

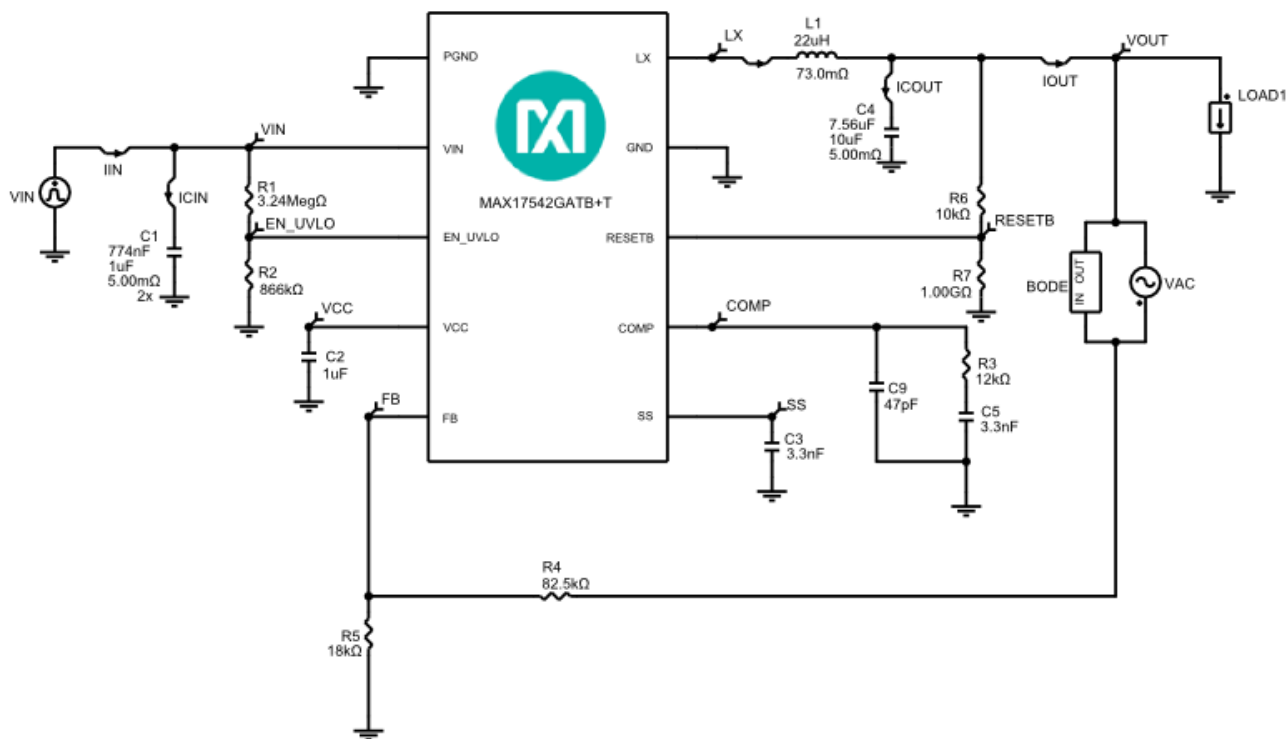
Initial Design

1.0

Design Requirements

Parameter	Value
Maximum Input Voltage	42V
Minimum Input Voltage	6.72V
Nominal Input Voltage	24V
Input Steady-State Ripple	0.25V
Input Undervoltage Lockout Level	5.9V
Output Voltage	5V
Output Current	1A
Output Voltage Load Step Over/Undershoot	0.15V
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
Ambient Temperature	25°C
Soft Start time	0.0006s

Schematic



***** Note *****

- Decreasing the output capacitance below recommended value might degrade the transient response or loop stability.

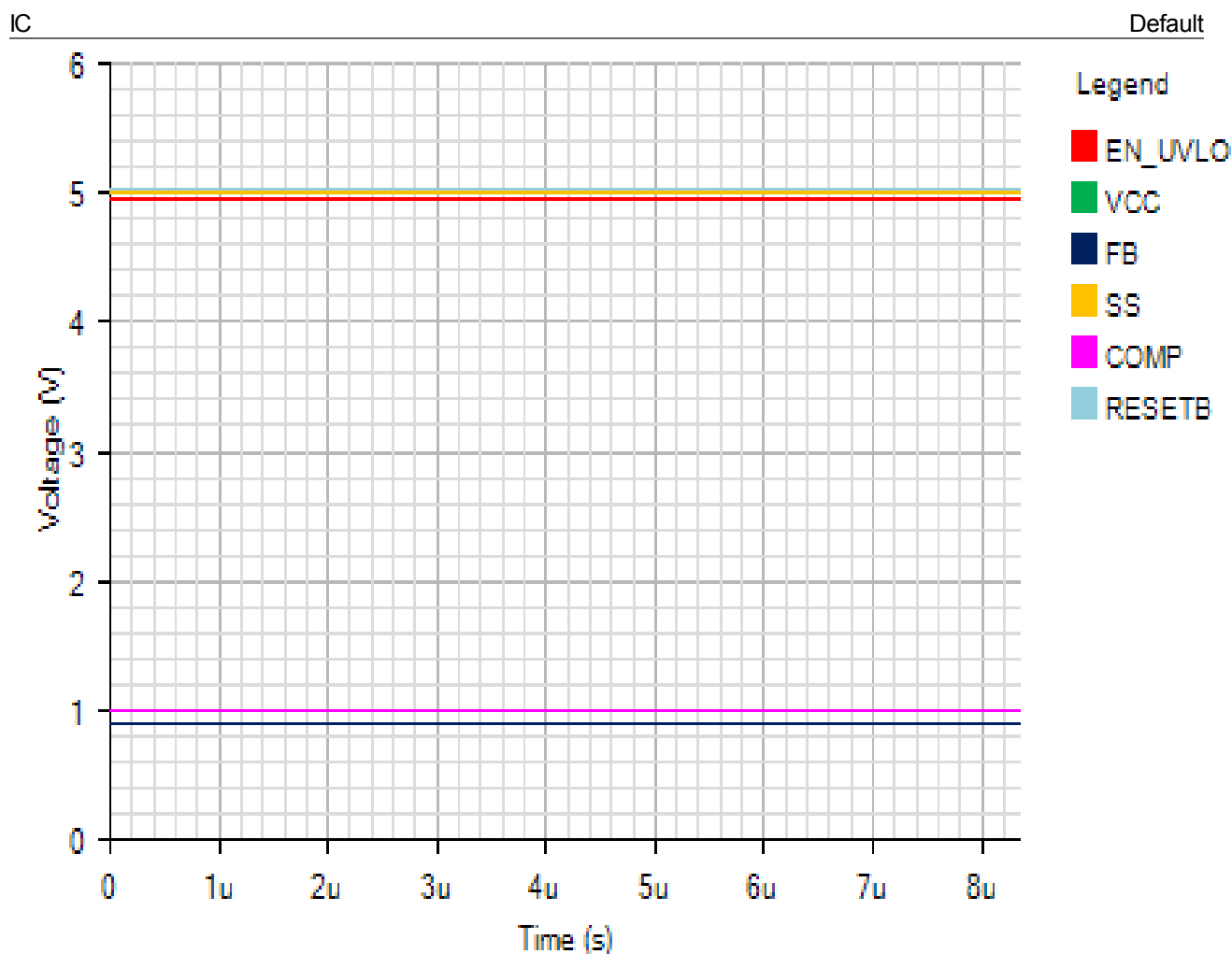
BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX17542G	Maxim Integrated	Voltage Regulators - Switching Regulators 42V, 1A, Ultra-Small, High efficiency, Synchronous Step-Down DC/DC converter
C1	2	C3216X7R2A105K160AA	TDK	Cap Ceramic 1uF 100V X7R 10% SMD 1206 125C Plastic T/R
C2	1	CGB3B3X7R0J105K055AB	TDK	Cap Ceramic 1uF 6.3V X7R 10% Pad SMD 0603 125°C T/R
C3	1	UMK105B7332KV-F	Taiyo Yuden	Cap Ceramic 0.0033uF 50V X7R 10% Pad SMD 0402 125°C T/R
C4	1	C2012X7R1A106K125AC	TDK	Cap Ceramic 10uF 10V X7R 10% SMD 0805 125C Plastic T/R
C5	1	UMK105B7332KV-F	Taiyo Yuden	Cap Ceramic 0.0033uF 50V X7R 10% Pad SMD 0402 125°C T/R
C9	1	CGA2B2C0G1H470J050BA	TDK	Cap Ceramic 47pF 50V C0G 5% Pad SMD 0402 125°C Automotive T/R
L1	1	MSS1038-223MLB	Coilcraft	Inductor 22uH 20% 65.7mOhm 2.8A Isat 2.85A Irms
R1	1	CRCW06033M24FKEA	Vishay	Res Thick Film 0603 3.24M Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

R2	1	CRCW0603866KFKEA	Vishay	Res Thick Film 0603 866K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	CRCW060312K0FKEA	Vishay	Res Thick Film 0603 12K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	CRCW060382K5FKEA	Vishay	Res Thick Film 0603 82.5K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	MCT06030C1802FP500	Vishay	Res Thin Film 0603 18K Ohm 1% 0.125W(1/8W) ±50ppm/°C Sulfur Resistant Pad SMD Automotive Medical T/R
R6	1	CRCW040210K0FKED	Vishay	Res Thick Film 0402 10K Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD Automotive T/R

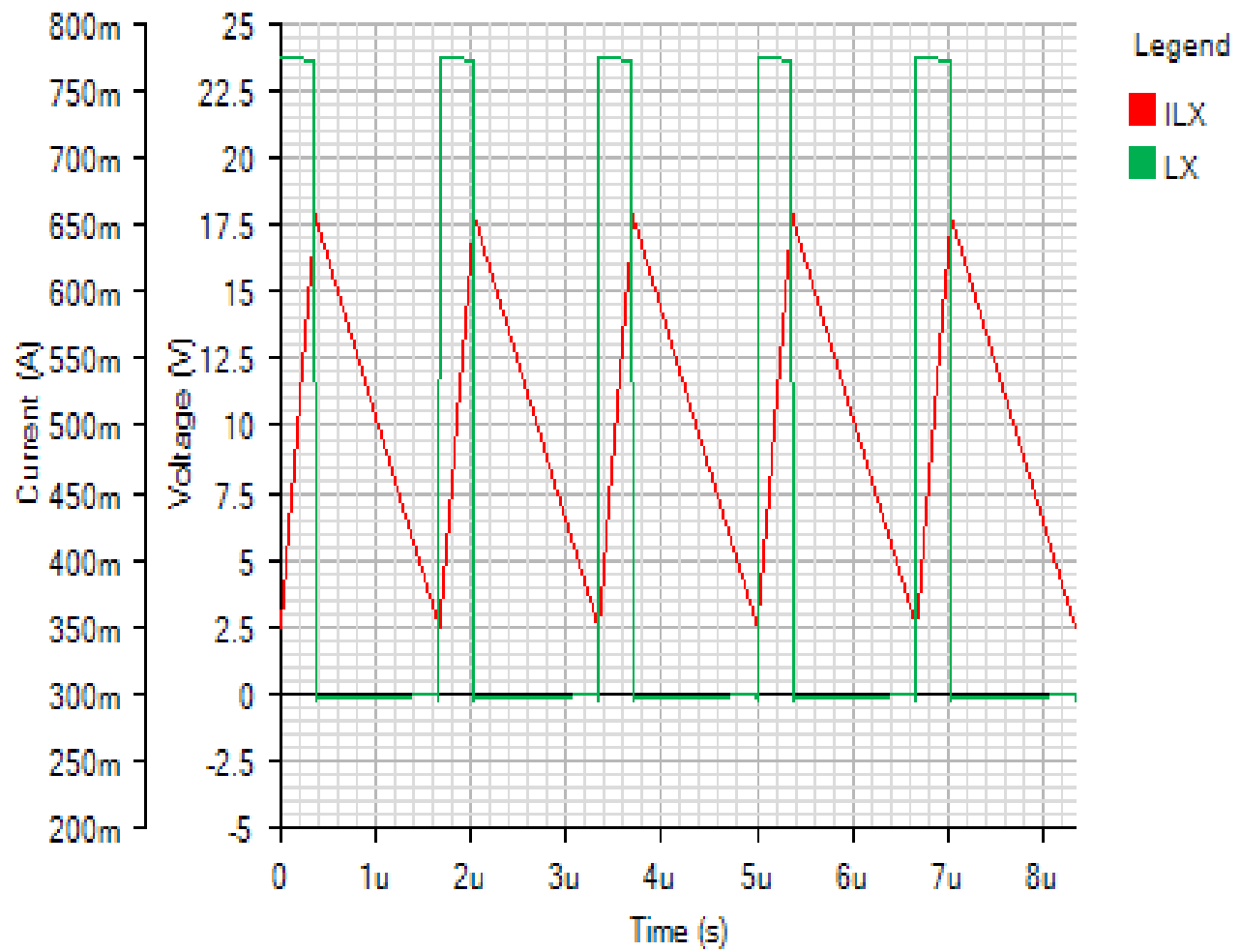
Simulation Results

Steady State - Tue Nov 20 2018 15:53:25



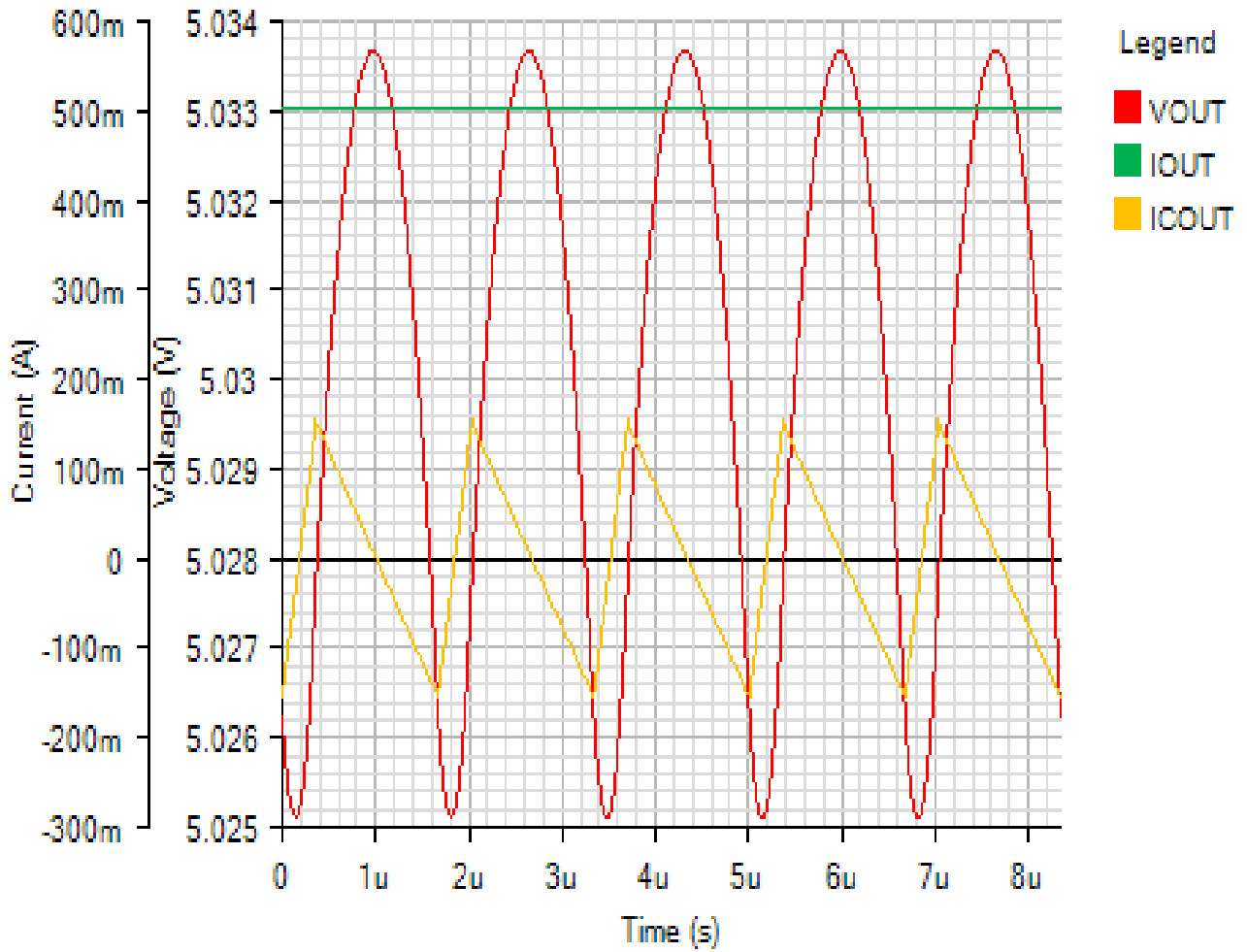
SWITCHING

Default



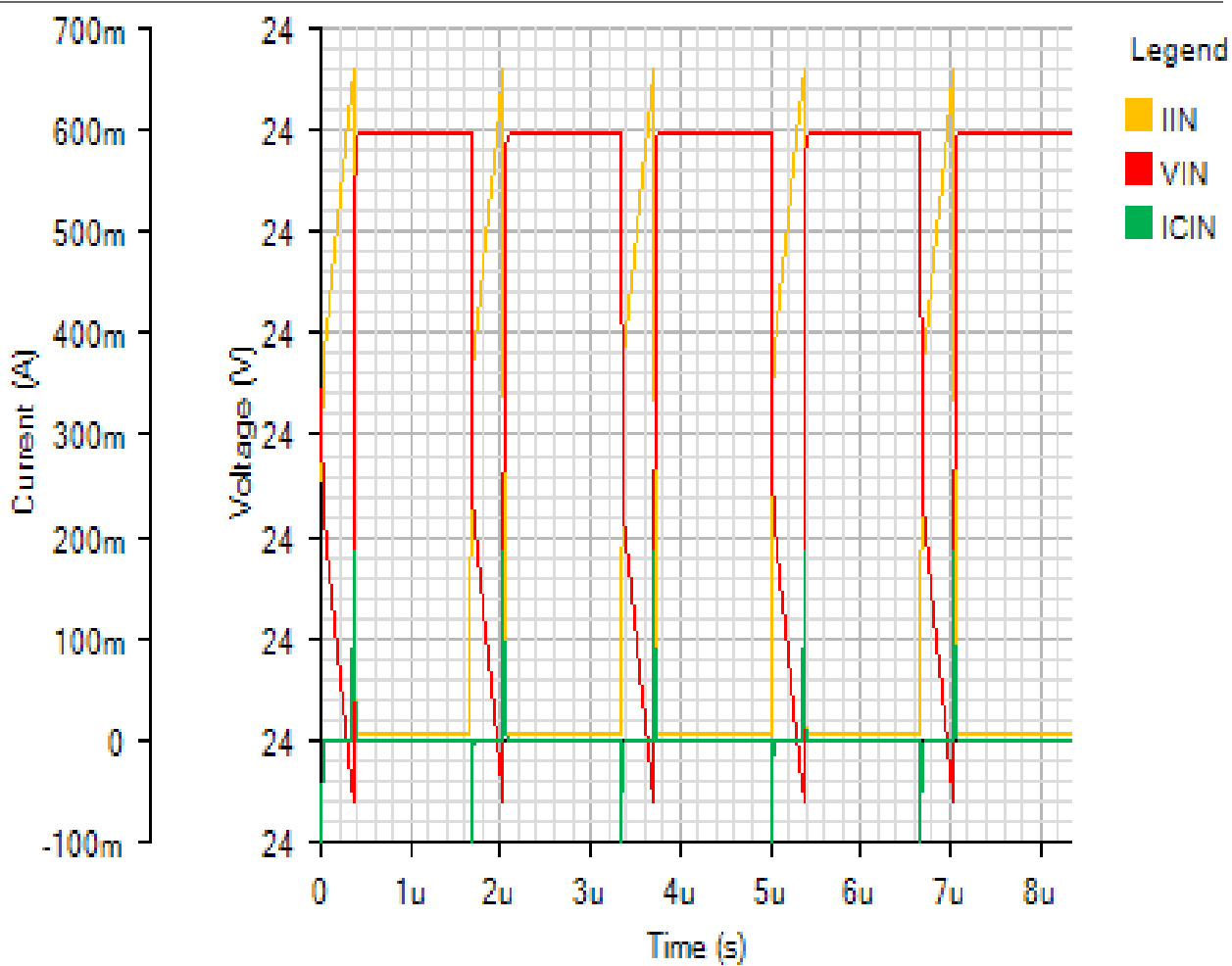
OUTPUT

Default



INPUT

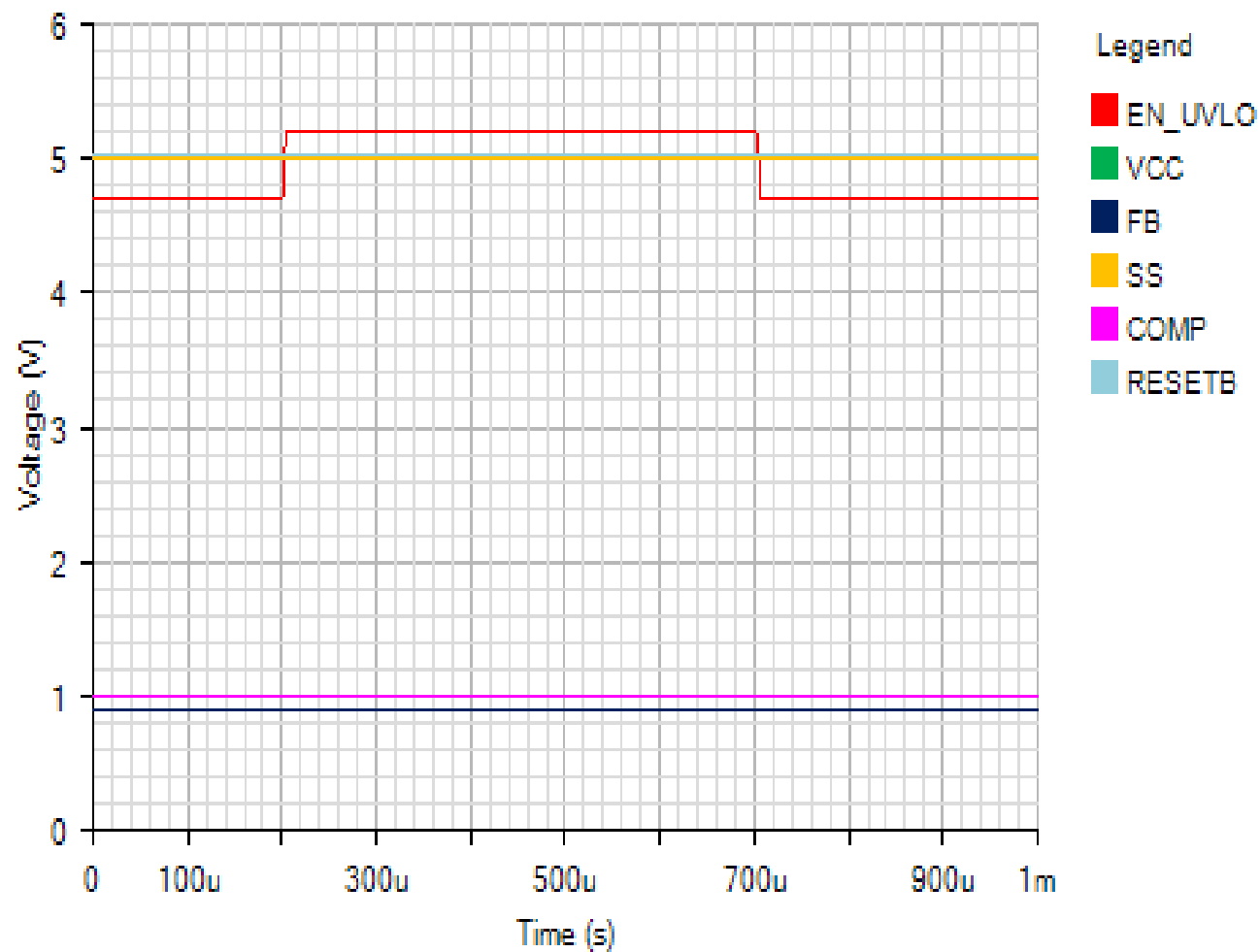
Default



Line Transient - Tue Nov 20 2018 15:53:25

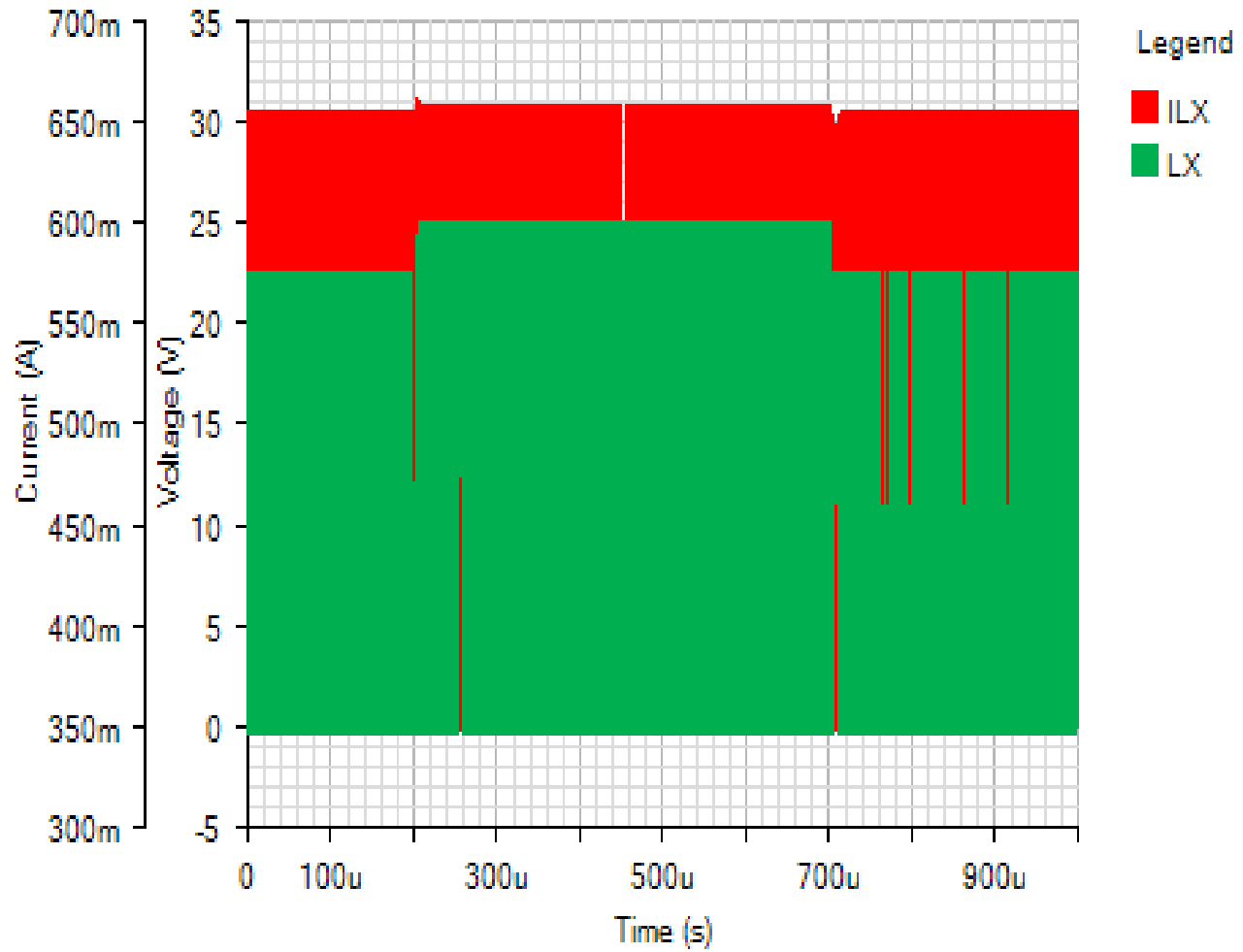
IC

Default



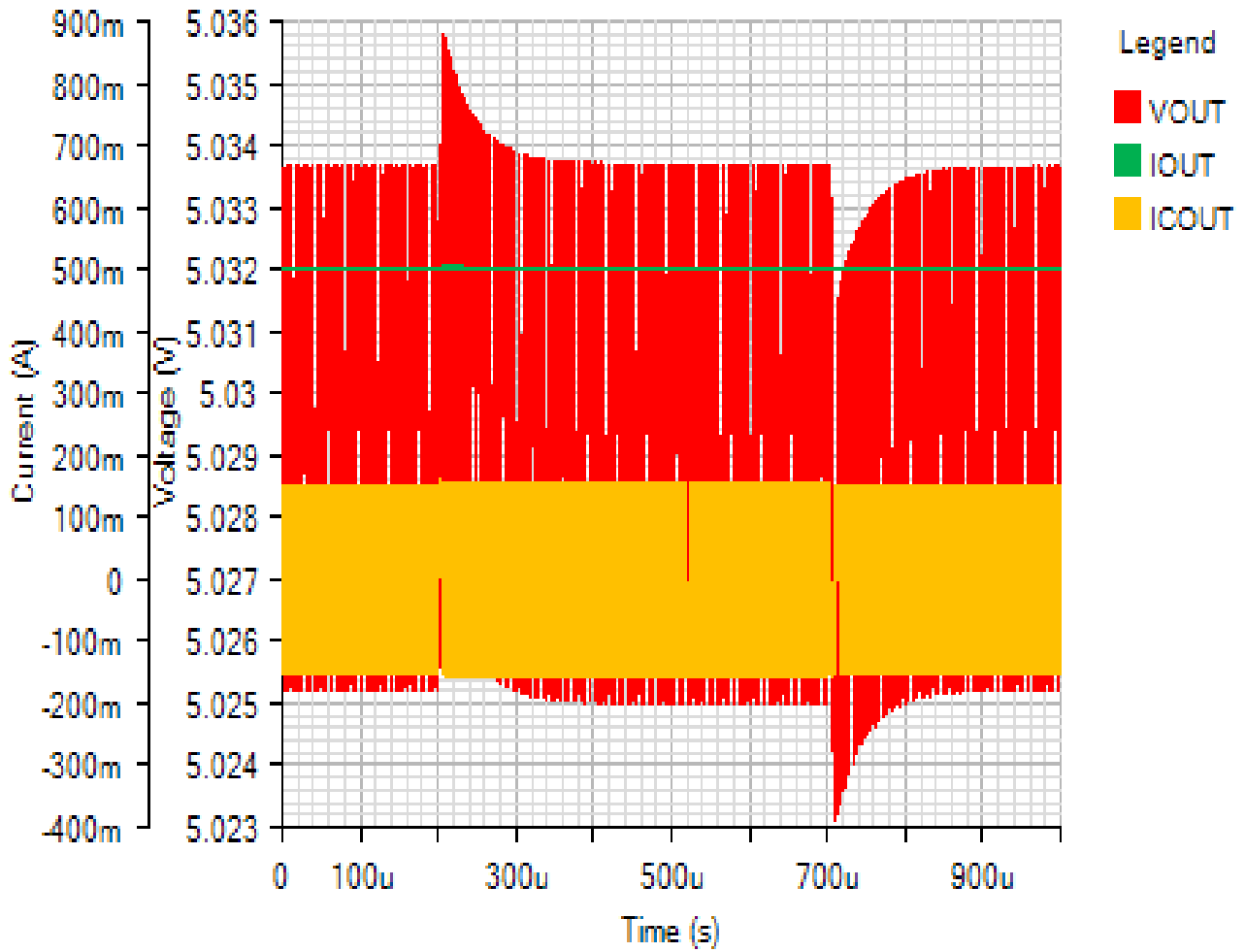
SWITCHING

Default



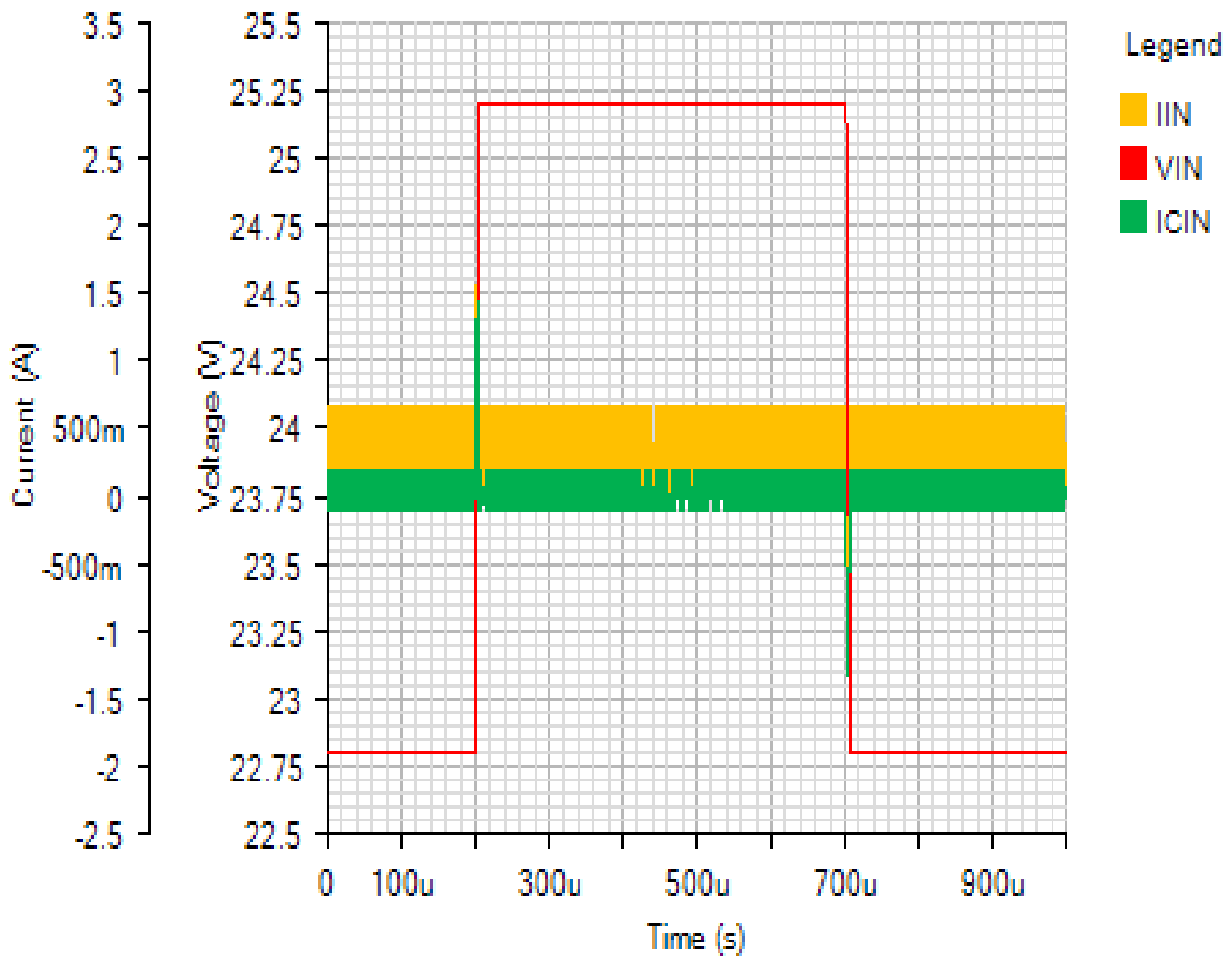
OUTPUT

Default



INPUT

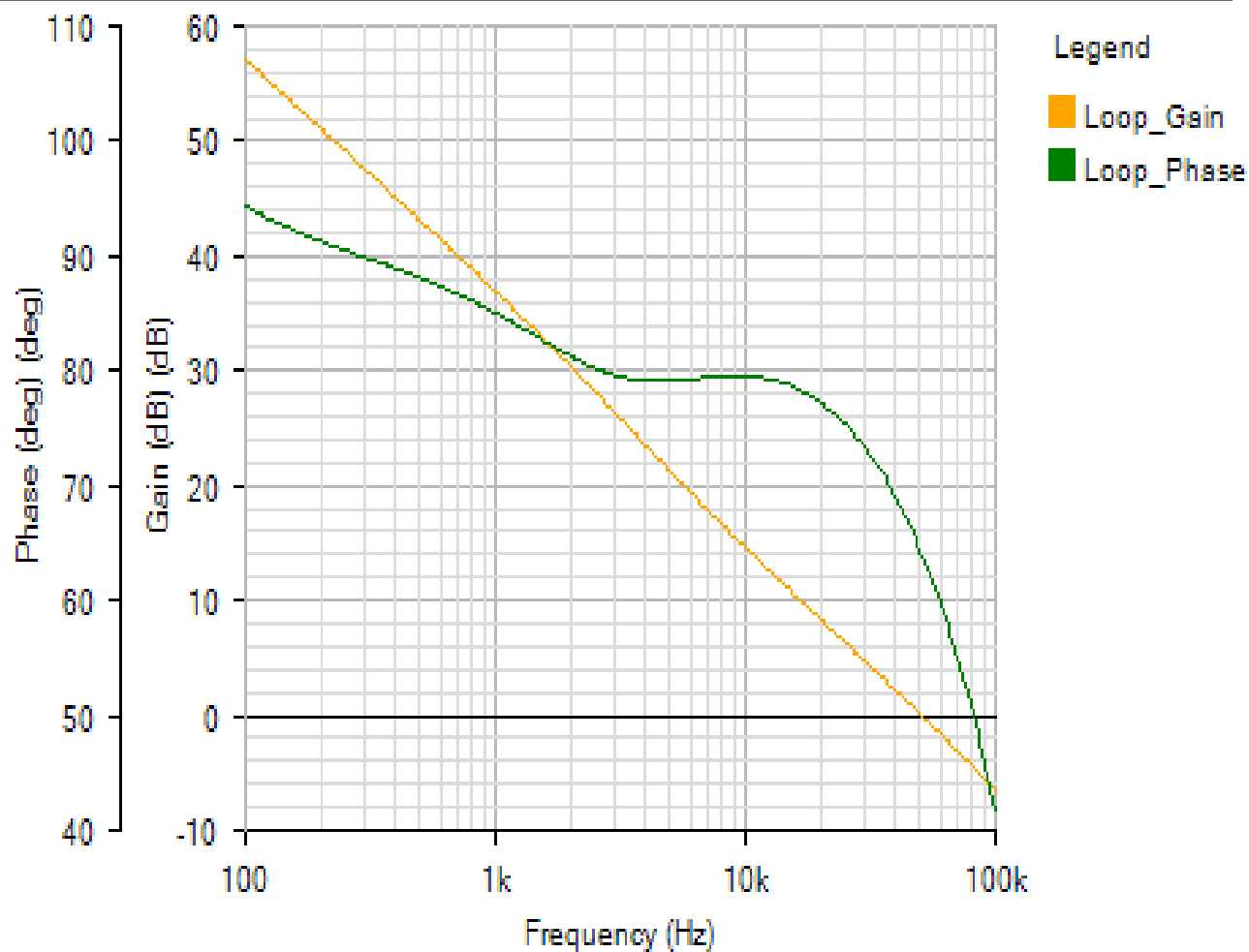
Default



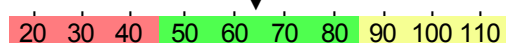
AC Loop - Tue Nov 20 2018 15:53:25

BODE

Default



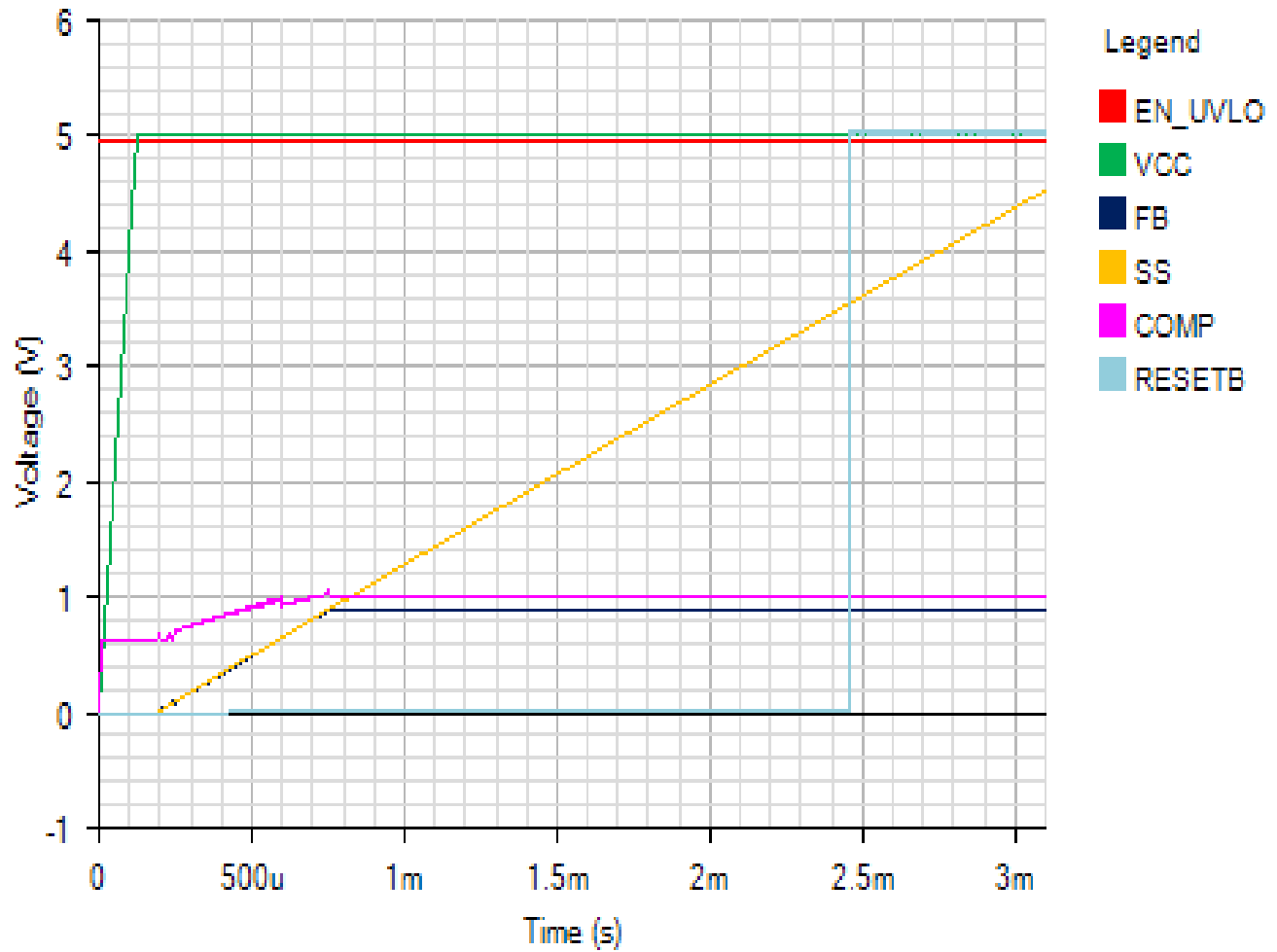
Phase Margin: 64.21° at a crossover frequency of 50.7kHz



Start Up - Tue Nov 20 2018 15:53:25

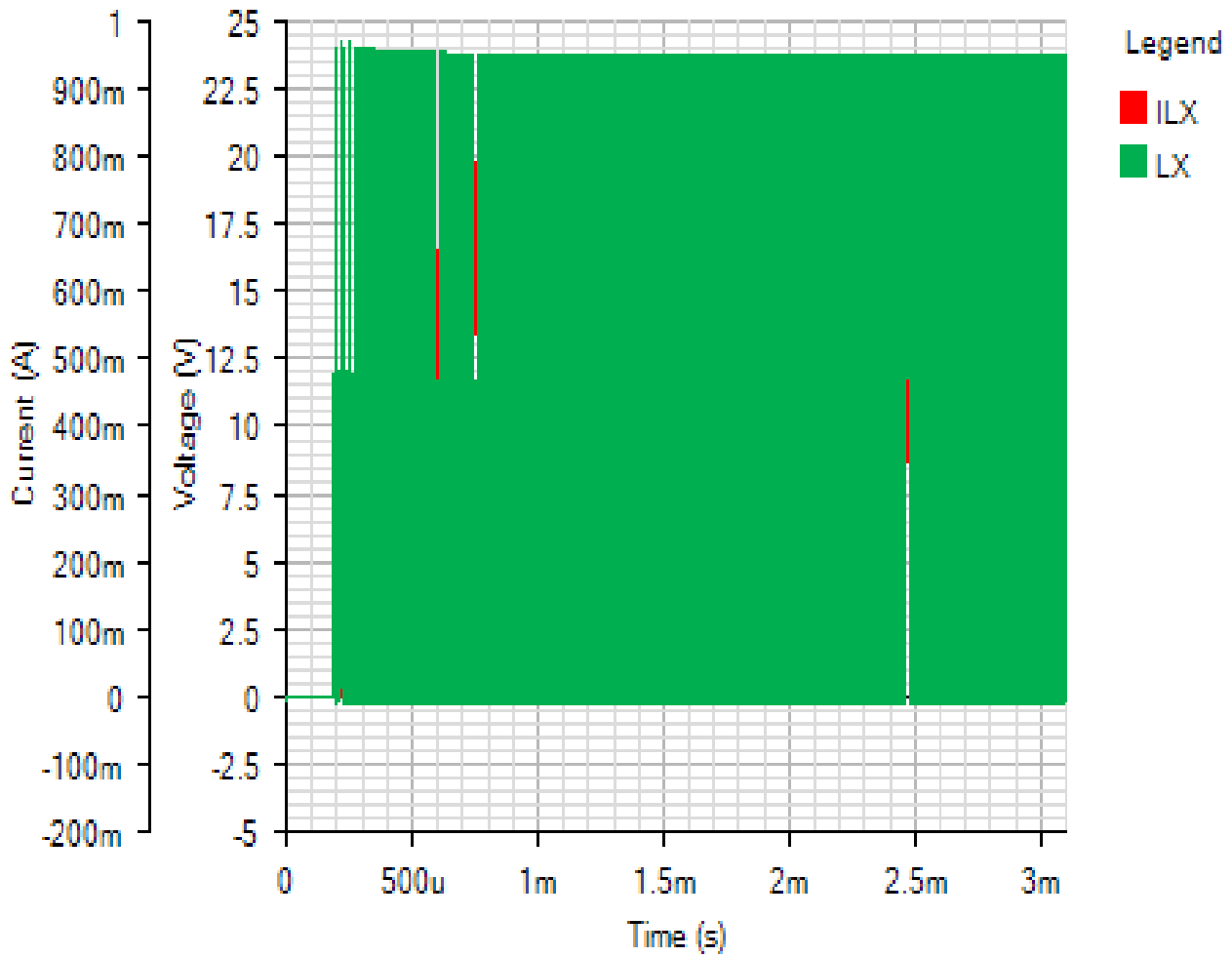
IC

Default



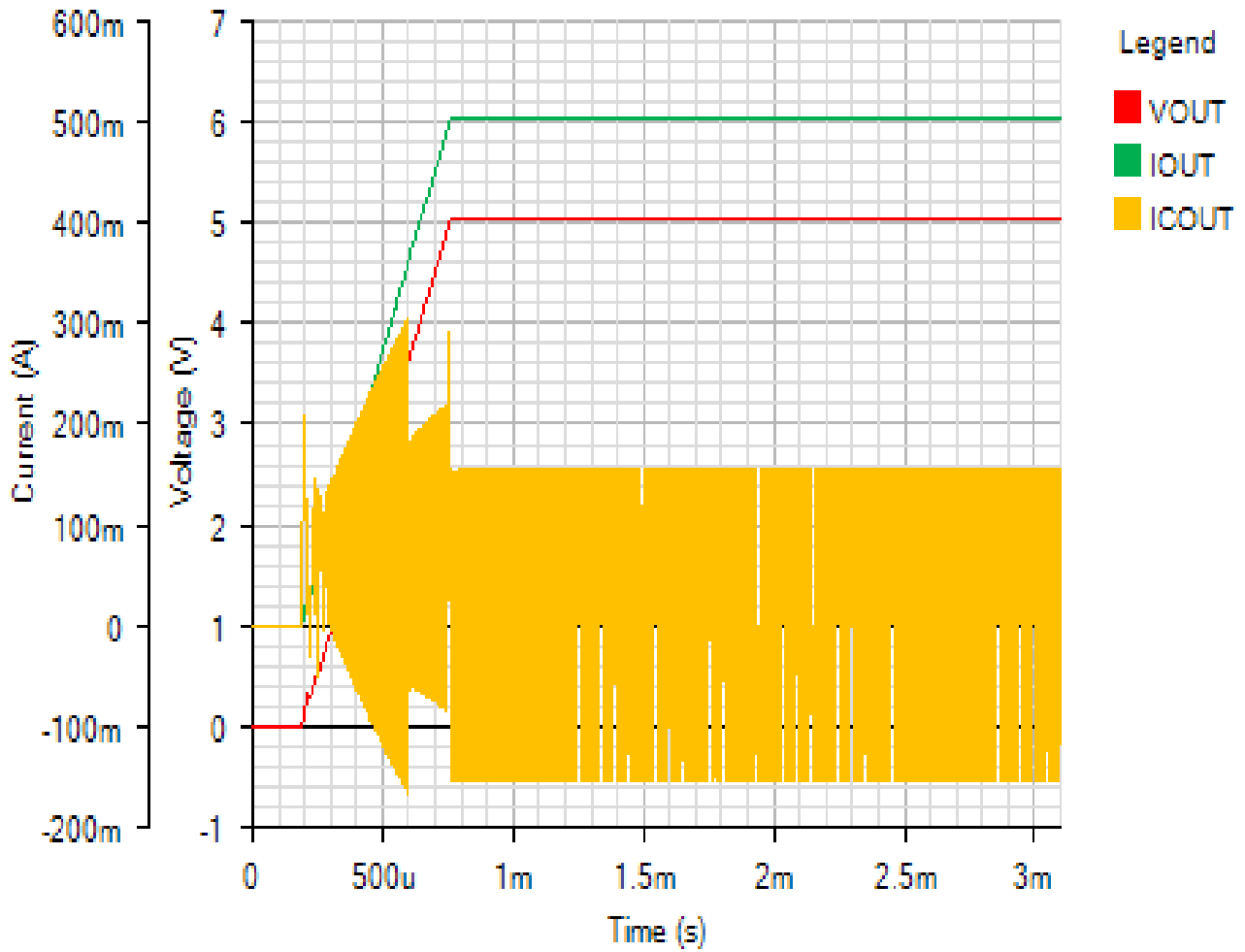
SWITCHING

Default



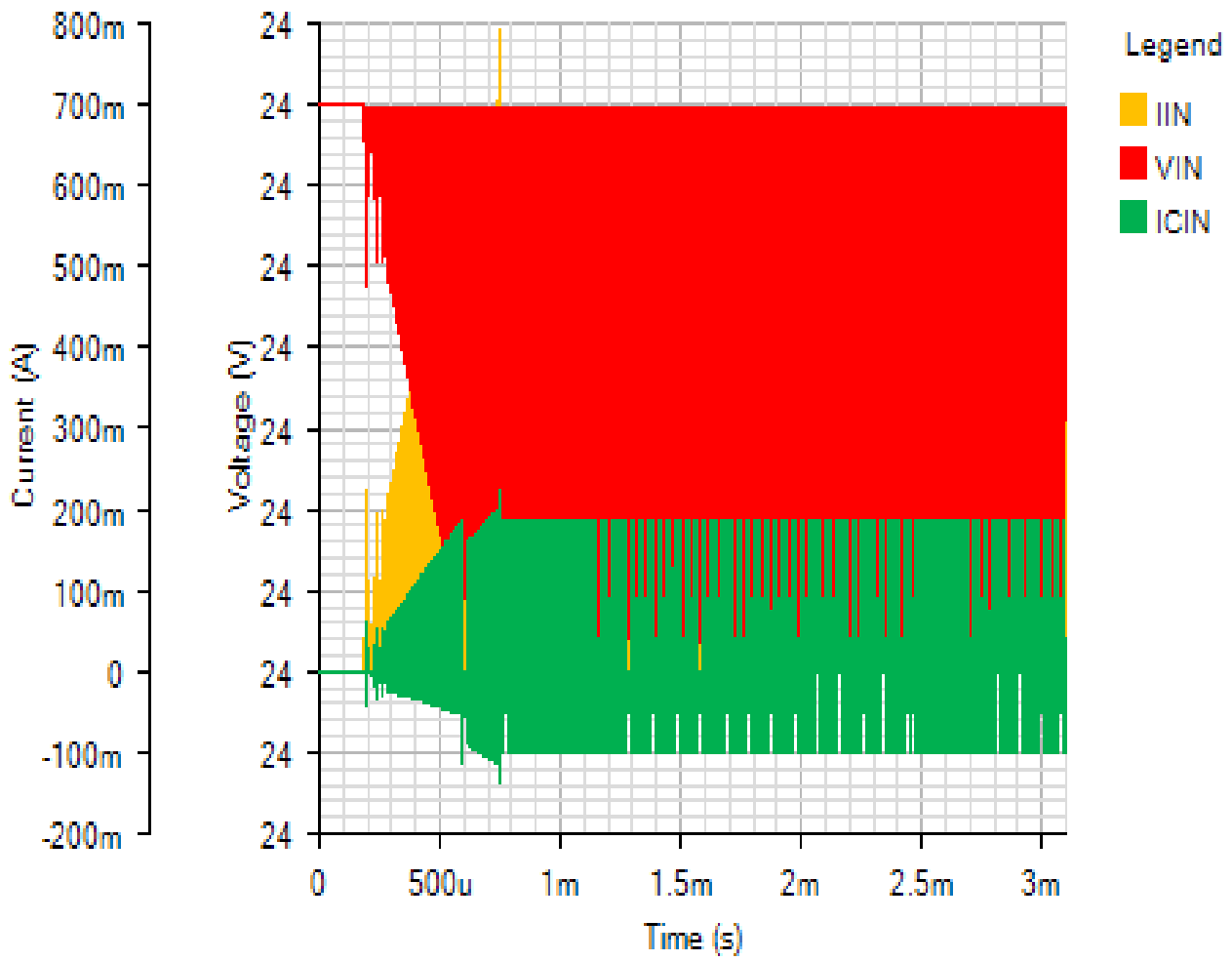
OUTPUT

Default



INPUT

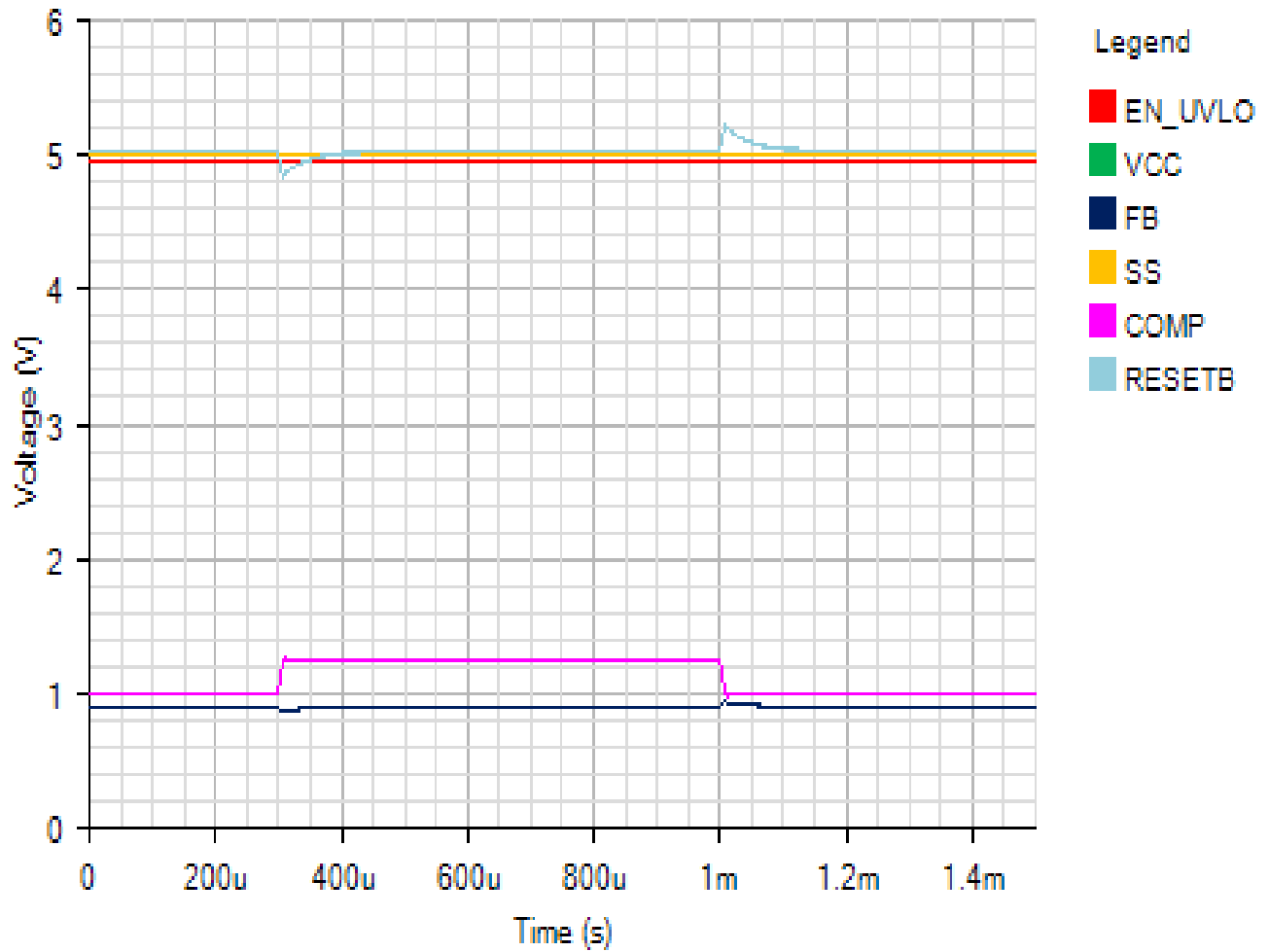
Default



Load Step - Tue Nov 20 2018 15:53:25

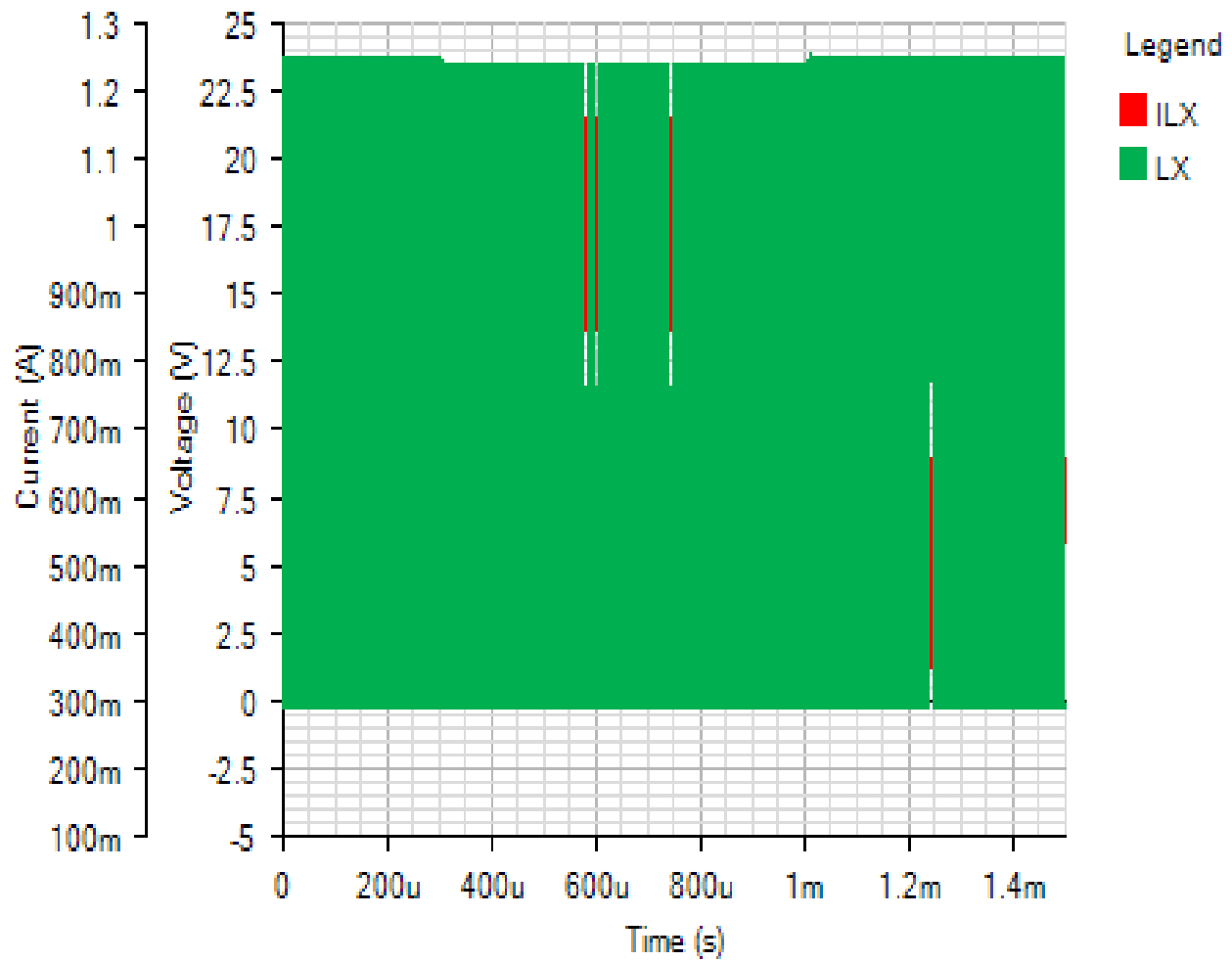
IC

Default



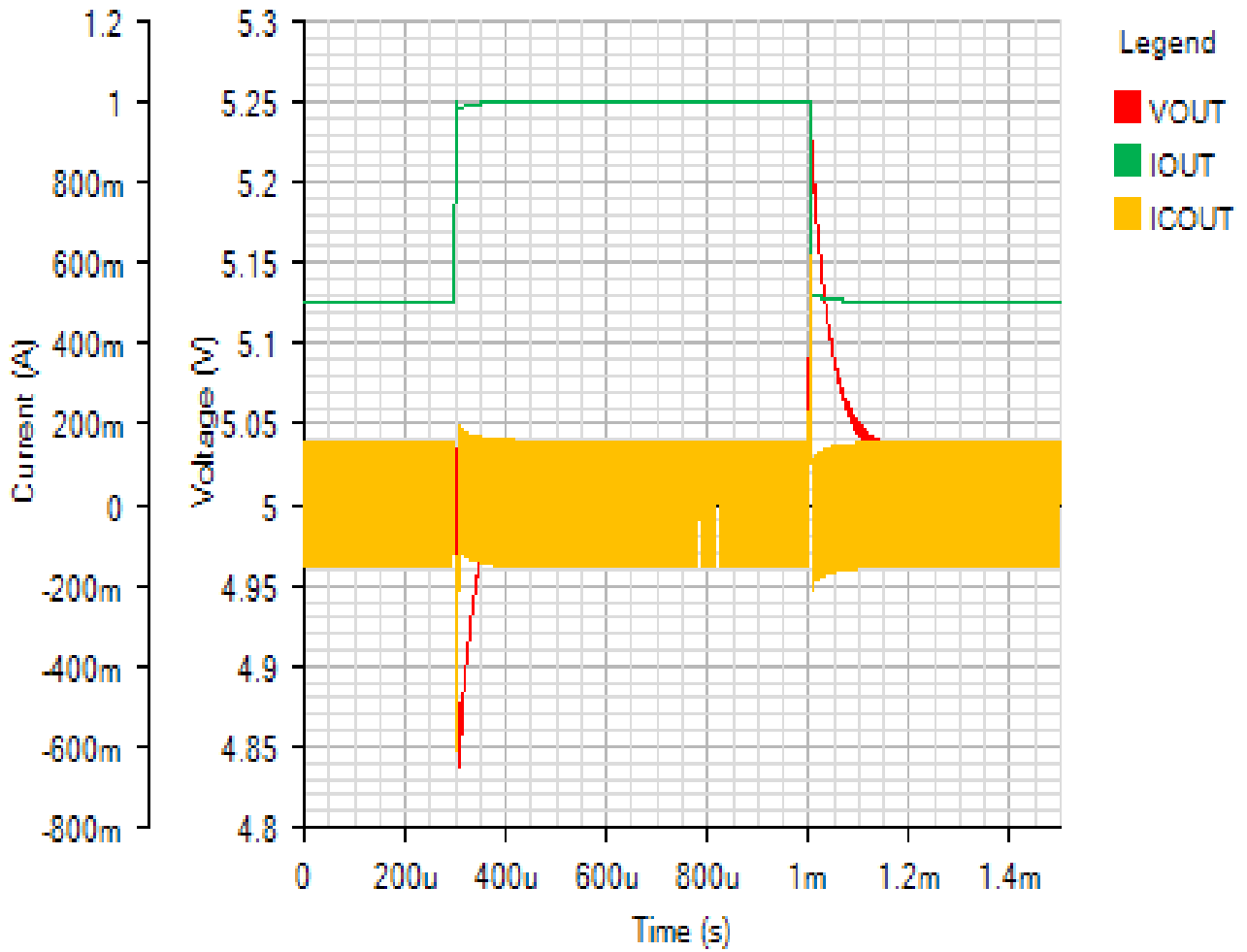
SWITCHING

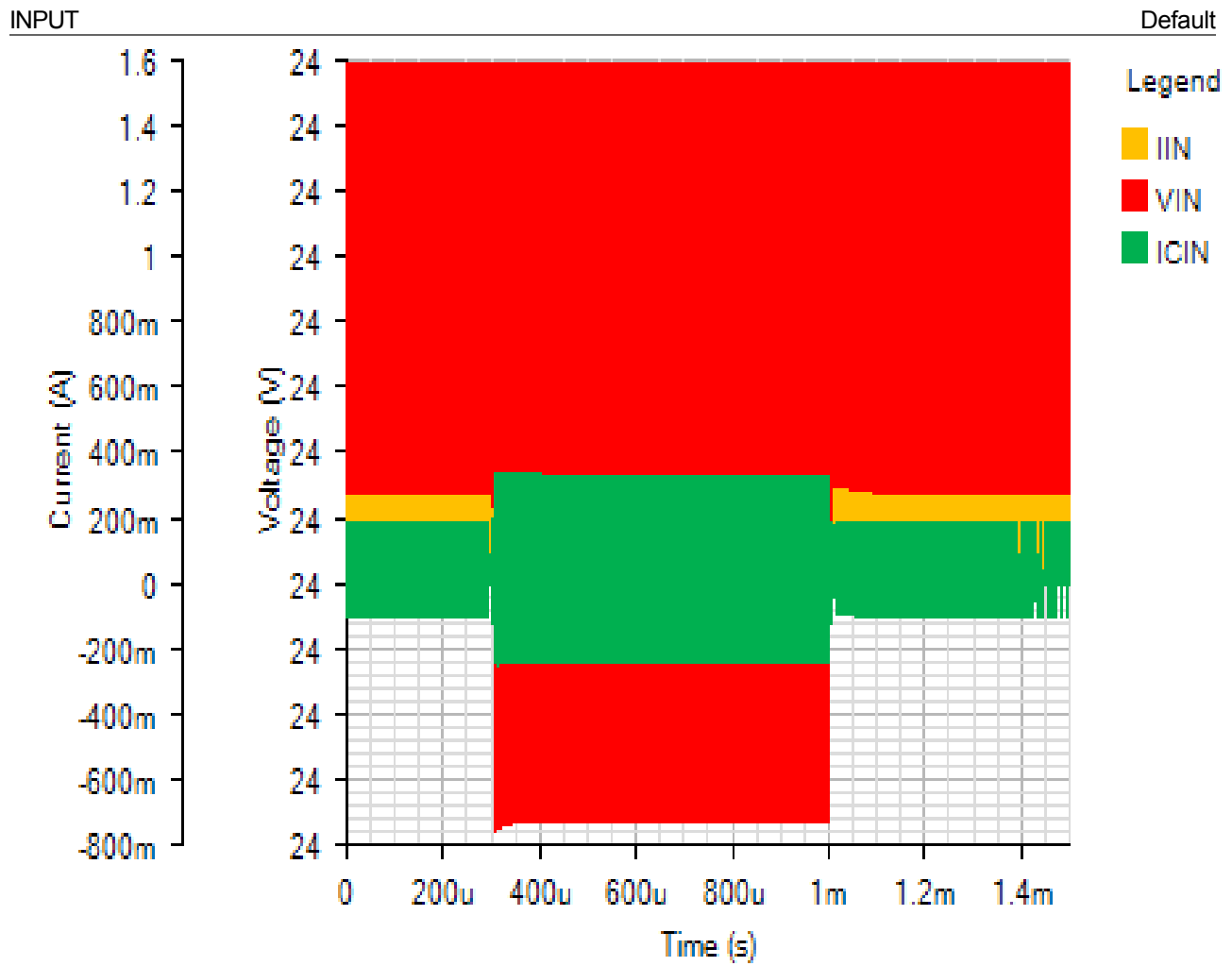
Default



OUTPUT

Default

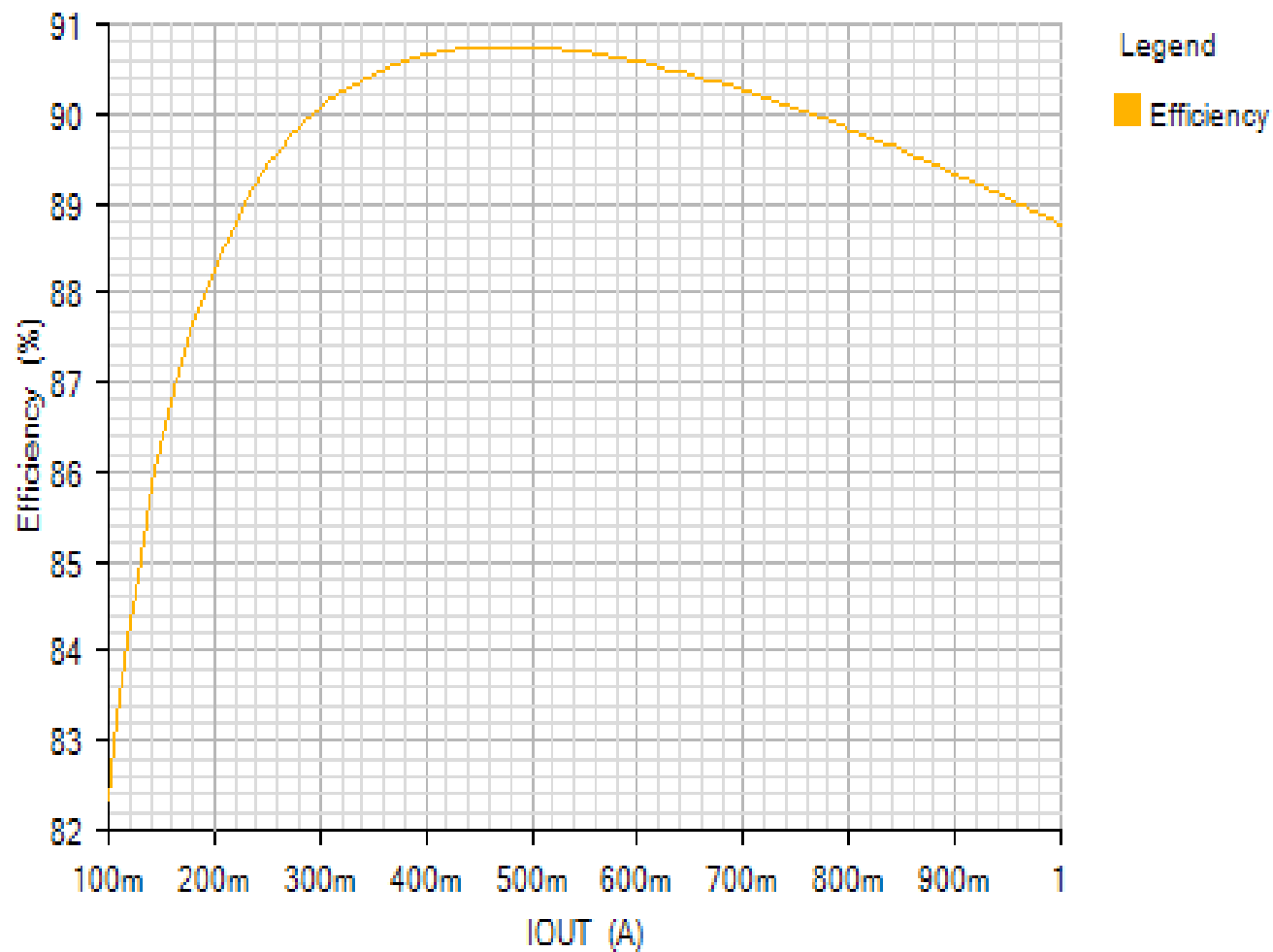




Efficiency - Tue Nov 20 2018 15:53:25

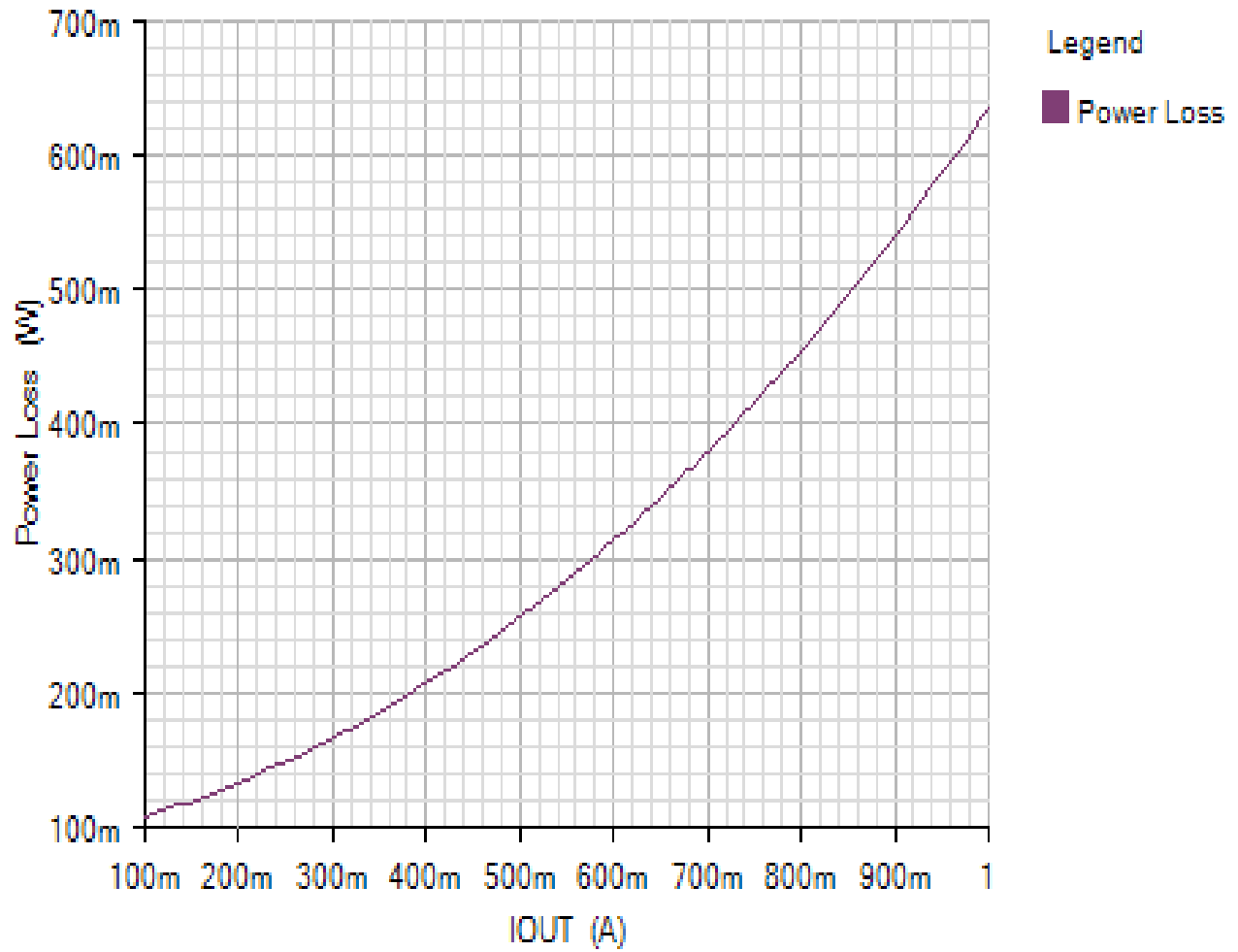
EFFICIENCY_PLOT

Default



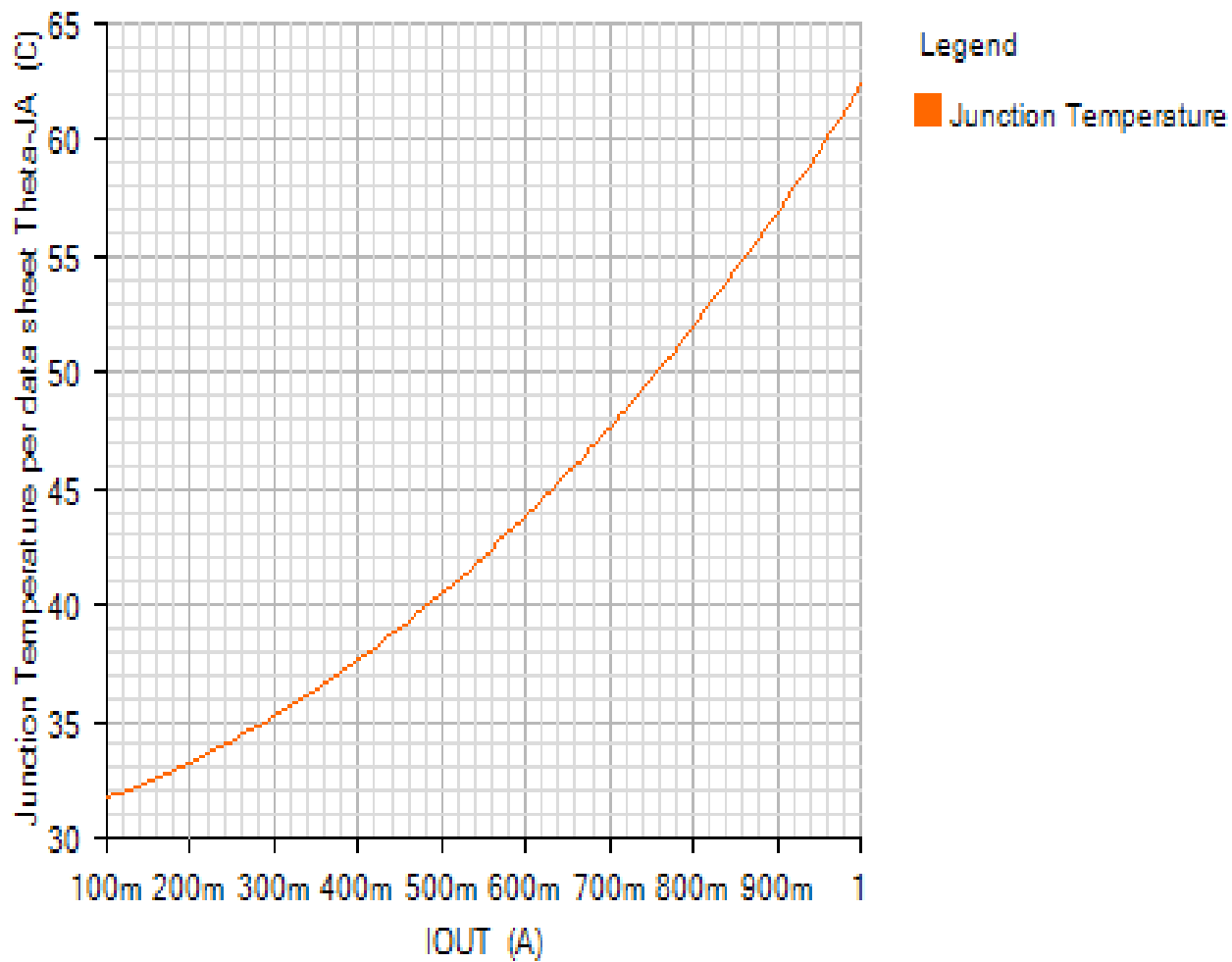
POWER_LOSS_PLOT

Default

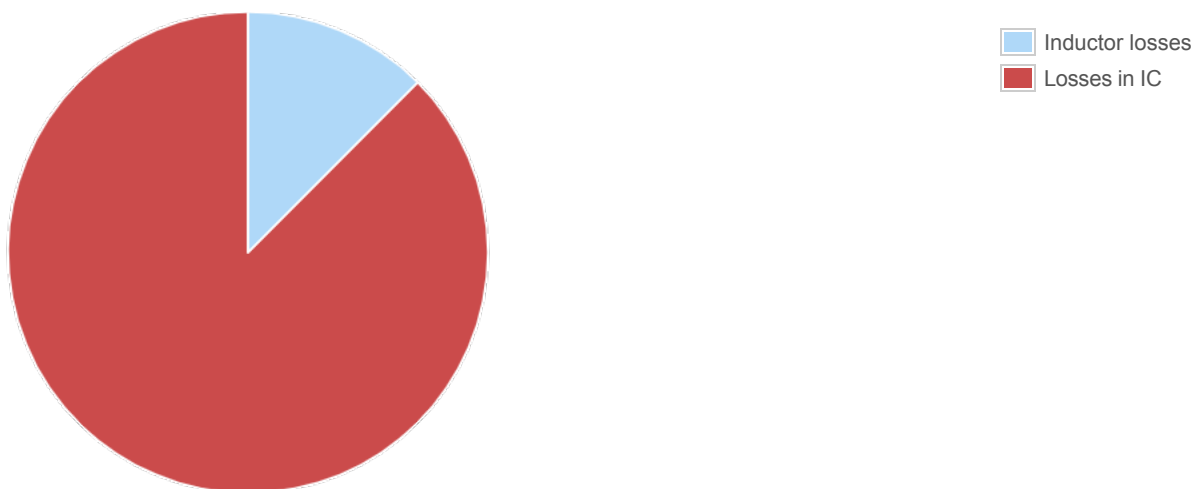


JUNCTION_TEMPERATURE_PLOT

Default



Losses



Component

Loss (W)

% of total