Initial Design
1.0

Design Requirements

Parameter	Value
Minimum Input Voltage	10V
Maximum Input Voltage	60V
Nominal Input Voltage	24V
Input Steady-State Ripple	0.5V
Input Undervoltage Lockout Level	9.6V
Output Voltage	5V
Load Current	3A
Load Step Start Current	1.5A
Load Step Current	3A
Load Step Edge Rate	10A/us
Output Voltage Load Step Over/Undershoot	3%
Performance Priority	Design for High Efficiency
Cost Priority	Cost
Mode of Operation	PWM
Switching Frequency	650kHz
Ambient Temperature	25°C
Soft Start time	5ms

Schematic
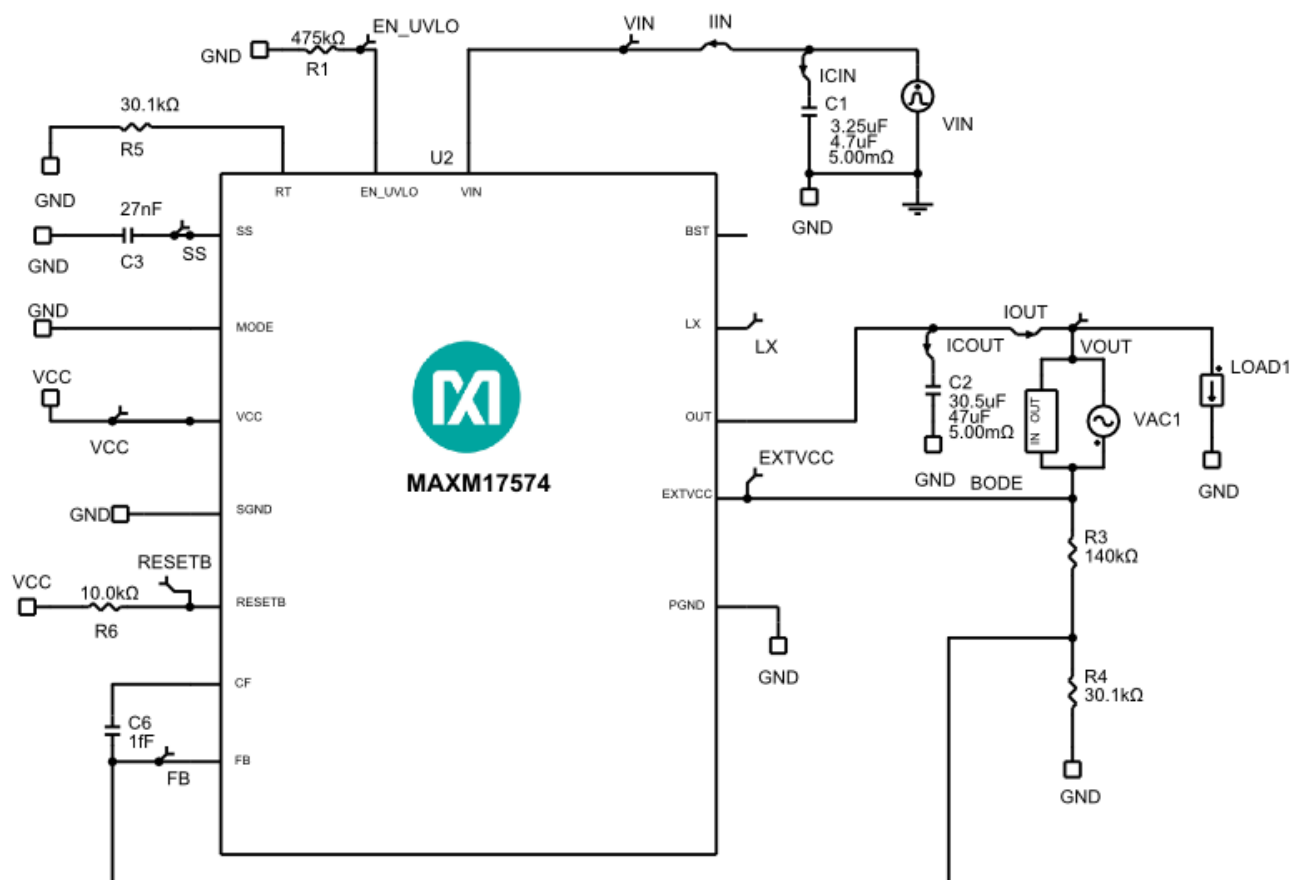
BOM

Ref	Qty	Part Number	Manufacturer	Description
U2	1	MAXM17574	User-Defined	IC
C1	1	GRM32ER71K475KE14	Murata	Cap Ceramic 4.7uF 80V 1210 125C
C2	1	GRM32ER71A476ME15L	Murata	Cap Ceramic 47uF 10V X7R 20% SMD 1210 125C Embossed T/R
C3	1	06035C273KAT2A	AVX	Cap Ceramic 0.027uF 50V X7R 10% Pad SMD 0603 125°C T/R
R1	1	ERJ3EKF4753V	Panasonic	Res Thick Film 0603 475K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	ERJ3EKF1403V	Panasonic	Res Thick Film 0603 140K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	ERJ3EKF3012V	Panasonic	Res Thick Film 0603 30.1K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	ERJ3EKF3012V	Panasonic	Res Thick Film 0603 30.1K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD

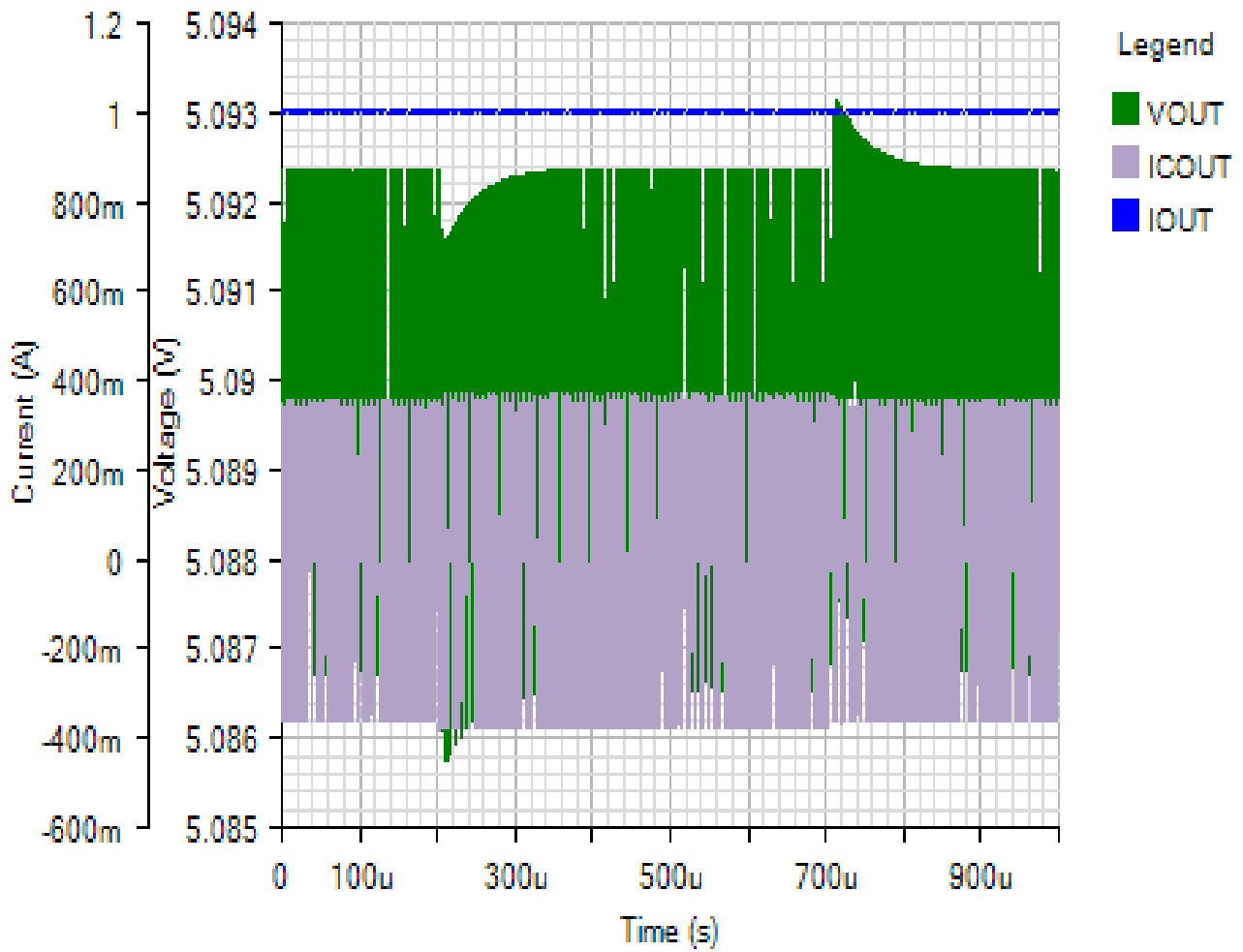|				Automotive T/R
R6	1	ERJ2RKF1002X	Panasonic	Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

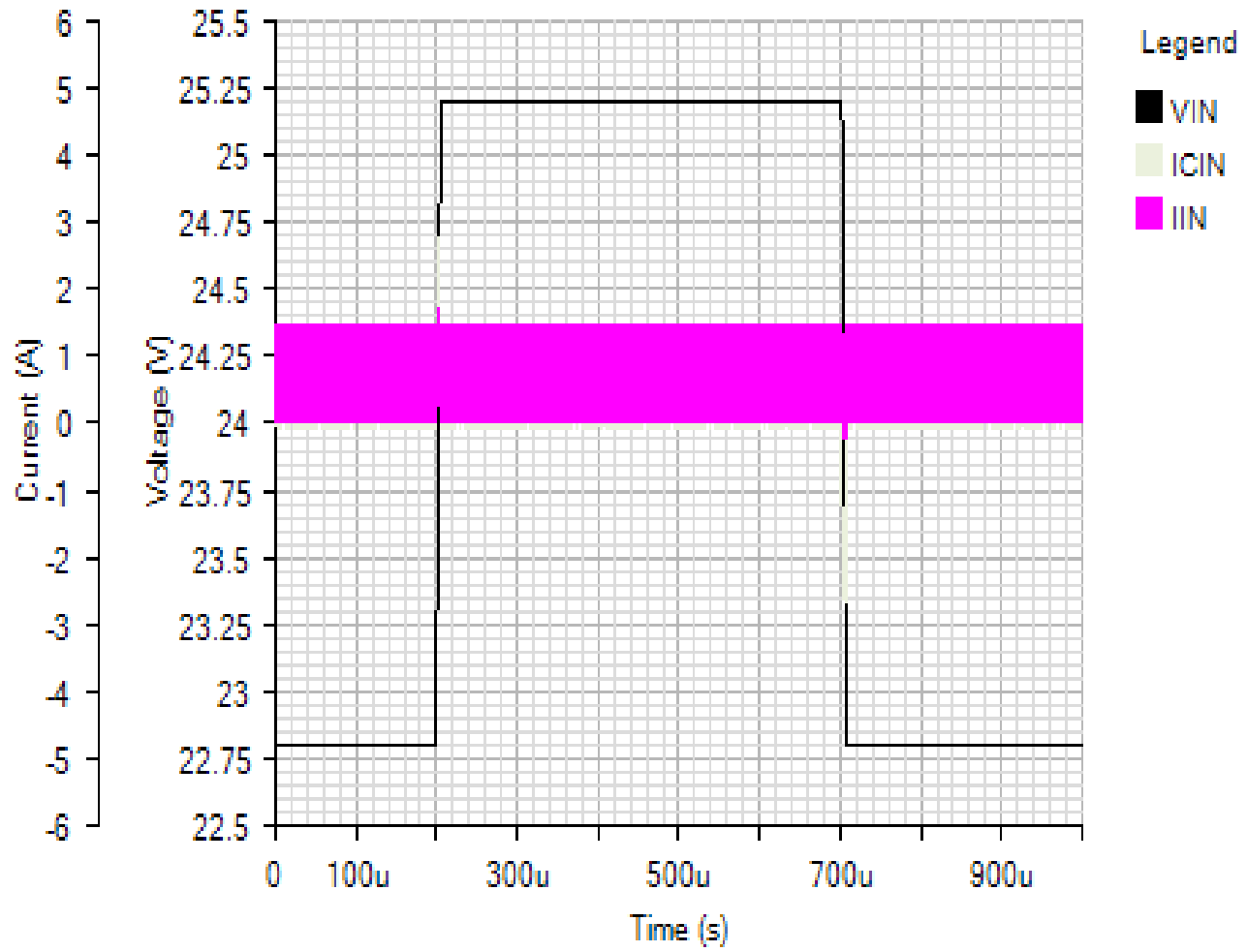## Simulation Results

Line Transient - Sun Nov 25 2018 20:54:42

IC   Default

Legend
- RESETB
- FB
- EXTVCC
- SS
- VCC
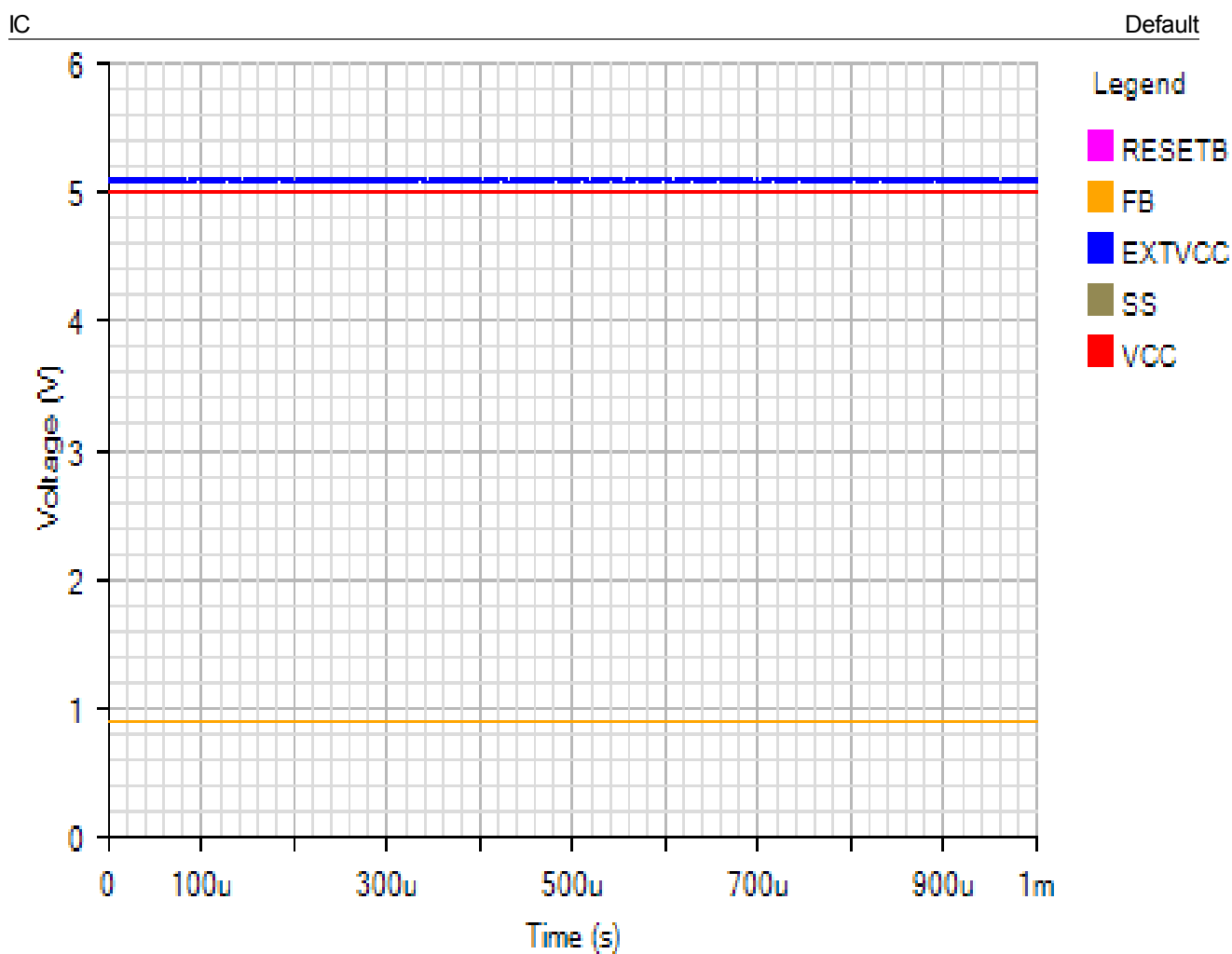
OUTPUT   Default
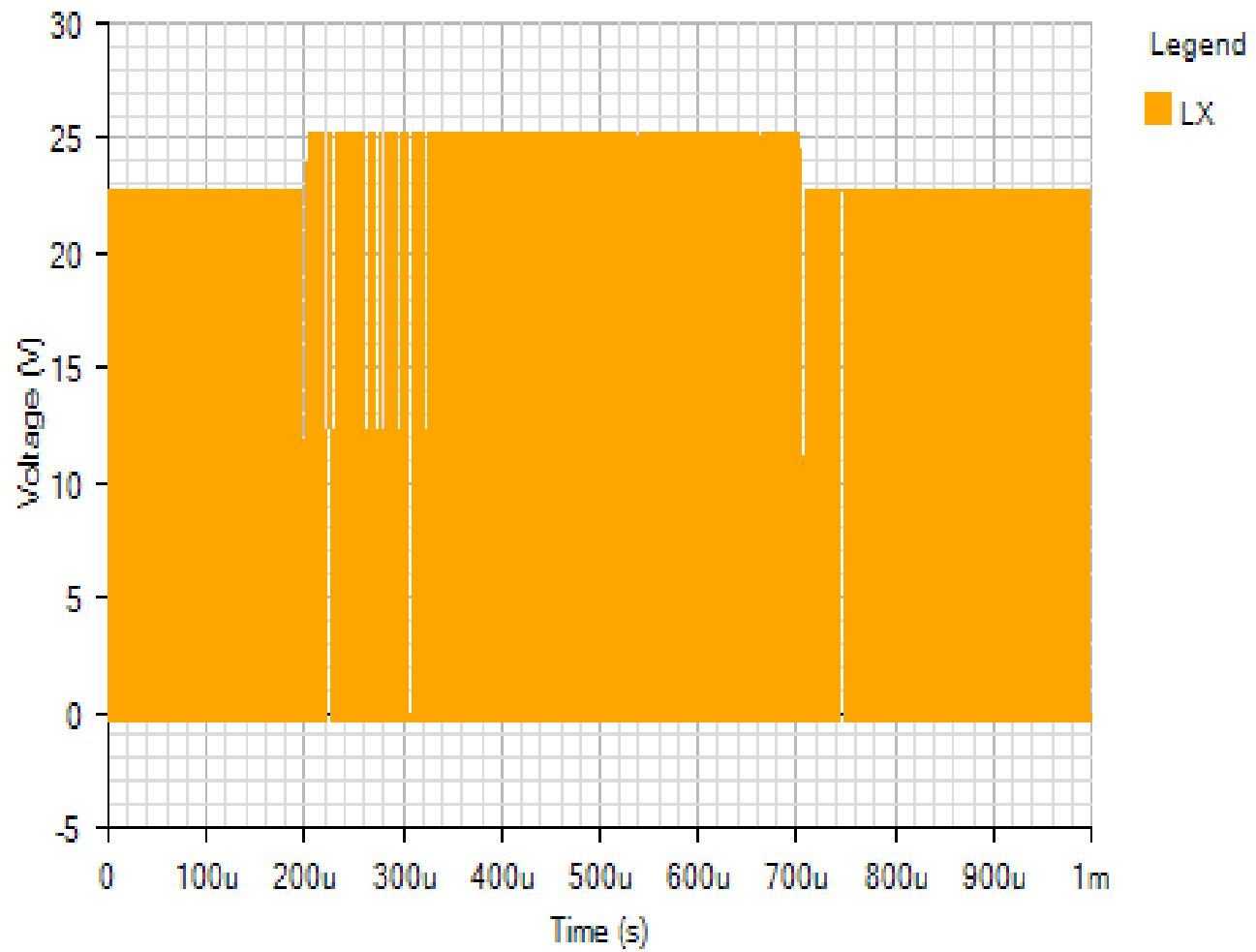
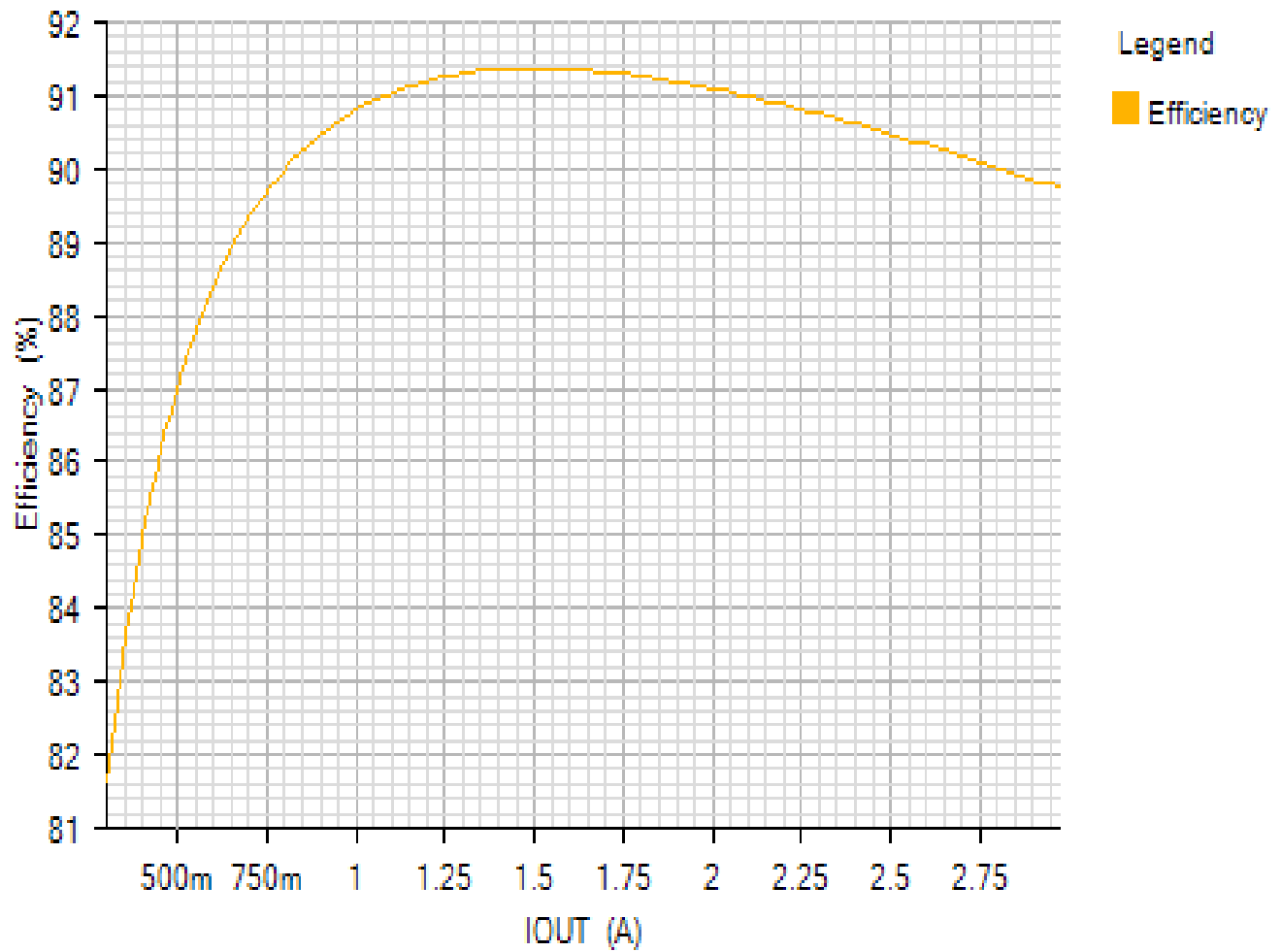INPUT   Default

SWITCHING   Default

Efficiency - Sun Nov 25 2018 20:54:42
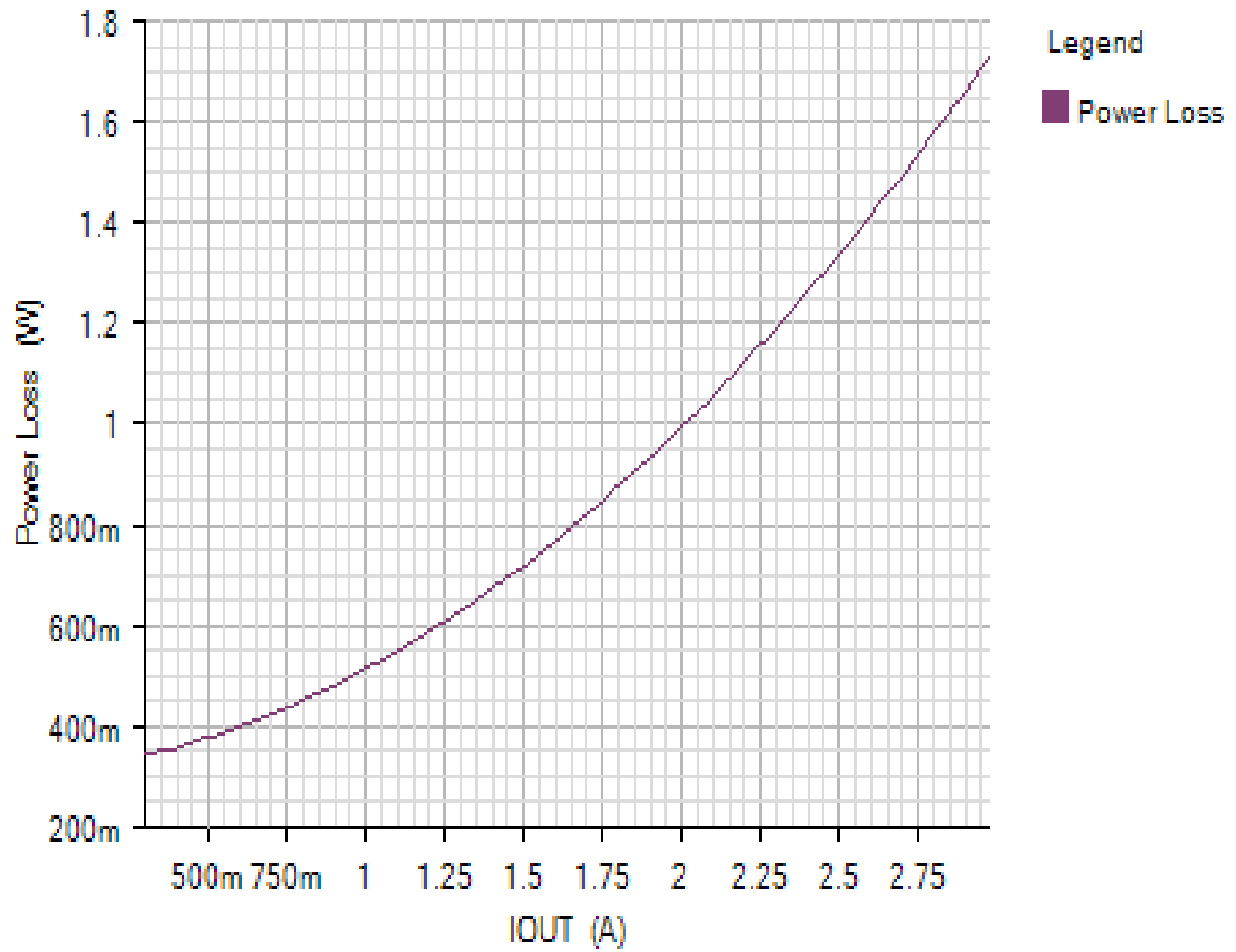
EFFICIENCY_PLOT   Default
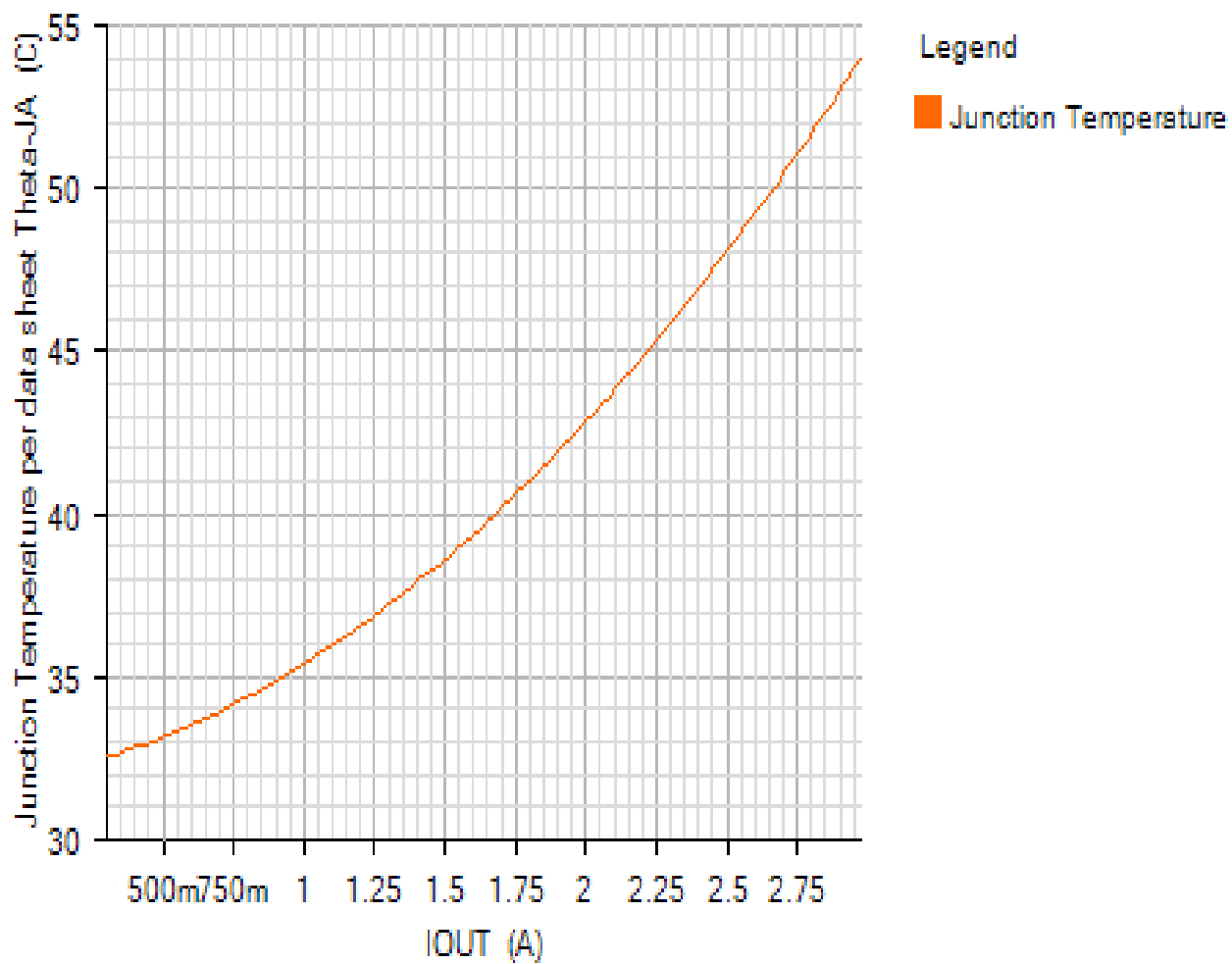
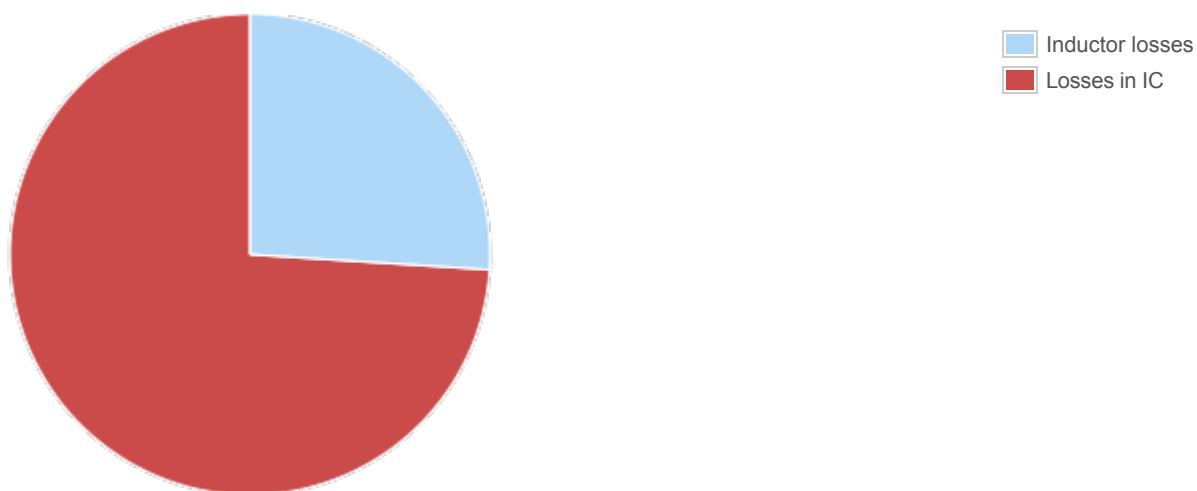POWER_LOSS_PLOT   Default

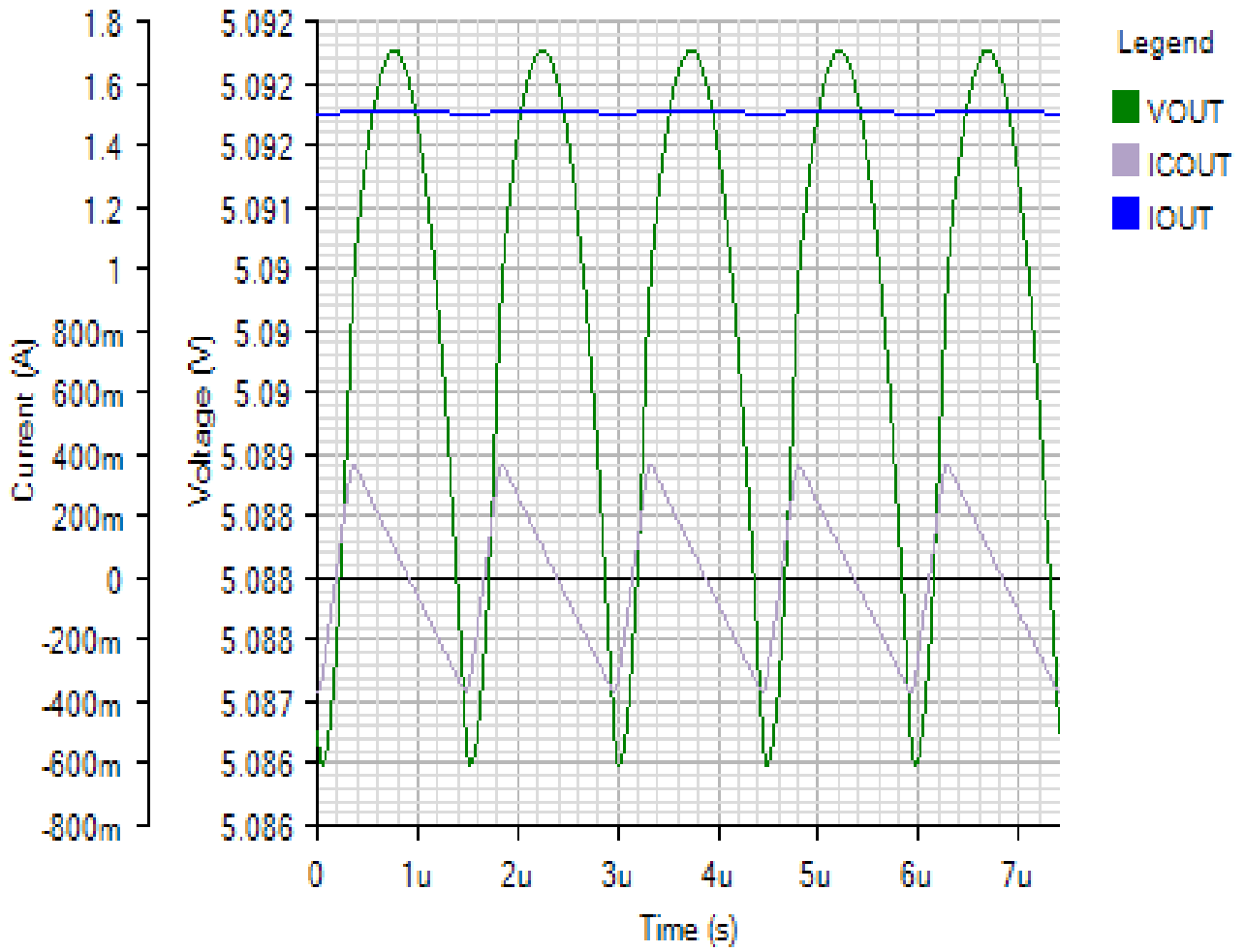JUNCTION_TEMPERATURE_PLOT   Default

Legend

■ Junction Temperature

Losses

■ Inductor losses
■ Losses in IC

Component	Loss (W)	% of total

Component	Loss (W)	% of total
Inductor losses	0.45	26
Losses in IC	1.28	74
Total	1.73	100

Steady State - Sun Nov 25 2018 20:54:42

IC   Default

Legend

■ RESETB
■ FB
■ EXTVCC
■ SS
■ VCC

OUTPUT

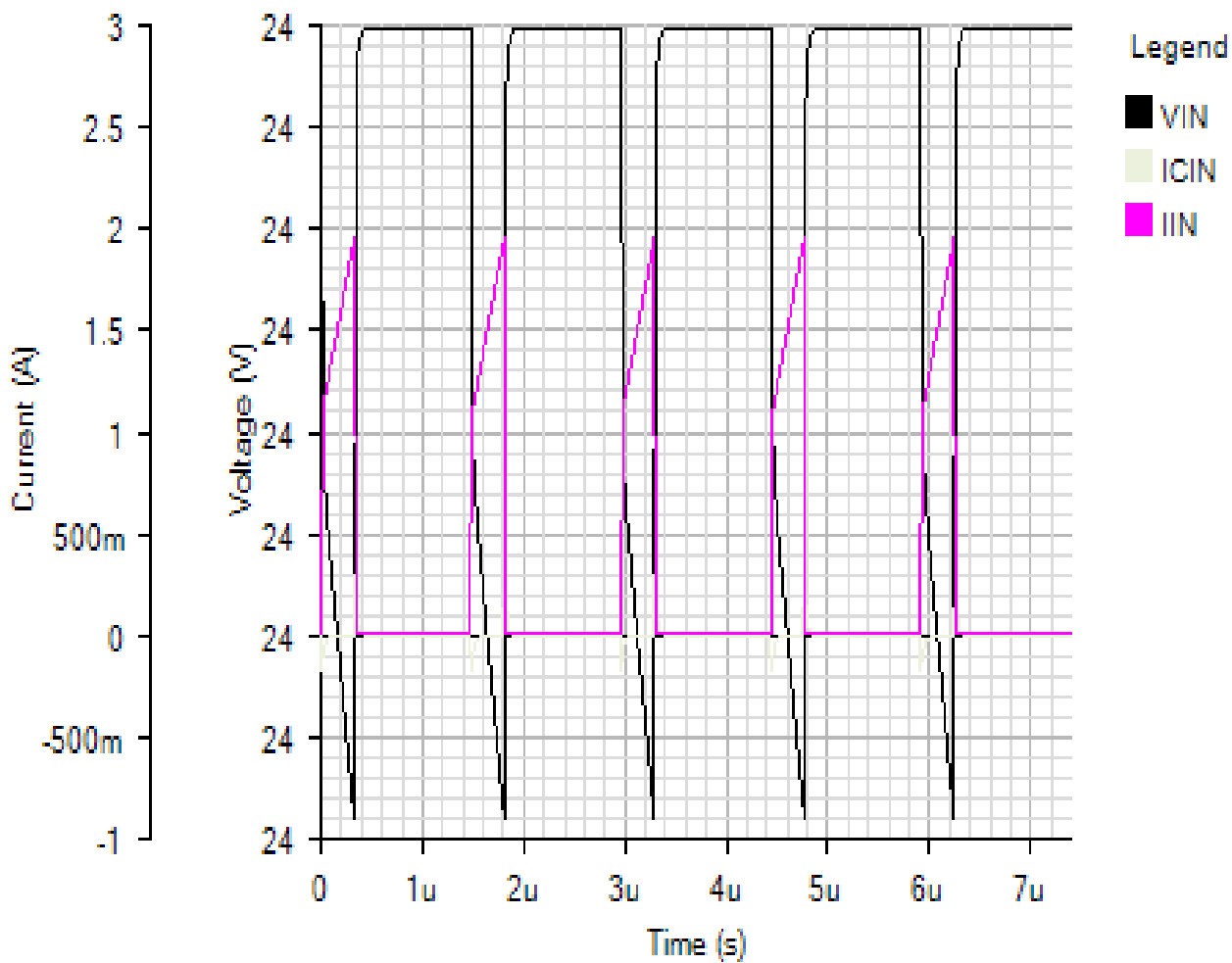Default

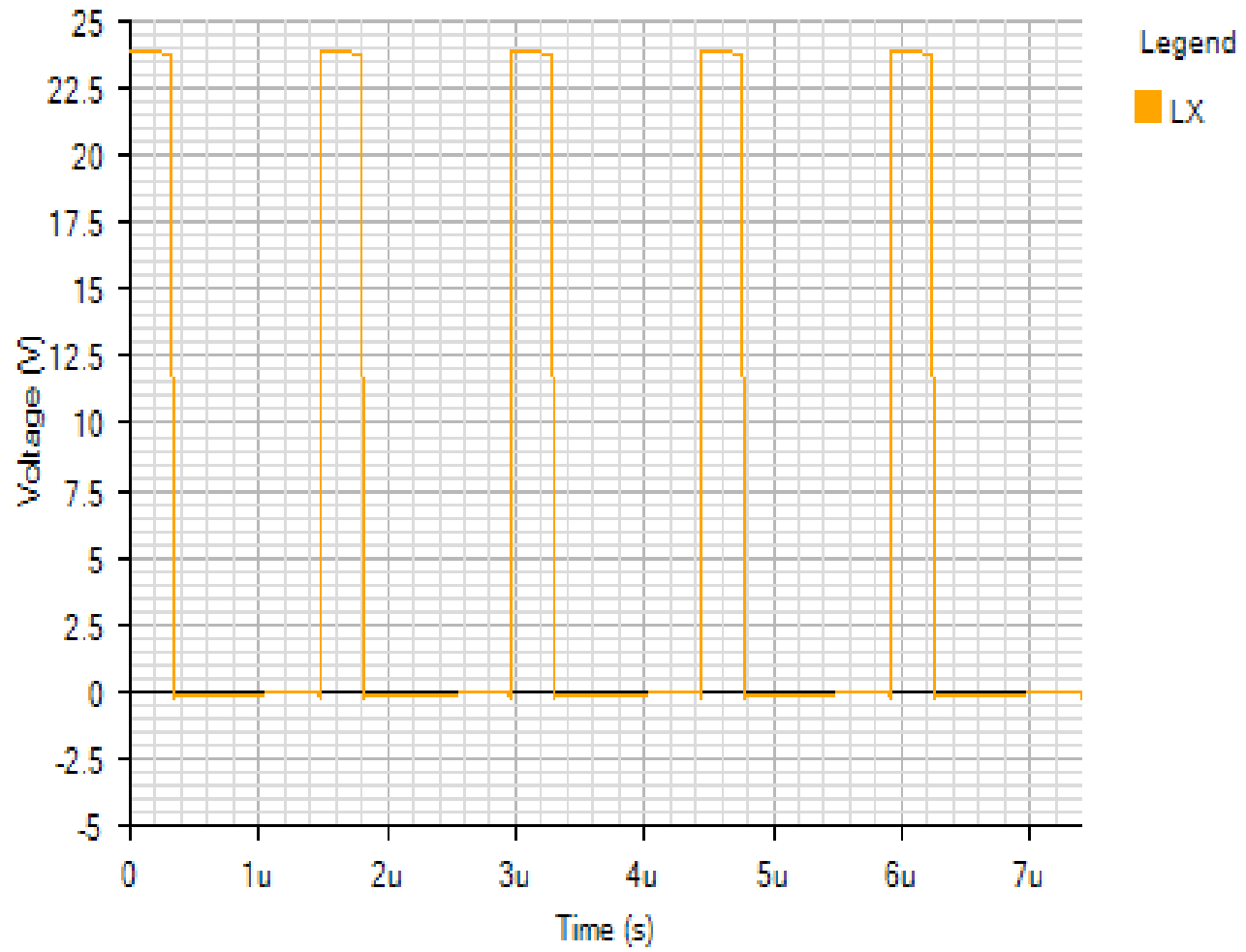INPUT   Default

SWITCHING   Default

Legend

■ LX
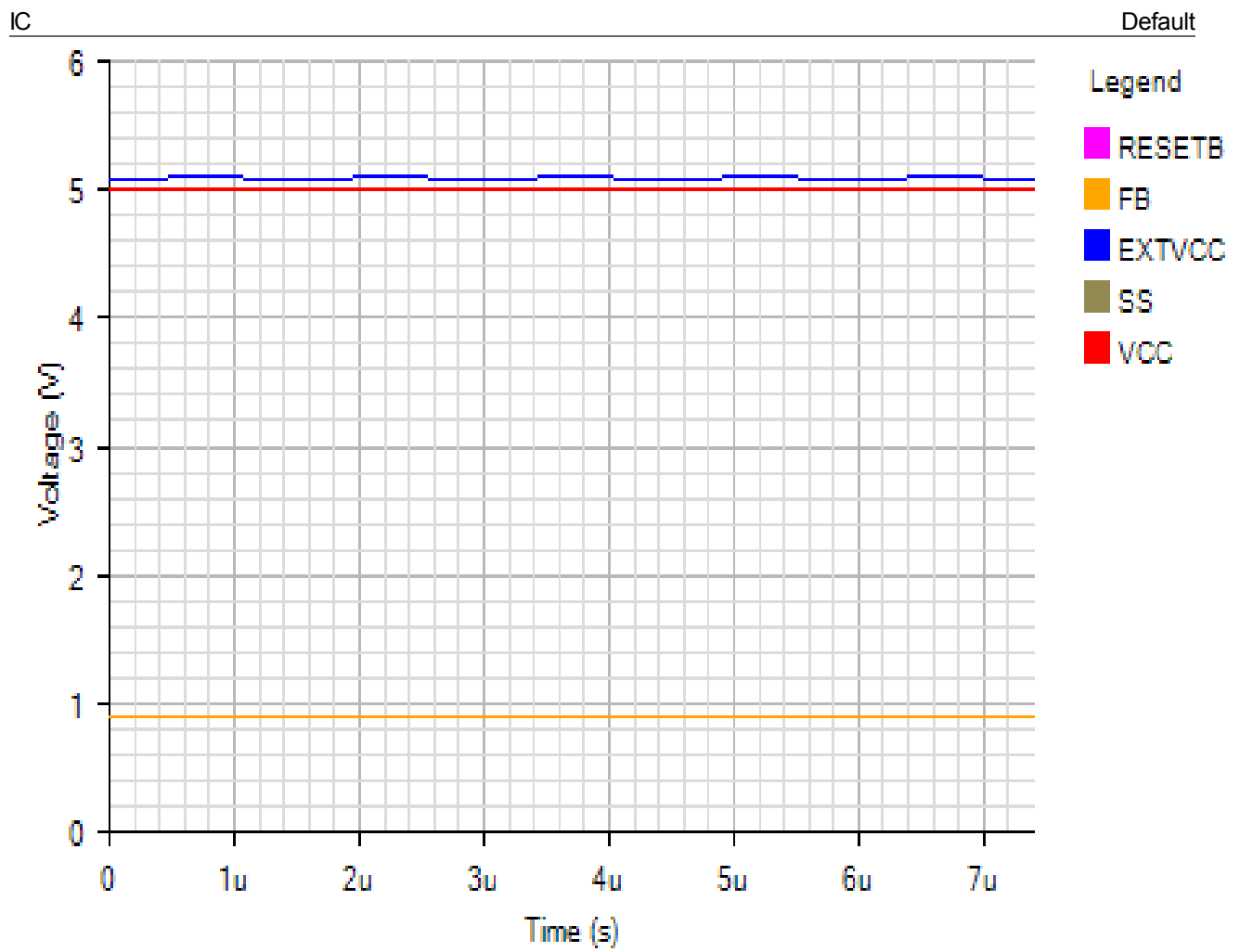
Start Up - Sun Nov 25 2018 20:54:42

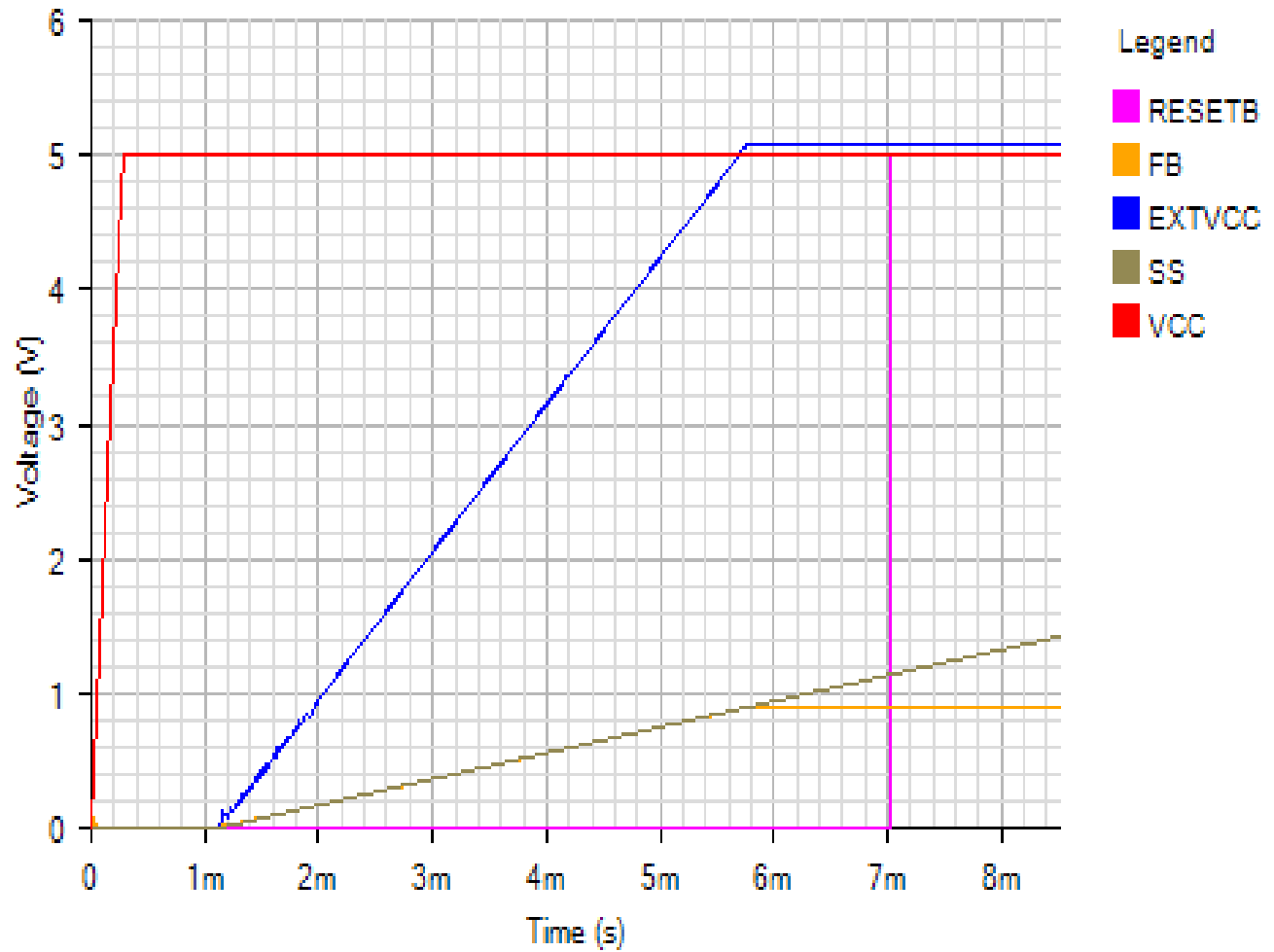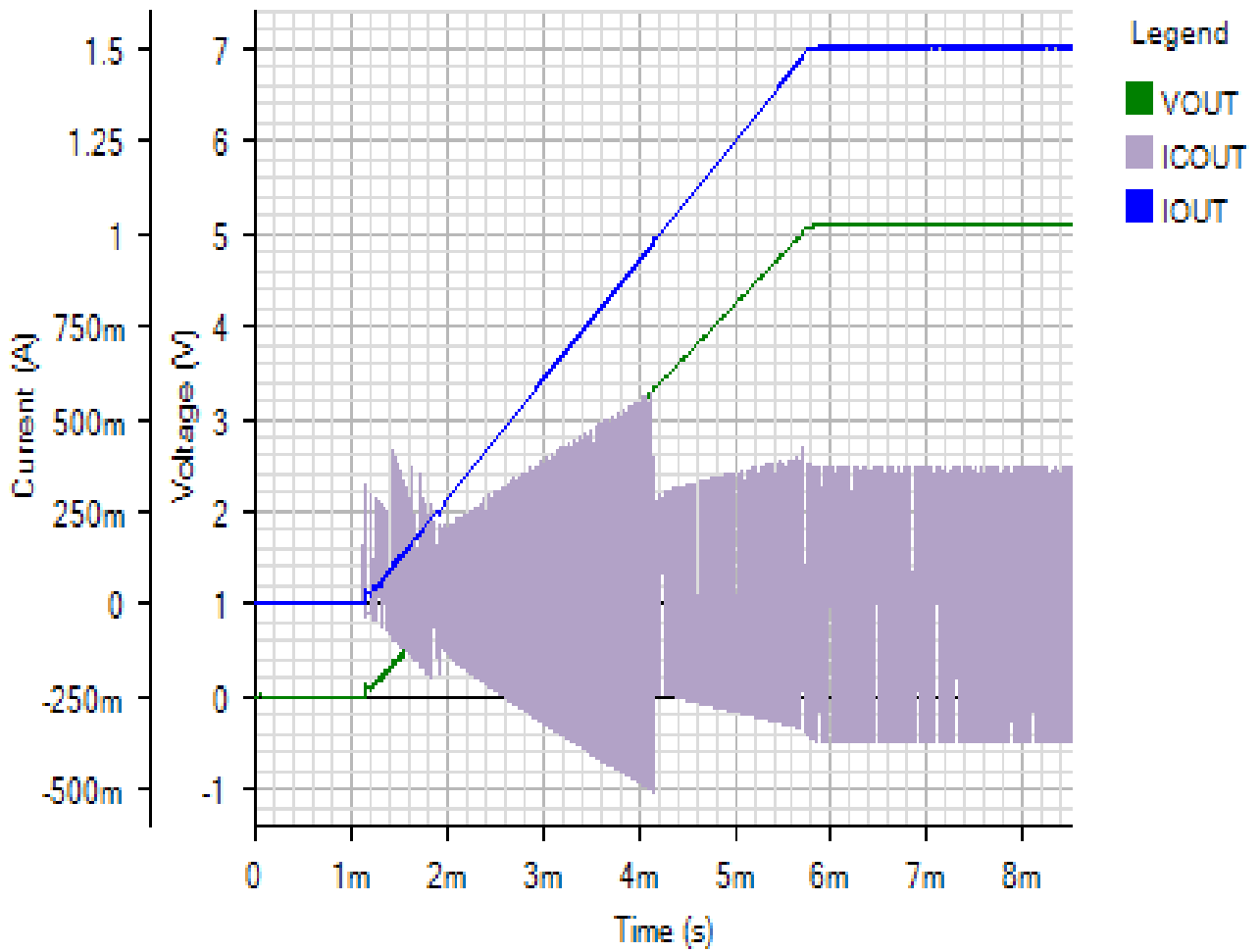IC   Default

OUTPUT   Default

Legend

■ VOUT
■ ICOUT
■ IOUT

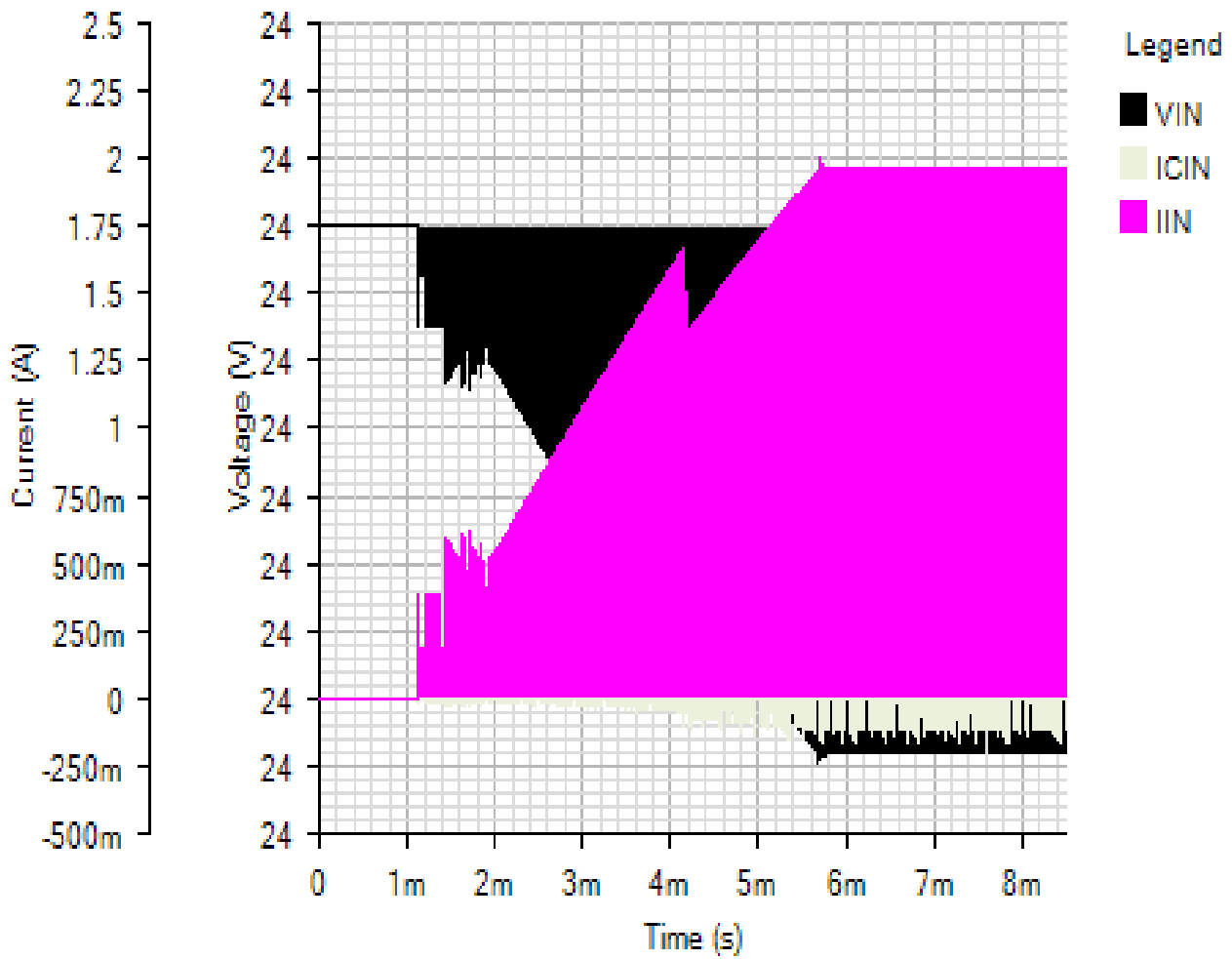INPUT   Default

SWITCHING   Default

Legend

LX

Load Step - Sun Nov 25 2018 20:54:42

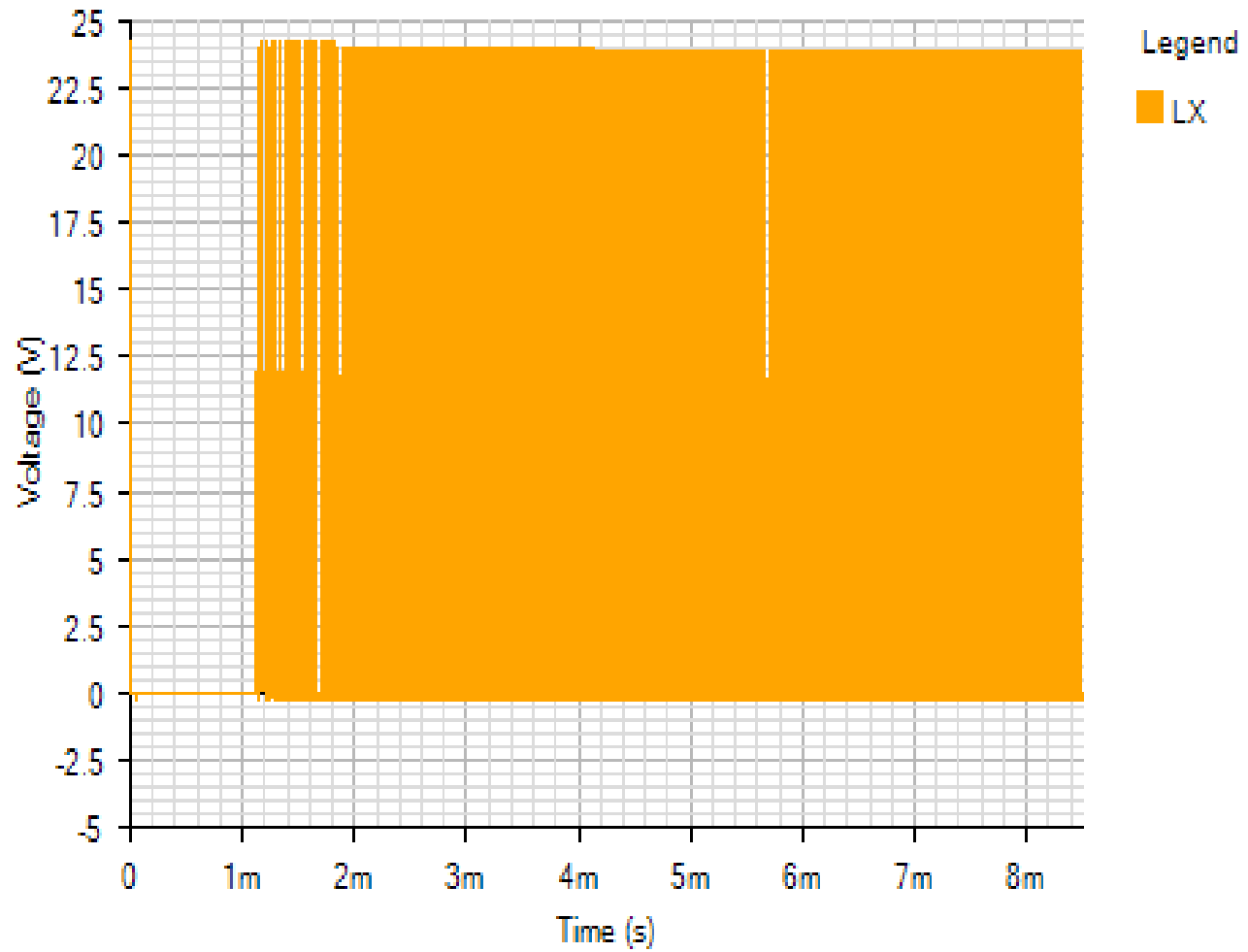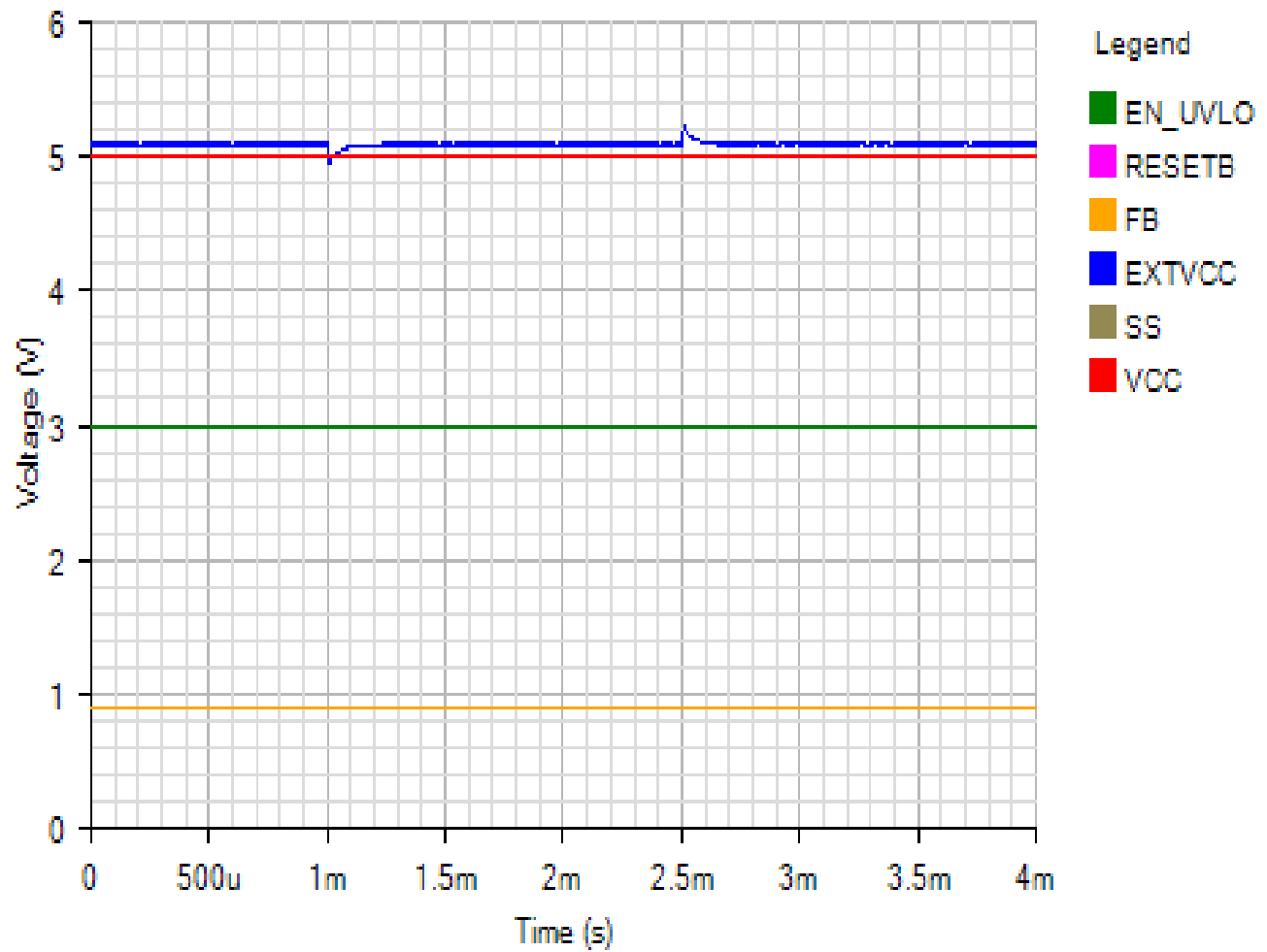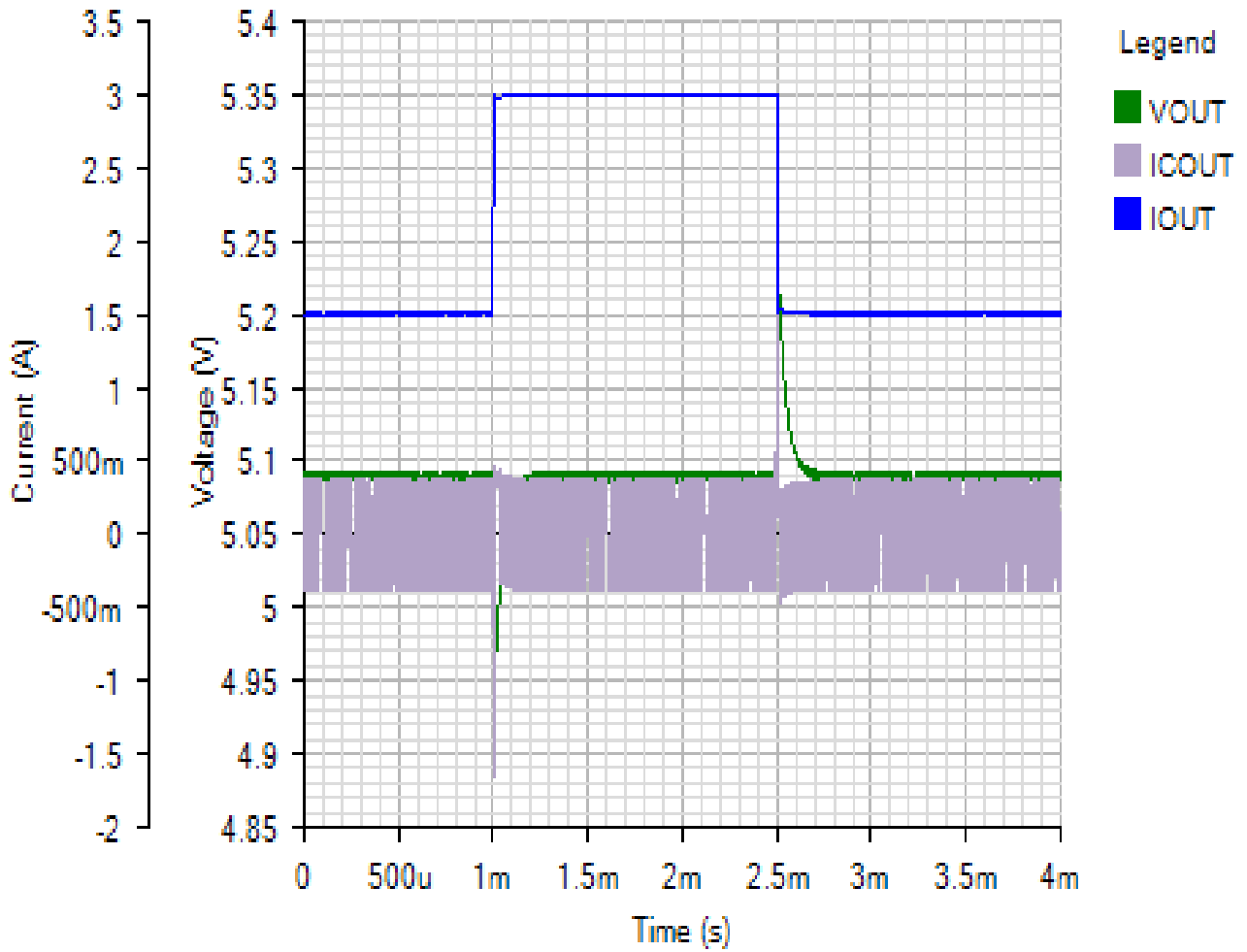IC   Default

OUTPUT   Default

Legend
- VOUT
- ICOUT
- IOUT

INPUT   Default
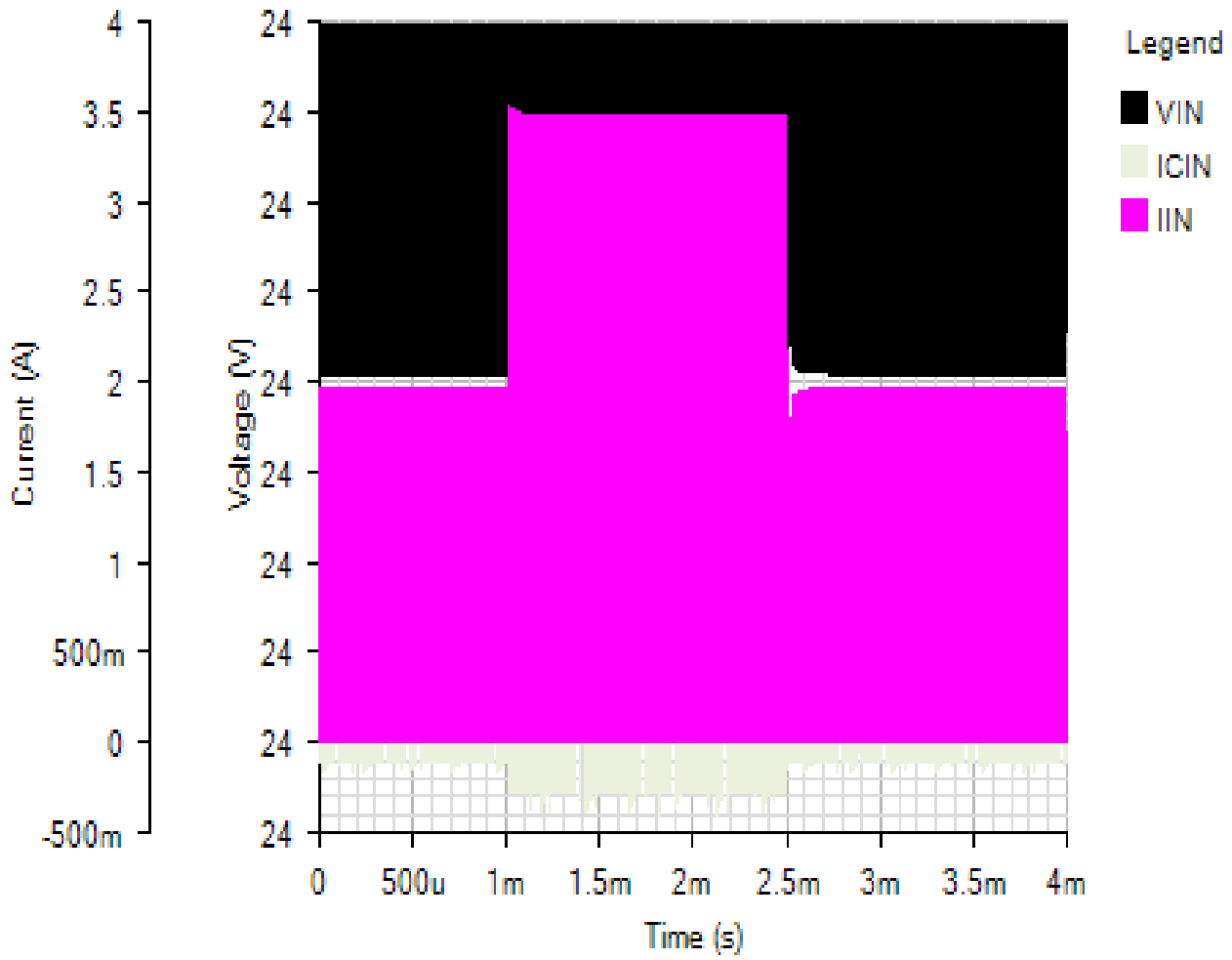
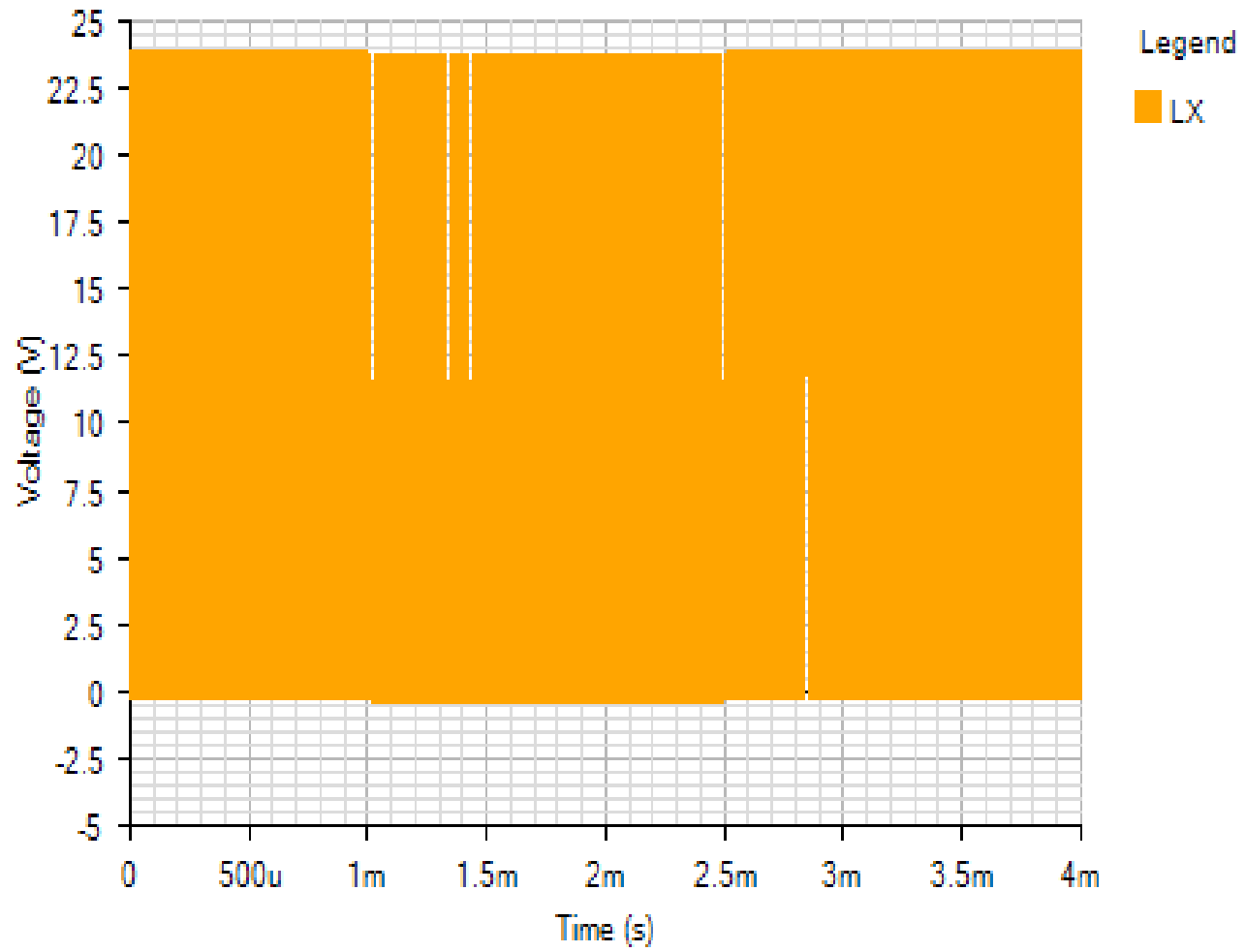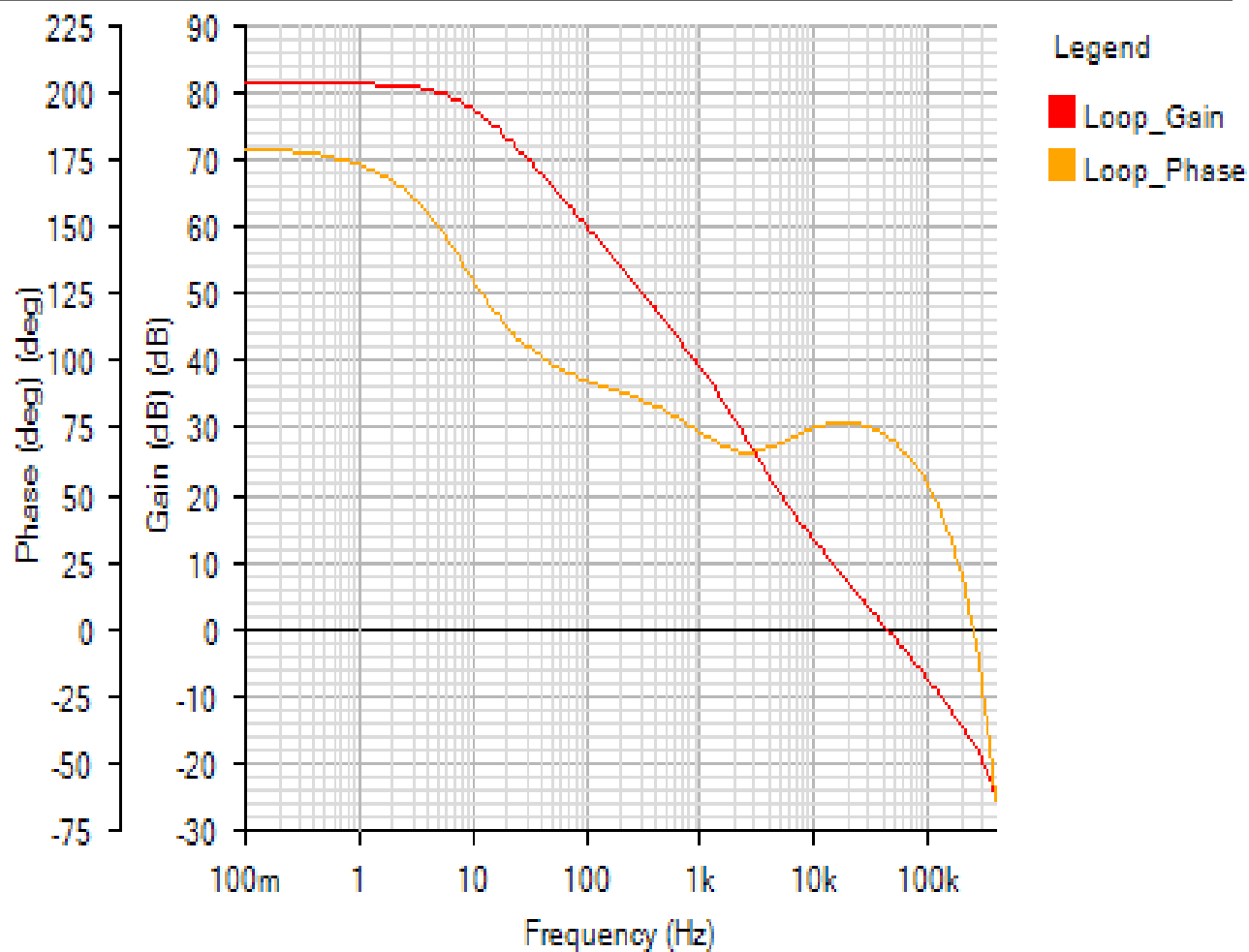SWITCHING   Default

AC Loop - Sun Nov 25 2018 20:54:42

BODE   Default

Phase Margin: 71.68° at a crossover frequency of 43.9kHz

| 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 |