

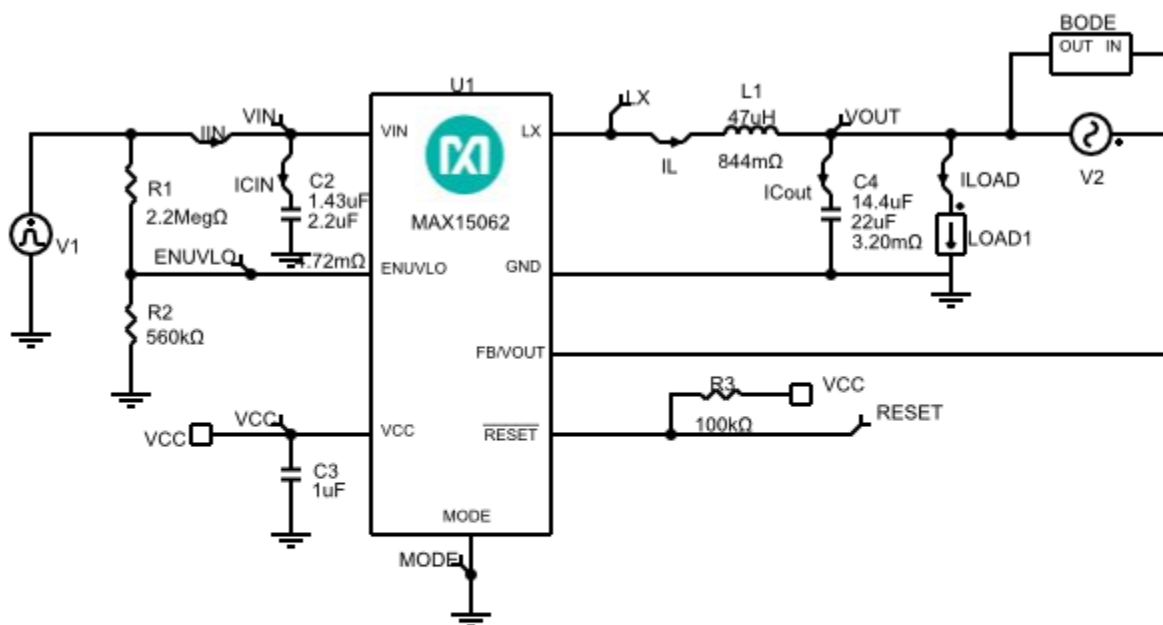
Initial Design

1.0

Design Requirements

Parameter	Value
Minimum Input Voltage	6.5V
Maximum Input Voltage	60V
Nominal Input Voltage	24V
Input Undervoltage Lockout Level	5.9V
Input Voltage Ripple	0.48V
Output Voltage	5V
Output Current	0.3A
Performance priority	Balance Efficiency and Size
BOM Priority	Cost
Mode of operation	PWM
Ambient Temperature	25°C

Schematic



Note 1: At very low output voltage to input voltage ratios, the converter may reach its minimum controllable ON time operation. It results in increased inductor current ripple and output voltage ripple, especially at light loads. However, the average output voltage will be regulated.

Note 2: With PFM mode selected, AC simulations may fail when the Load Current is low enough to engage PFM operation. PFM mode is hysteretic and there is no AC Loop to measure.

BOM

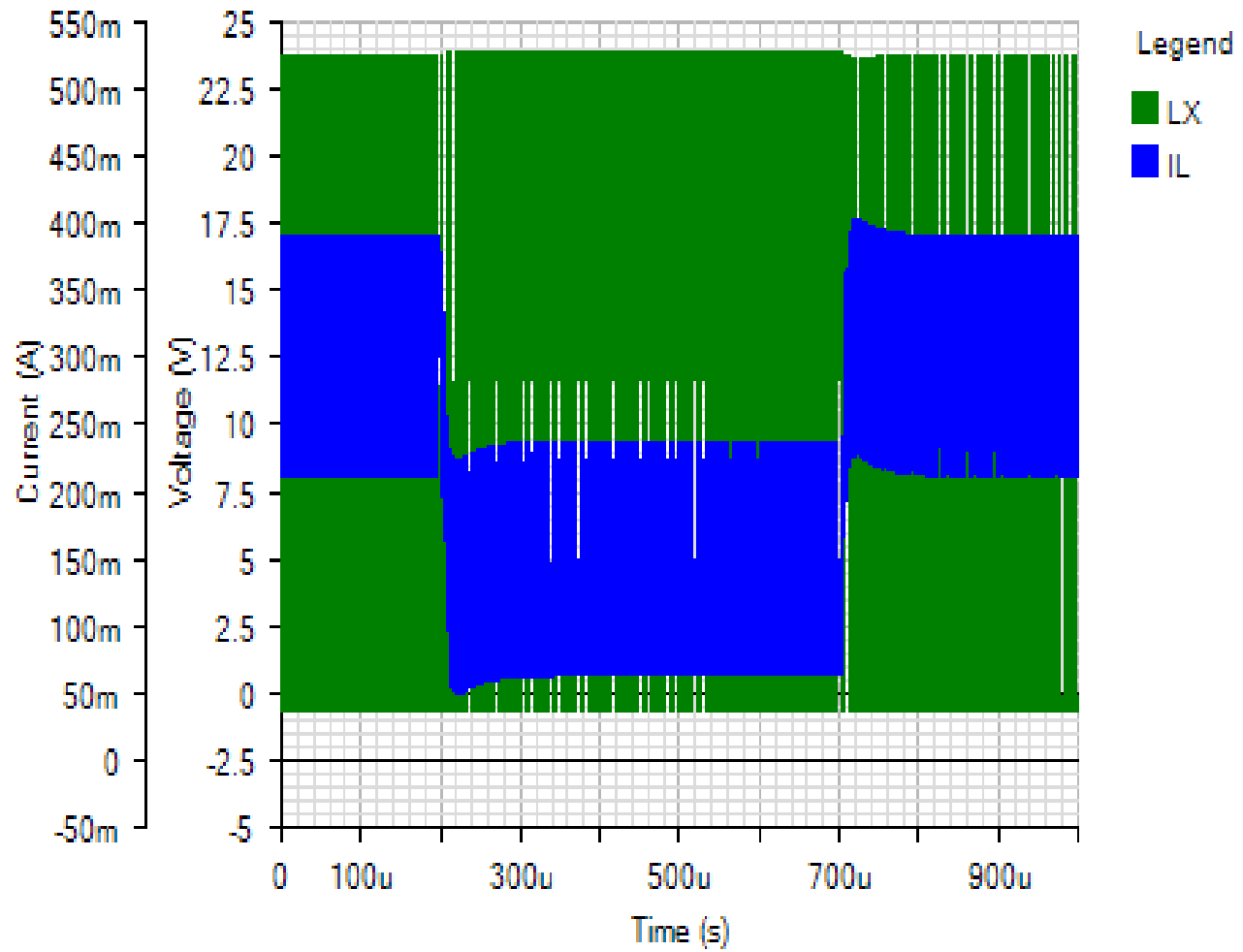
Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX15062BATA+	Maxim Integrated	60V, 300mA, Ultra-Small, High-Efficiency, Synchronous Step-Down DC-DC Converters
C2	1	GRM31CR71H225KA88	Murata	Cap Ceramic 2.2uF 50V X7R 10% SMD 1206 125C
C3	1	GRM155R70J105KA12J	Murata Manufacturing	Cap Ceramic 1uF 6.3V X7R 10% Pad SMD 0402 125°C T/R
C4	1	GRM31CR70J226KE19L	Murata	Cap Ceramic 22uF 6.3V X7R 10% SMD 1206 125C Embossed T/R
L1	1	SD43-473KLB	Coilcraft	Inductor 47uH 10% 759.6mOhm 0.87A Isat 0.86A Irms
R1	1	ERJ3EKF2204V	Panasonic	Res Thick Film 0603 2.2M Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R2	1	ERJ2RKF5603X	Panasonic	Res Thick Film 0402 560K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	ERJ2GEJ104X	Panasonic	Res Thick Film 0402 100K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R

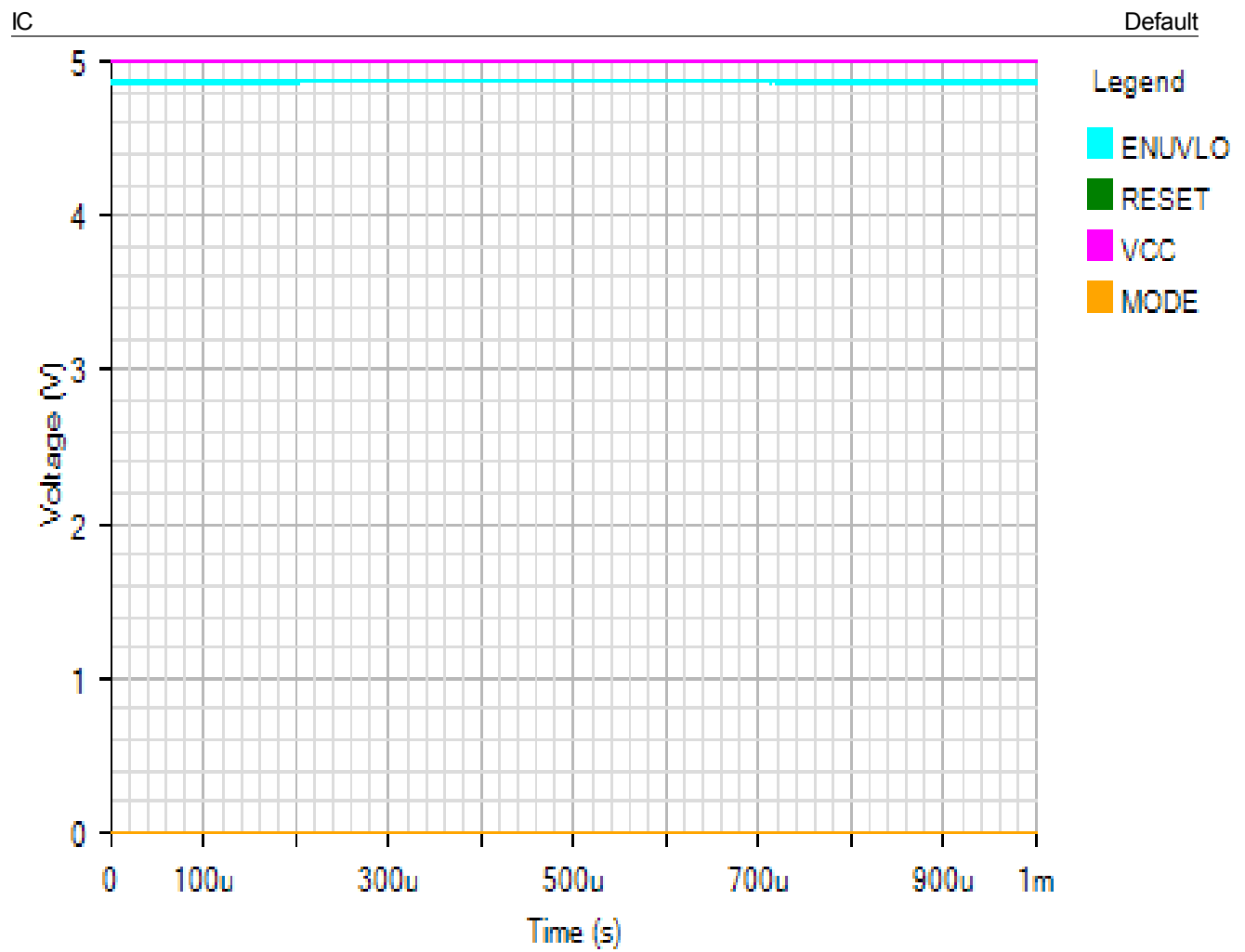
Simulation Results

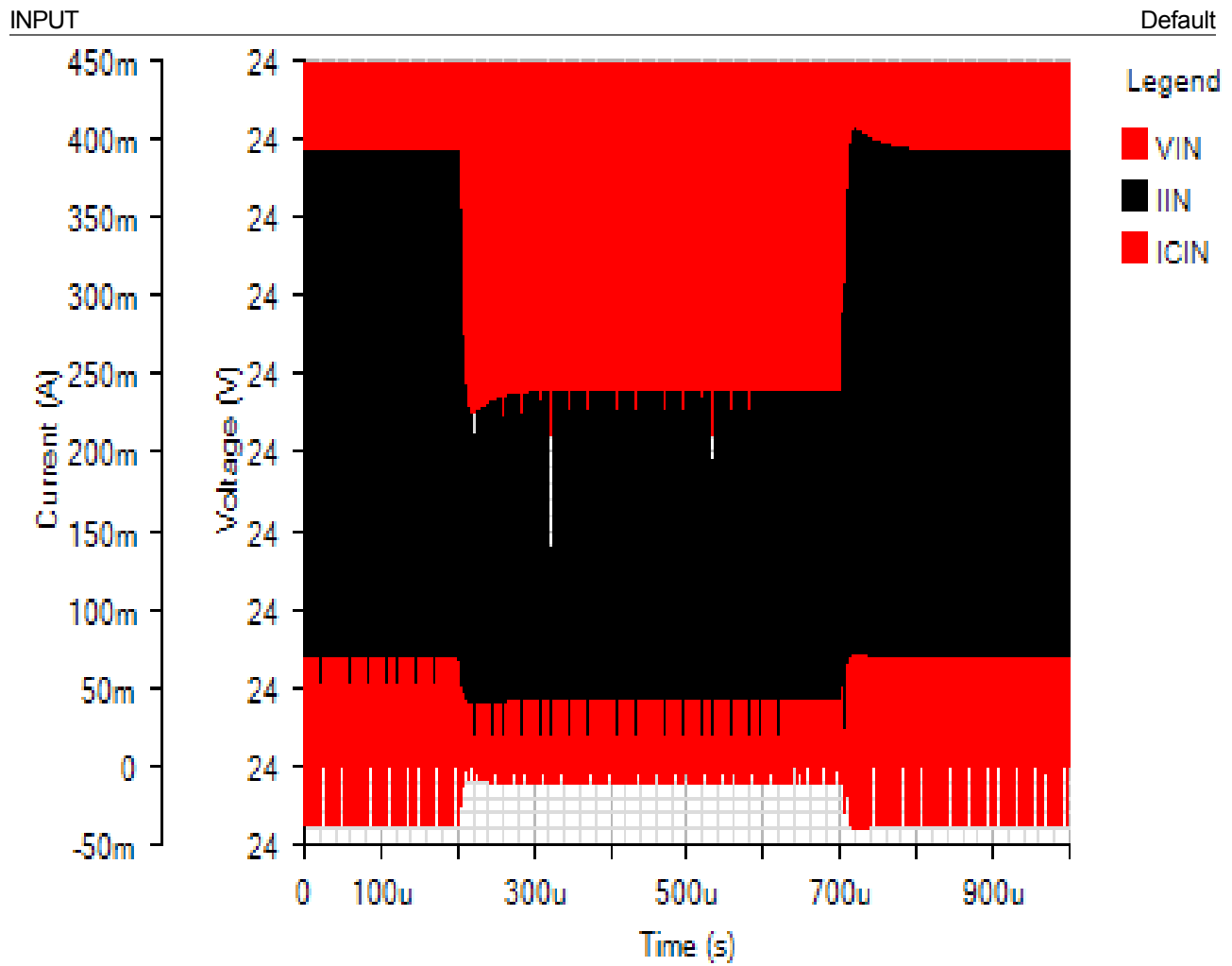
Load Step - Wed Dec 12 2018 13:28:24

SWITCHING

Default

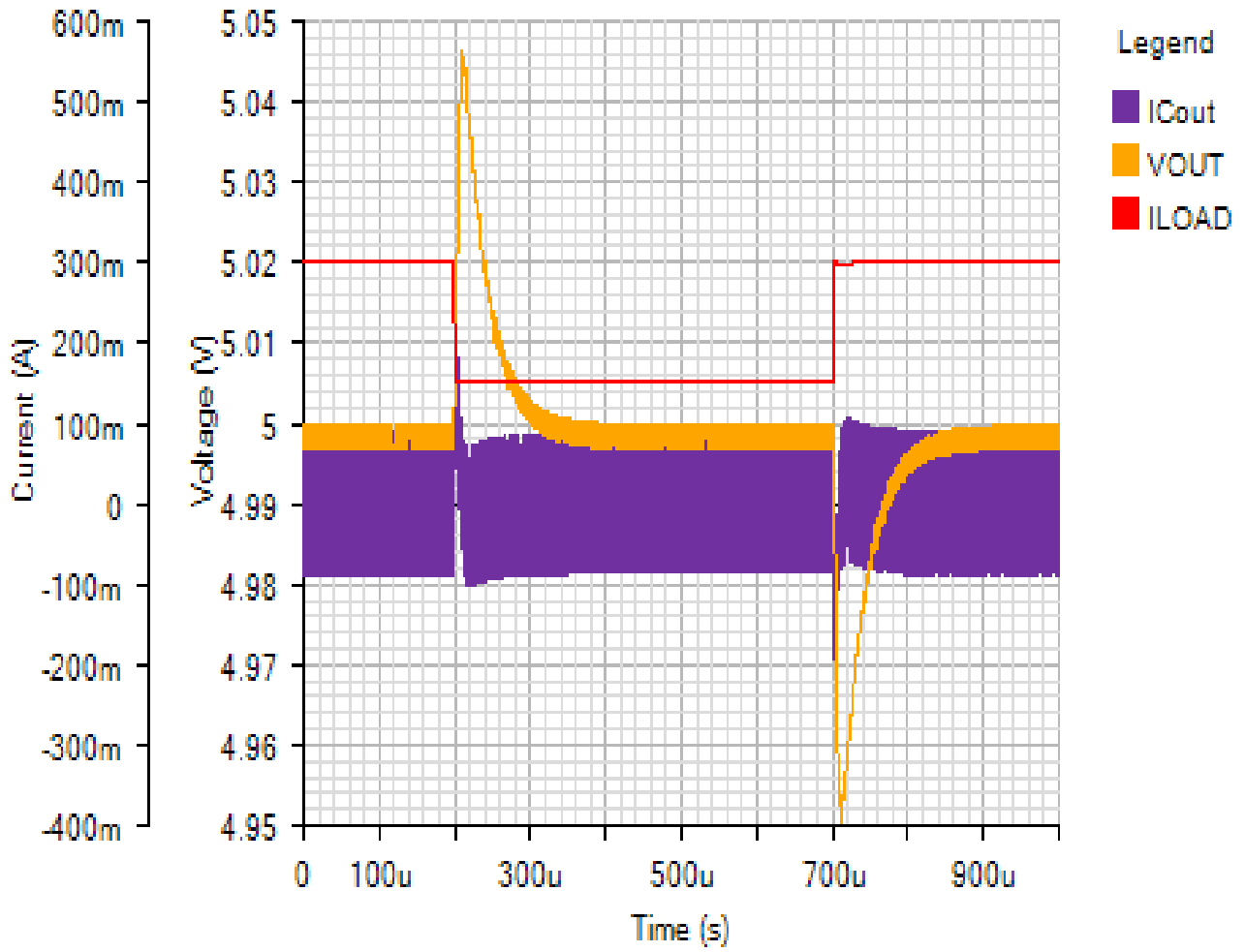






OUTPUT

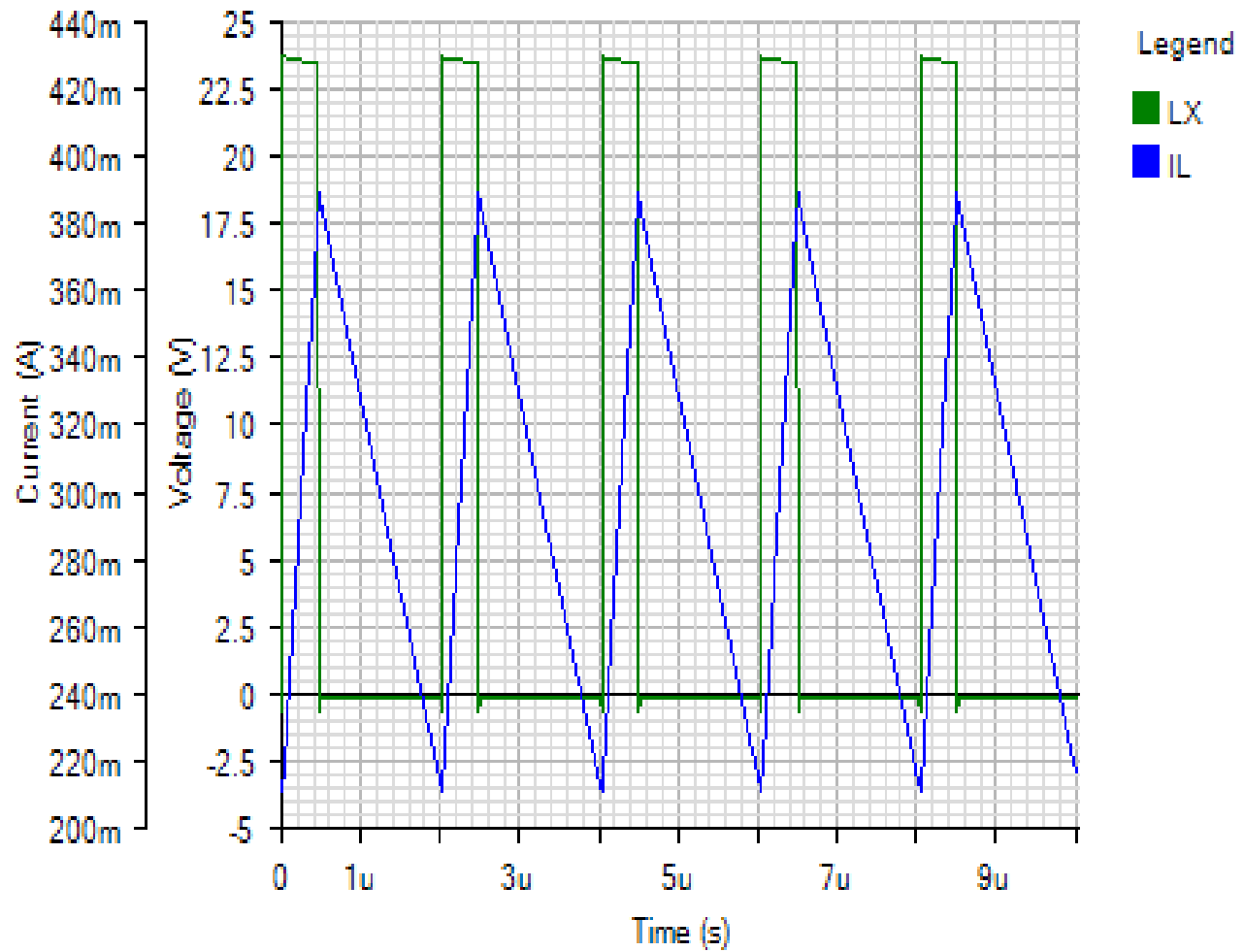
Default

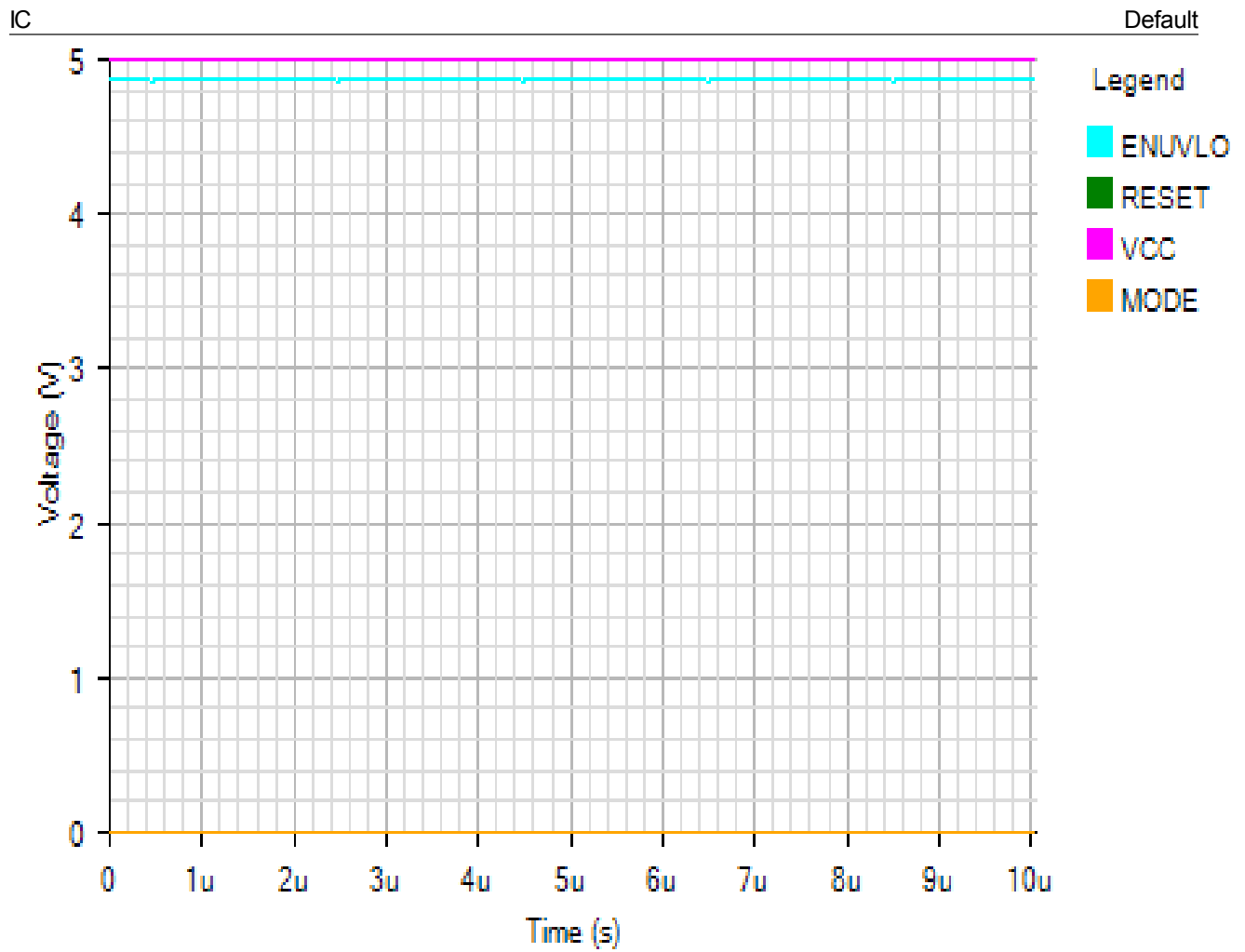


Steady State - Wed Dec 12 2018 13:28:24

SWITCHING

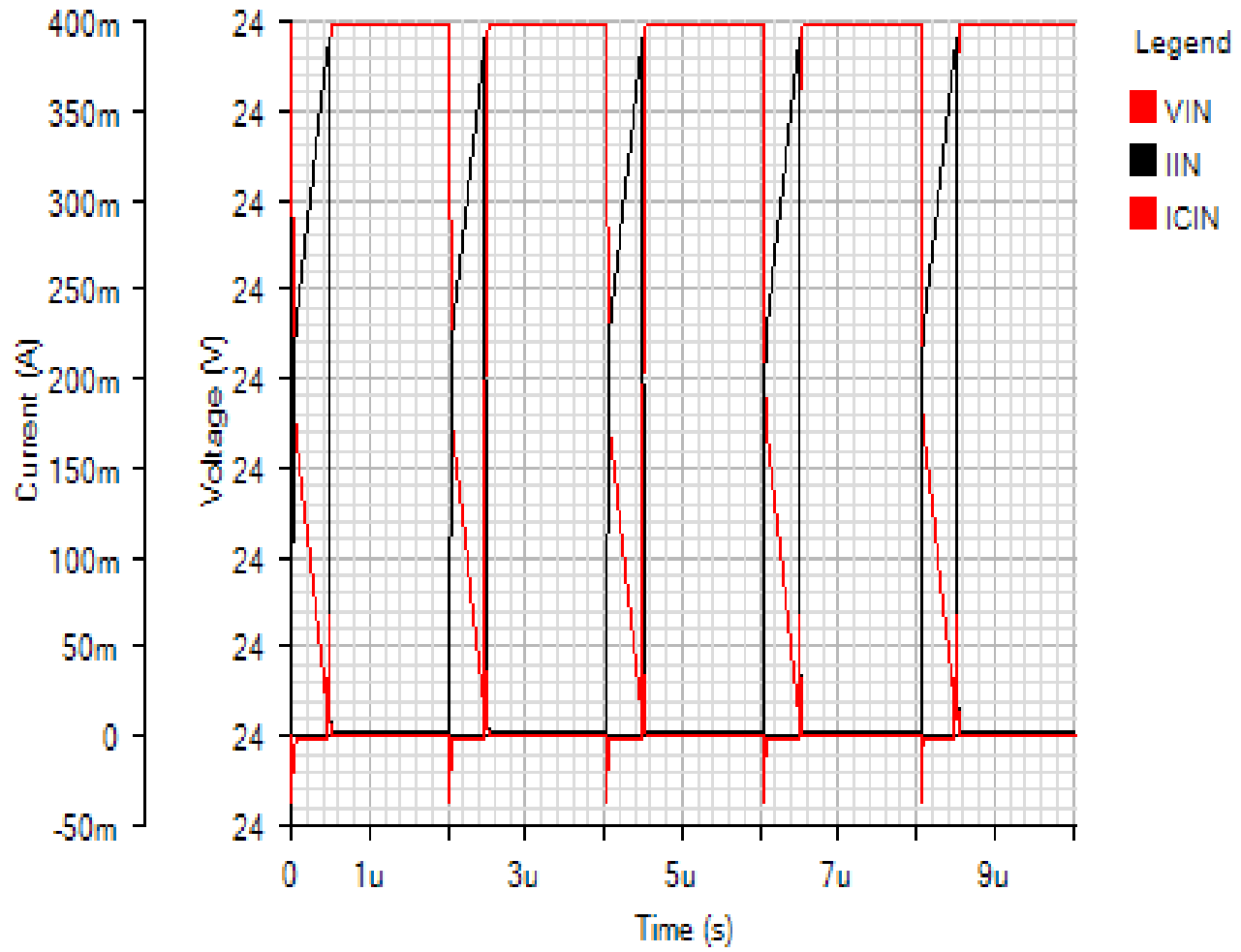
Default





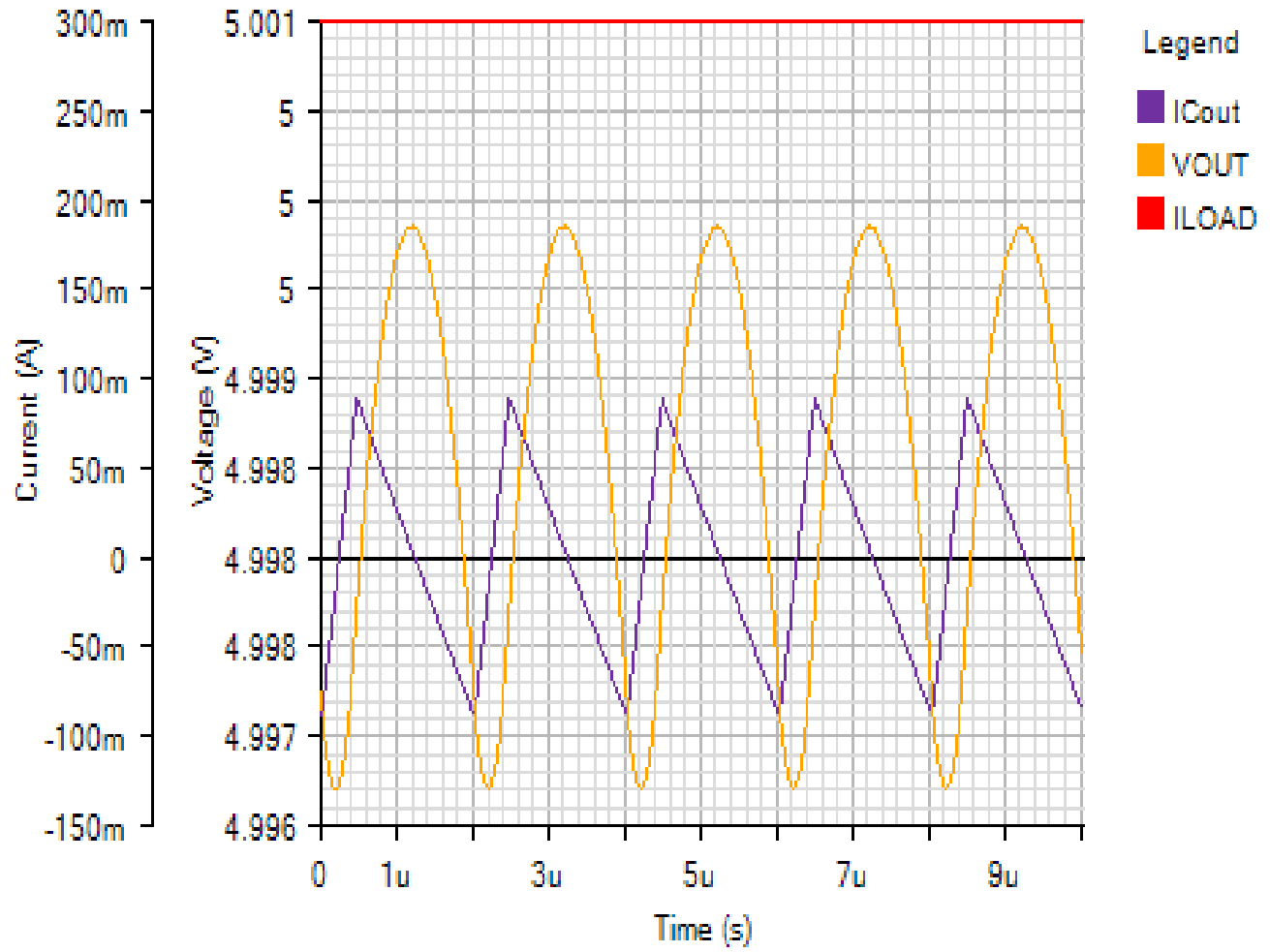
INPUT

Default



OUTPUT

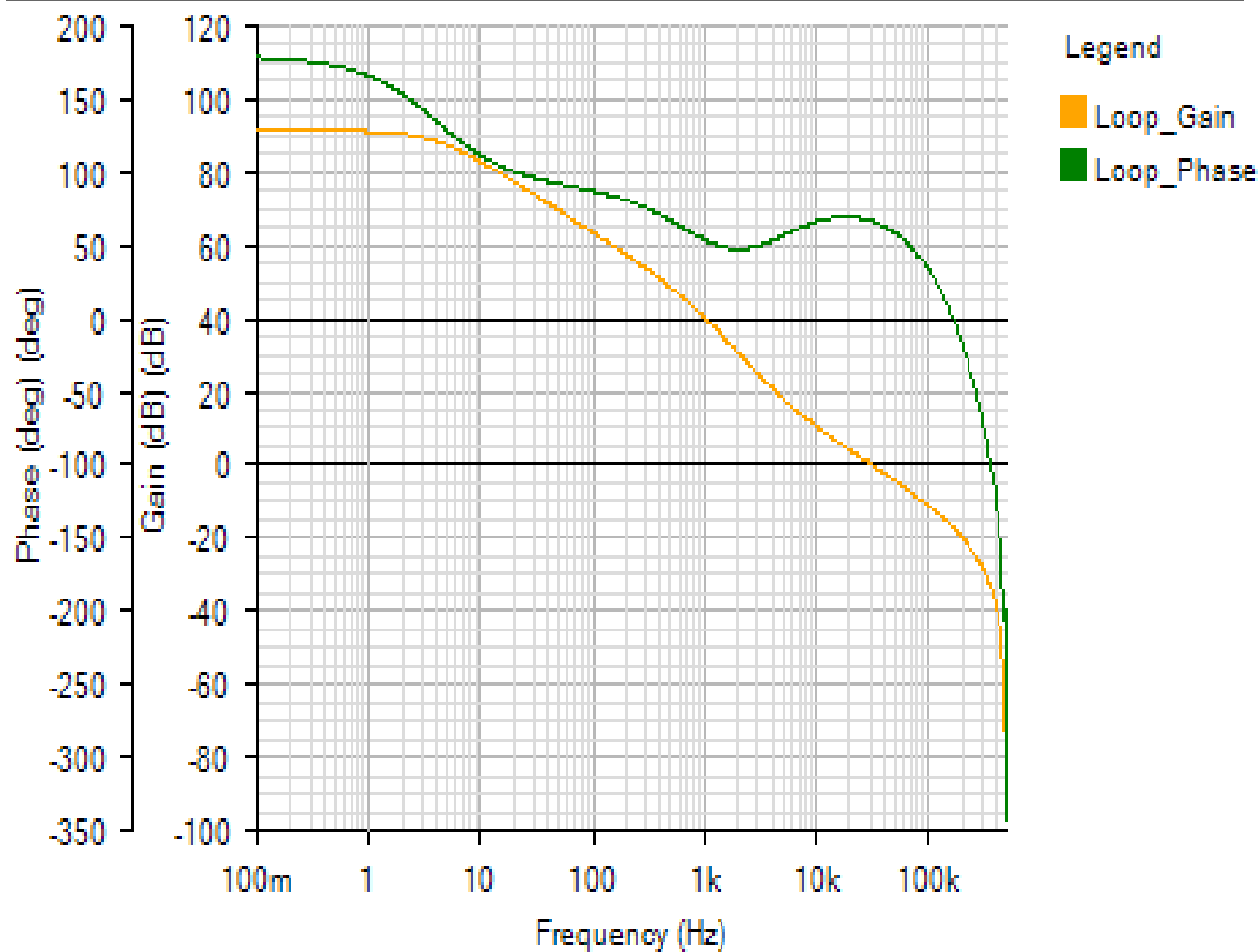
Default



AC Loop - Wed Dec 12 2018 13:28:24

BODE

Default



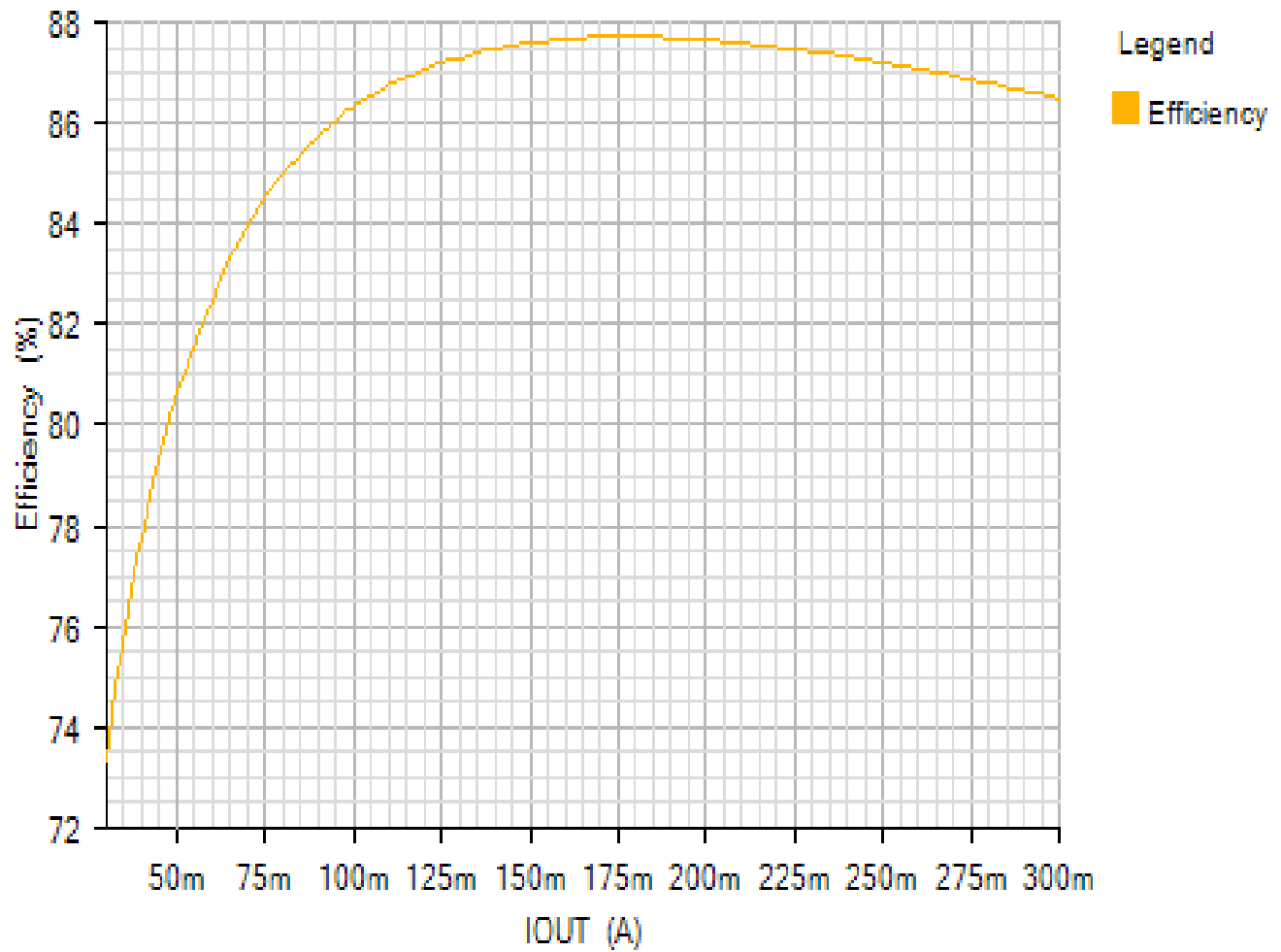
Phase Margin: 66.84° at a crossover frequency of 31.1kHz



Efficiency - Wed Dec 12 2018 13:28:24

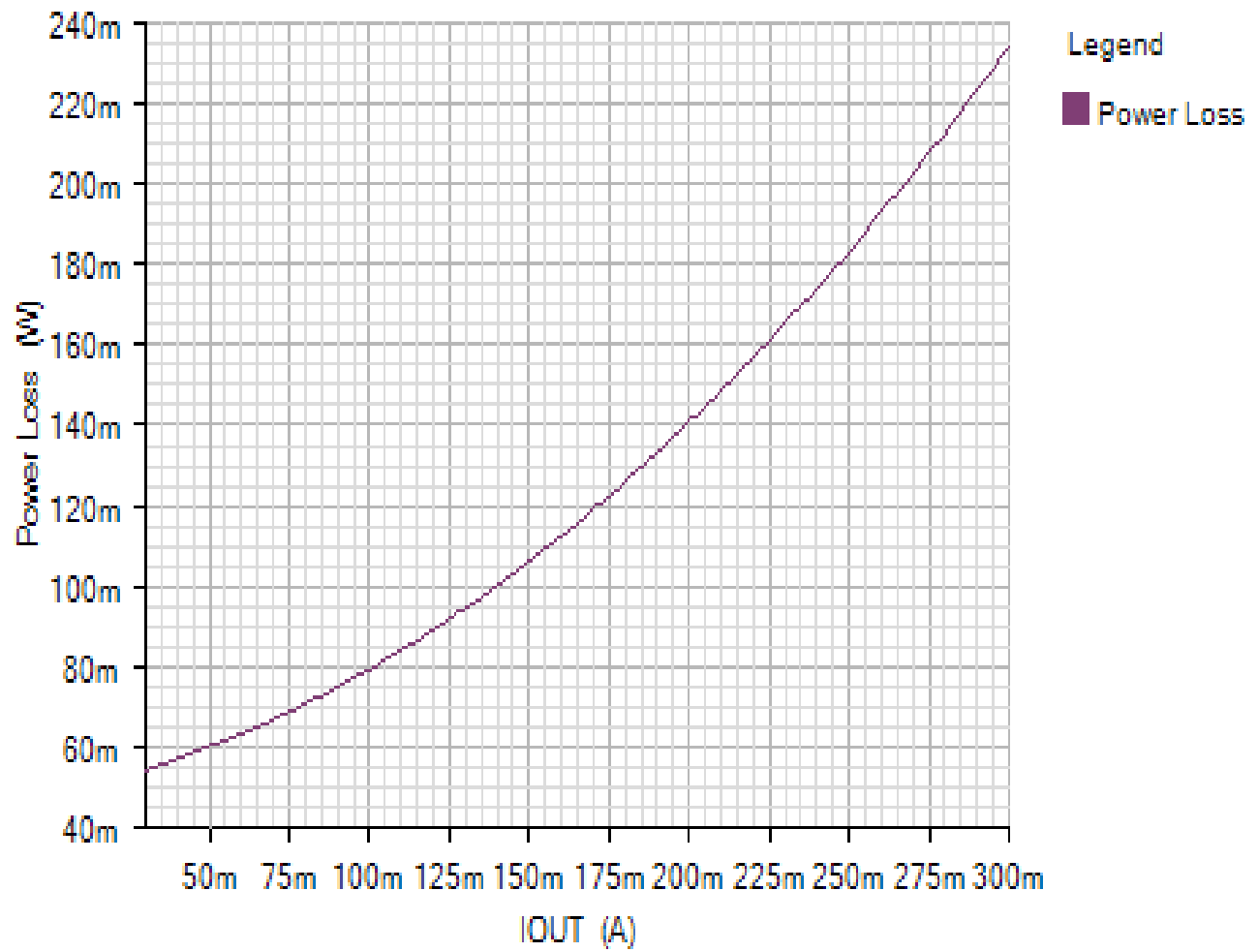
EFFICIENCY_PLOT

Default



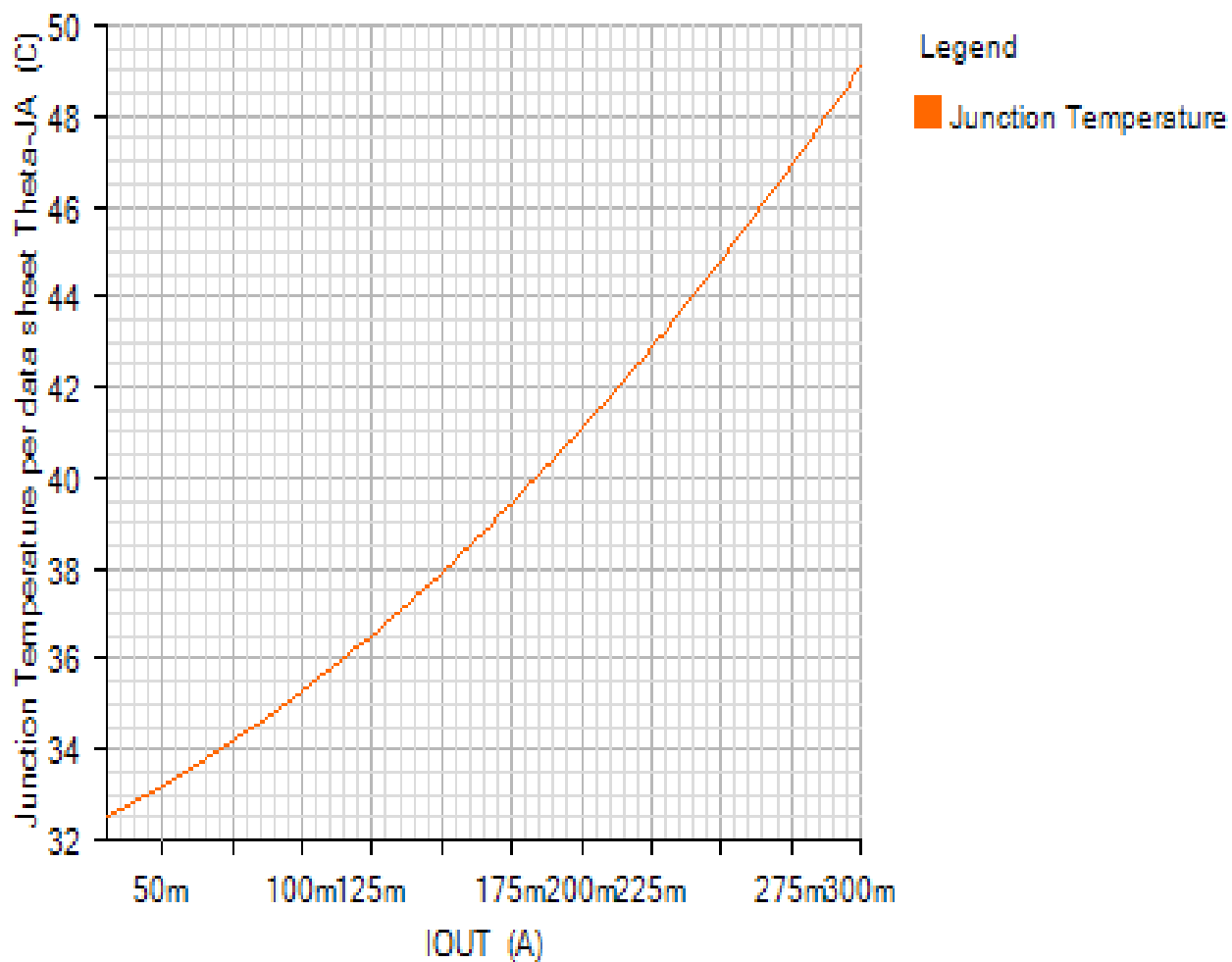
POWER_LOSS_PLOT

Default

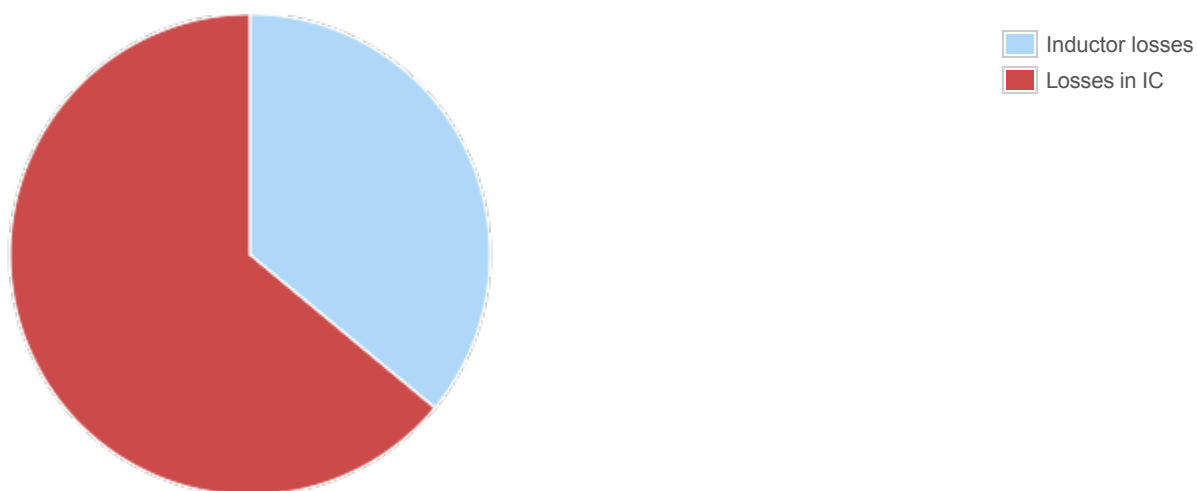


JUNCTION_TEMPERATURE_PLOT

Default



Losses



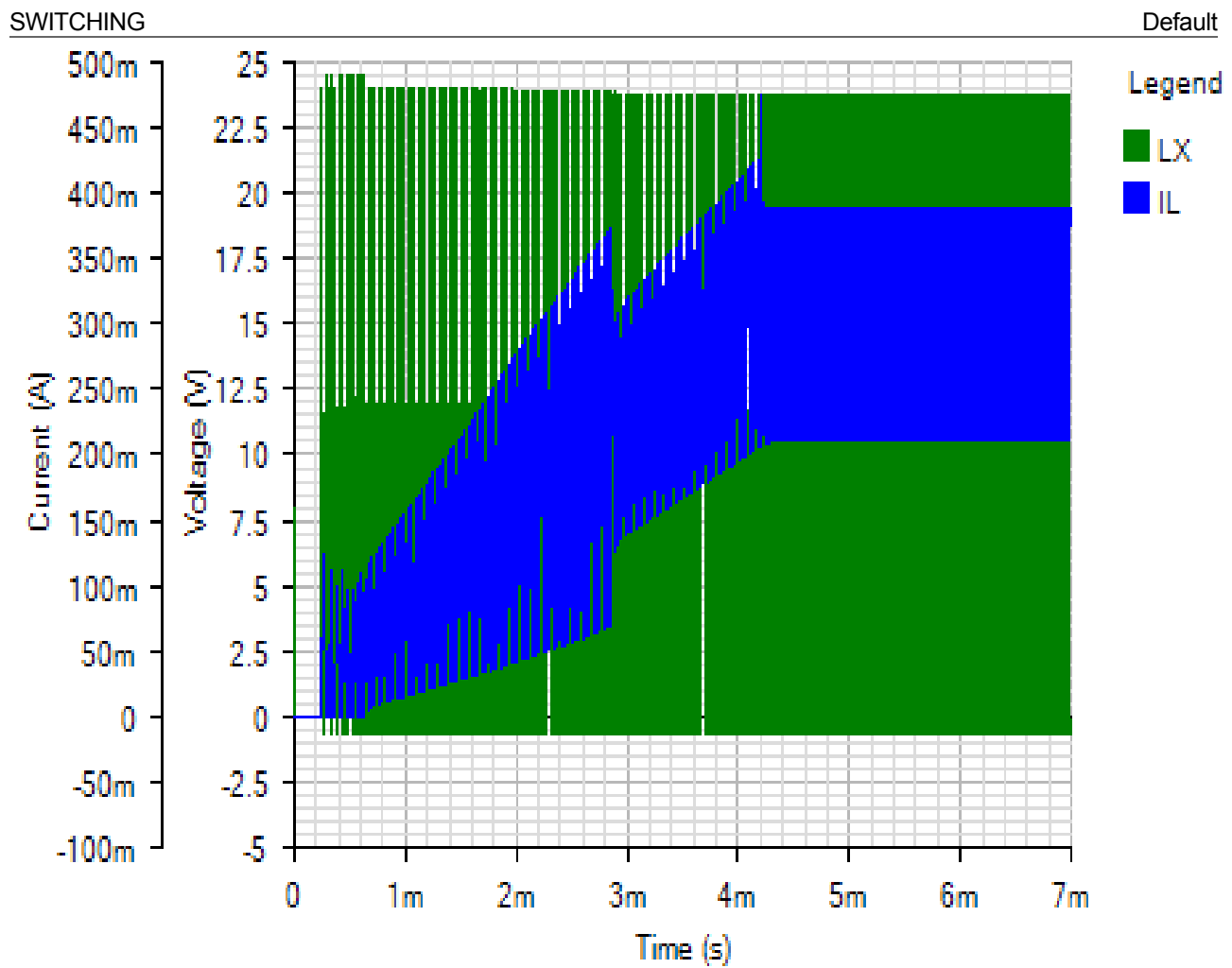
Component

Loss (W)

% of total

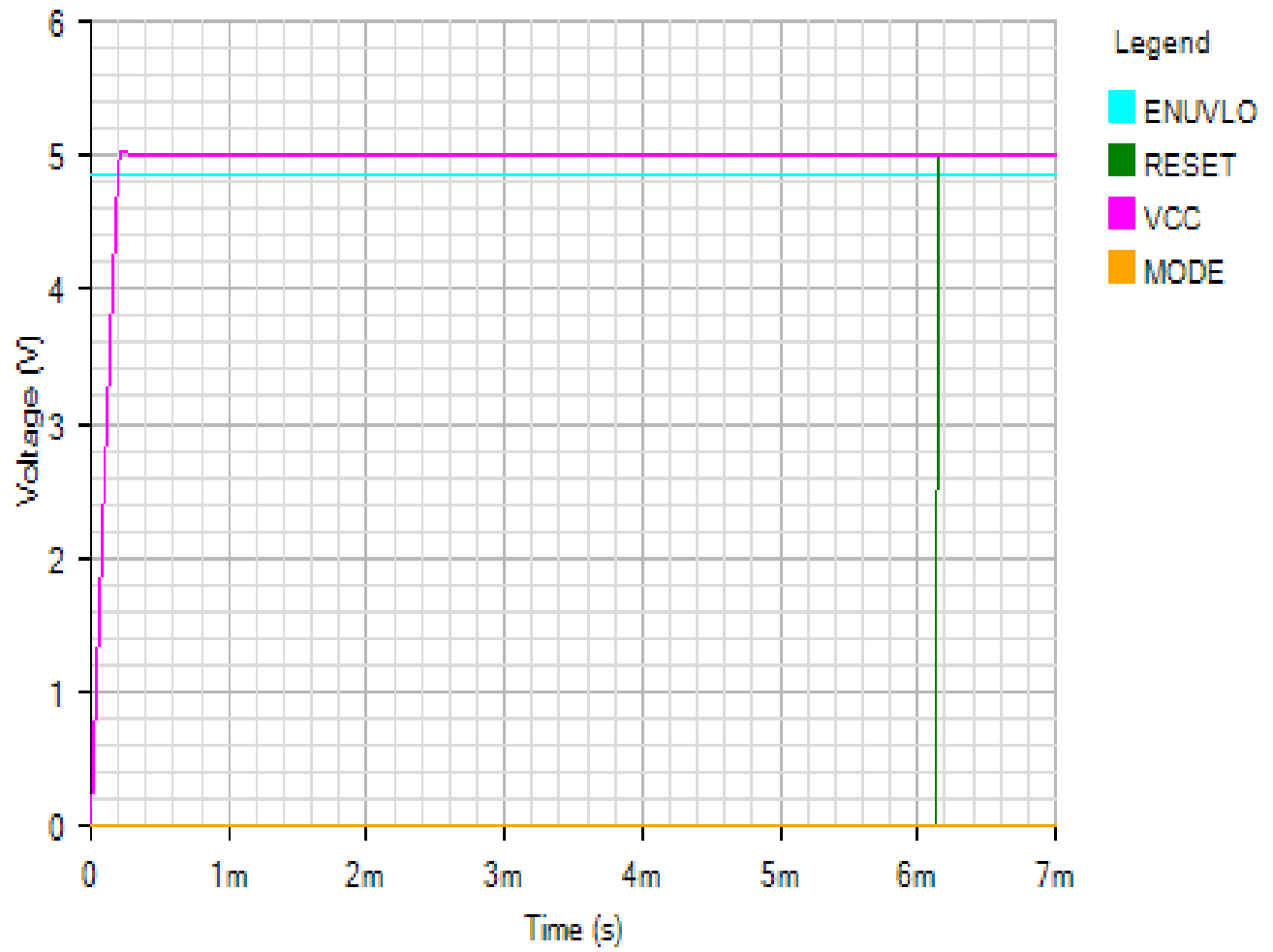
Component	Loss (W)	% of total
Inductor losses	0.09	36
Losses in IC	0.16	64
Total	0.25	100

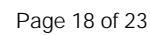
Start Up - Wed Dec 12 2018 13:28:24



IC

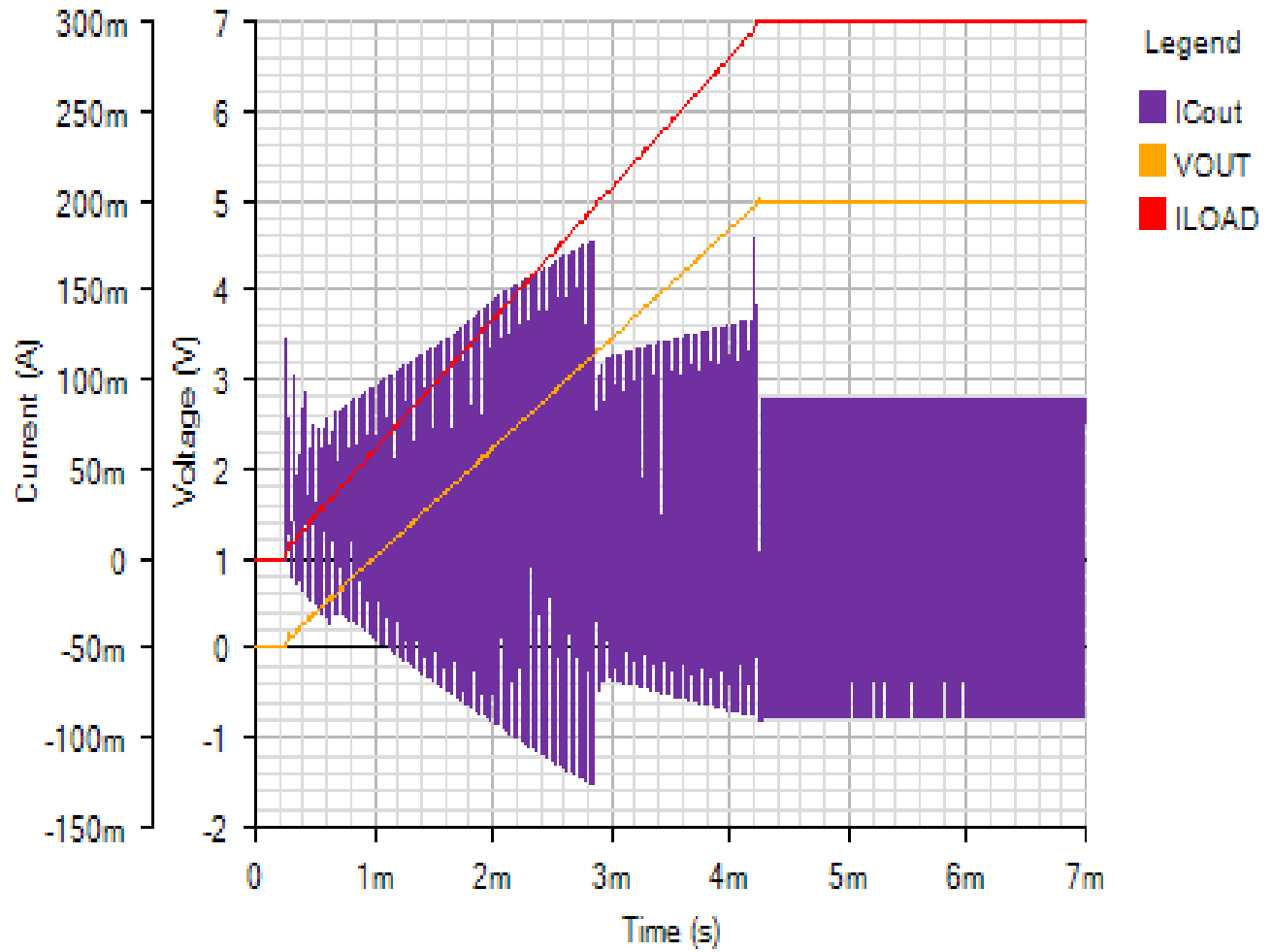
Default





OUTPUT

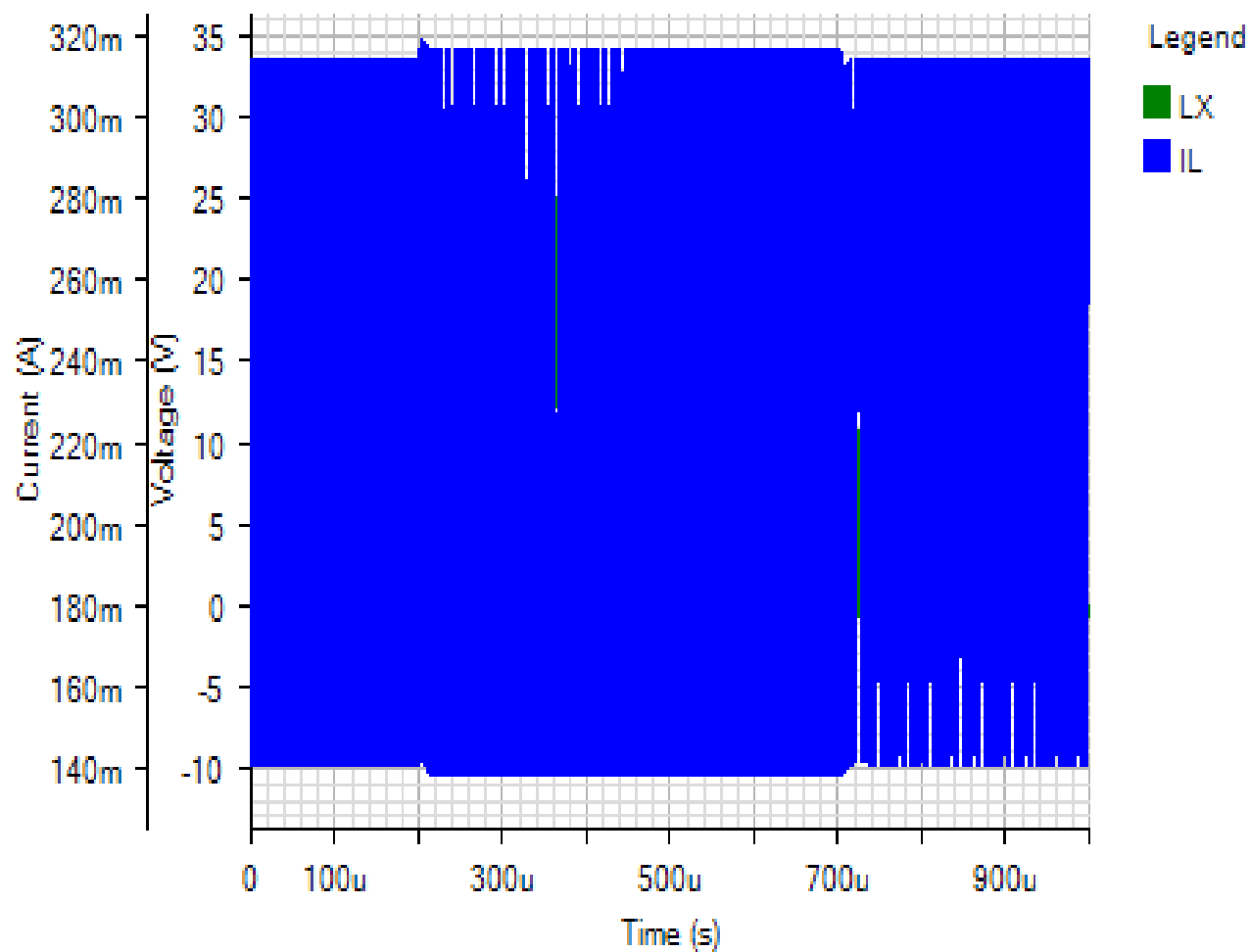
Default



Line Transient - Wed Dec 12 2018 13:28:24

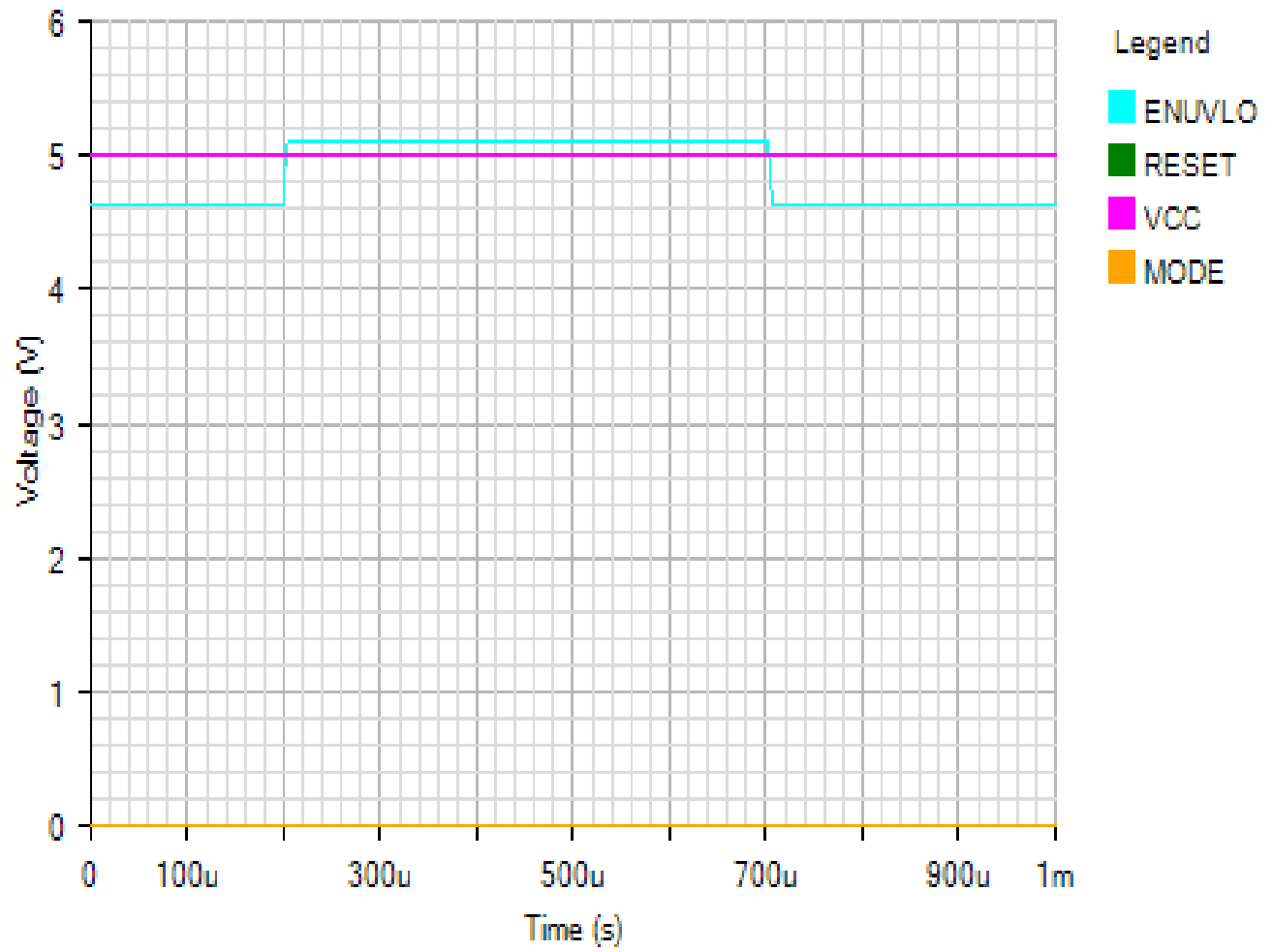
SWITCHING

Default



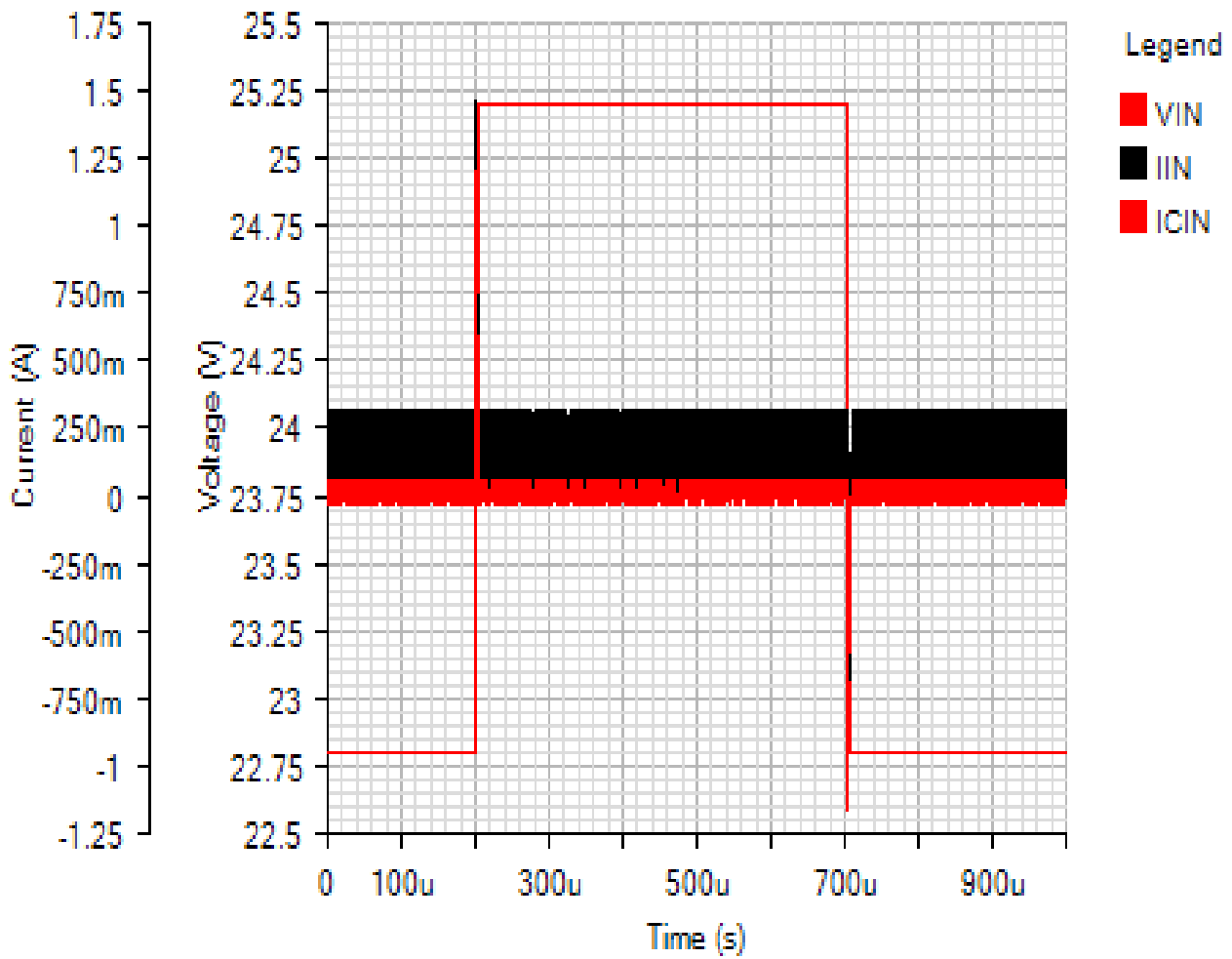
IC

Default



INPUT

Default



OUTPUT

Default

