

## Initial Design

1.0

**Design Requirements**

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Parameter	Value
Minimum Input Voltage	10V
Maximum Input Voltage	14V
Nominal Input Voltage	12V
Input Voltage Ripple	1%
Output Voltage Programming	External Resistive Divider
Output Voltage	5V
Output Current	2.5A
Load Step Start Current	1.25A
Load Step Current	2.5A
Output Voltage Ripple	2%
Output Voltage Load Step Over/Undershoot	5%
Performance Priority	Balance Efficiency and Size
BOM Priority	Cost
Inductor Current Ratio (LIR)	0.3
Mode of operation	PWM
Switching Frequency	700000Hz
Ambient Temperature	25°C

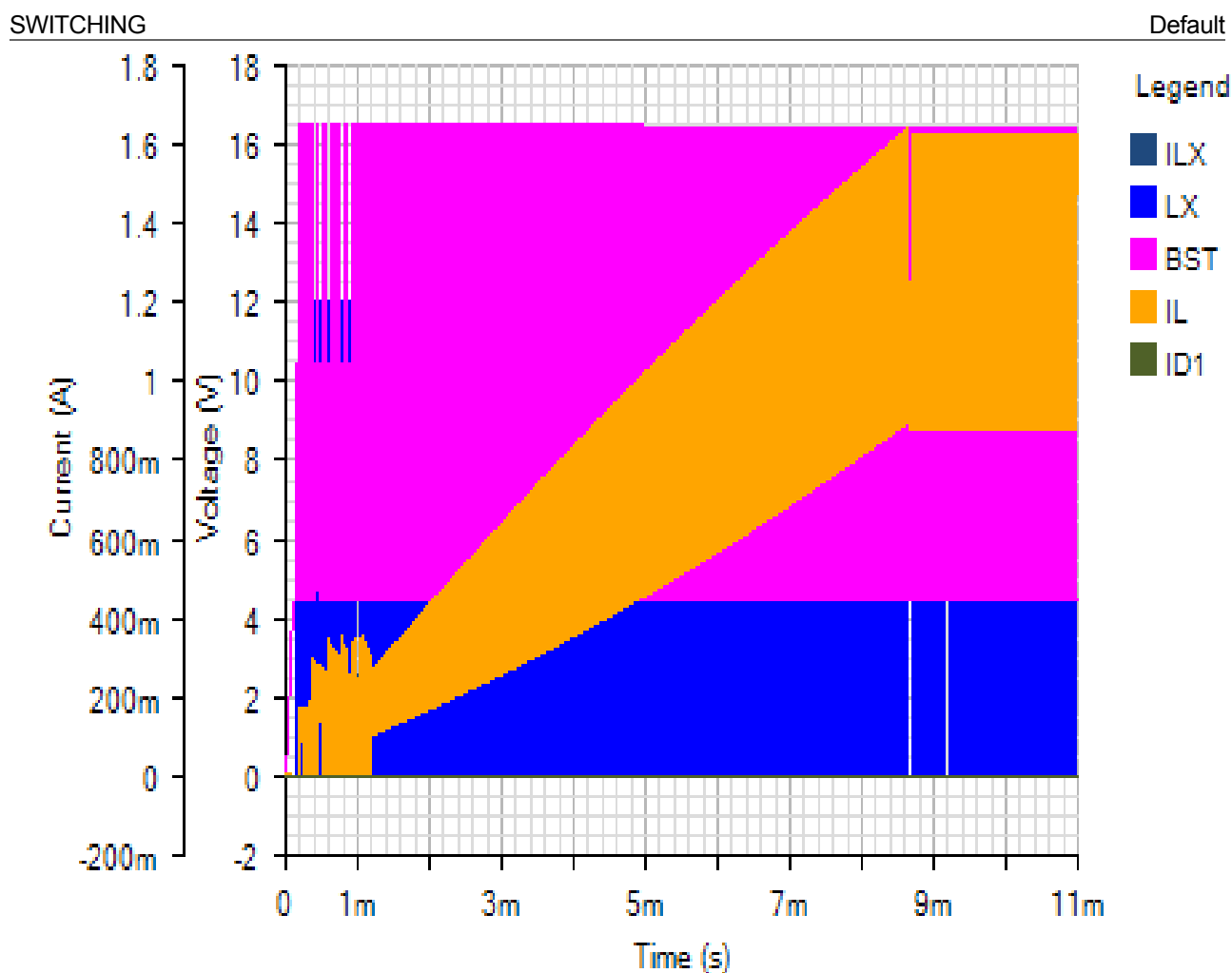


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R2	1	ERJ2RKF2263X	Panasonic	Automotive T/R Res Thick Film 0402 226K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R3	1	ERJ3EKF4022V	Panasonic	Res Thick Film 0603 40.2K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R4	1	ERJ2RKF1002X	Panasonic	Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R5	1	ERJ3EKF5622V	Panasonic	Res Thick Film 0603 56.2K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R

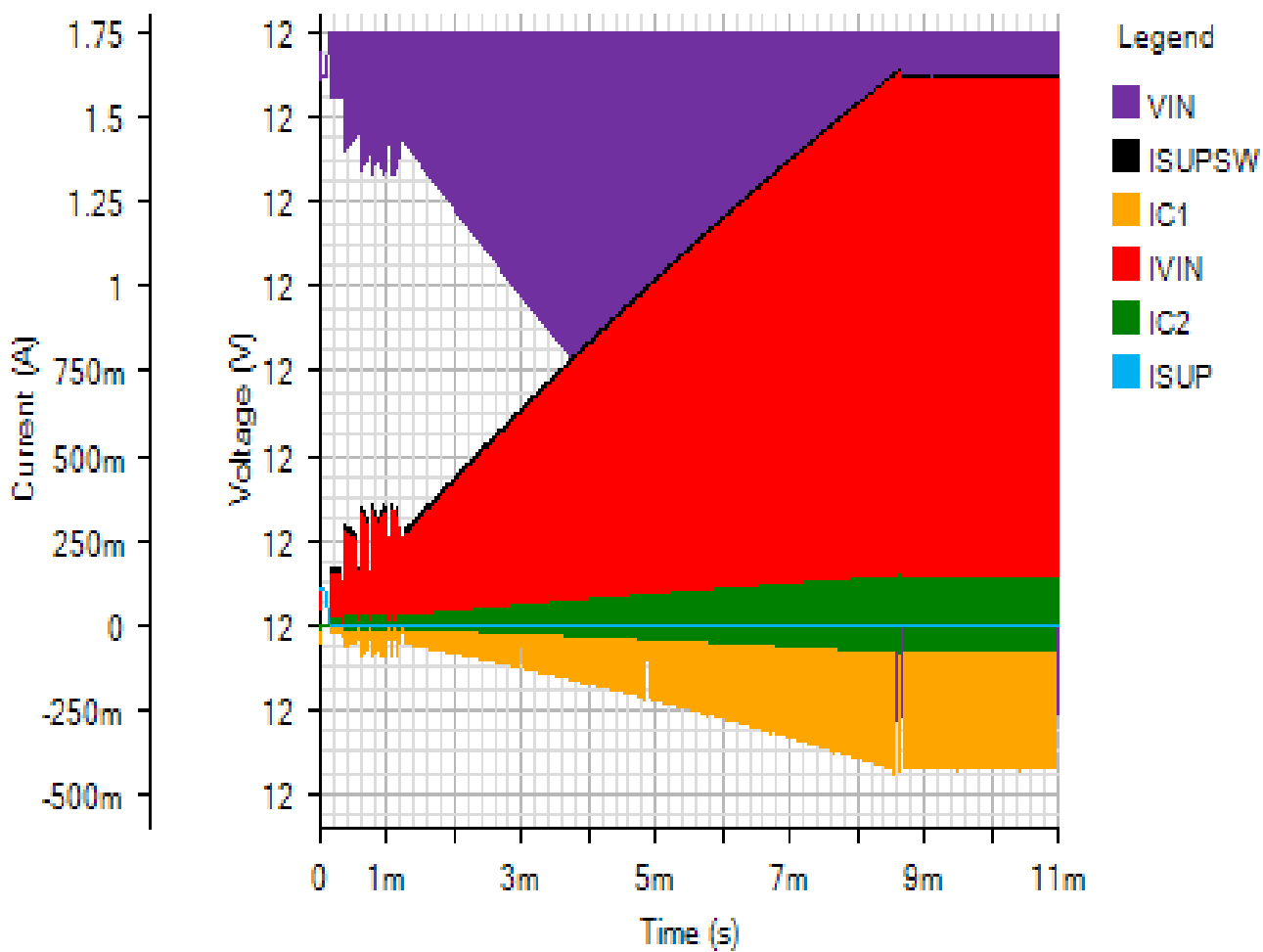
## Simulation Results

Start Up - Fri Nov 16 2018 09:28:05



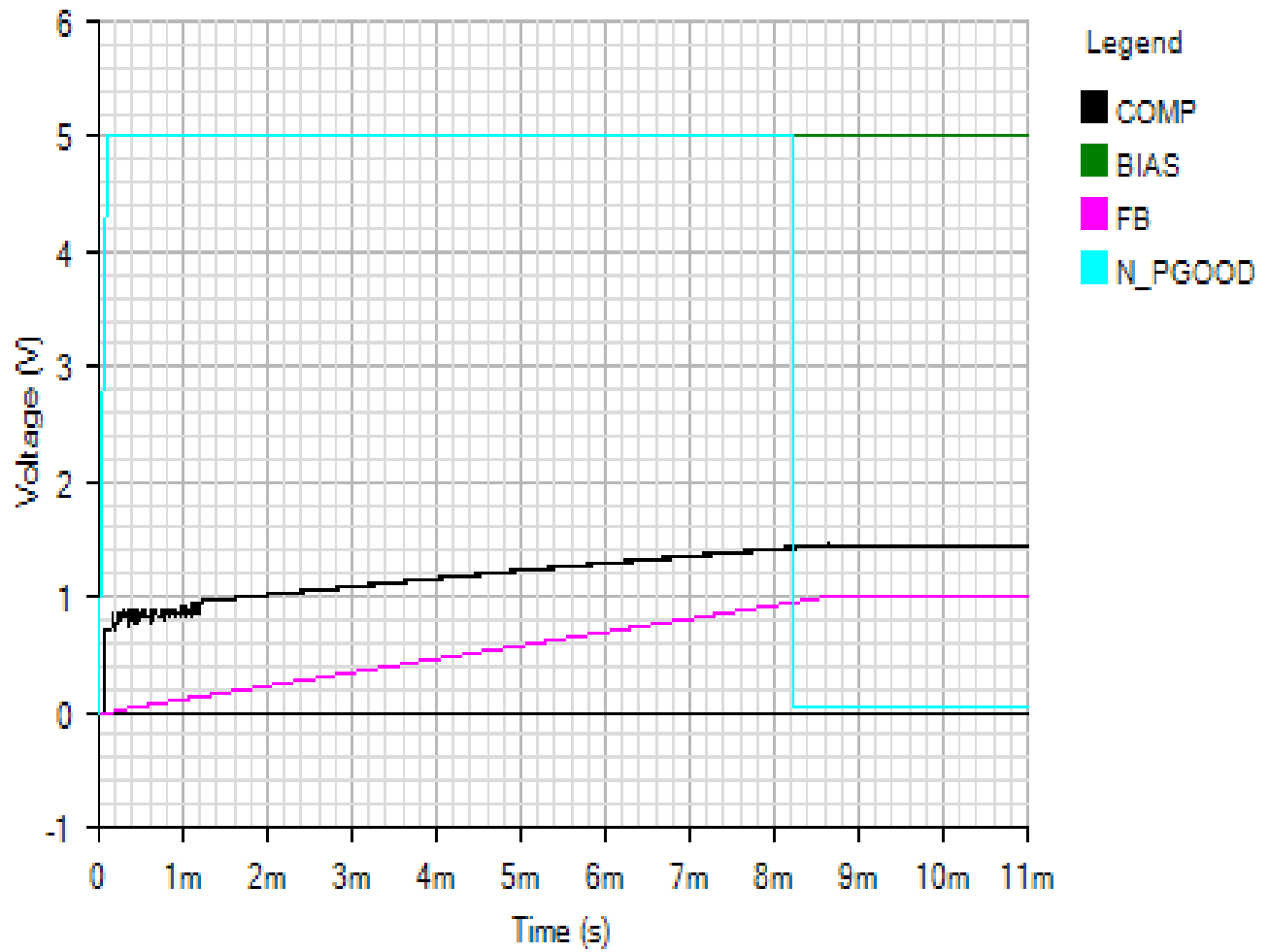
INPUT

Default



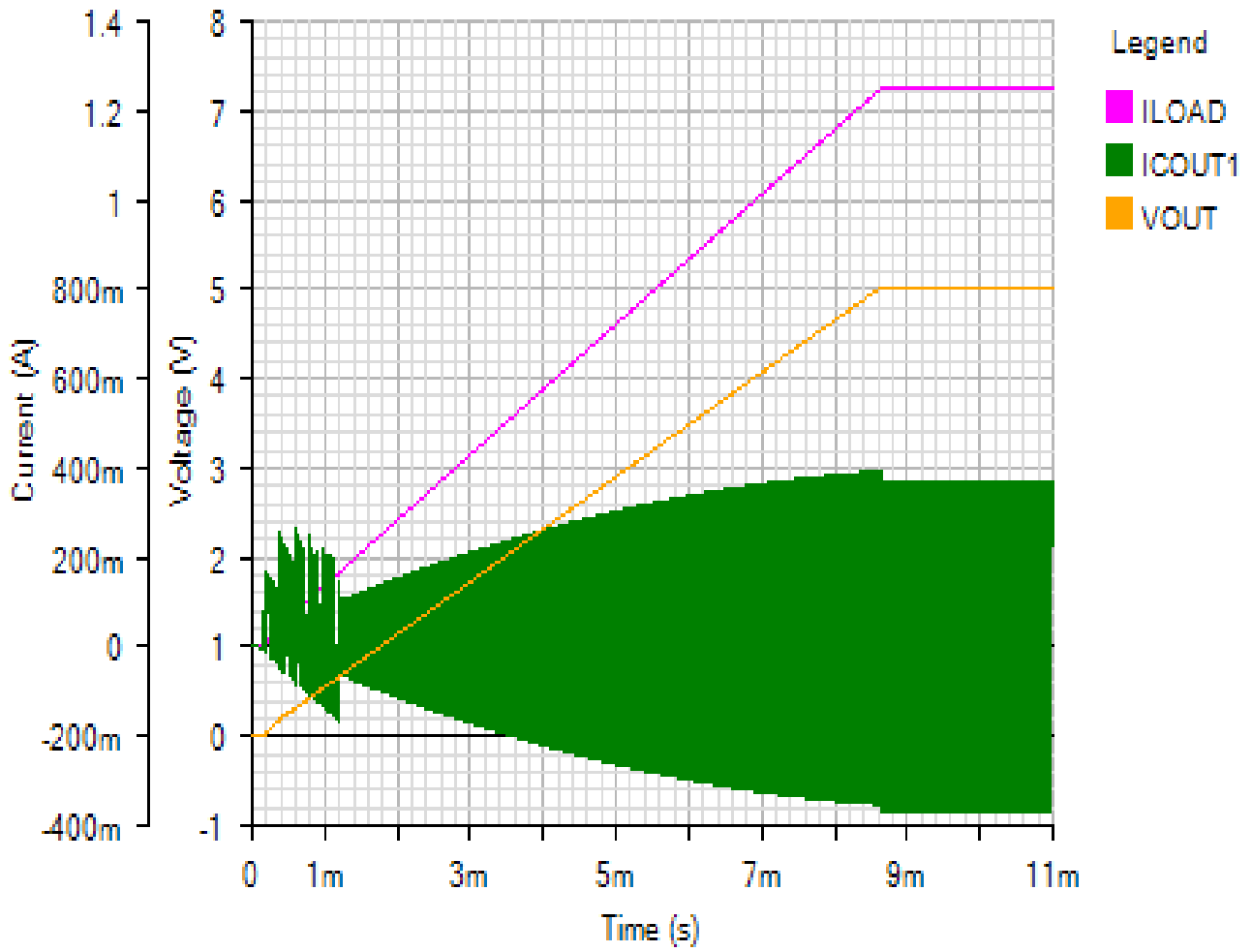
IC

Default



OUTPUT

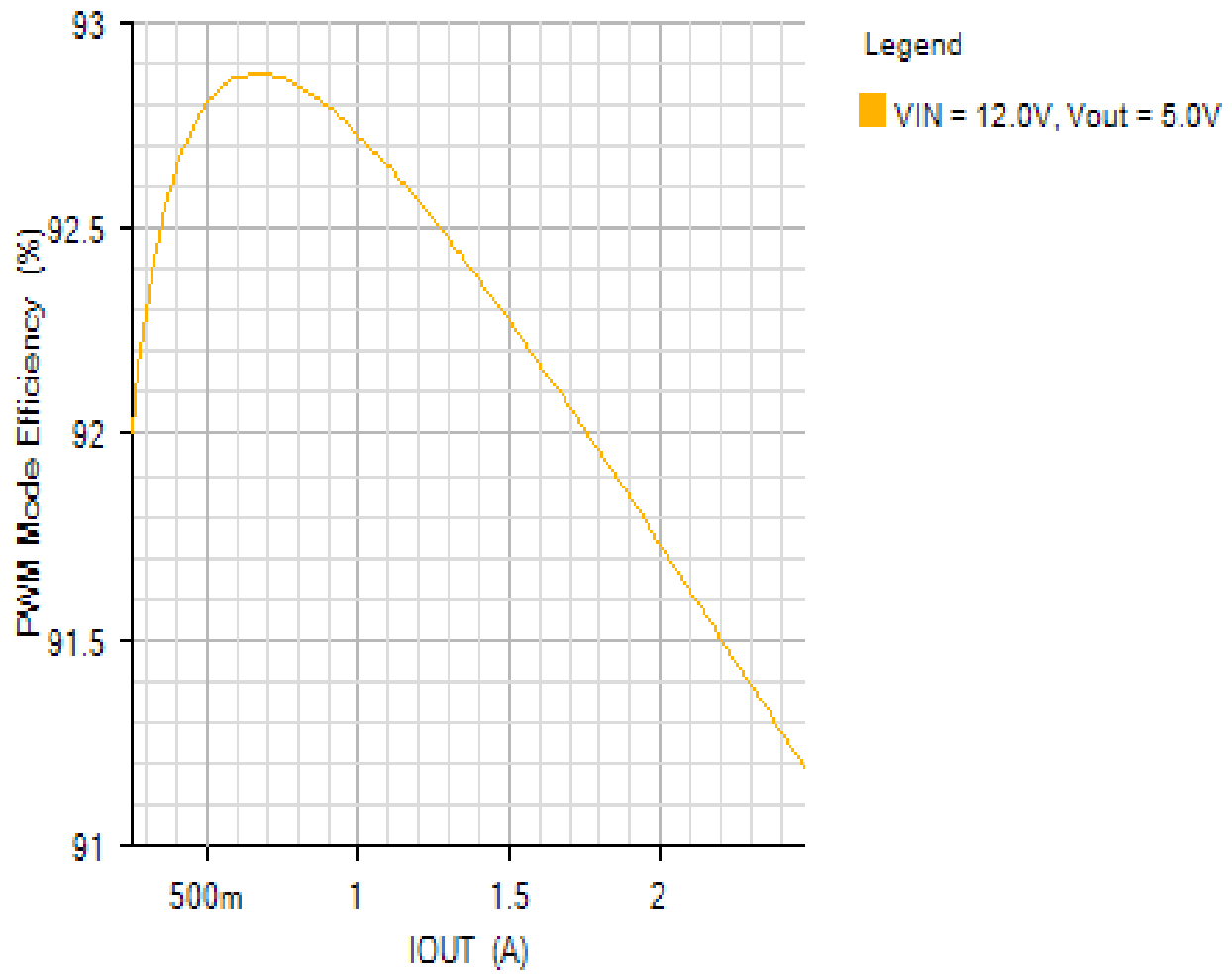
Default



Efficiency - Fri Nov 16 2018 09:28:05

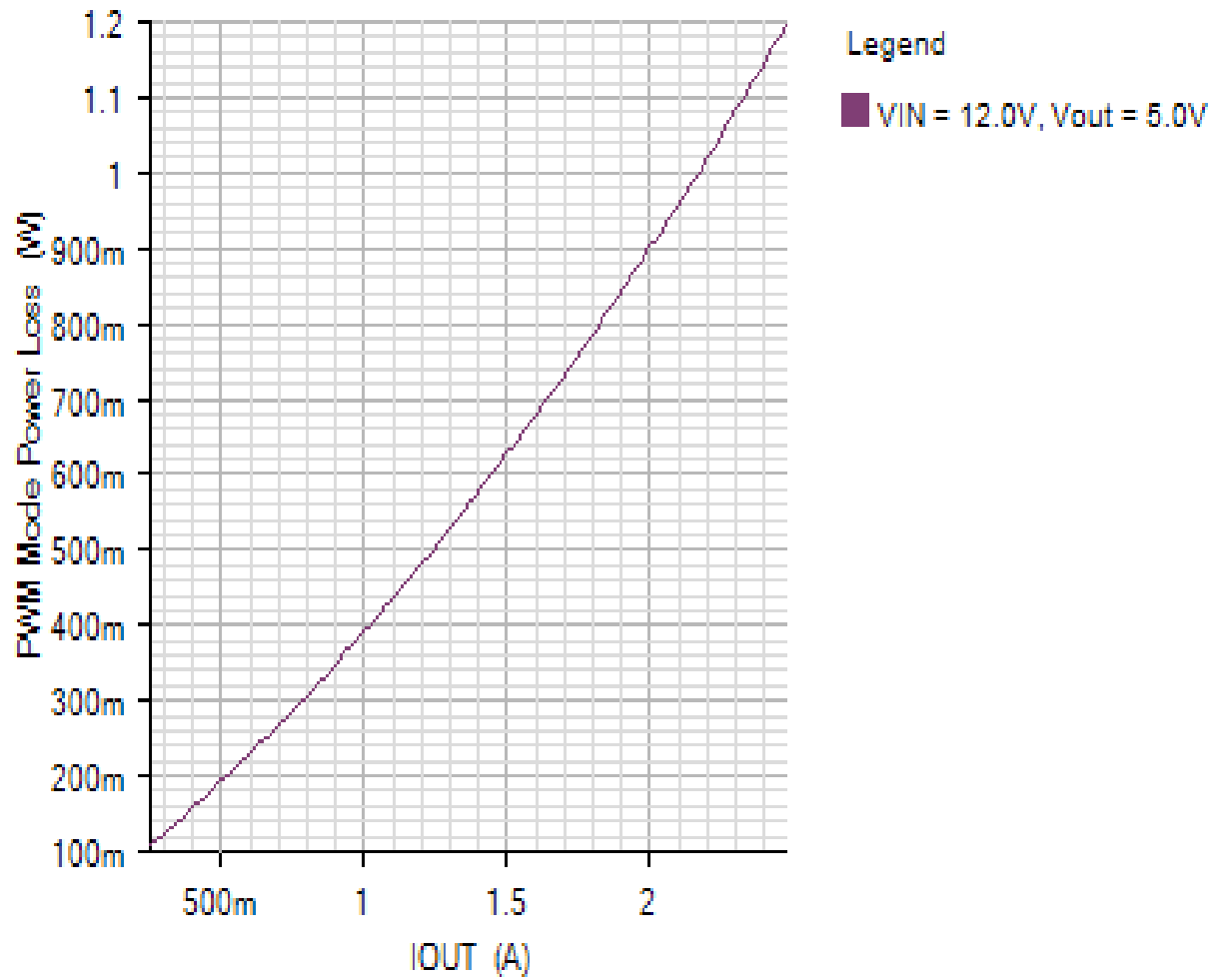
EFFICIENCY\_PLOT

Default



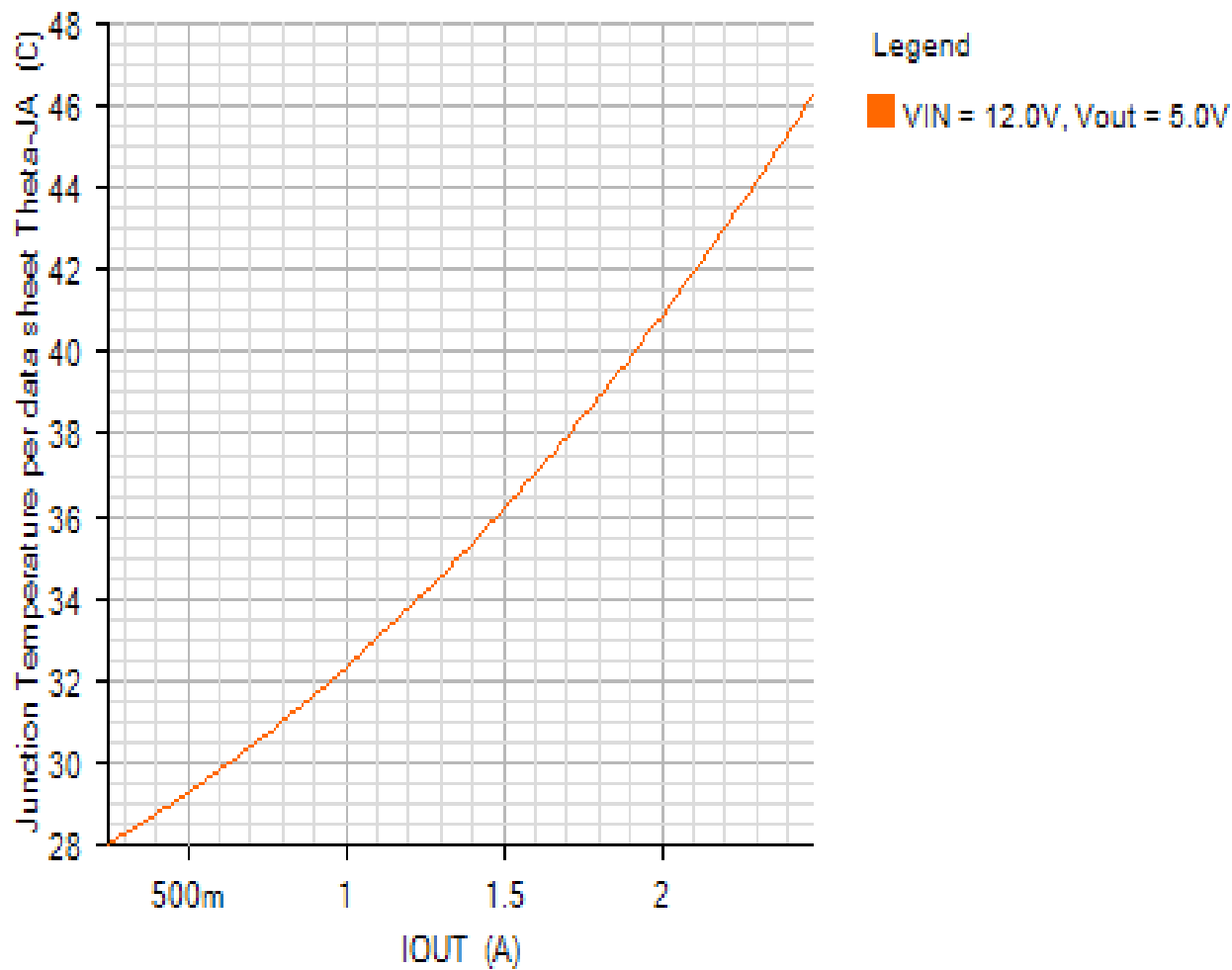
POWER\_LOSS\_PLOT

Default

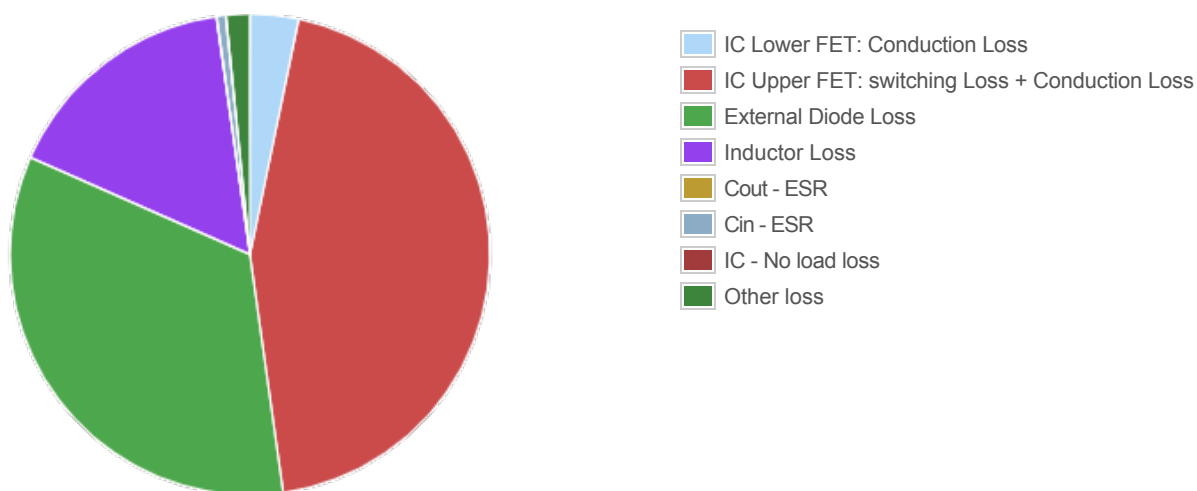


JUNCTION\_TEMPERATURE\_PLOT

Default



Losses



Component

Loss (W)

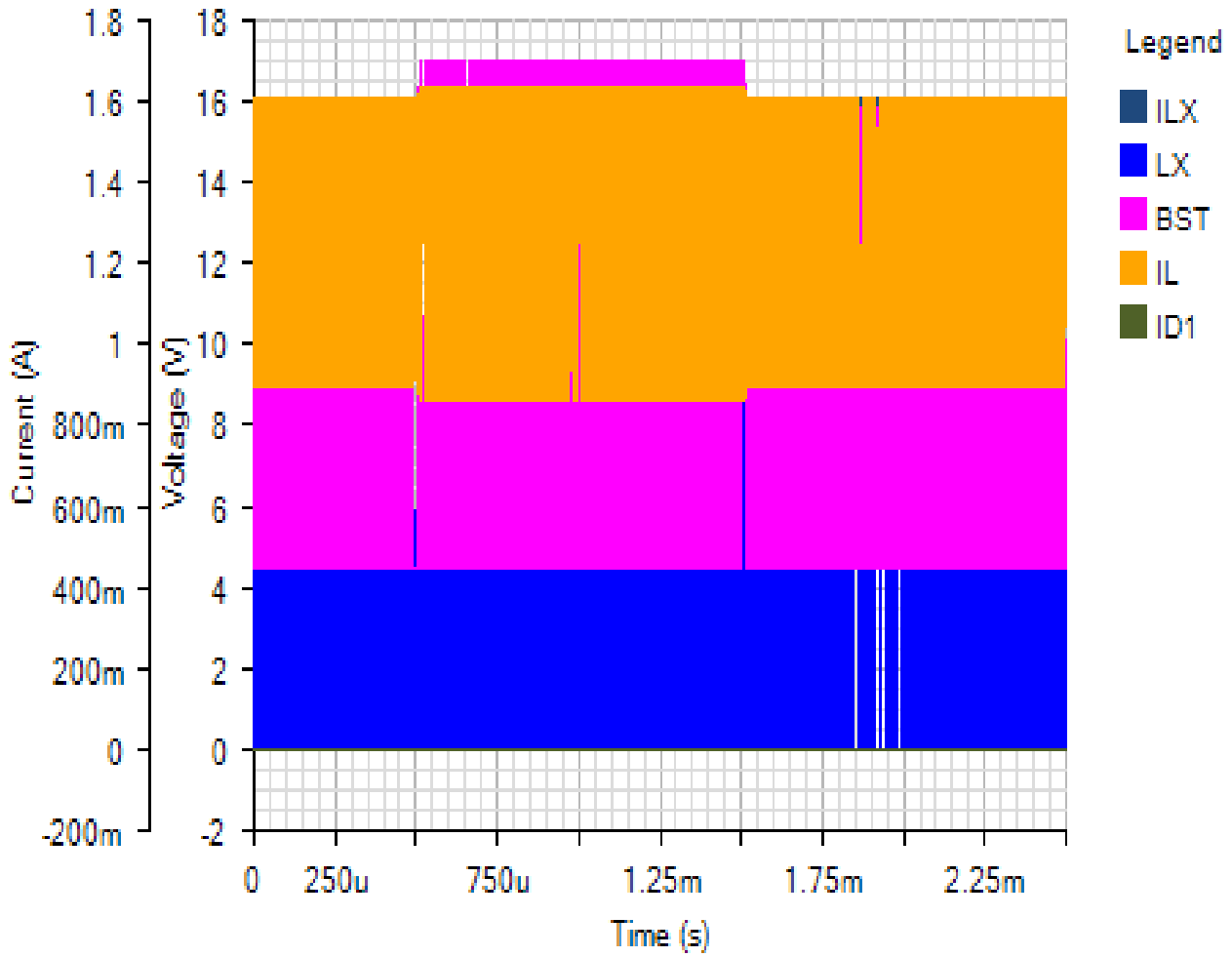
% of total

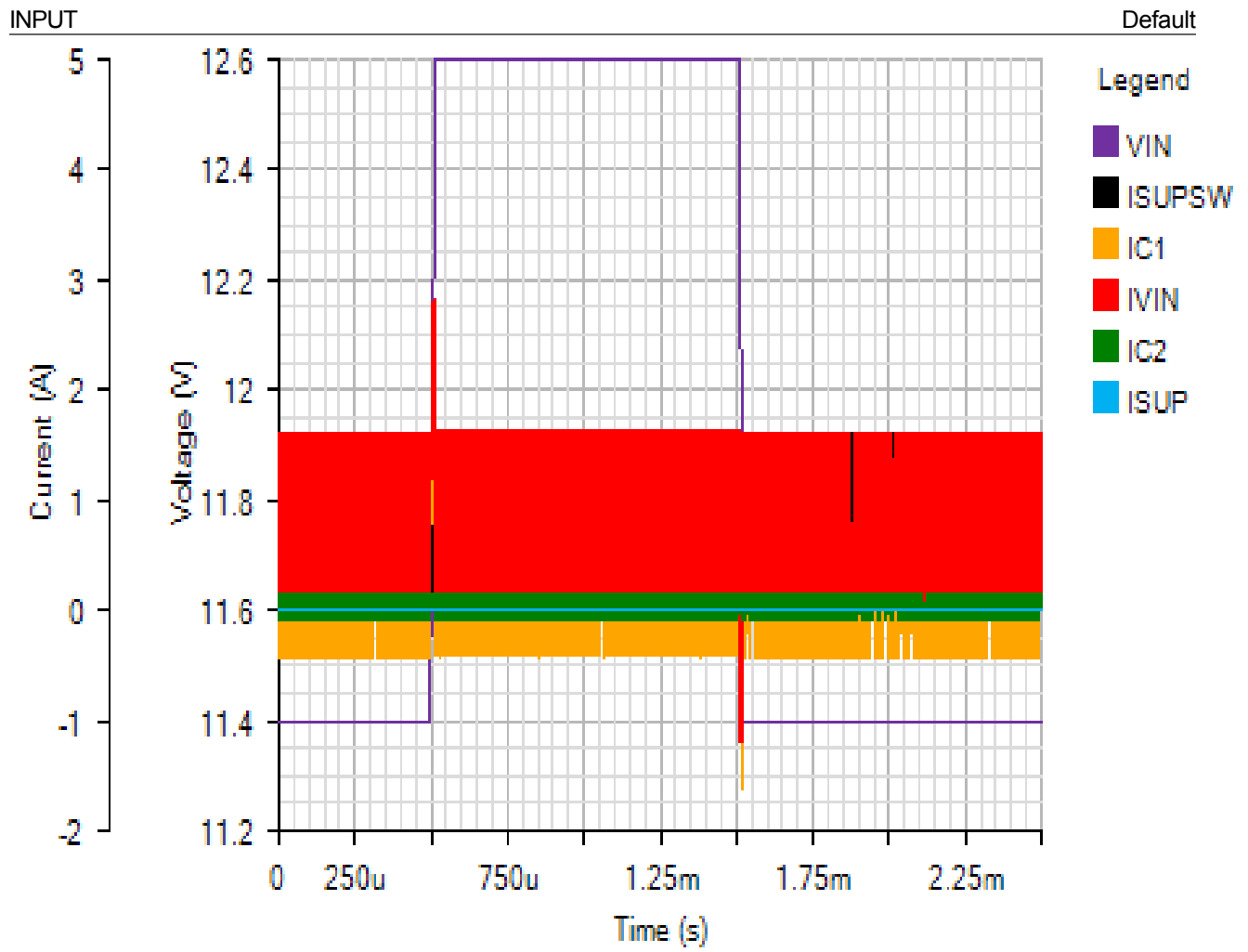
Component	Loss (W)	% of total
IC Lower FET: Conduction Loss	0.039	3.3
IC Upper FET: switching Loss + Conduction Loss	0.533	44.5
External Diode Loss	0.405	33.8
Inductor Loss	0.193	16.1
Cout - ESR	0.0001	0
Cin - ESR	0.0075	0.6
IC - No load loss	0.0003	0
Other loss	0.019	1.6
Total	1.1969	100

Line Transient - Fri Nov 16 2018 09:28:05

SWITCHING

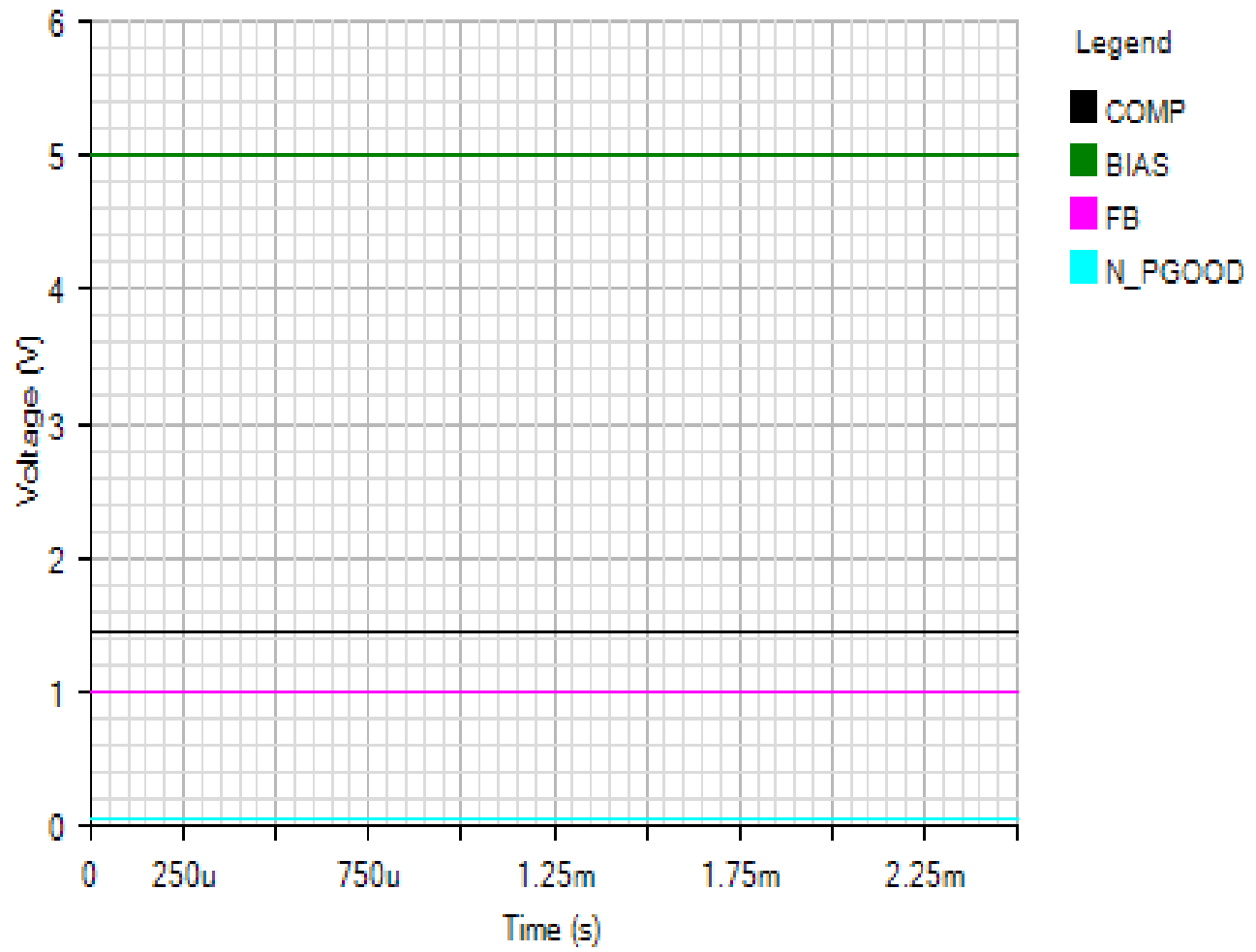
Default





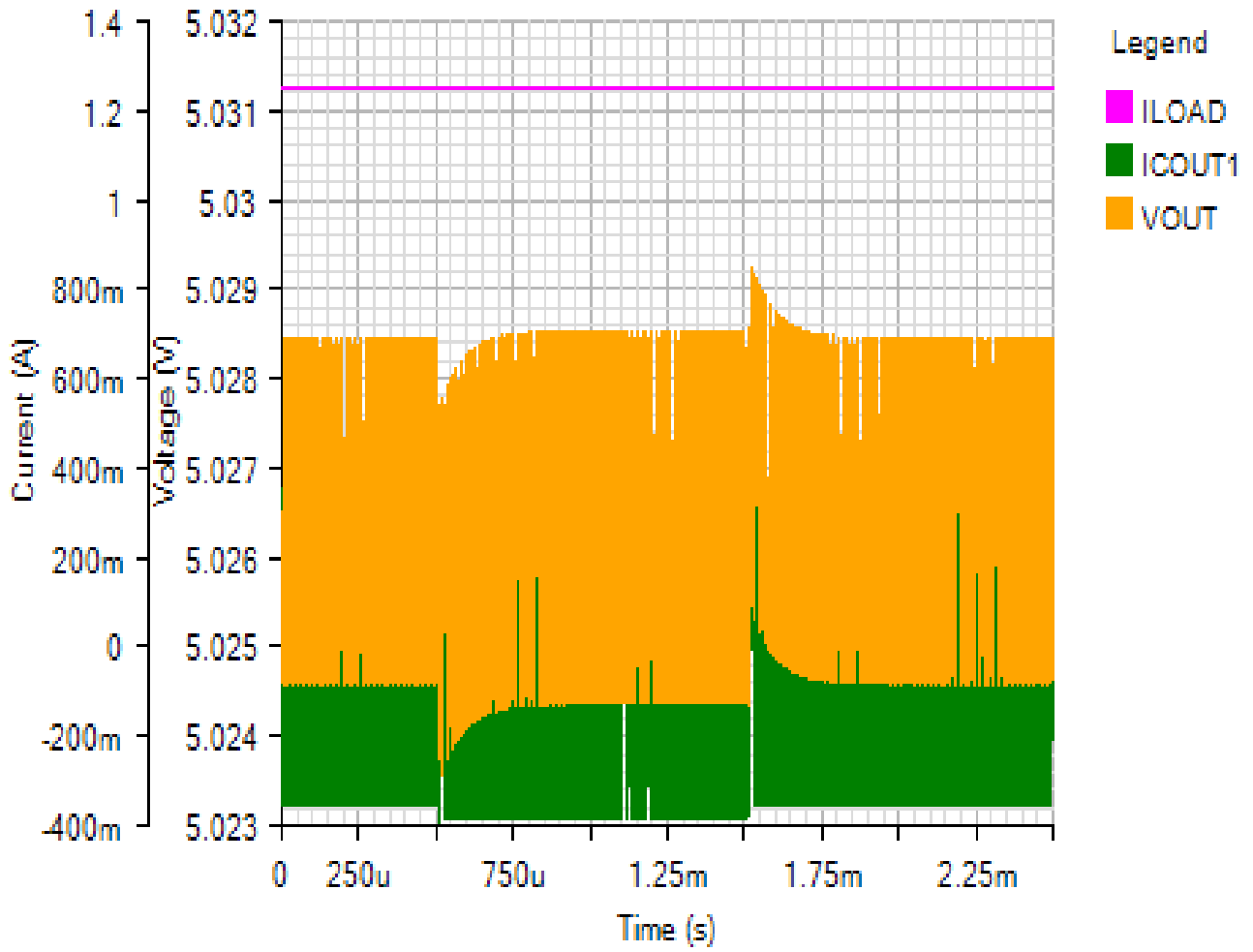
IC

Default



OUTPUT

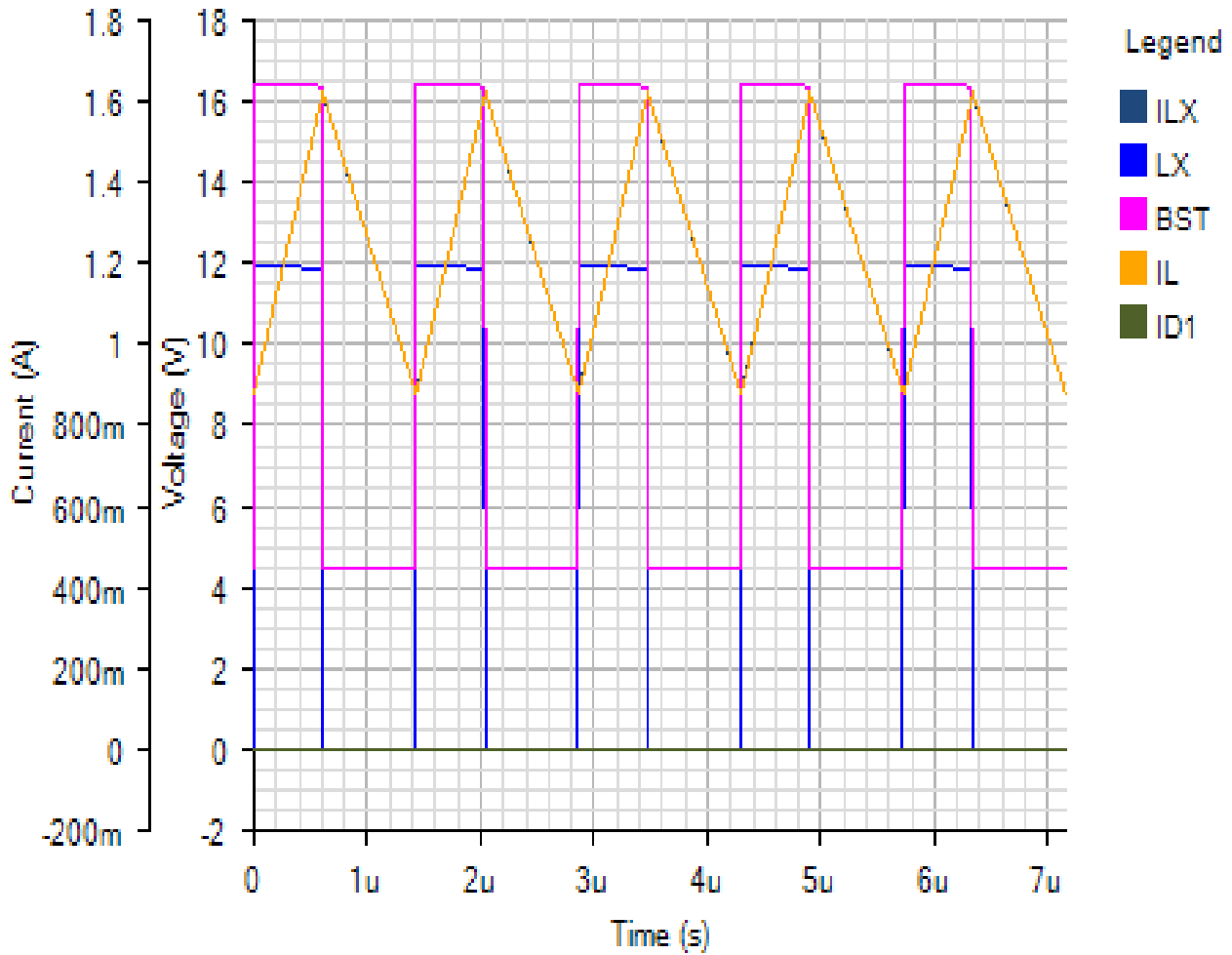
Default



Steady State - Fri Nov 16 2018 09:28:05

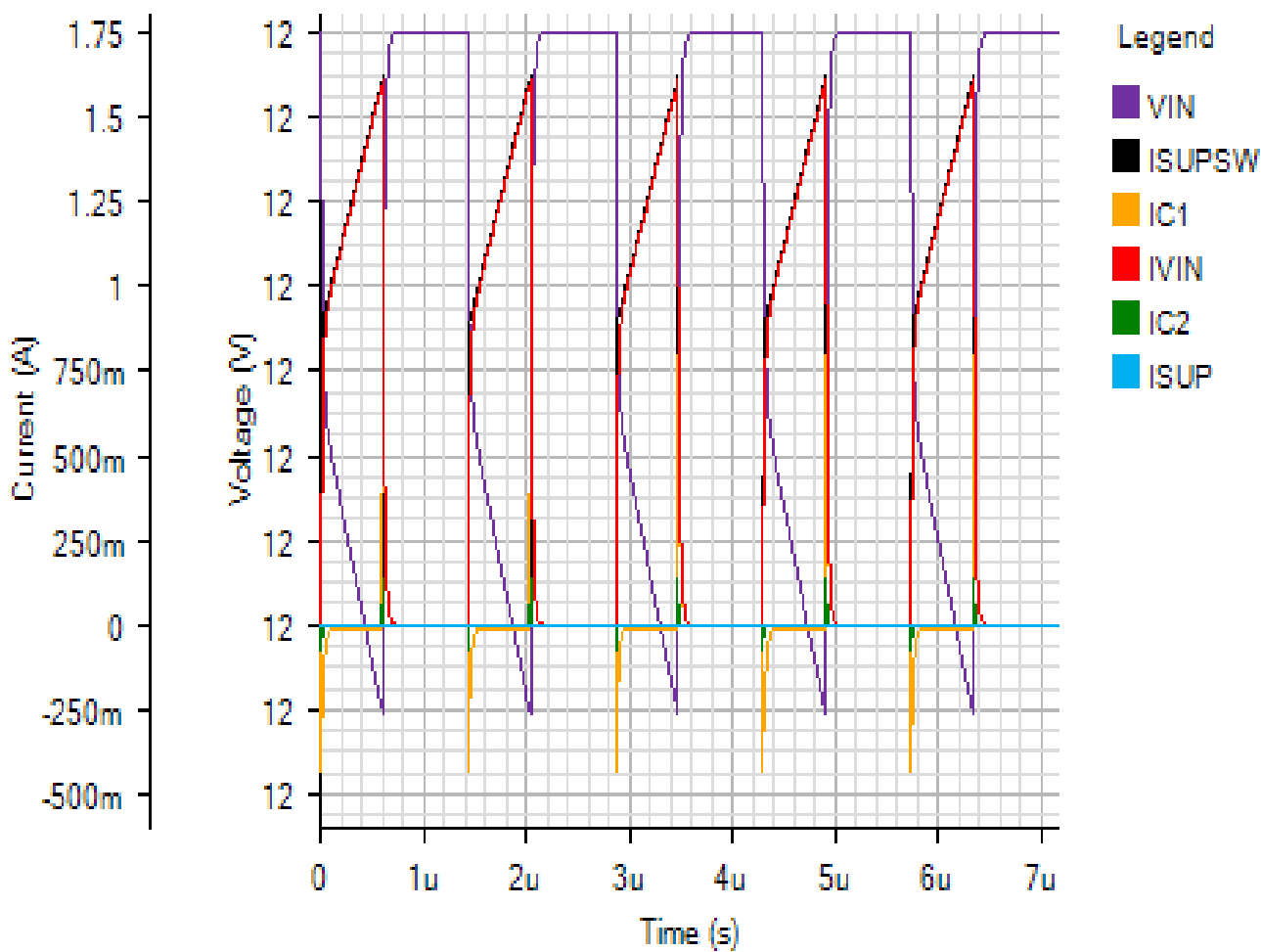
SWITCHING

Default



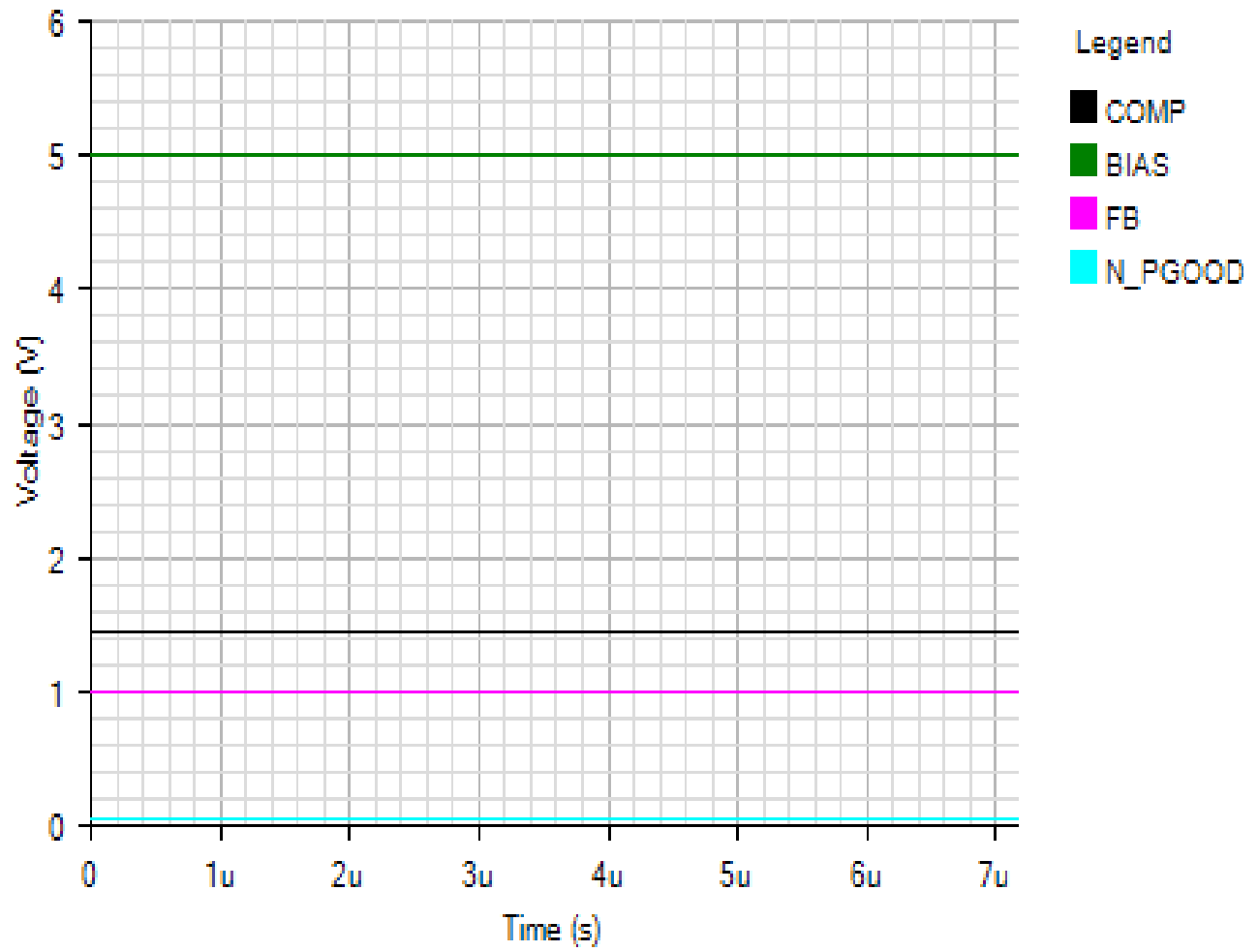
INPUT

Default



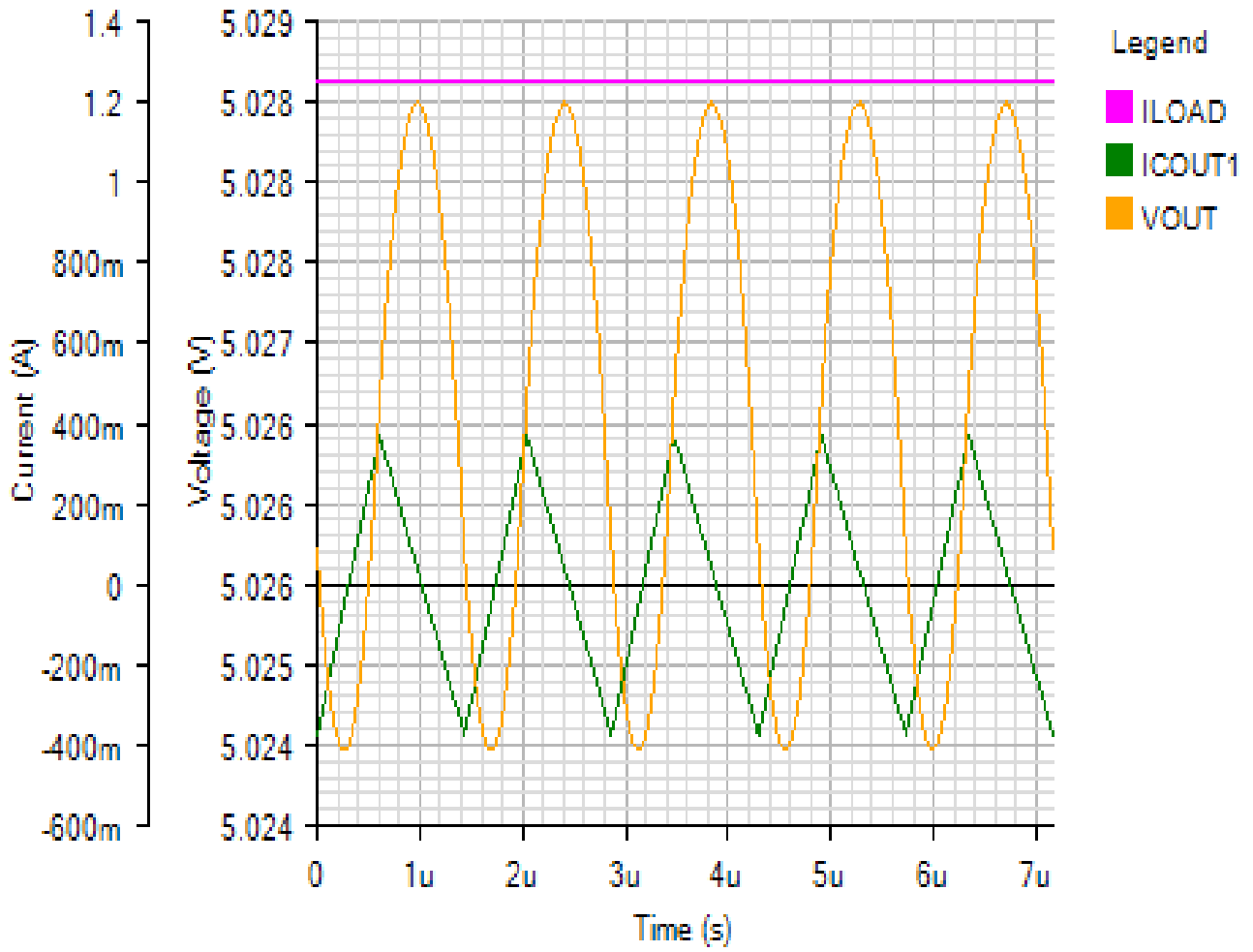
IC

Default



OUTPUT

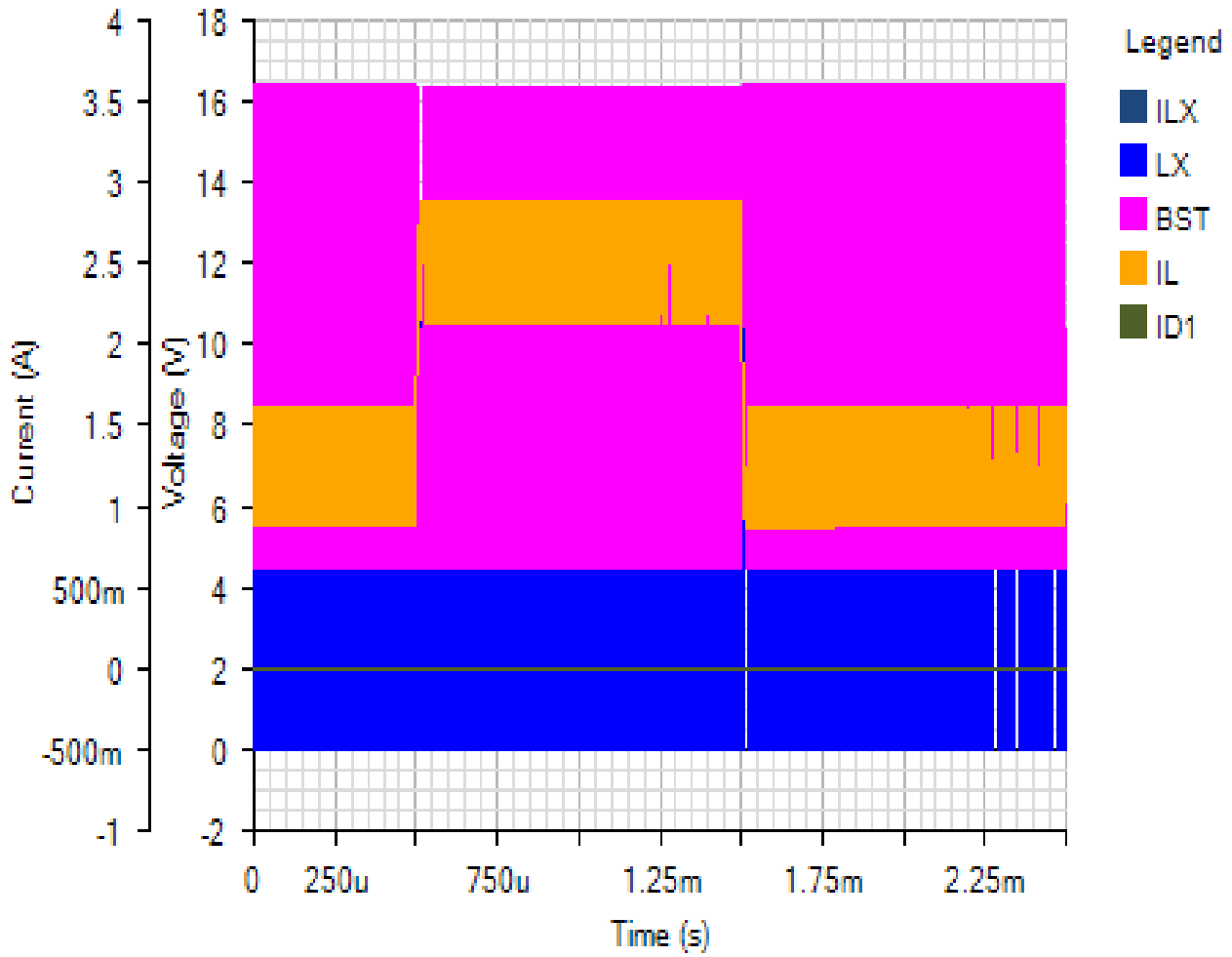
Default



Load Step - Fri Nov 16 2018 09:28:05

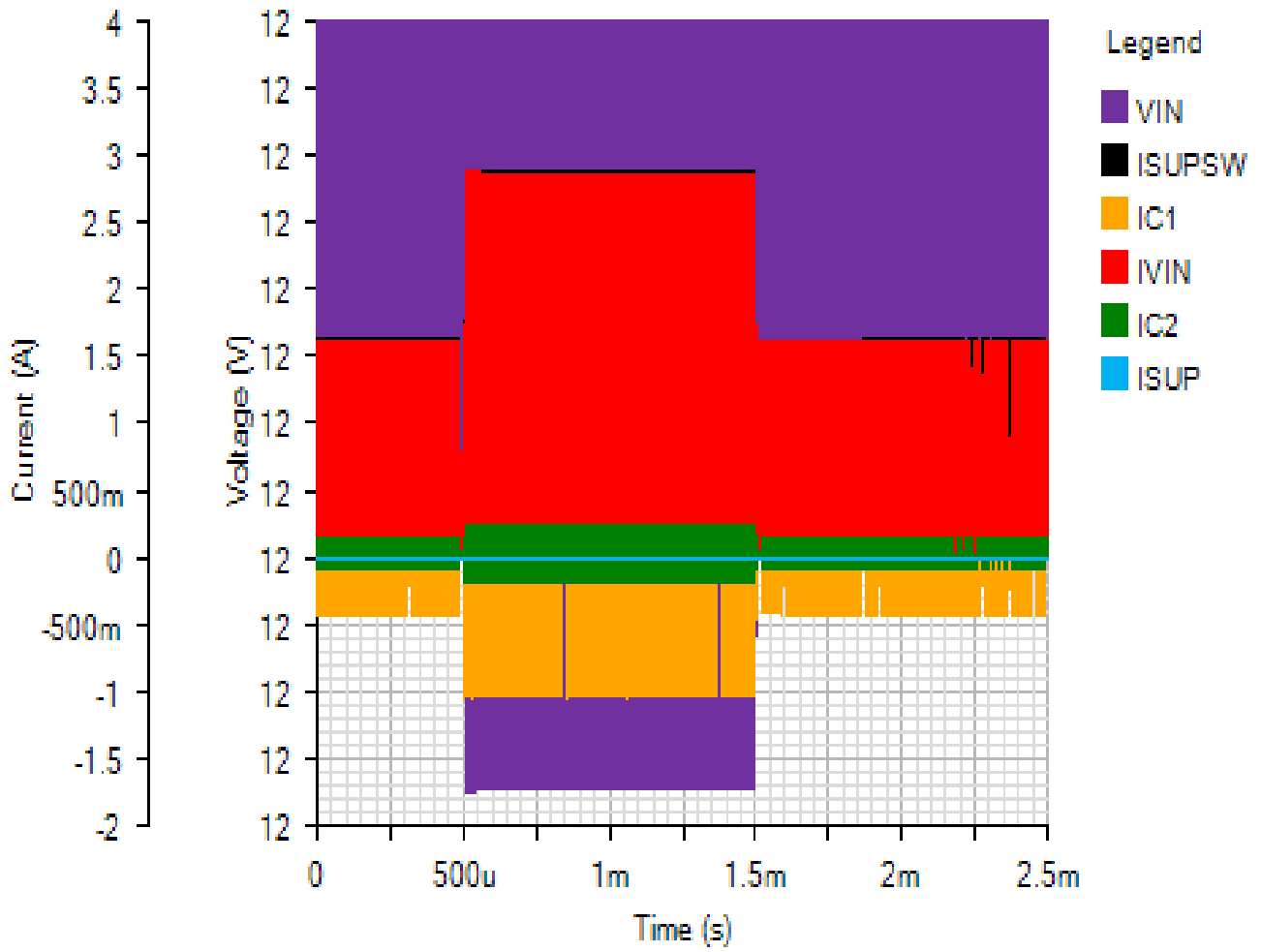
SWITCHING

Default



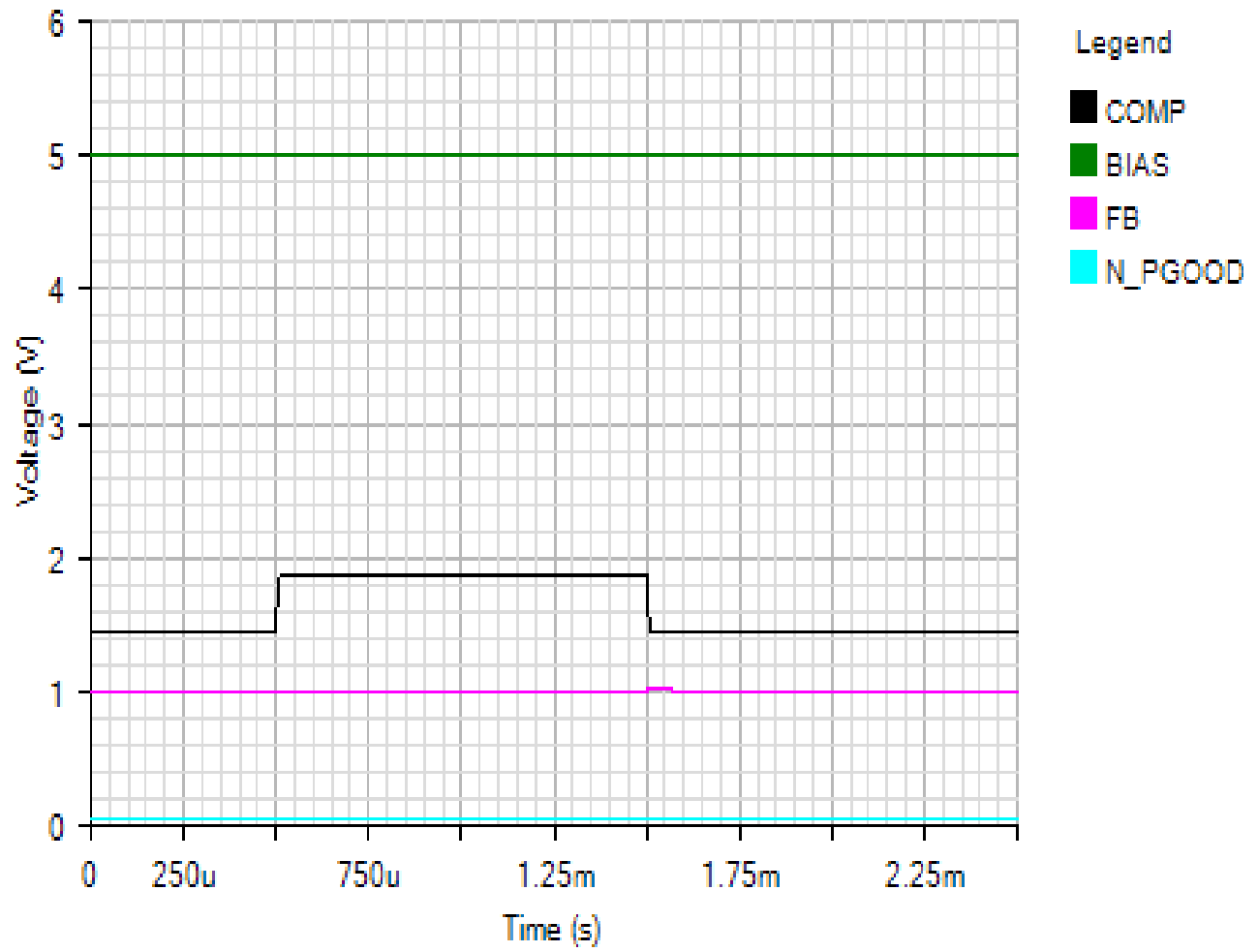
INPUT

Default



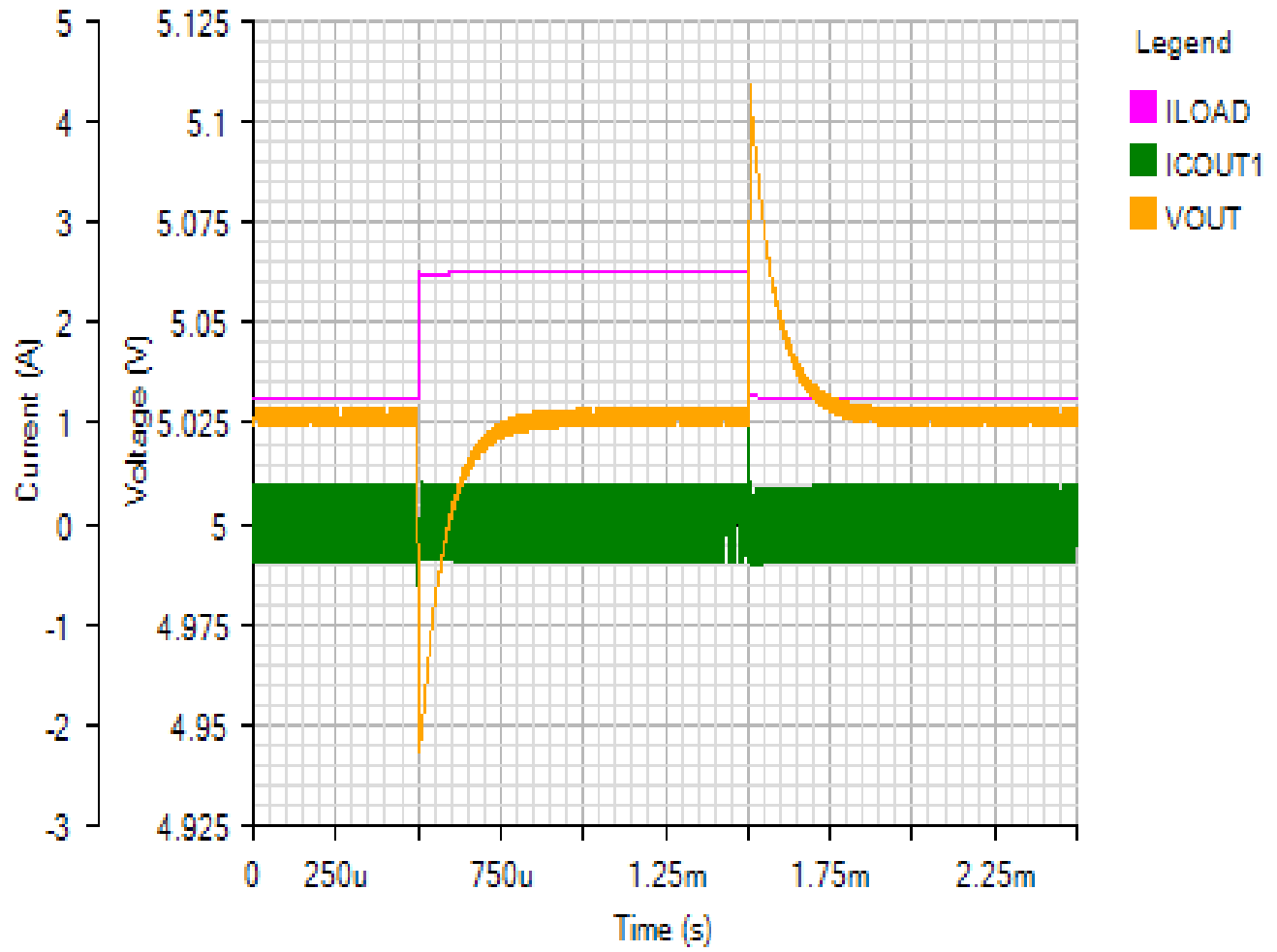
IC

Default



OUTPUT

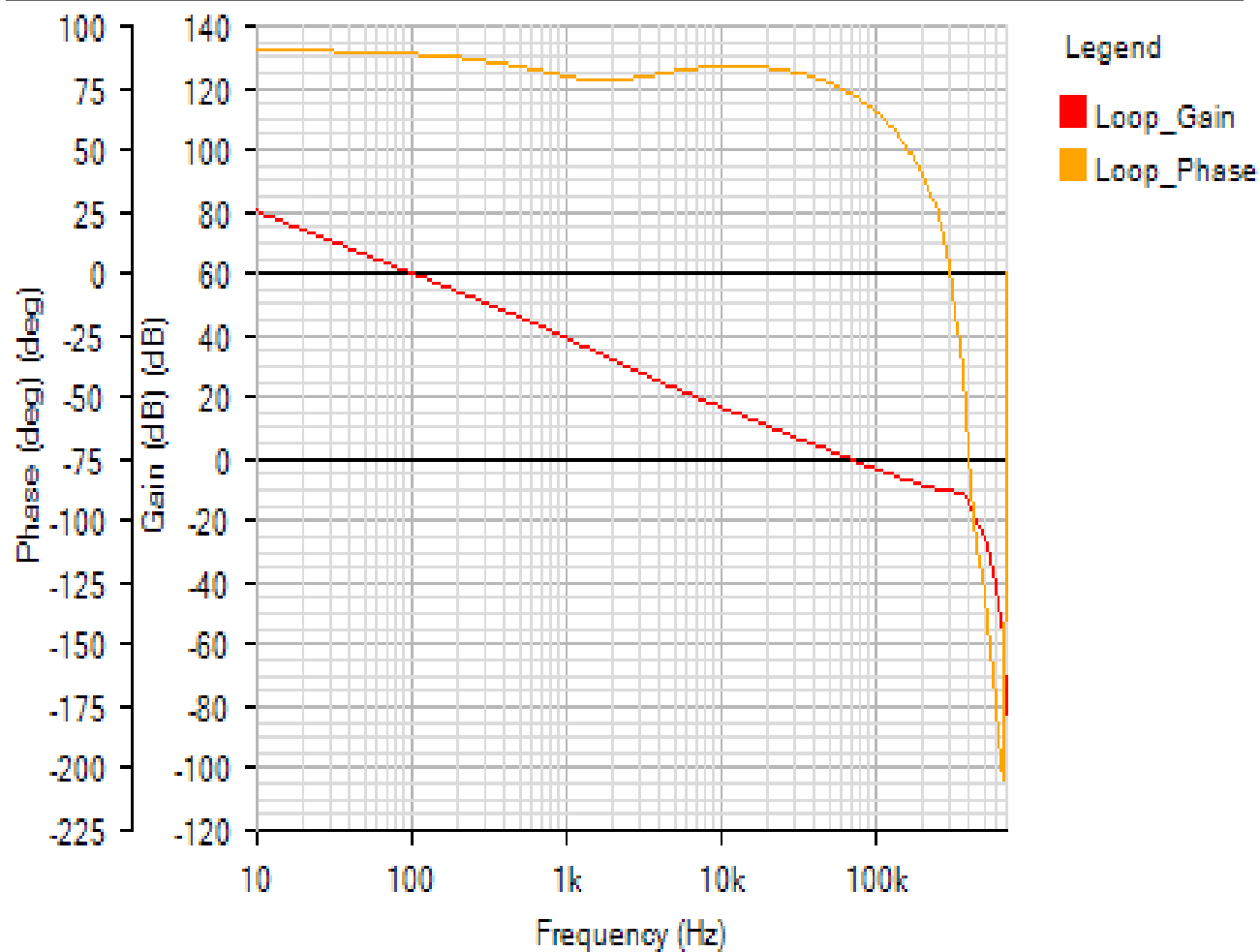
Default



AC Loop - Fri Nov 16 2018 09:28:05

BODE

Default



Phase Margin: 72.91° at a crossover frequency of 68.8kHz

