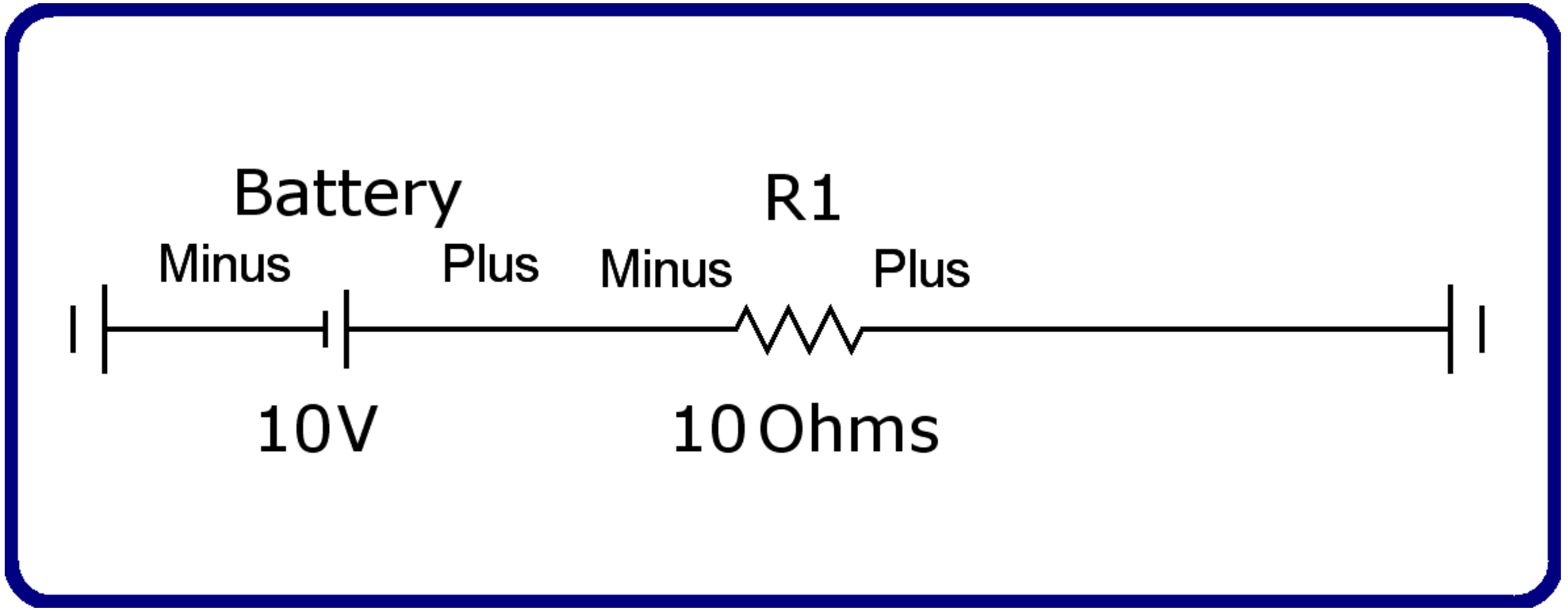


FIG. 1

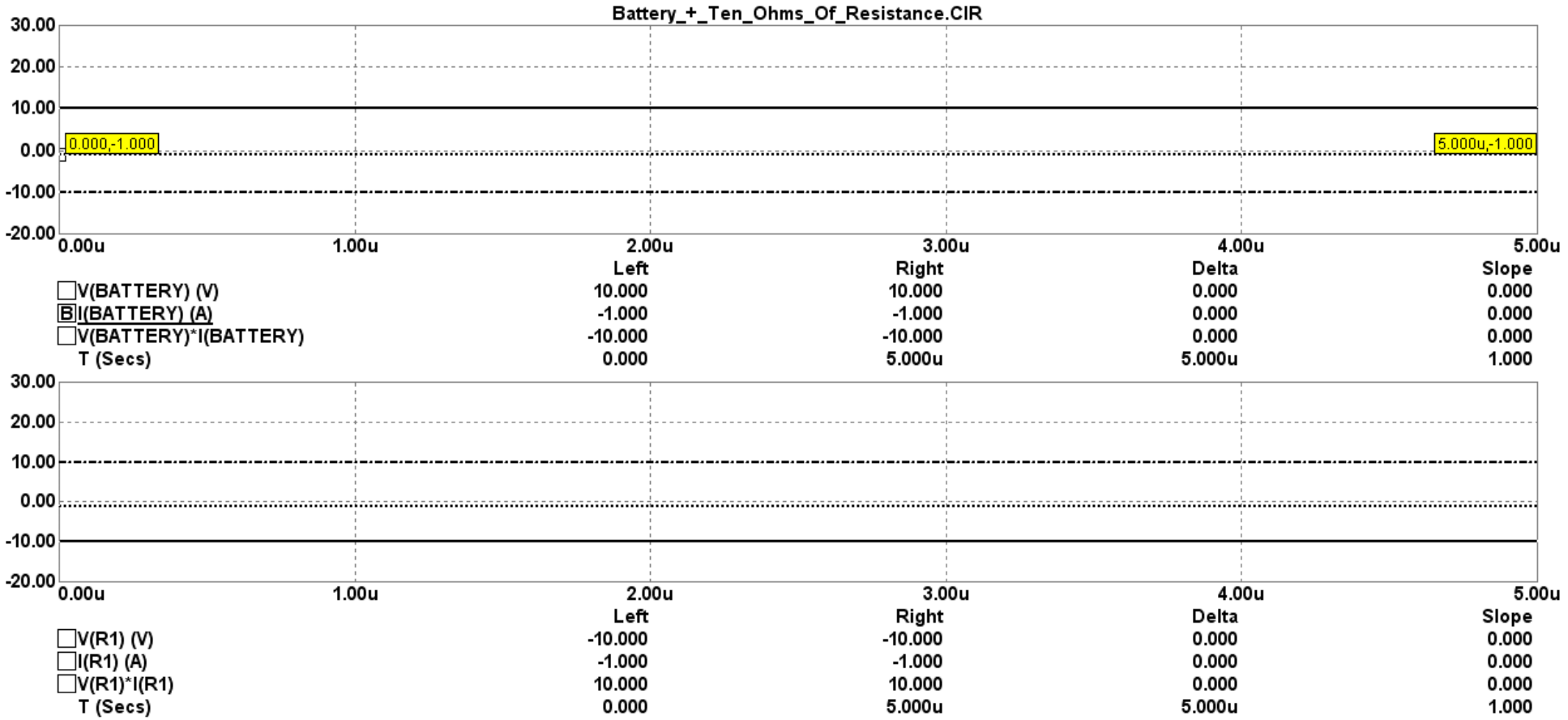

Battery_+_Ten_Ohms_Of_Resistance.CIR
30.00
20.00
10.00
0.00
-10.00
-20.00
0.000,-1.000
5.000u,-1.000
0.00u
1.00u
2.00u
3.00u
4.00u
5.00u
Left
Right
Delta
Slope
V(BATTERY) (V) 10.000 10.000 0.000 0.000
I(BATTERY) (A) -1.000 -1.000 0.000 0.000
V(BATTERY)*I(BATTERY) -10.000 -10.000 0.000 0.000
T (Secs) 0.000 5.000u 5.000u 1.000
30.00
20.00
10.00
0.00
-10.00
-20.00
0.00u
1.00u
2.00u
3.00u
4.00u
5.00u
Left
Right
Delta
Slope
V(R1) (V) -10.000 -10.000 0.000 0.000
I(R1) (A) -1.000 -1.000 0.000 0.000
V(R1)*I(R1) 10.000 10.000 0.000 0.000
T (Secs) 0.000 5.000u 5.000u 1.000

FIG. 2

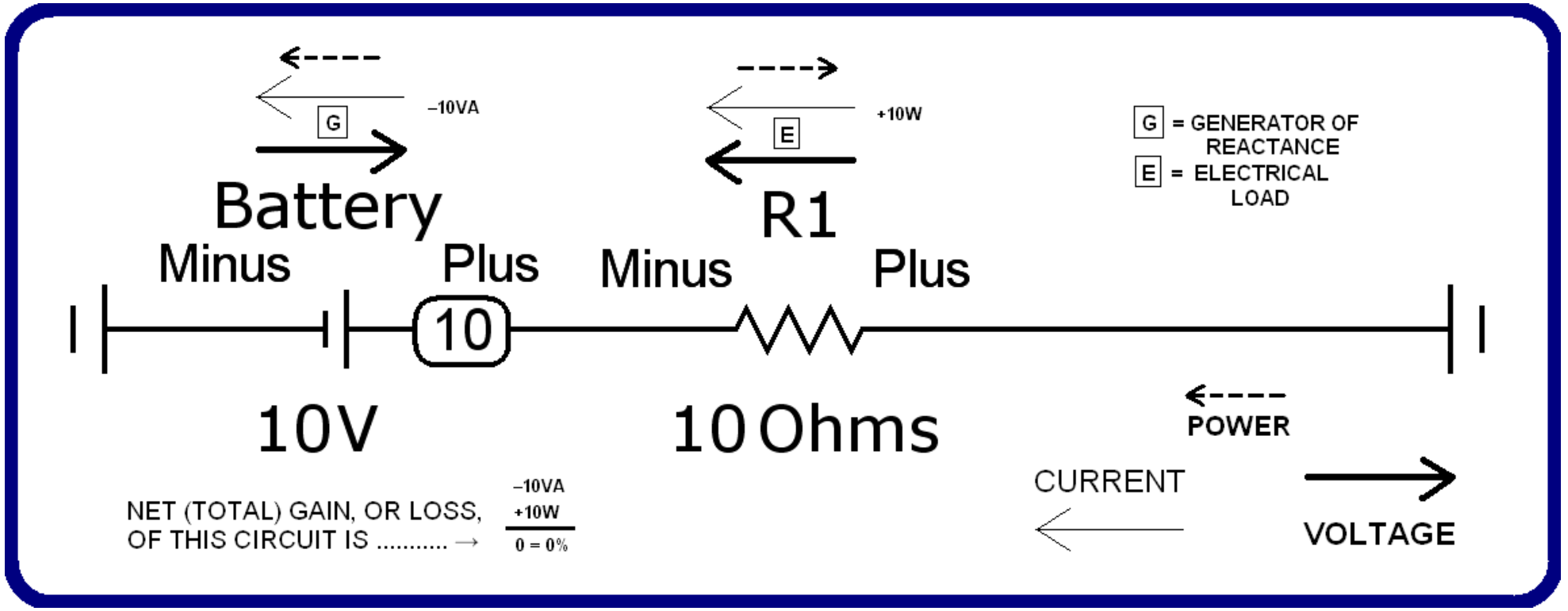

G
–10VA
Battery
Minus
Plus
10
10V
E
+10W
R1
Minus
Plus
10 Ohms
G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
POWER
CURRENT
VOLTAGE
NET (TOTAL) GAIN, OR LOSS, OF THIS CIRCUIT IS ..... →
–10VA
+10W
0 = 0%

FIG. 3

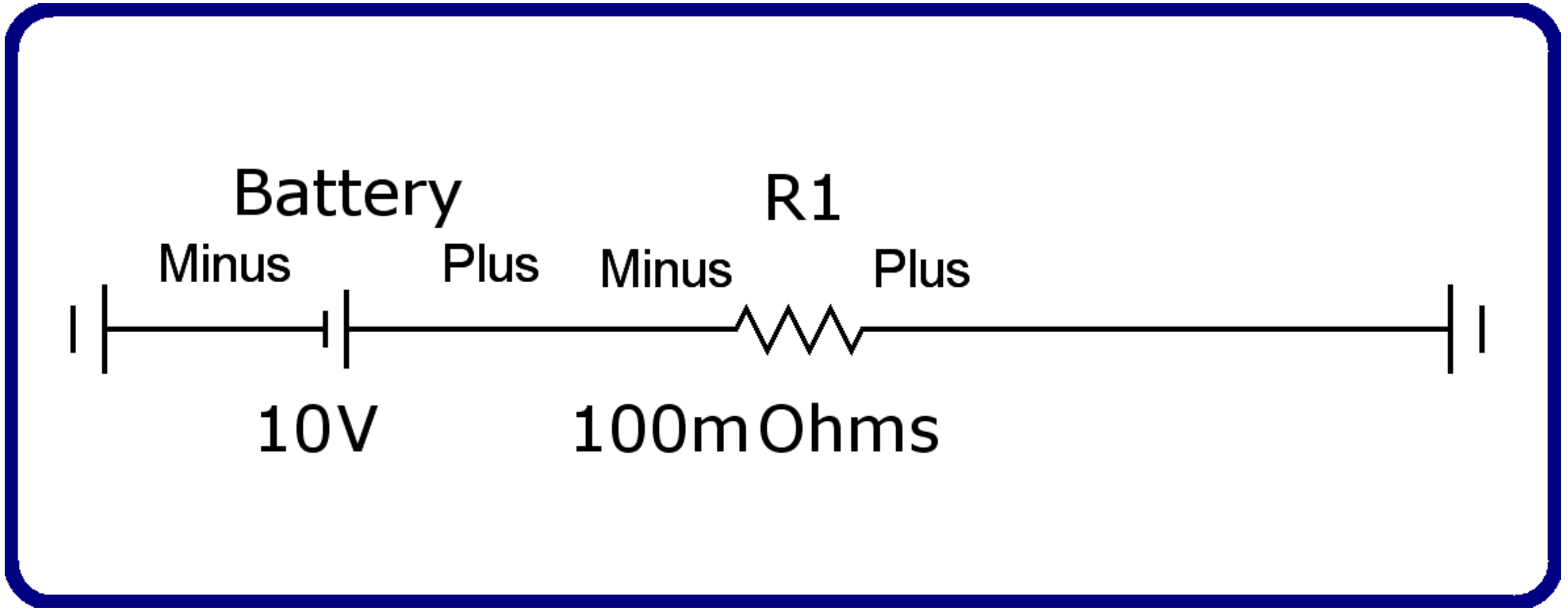


FIG. 4

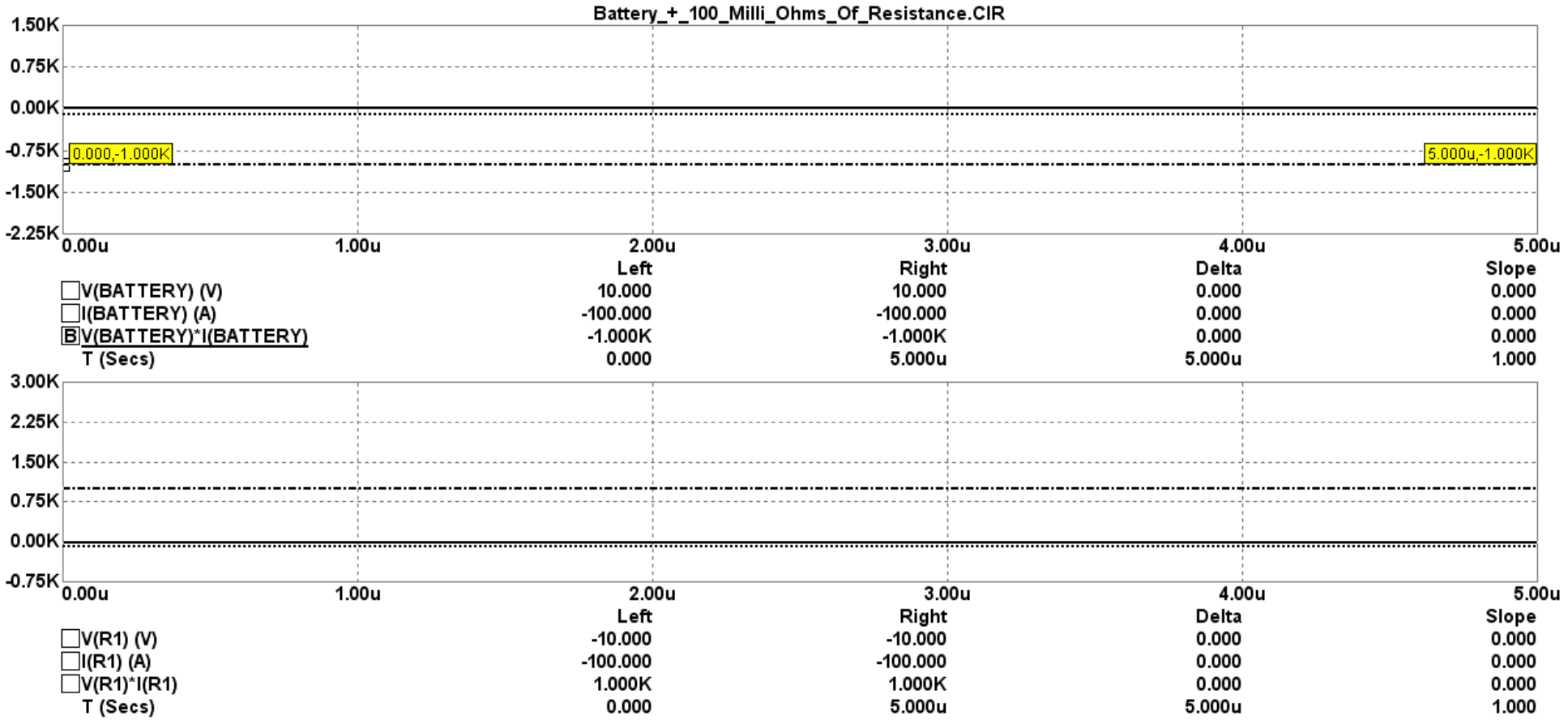

Battery_+_100_Milli_Ohms_Of_Resistance.CIR
1.50K
0.75K
0.00K
-0.75K
-1.50K
-2.25K
0.000,-1.000K
5.000u,-1.000K
0.00u
1.00u
2.00u
3.00u
4.00u
5.00u
Left
Right
Delta
Slope
V(BATTERY) (V) 10.000 10.000 0.000 0.000
I(BATTERY) (A) -100.000 -100.000 0.000 0.000
B V(BATTERY)*I(BATTERY) -1.000K -1.000K 0.000 0.000
T (Secs) 0.000 5.000u 5.000u 1.000
3.00K
2.25K
1.50K
0.75K
0.00K
-0.75K
0.00u
1.00u
2.00u
3.00u
4.00u
5.00u
Left
Right
Delta
Slope
V(R1) (V) -10.000 -10.000 0.000 0.000
I(R1) (A) -100.000 -100.000 0.000 0.000
V(R1)*I(R1) 1.000K 1.000K 0.000 0.000
T (Secs) 0.000 5.000u 5.000u 1.000

FIG. 5

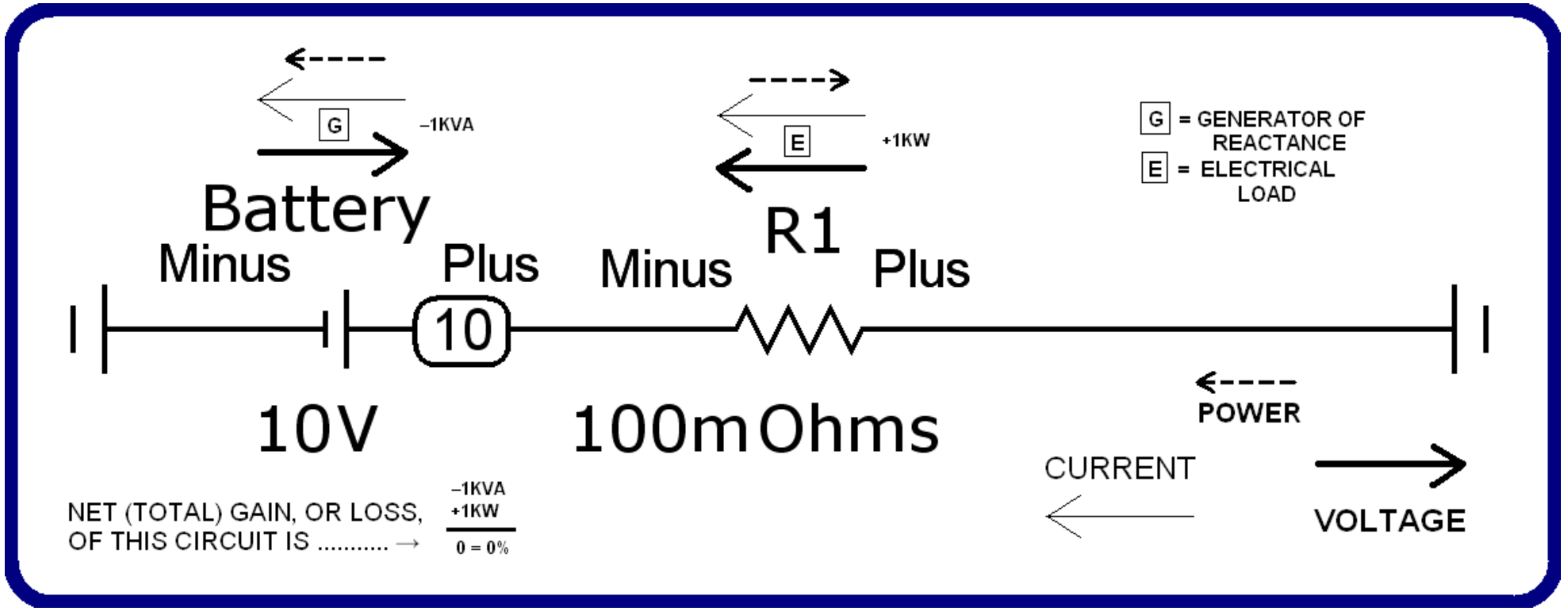

G
−1KVA
Battery
Minus
Plus
10
10V
E
+1KW
R1
Minus
Plus
100mOhms
G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
POWER
CURRENT
VOLTAGE
NET (TOTAL) GAIN, OR LOSS, OF THIS CIRCUIT IS ..... →
−1KVA
+1KW
0 = 0%

FIG. 6

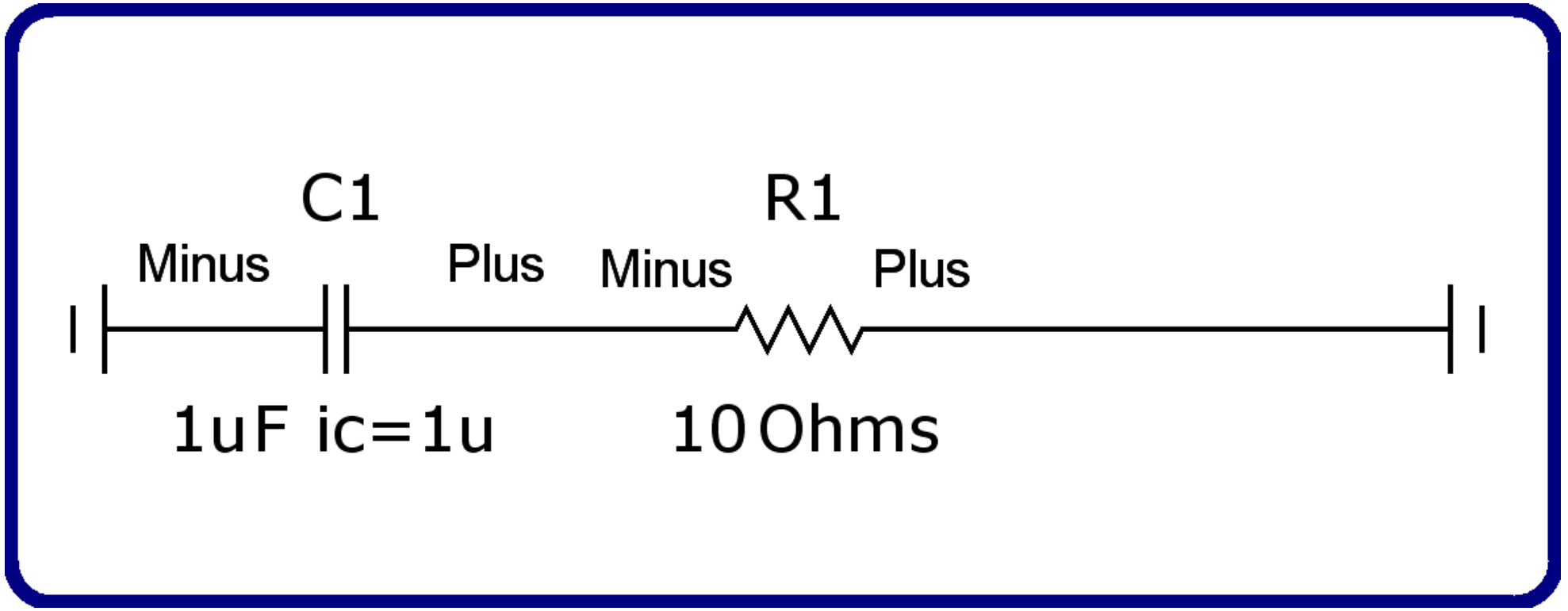


FIG. 7

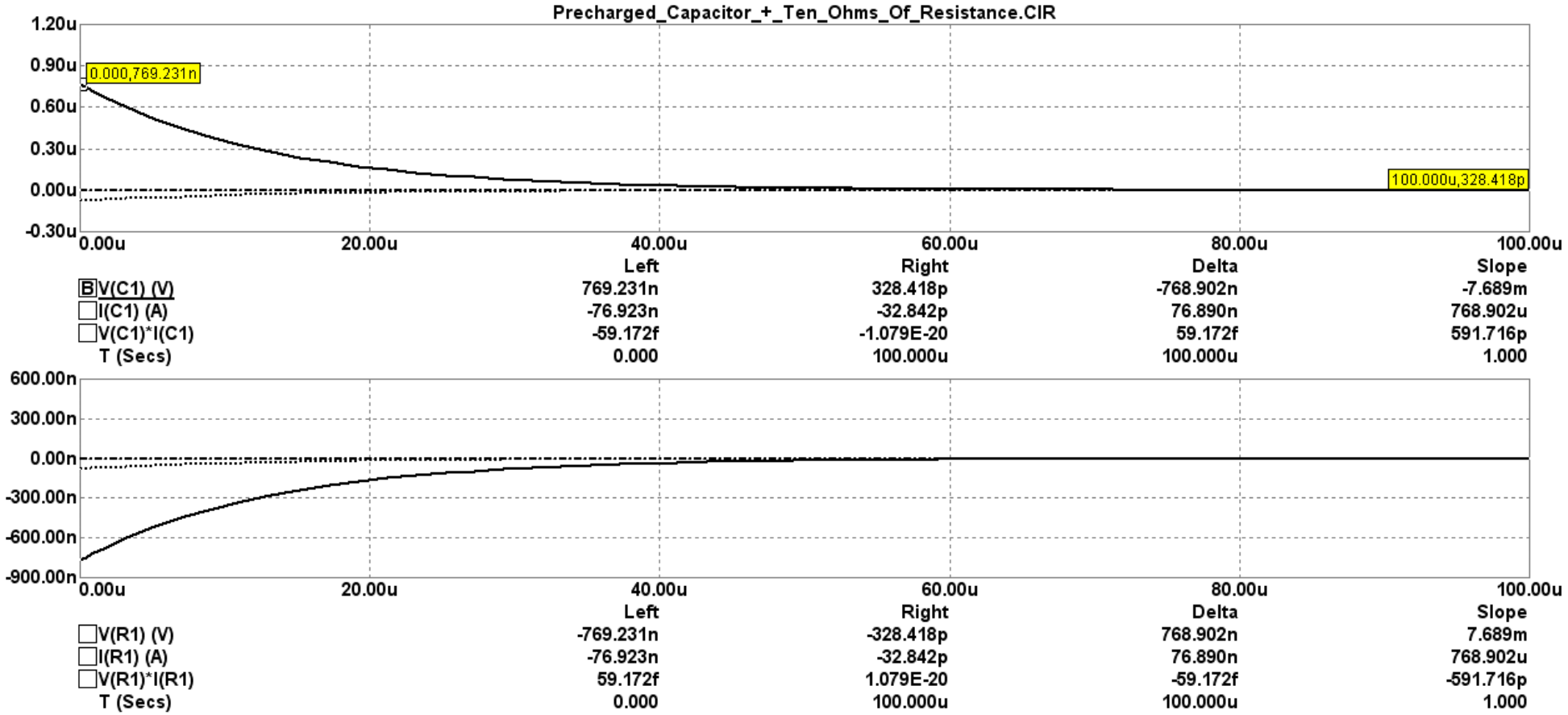

Precharged_Capacitor_+_Ten_Ohms_Of_Resistance.CIR
1.20u
0.90u
0.60u
0.30u
0.00u
-0.30u
0.000,769.231n
100.000u,328.418p
0.00u
20.00u
40.00u
60.00u
80.00u
100.00u
Left
Right
Delta
Slope
V(C1) (V) 769.231n 328.418p -768.902n -7.689m
I(C1) (A) -76.923n -32.842p 76.890n 768.902u
V(C1)*I(C1) -59.172f -1.079E-20 59.172f 591.716p
T (Secs) 0.000 100.000u 100.000u 1.000
600.00n
300.00n
0.00n
-300.00n
-600.00n
-900.00n
0.00u
20.00u
40.00u
60.00u
80.00u
100.00u
Left
Right
Delta
Slope
V(R1) (V) -769.231n -328.418p 768.902n 7.689m
I(R1) (A) -76.923n -32.842p 76.890n 768.902u
V(R1)*I(R1) 59.172f 1.079E-20 -59.172f -591.716p
T (Secs) 0.000 100.000u 100.000u 1.000

FIG. 8

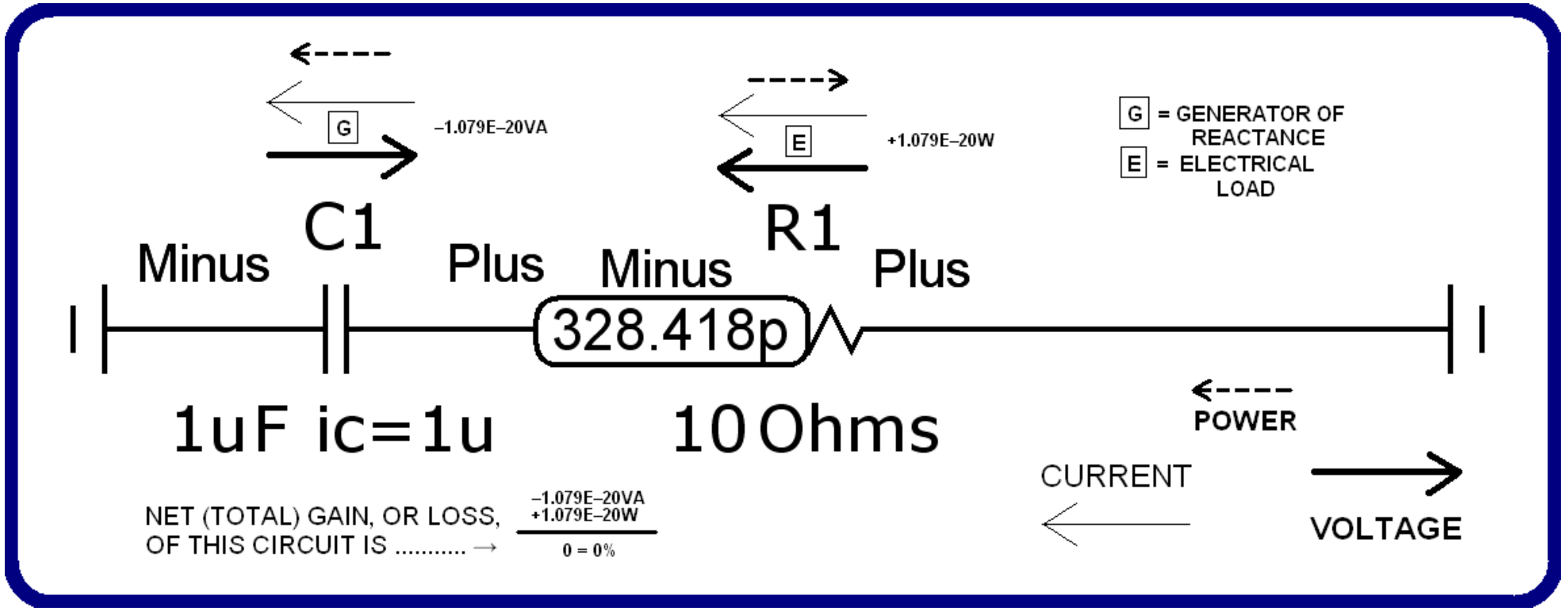

G
–1.079E–20VA
E
+1.079E–20W
G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
C1
R1
Minus
Plus
Minus
Plus
328.418p
1uF ic=1u
10Ohms
POWER
CURRENT
VOLTAGE
NET (TOTAL) GAIN, OR LOSS,
OF THIS CIRCUIT IS ..... →
–1.079E–20VA
+1.079E–20W
0 = 0%

FIG. 9

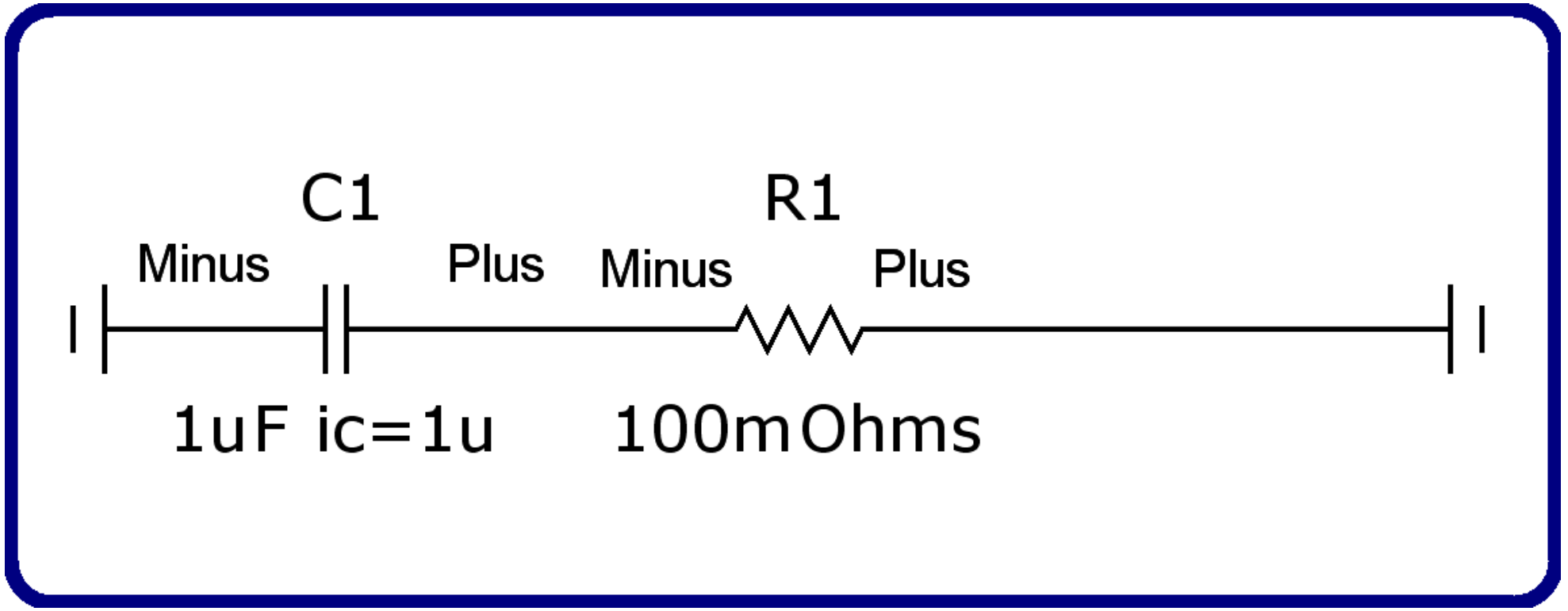


FIG. 10

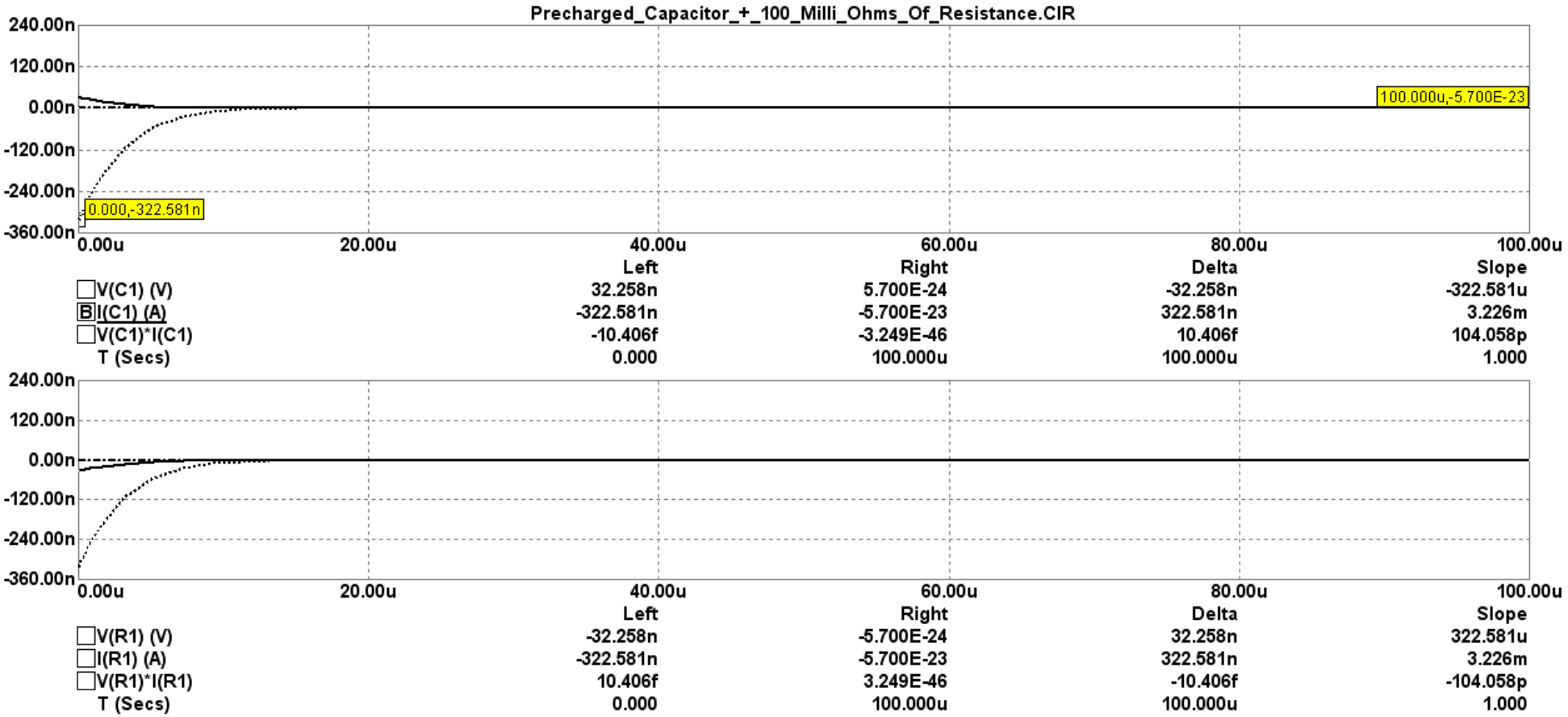

Precharged_Capacitor_+_100_Milli_Ohms_Of_Resistance.CIR
240.00n
120.00n
0.00n
-120.00n
-240.00n
-360.00n
100.000u,-5.700E-23
0.000,-322.581n
0.00u
20.00u
40.00u
60.00u
80.00u
100.00u
Left
Right
Delta
Slope
V(C1) (V) 32.258n 5.700E-24 -32.258n -322.581u
I(C1) (A) -322.581n -5.700E-23 322.581n 3.226m
V(C1)*I(C1) -10.406f -3.249E-46 10.406f 104.058p
T (Secs) 0.000 100.000u 100.000u 1.000
240.00n
120.00n
0.00n
-120.00n
-240.00n
-360.00n
0.00u
20.00u
40.00u
60.00u
80.00u
100.00u
Left
Right
Delta
Slope
V(R1) (V) -32.258n -5.700E-24 32.258n 322.581u
I(R1) (A) -322.581n -5.700E-23 322.581n 3.226m
V(R1)*I(R1) 10.406f 3.249E-46 -10.406f -104.058p
T (Secs) 0.000 100.000u 100.000u 1.000

FIG. 11

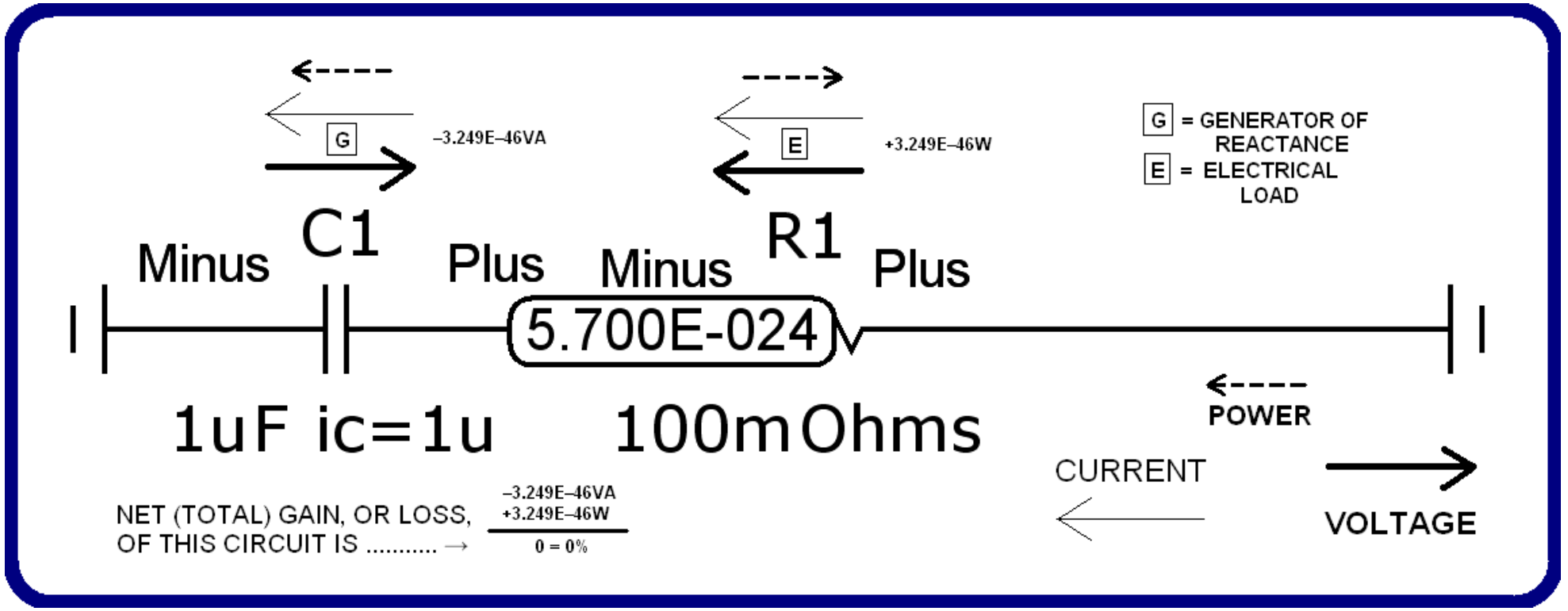

G
−3.249E−46VA
E
+3.249E−46W
G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
Minus
C1
Plus
Minus
R1
Plus
5.700E-024
1uF ic=1u
100mOhms
POWER
CURRENT
VOLTAGE
NET (TOTAL) GAIN, OR LOSS,
OF THIS CIRCUIT IS ..... →
−3.249E−46VA
+3.249E−46W
0 = 0%

FIG. 12

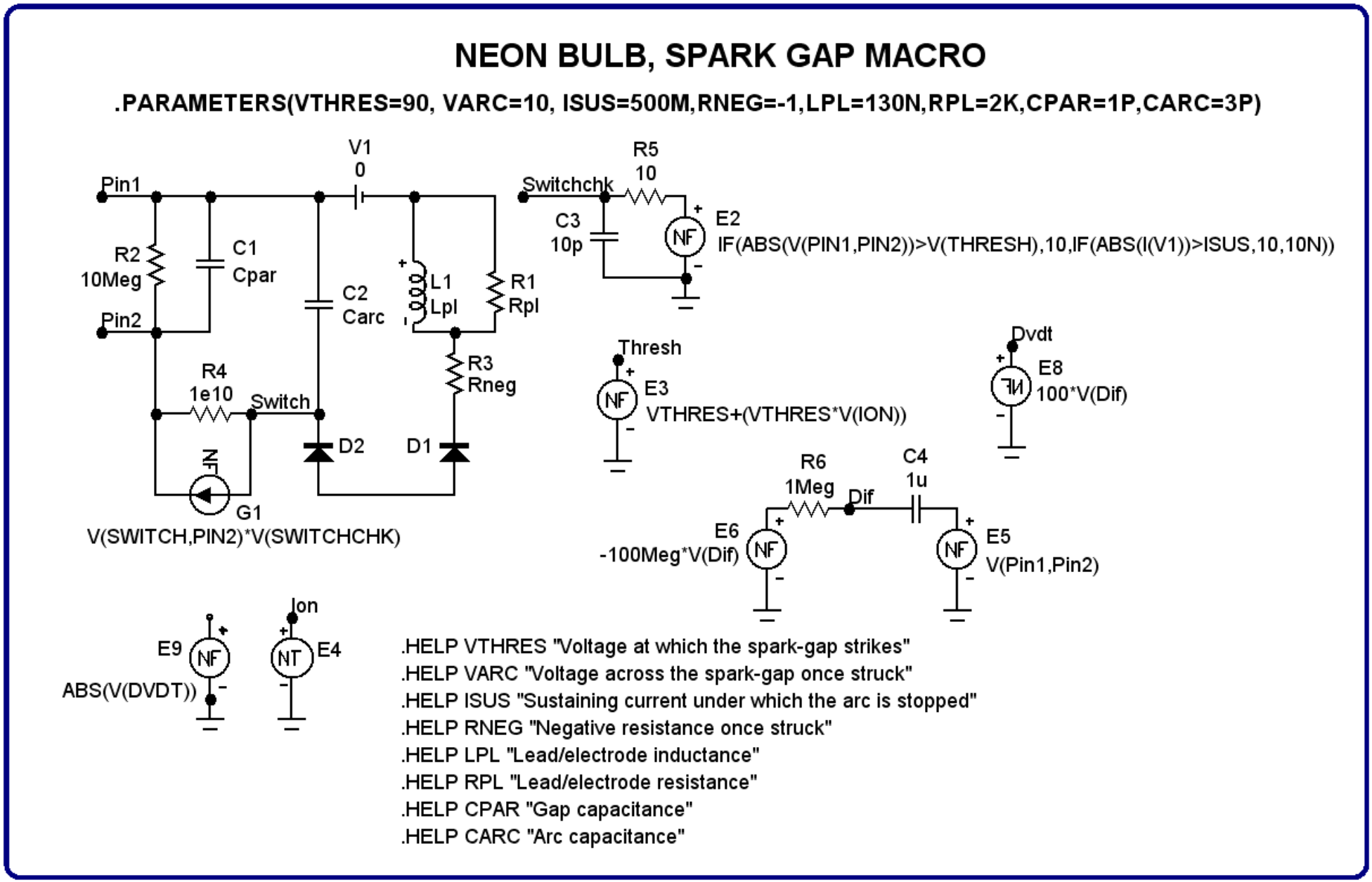

NEON BULB, SPARK GAP MACRO
.PARAMETERS(VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)
V1
0
Pin1
R2
10Meg
C1
Cpar
Pin2
C2
Carc
L1
Lpl
R1
Rpl
R3
Rneg
R4
1e10
Switch
D2
D1
G1
V(SWITCH,PIN2)*V(SWITCHCHK)
R5
10
Switchchk
C3
10p
E2
IF(ABS(V(PIN1,PIN2))>V(THRESH),10,IF(ABS(I(V1))>ISUS,10,10N))
Thresh
E3
VTHRES+(VTHRES*V(ION))
Dvdt
E8
100*V(Dif)
R6
1Meg
Dif
C4
1u
E6
-100Meg*V(Dif)
E5
V(Pin1,Pin2)
E9
ABS(V(DVDT))
Ion
E4
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 13

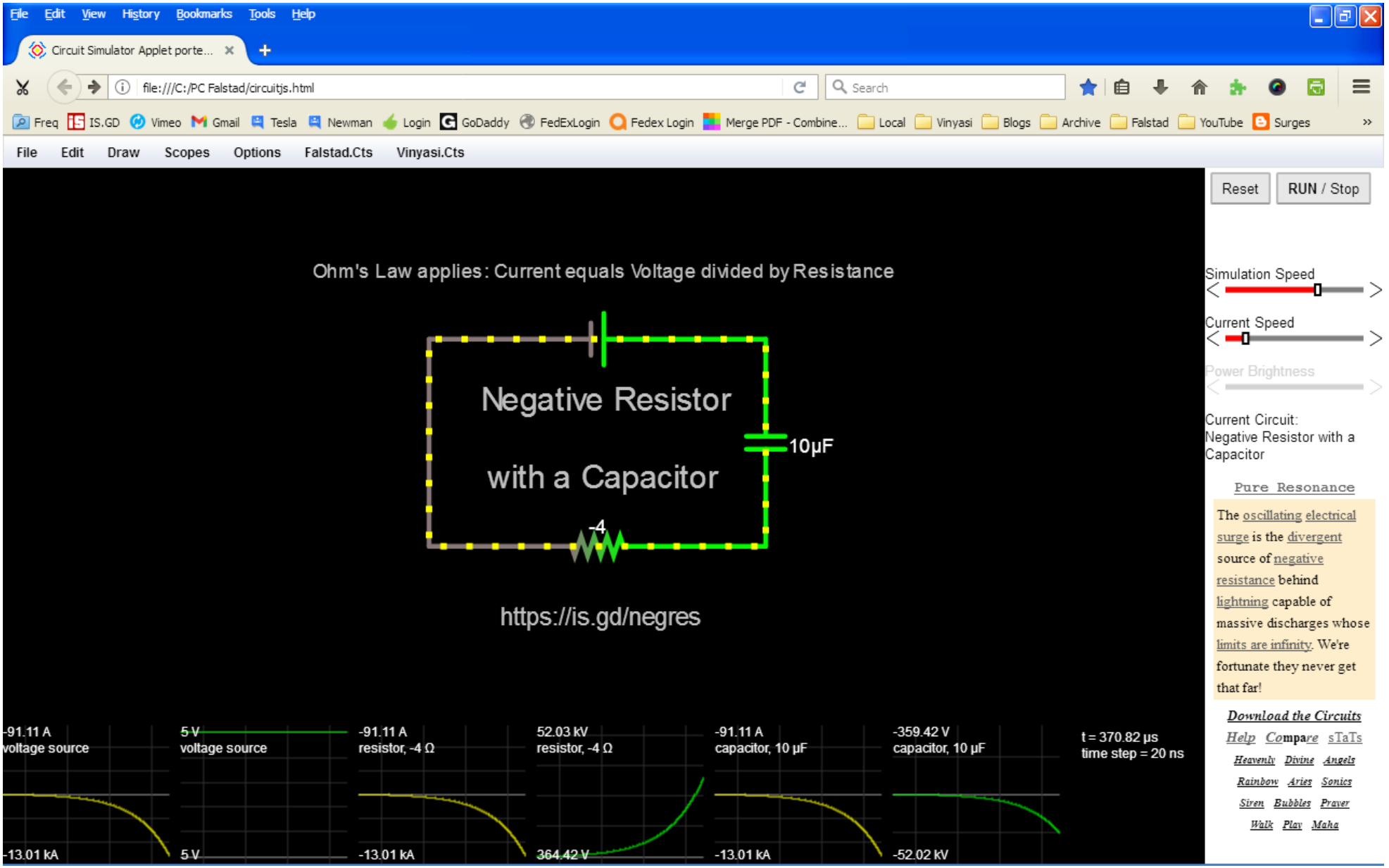
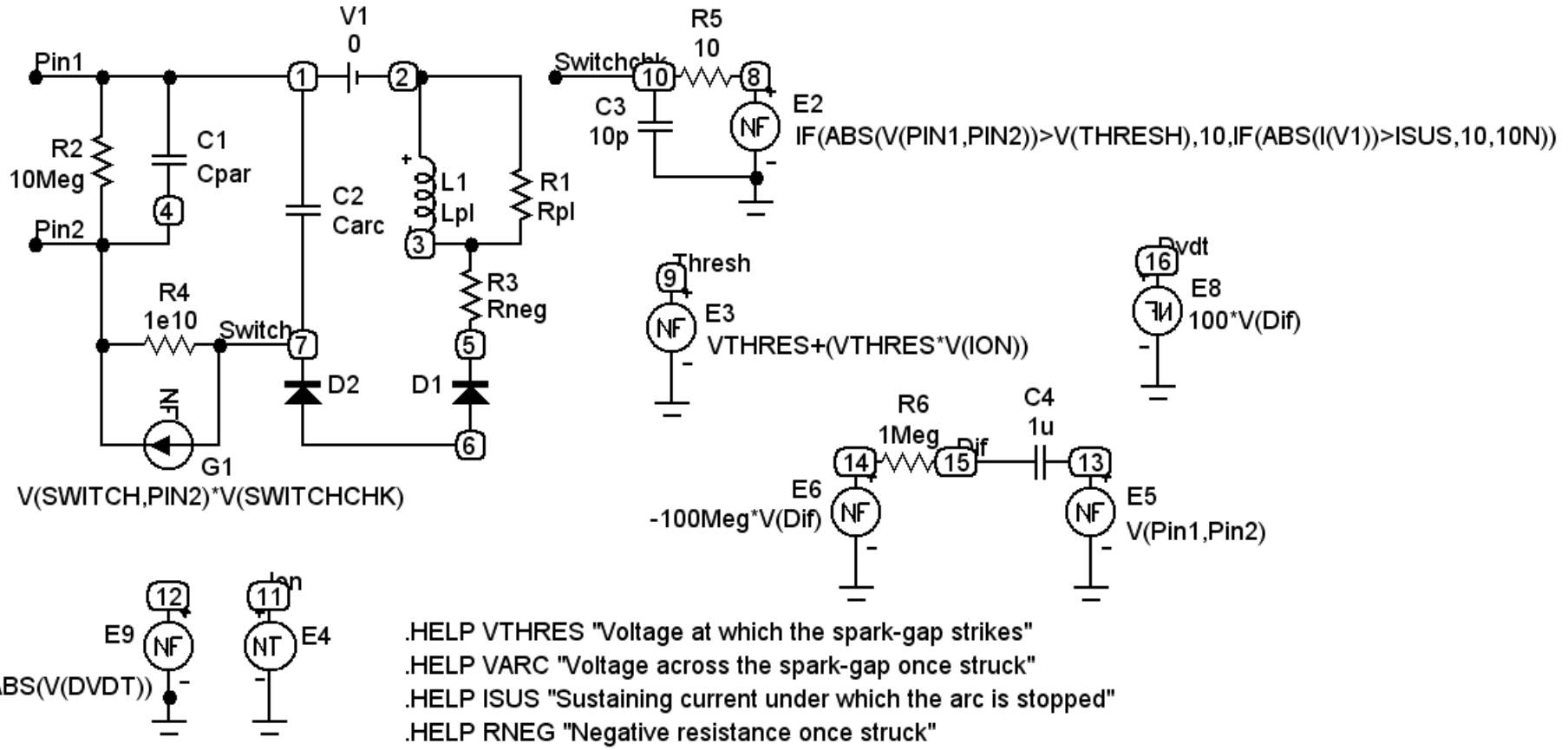

File Edit View History Bookmarks Tools Help
Circuit Simulator Applet porte...
file:///C:/PC Falstad/circuitjs.html
Search
Freq IS.GD Vimeo Gmail Tesla Newman Login GoDaddy FedExLogin Fedex Login Merge PDF - Combine... Local Vinyasi Blogs Archive Falstad YouTube Surges
File Edit Draw Scopes Options Falstad.Cts Vinyasi.Cts
Reset
RUN / Stop
Ohm's Law applies: Current equals Voltage divided by Resistance
Negative Resistor
with a Capacitor
10µF
-4
https://is.gd/negres
Simulation Speed
Current Speed
Power Brightness
Current Circuit:
Negative Resistor with a Capacitor
Pure Resonance
The oscillating electrical surge is the divergent source of negative resistance behind lightning capable of massive discharges whose limits are infinity. We're fortunate they never get that far!
Download the Circuits
Help Compare sTaTs
Heavenly Divine Angels
Rainbow Aries Sonics
Siren Bubbles Prayer
Walk Play Maha
-91.11 A
voltage source
-13.01 kA
5 V
voltage source
5 V
-91.11 A
resistor, -4 Ω
-13.01 kA
52.03 kV
resistor, -4 Ω
364.42 V
-91.11 A
capacitor, 10 µF
-13.01 kA
-359.42 V
capacitor, 10 µF
-52.02 kV
t = 370.82 µs
time step = 20 ns

FIG. 14

NEON BULB, SPARK GAP MACRO

.PARAMETERS(VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)

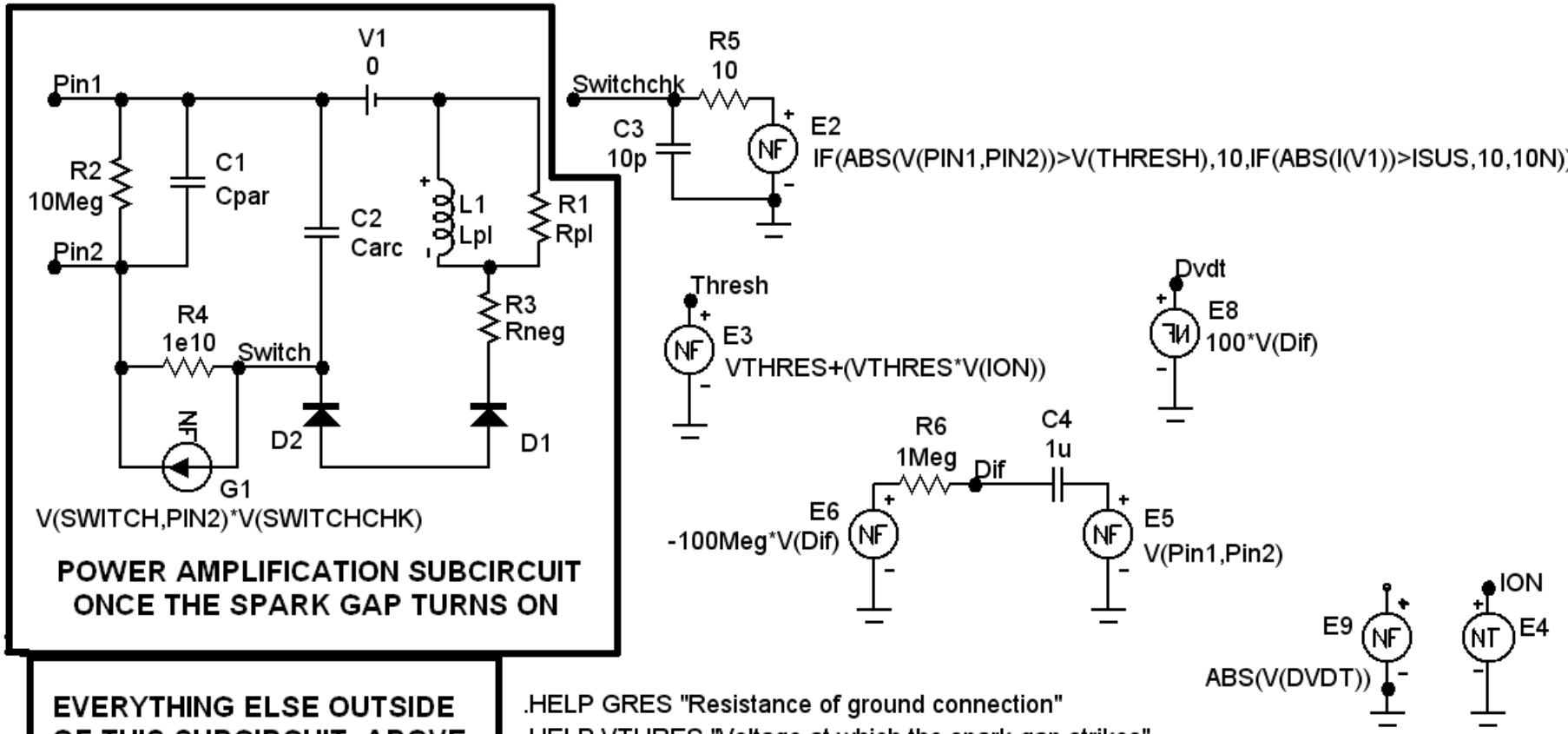


.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 15

SPARKGAP MACRO

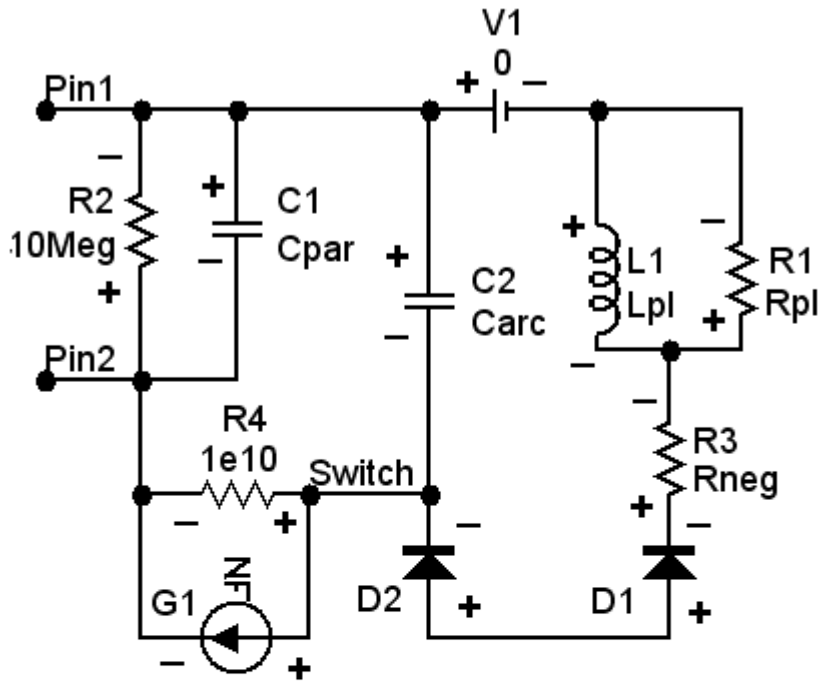
.PARAMETERS(GRES=1,VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)



EVERYTHING ELSE OUTSIDE OF THIS SUBCIRCUIT, ABOVE, MERELY DETERMINES WHEN TO TURN ON THIS SPARK GAP BEYOND ITS THRESHOLD OF RESISTANCE.

```
.HELP GRES "Resistance of ground connection"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"
```

FIG. 16



Each component is labeled with either a positive or negative polarity to reference the polarity of its output. So, a negative current is coming out of a negative label while a positive current is located at a positive label.

FIG. 17

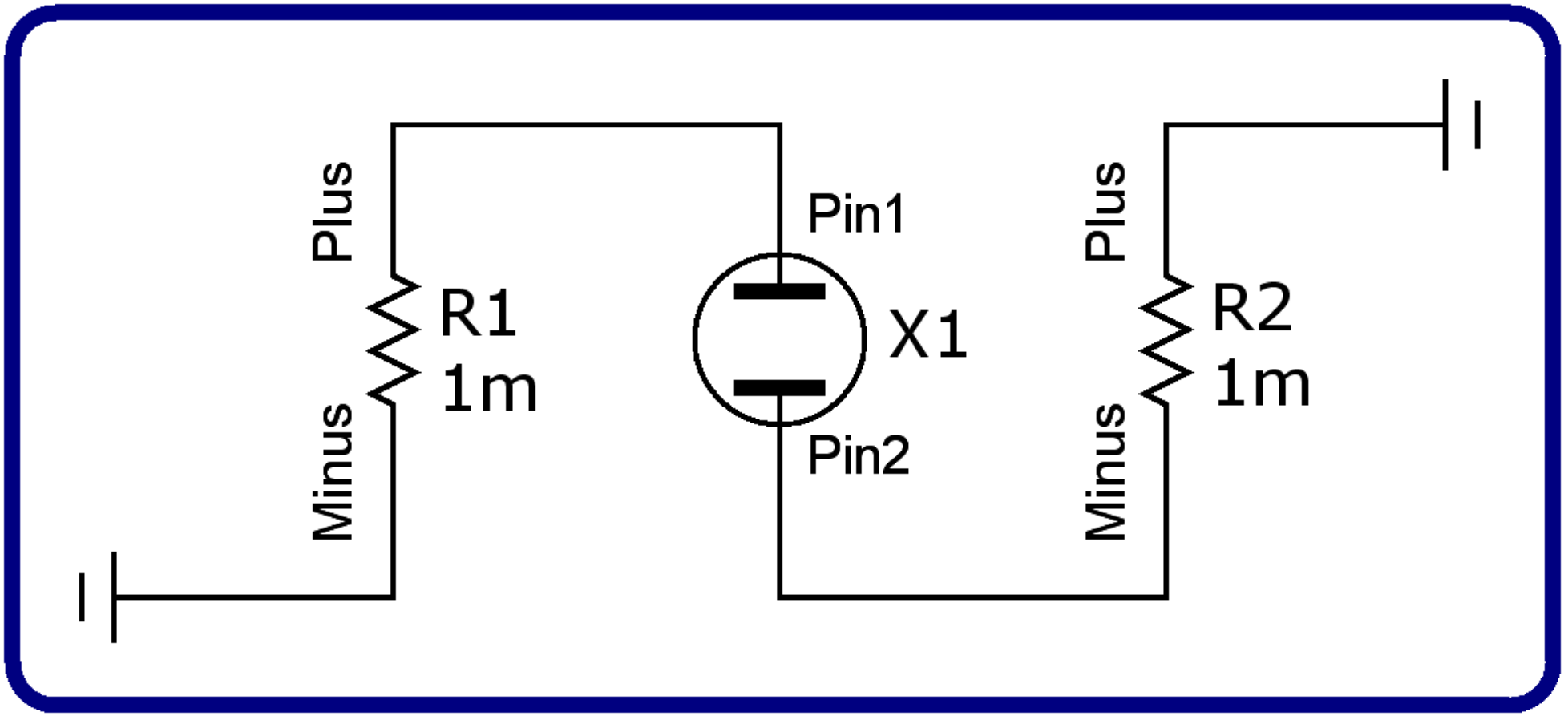
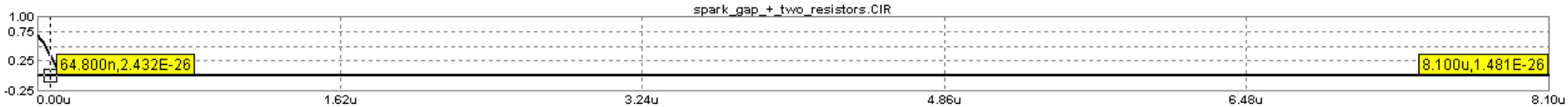


FIG. 18

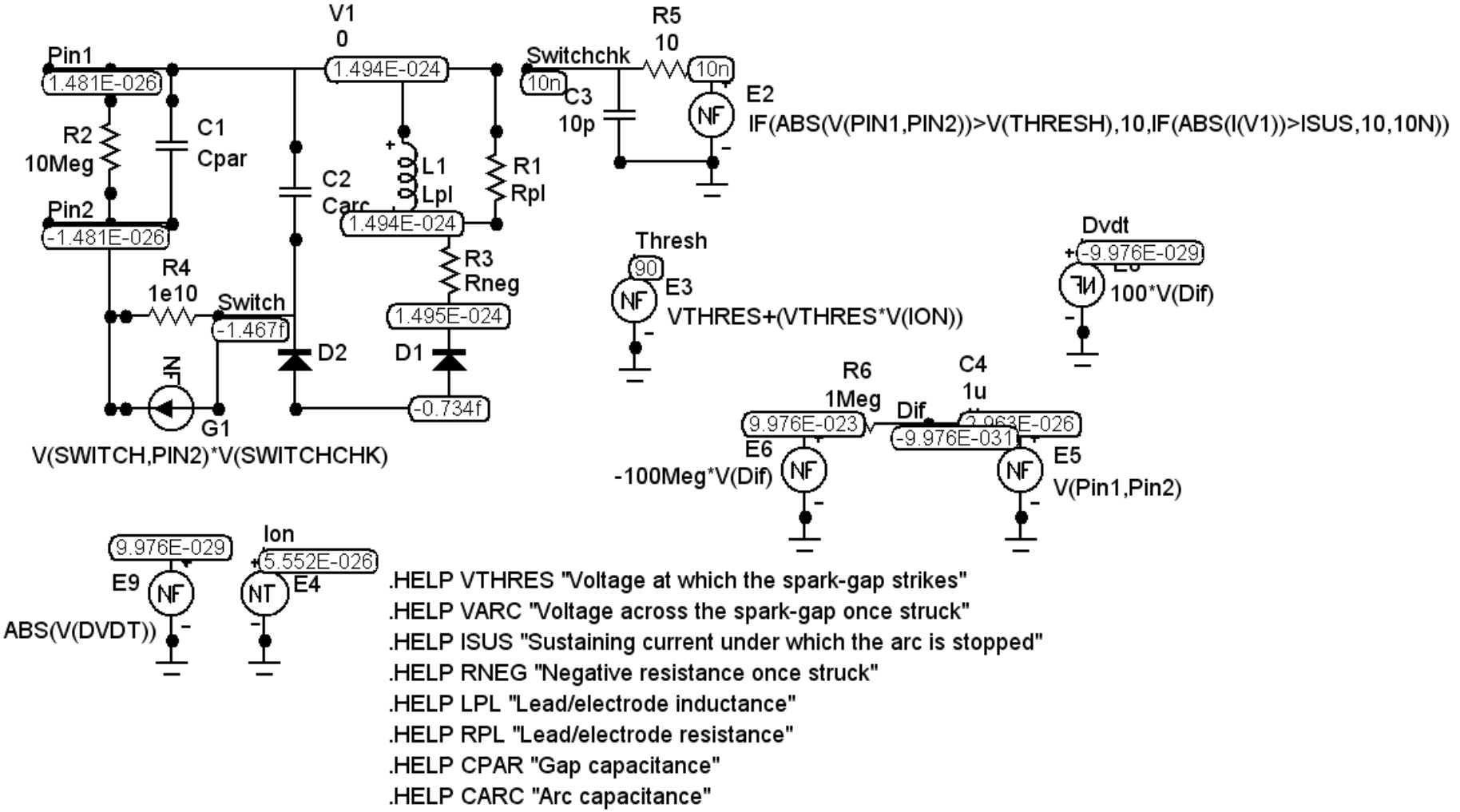


	Left	Right	Delta	Slope
V(R1) (V)	2.432E-26	1.481E-26	-9.507E-27	-1.183E-21
I(R1) (A)	2.432E-23	1.481E-23	-9.507E-24	-0.001f
V(R1)*I(R1)	5.915E-49	2.195E-49	-3.721E-49	-4.630E-44
V(R2) (V)	1.135E-26	1.481E-26	3.468E-27	4.316E-22
I(R2) (A)	1.135E-23	1.481E-23	3.468E-24	4.316E-19
V(R2)*I(R2)	1.288E-49	2.195E-49	9.072E-50	1.129E-44
V(X1.V1) (V)	7.770E-29	-1.479E-24	-1.480E-24	-1.841E-19
I(X1.V1) (A)	3.934E-24	1.018E-27	-3.933E-24	-4.894E-19
V(X1.V1)*I(X1.V1)	3.056E-52	-1.506E-51	-1.811E-51	-2.254E-46
V(X1.G1) (V)	-1.110f	-1.467f	-0.357f	-44.372p
I(X1.G1) (A)	-1.110E-23	-1.467E-23	-3.565E-24	-4.437E-19
V(X1.G1)*I(X1.G1)	1.233E-38	2.152E-38	9.188E-39	1.144E-33
V(X1.R1) (V)	-0.016f	-1.235E-30	0.016f	2.048p
I(X1.R1) (A)	-8.227E-21	-6.175E-34	8.227E-21	1.024f
V(X1.R1)*I(X1.R1)	1.354E-37	7.626E-64	-1.354E-37	-1.684E-32
V(X1.R2) (V)	-3.567E-26	-2.963E-26	6.039E-27	7.516E-22
I(X1.R2) (A)	-3.567E-33	-2.963E-33	6.039E-34	7.516E-29
V(X1.R2)*I(X1.R2)	1.272E-58	8.779E-59	-3.943E-59	-4.908E-54
V(X1.R3) (V)	3.934E-24	1.018E-27	-3.933E-24	-4.894E-19
I(X1.R3) (A)	-3.934E-24	-1.018E-27	3.933E-24	4.894E-19
V(X1.R3)*I(X1.R3)	-1.547E-47	-1.036E-54	1.547E-47	1.926E-42
V(X1.R4) (V)	-1.110f	-1.467f	-0.357f	-44.372p
I(X1.R4) (A)	-1.110E-25	-1.467E-25	-3.565E-26	-4.437E-21
V(X1.R4)*I(X1.R4)	1.233E-40	2.152E-40	9.188E-41	1.144E-35
V(X1.C1) (V)	3.567E-26	2.963E-26	-6.039E-27	-7.516E-22
I(X1.C1) (A)	-1.333E-25	-9.976E-35	1.333E-25	1.659E-20
V(X1.C1)*I(X1.C1)	-4.756E-51	-2.956E-60	4.756E-51	5.919E-46
V(X1.C2) (V)	1.110f	1.467f	0.357f	44.372p
I(X1.C2) (A)	-2.812E-23	-1.482E-23	1.331E-23	0.002f
V(X1.C2)*I(X1.C2)	-3.122E-38	-2.173E-38	9.491E-39	1.181E-33
V(X1.D1) (V)	342.305m	-0.734f	-342.305m	-42.601K
I(X1.D1) (A)	15.208n	-1.017E-27	-15.208n	-1.893m
V(X1.D1)*I(X1.D1)	5.206n	7.458E-43	-5.206n	-647.863u
V(X1.D2) (V)	342.305m	0.733f	-342.305m	-42.601K
I(X1.D2) (A)	15.208n	1.017E-27	-15.208n	-1.893m
V(X1.D2)*I(X1.D2)	5.206n	7.461E-43	-5.206n	-647.863u
V(X1.L1) (V)	0.016f	1.235E-30	-0.016f	-2.048p
I(X1.L1) (A)	-8.223E-21	1.018E-27	8.223E-21	1.023f
V(X1.L1)*I(X1.L1)	-1.353E-37	1.257E-57	1.353E-37	1.684E-32
T (Secs)	64.800n	8.100u	8.035u	1.000

FIG. 19

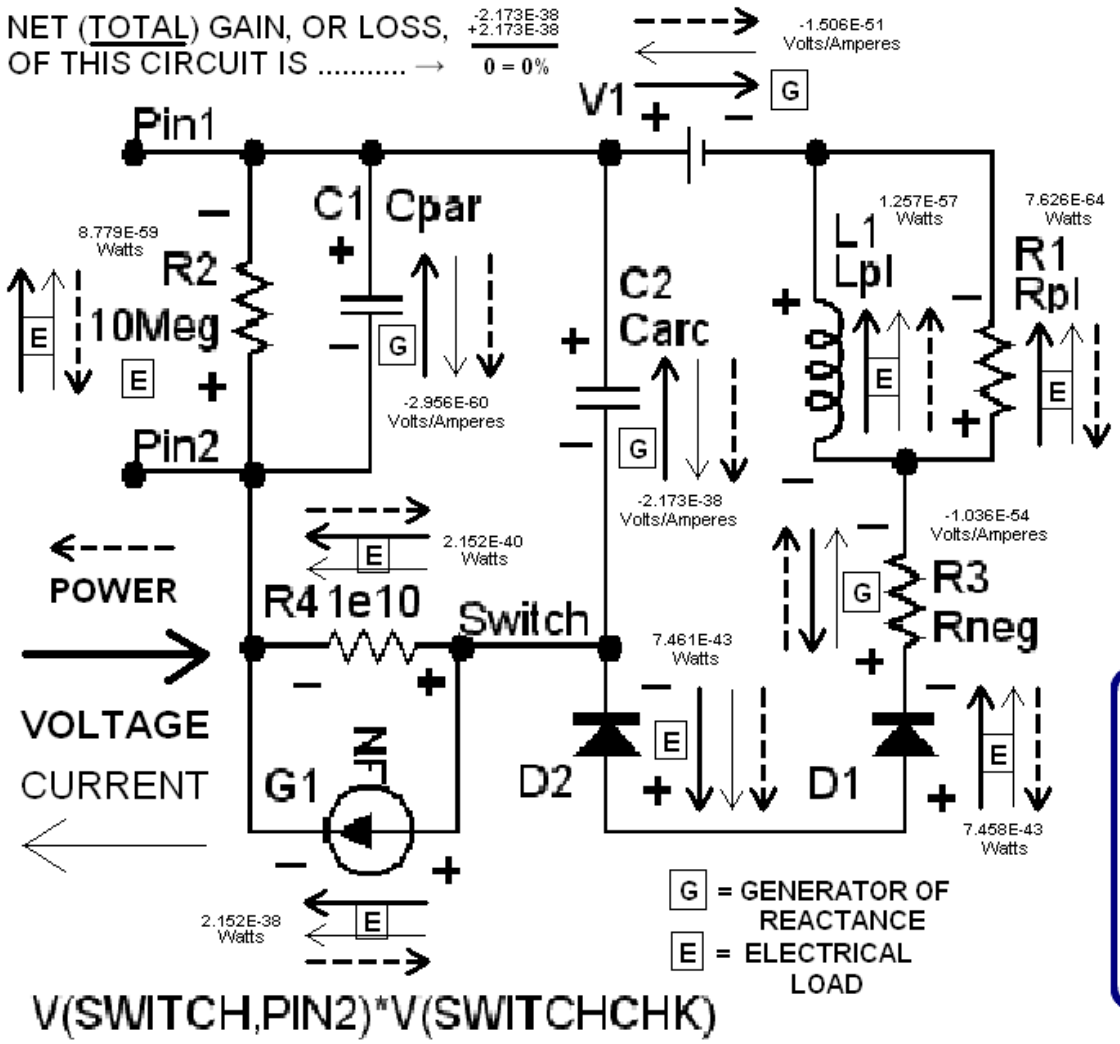
NEON BULB, SPARK GAP MACRO

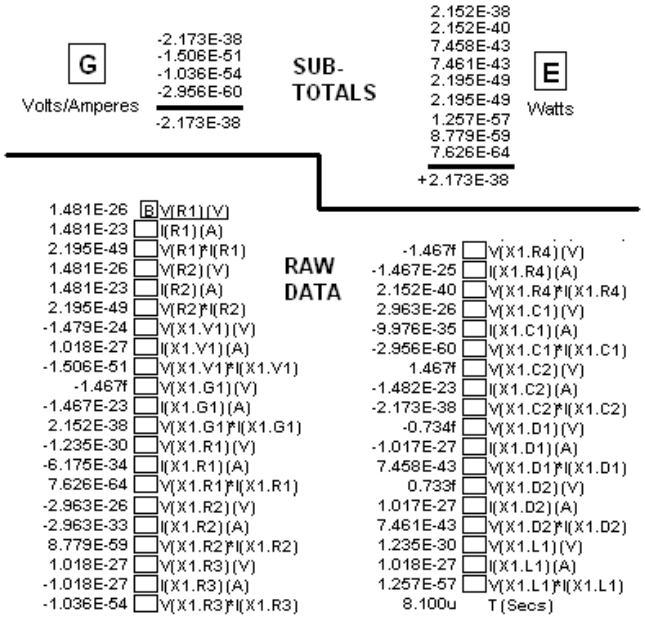
.PARAMETERS(VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)



.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 20


NET (TOTAL) GAIN, OR LOSS, OF THIS CIRCUIT IS ..... →
-2.173E-38
+2.173E-38
0 = 0%
-1.506E-51
Volts/Amperes
V1
Pin1
C1
Cpar
8.779E-59
Watts
R2
10Meg
-2.956E-60
Volts/Amperes
Pin2
1.257E-57
Watts
L1
Lpl
7.626E-64
Watts
R1
Rpl
C2
Carc
-2.173E-38
Volts/Amperes
-1.036E-54
Volts/Amperes
R3
Rneg
2.152E-40
Watts
POWER
R4 1e10
Switch
7.461E-43
Watts
VOLTAGE
CURRENT
G1
NFI
D2
D1
7.458E-43
Watts
2.152E-38
Watts
G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
V(SWITCH,PIN2)*V(SWITCHCHK)


G
Volts/Amperes
-2.173E-38
-1.506E-51
-1.036E-54
-2.956E-60
-2.173E-38
SUB-TOTALS
2.152E-38
2.152E-40
7.458E-43
7.461E-43
2.195E-49
2.195E-49
1.257E-57
8.779E-59
7.626E-64
+2.173E-38
E
Watts
RAW DATA
1.481E-26 V(R1)(V)
1.481E-23 I(R1)(A)
2.195E-49 V(R1)*I(R1)
1.481E-26 V(R2)(V)
1.481E-23 I(R2)(A)
2.195E-49 V(R2)*I(R2)
-1.479E-24 V(X1.V1)(V)
1.018E-27 I(X1.V1)(A)
-1.506E-51 V(X1.V1)*I(X1.V1)
-1.467f V(X1.G1)(V)
-1.467E-23 I(X1.G1)(A)
2.152E-38 V(X1.G1)*I(X1.G1)
-1.235E-30 V(X1.R1)(V)
-6.175E-34 I(X1.R1)(A)
7.626E-64 V(X1.R1)*I(X1.R1)
-2.963E-26 V(X1.R2)(V)
-2.963E-33 I(X1.R2)(A)
8.779E-59 V(X1.R2)*I(X1.R2)
1.018E-27 V(X1.R3)(V)
-1.018E-27 I(X1.R3)(A)
-1.036E-54 V(X1.R3)*I(X1.R3)
-1.467f V(X1.R4)(V)
-1.467E-25 I(X1.R4)(A)
2.152E-40 V(X1.R4)*I(X1.R4)
2.963E-26 V(X1.C1)(V)
-9.976E-35 I(X1.C1)(A)
-2.956E-60 V(X1.C1)*I(X1.C1)
1.467f V(X1.C2)(V)
-1.482E-23 I(X1.C2)(A)
-2.173E-38 V(X1.C2)*I(X1.C2)
-0.734f V(X1.D1)(V)
-1.017E-27 I(X1.D1)(A)
7.458E-43 V(X1.D1)*I(X1.D1)
0.733f V(X1.D2)(V)
1.017E-27 I(X1.D2)(A)
7.461E-43 V(X1.D2)*I(X1.D2)
1.235E-30 V(X1.L1)(V)
1.018E-27 I(X1.L1)(A)
1.257E-57 V(X1.L1)*I(X1.L1)
8.100u T(Secs)

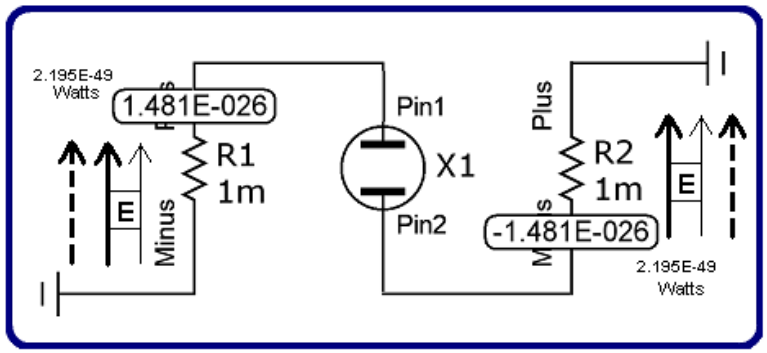

2.195E-49
Watts
1.481E-026
R1
1m
Minus
Pin1
X1
Pin2
Plus
R2
1m
-1.481E-026
2.195E-49
Watts

FIG. 21

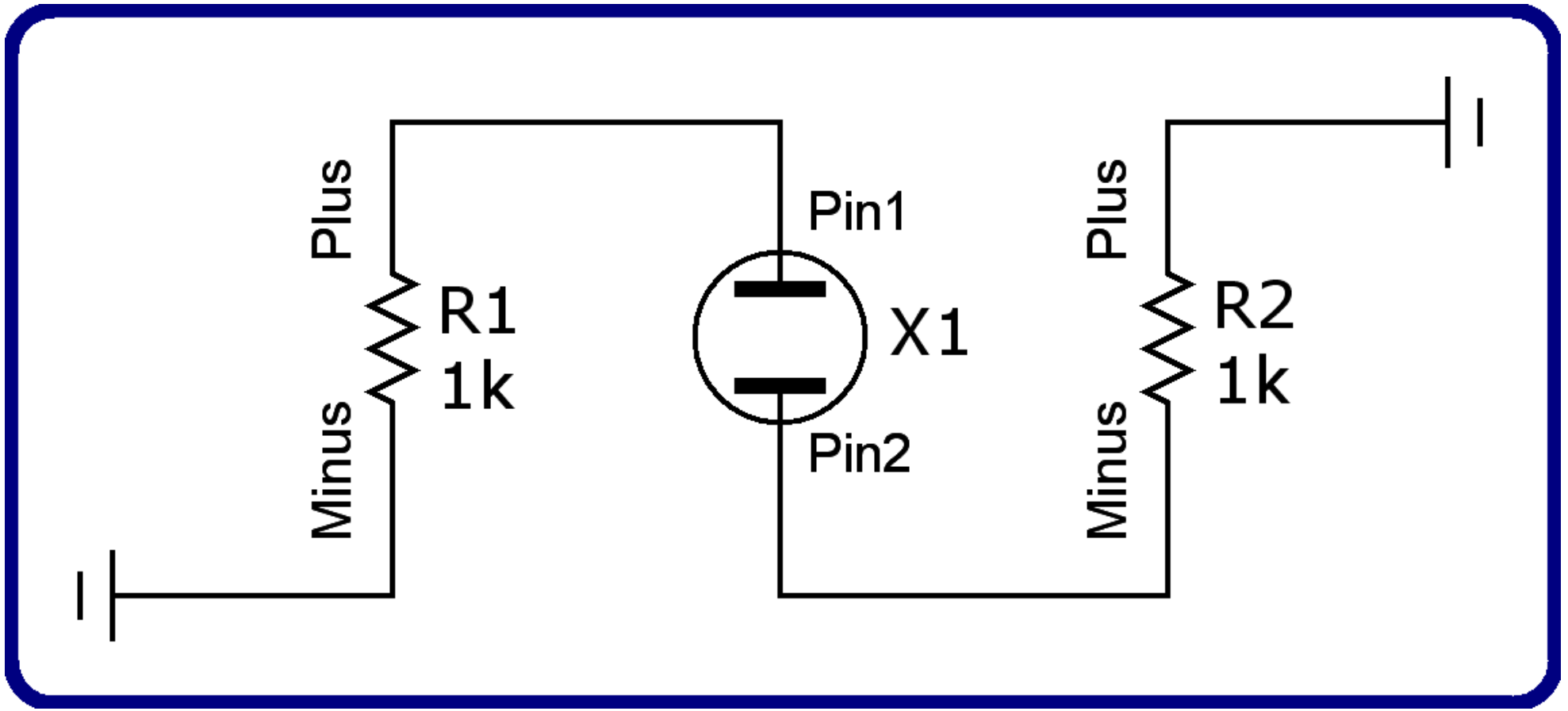
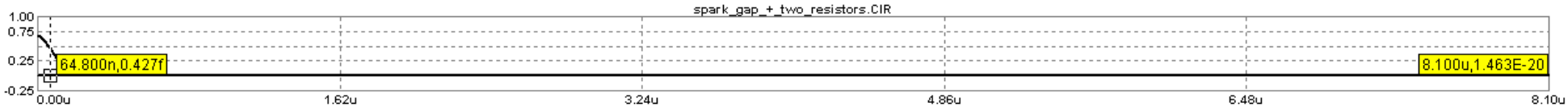


FIG. 22



	Left	Right	Delta	Slope
V(R1) (V)	0.427f	1.463E-20	-0.427f	-53.137p
I(R1) (A)	4.270E-19	1.463E-23	-4.270E-19	-53.137f
V(R1)*I(R1)	1.823E-34	2.140E-43	-1.823E-34	-2.269E-29
V(R2) (V)	0.436f	1.463E-20	-0.436f	-54.300p
I(R2) (A)	4.363E-19	1.463E-23	-4.363E-19	-54.300f
V(R2)*I(R2)	1.904E-34	2.140E-43	-1.904E-34	-2.369E-29
V(X1.V1) (V)	0.000	0.000	0.000	0.000
I(X1.V1) (A)	-1.263E-20	1.004E-27	1.263E-20	1.572f
V(X1.V1)*I(X1.V1)	0.000	0.000	0.000	0.000
V(X1.G1) (V)	-0.009f	-1.449f	-1.440f	-179.191p
I(X1.G1) (A)	-8.791E-26	-1.449E-23	-1.440E-23	-0.002f
V(X1.G1)*I(X1.G1)	7.728E-43	2.099E-38	2.098E-38	2.612E-33
V(X1.R1) (V)	-0.074f	3.172E-31	0.074f	9.264p
I(X1.R1) (A)	-3.722E-20	1.586E-34	3.722E-20	4.632f
V(X1.R1)*I(X1.R1)	2.771E-36	5.031E-65	-2.771E-36	-3.448E-31
V(X1.R2) (V)	-0.863f	-2.926E-20	0.863f	107.436p
I(X1.R2) (A)	-8.633E-23	-2.926E-27	8.633E-23	0.011f
V(X1.R2)*I(X1.R2)	7.453E-38	8.559E-47	-7.453E-38	-9.275E-33
V(X1.R3) (V)	-1.263E-20	1.004E-27	1.263E-20	1.572f
I(X1.R3) (A)	1.263E-20	-1.004E-27	-1.263E-20	-1.572f
V(X1.R3)*I(X1.R3)	-1.595E-40	-1.008E-54	1.595E-40	1.986E-35
V(X1.R4) (V)	-0.009f	-1.449f	-1.440f	-179.191p
I(X1.R4) (A)	-8.791E-28	-1.449E-25	-1.440E-25	-1.792E-20
V(X1.R4)*I(X1.R4)	7.728E-45	2.099E-40	2.098E-40	2.612E-35
V(X1.C1) (V)	0.863f	2.926E-20	-0.863f	-107.436p
I(X1.C1) (A)	-4.364E-19	-9.850E-29	4.364E-19	54.312f
V(X1.C1)*I(X1.C1)	-3.768E-34	-2.882E-48	3.768E-34	4.689E-29
V(X1.C2) (V)	0.872f	1.449f	0.577f	71.755p
I(X1.C2) (A)	2.198E-20	-1.463E-23	-2.199E-20	-2.737f
V(X1.C2)*I(X1.C2)	1.916E-35	-2.120E-38	-1.919E-35	-2.388E-30
V(X1.D1) (V)	471.626m	-0.724f	-471.626m	-58.695K
I(X1.D1) (A)	830.308n	-1.004E-27	-830.308n	-103.334m
V(X1.D1)*I(X1.D1)	391.595n	7.273E-43	-391.595n	-48.735m
V(X1.D2) (V)	471.626m	0.724f	-471.626m	-58.695K
I(X1.D2) (A)	830.308n	1.004E-27	-830.308n	-103.334m
V(X1.D2)*I(X1.D2)	391.595n	7.273E-43	-391.595n	-48.735m
V(X1.L1) (V)	0.074f	-3.172E-31	-0.074f	-9.264p
I(X1.L1) (A)	-4.985E-20	1.004E-27	4.985E-20	6.204f
V(X1.L1)*I(X1.L1)	-3.711E-36	-3.185E-58	3.711E-36	4.618E-31
T (Secs)	64.800n	8.100u	8.035u	1.000

FIG. 23

NEON BULB, SPARK GAP MACRO

.PARAMETERS(VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)

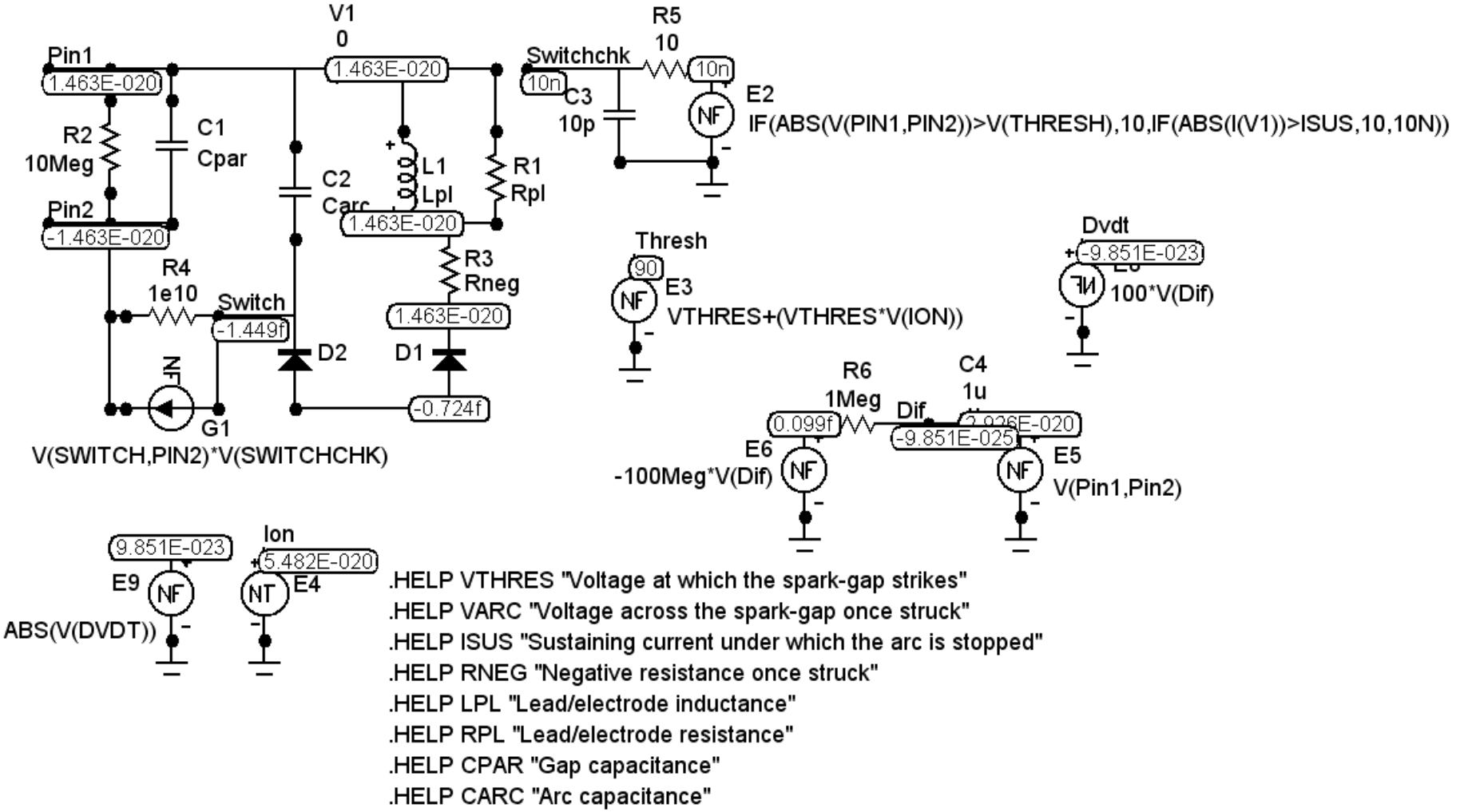


FIG. 24

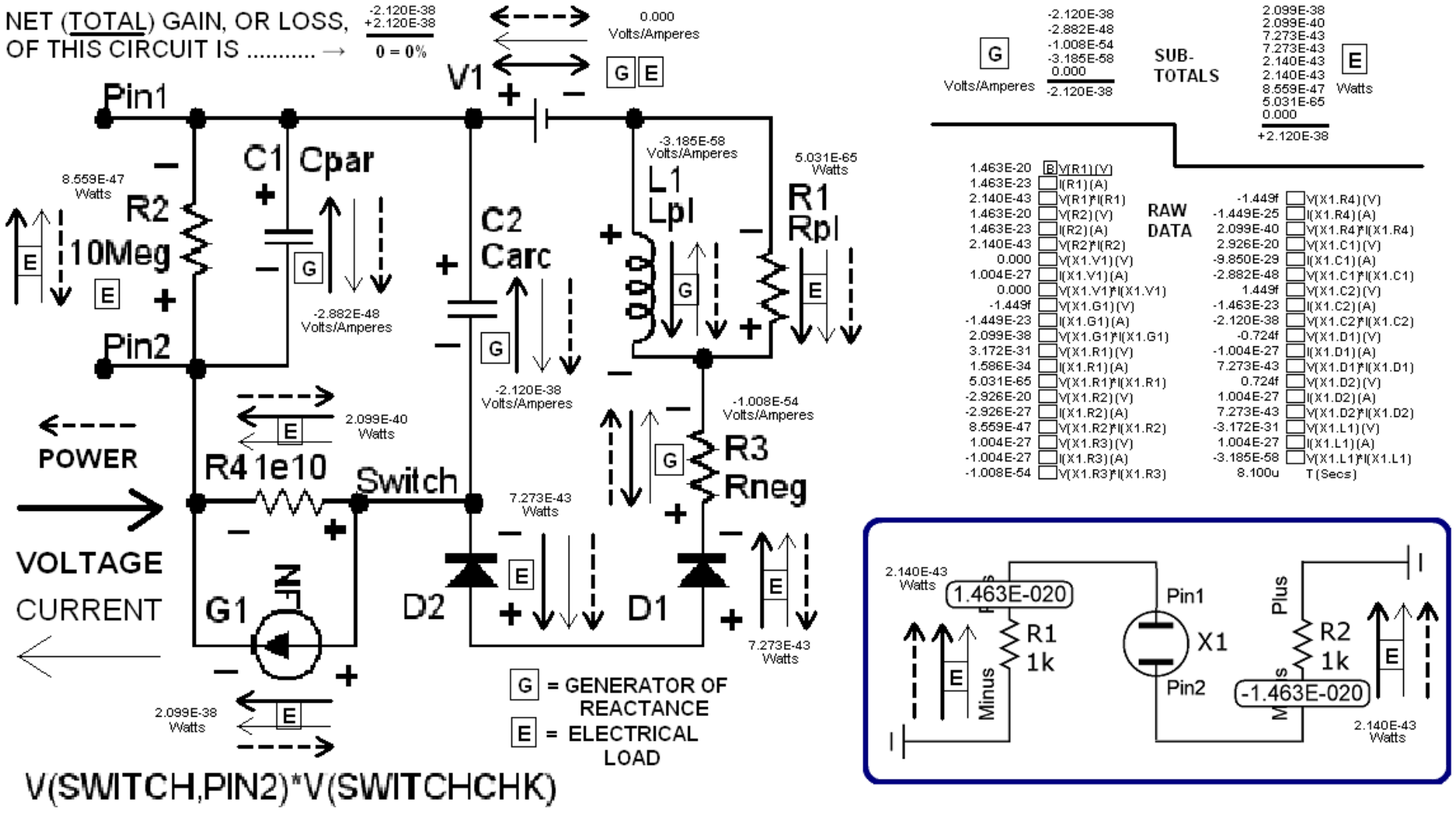

NET (TOTAL) GAIN, OR LOSS, OF THIS CIRCUIT IS ..... →
-2.120E-38
+2.120E-38
0 = 0%
0.000
Volts/Amperes
V1
Pin1
Pin2
C1 Cpar
C2 Carc
L1 Lpl
R1 Rpl
R2 10Meg
R3 Rneg
R4 1e10
Switch
D1
D2
G1
8.559E-47 Watts
-2.882E-48 Volts/Amperes
-2.120E-38 Volts/Amperes
-3.185E-58 Volts/Amperes
5.031E-65 Watts
-1.008E-54 Volts/Amperes
2.099E-40 Watts
7.273E-43 Watts
2.099E-38 Watts
POWER
VOLTAGE
CURRENT
G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
V(SWITCH,PIN2)*V(SWITCHCHK)
SUB-TOTALS
RAW DATA
T (Secs)
2.140E-43 Watts
1.463E-020
-1.463E-020
Plus
Minus
Pin1
Pin2
X1
R1 1k
R2 1k

FIG. 25

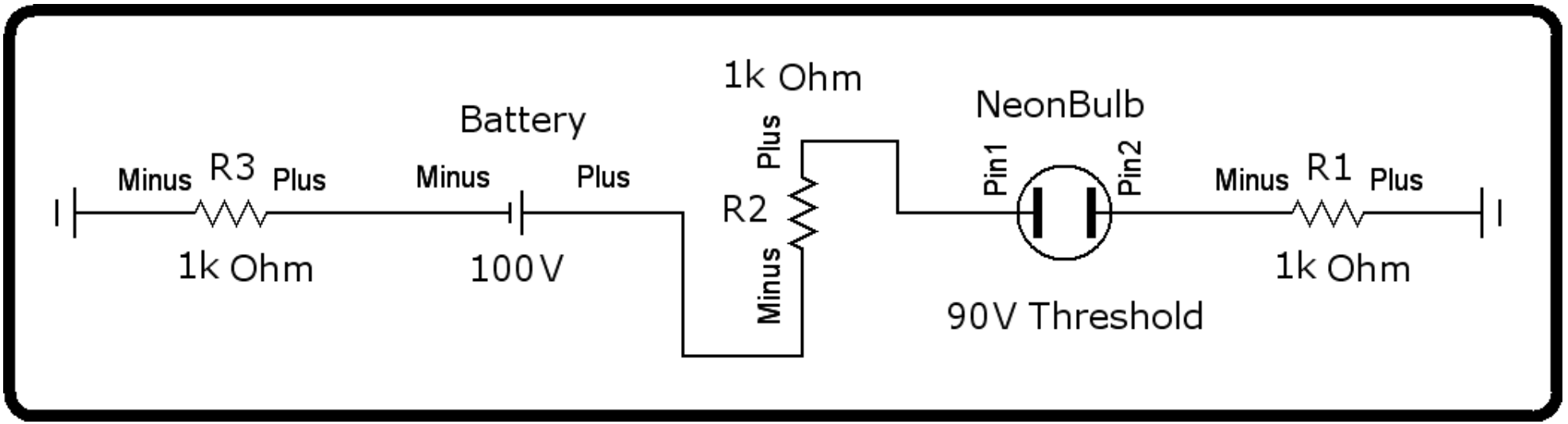

1k Ohm
Battery
NeonBulb
Plus
Minus R3 Plus
Minus
Plus
R2
Pin1
Pin2
Minus R1 Plus
1k Ohm
100V
Minus
1k Ohm
90V Threshold

FIG. 26

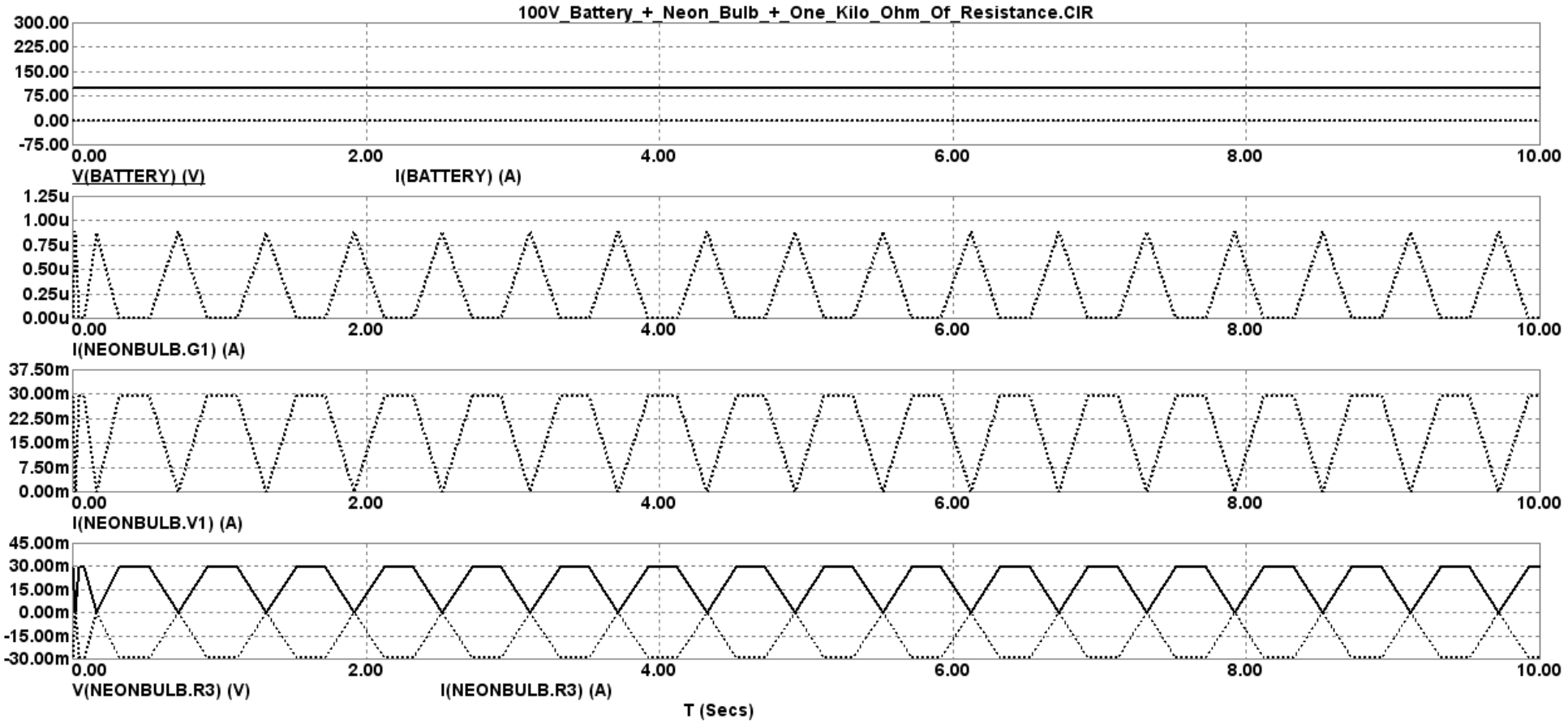

100V_Battery_+_Neon_Bulb_+_One_Kilo_Ohm_Of_Resistance.CIR
300.00
225.00
150.00
75.00
0.00
-75.00
0.00
2.00
4.00
6.00
8.00
10.00
V(BATTERY) (V)
I(BATTERY) (A)
1.25u
1.00u
0.75u
0.50u
0.25u
0.00u
I(NEONBULB.G1) (A)
37.50m
30.00m
22.50m
15.00m
7.50m
0.00m
I(NEONBULB.V1) (A)
45.00m
30.00m
15.00m
0.00m
-15.00m
-30.00m
V(NEONBULB.R3) (V)
I(NEONBULB.R3) (A)
T (Secs)

FIG. 27

-10.00K

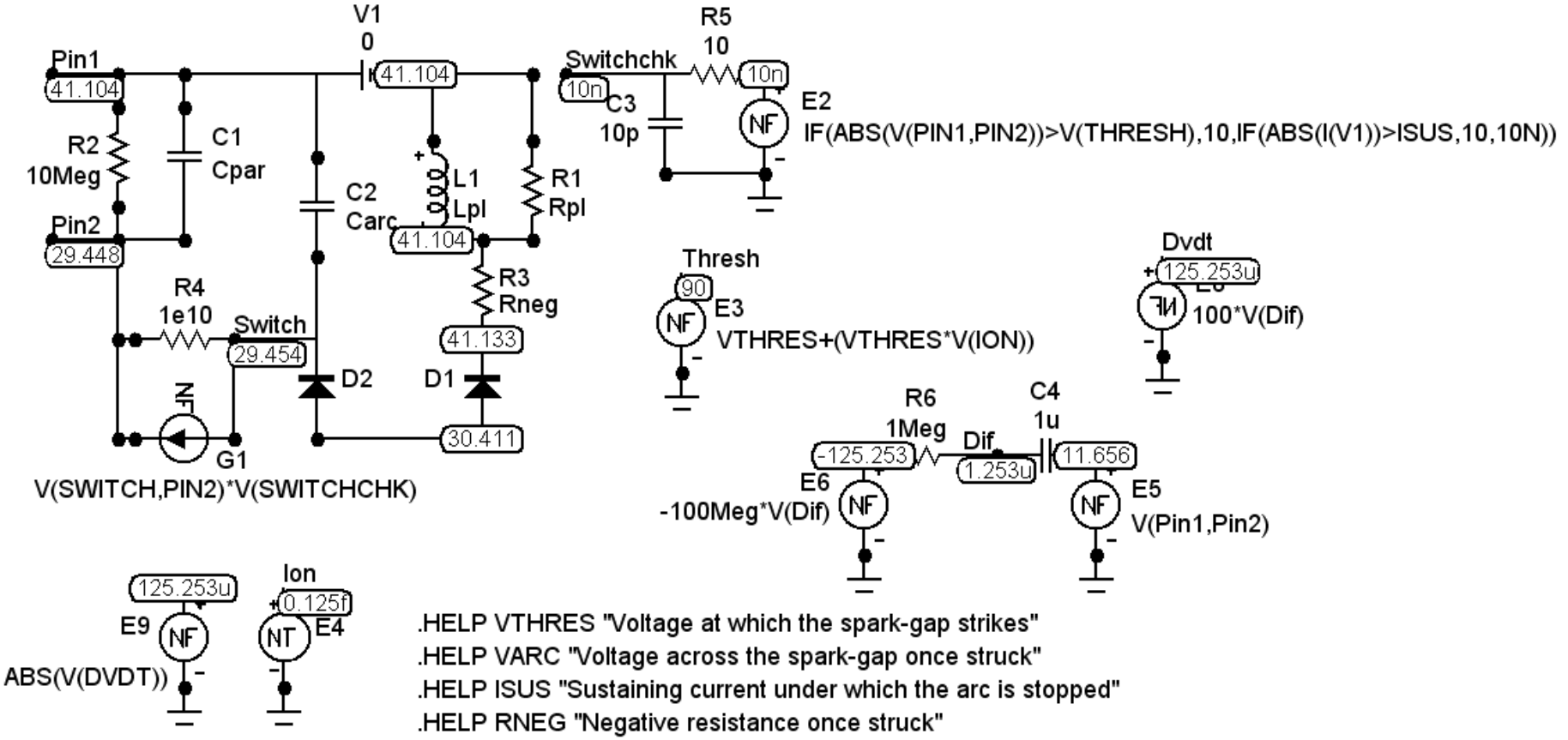
100V_Battery_+_Neon_Bulb_+_One_Kilo_Ohm_Of_Resistance.CIR

	Left	Right	Delta	Slope
V(BATTERY)(V)	100.000	100.000	0.000	0.000
I(BATTERY)(A)	-29.431m	-29.448m	-17.305u	-1.737u
V(BATTERY)*I(BATTERY)	-2.943	-2.945	-1.731m	-173.747u
V(R1)(V)	-29.431	-29.448	-17.305m	-1.737m
I(R1)(A)	-29.431m	-29.448m	-17.305u	-1.737u
V(R1)*I(R1)	866.168m	867.187m	1.019m	102.300u
V(R2)(V)	-29.431	-29.448	-17.305m	-1.737m
I(R2)(A)	-29.431m	-29.448m	-17.305u	-1.737u
V(R2)*I(R2)	866.168m	867.187m	1.019m	102.300u
V(R3)(V)	-29.431	-29.448	-17.305m	-1.737m
I(R3)(A)	-29.431m	-29.448m	-17.305u	-1.737u
V(R3)*I(R3)	866.168m	867.187m	1.019m	102.300u
V(NEONBULB.G1)(V)	5.933m	5.936m	3.042u	305.403n
I(NEONBULB.G1)(A)	59.331p	59.361p	30.418f	3.054f
V(NEONBULB.G1)*I(NEONBULB.G1)	352.011f	352.372f	0.361f	0.036f
V(NEONBULB.V1)(V)	0.000	0.000	0.000	0.000
I(NEONBULB.V1)(A)	29.430m	29.447m	17.306u	1.738u
V(NEONBULB.V1)*I(NEONBULB.V1)	0.000	0.000	0.000	0.000
V(NEONBULB.R1)(V)	-191.286n	5.429n	196.716n	19.751n
I(NEONBULB.R1)(A)	-95.643p	2.715p	98.358p	9.875p
V(NEONBULB.R1)*I(NEONBULB.R1)	0.018f	1.474E-20	-0.018f	-0.002f
V(NEONBULB.R2)(V)	-11.708	-11.656	51.916m	5.212m
I(NEONBULB.R2)(A)	-1.171u	-1.166u	5.192n	521.240p
V(NEONBULB.R2)*I(NEONBULB.R2)	13.707u	13.586u	-121.294n	-12.178n
V(NEONBULB.R3)(V)	29.430m	29.447m	17.306u	1.738u
I(NEONBULB.R3)(A)	-29.430m	-29.447m	-17.306u	-1.738u
V(NEONBULB.R3)*I(NEONBULB.R3)	-866.100u	-867.119u	-1.019u	-102.300n
V(NEONBULB.R4)(V)	5.933m	5.936m	3.042u	305.403n
I(NEONBULB.R4)(A)	593.305f	593.609f	0.304f	0.031f
V(NEONBULB.R4)*I(NEONBULB.R4)	3.520f	3.524f	0.004f	3.625E-19
V(NEONBULB.C1)(V)	11.708	11.656	-51.916m	-5.212m
I(NEONBULB.C1)(A)	-4.413n	125.253p	4.538n	455.646p
V(NEONBULB.C1)*I(NEONBULB.C1)	-51.666n	1.460n	53.126n	5.334n
V(NEONBULB.C2)(V)	11.702	11.650	-51.919m	-5.213m
I(NEONBULB.C2)(A)	44.041p	-2.925p	-46.966p	-4.715p
V(NEONBULB.C2)*I(NEONBULB.C2)	515.357p	-34.078p	-549.435p	-55.164p
V(NEONBULB.D1)(V)	-10.748	-10.722	25.946m	2.605m
I(NEONBULB.D1)(A)	-885.564	-324.731	560.833	56.309
V(NEONBULB.D1)*I(NEONBULB.D1)	9.518K	3.482K	-6.036K	-606.042
V(NEONBULB.D2)(V)	983.420m	957.465m	-25.955m	-2.606m
I(NEONBULB.D2)(A)	885.564	324.622	-560.942	-56.319
V(NEONBULB.D2)*I(NEONBULB.D2)	870.881	310.814	-560.066	-56.232
V(NEONBULB.L1)(V)	191.286n	-5.429n	-196.716n	-19.751n
I(NEONBULB.L1)(A)	29.430m	29.447m	17.306u	1.738u
V(NEONBULB.L1)*I(NEONBULB.L1)	5.629n	-159.874p	-5.789n	-581.260p
T(Secs)	40.000m	10.000	9.960	1.000

FIG. 28

NEON BULB, SPARK GAP MACRO

.PARAMETERS(VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)



.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 29

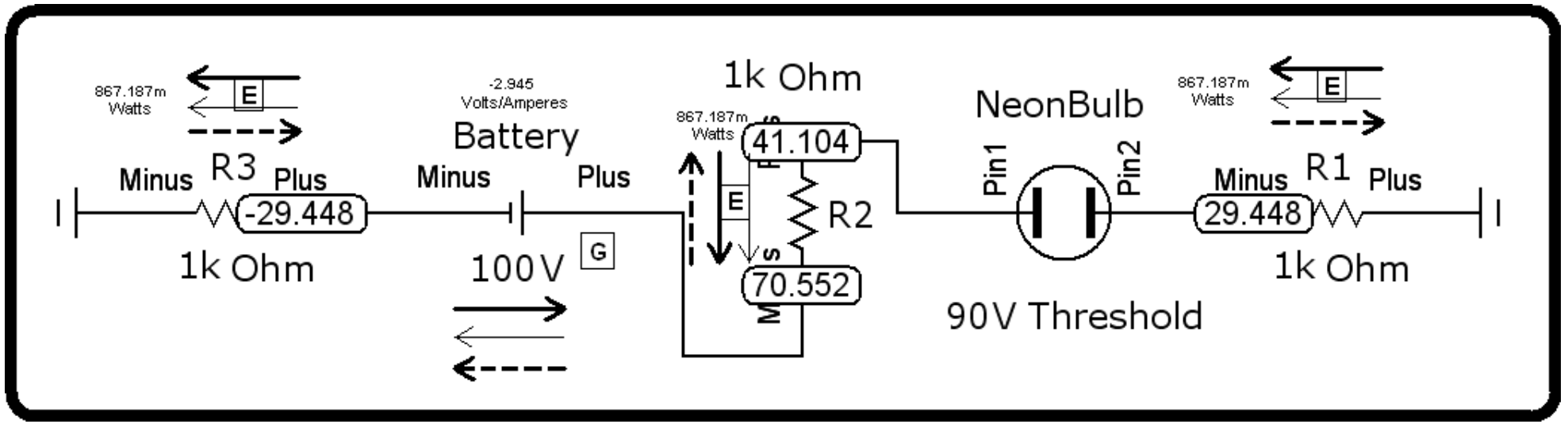
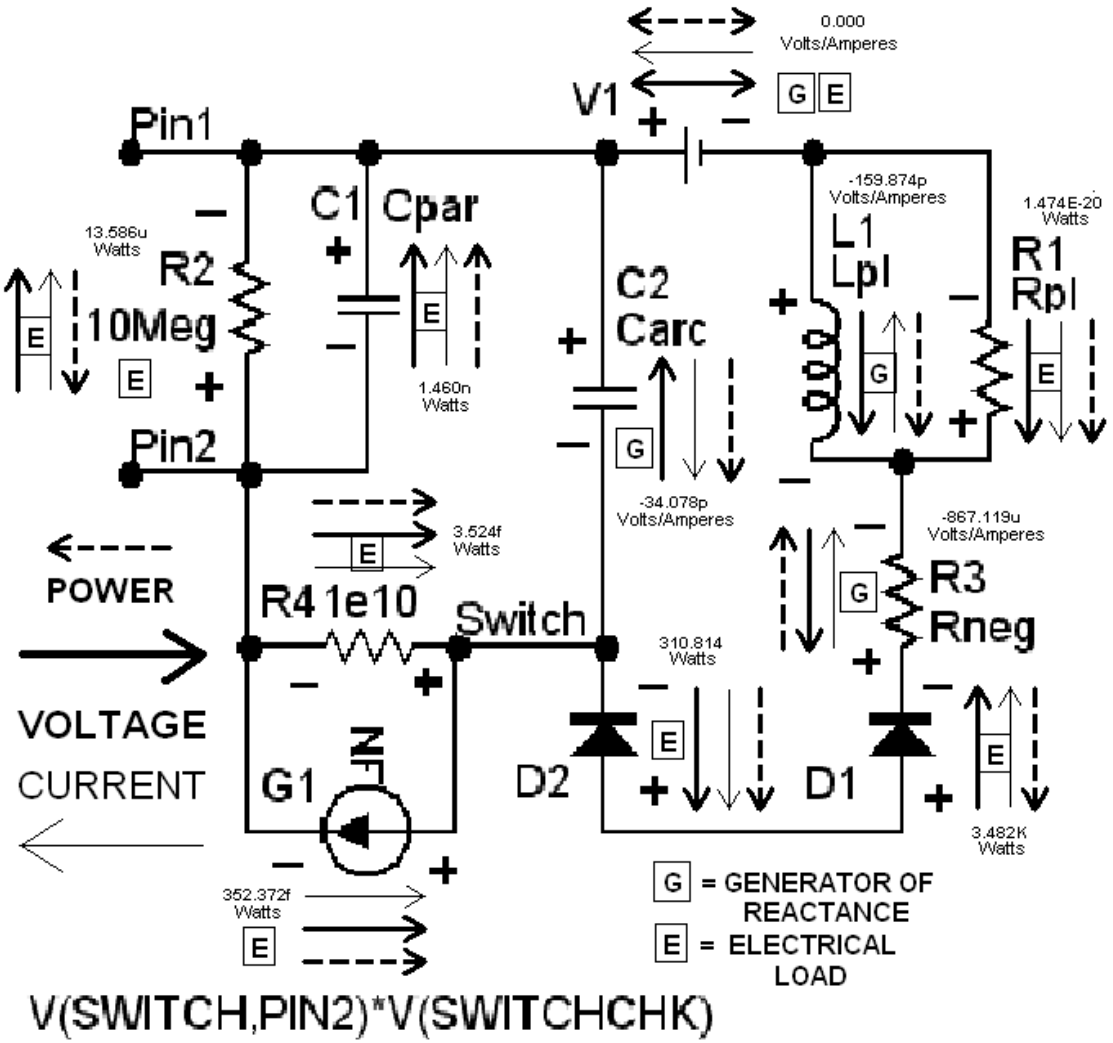

867.187m
Watts
E
R3
Minus
Plus
-29.448
1k Ohm
-2.945
Volts/Amperes
Battery
Minus
Plus
100V
G
1k Ohm
867.187m
Watts
41.104
E
R2
70.552
NeonBulb
Pin1
Pin2
90V Threshold
867.187m
Watts
E
Minus
R1
Plus
29.448
1k Ohm

FIG. 30


0.000
Volts/Amperes
V1
G E
Pin1
C1 Cpar
13.586u
Watts
R2
10Meg
E
E
1.460n
Watts
Pin2
C2
Carc
G
-34.078p
Volts/Amperes
-159.874p
Volts/Amperes
L1
Lpl
G
1.474E-20
Watts
R1
Rpl
E
3.524f
Watts
E
POWER
R4 1e10
Switch
310.814
Watts
-867.119u
Volts/Amperes
G
R3
Rneg
VOLTAGE
CURRENT
G1
NF
D2
E
D1
E
3.482K
Watts
352.372f
Watts
E
G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
V(SWITCH,PIN2)*V(SWITCHCHK)

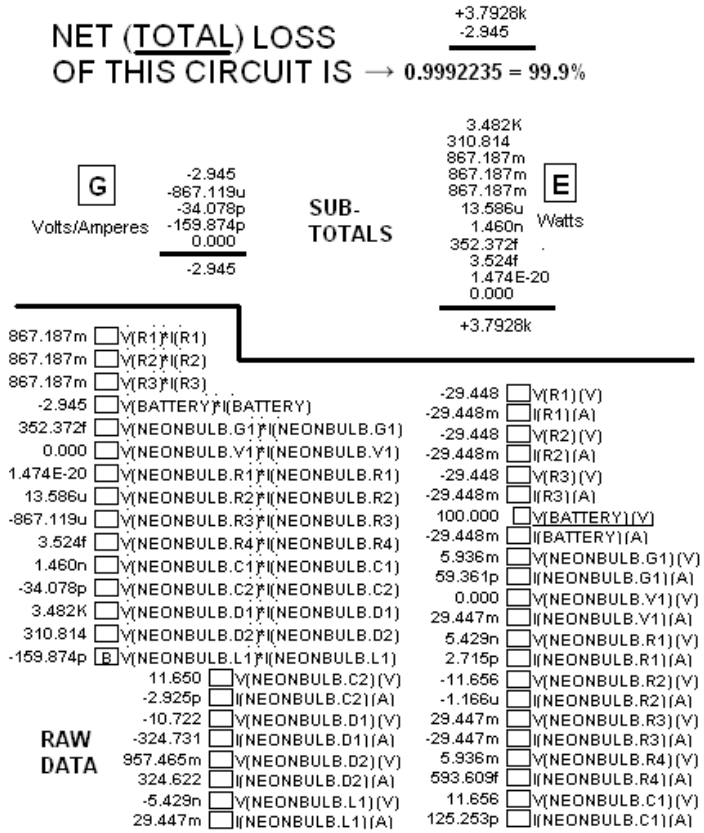

NET (TOTAL) LOSS OF THIS CIRCUIT IS → 0.9992235 = 99.9%
+3.7928k
-2.945
G
Volts/Amperes
-2.945
-867.119u
-34.078p
-159.874p
0.000
-2.945
SUB-TOTALS
3.482K
310.814
867.187m
867.187m
867.187m
13.586u
1.460n
352.372f
3.524f
1.474E-20
0.000
+3.7928k
E
Watts
867.187m V(R1)*I(R1)
867.187m V(R2)*I(R2)
867.187m V(R3)*I(R3)
-2.945 V(BATTERY)*I(BATTERY)
352.372f V(NEONBULB.G1)*I(NEONBULB.G1)
0.000 V(NEONBULB.V1)*I(NEONBULB.V1)
1.474E-20 V(NEONBULB.R1)*I(NEONBULB.R1)
13.586u V(NEONBULB.R2)*I(NEONBULB.R2)
-867.119u V(NEONBULB.R3)*I(NEONBULB.R3)
3.524f V(NEONBULB.R4)*I(NEONBULB.R4)
1.460n V(NEONBULB.C1)*I(NEONBULB.C1)
-34.078p V(NEONBULB.C2)*I(NEONBULB.C2)
3.482K V(NEONBULB.D1)*I(NEONBULB.D1)
310.814 V(NEONBULB.D2)*I(NEONBULB.D2)
-159.874p V(NEONBULB.L1)*I(NEONBULB.L1)
RAW DATA
11.650 V(NEONBULB.C2)(V)
-2.925p I(NEONBULB.C2)(A)
-10.722 V(NEONBULB.D1)(V)
-324.731 I(NEONBULB.D1)(A)
957.465m V(NEONBULB.D2)(V)
324.622 I(NEONBULB.D2)(A)
-5.429n V(NEONBULB.L1)(V)
29.447m I(NEONBULB.L1)(A)
-29.448 V(R1)(V)
-29.448m I(R1)(A)
-29.448 V(R2)(V)
-29.448m I(R2)(A)
-29.448 V(R3)(V)
-29.448m I(R3)(A)
100.000 V(BATTERY)(V)
-29.448m I(BATTERY)(A)
5.936m V(NEONBULB.G1)(V)
59.361p I(NEONBULB.G1)(A)
0.000 V(NEONBULB.V1)(V)
29.447m I(NEONBULB.V1)(A)
5.429n V(NEONBULB.R1)(V)
2.715p I(NEONBULB.R1)(A)
-11.656 V(NEONBULB.R2)(V)
-1.166u I(NEONBULB.R2)(A)
29.447m V(NEONBULB.R3)(V)
-29.447m I(NEONBULB.R3)(A)
5.936m V(NEONBULB.R4)(V)
593.609f I(NEONBULB.R4)(A)
11.656 V(NEONBULB.C1)(V)
125.253p I(NEONBULB.C1)(A)

FIG. 31

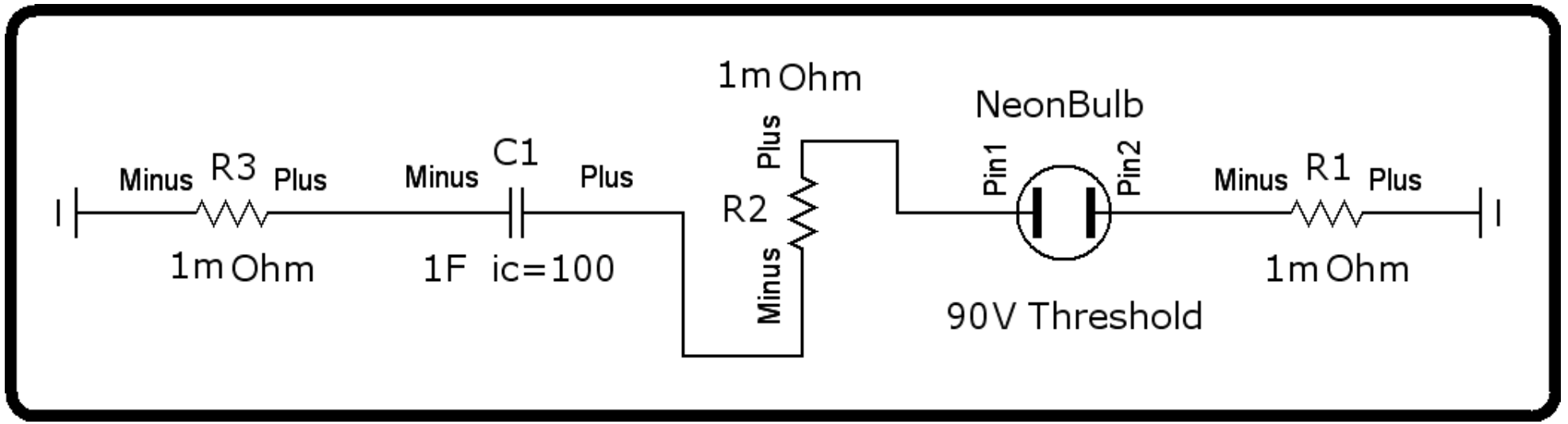

1m Ohm
NeonBulb
Minus
R3
Plus
Minus
C1
Plus
Plus
Pin1
Pin2
Minus
R1
Plus
R2
1m Ohm
1F ic=100
Minus
1m Ohm
90V Threshold

FIG. 32

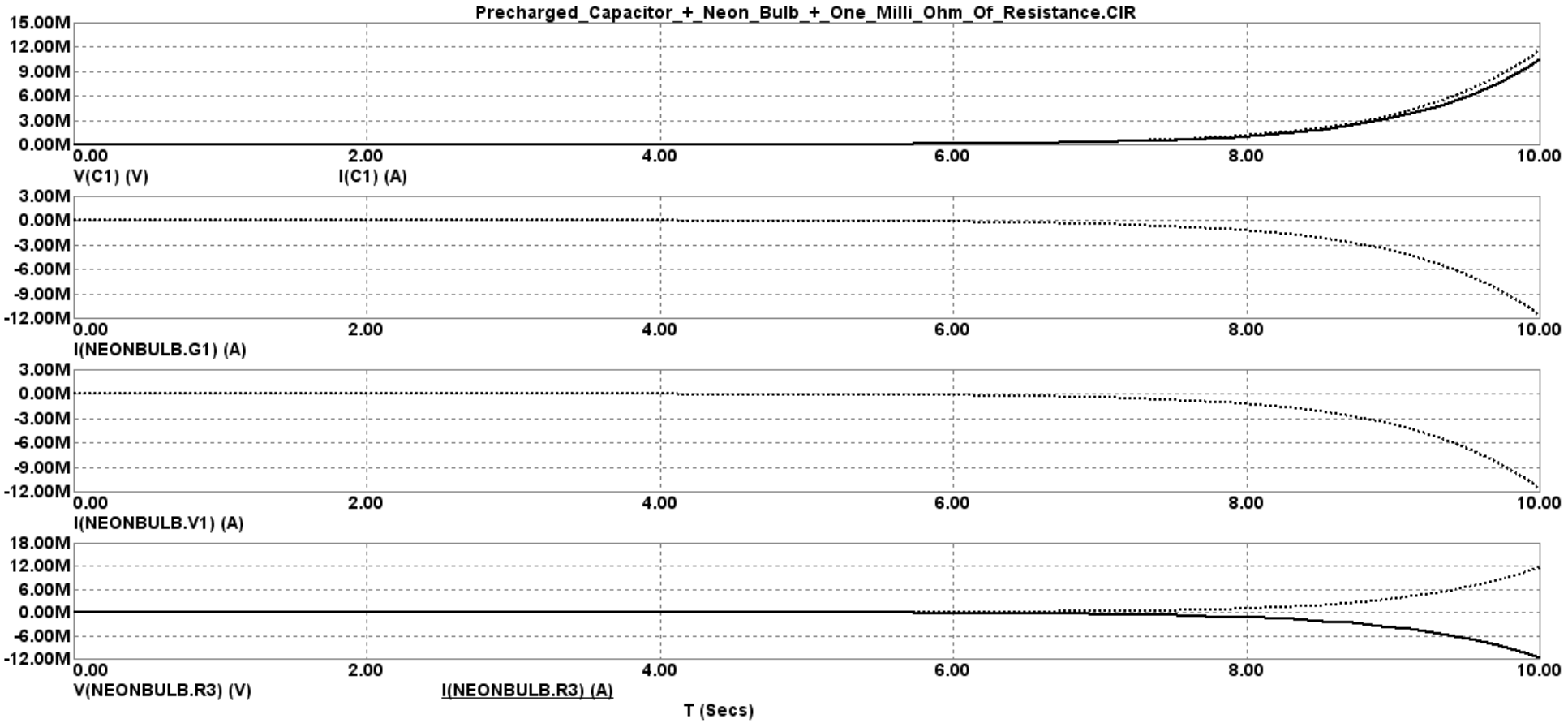
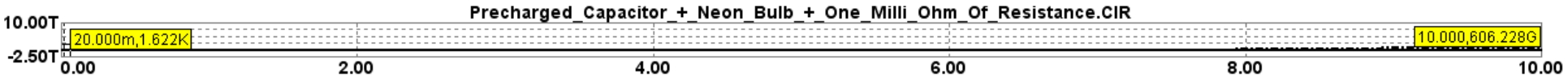

Precharged_Capacitor_+_Neon_Bulb_+_One_Milli_Ohm_Of_Resistance.CIR
15.00M
12.00M
9.00M
6.00M
3.00M
0.00M
0.00
2.00
4.00
6.00
8.00
10.00
V(C1) (V)
I(C1) (A)
3.00M
0.00M
-3.00M
-6.00M
-9.00M
-12.00M
I(NEONBULB.G1) (A)
I(NEONBULB.V1) (A)
18.00M
12.00M
6.00M
0.00M
-6.00M
-12.00M
V(NEONBULB.R3) (V)
I(NEONBULB.R3) (A)
T (Secs)

FIG. 33



	Left	Right	Delta	Slope
B RMS(V(NEONBULB.G1))*RMS(I(N	1.622K	606.228G	606.228G	60.744G
RMS(V(NEONBULB.V1))*RMS(I(N	0.000	0.000	0.000	0.000
RMS(V(NEONBULB.R1))*RMS(I(N	89.192f	65.110u	65.110u	6.524u
RMS(V(NEONBULB.R2))*RMS(I(N	1.060m	491.042K	491.042K	49.203K
RMS(V(NEONBULB.R3))*RMS(I(N	16.223K	6.062T	6.062T	607.443G
RMS(V(NEONBULB.L1))*RMS(I(NI	1.701m	888.496K	888.496K	89.028K
RMS(V(NEONBULB.D1))*RMS(I(N	122.182	2.733M	2.733M	273.838K
RMS(V(NEONBULB.D2))*RMS(I(N	1.366K	26.767M	26.766M	2.682M
RMS(V(NEONBULB.C1))*RMS(I(N	9.515n	5.536	5.536	554.709m
RMS(V(NEONBULB.C2))*RMS(I(N	35.643n	20.504	20.504	2.054
V(NEONBULB.G1) (V)	-12.714	-1.168M	-1.168M	-116.930K
I(NEONBULB.G1) (A)	-127.145	-11.683M	-11.683M	-1.169M
V(NEONBULB.V1) (V)	0.000	0.000	0.000	0.000
I(NEONBULB.V1) (A)	-127.145	-11.683M	-11.683M	-1.169M
V(NEONBULB.R1) (V)	8.024u	1.712	1.712	171.376m
I(NEONBULB.R1) (A)	4.012n	856.156u	856.152u	85.688u
V(NEONBULB.R2) (V)	-102.747	-10.515M	-10.515M	-1.052M
I(NEONBULB.R2) (A)	-10.275u	-1.051	-1.051	-105.237m
V(NEONBULB.R3) (V)	-127.145	-11.683M	-11.683M	-1.169M
I(NEONBULB.R3) (A)	127.145	11.683M	11.683M	1.169M
V(NEONBULB.L1) (V)	-8.024u	-1.712	-1.712	-171.376m
I(NEONBULB.L1) (A)	-127.145	-11.683M	-11.683M	-1.169M
V(NEONBULB.D1) (V)	959.084m	1.255	295.584m	29.583m
I(NEONBULB.D1) (A)	127.159	11.683M	11.683M	1.169M
V(NEONBULB.D2) (V)	-10.724	-11.019	-295.584m	-29.583m
I(NEONBULB.D2) (A)	-127.159	-11.683M	-11.683M	-1.169M
V(NEONBULB.C1) (V)	102.747	10.515M	10.515M	1.052M
I(NEONBULB.C1) (A)	55.525p	11.854u	11.854u	1.186u
V(NEONBULB.C2) (V)	115.462	11.683M	11.683M	1.169M
I(NEONBULB.C2) (A)	185.090p	39.515u	39.515u	3.955u
T (Secs)	20.000m	10.000	9.980	1.000

FIG. 34

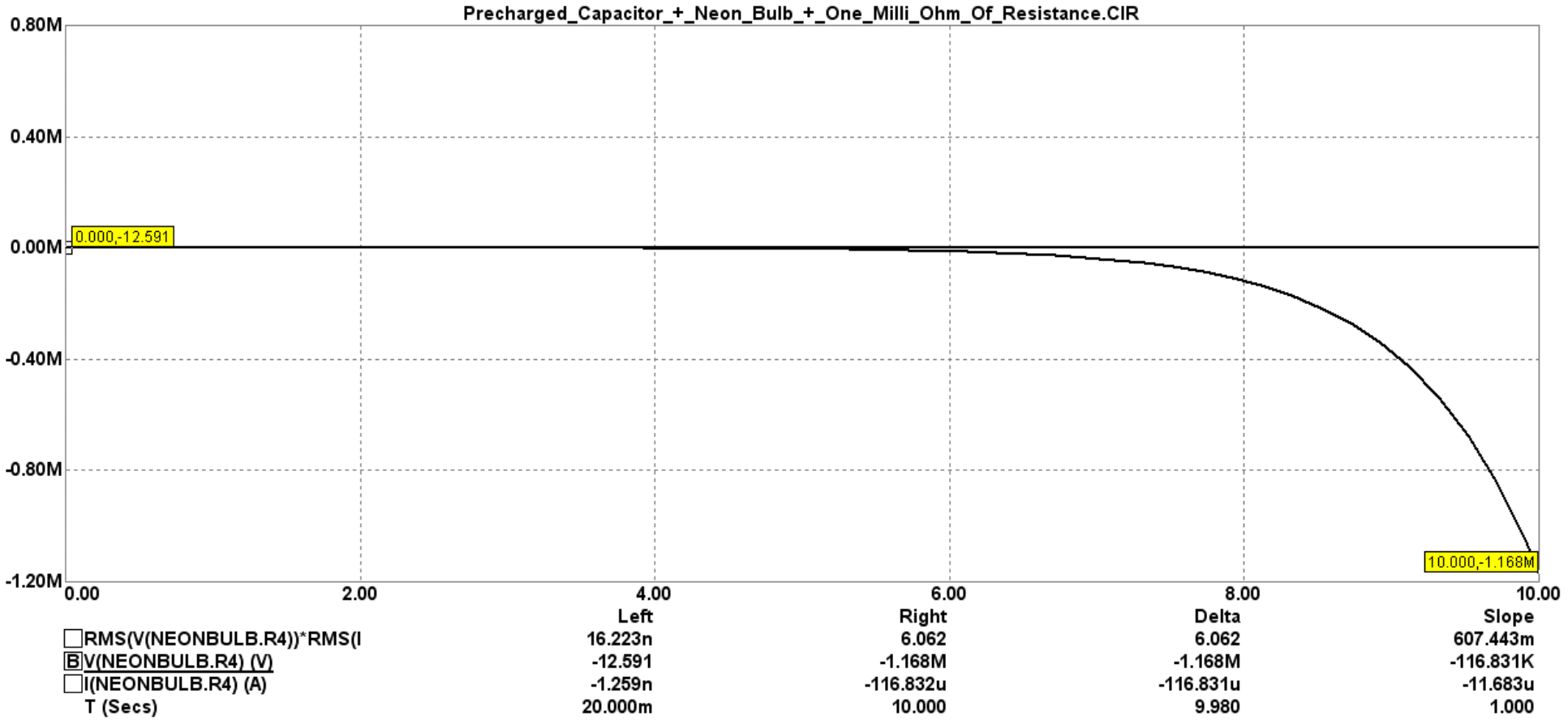
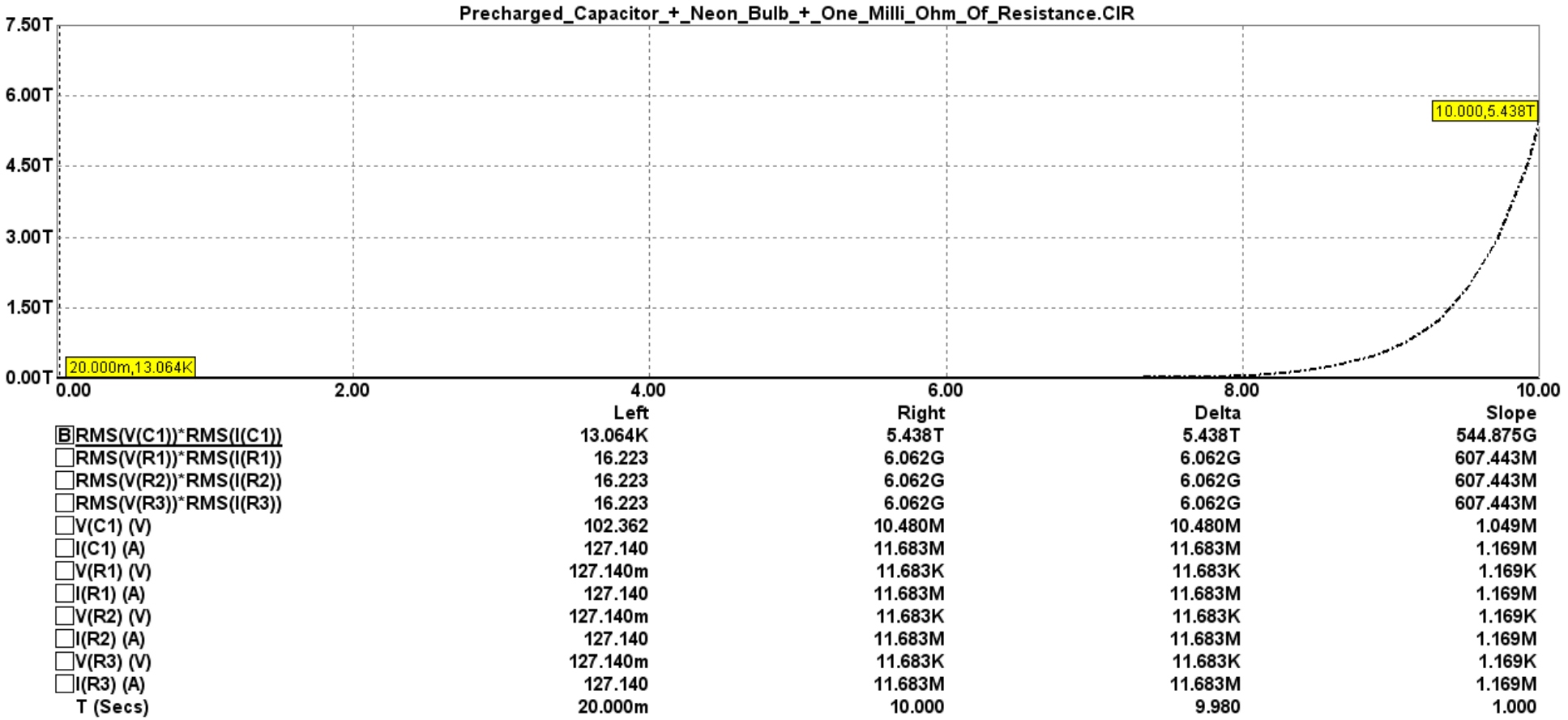

Precharged_Capacitor_+_Neon_Bulb_+_One_Milli_Ohm_Of_Resistance.CIR
0.80M
0.40M
0.00M
-0.40M
-0.80M
-1.20M
0.000,-12.591
10.000,-1.168M
0.00
2.00
4.00
6.00
8.00
10.00
Left
Right
Delta
Slope
RMS(V(NEONBULB.R4))*RMS(I
16.223n
6.062
6.062
607.443m
V(NEONBULB.R4) (V)
-12.591
-1.168M
-1.168M
-116.831K
I(NEONBULB.R4) (A)
-1.259n
-116.832u
-116.831u
-11.683u
T (Secs)
20.000m
10.000
9.980
1.000

FIG. 35

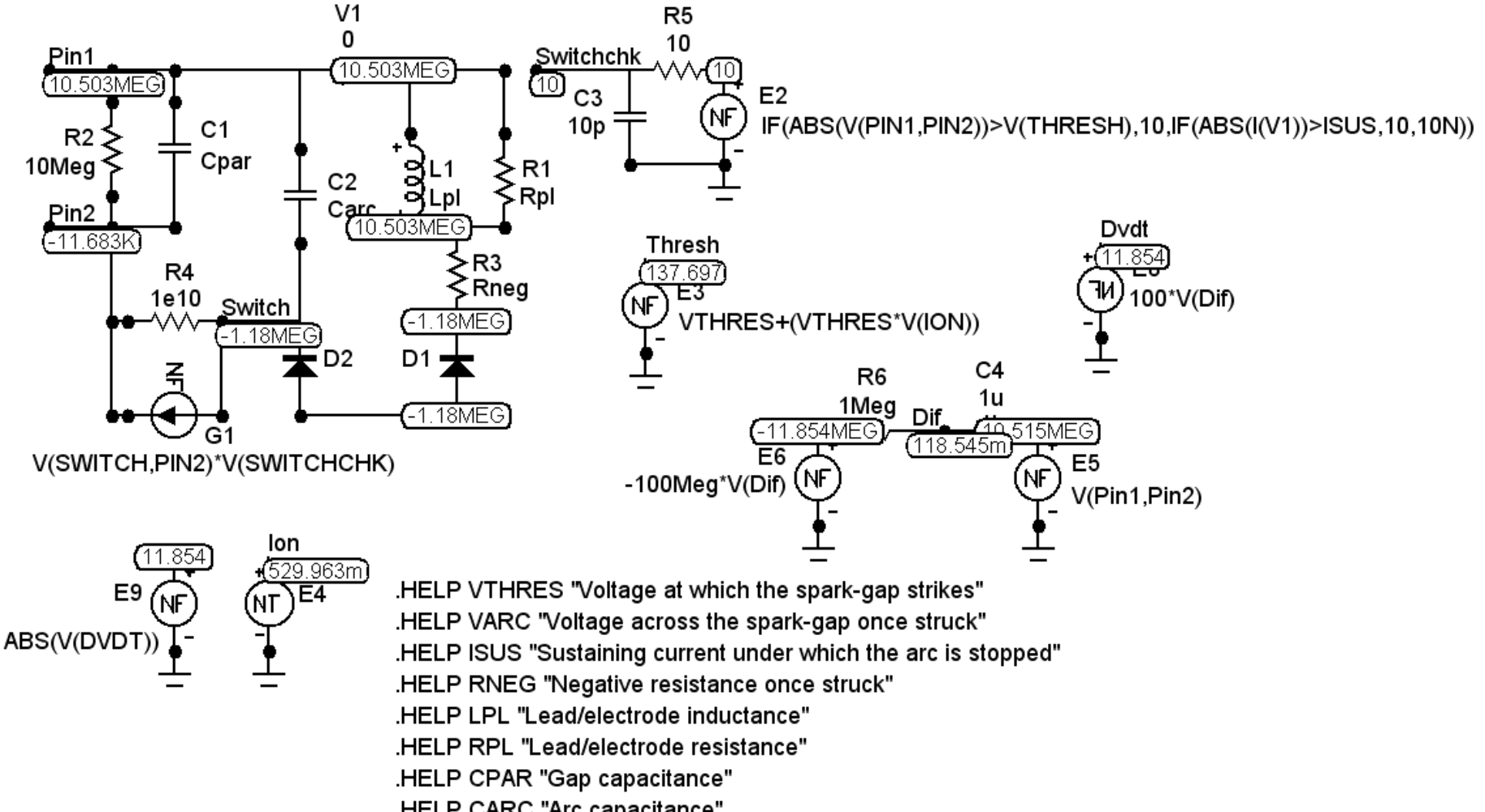


	Left	Right	Delta	Slope
B RMS(V(C1))*RMS(I(C1))	13.064K	5.438T	5.438T	544.875G
RMS(V(R1))*RMS(I(R1))	16.223	6.062G	6.062G	607.443M
RMS(V(R2))*RMS(I(R2))	16.223	6.062G	6.062G	607.443M
RMS(V(R3))*RMS(I(R3))	16.223	6.062G	6.062G	607.443M
V(C1) (V)	102.362	10.480M	10.480M	1.049M
I(C1) (A)	127.140	11.683M	11.683M	1.169M
V(R1) (V)	127.140m	11.683K	11.683K	1.169K
I(R1) (A)	127.140	11.683M	11.683M	1.169M
V(R2) (V)	127.140m	11.683K	11.683K	1.169K
I(R2) (A)	127.140	11.683M	11.683M	1.169M
V(R3) (V)	127.140m	11.683K	11.683K	1.169K
I(R3) (A)	127.140	11.683M	11.683M	1.169M
T (Secs)	20.000m	10.000	9.980	1.000

FIG. 36

NEON BULB, SPARK GAP MACRO

.PARAMETERS(VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)



.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 37

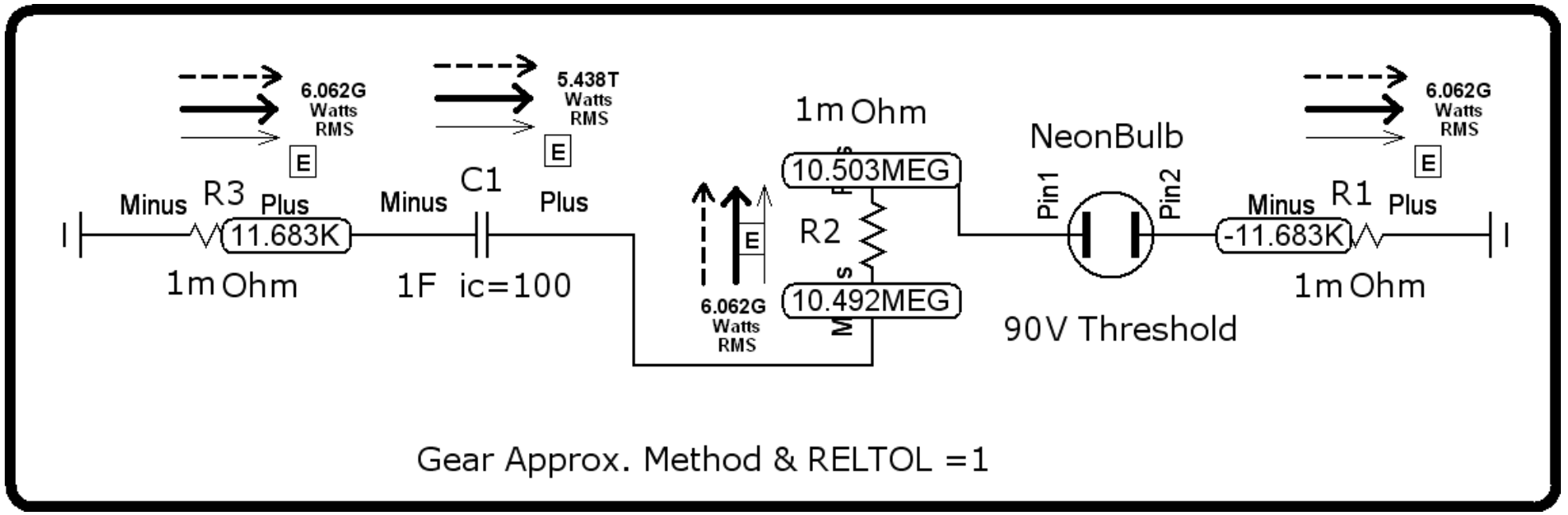

6.062G
Watts
RMS
E
5.438T
Watts
RMS
E
1m Ohm
NeonBulb
6.062G
Watts
RMS
E
Minus
R3
Plus
11.683K
1m Ohm
Minus
C1
Plus
1F ic=100
E
6.062G
Watts
RMS
10.503MEG
R2
10.492MEG
Pin1
Pin2
Minus
R1
Plus
-11.683K
1m Ohm
90V Threshold
Gear Approx. Method & RELTOL =1

FIG. 38

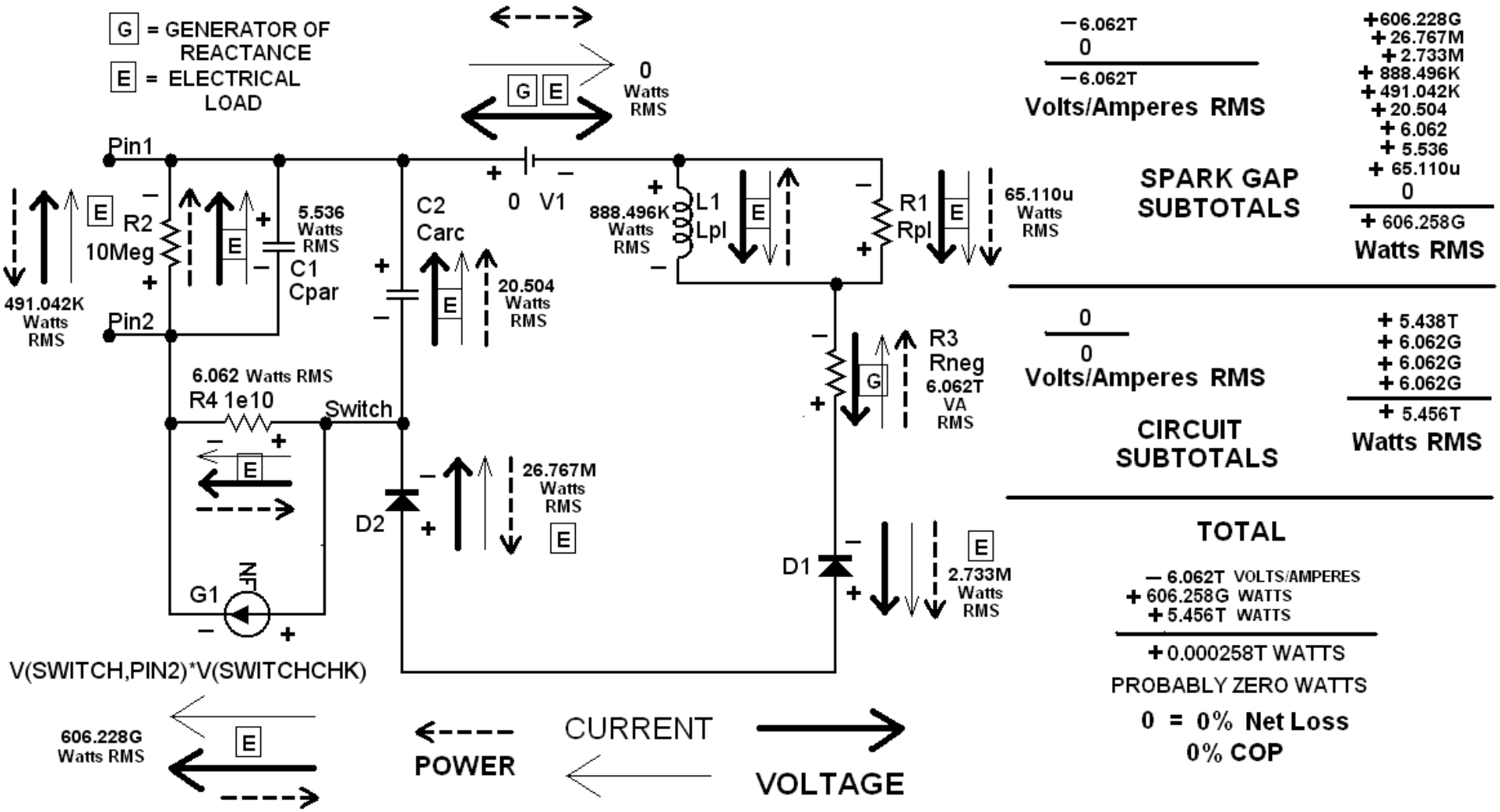

G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
0 Watts RMS
Pin1
Pin2
R2 10Meg
491.042K Watts RMS
5.536 Watts RMS
C1 Cpar
C2 Carc
20.504 Watts RMS
0 V1
888.496K Watts RMS
L1 Lpl
R1 Rpl
65.110u Watts RMS
6.062 Watts RMS
R4 1e10
Switch
R3 Rneg
6.062T VA RMS
26.767M Watts RMS
D2
D1
2.733M Watts RMS
G1
V(SWITCH,PIN2)*V(SWITCHCHK)
606.228G Watts RMS
POWER
CURRENT
VOLTAGE
−6.062T
0
−6.062T
Volts/Amperes RMS
SPARK GAP SUBTOTALS
+606.228G
+26.767M
+2.733M
+888.496K
+491.042K
+20.504
+6.062
+5.536
+65.110u
0
+606.258G
Watts RMS
0
0
Volts/Amperes RMS
CIRCUIT SUBTOTALS
+5.438T
+6.062G
+6.062G
+6.062G
+5.456T
Watts RMS
TOTAL
−6.062T VOLTS/AMPERES
+606.258G WATTS
+5.456T WATTS
+0.000258T WATTS
PROBABLY ZERO WATTS
0 = 0% Net Loss
0% COP

FIG. 39

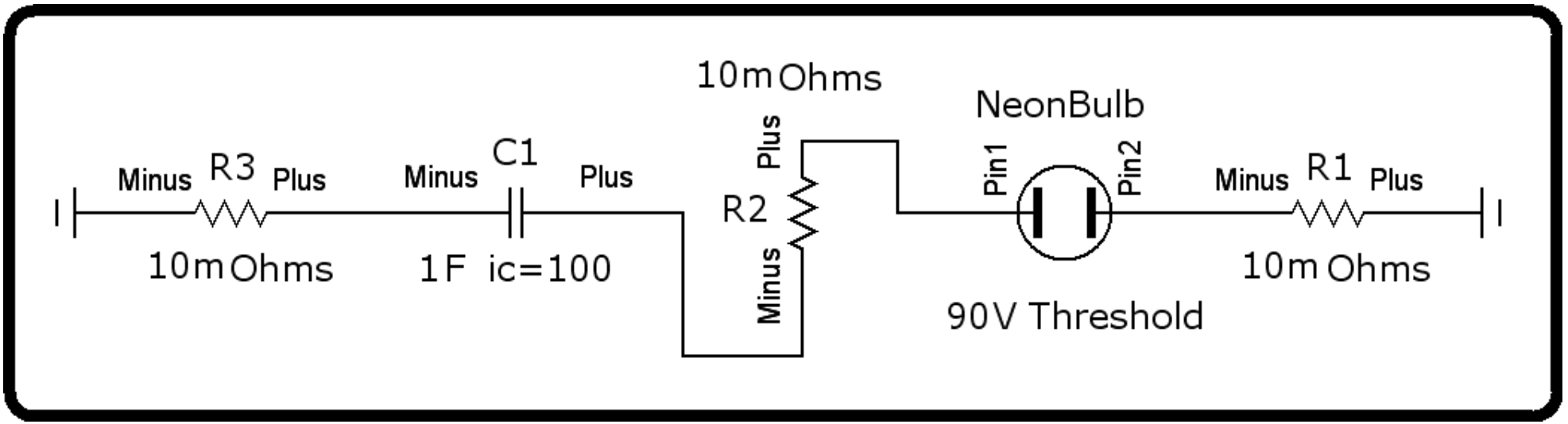

10m Ohms
NeonBulb
Minus
R3
Plus
Minus
C1
Plus
Plus
Pin1
Pin2
Minus
R1
Plus
R2
10m Ohms
1F ic=100
Minus
10m Ohms
90V Threshold

FIG. 40

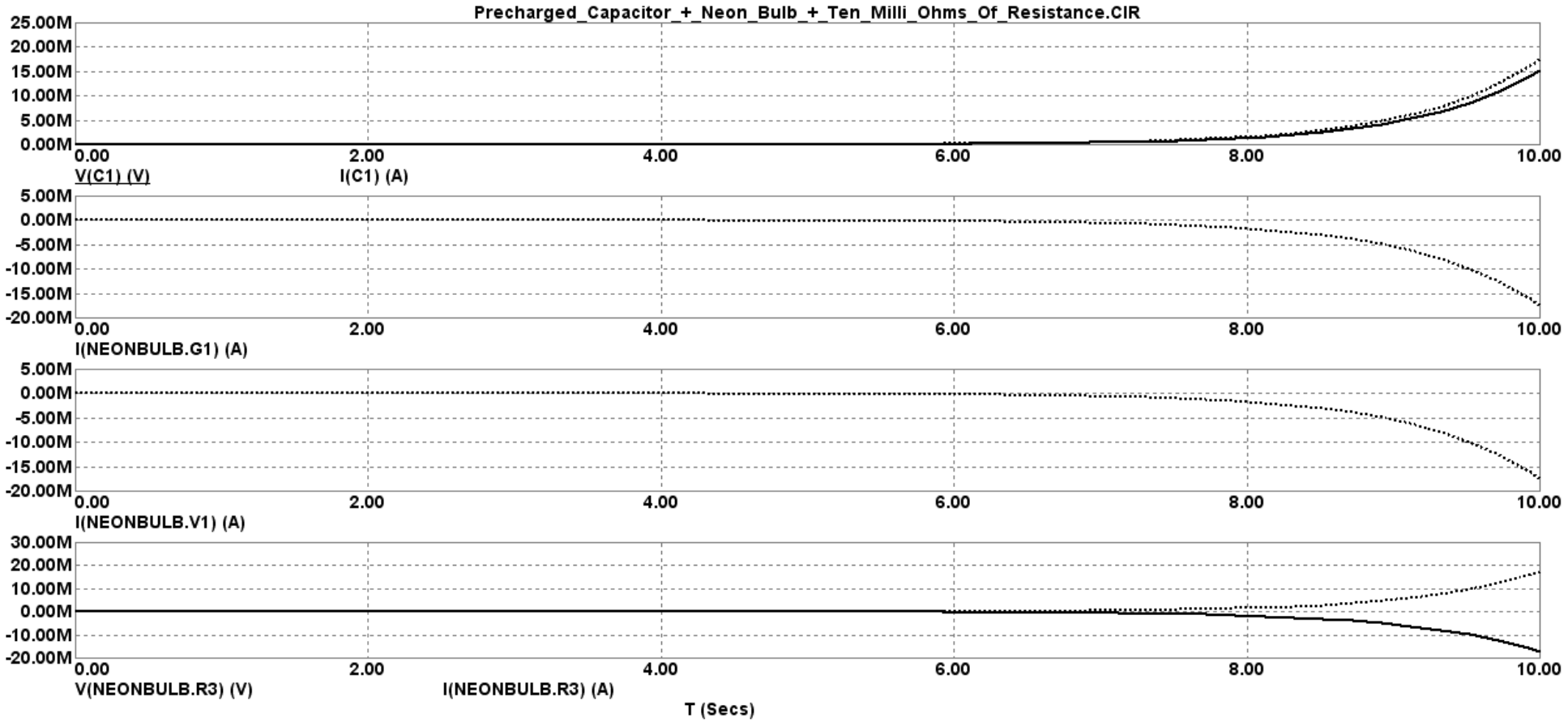

Precharged_Capacitor_+_Neon_Bulb_+_Ten_Milli_Ohms_Of_Resistance.CIR
25.00M
20.00M
15.00M
10.00M
5.00M
0.00M
0.00
2.00
4.00
6.00
8.00
10.00
V(C1) (V)
I(C1) (A)
5.00M
0.00M
-5.00M
-10.00M
-15.00M
-20.00M
I(NEONBULB.G1) (A)
I(NEONBULB.V1) (A)
30.00M
20.00M
10.00M
V(NEONBULB.R3) (V)
I(NEONBULB.R3) (A)
T (Secs)

FIG. 41

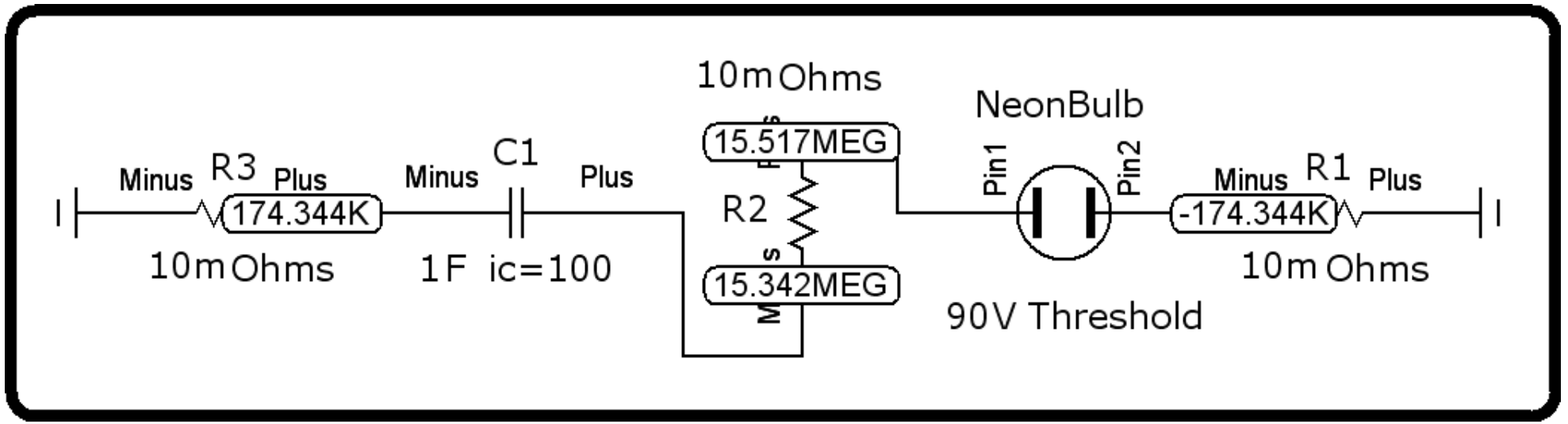

10m Ohms
NeonBulb
15.517MEG
Minus
R3
Plus
Minus
C1
Plus
Pin1
Pin2
Minus
R1
Plus
R2
174.344K
-174.344K
10m Ohms
1F ic=100
15.342MEG
10m Ohms
90V Threshold

FIG. 42

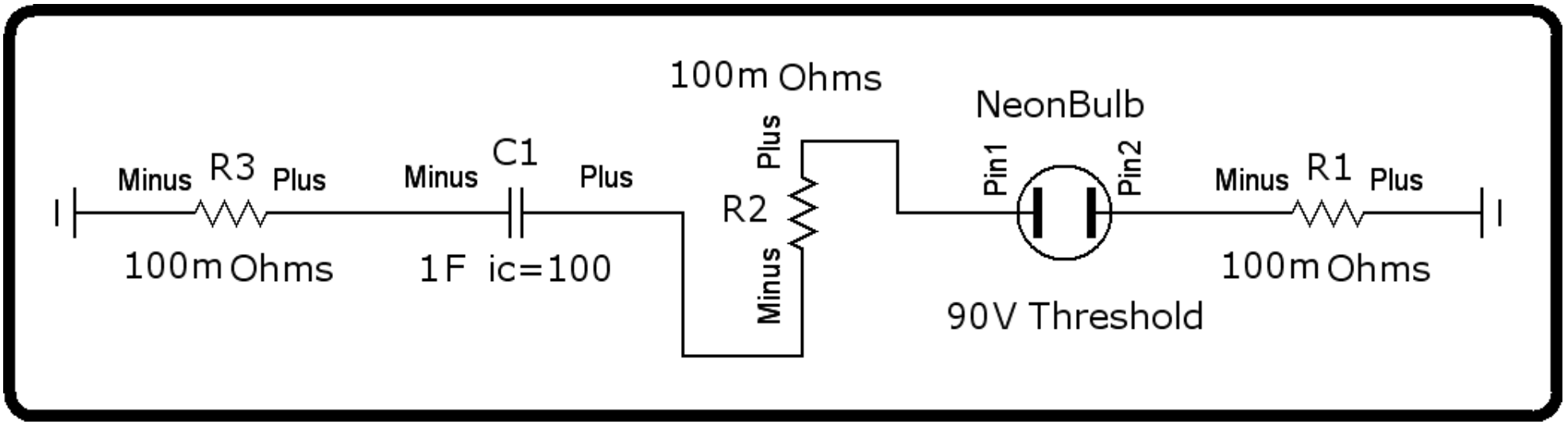

100m Ohms
NeonBulb
Minus
R3
Plus
Minus
C1
Plus
Plus
R2
Minus
Pin1
Pin2
Minus
R1
Plus
100m Ohms
1F ic=100
90V Threshold
100m Ohms

FIG. 43

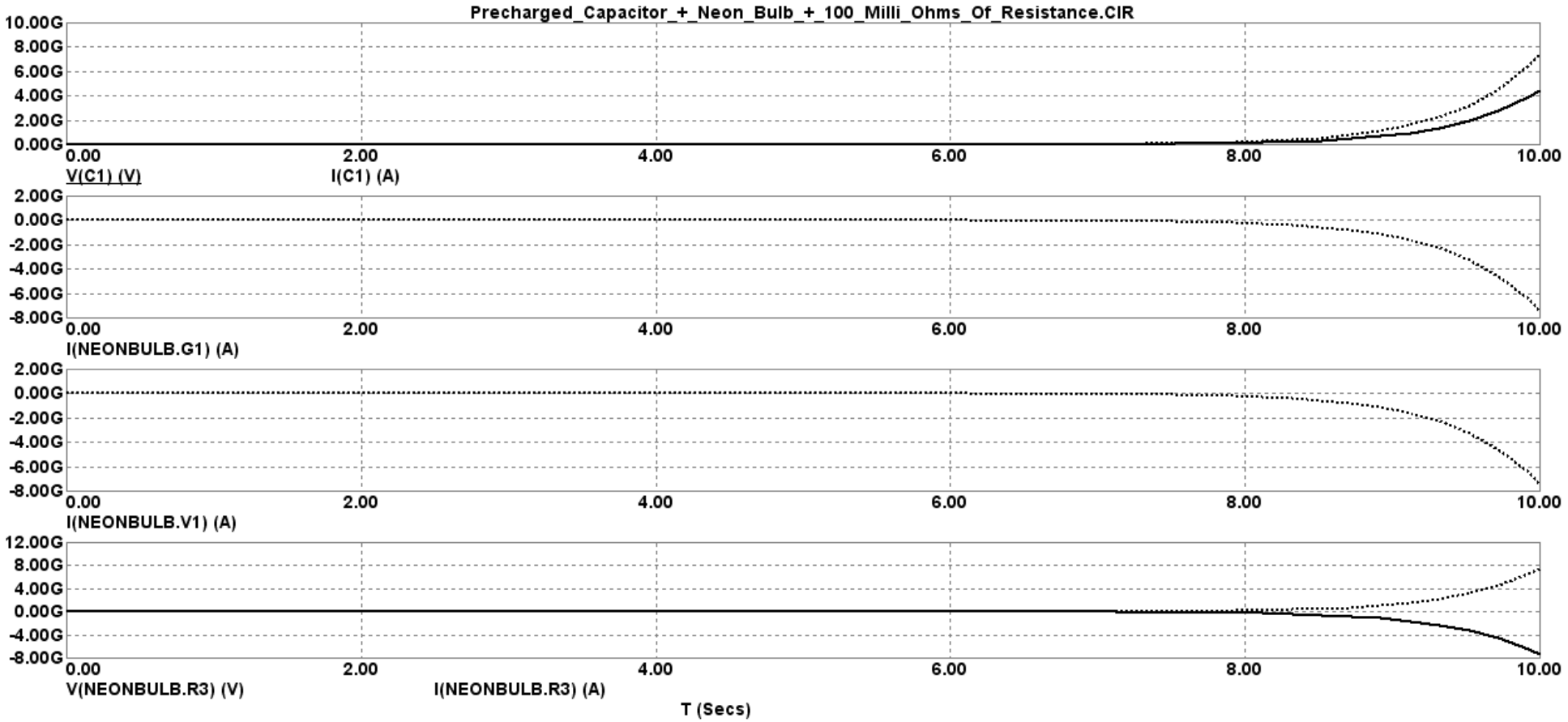

Precharged_Capacitor_+_Neon_Bulb_+_100_Milli_Ohms_Of_Resistance.CIR
10.00G
8.00G
6.00G
4.00G
2.00G
0.00G
0.00
2.00
4.00
6.00
8.00
10.00
V(C1) (V)
I(C1) (A)
2.00G
0.00G
-2.00G
-4.00G
-6.00G
-8.00G
I(NEONBULB.G1) (A)
I(NEONBULB.V1) (A)
12.00G
8.00G
4.00G
0.00G
-4.00G
-8.00G
V(NEONBULB.R3) (V)
I(NEONBULB.R3) (A)
T (Secs)

FIG. 44

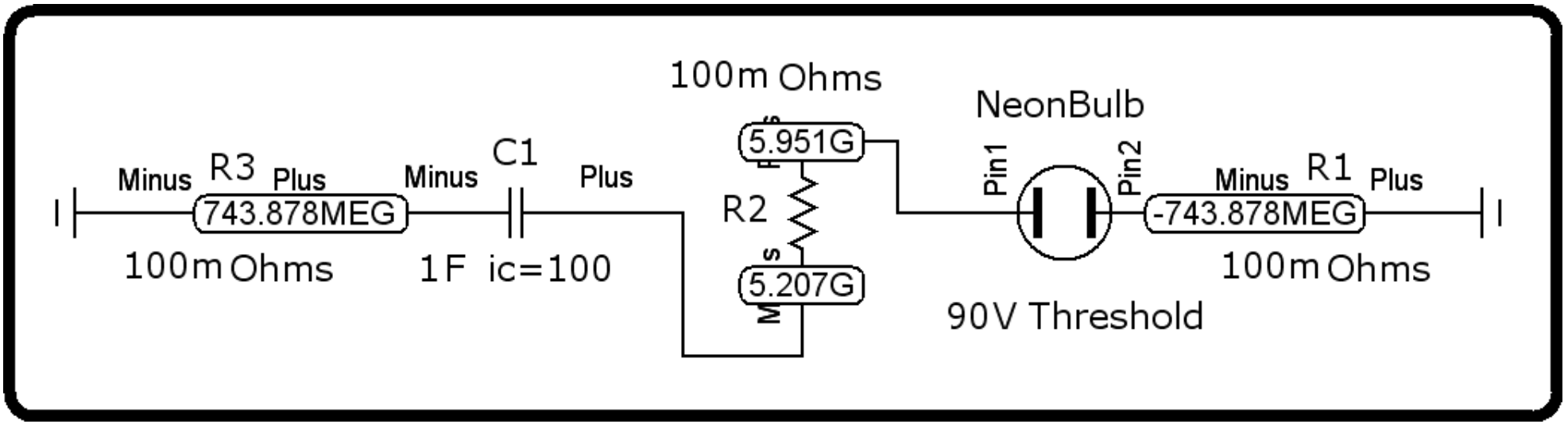

100m Ohms
NeonBulb
5.951G
Minus
R3
Plus
Minus
C1
Plus
Pin1
Pin2
Minus
R1
Plus
R2
743.878MEG
-743.878MEG
5.207G
100m Ohms
1F ic=100
100m Ohms
90V Threshold

FIG. 45

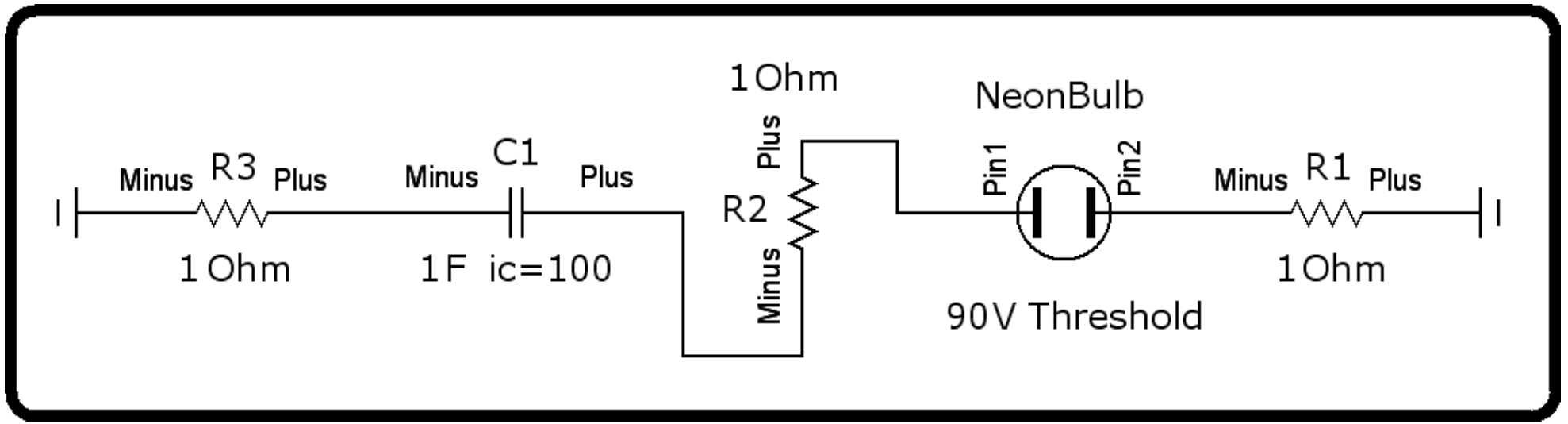

1Ohm
NeonBulb
Minus
R3
Plus
Minus
C1
Plus
Plus
Pin1
Pin2
Minus
R1
Plus
R2
1Ohm
1F ic=100
Minus
1Ohm
90V Threshold

FIG. 46

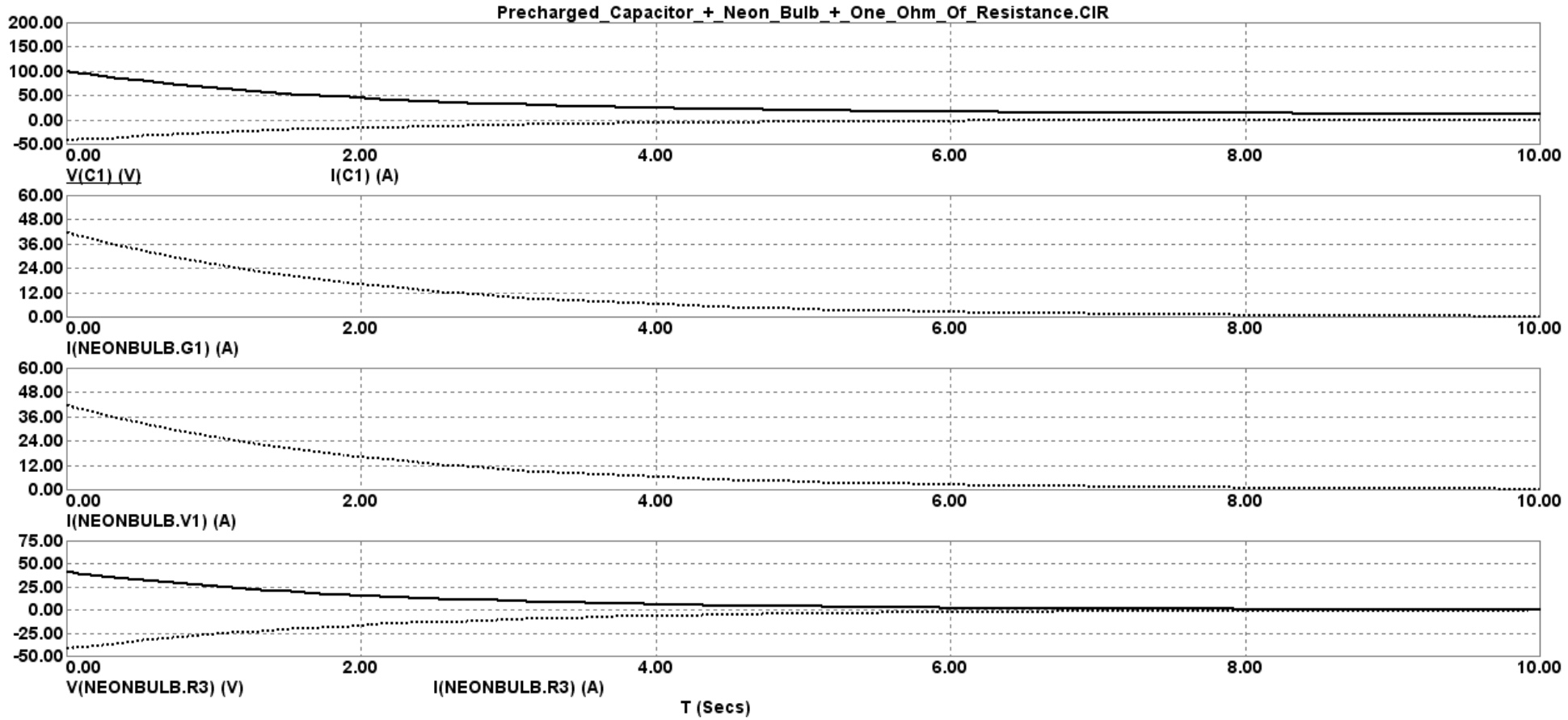

Precharged_Capacitor_+_Neon_Bulb_+_One_Ohm_Of_Resistance.CIR
200.00
150.00
100.00
50.00
0.00
-50.00
0.00
2.00
4.00
6.00
8.00
10.00
V(C1) (V)
I(C1) (A)
60.00
48.00
36.00
24.00
12.00
0.00
I(NEONBULB.G1) (A)
I(NEONBULB.V1) (A)
75.00
50.00
25.00
-25.00
V(NEONBULB.R3) (V)
I(NEONBULB.R3) (A)
T (Secs)

FIG. 47

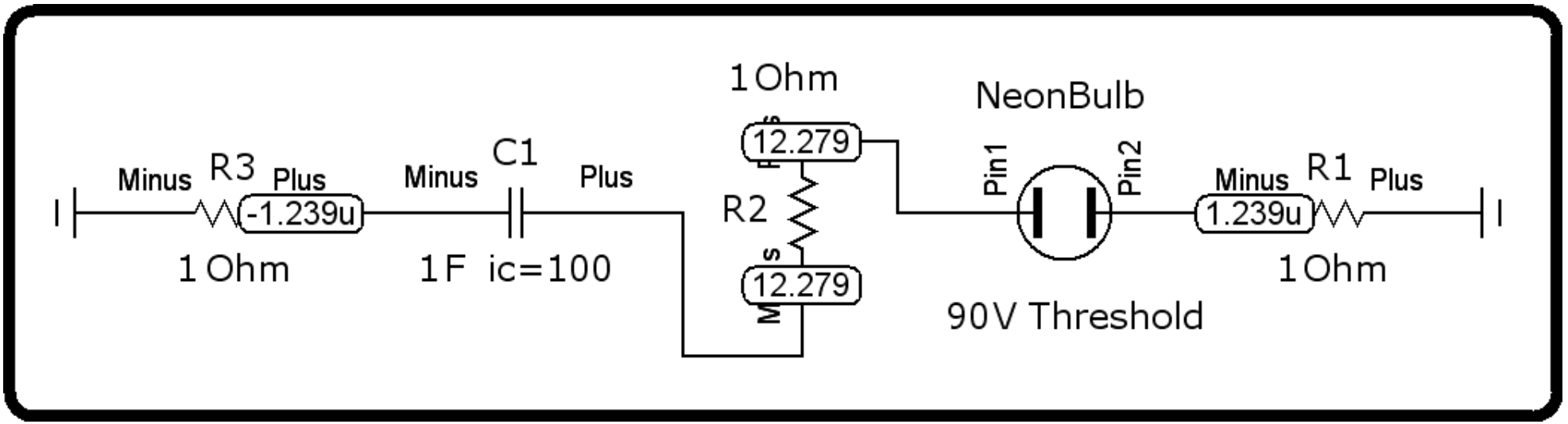

1Ohm
NeonBulb
12.279
Minus
R3
Plus
Minus
C1
Plus
Pin1
Pin2
Minus
R1
Plus
R2
-1.239u
1.239u
1Ohm
1F ic=100
12.279
1Ohm
90V Threshold

FIG. 48

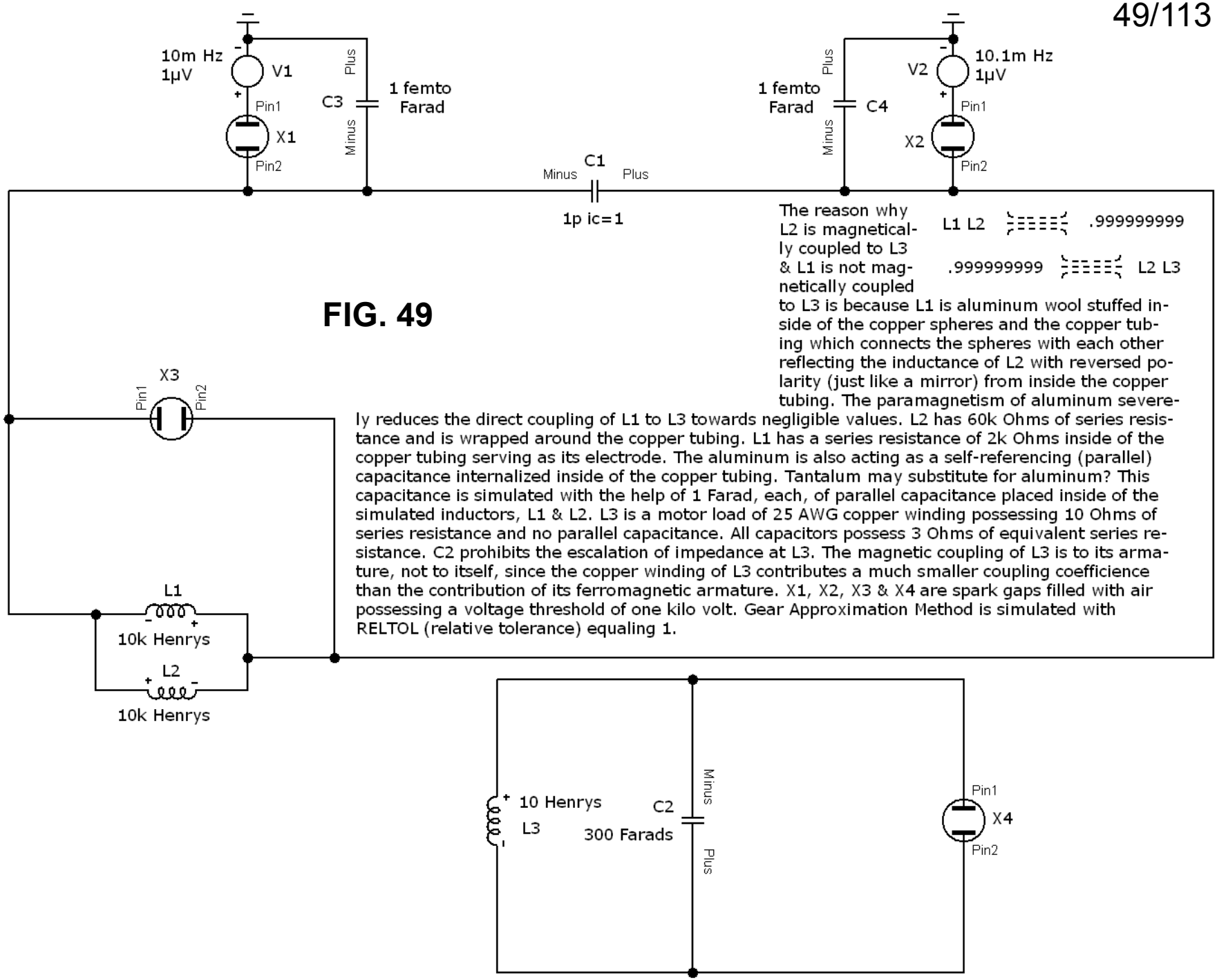
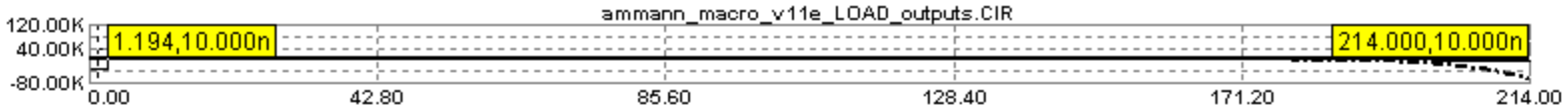


FIG. 49

The reason why L2 is magnetically coupled to L3 & L1 is not magnetically coupled to L3 is because L1 is aluminum wool stuffed inside of the copper spheres and the copper tubing which connects the spheres with each other reflecting the inductance of L2 with reversed polarity (just like a mirror) from inside the copper tubing. The paramagnetism of aluminum severely reduces the direct coupling of L1 to L3 towards negligible values. L2 has 60k Ohms of series resistance and is wrapped around the copper tubing. L1 has a series resistance of 2k Ohms inside of the copper tubing serving as its electrode. The aluminum is also acting as a self-referencing (parallel) capacitance internalized inside of the copper tubing. Tantalum may substitute for aluminum? This capacitance is simulated with the help of 1 Farad, each, of parallel capacitance placed inside of the simulated inductors, L1 & L2. L3 is a motor load of 25 AWG copper winding possessing 10 Ohms of series resistance and no parallel capacitance. All capacitors possess 3 Ohms of equivalent series resistance. C2 prohibits the escalation of impedance at L3. The magnetic coupling of L3 is to its armature, not to itself, since the copper winding of L3 contributes a much smaller coupling coefficience than the contribution of its ferromagnetic armature. X1, X2, X3 & X4 are spark gaps filled with air possessing a voltage threshold of one kilo volt. Gear Approximation Method is simulated with RELTOL (relative tolerance) equaling 1.

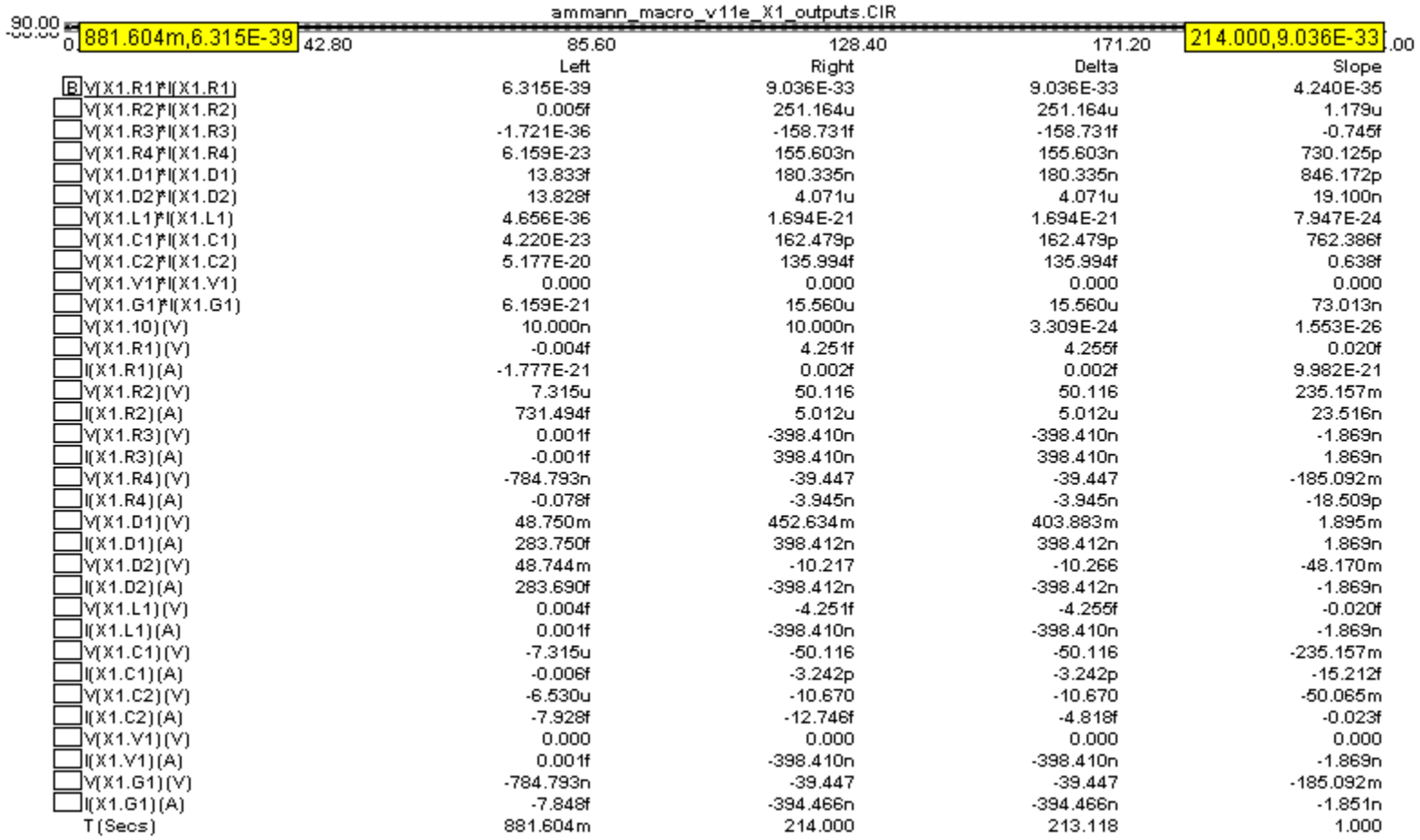
L1 L2 .999999999

.999999999 L2 L3



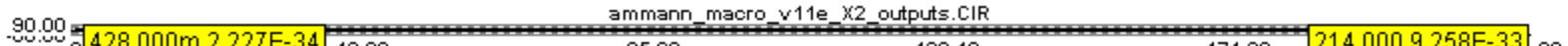
	Left	Right	Delta	Slope
V(X1.10)(V)	10.000n	10.000n	-9.049E-22	-4.252E-24
V(X2.10)(V)	10.000n	10.000n	-9.082E-22	-4.268E-24
V(X3.10)(V)	10.000n	10.000n	1.654E-24	7.774E-27
V(X4.10)(V)	10.000n	10.000	10.000	46.991m
V(V1)(V)	74.955n	770.513n	695.558n	3.269n
I(V1)(A)	28.869p	76.990u	76.990u	361.784n
V(V2)(V)	75.703n	849.009n	773.306n	3.634n
I(V2)(A)	-28.869p	-76.223u	-76.223u	-358.181n
V(L1)(V)	-577.368u	-1.524K	-1.524K	-7.163
I(L1)(A)	9.377n	-364.551u	-364.560u	-1.713u
V(L2)(V)	577.368u	1.524K	1.524K	7.163
I(L2)(A)	9.291n	-593.212u	-593.221u	-2.788u
V(C1)(V)	-577.368u	-1.524K	-1.524K	-7.163
I(C1)(A)	-0.484f	-98.642p	-98.642p	-463.529f
V(C2)(V)	4.432u	459.958	459.958	2.161
I(C2)(A)	1.476u	150.730	150.730	708.300m
V(C3)(V)	-288.760u	-762.192	-762.192	-3.582
I(C3)(A)	-2.423E-19	-47.130f	-47.129f	-0.221f
V(C4)(V)	288.608u	762.216	762.216	3.582
I(C4)(A)	2.413E-19	51.490f	51.489f	0.242f
V(L3)(V)	-4.432u	-459.958	-459.958	-2.161
I(L3)(A)	1.476u	150.731	150.731	708.300m
V(V1)*I(V1)	0.002f	59.322p	59.322p	278.760f
V(V2)*I(V2)	-0.002f	-64.714p	-64.714p	-304.099f
V(C1)*I(C1)	2.792E-19	150.371n	150.371n	706.611p
V(C2)*I(C2)	6.544p	69.330K	69.330K	325.788
V(C3)*I(C3)	6.995E-23	35.922p	35.922p	168.801f
V(C4)*I(C4)	6.964E-23	39.246p	39.246p	184.423f
V(L1)*I(L1)	-5.414p	555.724m	555.724m	2.611m
V(L2)*I(L2)	5.364p	-904.297m	-904.297m	-4.249m
V(L3)*I(L3)	-6.544p	-69.330K	-69.330K	-325.788
V(L3)/I(L3)	-3.002	-3.052	-49.436m	-232.306u
T(Secs)	1.194	214.000	212.806	1.000

FIG. 50



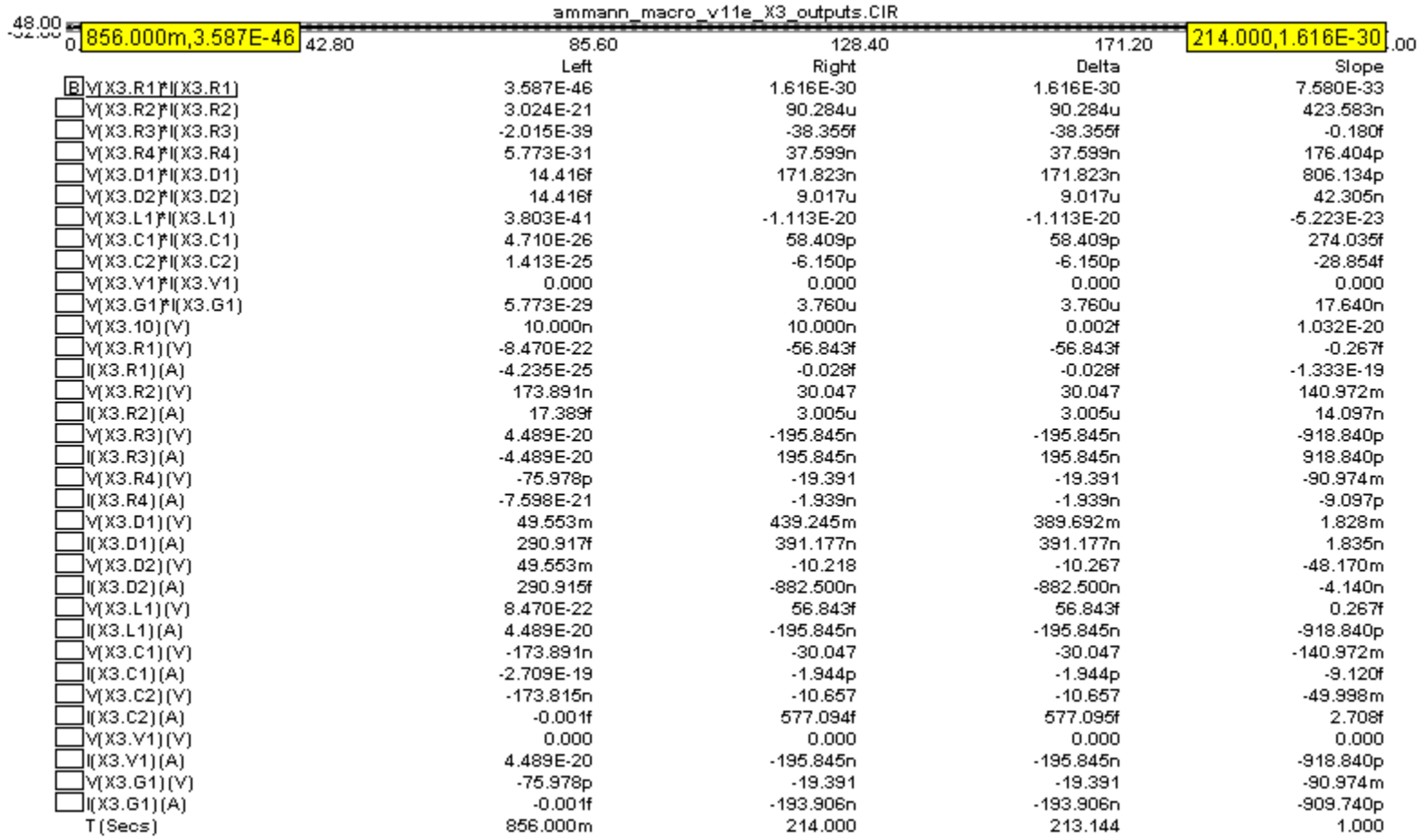
	Left	Right	Delta	Slope
B V(X1.R1)*I(X1.R1)	6.315E-39	9.036E-33	9.036E-33	4.240E-35
V(X1.R2)*I(X1.R2)	0.005f	251.164u	251.164u	1.179u
V(X1.R3)*I(X1.R3)	-1.721E-36	-158.731f	-158.731f	-0.745f
V(X1.R4)*I(X1.R4)	6.159E-23	155.603n	155.603n	730.125p
V(X1.D1)*I(X1.D1)	13.833f	180.335n	180.335n	846.172p
V(X1.D2)*I(X1.D2)	13.828f	4.071u	4.071u	19.100n
V(X1.L1)*I(X1.L1)	4.656E-36	1.694E-21	1.694E-21	7.947E-24
V(X1.C1)*I(X1.C1)	4.220E-23	162.479p	162.479p	762.386f
V(X1.C2)*I(X1.C2)	5.177E-20	135.994f	135.994f	0.638f
V(X1.V1)*I(X1.V1)	0.000	0.000	0.000	0.000
V(X1.G1)*I(X1.G1)	6.159E-21	15.560u	15.560u	73.013n
V(X1.10)(V)	10.000n	10.000n	3.309E-24	1.553E-26
V(X1.R1)(V)	-0.004f	4.251f	4.255f	0.020f
I(X1.R1)(A)	-1.777E-21	0.002f	0.002f	9.982E-21
V(X1.R2)(V)	7.315u	50.116	50.116	235.157m
I(X1.R2)(A)	731.494f	5.012u	5.012u	23.516n
V(X1.R3)(V)	0.001f	-398.410n	-398.410n	-1.869n
I(X1.R3)(A)	-0.001f	398.410n	398.410n	1.869n
V(X1.R4)(V)	-784.793n	-39.447	-39.447	-185.092m
I(X1.R4)(A)	-0.078f	-3.945n	-3.945n	-18.509p
V(X1.D1)(V)	48.750m	452.634m	403.883m	1.895m
I(X1.D1)(A)	283.750f	398.412n	398.412n	1.869n
V(X1.D2)(V)	48.744m	-10.217	-10.266	-48.170m
I(X1.D2)(A)	283.690f	-398.412n	-398.412n	-1.869n
V(X1.L1)(V)	0.004f	-4.251f	-4.255f	-0.020f
I(X1.L1)(A)	0.001f	-398.410n	-398.410n	-1.869n
V(X1.C1)(V)	-7.315u	-50.116	-50.116	-235.157m
I(X1.C1)(A)	-0.006f	-3.242p	-3.242p	-15.212f
V(X1.C2)(V)	-6.530u	-10.670	-10.670	-50.065m
I(X1.C2)(A)	-7.928f	-12.746f	-4.818f	-0.023f
V(X1.V1)(V)	0.000	0.000	0.000	0.000
I(X1.V1)(A)	0.001f	-398.410n	-398.410n	-1.869n
V(X1.G1)(V)	-784.793n	-39.447	-39.447	-185.092m
I(X1.G1)(A)	-7.848f	-394.466n	-394.466n	-1.851n
T(Secs)	881.604m	214.000	213.118	1.000

FIG. 51



	Left	Right	Delta	Slope
V(X2.R1)*I(X2.R1)	2.227E-34	9.258E-33	9.036E-33	4.231E-35
V(X2.R2)*I(X2.R2)	0.001f	251.164u	251.164u	1.176u
V(X2.R3)*I(X2.R3)	-3.417E-25	-158.677f	-158.677f	-0.743f
V(X2.R4)*I(X2.R4)	0.006f	155.550n	155.550n	728.325p
V(X2.D1)*I(X2.D1)	295.527p	9.249u	9.249u	43.307n
V(X2.D2)*I(X2.D2)	292.096p	180.436n	180.144n	843.481p
V(X2.L1)*I(X2.L1)	3.901E-28	1.714E-21	1.714E-21	8.026E-24
V(X2.C1)*I(X2.C1)	0.004f	162.478p	162.478p	760.766f
V(X2.C2)*I(X2.C2)	-0.495f	-1.129p	-1.129p	-5.286f
V(X2.V1)*I(X2.V1)	0.000	0.000	0.000	0.000
V(X2.G1)*I(X2.G1)	0.644f	15.555u	15.555u	72.833n
V(X2.10)(V)	10.000n	10.000n	0.009f	4.379E-20
V(X2.R1)(V)	-0.667f	-4.303f	-3.636f	-0.017f
I(X2.R1)(A)	-3.337E-19	-0.002f	-0.002f	-8.512E-21
V(X2.R2)(V)	-3.325u	-50.116	-50.116	-234.657m
I(X2.R2)(A)	-332.466f	-5.012u	-5.012u	-23.466n
V(X2.R3)(V)	584.516f	398.342n	398.342n	1.865n
I(X2.R3)(A)	-584.516f	-398.342n	-398.342n	-1.865n
V(X2.R4)(V)	253.703u	39.440	39.440	184.666m
I(X2.R4)(A)	25.370f	3.944n	3.944n	18.467p
V(X2.D1)(V)	273.851m	-10.224	-10.498	-49.153m
I(X2.D1)(A)	1.079n	-904.700n	-905.780n	-4.241n
V(X2.D2)(V)	273.601m	452.629m	179.029m	838.258u
I(X2.D2)(A)	1.068n	398.640n	397.572n	1.862n
V(X2.L1)(V)	0.667f	4.303f	3.636f	0.017f
I(X2.L1)(A)	584.515f	398.342n	398.342n	1.865n
V(X2.C1)(V)	3.325u	50.116	50.116	234.657m
I(X2.C1)(A)	1.168p	3.242p	2.074p	9.711f
V(X2.C2)(V)	-250.379u	10.676	10.677	49.991m
I(X2.C2)(A)	1.978p	-105.788f	-2.084p	-9.756f
V(X2.V1)(V)	0.000	0.000	0.000	0.000
I(X2.V1)(A)	584.516f	398.342n	398.342n	1.865n
V(X2.G1)(V)	253.703u	39.440	39.440	184.666m
I(X2.G1)(A)	2.537p	394.398n	394.396n	1.847n
T(Secs)	428.000m	214.000	213.572	1.000

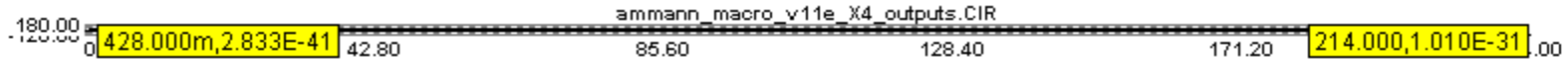
FIG. 52



ammann_macro_v11e_X3_outputs.CIR

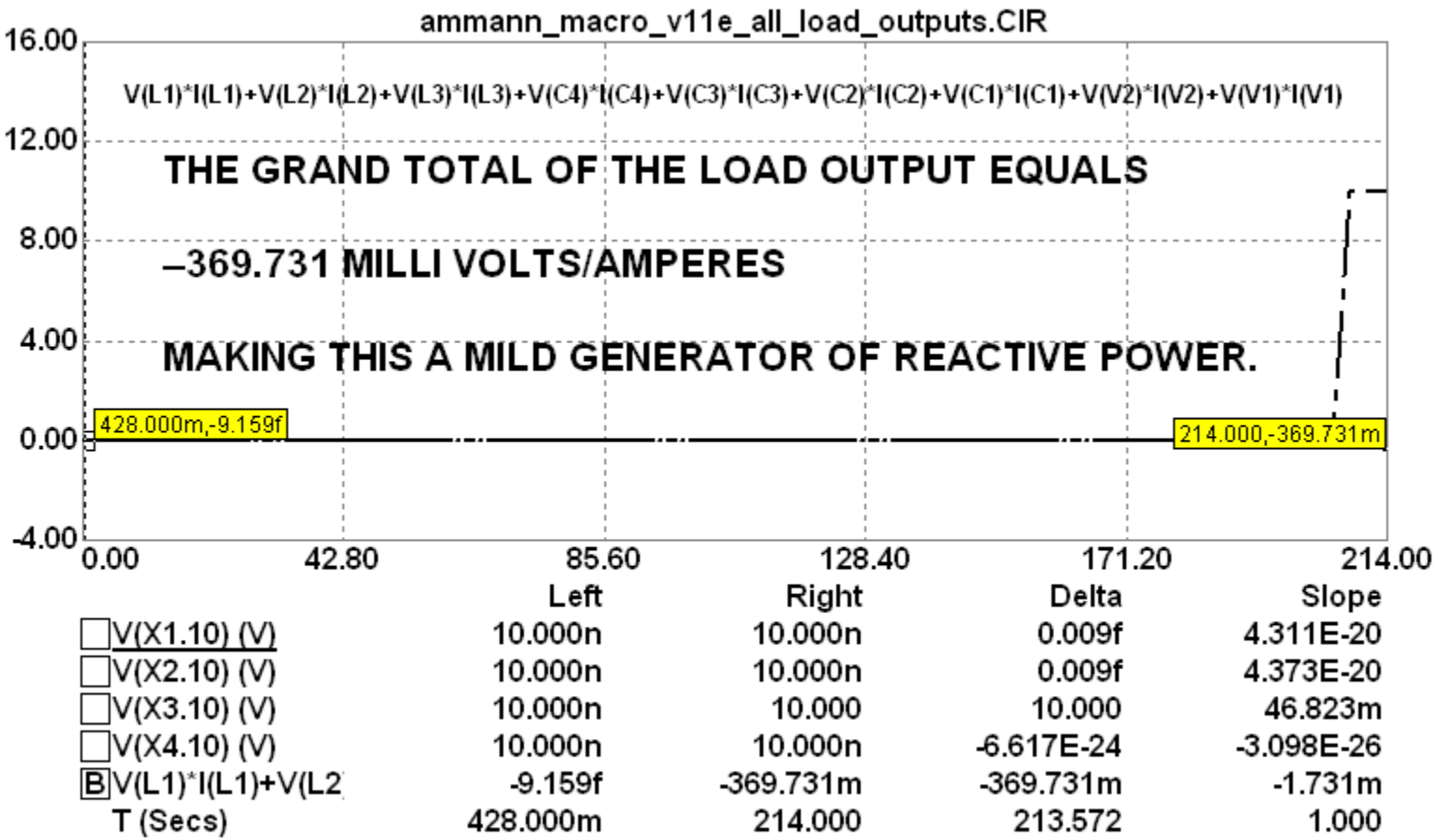
	Left	Right	Delta	Slope
B V(X3.R1)*I(X3.R1)	3.587E-46	1.616E-30	1.616E-30	7.580E-33
V(X3.R2)*I(X3.R2)	3.024E-21	90.284u	90.284u	423.583n
V(X3.R3)*I(X3.R3)	-2.015E-39	-38.355f	-38.355f	-0.180f
V(X3.R4)*I(X3.R4)	5.773E-31	37.599n	37.599n	176.404p
V(X3.D1)*I(X3.D1)	14.416f	171.823n	171.823n	806.134p
V(X3.D2)*I(X3.D2)	14.416f	9.017u	9.017u	42.305n
V(X3.L1)*I(X3.L1)	3.803E-41	-1.113E-20	-1.113E-20	-5.223E-23
V(X3.C1)*I(X3.C1)	4.710E-26	58.409p	58.409p	274.035f
V(X3.C2)*I(X3.C2)	1.413E-25	-6.150p	-6.150p	-28.854f
V(X3.V1)*I(X3.V1)	0.000	0.000	0.000	0.000
V(X3.G1)*I(X3.G1)	5.773E-29	3.760u	3.760u	17.640n
V(X3.10)(V)	10.000n	10.000n	0.002f	1.032E-20
V(X3.R1)(V)	-8.470E-22	-56.843f	-56.843f	-0.267f
I(X3.R1)(A)	-4.235E-25	-0.028f	-0.028f	-1.333E-19
V(X3.R2)(V)	173.891n	30.047	30.047	140.972m
I(X3.R2)(A)	17.389f	3.005u	3.005u	14.097n
V(X3.R3)(V)	4.489E-20	-195.845n	-195.845n	-918.840p
I(X3.R3)(A)	-4.489E-20	195.845n	195.845n	918.840p
V(X3.R4)(V)	-75.978p	-19.391	-19.391	-90.974m
I(X3.R4)(A)	-7.598E-21	-1.939n	-1.939n	-9.097p
V(X3.D1)(V)	49.553m	439.245m	389.692m	1.828m
I(X3.D1)(A)	290.917f	391.177n	391.177n	1.835n
V(X3.D2)(V)	49.553m	-10.218	-10.267	-48.170m
I(X3.D2)(A)	290.915f	-882.500n	-882.500n	-4.140n
V(X3.L1)(V)	8.470E-22	56.843f	56.843f	0.267f
I(X3.L1)(A)	4.489E-20	-195.845n	-195.845n	-918.840p
V(X3.C1)(V)	-173.891n	-30.047	-30.047	-140.972m
I(X3.C1)(A)	-2.709E-19	-1.944p	-1.944p	-9.120f
V(X3.C2)(V)	-173.815n	-10.657	-10.657	-49.998m
I(X3.C2)(A)	-0.001f	577.094f	577.095f	2.708f
V(X3.V1)(V)	0.000	0.000	0.000	0.000
I(X3.V1)(A)	4.489E-20	-195.845n	-195.845n	-918.840p
V(X3.G1)(V)	-75.978p	-19.391	-19.391	-90.974m
I(X3.G1)(A)	-0.001f	-193.906n	-193.906n	-909.740p
T(Secs)	856.000m	214.000	213.144	1.000

FIG. 53



	Left	Right	Delta	Slope
B V(X4.R1)*I(X4.R1)	2.833E-41	1.010E-31	1.010E-31	4.728E-34
V(X4.R2)*I(X4.R2)	0.004f	1.005m	1.005m	4.704u
V(X4.R3)*I(X4.R3)	-5.369E-28	-817.499f	-817.499f	-3.828f
V(X4.R4)*I(X4.R4)	0.048f	801.391n	801.391n	3.752n
V(X4.D1)*I(X4.D1)	11.599p	9.257u	9.257u	43.344n
V(X4.D2)*I(X4.D2)	11.247p	428.417n	428.406n	2.006n
V(X4.L1)*I(X4.L1)	5.515E-33	1.285E-20	1.285E-20	6.016E-23
V(X4.C1)*I(X4.C1)	0.015f	649.916p	649.916p	3.043p
V(X4.C2)*I(X4.C2)	-4.826f	120.466f	125.292f	0.587f
V(X4.V1)*I(X4.V1)	0.000	0.000	0.000	0.000
V(X4.G1)*I(X4.G1)	4.840f	80.139u	80.139u	375.232n
V(X4.10)(V)	10.000n	10.000n	0.074f	3.482E-19
V(X4.R1)(V)	-2.380E-19	-14.211f	-14.211f	-0.067f
I(X4.R1)(A)	-1.190E-22	-0.007f	-0.007f	-3.327E-20
V(X4.R2)(V)	-6.611u	-100.233	-100.233	-469.315m
I(X4.R2)(A)	-661.148f	-10.023u	-10.023u	-46.931n
V(X4.R3)(V)	23.170f	904.156n	904.156n	4.233n
I(X4.R3)(A)	-23.170f	-904.156n	-904.156n	-4.233n
V(X4.R4)(V)	695.689u	89.520	89.520	419.155m
I(X4.R4)(A)	69.569f	8.952n	8.952n	41.915p
V(X4.D1)(V)	198.294m	-10.238	-10.437	-48.867m
I(X4.D1)(A)	58.492p	-904.157n	-904.216n	-4.234n
V(X4.D2)(V)	197.605m	473.830m	276.225m	1.293m
I(X4.D2)(A)	56.917p	904.157n	904.100n	4.233n
V(X4.L1)(V)	2.380E-19	14.211f	14.211f	0.067f
I(X4.L1)(A)	23.170f	904.156n	904.156n	4.233n
V(X4.C1)(V)	6.611u	100.233	100.233	469.315m
I(X4.C1)(A)	2.336p	6.484p	4.148p	19.421f
V(X4.C2)(V)	-689.077u	10.712	10.713	50.160m
I(X4.C2)(A)	7.003p	11.246f	-6.992p	-32.739f
V(X4.V1)(V)	0.000	0.000	0.000	0.000
I(X4.V1)(A)	23.170f	904.156n	904.156n	4.233n
V(X4.G1)(V)	695.689u	89.520	89.520	419.155m
I(X4.G1)(A)	6.957p	895.204n	895.197n	4.192n
T(Secs)	428.000m	214.000	213.572	1.000

FIG. 54



	Left	Right	Delta	Slope
V(X1.10) (V)	10.000n	10.000n	0.009f	4.311E-20
V(X2.10) (V)	10.000n	10.000n	0.009f	4.373E-20
V(X3.10) (V)	10.000n	10.000	10.000	46.823m
V(X4.10) (V)	10.000n	10.000n	-6.617E-24	-3.098E-26
B V(L1)*I(L1)+V(L2	-9.159f	-369.731m	-369.731m	-1.731m
T (Secs)	428.000m	214.000	213.572	1.000

FIG. 55

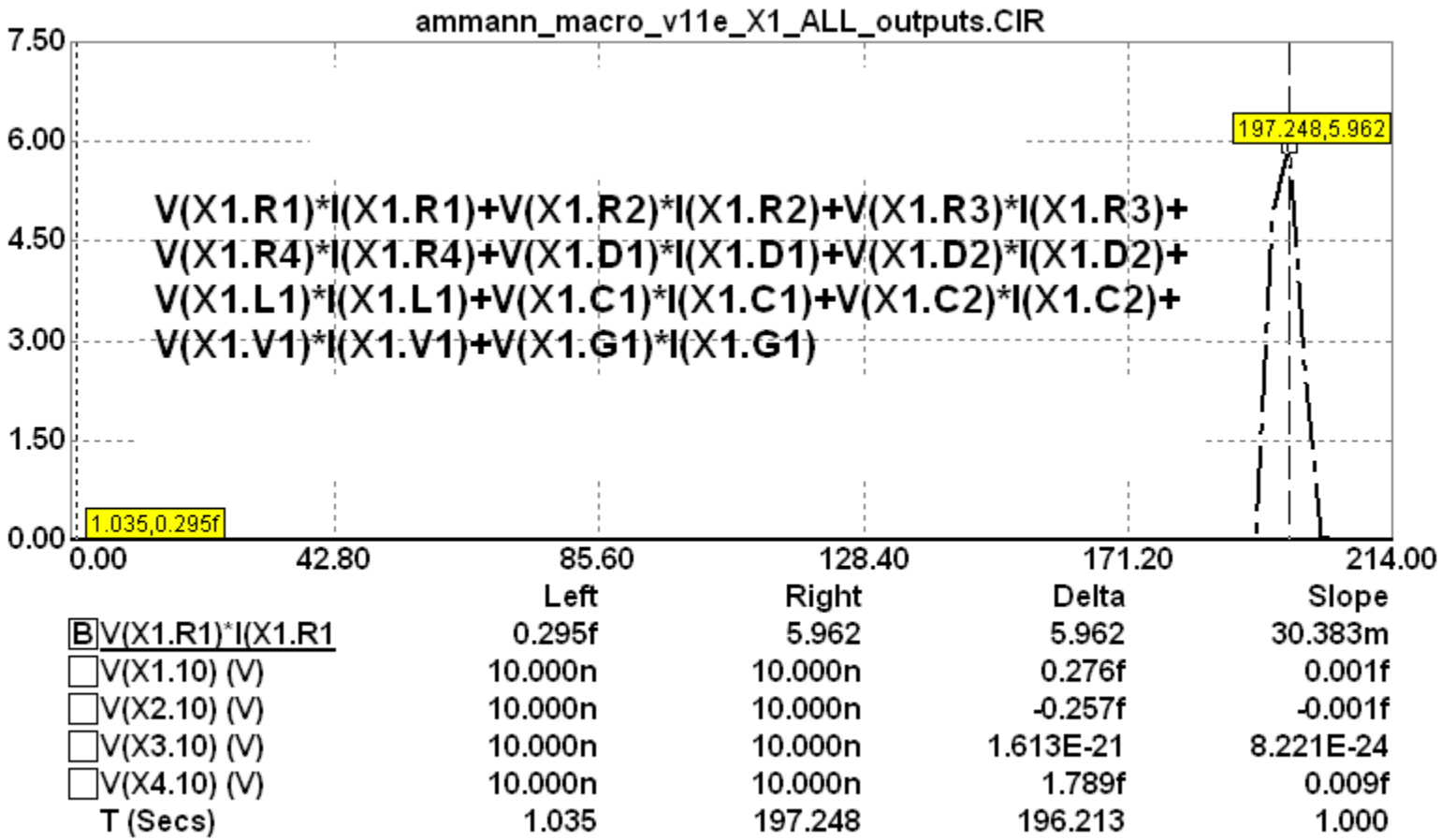
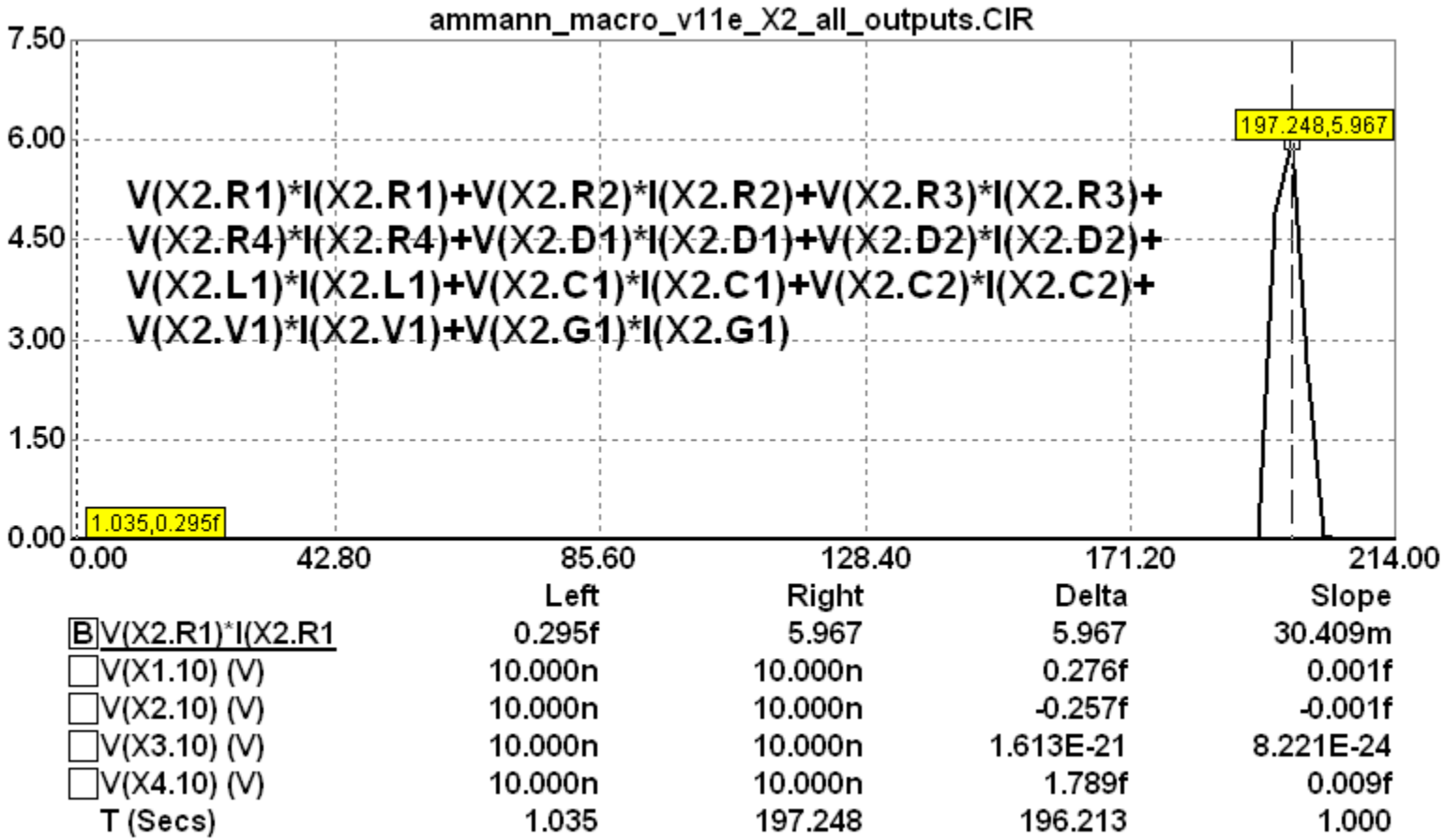

ammann_macro_v11e_X1_ALL_outputs.CIR
7.50
6.00
4.50
3.00
1.50
0.00
197.248,5.962
V(X1.R1)*I(X1.R1)+V(X1.R2)*I(X1.R2)+V(X1.R3)*I(X1.R3)+
V(X1.R4)*I(X1.R4)+V(X1.D1)*I(X1.D1)+V(X1.D2)*I(X1.D2)+
V(X1.L1)*I(X1.L1)+V(X1.C1)*I(X1.C1)+V(X1.C2)*I(X1.C2)+
V(X1.V1)*I(X1.V1)+V(X1.G1)*I(X1.G1)
1.035,0.295f
0.00
42.80
85.60
128.40
171.20
214.00
Left
Right
Delta
Slope
B V(X1.R1)*I(X1.R1 0.295f 5.962 5.962 30.383m
V(X1.10) (V) 10.000n 10.000n 0.276f 0.001f
V(X2.10) (V) 10.000n 10.000n -0.257f -0.001f
V(X3.10) (V) 10.000n 10.000n 1.613E-21 8.221E-24
V(X4.10) (V) 10.000n 10.000n 1.789f 0.009f
T (Secs) 1.035 197.248 196.213 1.000

FIG. 56



	Left	Right	Delta	Slope
B V(X2.R1)*I(X2.R1	0.295f	5.967	5.967	30.409m
V(X1.10) (V)	10.000n	10.000n	0.276f	0.001f
V(X2.10) (V)	10.000n	10.000n	-0.257f	-0.001f
V(X3.10) (V)	10.000n	10.000n	1.613E-21	8.221E-24
V(X4.10) (V)	10.000n	10.000n	1.789f	0.009f
T (Secs)	1.035	197.248	196.213	1.000

FIG. 57

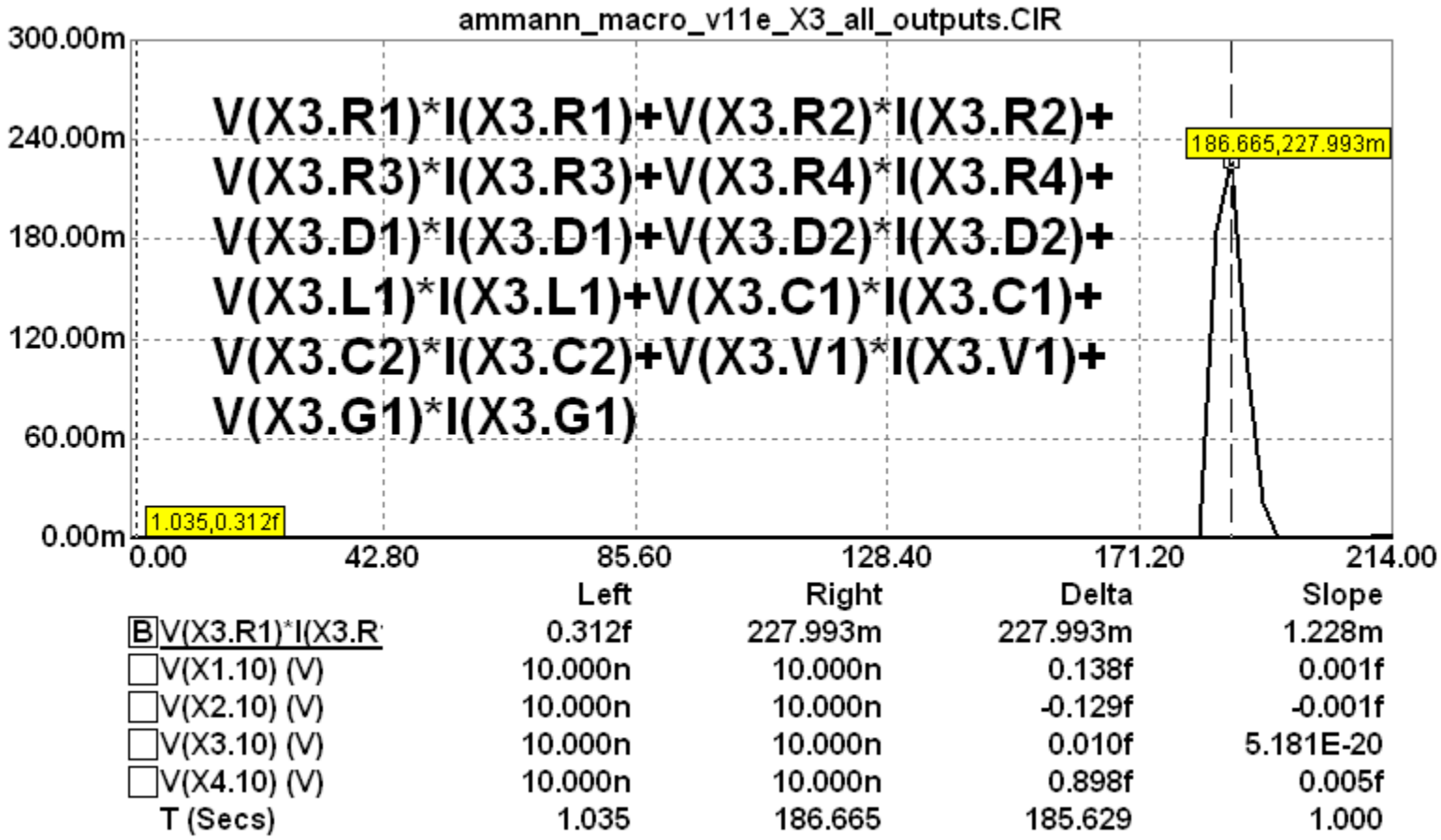

ammann_macro_v11e_X3_all_outputs.CIR
300.00m
240.00m
180.00m
120.00m
60.00m
0.00m
V(X3.R1)*I(X3.R1)+V(X3.R2)*I(X3.R2)+
V(X3.R3)*I(X3.R3)+V(X3.R4)*I(X3.R4)+
V(X3.D1)*I(X3.D1)+V(X3.D2)*I(X3.D2)+
V(X3.L1)*I(X3.L1)+V(X3.C1)*I(X3.C1)+
V(X3.C2)*I(X3.C2)+V(X3.V1)*I(X3.V1)+
V(X3.G1)*I(X3.G1)
186.665,227.993m
1.035,0.312f
0.00
42.80
85.60
128.40
171.20
214.00
Left
Right
Delta
Slope
B V(X3.R1)*I(X3.R
0.312f
227.993m
227.993m
1.228m
V(X1.10) (V)
10.000n
10.000n
0.138f
0.001f
V(X2.10) (V)
10.000n
10.000n
-0.129f
-0.001f
V(X3.10) (V)
10.000n
10.000n
0.010f
5.181E-20
V(X4.10) (V)
10.000n
10.000n
0.898f
0.005f
T (Secs)
1.035
186.665
185.629
1.000

FIG. 58

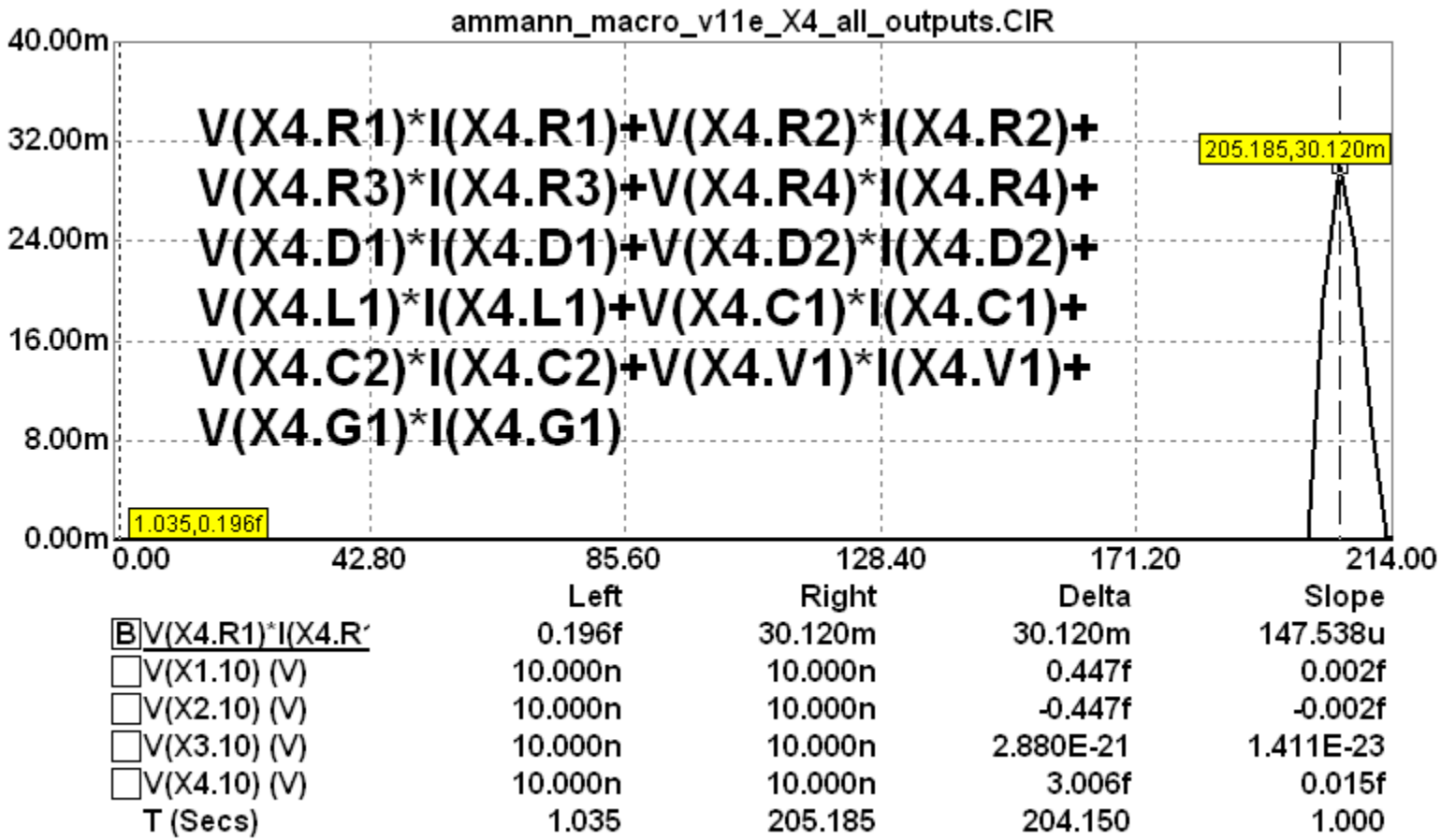

ammann_macro_v11e_X4_all_outputs.CIR
40.00m
32.00m
24.00m
16.00m
8.00m
0.00m
V(X4.R1)*I(X4.R1)+V(X4.R2)*I(X4.R2)+
V(X4.R3)*I(X4.R3)+V(X4.R4)*I(X4.R4)+
V(X4.D1)*I(X4.D1)+V(X4.D2)*I(X4.D2)+
V(X4.L1)*I(X4.L1)+V(X4.C1)*I(X4.C1)+
V(X4.C2)*I(X4.C2)+V(X4.V1)*I(X4.V1)+
V(X4.G1)*I(X4.G1)
205.185,30.120m
1.035,0.196f
0.00
42.80
85.60
128.40
171.20
214.00
Left
Right
Delta
Slope
B V(X4.R1)*I(X4.R
0.196f
30.120m
30.120m
147.538u
V(X1.10) (V)
10.000n
10.000n
0.447f
0.002f
V(X2.10) (V)
10.000n
10.000n
-0.447f
-0.002f
V(X3.10) (V)
10.000n
10.000n
2.880E-21
1.411E-23
V(X4.10) (V)
10.000n
10.000n
3.006f
0.015f
T (Secs)
1.035
205.185
204.150
1.000

FIG. 59

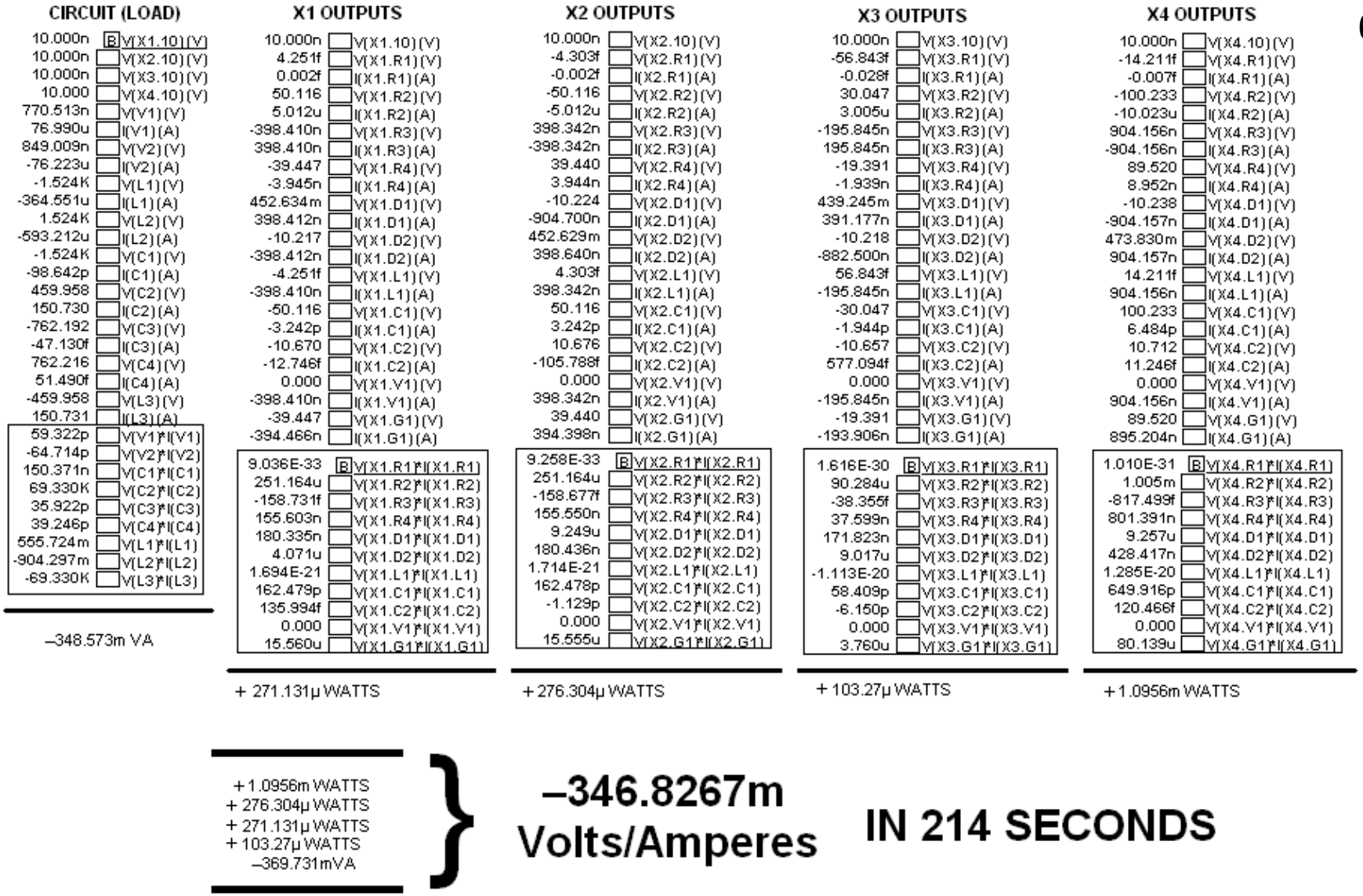
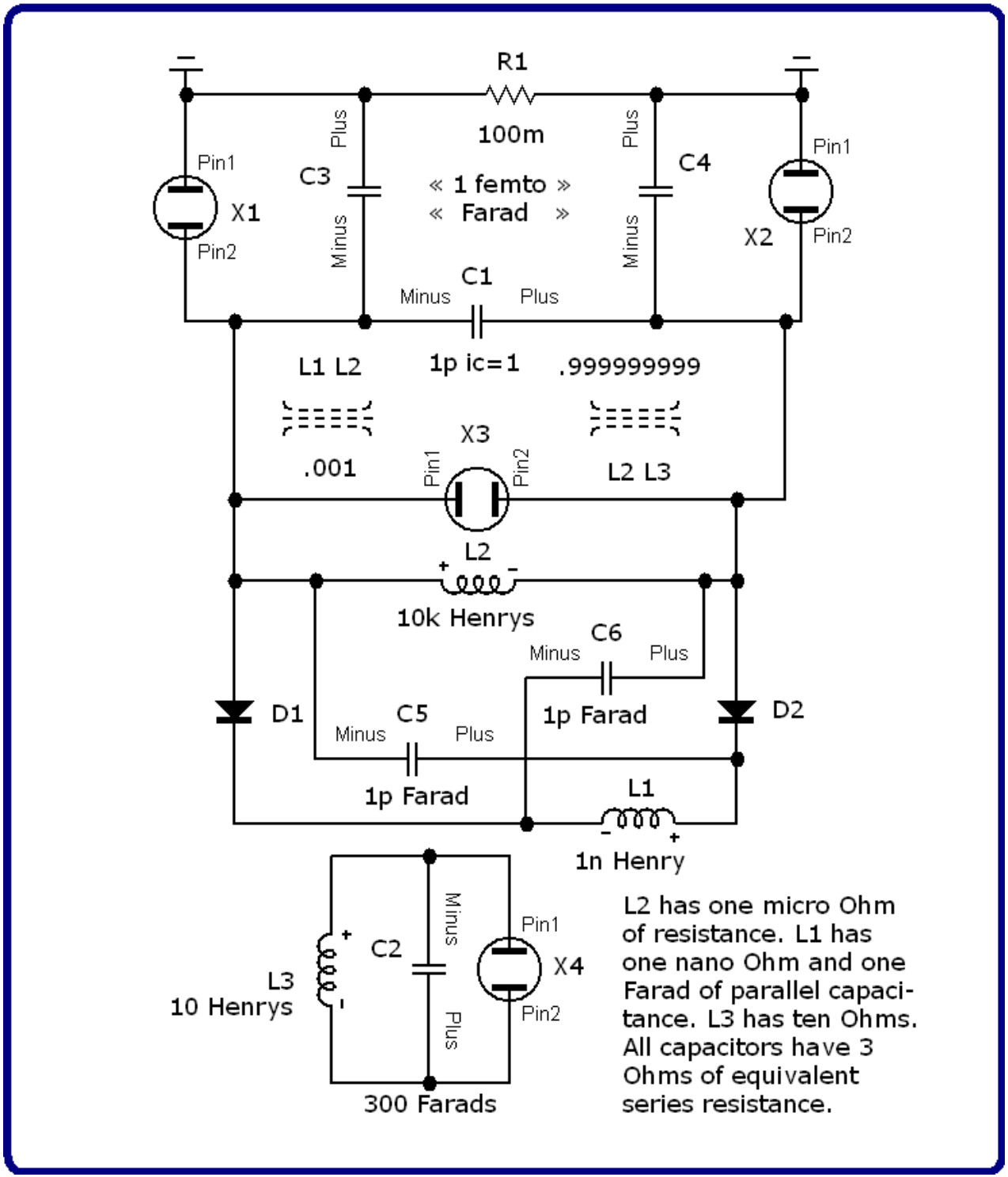

CIRCUIT (LOAD)
10.000n B V(X1.10)(V)
10.000n V(X2.10)(V)
10.000n V(X3.10)(V)
10.000 V(X4.10)(V)
770.513n V(V1)(V)
76.990u I(V1)(A)
849.009n V(V2)(V)
-76.223u I(V2)(A)
-1.524K V(L1)(V)
-364.551u I(L1)(A)
1.524K V(L2)(V)
-593.212u I(L2)(A)
-1.524K V(C1)(V)
-98.642p I(C1)(A)
459.958 V(C2)(V)
150.730 I(C2)(A)
-762.192 V(C3)(V)
-47.130f I(C3)(A)
762.216 V(C4)(V)
51.490f I(C4)(A)
-459.958 V(L3)(V)
150.731 I(L3)(A)
59.322p V(V1)*I(V1)
-64.714p V(V2)*I(V2)
150.371n V(C1)*I(C1)
69.330K V(C2)*I(C2)
35.922p V(C3)*I(C3)
39.246p V(C4)*I(C4)
555.724m V(L1)*I(L1)
-904.297m V(L2)*I(L2)
-69.330K V(L3)*I(L3)
–348.573m VA
X1 OUTPUTS
10.000n V(X1.10)(V)
4.251f V(X1.R1)(V)
0.002f I(X1.R1)(A)
50.116 V(X1.R2)(V)
5.012u I(X1.R2)(A)
-398.410n V(X1.R3)(V)
398.410n I(X1.R3)(A)
-39.447 V(X1.R4)(V)
-3.945n I(X1.R4)(A)
452.634m V(X1.D1)(V)
398.412n I(X1.D1)(A)
-10.217 V(X1.D2)(V)
-398.412n I(X1.D2)(A)
-4.251f V(X1.L1)(V)
-398.410n I(X1.L1)(A)
-50.116 V(X1.C1)(V)
-3.242p I(X1.C1)(A)
-10.670 V(X1.C2)(V)
-12.746f I(X1.C2)(A)
0.000 V(X1.V1)(V)
-398.410n I(X1.V1)(A)
-39.447 V(X1.G1)(V)
-394.466n I(X1.G1)(A)
9.036E-33 B V(X1.R1)*I(X1.R1)
251.164u V(X1.R2)*I(X1.R2)
-158.731f V(X1.R3)*I(X1.R3)
155.603n V(X1.R4)*I(X1.R4)
180.335n V(X1.D1)*I(X1.D1)
4.071u V(X1.D2)*I(X1.D2)
1.694E-21 V(X1.L1)*I(X1.L1)
162.479p V(X1.C1)*I(X1.C1)
135.994f V(X1.C2)*I(X1.C2)
0.000 V(X1.V1)*I(X1.V1)
15.560u V(X1.G1)*I(X1.G1)
+ 271.131µ WATTS
X2 OUTPUTS
10.000n V(X2.10)(V)
-4.303f V(X2.R1)(V)
-0.002f I(X2.R1)(A)
-50.116 V(X2.R2)(V)
-5.012u I(X2.R2)(A)
398.342n V(X2.R3)(V)
-398.342n I(X2.R3)(A)
39.440 V(X2.R4)(V)
3.944n I(X2.R4)(A)
-10.224 V(X2.D1)(V)
-904.700n I(X2.D1)(A)
452.629m V(X2.D2)(V)
398.640n I(X2.D2)(A)
4.303f V(X2.L1)(V)
398.342n I(X2.L1)(A)
50.116 V(X2.C1)(V)
3.242p I(X2.C1)(A)
10.676 V(X2.C2)(V)
-105.788f I(X2.C2)(A)
0.000 V(X2.V1)(V)
398.342n I(X2.V1)(A)
39.440 V(X2.G1)(V)
394.398n I(X2.G1)(A)
9.258E-33 B V(X2.R1)*I(X2.R1)
251.164u V(X2.R2)*I(X2.R2)
-158.677f V(X2.R3)*I(X2.R3)
155.550n V(X2.R4)*I(X2.R4)
9.249u V(X2.D1)*I(X2.D1)
180.436n V(X2.D2)*I(X2.D2)
1.714E-21 V(X2.L1)*I(X2.L1)
162.478p V(X2.C1)*I(X2.C1)
-1.129p V(X2.C2)*I(X2.C2)
0.000 V(X2.V1)*I(X2.V1)
15.555u V(X2.G1)*I(X2.G1)
+ 276.304µ WATTS
X3 OUTPUTS
10.000n V(X3.10)(V)
-56.843f V(X3.R1)(V)
-0.028f I(X3.R1)(A)
30.047 V(X3.R2)(V)
3.005u I(X3.R2)(A)
-195.845n V(X3.R3)(V)
195.845n I(X3.R3)(A)
-19.391 V(X3.R4)(V)
-1.939n I(X3.R4)(A)
439.245m V(X3.D1)(V)
391.177n I(X3.D1)(A)
-10.218 V(X3.D2)(V)
-882.500n I(X3.D2)(A)
56.843f V(X3.L1)(V)
-195.845n I(X3.L1)(A)
-30.047 V(X3.C1)(V)
-1.944p I(X3.C1)(A)
-10.657 V(X3.C2)(V)
577.094f I(X3.C2)(A)
0.000 V(X3.V1)(V)
-195.845n I(X3.V1)(A)
-19.391 V(X3.G1)(V)
-193.906n I(X3.G1)(A)
1.616E-30 B V(X3.R1)*I(X3.R1)
90.284u V(X3.R2)*I(X3.R2)
-38.355f V(X3.R3)*I(X3.R3)
37.599n V(X3.R4)*I(X3.R4)
171.823n V(X3.D1)*I(X3.D1)
9.017u V(X3.D2)*I(X3.D2)
-1.113E-20 V(X3.L1)*I(X3.L1)
58.409p V(X3.C1)*I(X3.C1)
-6.150p V(X3.C2)*I(X3.C2)
0.000 V(X3.V1)*I(X3.V1)
3.760u V(X3.G1)*I(X3.G1)
+ 103.27µ WATTS
X4 OUTPUTS
10.000n V(X4.10)(V)
-14.211f V(X4.R1)(V)
-0.007f I(X4.R1)(A)
-100.233 V(X4.R2)(V)
-10.023u I(X4.R2)(A)
904.156n V(X4.R3)(V)
-904.156n I(X4.R3)(A)
89.520 V(X4.R4)(V)
8.952n I(X4.R4)(A)
-10.238 V(X4.D1)(V)
-904.157n I(X4.D1)(A)
473.830m V(X4.D2)(V)
904.157n I(X4.D2)(A)
14.211f V(X4.L1)(V)
904.156n I(X4.L1)(A)
100.233 V(X4.C1)(V)
6.484p I(X4.C1)(A)
10.712 V(X4.C2)(V)
11.246f I(X4.C2)(A)
0.000 V(X4.V1)(V)
904.156n I(X4.V1)(A)
89.520 V(X4.G1)(V)
895.204n I(X4.G1)(A)
1.010E-31 B V(X4.R1)*I(X4.R1)
1.005m V(X4.R2)*I(X4.R2)
-817.499f V(X4.R3)*I(X4.R3)
801.391n V(X4.R4)*I(X4.R4)
9.257u V(X4.D1)*I(X4.D1)
428.417n V(X4.D2)*I(X4.D2)
1.285E-20 V(X4.L1)*I(X4.L1)
649.916p V(X4.C1)*I(X4.C1)
120.466f V(X4.C2)*I(X4.C2)
0.000 V(X4.V1)*I(X4.V1)
80.139u V(X4.G1)*I(X4.G1)
+ 1.0956m WATTS
+ 1.0956m WATTS
+ 276.304µ WATTS
+ 271.131µ WATTS
+ 103.27µ WATTS
–369.731mVA
–346.8267m
Volts/Amperes
IN 214 SECONDS
A SLIGHT GAIN OVER LOSS.
WHERE DID THIS ENERGY COME FROM?

FIG. 60

FIG. 61


R1
100m
C3
C4
« 1 femto »
« Farad »
Plus
Minus
Pin1
Pin2
X1
X2
C1
Minus
Plus
L1 L2
1p ic=1
.999999999
.001
X3
L2 L3
L2
10k Henrys
C6
1p Farad
D1
D2
C5
1p Farad
L1
1n Henry
L3
10 Henrys
C2
X4
300 Farads
L2 has one micro Ohm of resistance. L1 has one nano Ohm and one Farad of parallel capacitance. L3 has ten Ohms. All capacitors have 3 Ohms of equivalent series resistance.

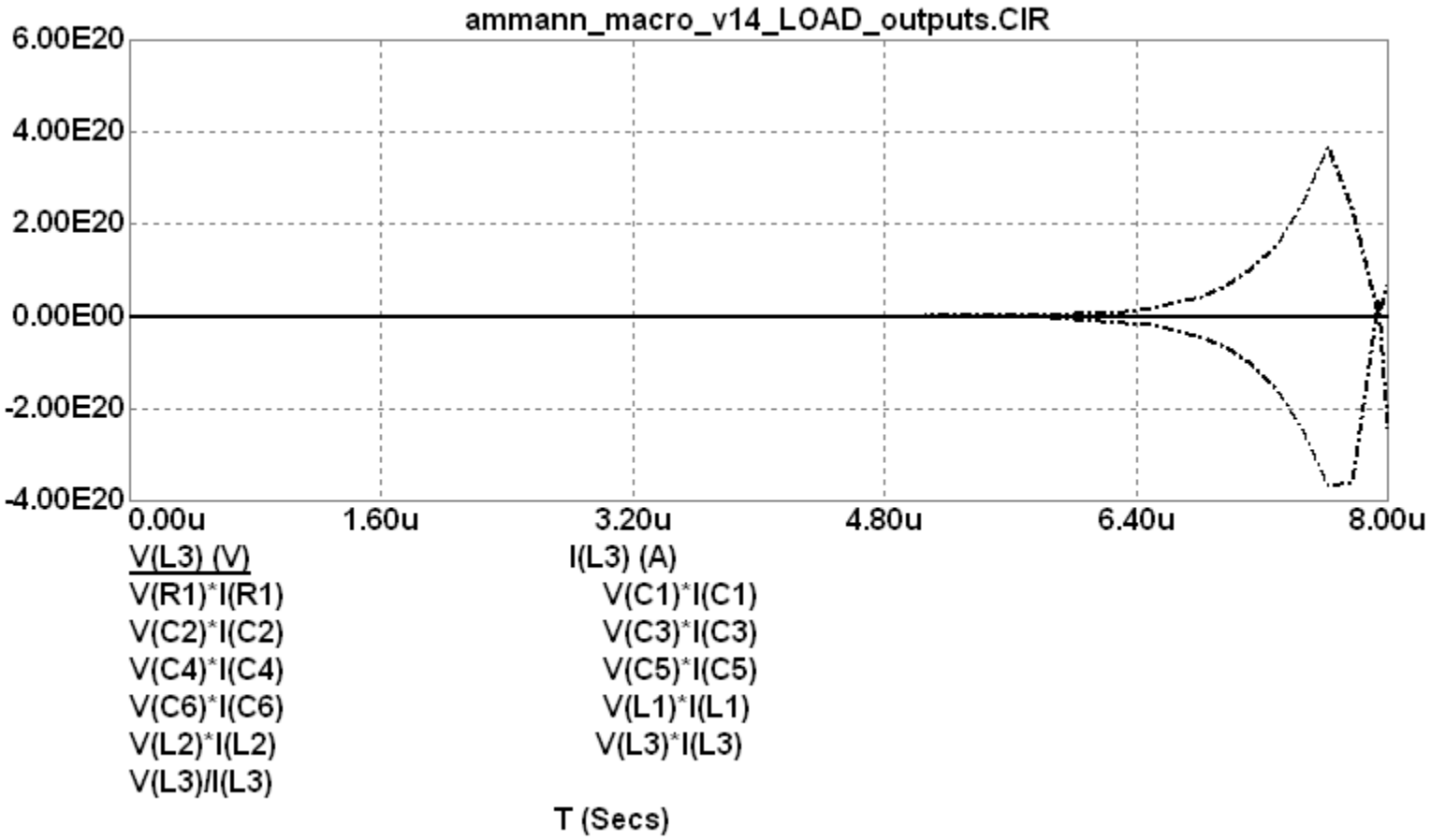
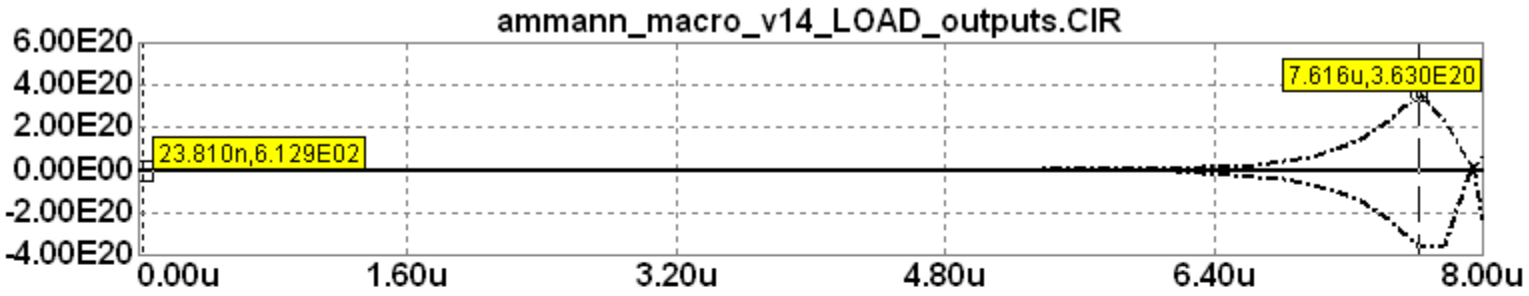

ammann_macro_v14_LOAD_outputs.CIR
6.00E20
4.00E20
2.00E20
0.00E00
-2.00E20
-4.00E20
0.00u
1.60u
3.20u
4.80u
6.40u
8.00u
V(L3) (V)
V(R1)*I(R1)
V(C2)*I(C2)
V(C4)*I(C4)
V(C6)*I(C6)
V(L2)*I(L2)
V(L3)/I(L3)
I(L3) (A)
V(C1)*I(C1)
V(C3)*I(C3)
V(C5)*I(C5)
V(L1)*I(L1)
V(L3)*I(L3)
T (Secs)

FIG. 62



	Left	Right	Delta	Slope
V(L3) (V)	-3.010E01	-3.300E10	-3.300E10	-4.347E15
I(L3) (A)	1.738E-01	1.100E10	1.100E10	1.449E15
V(R1)*I(R1)	0.000E00	0.000E00	0.000E00	0.000E00
V(C1)*I(C1)	8.217E01	5.022E14	5.022E14	6.614E19
B V(C2)*I(C2)	6.129E02	3.630E20	3.630E20	4.782E25
V(C3)*I(C3)	1.958E-02	1.256E11	1.256E11	1.654E16
V(C4)*I(C4)	2.414E-02	1.256E11	1.256E11	1.654E16
V(C5)*I(C5)	2.475E01	-4.372E14	-4.372E14	-5.758E19
V(C6)*I(C6)	3.769E01	6.883E14	6.883E14	9.066E19
V(L1)*I(L1)	1.356E-08	-3.349E10	-3.349E10	-4.411E15
V(L2)*I(L2)	-5.174E02	-2.188E18	-2.188E18	-2.882E23
V(L3)*I(L3)	-7.769E00	-3.630E20	-3.630E20	-4.782E25
V(L3)/I(L3)	-1.173E02	-3.000E00	1.143E02	1.505E07
T (Secs)	23.810n	7.616u	7.592u	1.000

FIG. 63

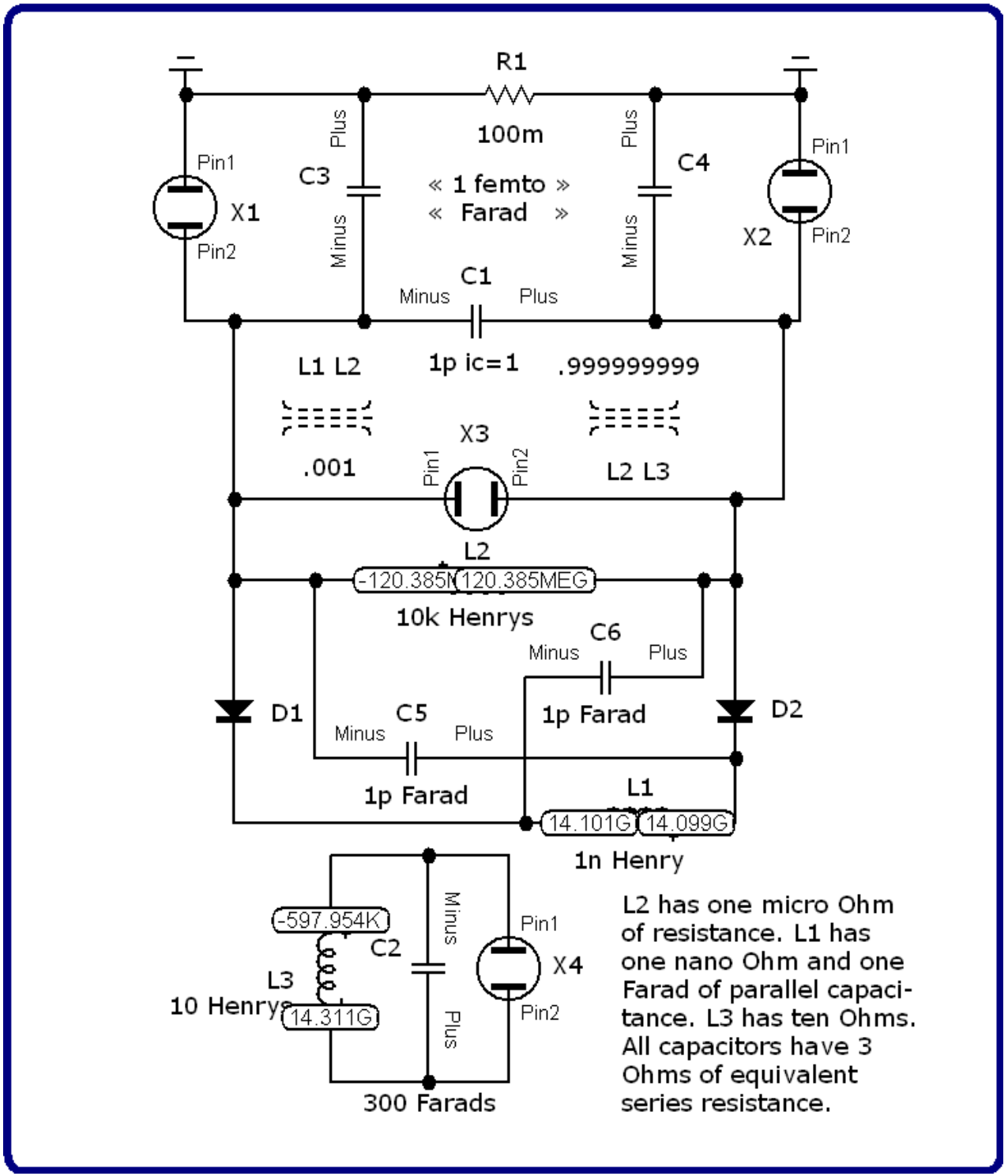

R1
100m
Plus
Minus
C3
« 1 femto »
« Farad »
C4
Pin1
Pin2
X1
X2
C1
Minus
Plus
L1 L2
1p ic=1
.999999999
.001
X3
L2 L3
L2
-120.385M
120.385MEG
10k Henrys
C6
D1
D2
C5
1p Farad
L1
14.101G
14.099G
1n Henry
-597.954K
C2
L3
10 Henrys
14.311G
X4
300 Farads
L2 has one micro Ohm of resistance. L1 has one nano Ohm and one Farad of parallel capacitance. L3 has ten Ohms. All capacitors have 3 Ohms of equivalent series resistance.

FIG. 64

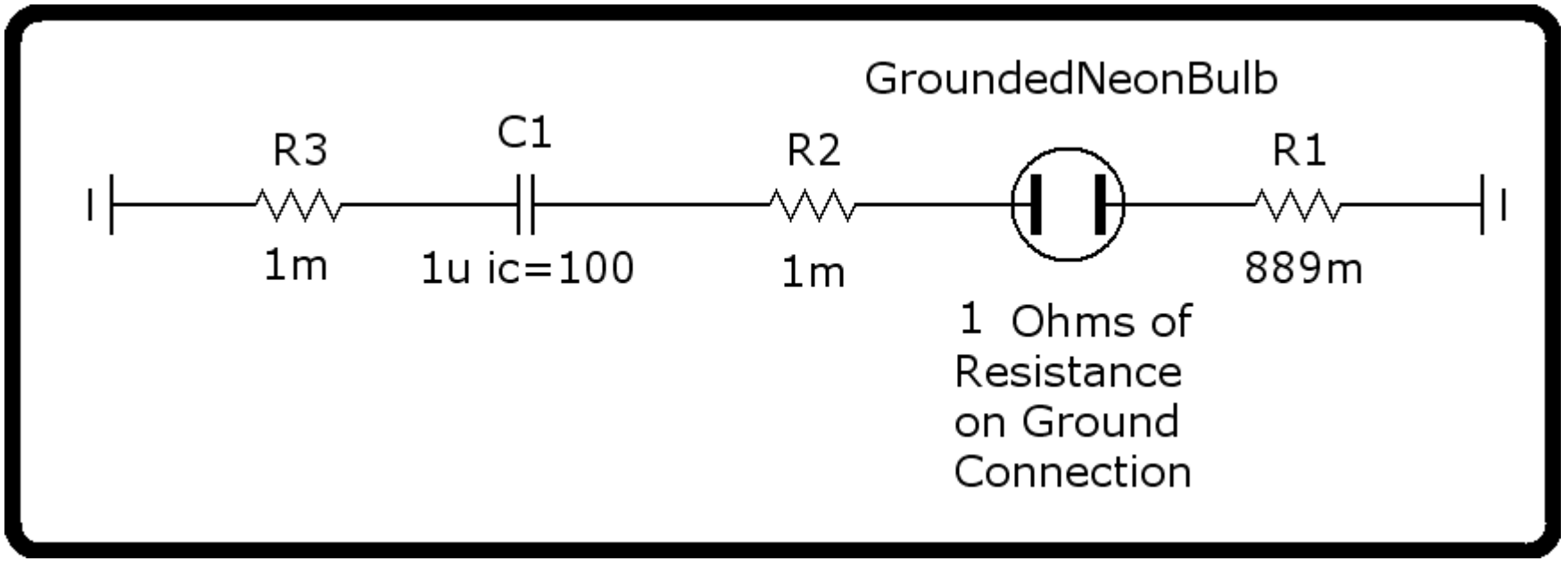

GroundedNeonBulb
R3
C1
R2
R1
1m
1u ic=100
1m
889m
1 Ohms of Resistance on Ground Connection

FIG. 65

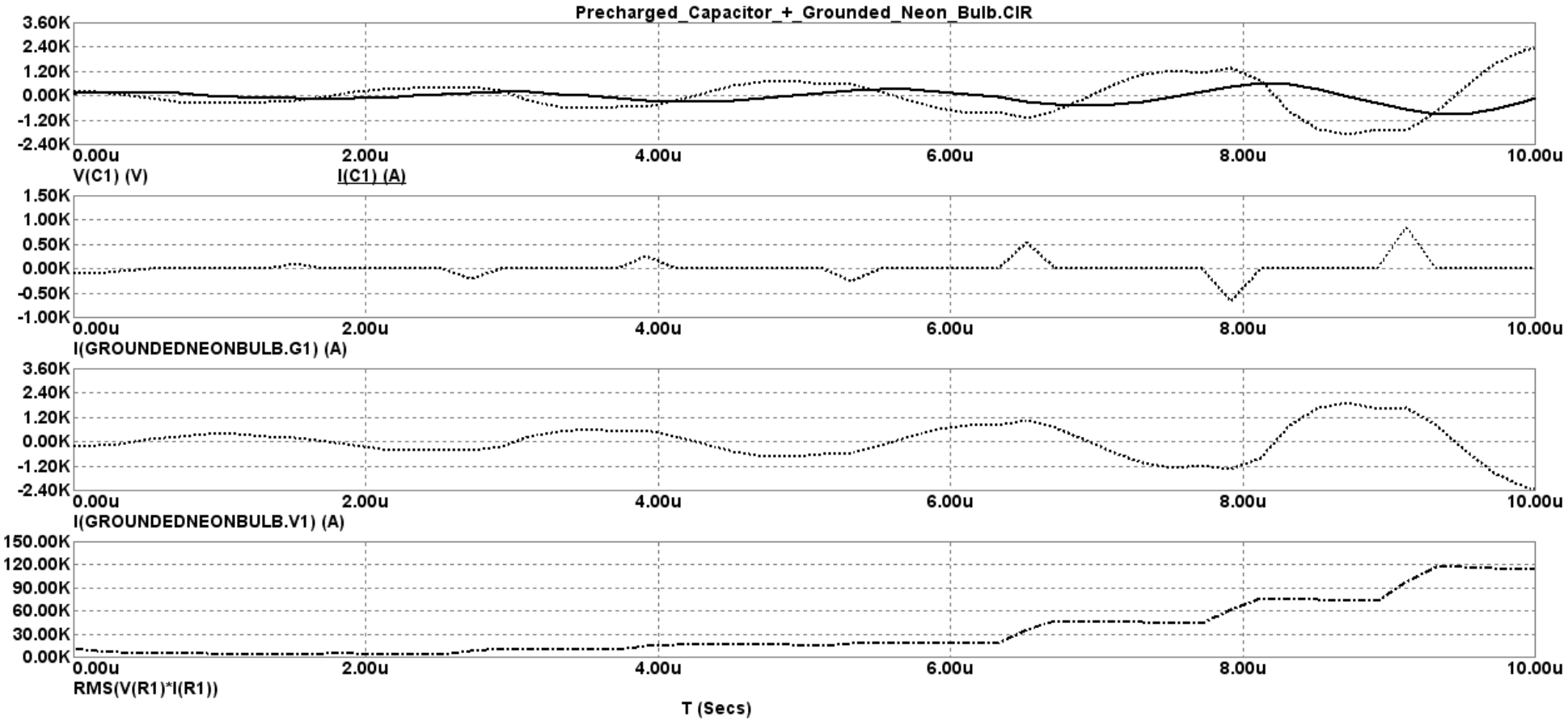

Precharged_Capacitor_+_Grounded_Neon_Bulb.CIR
3.60K
2.40K
1.20K
0.00K
-1.20K
-2.40K
0.00u
2.00u
4.00u
6.00u
8.00u
10.00u
V(C1) (V)
I(C1) (A)
1.50K
1.00K
0.50K
0.00K
-0.50K
-1.00K
I(GROUNDEDNEONBULB.G1) (A)
I(GROUNDEDNEONBULB.V1) (A)
150.00K
120.00K
90.00K
60.00K
30.00K
0.00K
RMS(V(R1)*I(R1))
T (Secs)

FIG. 66

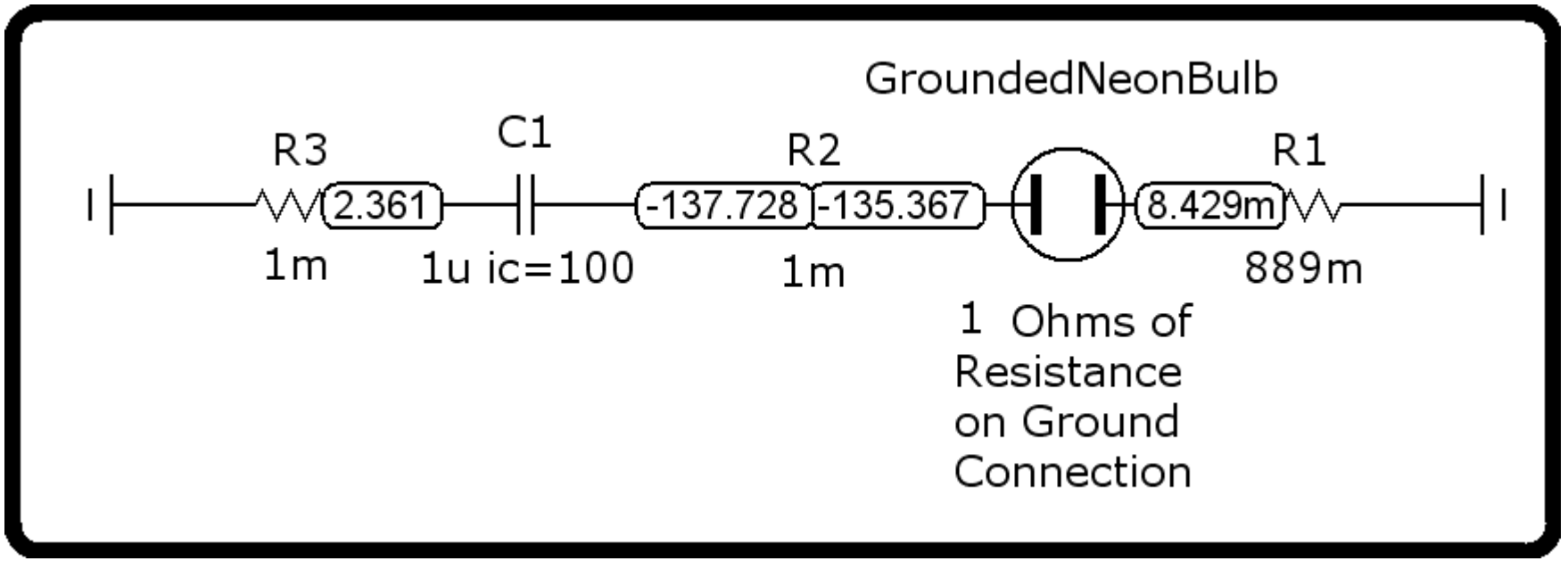
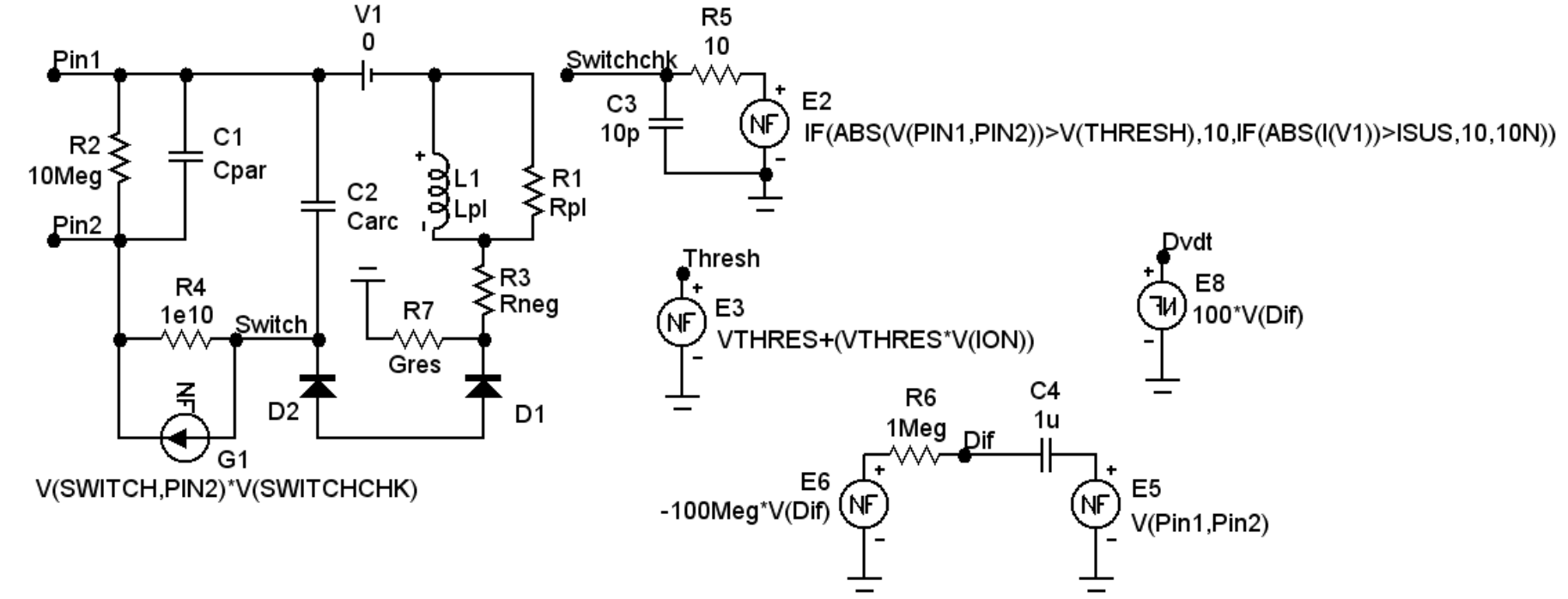

GroundedNeonBulb
R3
C1
R2
R1
2.361
-137.728
-135.367
8.429m
1m
1u ic=100
1m
889m
1 Ohms of Resistance on Ground Connection

FIG. 67

SPARKGAP MACRO, with a resistive ground connection.

.PARAMETERS(GRES=1,VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)

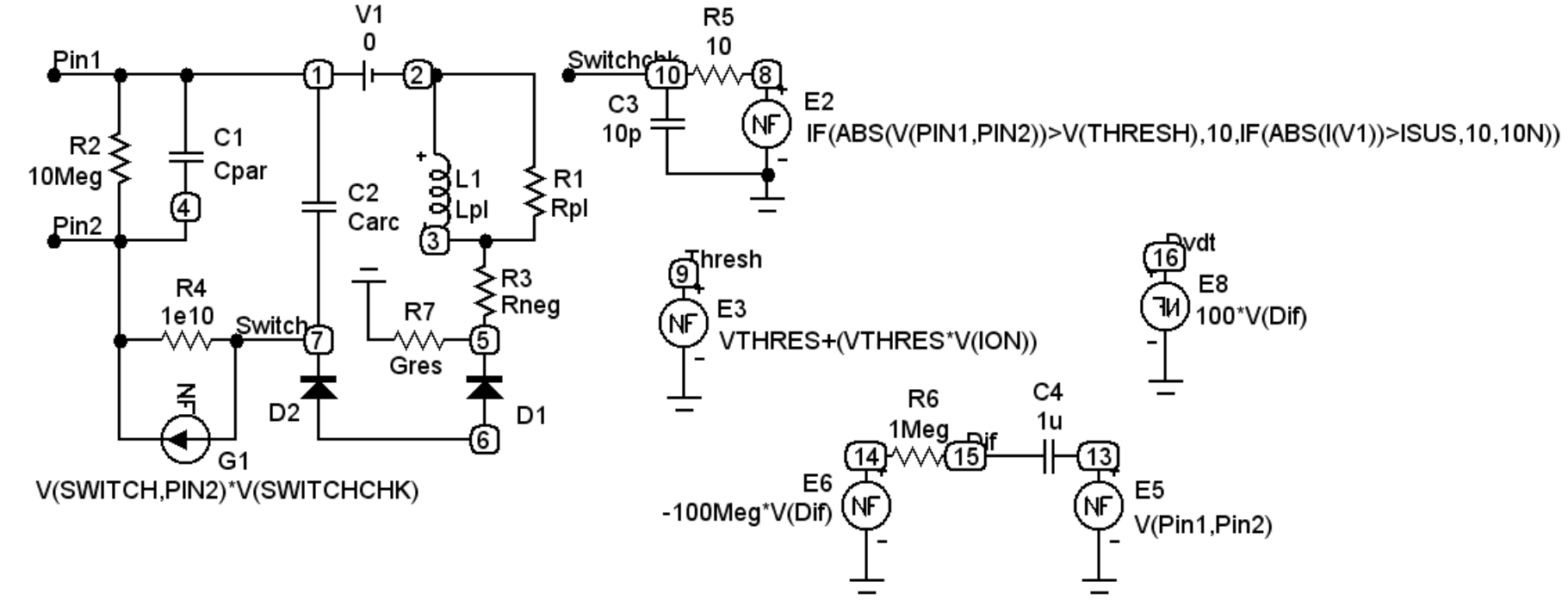



```
.HELP GRES "Resistance of ground connection"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"
```

FIG. 68

SPARKGAP MACRO, with a resistive ground connection.

.PARAMETERS(GRES=1,VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)

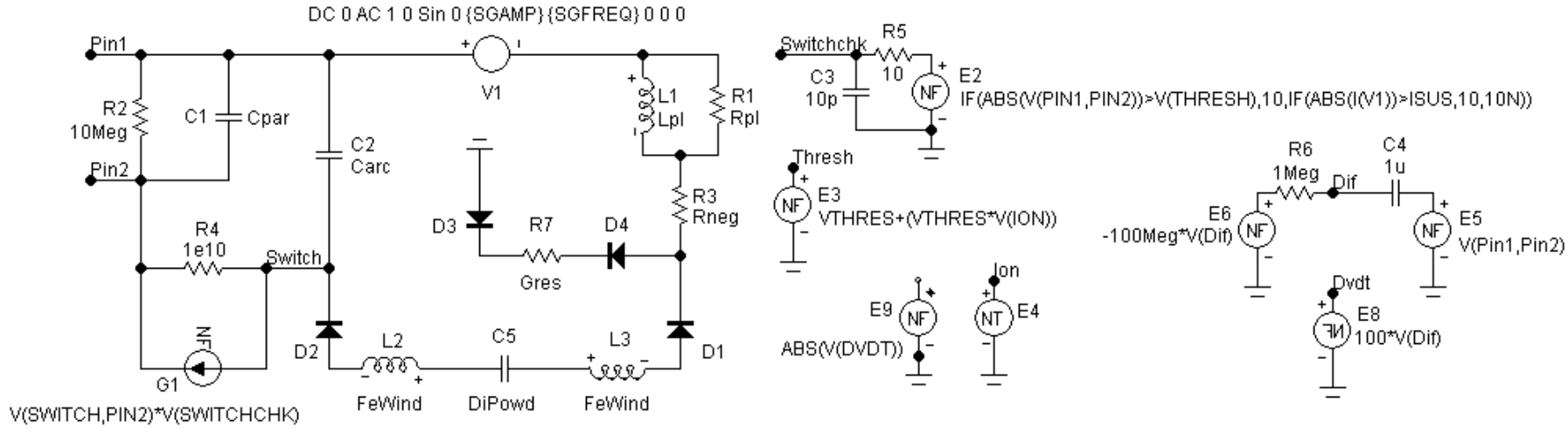



```
.HELP GRES "Resistance of ground connection"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"
```

FIG. 69

GROUNDED & BENT IN THE MIDDLE, NEON-FILLED, COPPER TUBING, FREQUENCY & AMPLITUDE MODULATED, SURROUNDED BY AN IRON WINDING REPRESENTS A PAIR OF INVERTED COILS » L2 & L3, & FILLED WITH POWDERED TANTALUM OR ALUMINA IS CAPACITOR » C5.

.PARAMETERS(FEWIND=1e6,DIPOWD=1e30,DIMAT=3,GRES=1e10,SGFREQ=1e4,SGAMP=1F,VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)



.HELP FEWIND "Inductance of L2 and L3, of inverted windings and undefined series resistance, is an iron coil surrounding a bent-in-the-middle copper tube filled with neon gas."
.HELP DIPOWD "Capacitance of C5 suffuses the interior of this neon bulb, spark gap."
.HELP DIMAT "Equivalent series resistance of the dielectric material within C5 defaults to 3 Ohms (analogous to tantalum or alumina dielectric)."

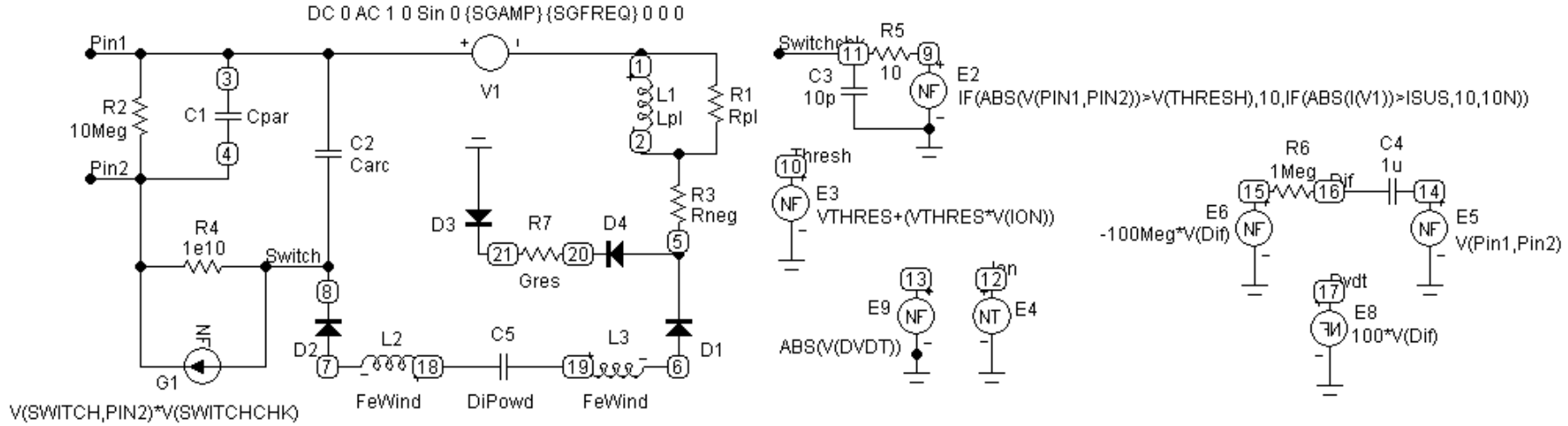
16 micrometers of neon gas and powdered iron and powdered tantalum or alumina (aluminum oxide) between two electrodes is Nikola Tesla's TriMetal Generator. It is assumed that X1.L2 and X1.L3, within this macro, will be magnetically coupled to another inductor, outside this macro, from within a circuit which uses this spark gap. This prevents suppression of over-reactance by electrically isolating the spark gap from the load.

.HELP SGFREQ "Frequency of sine wave input into spark gap, neon bulb"
.HELP SGAMP "Amplitude of sine wave input into spark gap, neon bulb"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 70

GROUNDED & BENT IN THE MIDDLE, NEON-FILLED, COPPER TUBING, FREQUENCY & AMPLITUDE MODULATED, SURROUNDED BY AN IRON WINDING REPRESENTS A PAIR OF INVERTED COILS » L2 & L3, & FILLED WITH POWDERED TANTALUM OR ALUMINA IS CAPACITOR » C5.

.PARAMETERS(FEWIND=1e6,DIPOWD=1e30,DIMAT=3,GRES=1e10,SGFREQ=1e4,SGAMP=1F,VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)

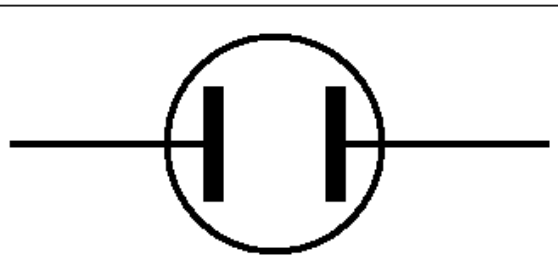


.HELP FEWIND "Inductance of L2 and L3, of inverted windings and undefined series resistance, is an iron coil surrounding a bent-in-the-middle copper tube filled with neon gas."
.HELP DIPOWD "Capacitance of C5 suffuses the interior of this neon bulb, spark gap."
.HELP DIMAT "Equivalent series resistance of the dielectric material within C5 defaults to 3 Ohms (analogous to tantalum or alumina dielectric)."

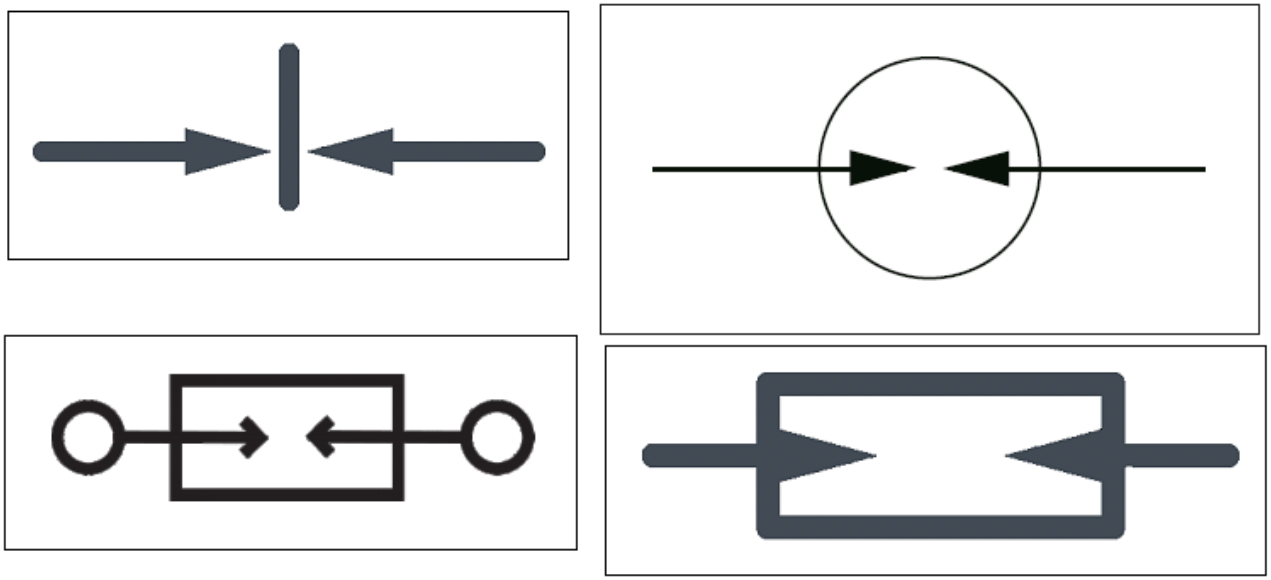
16 micrometers of neon gas and powdered iron and powdered tantalum or alumina (aluminum oxide) between two electrodes is Nikola Tesla's TriMetal Generator. It is assumed that X1.L2 and X1.L3, within this macro, will be magnetically coupled to another inductor, outside this macro, from within a circuit which uses this spark gap. This prevents suppression of over-reactance by electrically isolating the spark gap from the load.

.HELP SGFREQ "Frequency of sine wave input into spark gap, neon bulb"
.HELP SGAMP "Amplitude of sine wave input into spark gap, neon bulb"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 71



MICRO-CAP'S SCHEMATIC SYMBOL FOR A SPARK GAP SUGGESTS A CAPACITANT RELATIONSHIP BETWEEN ITS ELECTRODES



COMMON ALTERNATIVE SCHEMATIC SYMBOLS FOR A SPARK GAP RESEMBLING TWO DIODES WHOSE CATHODES APPEAR TO BE FACING EACH OTHER

FIG. 72

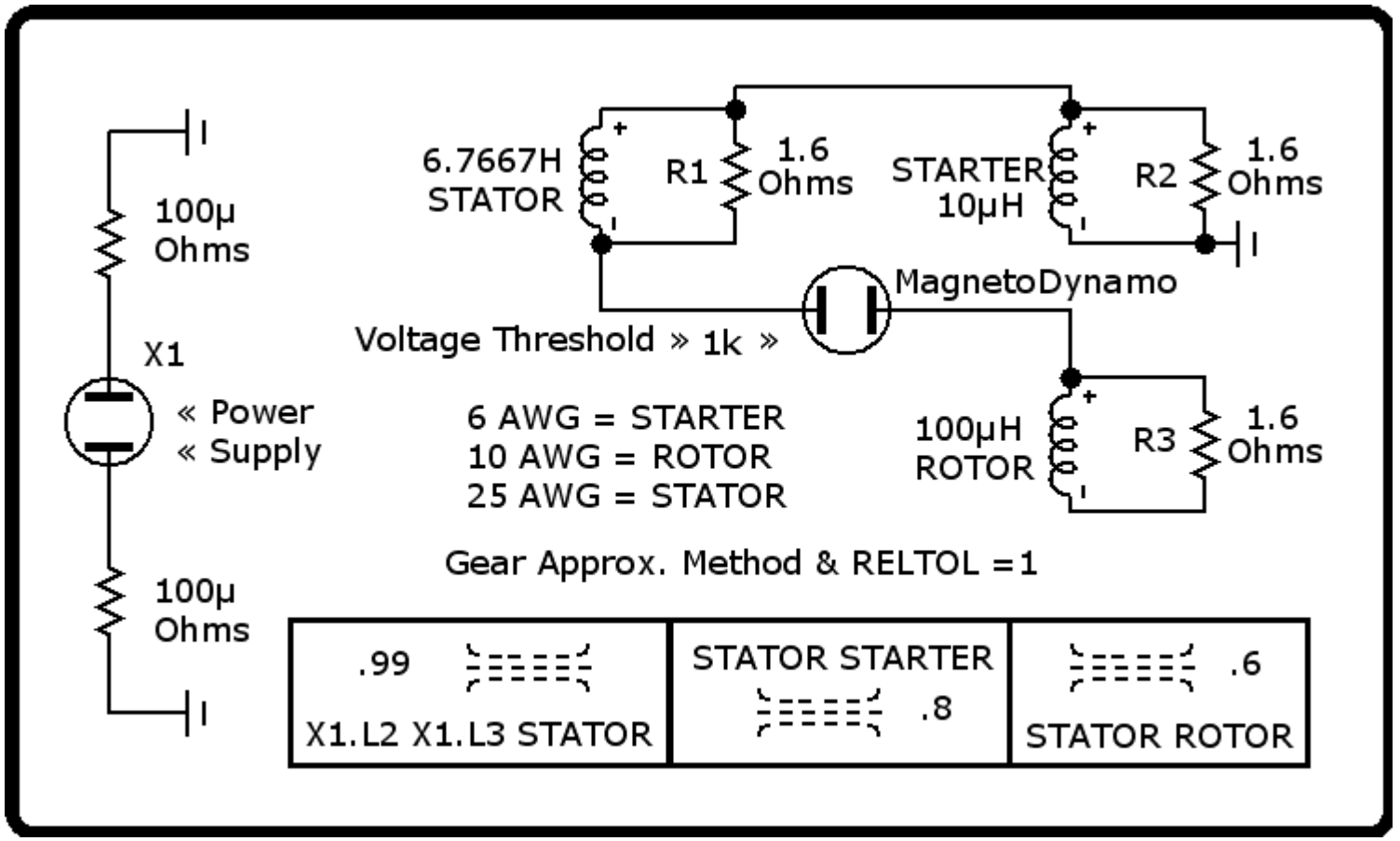

100µ
Ohms
X1
« Power
« Supply
100µ
Ohms
6.7667H
STATOR
R1
1.6
Ohms
STARTER
10µH
R2
1.6
Ohms
MagnetoDynamo
Voltage Threshold » 1k »
6 AWG = STARTER
10 AWG = ROTOR
25 AWG = STATOR
100µH
ROTOR
R3
1.6
Ohms
Gear Approx. Method & RELTOL =1
.99
X1.L2 X1.L3 STATOR
STATOR STARTER
.8
.6
STATOR ROTOR

FIG. 73

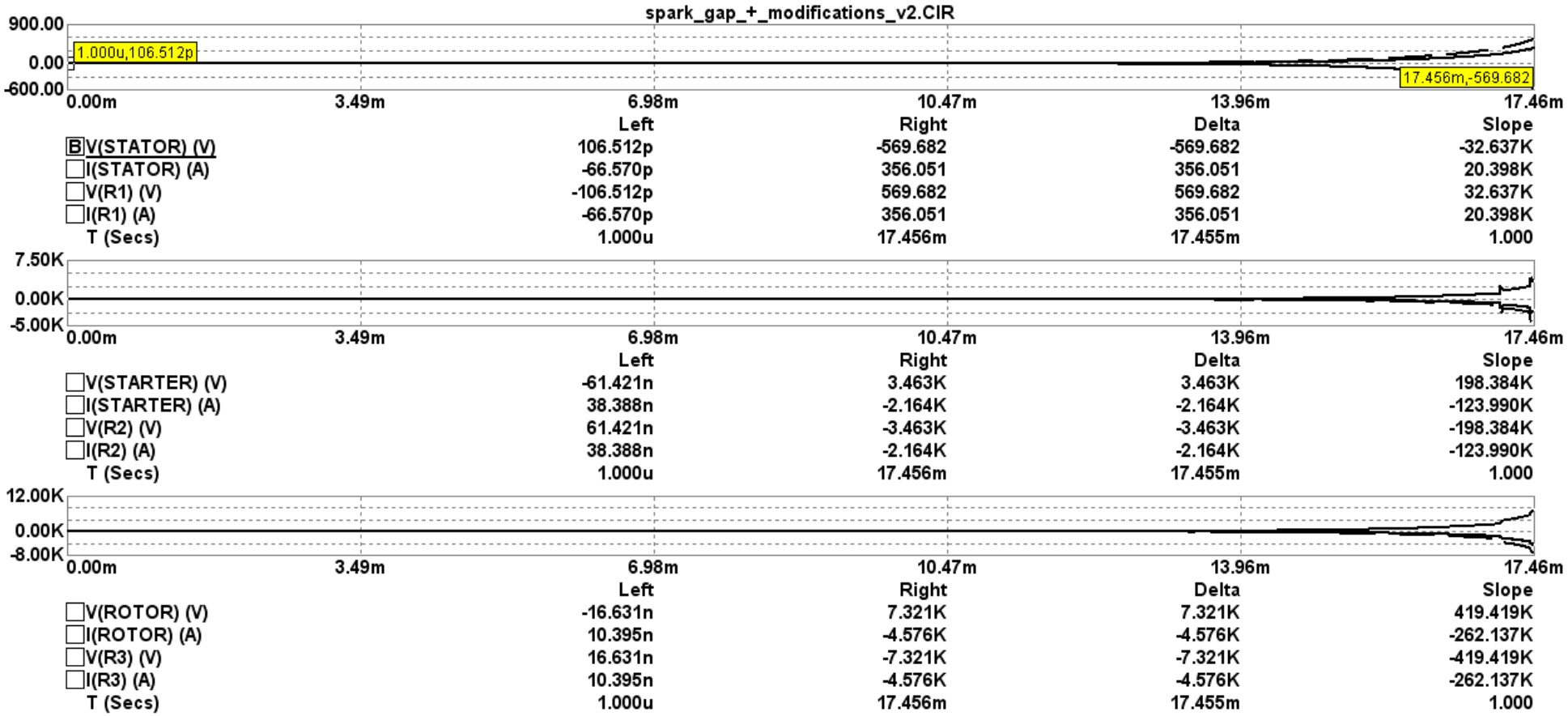
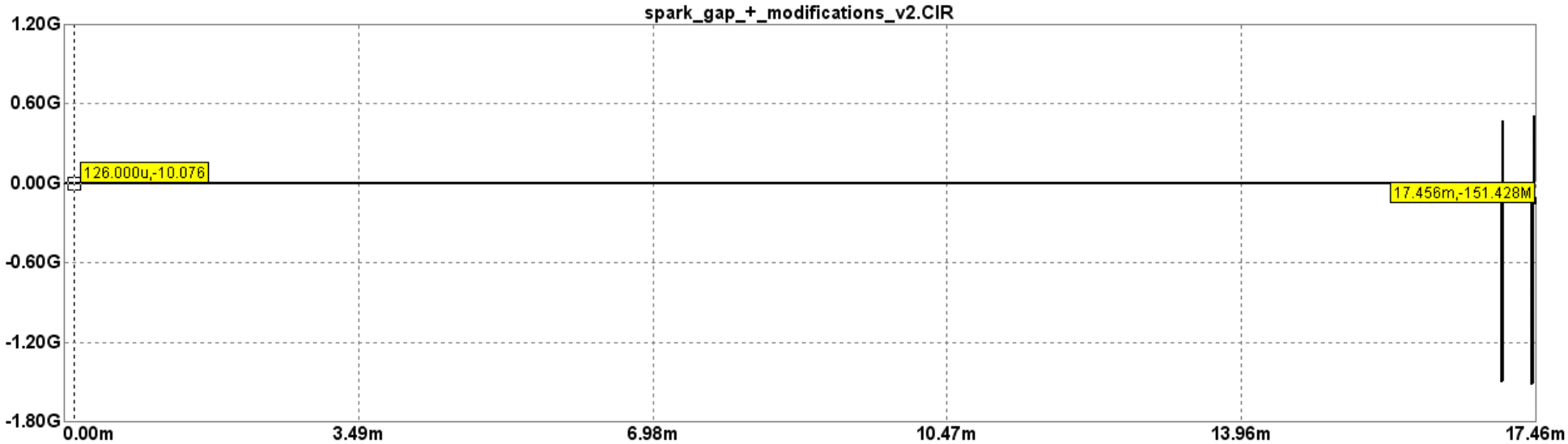
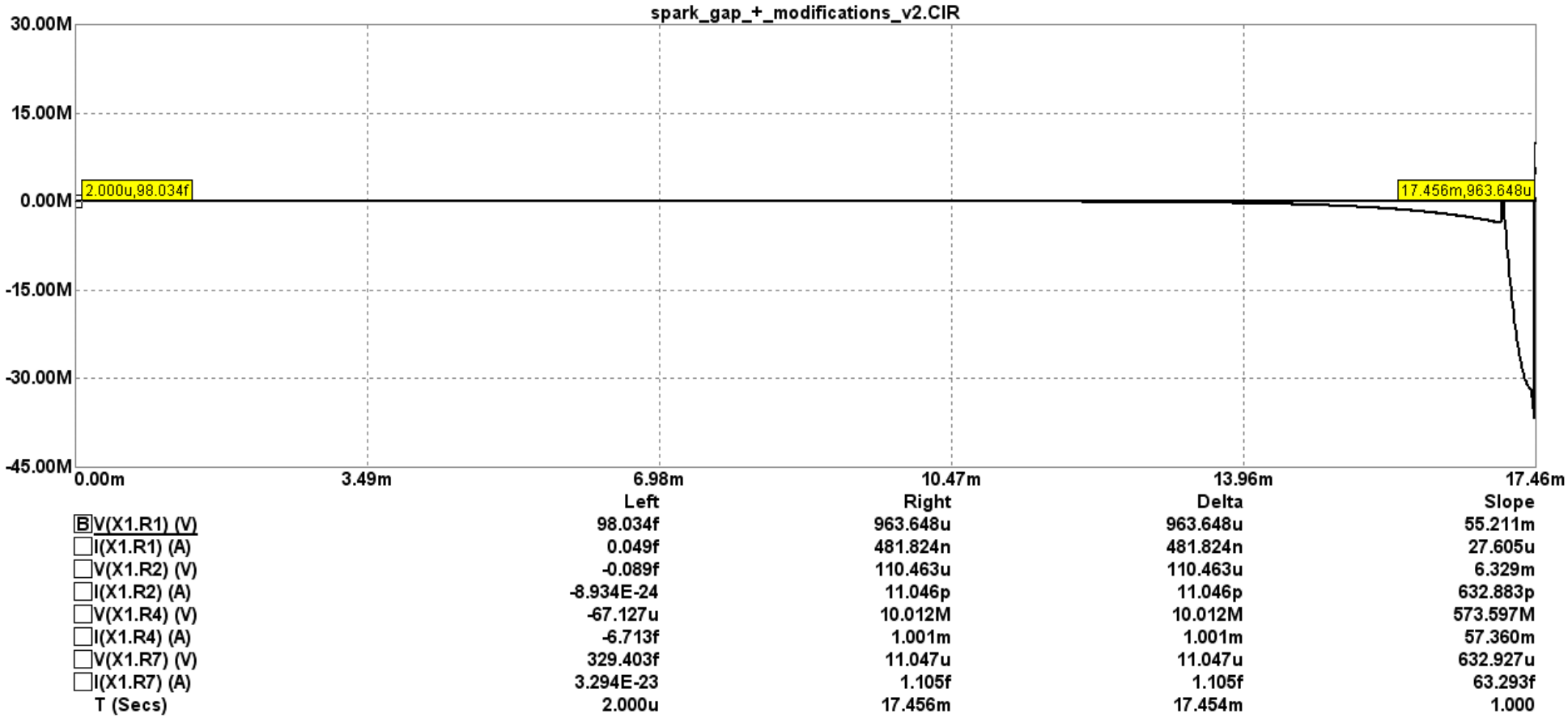

spark_gap_+_modifications_v2.CIR
900.00
0.00
-600.00
1.000u,106.512p
17.456m,-569.682
0.00m
3.49m
6.98m
10.47m
13.96m
17.46m
Left
Right
Delta
Slope
V(STATOR) (V) 106.512p -569.682 -569.682 -32.637K
I(STATOR) (A) -66.570p 356.051 356.051 20.398K
V(R1) (V) -106.512p 569.682 569.682 32.637K
I(R1) (A) -66.570p 356.051 356.051 20.398K
T (Secs) 1.000u 17.456m 17.455m 1.000
7.50K
0.00K
-5.00K
0.00m
3.49m
6.98m
10.47m
13.96m
17.46m
Left
Right
Delta
Slope
V(STARTER) (V) -61.421n 3.463K 3.463K 198.384K
I(STARTER) (A) 38.388n -2.164K -2.164K -123.990K
V(R2) (V) 61.421n -3.463K -3.463K -198.384K
I(R2) (A) 38.388n -2.164K -2.164K -123.990K
T (Secs) 1.000u 17.456m 17.455m 1.000
12.00K
0.00K
-8.00K
0.00m
3.49m
6.98m
10.47m
13.96m
17.46m
Left
Right
Delta
Slope
V(ROTOR) (V) -16.631n 7.321K 7.321K 419.419K
I(ROTOR) (A) 10.395n -4.576K -4.576K -262.137K
V(R3) (V) 16.631n -7.321K -7.321K -419.419K
I(R3) (A) 10.395n -4.576K -4.576K -262.137K
T (Secs) 1.000u 17.456m 17.455m 1.000

FIG. 74



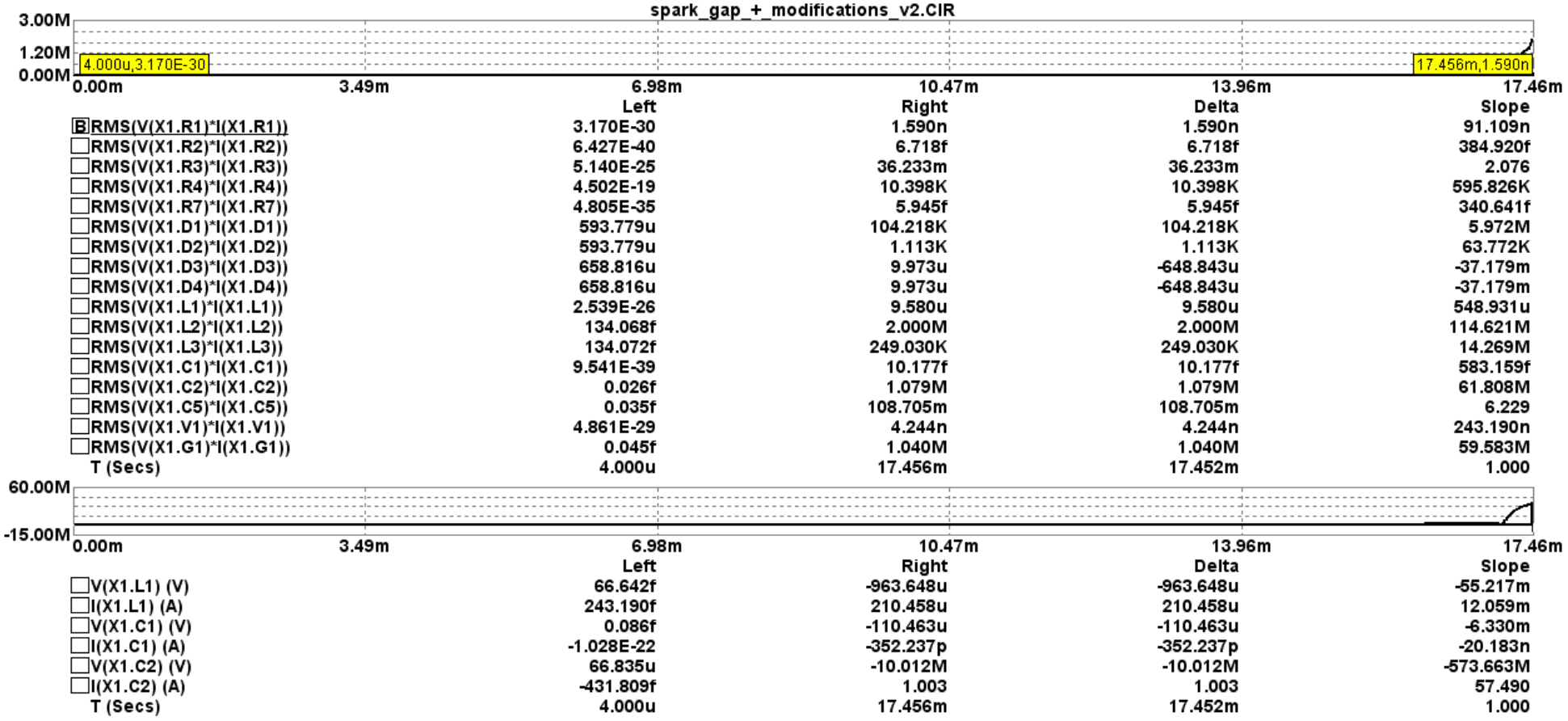
	Left	Right	Delta	Slope
B V(X1.D1) (V)	-10.076	-151.428M	-151.428M	-8.738G
I(X1.D1) (A)	-1.741n	-1.000E-50	1.741n	100.452n
V(X1.D2) (V)	-10.076	-65.139	-55.063	-3.177K
I(X1.D2) (A)	-1.709n	-426.062u	-426.061u	-24.585m
V(X1.D3) (V)	-750.708p	-797.331u	-797.330u	-46.009m
I(X1.D3) (A)	-1.041E-21	-0.110f	-0.110f	-6.333f
V(X1.D4) (V)	750.708p	946.496u	946.495u	54.616m
I(X1.D4) (A)	1.041E-21	8.433f	8.433f	486.594f
V(X1.R3) (V)	1.516n	209.976u	209.974u	12.116m
I(X1.R3) (A)	-1.516n	-209.976u	-209.974u	-12.116m
T (Secs)	126.000u	17.456m	17.330m	1.000

FIG. 75



	Left	Right	Delta	Slope
B V(X1.R1) (V)	98.034f	963.648u	963.648u	55.211m
I(X1.R1) (A)	0.049f	481.824n	481.824n	27.605u
V(X1.R2) (V)	-0.089f	110.463u	110.463u	6.329m
I(X1.R2) (A)	-8.934E-24	11.046p	11.046p	632.883p
V(X1.R4) (V)	-67.127u	10.012M	10.012M	573.597M
I(X1.R4) (A)	-6.713f	1.001m	1.001m	57.360m
V(X1.R7) (V)	329.403f	11.047u	11.047u	632.927u
I(X1.R7) (A)	3.294E-23	1.105f	1.105f	63.293f
T (Secs)	2.000u	17.456m	17.454m	1.000

FIG. 76



	Left	Right	Delta	Slope
B RMS(V(X1.R1)*I(X1.R1))	3.170E-30	1.590n	1.590n	91.109n
RMS(V(X1.R2)*I(X1.R2))	6.427E-40	6.718f	6.718f	384.920f
RMS(V(X1.R3)*I(X1.R3))	5.140E-25	36.233m	36.233m	2.076
RMS(V(X1.R4)*I(X1.R4))	4.502E-19	10.398K	10.398K	595.826K
RMS(V(X1.R7)*I(X1.R7))	4.805E-35	5.945f	5.945f	340.641f
RMS(V(X1.D1)*I(X1.D1))	593.779u	104.218K	104.218K	5.972M
RMS(V(X1.D2)*I(X1.D2))	593.779u	1.113K	1.113K	63.772K
RMS(V(X1.D3)*I(X1.D3))	658.816u	9.973u	-648.843u	-37.179m
RMS(V(X1.D4)*I(X1.D4))	658.816u	9.973u	-648.843u	-37.179m
RMS(V(X1.L1)*I(X1.L1))	2.539E-26	9.580u	9.580u	548.931u
RMS(V(X1.L2)*I(X1.L2))	134.068f	2.000M	2.000M	114.621M
RMS(V(X1.L3)*I(X1.L3))	134.072f	249.030K	249.030K	14.269M
RMS(V(X1.C1)*I(X1.C1))	9.541E-39	10.177f	10.177f	583.159f
RMS(V(X1.C2)*I(X1.C2))	0.026f	1.079M	1.079M	61.808M
RMS(V(X1.C5)*I(X1.C5))	0.035f	108.705m	108.705m	6.229
RMS(V(X1.V1)*I(X1.V1))	4.861E-29	4.244n	4.244n	243.190n
RMS(V(X1.G1)*I(X1.G1))	0.045f	1.040M	1.040M	59.583M
T (Secs)	4.000u	17.456m	17.452m	1.000

	Left	Right	Delta	Slope
V(X1.L1) (V)	66.642f	-963.648u	-963.648u	-55.217m
I(X1.L1) (A)	243.190f	210.458u	210.458u	12.059m
V(X1.C1) (V)	0.086f	-110.463u	-110.463u	-6.330m
I(X1.C1) (A)	-1.028E-22	-352.237p	-352.237p	-20.183n
V(X1.C2) (V)	66.835u	-10.012M	-10.012M	-573.663M
I(X1.C2) (A)	-431.809f	1.003	1.003	57.490
T (Secs)	4.000u	17.456m	17.452m	1.000

FIG. 77

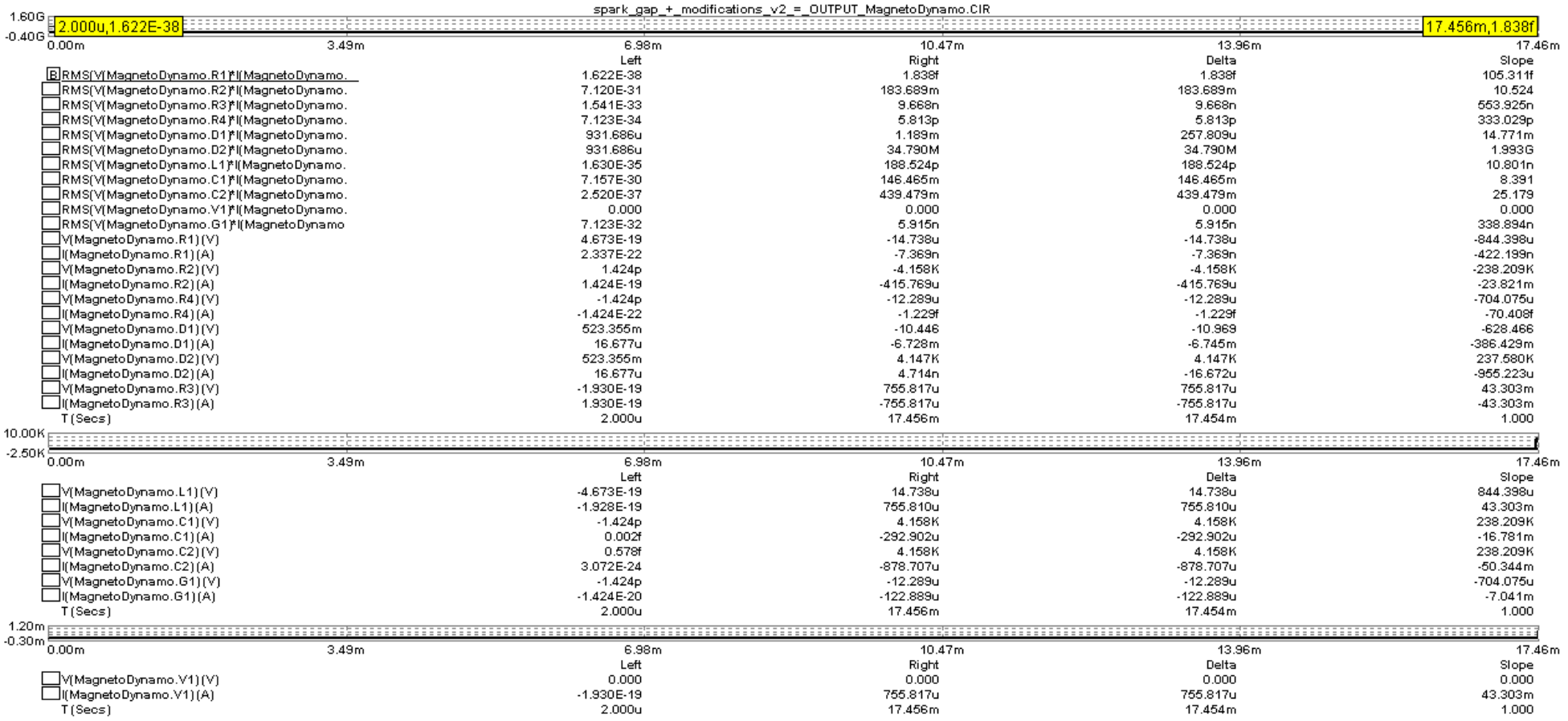

spark_gap_+_modifications_v2_=_OUTPUT_MagnetoDynamo.CIR
1.60G
-0.40G
2.000u,1.622E-38
17.456m,1.838f
0.00m
3.49m
6.98m
10.47m
13.96m
17.46m
Left
Right
Delta
Slope
RMS(V(MagnetoDynamo.R1)f(MagnetoDynamo. 1.622E-38 1.838f 1.838f 105.311f
RMS(V(MagnetoDynamo.R2)f(MagnetoDynamo. 7.120E-31 183.689m 183.689m 10.524
RMS(V(MagnetoDynamo.R3)f(MagnetoDynamo. 1.541E-33 9.668n 9.668n 553.925n
RMS(V(MagnetoDynamo.R4)f(MagnetoDynamo. 7.123E-34 5.813p 5.813p 333.029p
RMS(V(MagnetoDynamo.D1)f(MagnetoDynamo. 931.686u 1.189m 257.809u 14.771m
RMS(V(MagnetoDynamo.D2)f(MagnetoDynamo. 931.686u 34.790M 34.790M 1.993G
RMS(V(MagnetoDynamo.L1)f(MagnetoDynamo. 1.630E-35 188.524p 188.524p 10.801n
RMS(V(MagnetoDynamo.C1)f(MagnetoDynamo. 7.157E-30 146.465m 146.465m 8.391
RMS(V(MagnetoDynamo.C2)f(MagnetoDynamo. 2.520E-37 439.479m 439.479m 25.179
RMS(V(MagnetoDynamo.V1)f(MagnetoDynamo. 0.000 0.000 0.000 0.000
RMS(V(MagnetoDynamo.G1)f(MagnetoDynamo 7.123E-32 5.915n 5.915n 338.894n
V(MagnetoDynamo.R1)(V) 4.673E-19 -14.738u -14.738u -844.398u
I(MagnetoDynamo.R1)(A) 2.337E-22 -7.369n -7.369n -422.199n
V(MagnetoDynamo.R2)(V) 1.424p -4.158K -4.158K -238.209K
I(MagnetoDynamo.R2)(A) 1.424E-19 -415.769u -415.769u -23.821m
V(MagnetoDynamo.R4)(V) -1.424p -12.289u -12.289u -704.075u
I(MagnetoDynamo.R4)(A) -1.424E-22 -1.229f -1.229f -70.408f
V(MagnetoDynamo.D1)(V) 523.355m -10.446 -10.969 -628.466
I(MagnetoDynamo.D1)(A) 16.677u -6.728m -6.745m -386.429m
V(MagnetoDynamo.D2)(V) 523.355m 4.147K 4.147K 237.580K
I(MagnetoDynamo.D2)(A) 16.677u 4.714n -16.672u -955.223u
V(MagnetoDynamo.R3)(V) -1.930E-19 755.817u 755.817u 43.303m
I(MagnetoDynamo.R3)(A) 1.930E-19 -755.817u -755.817u -43.303m
T(Secs) 2.000u 17.456m 17.454m 1.000
10.00K
-2.50K
V(MagnetoDynamo.L1)(V) -4.673E-19 14.738u 14.738u 844.398u
I(MagnetoDynamo.L1)(A) -1.928E-19 755.810u 755.810u 43.303m
V(MagnetoDynamo.C1)(V) -1.424p 4.158K 4.158K 238.209K
I(MagnetoDynamo.C1)(A) 0.002f -292.902u -292.902u -16.781m
V(MagnetoDynamo.C2)(V) 0.578f 4.158K 4.158K 238.209K
I(MagnetoDynamo.C2)(A) 3.072E-24 -878.707u -878.707u -50.344m
V(MagnetoDynamo.G1)(V) -1.424p -12.289u -12.289u -704.075u
I(MagnetoDynamo.G1)(A) -1.424E-20 -122.889u -122.889u -7.041m
T(Secs) 2.000u 17.456m 17.454m 1.000
1.20m
-0.30m
V(MagnetoDynamo.V1)(V) 0.000 0.000 0.000 0.000
I(MagnetoDynamo.V1)(A) -1.930E-19 755.817u 755.817u 43.303m
T(Secs) 2.000u 17.456m 17.454m 1.000

FIG. 78

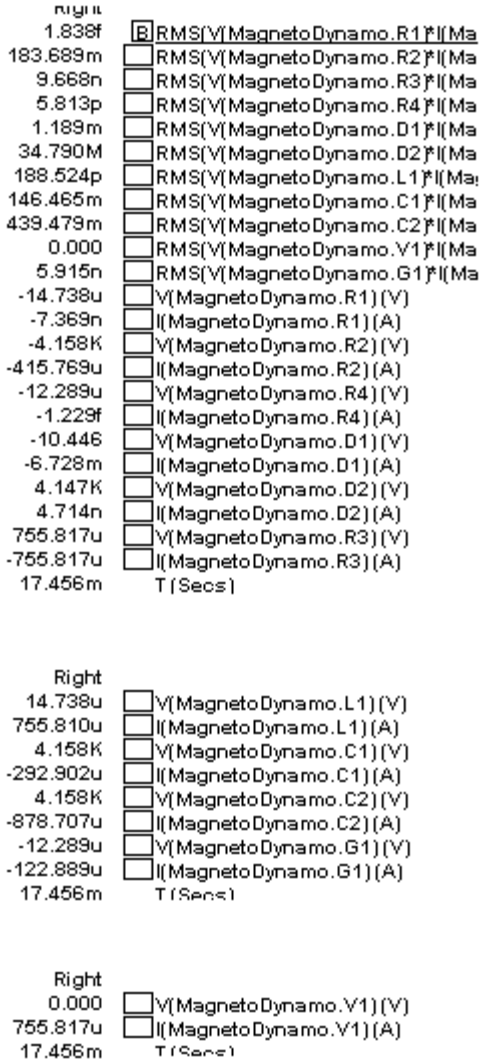

Right
1.838f
RMS(V(MagnetoDynamo.R1)*I(Ma
183.689m
RMS(V(MagnetoDynamo.R2)*I(Ma
9.668n
RMS(V(MagnetoDynamo.R3)*I(Ma
5.813p
RMS(V(MagnetoDynamo.R4)*I(Ma
1.189m
RMS(V(MagnetoDynamo.D1)*I(Ma
34.790M
RMS(V(MagnetoDynamo.D2)*I(Ma
188.524p
RMS(V(MagnetoDynamo.L1)*I(Ma
146.465m
RMS(V(MagnetoDynamo.C1)*I(Ma
439.479m
RMS(V(MagnetoDynamo.C2)*I(Ma
0.000
RMS(V(MagnetoDynamo.V1)*I(Ma
5.915n
RMS(V(MagnetoDynamo.G1)*I(Ma
-14.738u
V(MagnetoDynamo.R1)(V)
-7.369n
I(MagnetoDynamo.R1)(A)
-4.158K
V(MagnetoDynamo.R2)(V)
-415.769u
I(MagnetoDynamo.R2)(A)
-12.289u
V(MagnetoDynamo.R4)(V)
-1.229f
I(MagnetoDynamo.R4)(A)
-10.446
V(MagnetoDynamo.D1)(V)
-6.728m
I(MagnetoDynamo.D1)(A)
4.147K
V(MagnetoDynamo.D2)(V)
4.714n
I(MagnetoDynamo.D2)(A)
755.817u
V(MagnetoDynamo.R3)(V)
-755.817u
I(MagnetoDynamo.R3)(A)
17.456m
T(Secs)
Right
14.738u
V(MagnetoDynamo.L1)(V)
755.810u
I(MagnetoDynamo.L1)(A)
4.158K
V(MagnetoDynamo.C1)(V)
-292.902u
I(MagnetoDynamo.C1)(A)
4.158K
V(MagnetoDynamo.C2)(V)
-878.707u
I(MagnetoDynamo.C2)(A)
-12.289u
V(MagnetoDynamo.G1)(V)
-122.889u
I(MagnetoDynamo.G1)(A)
17.456m
T(Secs)
Right
0.000
V(MagnetoDynamo.V1)(V)
755.817u
I(MagnetoDynamo.V1)(A)
17.456m
T(Secs)

FIG. 79

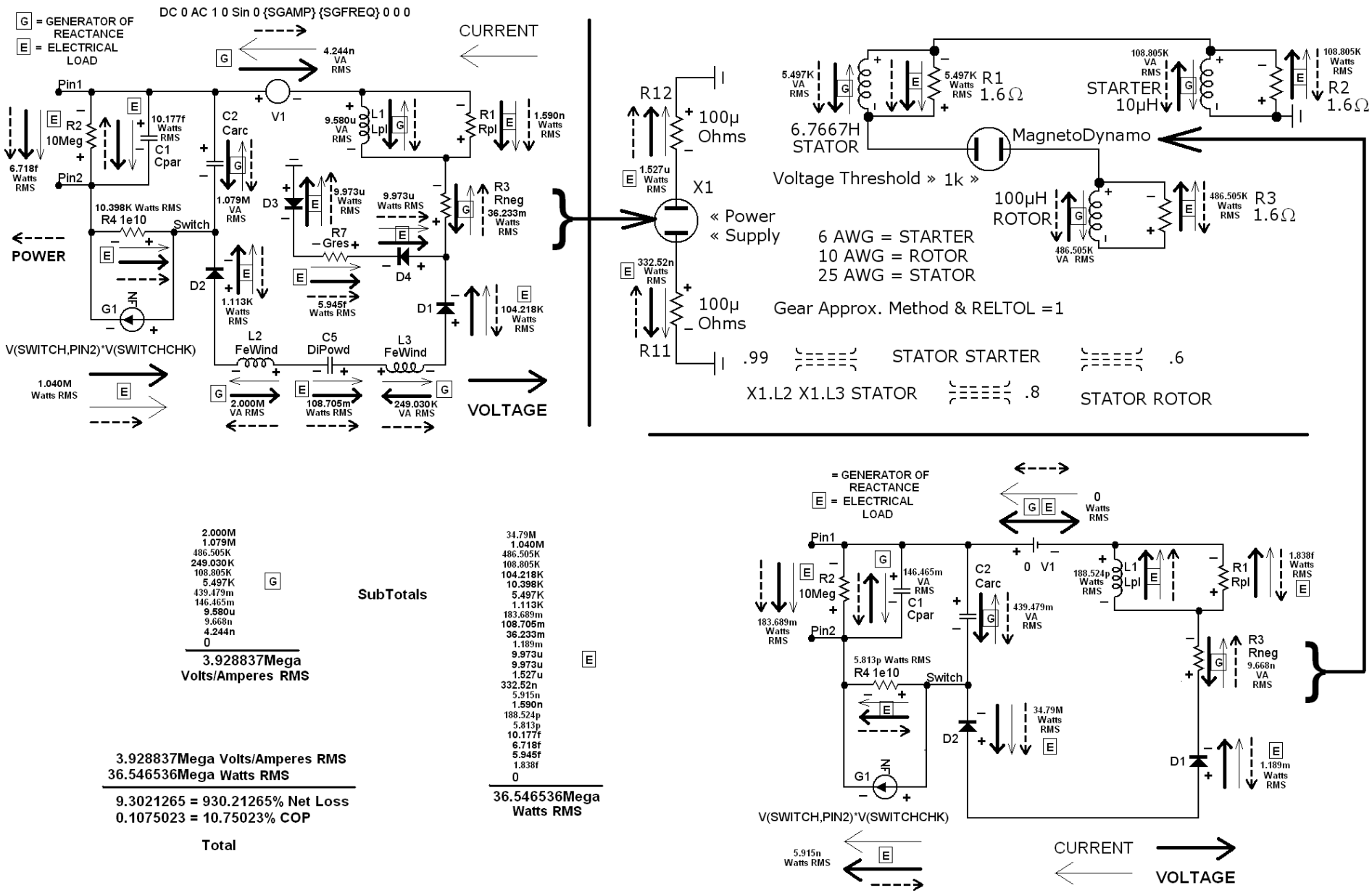

G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
DC 0 AC 1 0 Sin 0 {SGAMP} {SGFREQ} 0 0 0
CURRENT
4.244n VA RMS
Pin1
Pin2
R2 10Meg
6.718f Watts RMS
10.177f Watts RMS
C1 Cpar
C2 Carc
1.079M VA RMS
V1
9.580u VA RMS
L1 Lpl
R1 Rpl
1.590n Watts RMS
D3
9.973u Watts RMS
9.973u Watts RMS
R3 Rneg
36.233m Watts RMS
10.398K Watts RMS
R4 1e10
Switch
R7 Gres
POWER
D2
1.113K Watts RMS
5.945f Watts RMS
D4
D1
104.218K Watts RMS
G1
NI
V(SWITCH,PIN2)*V(SWITCHCHK)
L2 FeWind
C5 DiPowd
L3 FeWind
1.040M Watts RMS
2.000M VA RMS
108.705m Watts RMS
249.030K VA RMS
VOLTAGE
R12
100µ Ohms
1.527u Watts RMS
X1
« Power
« Supply
332.52n Watts RMS
100µ Ohms
R11
5.497K VA RMS
5.497K Watts RMS R1 1.6Ω
6.7667H STATOR
MagnetoDynamo
Voltage Threshold » 1k »
100µH ROTOR
486.505K VA RMS
486.505K Watts RMS R3 1.6Ω
108.805K VA RMS
108.805K Watts RMS
STARTER 10µH
R2 1.6Ω
6 AWG = STARTER
10 AWG = ROTOR
25 AWG = STATOR
Gear Approx. Method & RELTOL =1
.99
STATOR STARTER
.6
X1.L2 X1.L3 STATOR
.8
STATOR ROTOR
2.000M
1.079M
486.505K
249.030K
108.805K
5.497K
439.479m
146.465m
9.580u
9.668n
4.244n
0
3.928837Mega Volts/Amperes RMS
SubTotals
34.79M
1.040M
486.505K
108.805K
104.218K
10.398K
5.497K
1.113K
183.689m
108.705m
36.233m
1.189m
9.973u
9.973u
1.527u
332.52n
5.915n
1.590n
188.524p
5.813p
10.177f
6.718f
5.945f
1.838f
0
3.928837Mega Volts/Amperes RMS
36.546536Mega Watts RMS
9.3021265 = 930.21265% Net Loss
0.1075023 = 10.75023% COP
Total
36.546536Mega Watts RMS
= GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
0 Watts RMS
Pin1
Pin2
R2 10Meg
183.689m Watts RMS
146.465m VA RMS
C1 Cpar
C2 Carc
439.479m VA RMS
0 V1
188.524p Watts RMS
L1 Lpl
R1 Rpl
1.838f Watts RMS
5.813p Watts RMS
R4 1e10
Switch
R3 Rneg
9.668n VA RMS
34.79M Watts RMS
D2
D1
1.189m Watts RMS
G1
NI
V(SWITCH,PIN2)*V(SWITCHCHK)
5.915n Watts RMS
CURRENT
VOLTAGE

FIG. 80

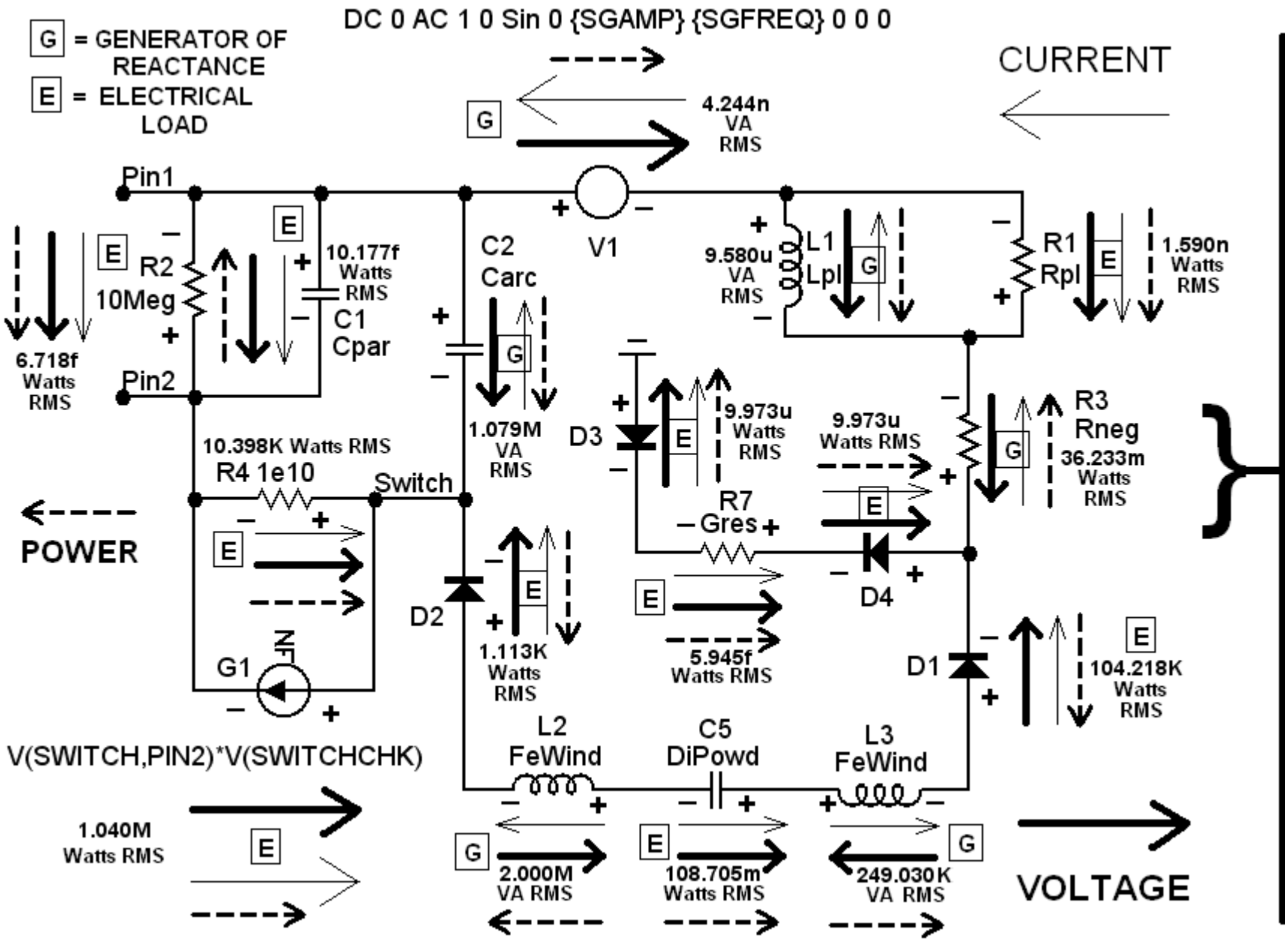

G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
DC 0 AC 1 0 Sin 0 {SGAMP} {SGFREQ} 0 0 0
CURRENT
4.244n VA RMS
Pin1
Pin2
R2 10Meg
10.177f Watts RMS
C1 Cpar
6.718f Watts RMS
C2 Carc
1.079M VA RMS
V1
9.580u VA RMS
L1 Lpl
R1 Rpl
1.590n Watts RMS
D3
9.973u Watts RMS
9.973u Watts RMS
R3 Rneg
36.233m Watts RMS
10.398K Watts RMS
R4 1e10
Switch
R7 Gres
POWER
D2
1.113K Watts RMS
5.945f Watts RMS
D4
D1
104.218K Watts RMS
G1
V(SWITCH,PIN2)*V(SWITCHCHK)
L2 FeWind
C5 DiPowd
L3 FeWind
1.040M Watts RMS
2.000M VA RMS
108.705m Watts RMS
249.030K VA RMS
VOLTAGE

FIG. 81

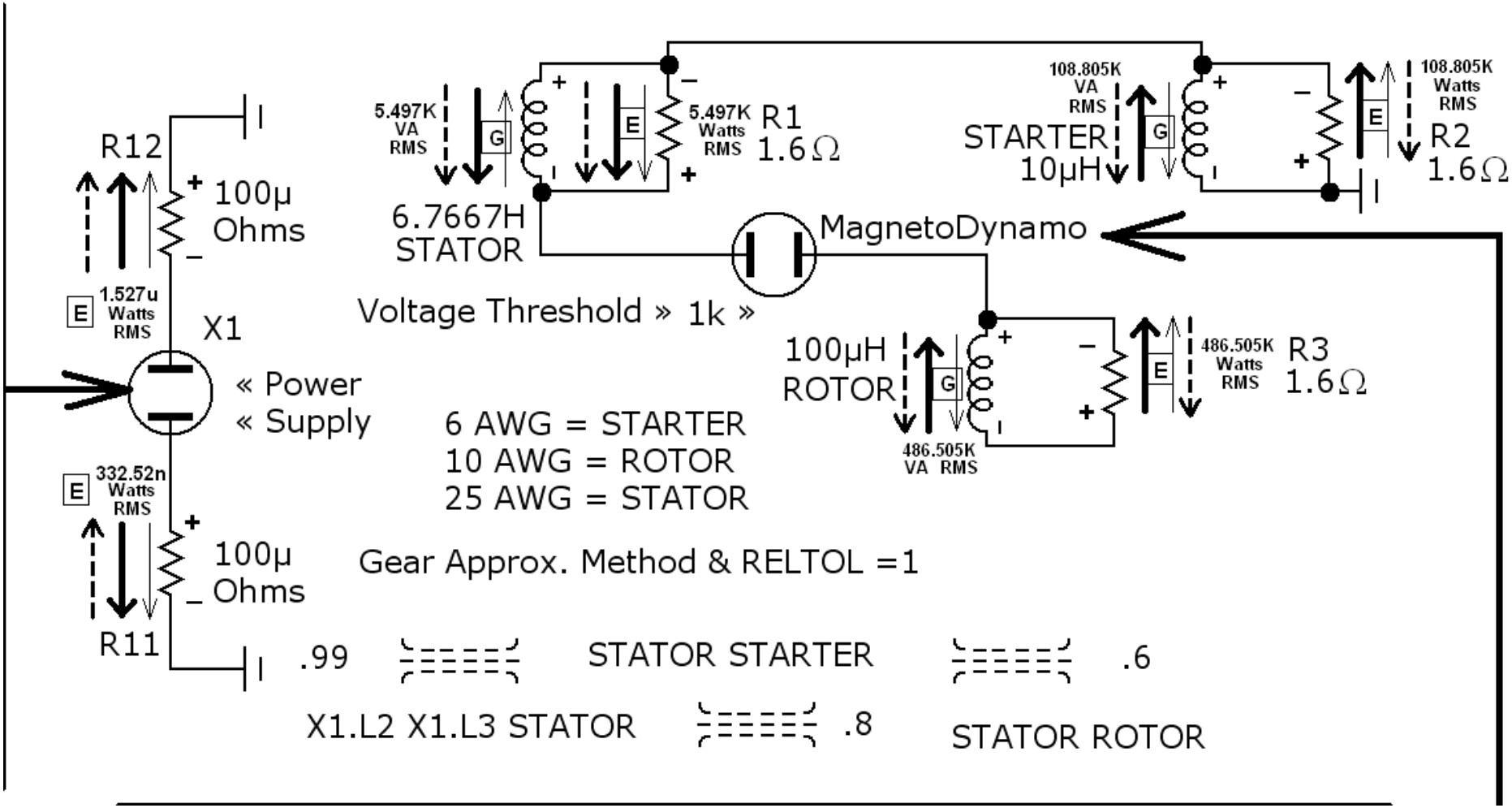

R12
100µ
Ohms
1.527u
Watts
RMS
X1
« Power
« Supply
332.52n
Watts
RMS
100µ
Ohms
R11
5.497K
VA
RMS
5.497K
Watts
RMS
R1
1.6Ω
6.7667H
STATOR
108.805K
VA
RMS
STARTER
10µH
108.805K
Watts
RMS
R2
1.6Ω
MagnetoDynamo
Voltage Threshold » 1k »
100µH
ROTOR
486.505K
VA RMS
486.505K
Watts
RMS
R3
1.6Ω
6 AWG = STARTER
10 AWG = ROTOR
25 AWG = STATOR
Gear Approx. Method & RELTOL =1
.99
STATOR STARTER
.6
X1.L2 X1.L3 STATOR
.8
STATOR ROTOR

FIG. 82

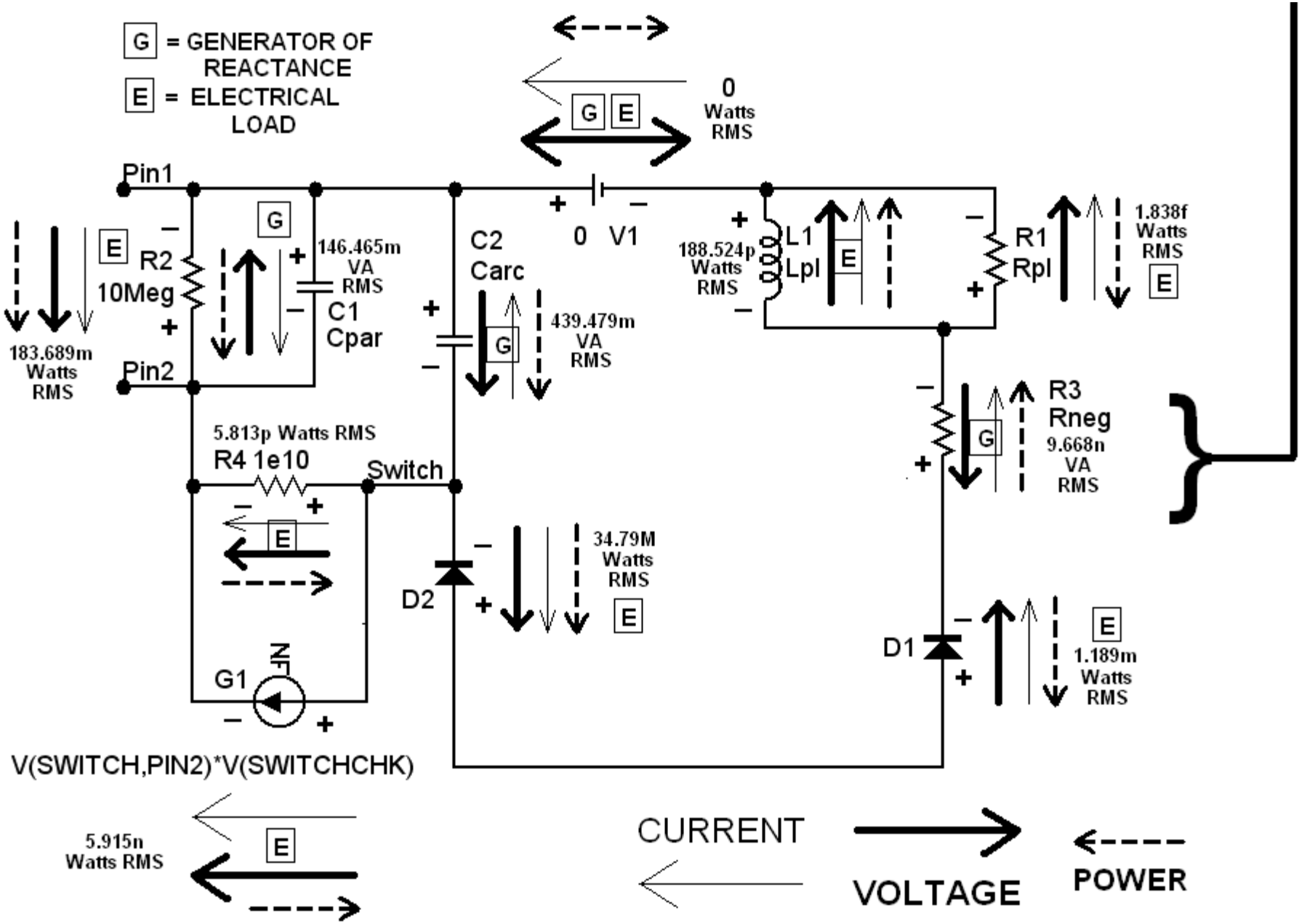

G = GENERATOR OF REACTANCE
E = ELECTRICAL LOAD
0 Watts RMS
Pin1
Pin2
R2 10Meg
183.689m Watts RMS
146.465m VA RMS
C1 Cpar
C2 Carc
0 V1
439.479m VA RMS
188.524p Watts RMS
L1 Lpl
R1 Rpl
1.838f Watts RMS
R3 Rneg
9.668n VA RMS
5.813p Watts RMS
R4 1e10
Switch
34.79M Watts RMS
D2
D1
1.189m Watts RMS
G1
V(SWITCH,PIN2)*V(SWITCHCHK)
5.915n Watts RMS
CURRENT
VOLTAGE
POWER

FIG. 83

2.000M
1.079M
486.505K
249.030K
108.805K
5.497K
439.479m
146.465m
9.580u
9.668n
4.244n
0

G

3.928837Mega
Volts/Amperes RMS

SubTotals

34.79M
1.040M
486.505K
108.805K
104.218K
10.398K
5.497K
1.113K
183.689m
108.705m
36.233m
1.189m
9.973u
9.973u
1.527u
332.52n
5.915n
1.590n
188.524p
5.813p
10.177f
6.718f
5.945f
1.838f
0

E

36.546536Mega
Watts RMS

3.928837Mega Volts/Amperes RMS
36.546536Mega Watts RMS

9.3021265 = 930.21265% Net Loss
0.1075023 = 10.75023% COP

Total

FIG. 84

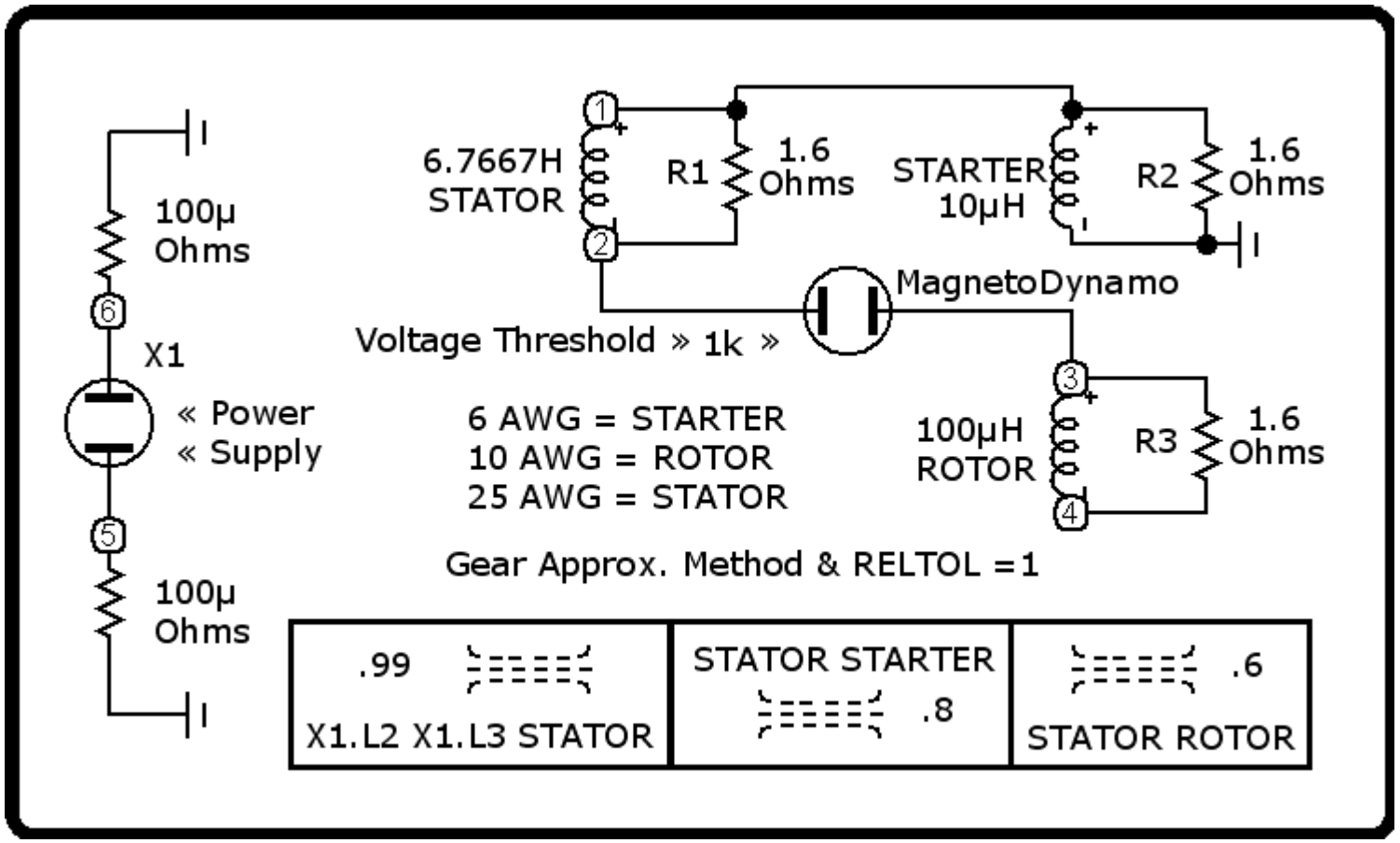

100µ
Ohms
6
X1
« Power
« Supply
5
100µ
Ohms
6.7667H
STATOR
1
2
R1
1.6
Ohms
STARTER
10µH
R2
1.6
Ohms
MagnetoDynamo
Voltage Threshold » 1k »
6 AWG = STARTER
10 AWG = ROTOR
25 AWG = STATOR
3
100µH
ROTOR
4
R3
1.6
Ohms
Gear Approx. Method & RELTOL =1
.99
X1.L2 X1.L3 STATOR
STATOR STARTER
.8
.6
STATOR ROTOR

FIG. 85

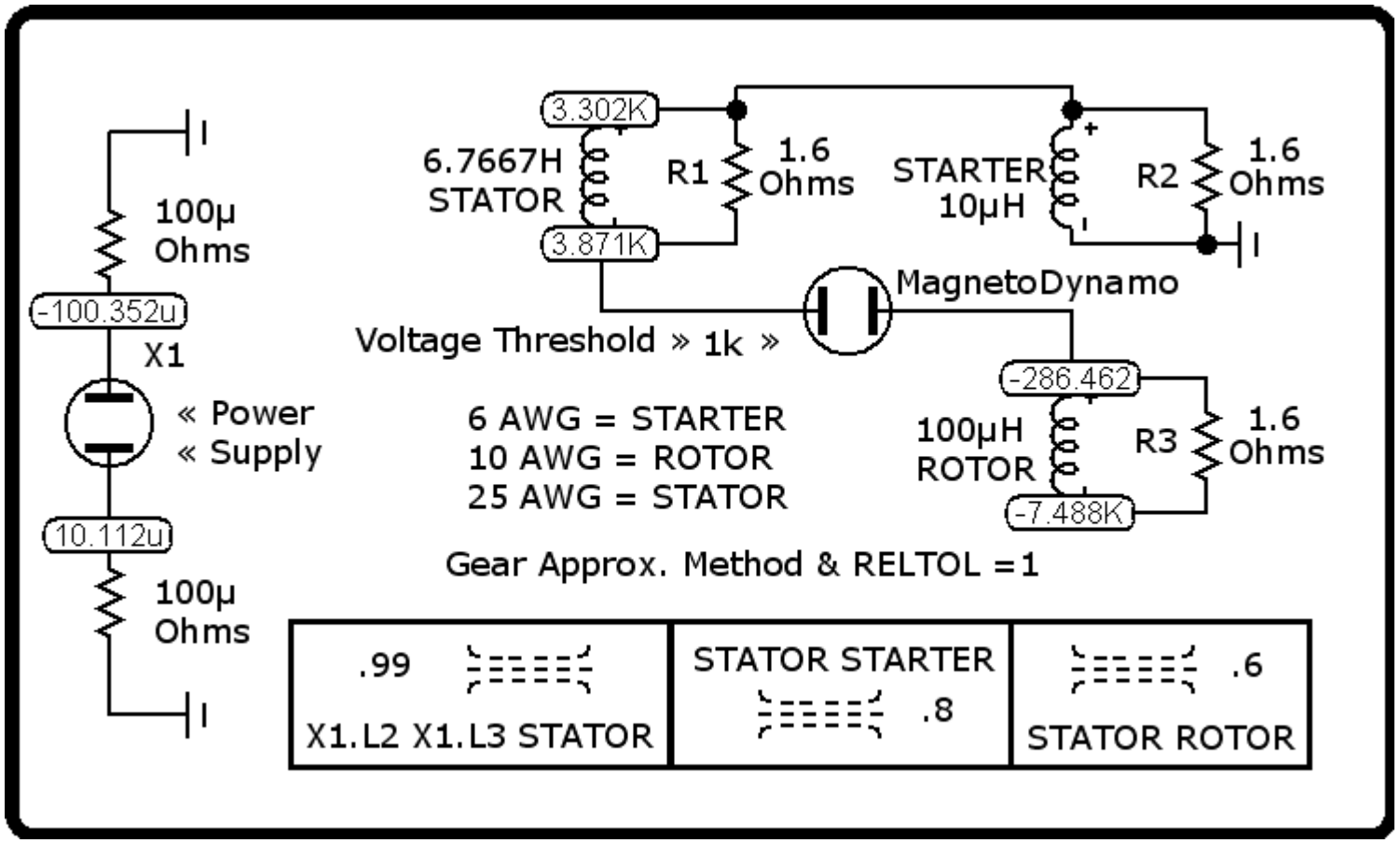
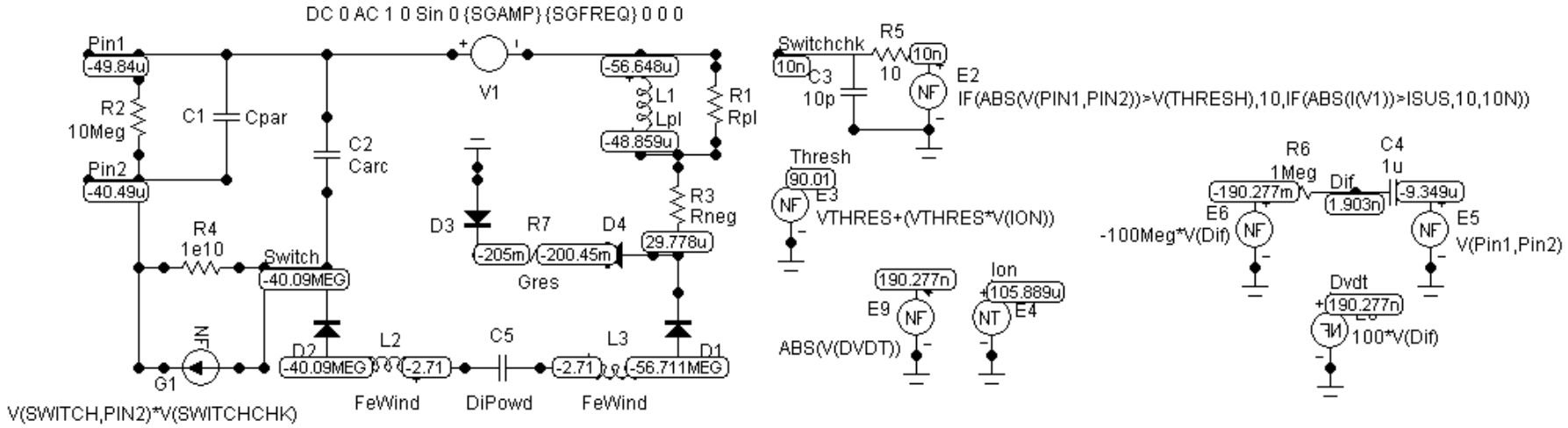

100µ
Ohms
-100.352u
X1
« Power
« Supply
10.112u
100µ
Ohms
3.302K
6.7667H
STATOR
R1
1.6
Ohms
3.871K
STARTER
10µH
R2
1.6
Ohms
MagnetoDynamo
Voltage Threshold » 1k »
-286.462
100µH
ROTOR
R3
1.6
Ohms
-7.488K
6 AWG = STARTER
10 AWG = ROTOR
25 AWG = STATOR
Gear Approx. Method & RELTOL =1
.99
X1.L2 X1.L3 STATOR
STATOR STARTER
.8
.6
STATOR ROTOR

FIG. 86

GROUNDED & BENT IN THE MIDDLE, NEON-FILLED, COPPER TUBING, FREQUENCY & AMPLITUDE MODULATED, SURROUNDED BY AN IRON WINDING REPRESENTS A PAIR OF INVERTED COILS » L2 & L3, & FILLED WITH POWDERED TANTALUM OR ALUMINA IS CAPACITOR » C5.

.PARAMETERS(FEWIND=1e6,DIPOWD=1e30,DIMAT=3,GRES=1e10,SGFREQ=1e4,SGAMP=1F,VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)



.HELP FEWIND "Inductance of L2 and L3, of inverted windings and undefined series resistance, is an iron coil surrounding a bent-in-the-middle copper tube filled with neon gas."
.HELP DIPOWD "Capacitance of C5 suffuses the interior of this neon bulb, spark gap."
.HELP DIMAT "Equivalent series resistance of the dielectric material within C5 defaults to 3 Ohms (analogous to tantalum or alumina dielectric)."

16 micrometers of neon gas and powdered iron and powdered tantalum or alumina (aluminum oxide) between two electrodes is Nikola Tesla's TriMetal Generator. It is assumed that X1.L2 and X1.L3, within this macro, will be magnetically coupled to another inductor, outside this macro, from within a circuit which uses this spark gap. This prevents suppression of over-reactance by electrically isolating the spark gap from the load.

.HELP SGFREQ "Frequency of sine wave input into spark gap, neon bulb"
.HELP SGAMP "Amplitude of sine wave input into spark gap, neon bulb"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 87

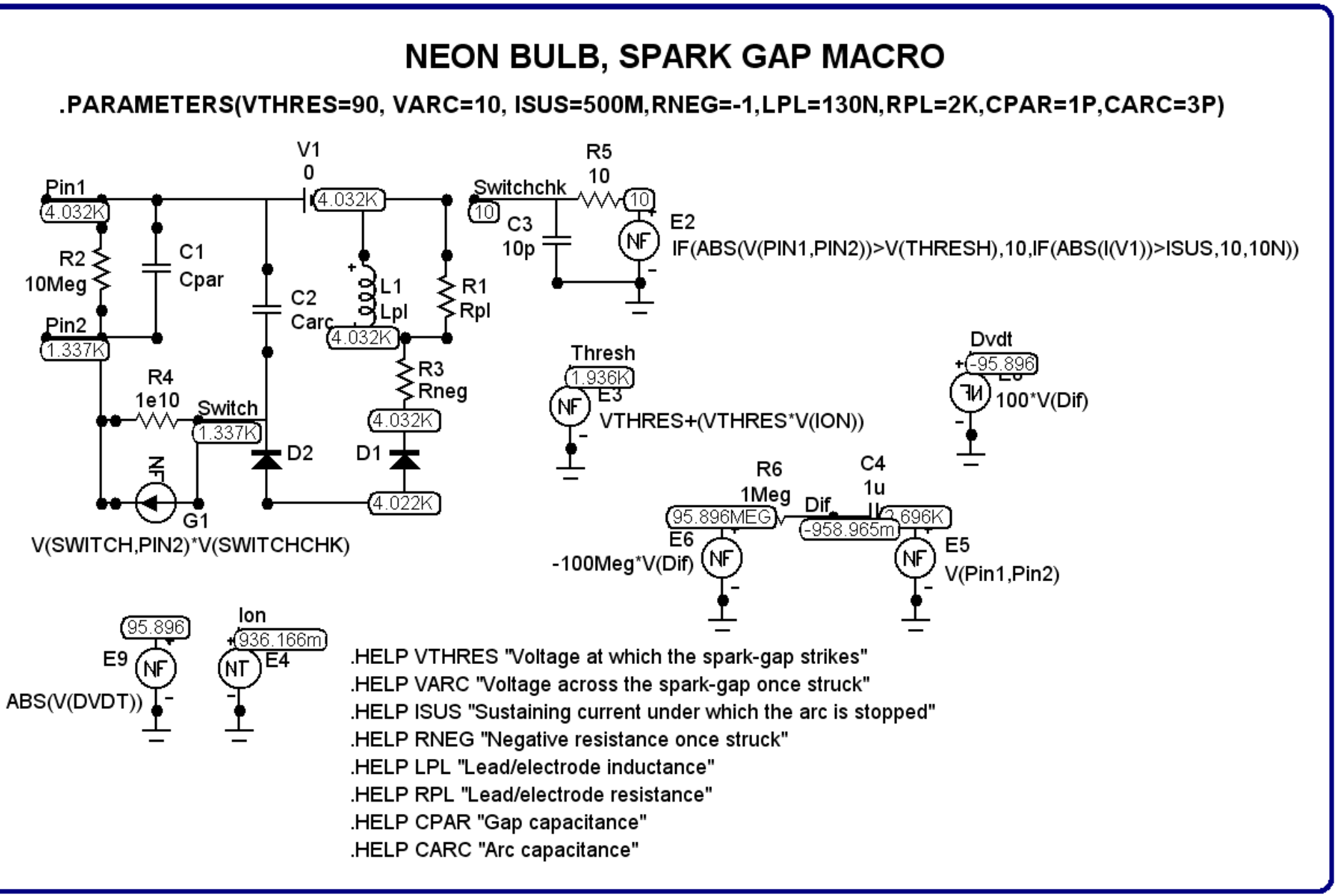

NEON BULB, SPARK GAP MACRO
.PARAMETERS(VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)
V1
0
Pin1
4.032K
R2
10Meg
C1
Cpar
Pin2
1.337K
C2
Carc
L1
Lpl
4.032K
R1
Rpl
R3
Rneg
4.032K
R4
1e10
Switch
1.337K
D2
D1
4.022K
G1
V(SWITCH,PIN2)*V(SWITCHCHK)
R5
10
Switchchk
10
C3
10p
E2
IF(ABS(V(PIN1,PIN2))>V(THRESH),10,IF(ABS(I(V1))>ISUS,10,10N))
Thresh
1.936K
E3
VTHRES+(VTHRES*V(ION))
Dvdt
-95.896
100*V(Dif)
R6
1Meg
C4
1u
Dif
95.896MEG
-958.965m
E6
-100Meg*V(Dif)
E5
V(Pin1,Pin2)
95.896
E9
ABS(V(DVDT))
Ion
936.166m
E4
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 88

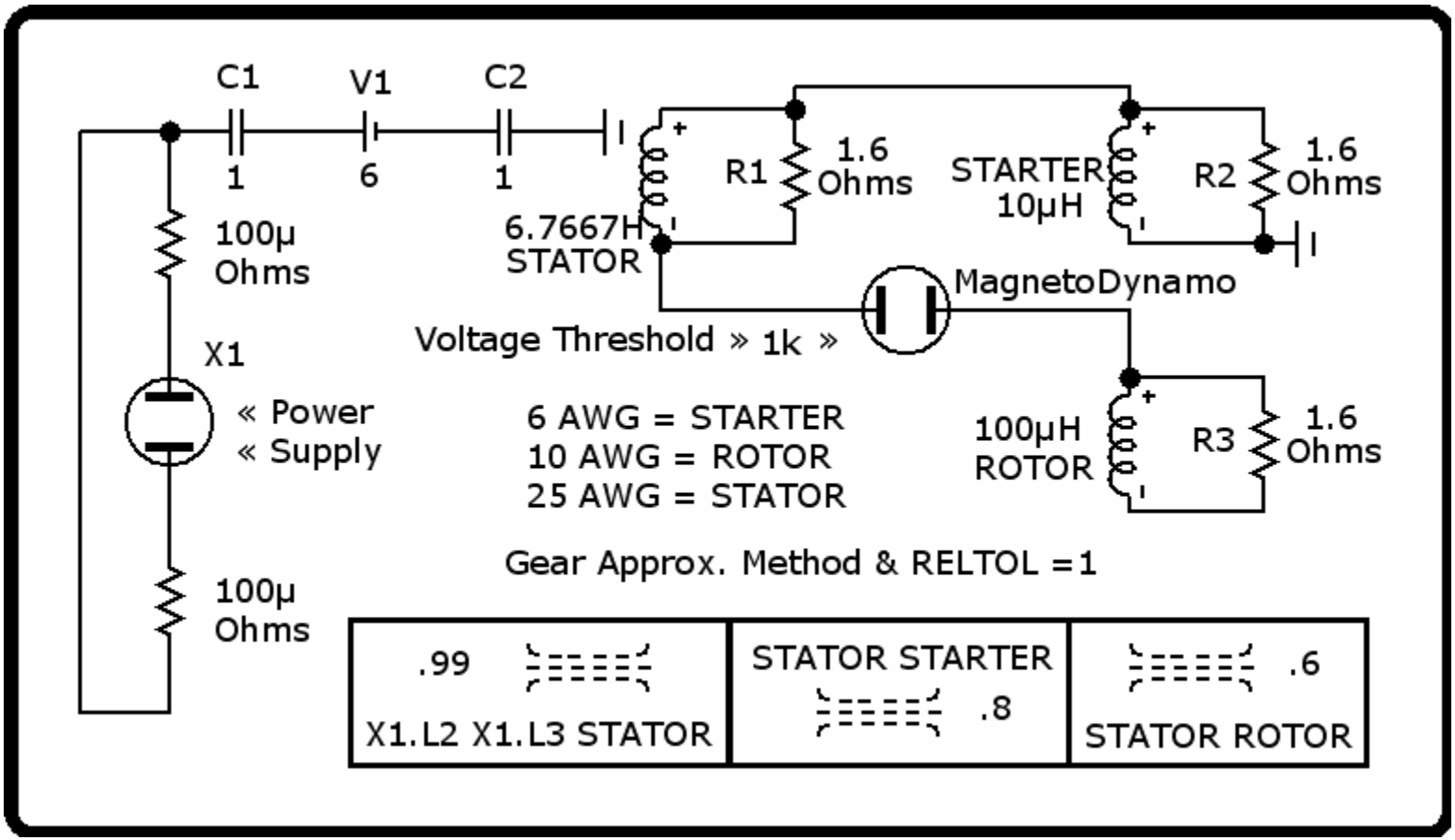

C1
V1
C2
1
6
1
100µ
Ohms
X1
« Power
« Supply
100µ
Ohms
6.7667H
STATOR
R1
1.6
Ohms
STARTER
10µH
R2
1.6
Ohms
MagnetoDynamo
Voltage Threshold » 1k »
6 AWG = STARTER
10 AWG = ROTOR
25 AWG = STATOR
100µH
ROTOR
R3
1.6
Ohms
Gear Approx. Method & RELTOL =1
.99
X1.L2 X1.L3 STATOR
STATOR STARTER
.8
.6
STATOR ROTOR

FIG. 89

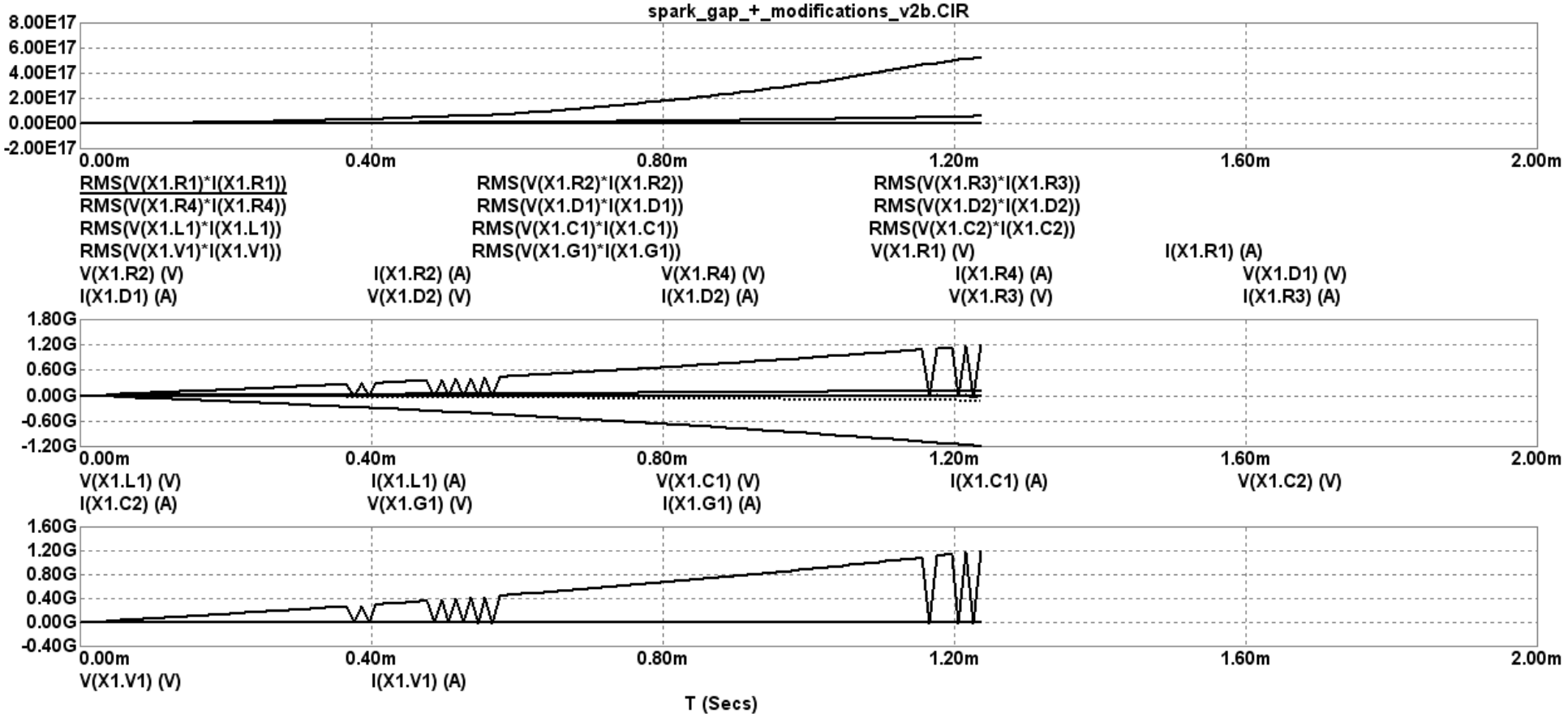

spark_gap_+_modifications_v2b.CIR
8.00E17
6.00E17
4.00E17
2.00E17
0.00E00
-2.00E17
0.00m
0.40m
0.80m
1.20m
1.60m
2.00m
RMS(V(X1.R1)*I(X1.R1))
RMS(V(X1.R2)*I(X1.R2))
RMS(V(X1.R3)*I(X1.R3))
RMS(V(X1.R4)*I(X1.R4))
RMS(V(X1.D1)*I(X1.D1))
RMS(V(X1.D2)*I(X1.D2))
RMS(V(X1.L1)*I(X1.L1))
RMS(V(X1.C1)*I(X1.C1))
RMS(V(X1.C2)*I(X1.C2))
RMS(V(X1.V1)*I(X1.V1))
RMS(V(X1.G1)*I(X1.G1))
V(X1.R1) (V)
I(X1.R1) (A)
V(X1.R2) (V)
I(X1.R2) (A)
V(X1.R4) (V)
I(X1.R4) (A)
V(X1.D1) (V)
I(X1.D1) (A)
V(X1.D2) (V)
I(X1.D2) (A)
V(X1.R3) (V)
I(X1.R3) (A)
1.80G
1.20G
0.60G
0.00G
-0.60G
-1.20G
V(X1.L1) (V)
I(X1.L1) (A)
V(X1.C1) (V)
I(X1.C1) (A)
V(X1.C2) (V)
I(X1.C2) (A)
V(X1.G1) (V)
I(X1.G1) (A)
1.60G
1.20G
0.80G
0.40G
0.00G
-0.40G
V(X1.V1) (V)
I(X1.V1) (A)
T (Secs)

FIG. 90

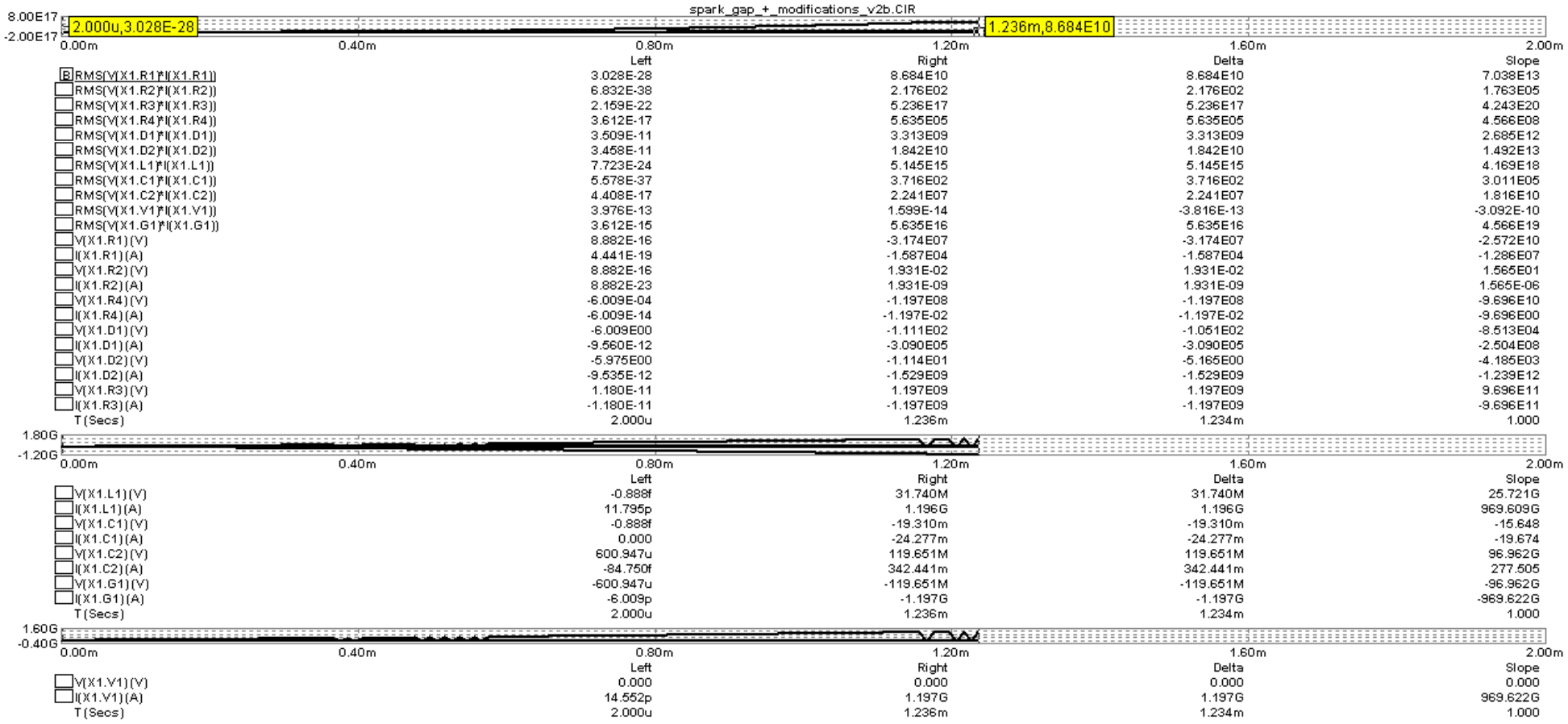

spark_gap_+_modifications_v2b.CIR
8.00E17
-2.00E17
2.000u,3.028E-28
1.236m,8.684E10
0.00m
0.40m
0.80m
1.20m
1.60m
2.00m
Left
Right
Delta
Slope
RMS(V(X1.R1)*I(X1.R1)) 3.028E-28 8.684E10 8.684E10 7.038E13
RMS(V(X1.R2)*I(X1.R2)) 6.832E-38 2.176E02 2.176E02 1.763E05
RMS(V(X1.R3)*I(X1.R3)) 2.159E-22 5.236E17 5.236E17 4.243E20
RMS(V(X1.R4)*I(X1.R4)) 3.612E-17 5.635E05 5.635E05 4.566E08
RMS(V(X1.D1)*I(X1.D1)) 3.509E-11 3.313E09 3.313E09 2.685E12
RMS(V(X1.D2)*I(X1.D2)) 3.458E-11 1.842E10 1.842E10 1.492E13
RMS(V(X1.L1)*I(X1.L1)) 7.723E-24 5.145E15 5.145E15 4.169E18
RMS(V(X1.C1)*I(X1.C1)) 5.578E-37 3.716E02 3.716E02 3.011E05
RMS(V(X1.C2)*I(X1.C2)) 4.408E-17 2.241E07 2.241E07 1.816E10
RMS(V(X1.V1)*I(X1.V1)) 3.976E-13 1.599E-14 -3.816E-13 -3.092E-10
RMS(V(X1.G1)*I(X1.G1)) 3.612E-15 5.635E16 5.635E16 4.566E19
V(X1.R1)(V) 8.882E-16 -3.174E07 -3.174E07 -2.572E10
I(X1.R1)(A) 4.441E-19 -1.587E04 -1.587E04 -1.286E07
V(X1.R2)(V) 8.882E-16 1.931E-02 1.931E-02 1.565E01
I(X1.R2)(A) 8.882E-23 1.931E-09 1.931E-09 1.565E-06
V(X1.R4)(V) -6.009E-04 -1.197E08 -1.197E08 -9.696E10
I(X1.R4)(A) -6.009E-14 -1.197E-02 -1.197E-02 -9.696E00
V(X1.D1)(V) -6.009E00 -1.111E02 -1.051E02 -8.513E04
I(X1.D1)(A) -9.560E-12 -3.090E05 -3.090E05 -2.504E08
V(X1.D2)(V) -5.975E00 -1.114E01 -5.165E00 -4.185E03
I(X1.D2)(A) -9.535E-12 -1.529E09 -1.529E09 -1.239E12
V(X1.R3)(V) 1.180E-11 1.197E09 1.197E09 9.696E11
I(X1.R3)(A) -1.180E-11 -1.197E09 -1.197E09 -9.696E11
T(Secs) 2.000u 1.236m 1.234m 1.000
1.80G
-1.20G
V(X1.L1)(V) -0.888f 31.740M 31.740M 25.721G
I(X1.L1)(A) 11.795p 1.196G 1.196G 969.609G
V(X1.C1)(V) -0.888f -19.310m -19.310m -15.648
I(X1.C1)(A) 0.000 -24.277m -24.277m -19.674
V(X1.C2)(V) 600.947u 119.651M 119.651M 96.962G
I(X1.C2)(A) -84.750f 342.441m 342.441m 277.505
V(X1.G1)(V) -600.947u -119.651M -119.651M -96.962G
I(X1.G1)(A) -6.009p -1.197G -1.197G -969.622G
T(Secs) 2.000u 1.236m 1.234m 1.000
1.60G
-0.40G
V(X1.V1)(V) 0.000 0.000 0.000 0.000
I(X1.V1)(A) 14.552p 1.197G 1.197G 969.622G
T(Secs) 2.000u 1.236m 1.234m 1.000

FIG. 91

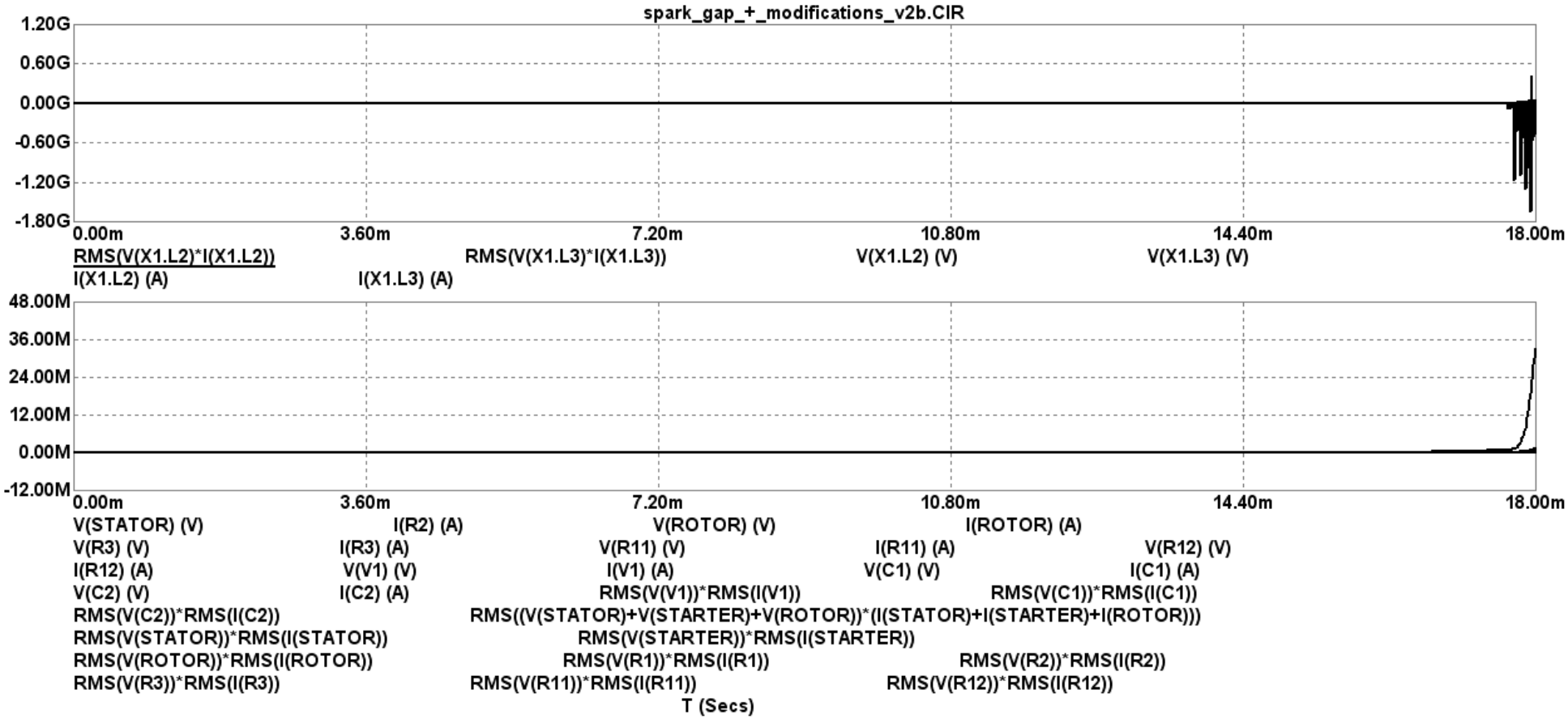
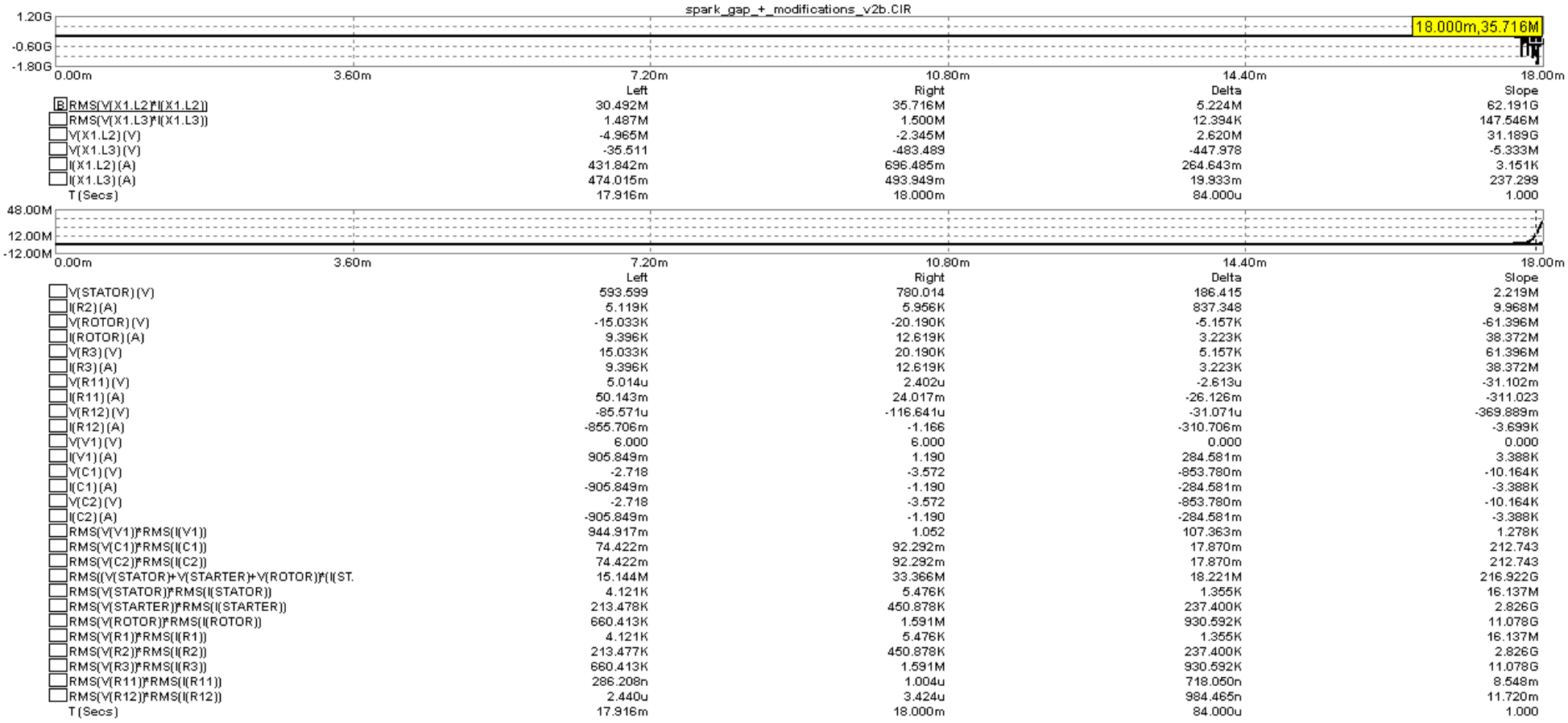

spark_gap_+_modifications_v2b.CIR
1.20G
0.60G
0.00G
-0.60G
-1.20G
-1.80G
0.00m
3.60m
7.20m
10.80m
14.40m
18.00m
RMS(V(X1.L2)*I(X1.L2))
RMS(V(X1.L3)*I(X1.L3))
V(X1.L2) (V)
V(X1.L3) (V)
I(X1.L2) (A)
I(X1.L3) (A)
48.00M
36.00M
24.00M
12.00M
0.00M
-12.00M
0.00m
3.60m
7.20m
10.80m
14.40m
18.00m
V(STATOR) (V)
I(R2) (A)
V(ROTOR) (V)
I(ROTOR) (A)
V(R3) (V)
I(R3) (A)
V(R11) (V)
I(R11) (A)
V(R12) (V)
I(R12) (A)
V(V1) (V)
I(V1) (A)
V(C1) (V)
I(C1) (A)
V(C2) (V)
I(C2) (A)
RMS(V(V1))*RMS(I(V1))
RMS(V(C1))*RMS(I(C1))
RMS(V(C2))*RMS(I(C2))
RMS((V(STATOR)+V(STARTER)+V(ROTOR))*(I(STATOR)+I(STARTER)+I(ROTOR)))
RMS(V(STATOR))*RMS(I(STATOR))
RMS(V(STARTER))*RMS(I(STARTER))
RMS(V(ROTOR))*RMS(I(ROTOR))
RMS(V(R1))*RMS(I(R1))
RMS(V(R2))*RMS(I(R2))
RMS(V(R3))*RMS(I(R3))
RMS(V(R11))*RMS(I(R11))
RMS(V(R12))*RMS(I(R12))
T (Secs)

FIG. 92



	Left	Right	Delta	Slope
RMS(V(X1.L2)*I(X1.L2))	30.492M	35.716M	5.224M	62.191G
RMS(V(X1.L3)*I(X1.L3))	1.487M	1.500M	12.394K	147.546M
V(X1.L2) (V)	-4.965M	-2.345M	2.620M	31.189G
V(X1.L3) (V)	-35.511	-483.489	-447.978	-5.333M
I(X1.L2) (A)	431.842m	696.485m	264.643m	3.151K
I(X1.L3) (A)	474.015m	493.949m	19.933m	237.299
T (Secs)	17.916m	18.000m	84.000u	1.000
V(STATOR) (V)	593.599	780.014	186.415	2.219M
I(R2) (A)	5.119K	5.956K	837.348	9.968M
V(ROTOR) (V)	-15.033K	-20.190K	-5.157K	-61.396M
I(ROTOR) (A)	9.396K	12.619K	3.223K	38.372M
V(R3) (V)	15.033K	20.190K	5.157K	61.396M
I(R3) (A)	9.396K	12.619K	3.223K	38.372M
V(R11) (V)	5.014u	2.402u	-2.613u	-31.102m
I(R11) (A)	50.143m	24.017m	-26.126m	-311.023
V(R12) (V)	-85.571u	-116.641u	-31.071u	-369.889m
I(R12) (A)	-855.706m	-1.166	-310.706m	-3.699K
V(V1) (V)	6.000	6.000	0.000	0.000
I(V1) (A)	905.849m	1.190	284.581m	3.388K
V(C1) (V)	-2.718	-3.572	-853.780m	-10.164K
I(C1) (A)	-905.849m	-1.190	-284.581m	-3.388K
V(C2) (V)	-2.718	-3.572	-853.780m	-10.164K
I(C2) (A)	-905.849m	-1.190	-284.581m	-3.388K
RMS(V(V1)*RMS(I(V1))	944.917m	1.052	107.363m	1.278K
RMS(V(C1)*RMS(I(C1))	74.422m	92.292m	17.870m	212.743
RMS(V(C2)*RMS(I(C2))	74.422m	92.292m	17.870m	212.743
RMS((V(STATOR)+V(STARTER)+V(ROTOR))*(I(ST.	15.144M	33.366M	18.221M	216.922G
RMS(V(STATOR)*RMS(I(STATOR))	4.121K	5.476K	1.355K	16.137M
RMS(V(STARTER)*RMS(I(STARTER))	213.478K	450.878K	237.400K	2.826G
RMS(V(ROTOR)*RMS(I(ROTOR))	660.413K	1.591M	930.592K	11.078G
RMS(V(R1)*RMS(I(R1))	4.121K	5.476K	1.355K	16.137M
RMS(V(R2)*RMS(I(R2))	213.477K	450.878K	237.400K	2.826G
RMS(V(R3)*RMS(I(R3))	660.413K	1.591M	930.592K	11.078G
RMS(V(R11)*RMS(I(R11))	286.208n	1.004u	718.050n	8.548m
RMS(V(R12)*RMS(I(R12))	2.440u	3.424u	984.465n	11.720m
T (Secs)	17.916m	18.000m	84.000u	1.000

FIG. 93

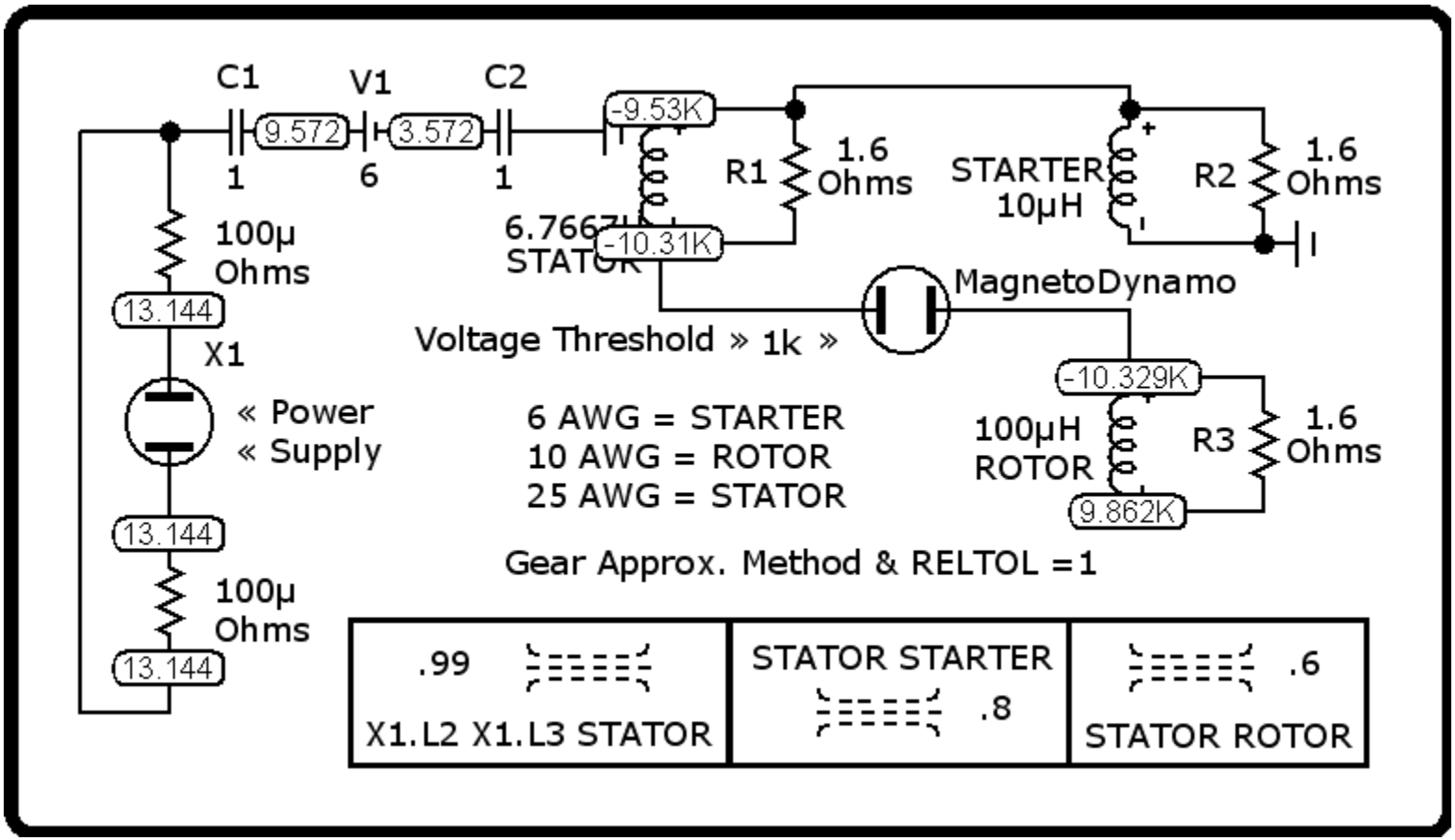

C1
V1
C2
9.572
3.572
1
6
1
-9.53K
R1
1.6
Ohms
STARTER
10µH
R2
1.6
Ohms
100µ
Ohms
6.766µH
STATOR
-10.31K
MagnetoDynamo
13.144
X1
Voltage Threshold » 1k »
« Power
« Supply
6 AWG = STARTER
10 AWG = ROTOR
25 AWG = STATOR
-10.329K
100µH
ROTOR
R3
1.6
Ohms
9.862K
13.144
Gear Approx. Method & RELTOL =1
100µ
Ohms
13.144
.99
X1.L2 X1.L3 STATOR
STATOR STARTER
.8
.6
STATOR ROTOR

FIG. 94

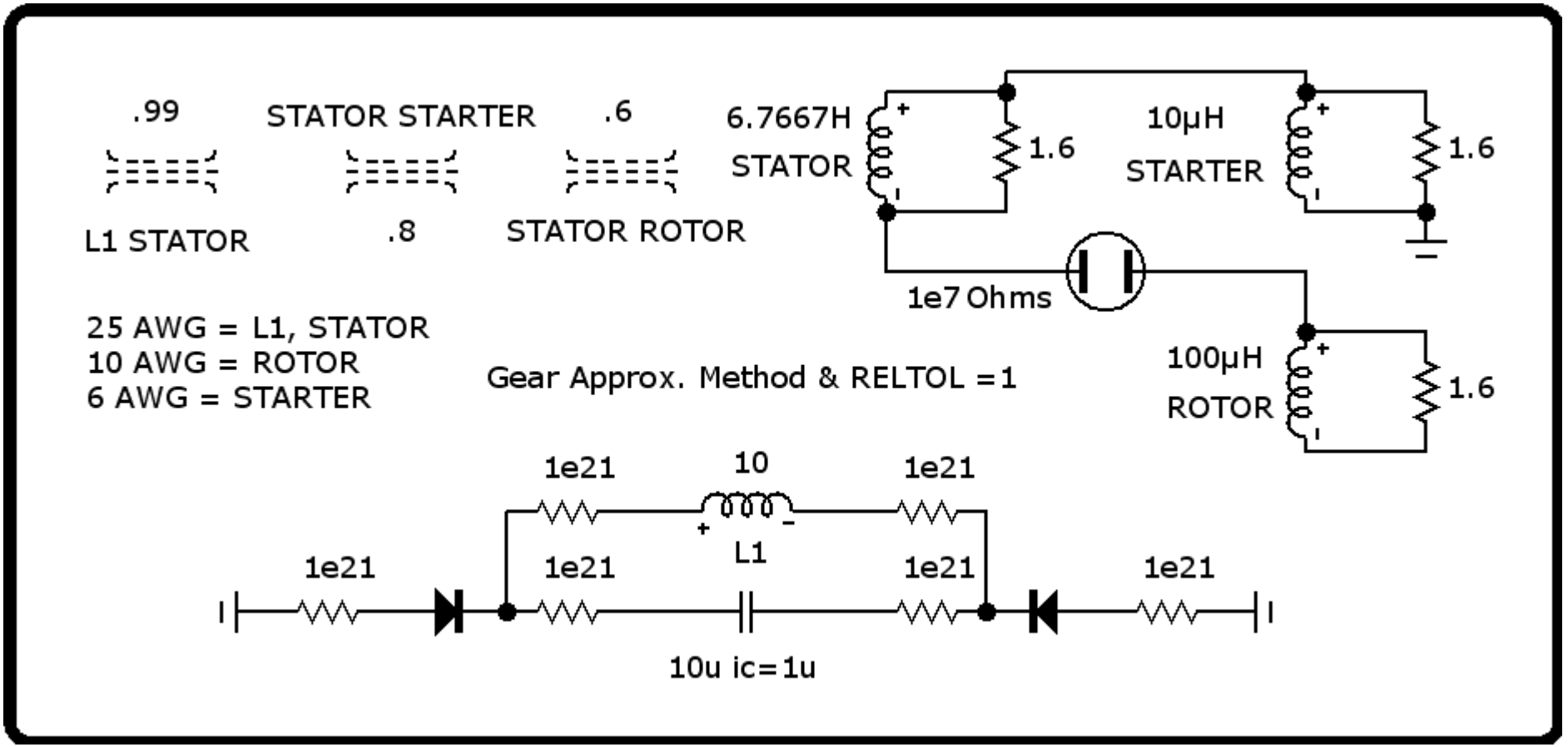

.99
STATOR STARTER
.6
L1 STATOR
.8
STATOR ROTOR
6.7667H
STATOR
1.6
10µH
STARTER
1.6
1e7 Ohms
100µH
ROTOR
1.6
25 AWG = L1, STATOR
10 AWG = ROTOR
6 AWG = STARTER
Gear Approx. Method & RELTOL =1
1e21
10
1e21
L1
1e21
1e21
1e21
1e21
10u ic=1u

FIG. 95

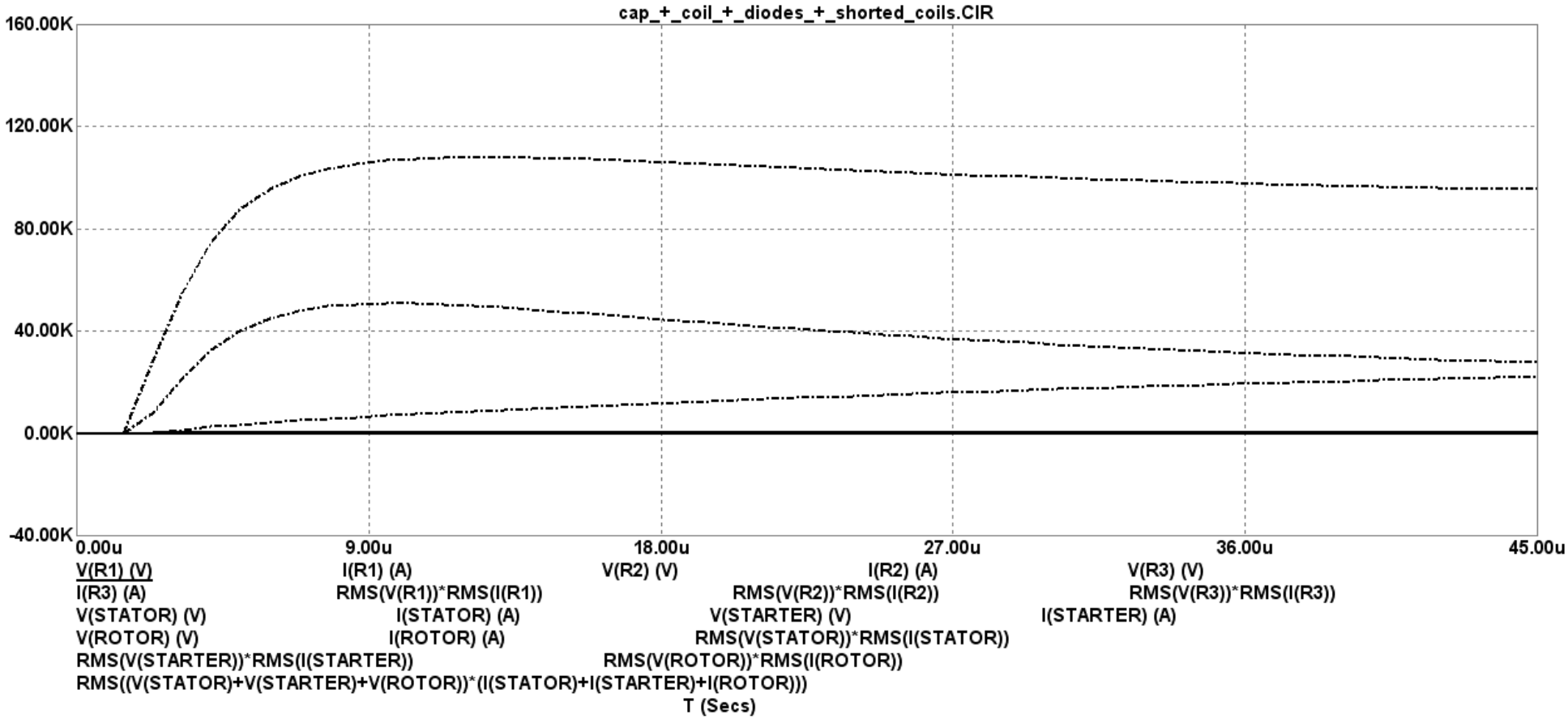
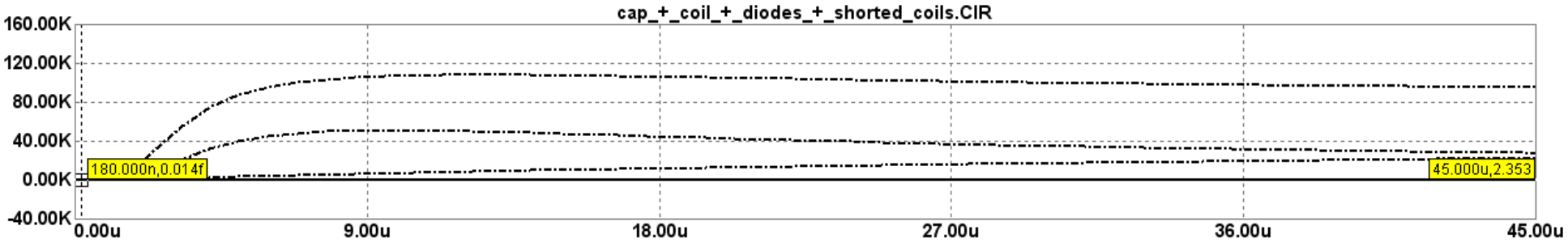

cap_+_coil_+_diodes_+_shorted_coils.CIR
160.00K
120.00K
80.00K
40.00K
0.00K
-40.00K
0.00u
9.00u
18.00u
27.00u
36.00u
45.00u
V(R1) (V)
I(R1) (A)
V(R2) (V)
I(R2) (A)
V(R3) (V)
I(R3) (A)
RMS(V(R1))*RMS(I(R1))
RMS(V(R2))*RMS(I(R2))
RMS(V(R3))*RMS(I(R3))
V(STATOR) (V)
I(STATOR) (A)
V(STARTER) (V)
I(STARTER) (A)
V(ROTOR) (V)
I(ROTOR) (A)
RMS(V(STATOR))*RMS(I(STATOR))
RMS(V(STARTER))*RMS(I(STARTER))
RMS(V(ROTOR))*RMS(I(ROTOR))
RMS((V(STATOR)+V(STARTER)+V(ROTOR))*(I(STATOR)+I(STARTER)+I(ROTOR)))
T (Secs)

FIG. 96



	Left	Right	Delta	Slope
B V(R1) (V)	0.014f	2.353	2.353	52.494K
I(R1) (A)	0.009f	1.470	1.470	32.809K
V(R2) (V)	0.005f	-237.564	-237.564	-5.300M
I(R2) (A)	0.003f	-148.478	-148.478	-3.313M
V(R3) (V)	-0.068f	-136.306	-136.306	-3.041M
I(R3) (A)	-0.043f	-85.191	-85.191	-1.901M
RMS(V(R1))*RMS(I(R1))	9.191E-34	1.628	1.628	36.317K
RMS(V(R2))*RMS(I(R2))	4.550E-36	22.223K	22.223K	495.818M
RMS(V(R3))*RMS(I(R3))	2.722E-33	27.726K	27.726K	618.616M
V(STATOR) (V)	-0.014f	-2.353	-2.353	-52.494K
I(STATOR) (A)	0.009f	1.470	1.470	32.809K
V(STARTER) (V)	0.068f	136.306	136.306	3.041M
I(STARTER) (A)	-0.043f	-85.191	-85.191	-1.901M
V(ROTOR) (V)	-0.005f	237.564	237.564	5.300M
I(ROTOR) (A)	0.003f	-148.478	-148.478	-3.313M
RMS(V(STATOR))*RMS(I(STAT	3.697E-34	1.628	1.628	36.318K
RMS(V(STARTER))*RMS(I(STA	3.435E-33	27.726K	27.726K	618.616M
RMS(V(ROTOR))*RMS(I(ROTO	4.550E-36	22.223K	22.223K	495.818M
RMS((V(STATOR)+V(STARTER	2.845E-33	95.401K	95.401K	2.129G
T (Secs)	180.000n	45.000u	44.820u	1.000

FIG. 97

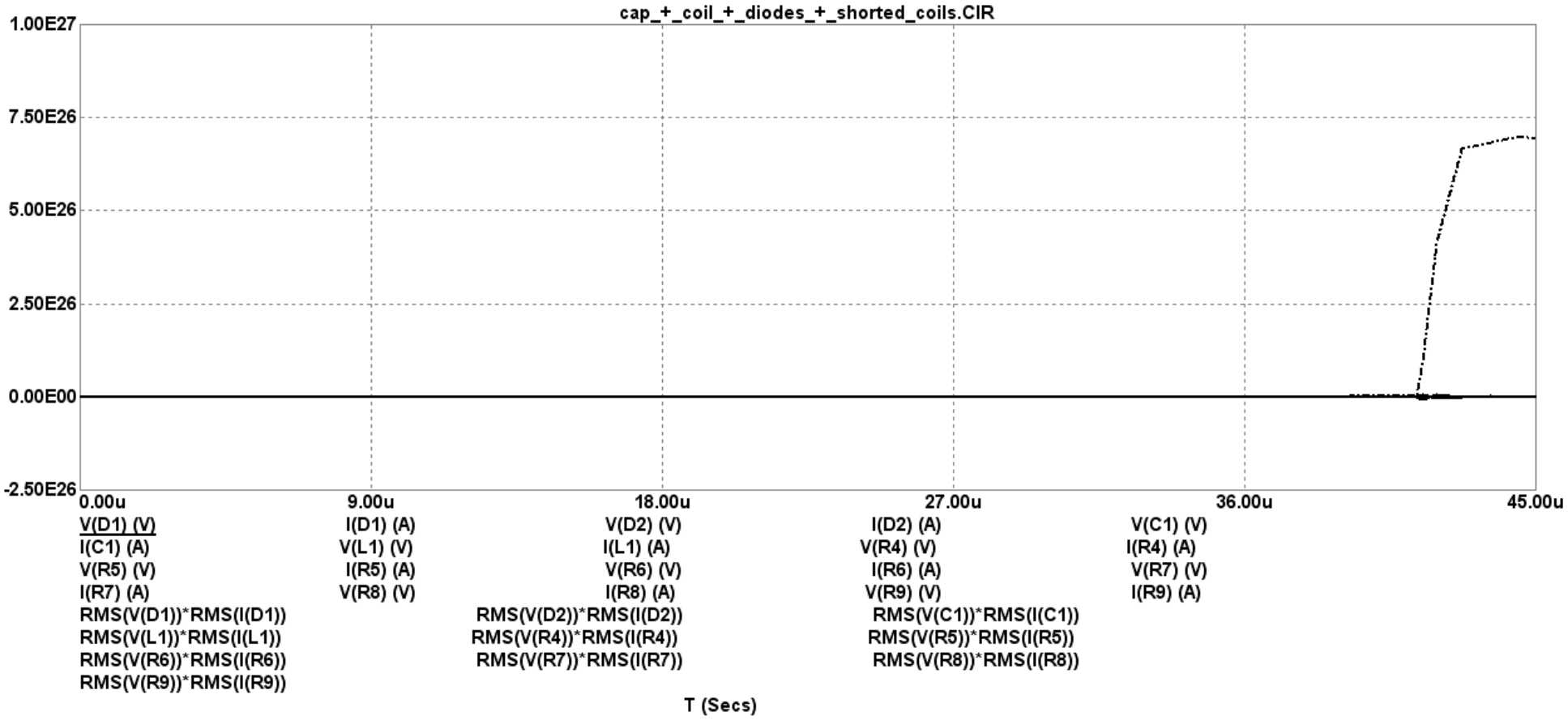
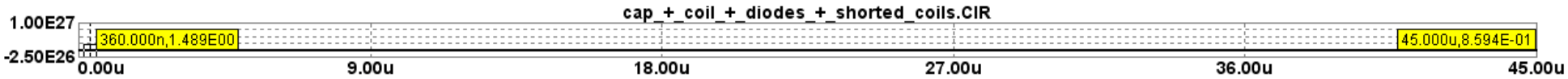

cap_+_coil_+_diodes_+_shorted_coils.CIR
1.00E27
7.50E26
5.00E26
2.50E26
0.00E00
-2.50E26
0.00u
9.00u
18.00u
27.00u
36.00u
45.00u
V(D1) (V)
I(D1) (A)
V(D2) (V)
I(D2) (A)
V(C1) (V)
I(C1) (A)
V(L1) (V)
I(L1) (A)
V(R4) (V)
I(R4) (A)
V(R5) (V)
I(R5) (A)
V(R6) (V)
I(R6) (A)
V(R7) (V)
I(R7) (A)
V(R8) (V)
I(R8) (A)
V(R9) (V)
I(R9) (A)
RMS(V(D1))*RMS(I(D1))
RMS(V(D2))*RMS(I(D2))
RMS(V(C1))*RMS(I(C1))
RMS(V(L1))*RMS(I(L1))
RMS(V(R4))*RMS(I(R4))
RMS(V(R5))*RMS(I(R5))
RMS(V(R6))*RMS(I(R6))
RMS(V(R7))*RMS(I(R7))
RMS(V(R8))*RMS(I(R8))
RMS(V(R9))*RMS(I(R9))
T (Secs)

FIG. 98



	Left	Right	Delta	Slope
B V(D1) (V)	1.489E00	8.594E-01	-6.295E-01	-1.410E04
I(D1) (A)	6.946E04	3.709E-04	-6.946E04	-1.556E09
V(D2) (V)	7.886E-01	8.186E-01	2.992E-02	6.702E02
I(D2) (A)	9.179E-02	1.627E-01	7.093E-02	1.589E03
V(C1) (V)	9.997E-07	1.349E02	1.349E02	3.021E06
I(C1) (A)	-1.012E-10	-5.340E-08	-5.329E-08	-1.194E-03
V(L1) (V)	9.997E-07	2.133E07	2.133E07	4.778E11
I(L1) (A)	1.012E-10	-3.774E-16	-1.012E-10	-2.267E-06
V(R4) (V)	-1.012E11	-5.349E13	-5.339E13	-1.196E18
I(R4) (A)	-1.012E-10	-5.349E-08	-5.339E-08	-1.196E-03
V(R5) (V)	1.012E11	4.884E01	-1.012E11	-2.267E15
I(R5) (A)	1.012E-10	4.884E-20	-1.012E-10	-2.267E-06
V(R6) (V)	1.012E11	5.349E13	5.339E13	1.196E18
I(R6) (A)	1.012E-10	5.349E-08	5.339E-08	1.196E-03
V(R7) (V)	-1.012E11	2.095E07	1.012E11	2.267E15
I(R7) (A)	-1.012E-10	2.095E-14	1.012E-10	2.267E-06
V(R8) (V)	-1.012E11	3.774E05	1.012E11	2.267E15
I(R8) (A)	-1.012E-10	3.774E-16	1.012E-10	2.267E-06
V(R9) (V)	-1.012E11	-5.349E13	-5.339E13	-1.196E18
I(R9) (A)	-1.012E-10	-5.349E-08	-5.339E-08	-1.196E-03
RMS(V(D1))*RMS(I(D1))	4.179E04	5.860E10	5.860E10	1.313E15
RMS(V(D2))*RMS(I(D2))	3.370E-02	1.260E05	1.260E05	2.823E09
RMS(V(C1))*RMS(I(C1))	1.012E-16	2.087E06	2.087E06	4.675E10
RMS(V(L1))*RMS(I(L1))	1.012E-16	9.058E11	9.058E11	2.029E16
RMS(V(R4))*RMS(I(R4))	1.024E01	6.941E26	6.941E26	1.555E31
RMS(V(R5))*RMS(I(R5))	1.024E01	6.941E26	6.941E26	1.555E31
RMS(V(R6))*RMS(I(R6))	1.024E01	6.941E26	6.941E26	1.555E31
RMS(V(R7))*RMS(I(R7))	1.024E01	6.941E26	6.941E26	1.555E31
RMS(V(R8))*RMS(I(R8))	1.024E01	6.941E26	6.941E26	1.555E31
RMS(V(R9))*RMS(I(R9))	1.024E01	6.941E26	6.941E26	1.555E31
T (Secs)	360.000n	45.000u	44.640u	1.000

FIG. 99

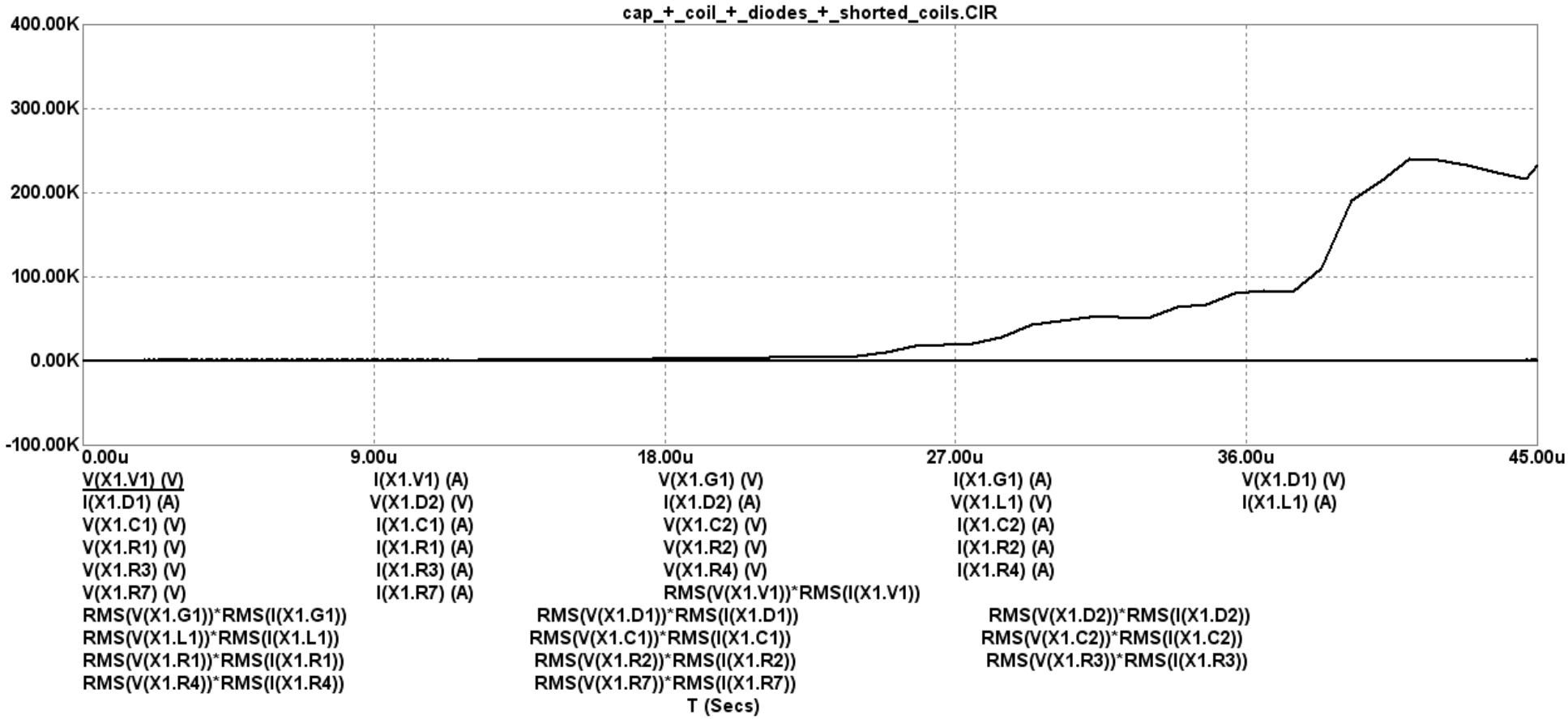
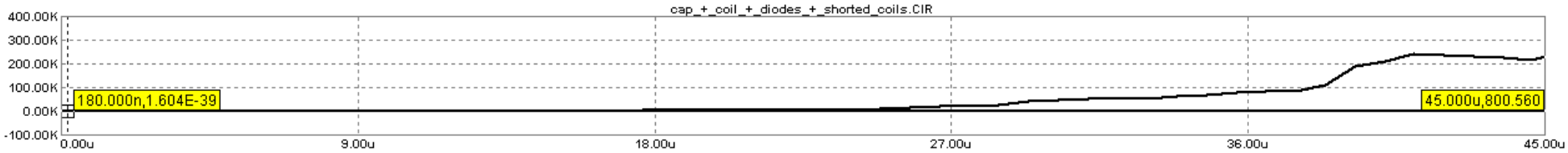

cap_+_coil_+_diodes_+_shorted_coils.CIR
400.00K
300.00K
200.00K
100.00K
0.00K
-100.00K
0.00u
9.00u
18.00u
27.00u
36.00u
45.00u
V(X1.V1) (V)
I(X1.D1) (A)
V(X1.C1) (V)
V(X1.R1) (V)
V(X1.R3) (V)
V(X1.R7) (V)
RMS(V(X1.G1))*RMS(I(X1.G1))
RMS(V(X1.L1))*RMS(I(X1.L1))
RMS(V(X1.R1))*RMS(I(X1.R1))
RMS(V(X1.R4))*RMS(I(X1.R4))
I(X1.V1) (A)
V(X1.D2) (V)
I(X1.C1) (A)
I(X1.R1) (A)
I(X1.R3) (A)
I(X1.R7) (A)
V(X1.G1) (V)
I(X1.D2) (A)
V(X1.C2) (V)
V(X1.R2) (V)
V(X1.R4) (V)
RMS(V(X1.V1))*RMS(I(X1.V1))
RMS(V(X1.D1))*RMS(I(X1.D1))
RMS(V(X1.C1))*RMS(I(X1.C1))
RMS(V(X1.R2))*RMS(I(X1.R2))
RMS(V(X1.R7))*RMS(I(X1.R7))
I(X1.G1) (A)
V(X1.L1) (V)
I(X1.C2) (A)
I(X1.R2) (A)
I(X1.R4) (A)
RMS(V(X1.D2))*RMS(I(X1.D2))
RMS(V(X1.C2))*RMS(I(X1.C2))
RMS(V(X1.R3))*RMS(I(X1.R3))
V(X1.D1) (V)
I(X1.L1) (A)
T (Secs)

FIG. 100

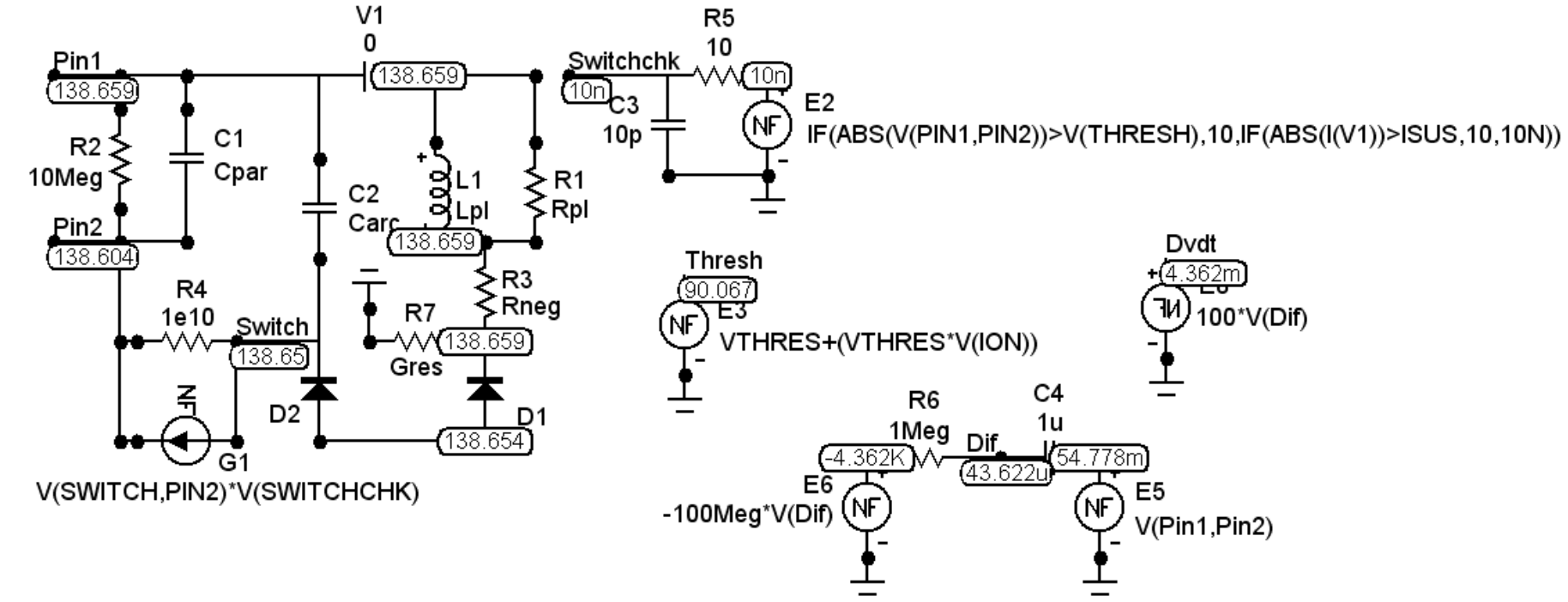


	Left	Right	Delta	Slope
V(X1.V1)(V)	0.000	0.000	0.000	0.000
I(X1.V1)(A)	7.300E-20	23.282m	23.282m	519.454
V(X1.G1)(V)	-1.027f	47.515	47.515	1.060M
I(X1.G1)(A)	-1.027E-23	475.155n	475.155n	10.601m
V(X1.D1)(V)	523.355m	-2.135	-2.659	-59.321K
I(X1.D1)(A)	16.677u	-2.145p	-16.677u	-372.092m
V(X1.D2)(V)	523.355m	137.270m	-386.084m	-8.614K
I(X1.D2)(A)	16.677u	2.145p	-16.677u	-372.092m
V(X1.L1)(V)	-0.005f	785.764u	785.764u	17.532
I(X1.L1)(A)	7.547E-20	23.282m	23.282m	519.445
V(X1.C1)(V)	0.035f	49.766	49.766	1.110M
I(X1.C1)(A)	6.905E-24	12.136u	12.136u	270.763m
V(X1.C2)(V)	1.062f	2.250	2.250	50.205K
I(X1.C2)(A)	1.835E-20	479.904n	479.904n	10.707m
V(X1.R1)(V)	0.005f	-785.764u	-785.764u	-17.532
I(X1.R1)(A)	2.466E-21	-392.882n	-392.882n	-8.766m
V(X1.R2)(V)	-0.035f	-49.766	-49.766	-1.110M
I(X1.R2)(A)	-3.475E-24	-4.977u	-4.977u	-111.035m
V(X1.R3)(V)	7.300E-20	23.282m	23.282m	519.454
I(X1.R3)(A)	-7.300E-20	-23.282m	-23.282m	-519.454
V(X1.R4)(V)	-1.027f	47.515	47.515	1.060M
I(X1.R4)(A)	-1.027E-25	4.752n	4.752n	106.014u
V(X1.R7)(V)	0.088f	232.819K	232.819K	5.195G
I(X1.R7)(A)	8.762E-24	23.282m	23.282m	519.454
RMS(V(X1.V1))*RMS(I(X1.V1))	0.000	0.000	0.000	0.000
RMS(V(X1.G1))*RMS(I(X1.G1))	4.064E-39	1.761u	1.761u	39.283m
RMS(V(X1.D1))*RMS(I(X1.D1))	859.994u	105.553u	-754.441u	-16.833
RMS(V(X1.D2))*RMS(I(X1.D2))	859.994u	204.728	204.728	4.568M
RMS(V(X1.L1))*RMS(I(X1.L1))	1.482E-33	2.385u	2.385u	53.211m
RMS(V(X1.C1))*RMS(I(X1.C1))	1.231E-40	31.313u	31.313u	698.635m
RMS(V(X1.C2))*RMS(I(X1.C2))	6.523E-36	1.190u	1.190u	26.555m
RMS(V(X1.R1))*RMS(I(X1.R1))	1.415E-36	35.525p	35.525p	792.612n
RMS(V(X1.R2))*RMS(I(X1.R2))	1.173E-40	19.691u	19.691u	439.330m
RMS(V(X1.R3))*RMS(I(X1.R3))	7.763E-34	80.056u	80.056u	1.786
RMS(V(X1.R4))*RMS(I(X1.R4))	4.064E-41	17.615n	17.615n	393.014u
B RMS(V(X1.R7))*RMS(I(X1.R7))	1.604E-39	800.560	800.560	17.862M
T(Secs)	180.000n	45.000u	44.820u	1.000

FIG. 101

SPARKGAP MACRO, with a resistive ground connection.

.PARAMETERS(GRES=1,VTHRES=90, VARC=10, ISUS=500M,RNEG=-1,LPL=130N,RPL=2K,CPAR=1P,CARC=3P)



.HELP GRES "Resistance of ground connection"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

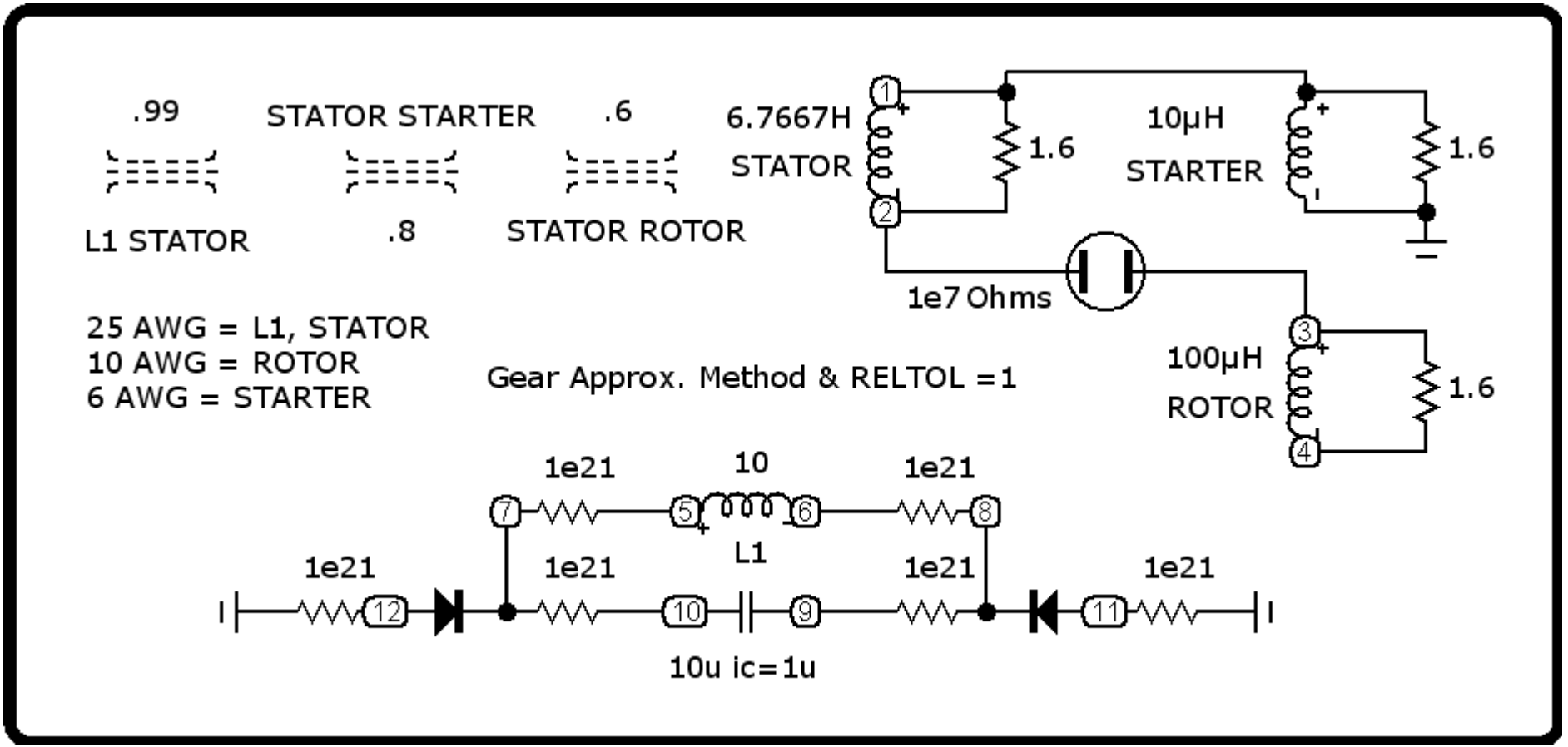

.99
STATOR STARTER
.6
6.7667H
STATOR
1.6
10µH
STARTER
1.6
L1 STATOR
.8
STATOR ROTOR
1e7 Ohms
25 AWG = L1, STATOR
10 AWG = ROTOR
6 AWG = STARTER
Gear Approx. Method & RELTOL =1
100µH
ROTOR
1.6
1e21
10
1e21
L1
1e21
1e21
1e21
1e21
10u ic=1u

FIG. 103

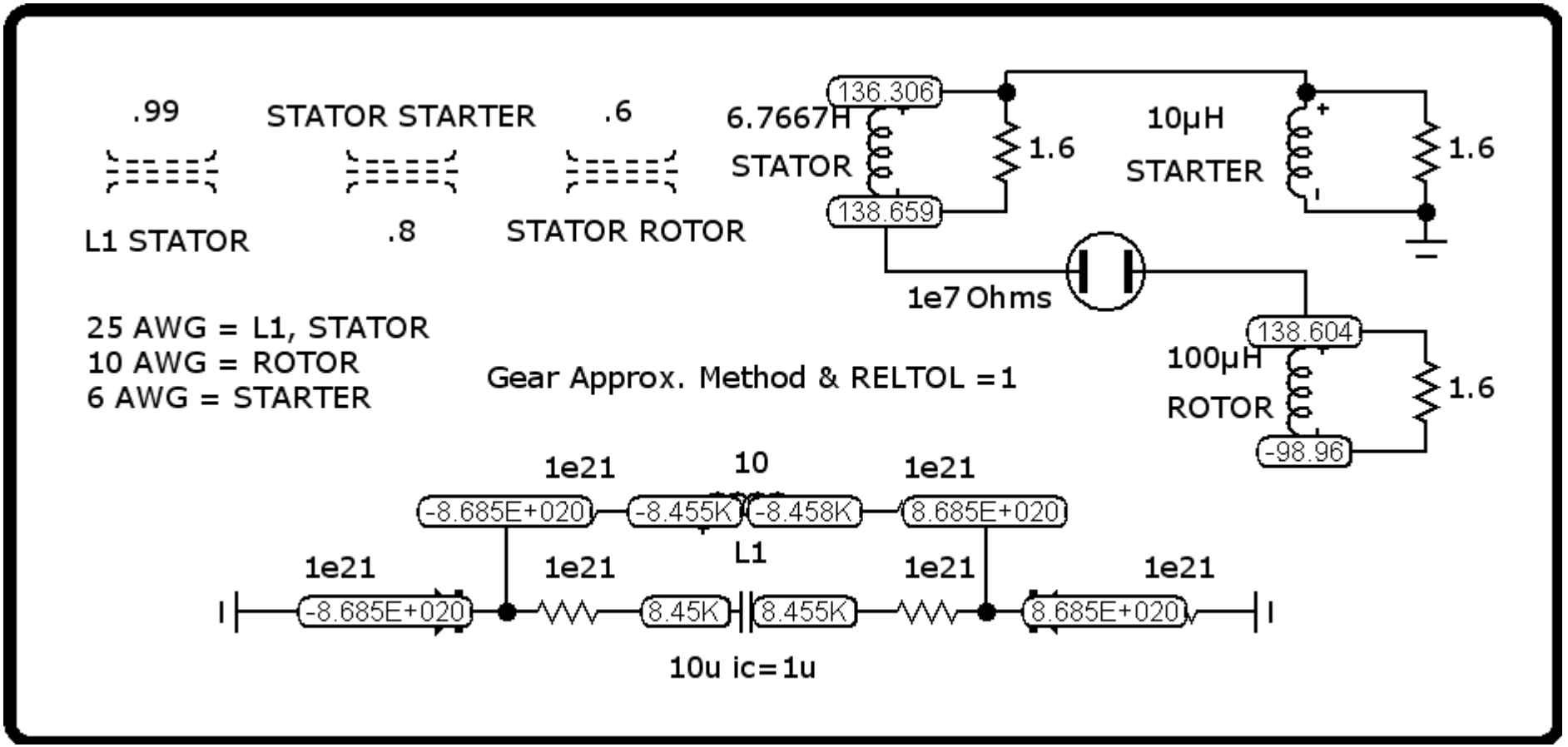
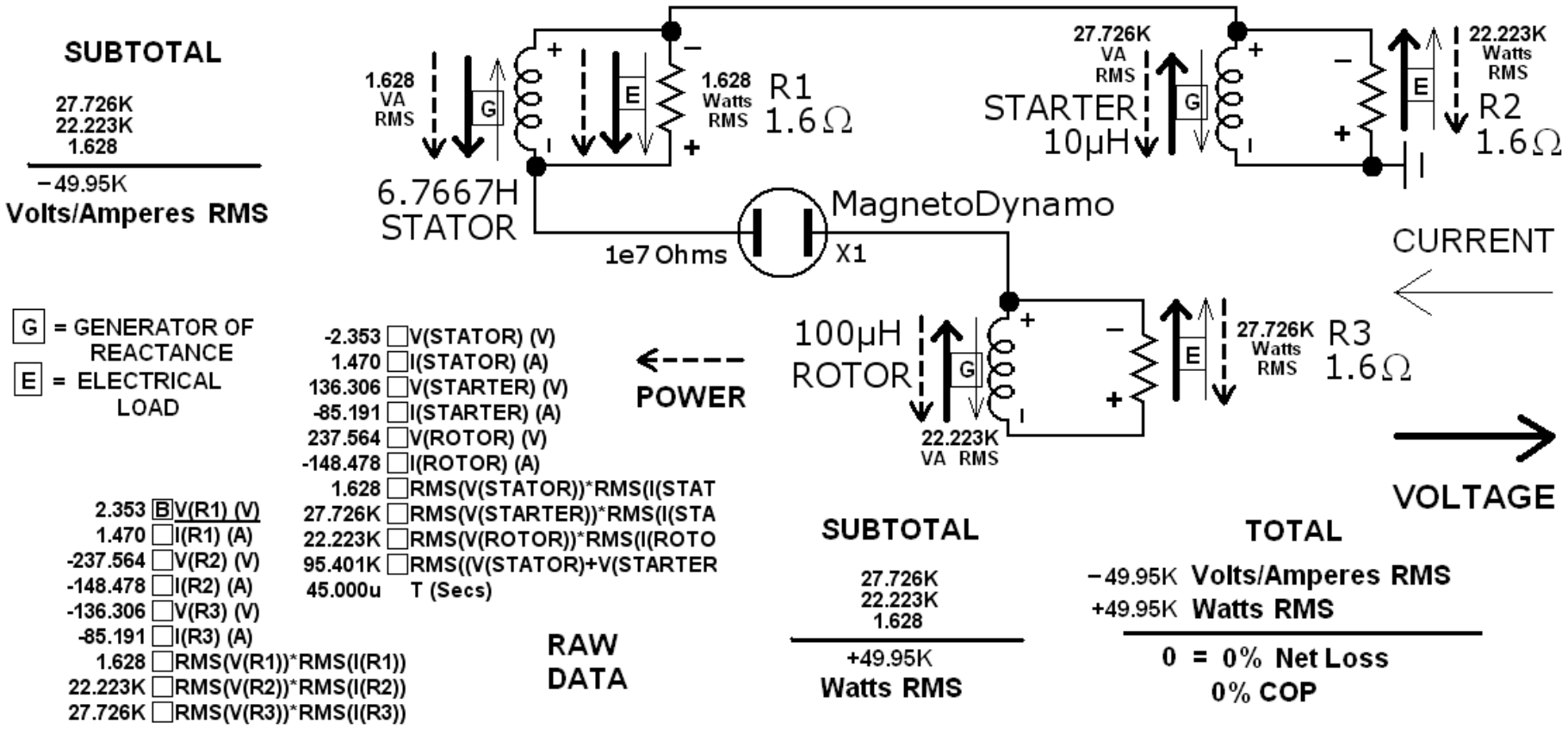

.99
STATOR STARTER
.6
L1 STATOR
.8
STATOR ROTOR
136.306
6.7667H
STATOR
1.6
138.659
10µH
STARTER
1.6
1e7 Ohms
138.604
100µH
ROTOR
1.6
-98.96
25 AWG = L1, STATOR
10 AWG = ROTOR
6 AWG = STARTER
Gear Approx. Method & RELTOL =1
1e21
10
1e21
-8.685E+020
-8.455K
-8.458K
8.685E+020
L1
1e21
1e21
1e21
1e21
-8.685E+020
8.45K
8.455K
8.685E+020
10u ic=1u

FIG. 104



THIS SUBCIRCUIT IS THERMODYNAMICALLY INCLINED IN THAT ALL ELECTRICAL LOADS ARE COUNTERBALANCED (IE. NEUTRALIZED) BY ALL REACTIVE GENERATORS

FIG. 105

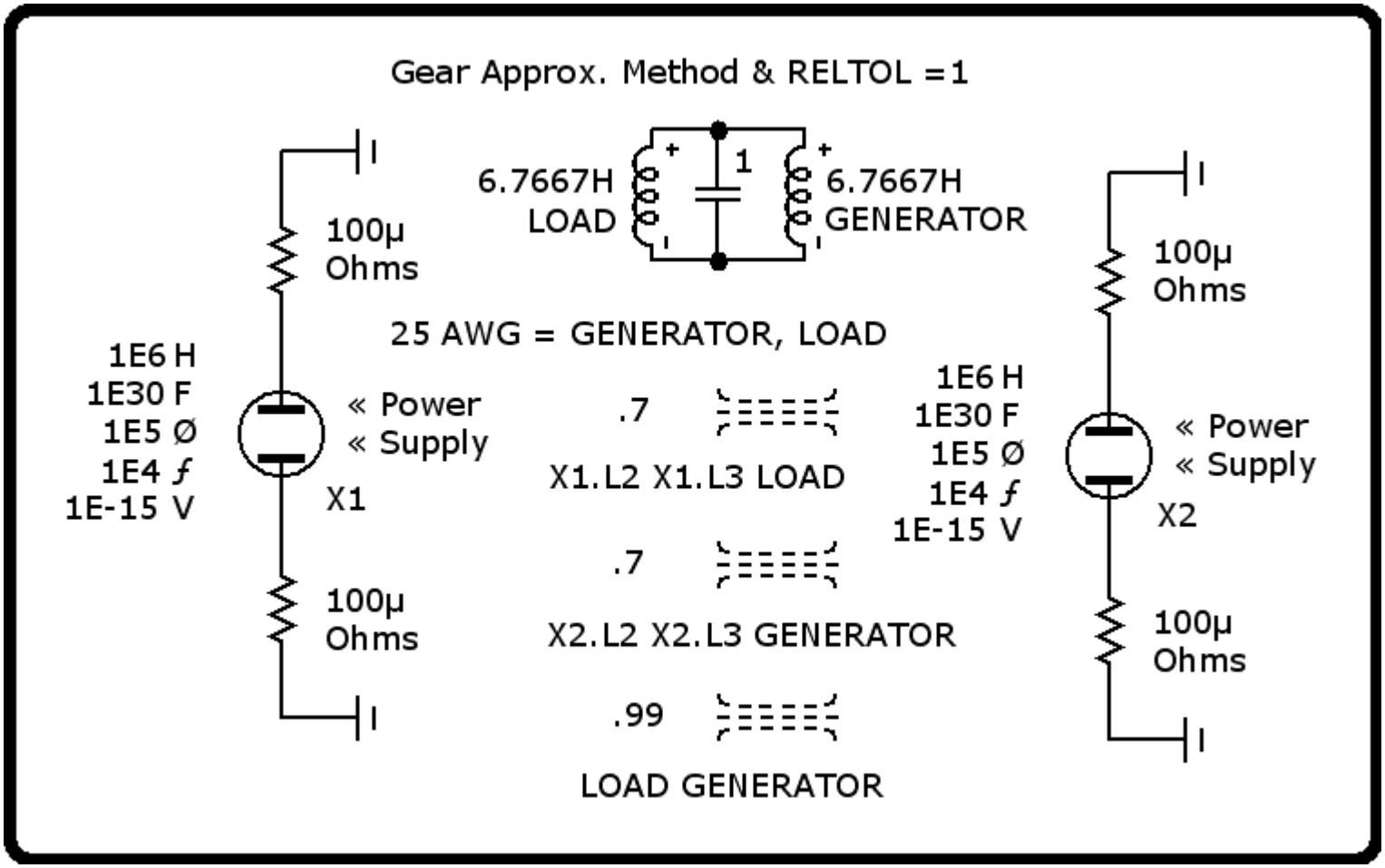

Gear Approx. Method & RELTOL =1
6.7667H
LOAD
1
6.7667H
GENERATOR
100µ
Ohms
25 AWG = GENERATOR, LOAD
1E6 H
1E30 F
1E5 Ø
1E4 ƒ
1E-15 V
« Power
« Supply
X1
.7
X1.L2 X1.L3 LOAD
.7
X2.L2 X2.L3 GENERATOR
100µ
Ohms
.99
LOAD GENERATOR
1E6 H
1E30 F
1E5 Ø
1E4 ƒ
1E-15 V
« Power
« Supply
X2
100µ
Ohms

FIG. 106

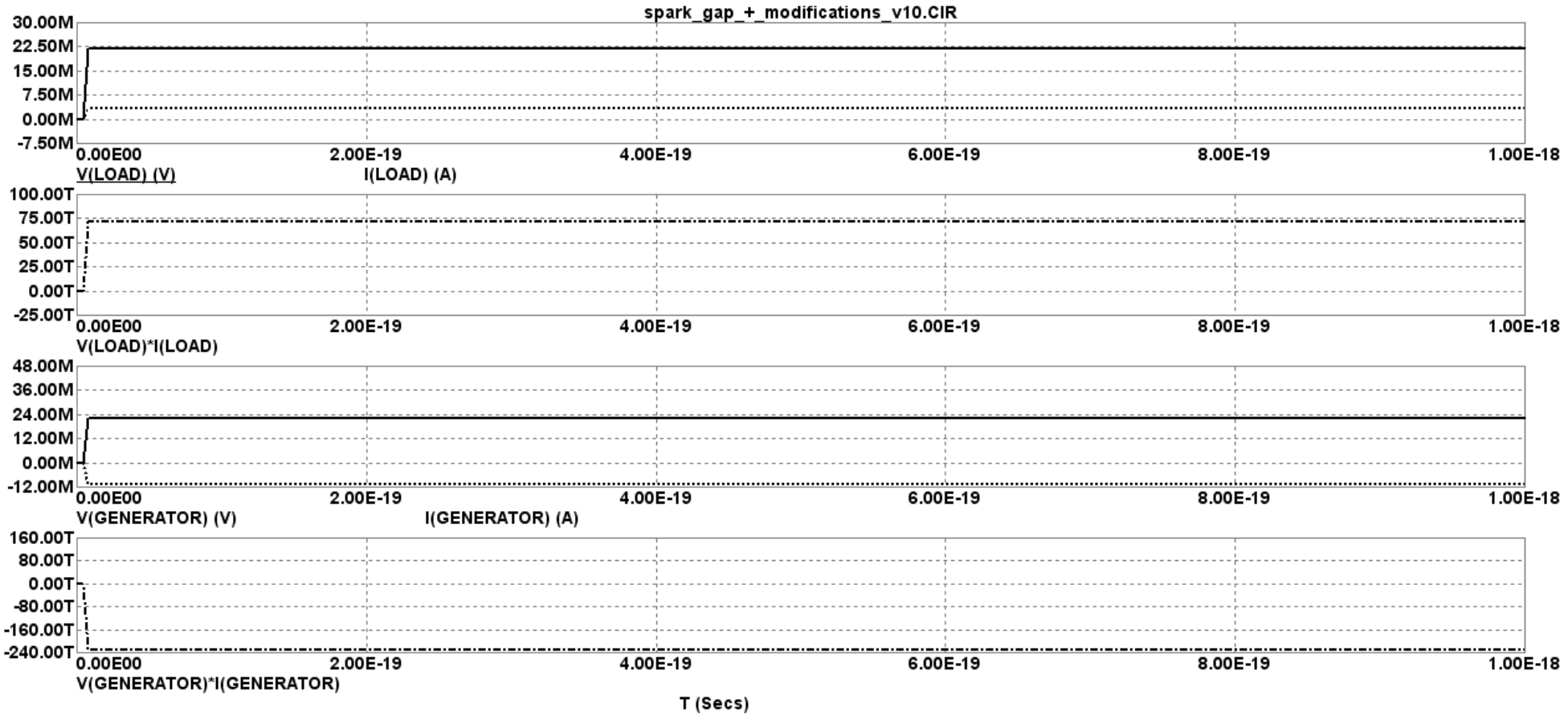

spark_gap_+_modifications_v10.CIR
30.00M
22.50M
15.00M
7.50M
0.00M
-7.50M
0.00E00
2.00E-19
4.00E-19
6.00E-19
8.00E-19
1.00E-18
V(LOAD) (V)
I(LOAD) (A)
100.00T
75.00T
50.00T
25.00T
0.00T
-25.00T
V(LOAD)*I(LOAD)
48.00M
36.00M
24.00M
12.00M
0.00M
-12.00M
V(GENERATOR) (V)
I(GENERATOR) (A)
160.00T
80.00T
0.00T
-80.00T
-160.00T
-240.00T
V(GENERATOR)*I(GENERATOR)
T (Secs)

FIG. 107

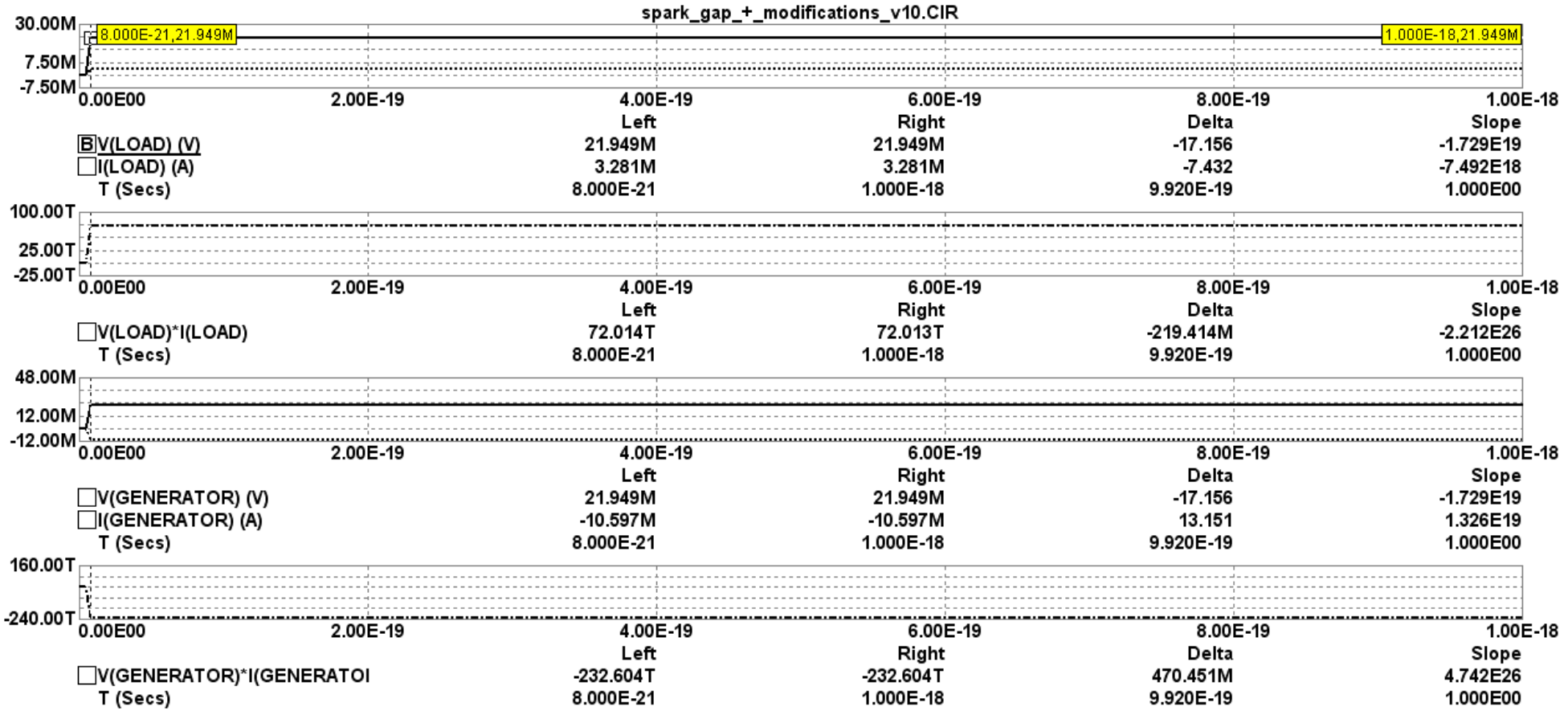

spark_gap_+_modifications_v10.CIR
30.00M
7.50M
-7.50M
8.000E-21,21.949M
1.000E-18,21.949M
0.00E00
2.00E-19
4.00E-19
6.00E-19
8.00E-19
1.00E-18
Left
Right
Delta
Slope
V(LOAD) (V) 21.949M 21.949M -17.156 -1.729E19
I(LOAD) (A) 3.281M 3.281M -7.432 -7.492E18
T (Secs) 8.000E-21 1.000E-18 9.920E-19 1.000E00
100.00T
25.00T
-25.00T
V(LOAD)*I(LOAD) 72.014T 72.013T -219.414M -2.212E26
48.00M
12.00M
-12.00M
V(GENERATOR) (V) 21.949M 21.949M -17.156 -1.729E19
I(GENERATOR) (A) -10.597M -10.597M 13.151 1.326E19
160.00T
-240.00T
V(GENERATOR)*I(GENERATOI -232.604T -232.604T 470.451M 4.742E26

FIG. 108

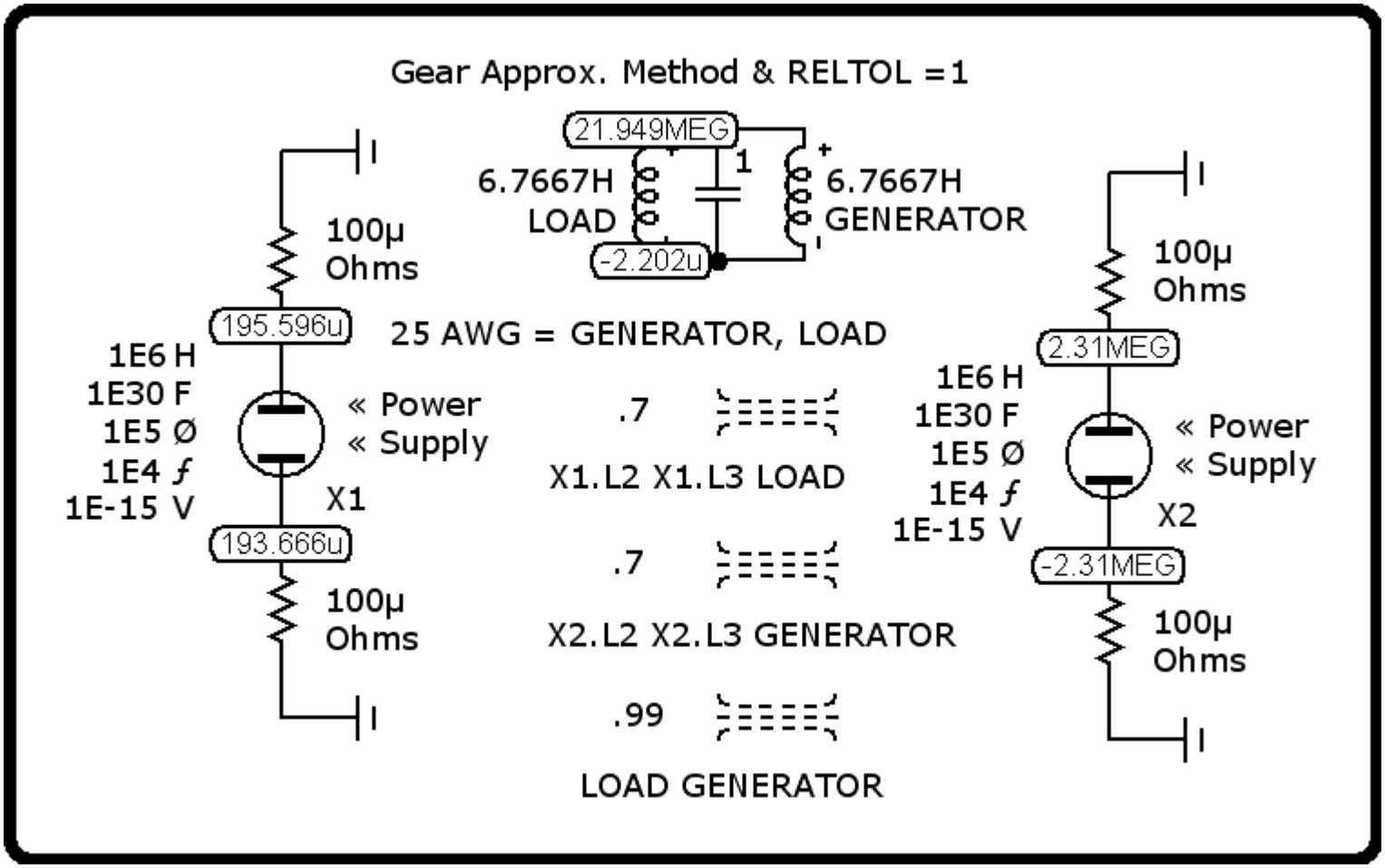
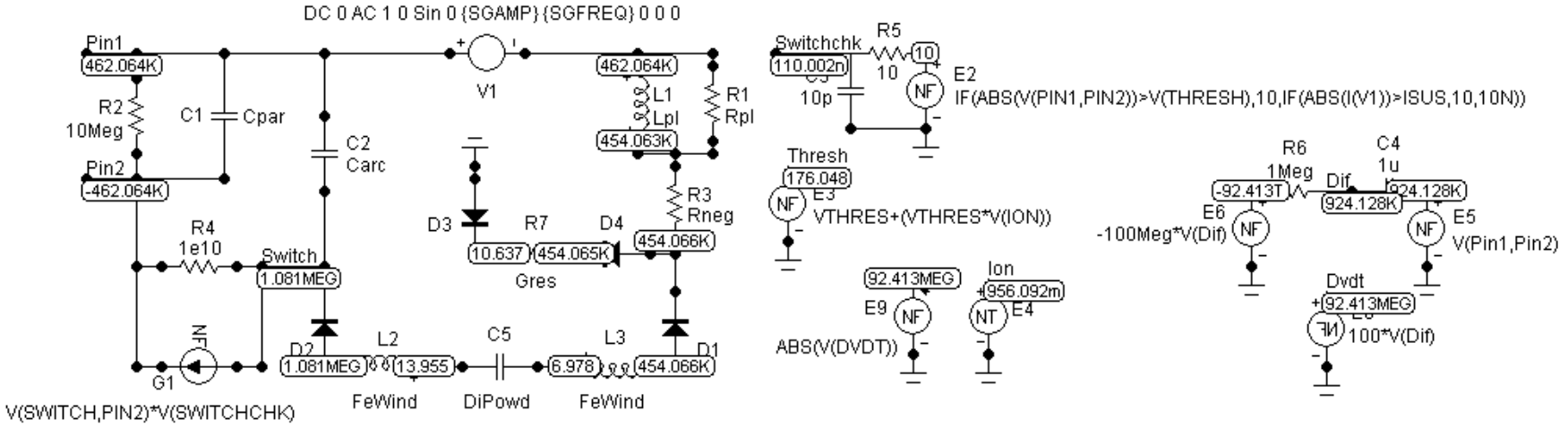

Gear Approx. Method & RELTOL =1
21.949MEG
6.7667H
LOAD
1
6.7667H
GENERATOR
-2.202u
100µ
Ohms
195.596u
25 AWG = GENERATOR, LOAD
1E6 H
1E30 F
1E5 Ø
1E4 ƒ
1E-15 V
« Power
« Supply
X1
193.666u
100µ
Ohms
.7
X1.L2 X1.L3 LOAD
.7
X2.L2 X2.L3 GENERATOR
.99
LOAD GENERATOR
100µ
Ohms
2.31MEG
1E6 H
1E30 F
1E5 Ø
1E4 ƒ
1E-15 V
« Power
« Supply
X2
-2.31MEG
100µ
Ohms

FIG. 109

GROUNDED & BENT IN THE MIDDLE, NEON-FILLED, COPPER TUBING, FREQUENCY & AMPLITUDE MODULATED, SURROUNDED BY AN IRON WINDING REPRESENTS A PAIR OF INVERTED COILS » L2 & L3, & FILLED WITH POWDERED TANTALUM OR ALUMINA IS CAPACITOR » C5.

.PARAMETERS(FEWIND=1e6,DIPOWD=1e30,DIMAT=3,GRES=1e5,SGFREQ=1e4,SGAMP=1e-15,VTHRES=9e1, VARC=1e1, ISUS=5e-1,RNEG=-1,LPL=1.3e-7,RPL=2e3,CPAR=1e-12,CARC=3e-12)



.HELP FEWIND "Inductance of L2 and L3, of inverted windings and undefined series resistance, is an iron coil surrounding a bent-in-the-middle copper tube filled with neon gas."
.HELP DIPOWD "Capacitance of C5 suffuses the interior of this neon bulb, spark gap." .HELP GRES "Resistance of ground connection"
.HELP DIMAT "Equivalent series resistance of the dielectric material within C5 defaults to 3 Ohms (analogous to tantalum or alumina dielectric)."

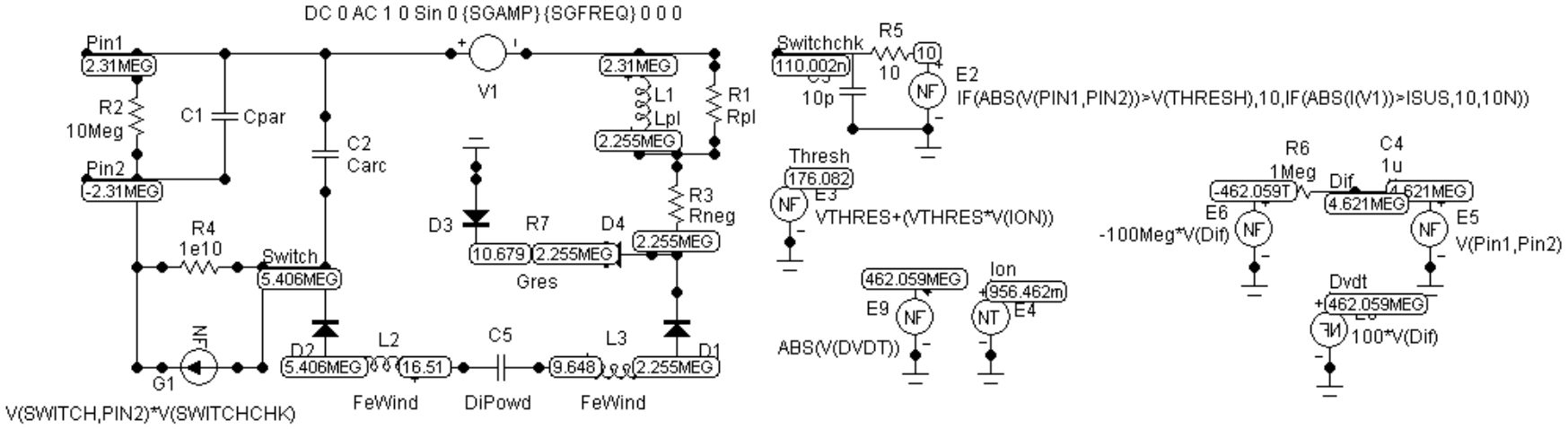
16 micrometers of neon gas and powdered iron and powdered tantalum or alumina (aluminum oxide) between two electrodes is Nikola Tesla's TriMetal Generator. It is assumed that X1.L2 and X1.L3, within this macro, will be magnetically coupled to another inductor, outside this macro, from within a circuit which uses this spark gap. This prevents suppression of over-reactance by electrically isolating the spark gap from the load.

.HELP SGFREQ "Frequency of sine wave input into spark gap, neon bulb"
.HELP SGAMP "Amplitude of sine wave input into spark gap, neon bulb"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 110

GROUNDED & BENT IN THE MIDDLE, NEON-FILLED, COPPER TUBING, FREQUENCY & AMPLITUDE MODULATED, SURROUNDED BY AN IRON WINDING REPRESENTS A PAIR OF INVERTED COILS » L2 & L3, & FILLED WITH POWDERED TANTALUM OR ALUMINA IS CAPACITOR » C5.

.PARAMETERS(FEWIND=1e6,DIPOWD=1e30,DIMAT=3,GRES=1e5,SGFREQ=1e4,SGAMP=1e-15,VTHRES=9e1, VARC=1e1, ISUS=5e-1,RNEG=-1,LPL=1.3e-7,RPL=2e3,CPAR=1e-12,CARC=3e-12)



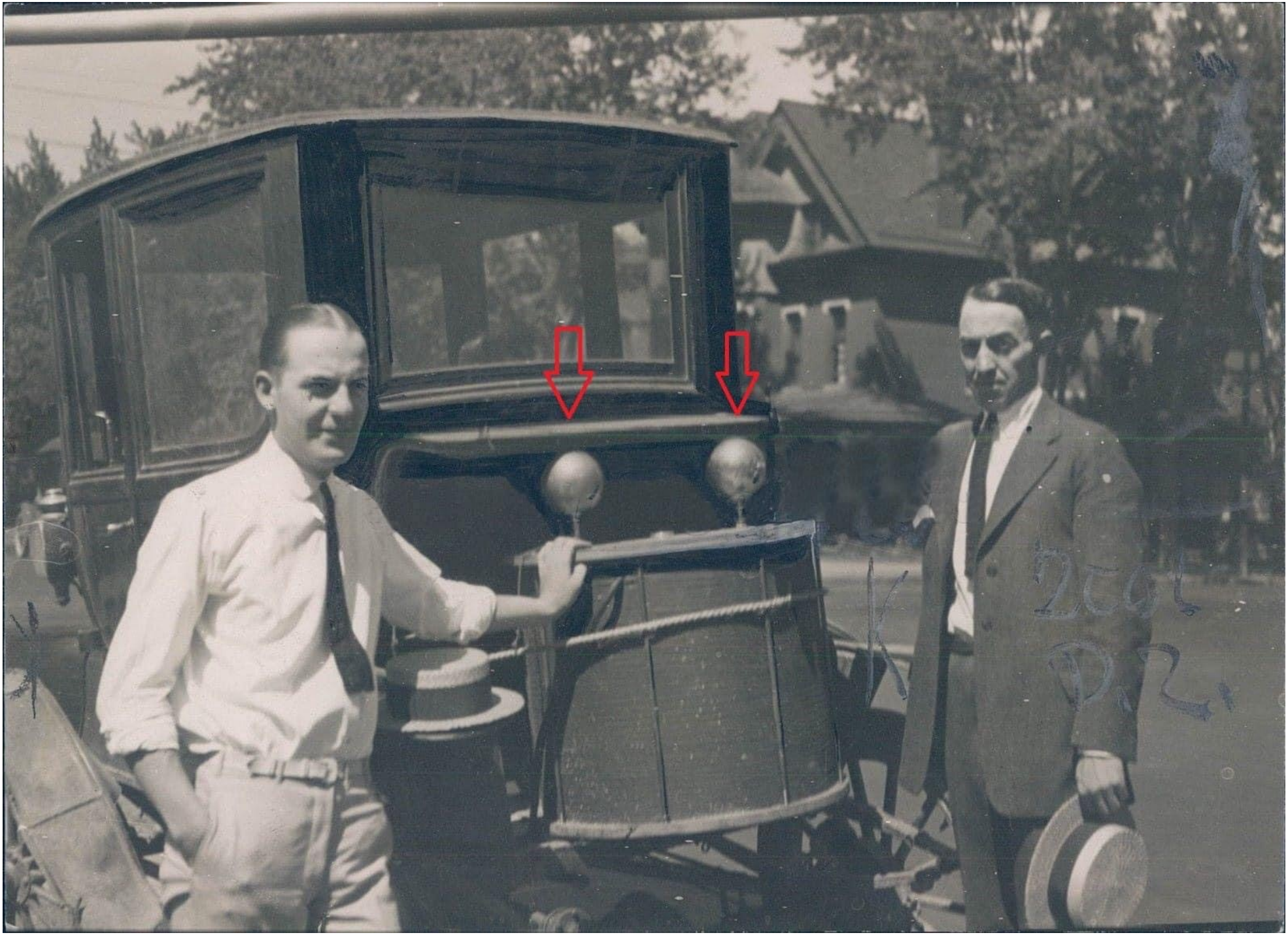
.HELP FEWIND "Inductance of L2 and L3, of inverted windings and undefined series resistance, is an iron coil surrounding a bent-in-the-middle copper tube filled with neon gas."
.HELP DIPOWD "Capacitance of C5 suffuses the interior of this neon bulb, spark gap." .HELP GRES "Resistance of ground connection"
.HELP DIMAT "Equivalent series resistance of the dielectric material within C5 defaults to 3 Ohms (analogous to tantalum or alumina dielectric)."

16 micrometers of neon gas and powdered iron and powdered tantalum or alumina (aluminum oxide) between two electrodes is Nikola Tesla's TriMetal Generator. It is assumed that X1.L2 and X1.L3, within this macro, will be magnetically coupled to another inductor, outside this macro, from within a circuit which uses this spark gap. This prevents suppression of over-reactance by electrically isolating the spark gap from the load.

.HELP SGFREQ "Frequency of sine wave input into spark gap, neon bulb"
.HELP SGAMP "Amplitude of sine wave input into spark gap, neon bulb"
.HELP VTHRES "Voltage at which the spark-gap strikes"
.HELP VARC "Voltage across the spark-gap once struck"
.HELP ISUS "Sustaining current under which the arc is stopped"
.HELP RNEG "Negative resistance once struck"
.HELP LPL "Lead/electrode inductance"
.HELP RPL "Lead/electrode resistance"
.HELP CPAR "Gap capacitance"
.HELP CARC "Arc capacitance"

FIG. 111

FIG. 112



SUBSTANTIAL CUT IN PIERCE-ARROW PRICE ANNOUNCED

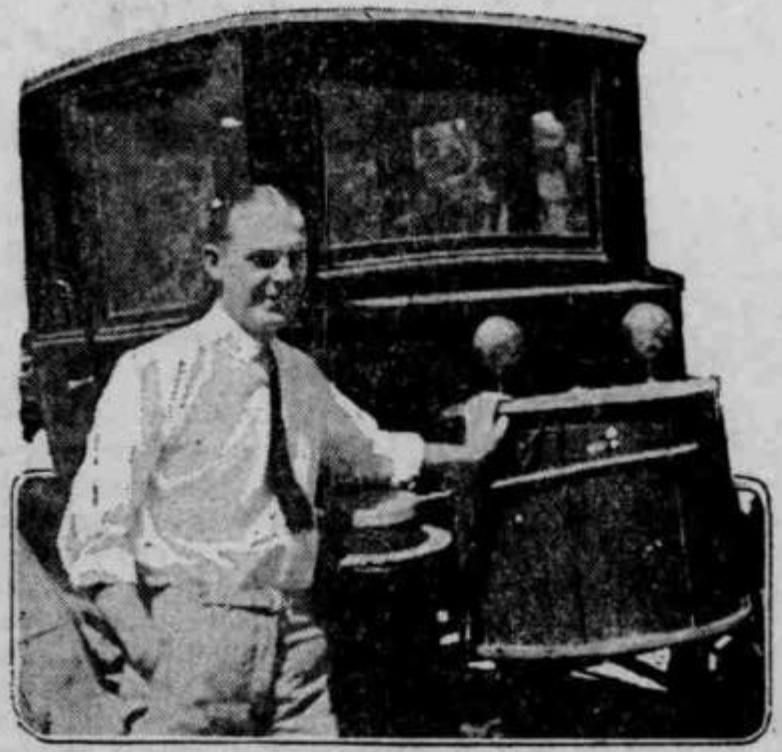
A substantial reduction in the prices of its touring car models effective after September 1, and a reduction on the prices of its truck models, effective immediately, has been announced by George W. Mixter, president of the Pierce-Arrow Motor Car company.

The new price of the standard seven-passenger touring car is $6,500 at the factory, the inclosed car prices being graded proportionately.

The new prices of its truck models are: $4,850 for the five-ton size; $4,350 for the 3½-ton and $3,200 for the 2-ton.

This Tire

ELECTRICITY "TAKEN FROM AIR" DRIVES AUTOMOBILE



C. E. AMMANN AND HIS "ATMOSPHERIC GENERATOR" ATTACHED TO AN ELECTRIC AUTOMOBILE

DENVER, Colo., Aug. 26.—Demonstrations are being made on the streets of Denver of a new electric generator that is claimed by the inventors to take electricity from the air.

The inventors are J. E. Ammann of Denver, and his brother, C. E. Ammann of Spokane, Wash.

To demonstrate, the brothers borrowed an old electric auto, took out the batteries, and after roping their new "atmospheric generator" fast, they got in and rode off at high speed.

"There is nothing inside the drum that moves; the contents consists only of iron, wire and minerals," says C. E. Ammann.

"It can be used to drive any electrical apparatus and can be made in any size."

The brothers are closely guarding their secret, and even take their "brain-child" when it is not in use, to their room in the Argonaut hotel.

So far the brothers have not offered to sell their proposition.

Electrical men in Denver are waiting "to be shown," but they grant the thing works.

AUTO INSURANCE

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cost of re-shipment
make special terms
cars. There are onl

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curtains . . . . . .
$3,000.00 truck cha
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few days only. If
given to ship them

"TWO REA

Dodge Coupe
car for private use
1921 Nash 7
extra equipment.
covers and will m
Special terms on e
Then we hav
Dodge Comm
Ford Coupe
Hudson Sup
1921 Essex

FIG. 113