

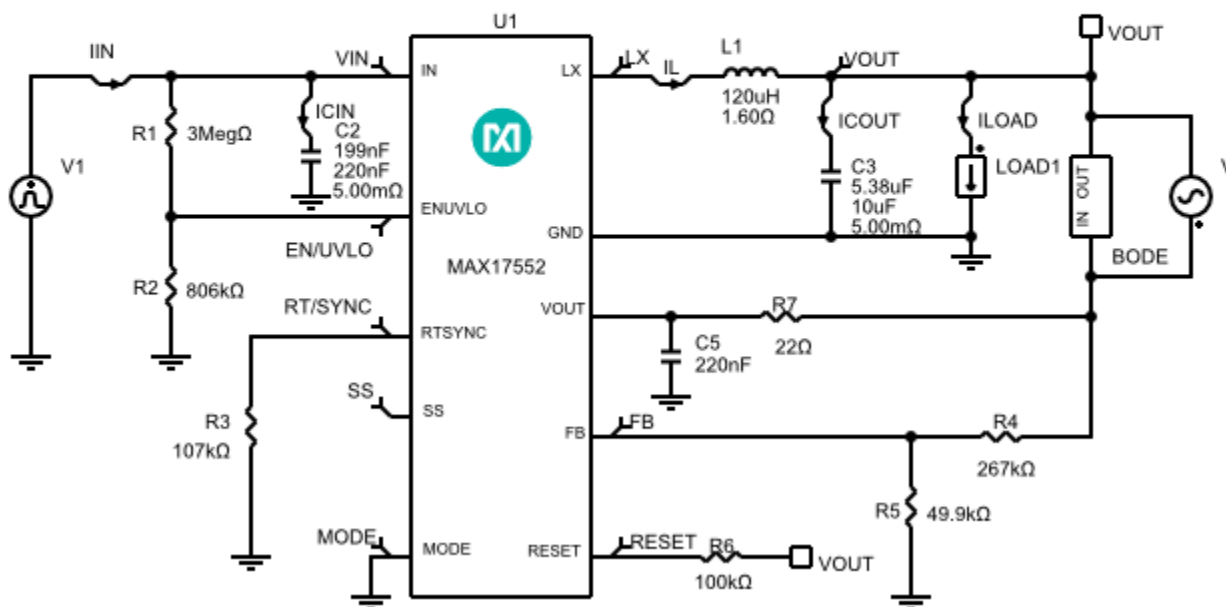
Initial Design

1.0

Design Requirements

Parameter	Value
Maximum Input Voltage	60V
Minimum Input Voltage	6.5V
Typical Input Voltage	24V
Input Ripple Voltage	0.5V
Input Undervoltage Lockout Level	5.9V
Output Voltage	5V
Load Current	0.1mA
Transient Output Ripple Voltage	0.15V
Performance Tradeoff	Balance Efficiency and Size
Cost Tradeoff	Cost
Mode of Operation	PWM
Switching Frequency	380kHz
Soft-start time	5ms
Ambient Temperature	25°C

Schematic



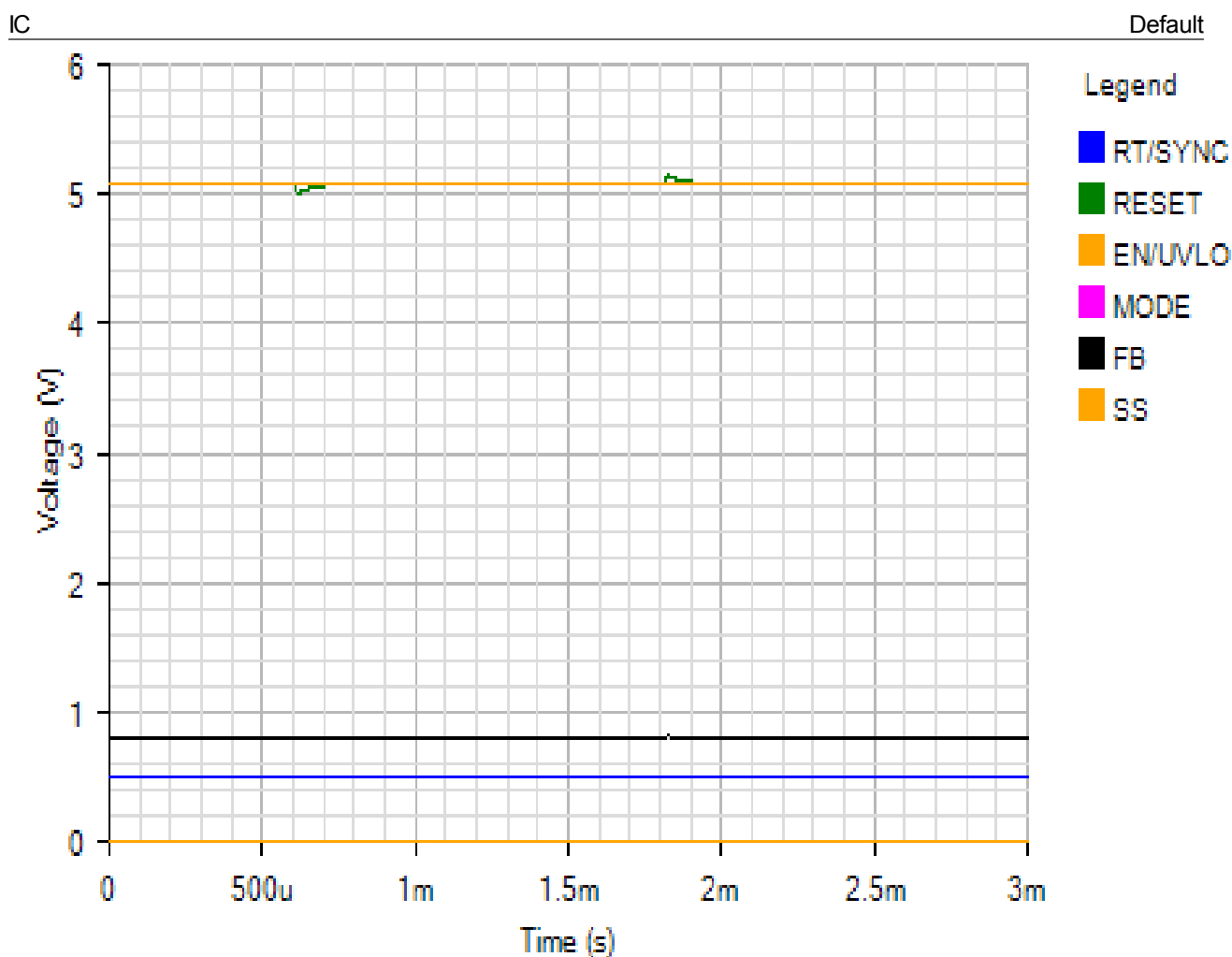
BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX17552	Maxim Integrated	60V, 100mA, Ultra-Small, High-Efficiency Synchronous Step-Down DC-DC Converter with 22μA No-Load Supply Current
C2	1	C3216X7R2A224K115AA	TDK	Cap Ceramic 0.22uF 100V X7R 10% SMD 1206 125C Plastic T/R
C3	1	GRM21BR71A106KA73	Murata	Cap Ceramic 10uF 10V 0805 125C
C5	1	EMK105B7224KV-FR	Taiyo Yuden	Cap Ceramic 0.22uF 16V X7R 10% Pad SMD 0402 125°C T/R
L1	1	LPS4018-124MRB	Coilcraft	Inductor 120uH 20% 1.44Ohm 0.34A Isat 0.45A Irms
R1	1	CRCW06033M00FKEA	Vishay	Res Thick Film 0603 3M Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R2	1	ERJ3EKF8063V	Panasonic	Res Thick Film 0603 806K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	ERJ3EKF1073V	Panasonic	Res Thick Film 0603 107K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

R4	1	ERJ3EKF2673V	Panasonic	Res Thick Film 0603 267K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	ERJ3EKF4992V	Panasonic	Res Thick Film 0603 49.9K Ohm 1% 0.1W(1/10W) ±100ppm/°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	ERJ3GEYJ220V	Panasonic	Res Thick Film 0603 22 Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R

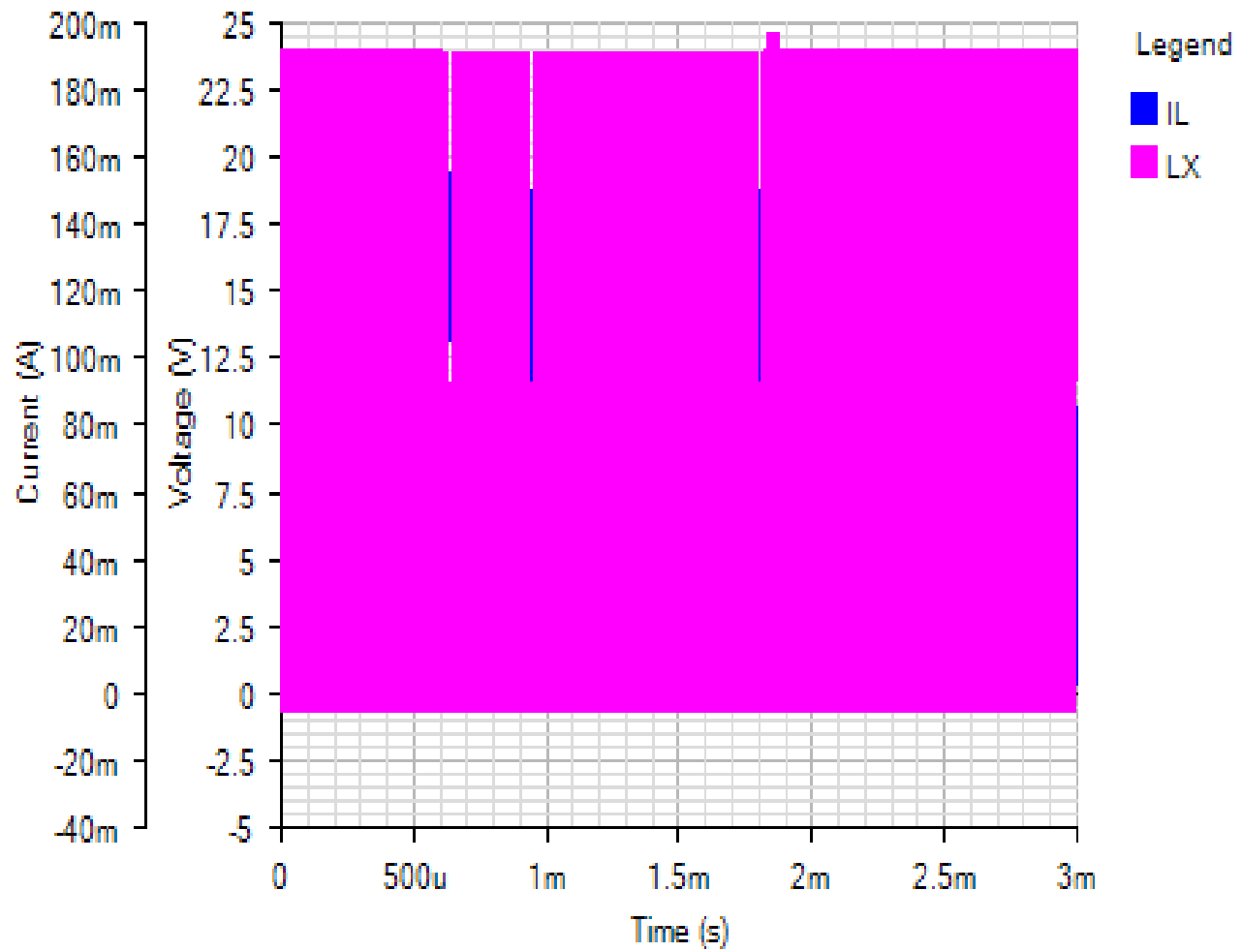
Simulation Results

Load Step - Tue Nov 20 2018 08:33:58



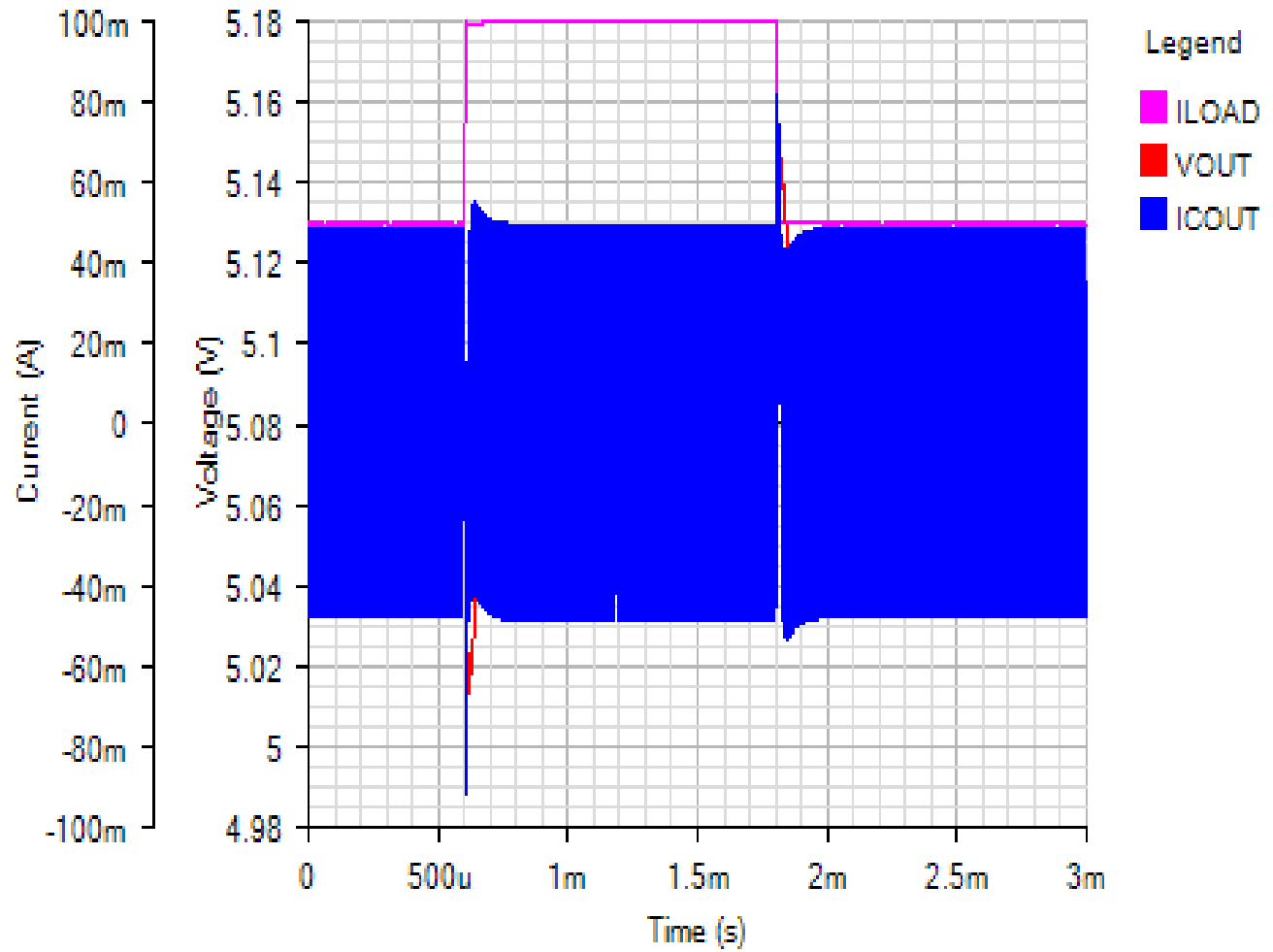
SWITCHING

Default



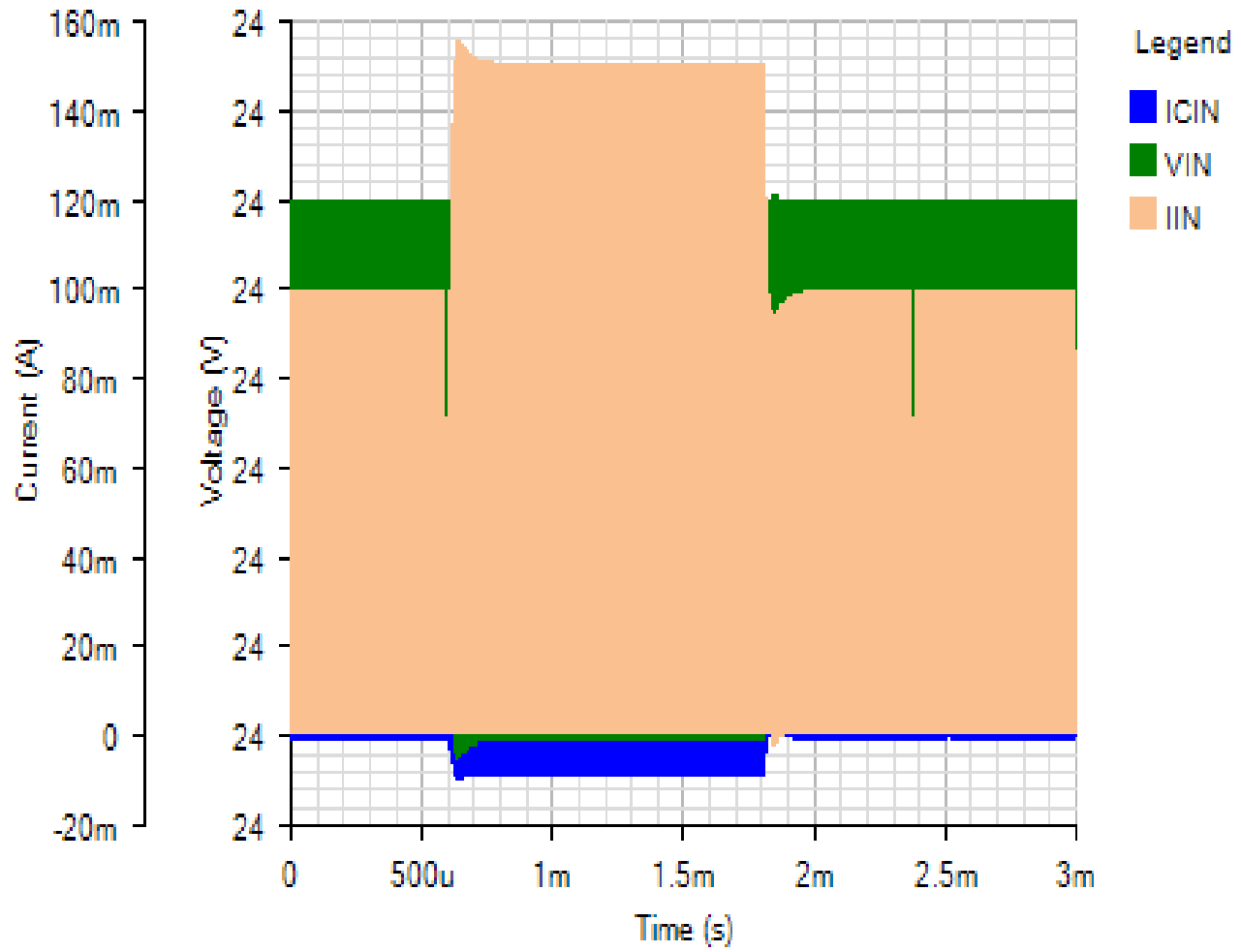
OUTPUT

Default



INPUT

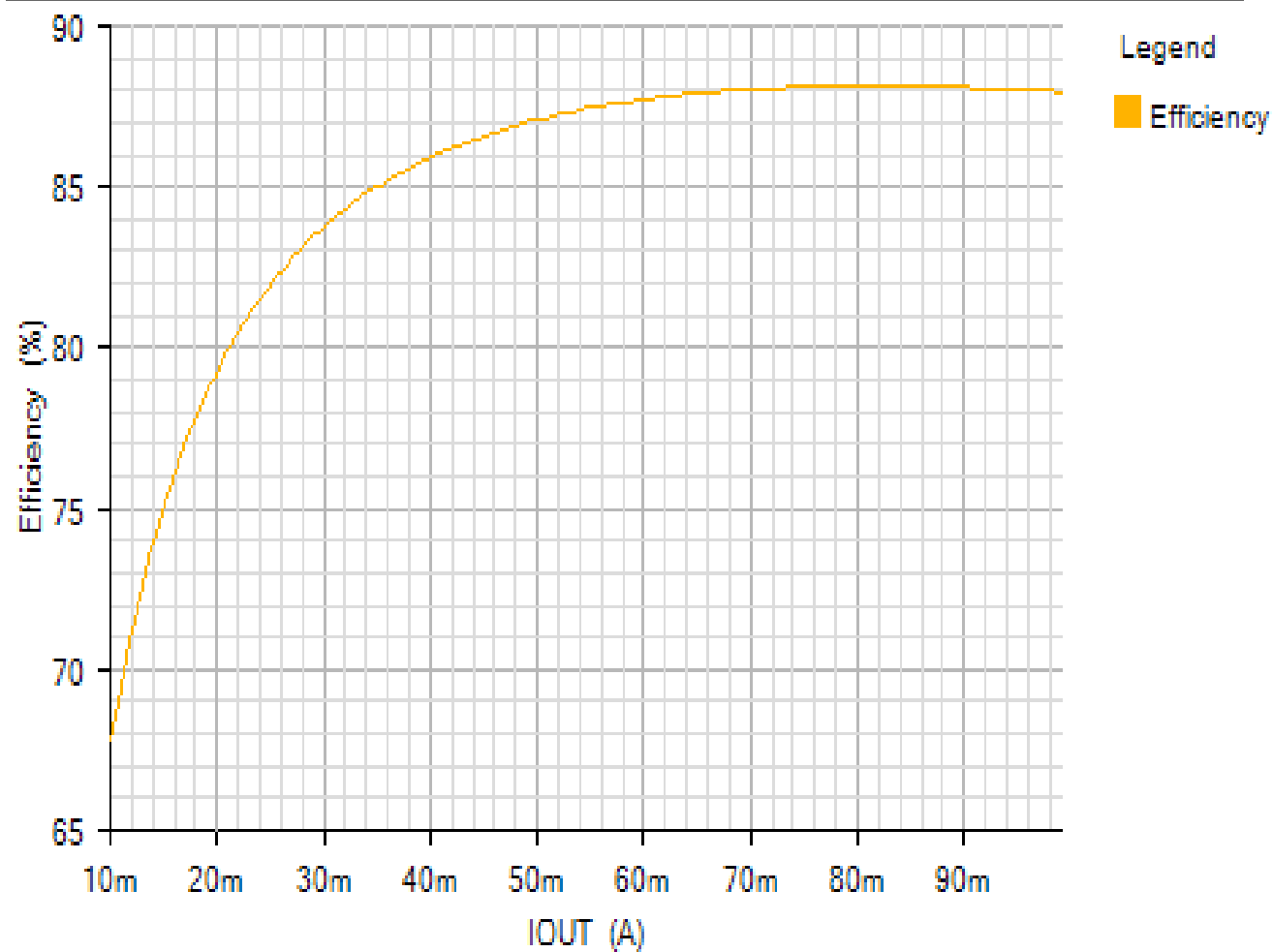
Default



Efficiency - Tue Nov 20 2018 08:33:58

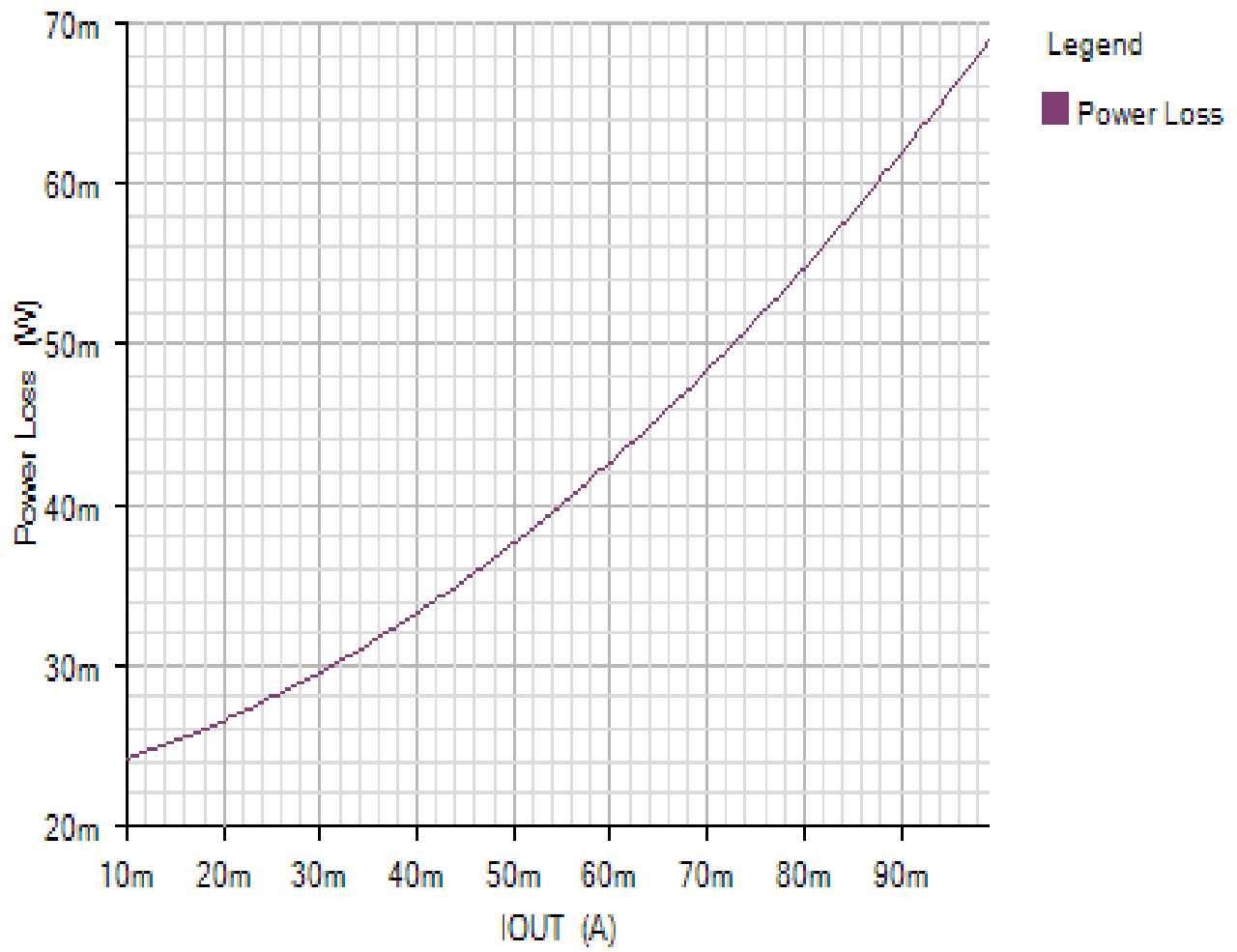
EFFICIENCY_PLOT

Default



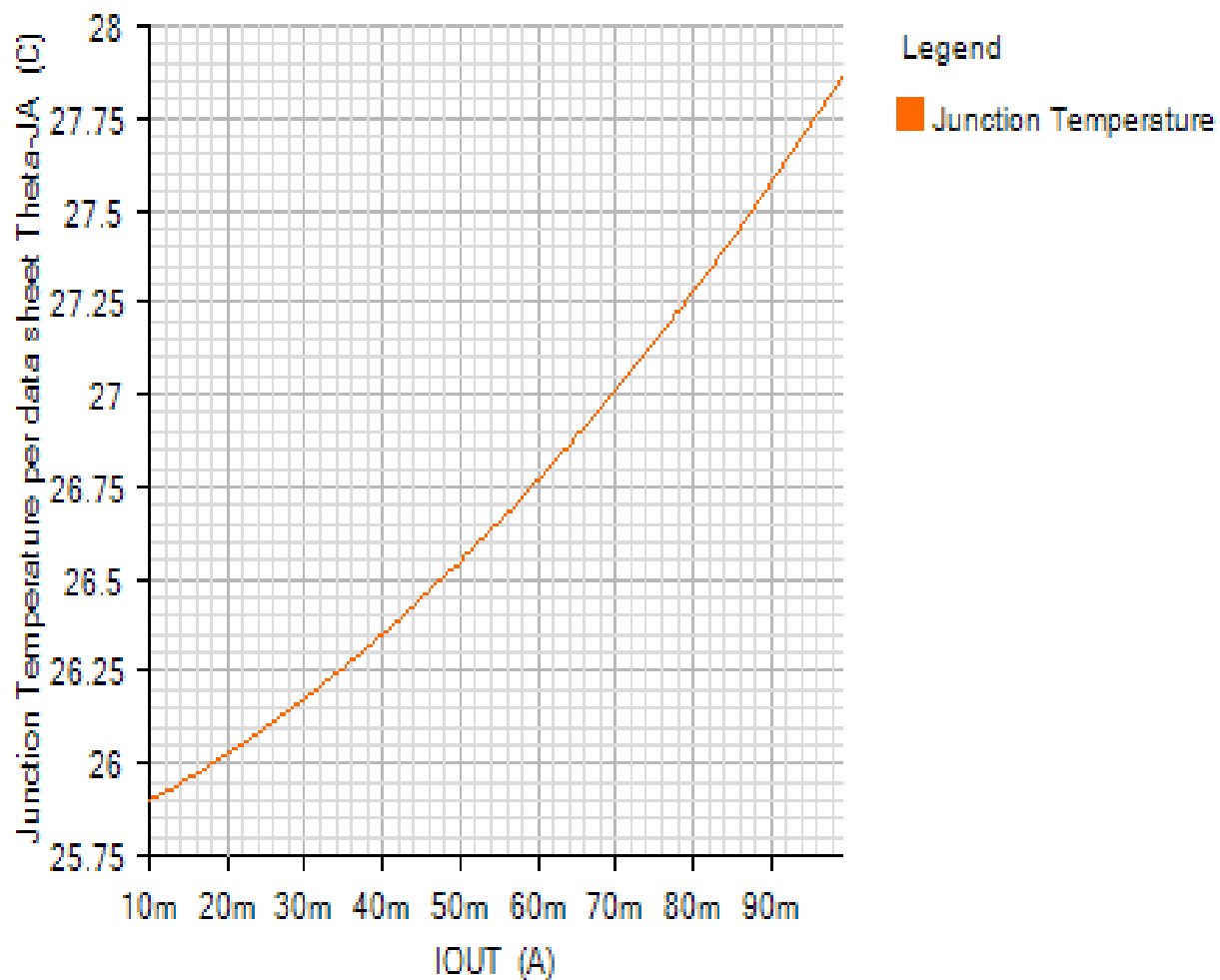
POWER_LOSS_PLOT

Default

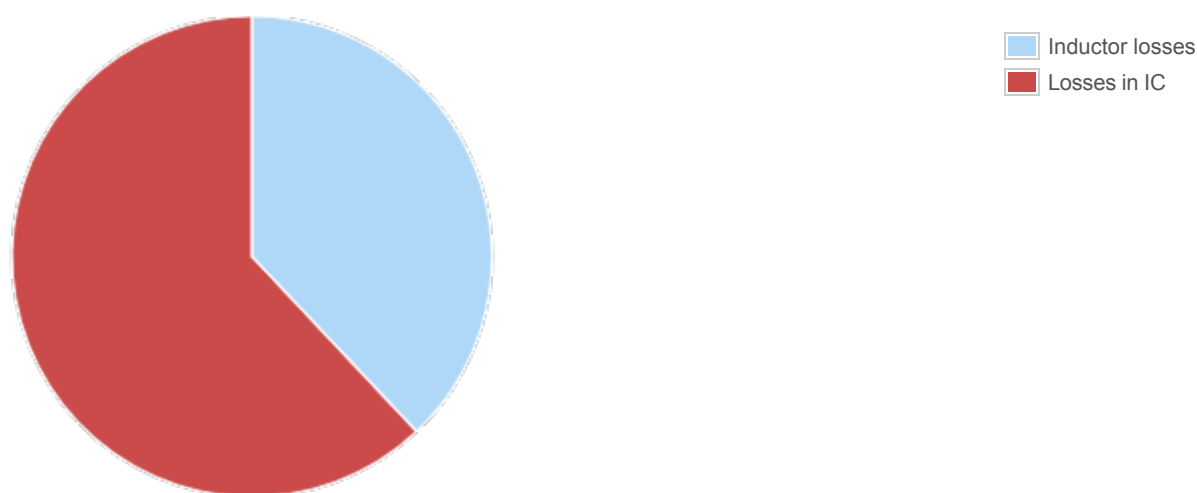


JUNCTION_TEMPERATURE_PLOT

Default



Losses



Component

Loss (W)

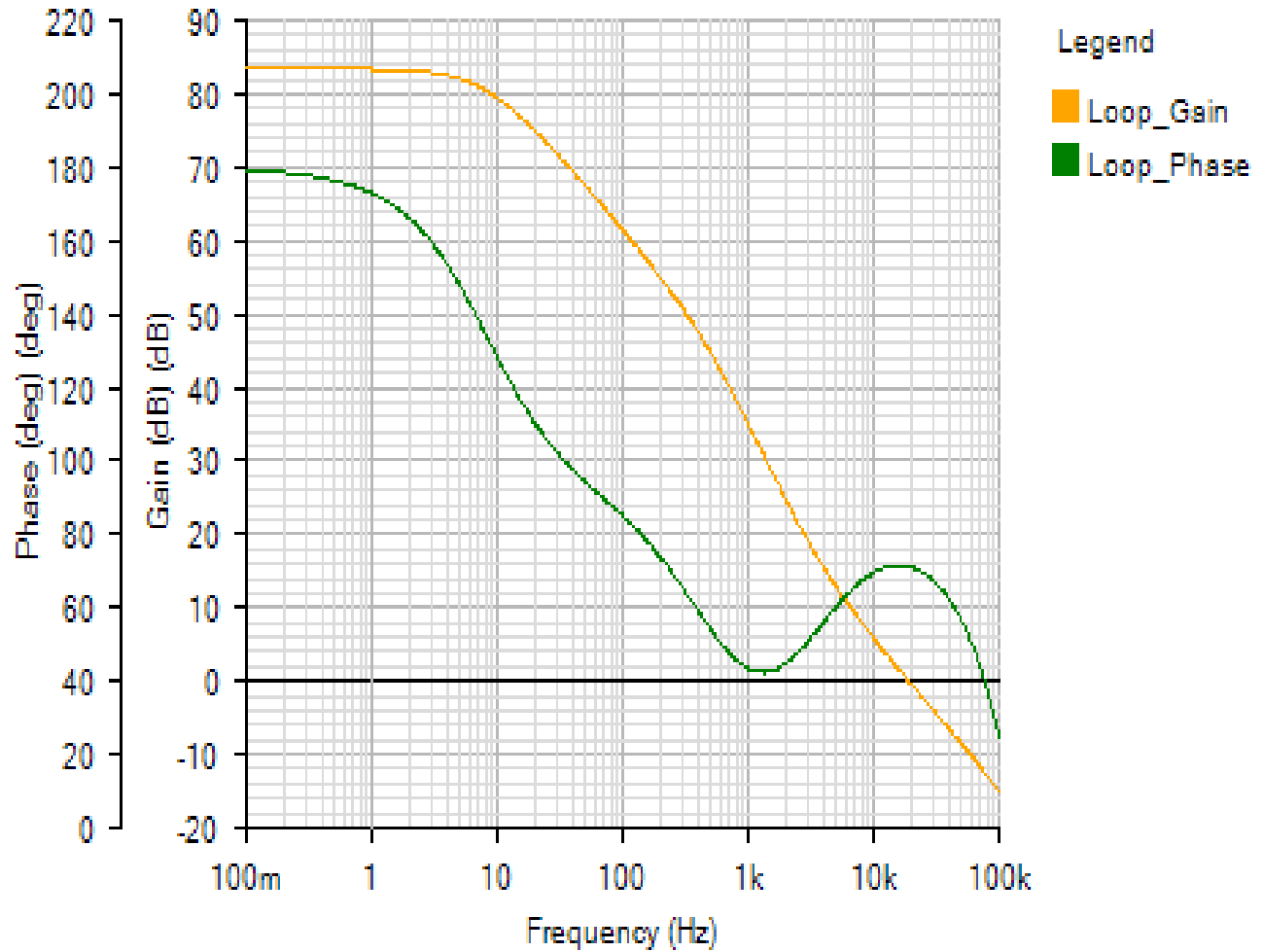
% of total

Component	Loss (W)	% of total
Inductor losses	0.02616	38
Losses in IC	0.04274	62
Total	0.0689	100

AC Loop - Tue Nov 20 2018 08:33:58

BODE

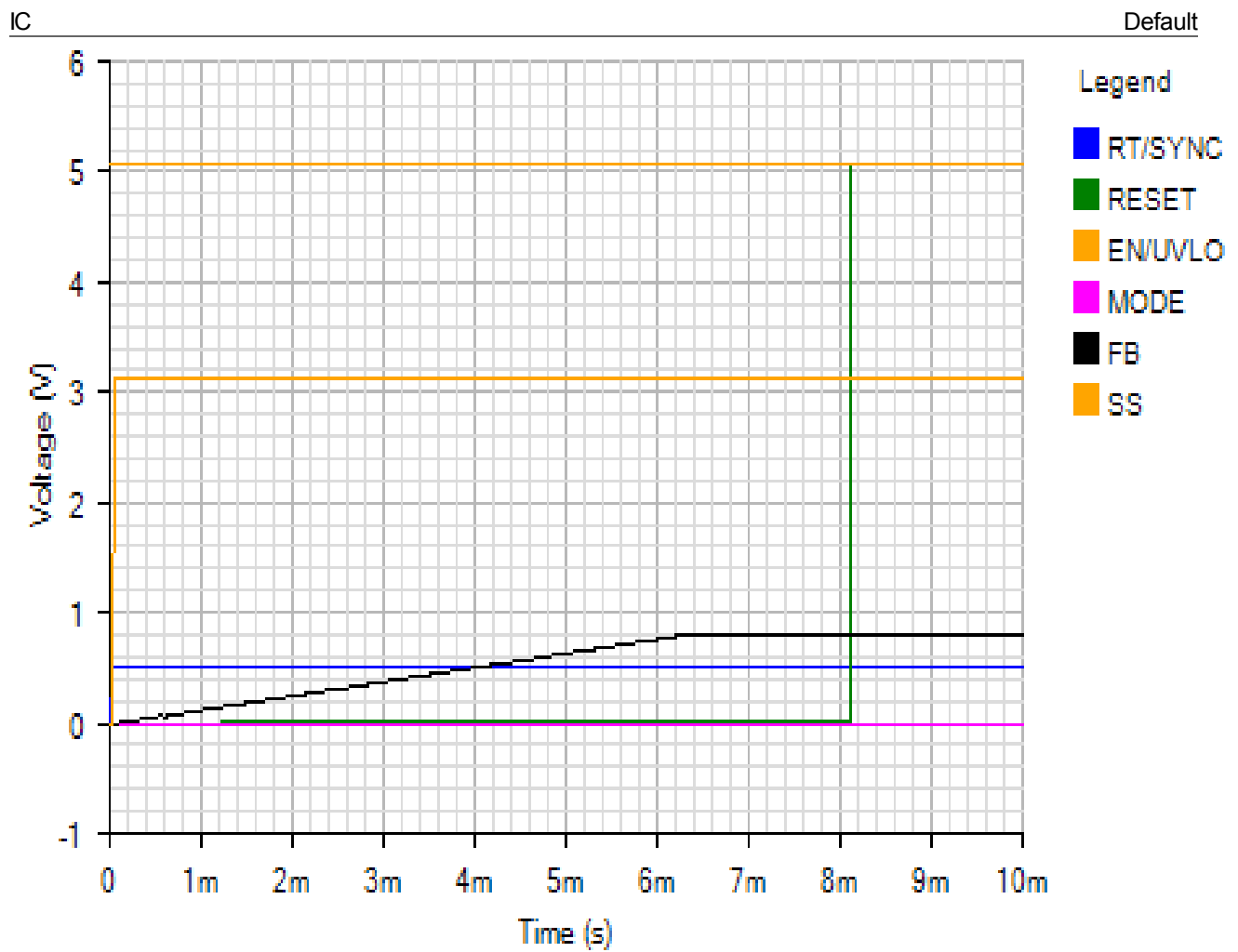
Default



Phase Margin: 71.21° at a crossover frequency of 19.1kHz

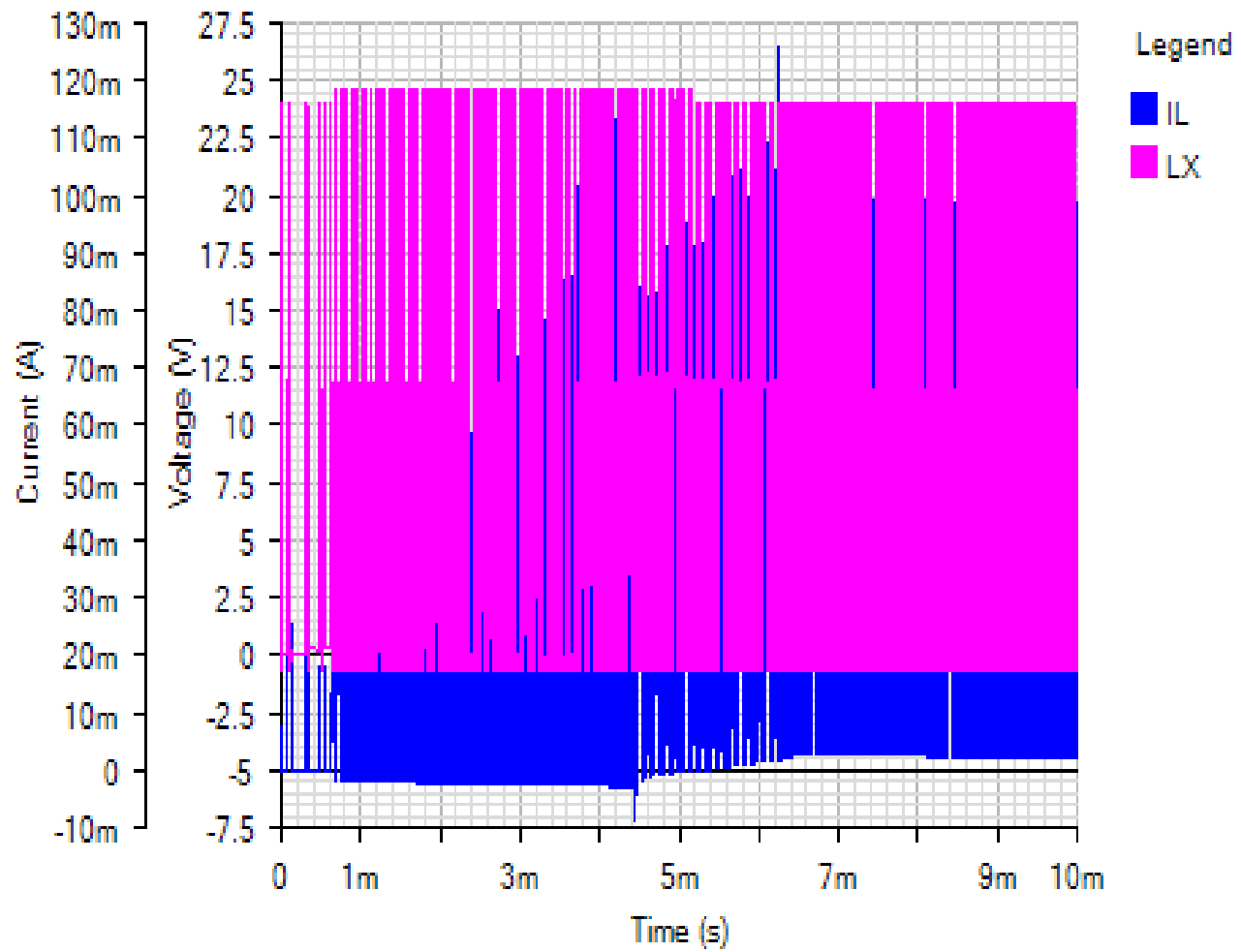


Start Up - Tue Nov 20 2018 08:33:58



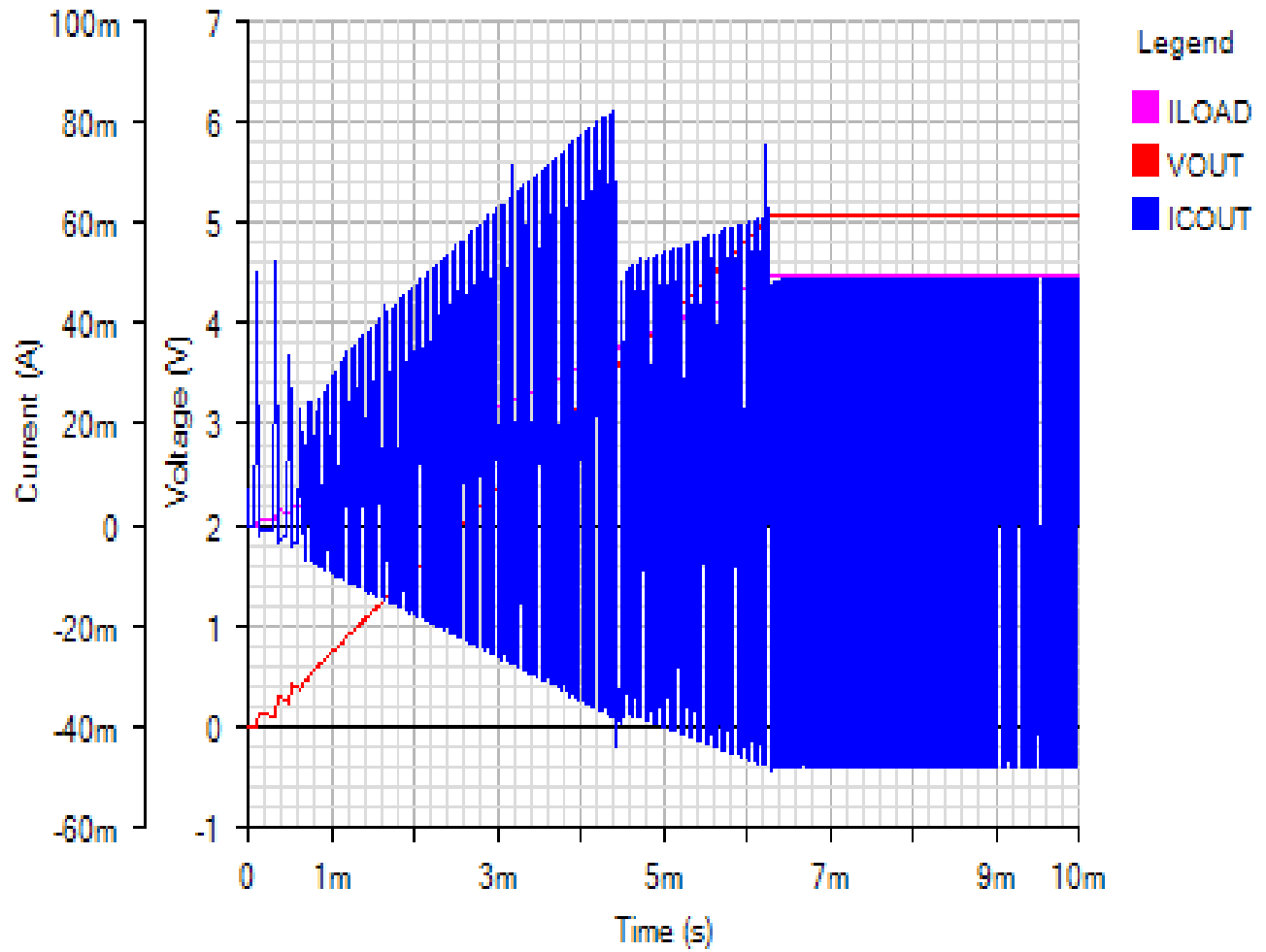
SWITCHING

Default



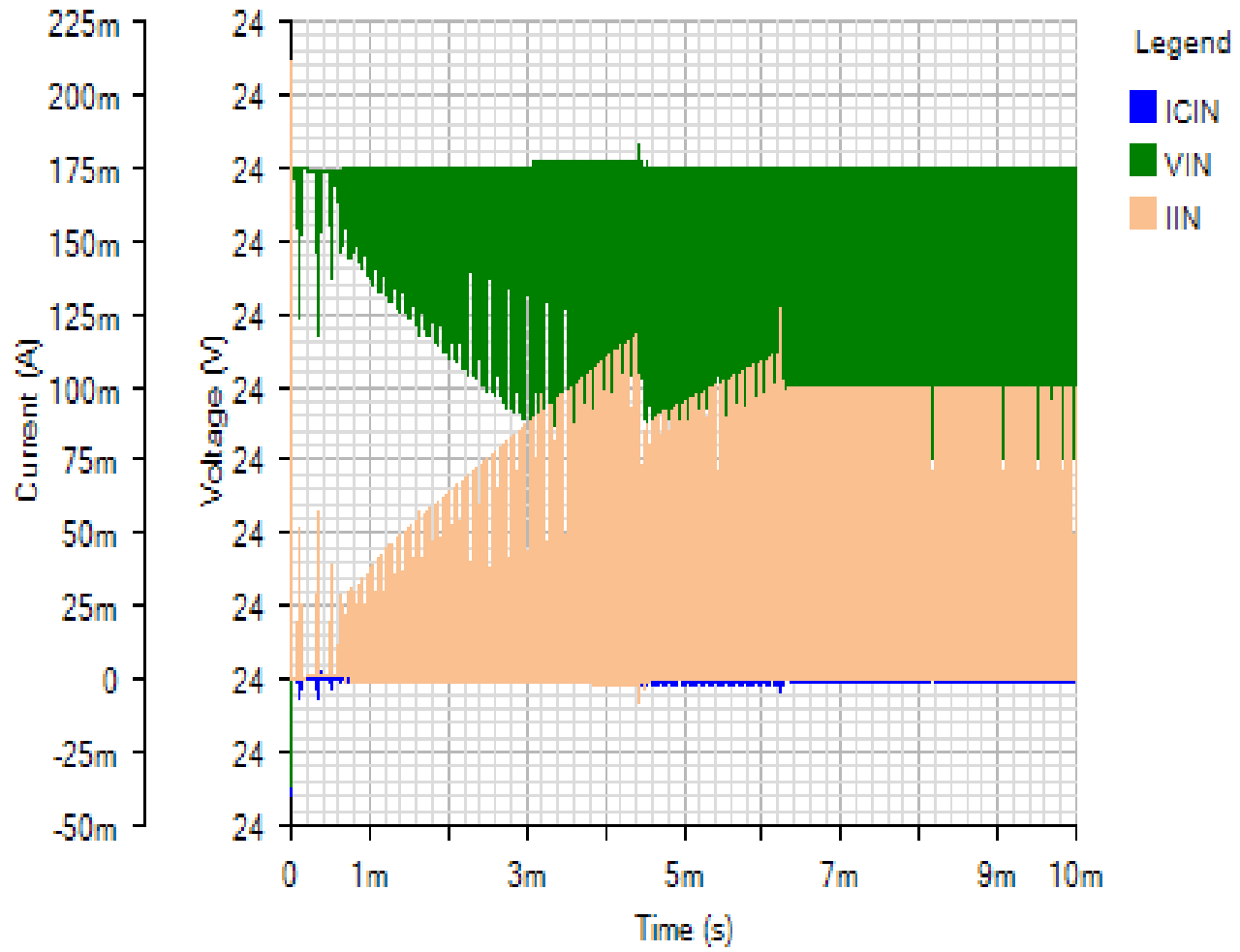
OUTPUT

Default

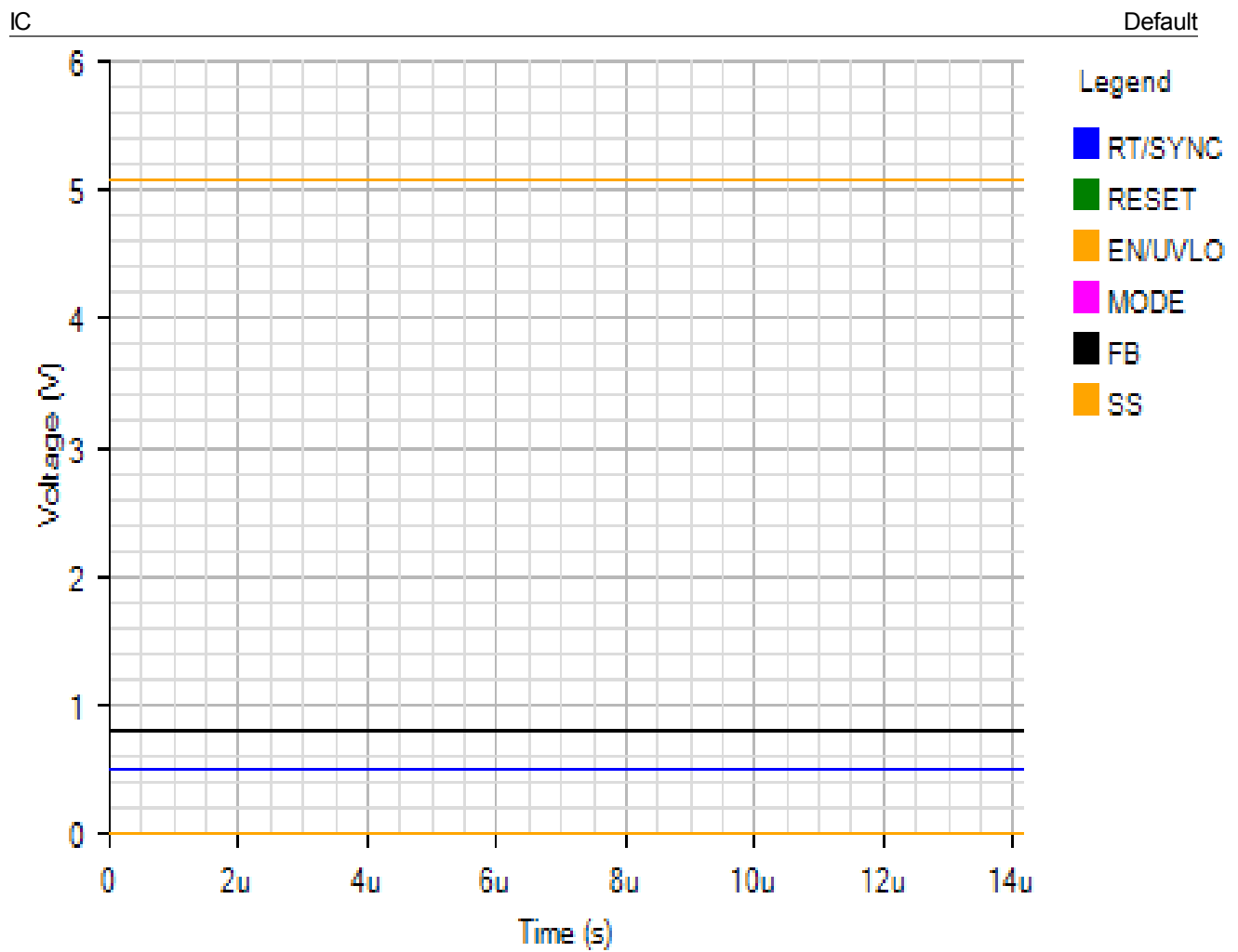


INPUT

Default

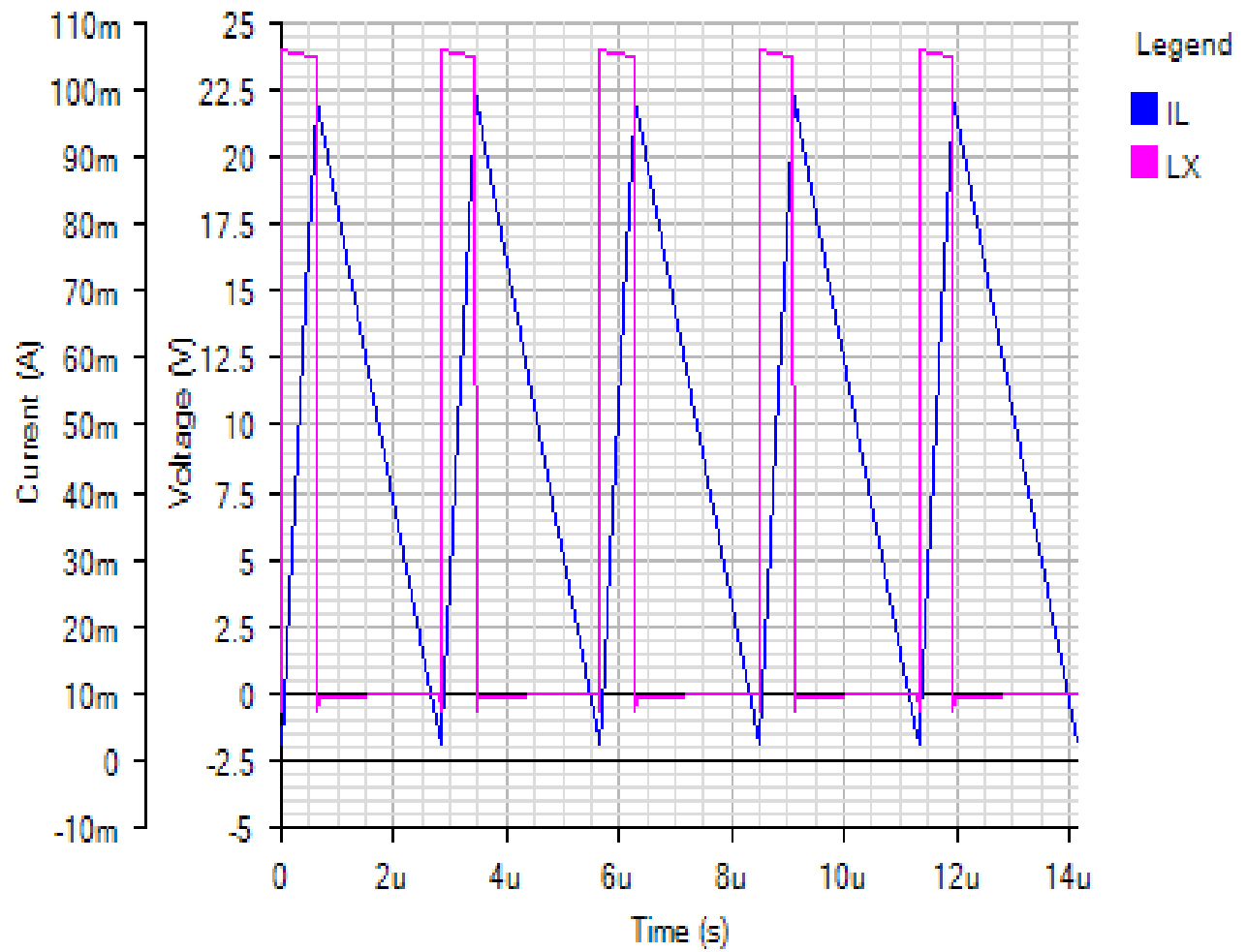


Steady State - Tue Nov 20 2018 08:33:58



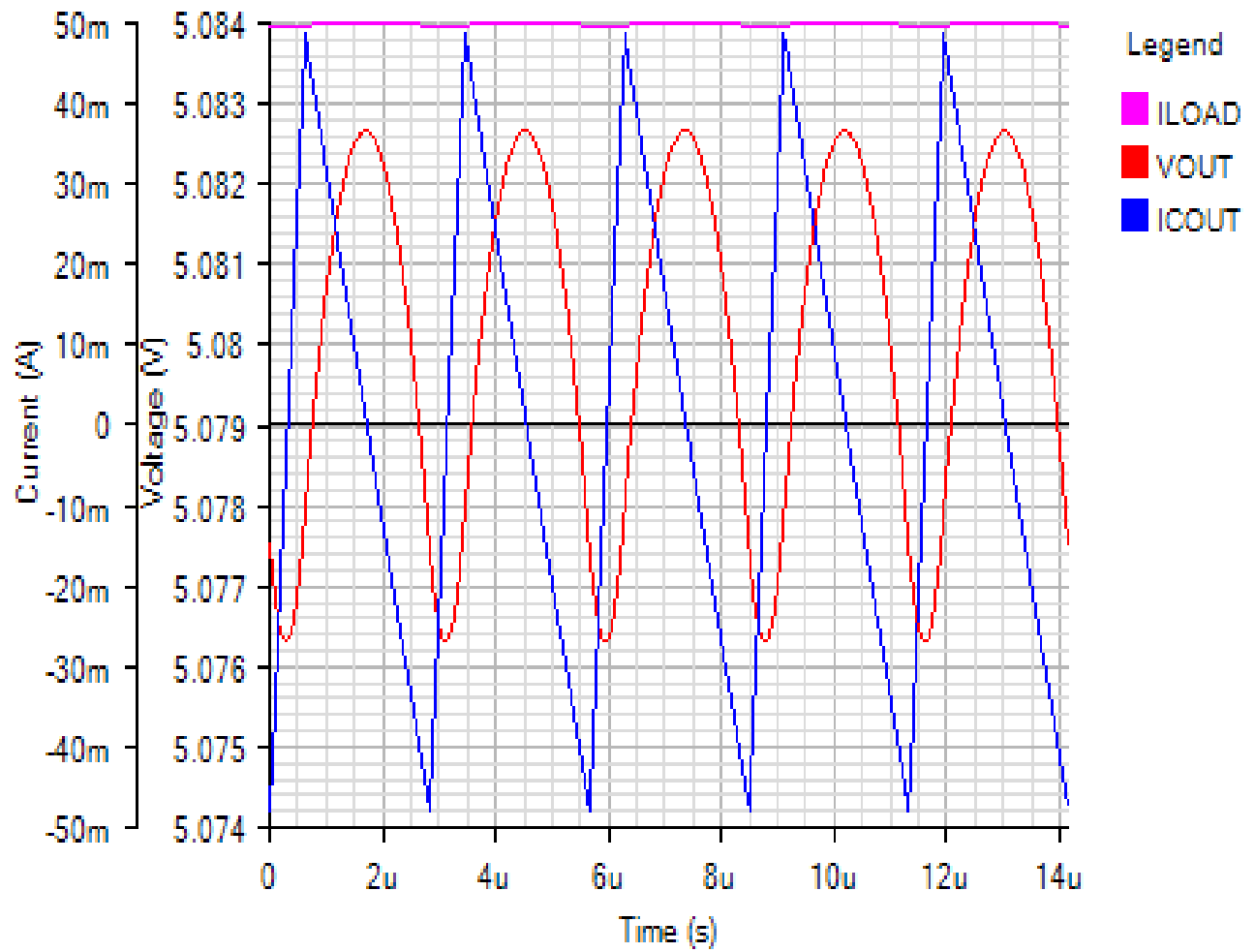
SWITCHING

Default



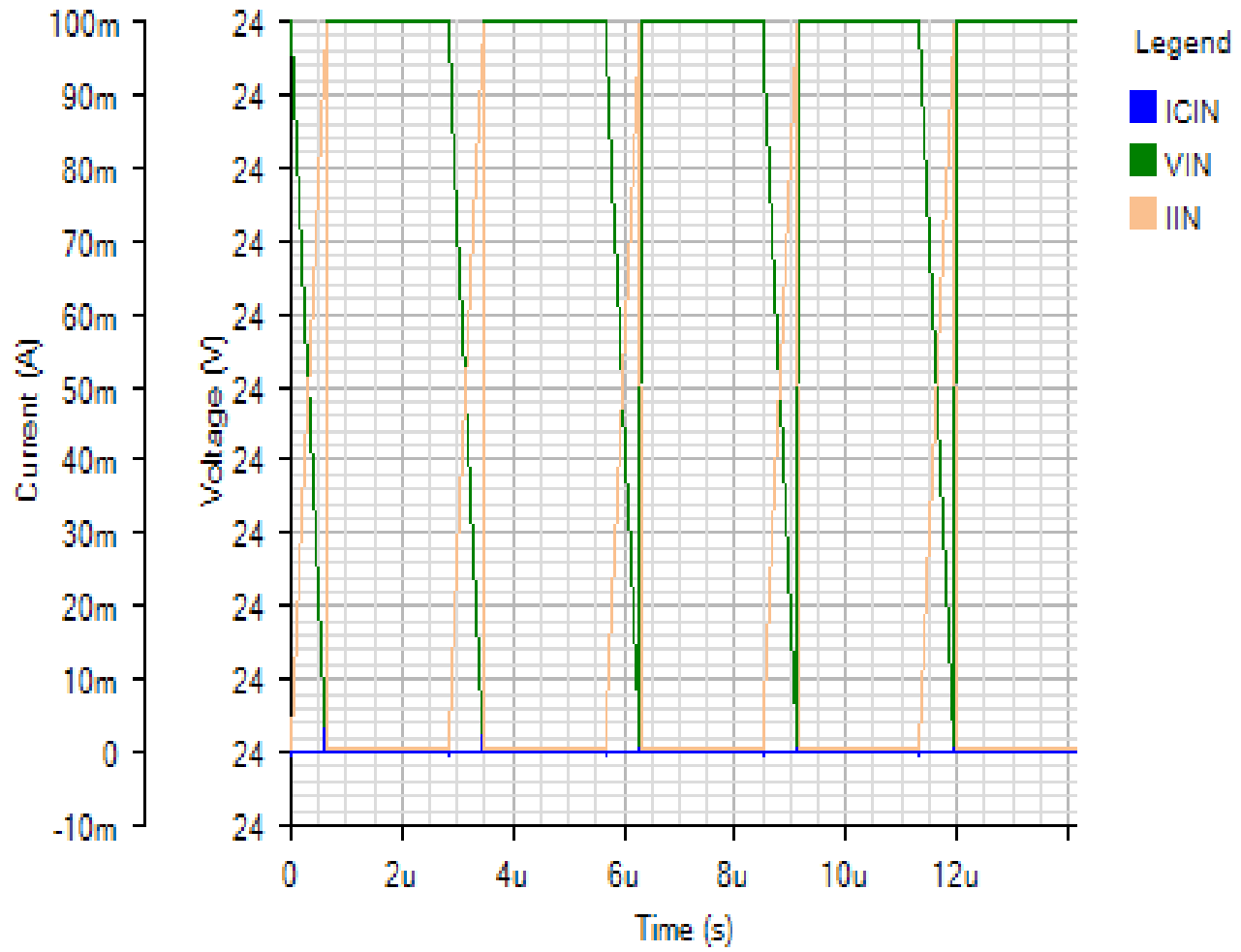
OUTPUT

Default



INPUT

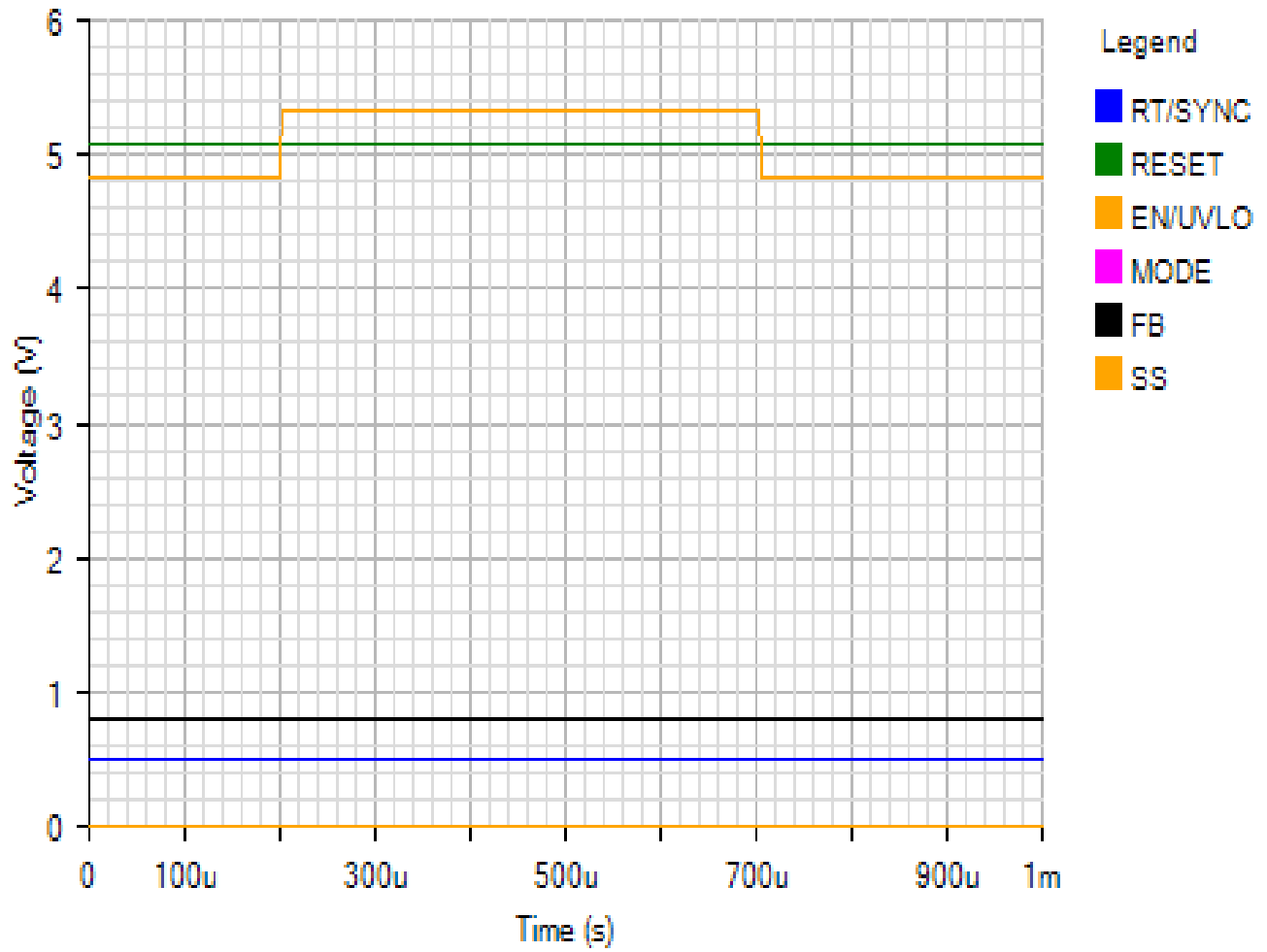
Default



Line Transient - Tue Nov 20 2018 08:33:58

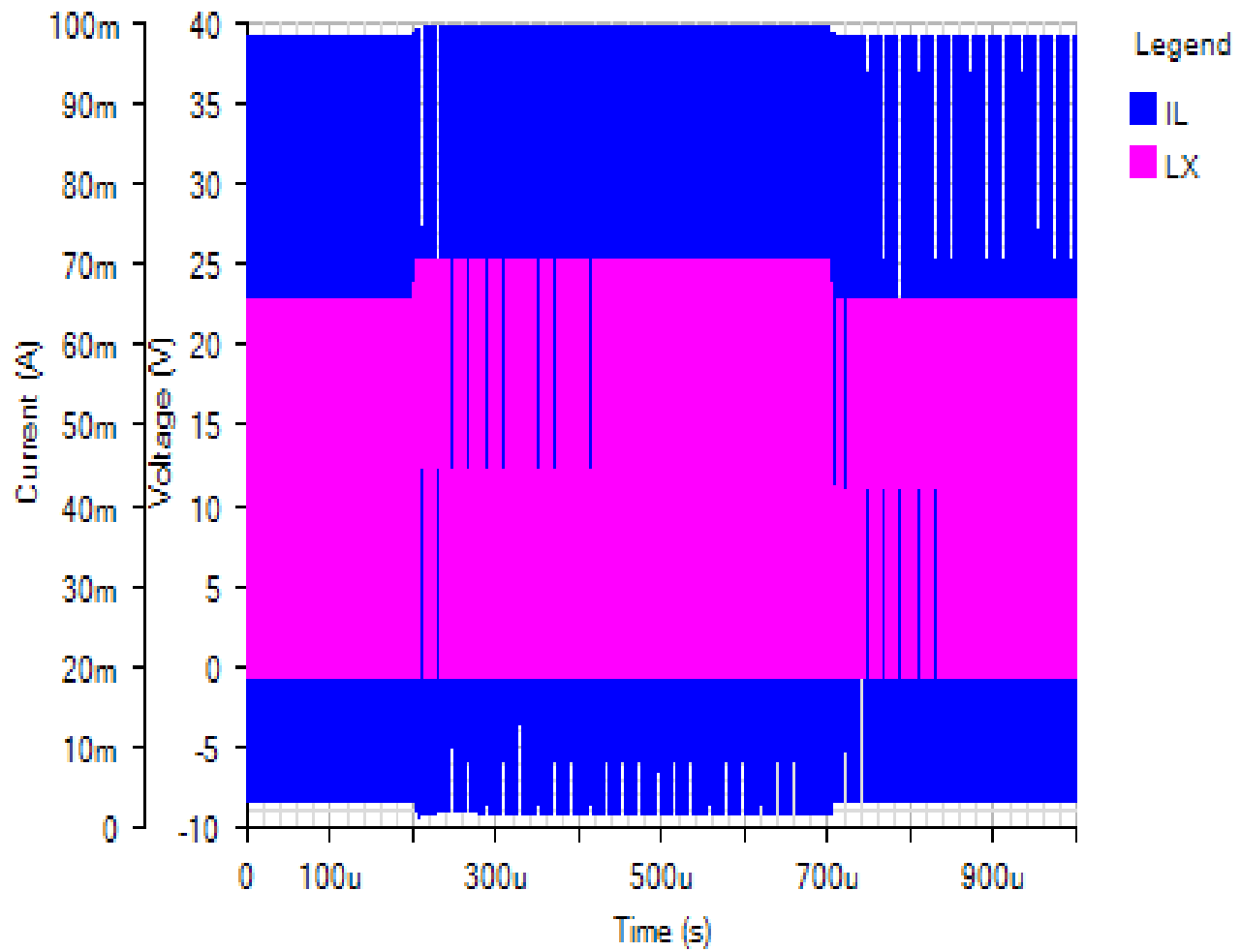
IC

Default



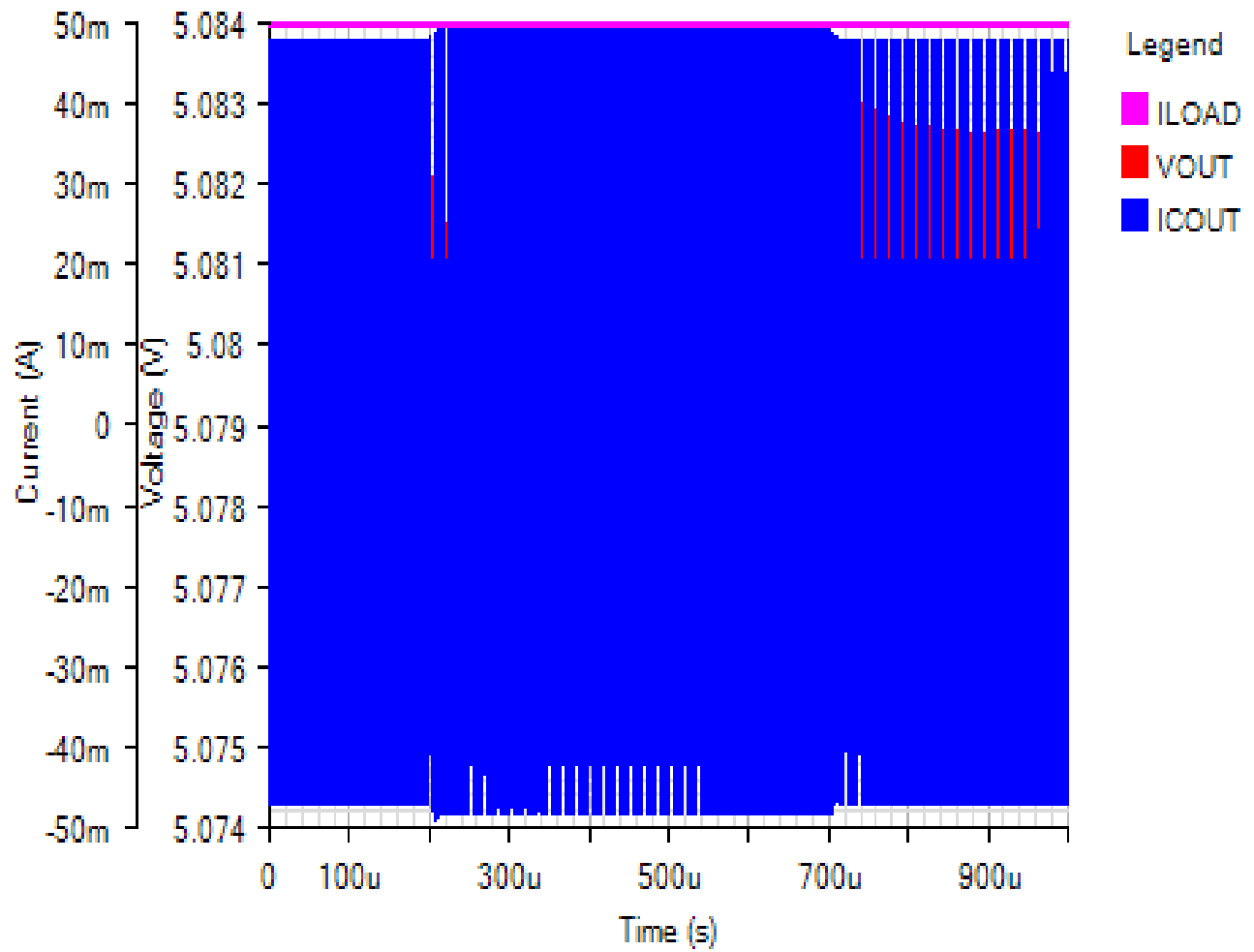
SWITCHING

Default



OUTPUT

Default



INPUT

Default

