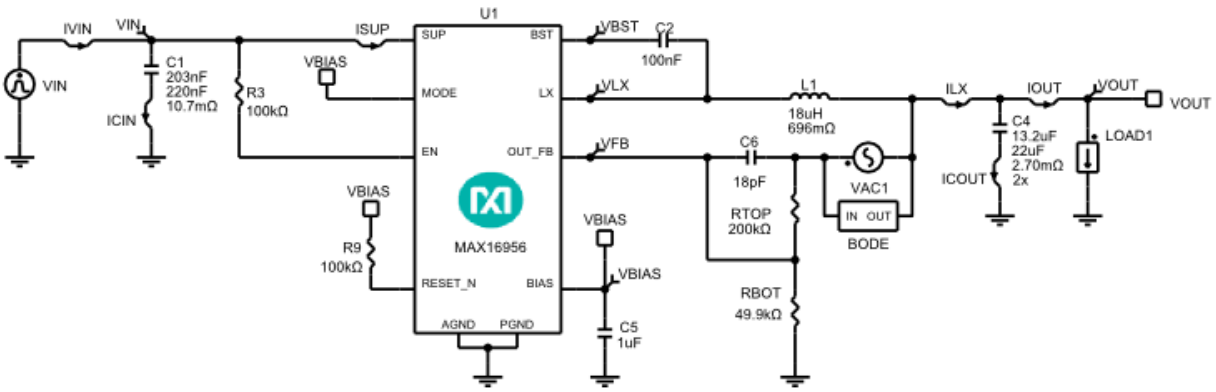
Initial Design

1.0

Design Requirements

Parameter	Value
Min. Input Voltage	10V
Max. Input Voltage	36V
Typ. Input Voltage	12V
Input Voltage Ripple	1%
Output Voltage	5V
Output Current	0.3A
Output Voltage Ripple	1%
Load Step Start Current	0.3A
Load Step Current	0.15A
Load Step Edge Rate	0.1A/us
Output Voltage Load Step Over/Undershoot	1%
Performance Priority	Balance Efficiency and Size
Cost Tradeoff	Cost
Inductor Current Ratio (LIR)	0.3

Schematic



ent is less than 135mA, the PWM portion of burst mode has an effective load of at least 135mA. Therefore, AC Loop simulations must be run with at least this much load current.

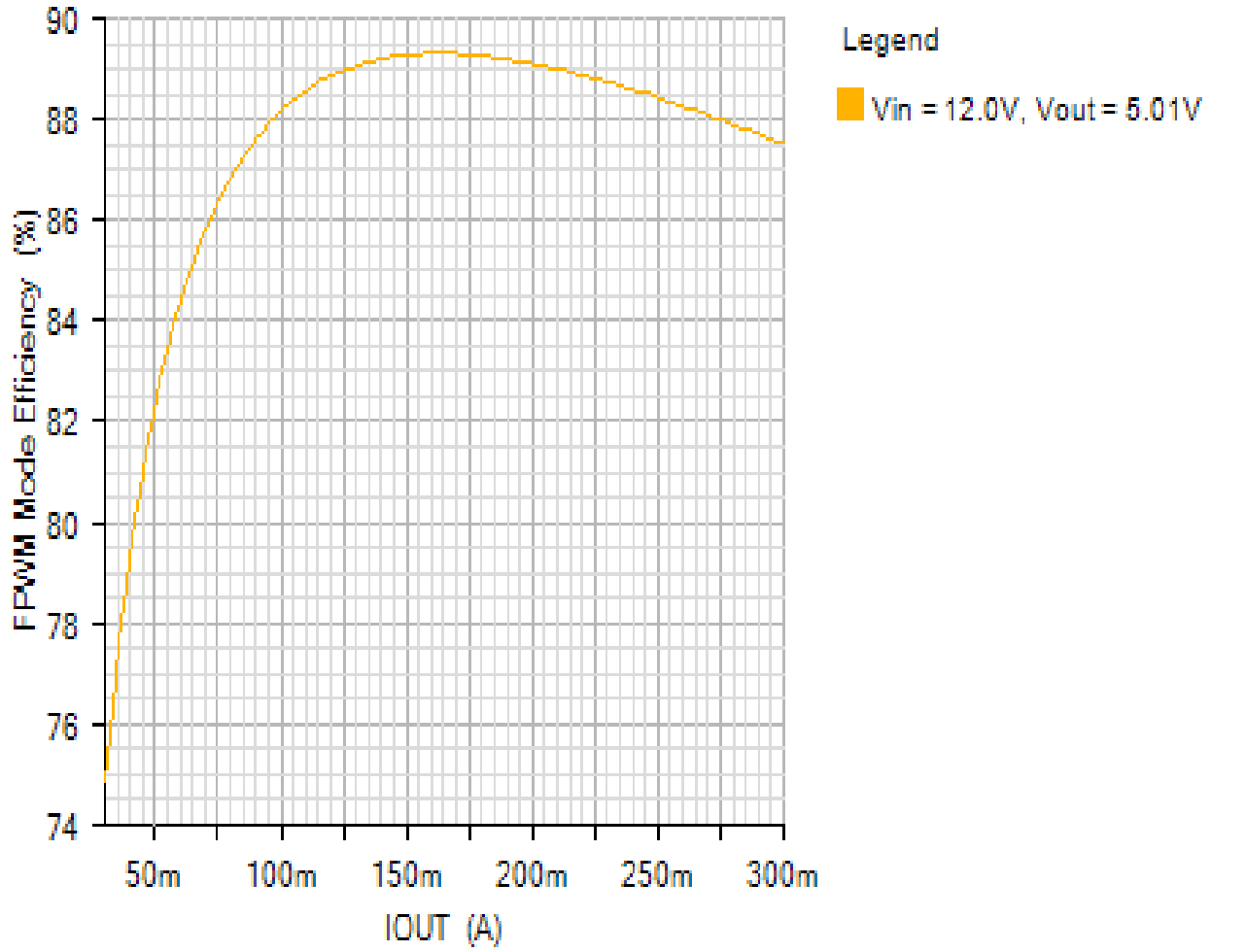
BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAX16956	Maxim Integrated	36V, 300mA, Mini Buck Converter with 1.1µA IQ
C1	1	C2012X5R1H224K125AA	TDK	Cap Ceramic 220nF 50V 0805 85C
C2	1	06033C104JAT2A	AVX	Cap Ceramic 0.1uF 25V X7R 5% Pad SMD 0603 125°C T/R
C4	2	GRM31CD71A226KE15L	Murata	Cap Ceramic 22uF 10V X7T 10% SMD 1206 125C Embossed T/R
C5	1	CL10B105KA8VPNC	Samsung Electro-Mechanics	Cap Ceramic 1uF 25V X7R 10% Pad SMD 0603 125°C Automotive T/R
C6	1	C0603C180J3GACTU	KEMET Corporation	Cap Ceramic 18pF 25V C0G 5% Pad SMD 0603 125°C T/R
L1	1	ME3220-183KLB	Coilcraft	Inductor 18uH 10% 626.4mOhm 0.74A Isat 0.7A Irms
R3	1	ERJ3GEYJ104V	Panasonic	Res Thick Film 0603 100K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
R9	1	ERJ3GEYJ104V	Panasonic	Res Thick Film 0603 100K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R
RBOT	1	ERJ3EKF4992V	Panasonic	Res Thick Film 0603 49.9K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
RTOP	1	ERJ3EKF2003V	Panasonic	Res Thick Film 0603 200K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

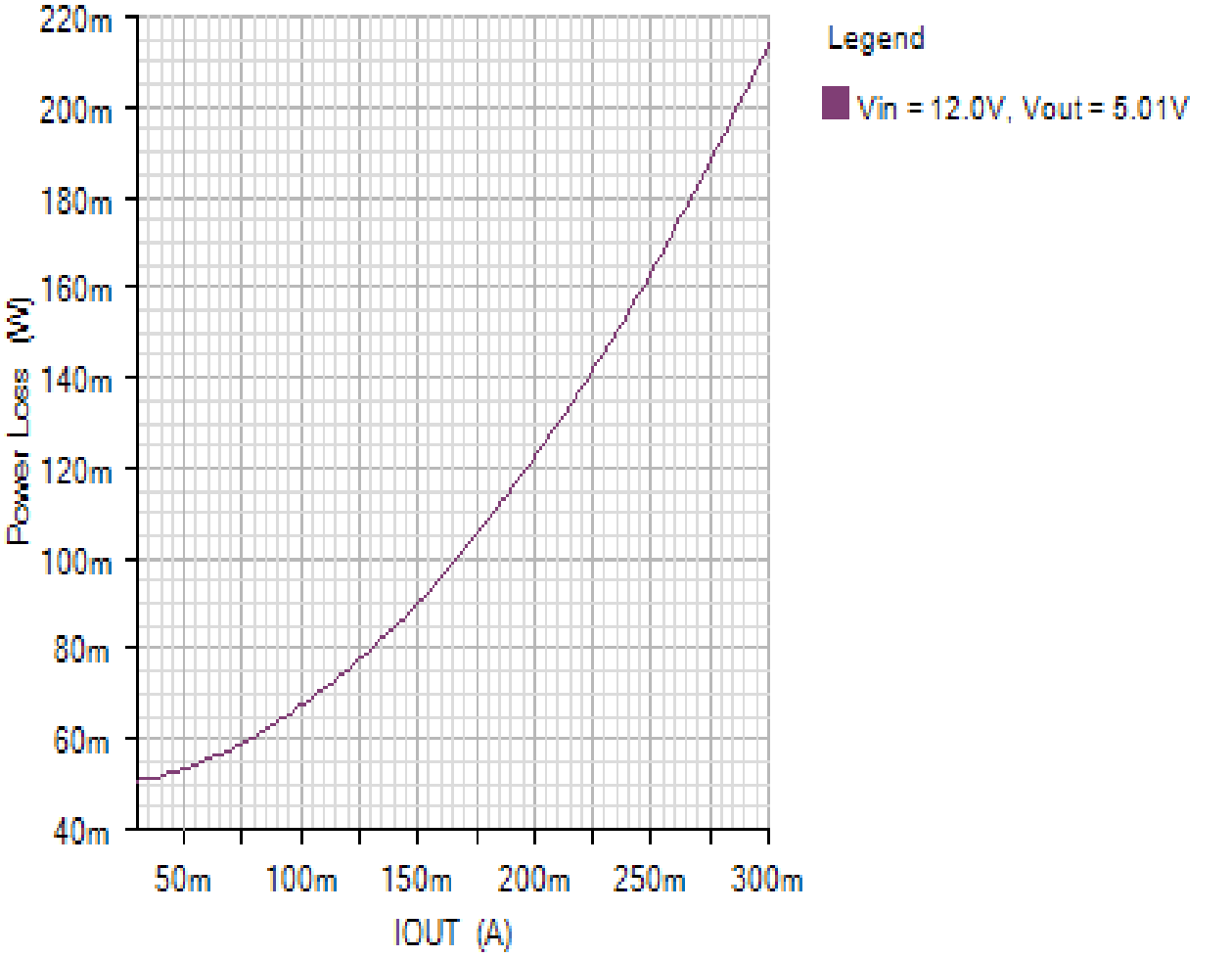
Simulation Results

Efficiency - Thu Nov 15 2018 14:19:02

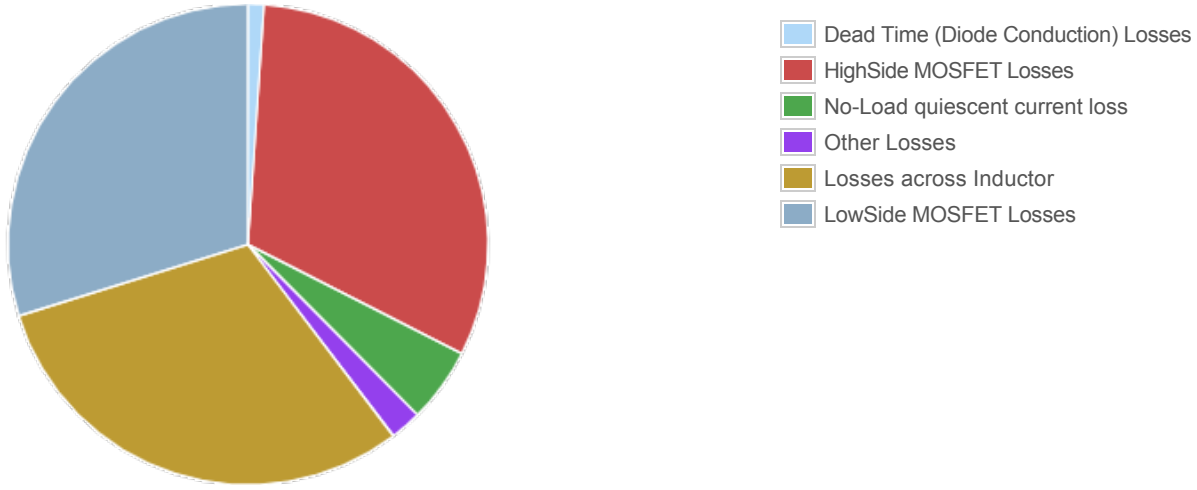
EFFICIENCY_PLOT Default



POWER_LOSS_PLOT Default



Losses



Component	Loss (W)	% of total

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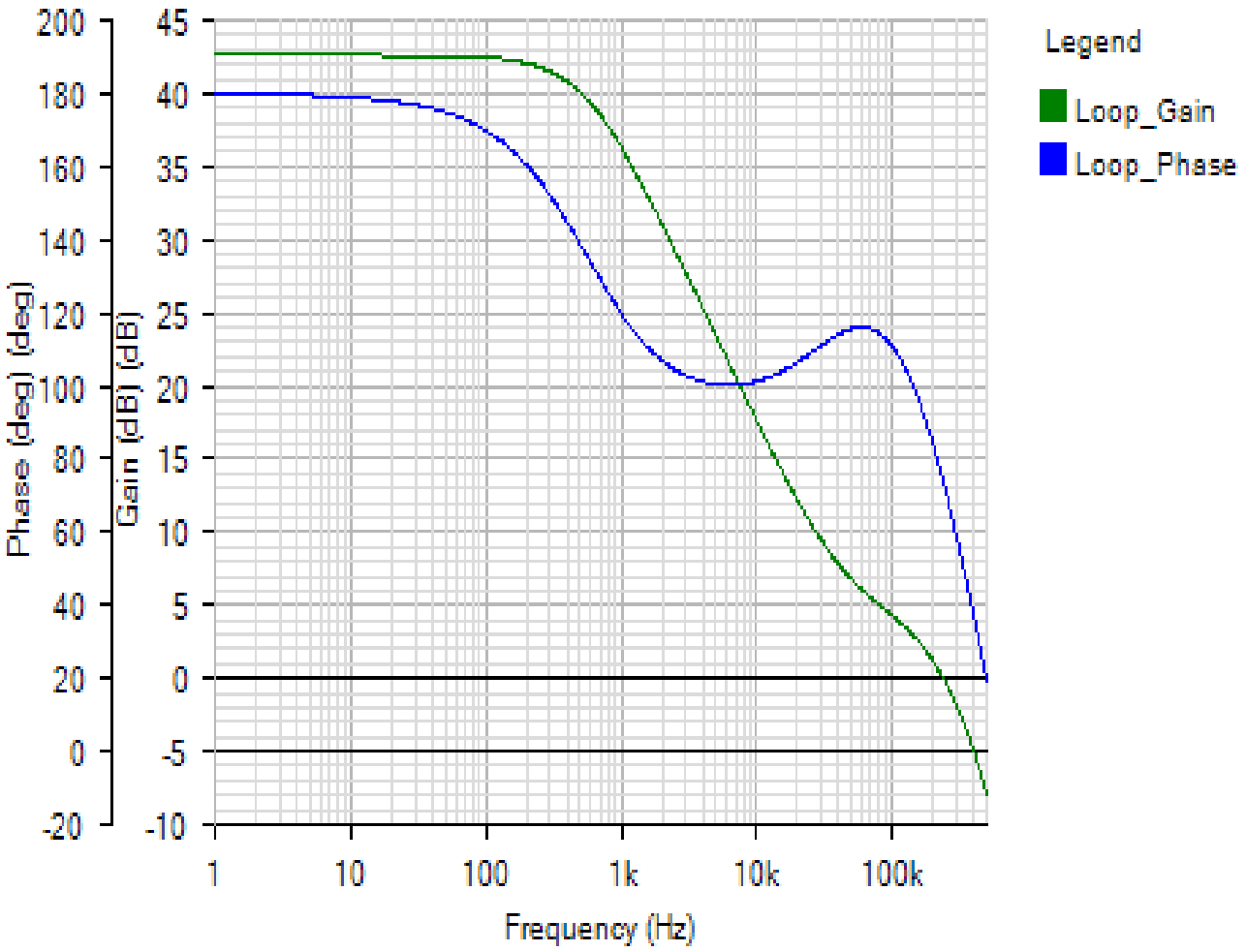
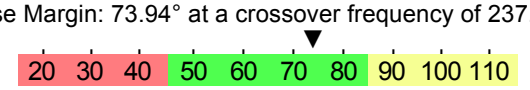
Dead Time (Diode Conduction) Losses	0.010591	1.1
HighSide MOSFET Losses	0.314256	31.4
No-Load quiescent current loss	0.050397	5
Other Losses	0.021175	2.1
Losses across Inductor	0.30554	30.6
LowSide MOSFET Losses	0.298041	29.8
Total	1	100

AC Loop - Thu Nov 15 2018 14:19:02

BODE Default

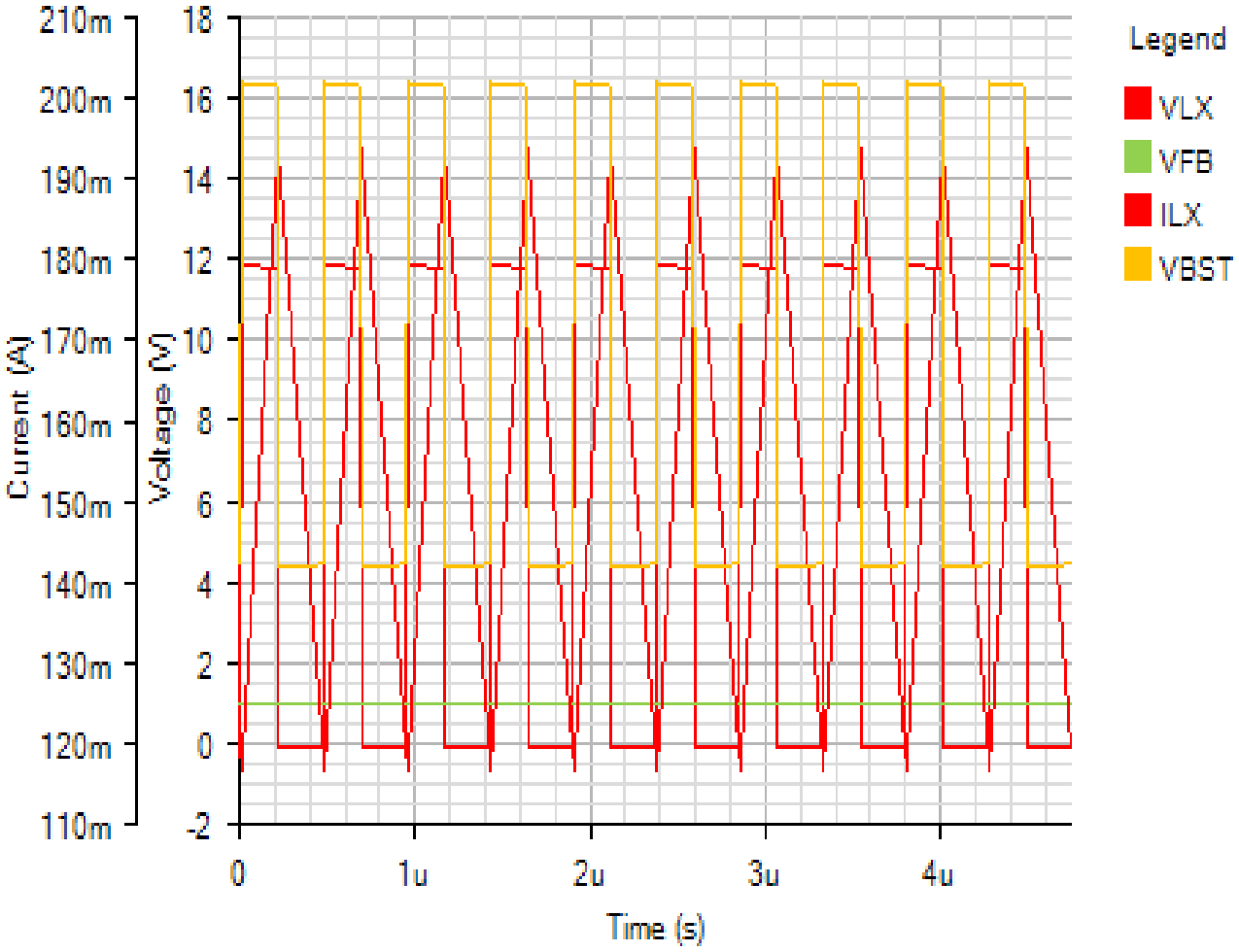


Phase Margin: 73.94° at a crossover frequency of 237.9kHz

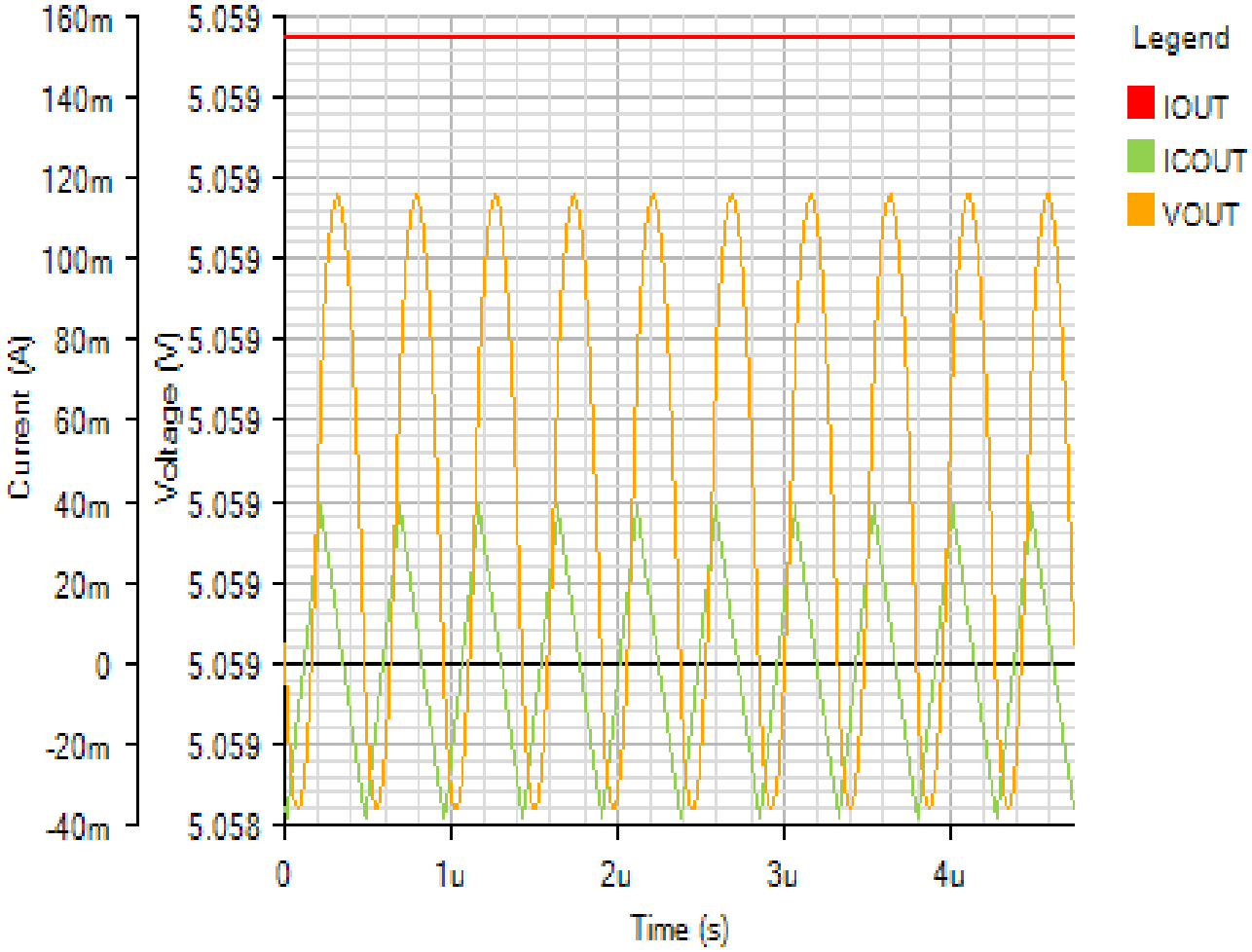


Steady State - Thu Nov 15 2018 14:19:02

SWITCHING Default



OUTPUT Default



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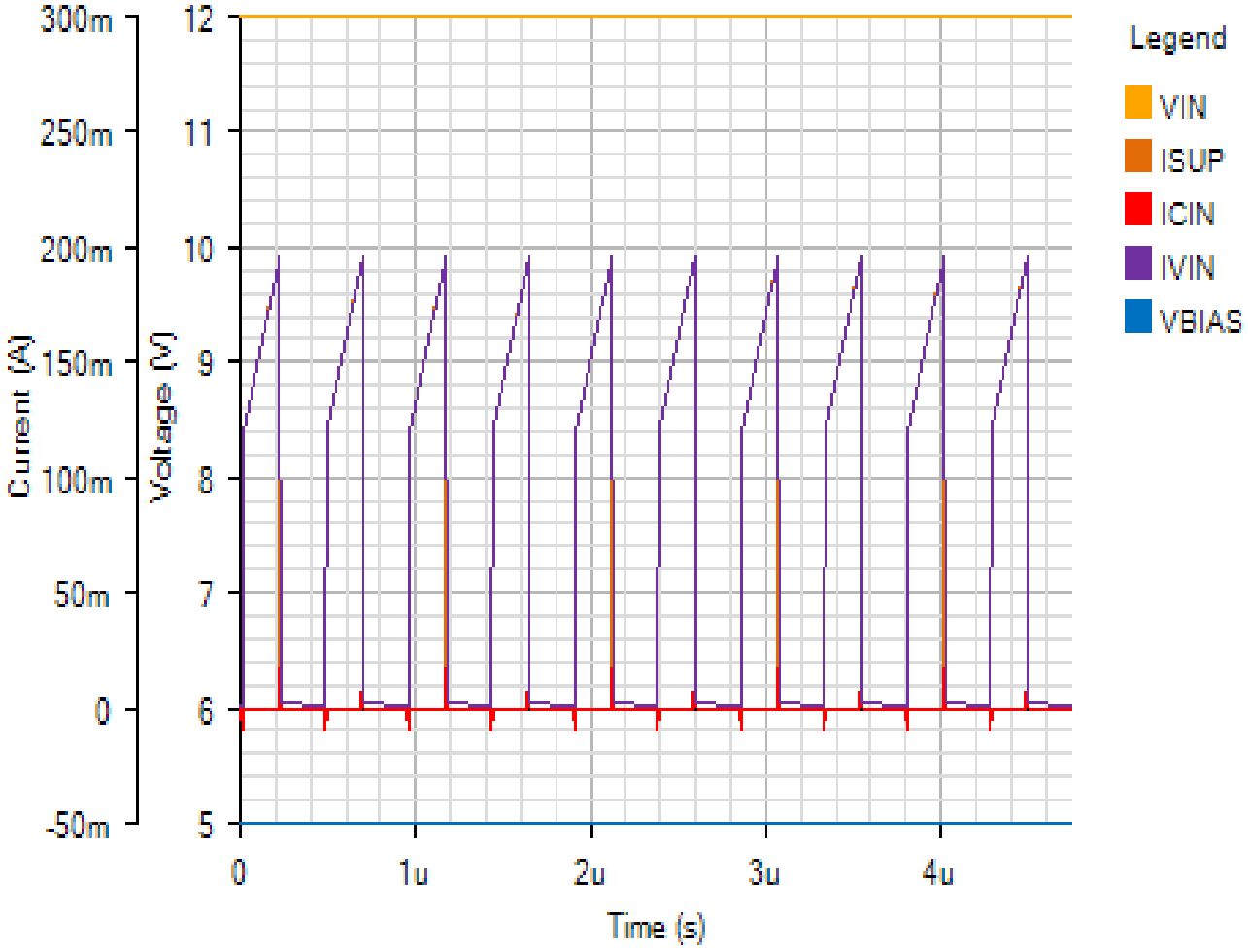
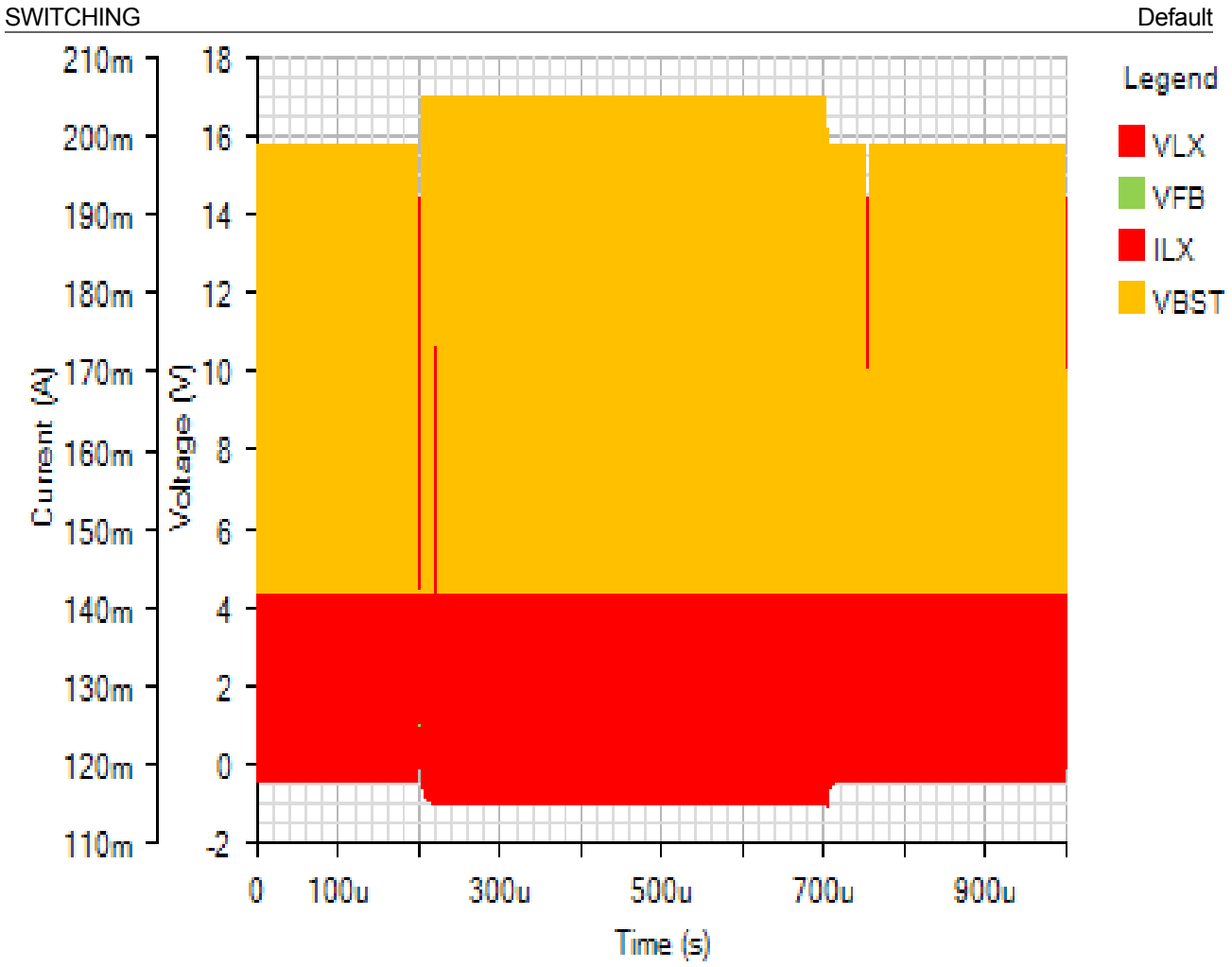


Line Transient - Thu Nov 15 2018 14:19:02



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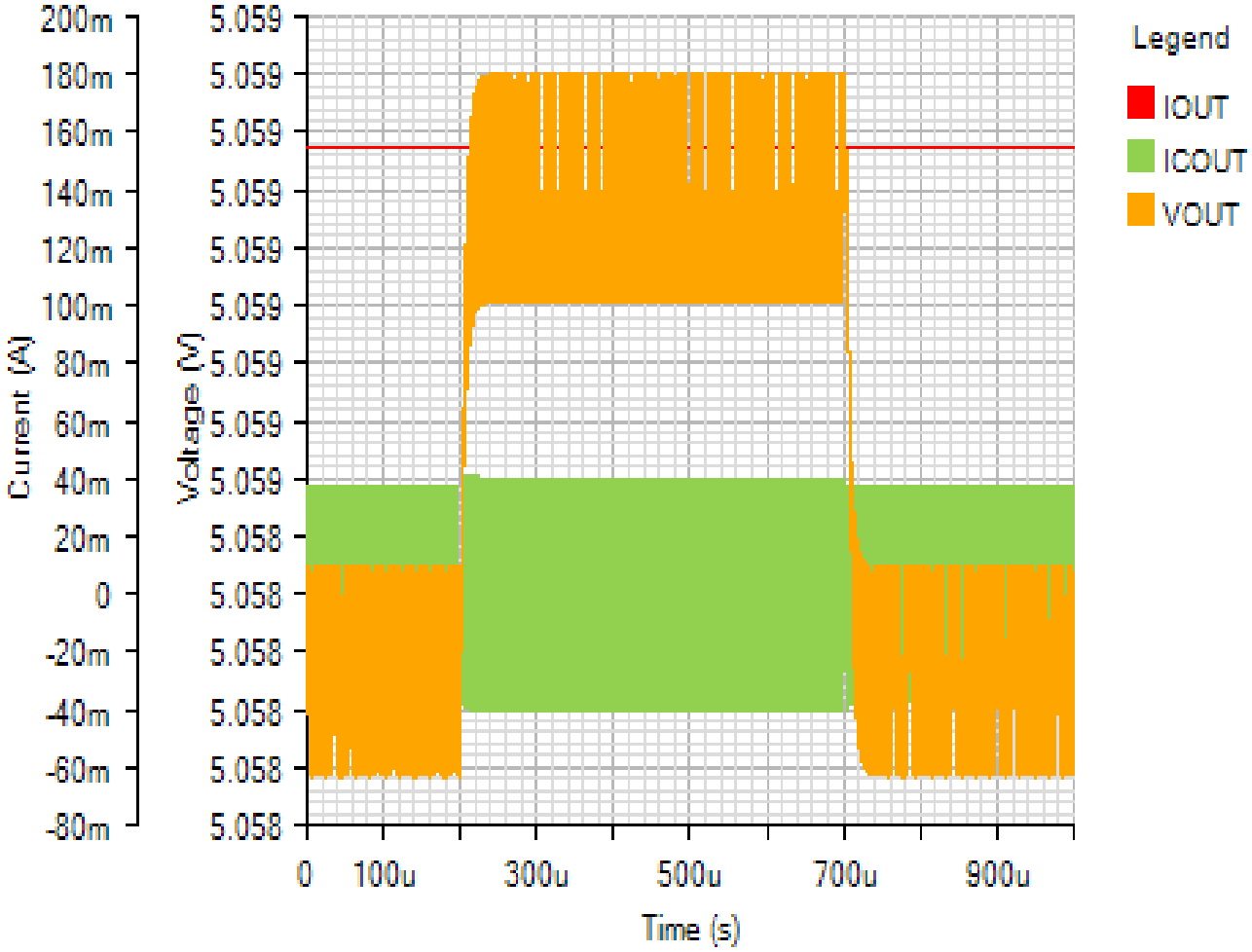

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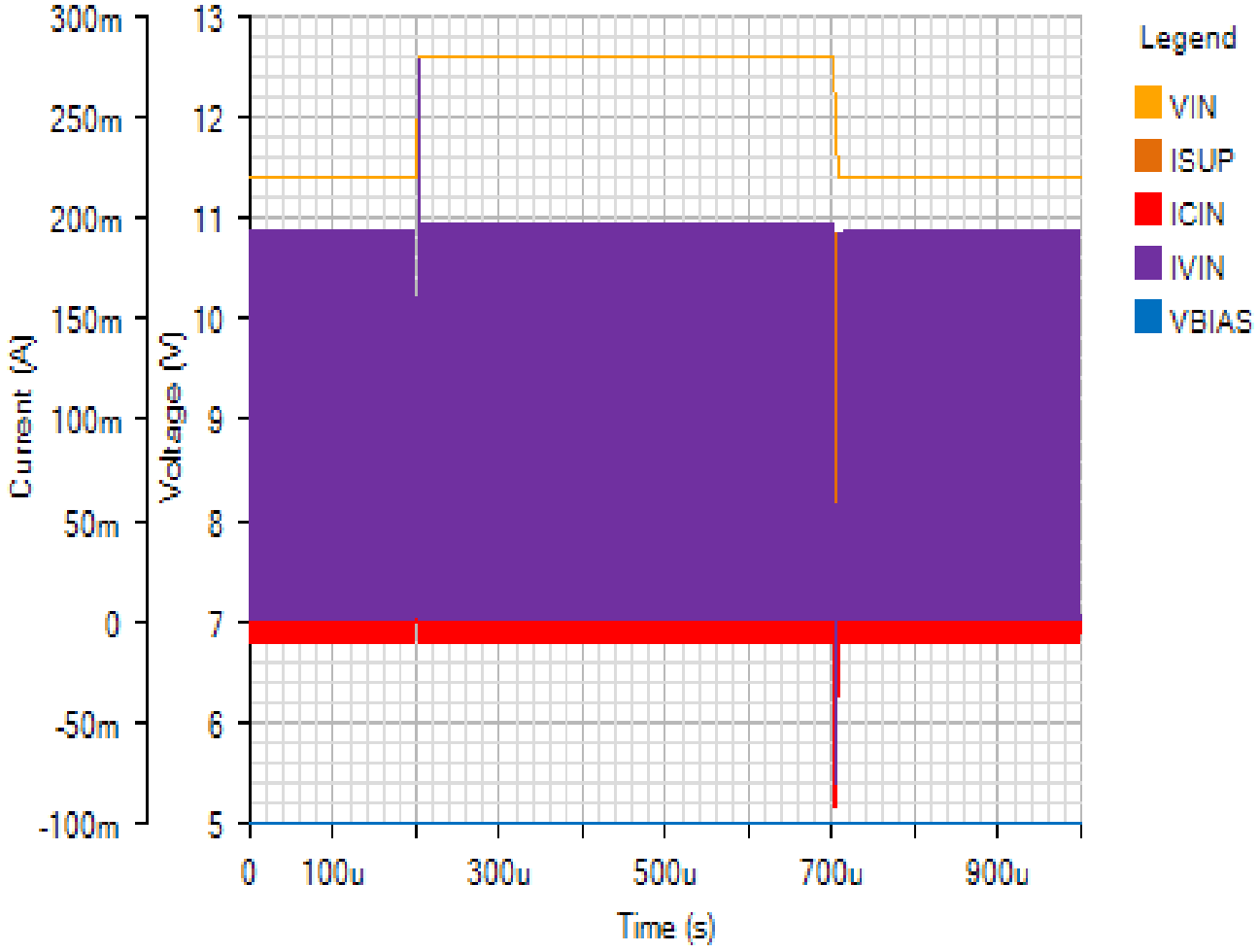
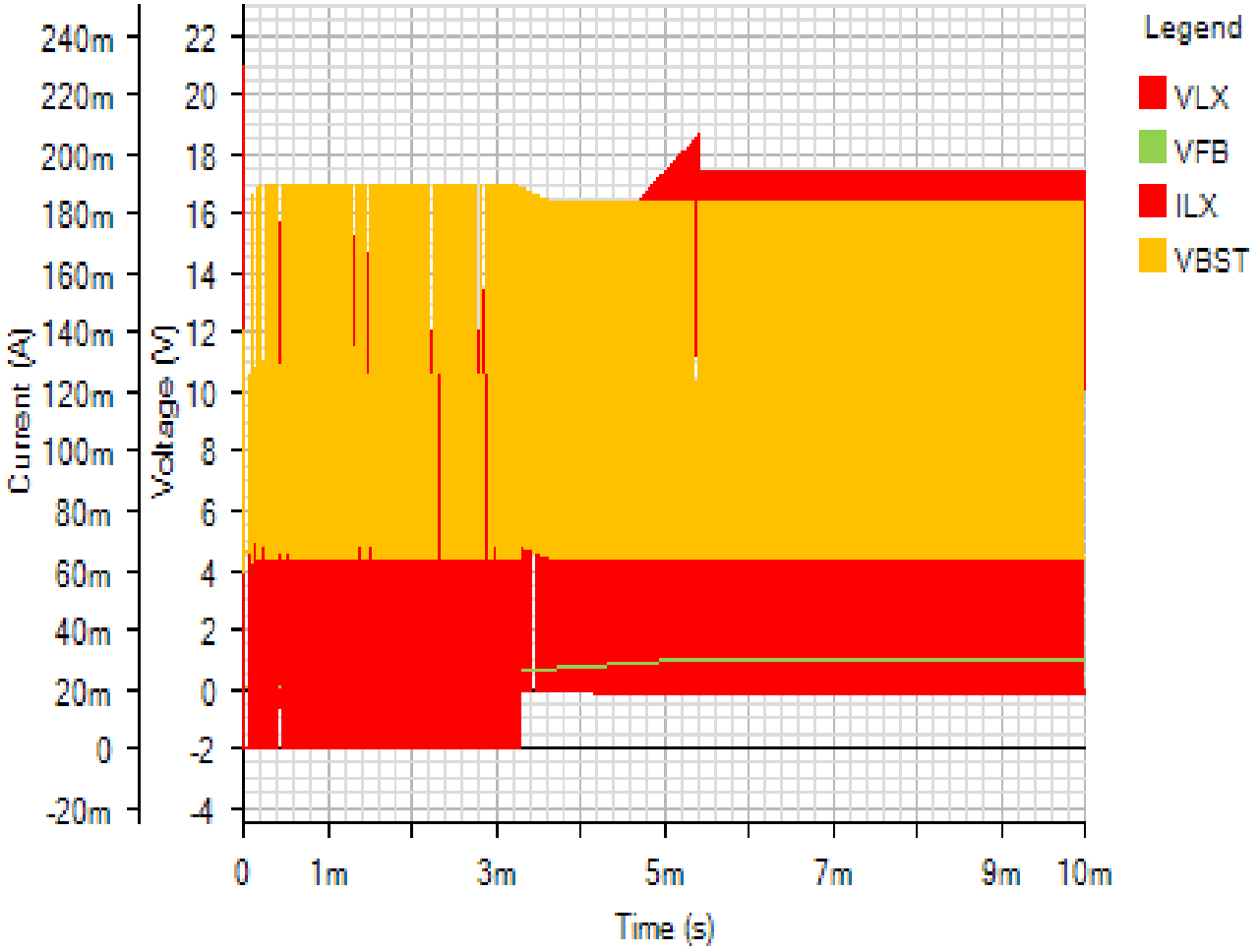
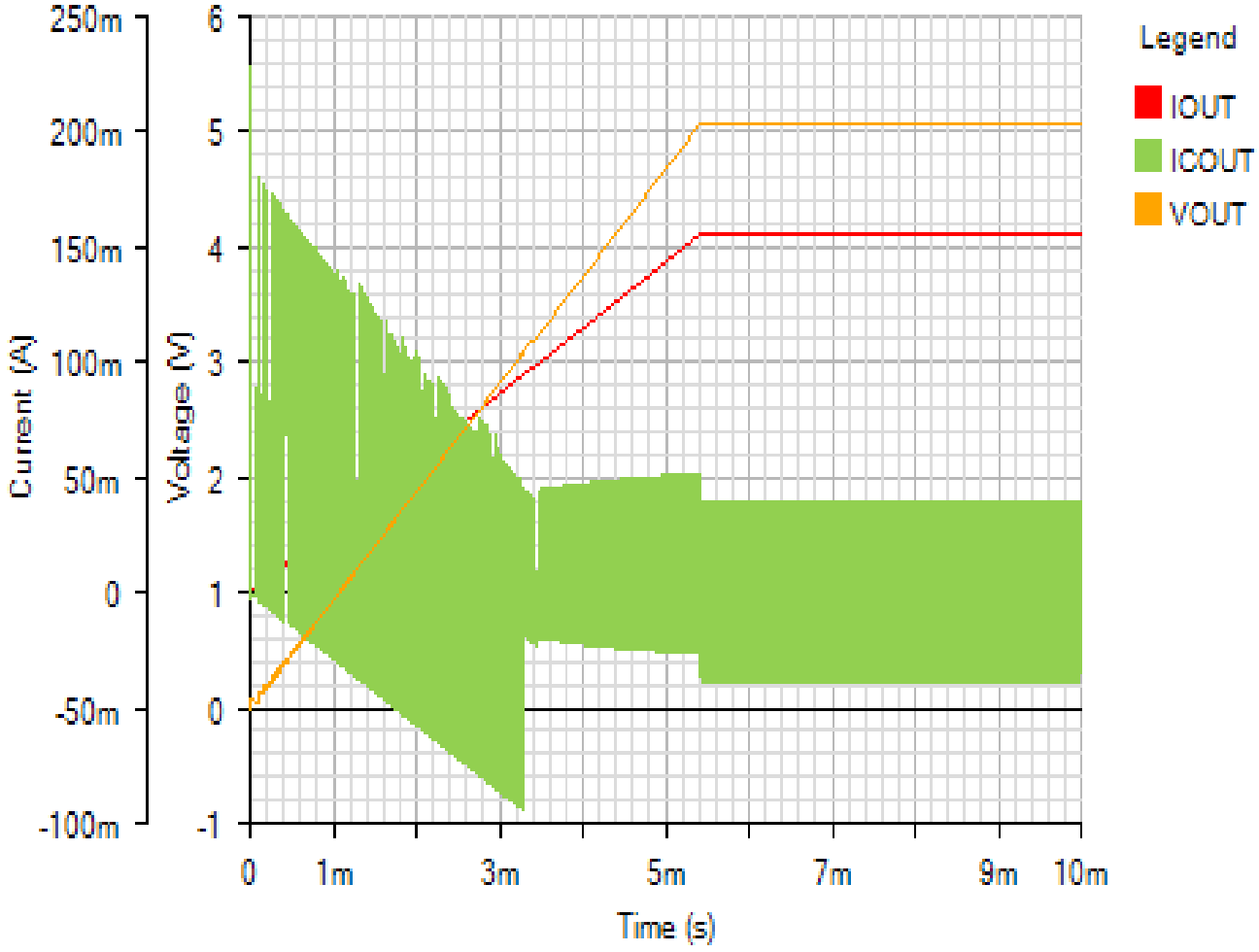


Start Up - Thu Nov 15 2018 14:19:02

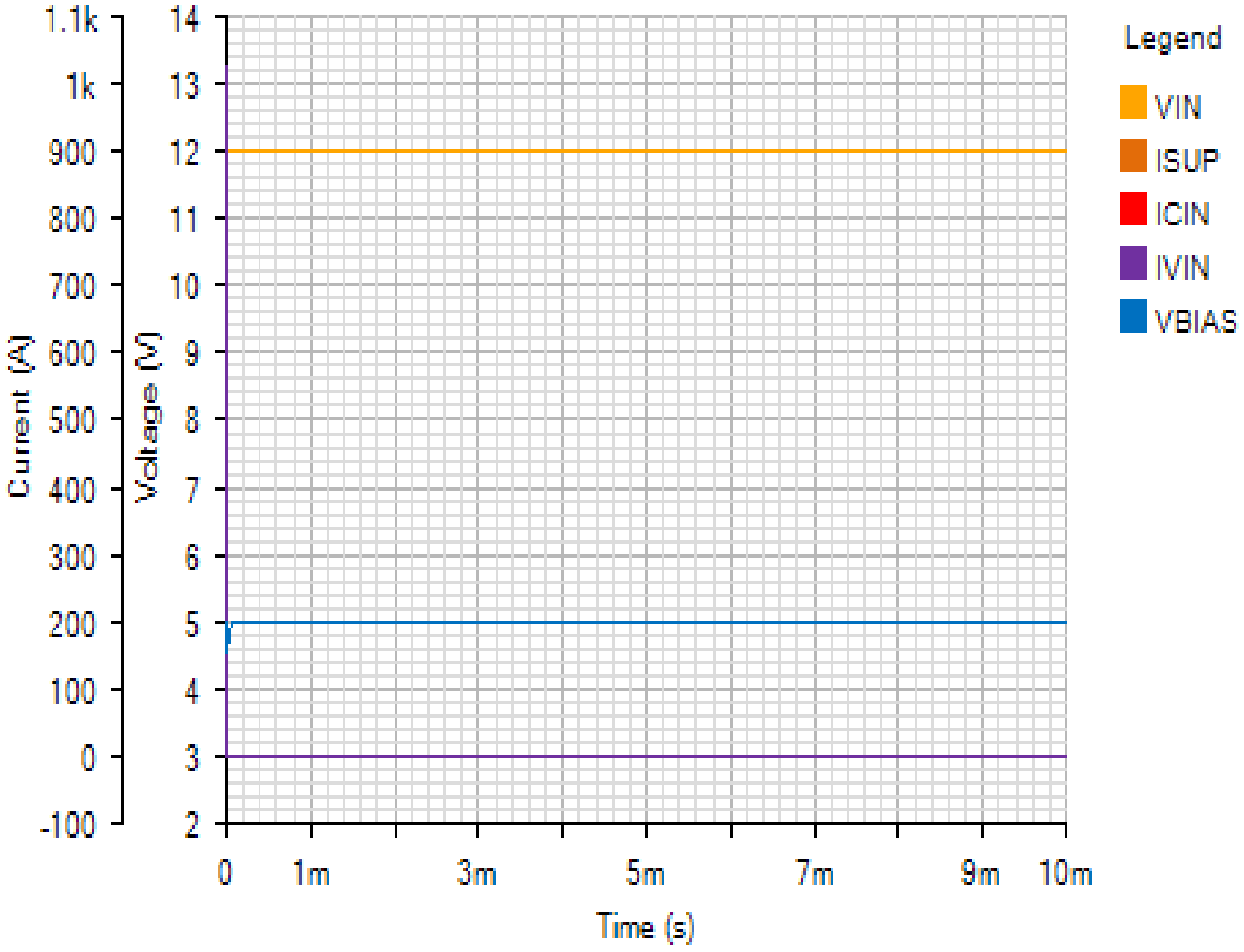
SWITCHING Default



OUTPUT Default

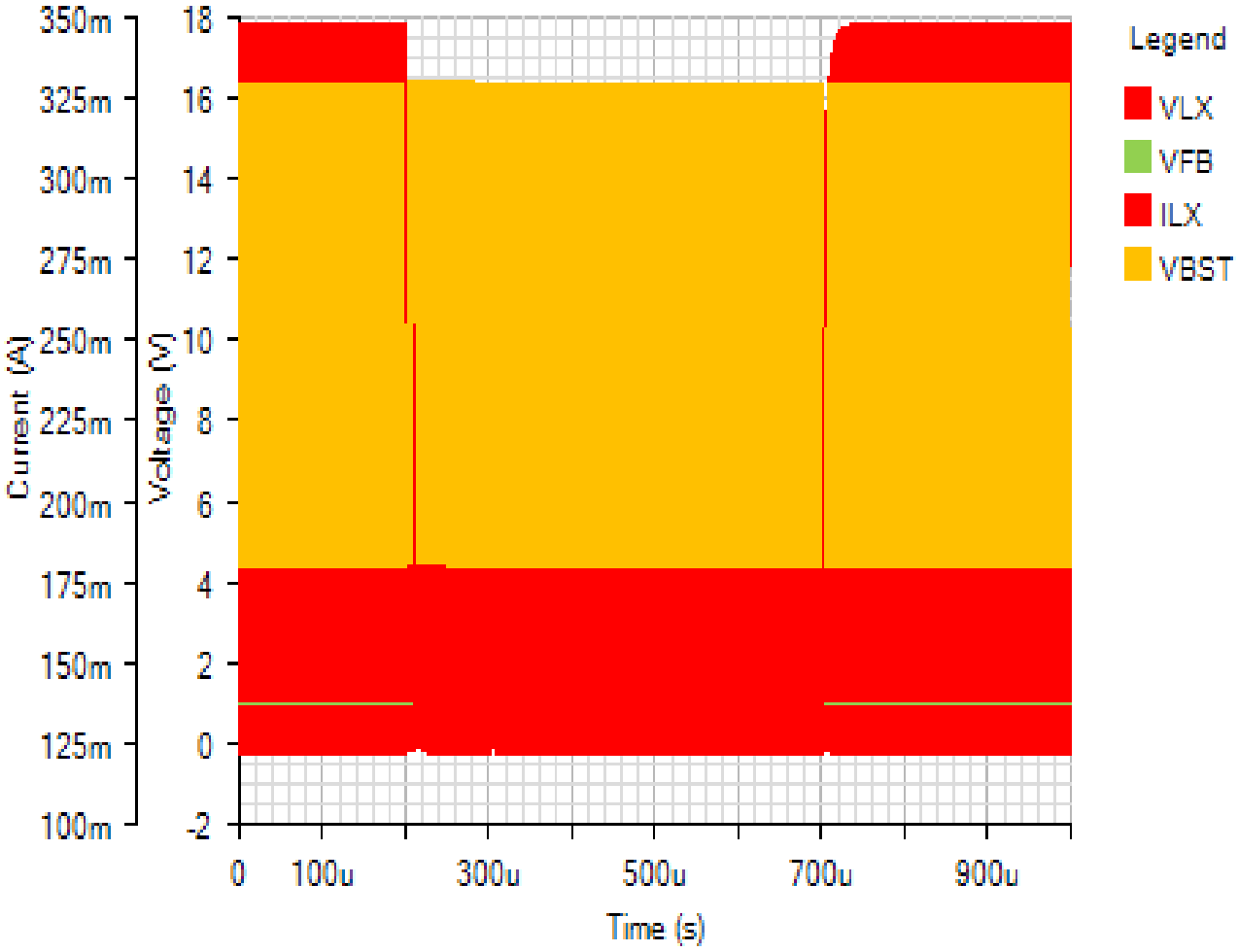


INPUT Default

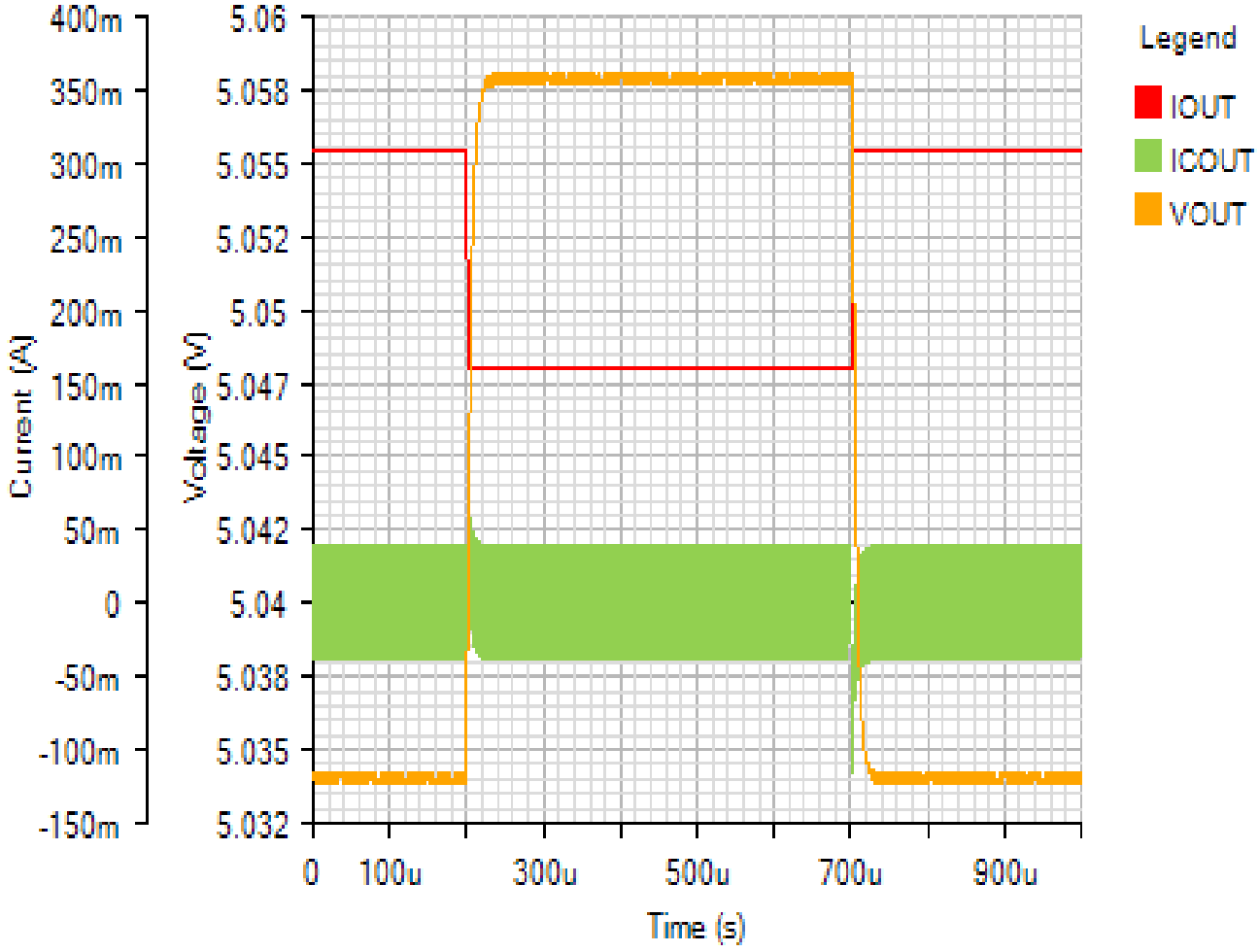


Load Step - Thu Nov 15 2018 14:19:02

SWITCHING Default



OUTPUT Default



INPUT Default