

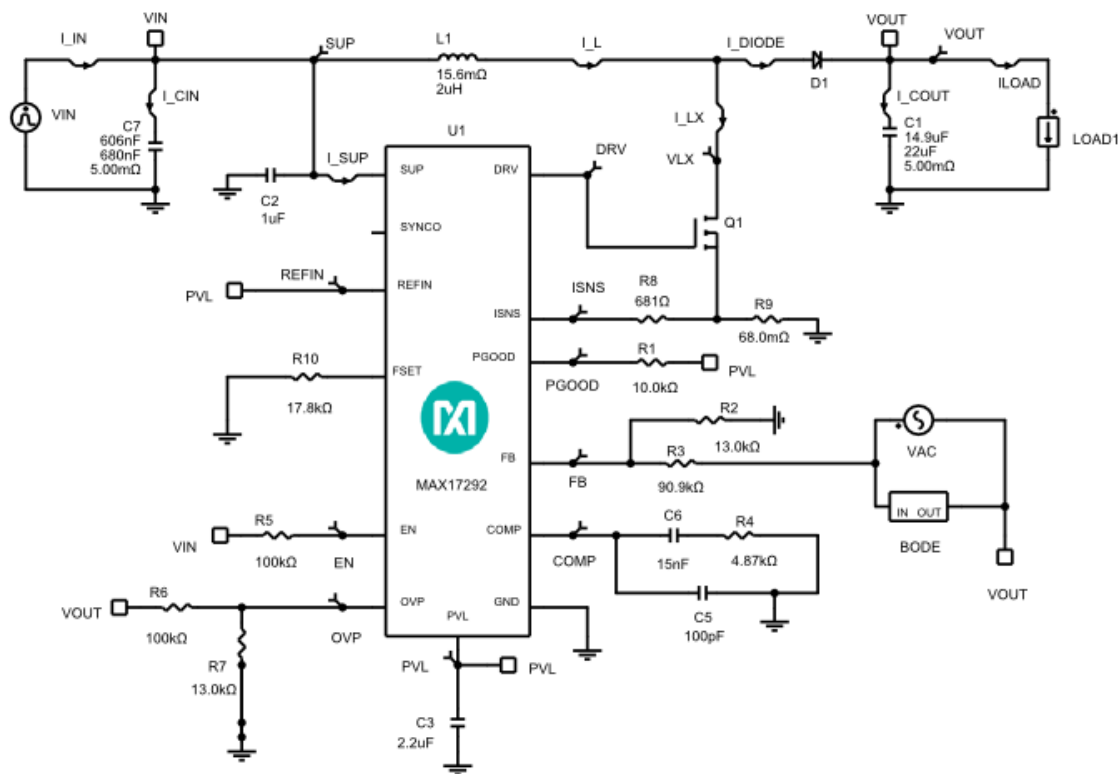
Initial Design

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	MAX17292	Maxim Integrated	2.5V to 36V, 2.5MHz, PWM Boost Controller with 4µA Shutdown Current and Reduced EMI
C1	1	GRM32ER71E226ME15	Murata	Cap Ceramic 22µF 25V 1210 125C
C2	1	08055D105KAT2A	AVX	Cap Ceramic 1µF 50V X5R 10% Pad SMD 0805 85°C T/R
C3	1	C1608X7R1A225K080AC	TDK	Cap Ceramic 2.2µF 10V X7R 10% Pad SMD 0603 125°C T/R
C5	1	04023C101KAT2A	AVX	Cap Ceramic 100pF 25V X7R 10% Pad SMD 0402 125°C T/R
C6	1	06035C153KAT2A	AVX	Cap Ceramic 0.015µF 50V X7R 10% Pad SMD 0603 125°C T/R
C7	1	C0805C684K4RAC	Kemet	Cap Ceramic 0.68µF 16V X7R 10% SMD 0805 125C Bulk
D1	1	SS22-E3/52T	Vishay	Diode Schottky 20V 2A 2-Pin SMB T/R
L1	1	744310200	Würth Electronics	Inductor 2µH 20% 14.2mOhm 9A Isat 5.814A Irms Trans MOSFET N-CH 30VDS

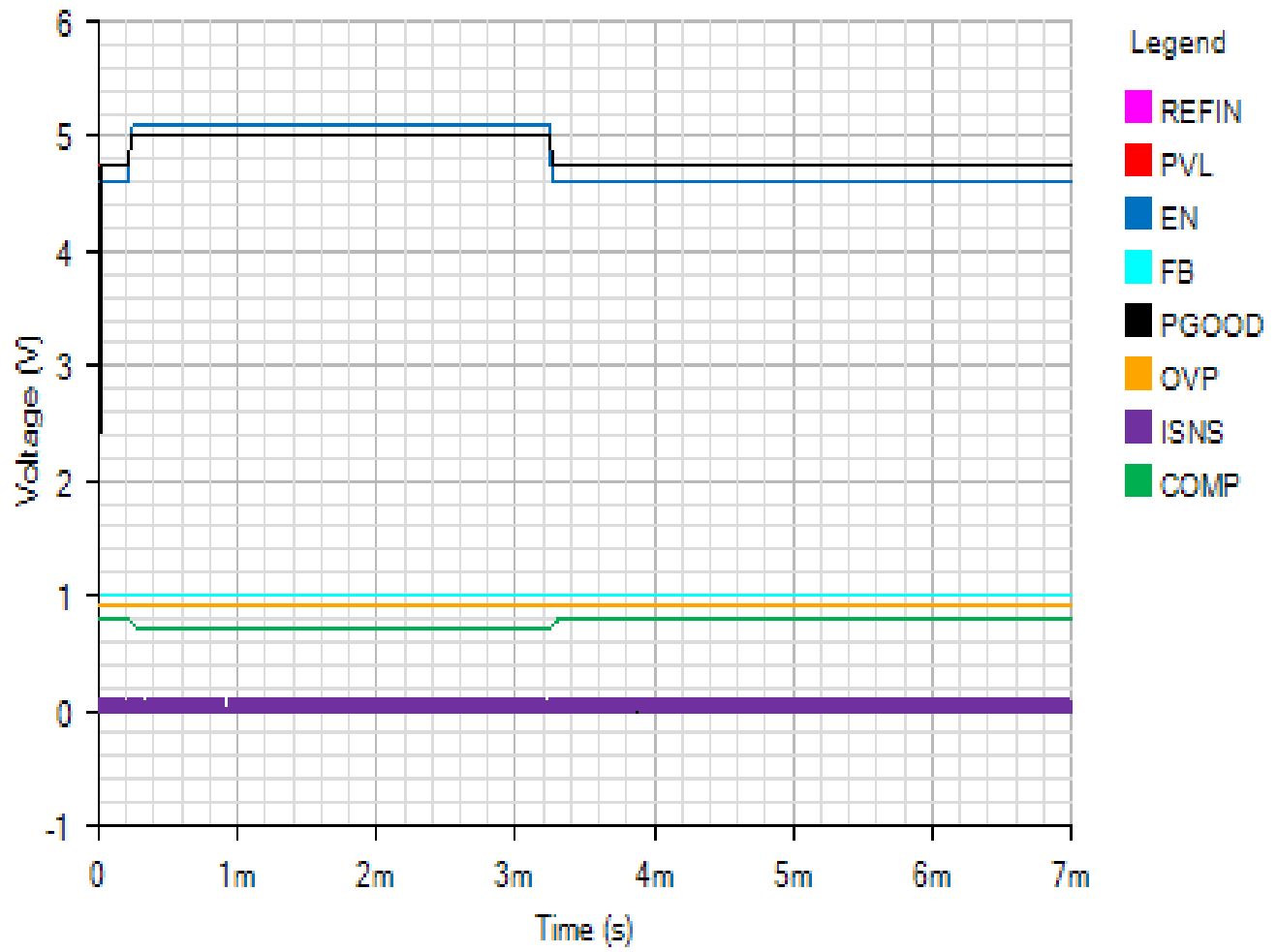
Q1	1	FDS4488	Fairchild Semiconductor	30mOhm@4.5V 28mOhm@6V 9.5nC 4.75nC 0.93nF 0.241nF 175°C 7.9A 2.5W 25°C/W 1.75mm 31mm^2 SO 8L NB
R1	1	ERJ3GEYJ103V	Panasonic	Res Thick Film 0603 10K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R2	1	ERJ2RKF1302X	Panasonic	Res Thick Film 0402 13K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	ERJ2RKF9092X	Panasonic	Res Thick Film 0402 90.9K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	AR0603JR-074K87	Yageo	Res Thick Film 0603 4.87K Ohm 5% 0.1W(1/10W) ±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	AR0603JR-07681R	Yageo	Res Thick Film 0603 681 Ohm 5% 0.1W(1/10W) ±100ppm/°C Epoxy 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	AR0603JR-0717K8	Yageo	Res Thick Film 0603 17.8K Ohm 5% 0.1W(1/10W) ±100ppm/°C Epoxy Pad SMD Automotive T/R

Simulation Results

Line Transient - Wed Jan 02 2019 15:30:46

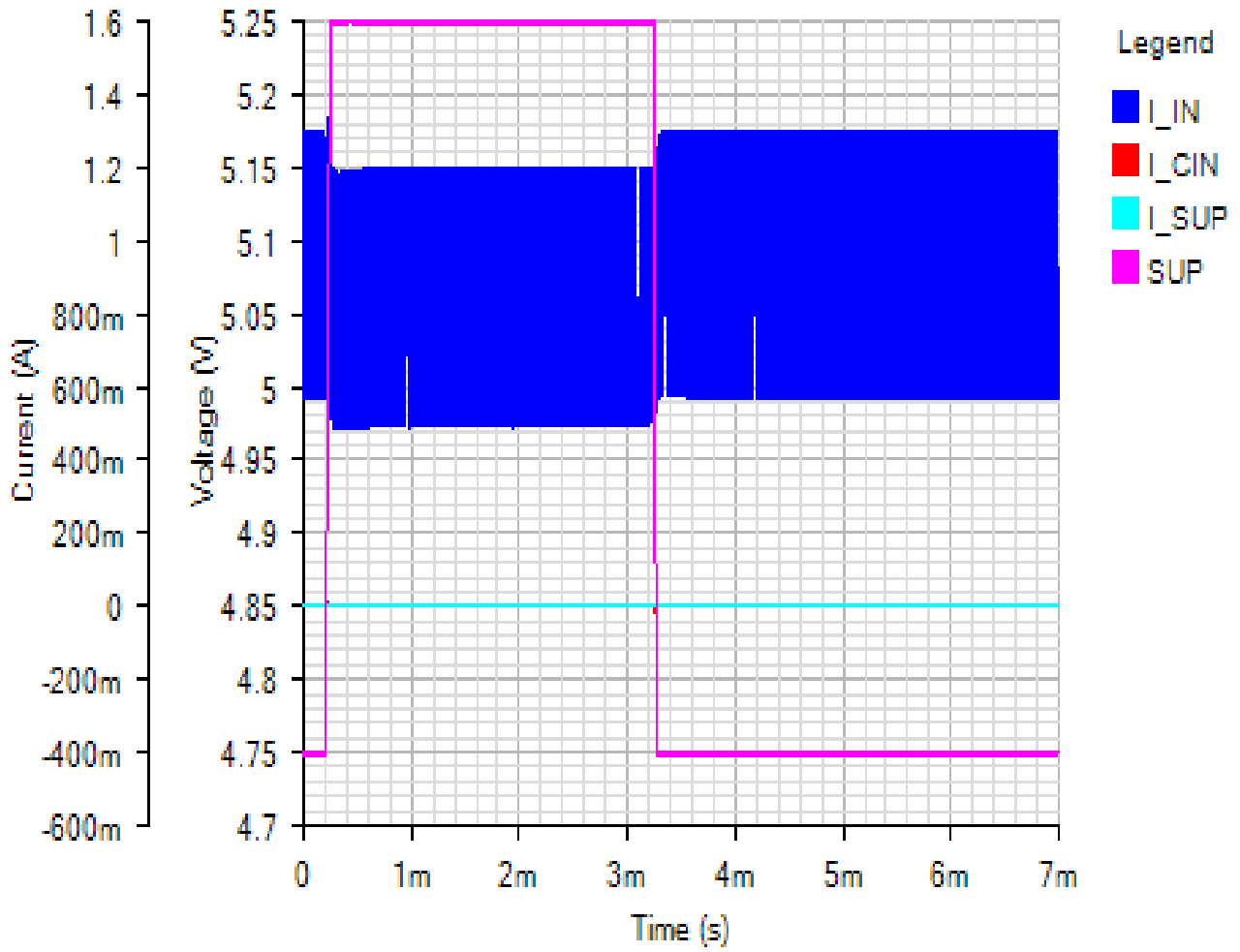
IC

Default



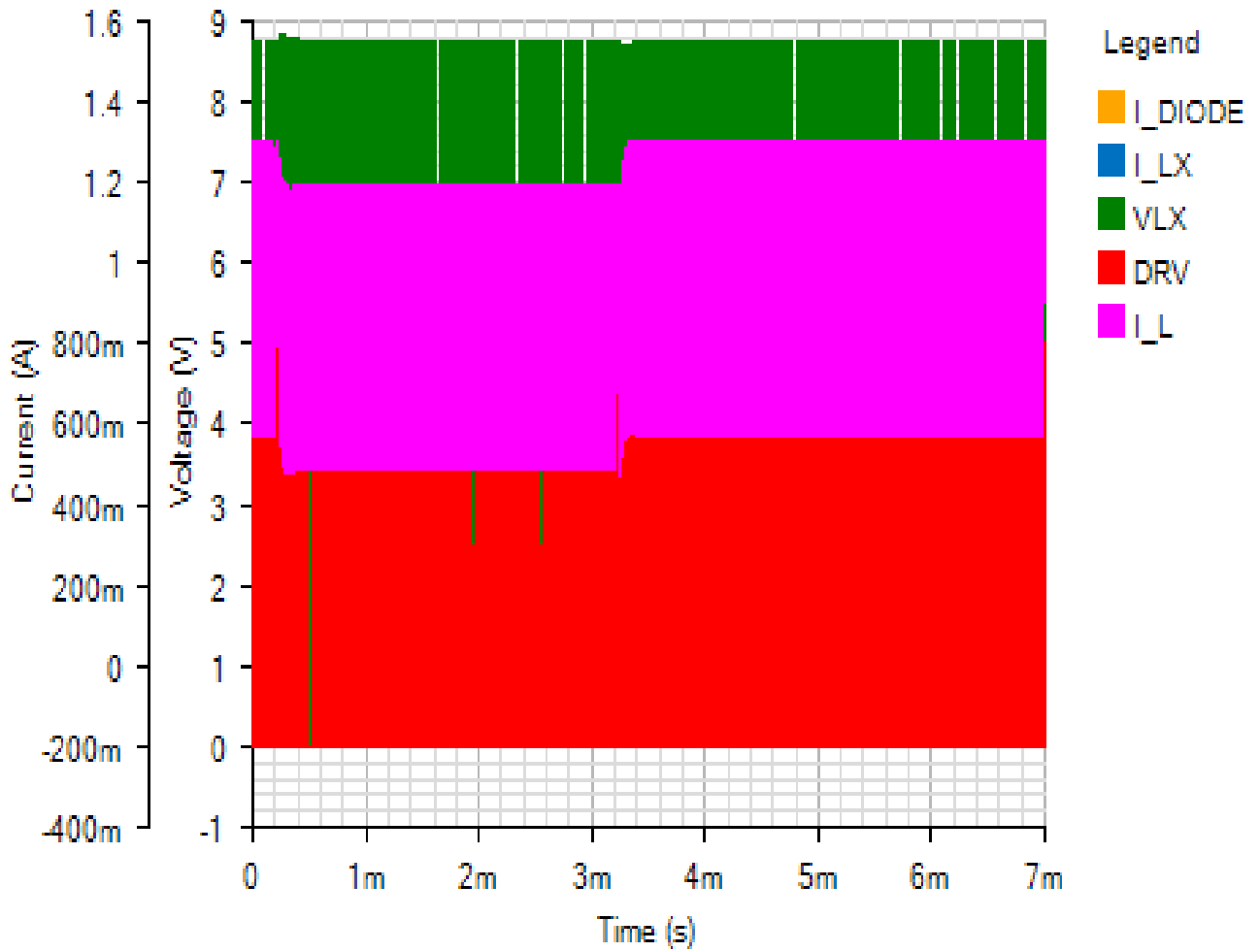
INPUT

Default



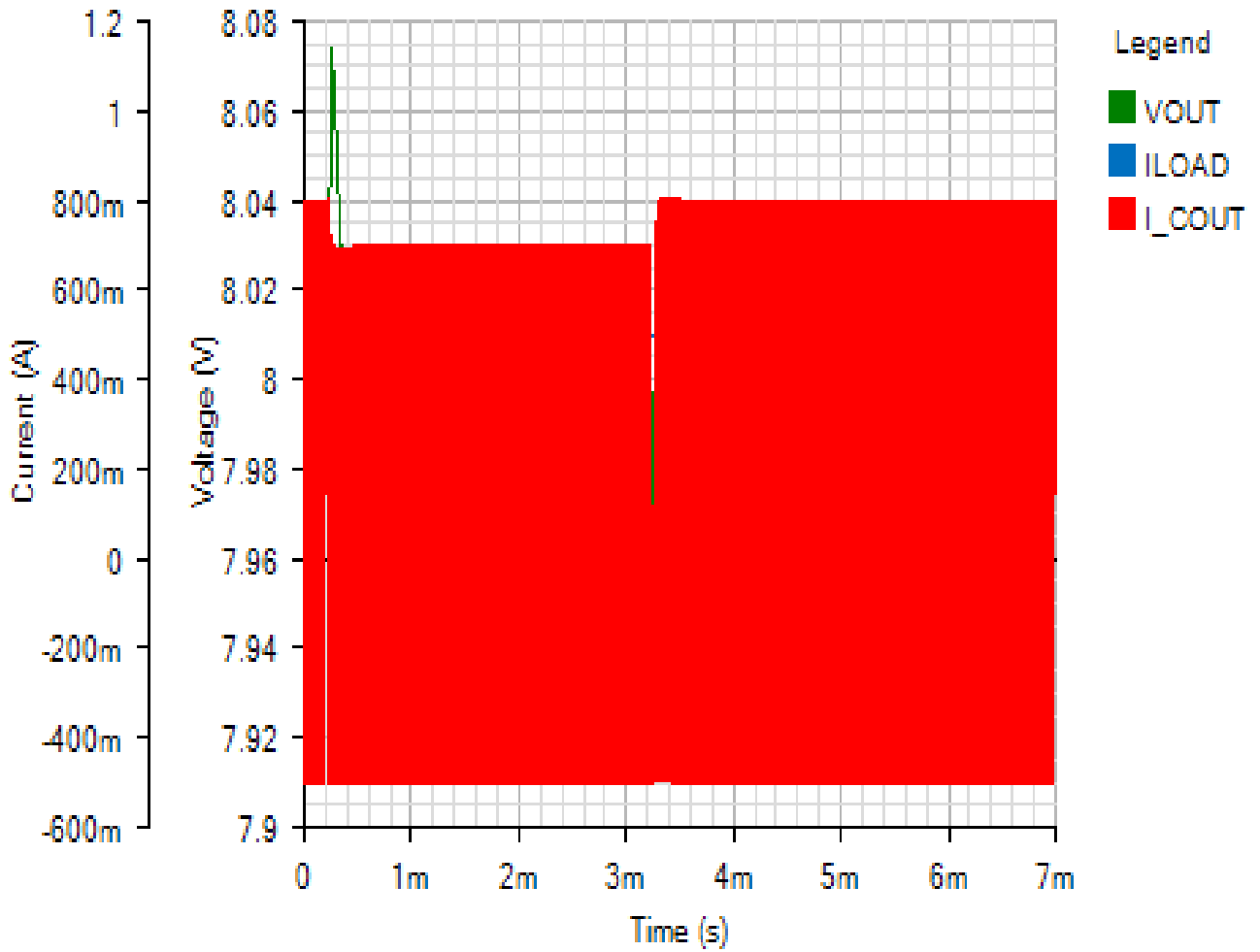
SWITCHING

Default



OUTPUT

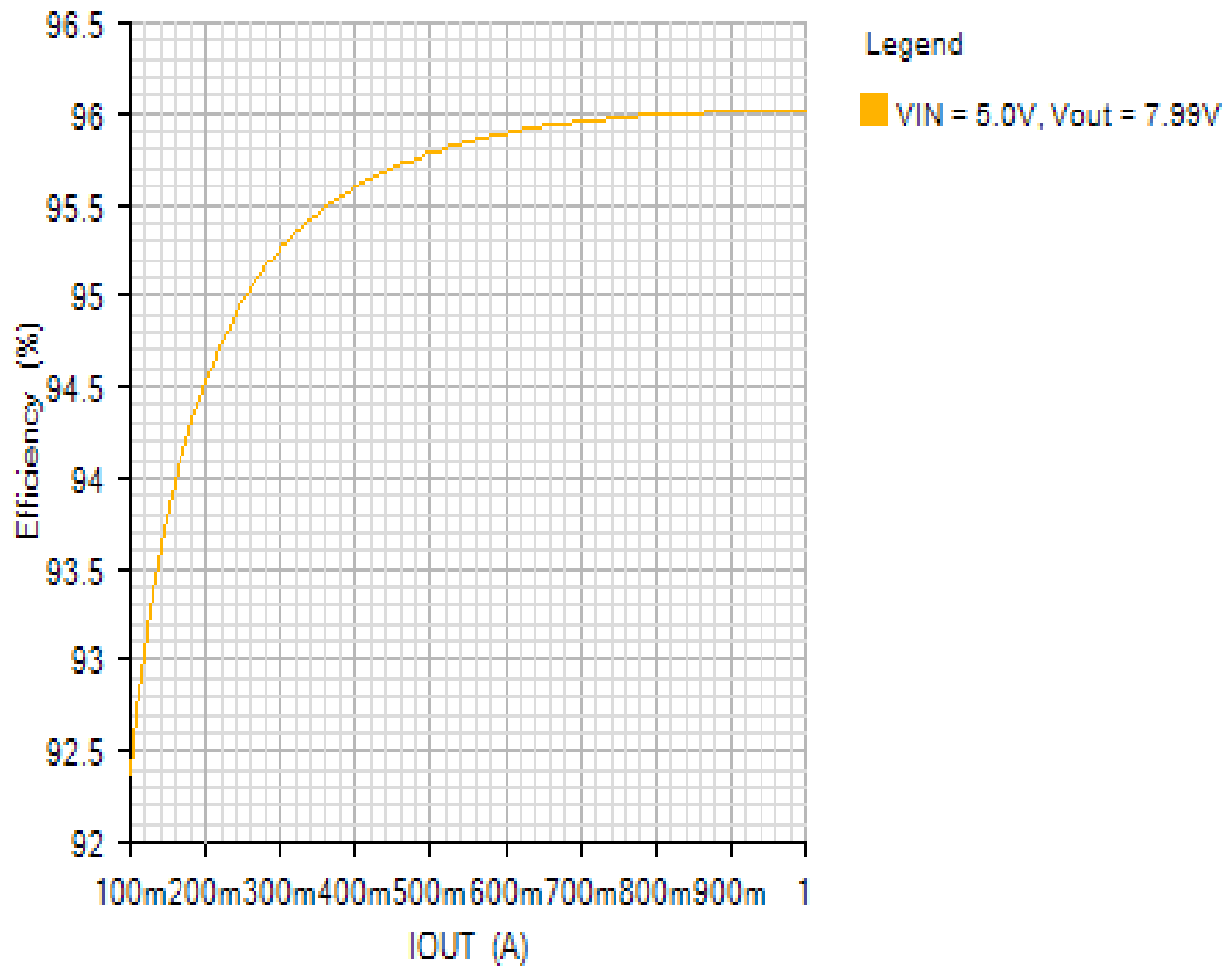
Default



Efficiency - Wed Jan 02 2019 15:30:46

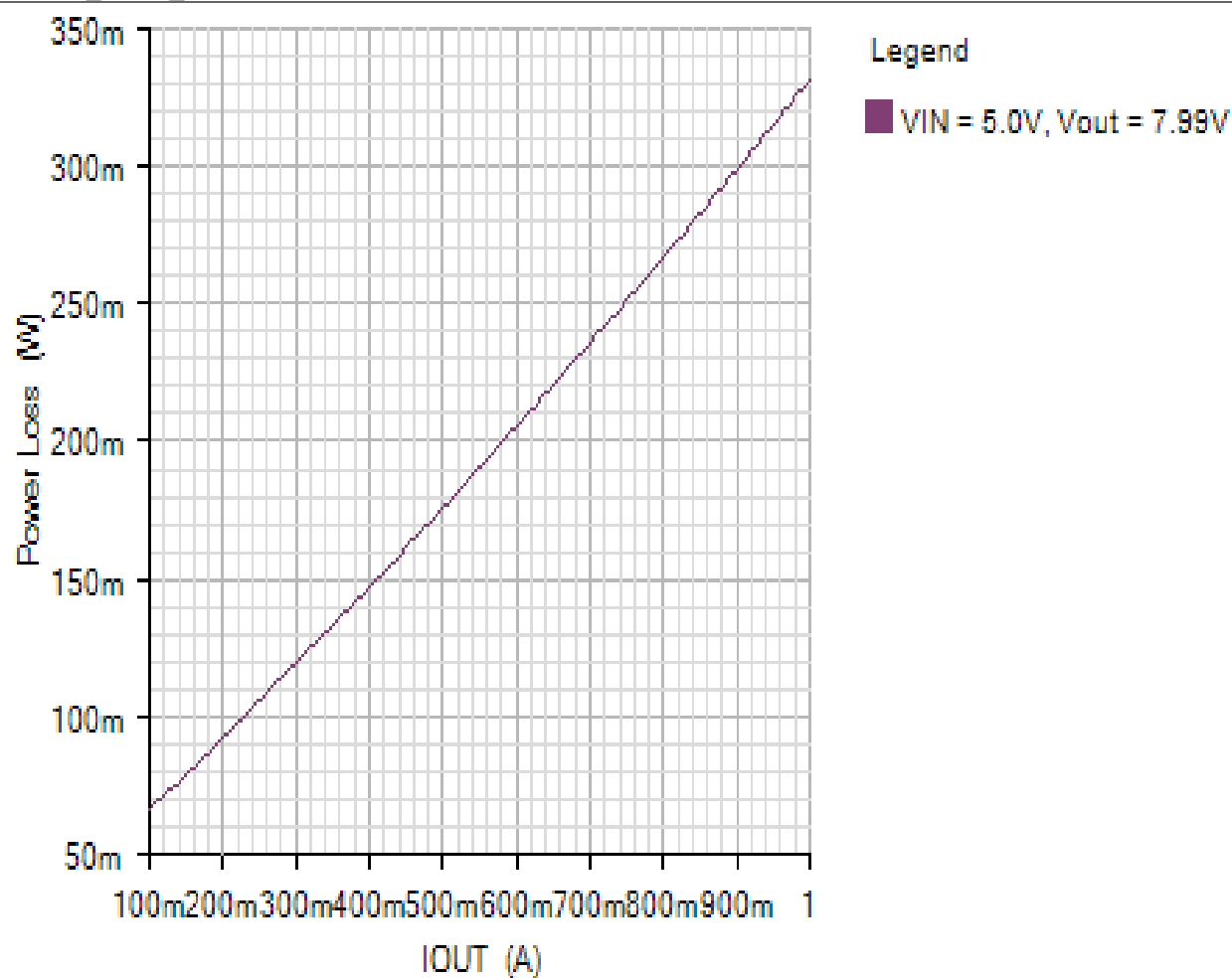
EFFICIENCY_PLOT

Default



POWER_LOSS_PLOT

Default



Losses



Component

Loss (W)

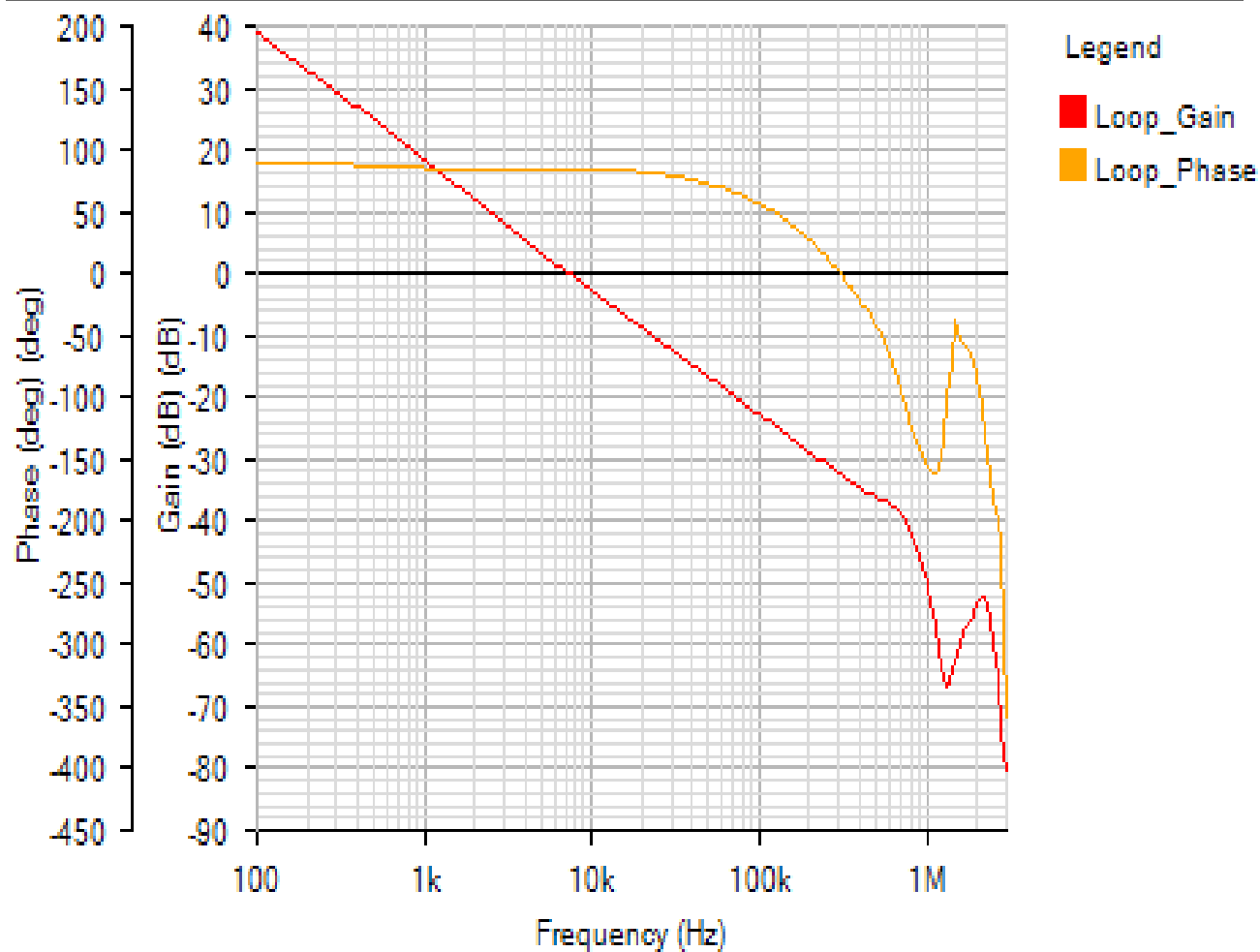
% of total

Component	Loss (W)	% of total
MAX17290/2 IC	0.00625	1.9
Cout	0.002938	0.9
Lout	0.002272	0.7
Diode	0.250866	75.6
Cin	0.003173	1
MOSFET and Sense Resistor	0.066263	20
Total	0.331761	100

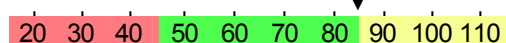
AC Loop - Wed Jan 02 2019 15:30:46

BODE

Default



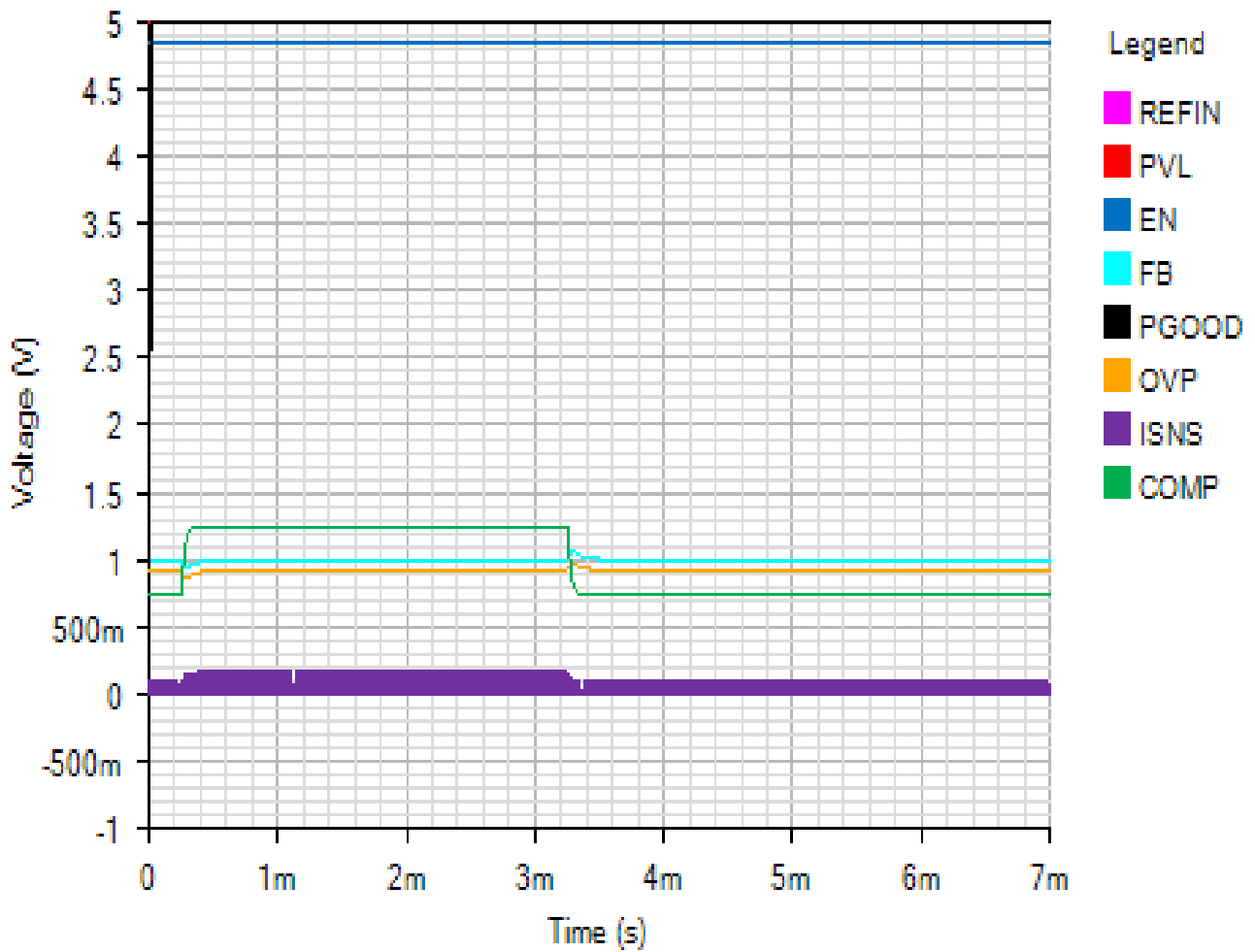
Phase Margin: 84.78° at a crossover frequency of 7.4kHz



Load Step - Wed Jan 02 2019 15:30:46

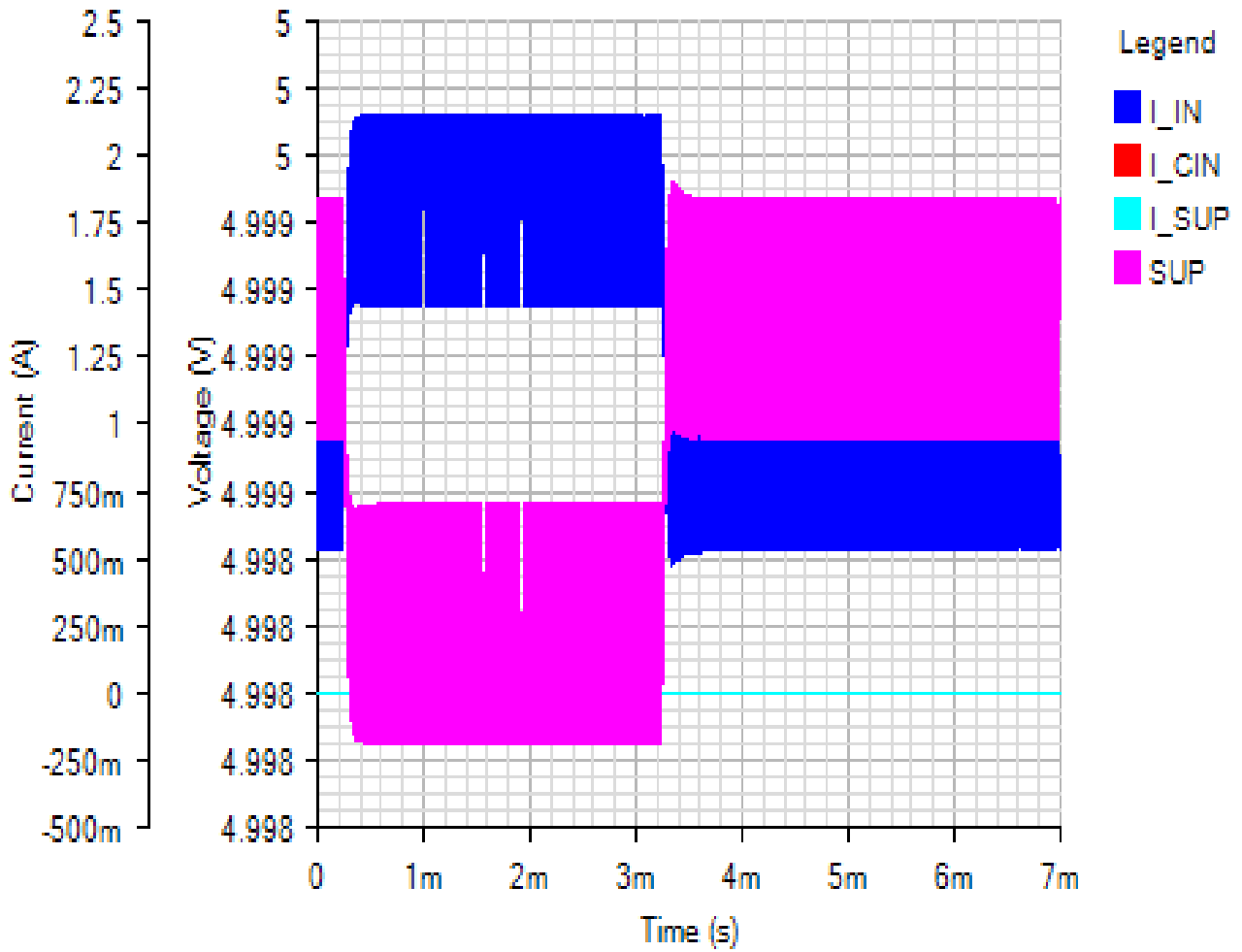
IC

Default



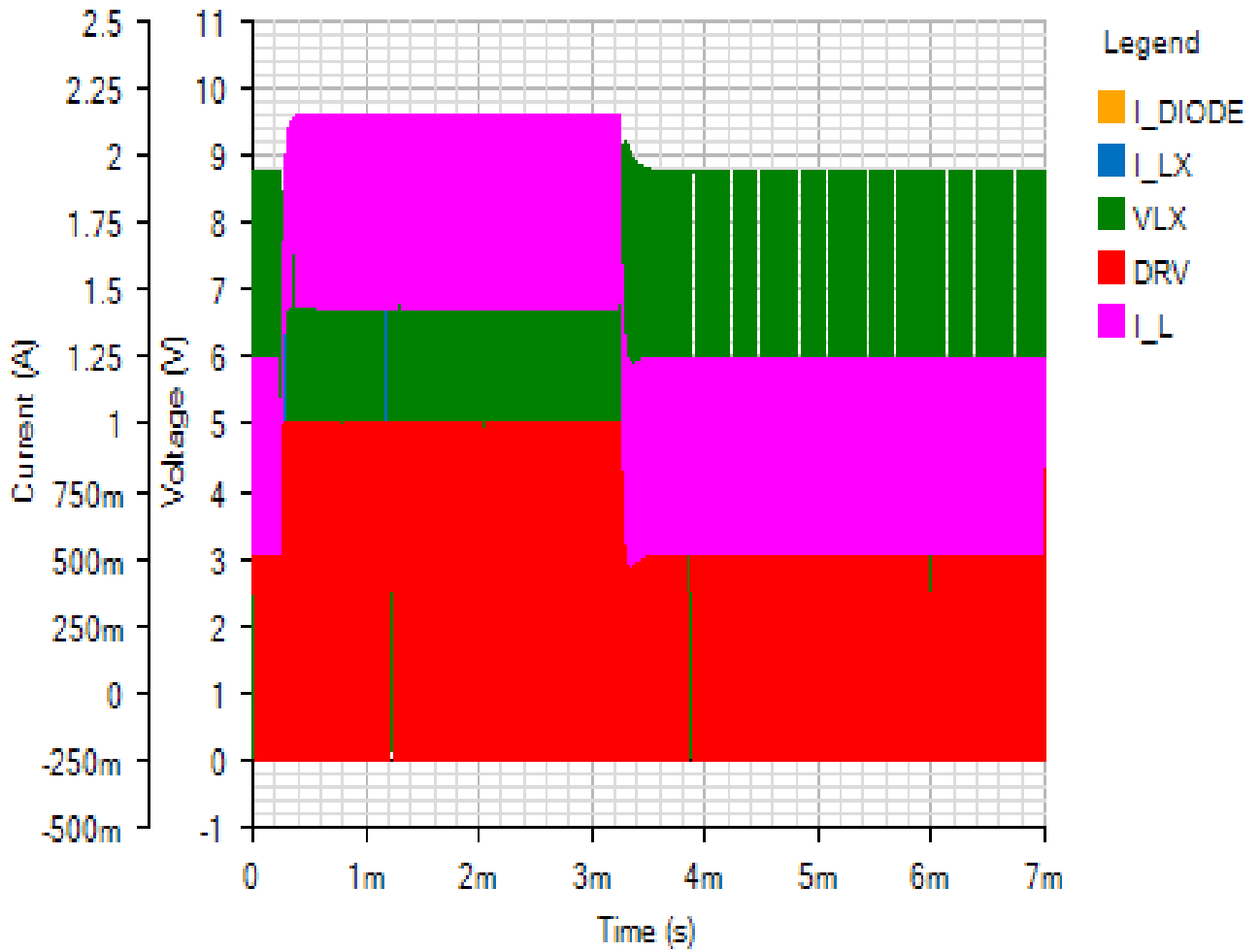
INPUT

Default



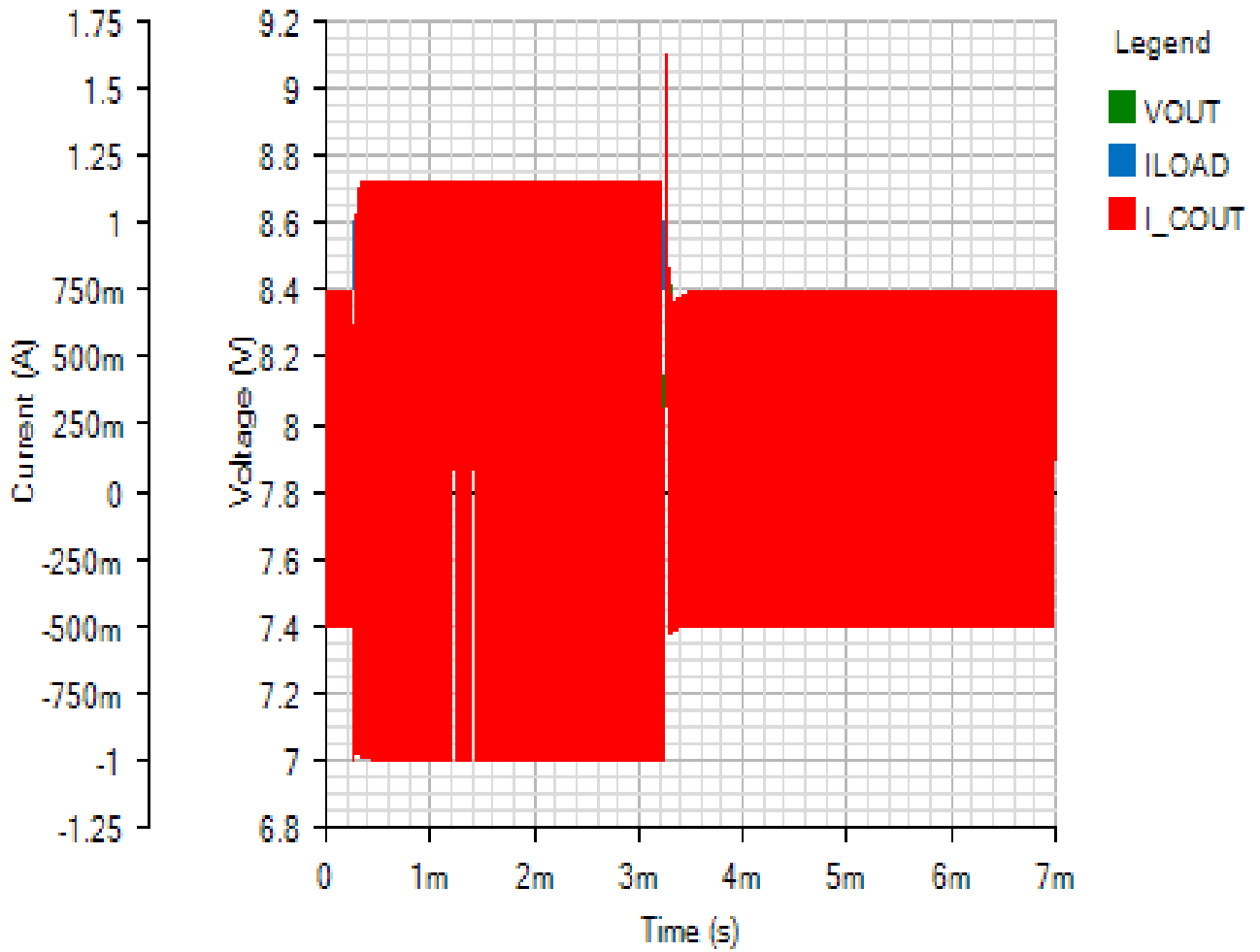
SWITCHING

Default

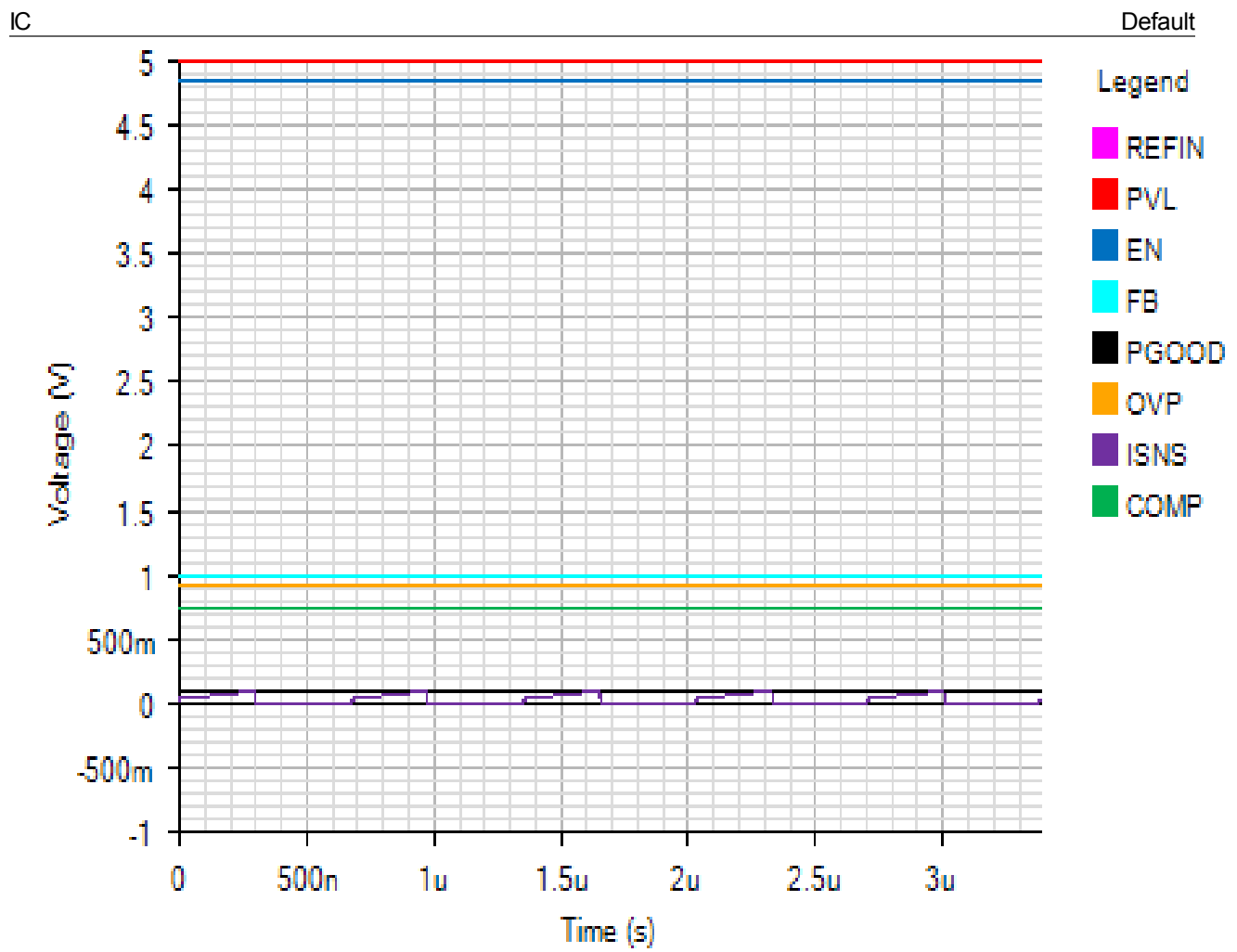


OUTPUT

Default

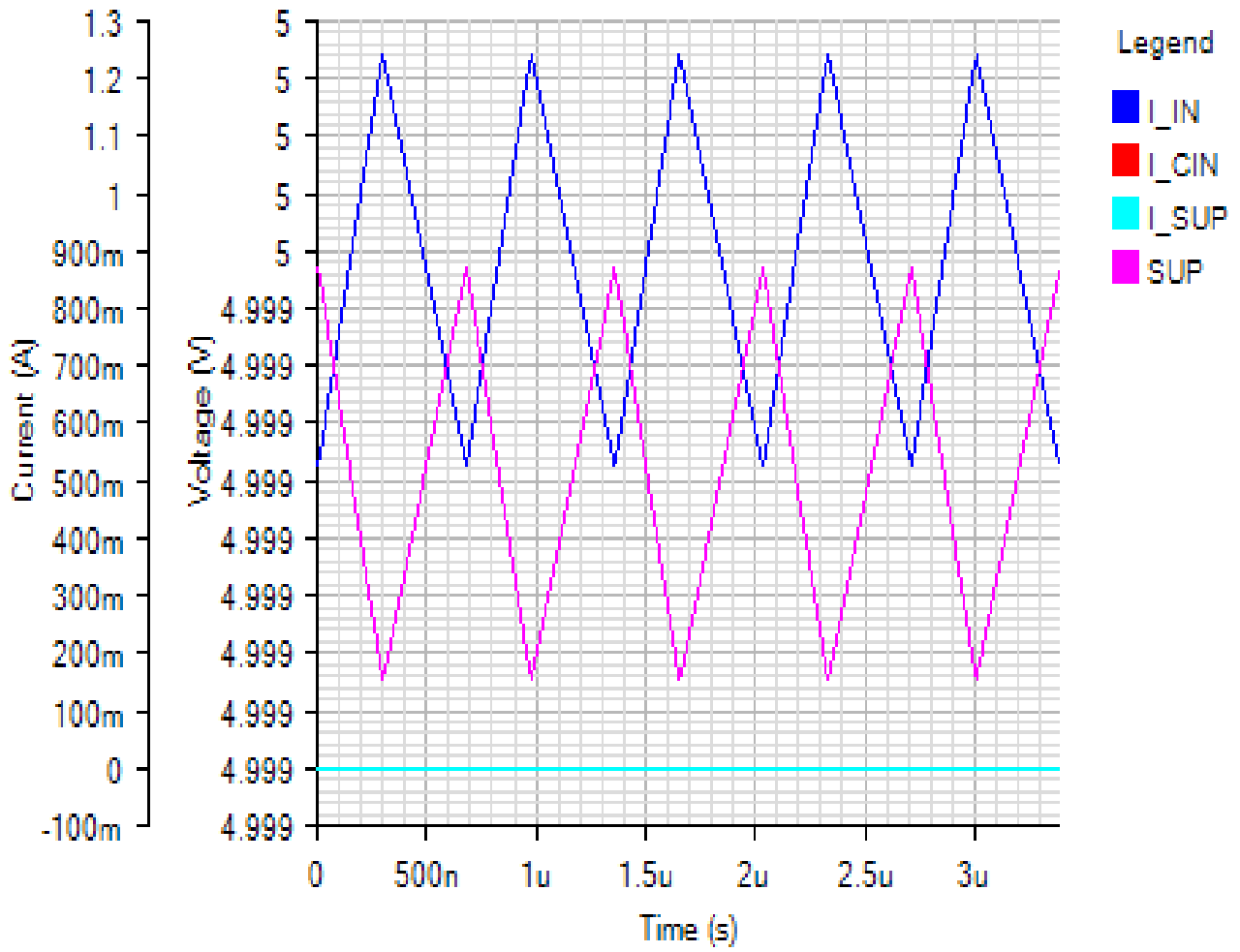


Steady State - Wed Jan 02 2019 15:30:46



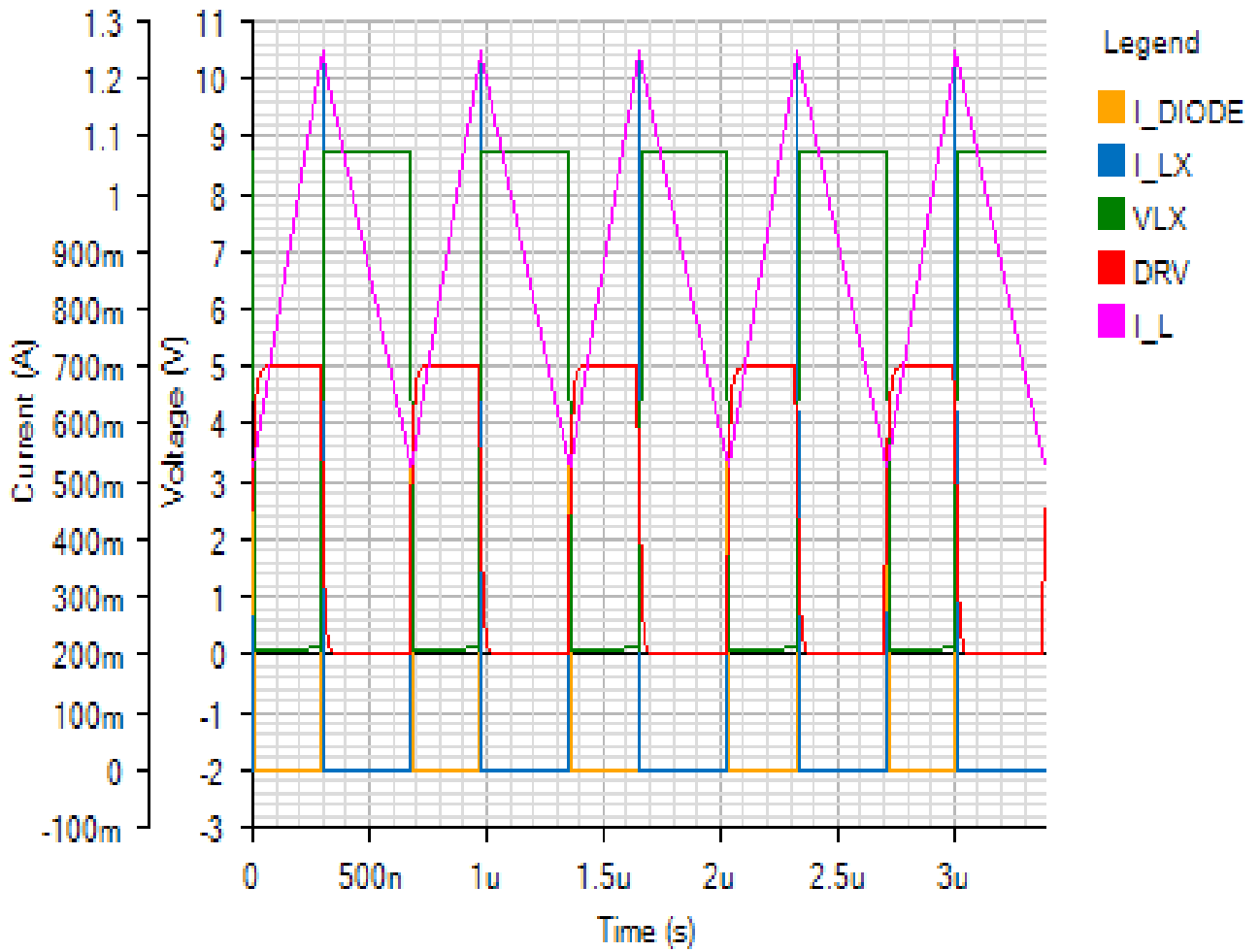
INPUT

Default



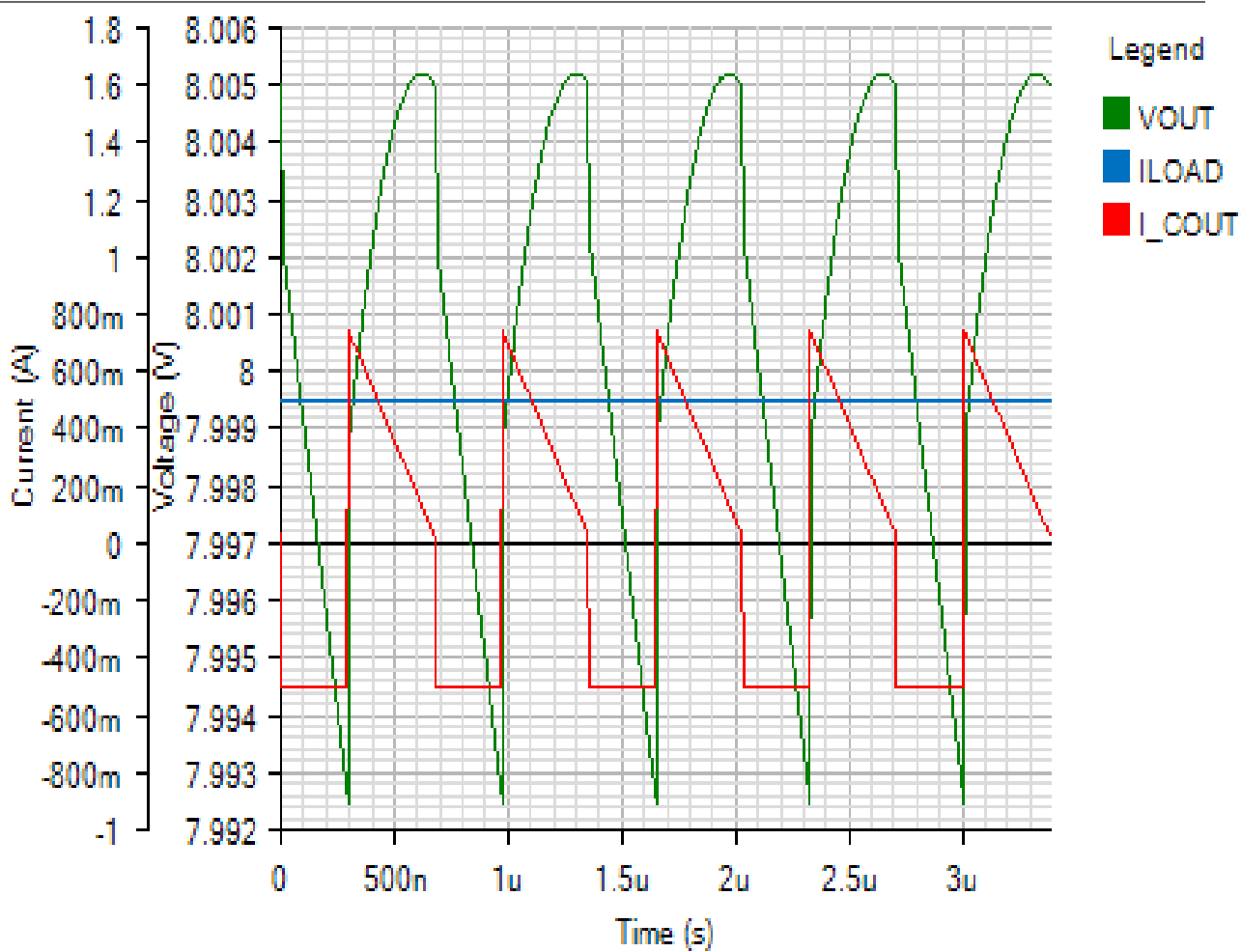
SWITCHING

Default



OUTPUT

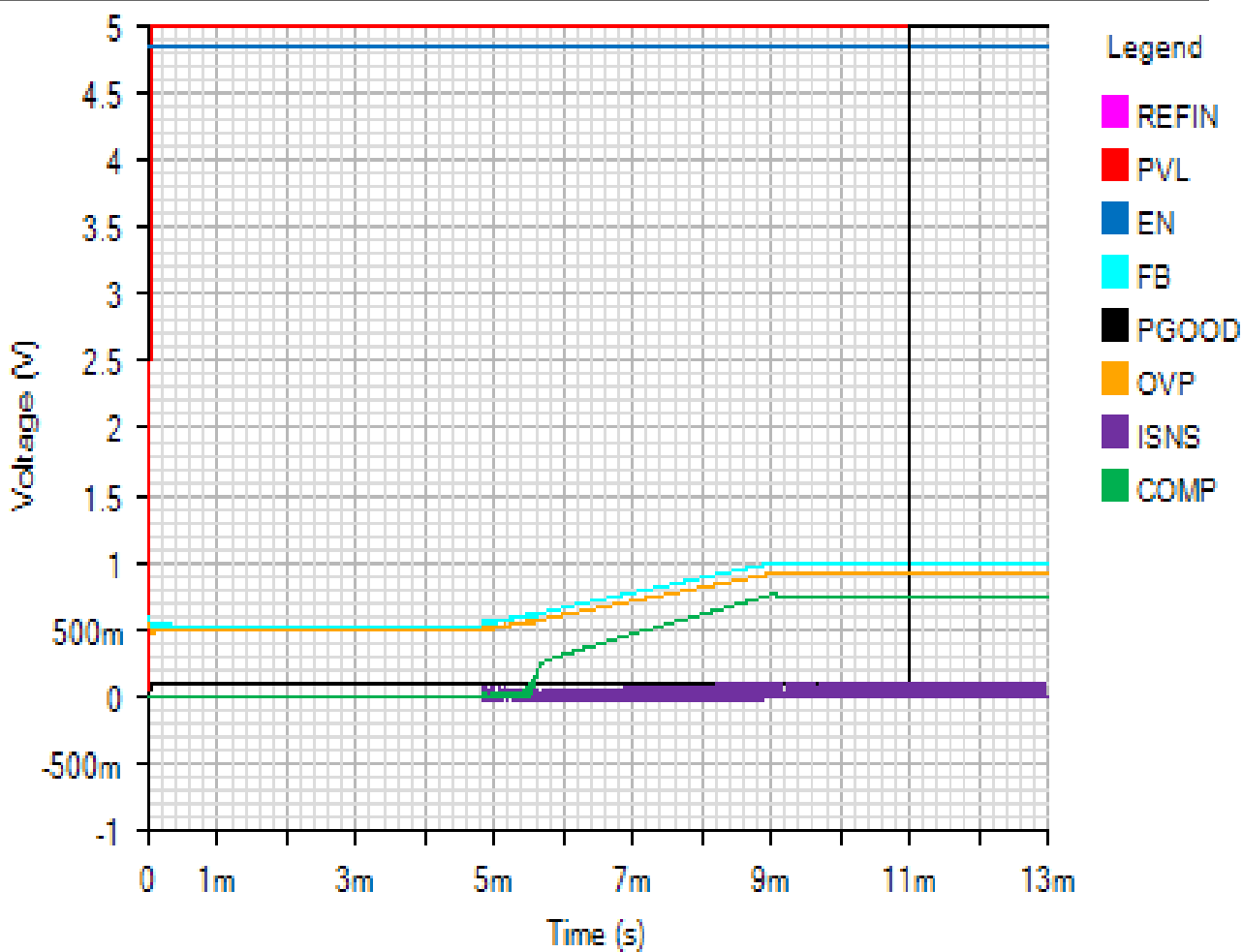
Default



Start Up - Wed Jan 02 2019 15:30:46

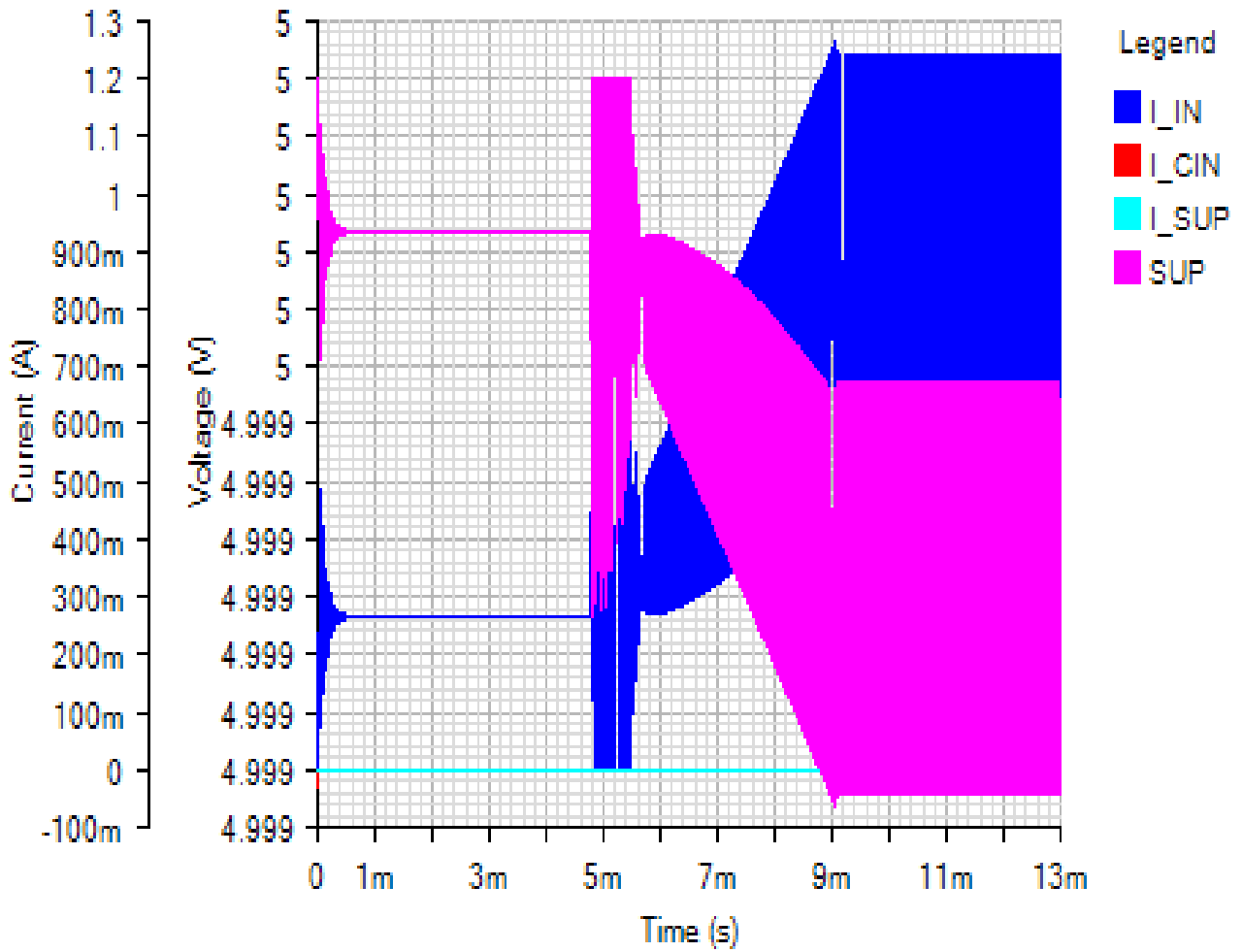
IC

Default



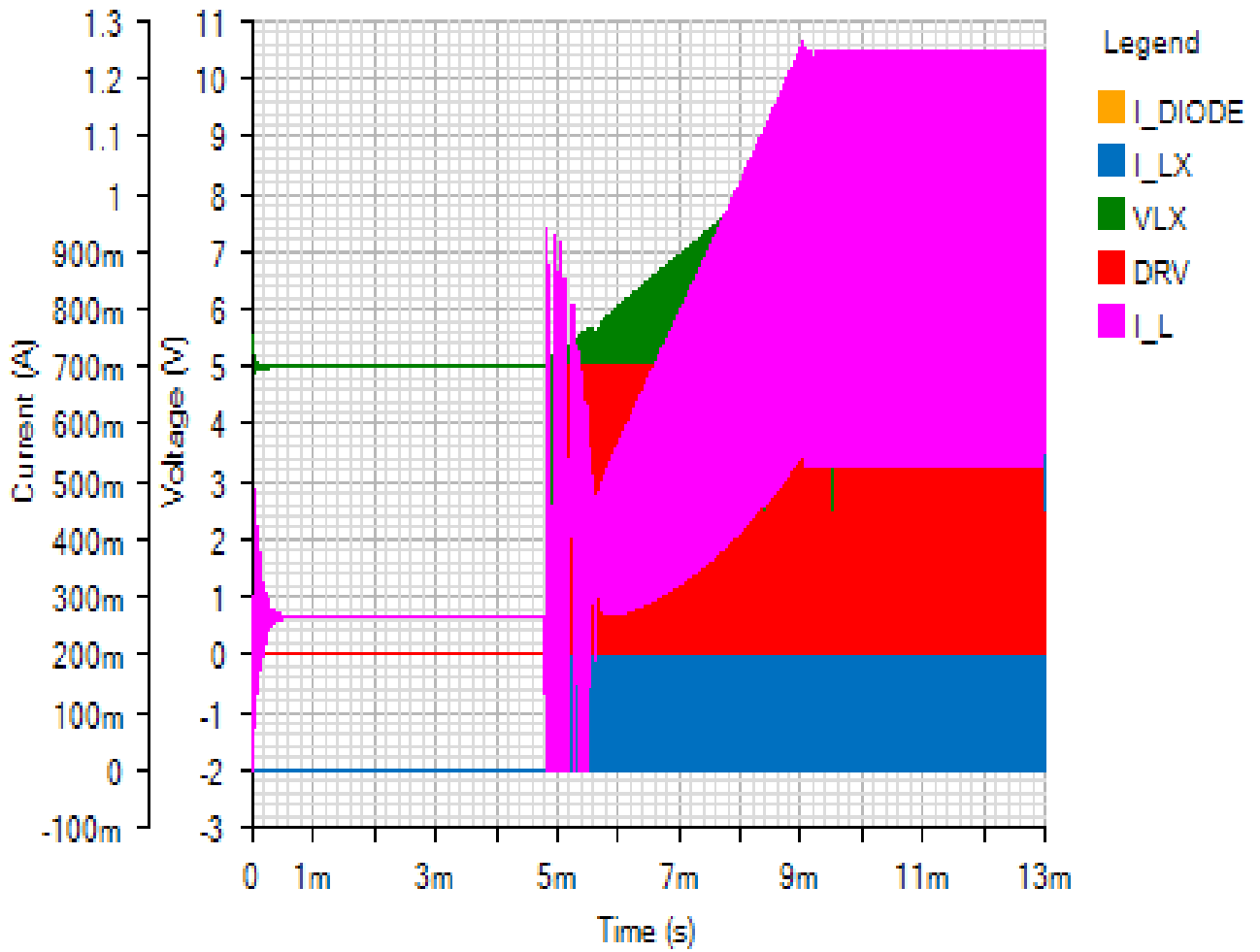
INPUT

Default



SWITCHING

Default



OUTPUT

Default

