

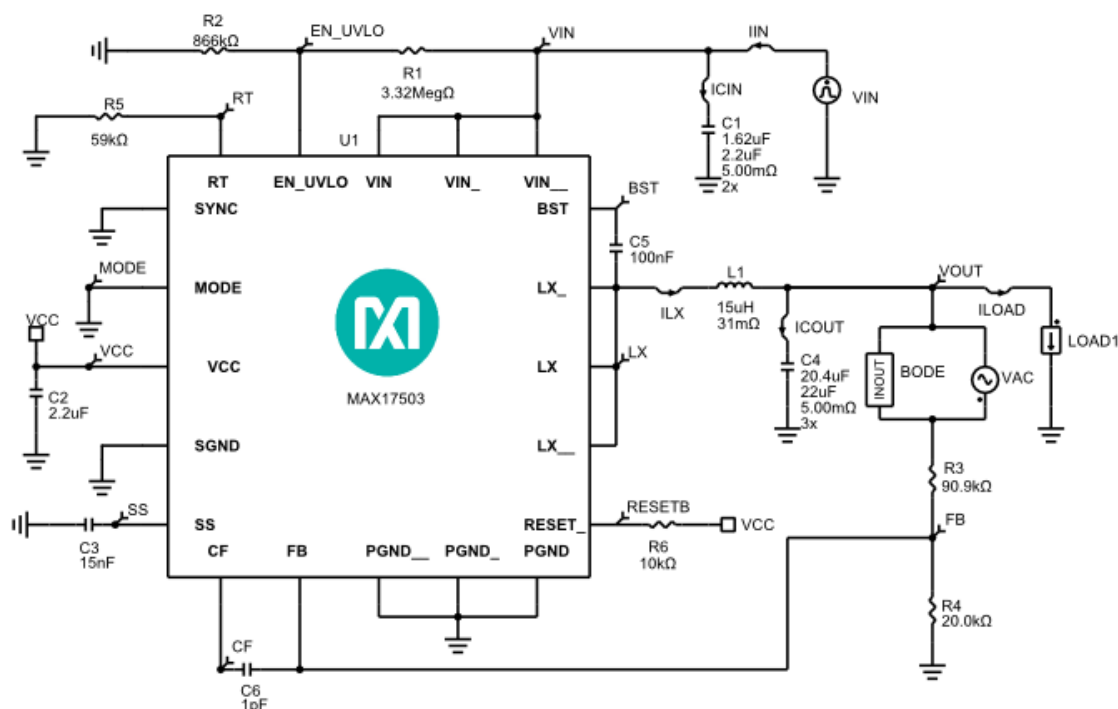
Initial Design

1.0

Design Requirements

Parameter	Value
Part Version	MAX17503
Minimum Input Voltage	6.7V
Maximum Input Voltage	60V
Nominal Input Voltage	24V
Input Steady-State Ripple	0.5V
Input Undervoltage Lockout Level	5.9V
Output Voltage	5V
Output Current	2.5A
Output Voltage Load Step Over/Undershoot	0.15V
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
Mode of Operation	PWM
Switching Frequency	348kHz
Ambient Temperature	25°C
Soft Start time	3ms

Schematic



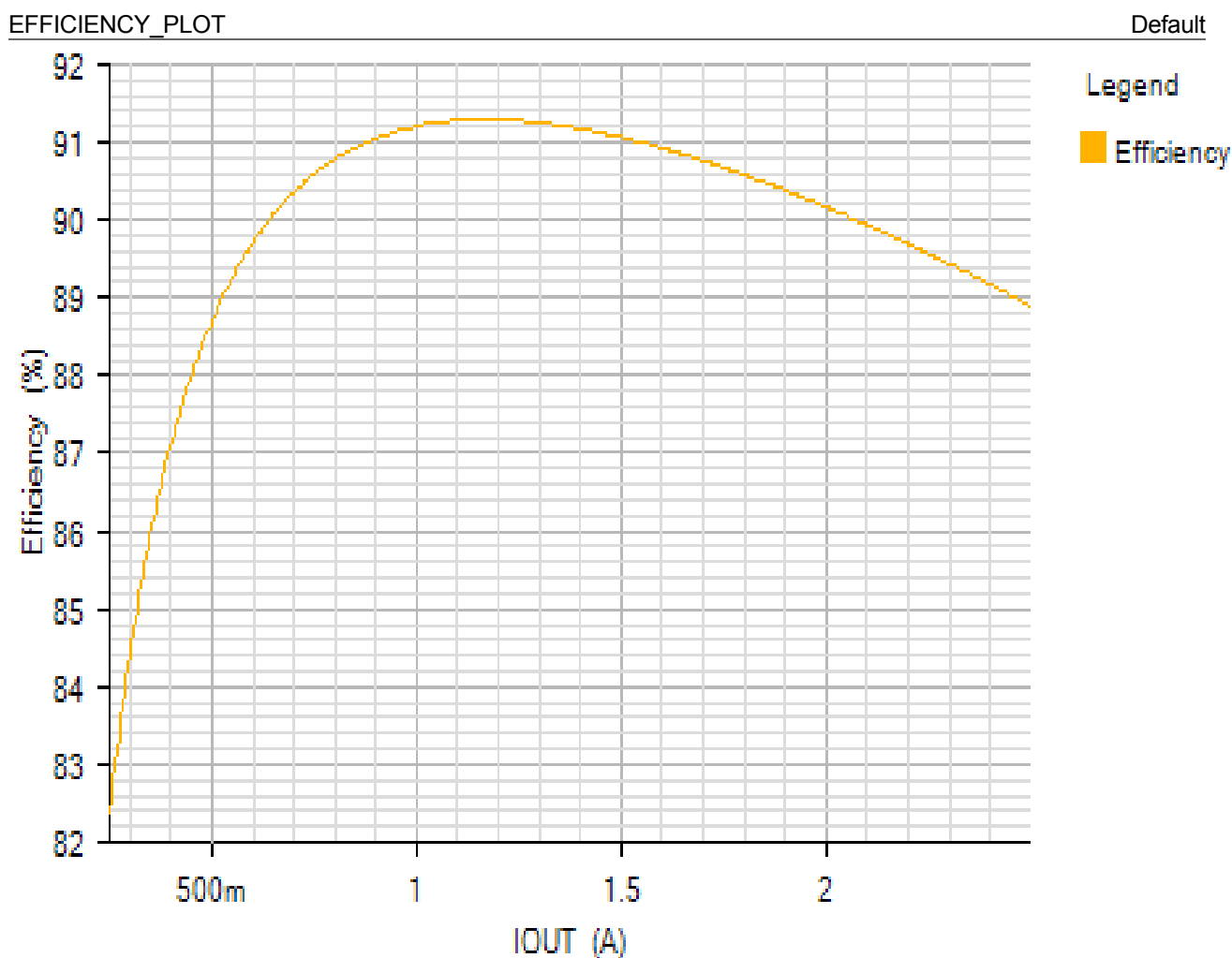
BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX17503	Maxim Integrated	4.5V-60V, 2.5A, High-Efficiency, Synchronous Step-Down DC-DC Converter With Internal Compensation
C1	2	C1210C225K1RAC	Kemet	Cap Ceramic 2.2uF 100V X7R 10% SMD 1210 125C Bulk
C2	1	C1608X7R1A225K080AC	TDK	Cap Ceramic 2.2uF 10V X7R 10% Pad SMD 0603 125°C T/R
C3	1	CGA2B2X7R1E153K050BA	TDK	Cap Ceramic 0.015uF 25V X7R 10% Pad SMD 0402 125°C Automotive T/R
C4	3	GRM32ER71E226ME15	Murata	Cap Ceramic 22uF 25V 1210 125C
C5	1	CGA2B1X7R1C104K050BC	TDK	Cap Ceramic 0.1uF 16V X7R 10% Pad SMD 0402 125°C Automotive T/R
C6	1	CGA2B2C0G1H010C050BA	TDK	Cap Ceramic 1pF 50V C0G 0.25pF Pad SMD 0402 125°C Automotive T/R
L1	1	MSS1278-153MLB	Coilcraft	Inductor 15uH 20% 27.9mOhm 8.9A Isat 4.9A Irms
R1	1	CRCW06033M32FKEA	Vishay	Res Thick Film 0603 3.32M Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
				Res Thick Film 0603 866K Ohm 1%

R2	1	ERJ3EKF8663V	Panasonic	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	ERJ2RKF2002X	Panasonic	Res Thick Film 0402 20K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	ERJ2RKF5902X	Panasonic	Res Thick Film 0402 59K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R6	1	ERJ2RKF1002X	Panasonic	Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

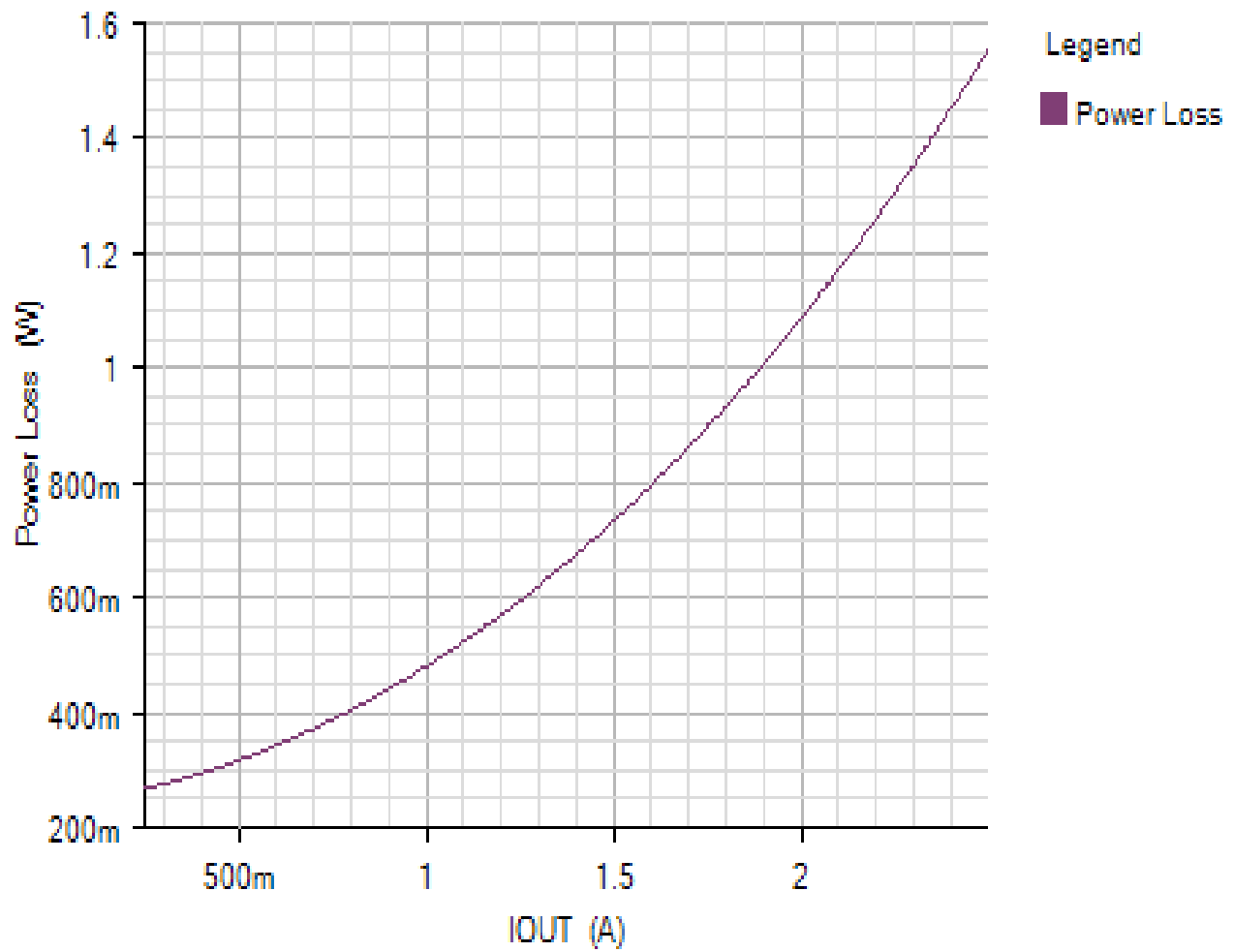
Simulation Results

Efficiency - Fri Nov 16 2018 09:43:08



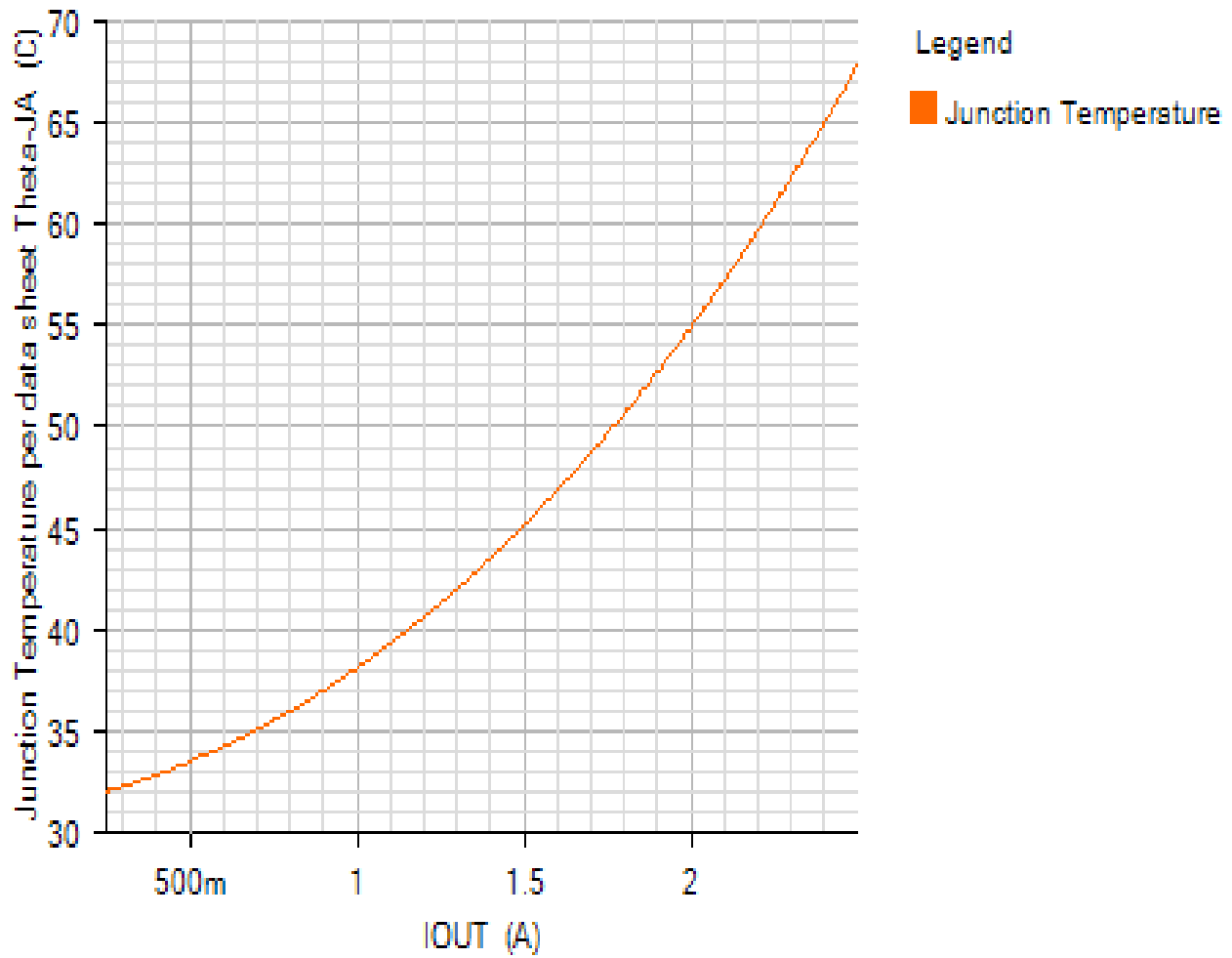
POWER_LOSS_PLOT

Default

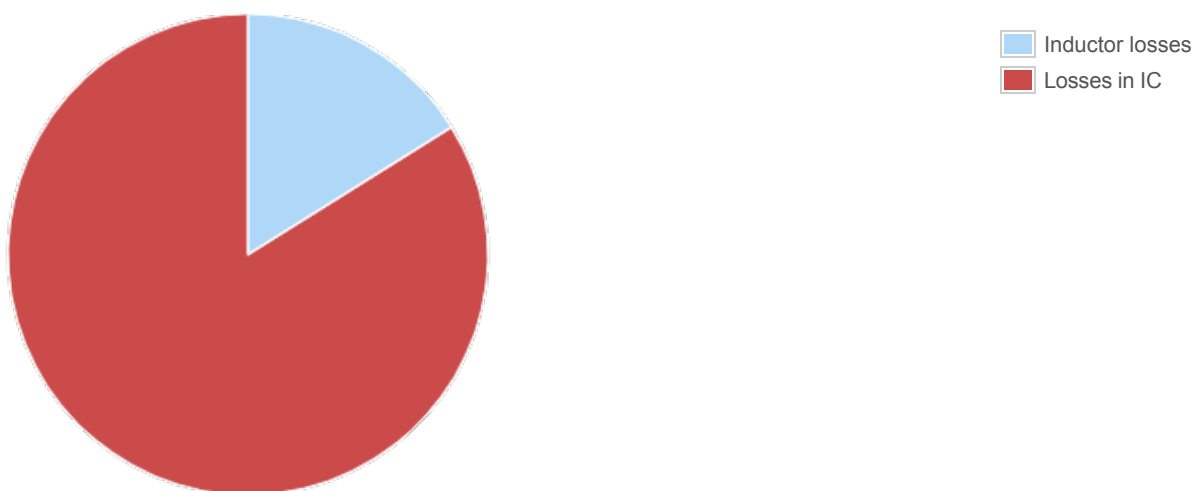


JUNCTION_TEMPERATURE_PLOT

Default



Losses



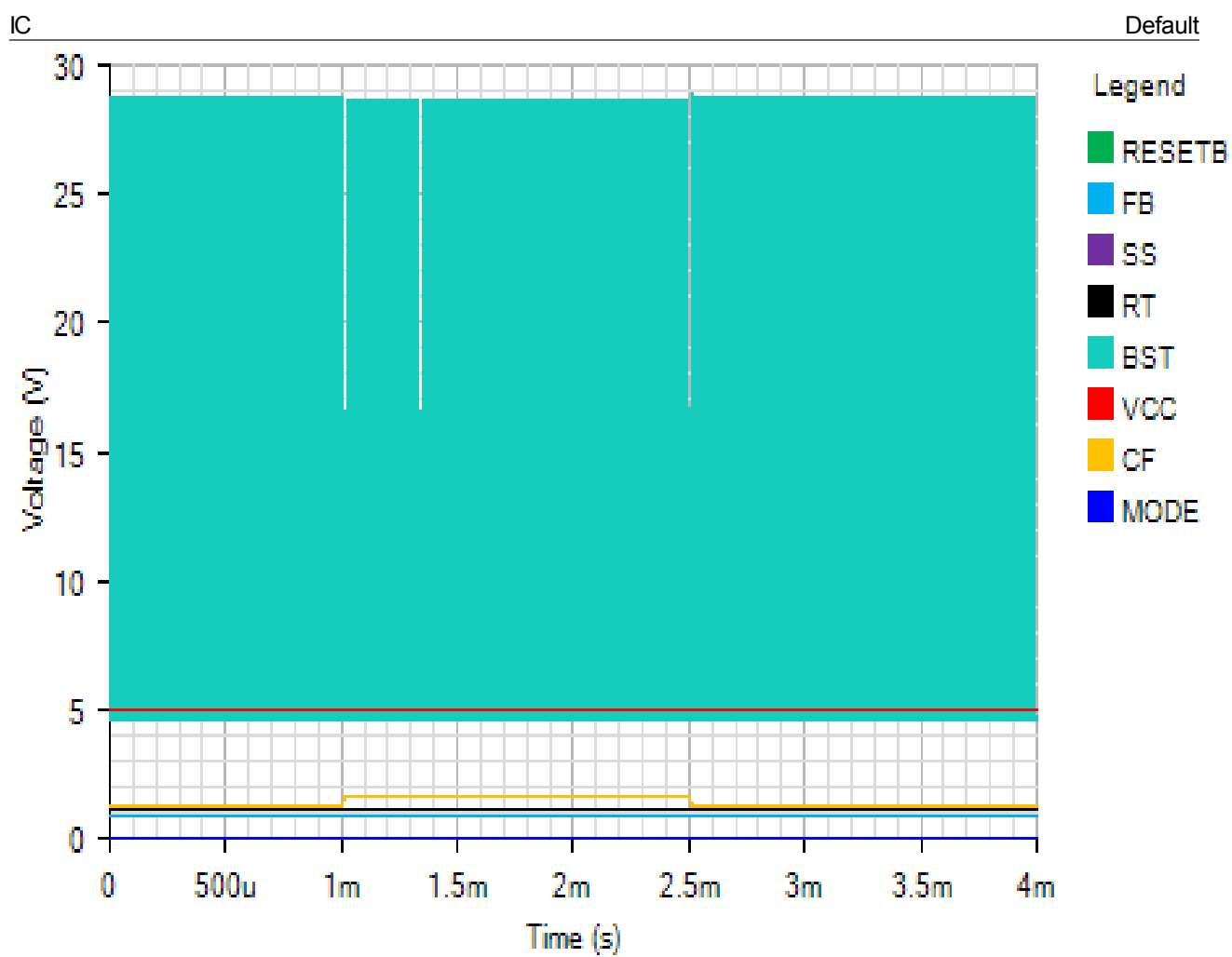
Component

Loss (W)

% of total

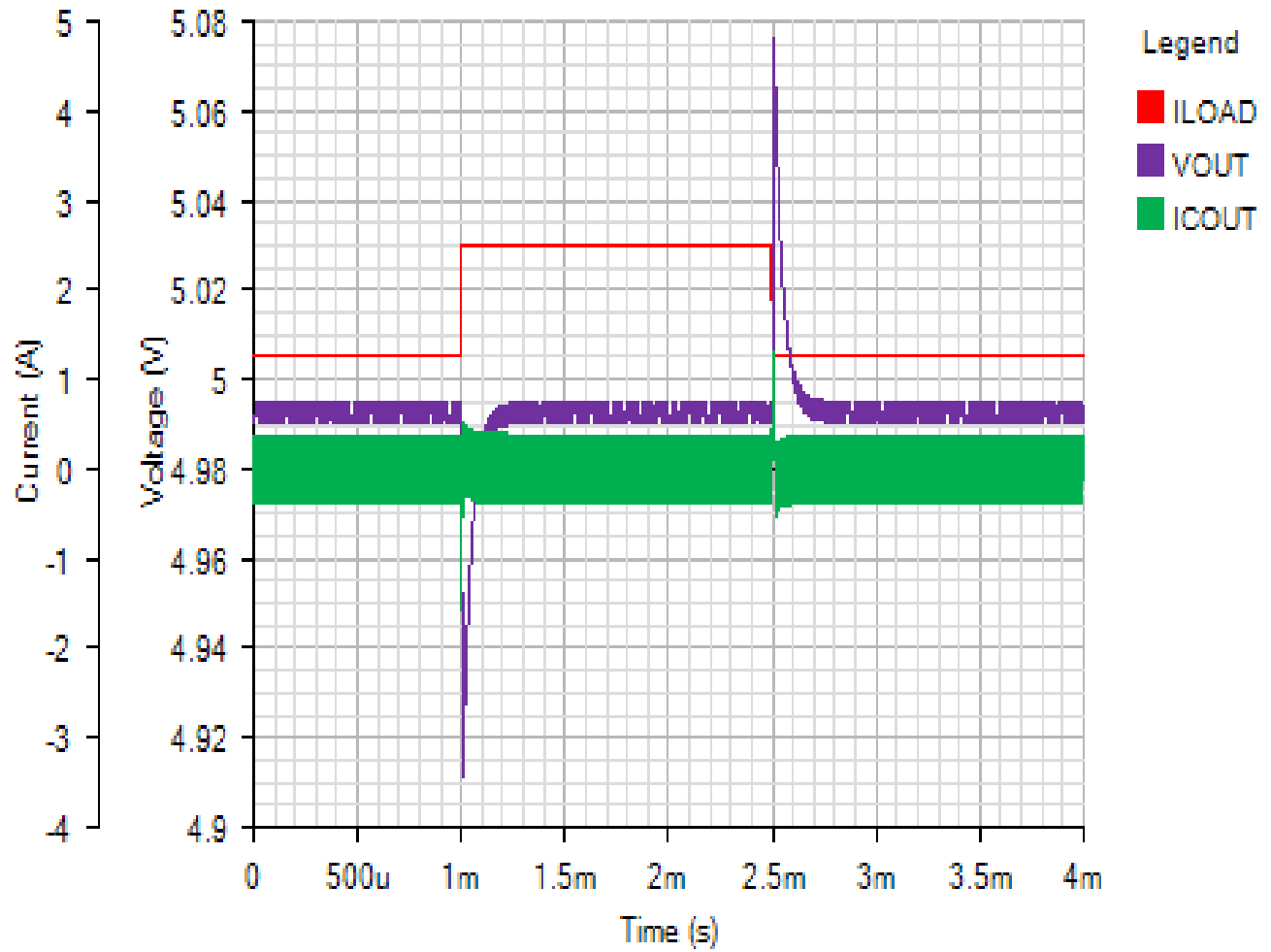
Component	Loss (W)	% of total
Inductor losses	0.25	16.1
Losses in IC	1.3	83.9
Total	1.55	100

Load Step - Fri Nov 16 2018 09:43:08



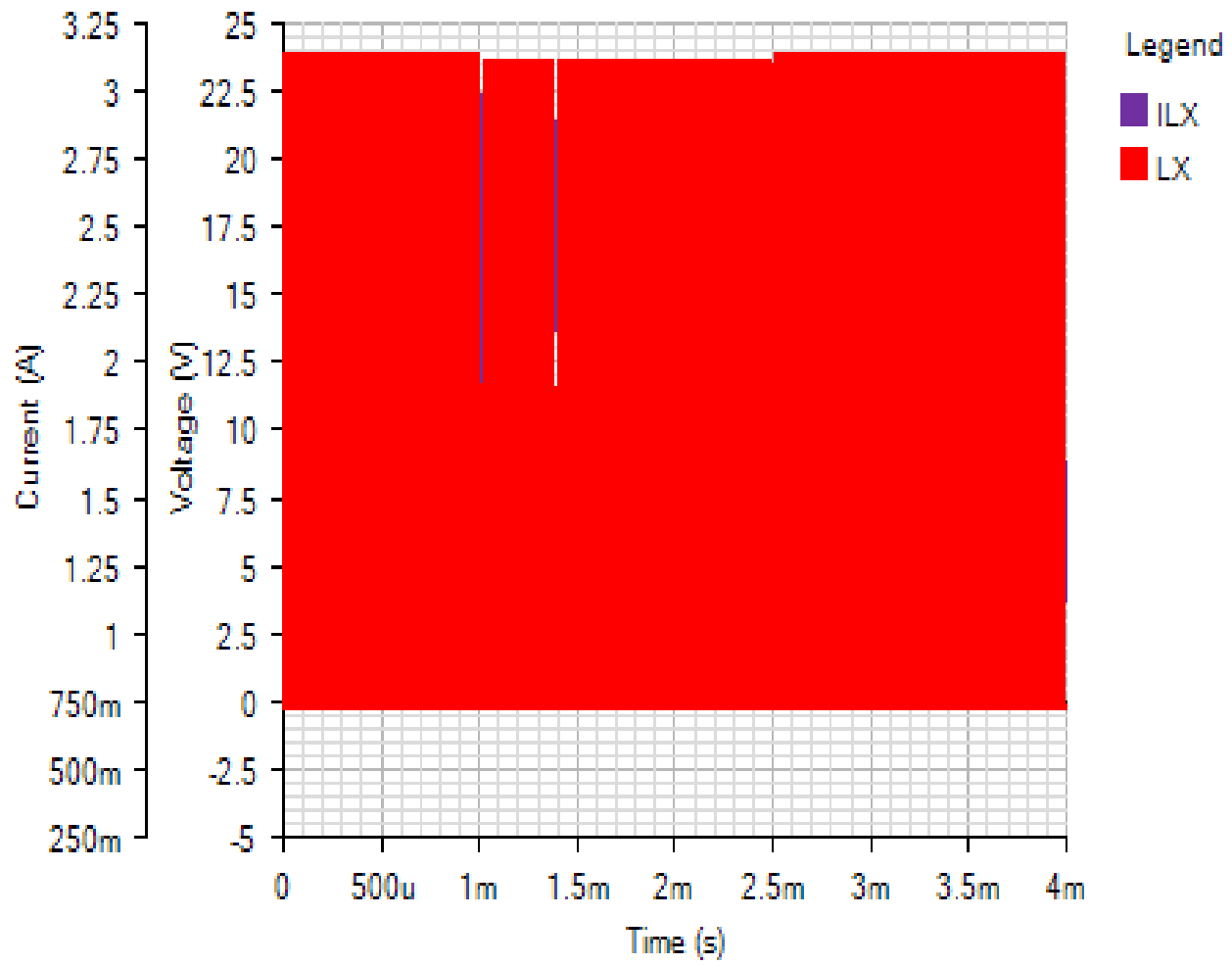
OUTPUT

Default



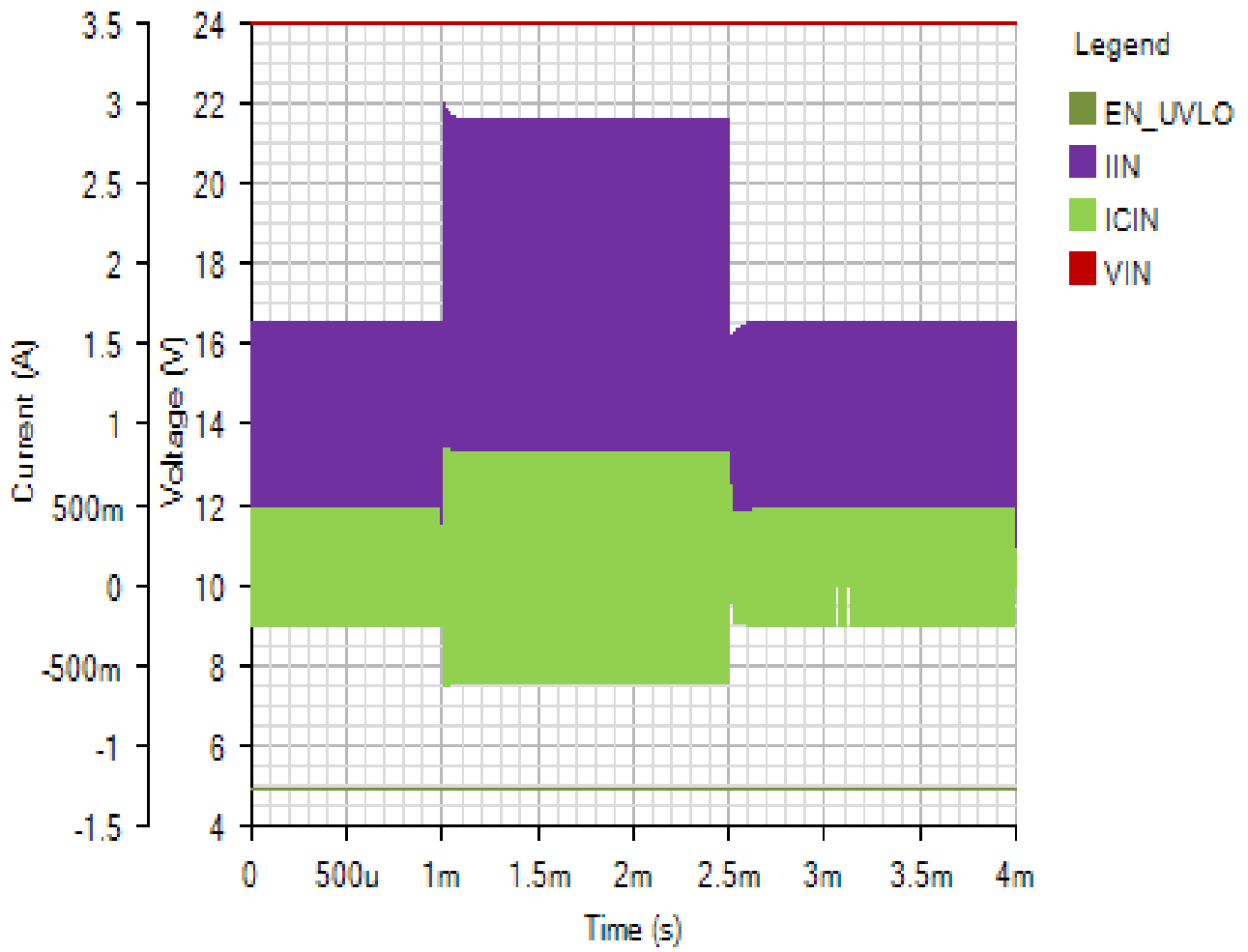
SWITCHING

Default



INPUT

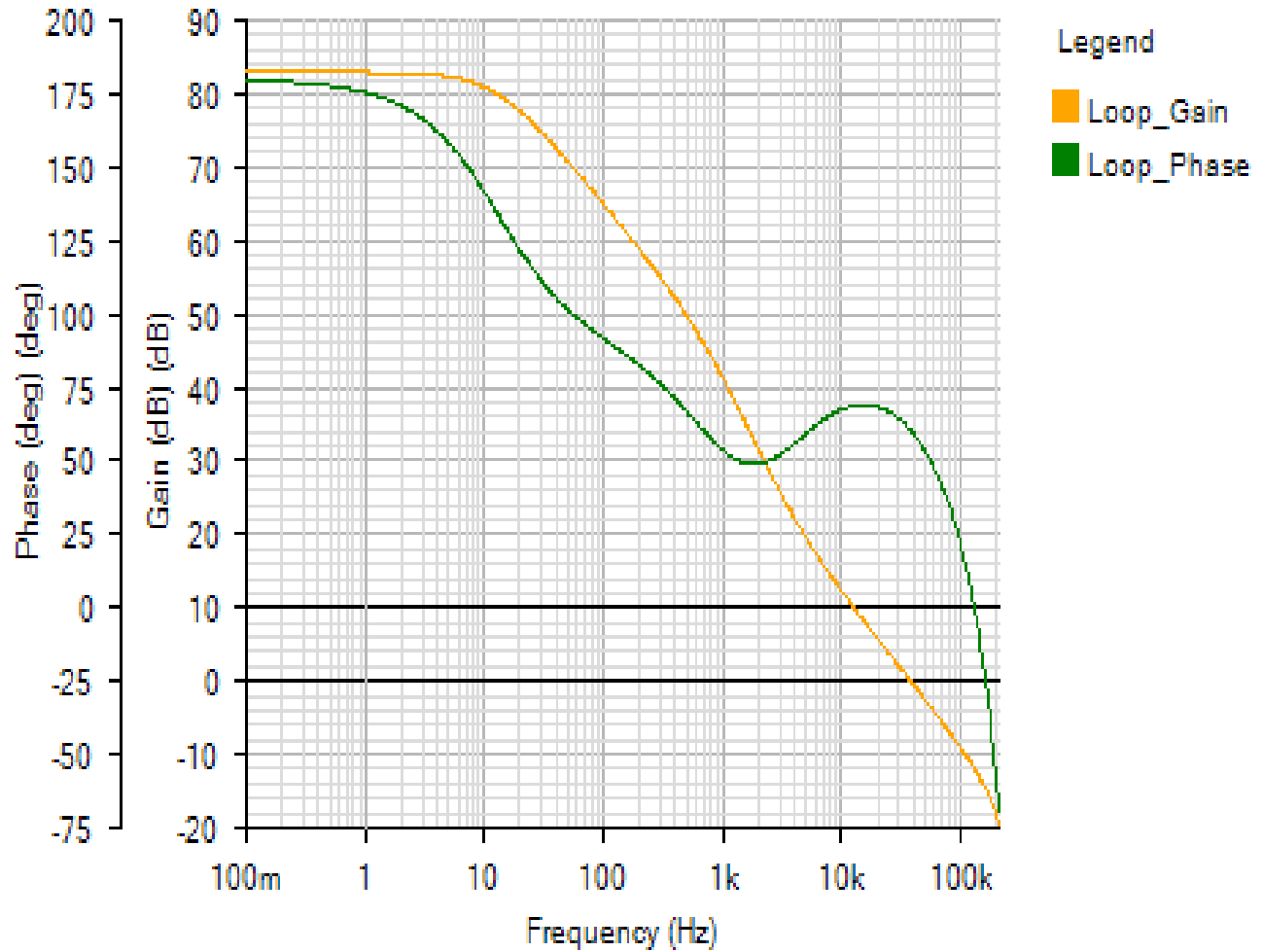
Default



AC Loop - Fri Nov 16 2018 09:43:08

BODE

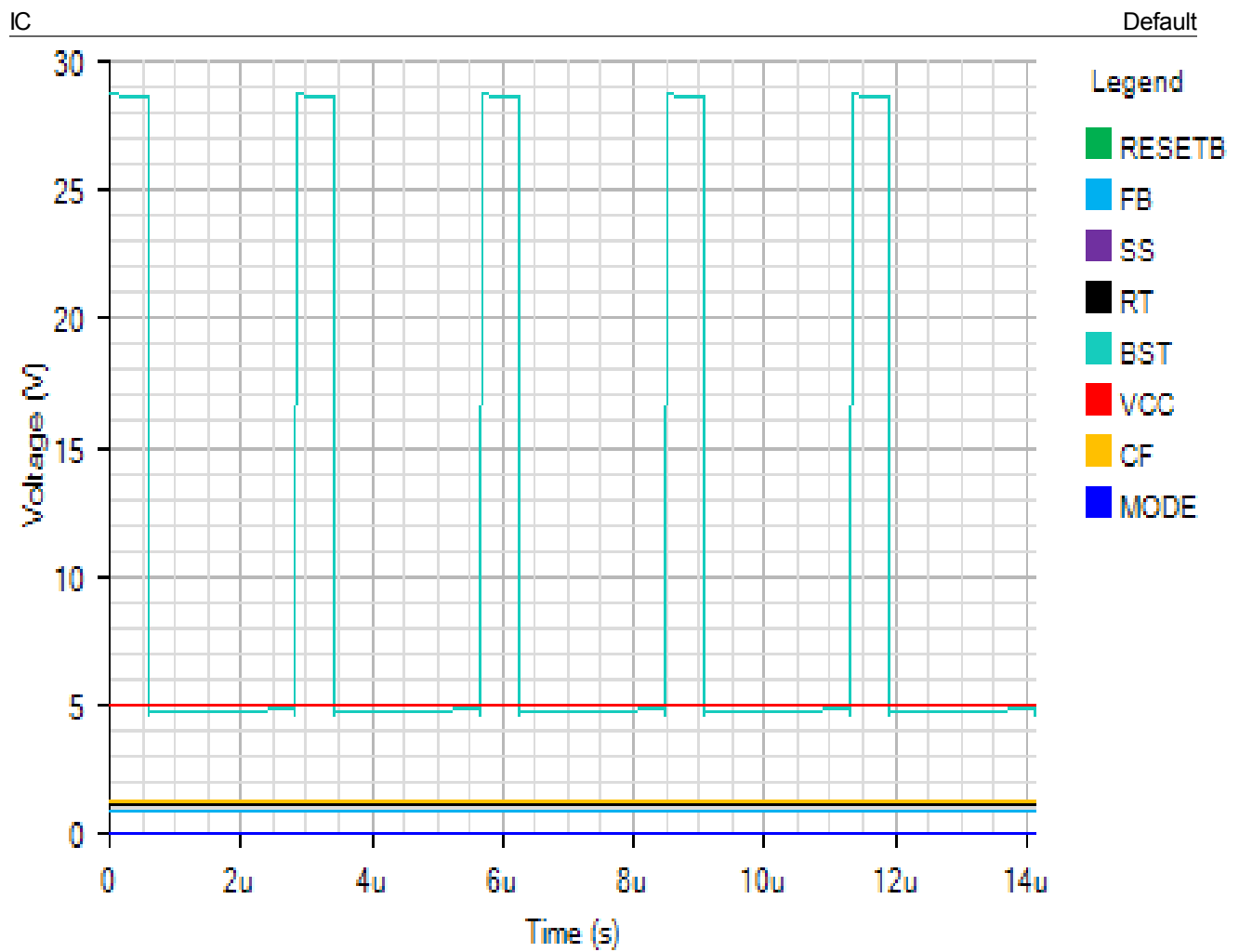
Default



Phase Margin: 60.34° at a crossover frequency of 38.1kHz

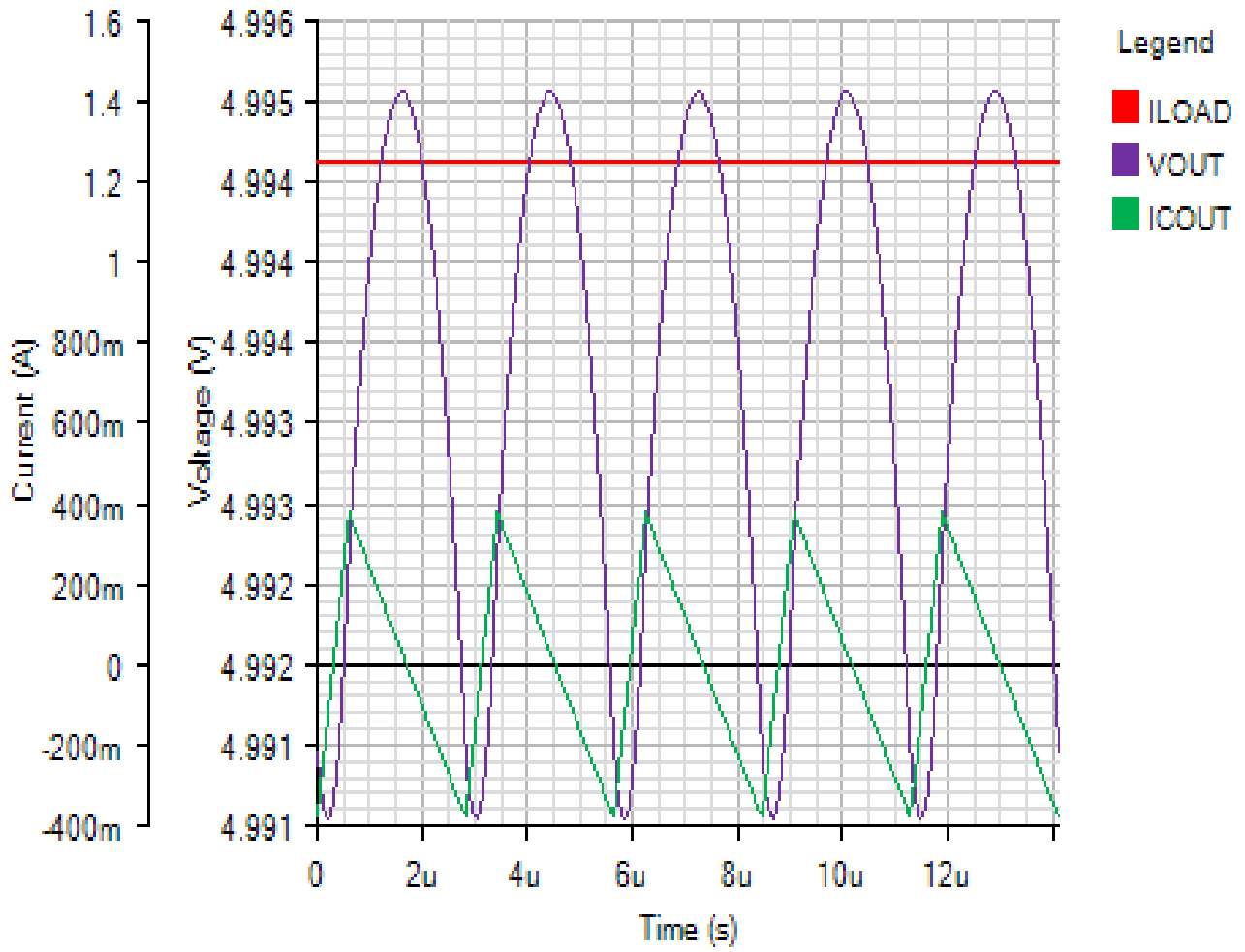


Steady State - Fri Nov 16 2018 09:43:08



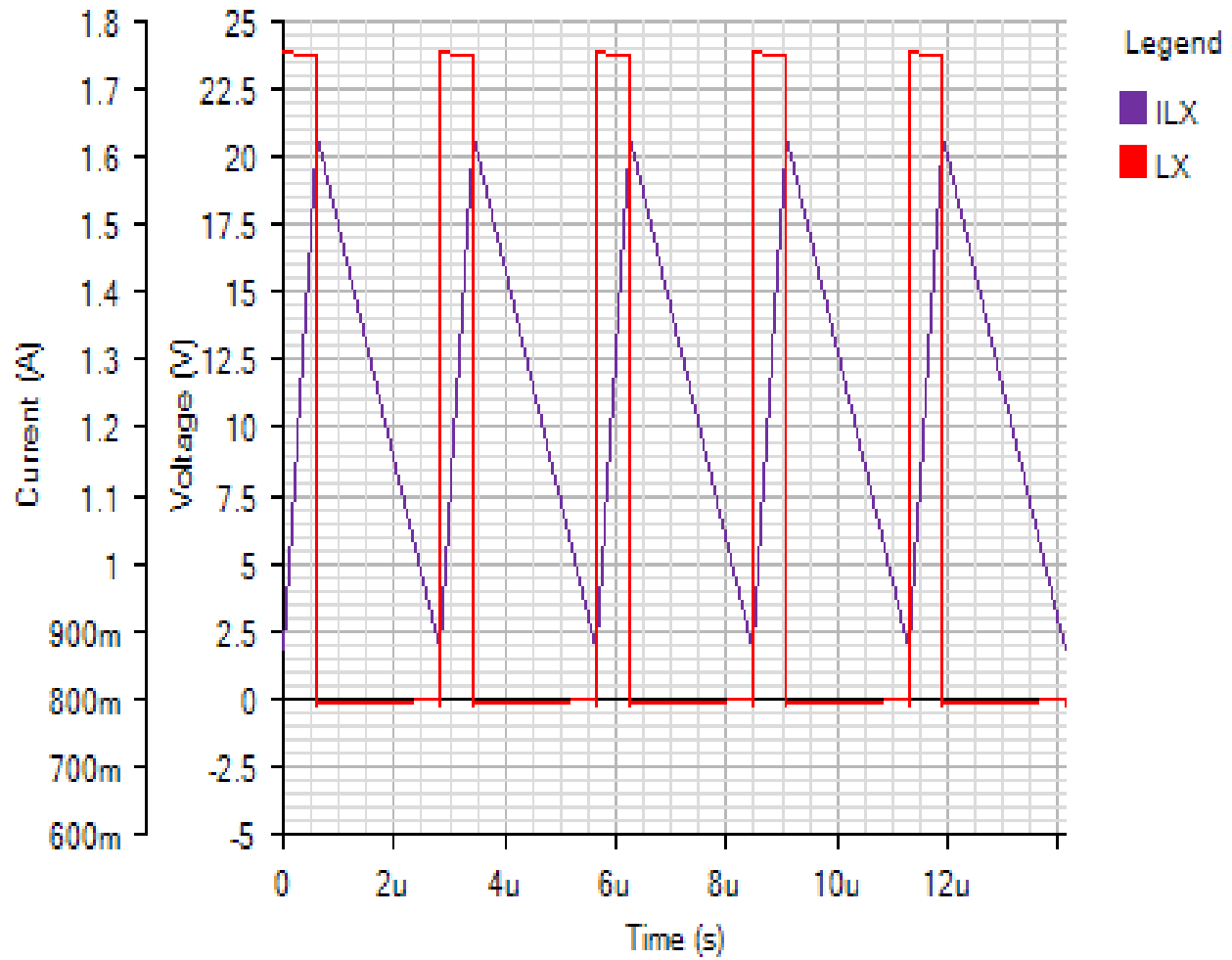
OUTPUT

Default



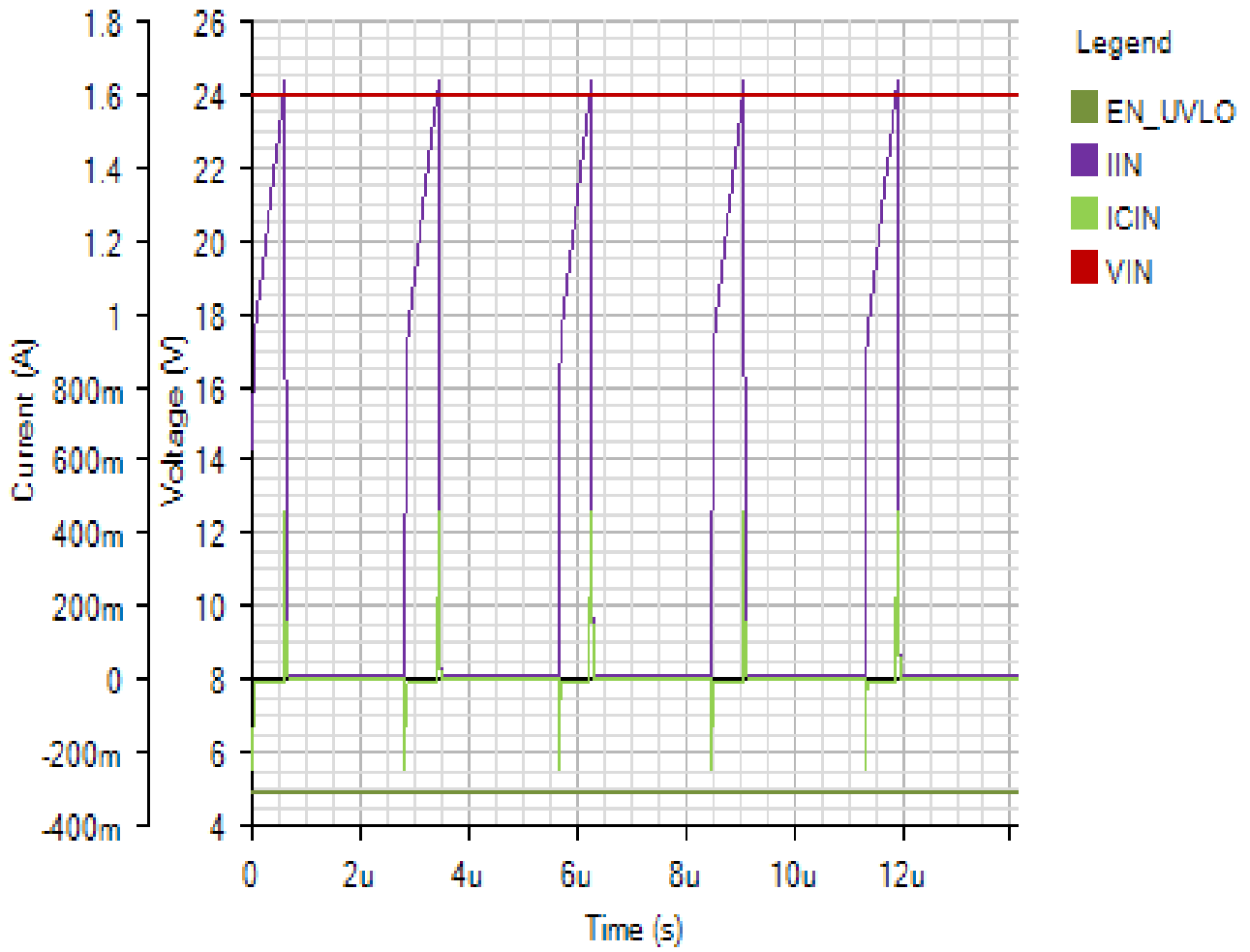
SWITCHING

Default

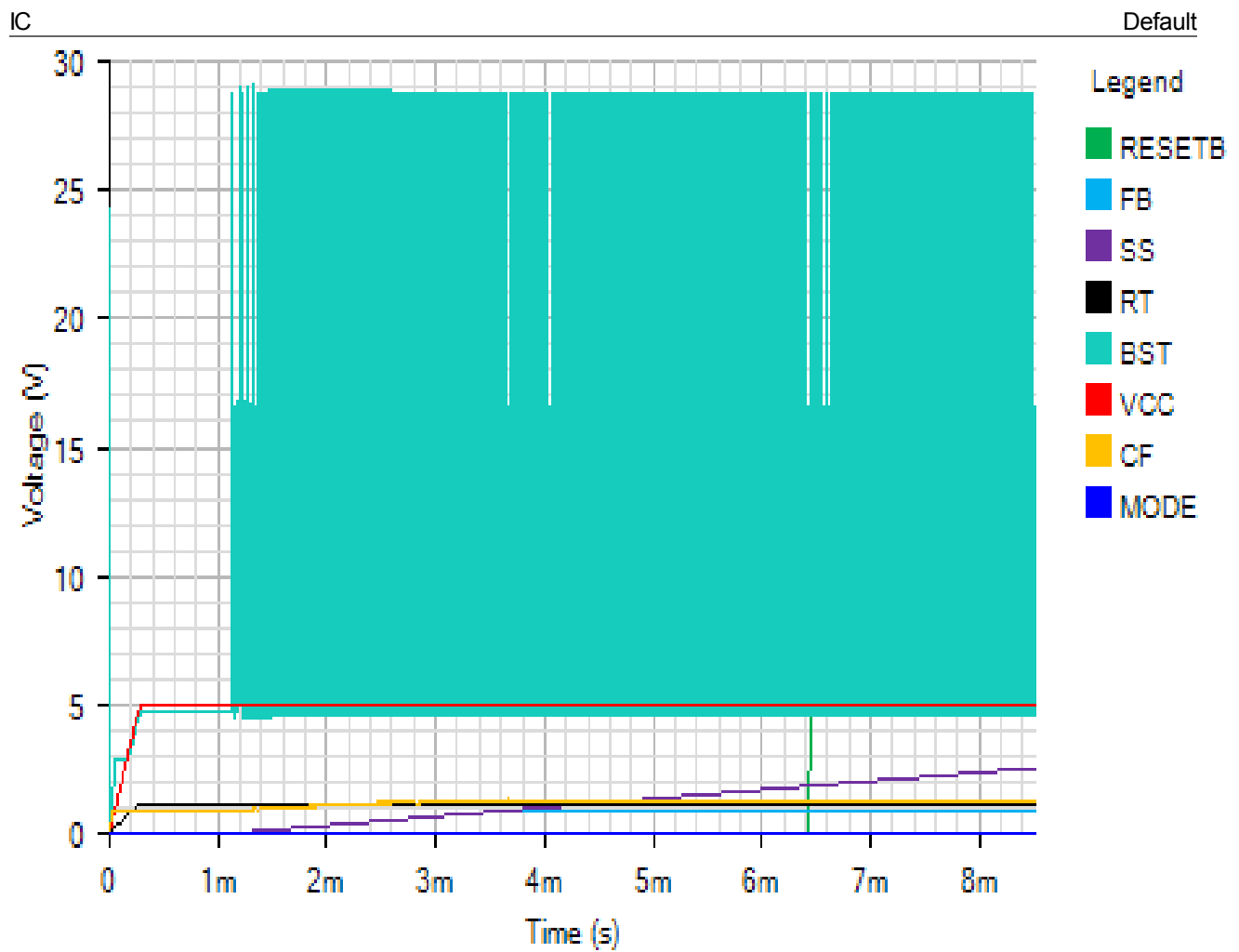


INPUT

Default

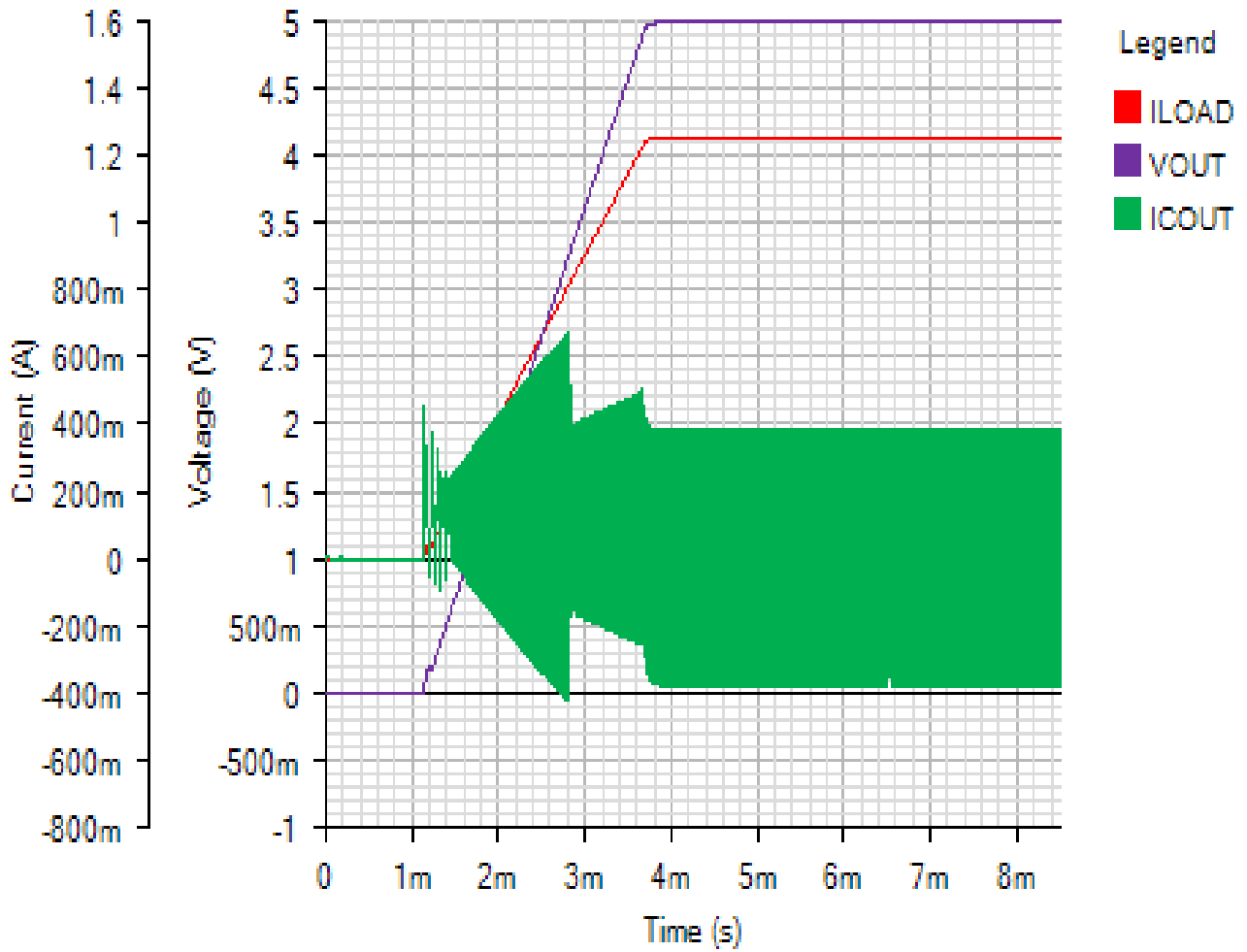


Start Up - Fri Nov 16 2018 09:43:08



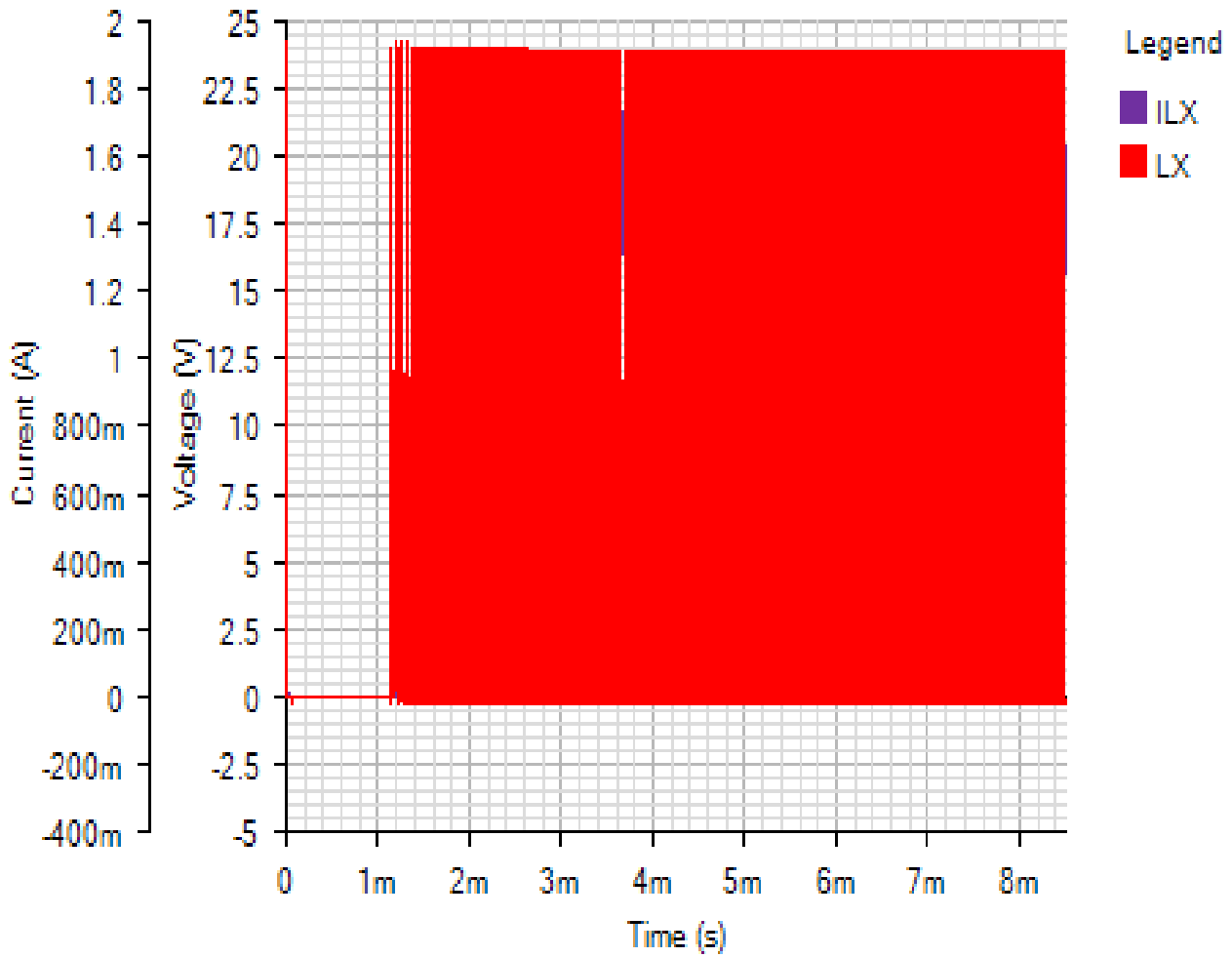
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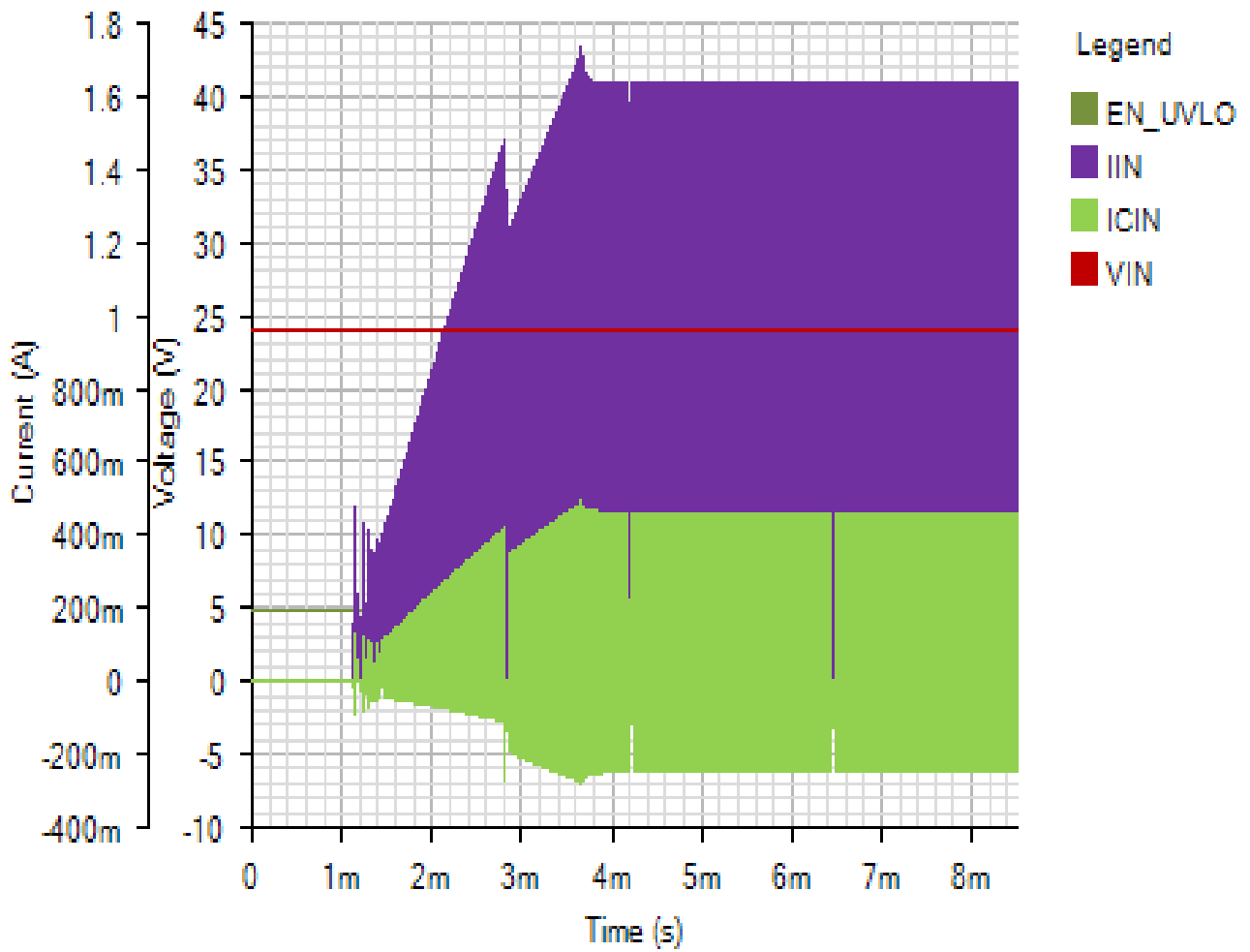
SWITCHING

Default

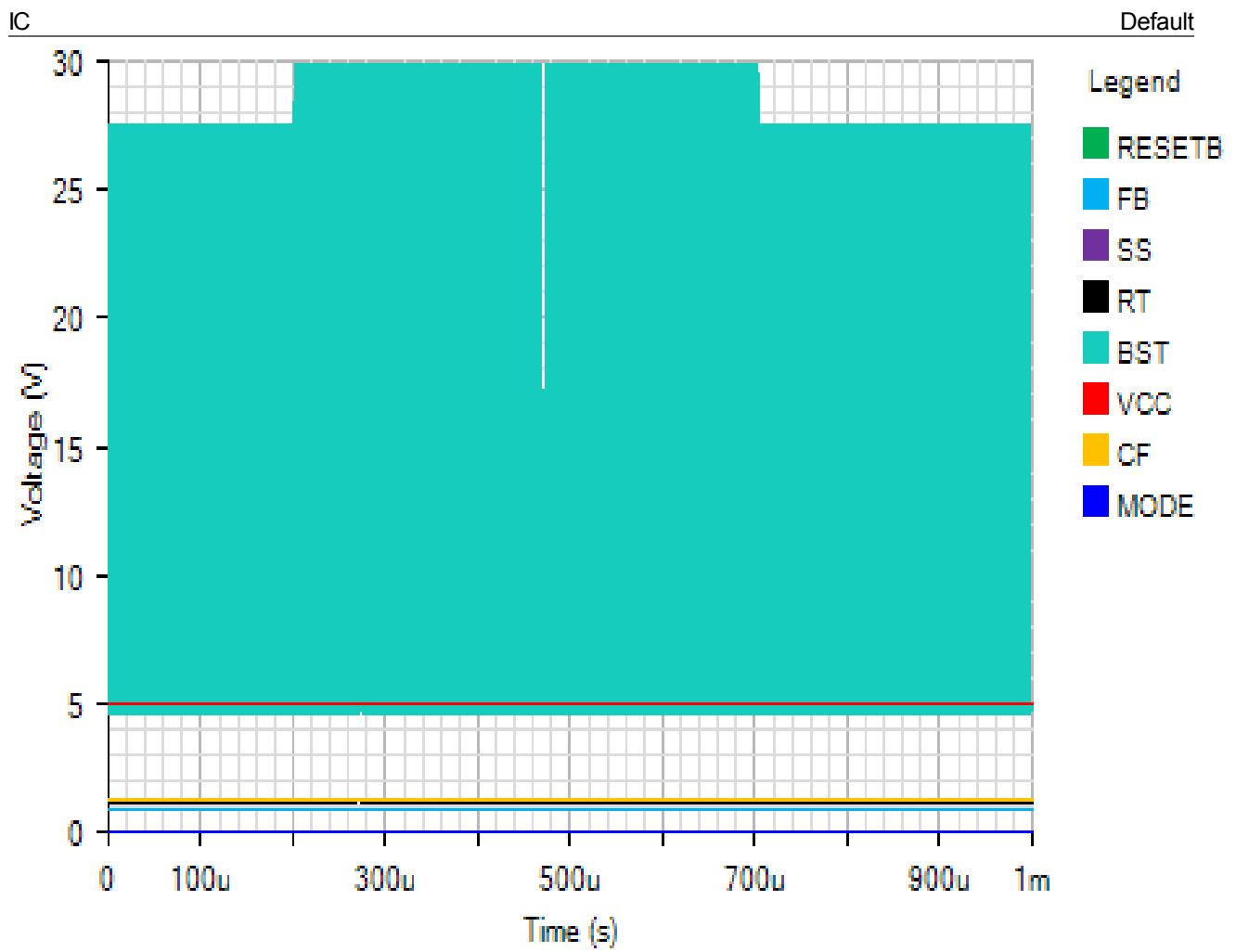


INPUT

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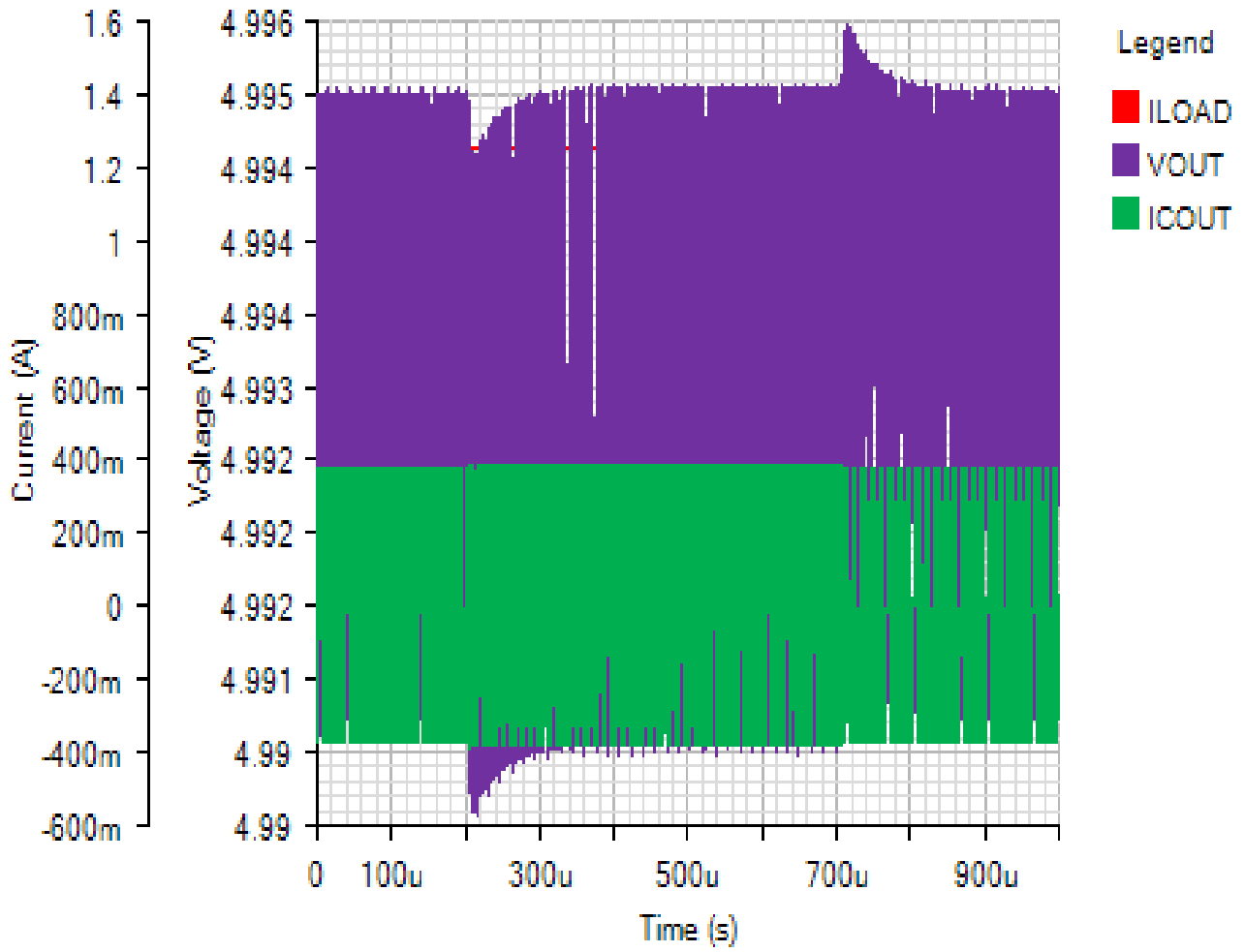


Line Transient - Fri Nov 16 2018 09:43:08



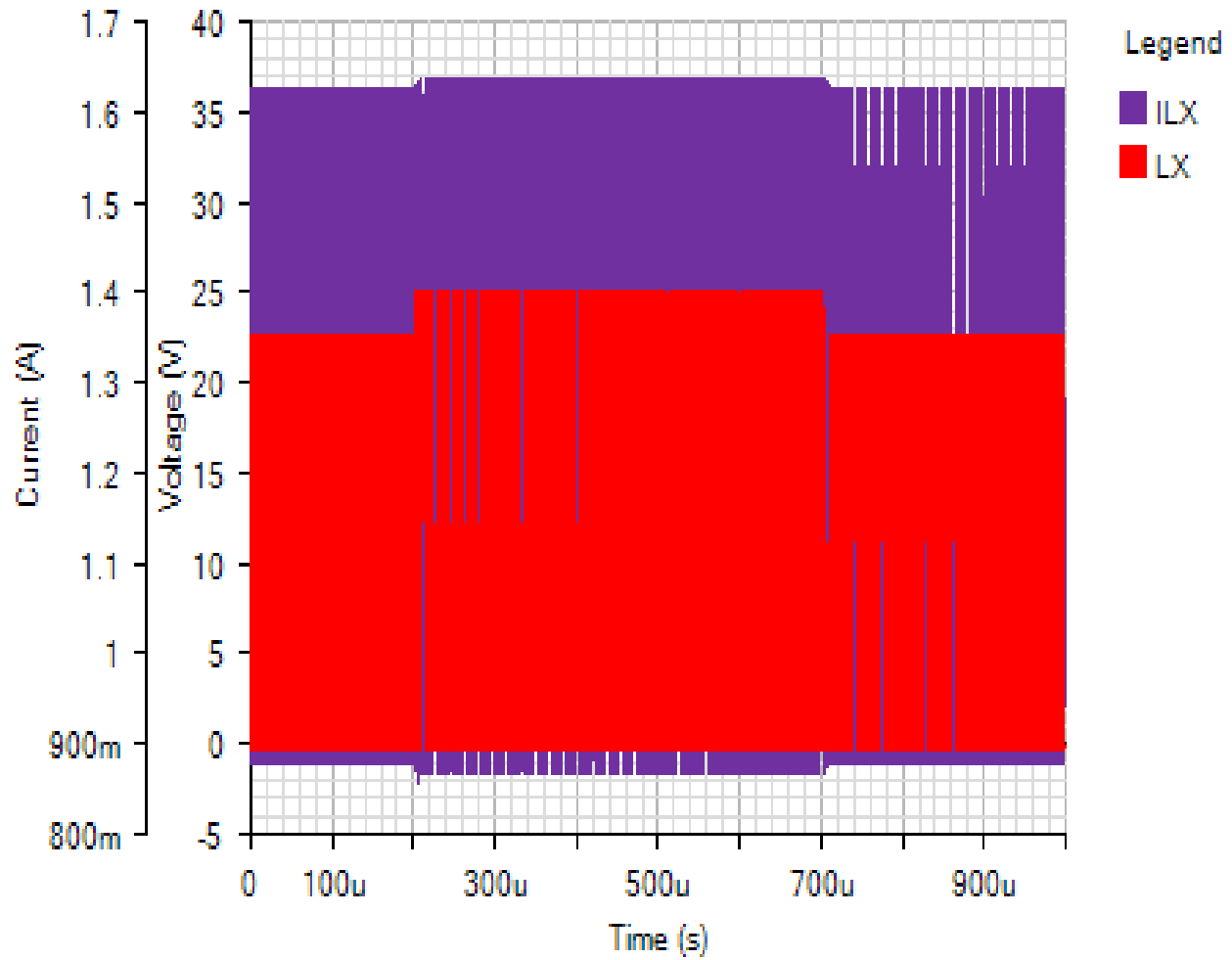
OUTPUT

Default



SWITCHING

Default



INPUT

Default

