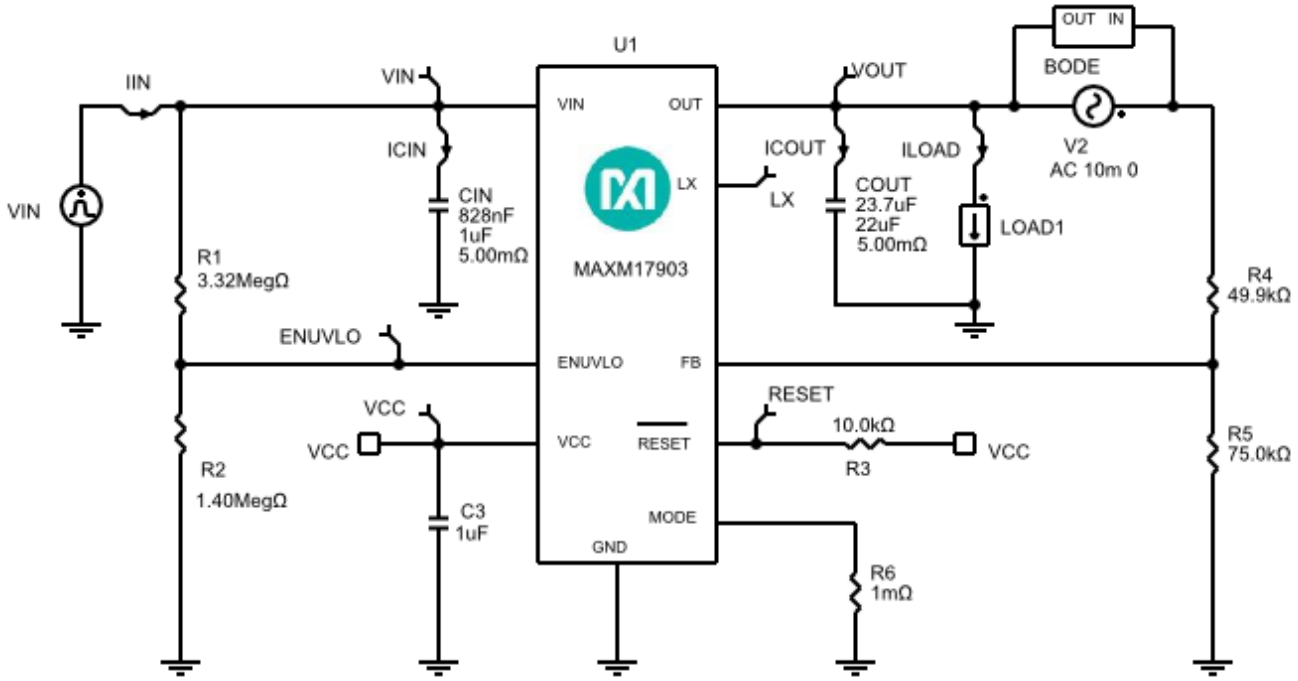
Initial Design

1.0

Design Requirements

Parameter	Value
Minimum Input Voltage	4.5V
Maximum Input Voltage	21.5V
Nominal Input Voltage	12V
Input Steady-State Ripple	5%
Input Undervoltage Lockout Level	4.05V
Output Voltage	1.5V
Load Current	0.3A
Load Step Start Current	0.15A
Load Step Current	0.3A
Mode of Operation	PWM
Switching Frequency	500kHz
Ambient Temperature	25°C
Soft Start time	4ms

Schematic



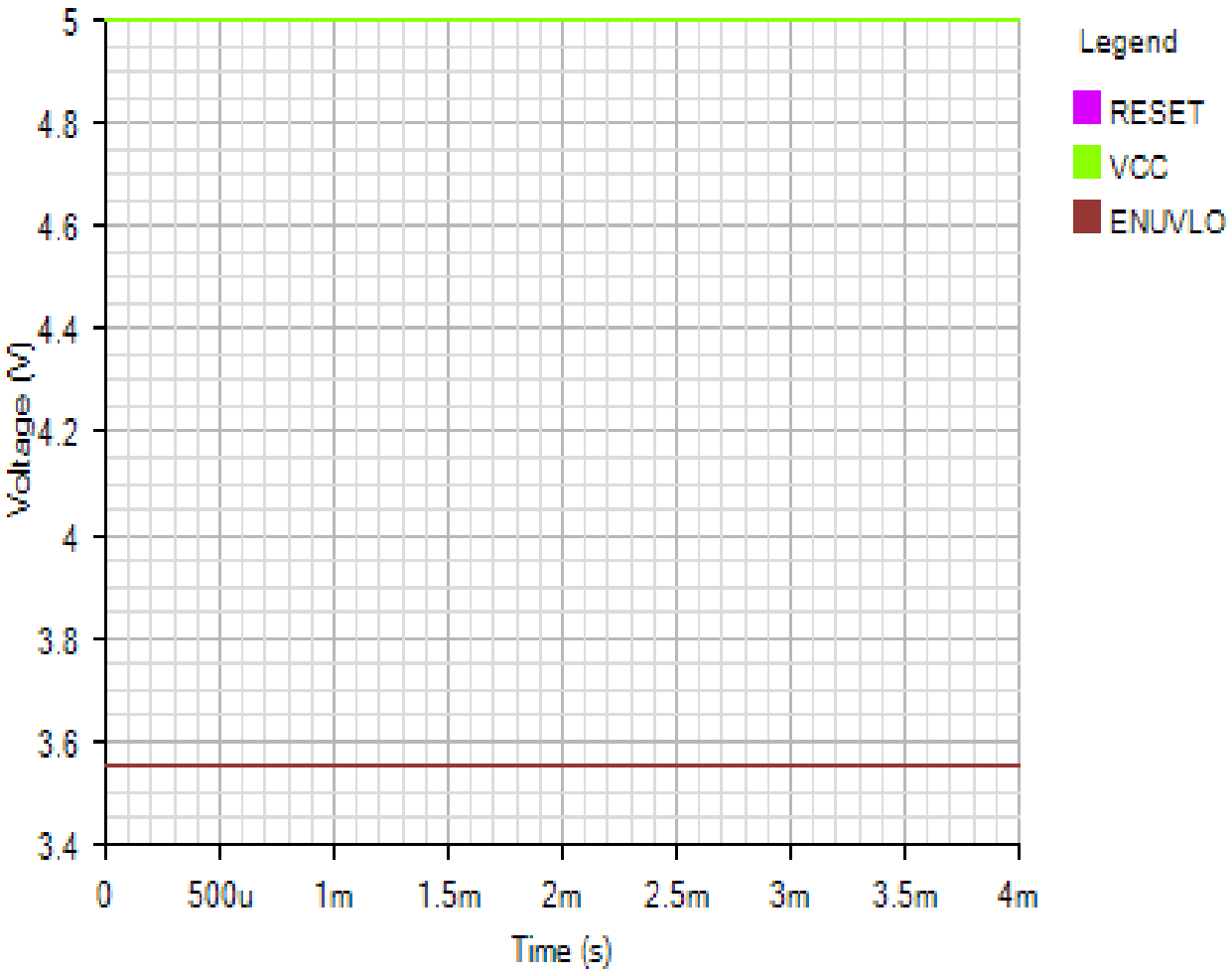
BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAXM17903	User-Defined	IC
C3	1	CC0603KRX7R6BB105	Yageo	Cap Ceramic 1uF 10V X7R 10% Pad SMD 0603 125°C T/R
CIN	1	C1206C105K3RAC	Kemet	Cap Ceramic 1uF 25V X7R 10% SMD 1206 125C Bulk
COUT	1	GRM31CR70J226KE19L	Murata	Cap Ceramic 22uF 6.3V X7R 10% SMD 1206 125C Embossed T/R
R1	1	RC0402FR-073M32L	Yageo	Res Thick Film 0402 3.32M Ohm 1% 0.063W(1/16W) ±100ppm/°C Epoxy Pad SMD T/R
R2	1	CRCW04021M40FKED	Vishay	Res Thick Film 0402 1.4M Ohm 1% 0.063W(1/16W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	ERJ2RKF1002X	Panasonic	Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	RC0402FR-0749K9L	Yageo	Res Thick Film 0402 49.9K Ohm 1% 0.063W(1/16W) ±100ppm/°C Epoxy Pad SMD T/R
R5	1	ERJ2RKF7502X	Panasonic	Res Thick Film 0402 75K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

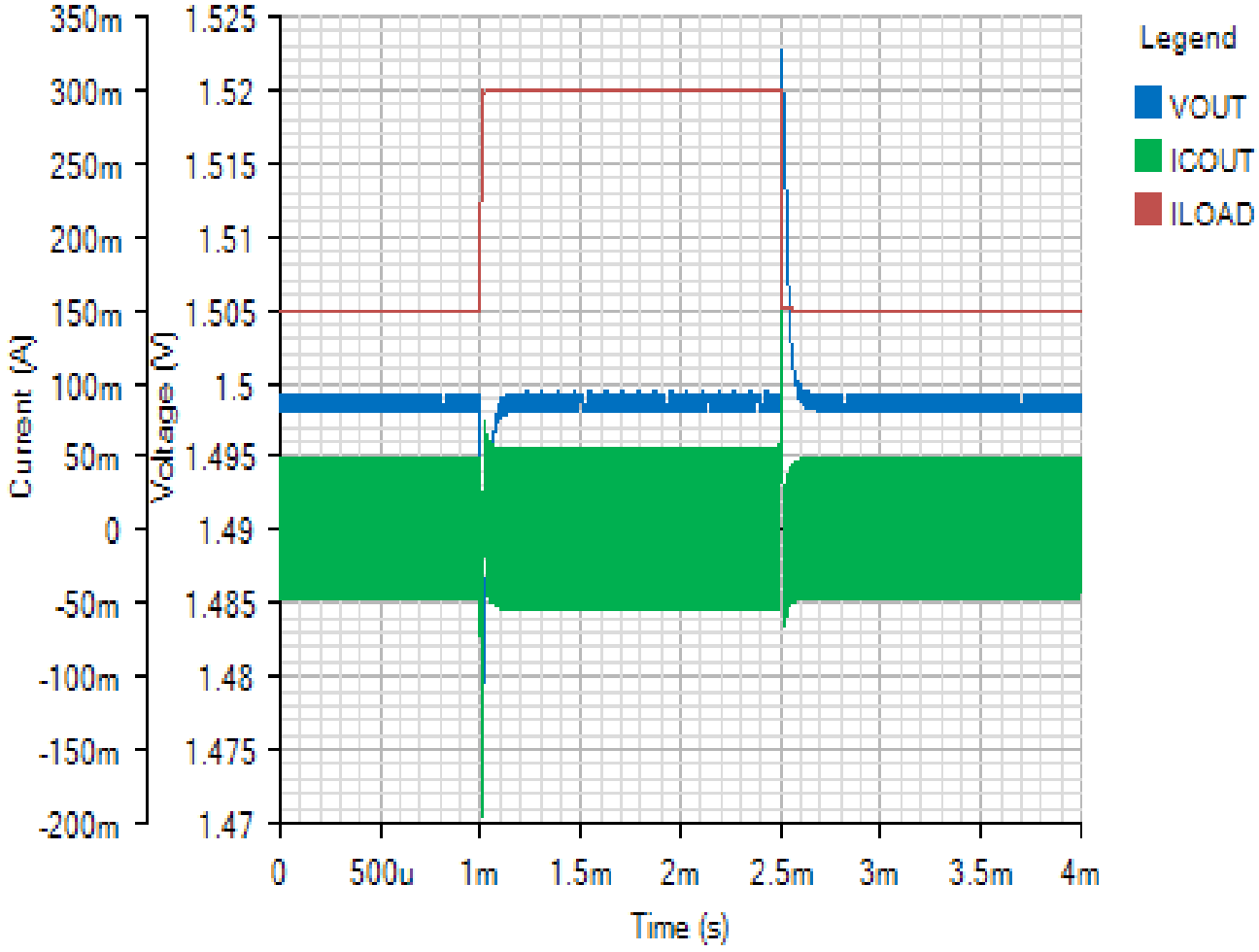
Simulation Results

Load step - Fri Nov 16 2018 16:39:16

IC Default



OUTPUT Default



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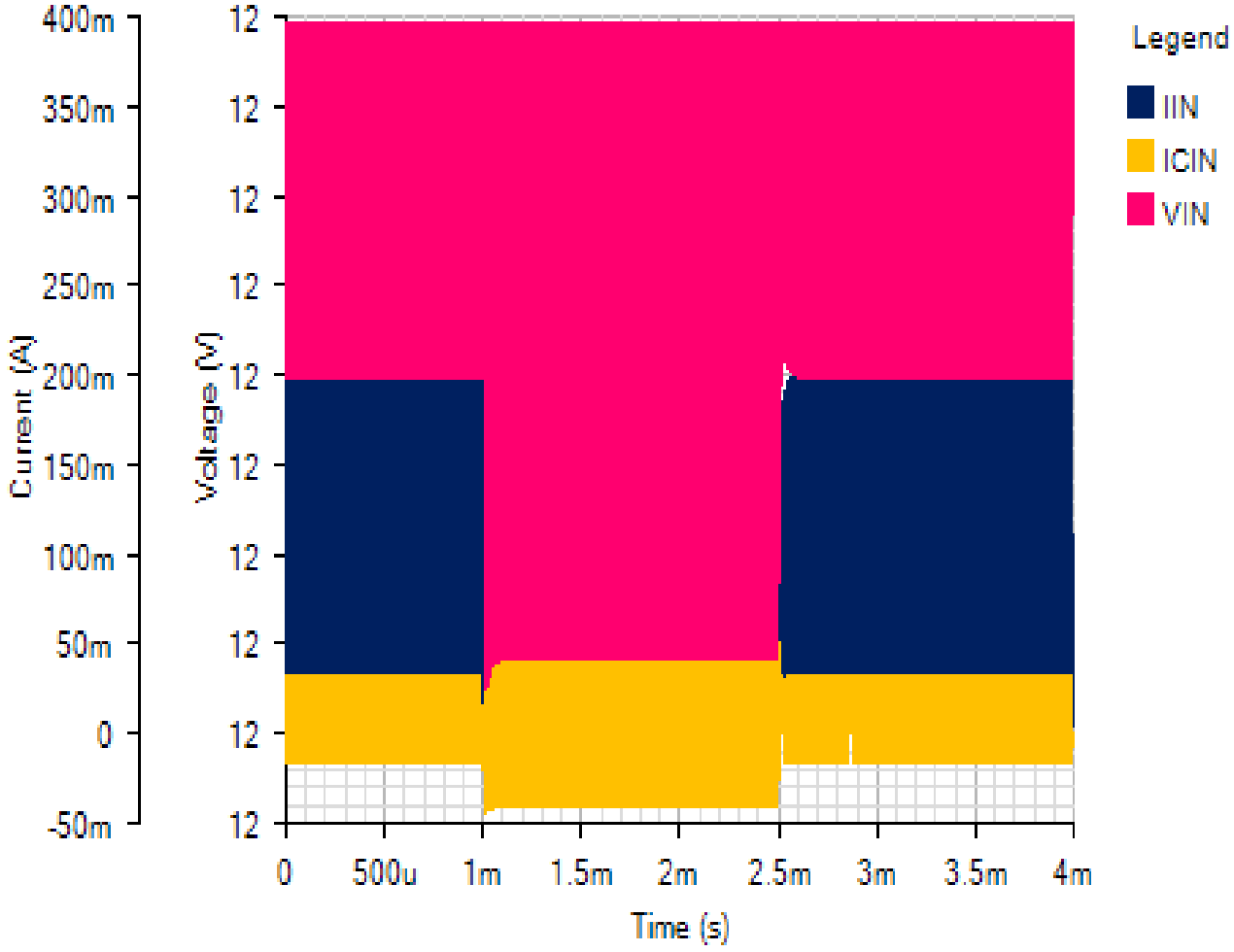
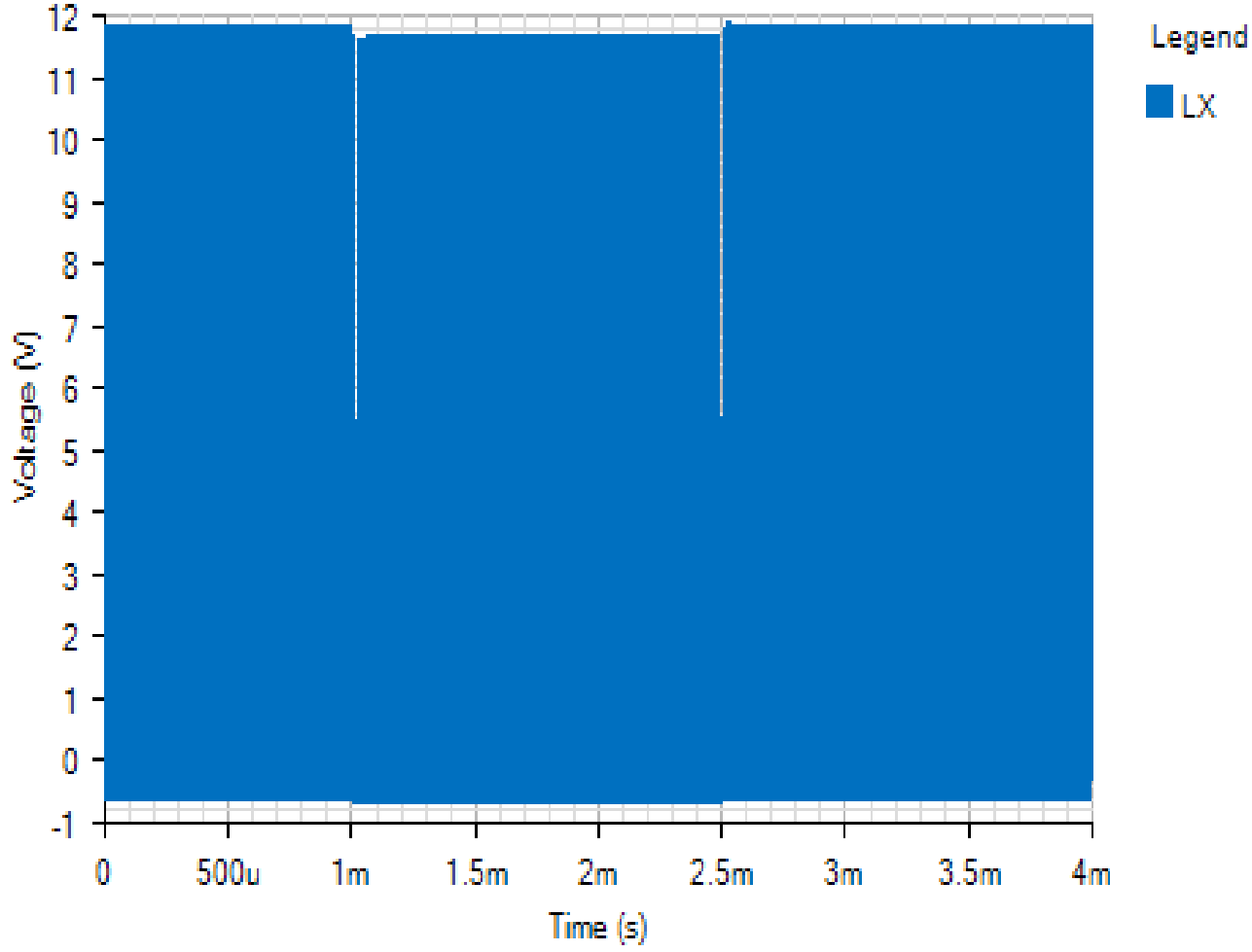
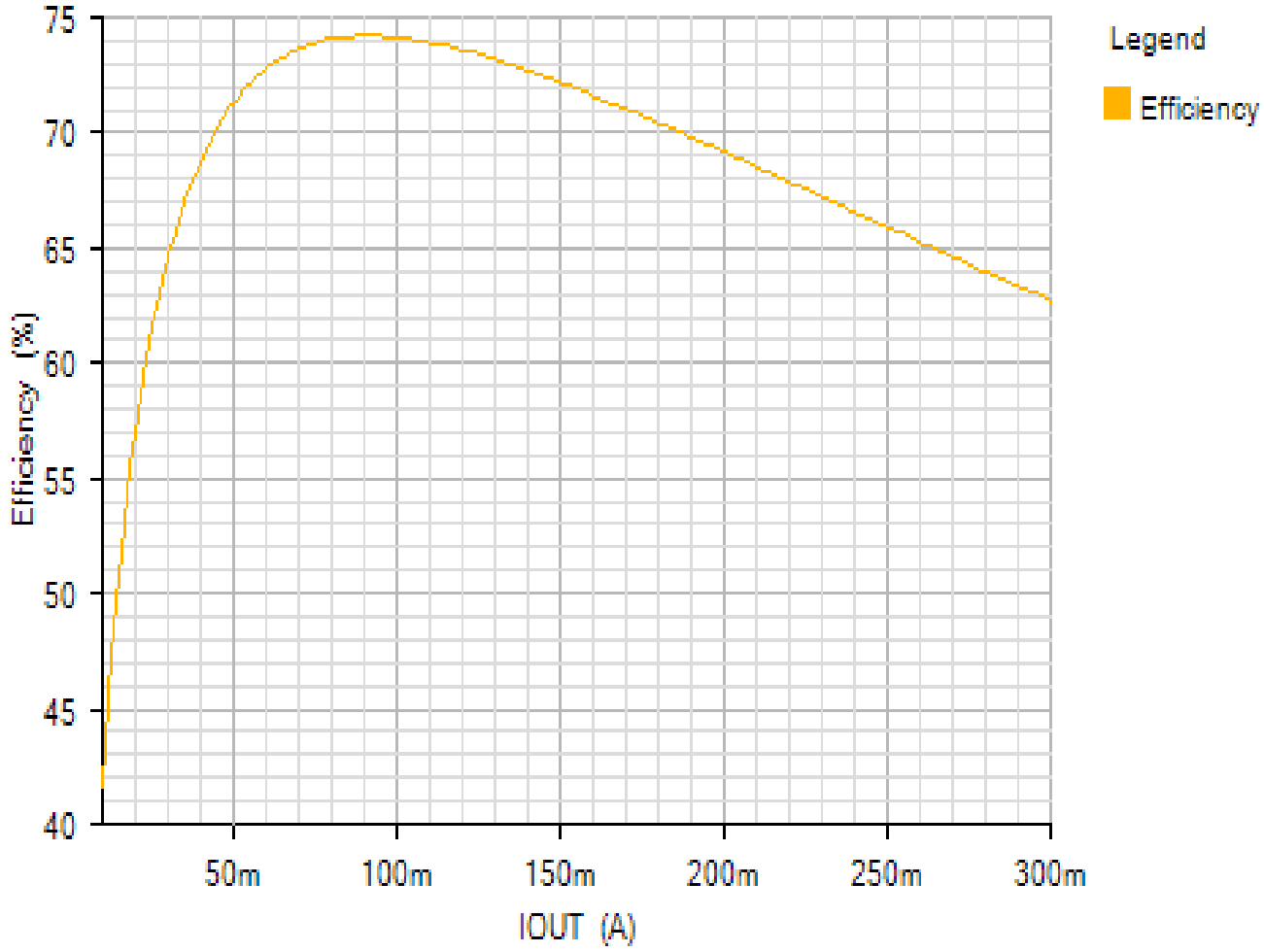


SWITCHING Default

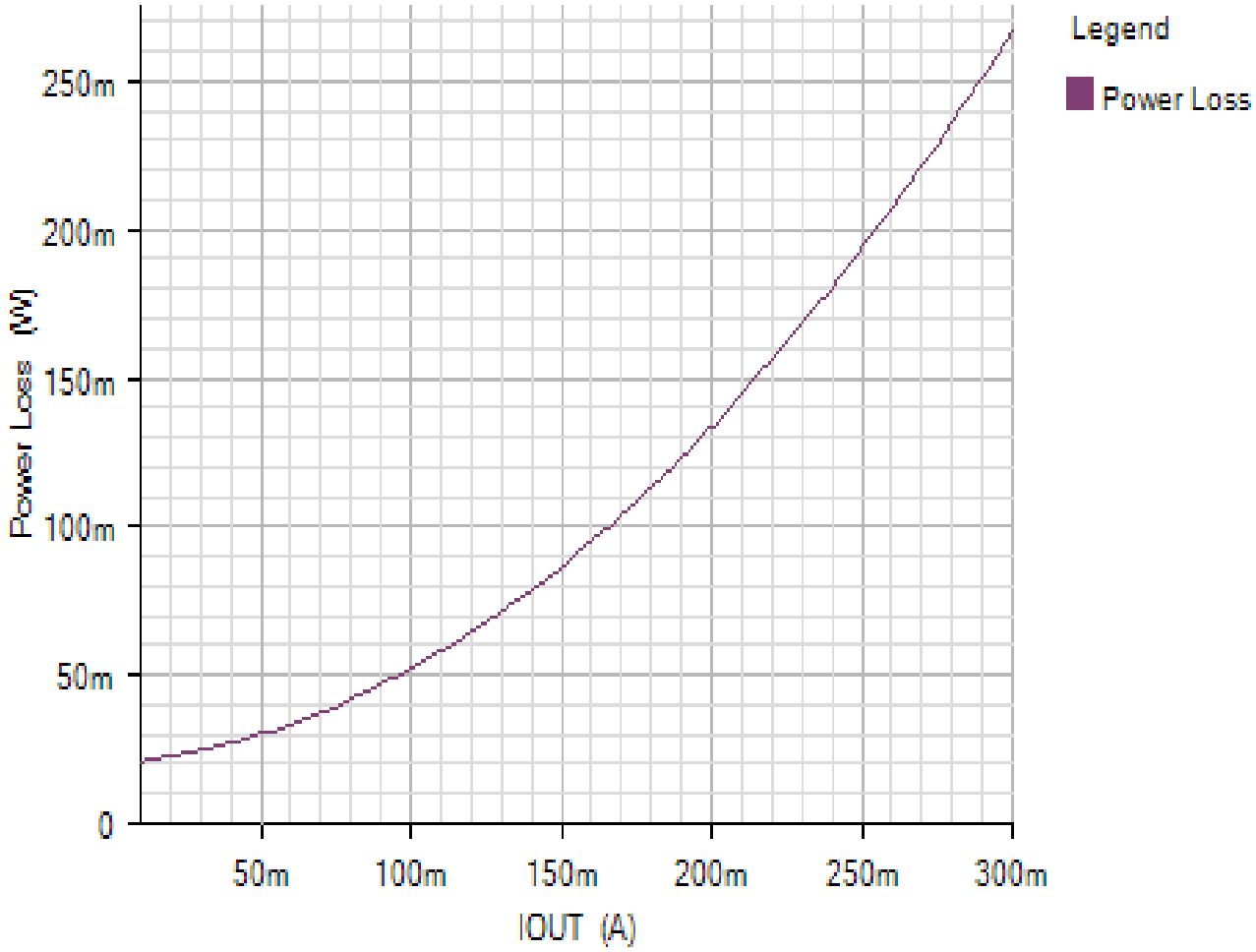


Efficiency - Fri Nov 16 2018 16:39:16

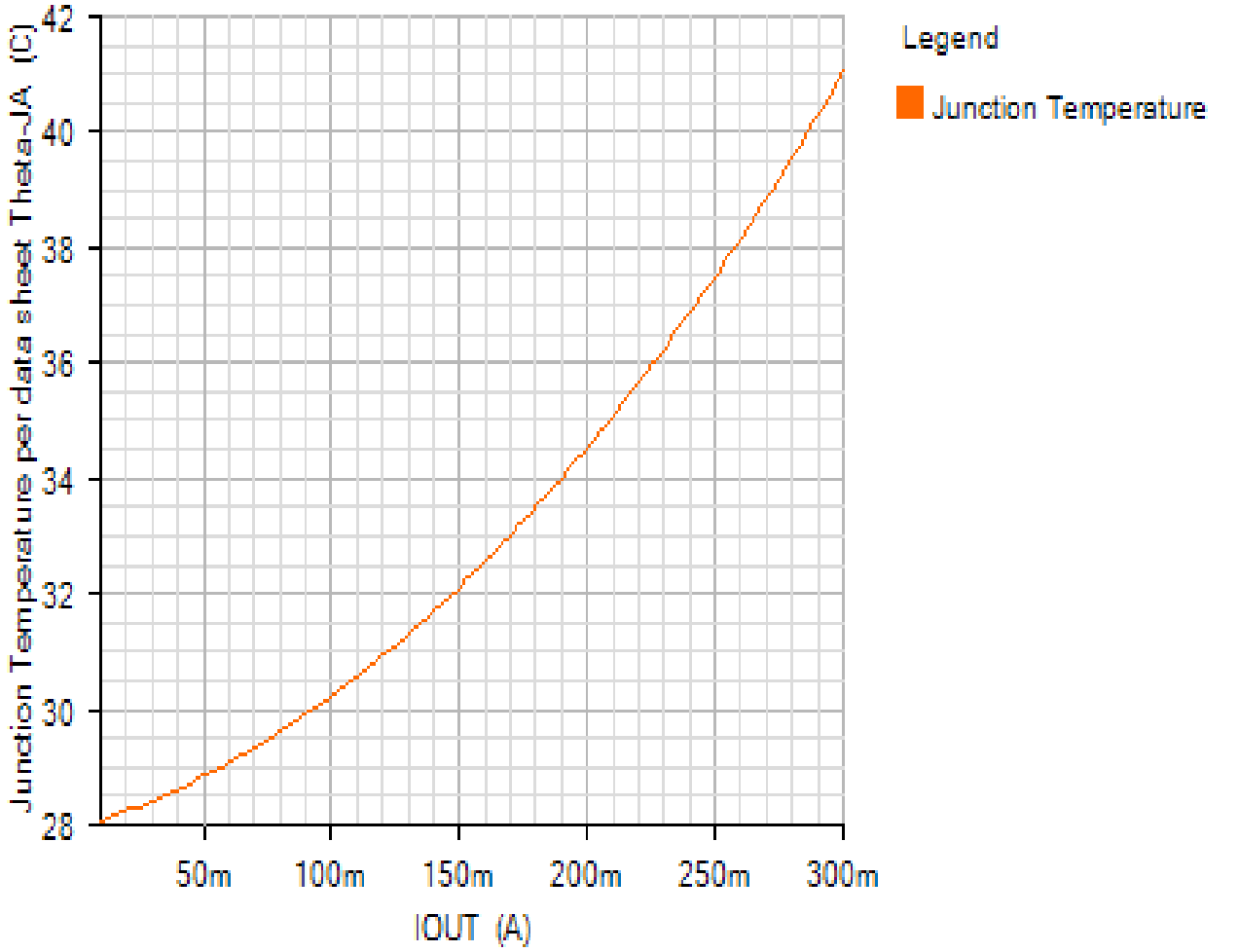
EFFICIENCY_PLOT Default



POWER_LOSS_PLOT Default



JUNCTION_TEMPERATURE_PLOT Default

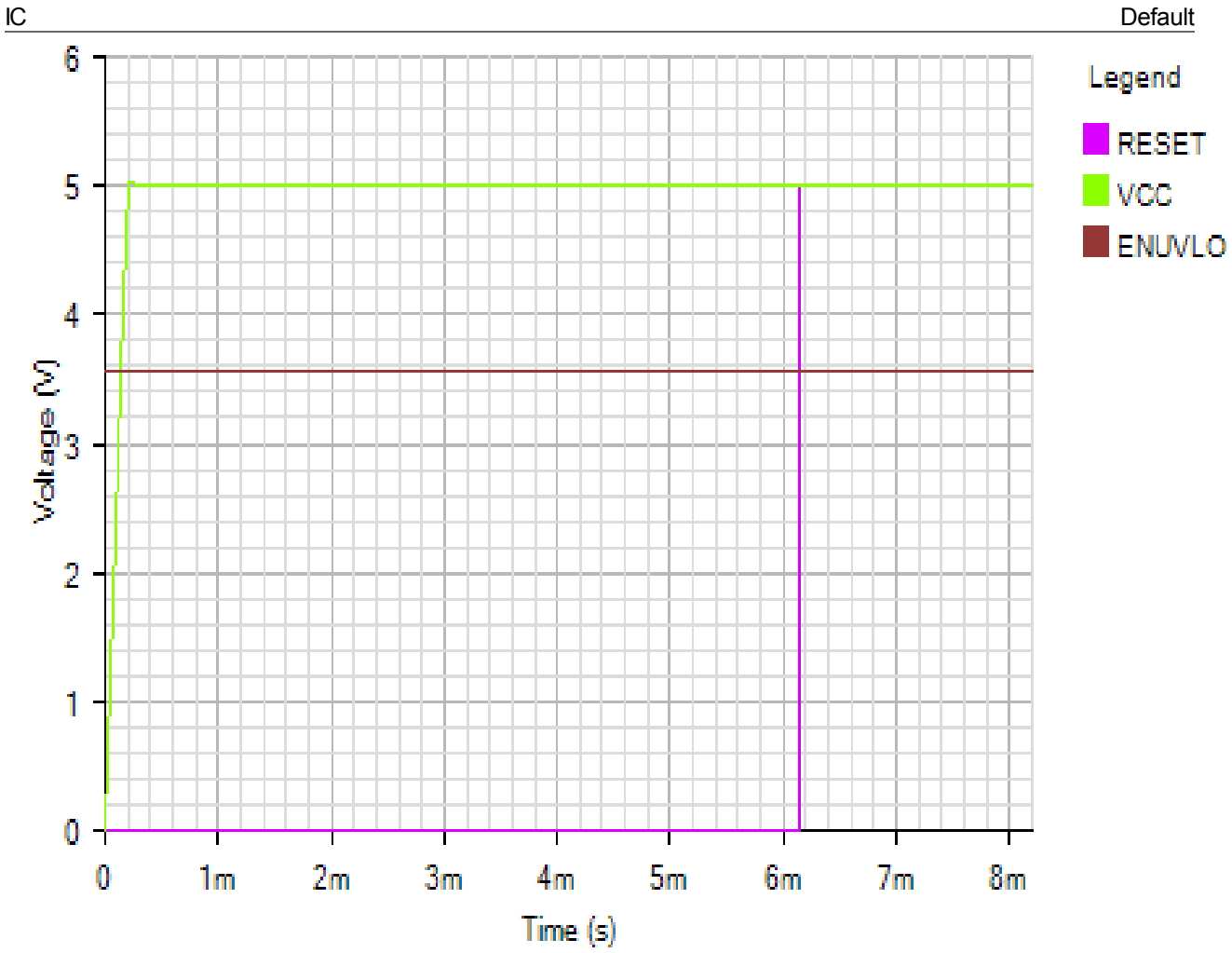


Losses

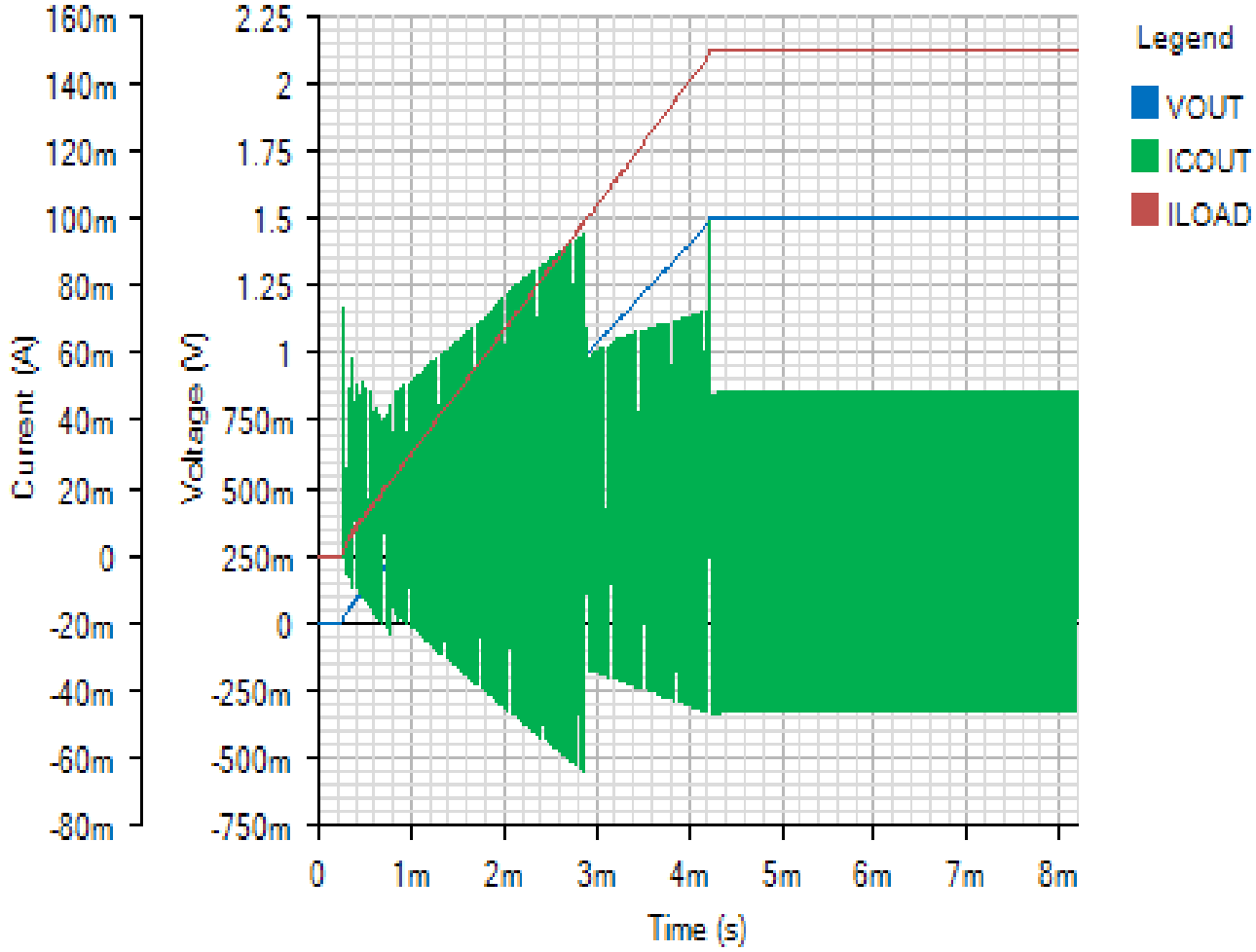
Component	Loss (W)	% of total

Component	Loss (W)	% of total
Total	0	100

Start Up - Fri Nov 16 2018 16:39:16



OUTPUT Default



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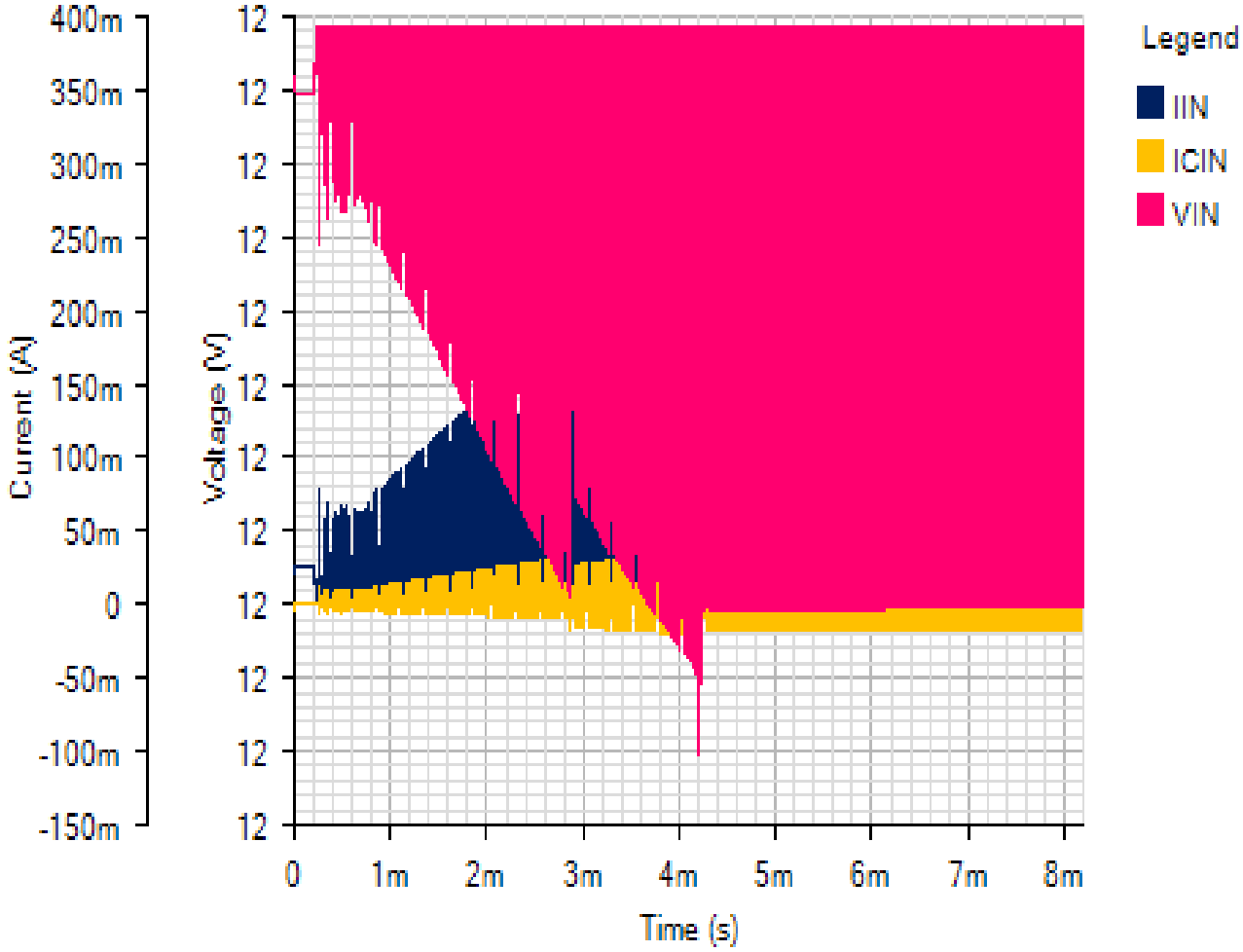
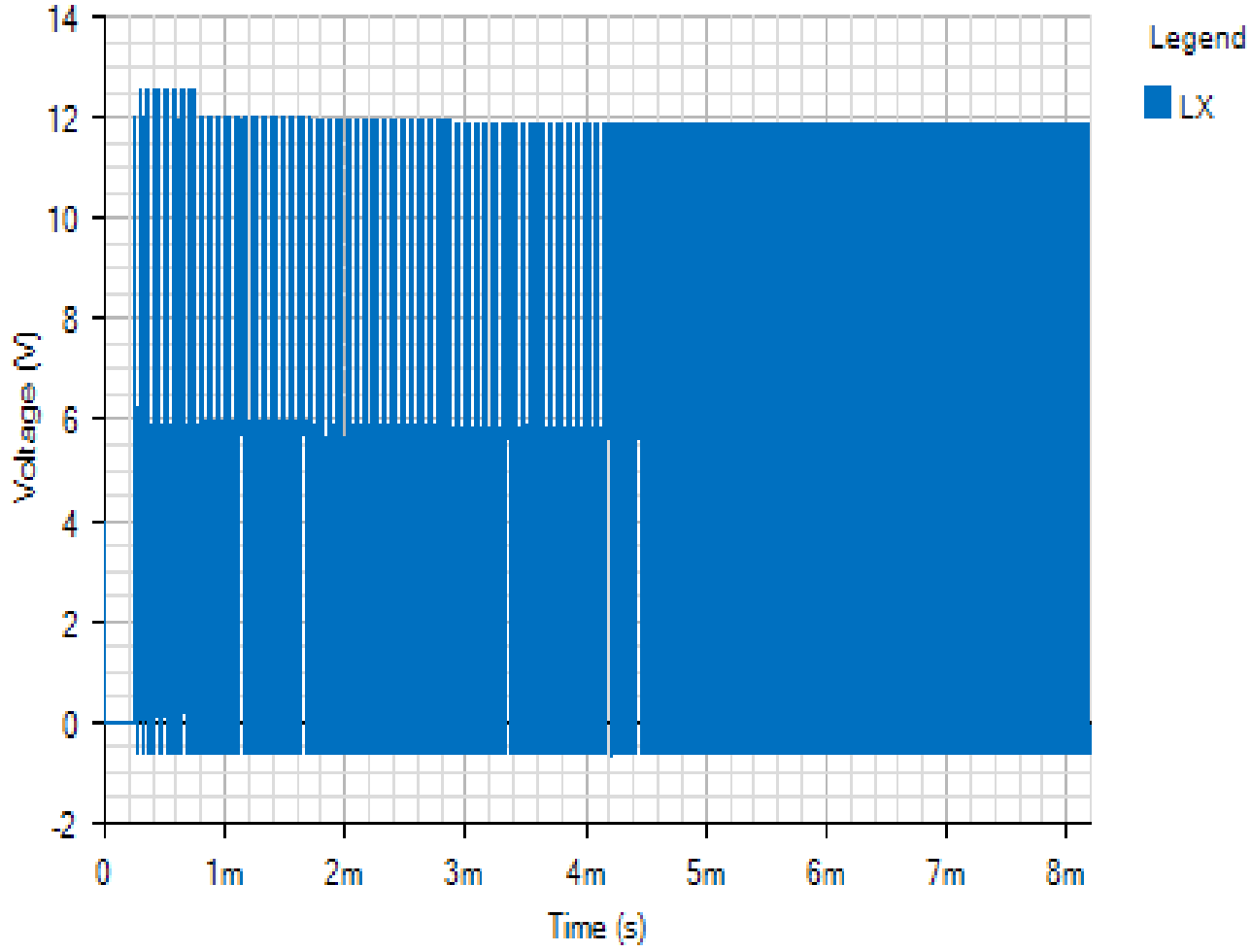
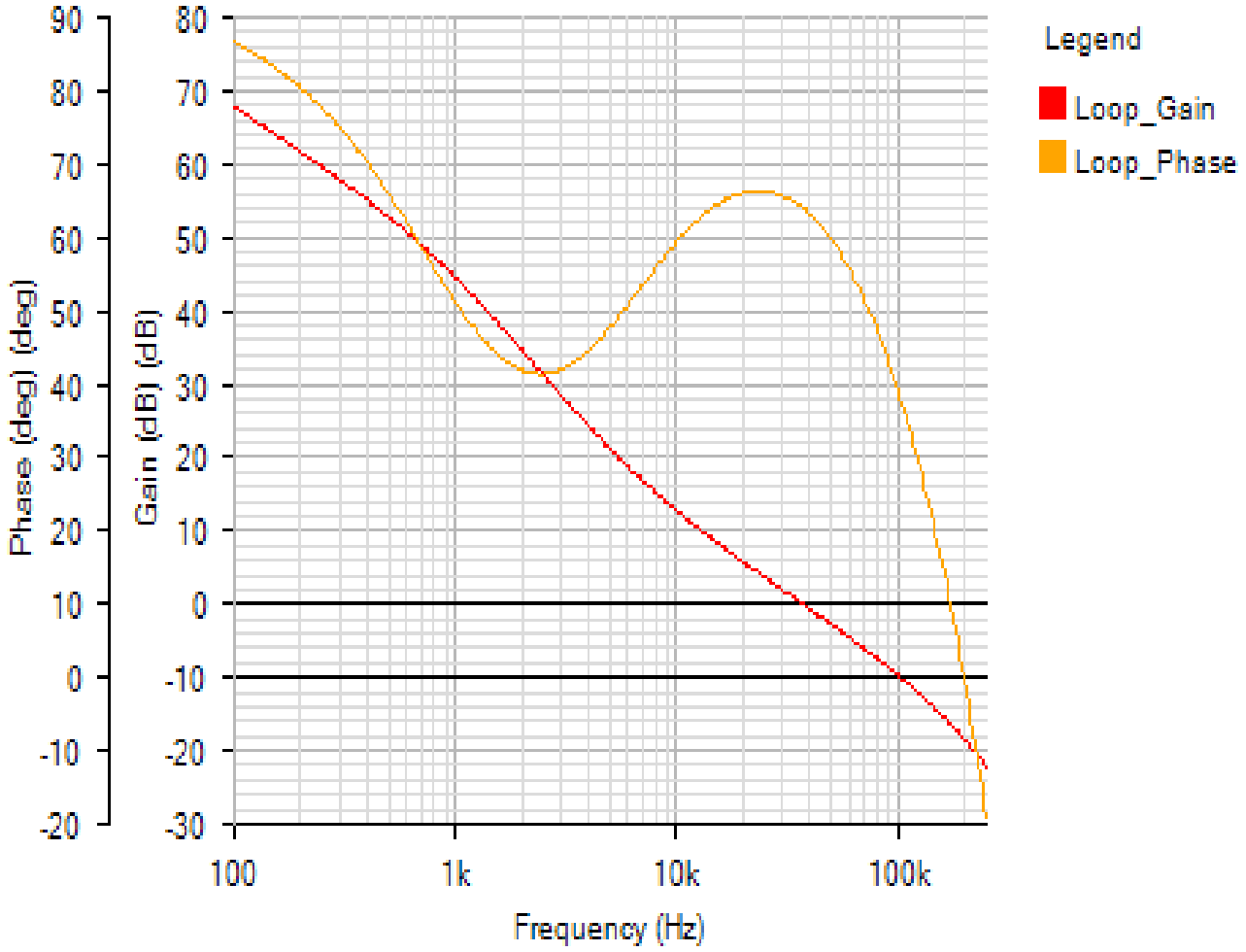


SWITCHING Default



AC Loop - Fri Nov 16 2018 16:39:16

BODE Default

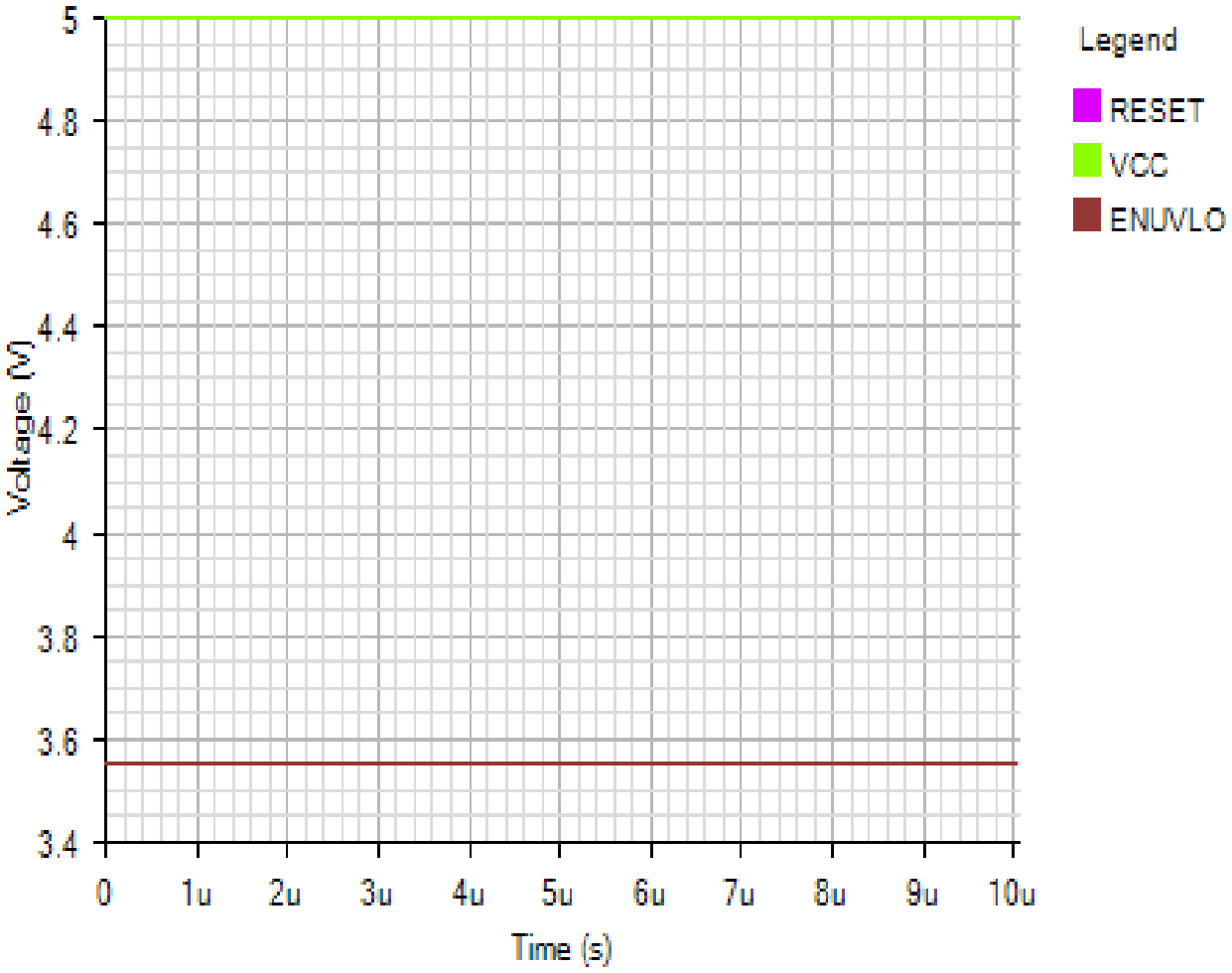


Phase Margin: 64.01° at a crossover frequency of 37.1kHz

20 30 40 50 60 70 80 90 100 110

Steady state - Fri Nov 16 2018 16:39:16

IC Default



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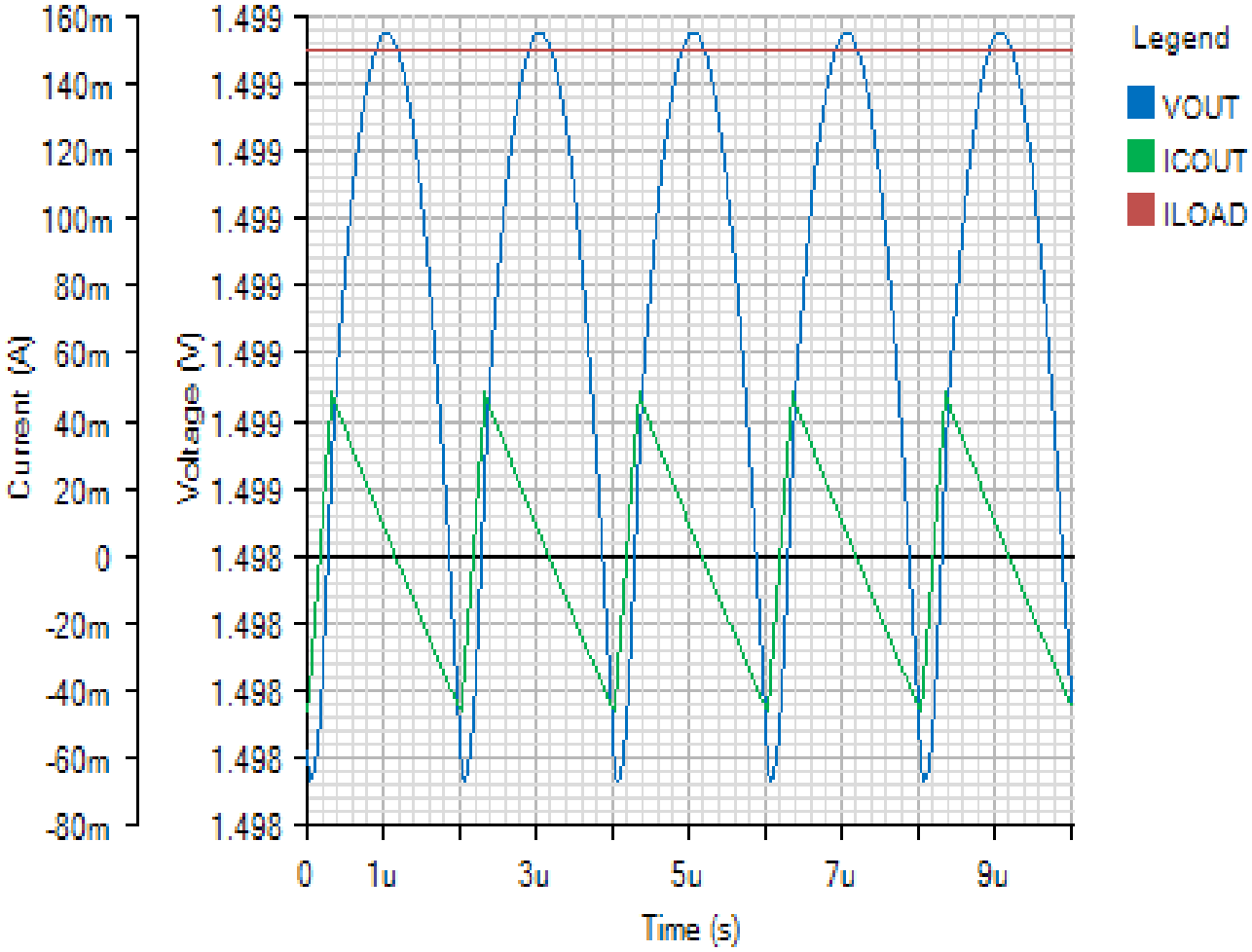

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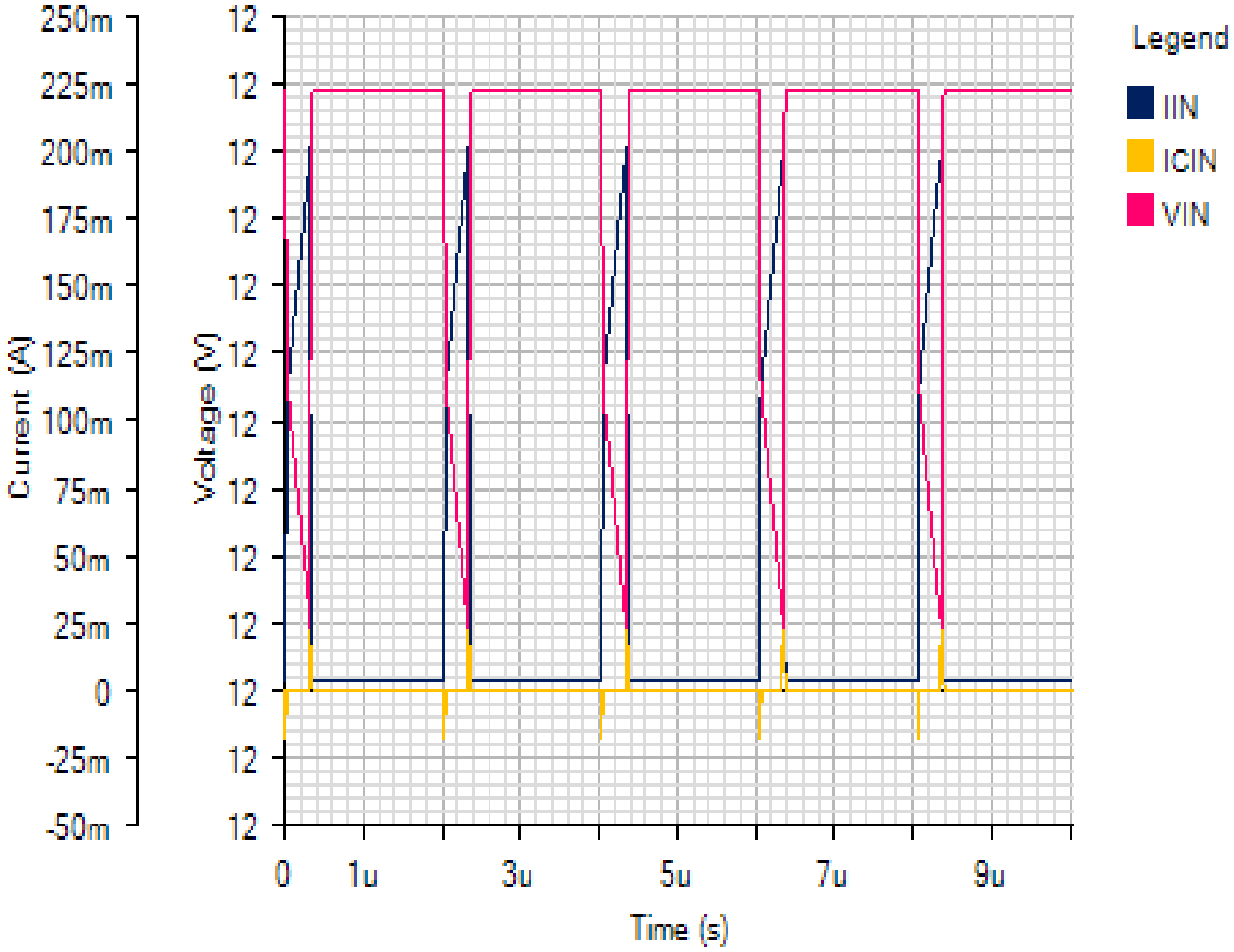
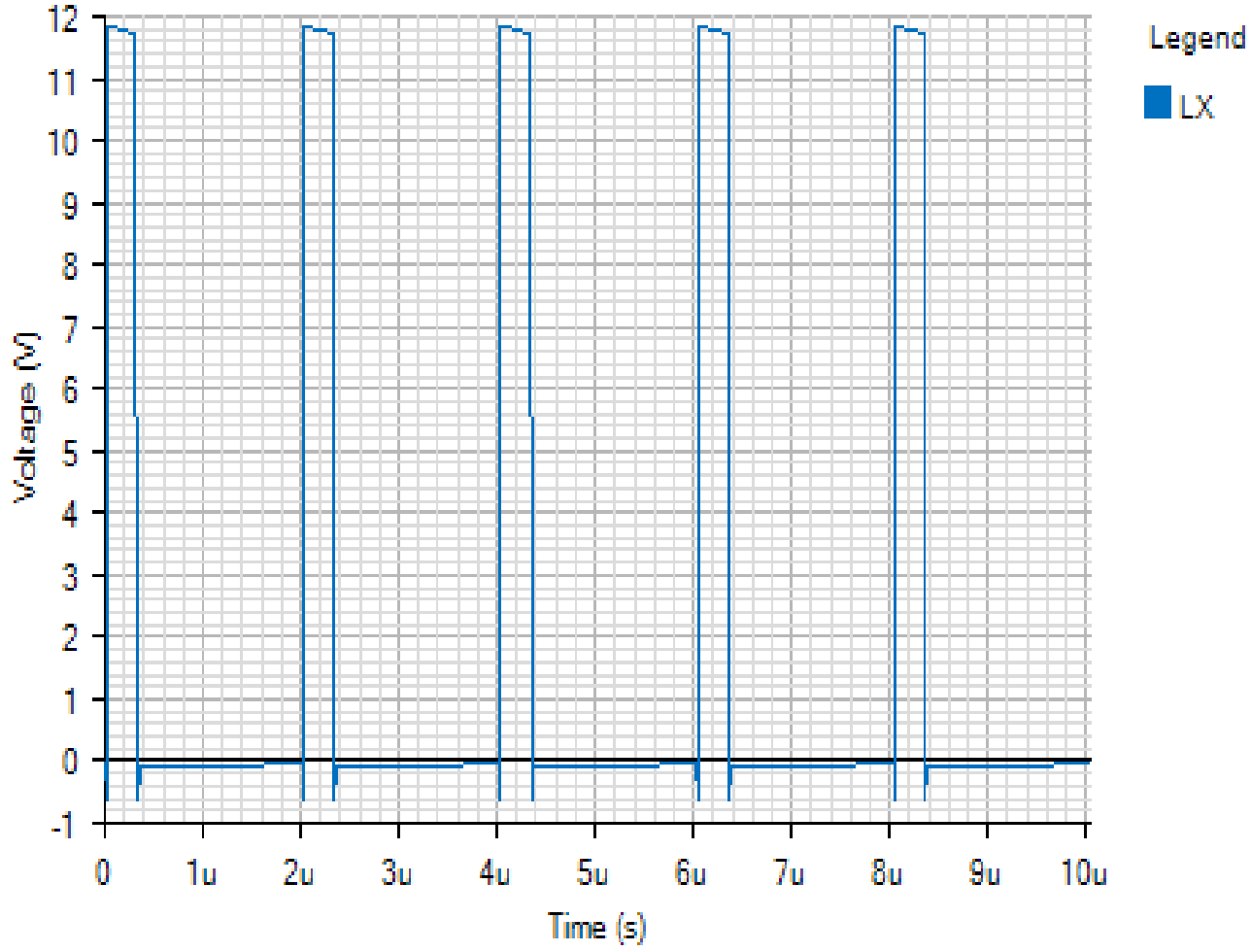


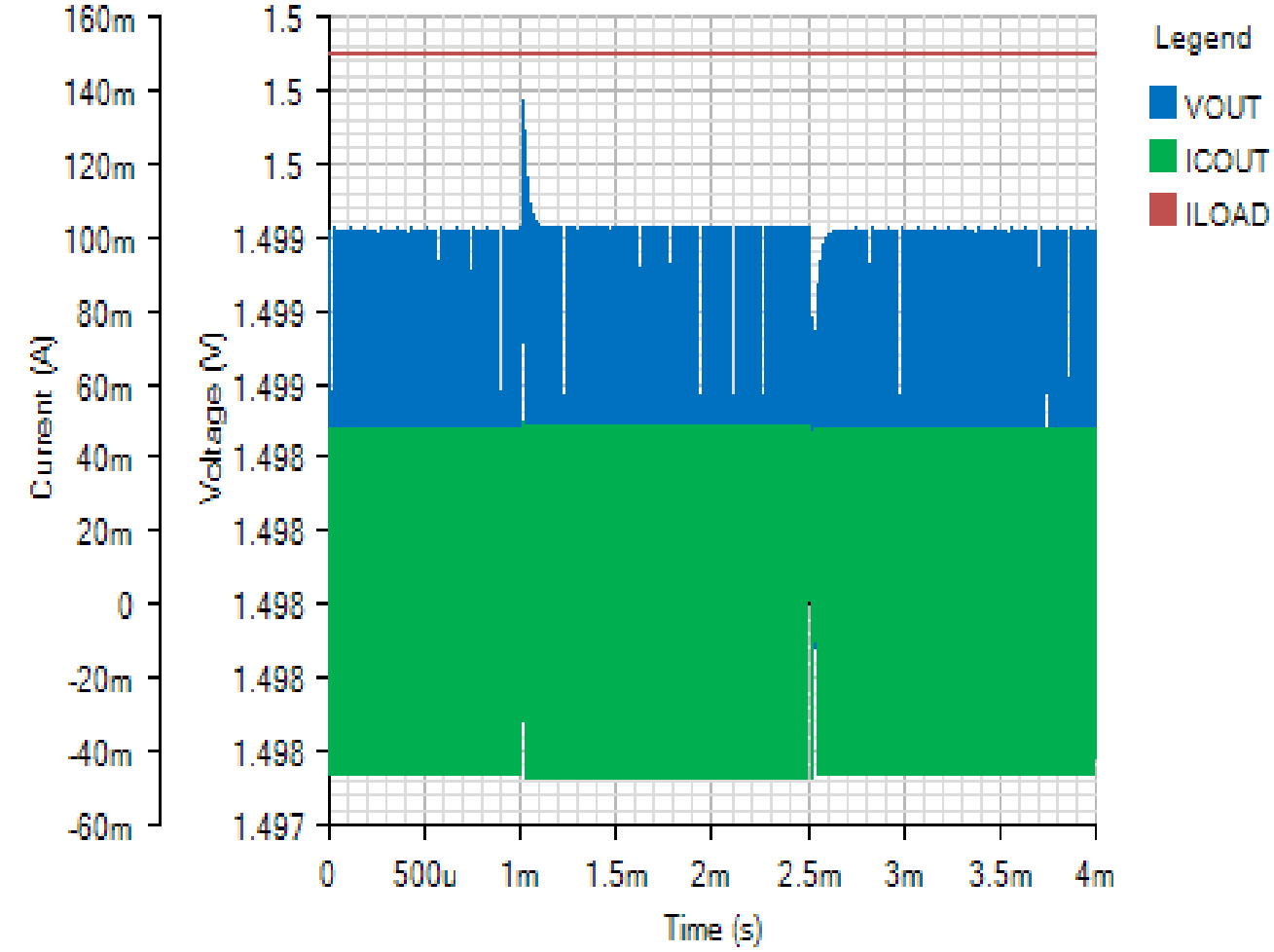
SWITCHING Default



Line Transient - Fri Nov 16 2018 16:39:16

IC Default

OUTPUT Default



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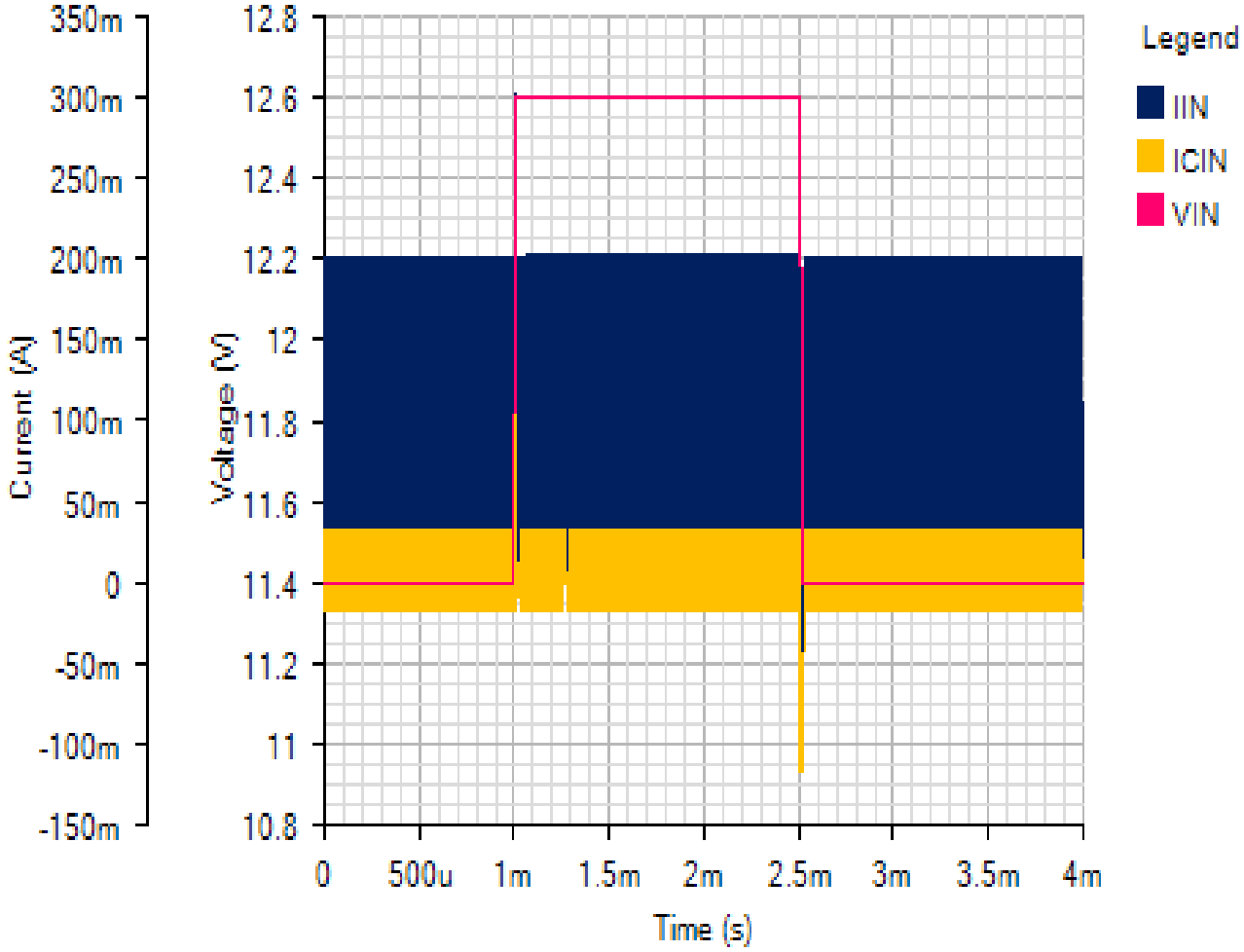

SWITCHING Default