

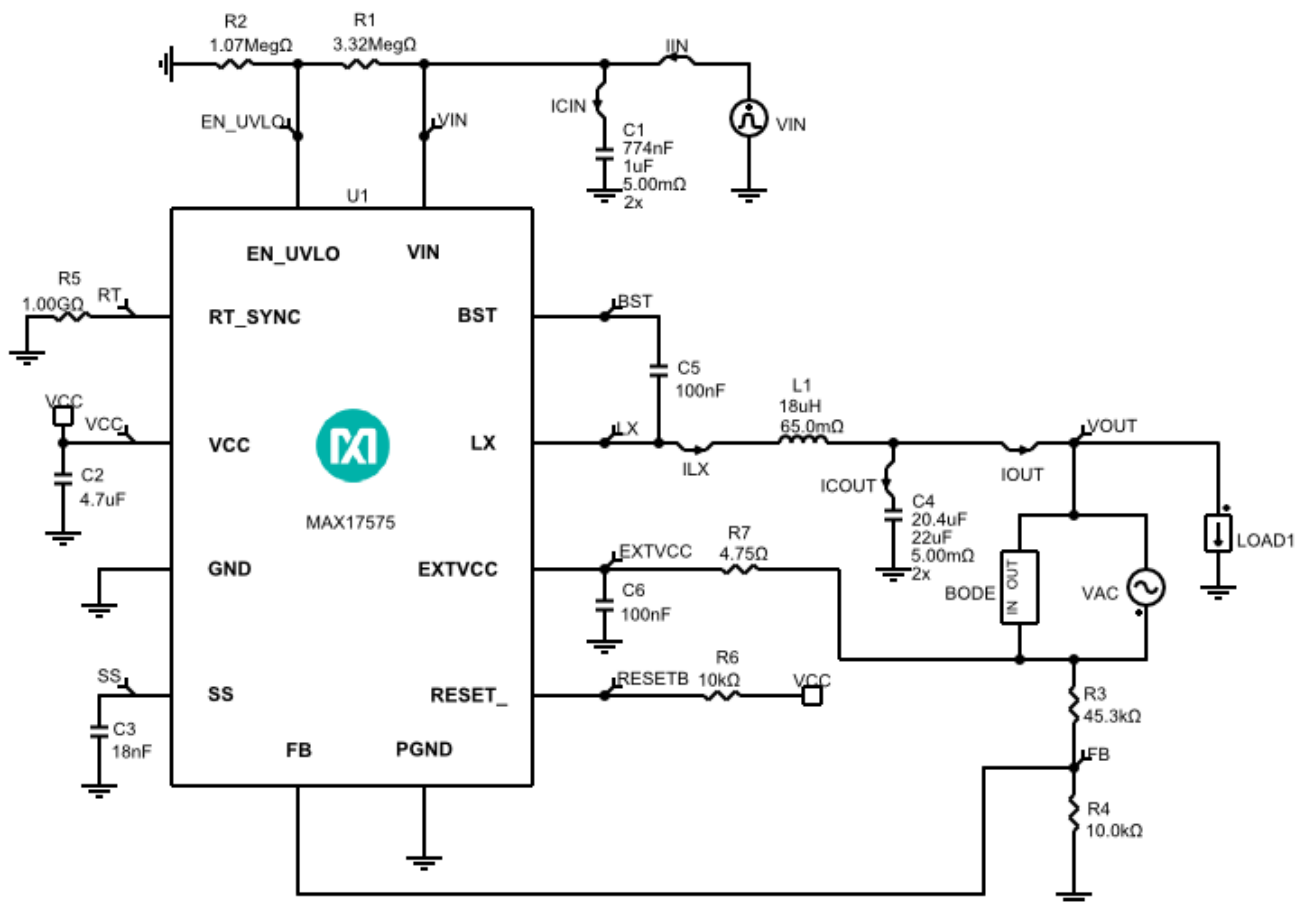
Initial Design

1.0

Design Requirements

Parameter	Value
Minimum Input Voltage	6.5V
Maximum Input Voltage	60V
Nominal Input Voltage	24V
Input Steady-State Ripple	0.5V
Input Undervoltage Lockout Level	5V
Output Voltage	5V
Output Current	1.5A
Output Voltage Load Step Over/Undershoot	0.15V
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
Switching Frequency	500kHz
Soft Start time	3ms
Ambient Temperature	25°C

Schematic



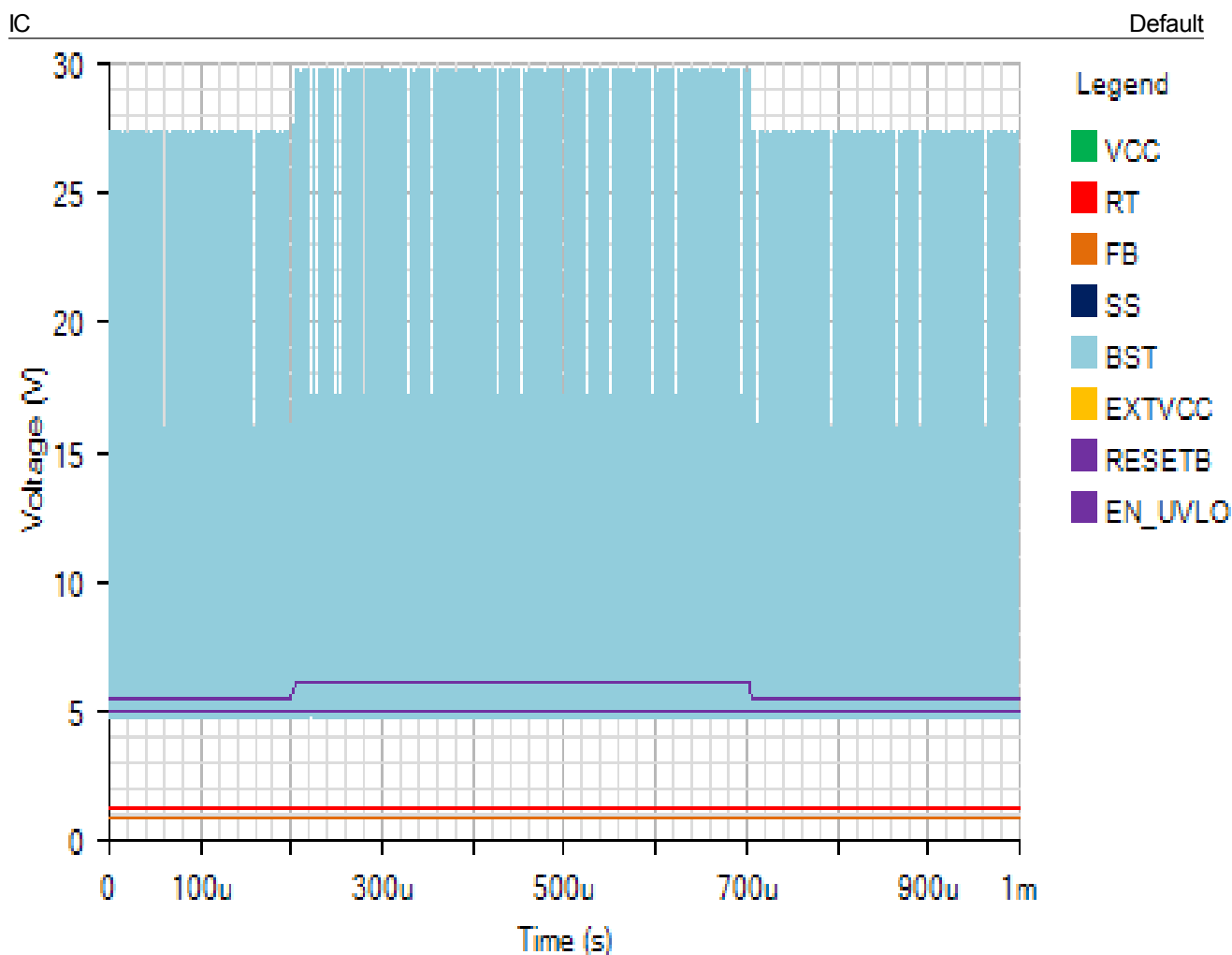
BOM

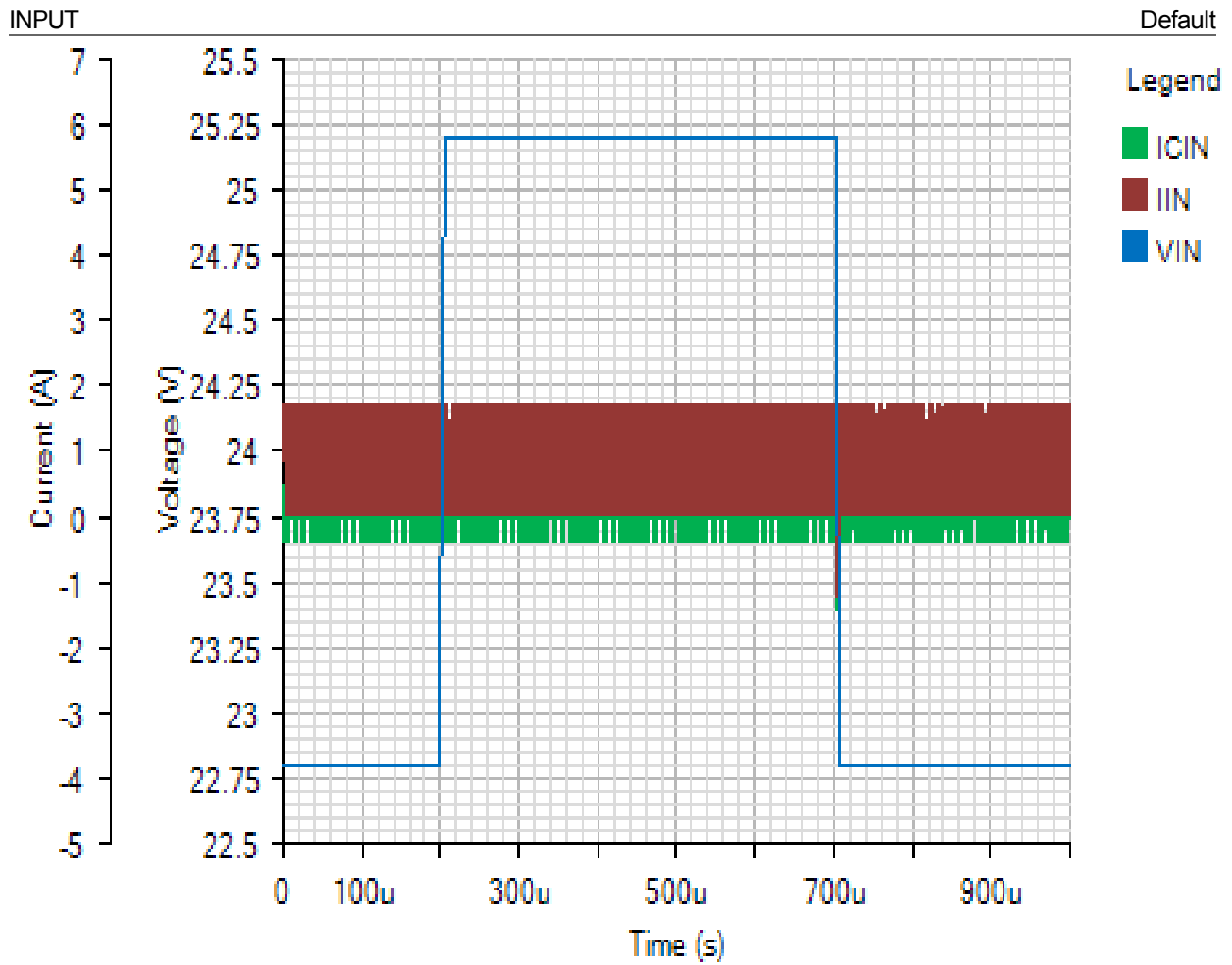
Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX17575	User-Defined	IC
C1	2	C3216X7R2A105K160AA	TDK	Cap Ceramic 1uF 100V X7R 10% SMD 1206 125C Plastic T/R
C2	1	C2012X7R1A475K125AC	TDK	Cap Ceramic 4.7uF 10V X7R 10% Pad SMD 0805 125°C T/R
C3	1	C0402C183K5RACTU	KEMET Corporation	Cap Ceramic 0.018uF 50V X7R 10% Pad SMD 0402 125°C T/R
C4	2	GRM32ER71E226ME15	Murata	Cap Ceramic 22uF 25V 1210 125C
C5	1	GCM155R71C104KA55D	Murata Manufacturing	Cap Ceramic 0.1uF 16V X7R 10% Pad SMD 0402 125°C Automotive T/R
C6	1	CGA2B3X7R1H104K050BB	TDK	Cap Ceramic 0.1uF 50V X7R 10% Pad SMD 0402 125°C Automotive T/R
L1	1	MSS1038-183MLB	Coilcraft	Inductor 18uH 20% 58.5mOhm 3.1A Isat 3.35A Irms
R1	1	AR0603JR-073M32	Yageo	Res Thick Film 0603 3.32M Ohm 5% 0.1W(1/10W) ±100ppm/°C Epoxy Pad

				SMD Automotive T/R
R2	1	AR0402JR-071M07	Yageo	Res Thick Film 0402 1.07M Ohm 5% 0.063W(1/16W) ±100ppm/°C Epoxy Pad SMD Automotive T/R
R3	1	ERJ2RKF4532X	Panasonic	Res Thick Film 0402 45.3K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	ERJ2RKF1002X	Panasonic	Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R6	1	ERJ2GEJ103X	Panasonic	Res Thick Film 0402 10K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R7	1	AR0402JR-074R75	Yageo	Res Thick Film 0402 4.75 Ohm 5% 0.063W(1/16W) ±200ppm/°C Epoxy Pad SMD Automotive T/R

Simulation Results

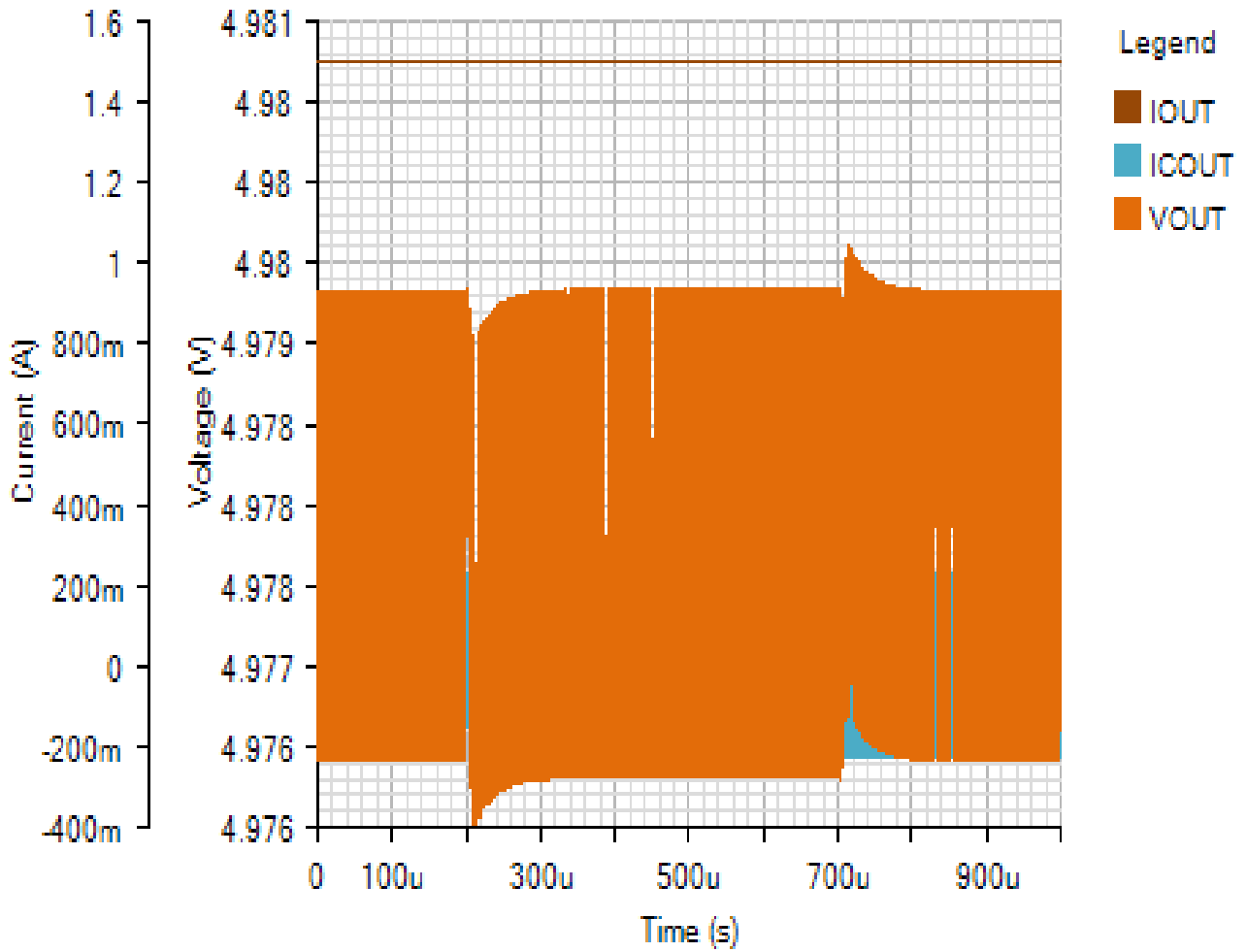
Line Transient - Tue Nov 20 2018 11:28:55





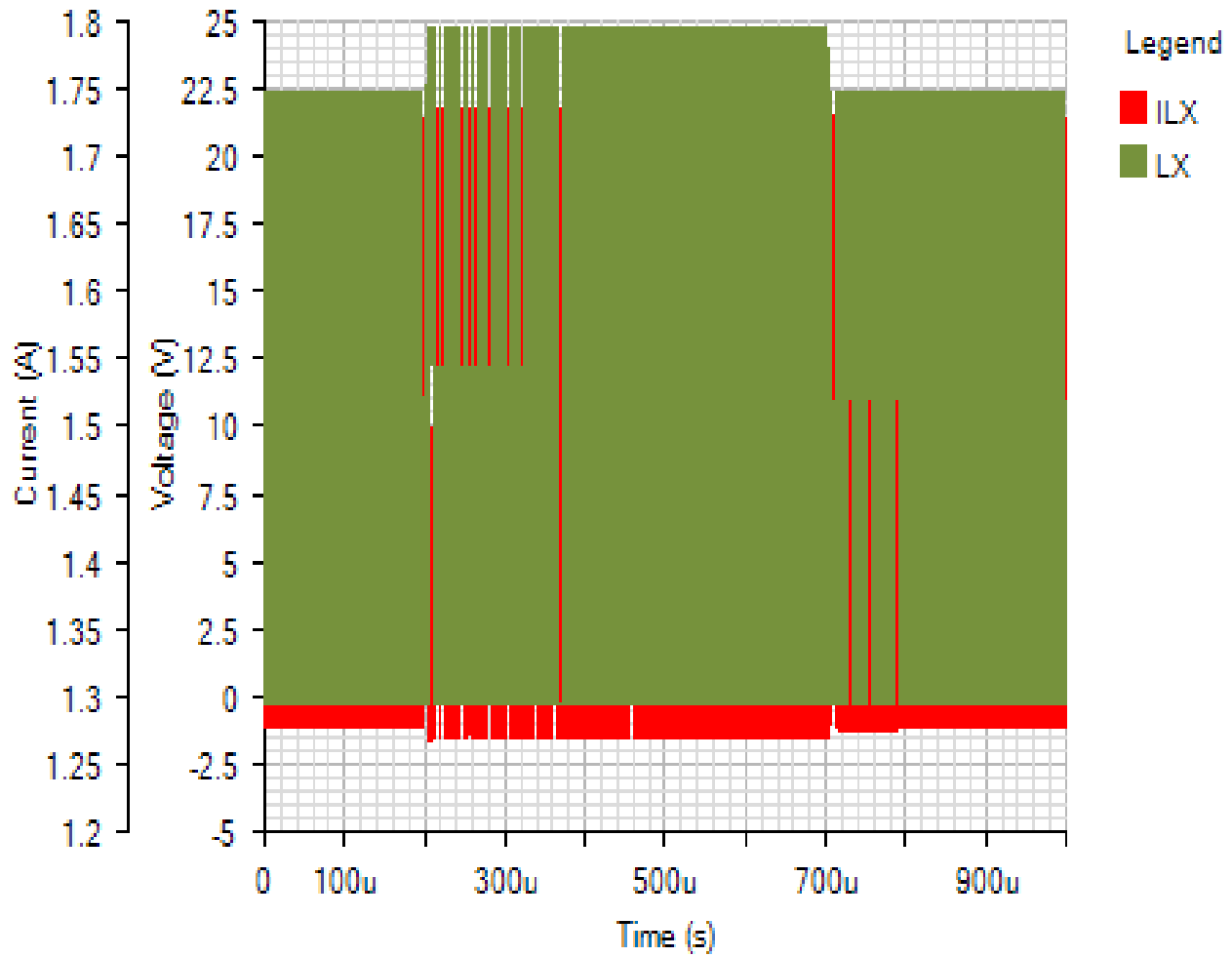
OUTPUT

Default



SWITCHING

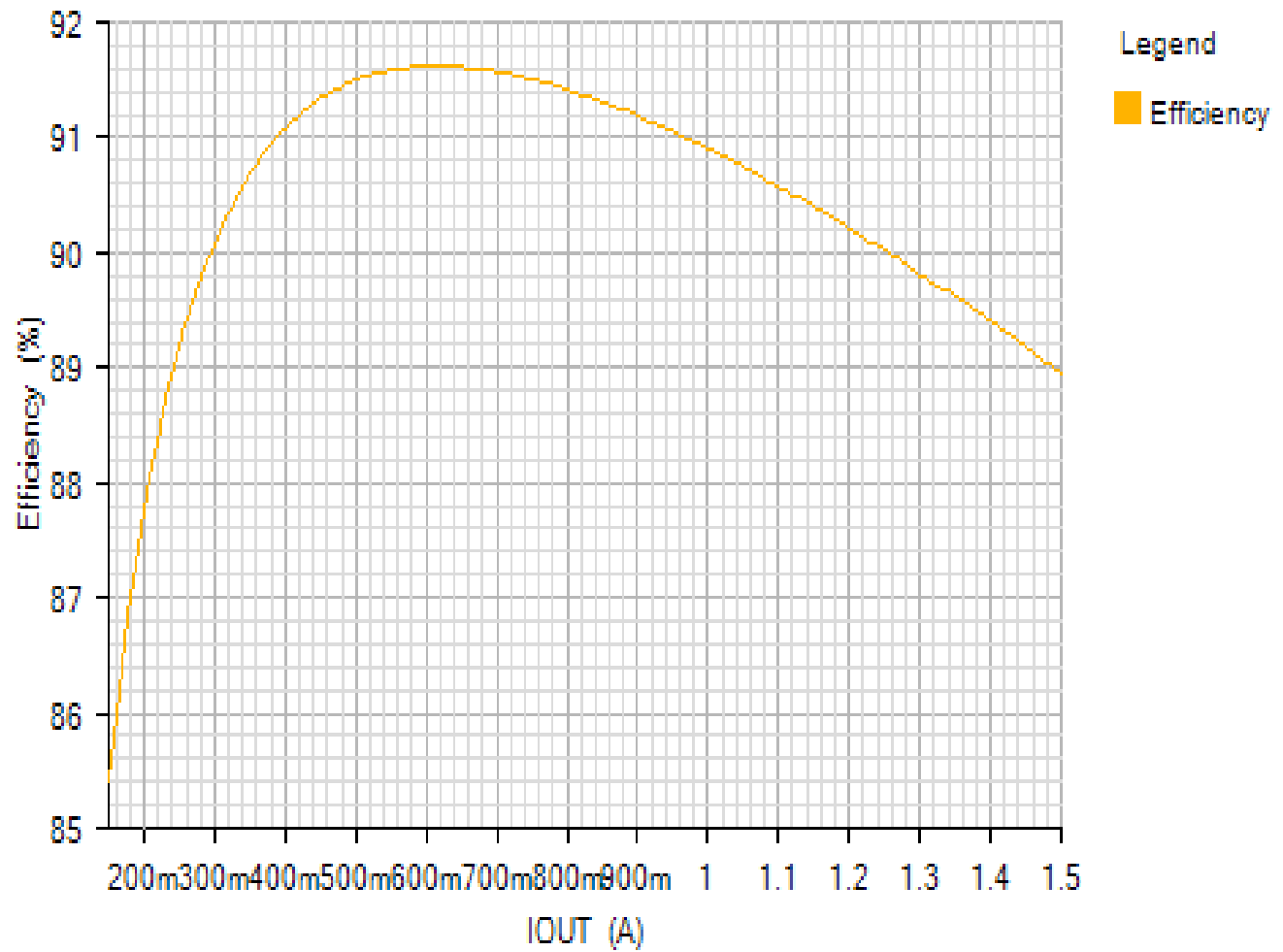
Default



Efficiency - Tue Nov 20 2018 11:28:55

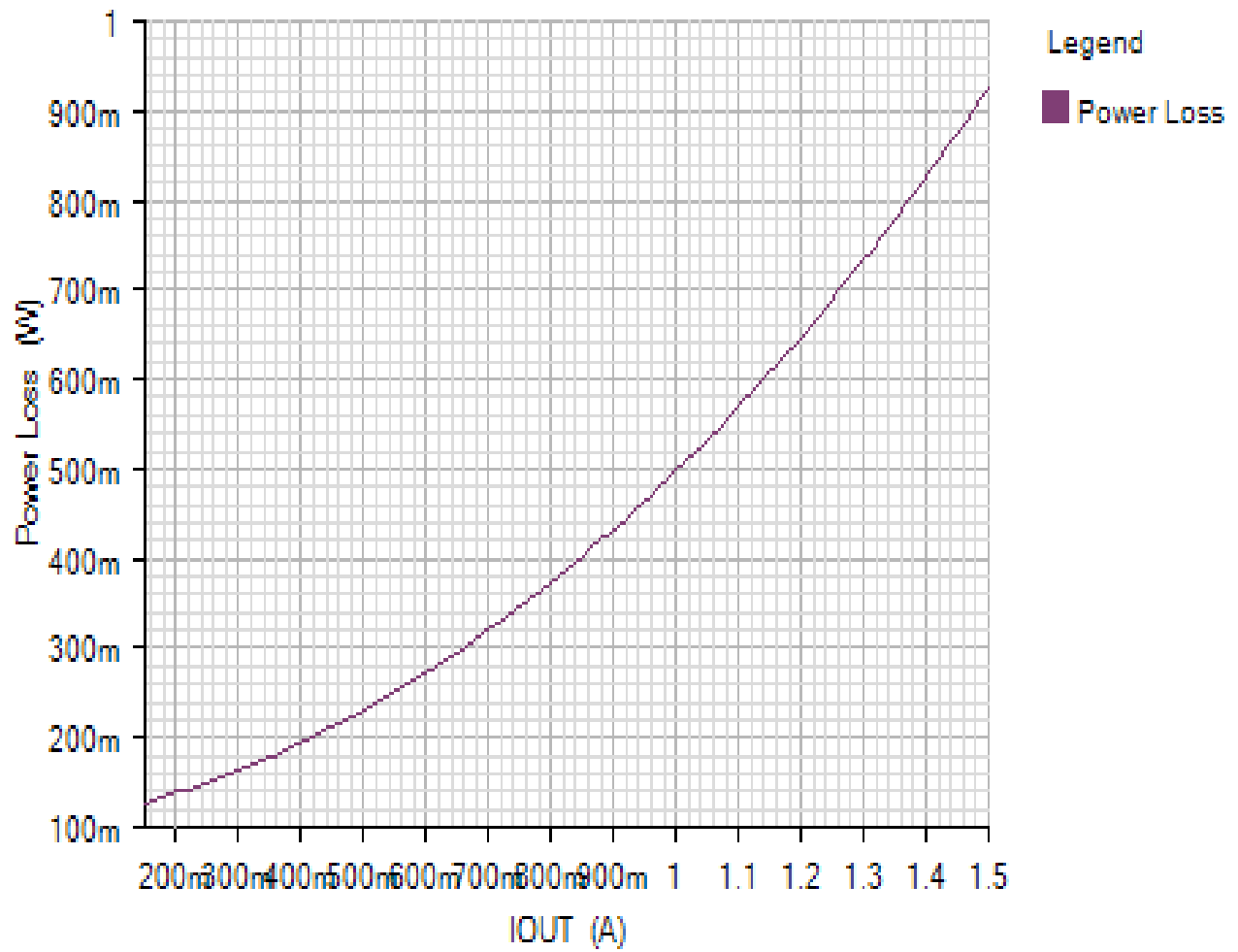
EFFICIENCY_PLOT

Default



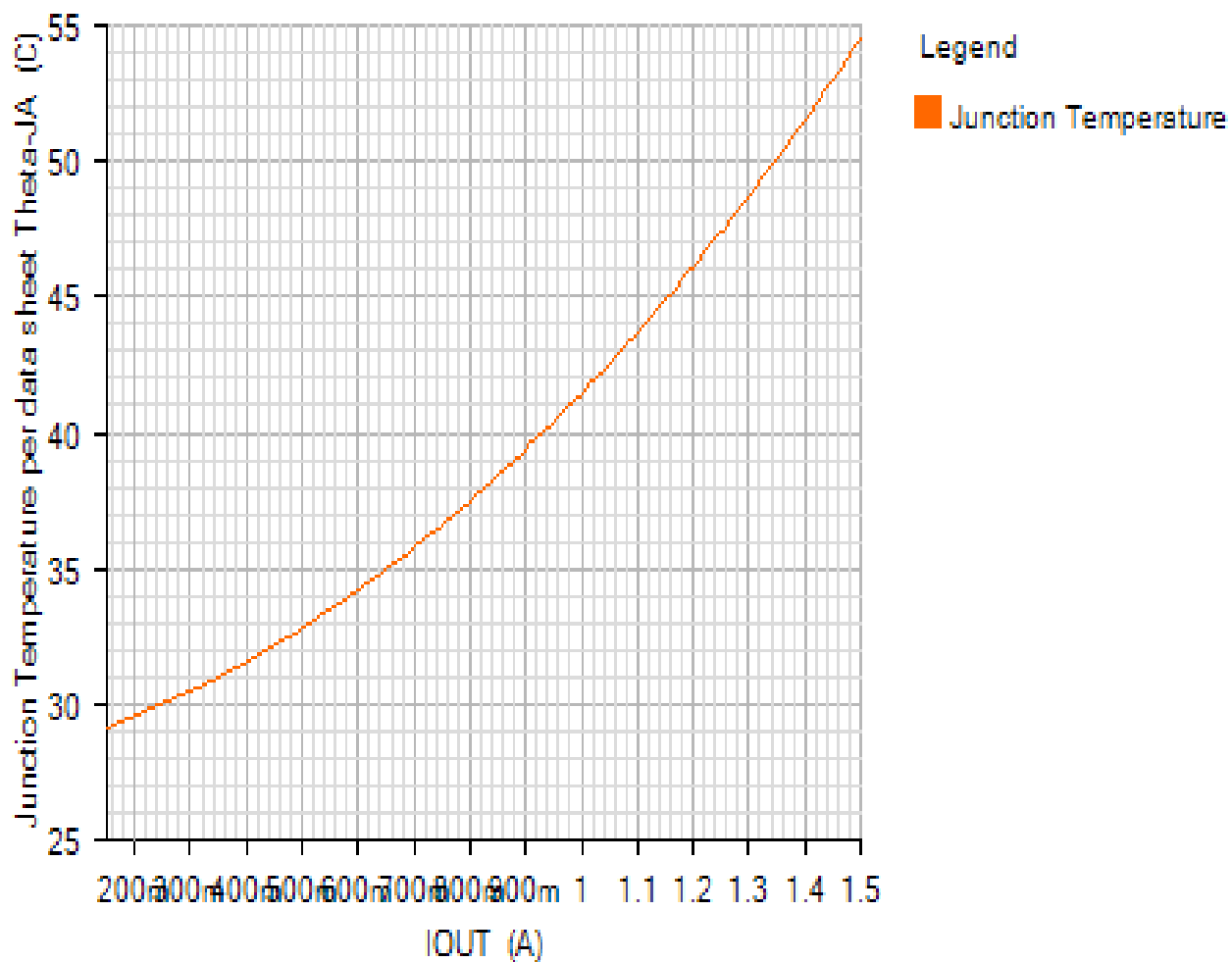
POWER_LOSS_PLOT

Default

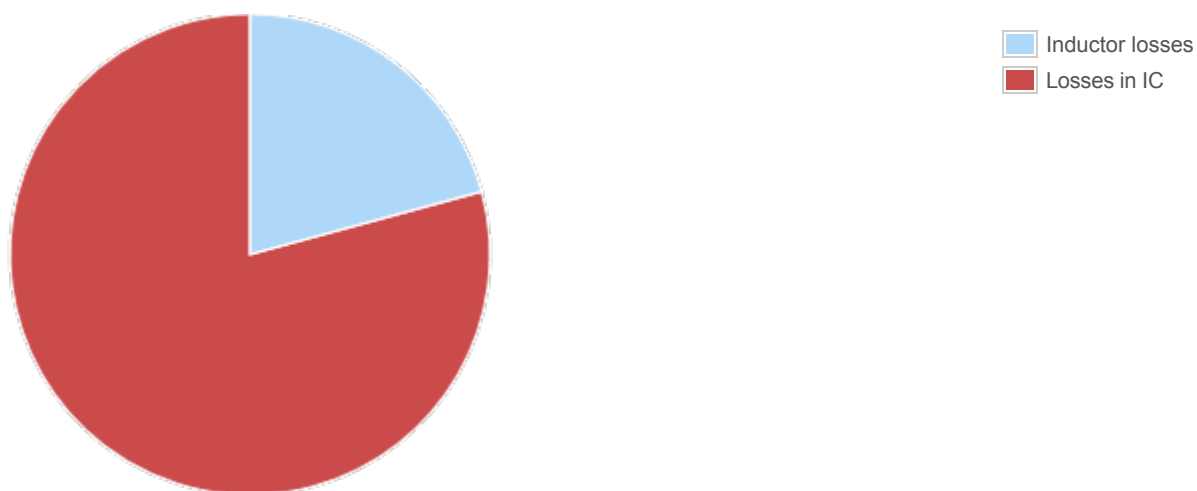


JUNCTION_TEMPERATURE_PLOT

Default



Losses



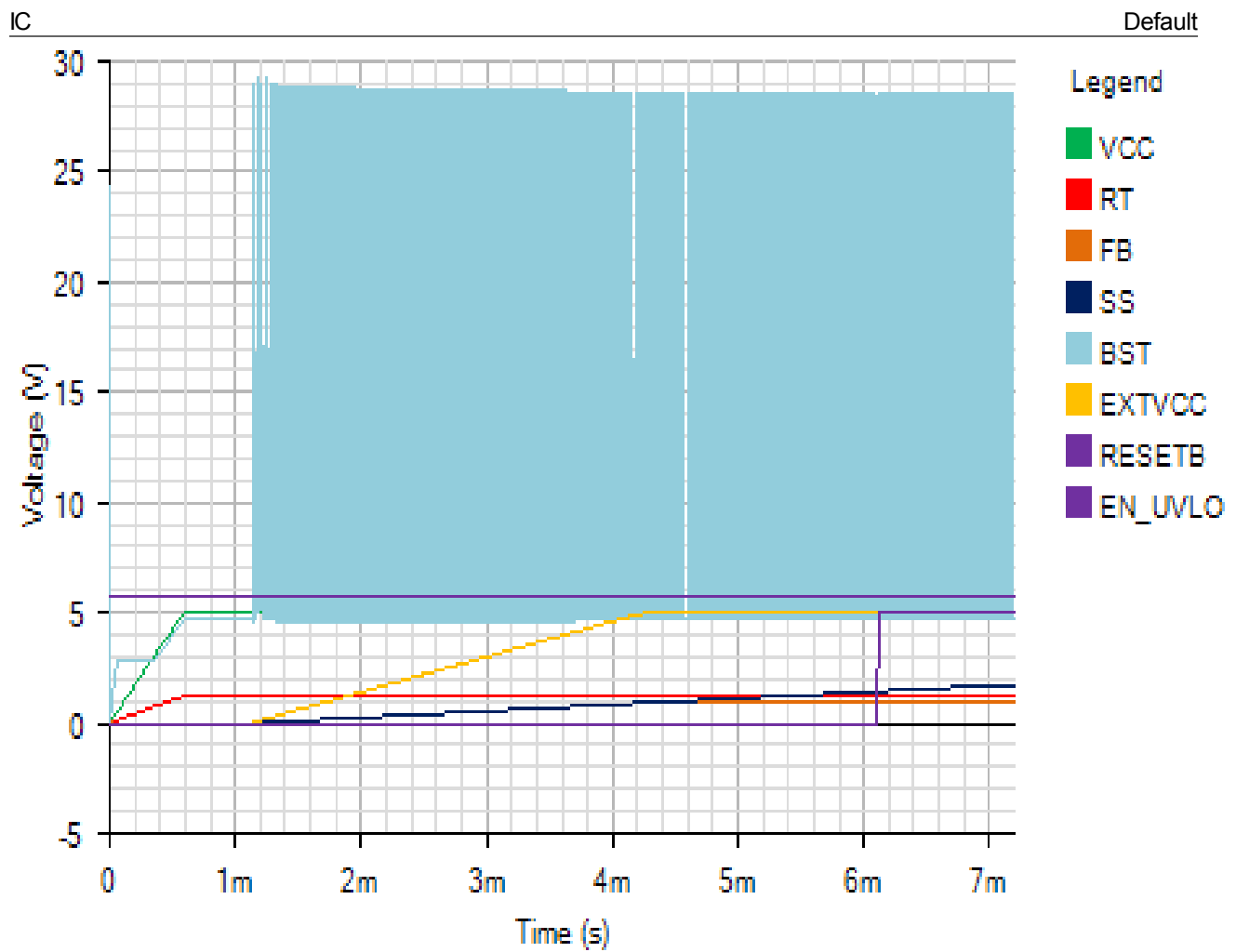
Component

Loss (W)

% of total

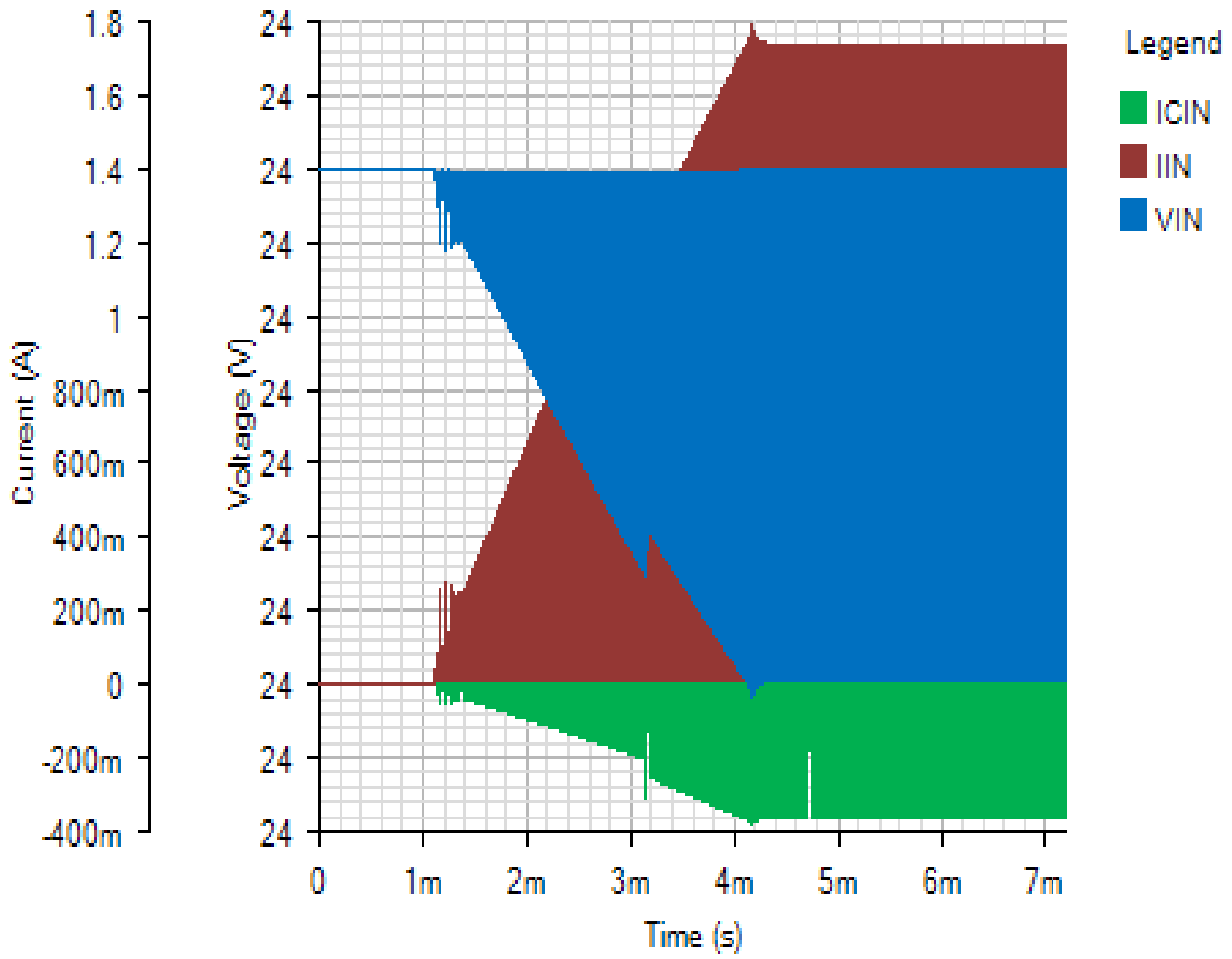
Component	Loss (W)	% of total
Inductor losses	0.21	20.8
Losses in IC	0.8	79.2
Total	1.01	100

Start Up - Tue Nov 20 2018 11:28:55



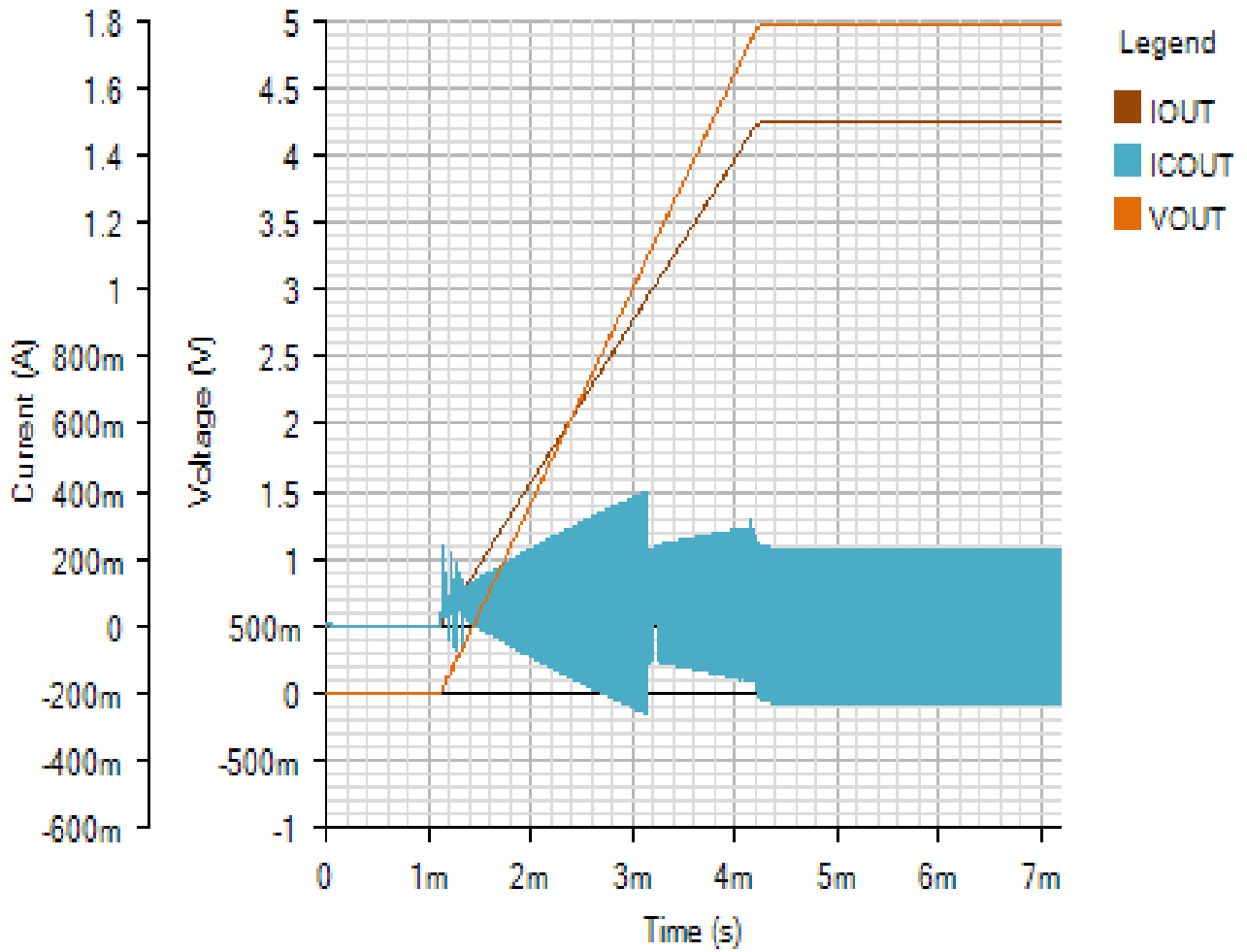
INPUT

Default



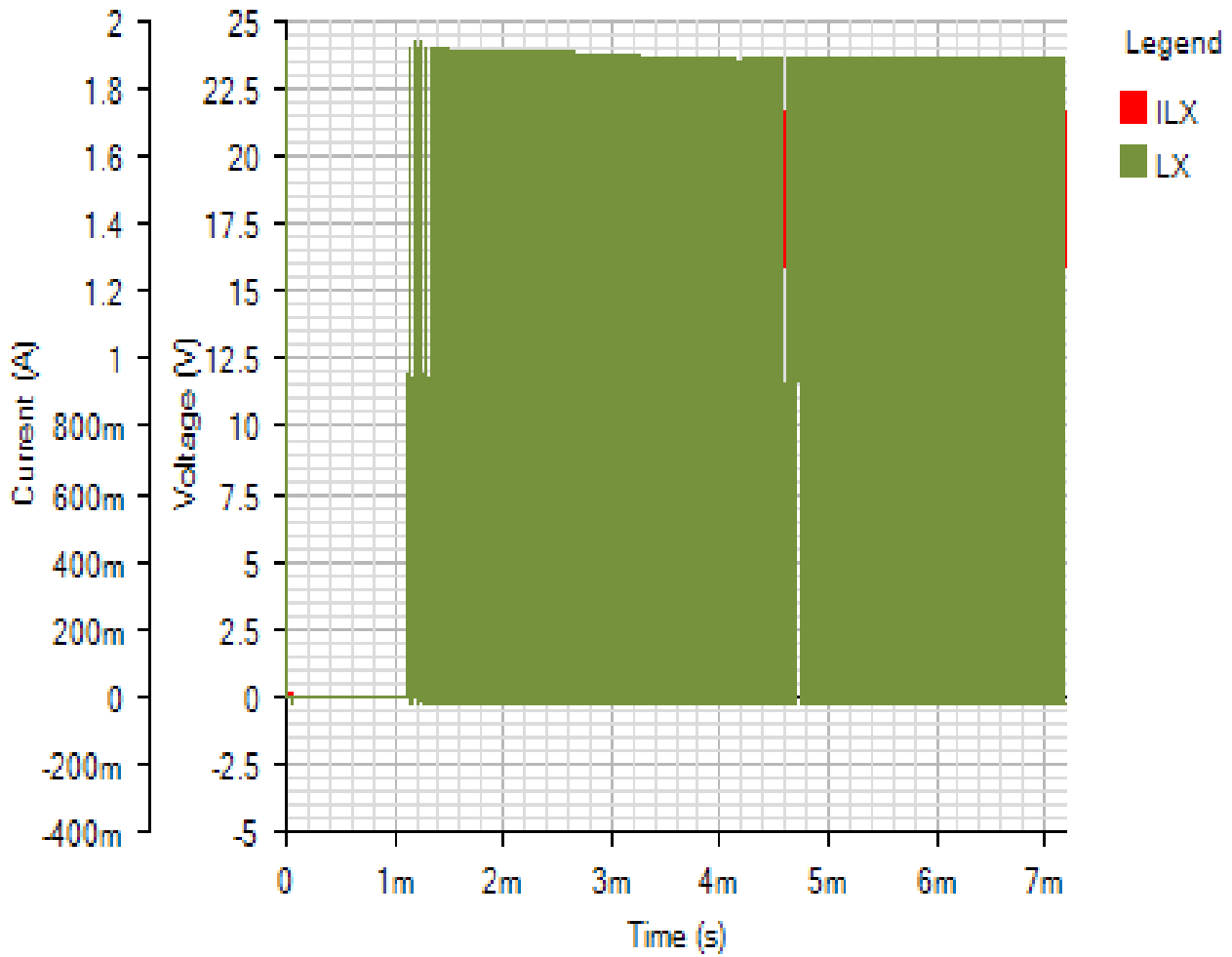
OUTPUT

Default

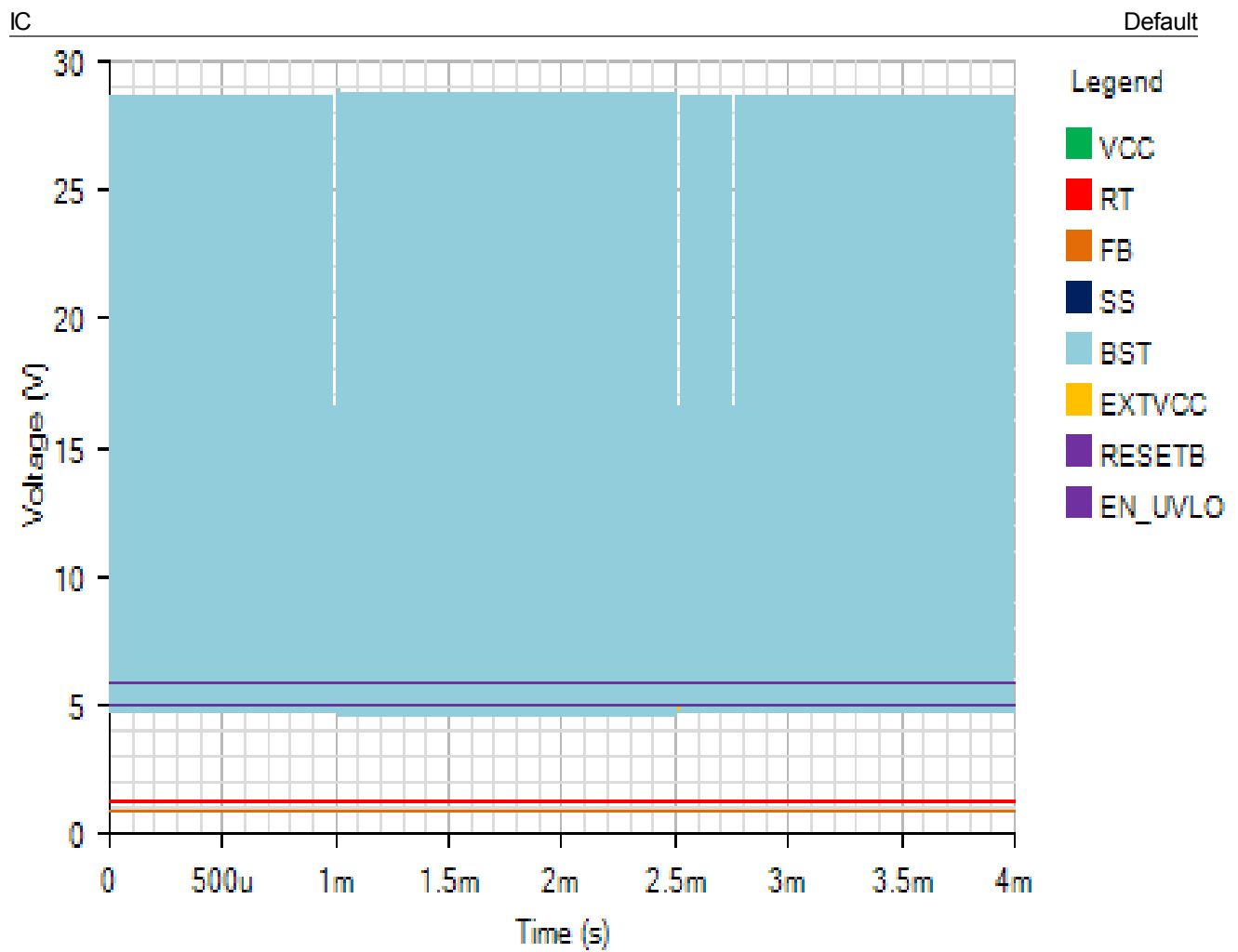


SWITCHING

Default

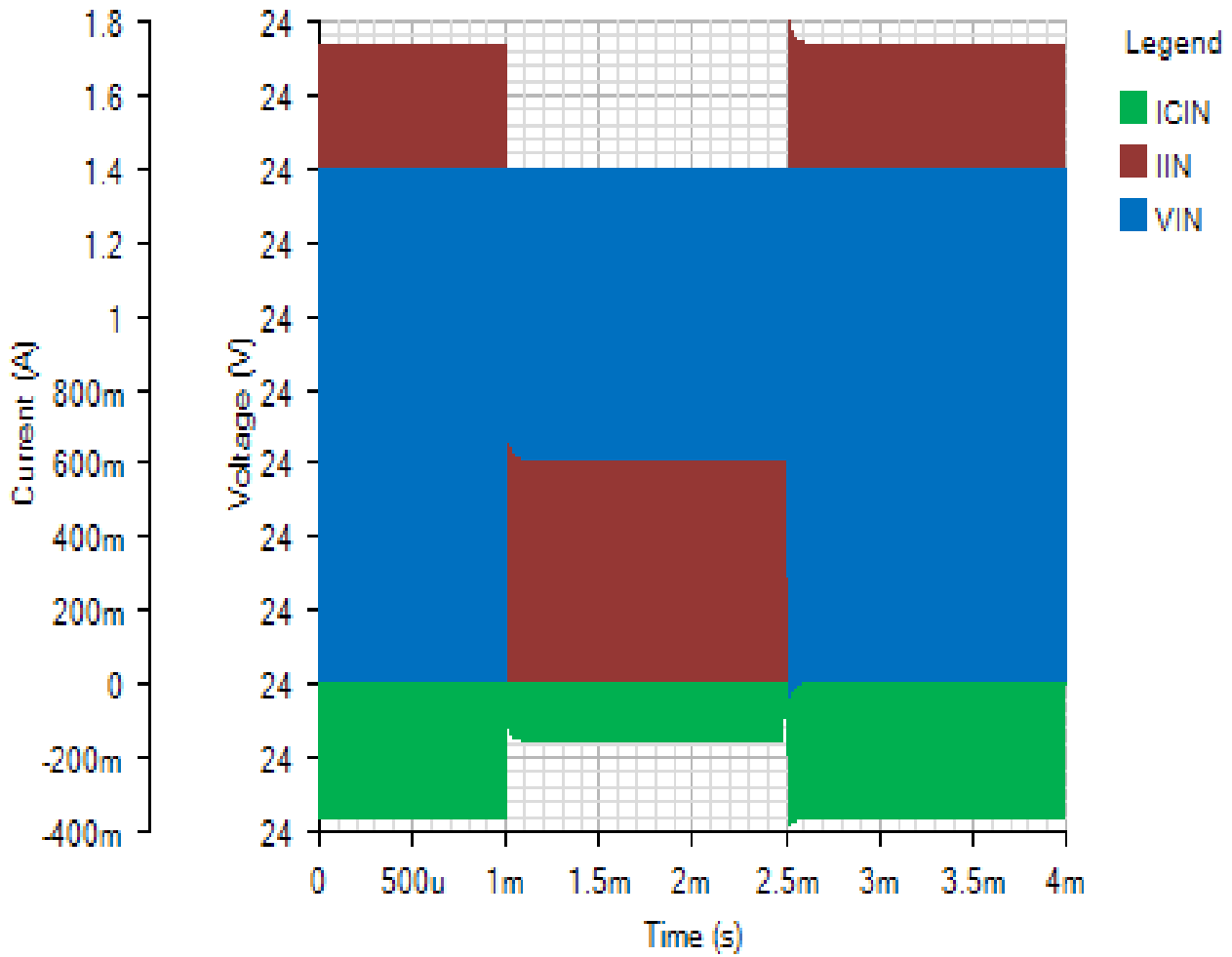


Load Step - Tue Nov 20 2018 11:28:55



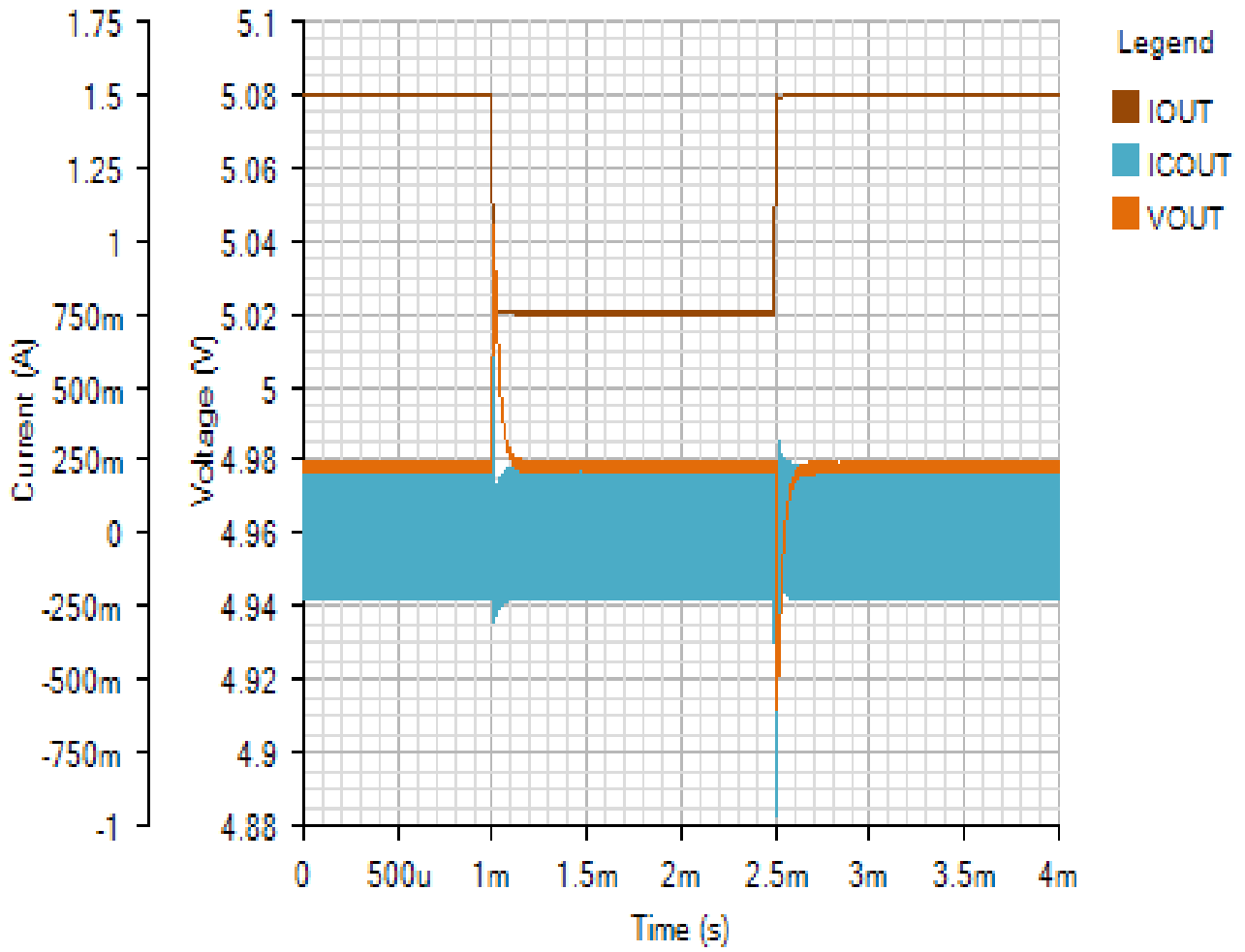
INPUT

Default



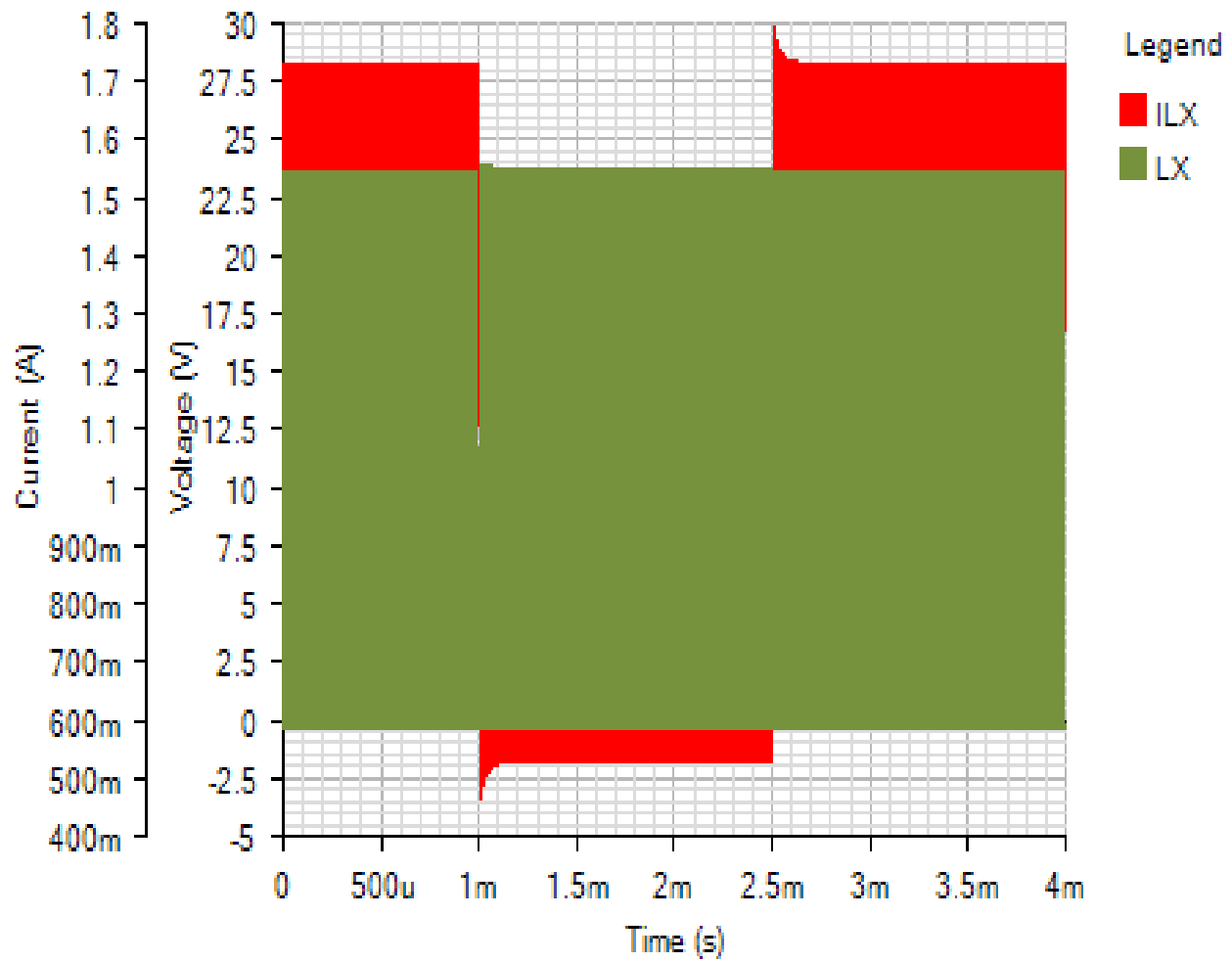
OUTPUT

Default

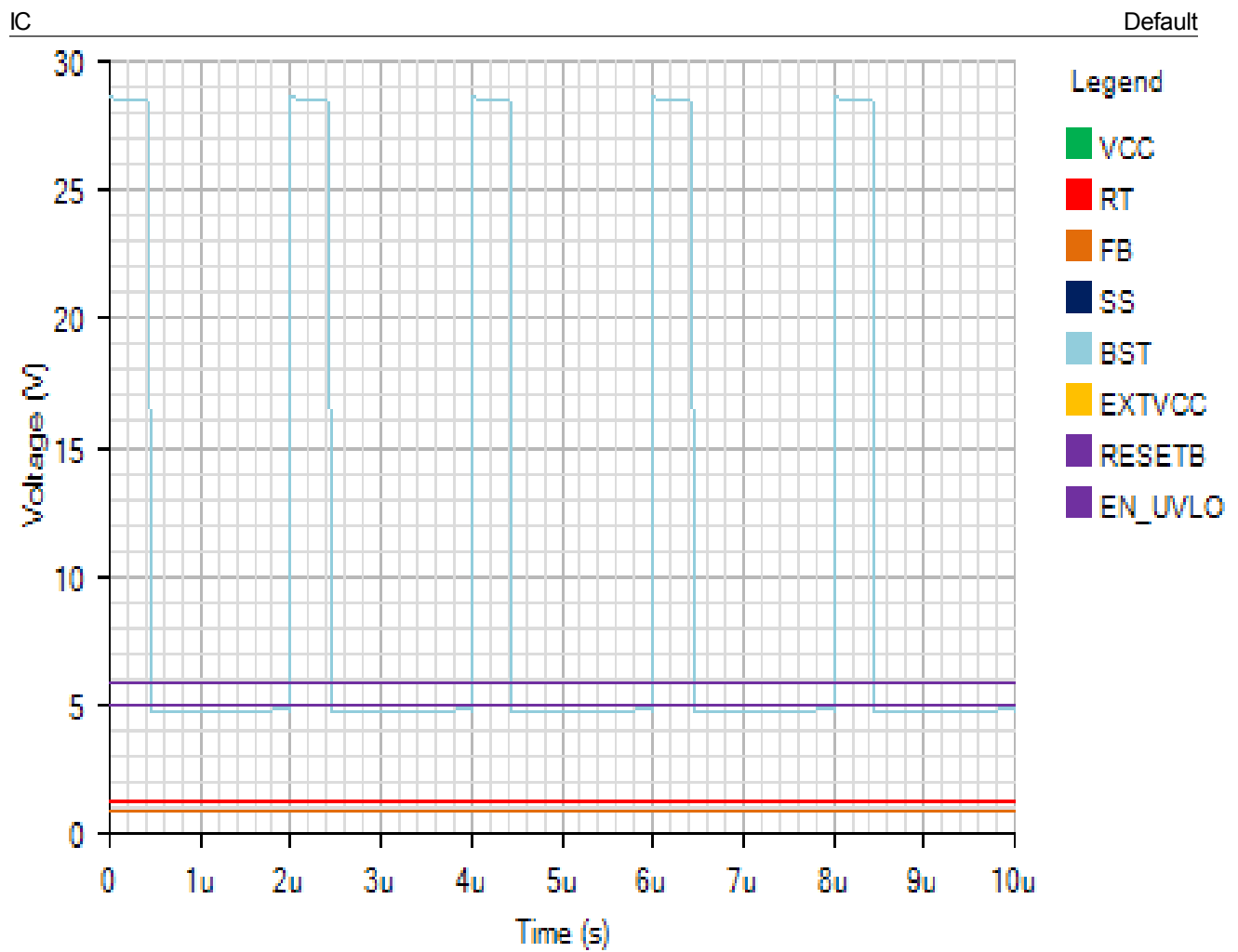


SWITCHING

Default

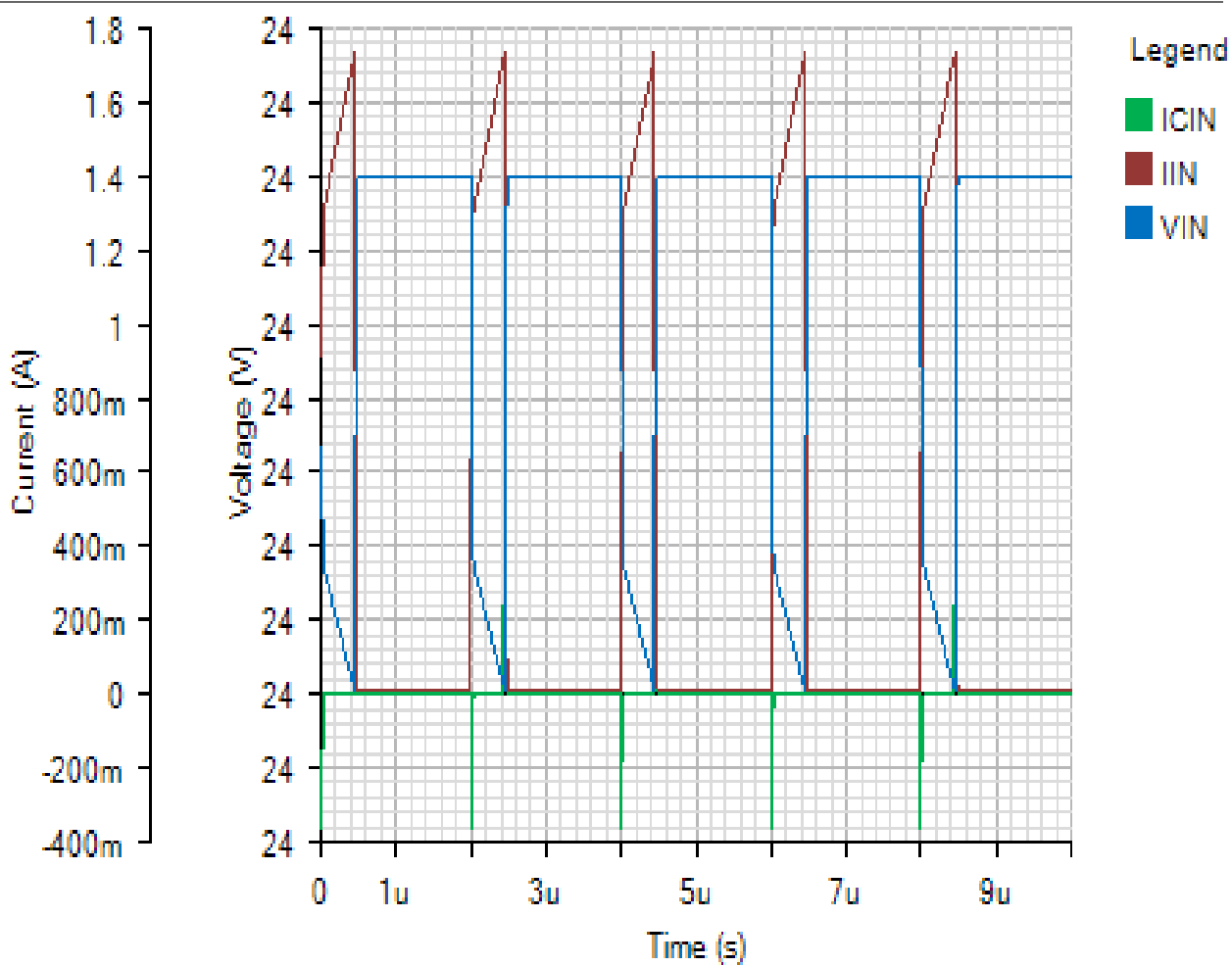


Steady State - Tue Nov 20 2018 11:28:55



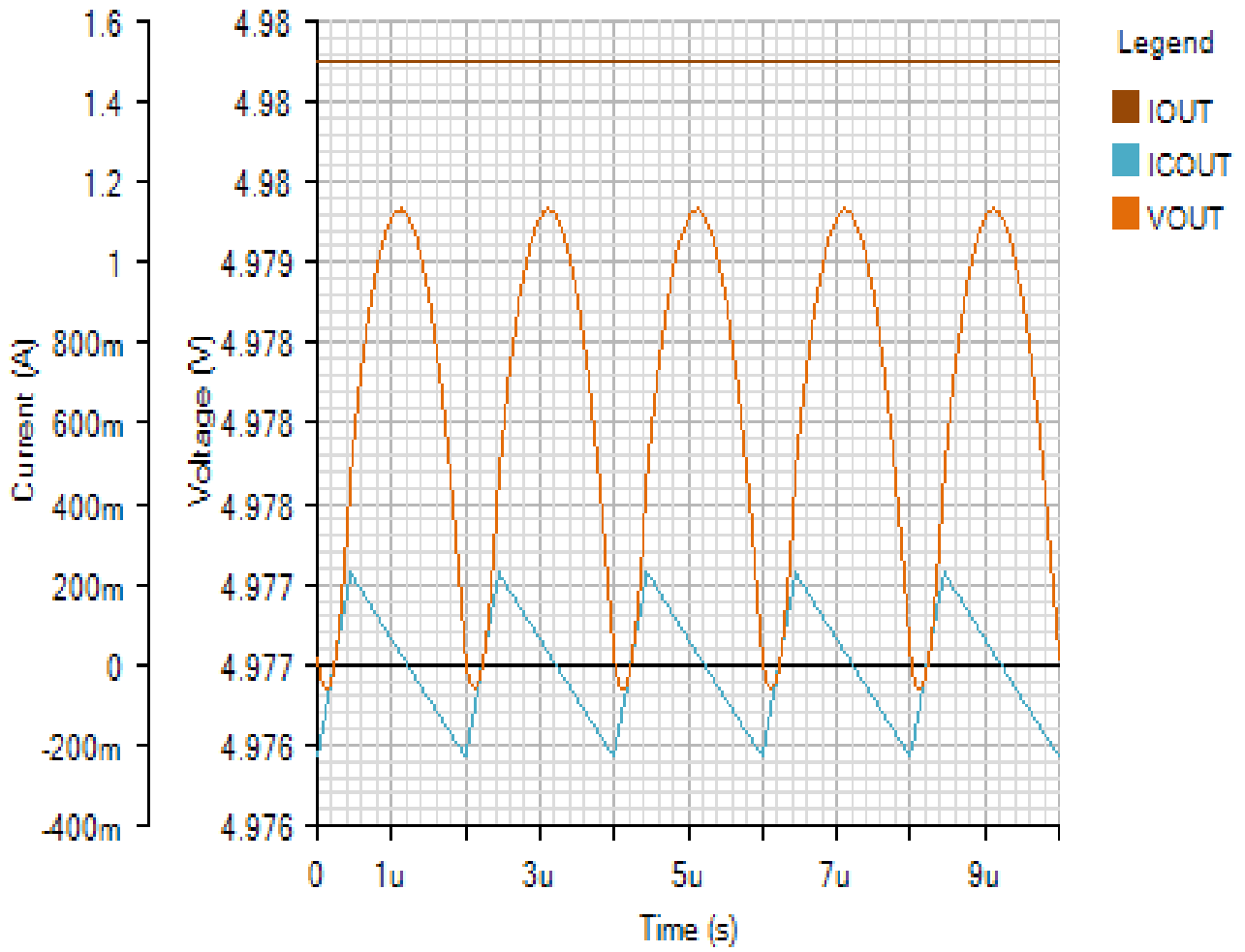
INPUT

Default



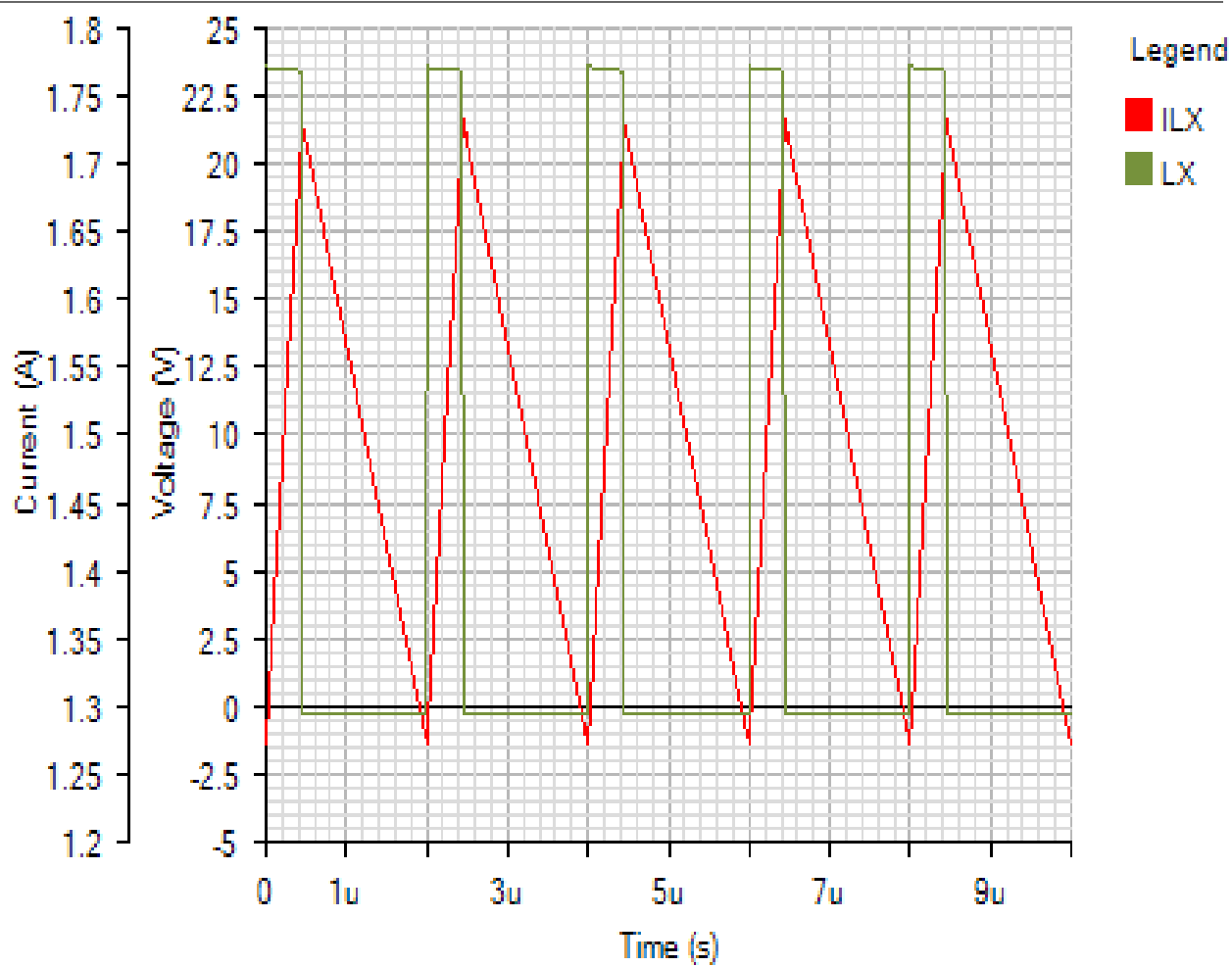
OUTPUT

Default



SWITCHING

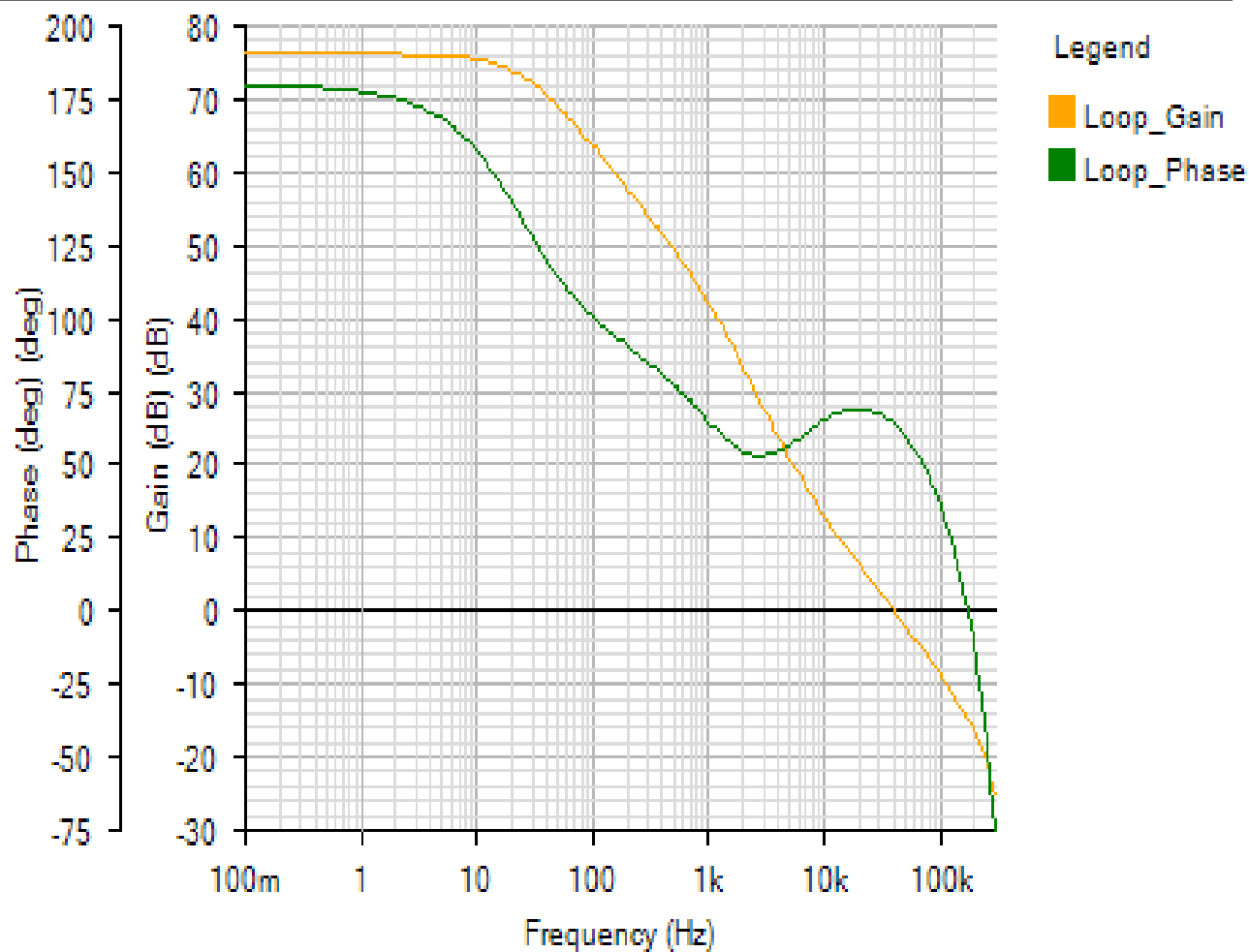
Default



AC Loop - Tue Nov 20 2018 11:28:55

BODE

Default



Phase Margin: 63.89° at a crossover frequency of 40.3kHz

