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	3%
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
Switching Frequency	500kHz
Ambient Temperature	25°C
Inductor Current Ratio (LIR)	0.3
Overvoltage Protection Threshold	9.6V

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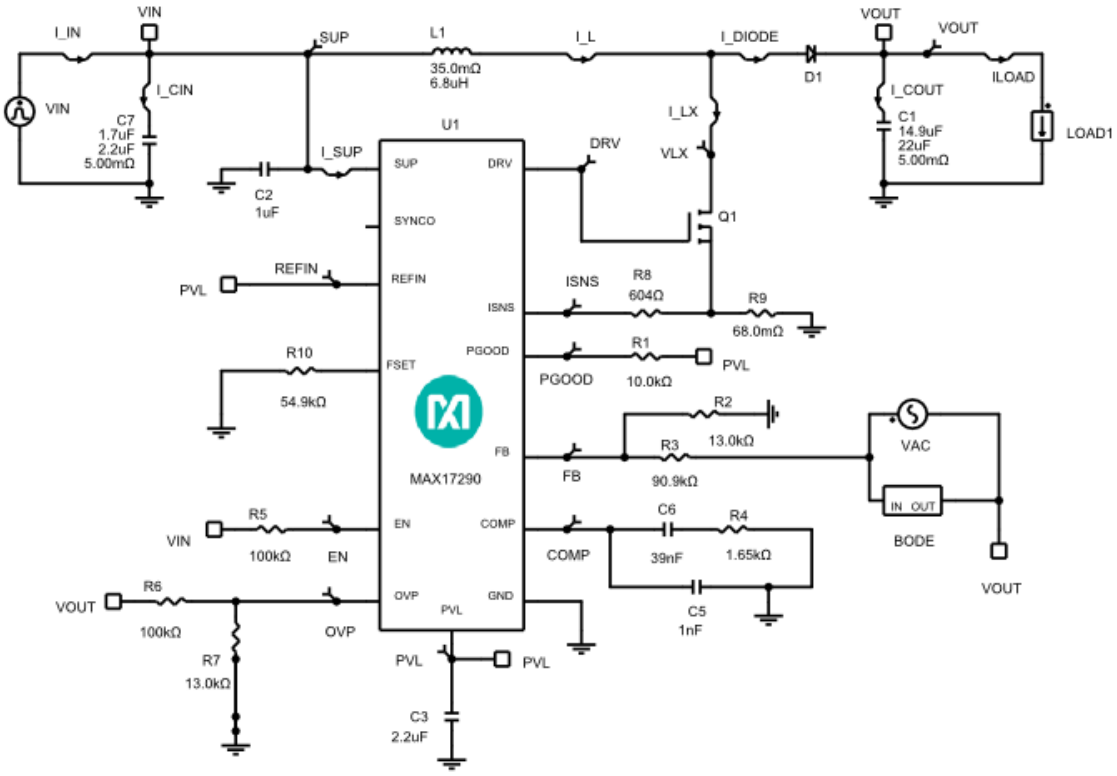
Schematic



BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX17290	Maxim Integrated	2.5V to 36V, 2.5MHz, PWM Boost Controller with 4µA Shutdown Current and Reduced EMI
C1	1	GRM32ER71E226ME15	Murata	Cap Ceramic 22uF 25V 1210 125C
C2	1	08055D105KAT2A	AVX	Cap Ceramic 1uF 50V X5R 10% Pad SMD 0805 85°C T/R
C3	1	C1608X7R1A225K080AC	TDK	Cap Ceramic 2.2uF 10V X7R 10% Pad SMD 0603 125°C T/R
C5	1	C1608X7R2A102K080AA	TDK	Cap Ceramic 0.001uF 100V X7R 10% Pad SMD 0603 125°C T/R
C6	1	08055C393KAT2A	AVX	Cap Ceramic 0.039uF 50V X7R 10% Pad SMD 0805 125°C T/R
C7	1	GRM219R71C225KE15	Murata	Cap Ceramic 2.2uF 16V 0805 125C
D1	1	SS22-E3/52T	Vishay	Diode Schottky 20V 2A 2-Pin SMB T/R
L1	1	7447779006	Wurth Electronics	INDUCTOR POWER 6.8UH 2.91A SMD
				Trans MOSFET N-CH 30VDS

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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	ERJ2RKF9092X	Panasonic	Res Thick Film 0402 90.9K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	AR0402JR-071K65	Yageo	Res Thick Film 0402 1.65K Ohm 5% 0.063W(1/16W) ±100ppm/°C Epoxy 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	CRCW0603604RJNEA	Vishay	Res Thick Film 0603 604 Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R9	1	RLP73M2AR068JTD	TE Connectivity	Res Thick Film 0805 0.068 Ohm 5% 0.25W(1/4W) ±400ppm/°C Epoxy Pad SMD Automotive T/R
R10	1	AR0402JR-0754K9	Yageo	Res Thick Film 0402 54.9K Ohm 5% 0.063W(1/16W) ±100ppm/°C Epoxy Pad SMD Automotive T/R

Simulation Results

Efficiency - Wed Jan 02 2019 14:59:44

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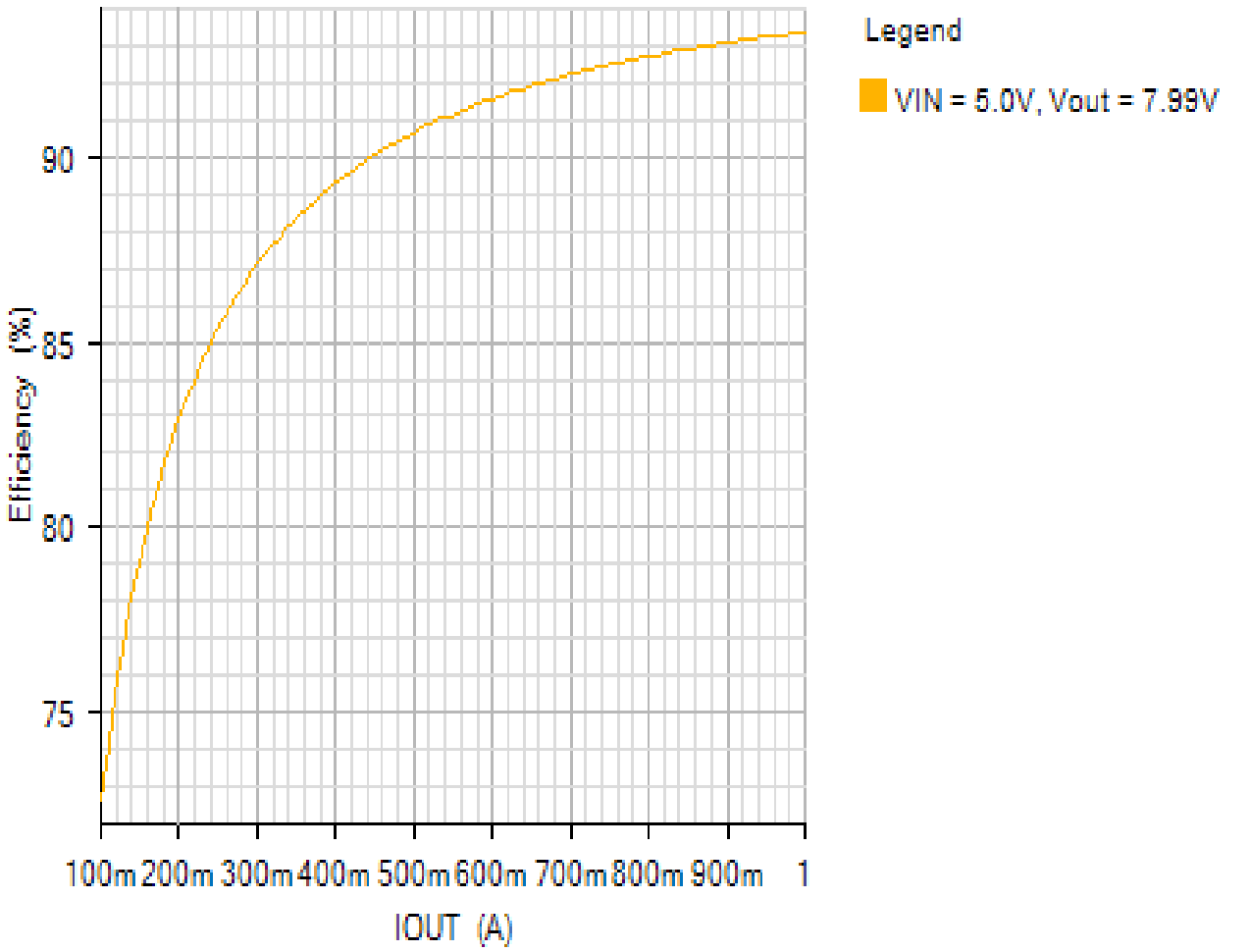
EFFICIENCY_PLOT Default



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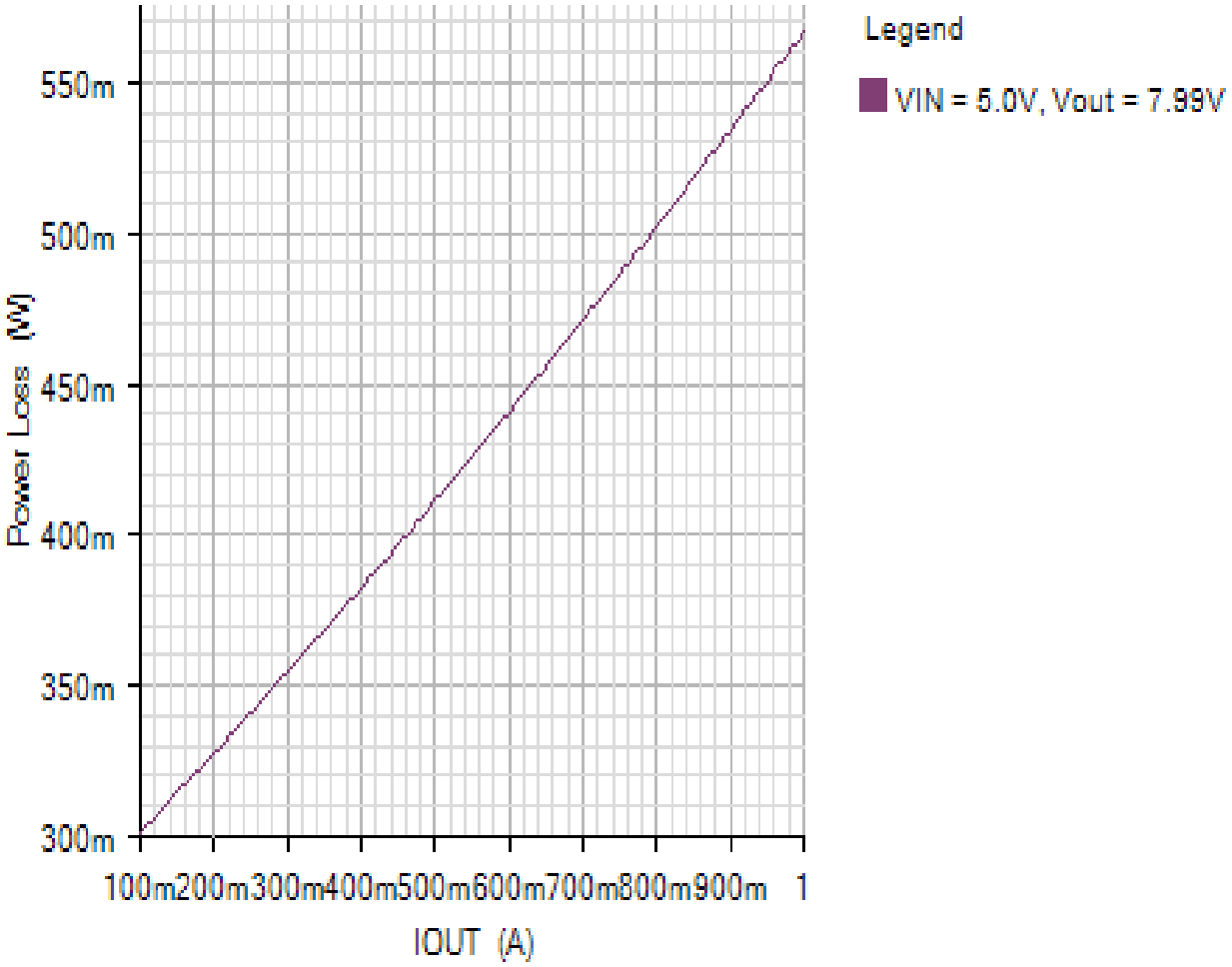
POWER_LOSS_PLOT Default



Losses

Component	Loss (W)	% of total

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Component	Loss (W)	% of total
MAX17290/2 IC	0.00625	1.1
Cout	0.02644	4.7
Lout	0.008998	1.6
Diode	0.250866	44.2
Cin	0.028555	5
MOSFET and Sense Resistor	0.246062	43.4
Total	0.567172	100

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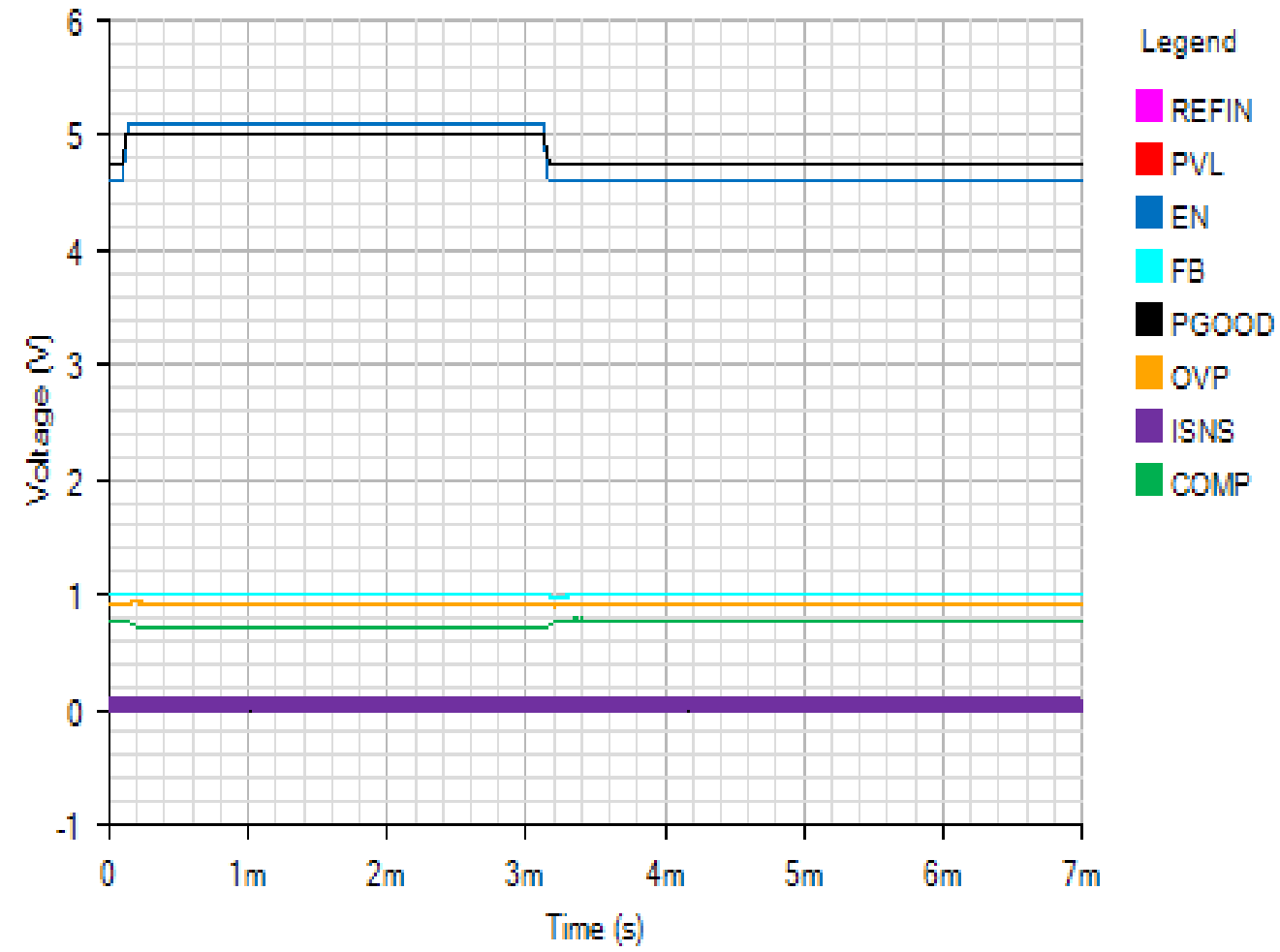
Line Transient - Wed Jan 02 2019 14:59:44

IC Default



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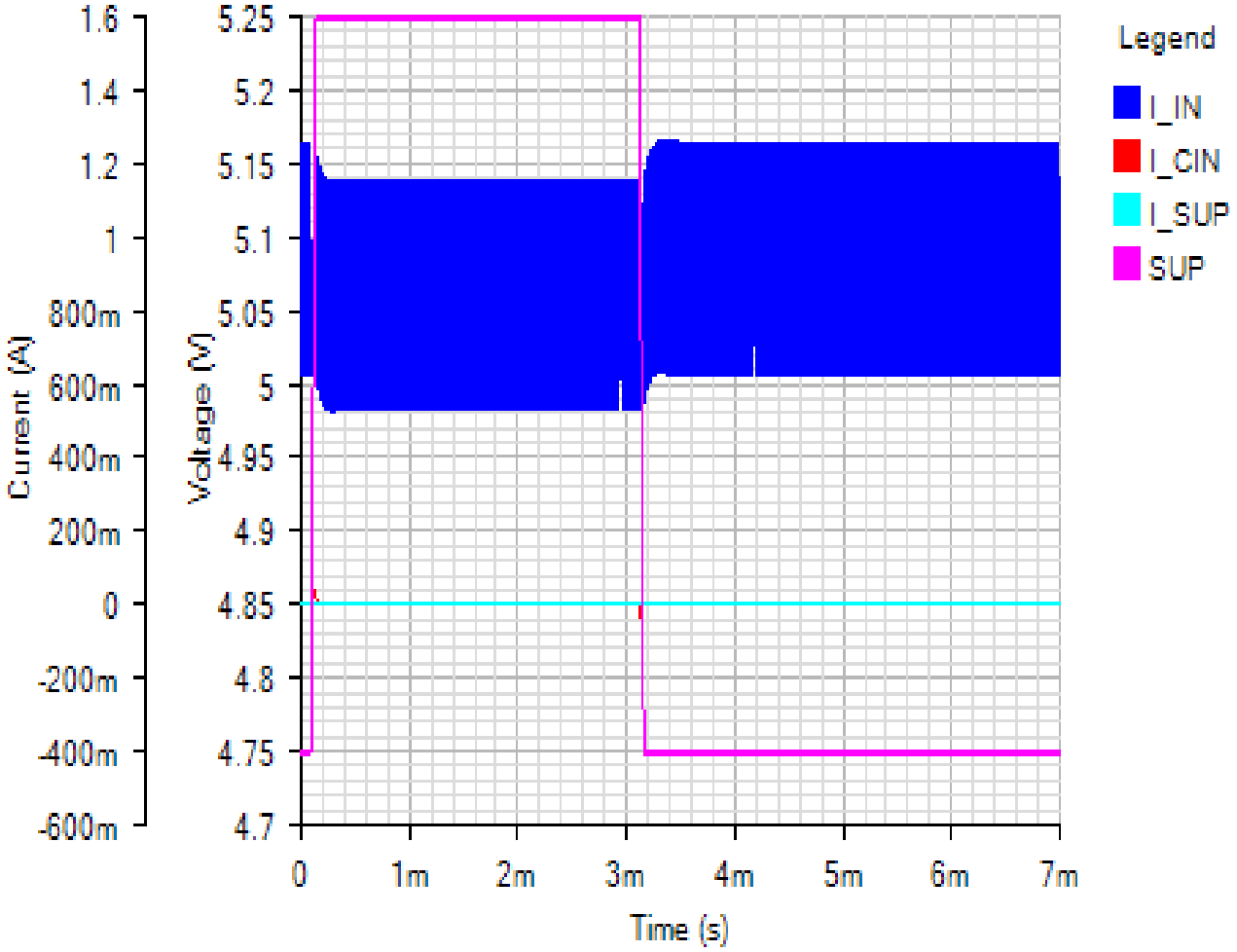

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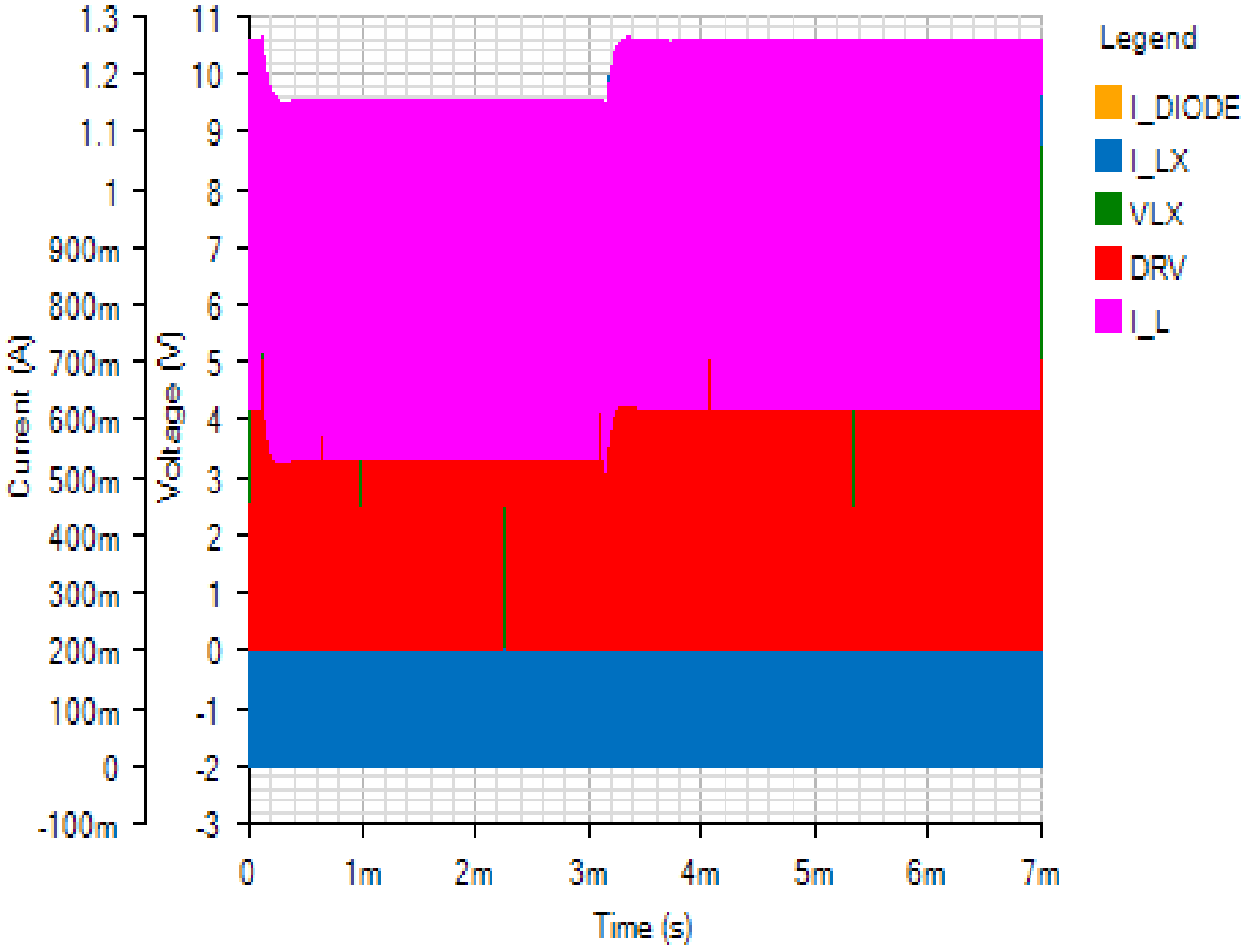
SWITCHING Default



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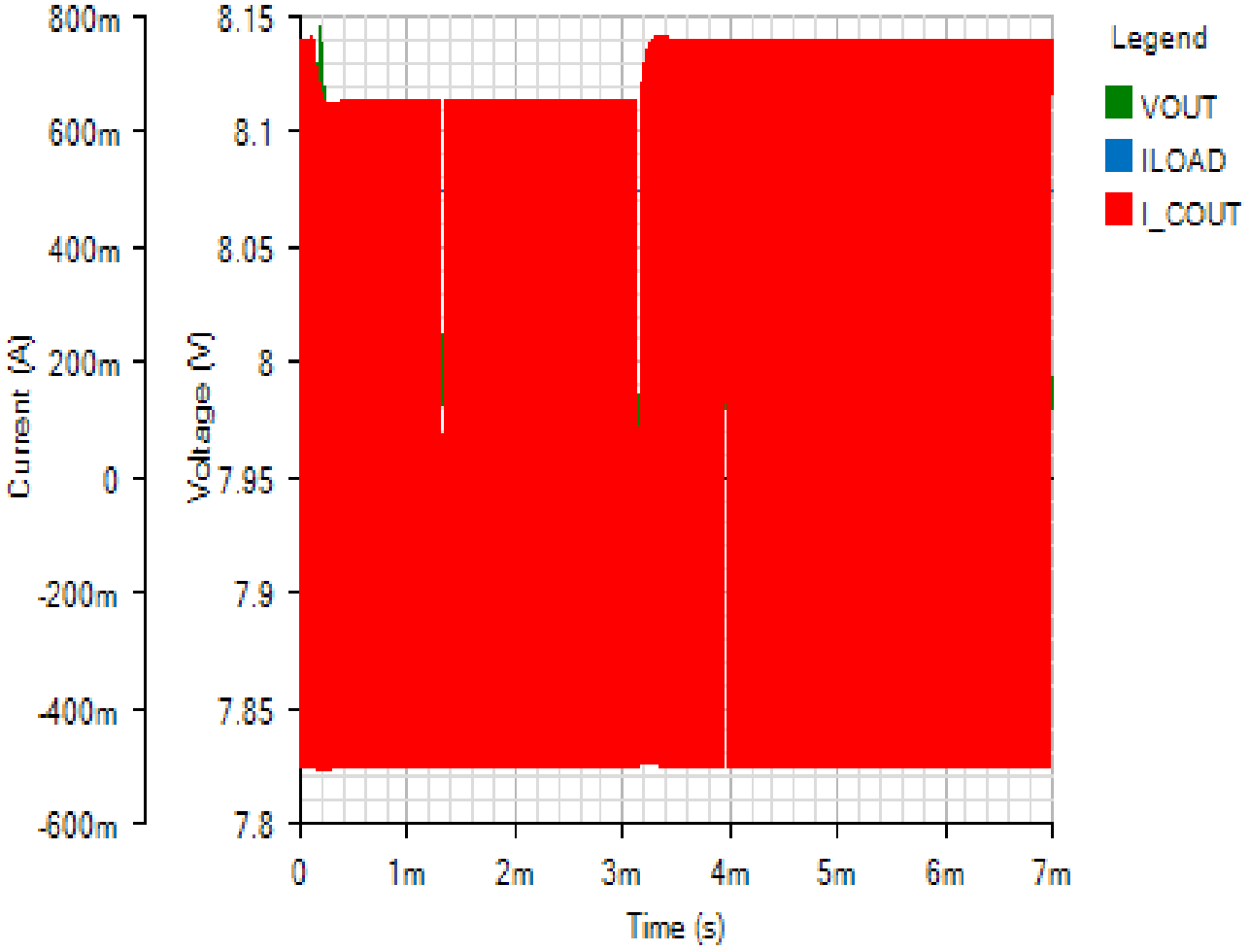
OUTPUT Default



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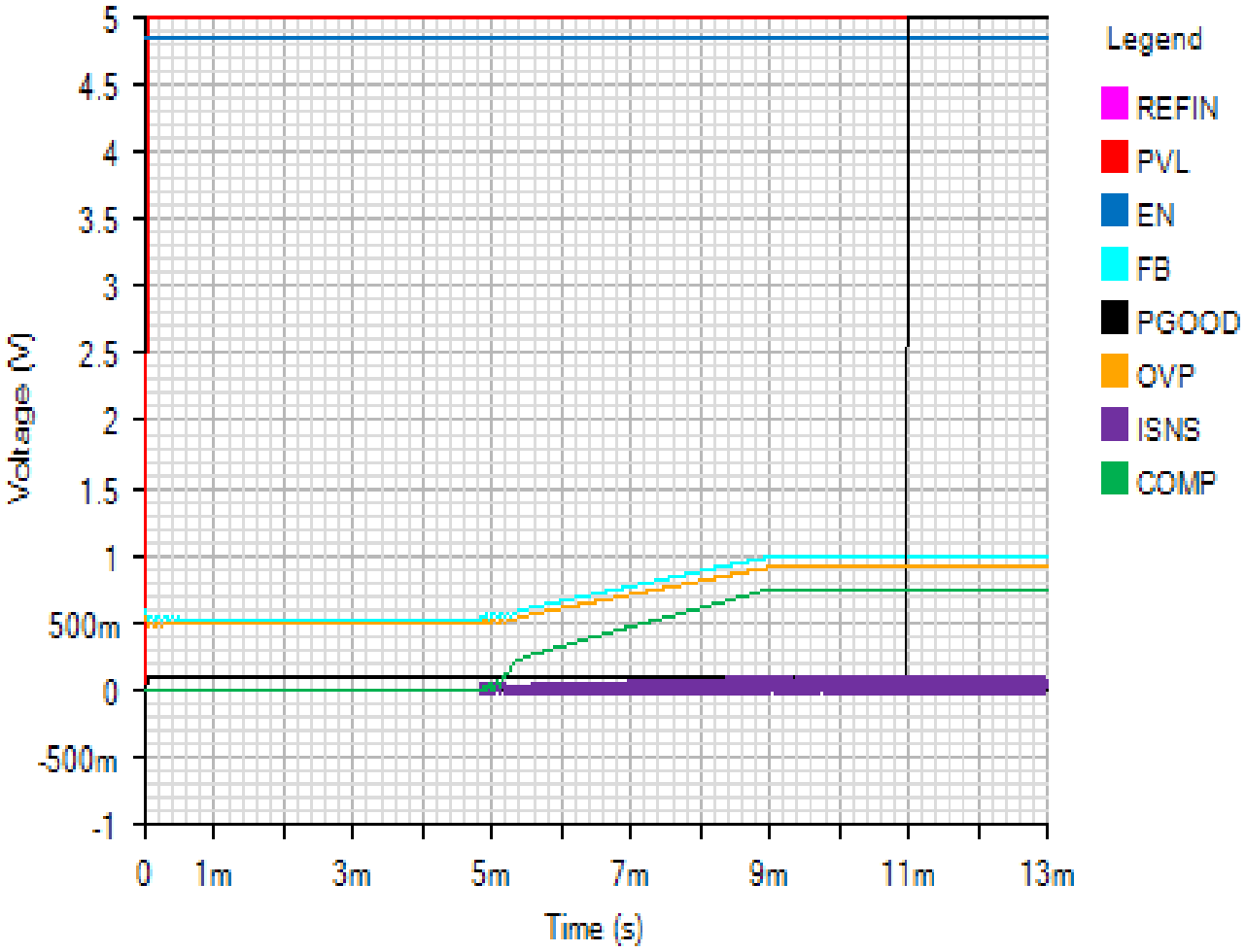
Start Up - Wed Jan 02 2019 14:59:44

IC Default



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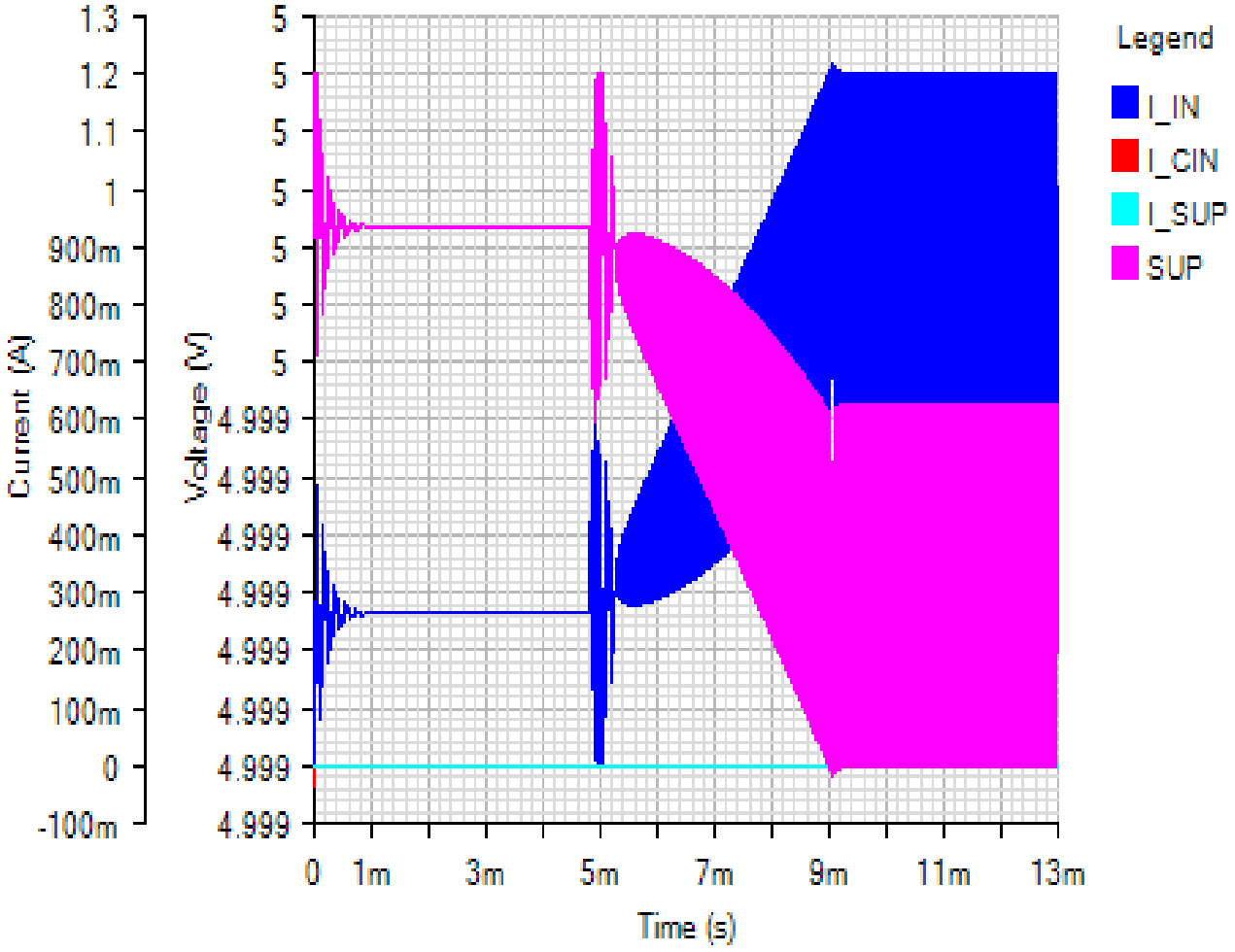

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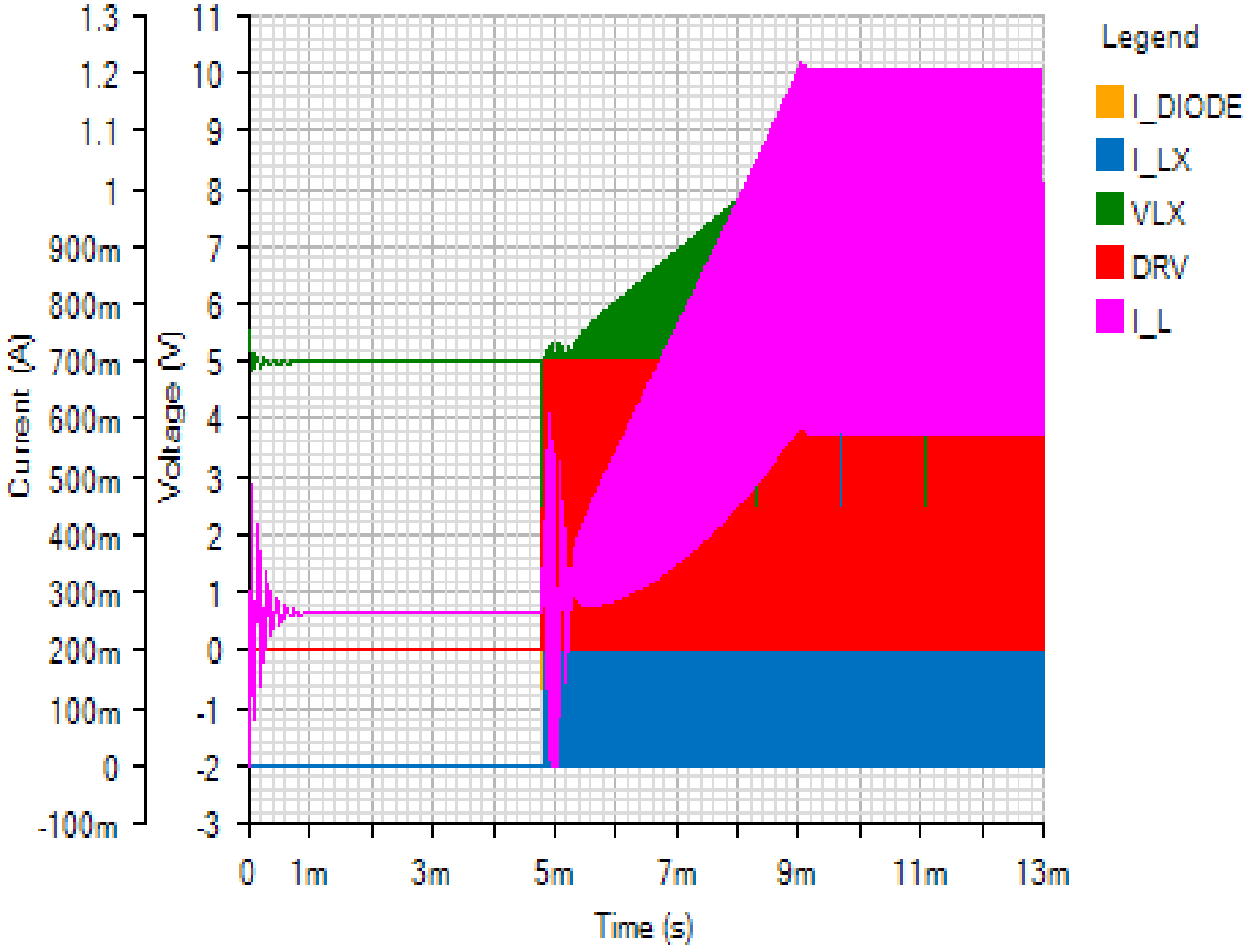

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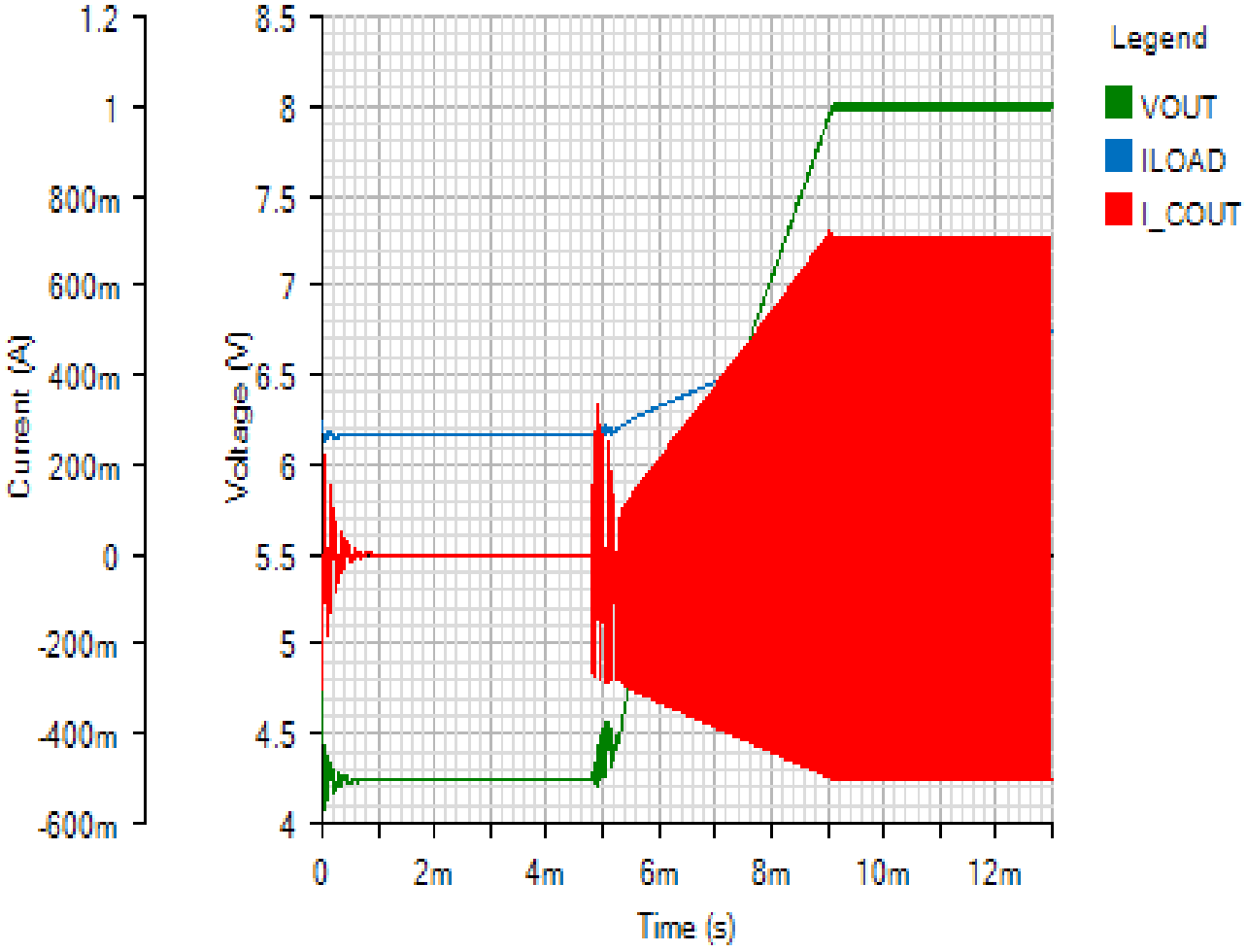

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Load Step - Wed Jan 02 2019 14:59:44

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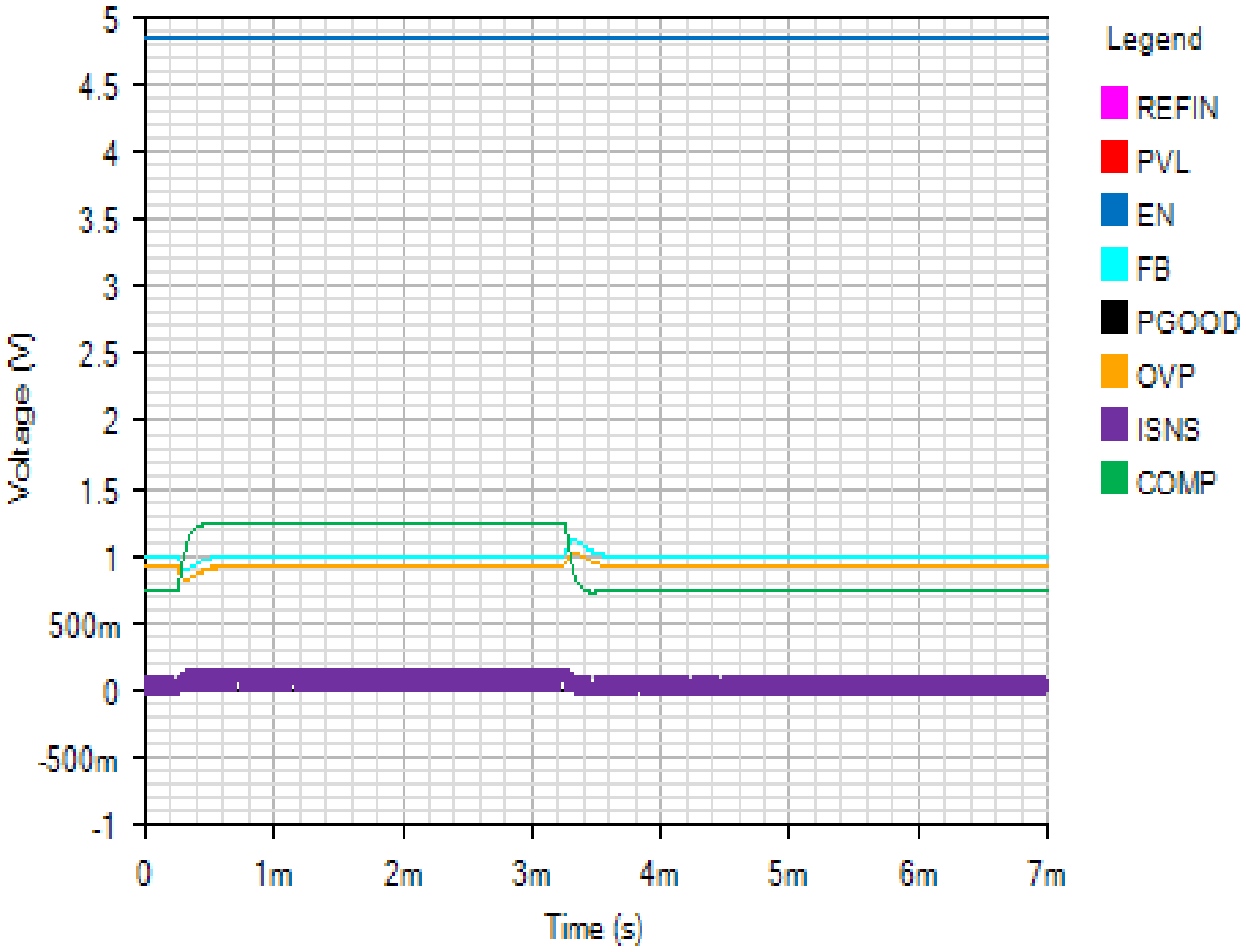

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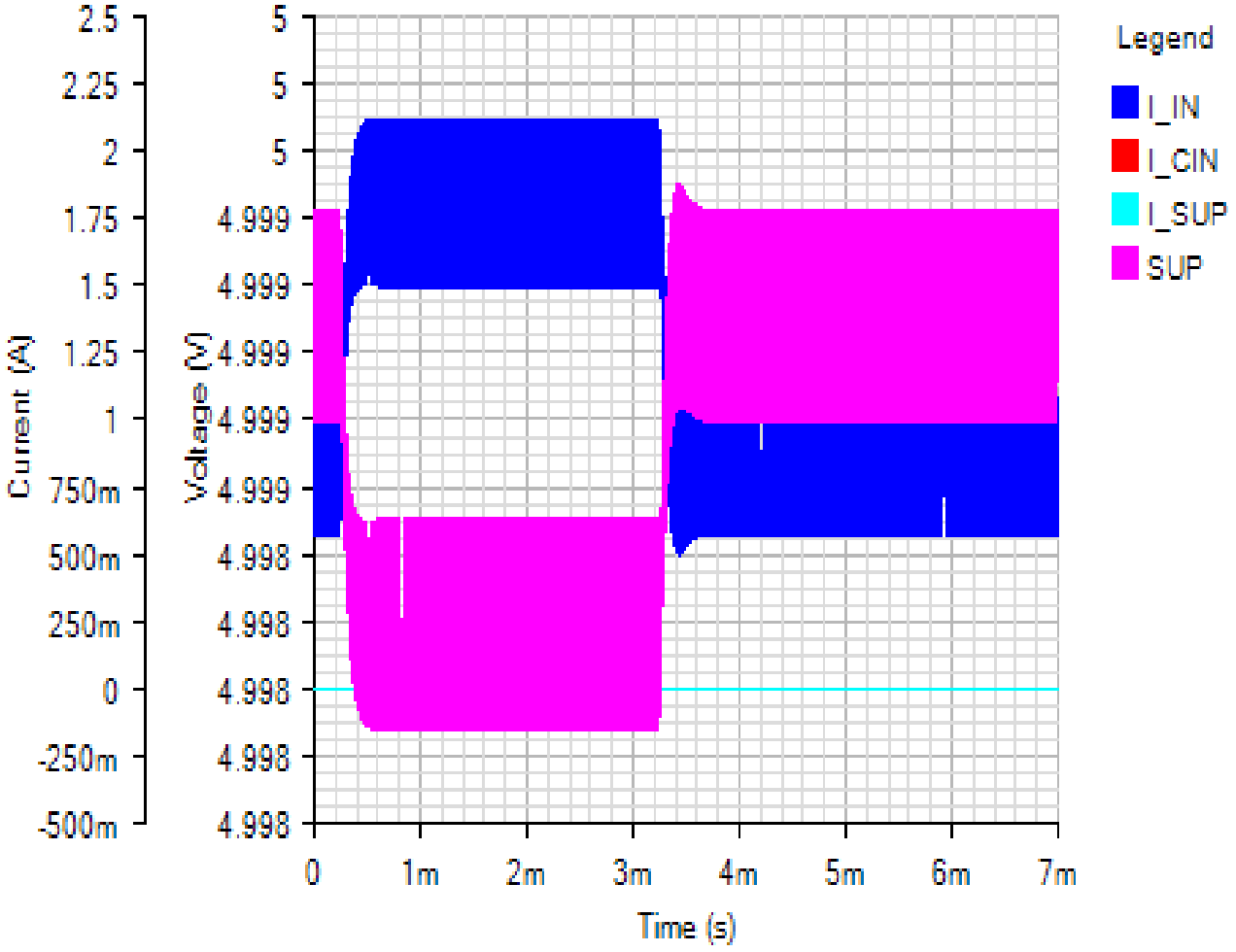
INPUT Default



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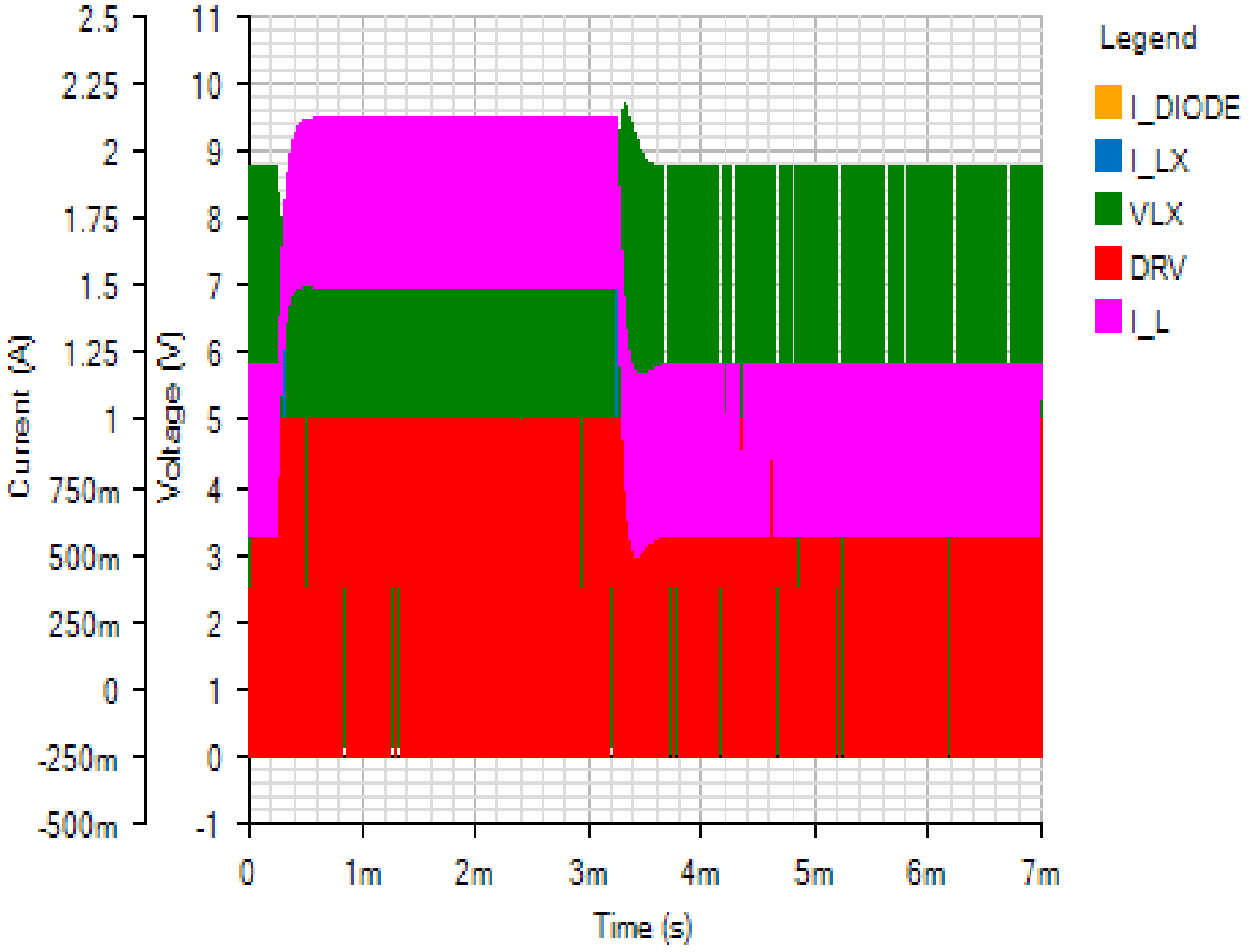

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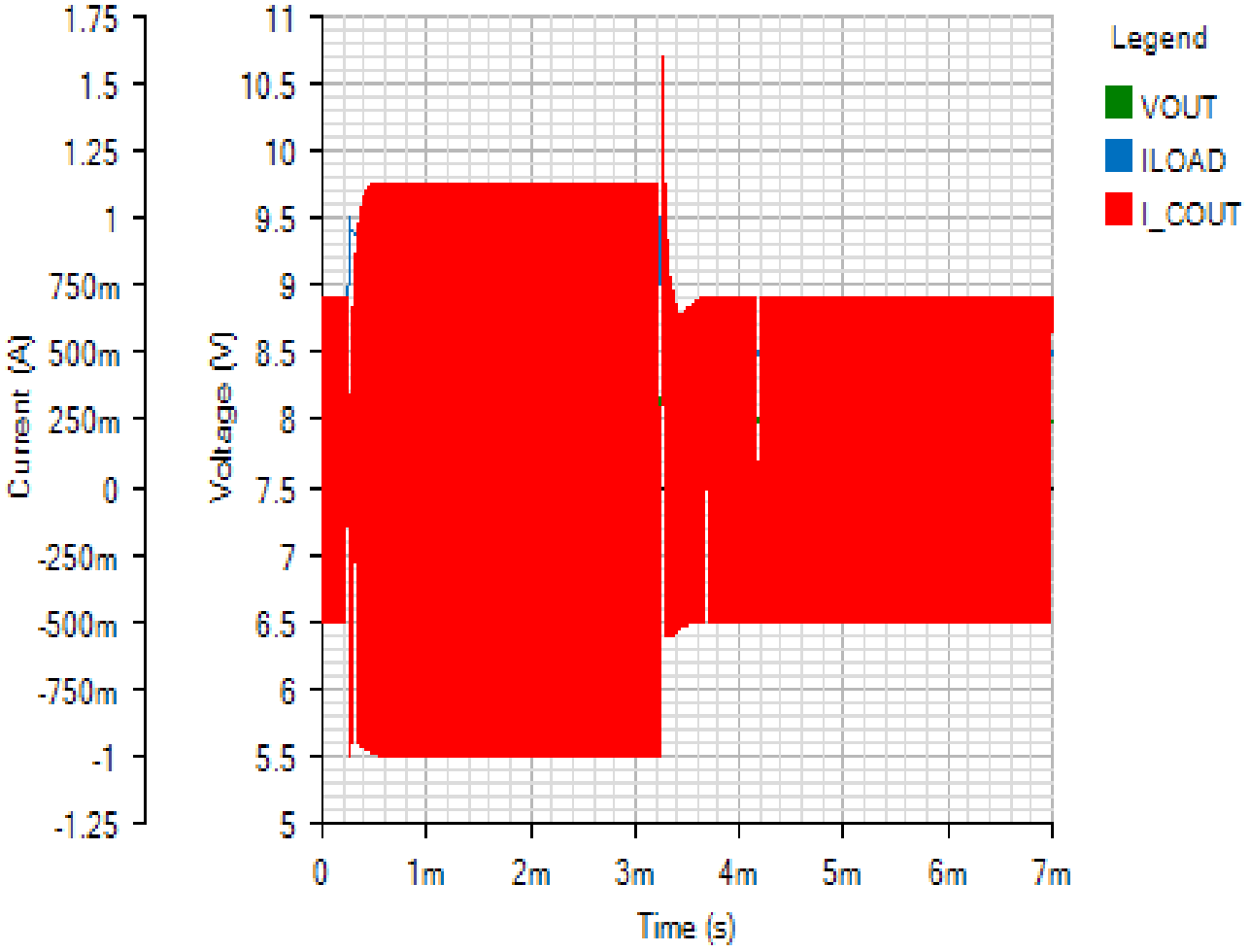

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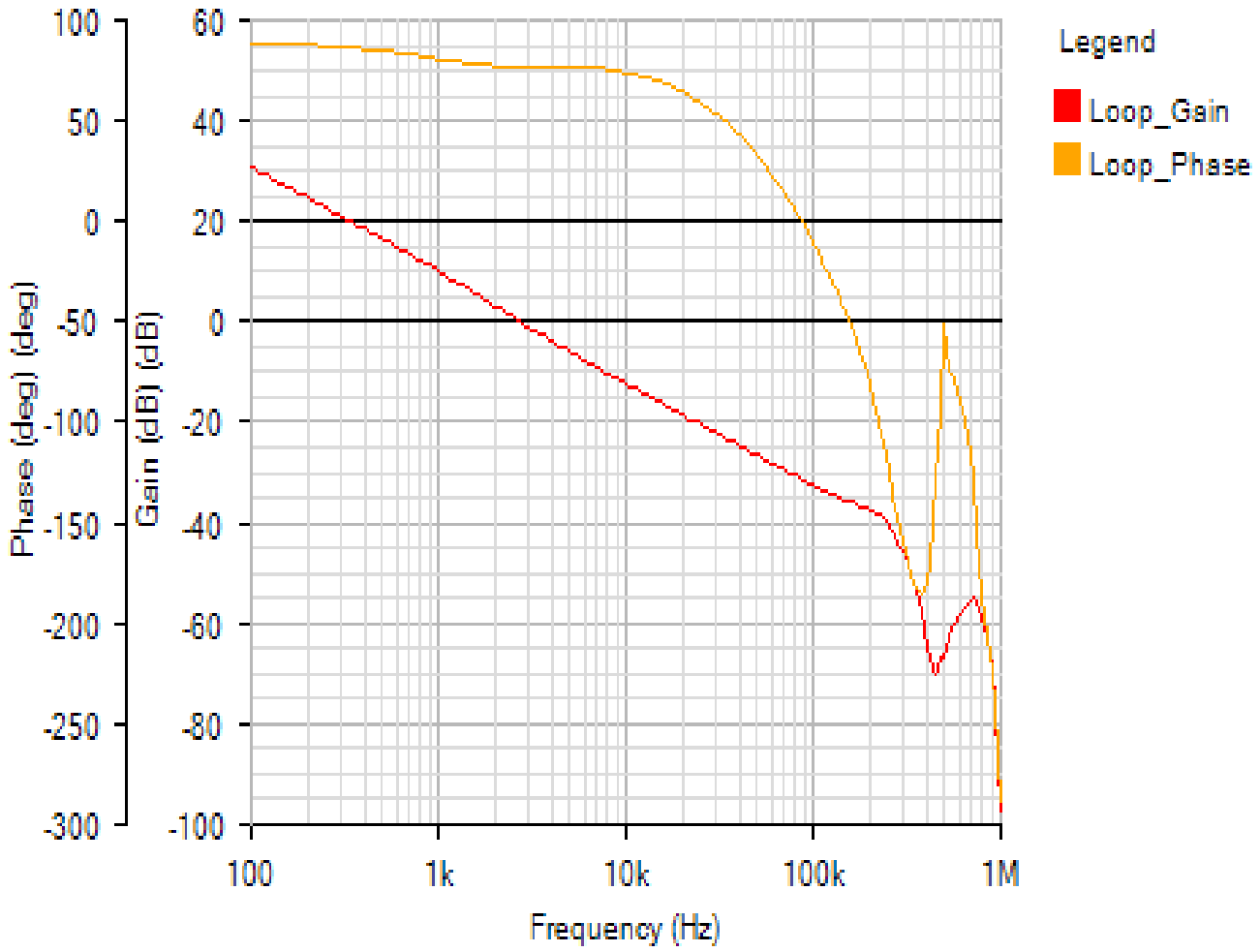
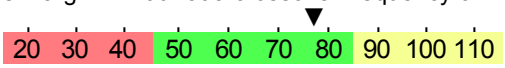
AC Loop - Wed Jan 02 2019 14:59:44

BODE Default



Phase Margin: 77.06° at a crossover frequency of 2.7kHz



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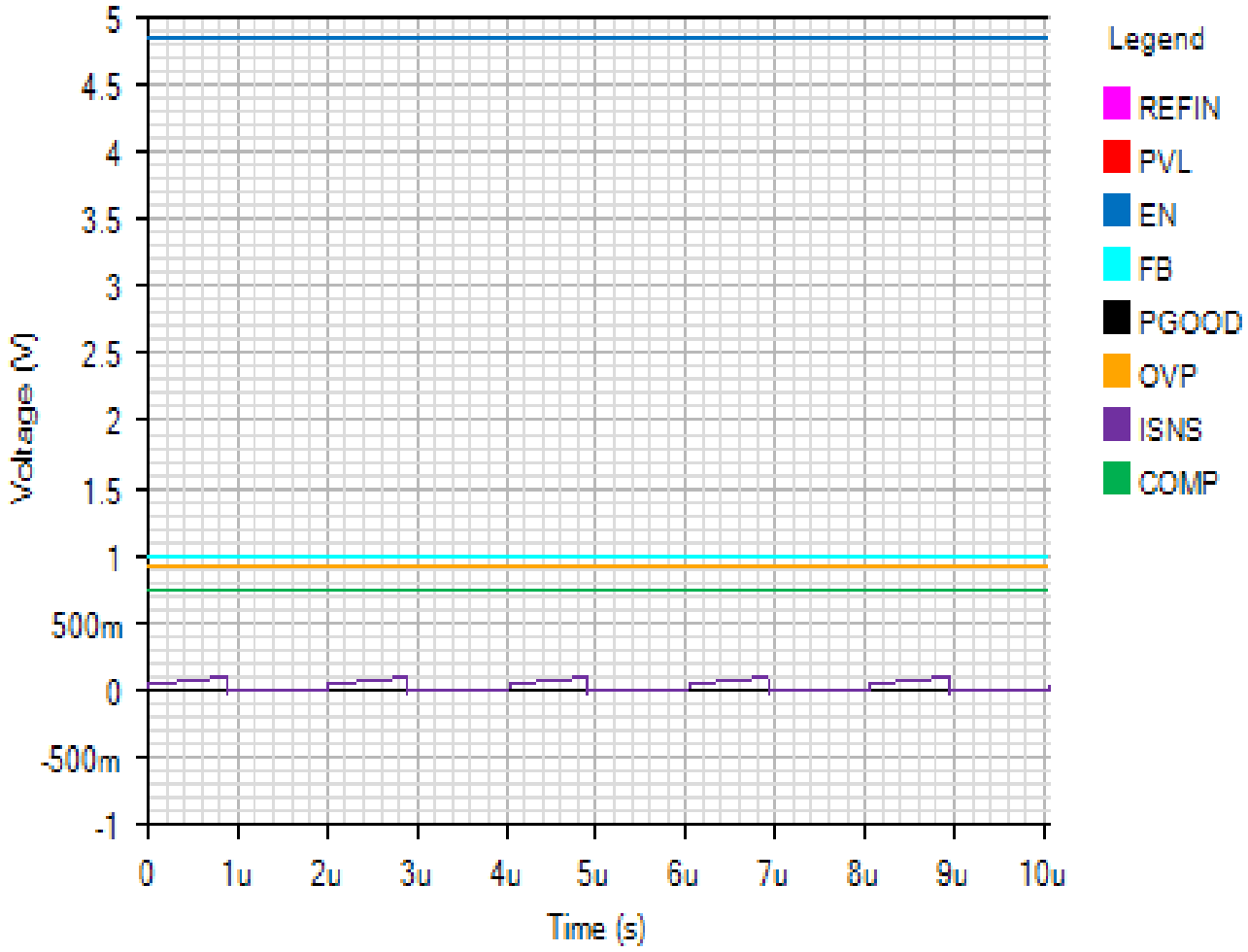
Steady State - Wed Jan 02 2019 14:59:44

IC Default



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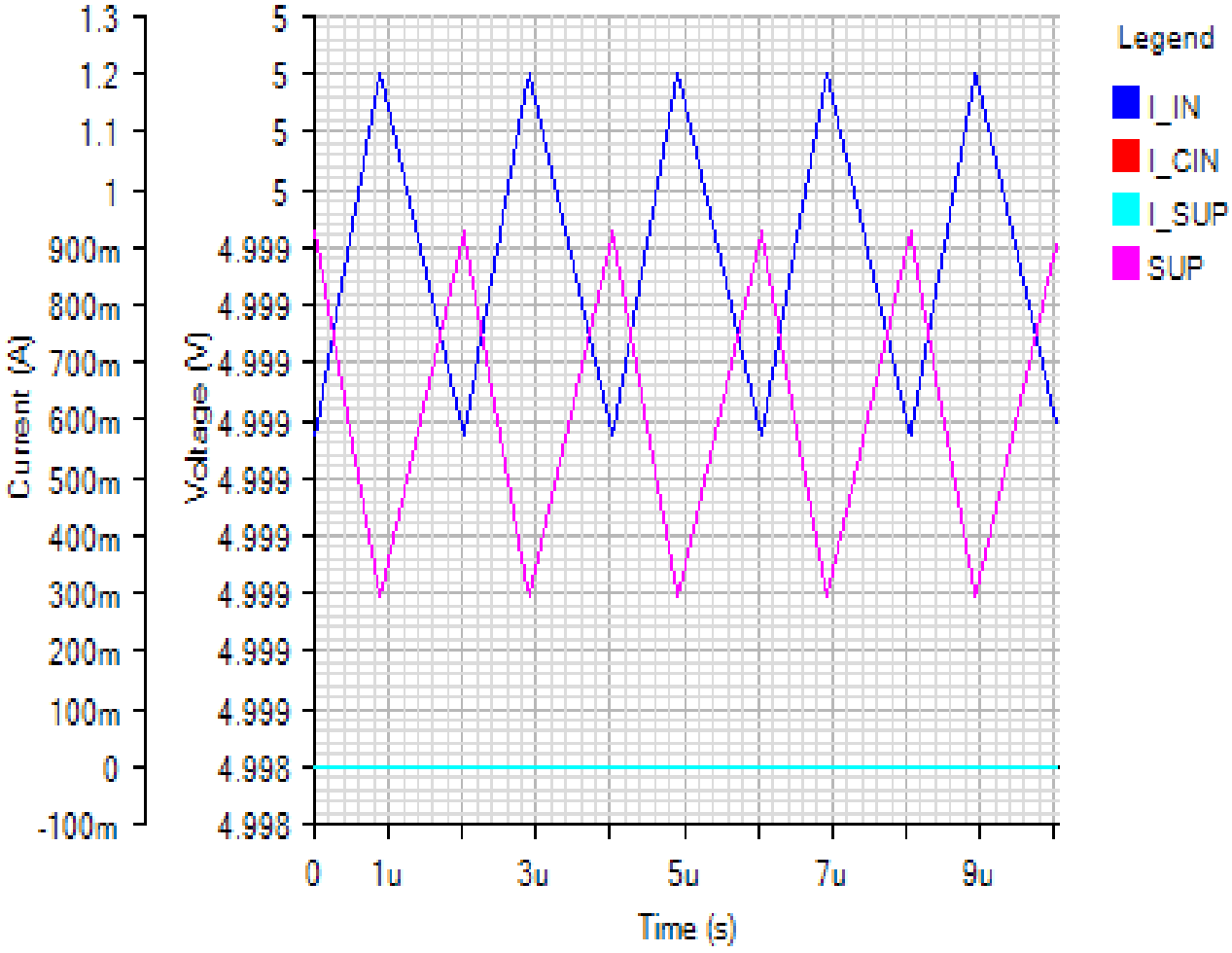

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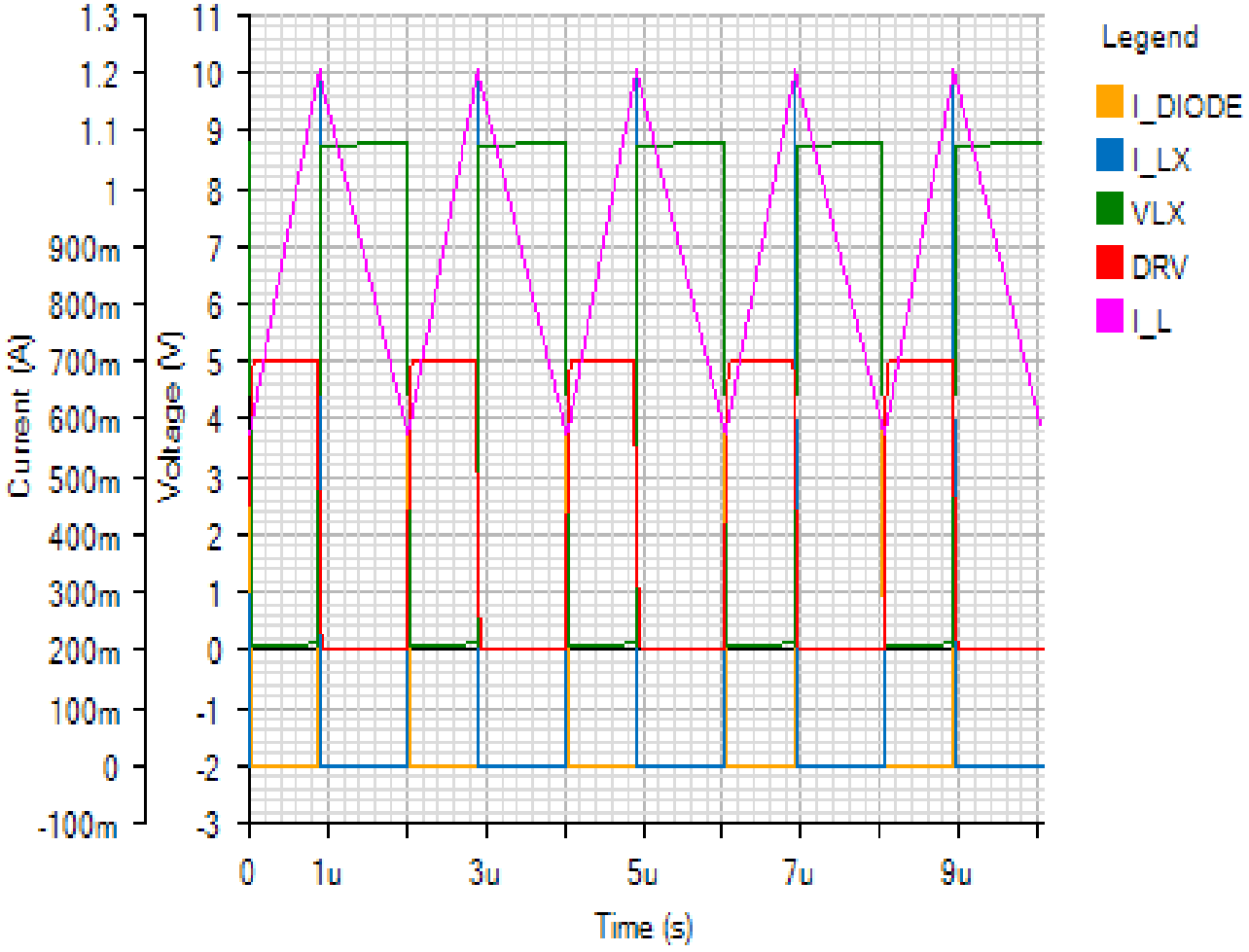

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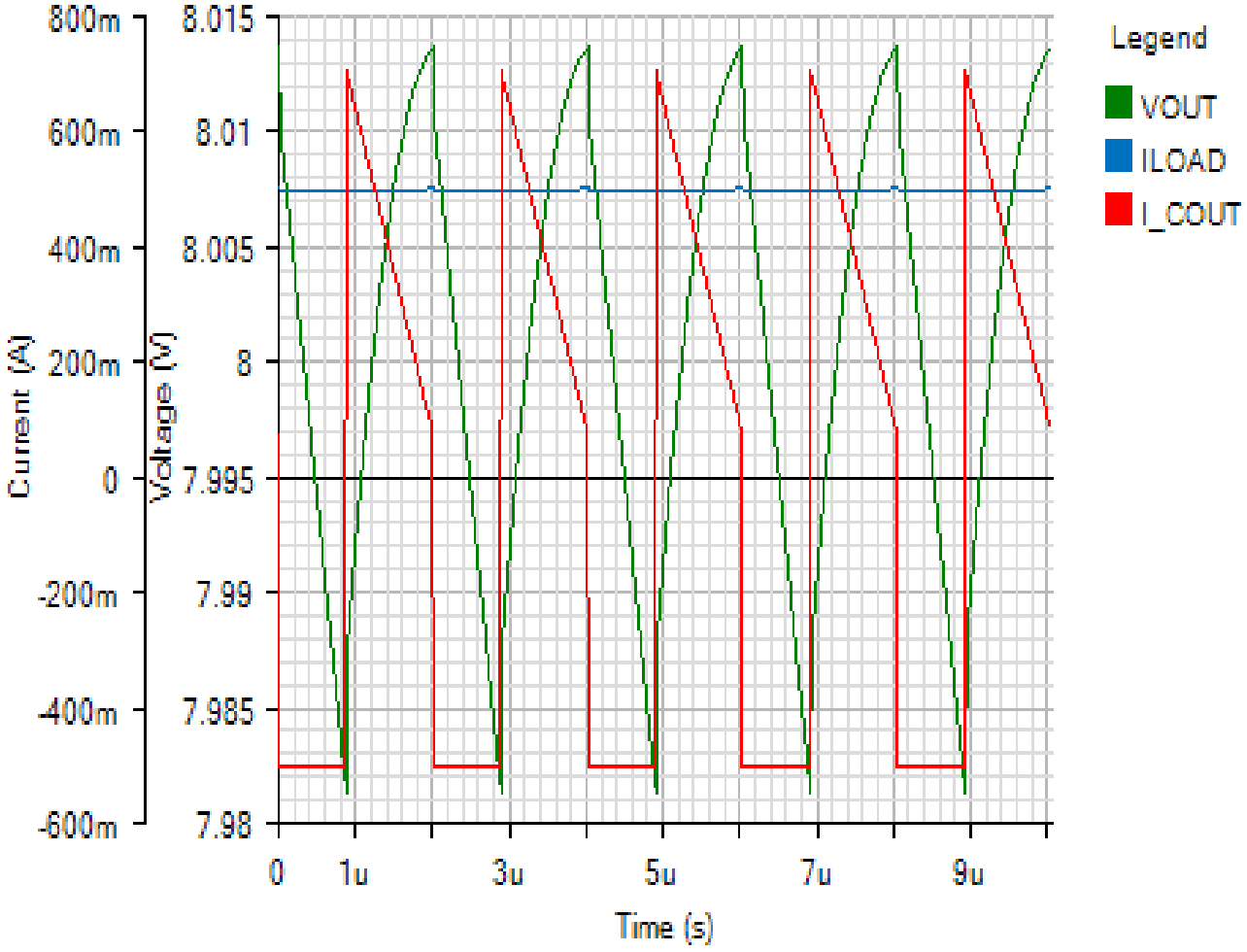

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