

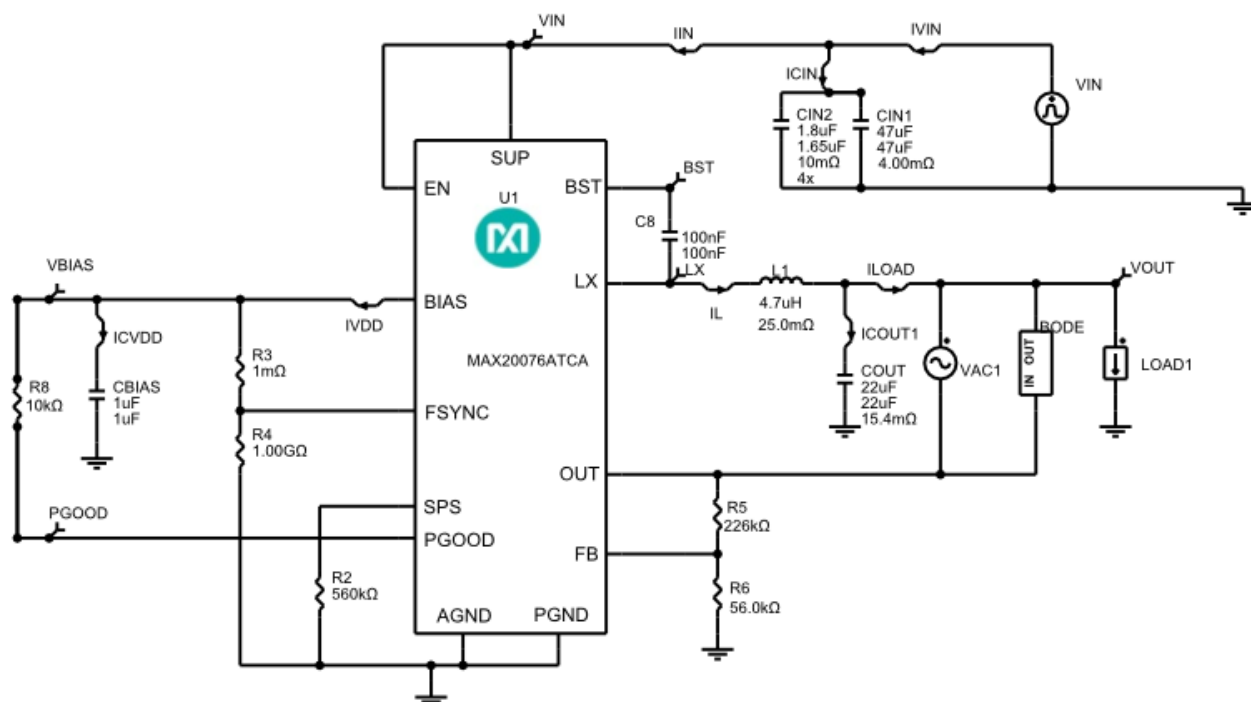
Initial Design

1.0

Design Requirements

Parameter	Value
Minimum Input Voltage	6V
Maximum Input Voltage	18V
Nominal Input Voltage	14V
Input Voltage Ripple	1%
Output Voltage Control	External Resistive Divider
Output Voltage	5V
Output Current	1A
Load Step Start Current	0.5A
Load Step Current	1A
Output Voltage Ripple	1%
Output Voltage Load Step Over/Undershoot	5%
Load Step Edge Rate	5A/us
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
External Synchronization Enable	PV - FPWM Mode
Switching Frequency	2100000KHz
Inductor Current Ratio (LIR)	0.3
Ambient Temperature	25°C

Schematic



SYNC IMPLEMENTATION

For internal clock frequency:
 SYNC tied HIGH = FPWM
 SYNC tied LOW = SKIP

For external clock frequency:
MODEL ONLY: float SYNC and enter desired frequency using FOSC parameter.
(No external source needed for model)

POP SIMULATION FAILURES

If current level (starting current for Load Steps) is too low, AC, Steady State and Load Step analyses may fail in SKIP mode.
ie simulations may also fail in the Extended Input Voltage Range (VIN=18V or approaching dropout). For this range please see the datasheet for detailed description.

BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX20076ATCA	User-Defined	IC
C8	1	LLL185R71A104MA01L	Murata Manufacturing	Cap Ceramic 0.1uF 10V X7R 20% Wide Terminal SMD 0306 125°C T/R
CBIAS	1	LMK212B7105KD-T	Taiyo Yuden	Cap Ceramic 1uF 10V X7R 10% Pad SMD 0805 125°C T/R
CIN1	1	511D476M050BB4D	Vishay	Cap Aluminum Lytic 47uF 50V 20% (8 X 12mm) Radial 3.5mm 0.004 Ohm 137mA 1000h 105°C Ammo
CIN2	4	C1210C185K3RACTU	KEMET Corporation	Cap Ceramic 1.8uF 25V X7R 10% Pad SMD 1210 125°C T/R

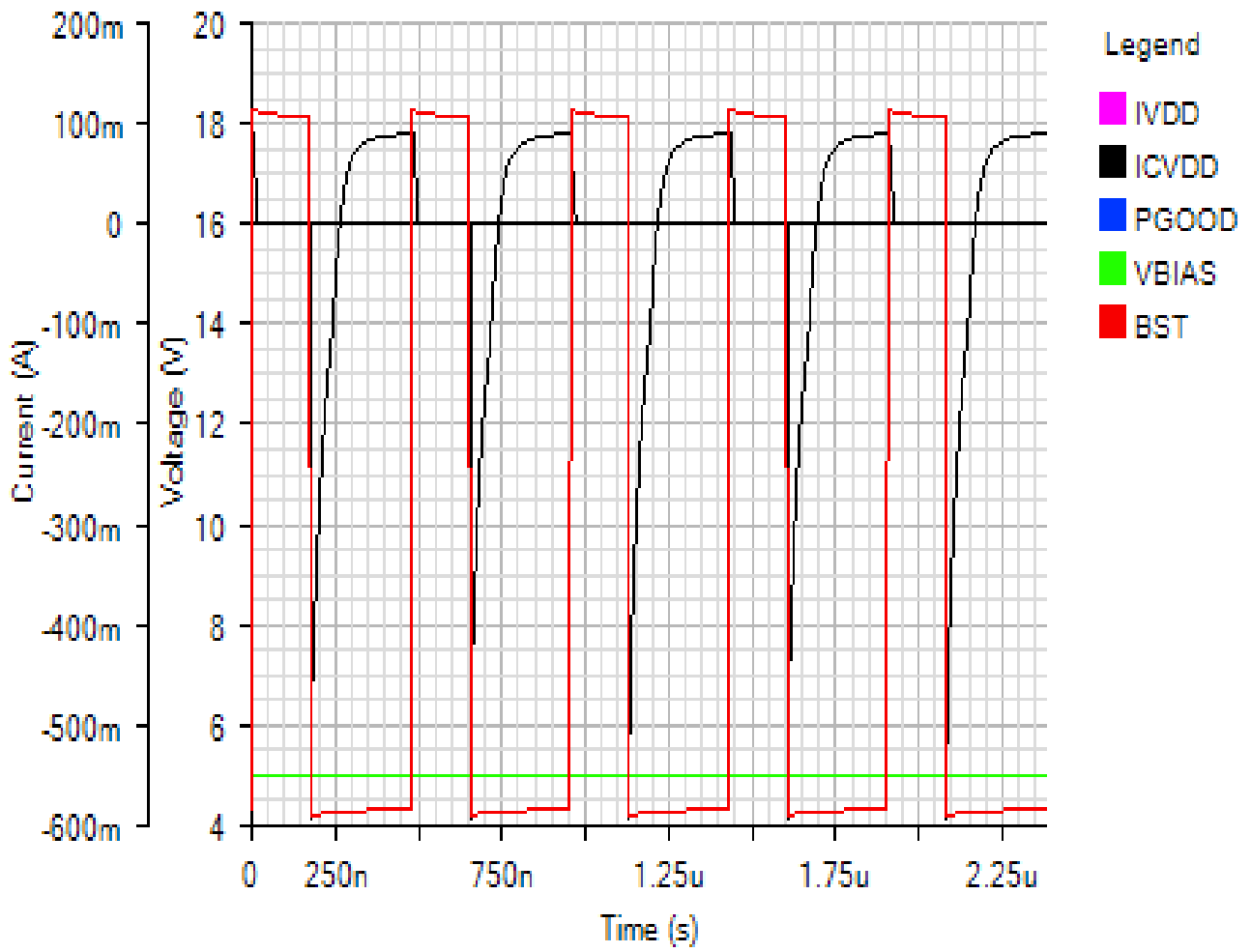
COUT	1	GCM32ER71A226KE12L	Murata Manufacturing	Cap Ceramic 22uF 10V X7R 10% Pad SMD 1210 125°C Automotive T/R
L1	1	VLP8040T-4R7M	TDK	Inductor Power Shielded Wirewound 4.7uH 20% 100KHz Ferrite 4.5A 25mOhm DCR Embossed Carrier T/R
R2	1	ERJ3EKF5603V	Panasonic	Res Thick Film 0603 560K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	ERJ2RKF2263X	Panasonic	Res Thick Film 0402 226K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R6	1	ERJ3EKF5602V	Panasonic	Res Thick Film 0603 56K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R8	1	ERJ2RKF1002X	Panasonic	Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

Simulation Results

Steady State - Tue Nov 20 2018 13:21:11

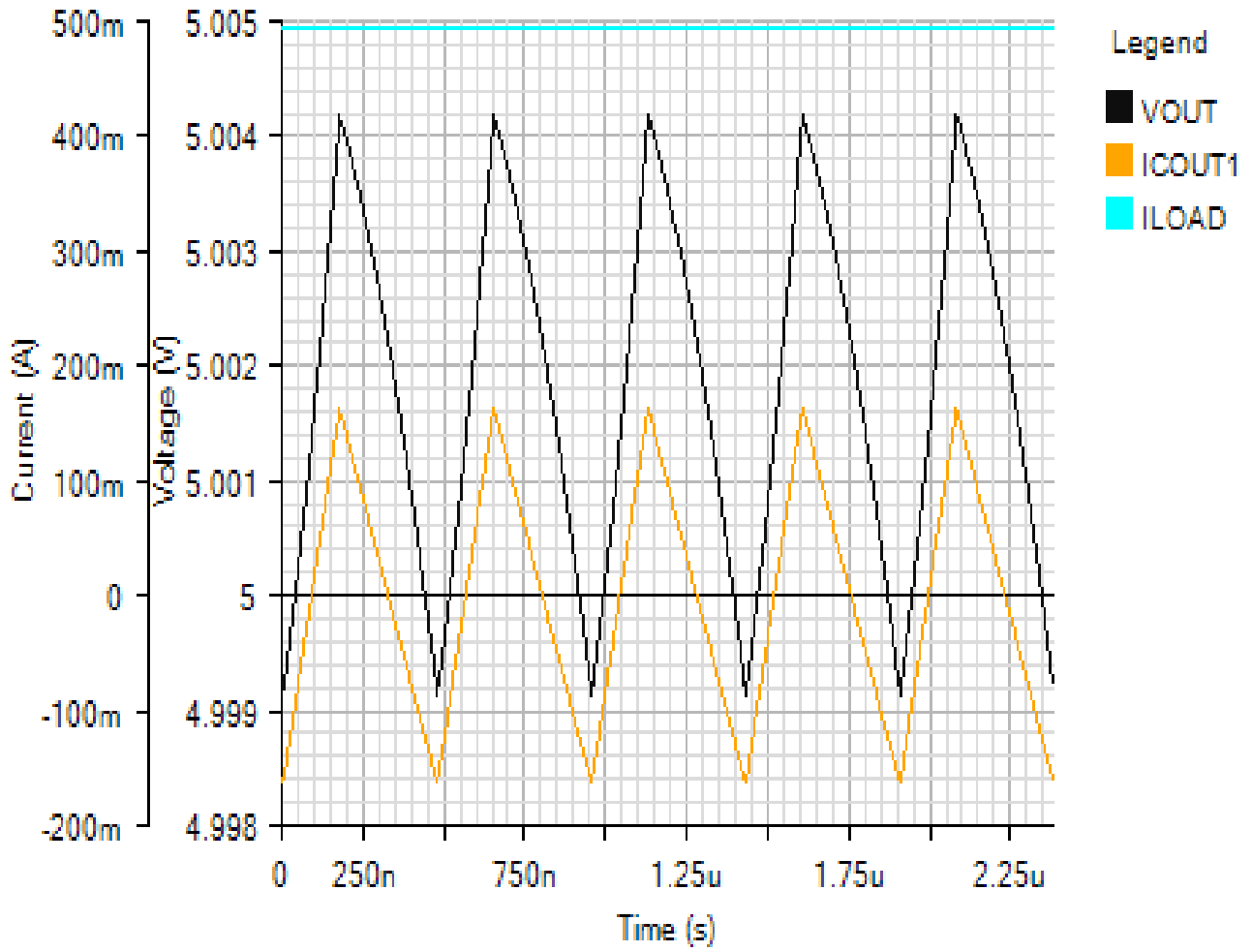
IC

Default



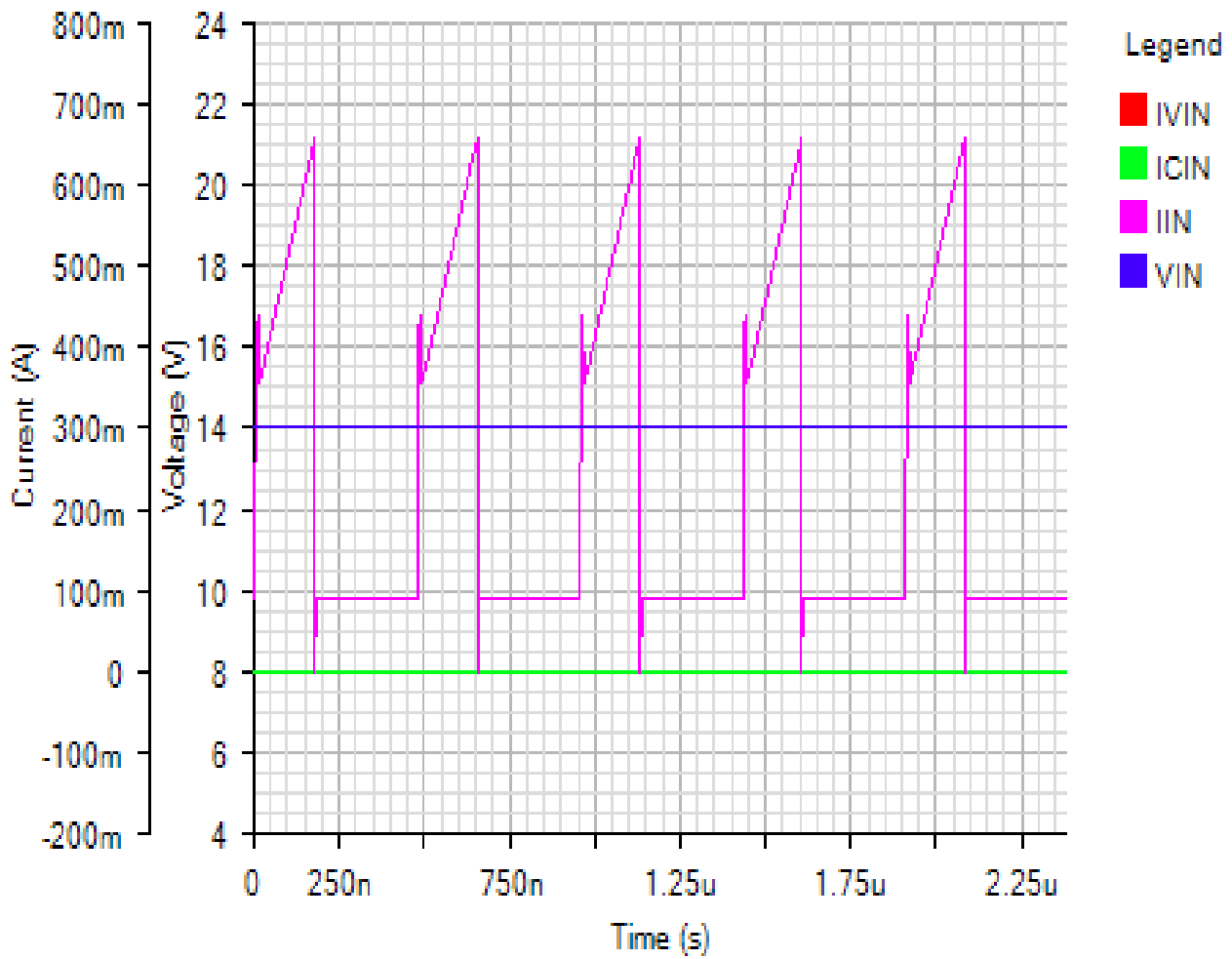
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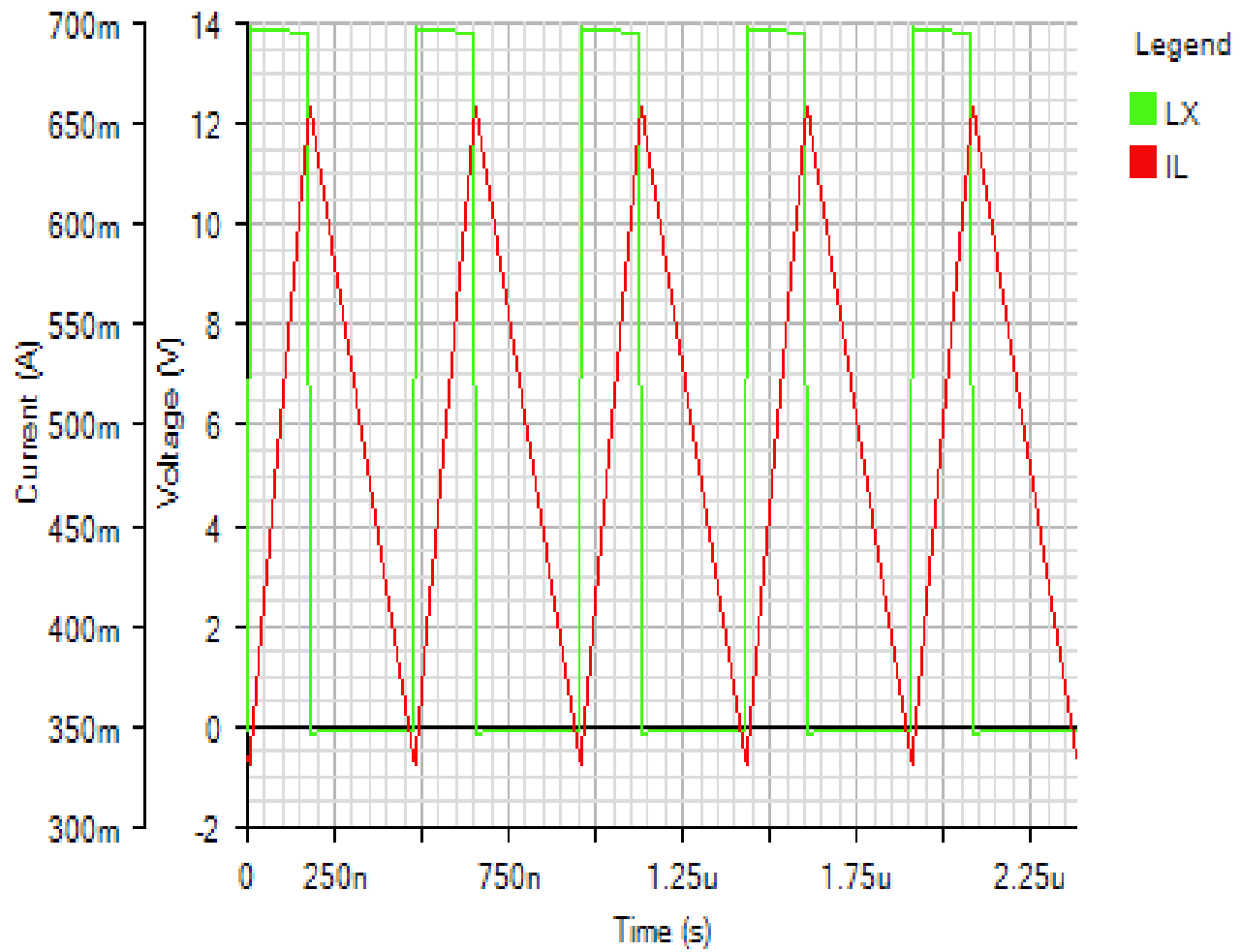
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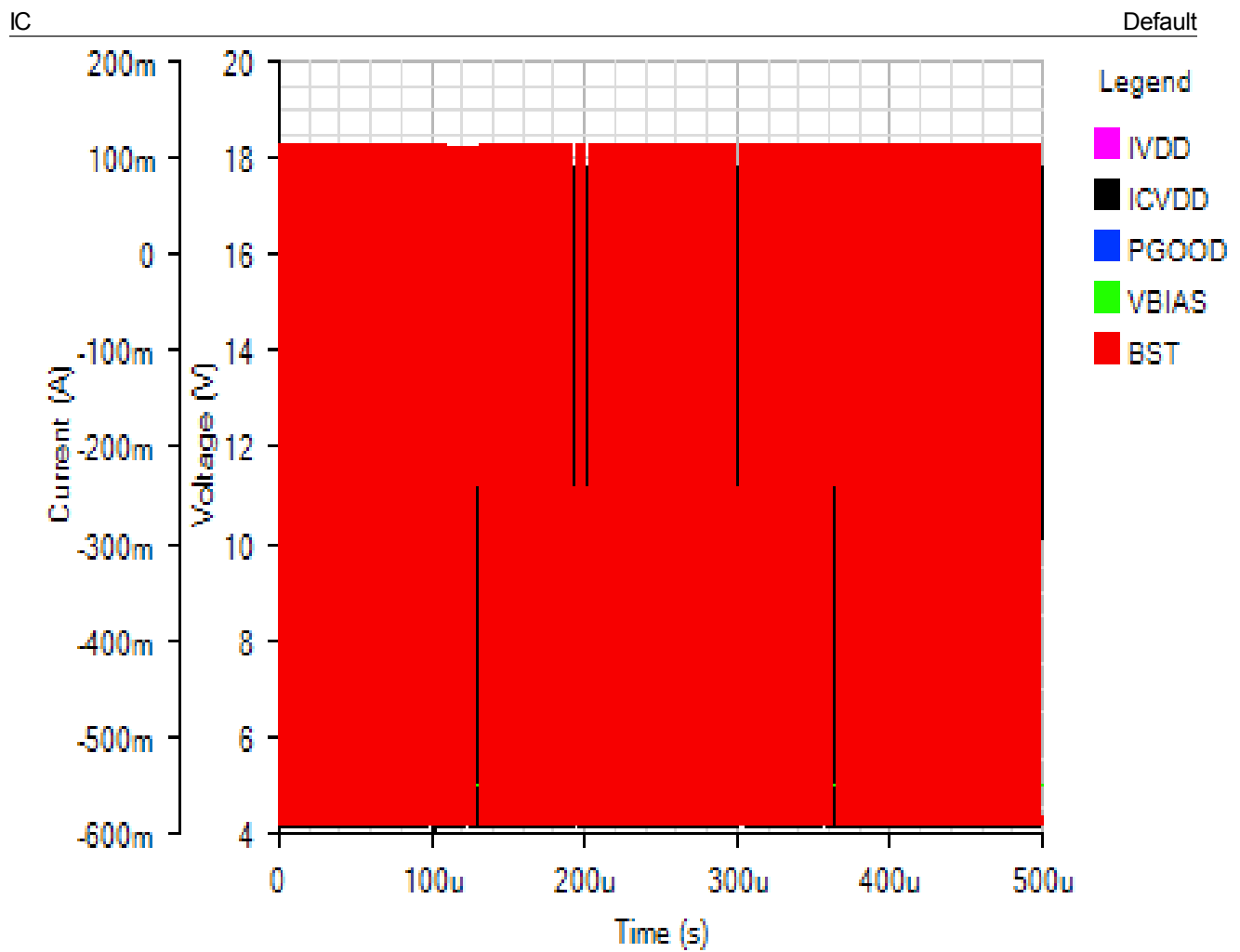


SWITCHING

Default

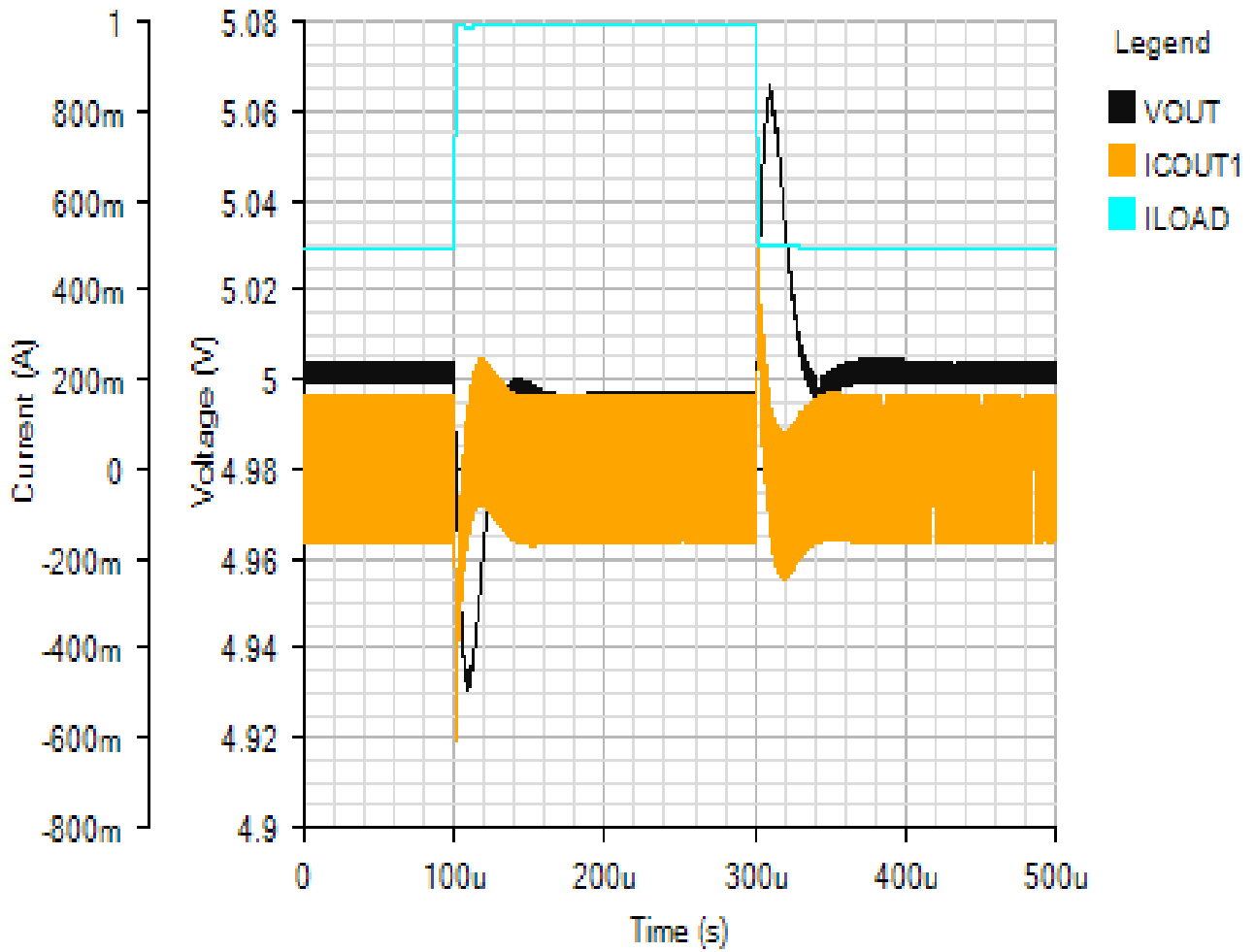


Load Step - Tue Nov 20 2018 13:21:11



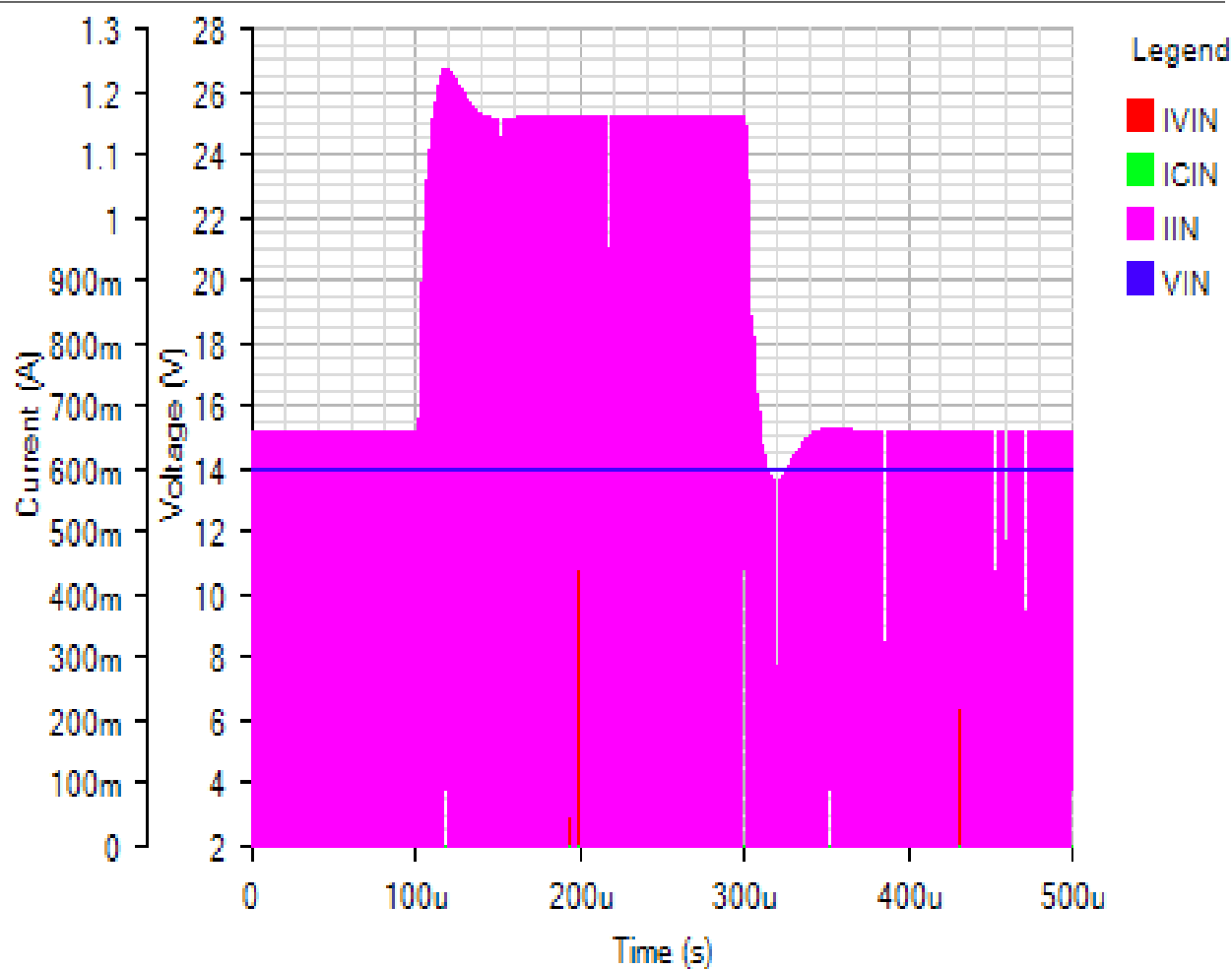
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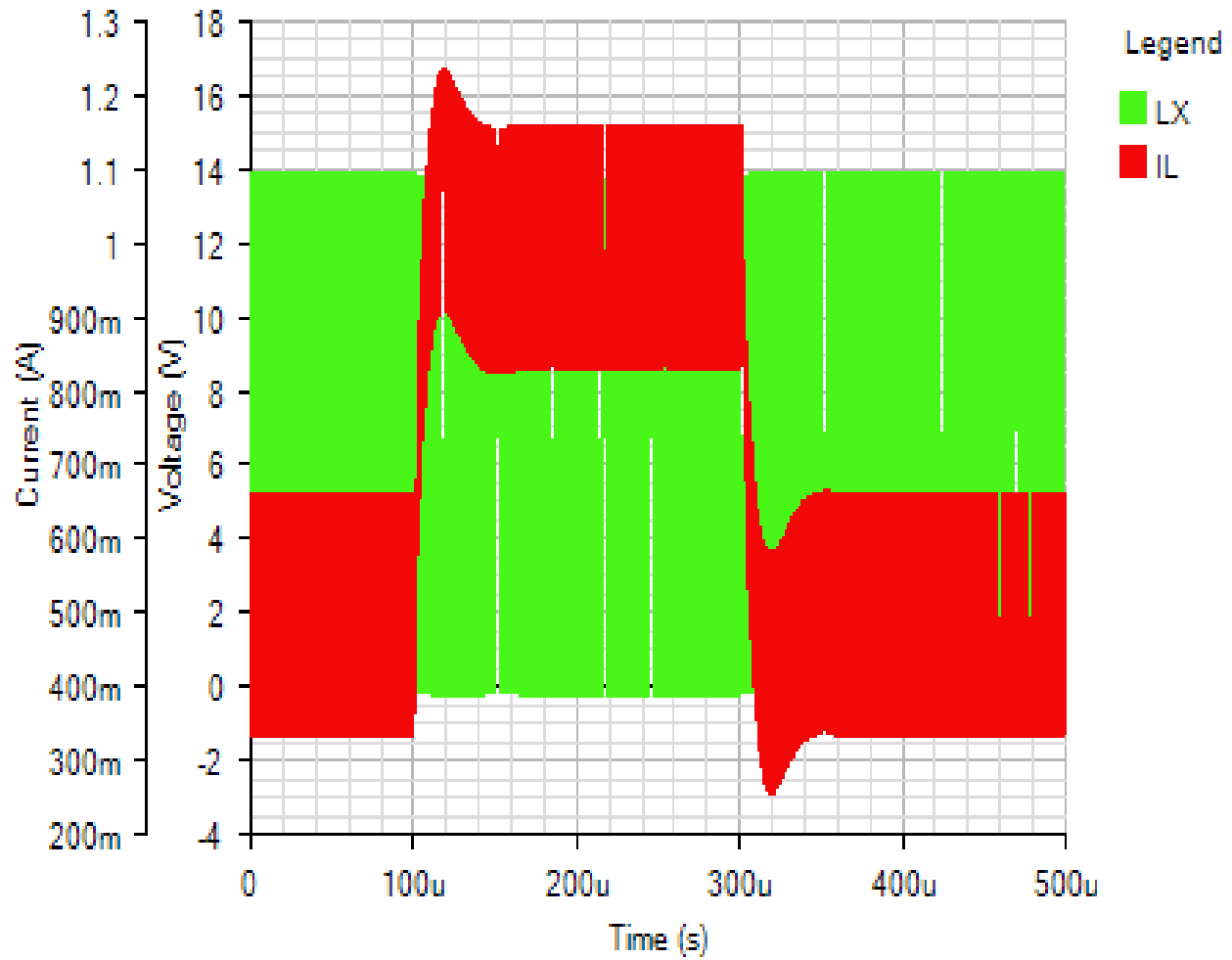
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SWITCHING

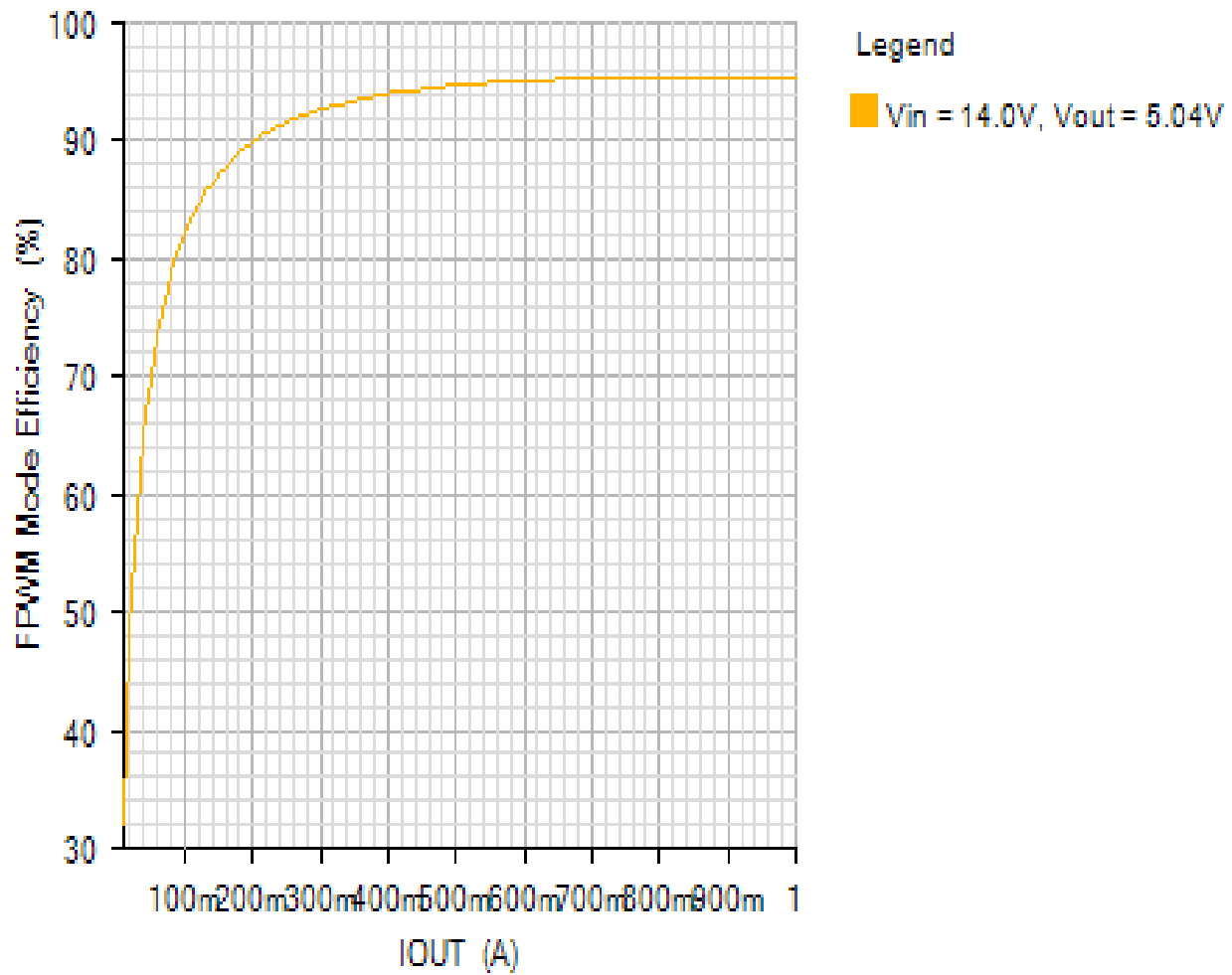
Default



Efficiency - Tue Nov 20 2018 13:21:11

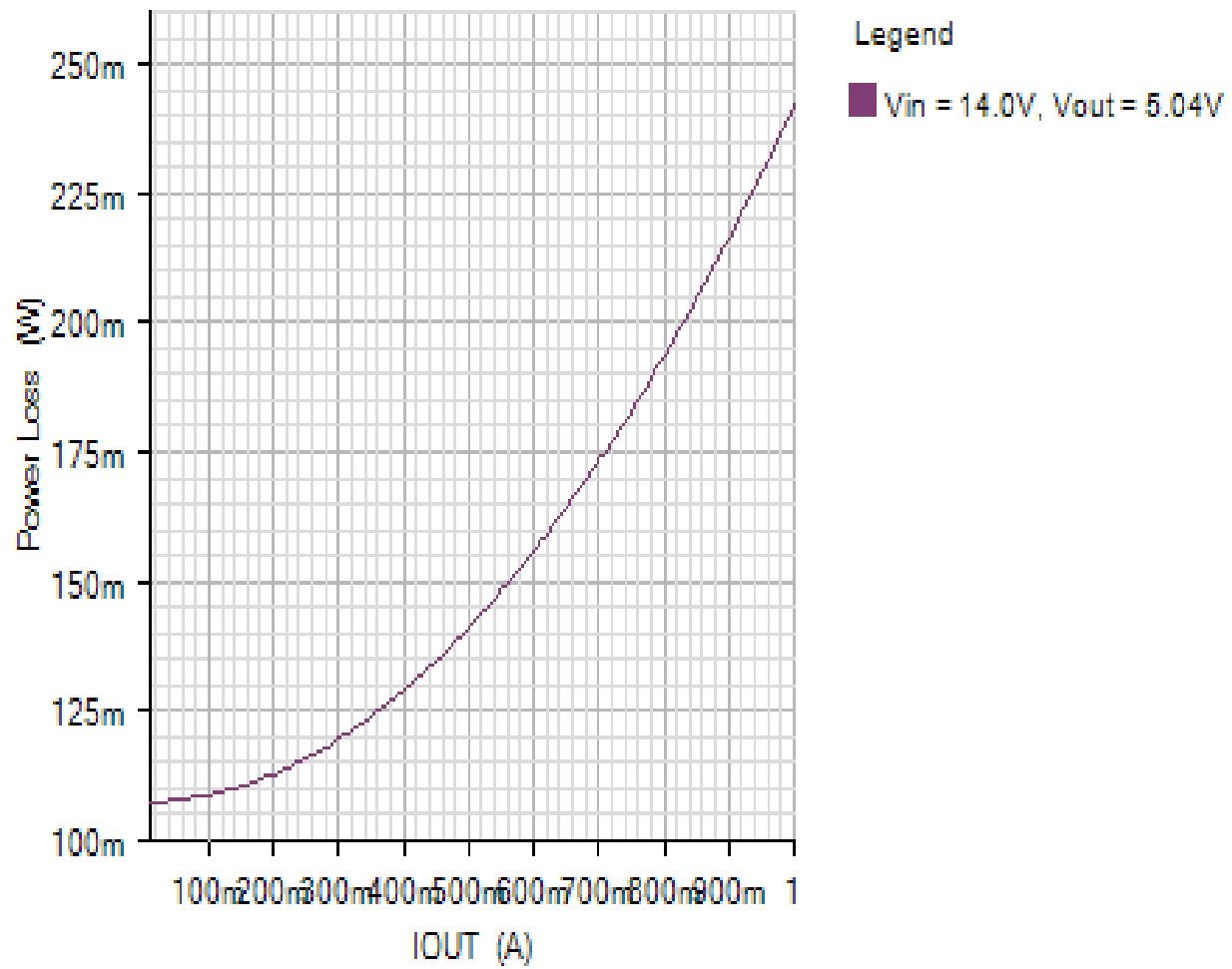
EFFICIENCY_PLOT

Default



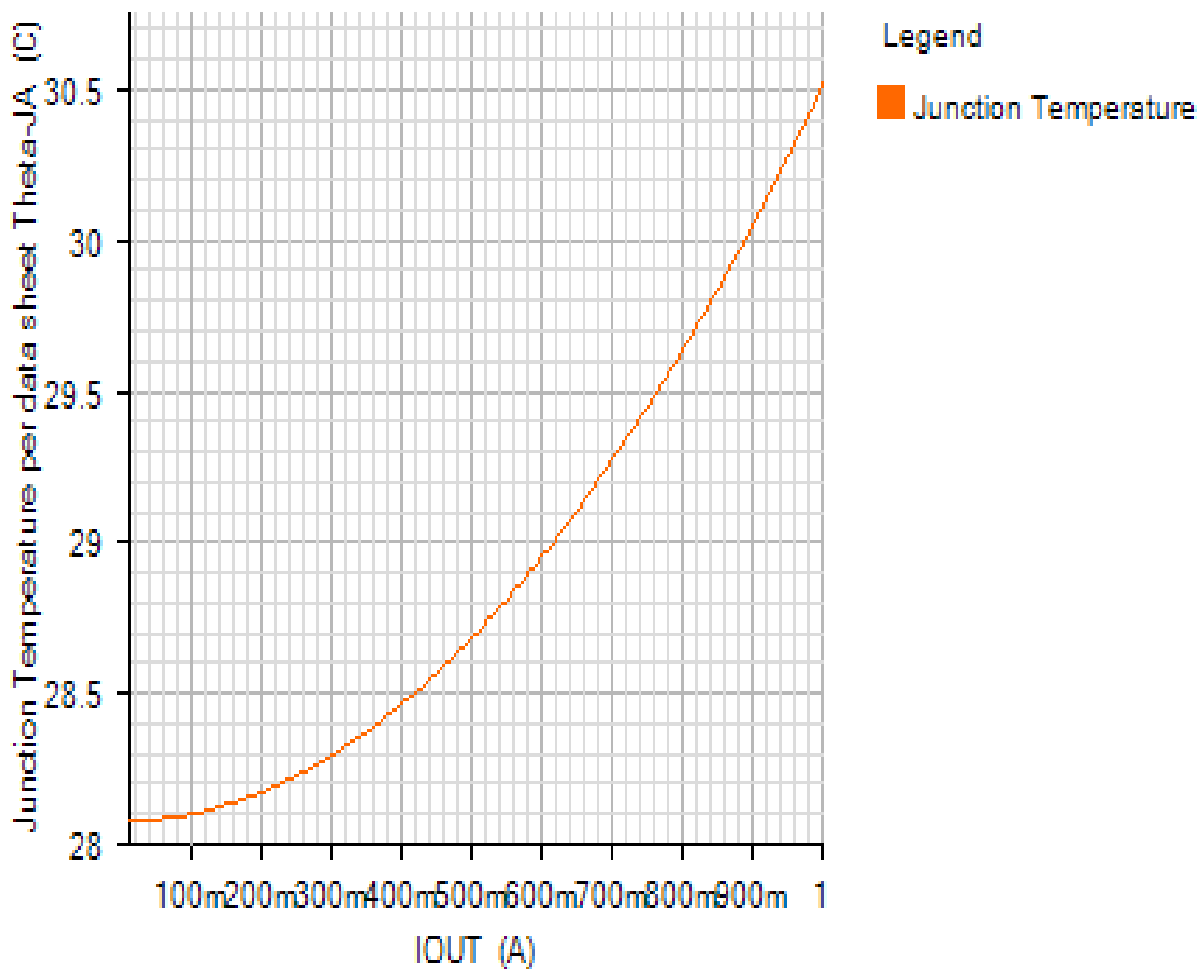
POWER_LOSS_PLOT

Default

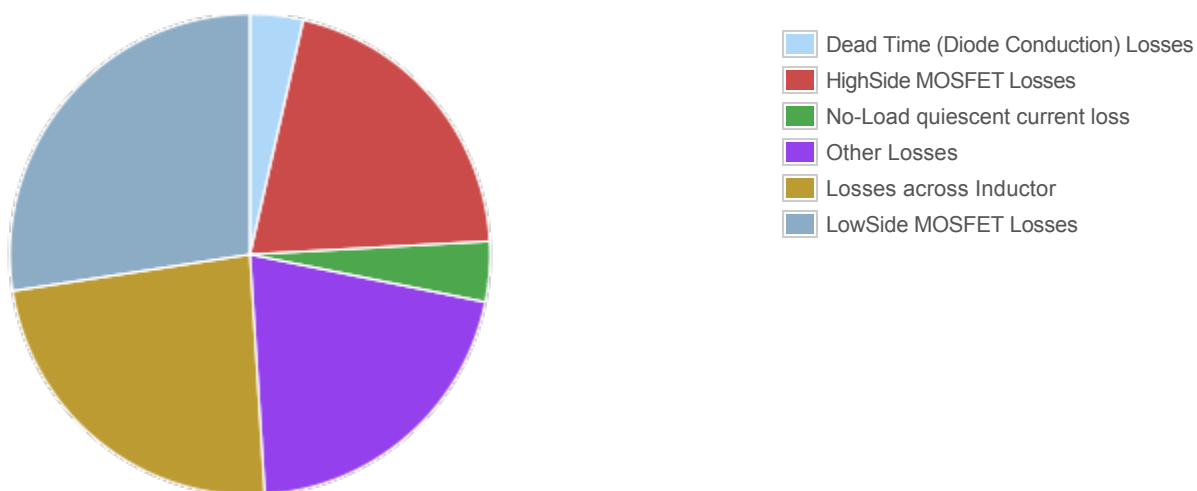


JUNCTION_TEMPERATURE_PLOT

Default



Losses



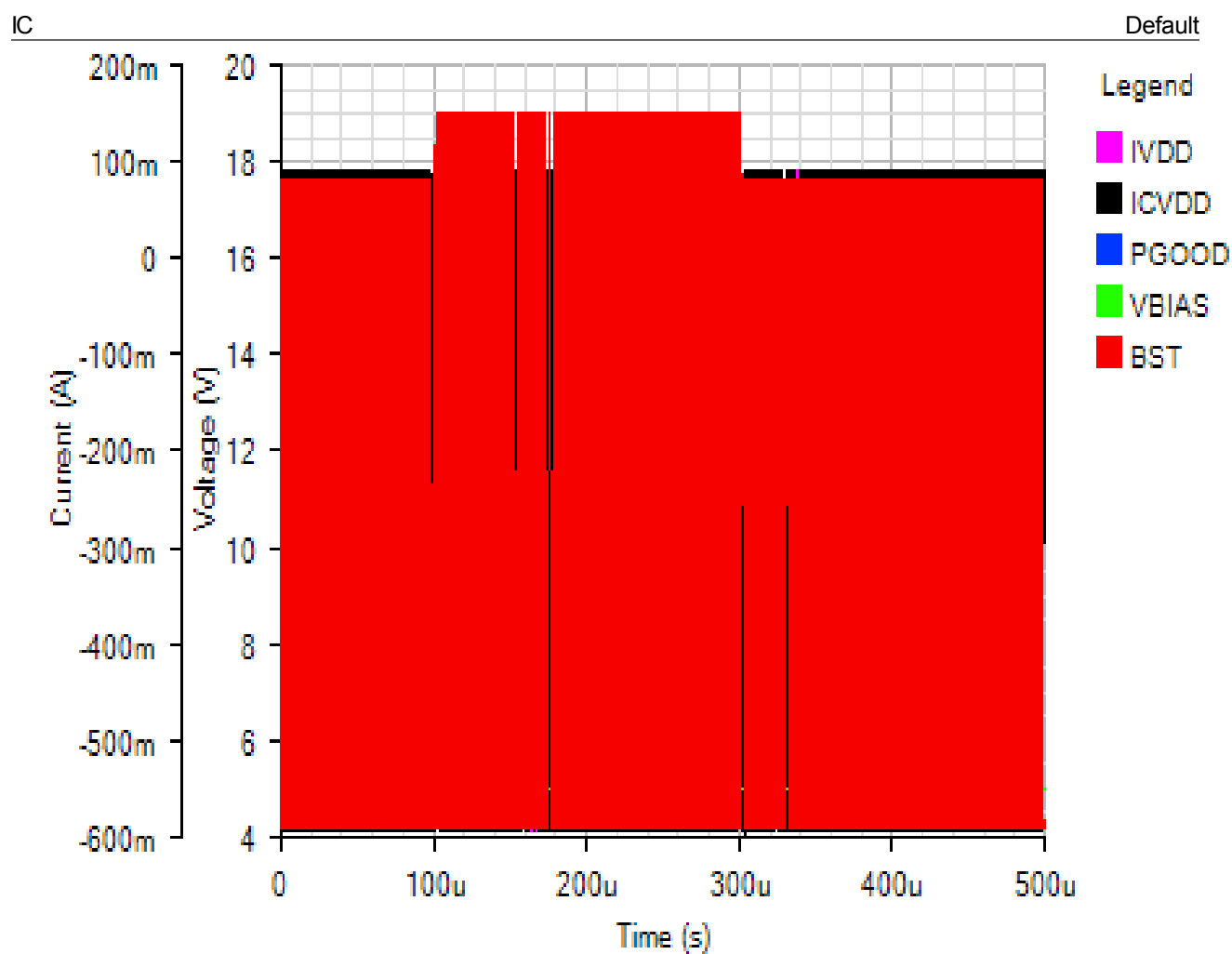
Component

Loss (W)

% of total

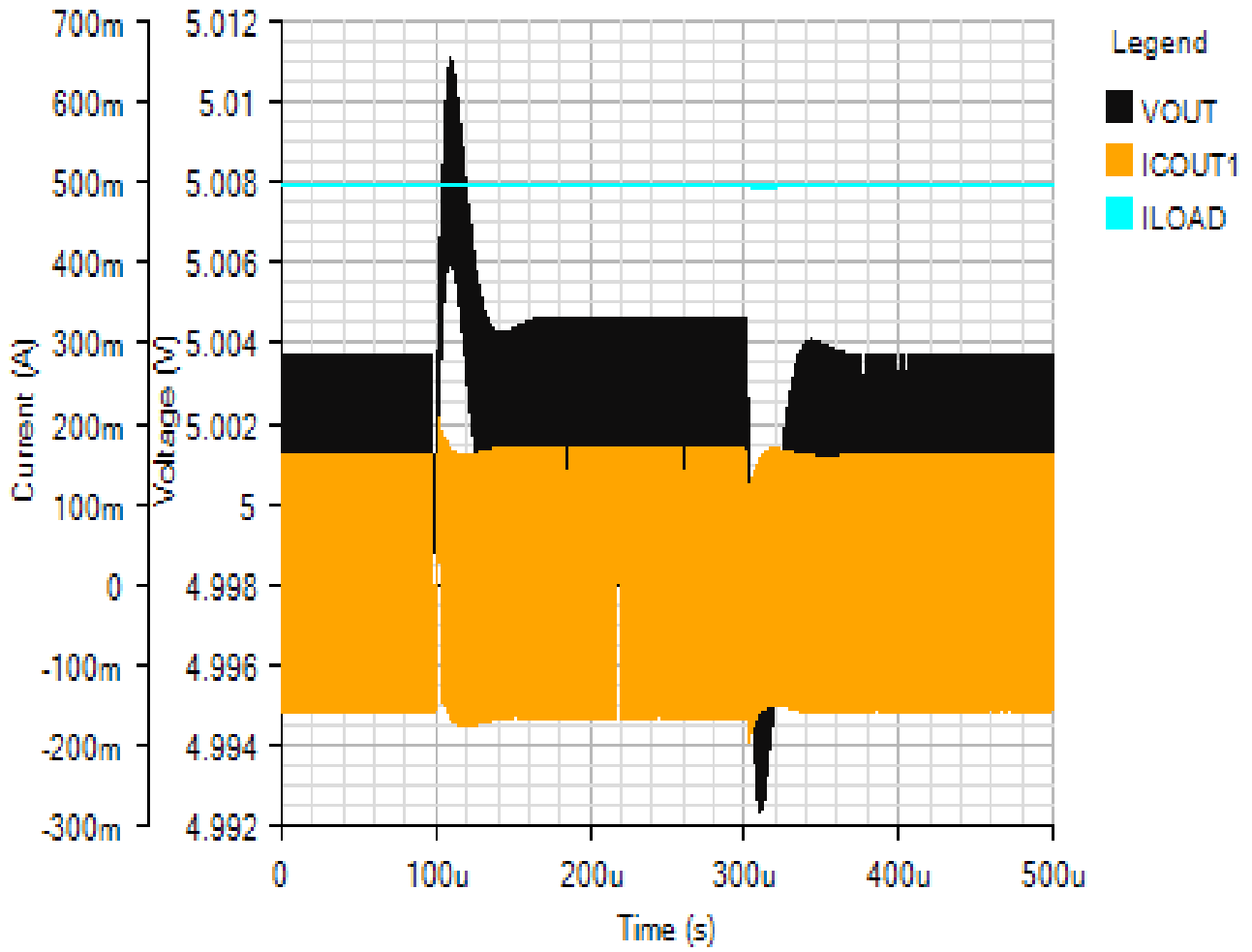
Component	Loss (W)	% of total
Dead Time (Diode Conduction) Losses	0.008644	3.6
HighSide MOSFET Losses	0.049735	20.6
No-Load quiescent current loss	0.0098	4
Other Losses	0.050445	20.8
Losses across Inductor	0.057017	23.6
LowSide MOSFET Losses	0.066376	27.4
Total	0.242017	100

Line Transient - Tue Nov 20 2018 13:21:11



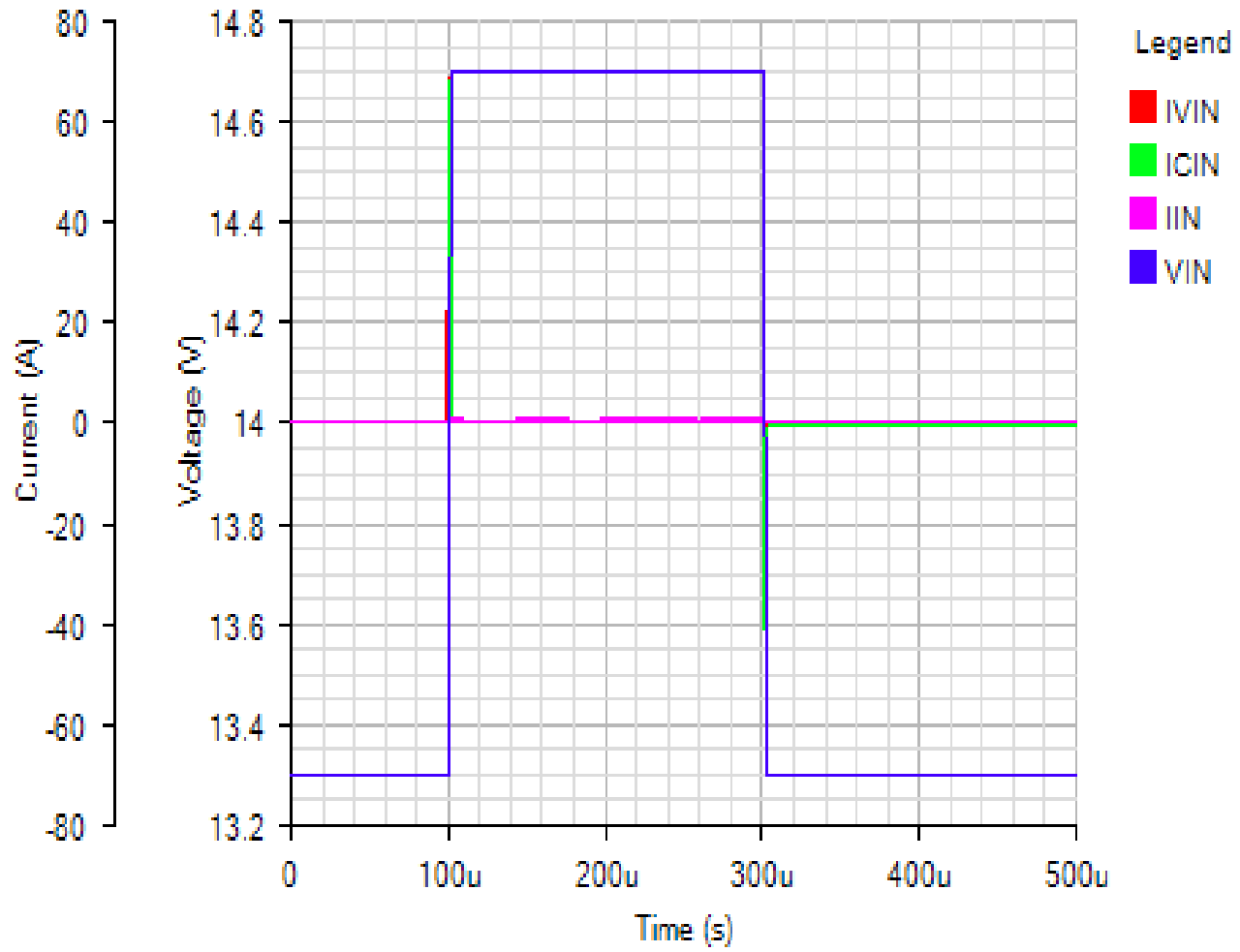
OUTPUT

Default



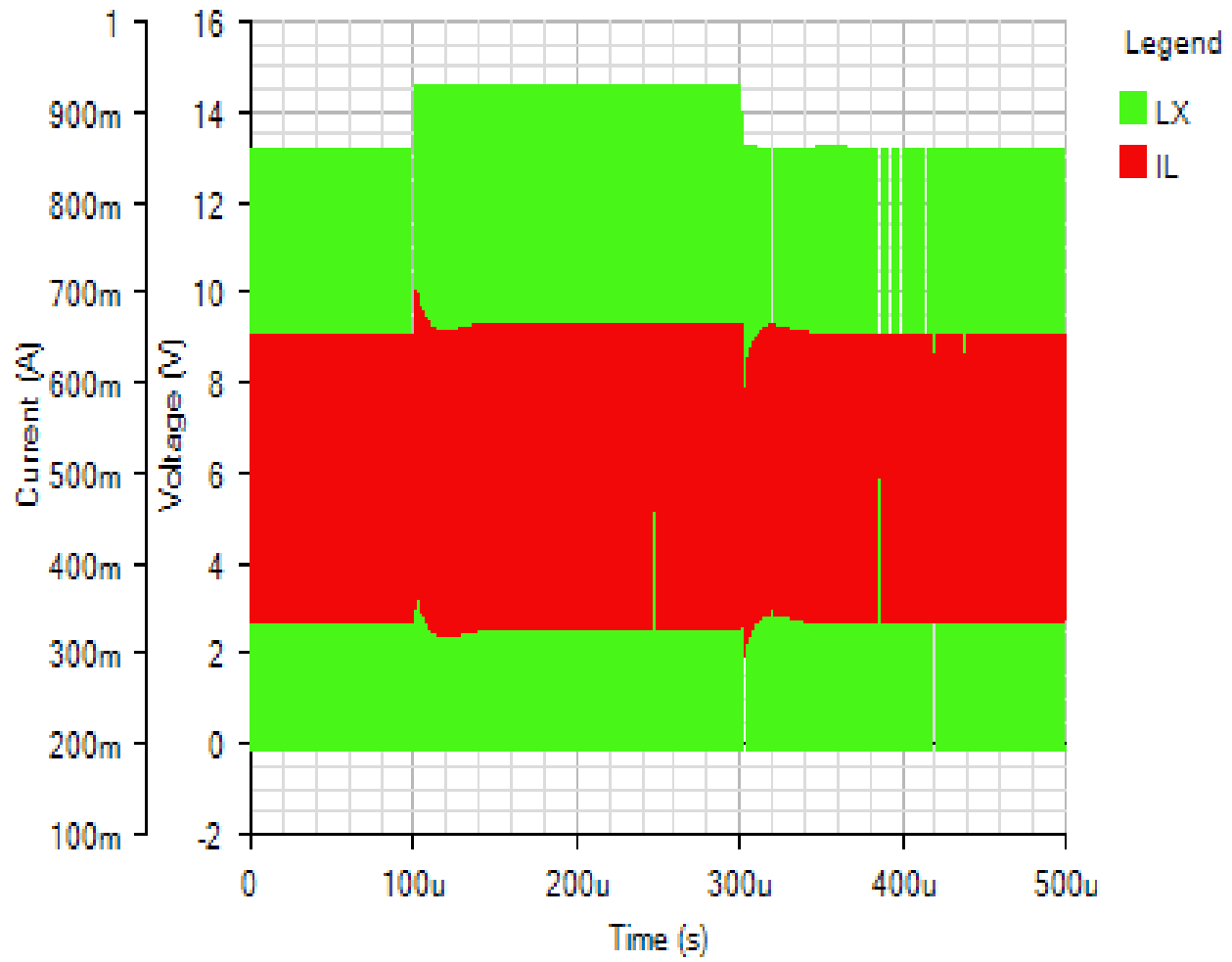
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SWITCHING

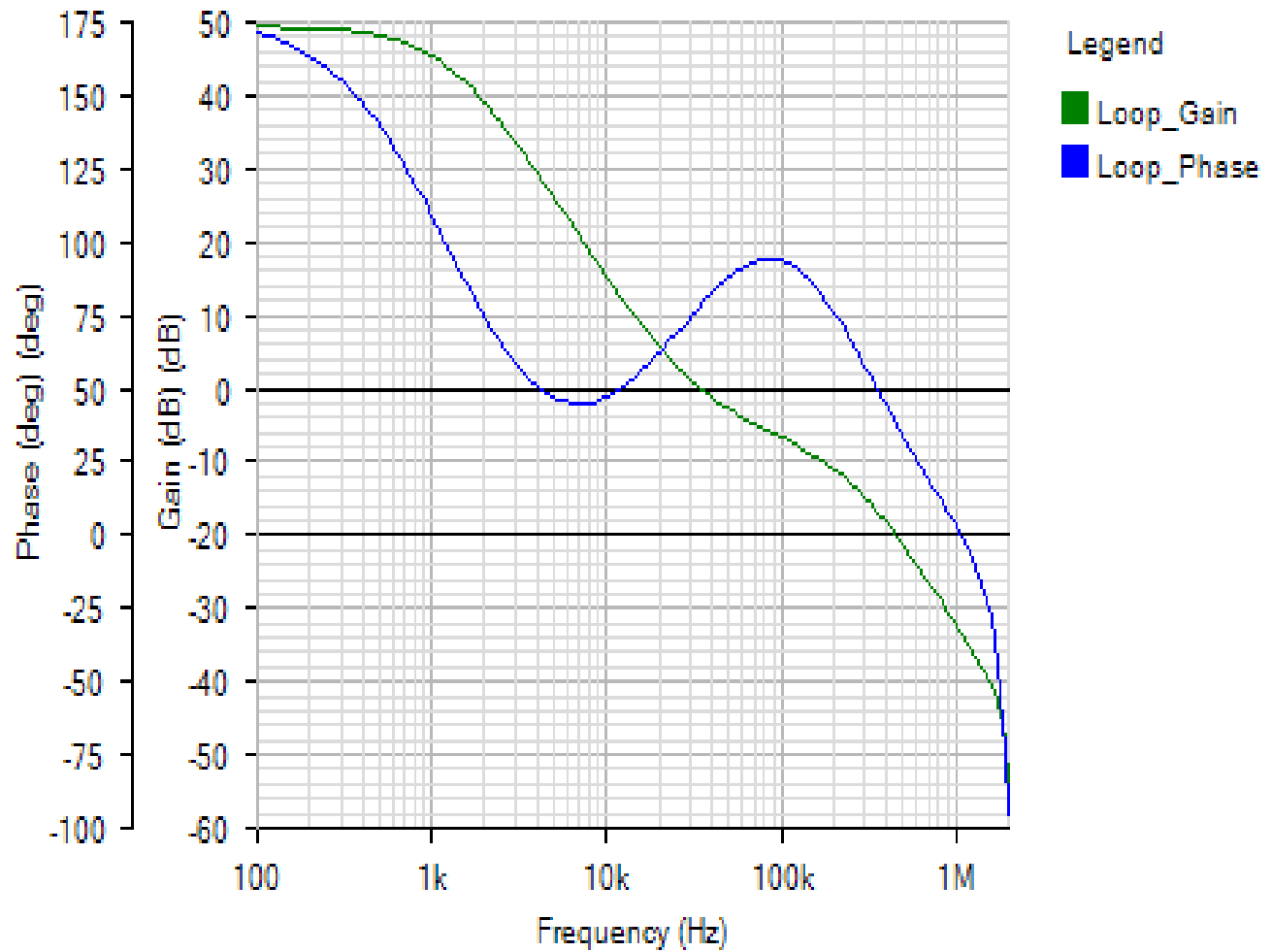
Default



AC Loop - Tue Nov 20 2018 13:21:11

BODE

Default



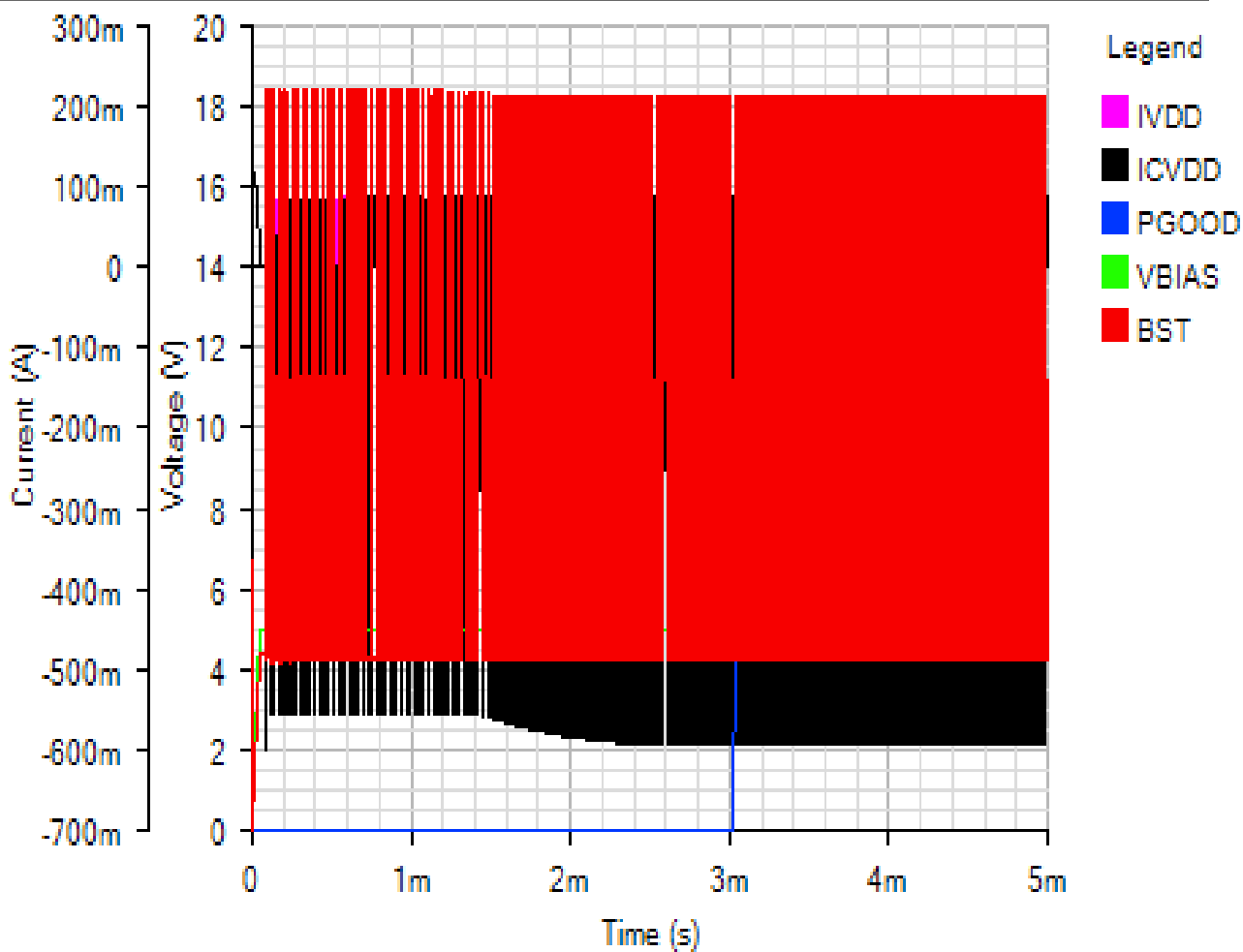
Phase Margin: 78.66° at a crossover frequency of 34.9kHz



Start Up - Tue Nov 20 2018 13:21:11

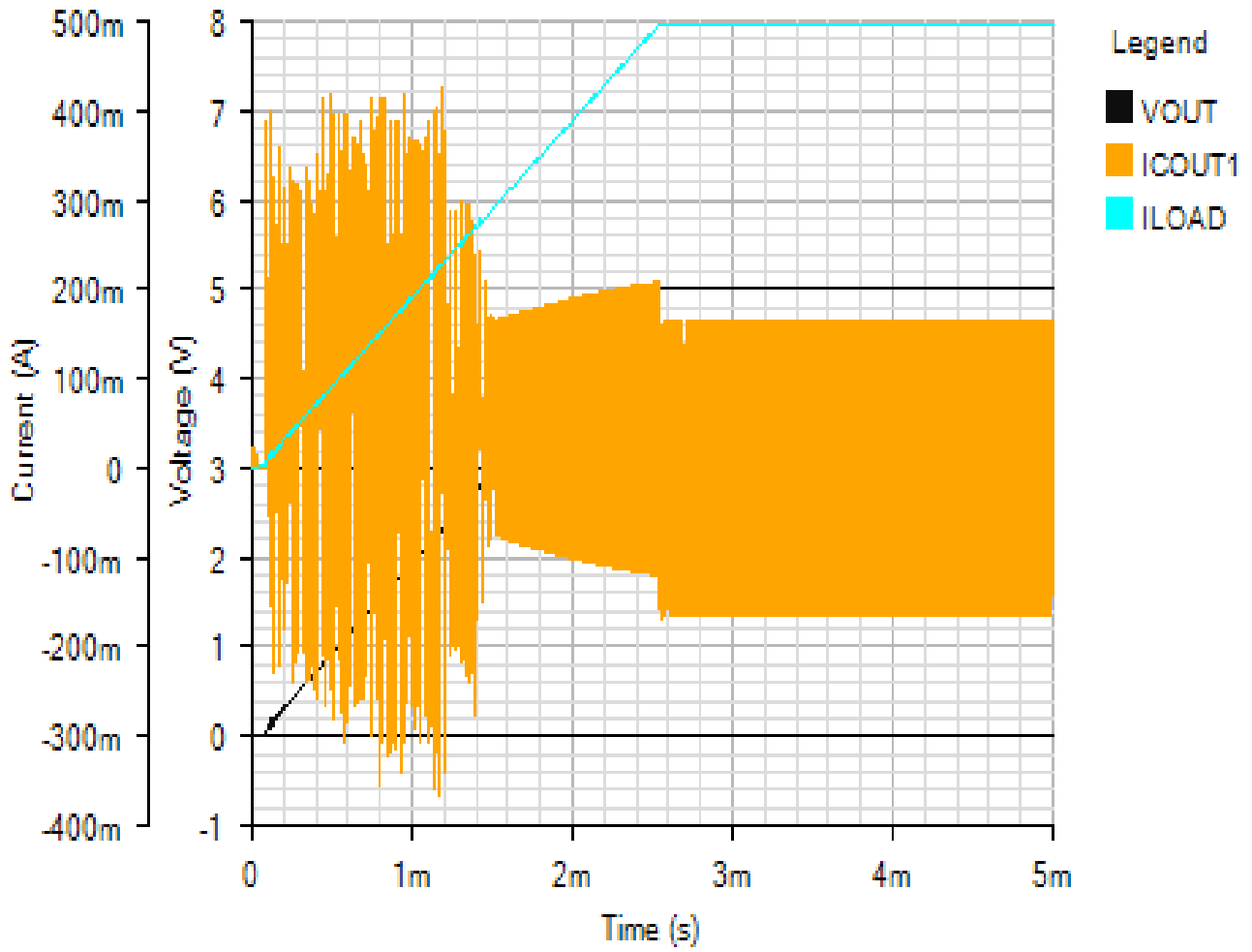
IC

Default



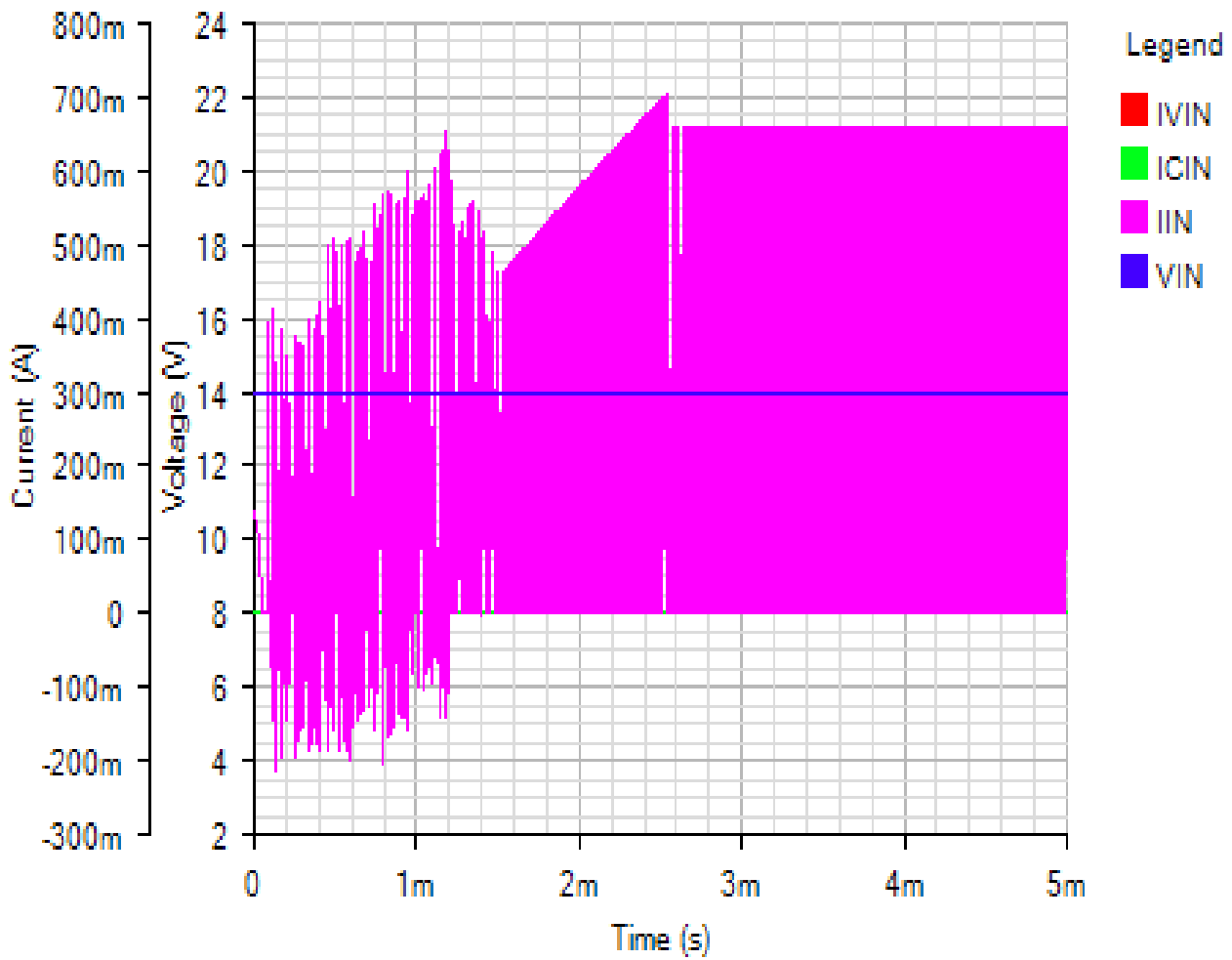
OUTPUT

Default



INPUT

Default



SWITCHING

Default

