

## Initial Design

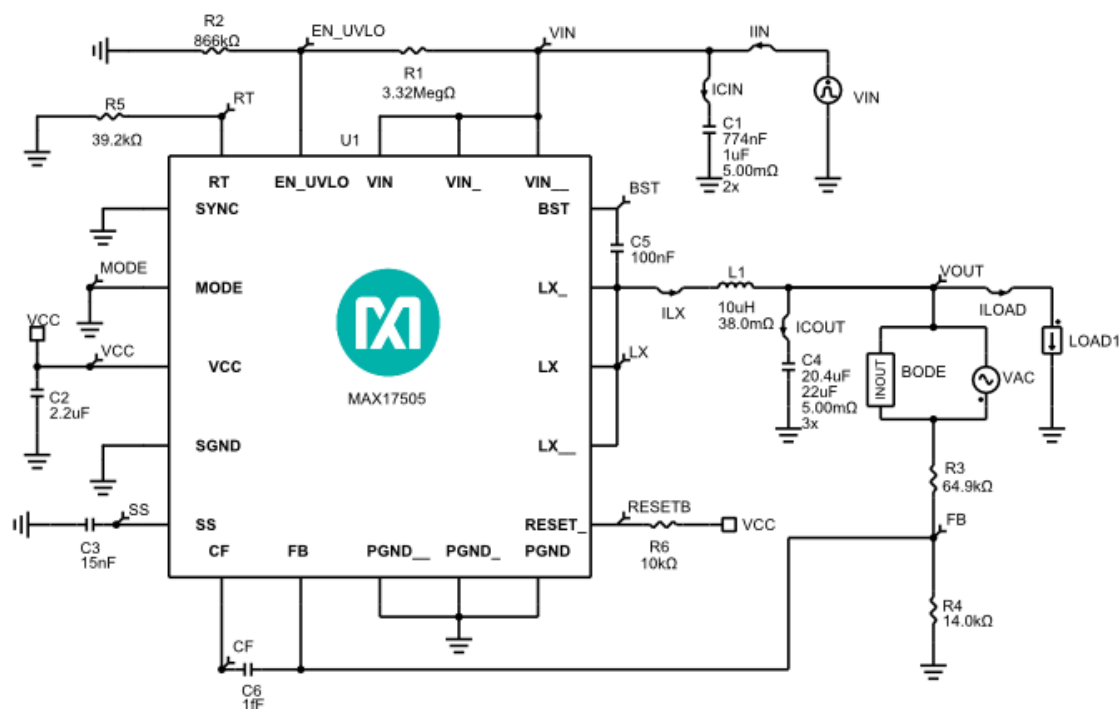
1.0

Design Requirements

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Parameter	Value
Part Version	MAX17505
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	1.7A
Output Voltage Load Step Over/Undershoot	0.15V
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
Mode of Operation	PWM
Switching Frequency	512kHz
Ambient Temperature	25°C
Soft Start time	3ms

## Schematic



\*\*\*\*\* Notes \*\*\*\*\*  
 - Decreasing the output capacitance below recommended value might degrade the transient response or loop stability.  
 - If the current level (starting current for Load Steps) is too low, AC, Steady State and Load Step analyses may fail when PFM mode is selected.

## BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	<a href="#">MAX17505</a>	Maxim Integrated	MAX17505
C1	2	<a href="#">C3216X7R2A105K160AA</a>	TDK	Cap Ceramic 1uF 100V X7R 10% SMD 1206 125C Plastic T/R
C2	1	<a href="#">C1608X7R1A225K080AC</a>	TDK	Cap Ceramic 2.2uF 10V X7R 10% Pad SMD 0603 125°C T/R
C3	1	<a href="#">CGA2B2X7R1E153K050BA</a>	TDK	Cap Ceramic 0.015uF 25V X7R 10% Pad SMD 0402 125°C Automotive T/R
C4	3	<a href="#">GRM32ER71E226ME15</a>	Murata	Cap Ceramic 22uF 25V 1210 125C
C5	1	<a href="#">CGA2B1X7R1C104K050BC</a>	TDK	Cap Ceramic 0.1uF 16V X7R 10% Pad SMD 0402 125°C Automotive T/R
L1	1	<a href="#">VLP8040T-100M</a>	TDK	Inductor Power Shielded Wirewound 10uH 20% 100KHz Ferrite 3.5A 38mOhm DCR Embossed Carrier T/R
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
R2	1	<a href="#">ERJ3EKF8663V</a>	Panasonic	Res Thick Film 0603 866K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

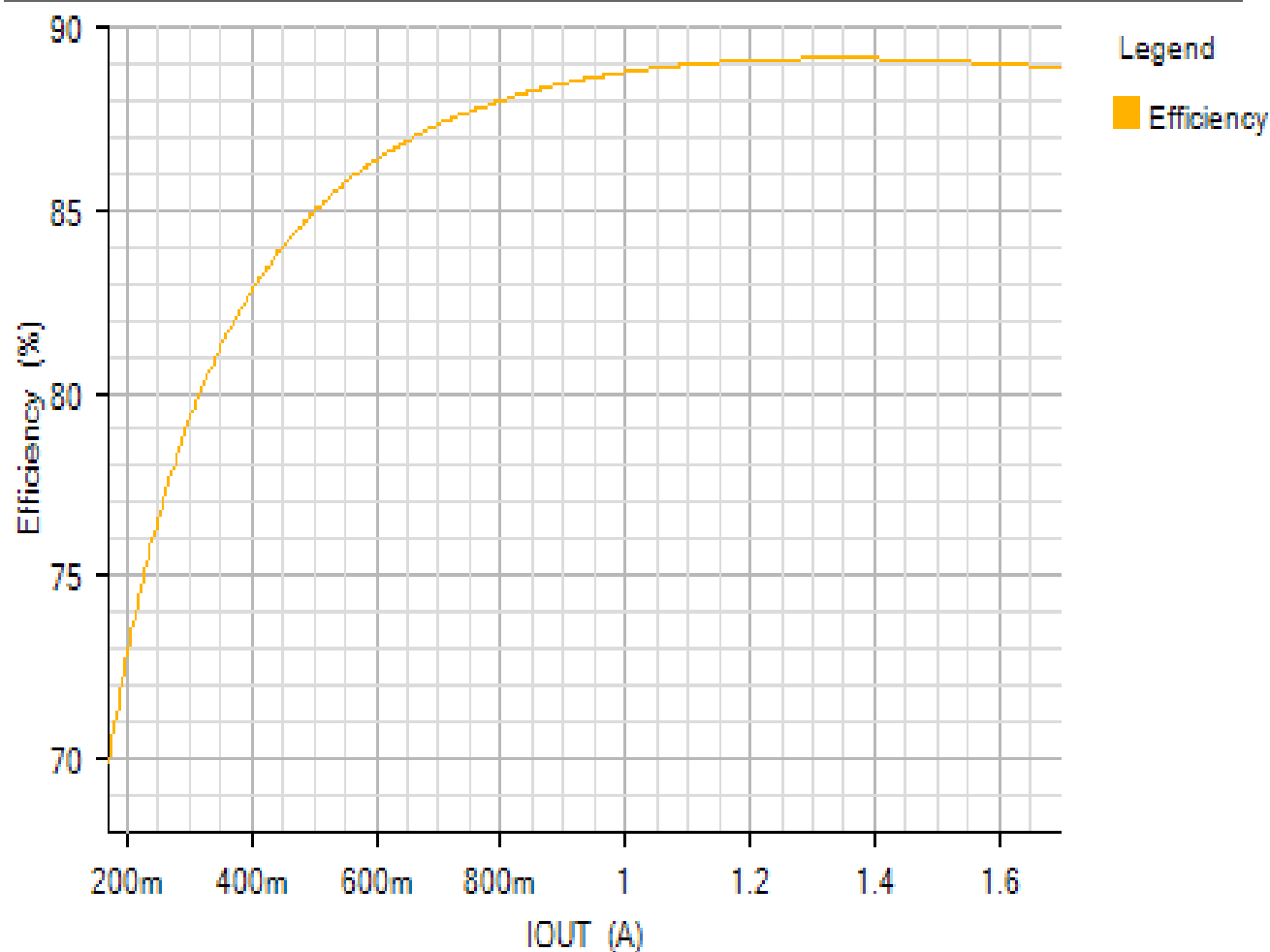
R3	1	ERJ2RKF6492X	Panasonic	Res Thick Film 0402 64.9K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	ERJ2RKF1402X	Panasonic	Res Thick Film 0402 14K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	ERJ2RKF3922X	Panasonic	Res Thick Film 0402 39.2K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD 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 09:52:27

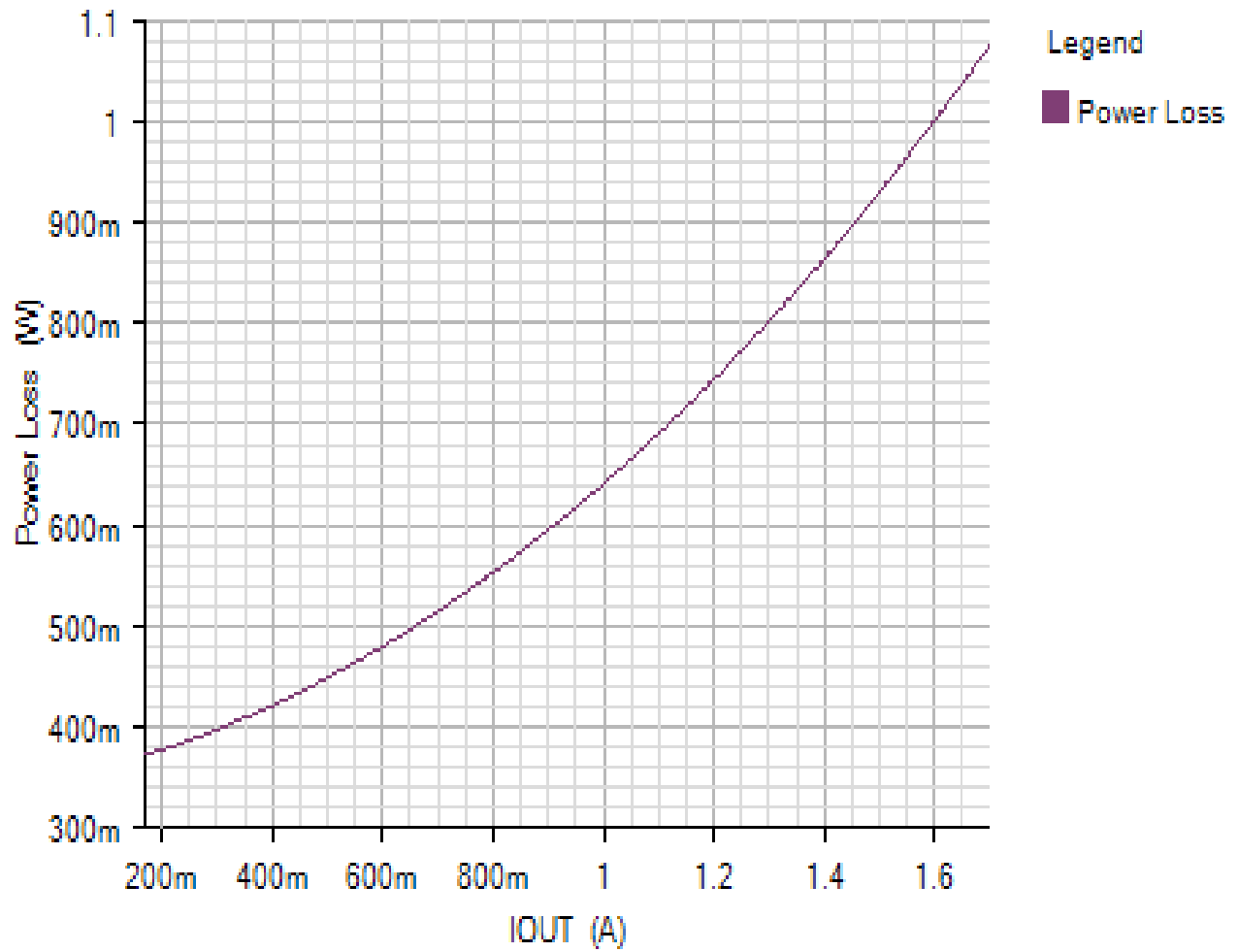
EFFICIENCY\_PLOT

Default



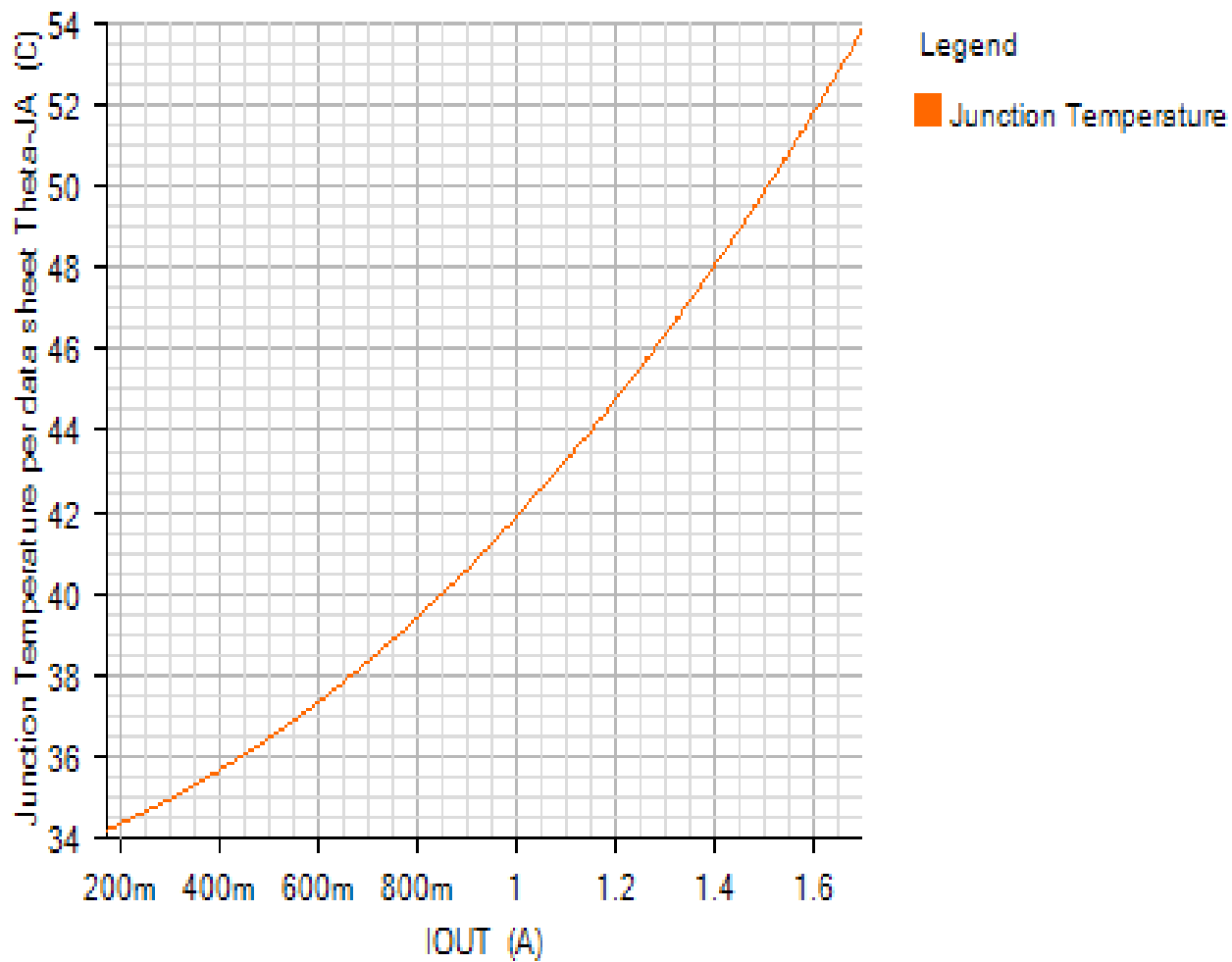
POWER\_LOSS\_PLOT

Default

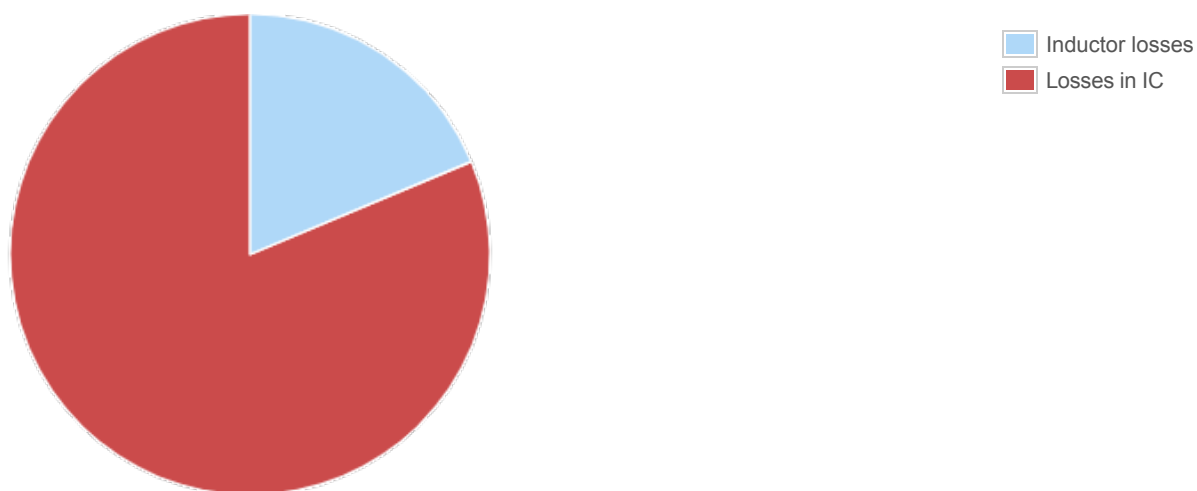


JUNCTION\_TEMPERATURE\_PLOT

Default



Losses



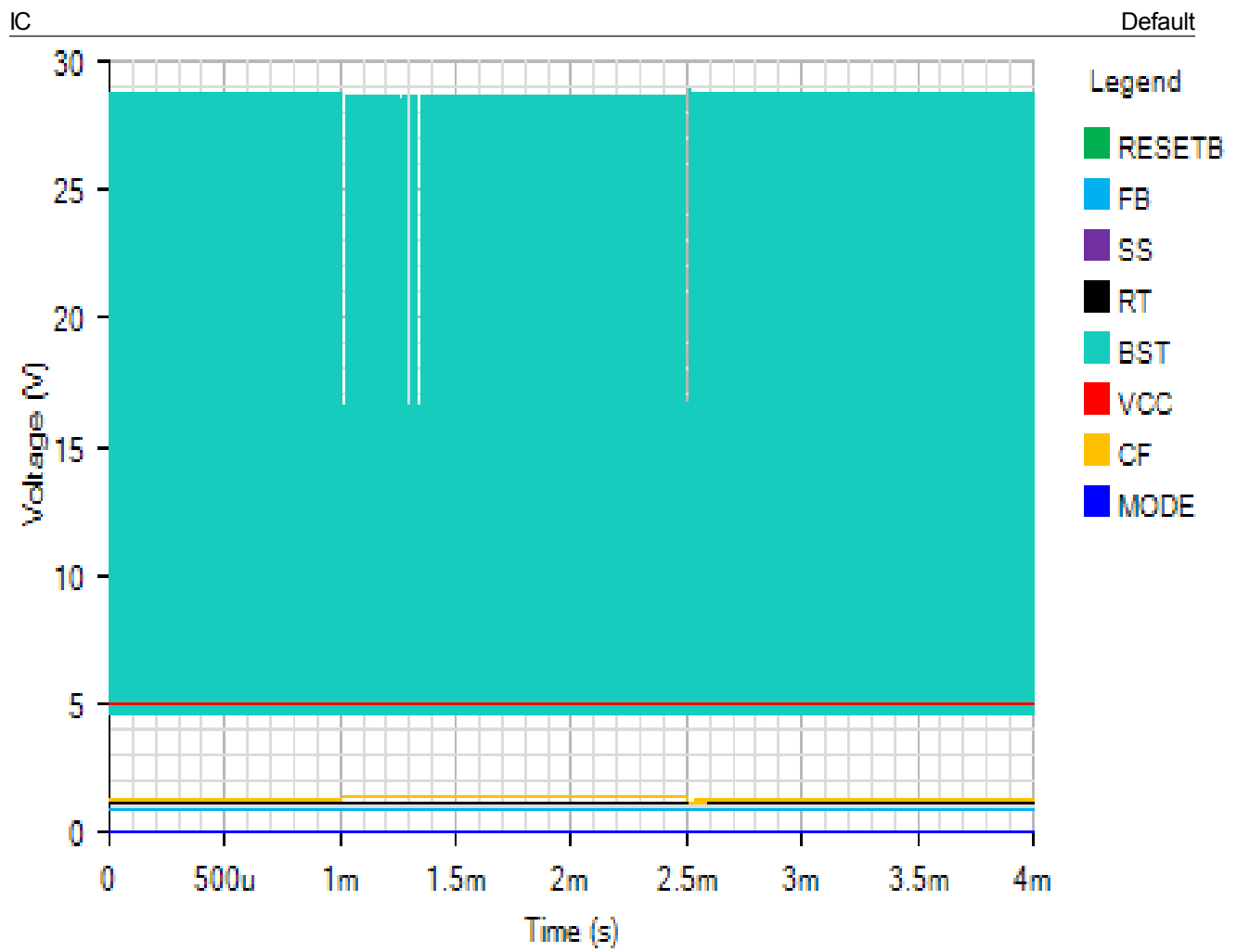
Component

Loss (W)

% of total

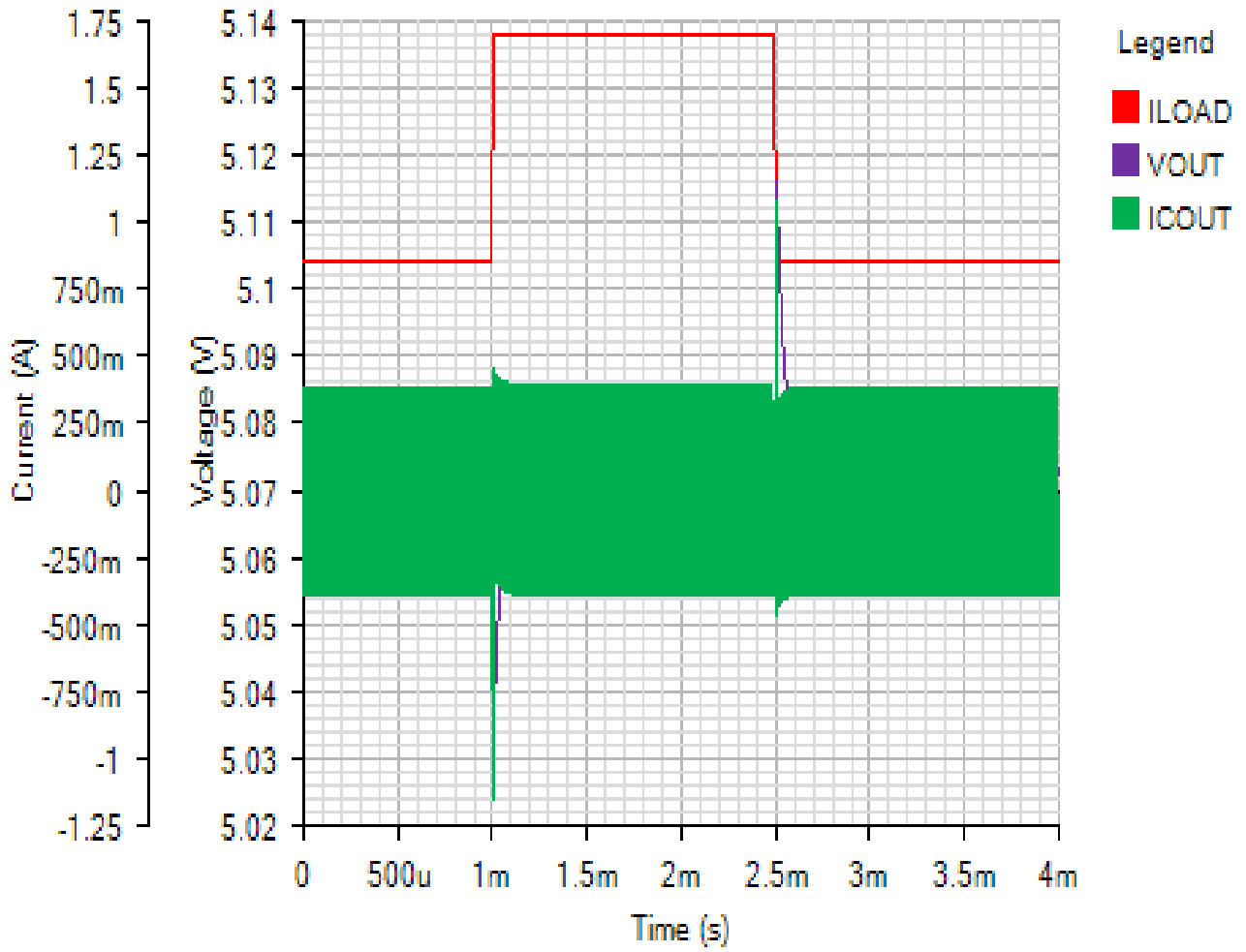
Component	Loss (W)	% of total
Inductor losses	0.2	18.7
Losses in IC	0.87	81.3
Total	1.07	100

Load Step - Fri Nov 16 2018 09:52:27



OUTPUT

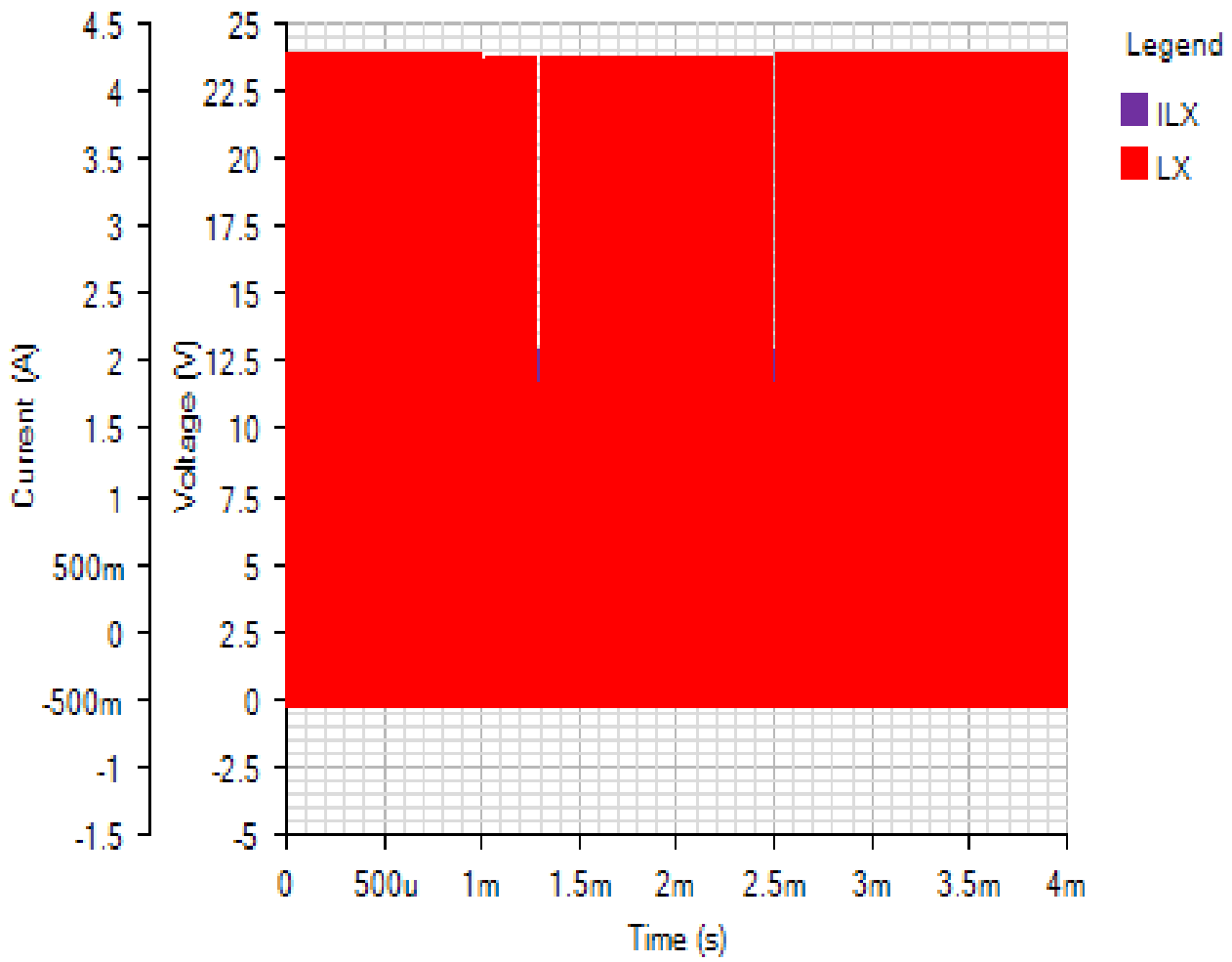
Default





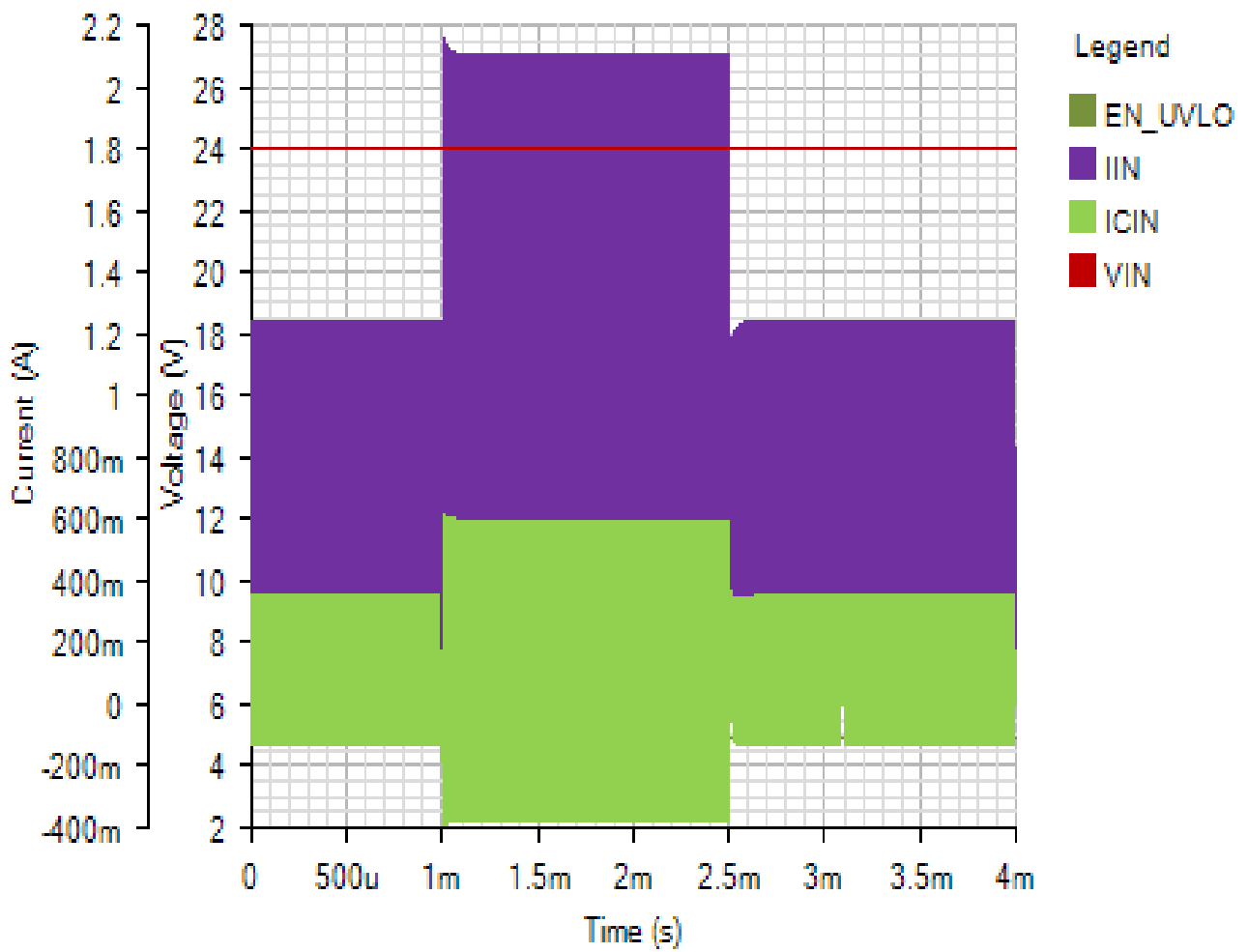
SWITCHING

Default

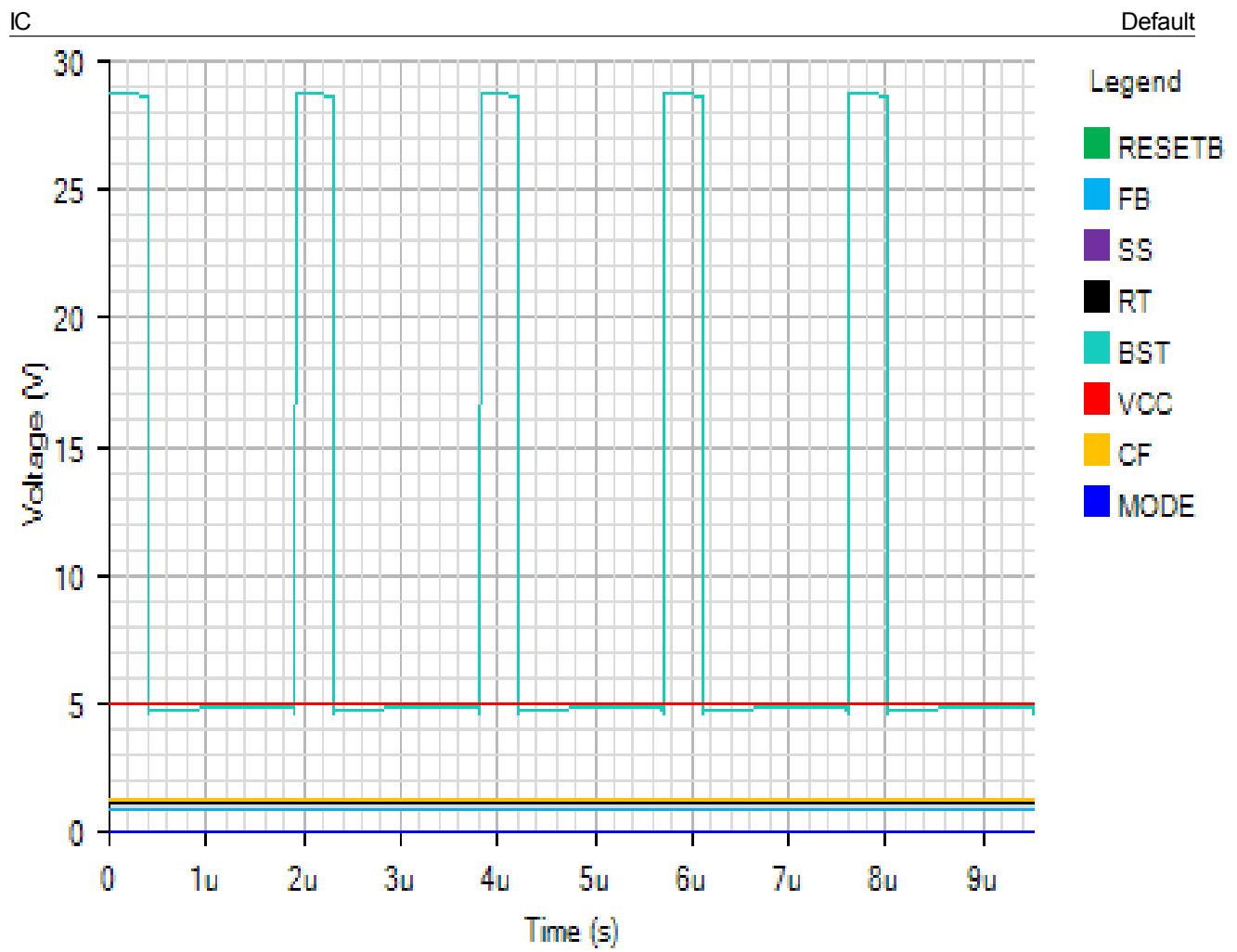


INPUT

Default

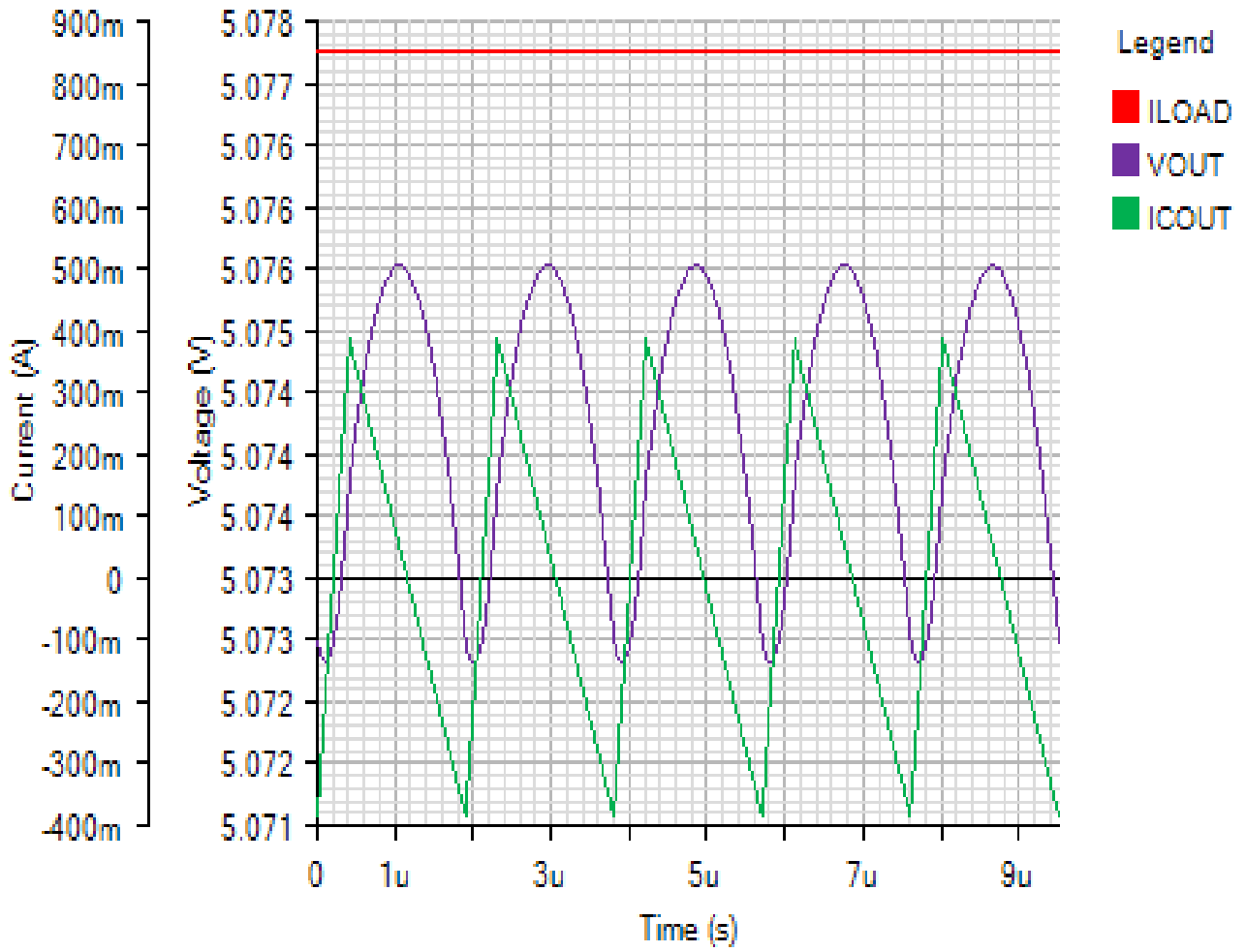


Steady State - Fri Nov 16 2018 09:52:27



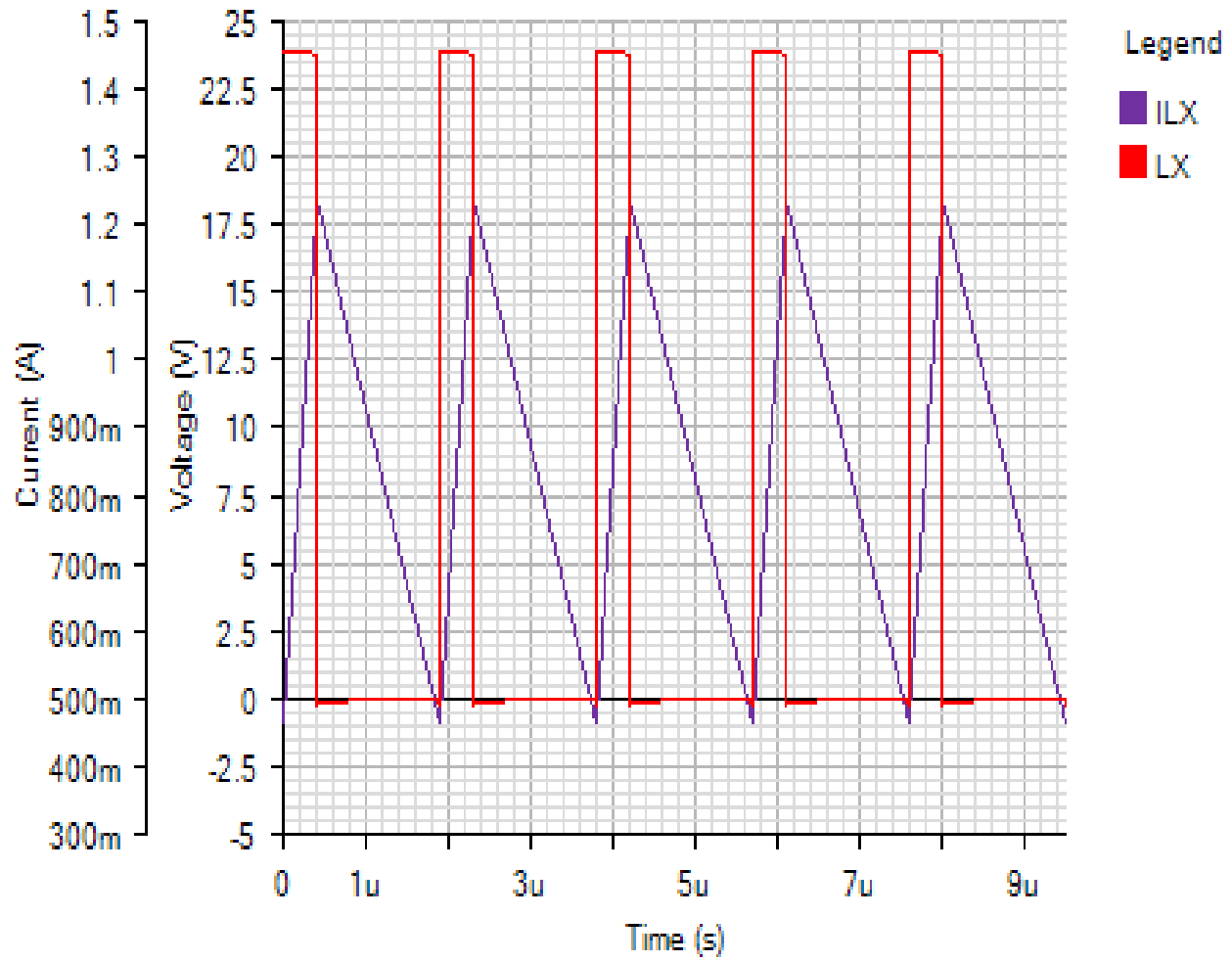
OUTPUT

Default



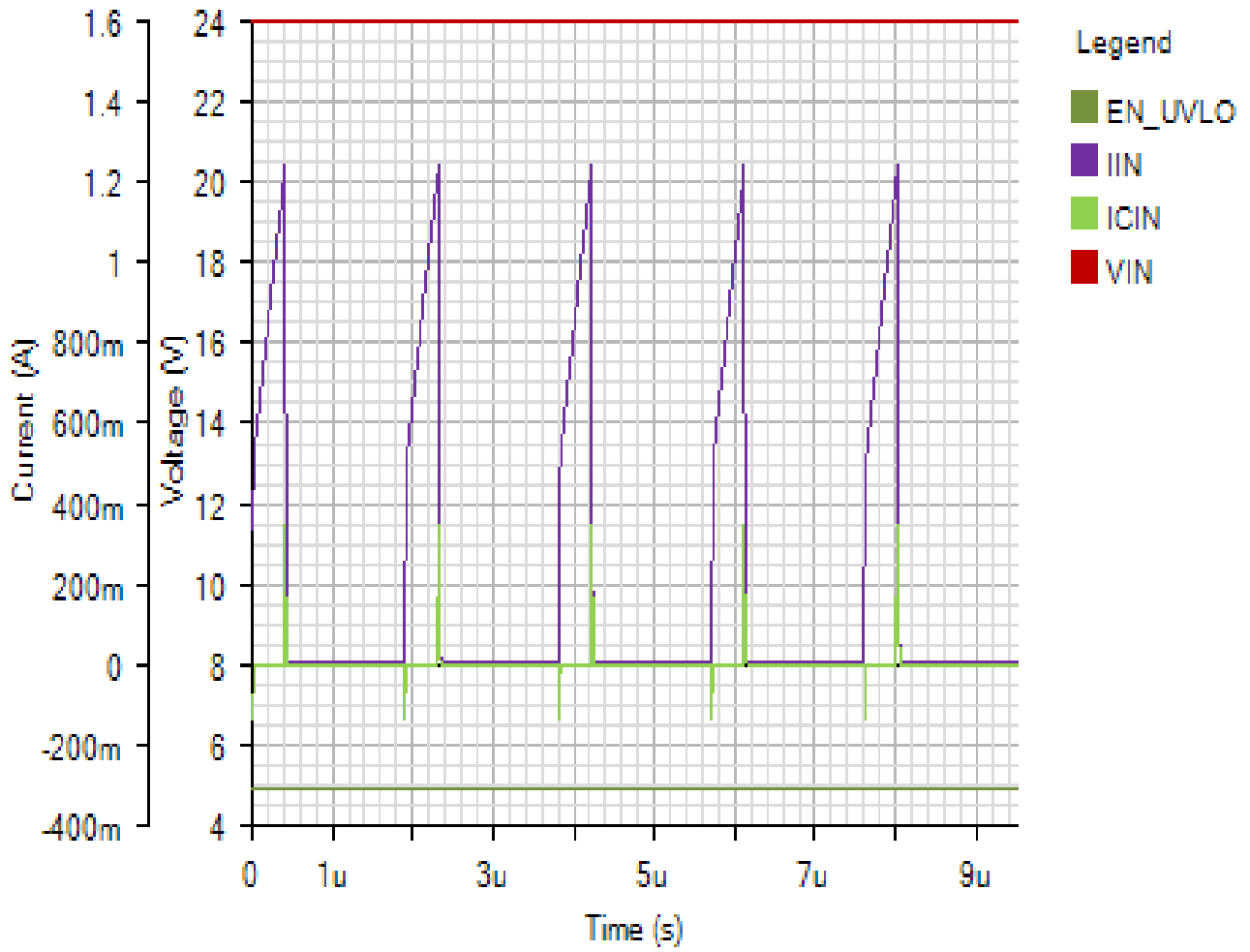
SWITCHING

Default

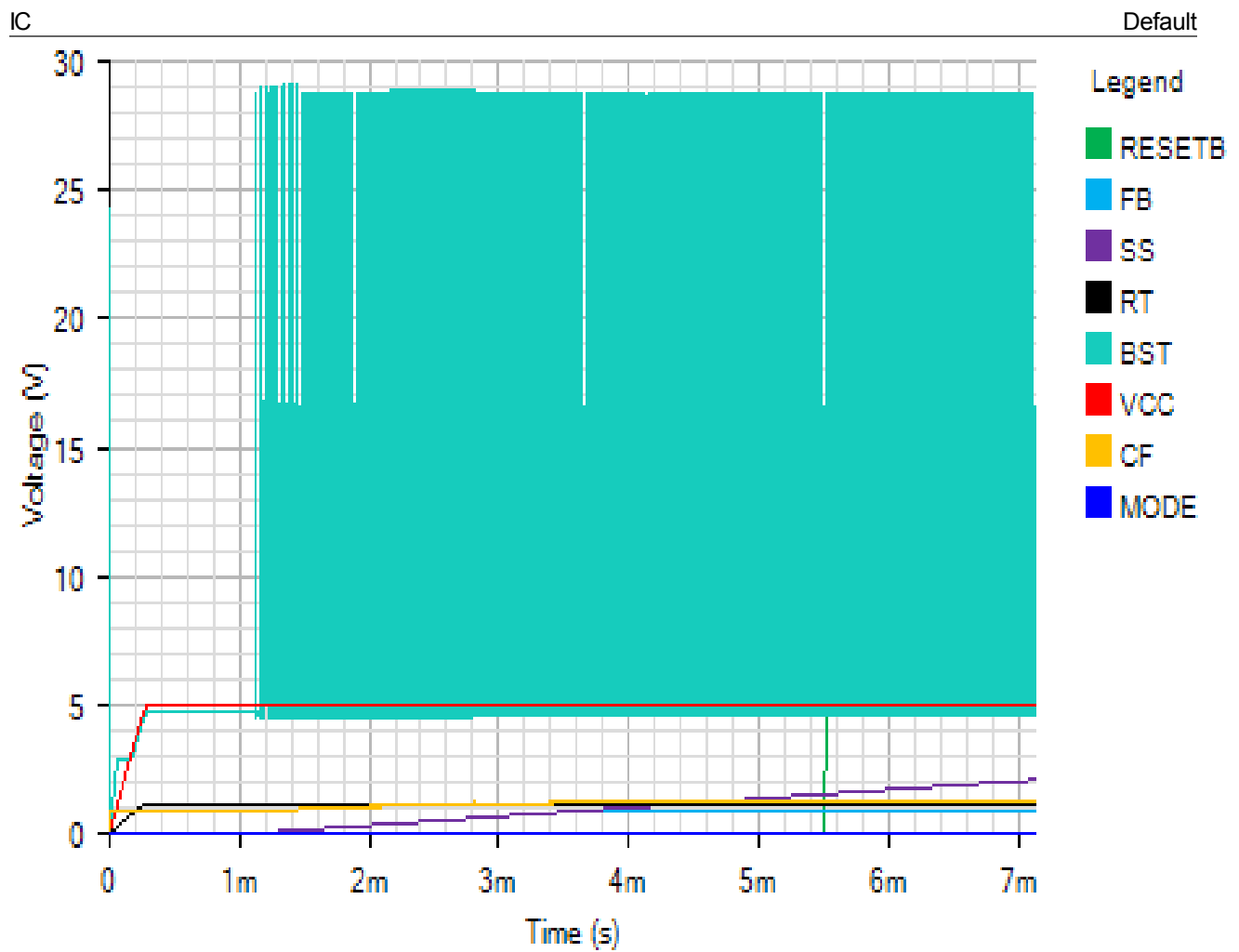


INPUT

Default

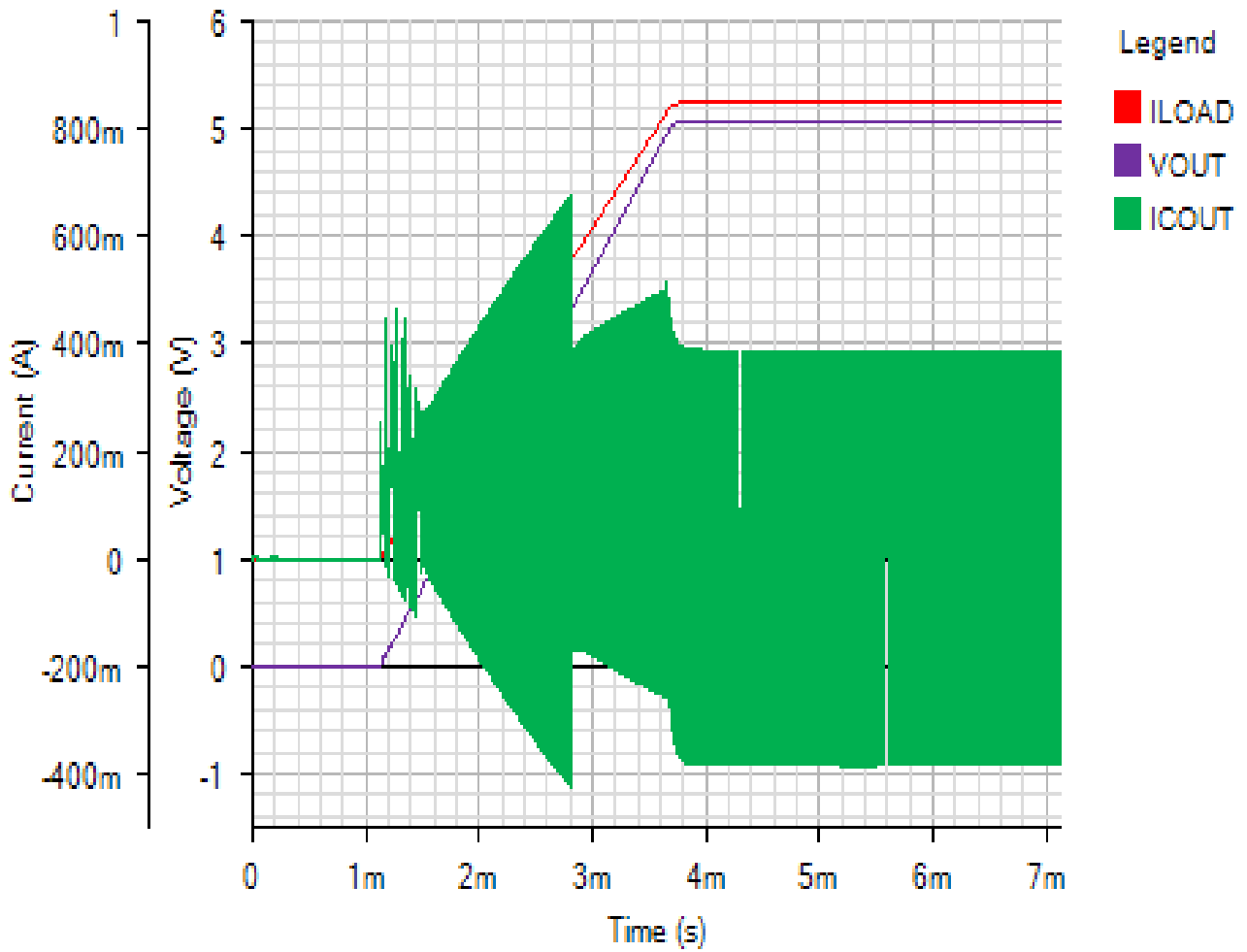


Start Up - Fri Nov 16 2018 09:52:27



OUTPUT

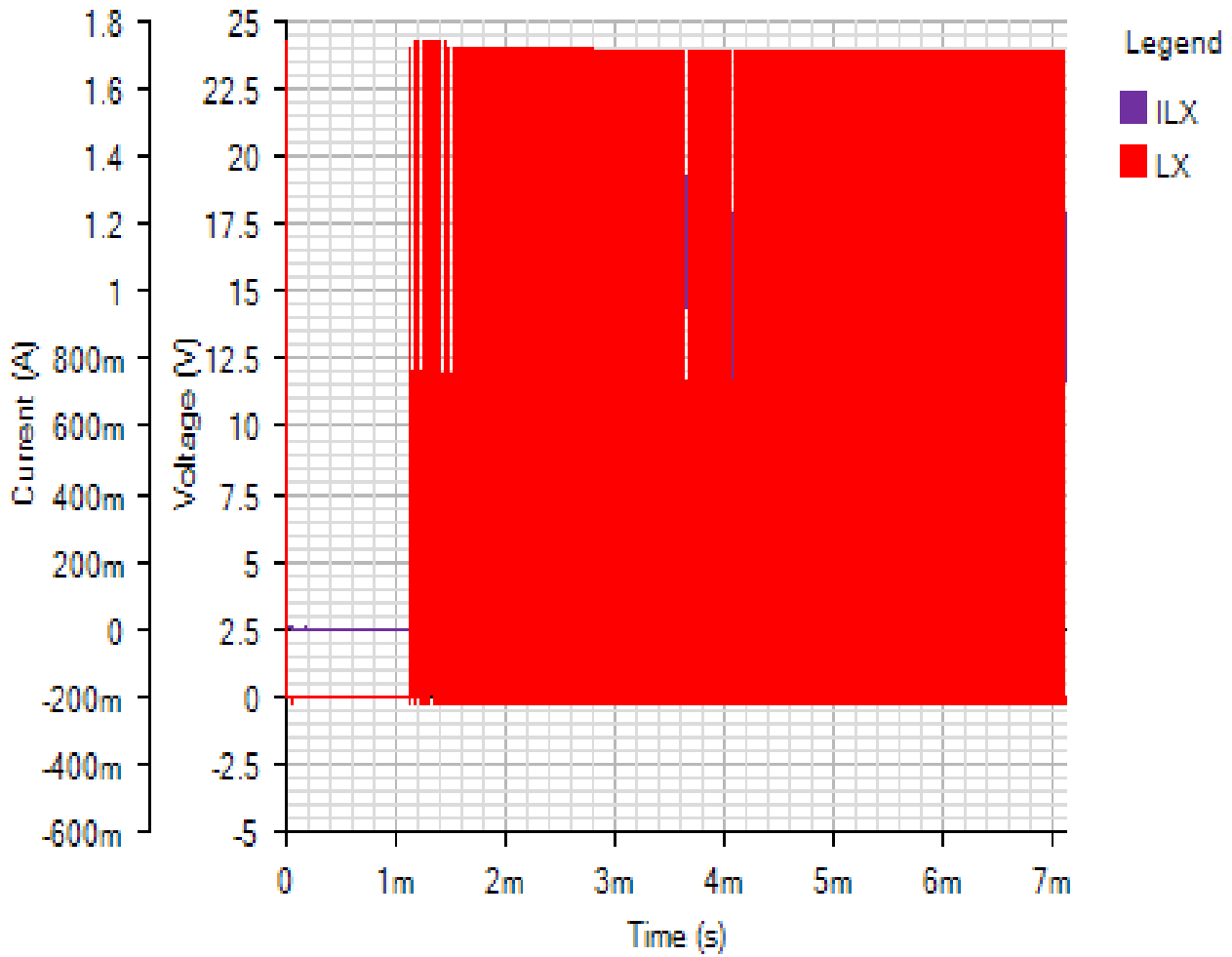
Default





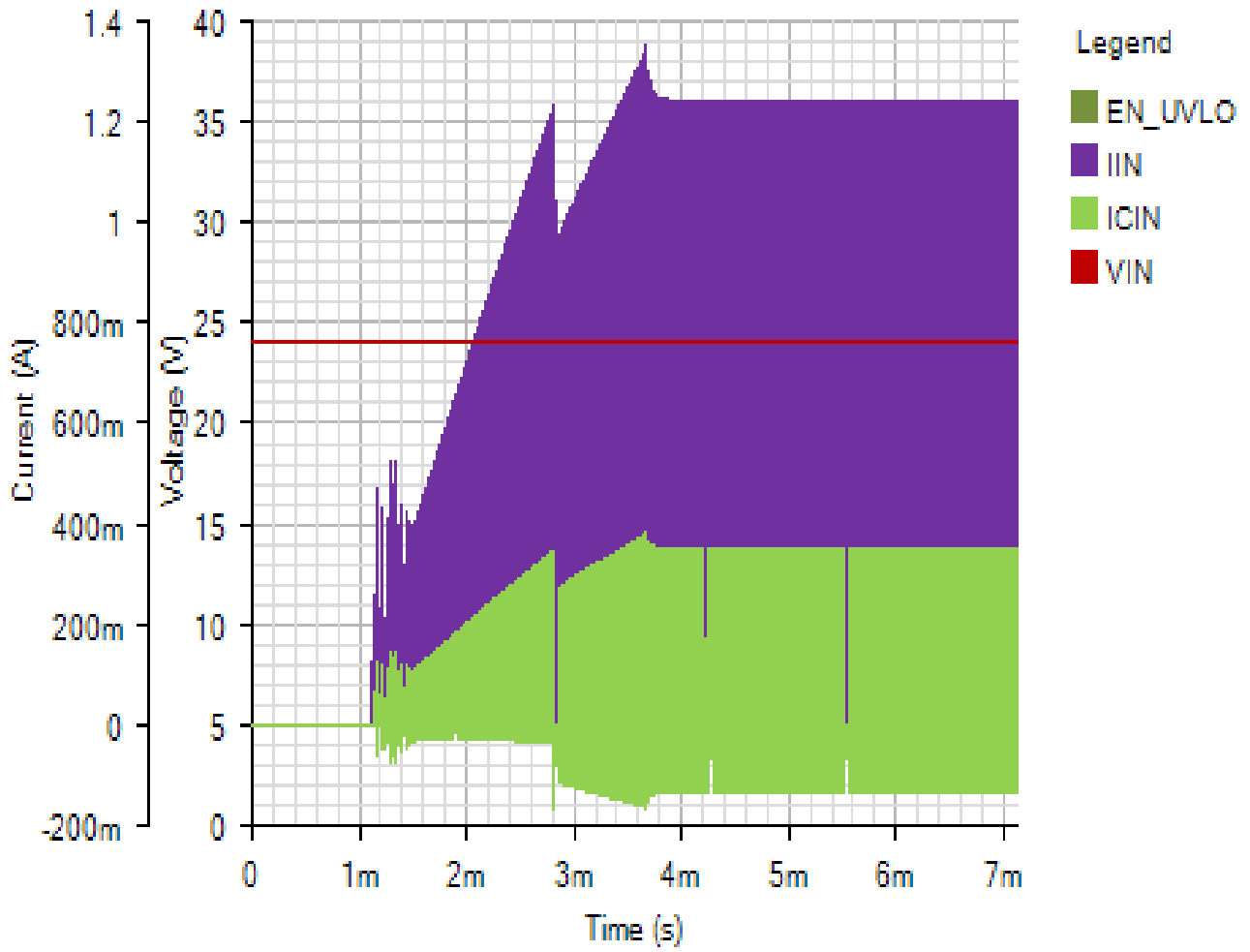
SWITCHING

Default

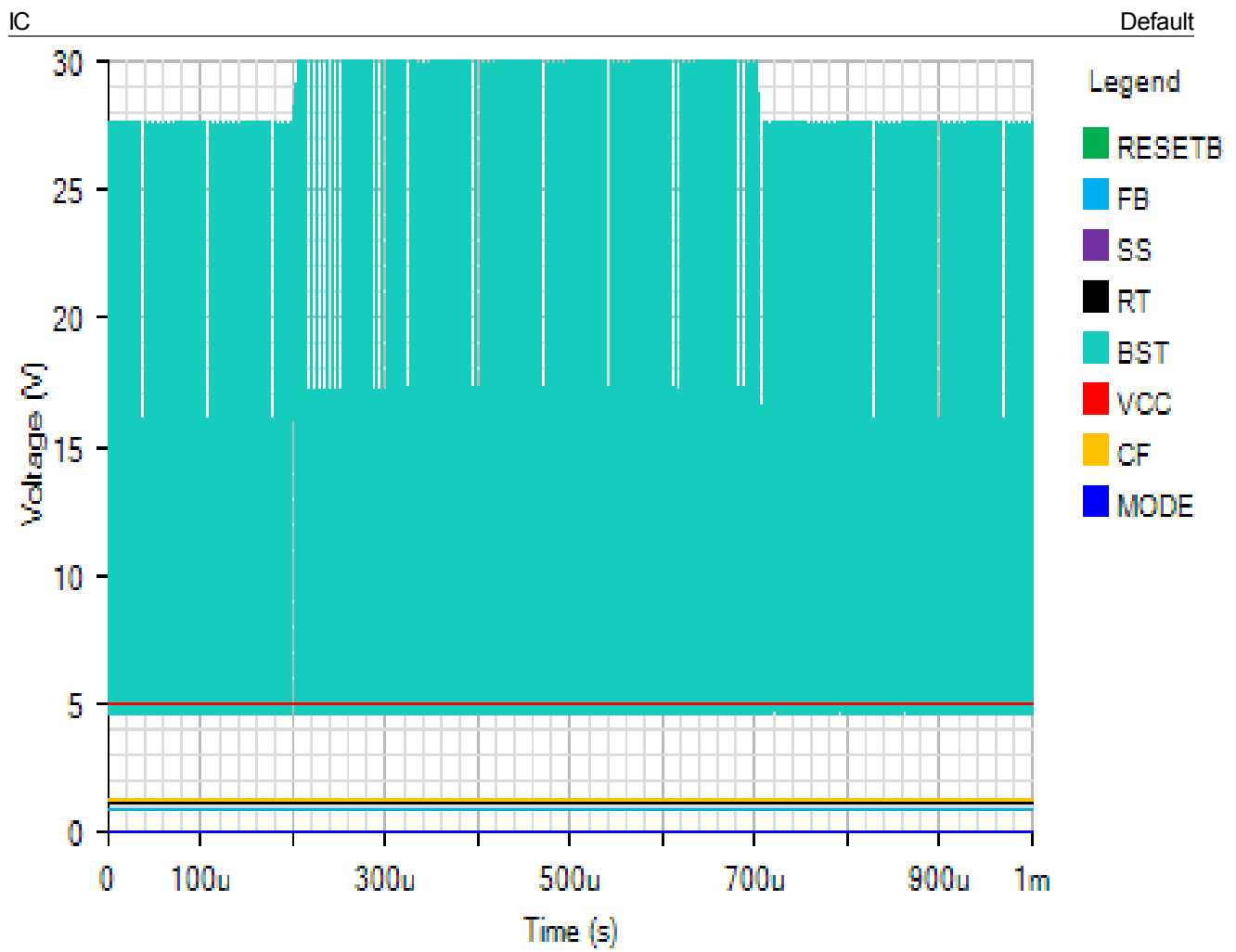


INPUT

Default

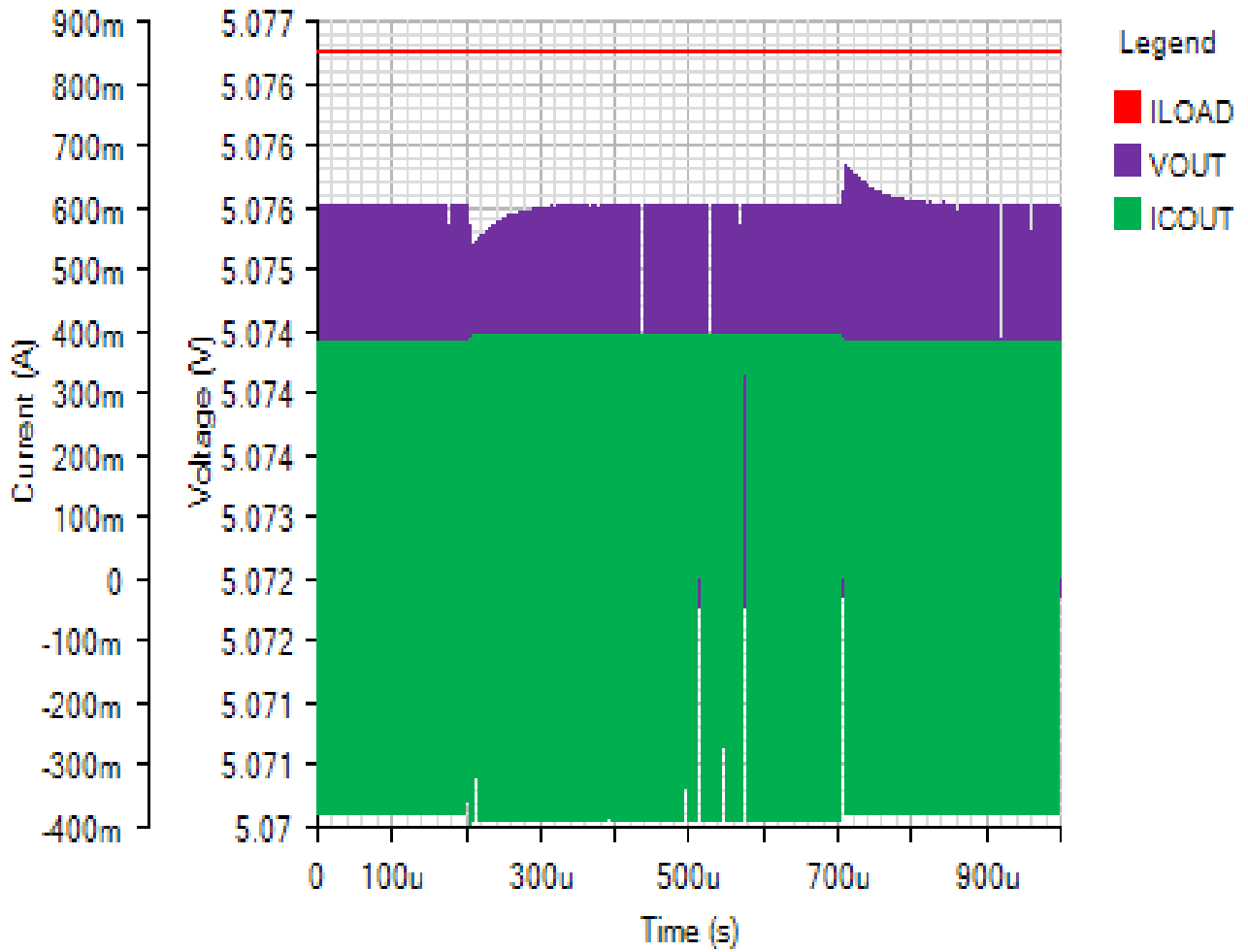


Line Transient - Fri Nov 16 2018 09:52:27



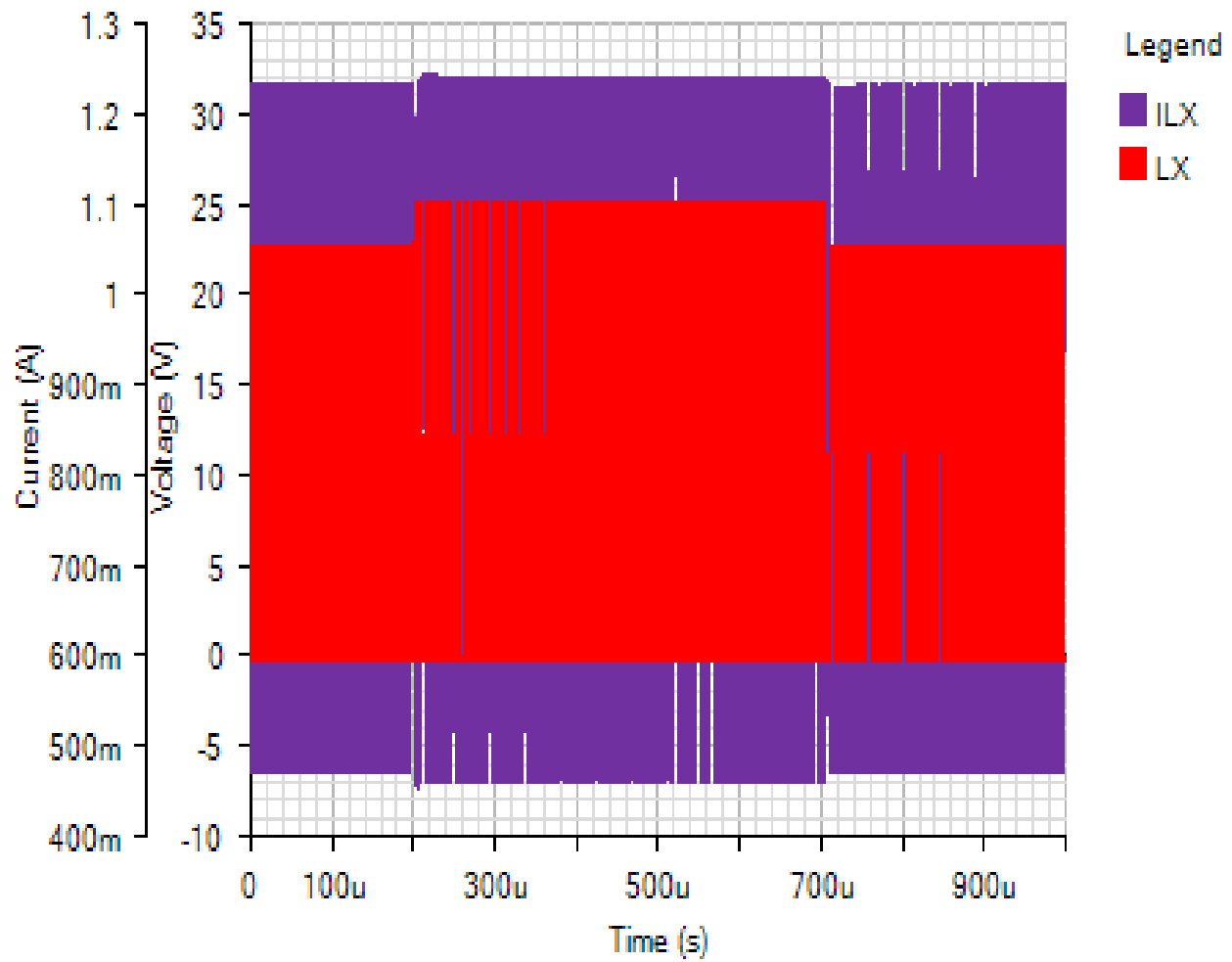
OUTPUT

Default



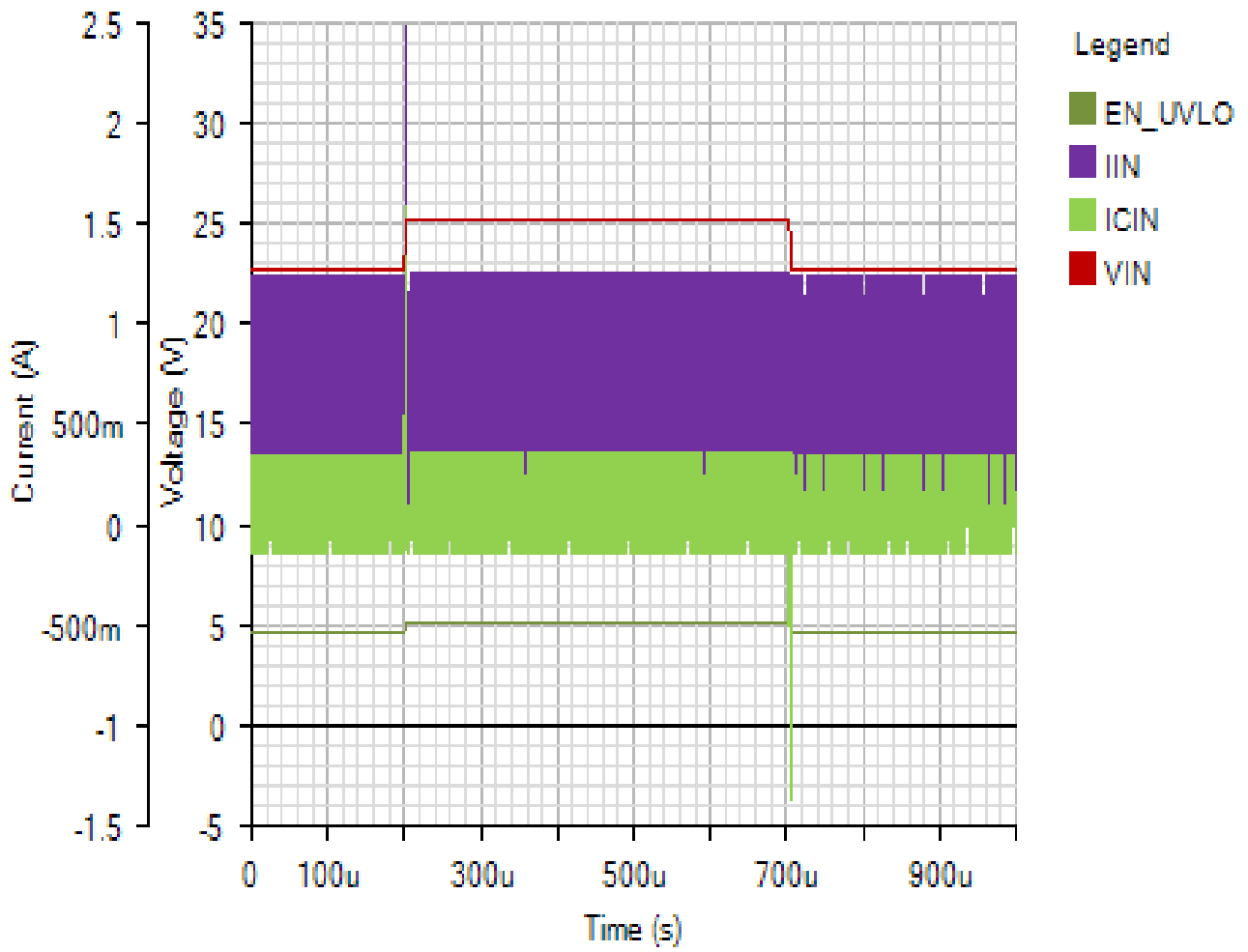
SWITCHING

Default



INPUT

Default



AC Loop - Fri Nov 16 2018 09:52:27

BODE

Default

