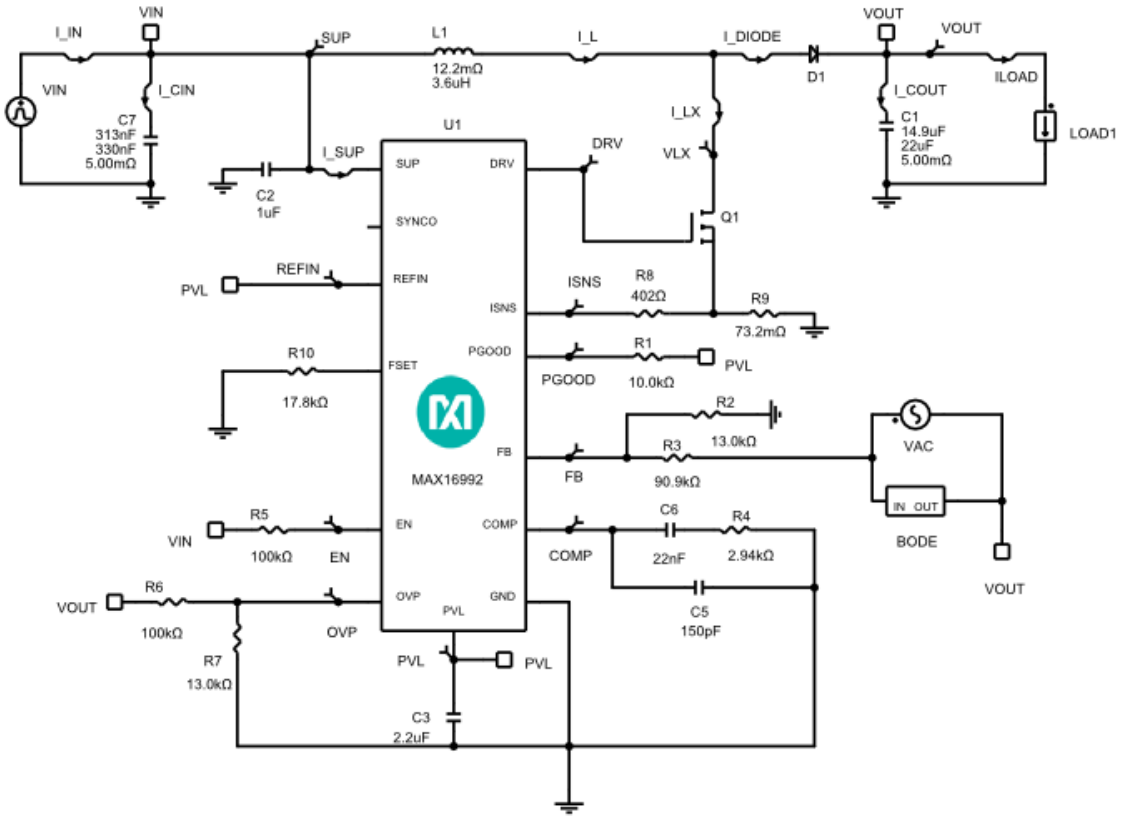
Initial Design

1.0

Design Requirements

Parameter	Value
Minimum Input Voltage	4.5V
Maximum Input Voltage	5.5V
Nominal Input Voltage	5V
Input Voltage Ripple	1%
Output Voltage	8V
Output Current	1A
Output Voltage Ripple	1%
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
Switching Frequency	1500kHz
Ambient Temperature	25°C
Inductor Current Ratio (LIR)	0.3
Overvoltage Protection Threshold	9.6V

Schematic



BOM

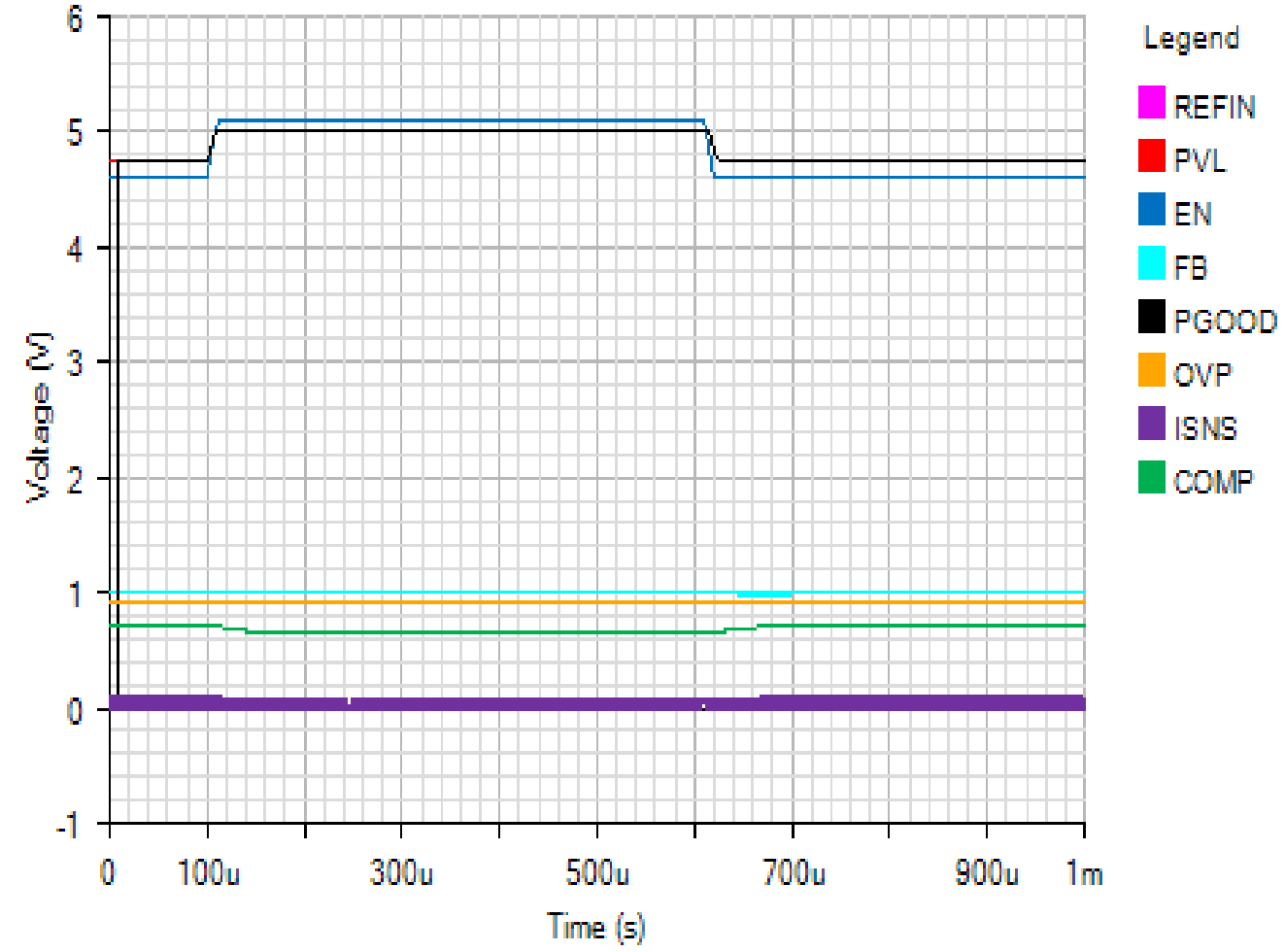
Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX16992	User-Defined	IC
C1	1	GRM32ER71E226ME15	Murata	Cap Ceramic 22uF 25V 1210 125C
C2	1	CC0805KKX7R9BB105	Yageo	Cap Ceramic 1uF 50V X7R 10% Pad SMD 0805 125°C T/R
C3	1	C1608X7R1A225K080AC	TDK	Cap Ceramic 2.2uF 10V X7R 10% Pad SMD 0603 125°C T/R
C5	1	06035A151KAT2A	AVX	Cap Ceramic 150pF 50V C0G 10% Pad SMD 0603 125°C T/R
C6	1	C1608X7R2A223K080AA	TDK	Cap Ceramic 0.022uF 100V X7R 10% Pad SMD 0603 125°C T/R
C7	1	C0805C334K4RAC	Kemet	Cap Ceramic 0.33uF 16V X7R 10% SMD 0805 125C Bulk
D1	1	SL22-E3/52T	Vishay	Diode Schottky 20V 2A 2-Pin SMB T/R
L1	1	7447797360	Wurth Electronics	INDUCTOR POWER 3.6UH 6.8A SMD
				Trans MOSFET N-CH 30VDS

Q1	1	FDS4488	Fairchild Semiconductor	30mOhm@4.5V 28mOhm@6V 9.5nC 4.75nC 0.93nF 0.241nF 175°C 7.9A 2.5W 25°C/W 1.75mm 31mm^2 SO 8L NB
R1	1	ERJ3GEYJ103V	Panasonic	Res Thick Film 0603 10K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R2	1	ERJ2RKF1302X	Panasonic	Res Thick Film 0402 13K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	ERJ3EKF9092V	Panasonic	Res Thick Film 0603 90.9K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	ERJ2RKF2941X	Panasonic	Res Thick Film 0402 2.94K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	ERJ2GEJ104X	Panasonic	Res Thick Film 0402 100K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R6	1	ERJ2GEJ104X	Panasonic	Res Thick Film 0402 100K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R7	1	ERJ2GEJ133X	Panasonic	Res Thick Film 0402 13K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R8	1	ERJ3EKF4020V	Panasonic	Res Thick Film 0603 402 Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R9	1	RL0805FR100R0732	Hitano Enterprise	Res Thick Film 0805 0.0732 Ohm 1% 0.25W(1/4W) ±100ppm/°C Pad SMD Automotive T/R
R10	1	TFV0603R1782J-T5	Thin Film Technology	Res Thick Film 0603 17.8K Ohm 5% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

Simulation Results

Line Transient - Fri Nov 16 2018 18:07:31

IC Default



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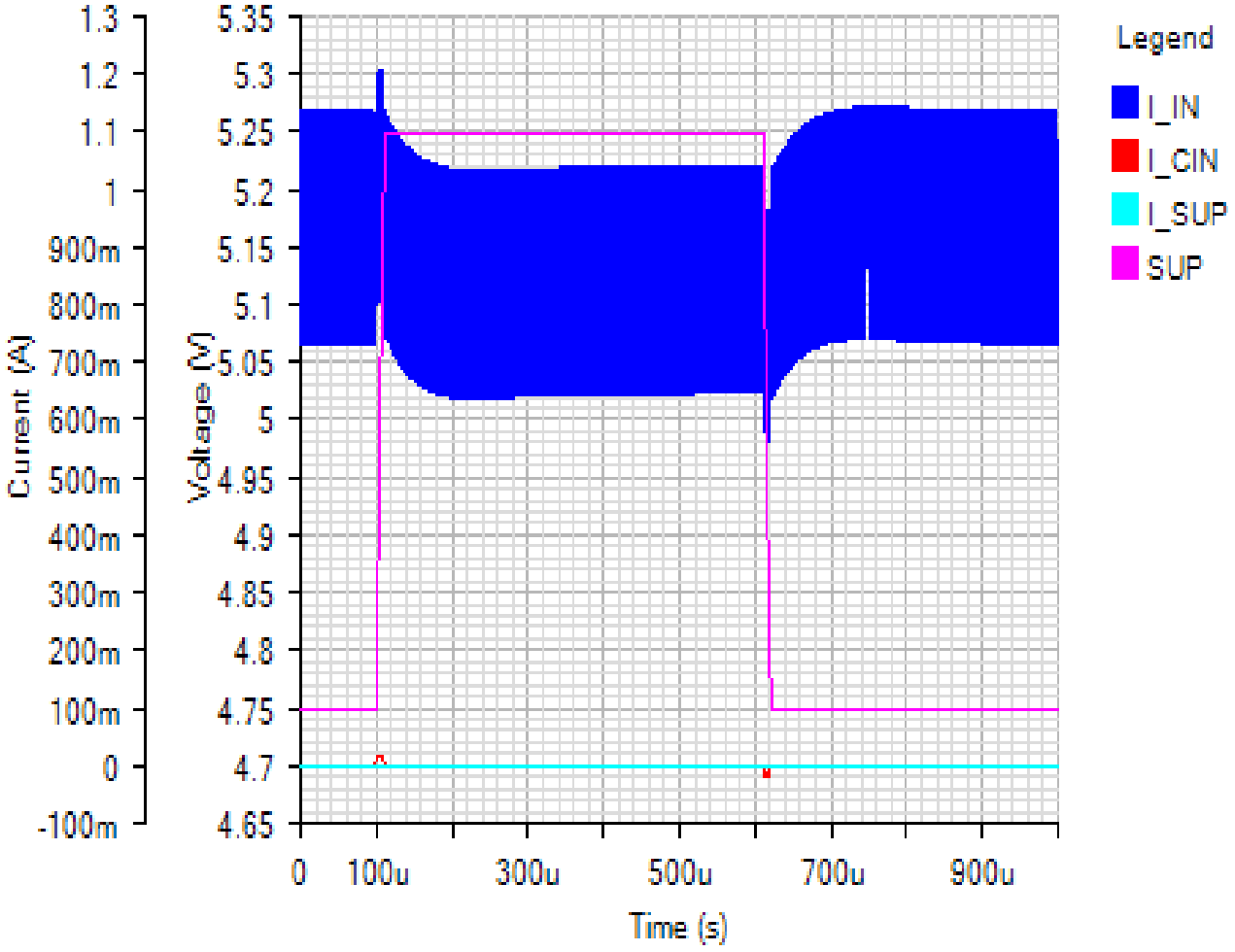

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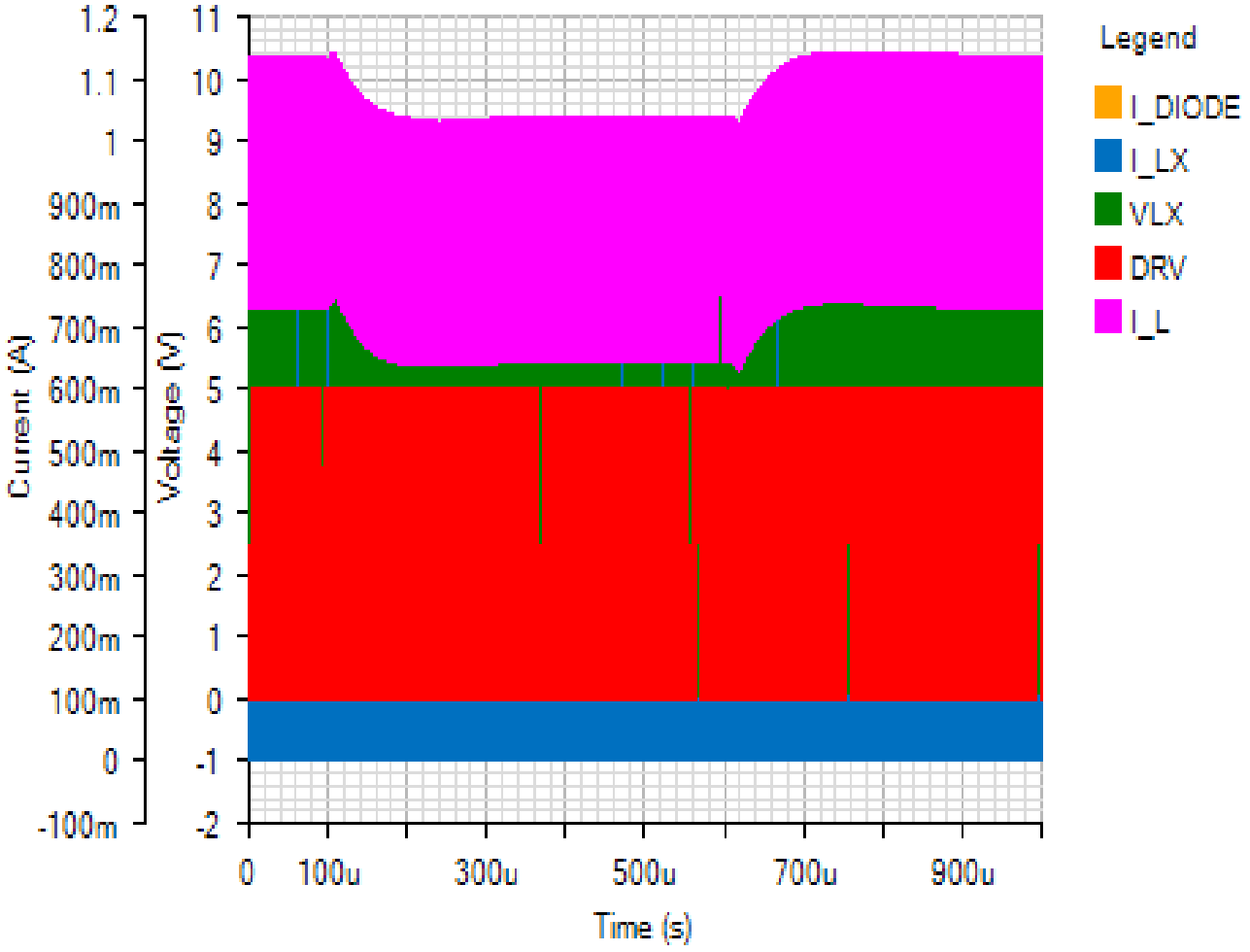

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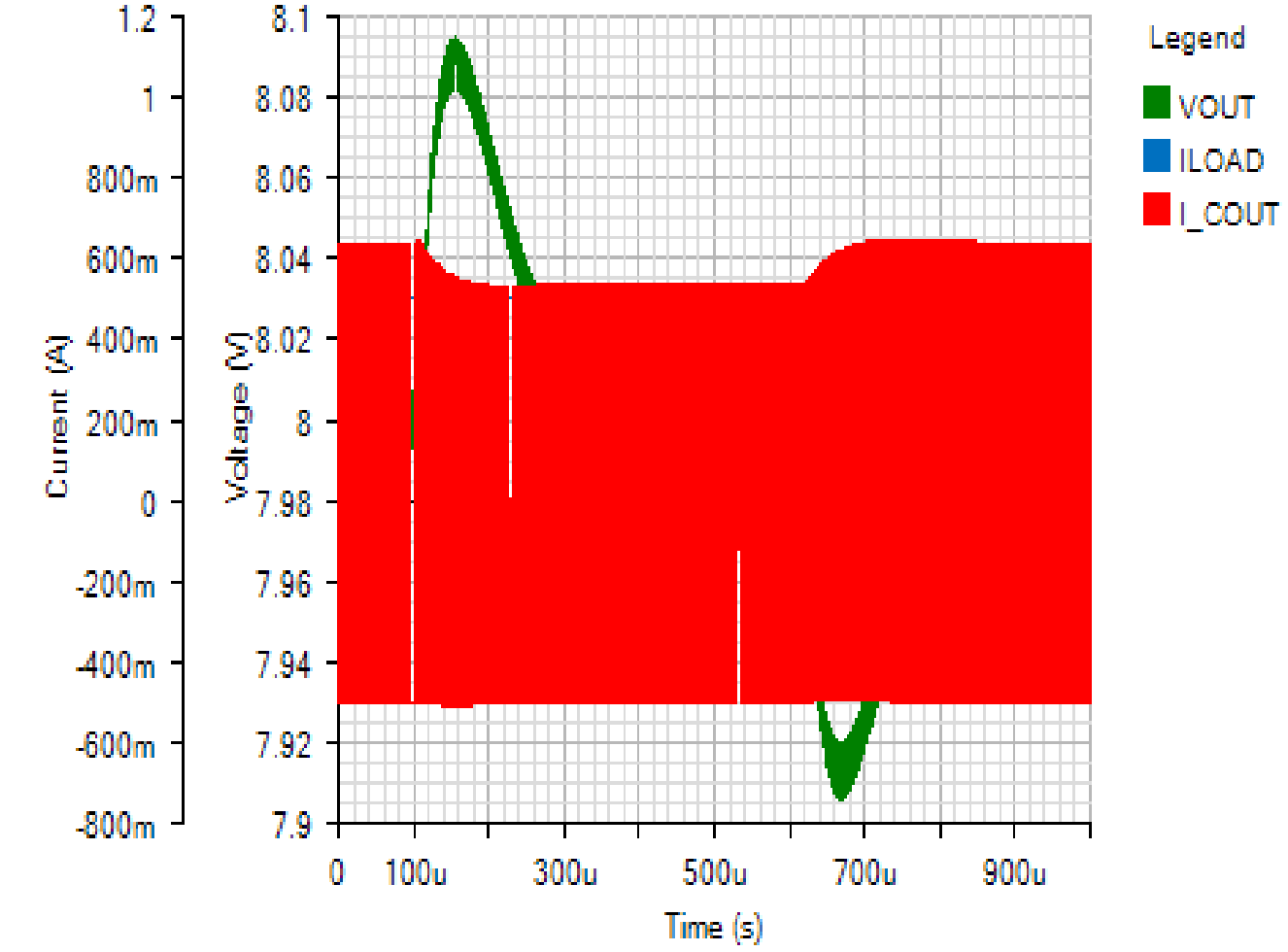

Start Up - Fri Nov 16 2018 18:07:31

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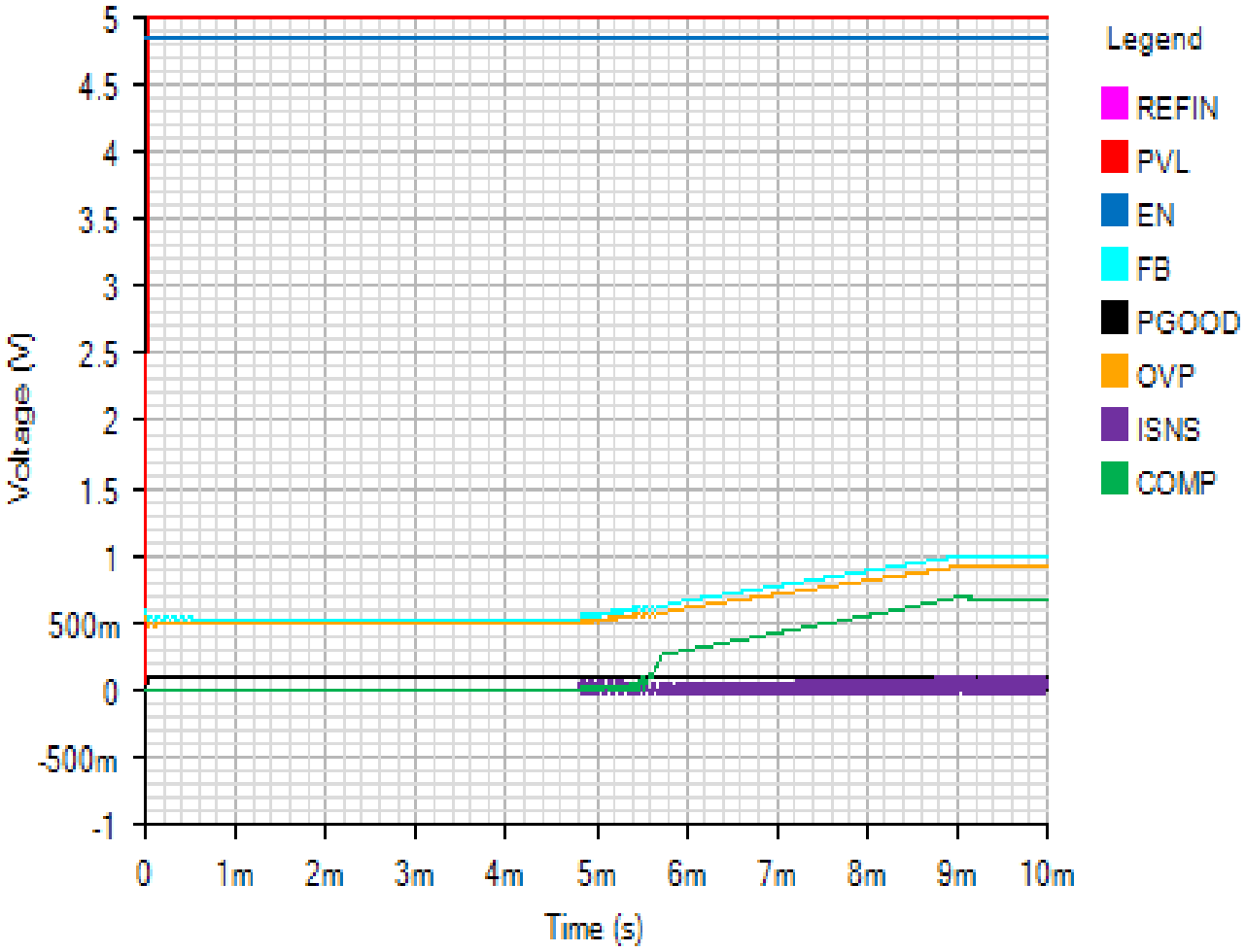

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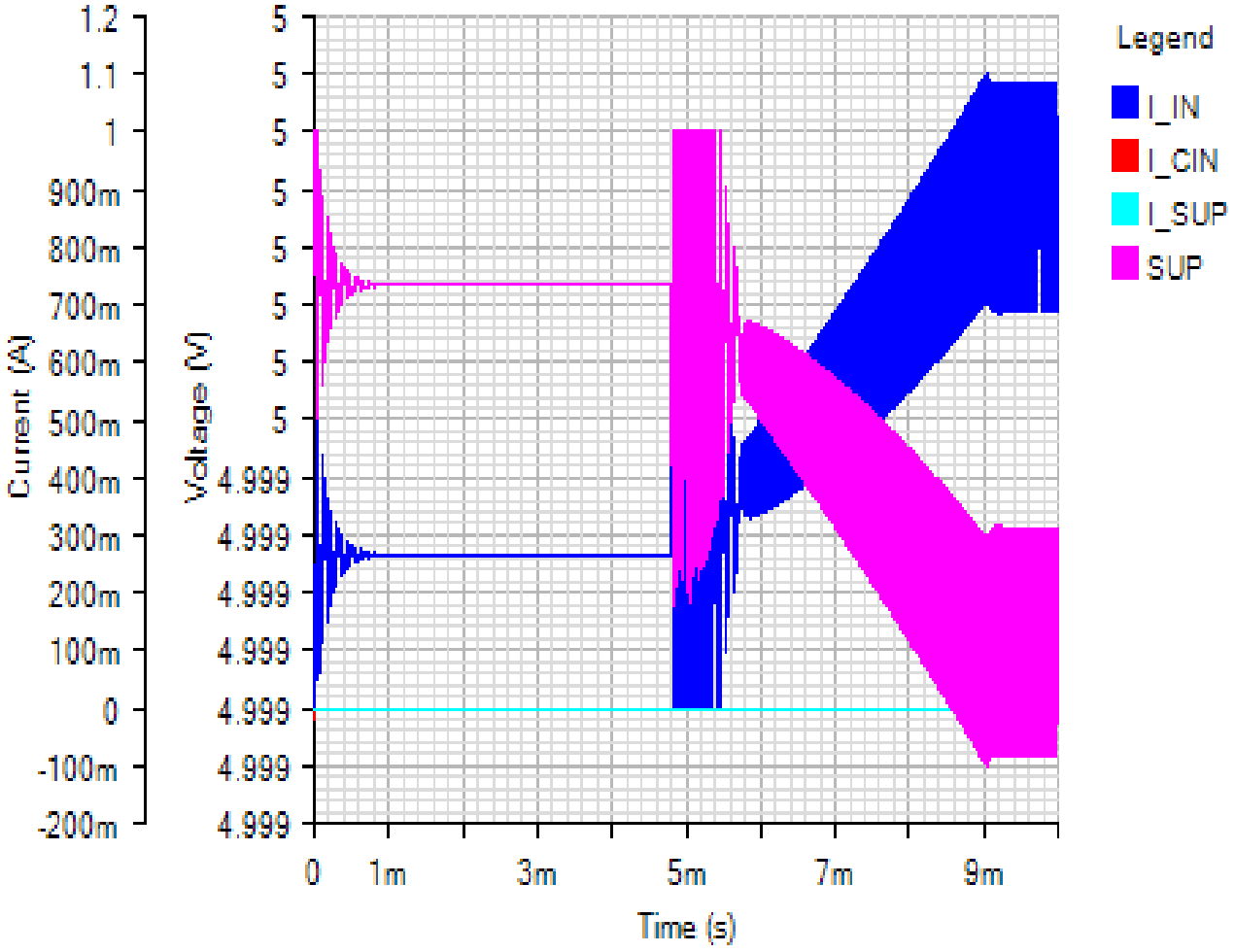

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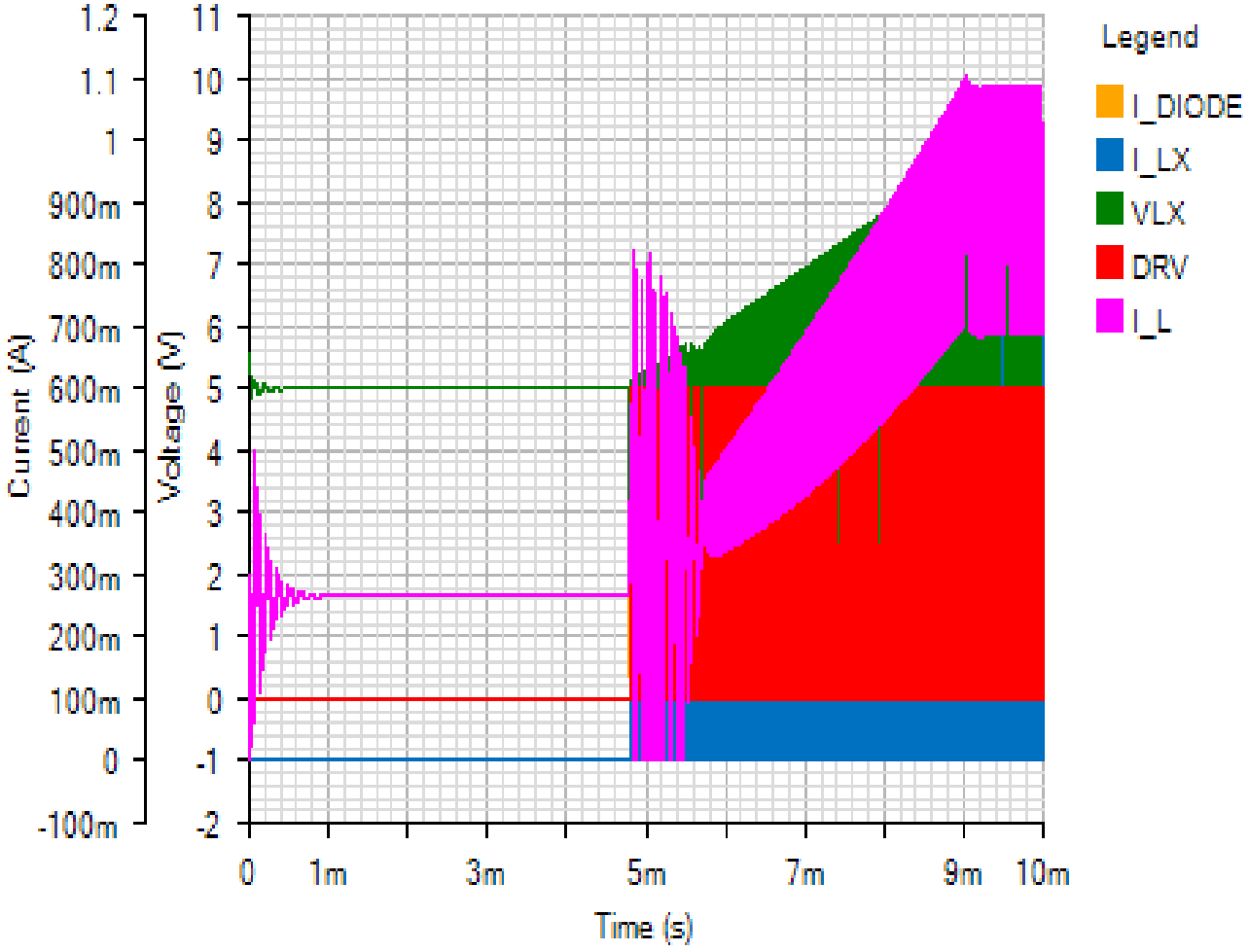

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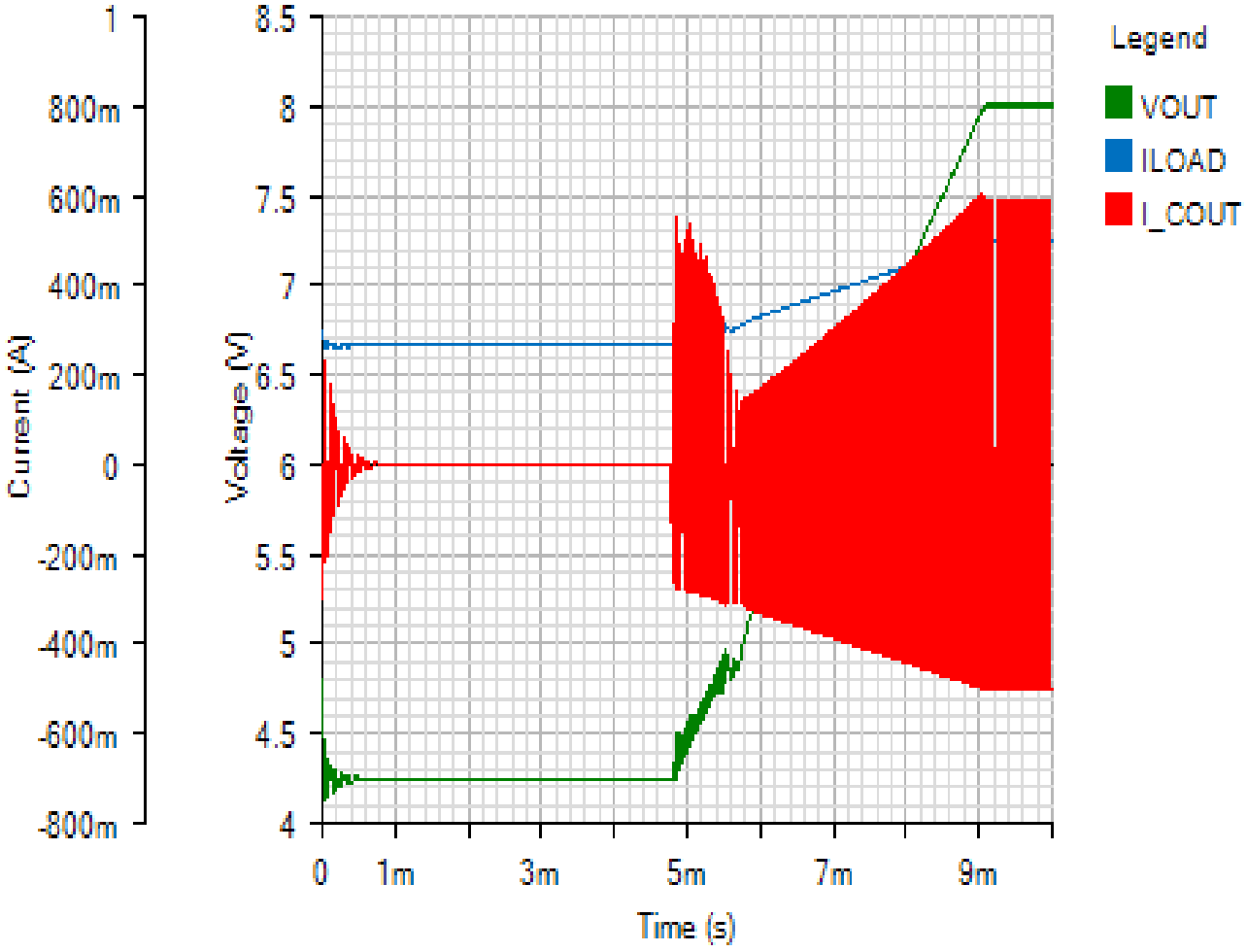

Steady State - Fri Nov 16 2018 18:07:31

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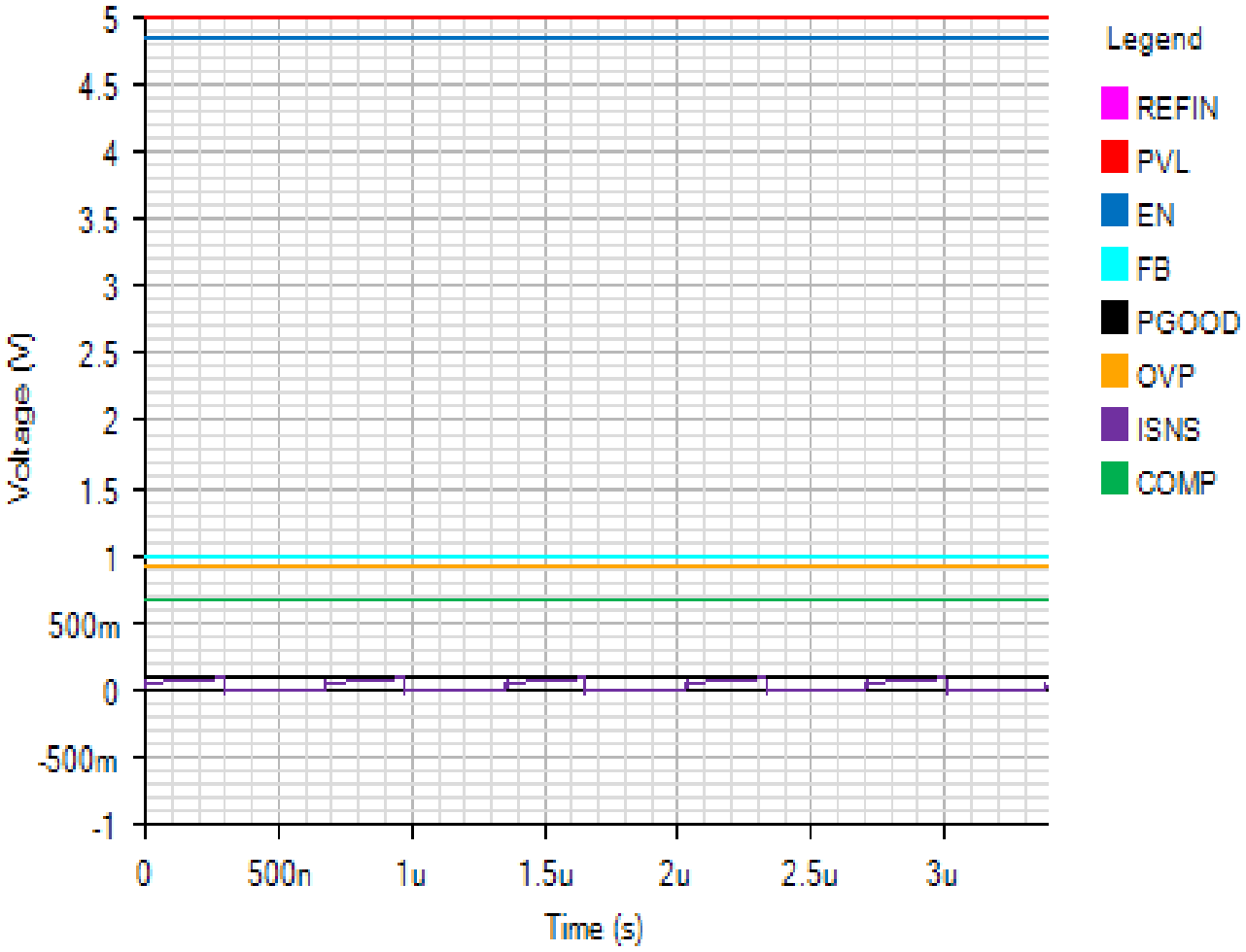

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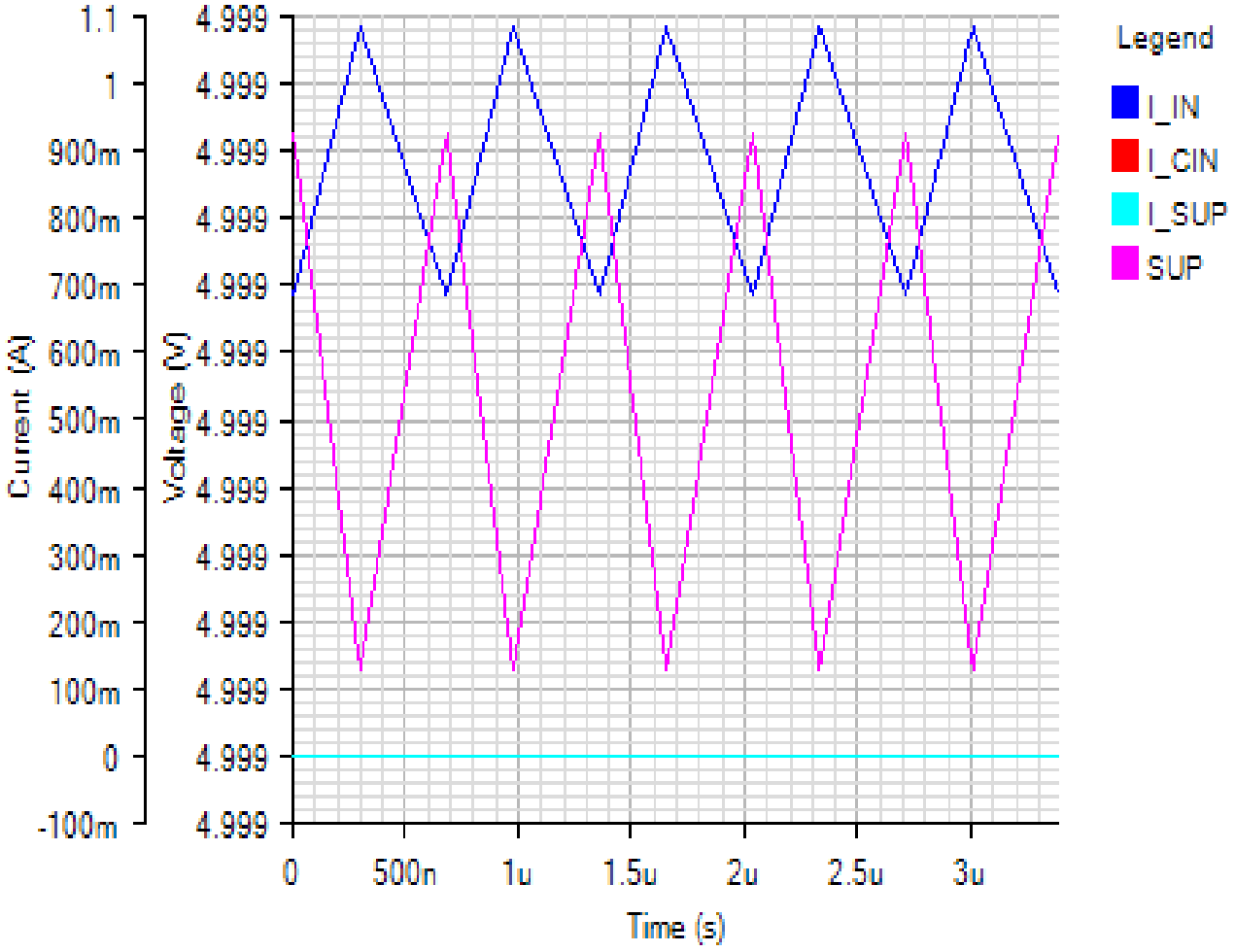

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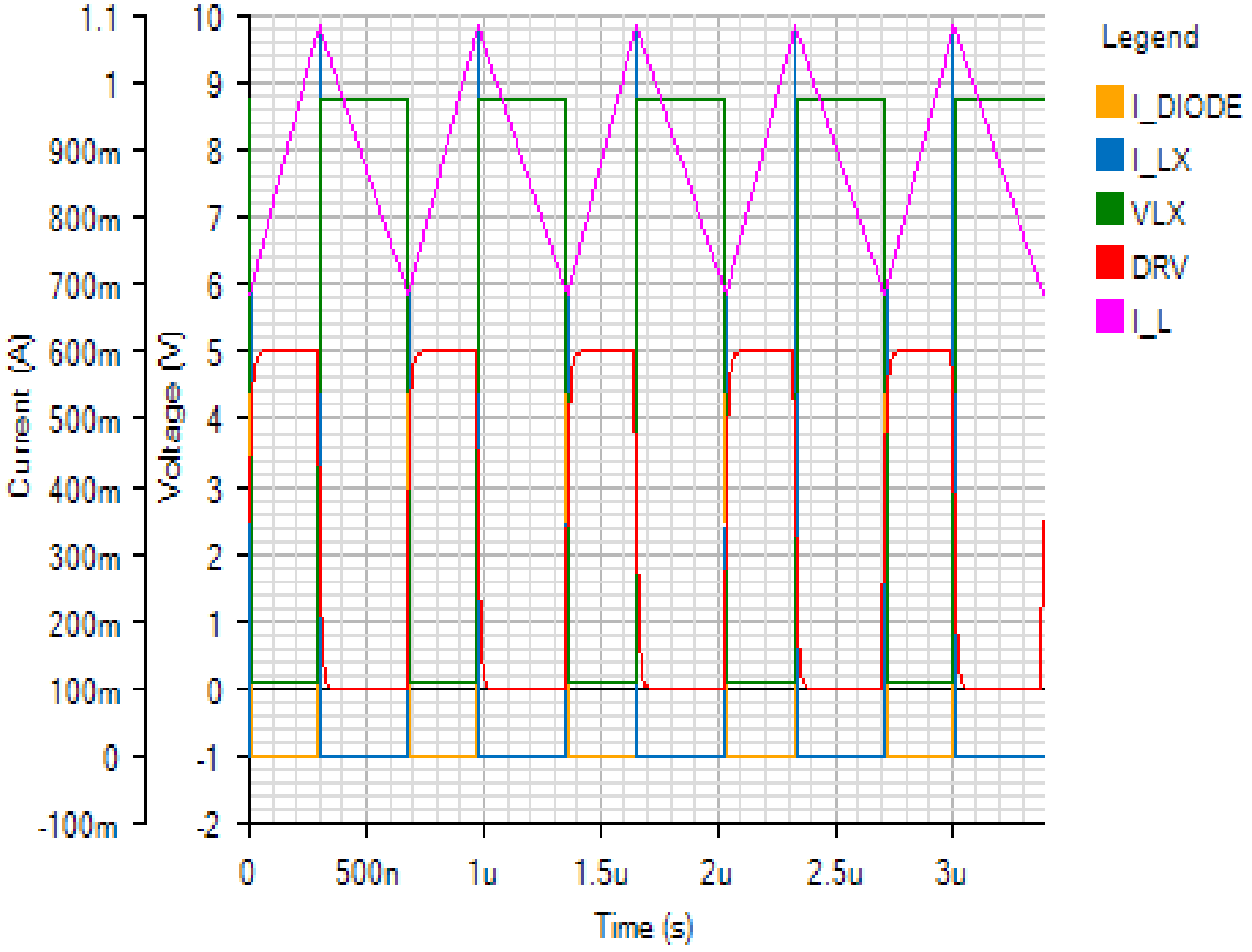

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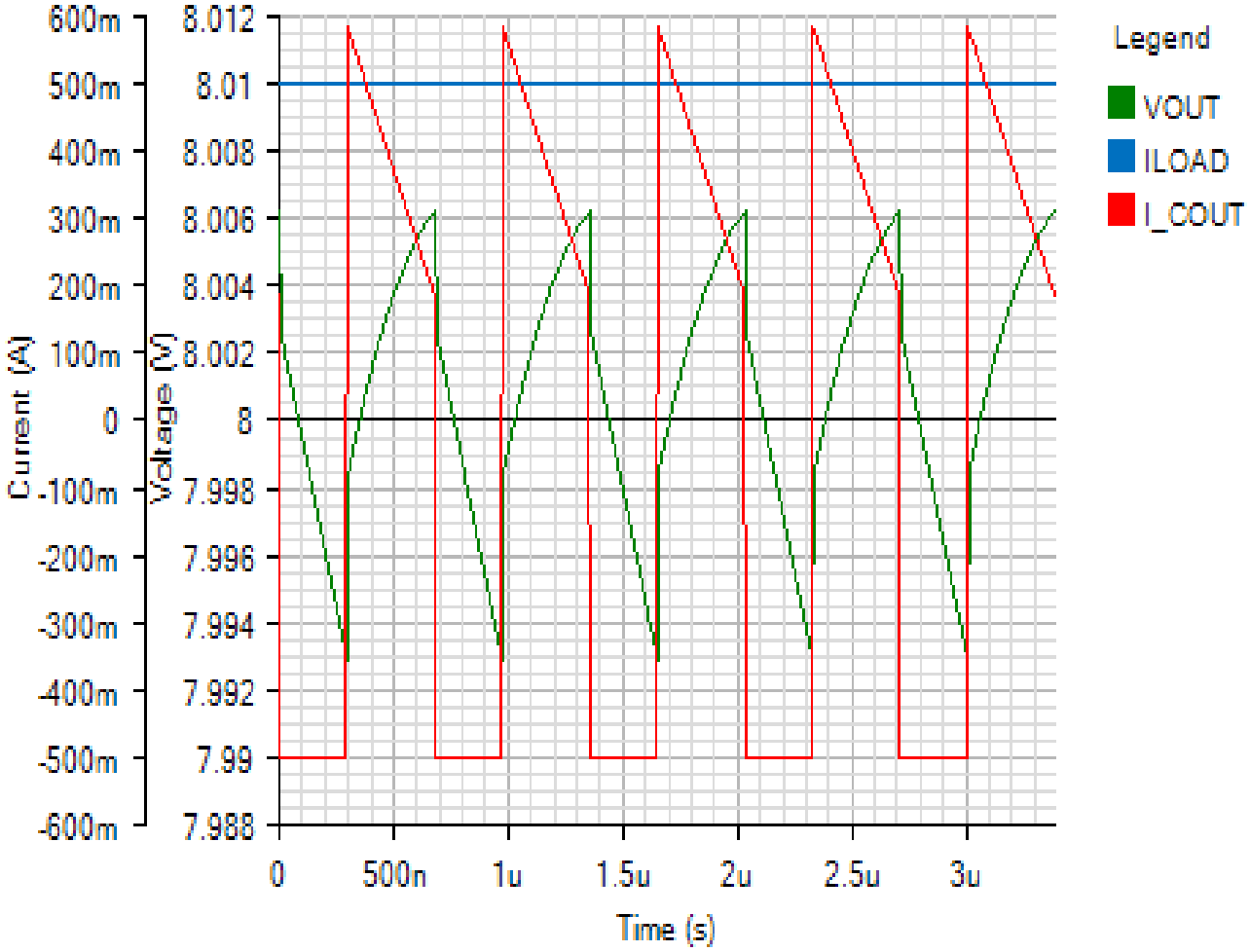
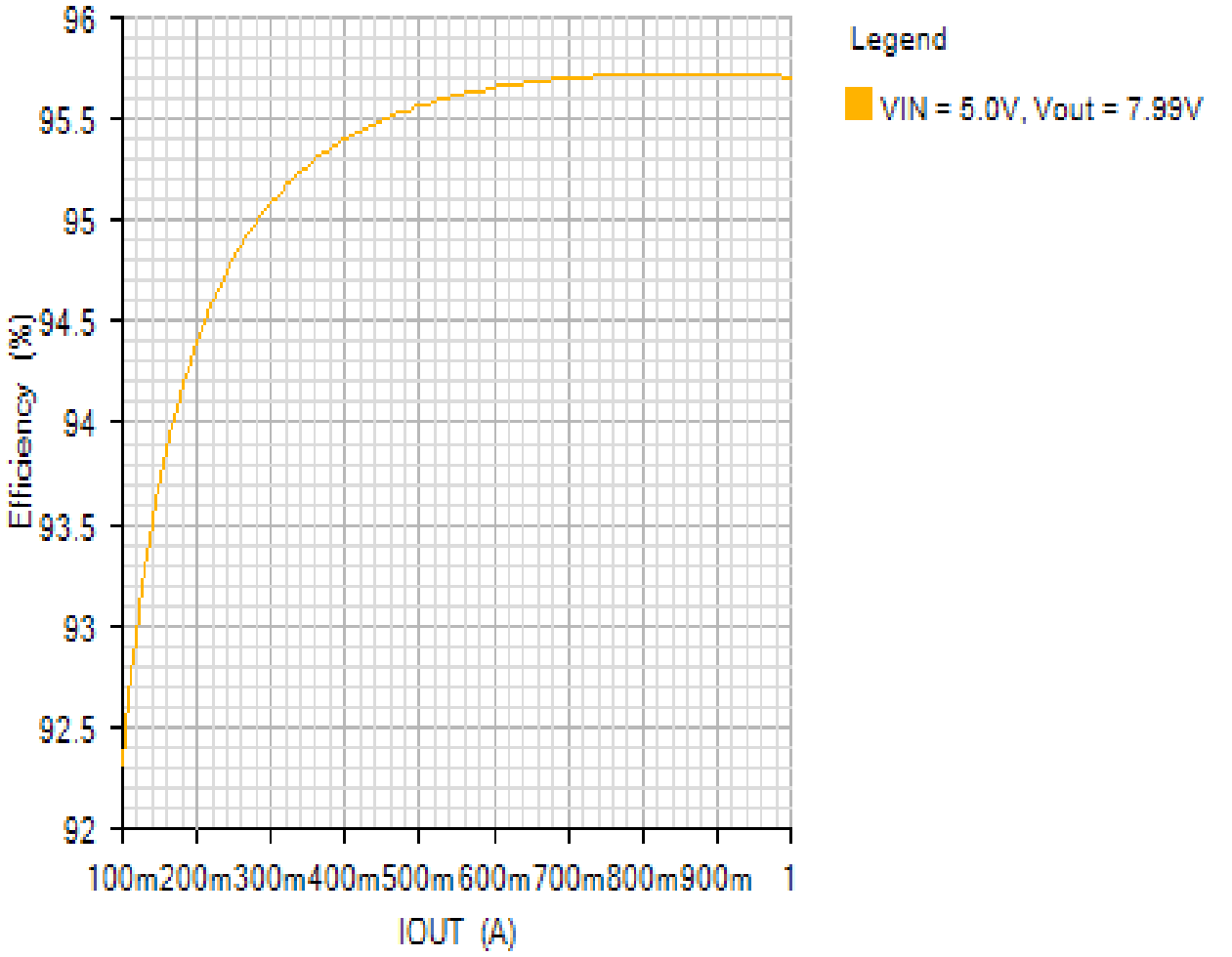


Efficiency - Fri Nov 16 2018 18:07:31

EFFICIENCY_PLOT Default



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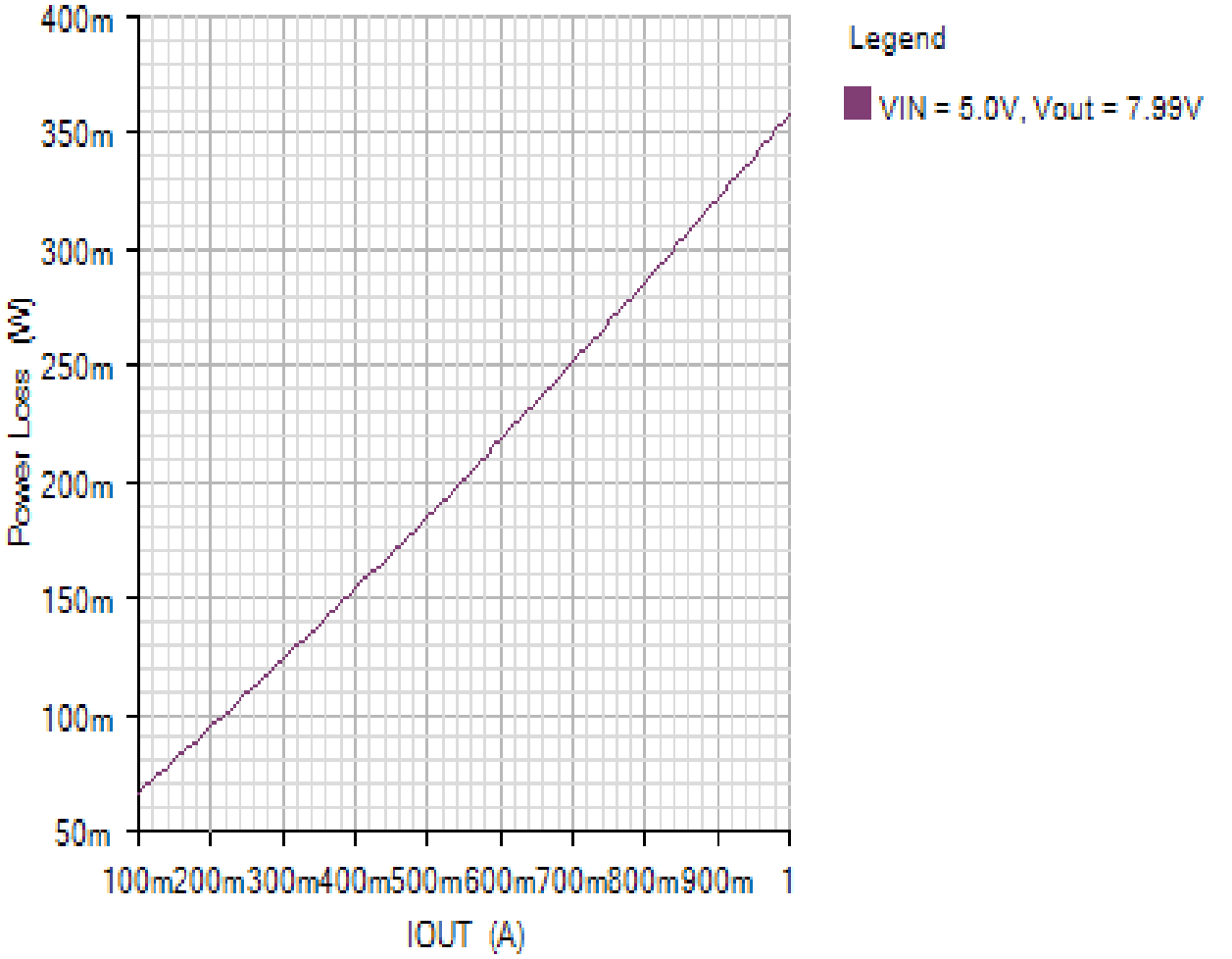


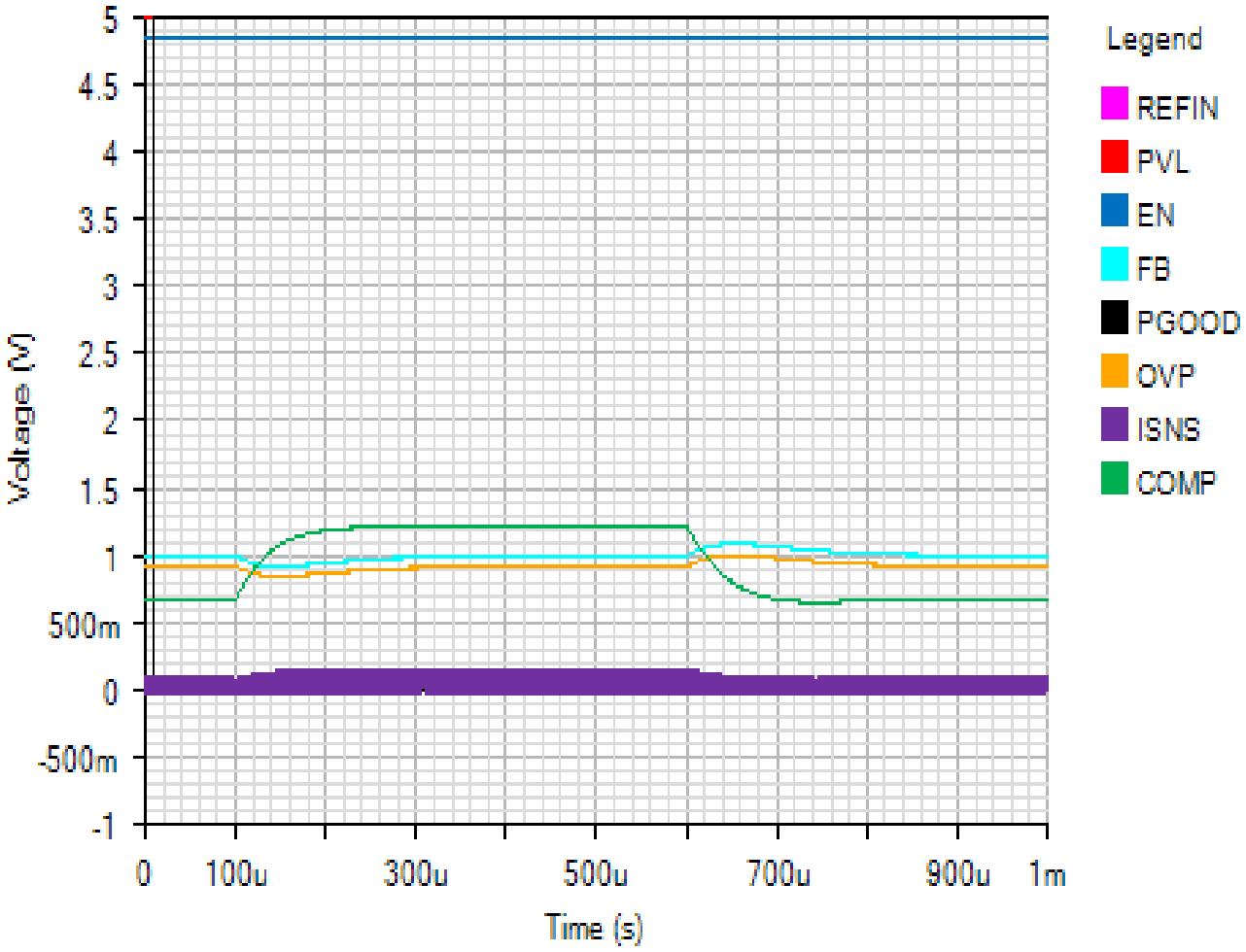
Losses

Component	Loss (W)	% of total

Component	Loss (W)	% of total
MAX16990/2 IC	0.00625	1.7
Lout	0.013062	3.6
Diode	0.250866	70
Cin	0.000054	0
MOSFET and Sense Resistor	0.088185	24.6
Cout	0.00005	0
Total	0.358467	100

Load Step - Fri Nov 16 2018 18:07:31

IC Default



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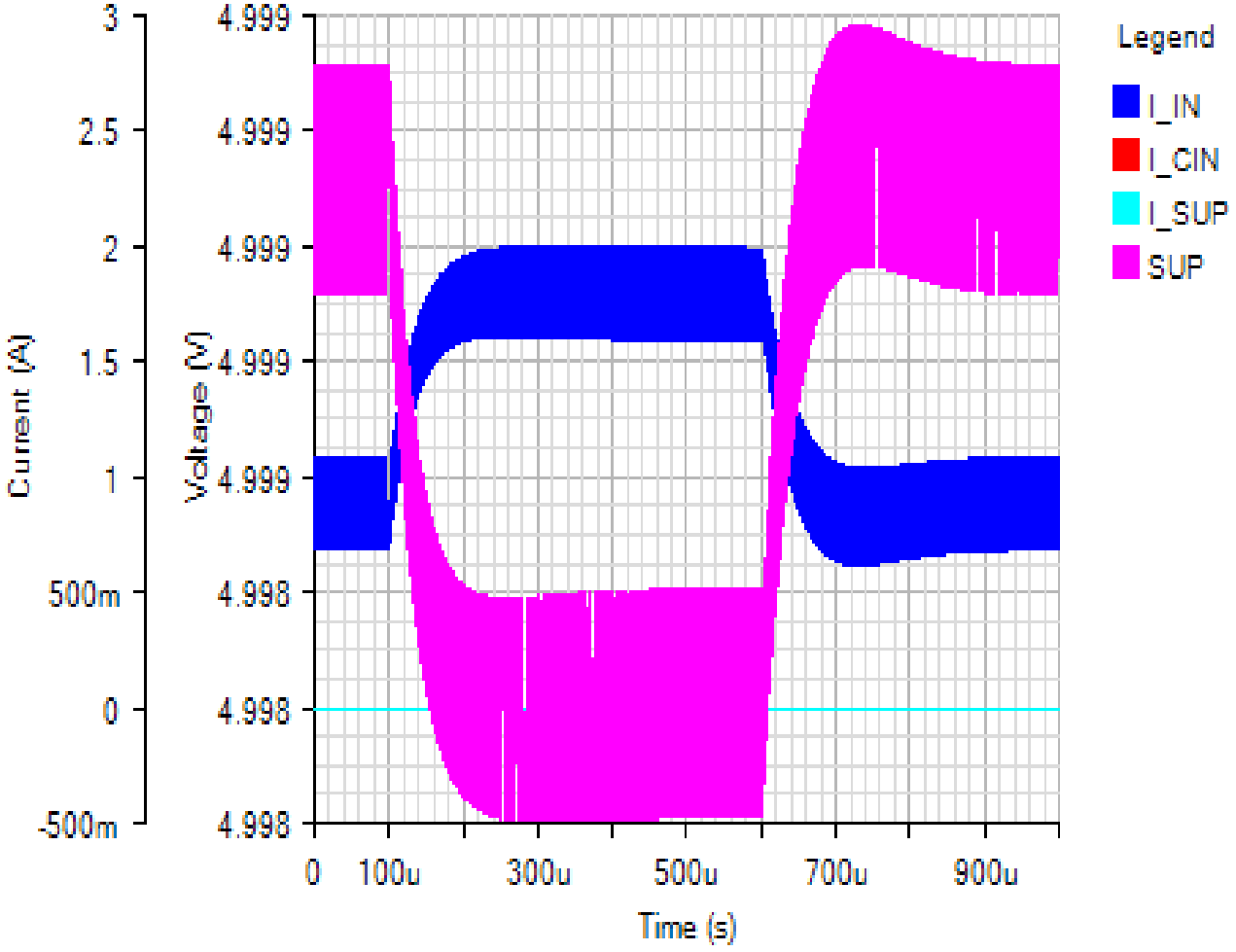

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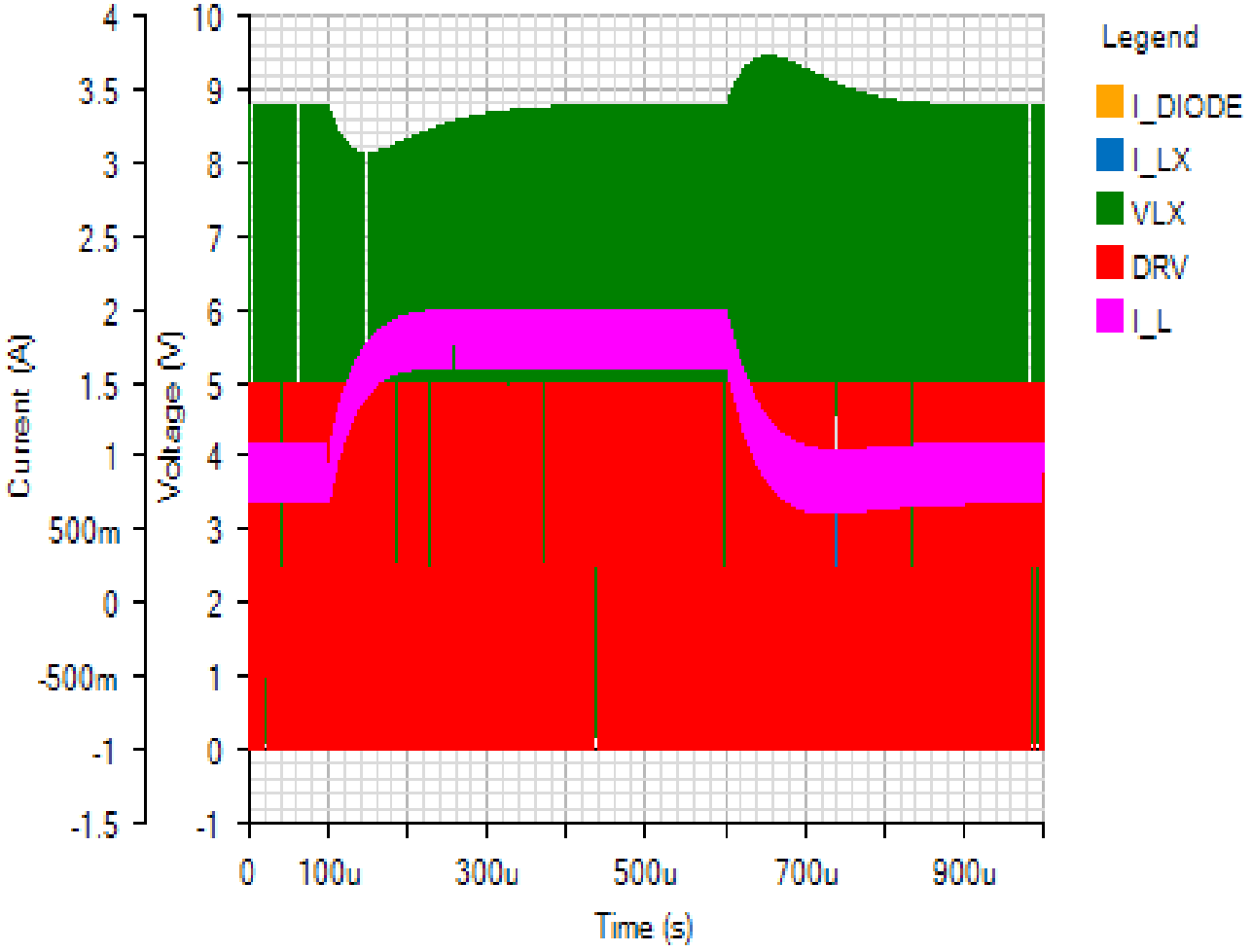

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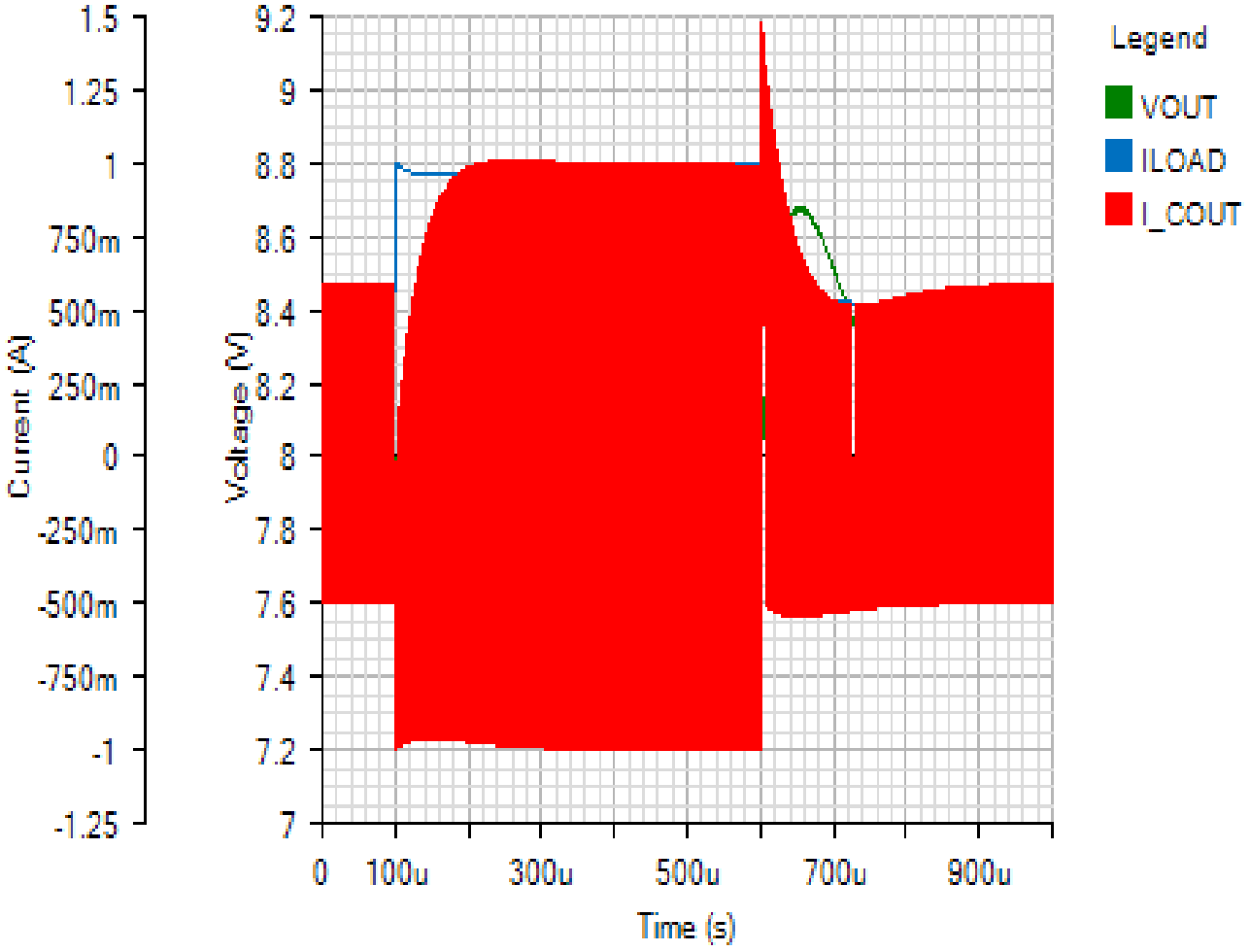
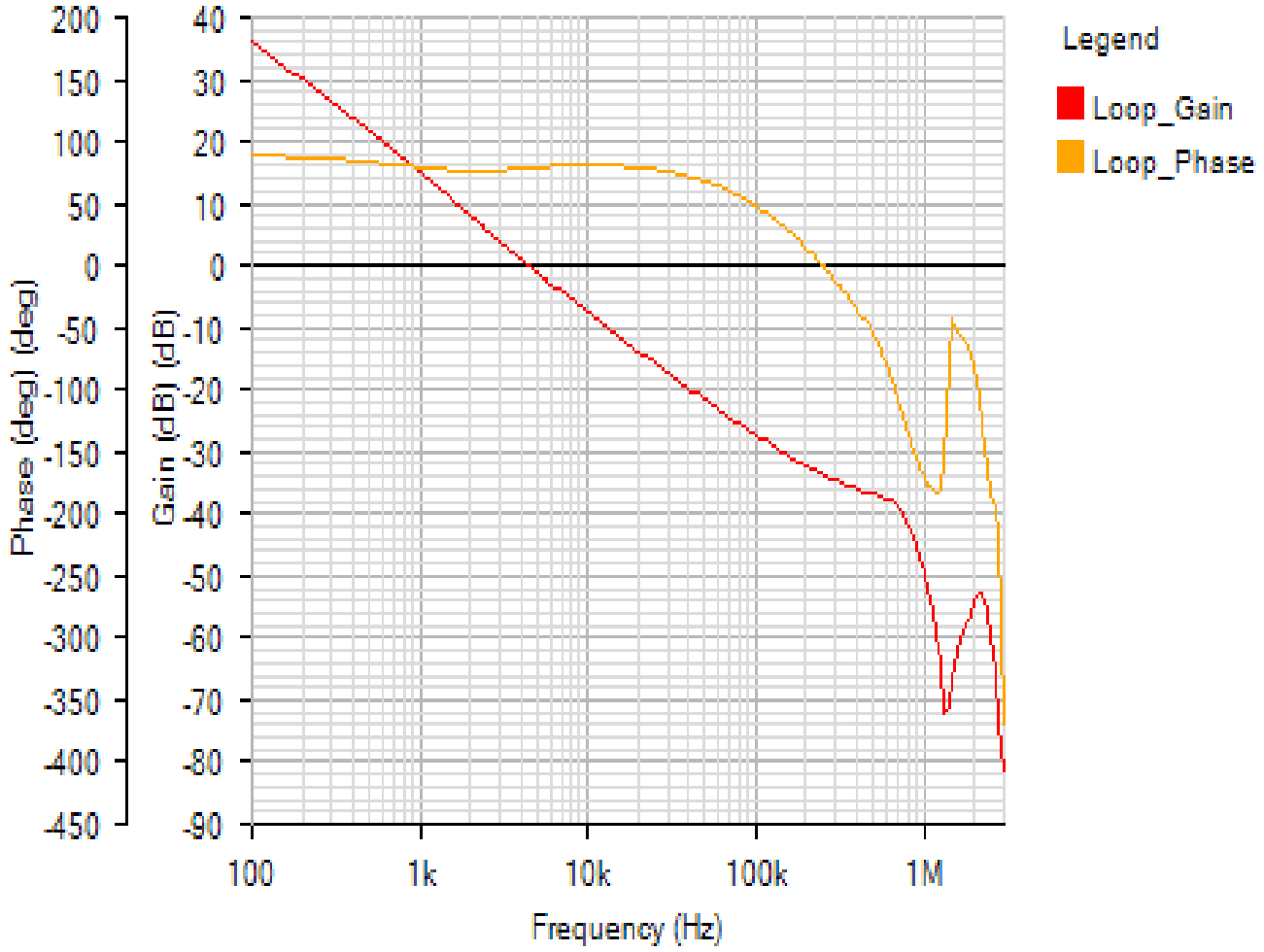


AC Loop - Fri Nov 16 2018 18:07:31

BODE Default



Phase Margin: 78.57° at a crossover frequency of 4.4kHz