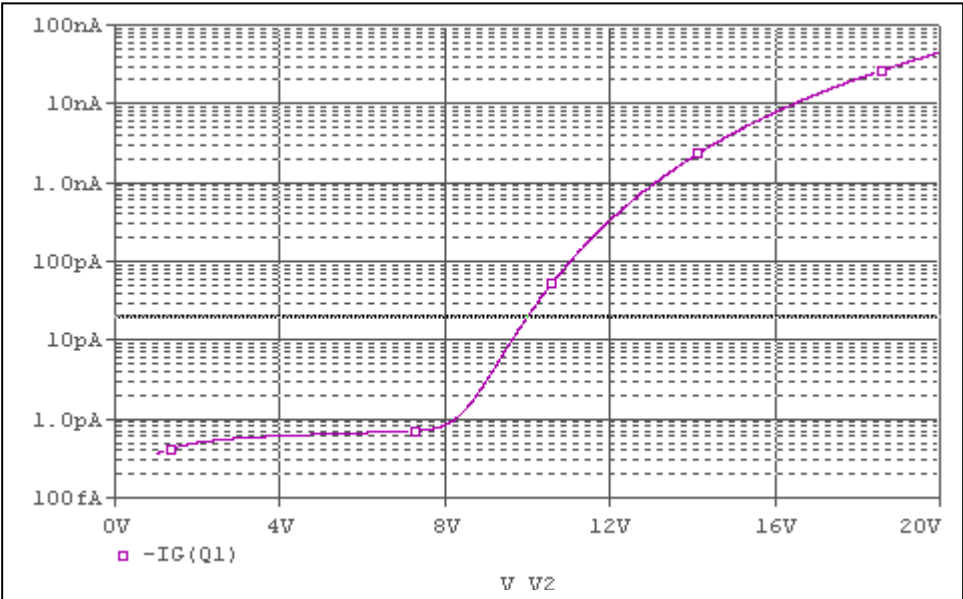


### Simulation Result

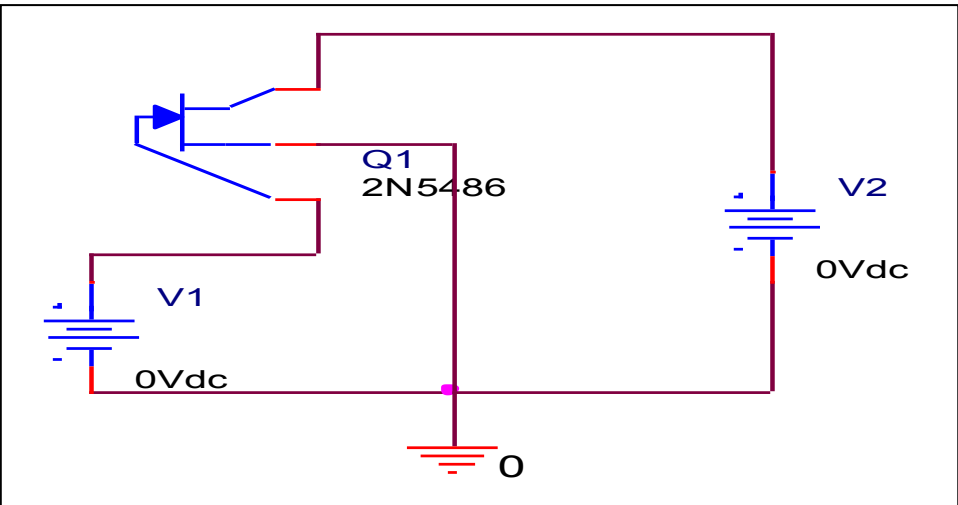
| VDS (V) | I <sub>gss</sub> (pA) |            | Error(%) |
|---------|-----------------------|------------|----------|
|         | Measurement           | Simulation |          |
| 2       | 0.9                   | 0.892      | -0.888   |
| 4       | 0.95                  | 0.974      | 2.526    |
| 6       | 1                     | 1.022      | 2.2      |

# Active Gate Leakage

## Circuit Simulation Result



## Evaluation Circuit



| VDG=10V,ID=1mA<br>(Test Conditions) | IG (pA)     |            | Error(%) |
|-------------------------------------|-------------|------------|----------|
|                                     | Measurement | Simulation |          |
| Gate Operating Current(IG)          | -20         | -19.4      | -3       |