

## Initial Design

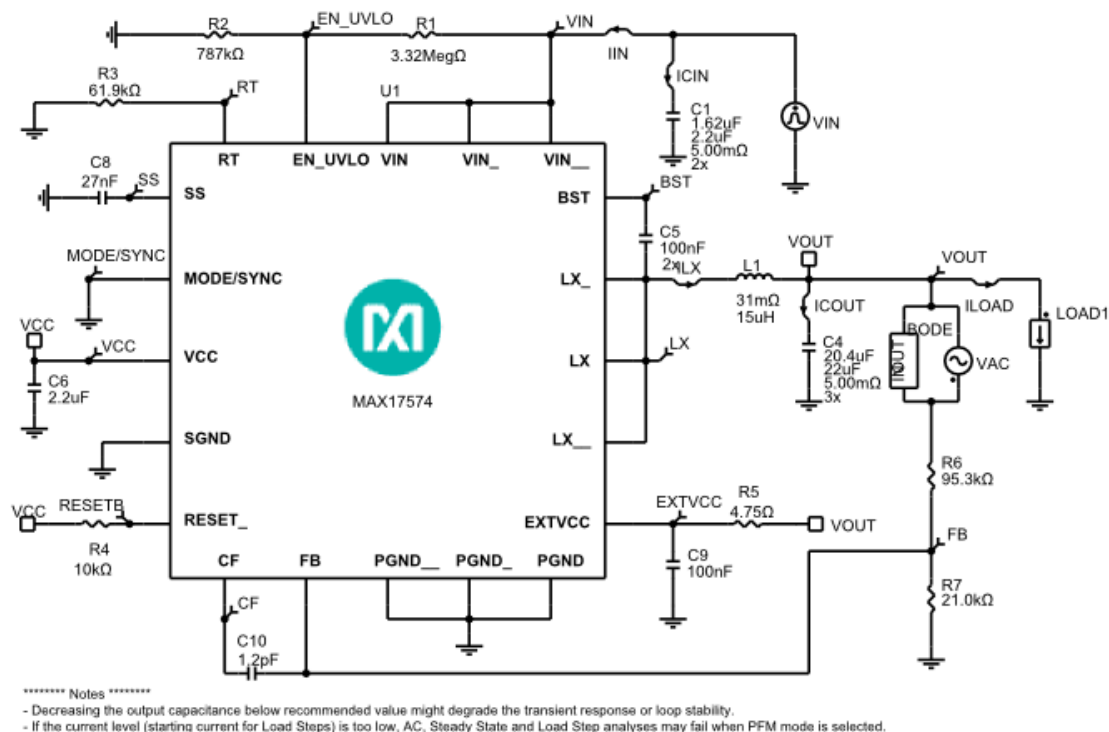
1.0

**Design Requirements**

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Parameter	Value
Minimum Input Voltage	7V
Maximum Input Voltage	60V
Nominal Input Voltage	24V
Input Steady-State Ripple	0.5V
Input Undervoltage Lockout Level	6.3V
Output Voltage	5V
Load Current	3A
Output Voltage Load Step Over/Undershoot	0.15V
Performance Priority	Balance Efficiency and Size
Cost Priority	Cost
Mode of Operation	PWM
Switching Frequency	330kHz
Ambient Temperature	25°C
Soft Start time	5ms

## Schematic



## BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX17574	User-Defined	IC
C1	2	<a href="#">C1210C225K1RAC</a>	Kemet	Cap Ceramic 2.2uF 100V X7R 10% SMD 1210 125C Bulk
C4	3	<a href="#">GRM32ER71E226ME15</a>	Murata	Cap Ceramic 22uF 25V 1210 125C
C5	2	<a href="#">0805YC104KAT2A</a>	AVX	Cap Ceramic 0.1uF 16V X7R 10% Pad SMD 0805 125°C T/R
C6	1	<a href="#">CGA4J3X7R1C225K125AB</a>	TDK	Cap Ceramic 2.2uF 16V X7R 10% Pad SMD 0805 125°C Automotive T/R
C8	1	<a href="#">0603YC273KAT2A</a>	AVX	Cap Ceramic 0.027uF 16V X7R 10% Pad SMD 0603 125°C T/R
C9	1	<a href="#">0805YC104KAT2A</a>	AVX	Cap Ceramic 0.1uF 16V X7R 10% Pad SMD 0805 125°C T/R
C10	1	<a href="#">12065A1R2KAT2A</a>	AVX	Cap Ceramic 1.2pF 50V C0G 10% Pad SMD 1206 125°C T/R
L1	1	<a href="#">MSS1278-153MLB</a>	Coilcraft	Inductor 15uH 20% 27.9mOhm 8.9A Isat 4.9A Irms
R1	1	<a href="#">CRCW06033M32FKEA</a>	Vishay	Res Thick Film 0603 3.32M Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
				Res Thick Film 0402 787K Ohm 1%

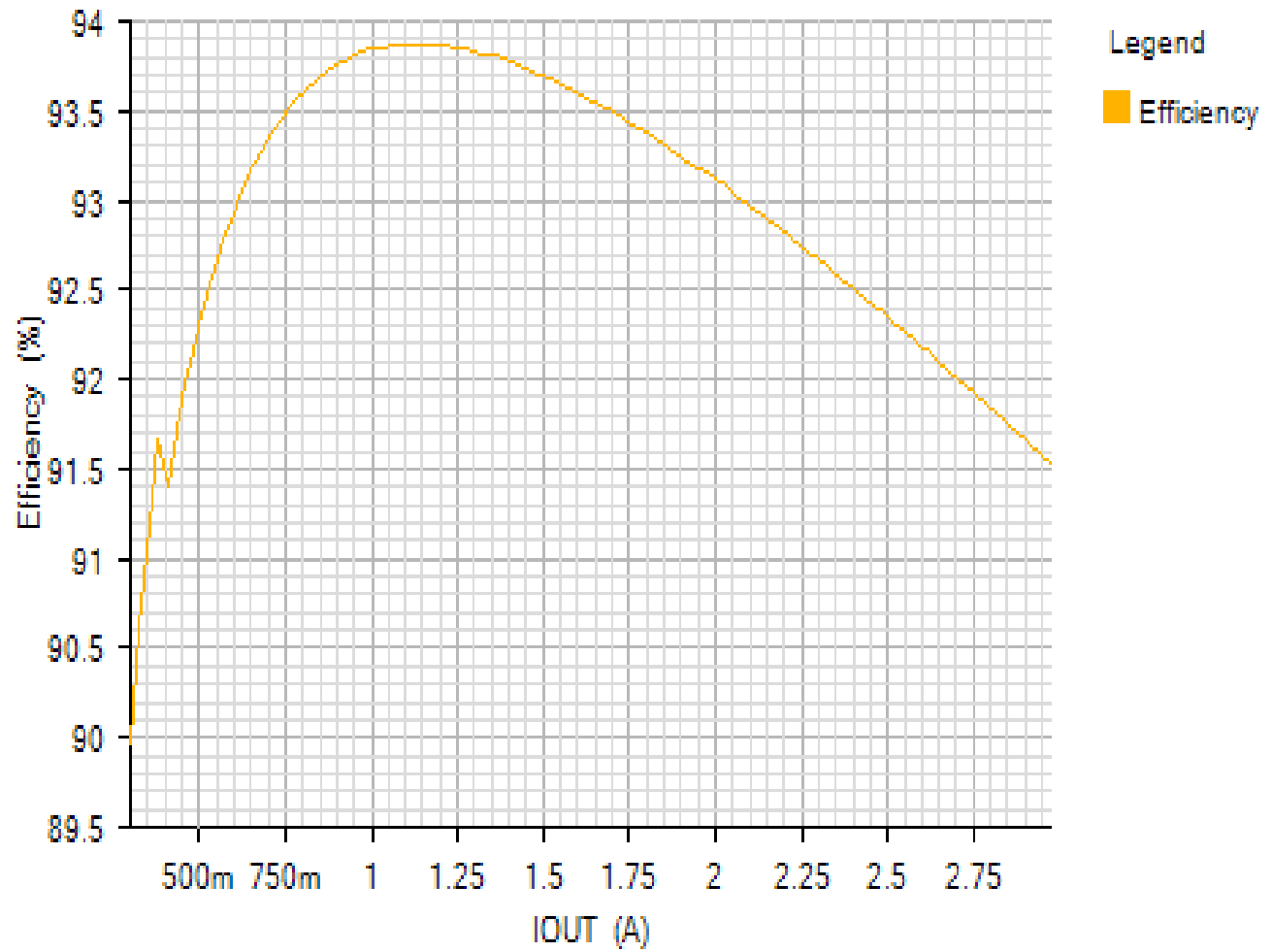
R2	1	<a href="#">ERJ2RKF7873X</a>	Panasonic	0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	<a href="#">ERJ2RKF6192X</a>	Panasonic	Res Thick Film 0402 61.9K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	<a href="#">ERJ2RKF1002X</a>	Panasonic	Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	<a href="#">CRCW04024R75FKED</a>	Vishay	Res Thick Film 0402 4.75 Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD Automotive T/R
R6	1	<a href="#">ERJ2RKF9532X</a>	Panasonic	Res Thick Film 0402 95.3K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R7	1	<a href="#">ERJ2RKF2102X</a>	Panasonic	Res Thick Film 0402 21K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

## Simulation Results

**Efficiency - Tue Nov 20 2018 10:10:16**

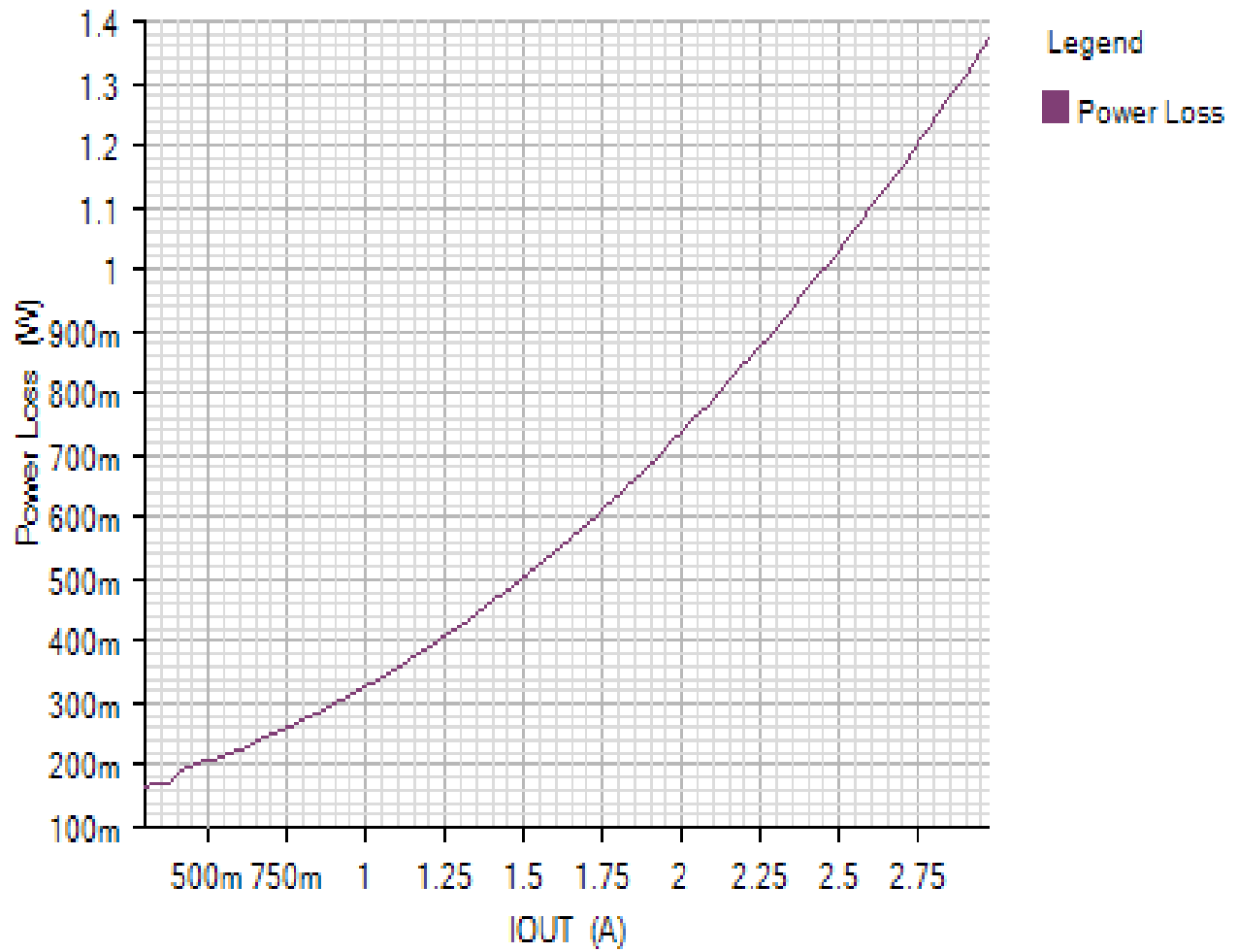
EFFICIENCY\_PLOT

Default



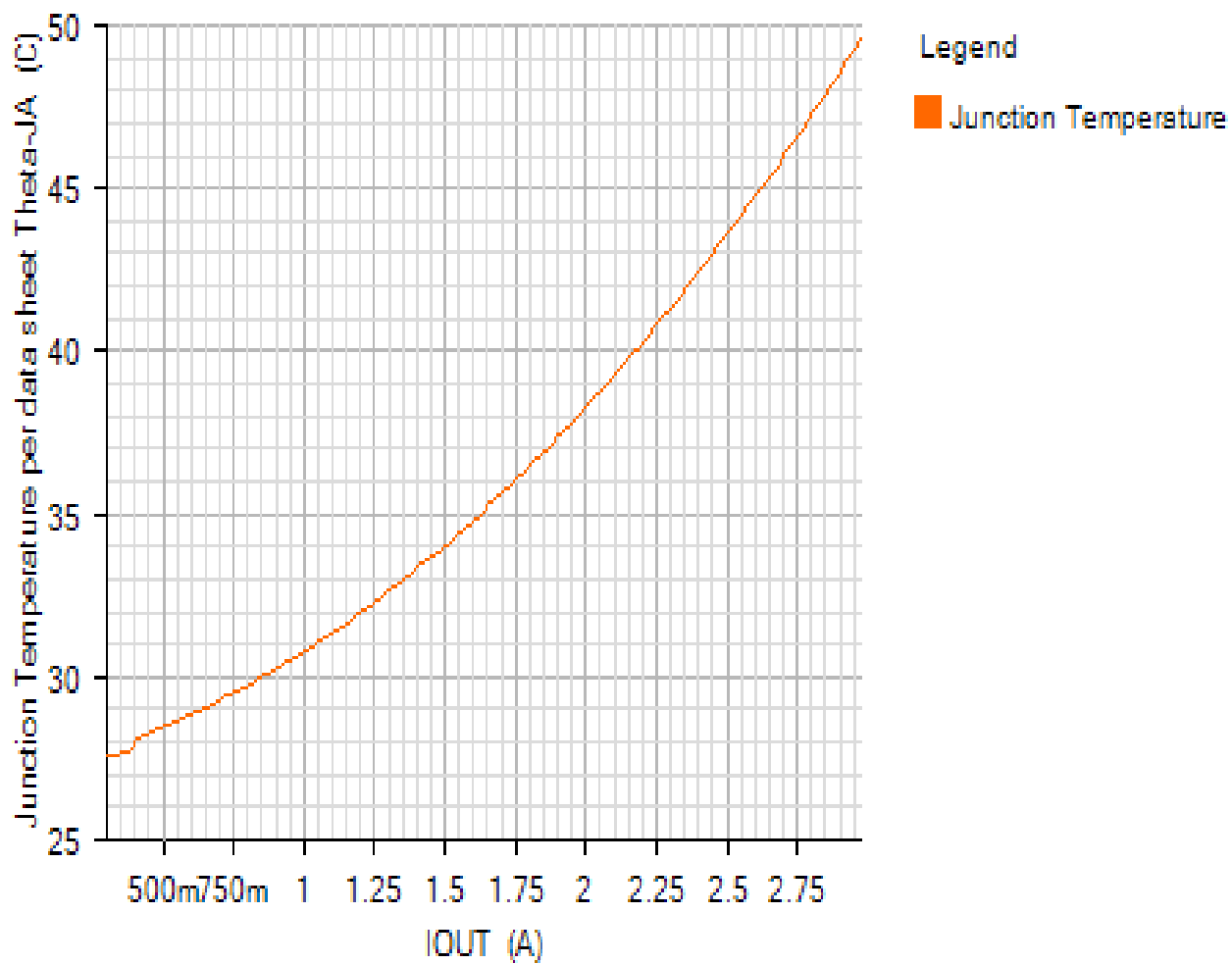
POWER\_LOSS\_PLOT

Default

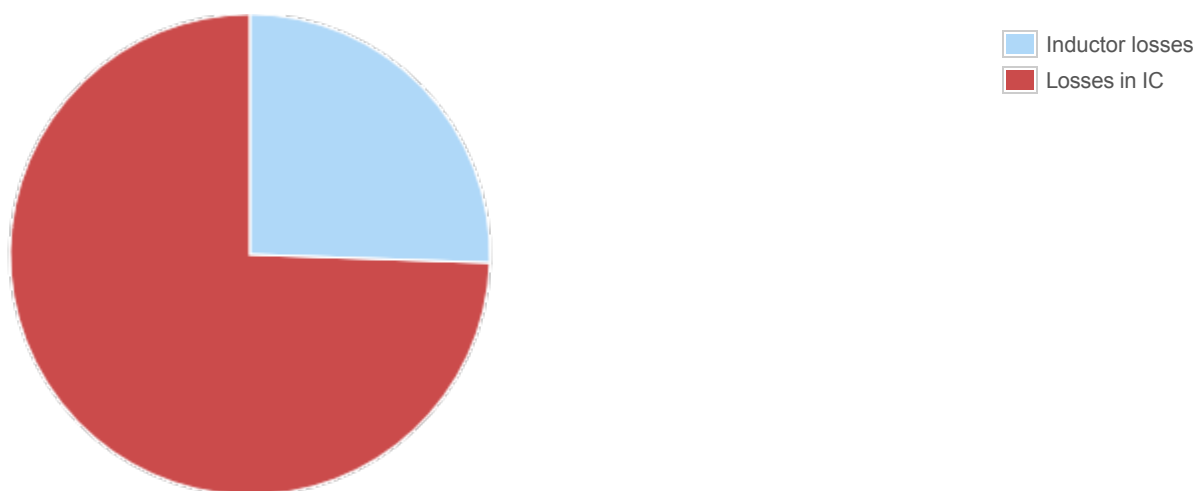


JUNCTION\_TEMPERATURE\_PLOT

Default



Losses



Component

Loss (W)

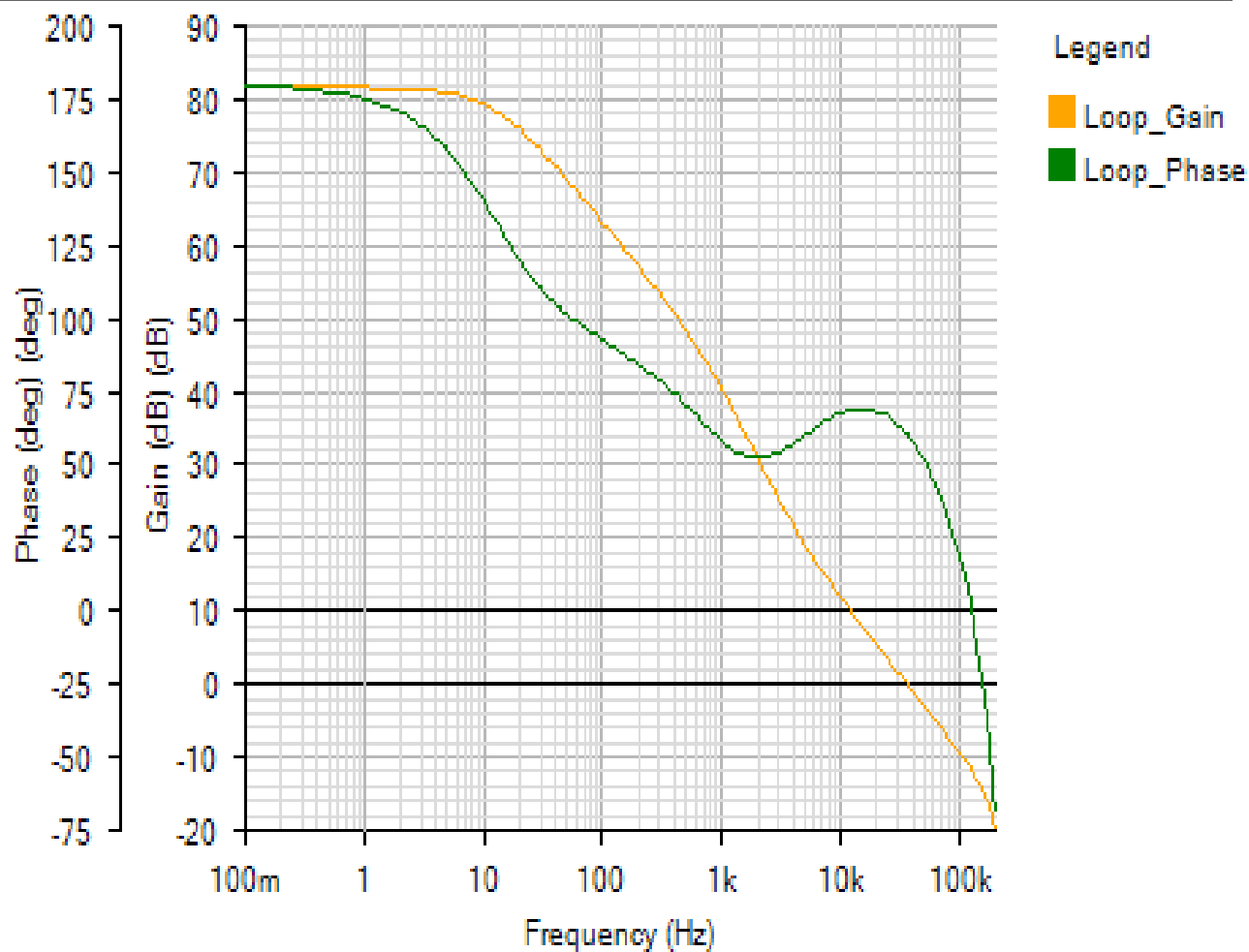
% of total

Component	Loss (W)	% of total
Inductor losses	0.35	25.5
Losses in IC	1.02	74.5
Total	1.37	100

AC Loop - Tue Nov 20 2018 10:10:16

BODE

Default



Phase Margin: 60.28° at a crossover frequency of 36.3kHz

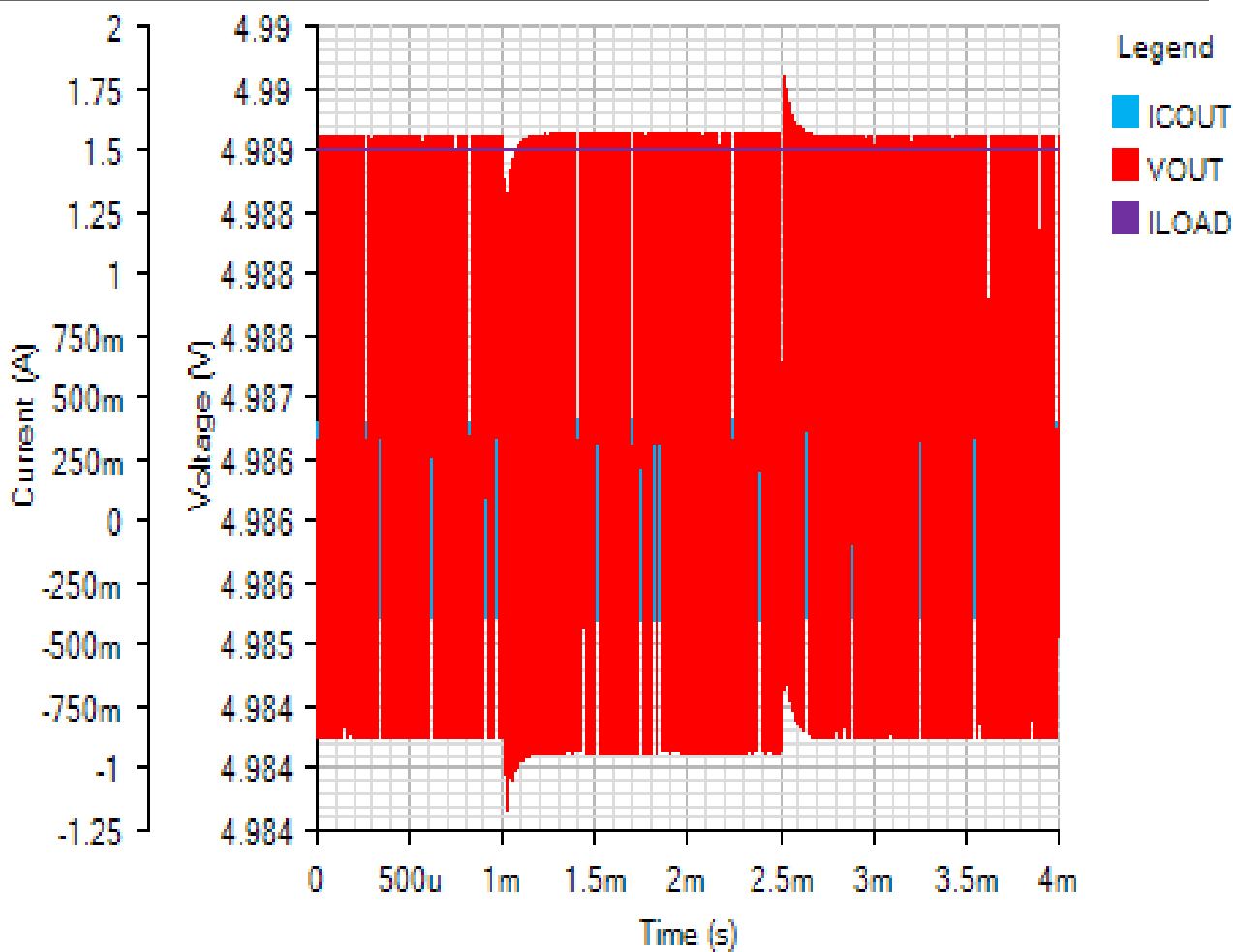




Line Transient - Tue Nov 20 2018 10:10:16

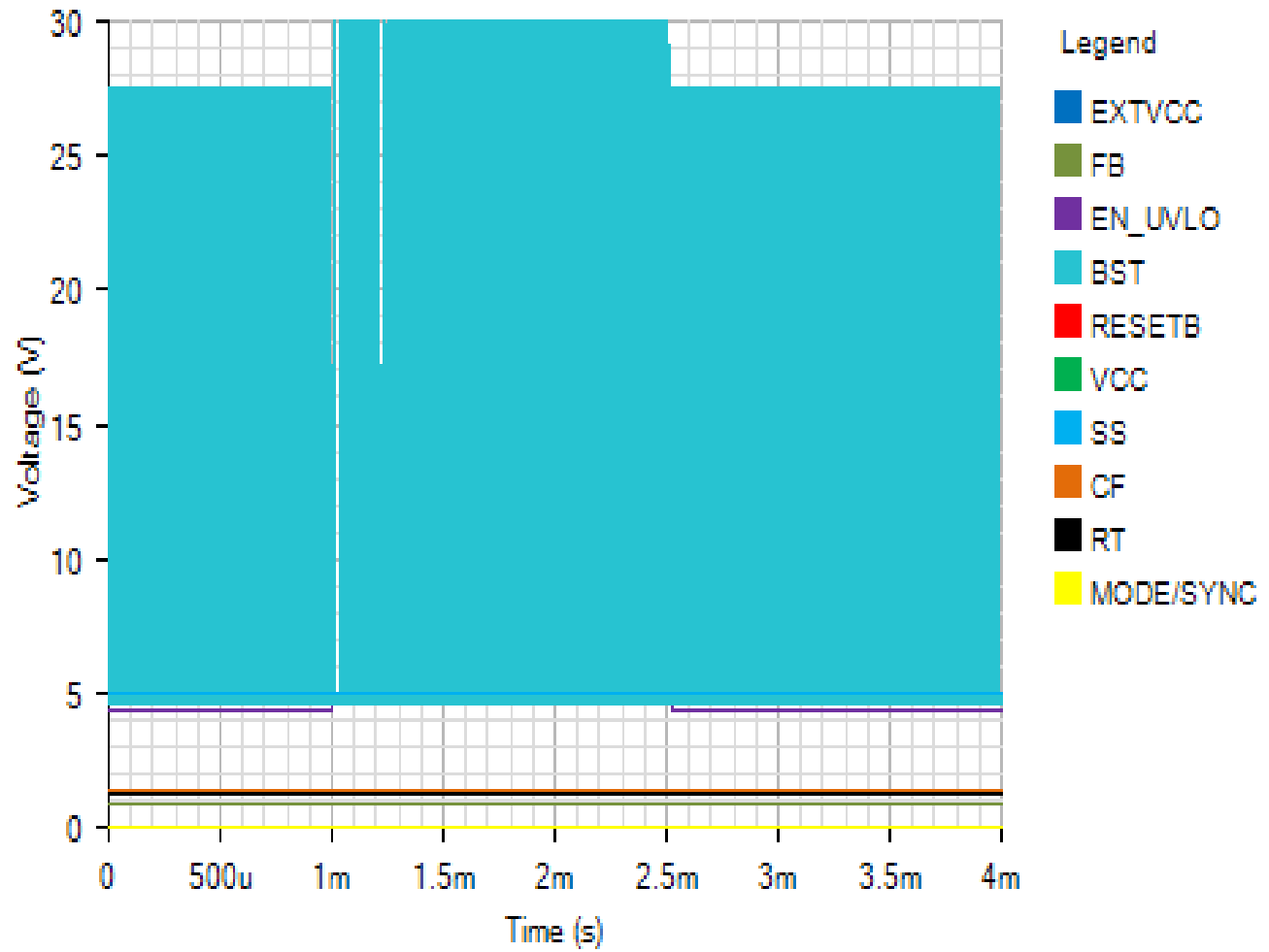
OUTPUT

Default



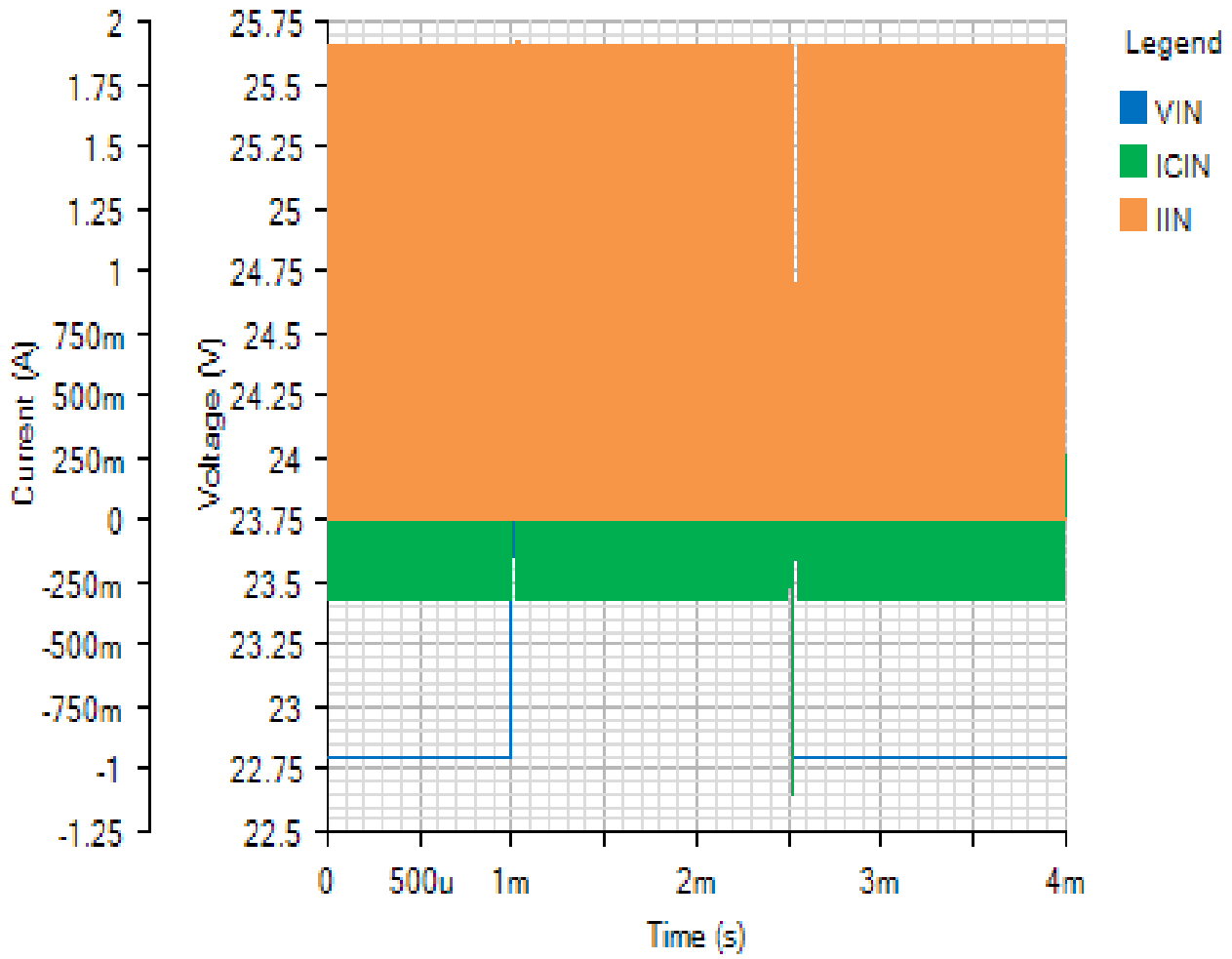
IC

Default



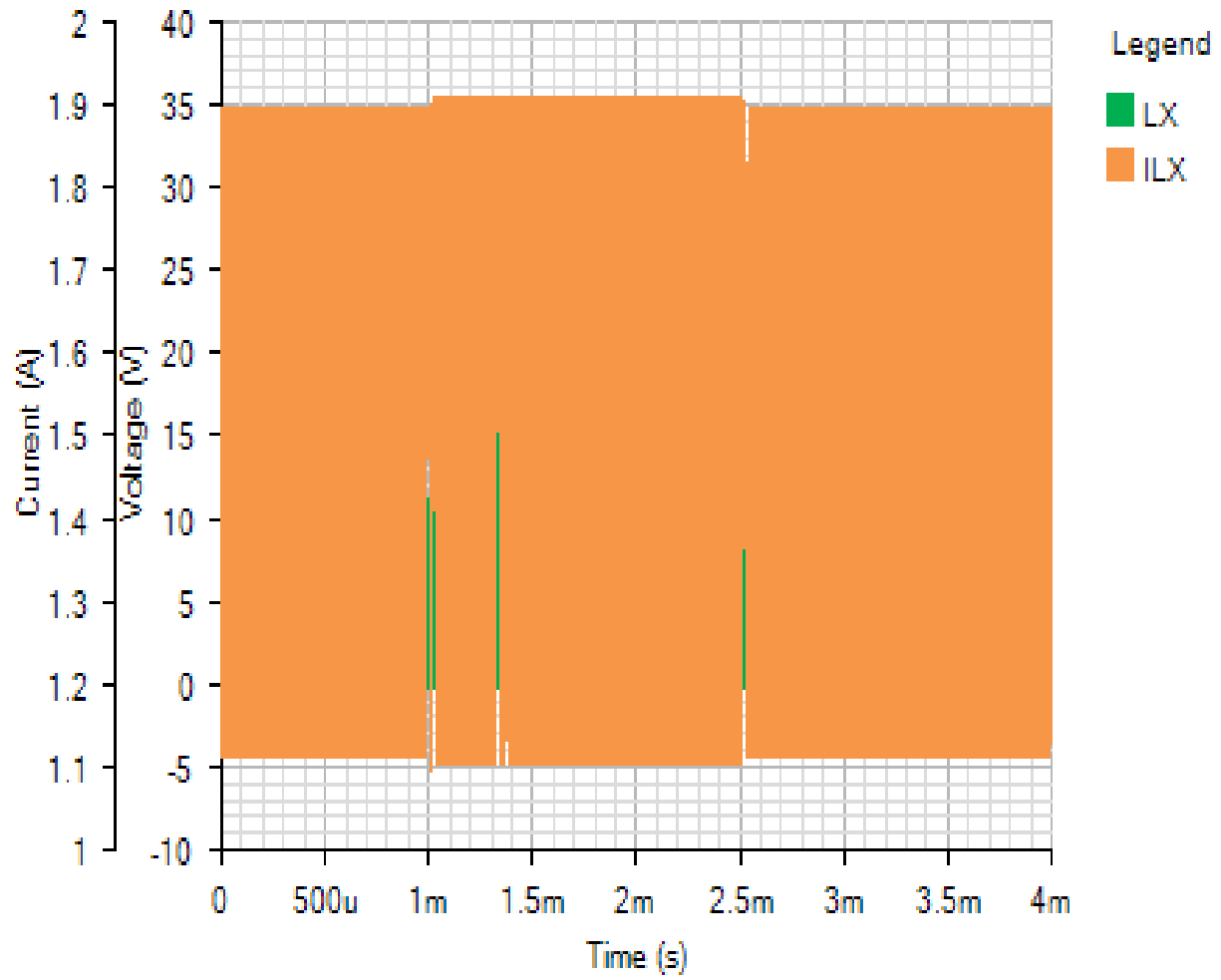
INPUT

Default



SWITCHING

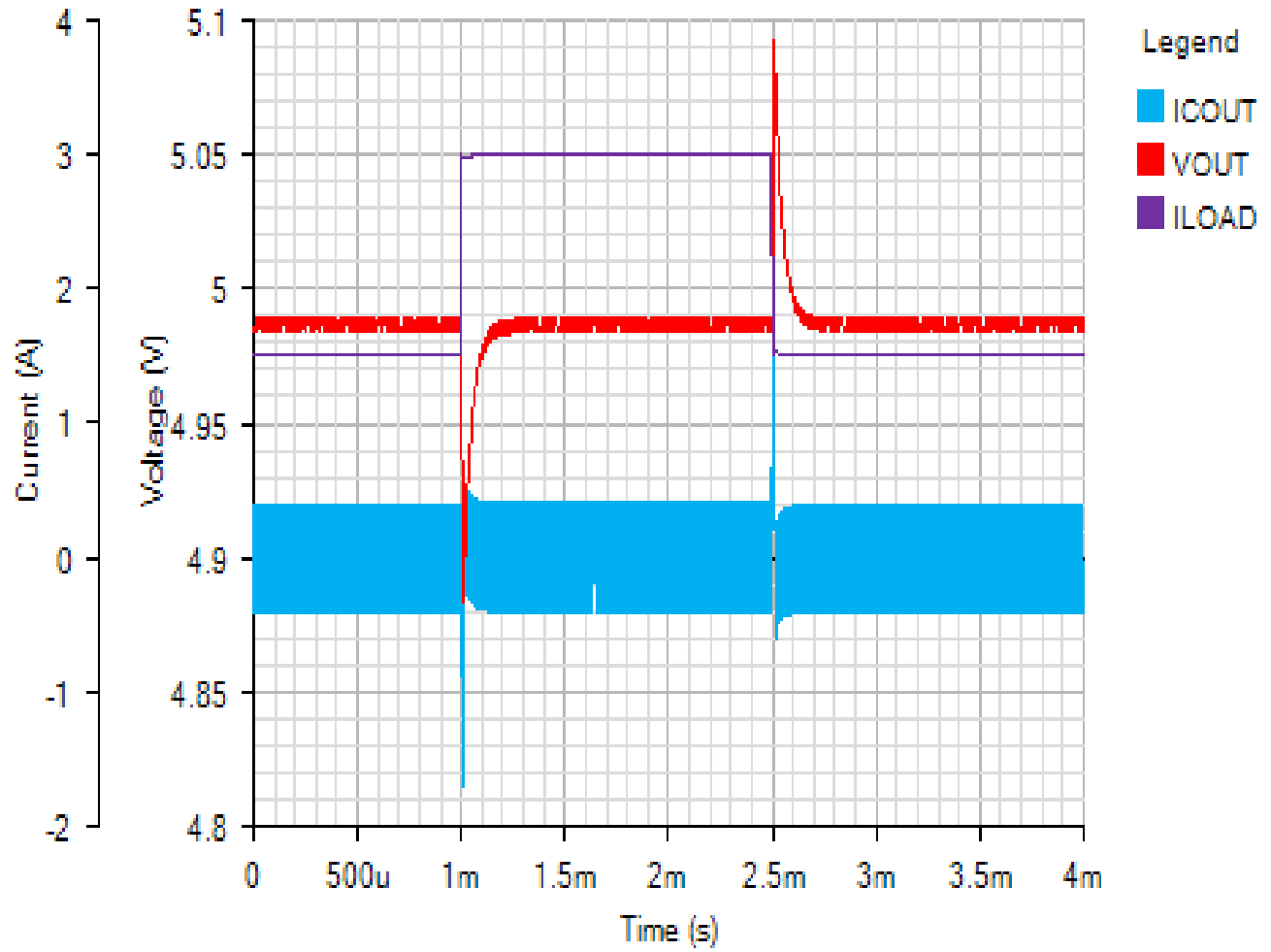
Default



Load Step - Tue Nov 20 2018 10:10:16

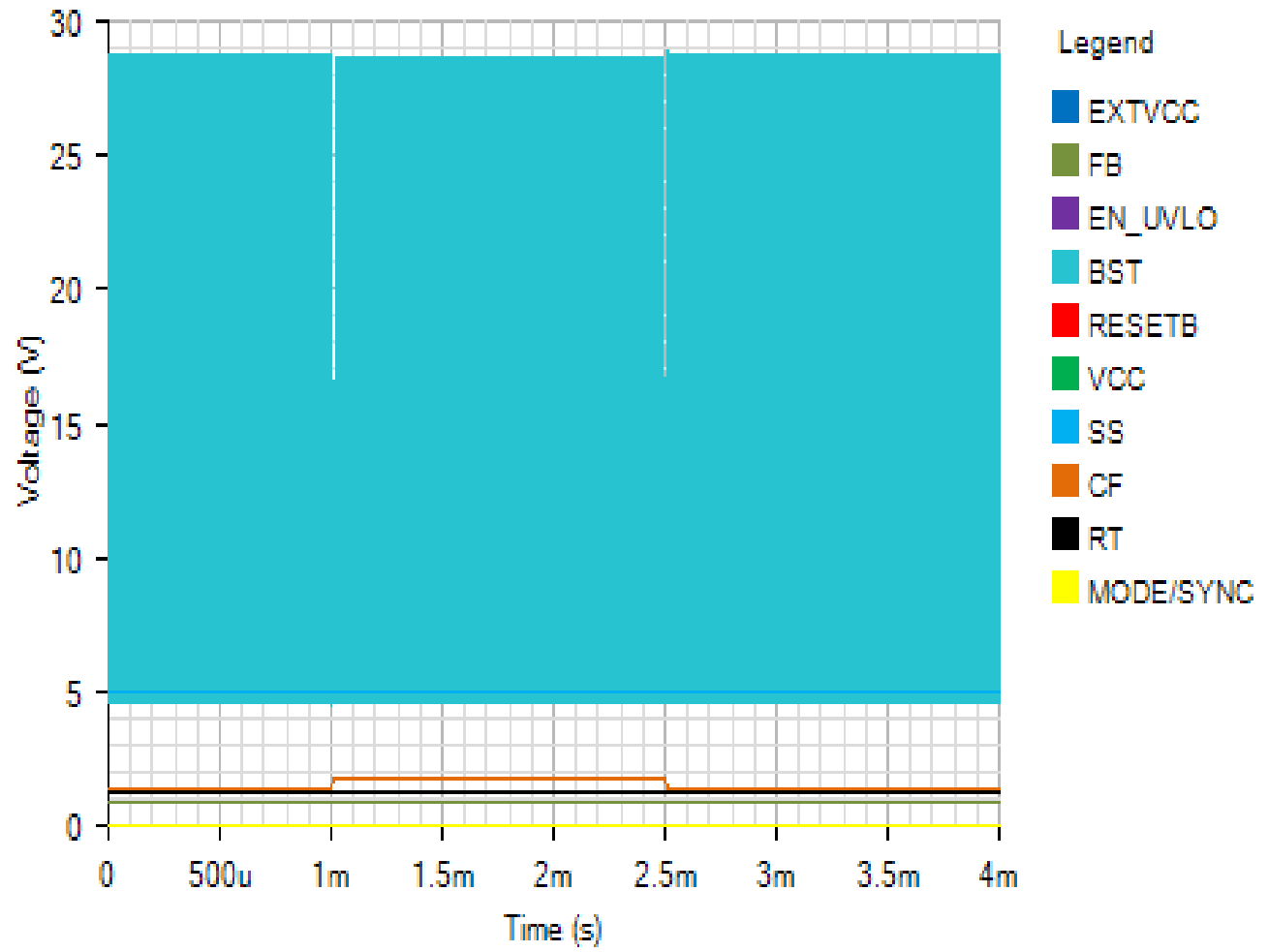
OUTPUT

Default



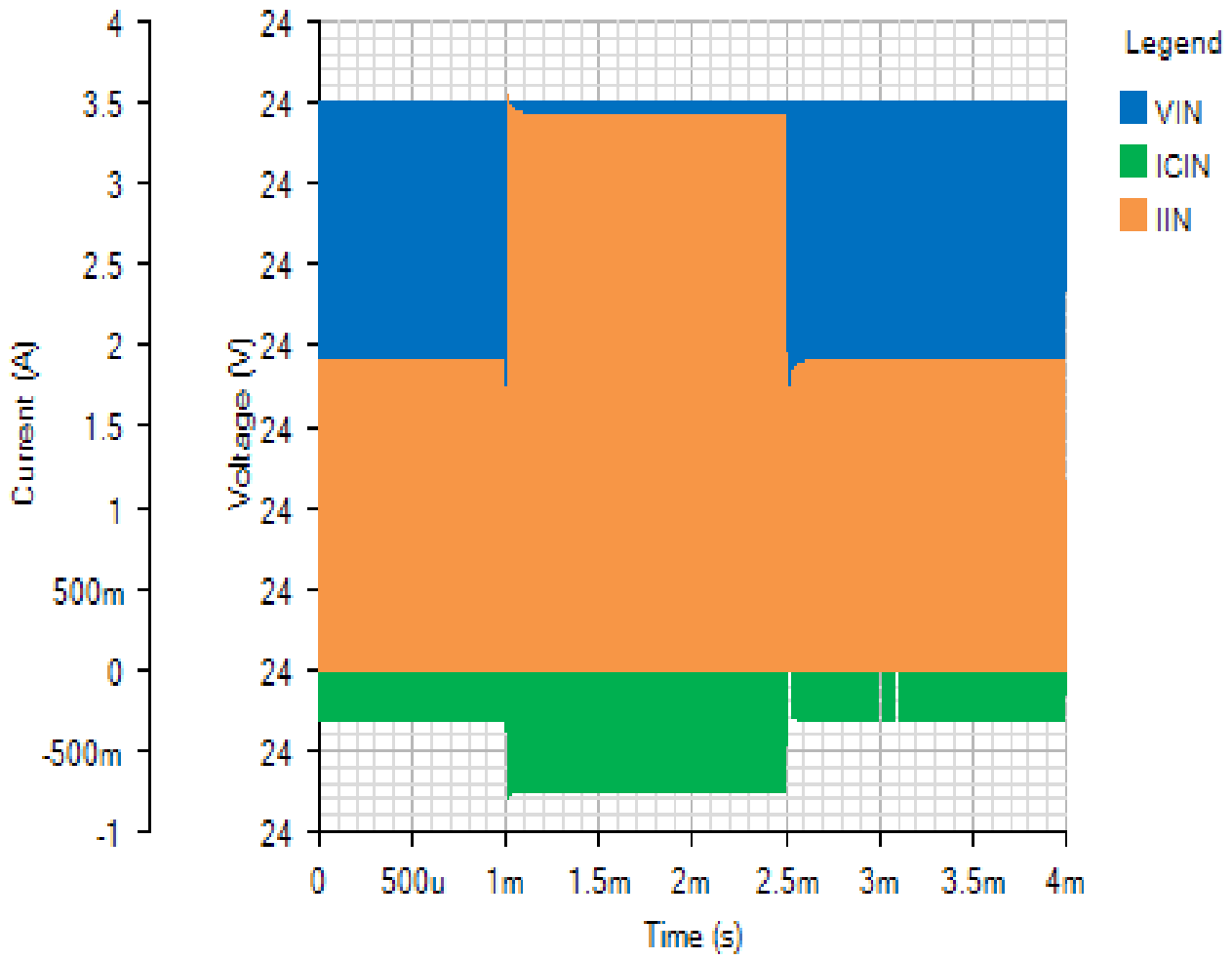
IC

Default



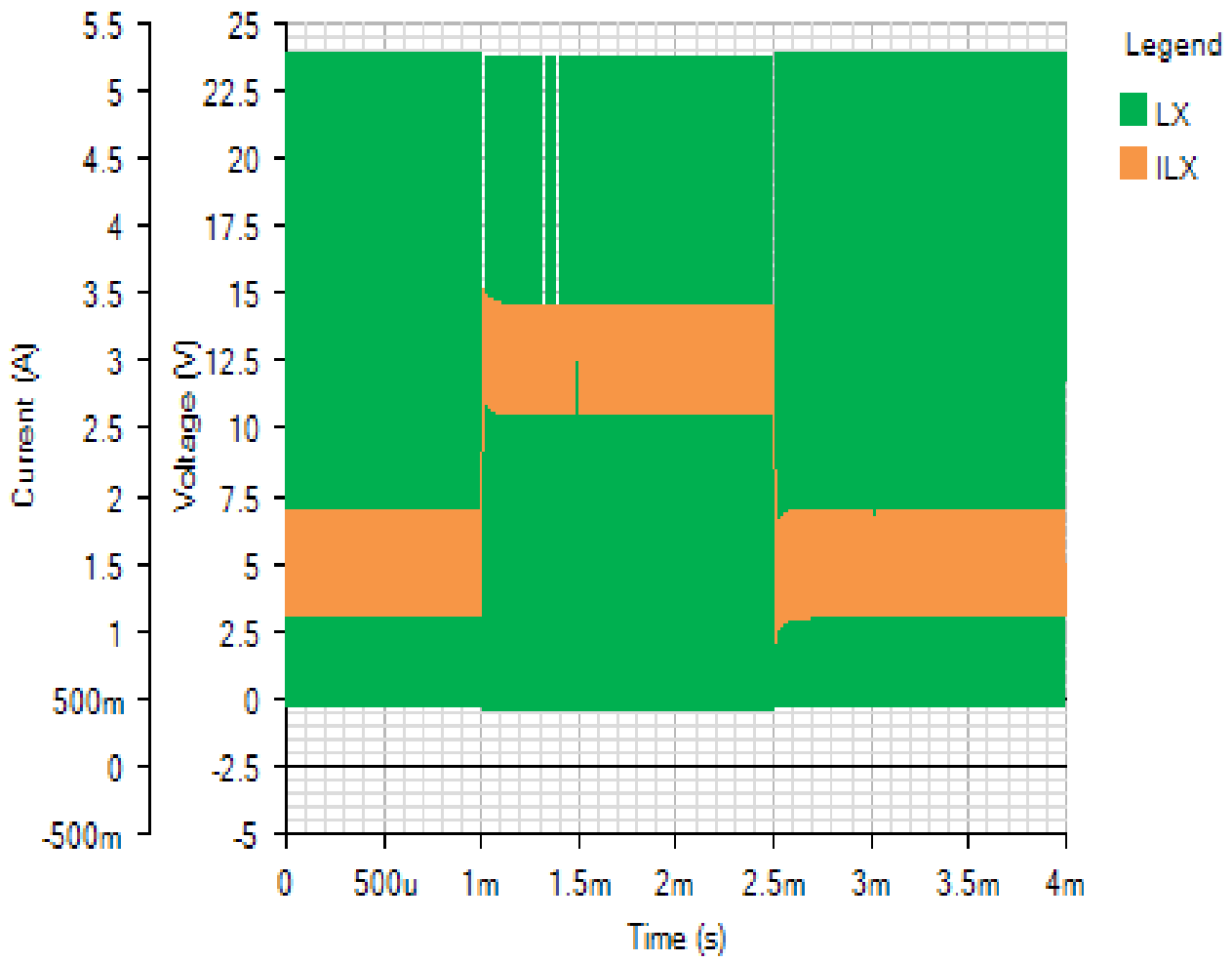
INPUT

Default



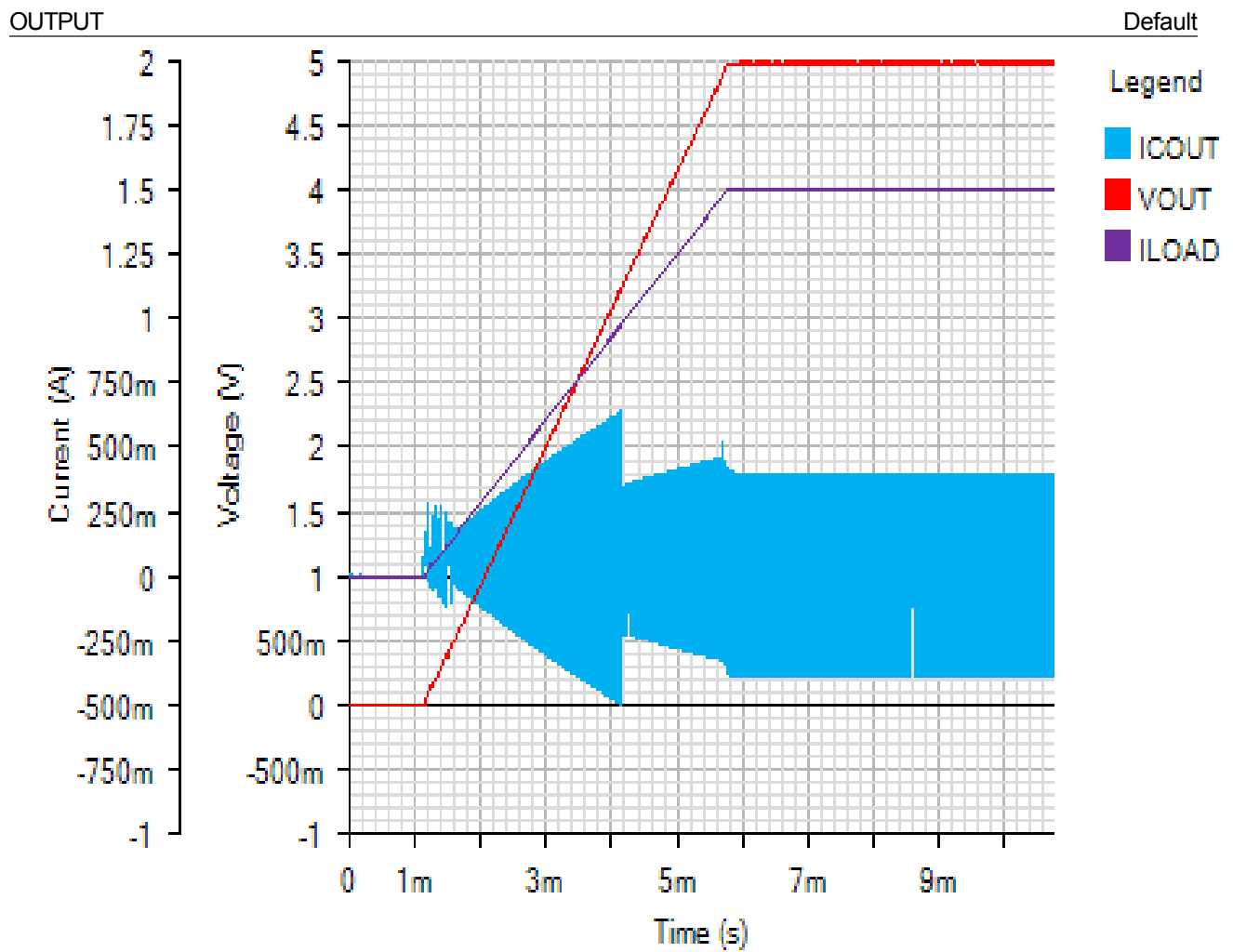
SWITCHING

Default



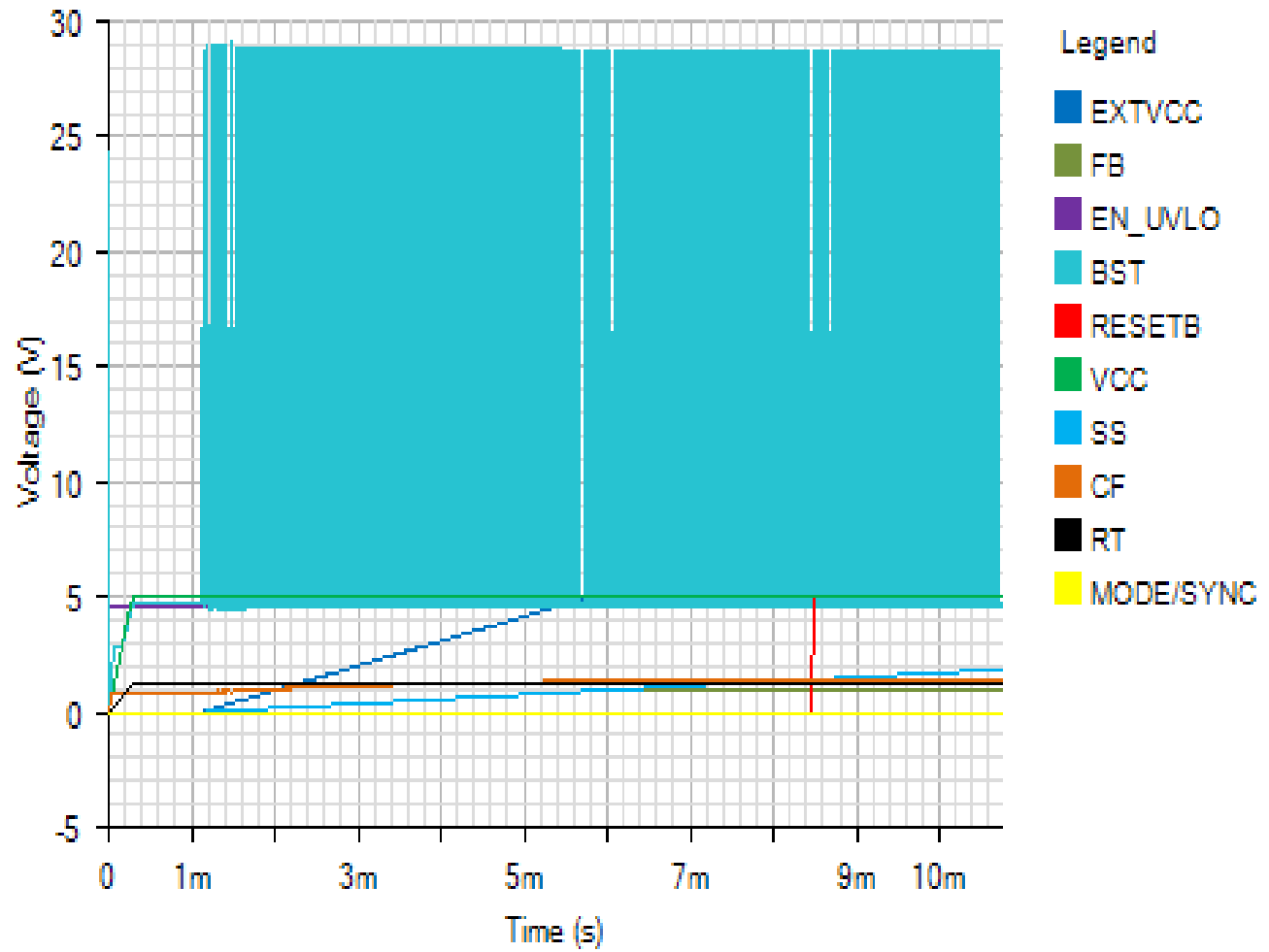


Start Up - Tue Nov 20 2018 10:10:16



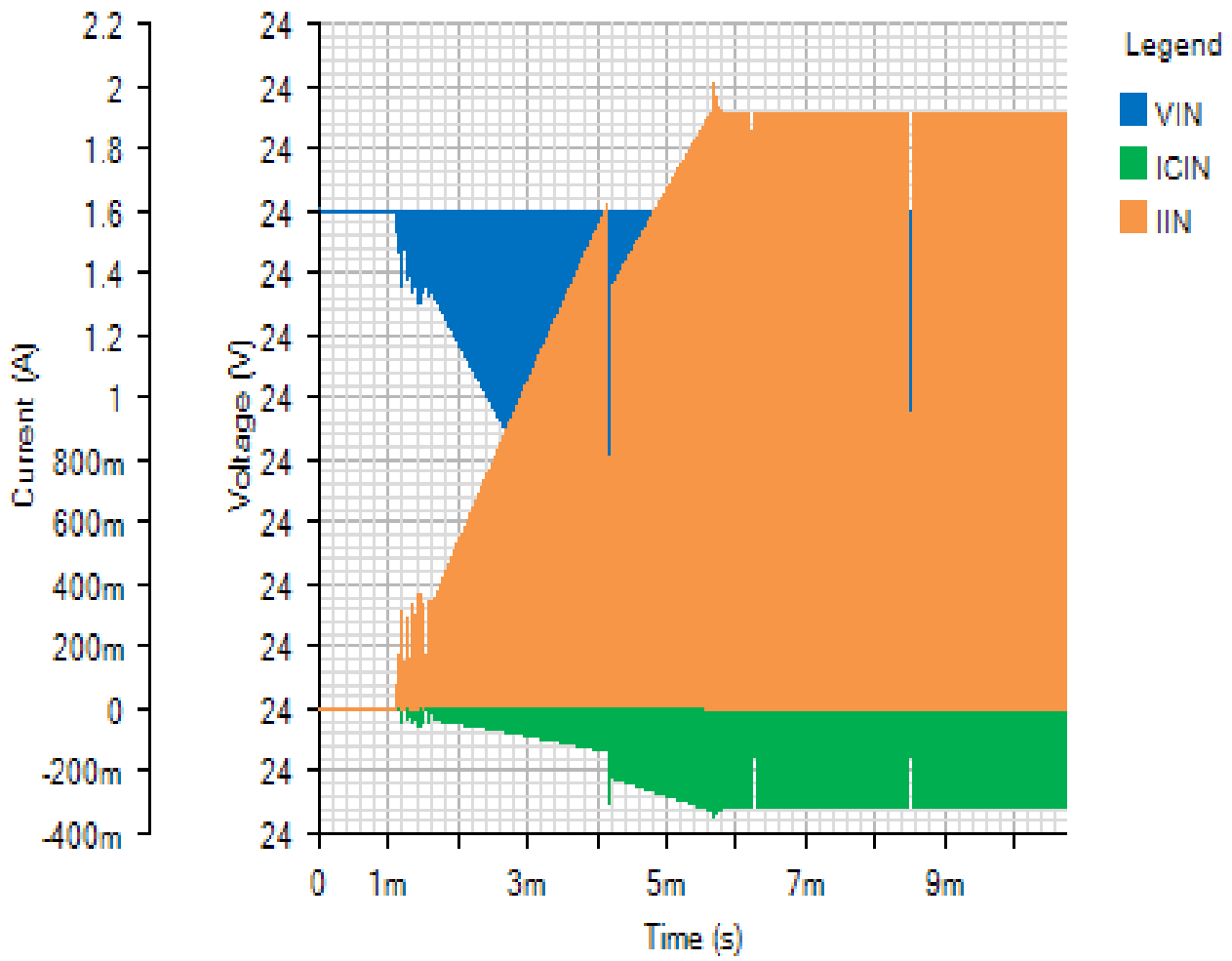
IC

Default



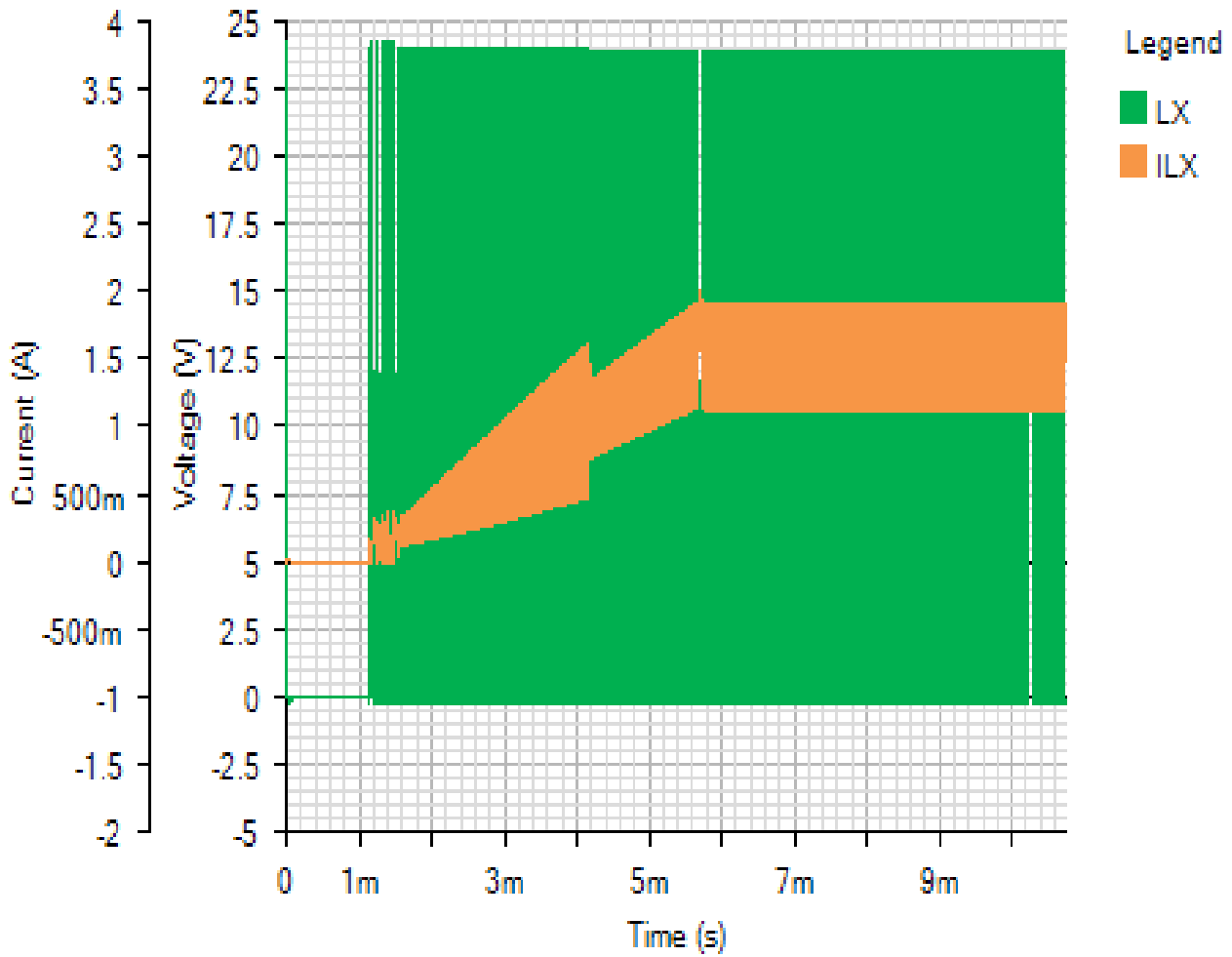
INPUT

Default



SWITCHING

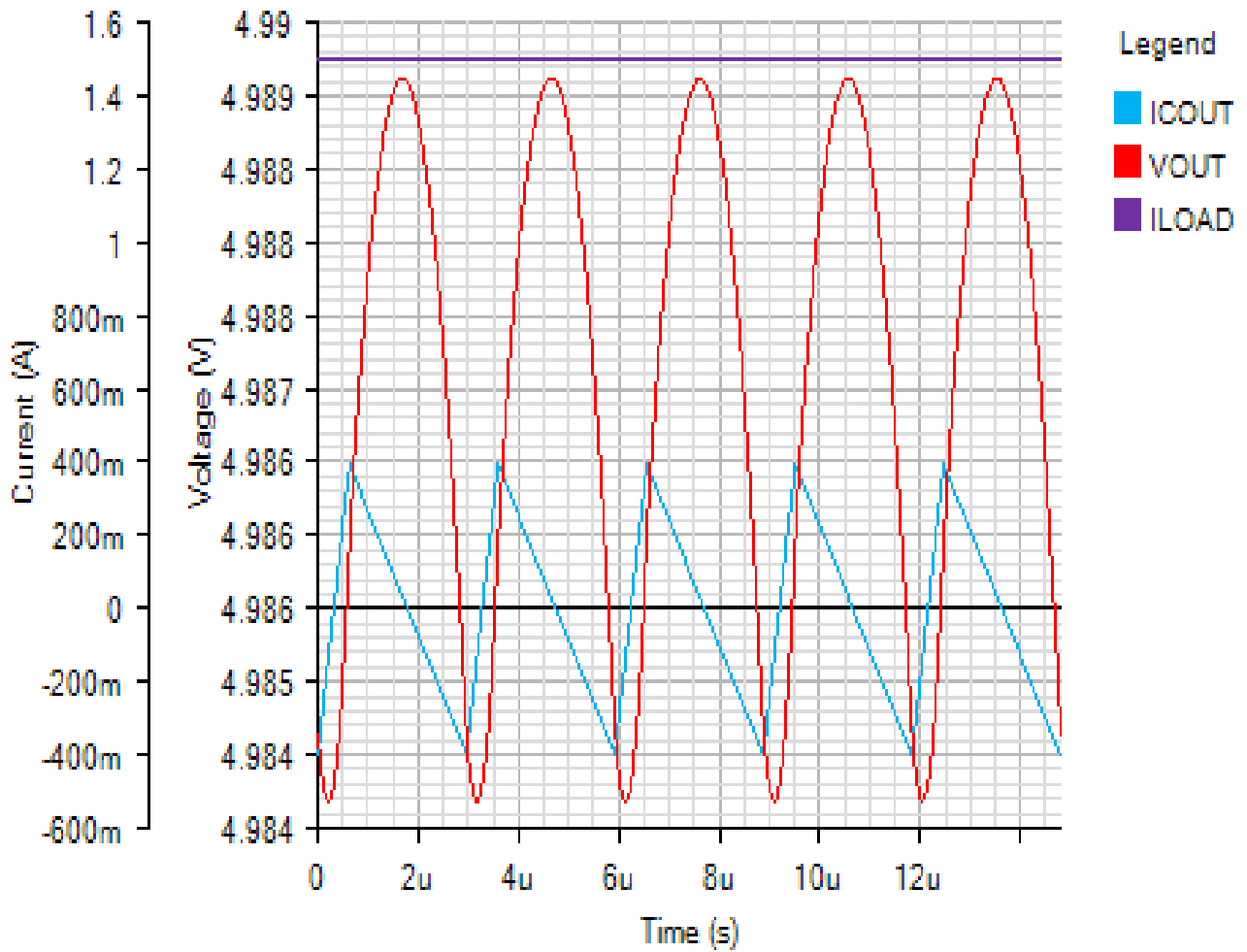
Default



Steady State - Tue Nov 20 2018 10:10:16

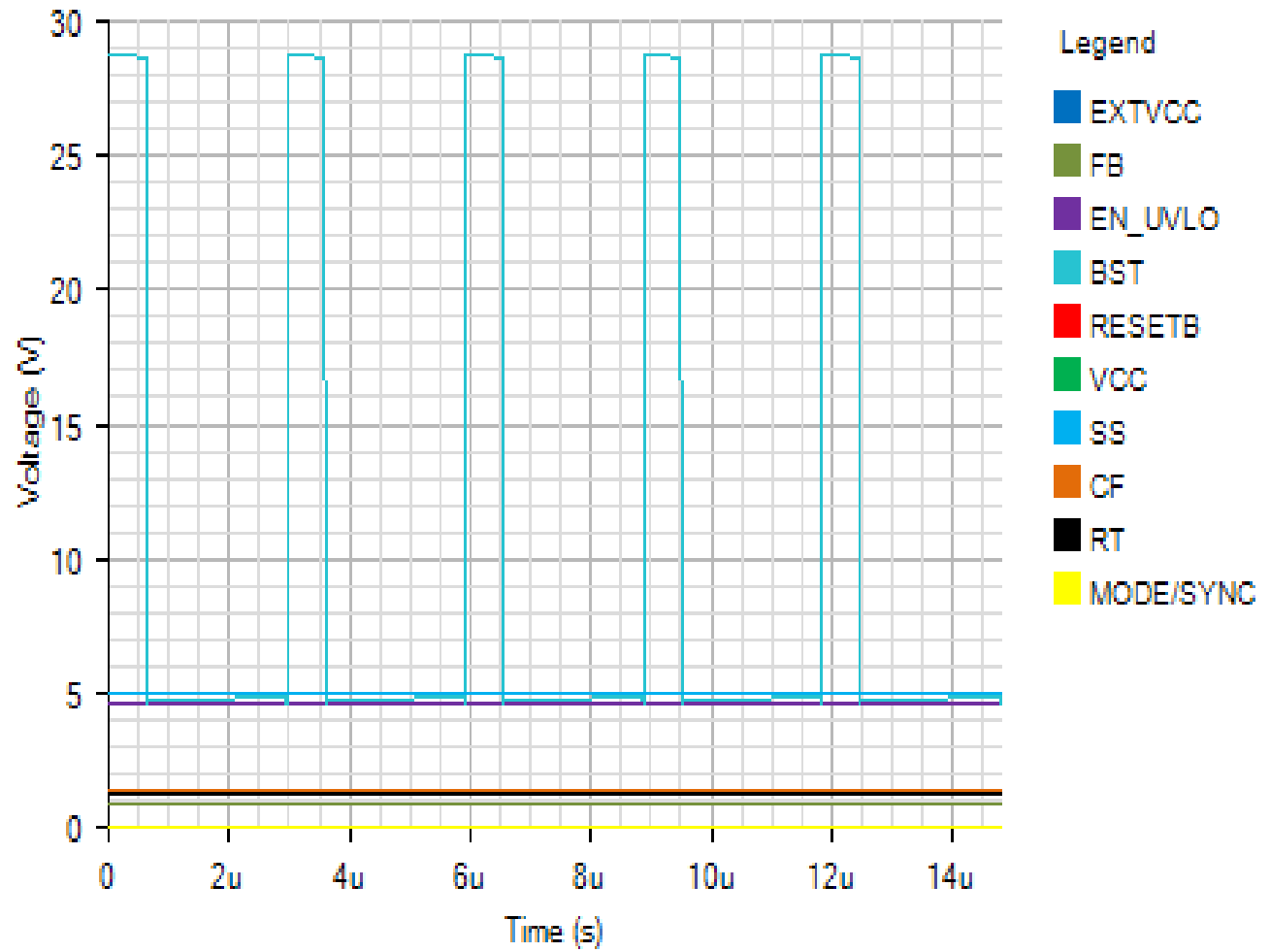
OUTPUT

Default



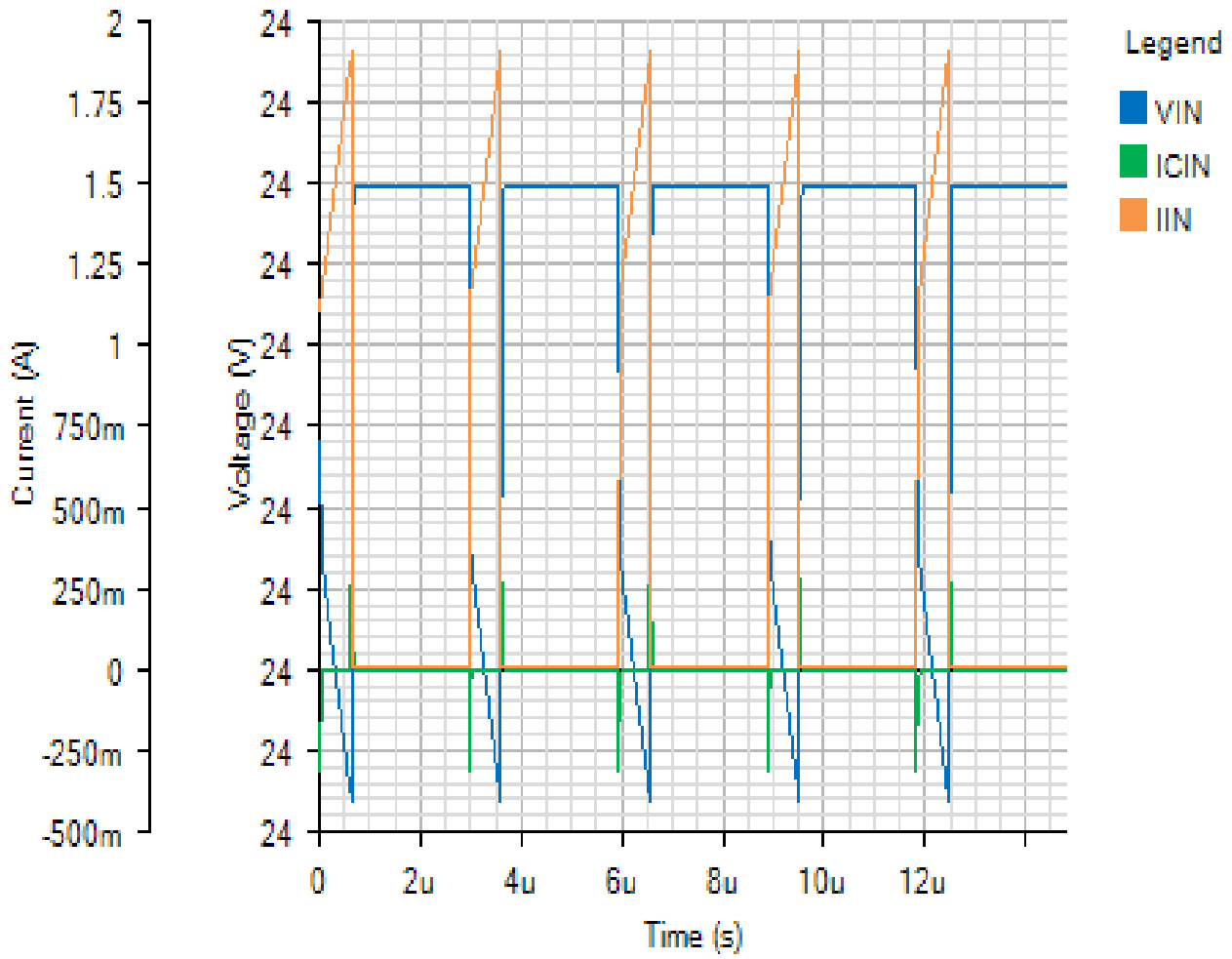
IC

Default



INPUT

Default



SWITCHING

Default

