

# Device Modeling Report

COMPONENTS: RESISTOR  
PART NUMBER: ERF10AK3R0  
THERMAL:TA=120(degree)  
MANUFACTURER: MATSUSHITA



**Bee Technologies Inc.**

## Theory: Auto Balancing Bridge Method

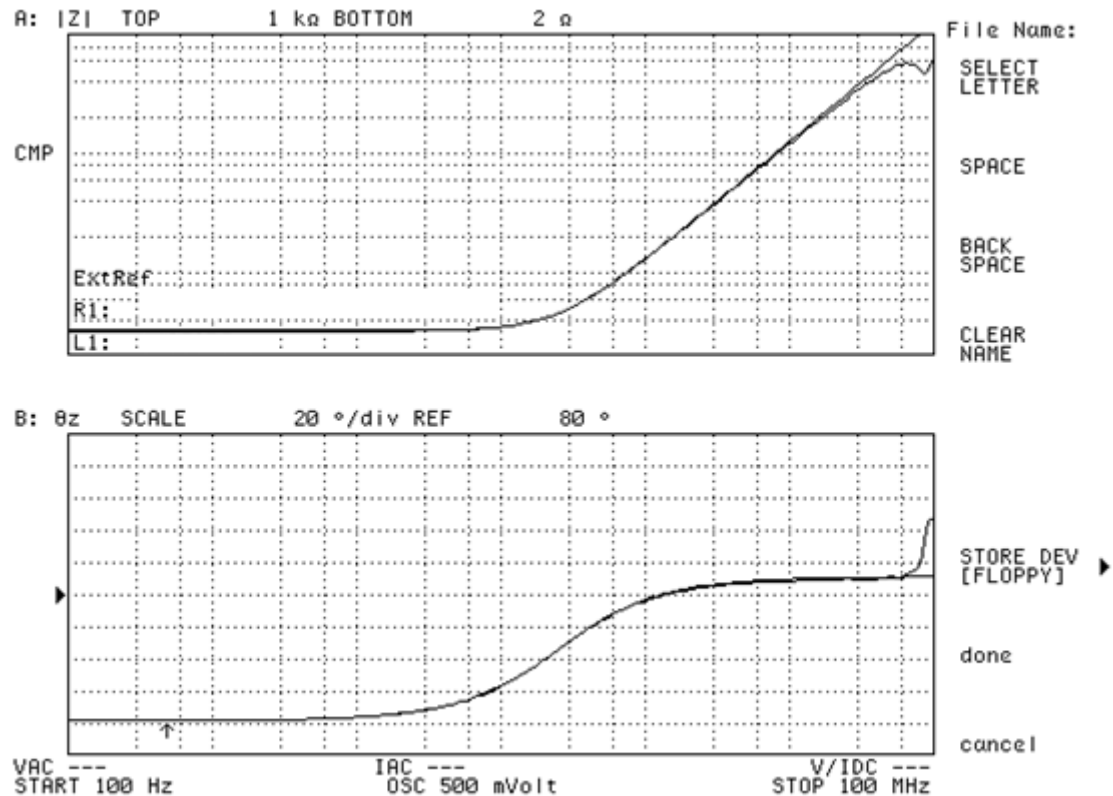
### Optimization of Simulation

Range of adjustment Frequency: 100 to 100M(Hz)

Frequency vs.  $|Z|$  and Frequency vs.  $\theta_z$  Characteristic

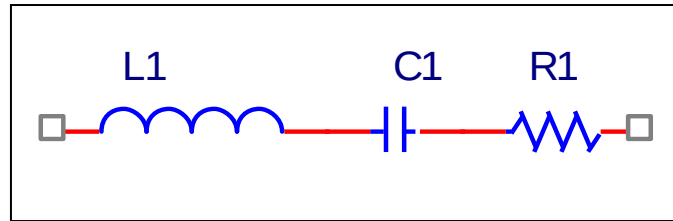
Attention

*Please use SPICE MODEL within the range from 100 to 100M(Hz)*



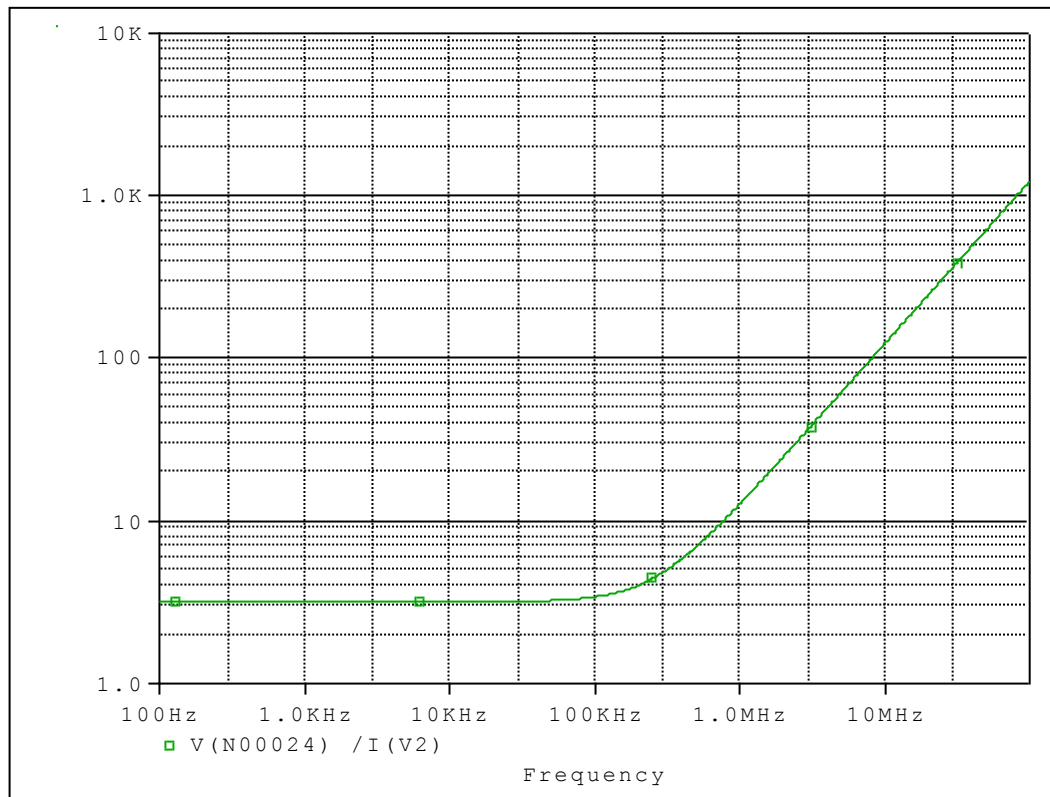
| Measurement |  |  |
|-------------|--|--|
| R1          |  |  |
| L1          |  |  |
| C1          |  |  |

Equivalent circuit

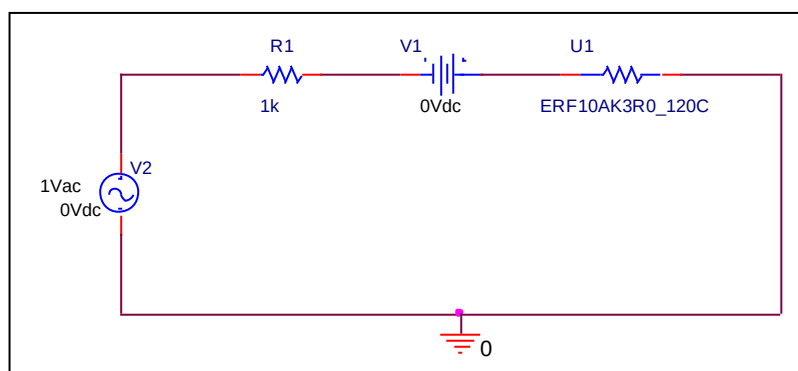


## Frequency vs. $|Z|$ Characteristic

Circuit simulation result



Evaluation Circuit



## Simulation Result

| <b>Frequency(HZ)</b> | <b> Z (ohm)<br/>Measurement</b> | <b> Z (ohm)<br/>Circuit Simulation</b> | <b>%Error</b> |
|----------------------|---------------------------------|----------------------------------------|---------------|
| <b>100</b>           | <b>3.163</b>                    | <b>3.183</b>                           | <b>0.637</b>  |
| <b>1K</b>            | <b>3.164</b>                    | <b>3.183</b>                           | <b>0.588</b>  |
| <b>10K</b>           | <b>3.169</b>                    | <b>3.185</b>                           | <b>0.499</b>  |
| <b>100K</b>          | <b>3.405</b>                    | <b>3.412</b>                           | <b>0.210</b>  |
| <b>1M</b>            | <b>13.151</b>                   | <b>12.700</b>                          | <b>3.433</b>  |
| <b>10M</b>           | <b>120.372</b>                  | <b>122.987</b>                         | <b>2.173</b>  |