

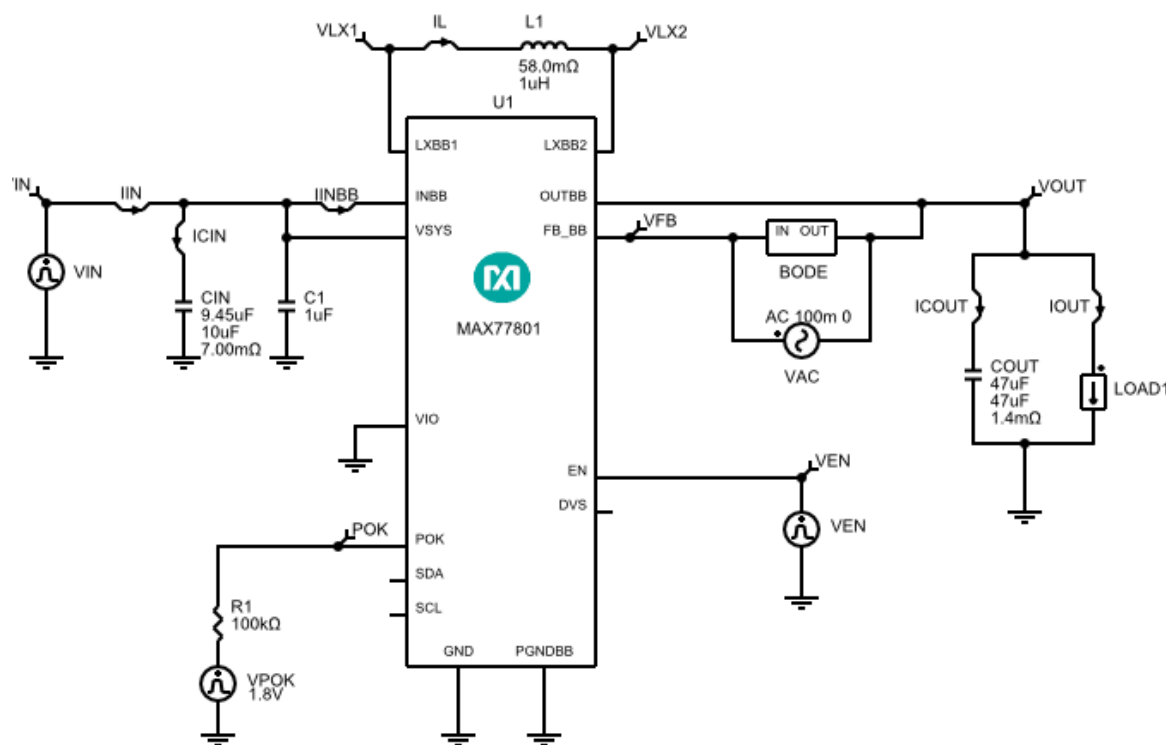
Initial Design

1.0

Design Requirements

| Parameter | Value |
|------------------------------------|-----------------------------|
| Package Type | WLP |
| Minimum Input Voltage | 2.5V |
| Maximum Input Voltage | 5.5V |
| Nominal Input Voltage | 5V |
| Input Voltage Ripple | 1% |
| Output Voltage (Vout) | 3.3V |
| Output Voltage Ripple | 1% |
| Output Voltage Change (WLP) | 3.4V |
| Output Voltage Change (TQFN) | 3.75V |
| Output Current | 2A |
| Performance Priority | Balance Efficiency and Size |
| BOM Priority | Cost |
| Mode of Operation | Skip |
| Output Voltage Ramp-up Slew Rate | 12.5mV/us |
| Output Voltage Ramp-down Slew Rate | 3.125mV/us |
| Over Voltage Protection Threshold | 1.2 |
| Active Output Discharge | (1==Enable) |
| Ambient Temperature | 25°C |

Schematic



*****Notes*****

If the current level (starting current for Load Steps) is too low, AC, Steady State, Load Step and Line Transient analyses may fail.

When running DVS simulation, the output current will change with the voltage as the load has a resistive component. The load current setting in the simulation settings is for Vout. If this current is set at or near the maximum and desired output voltage is higher than Vout, it may cause the output current to exceed the current limit, causing the output voltage to collapse. If this happens, lower the Load Current in the simulation settings and rerun the simulation.

To use Maxim Recommended Inductor, Coilcraft XAL4020-102MEB, select L1, open the properties window, click on the "Select Vendor Part" button and then select the part number from the list and apply the changes. (This note does not apply to downloaded schematics)

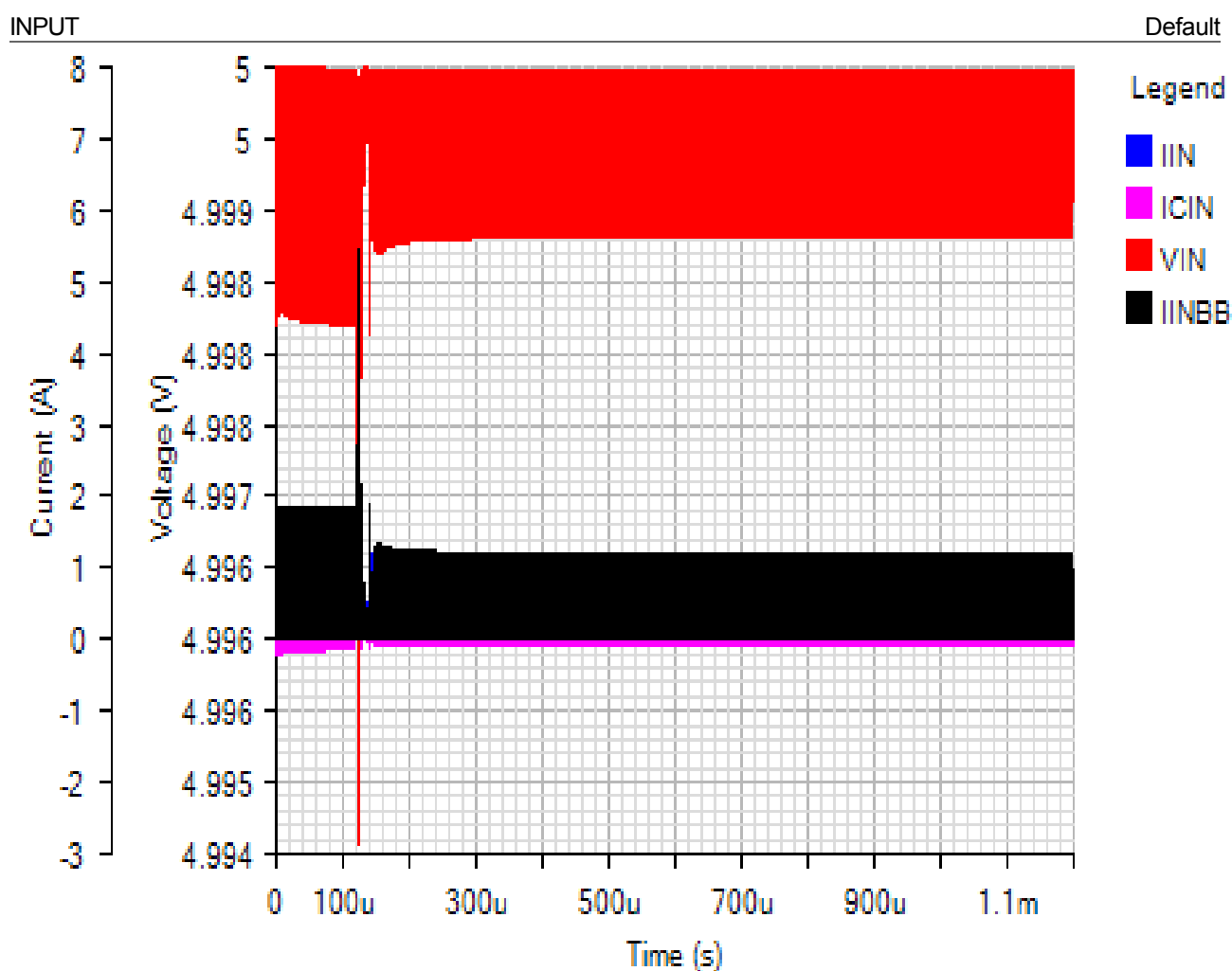
BOM

| Ref | Qty | Part Number | Manufacturer | Description |
|------|-----|------------------------------------|--------------|---|
| U1 | 1 | MAX77801 | User-Defined | IC |
| C1 | 1 | CC0402KRX5R5BB105 | Yageo | Cap Ceramic 1uF 6.3V X5R 10% Pad SMD 0402 85°C T/R |
| CIN | 1 | C1206C106K9PAC | Kemet | Cap Ceramic 10uF 6.3V X5R 10% SMD 1206 85C Bulk |
| COUT | 1 | GRM32ER60J476ME20L | Murata | Cap Ceramic 47uF 6.3V X5R 20% SMD 1210 85C Embossed T/R |

| | | | | |
|----|---|-------------------|-----------|---|
| L1 | 1 | HMLE20161B-1R0MDR | Cyntec | Inductor 1uH 48mOhm 3.34A Isat 2.7A Irms |
| R1 | 1 | ERJ2GEJ104X | Panasonic | Res Thick Film 0402 100K Ohm 5% 0.1W(1/10W) ±200ppm/°C Pad SMD Automotive T/R |

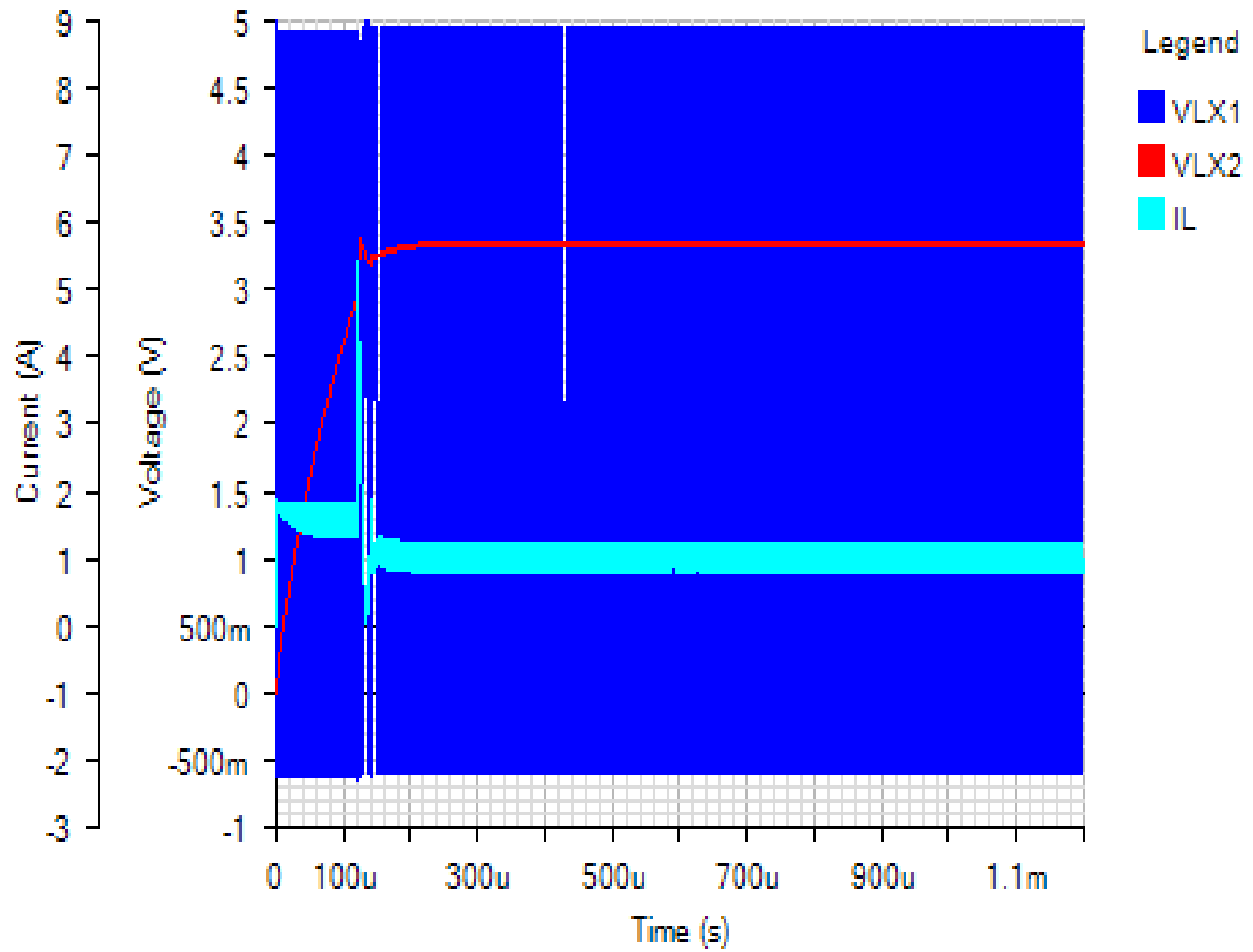
Simulation Results

Start Up - Fri Jan 04 2019 11:27:56



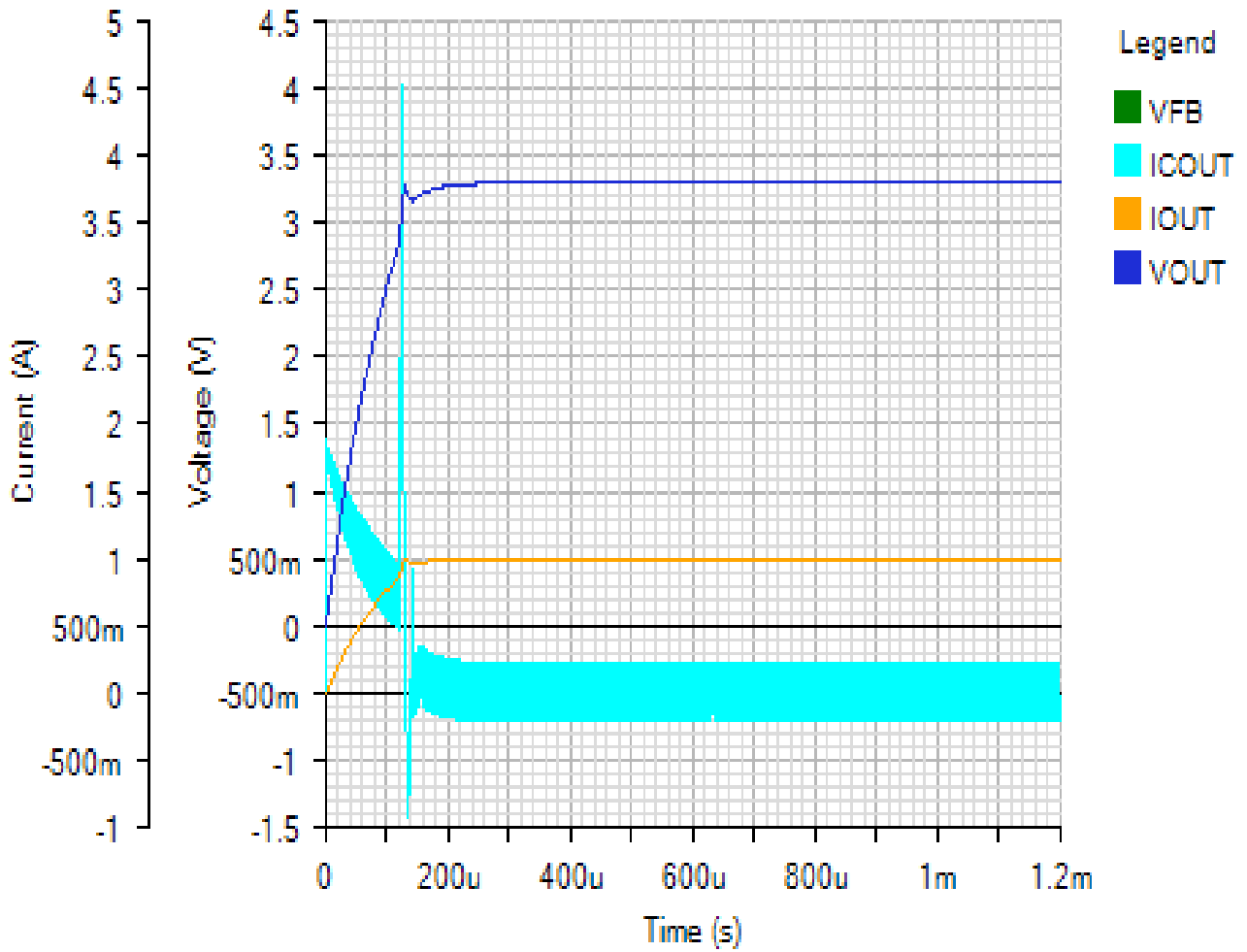
SWITCHING

Default



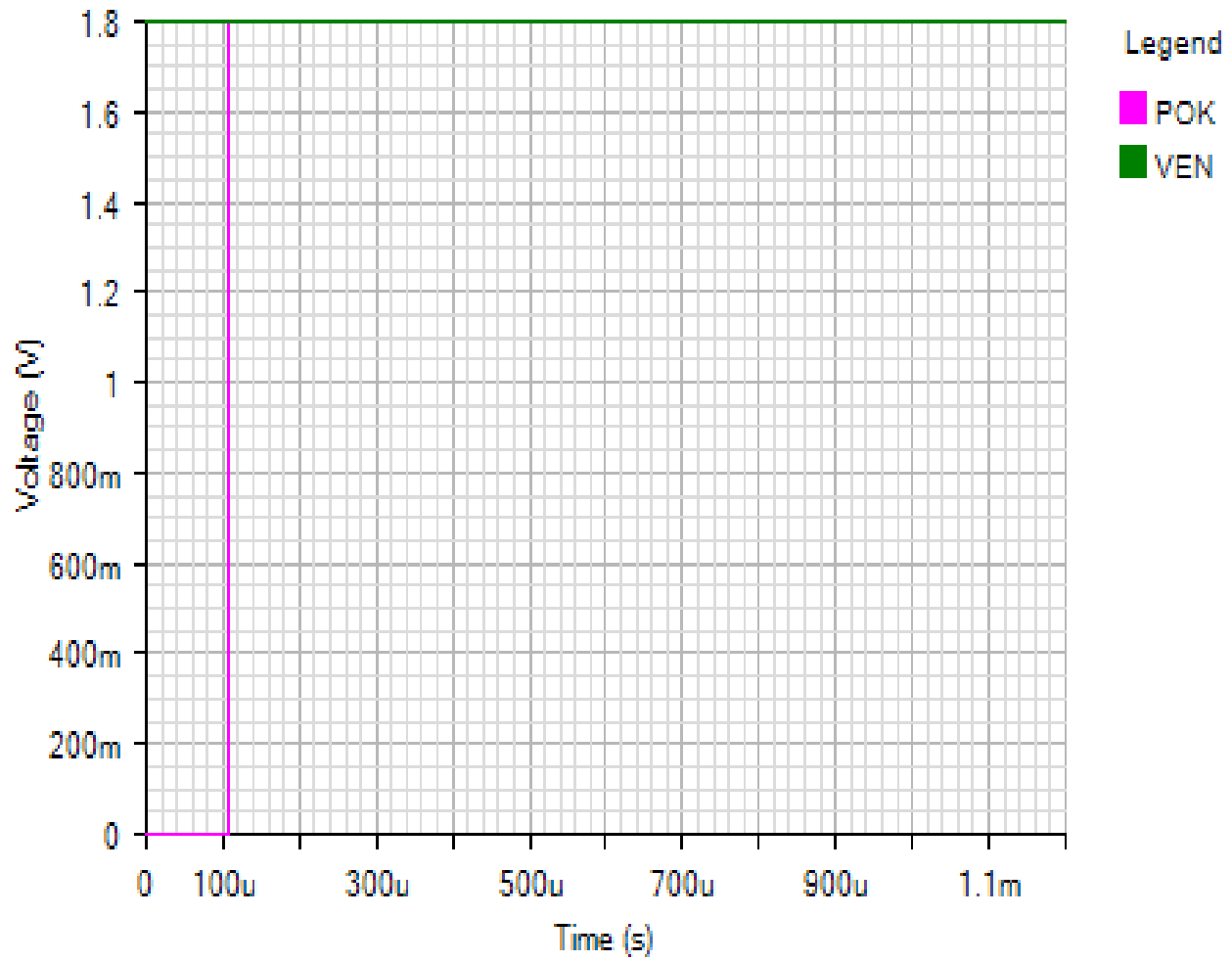
OUTPUT

Default



IC

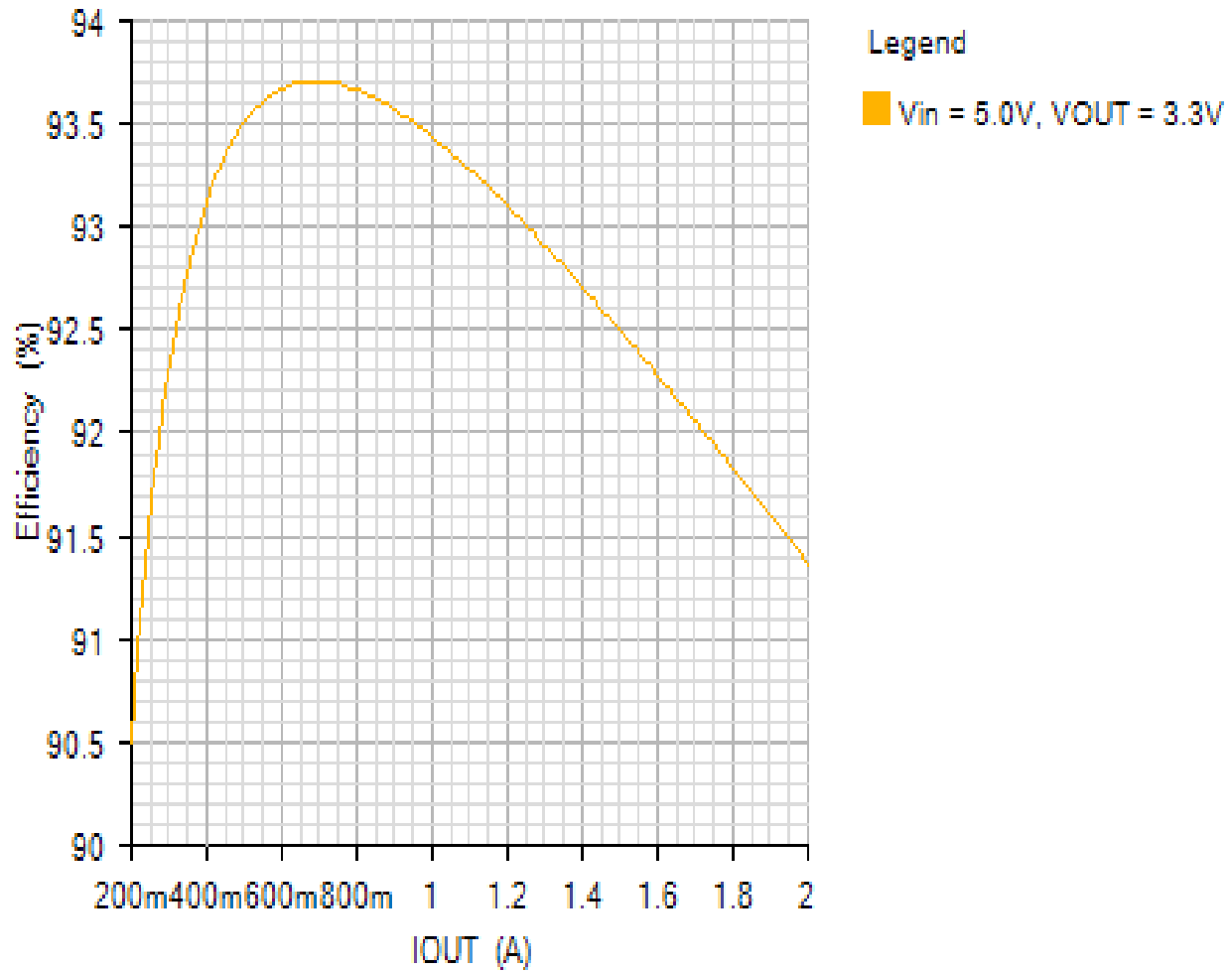
Default



Efficiency - Fri Jan 04 2019 11:27:56

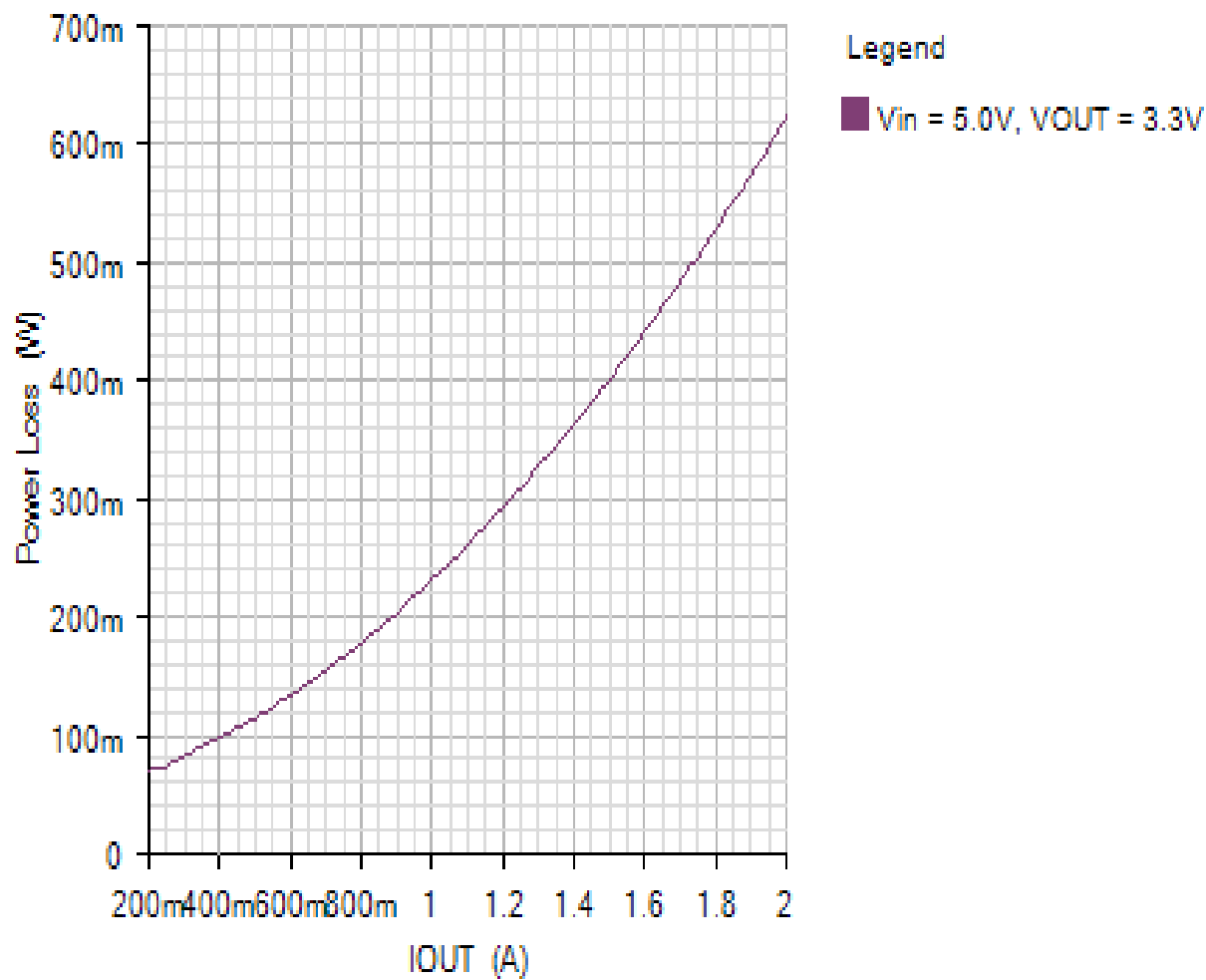
EFFICIENCY_PLOT

Default



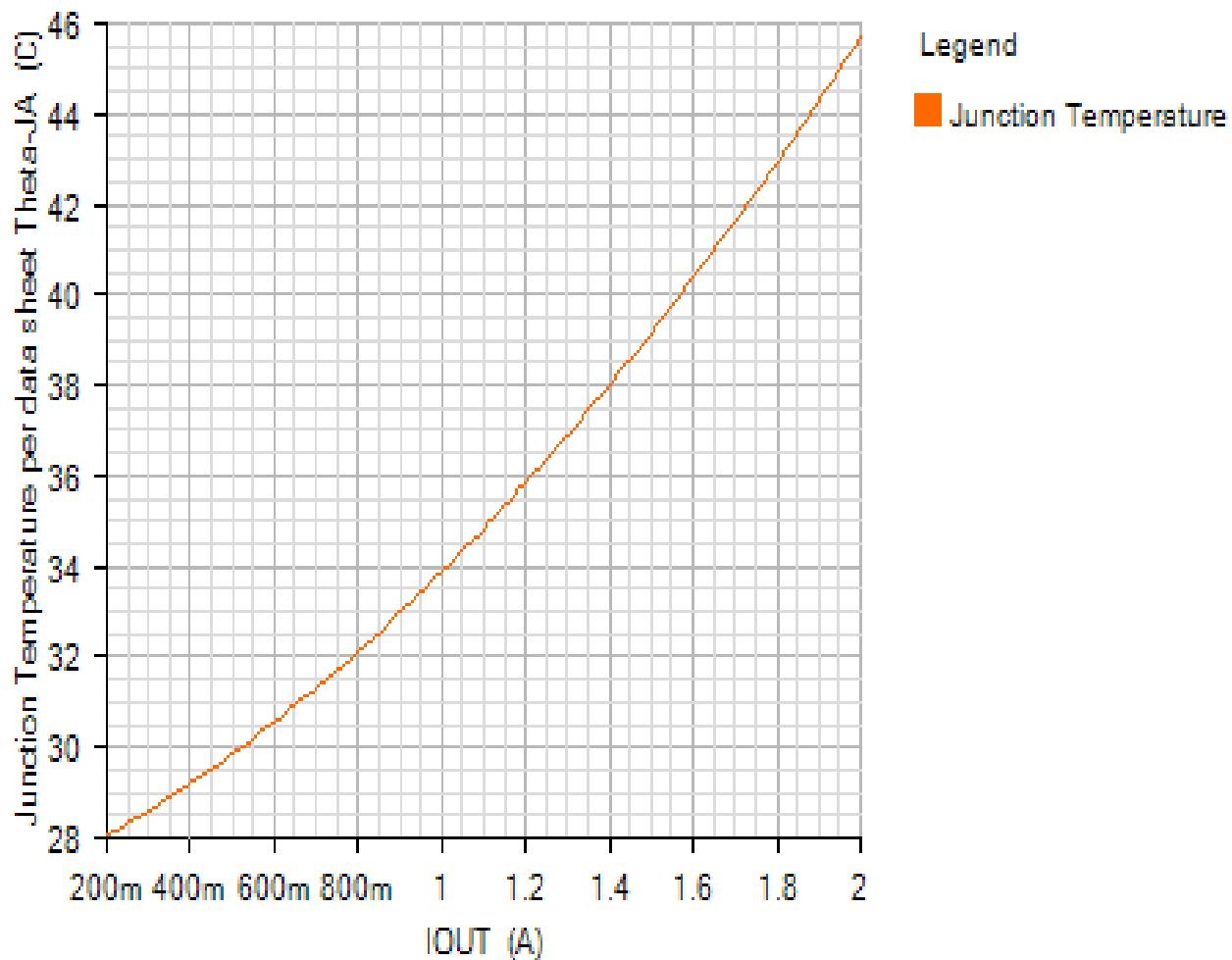
POWER_LOSS_PLOT

Default



JUNCTION_TEMPERATURE_PLOT

Default



Losses



Component

Loss (W)

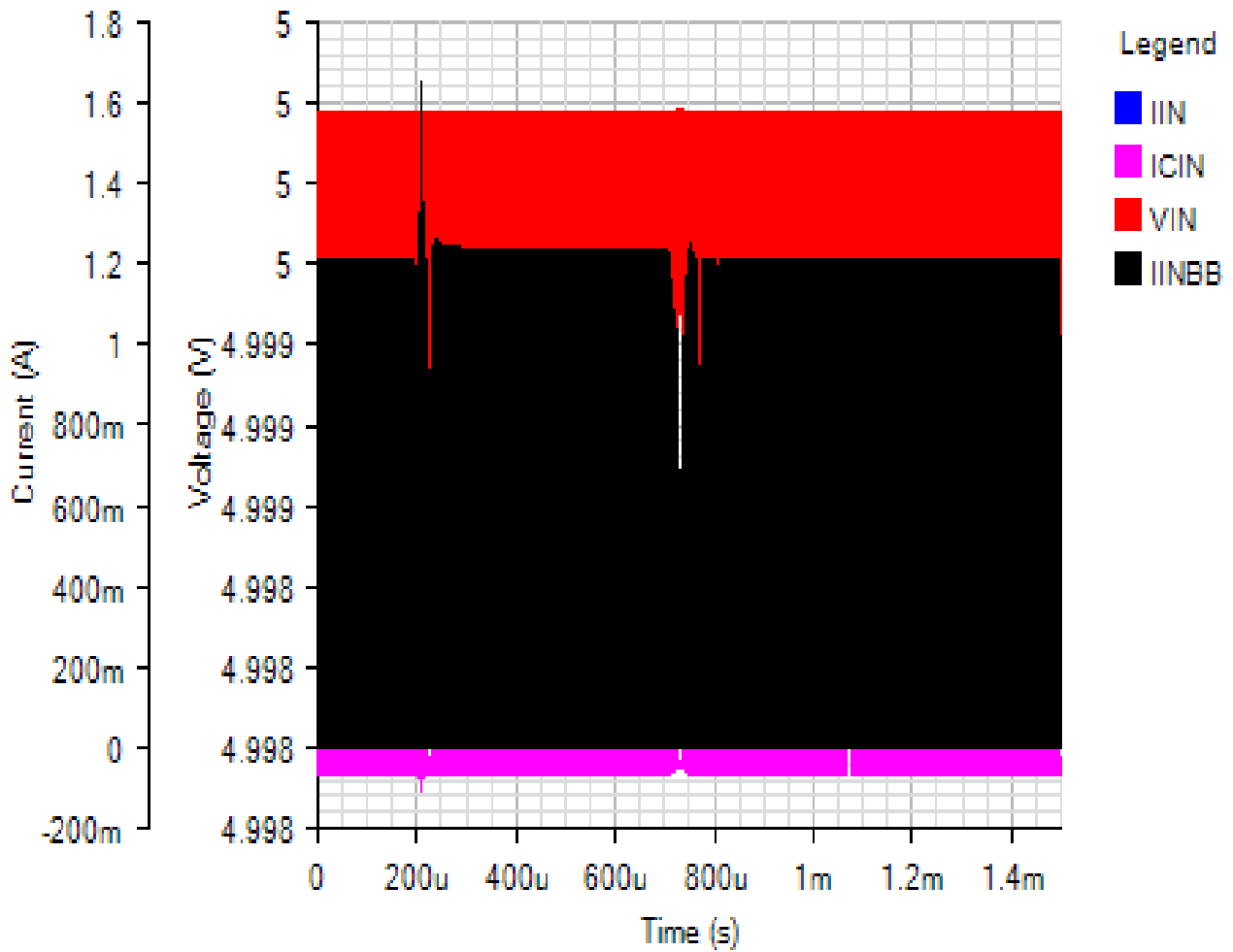
% of total

| Component | Loss (W) | % of total |
|-----------------------------|----------|------------|
| IC Quiescent Losses | 0.048121 | 4.8 |
| FET Conduction Losses | 0.417686 | 41.8 |
| Output Capacitor ESR Losses | 0.000038 | 0 |
| FET Switching Losses | 0.132331 | 13.2 |
| Inductor Losses | 0.39138 | 39.1 |
| Input Capacitor ESR Losses | 0.010444 | 1 |
| Total | 1 | 100 |

DVS - Fri Jan 04 2019 11:27:56

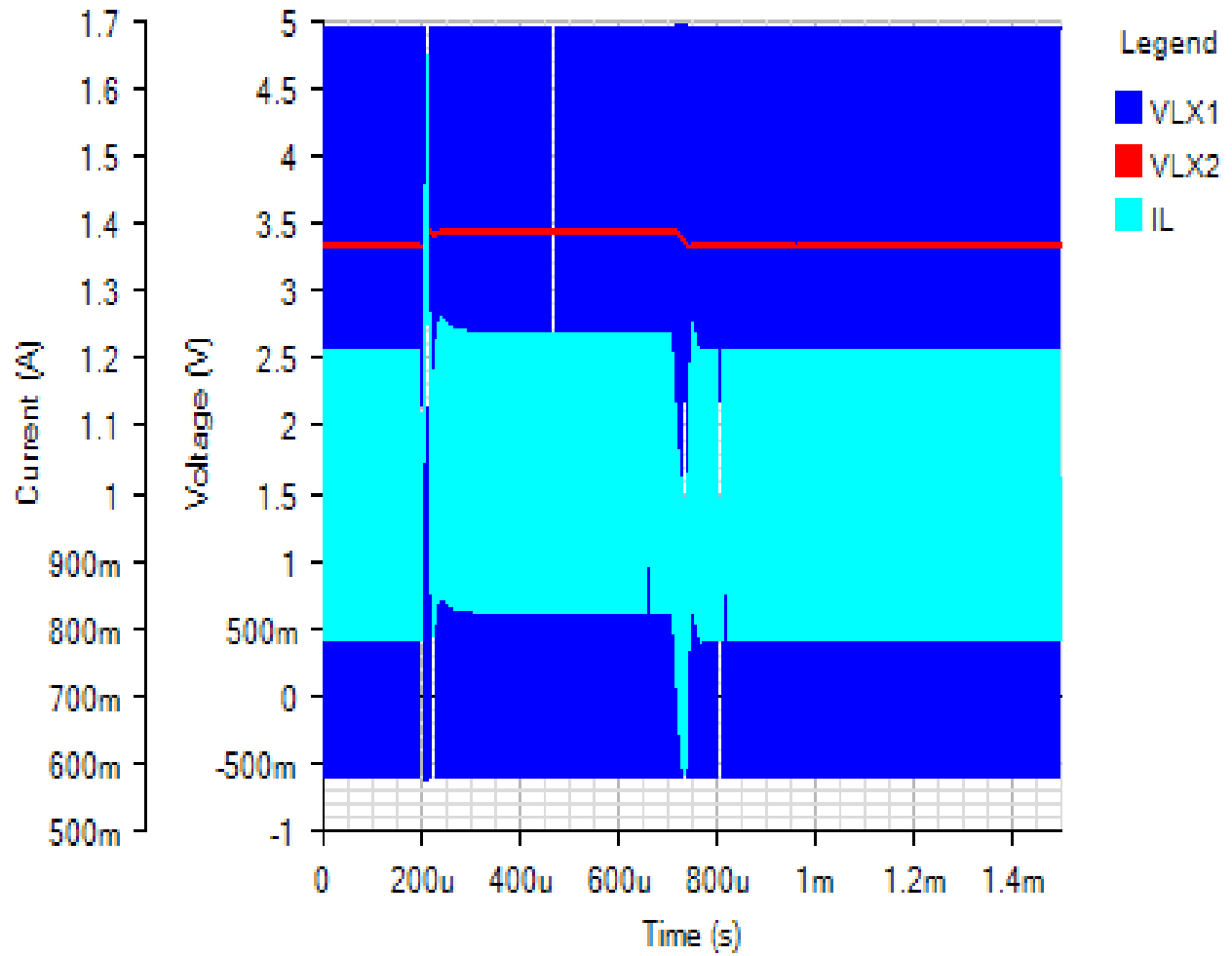
INPUT

Default



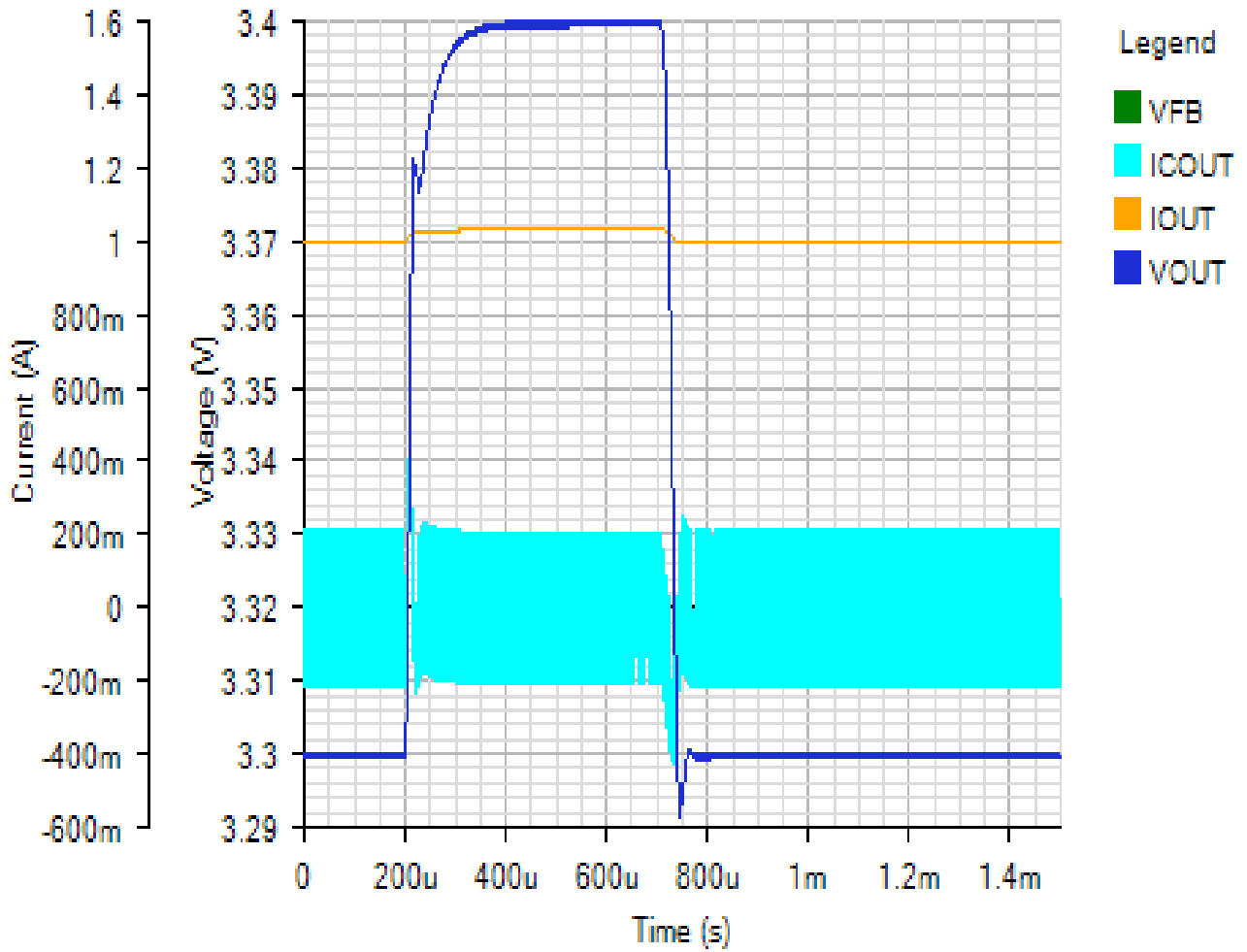
SWITCHING

Default



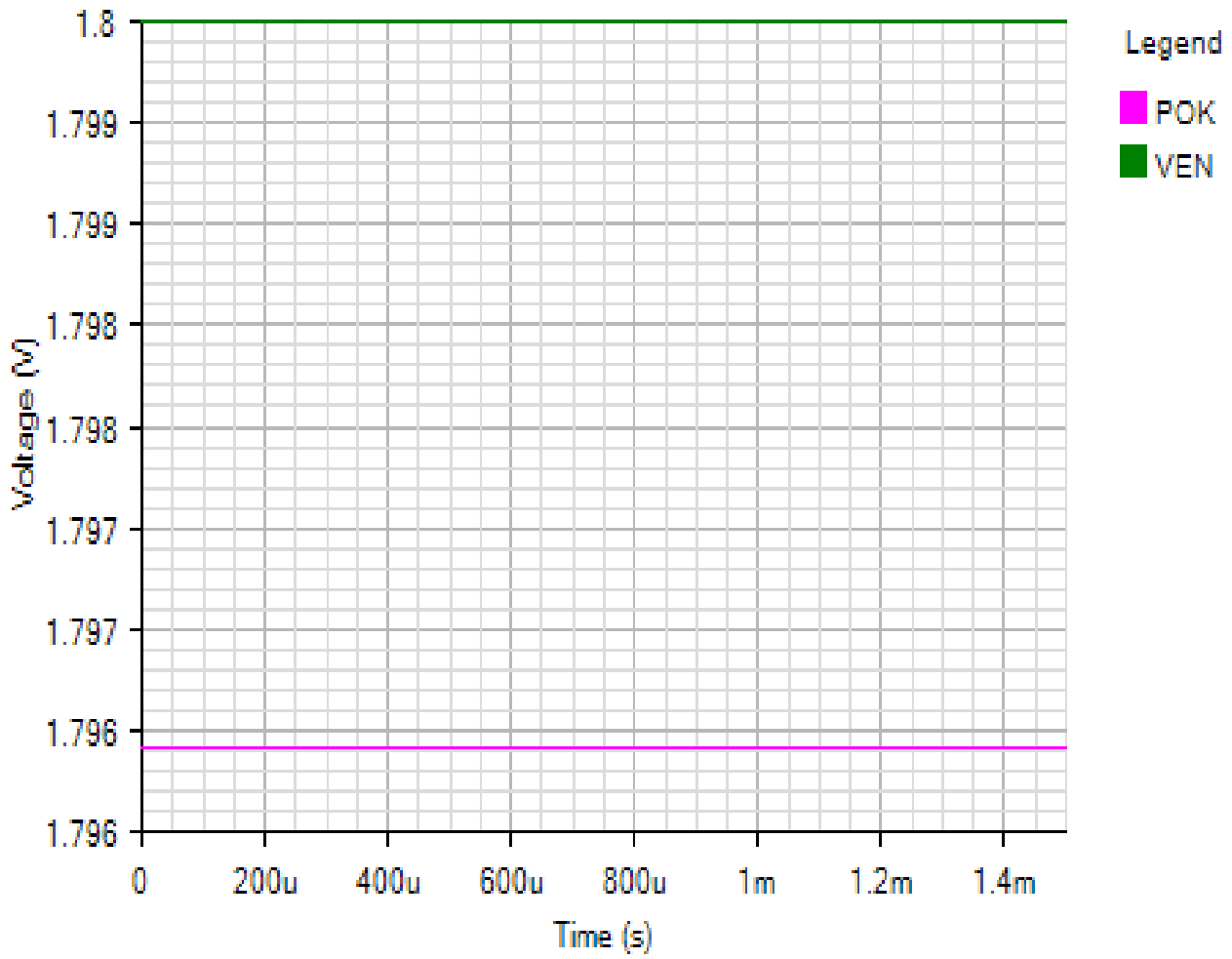
OUTPUT

Default



IC

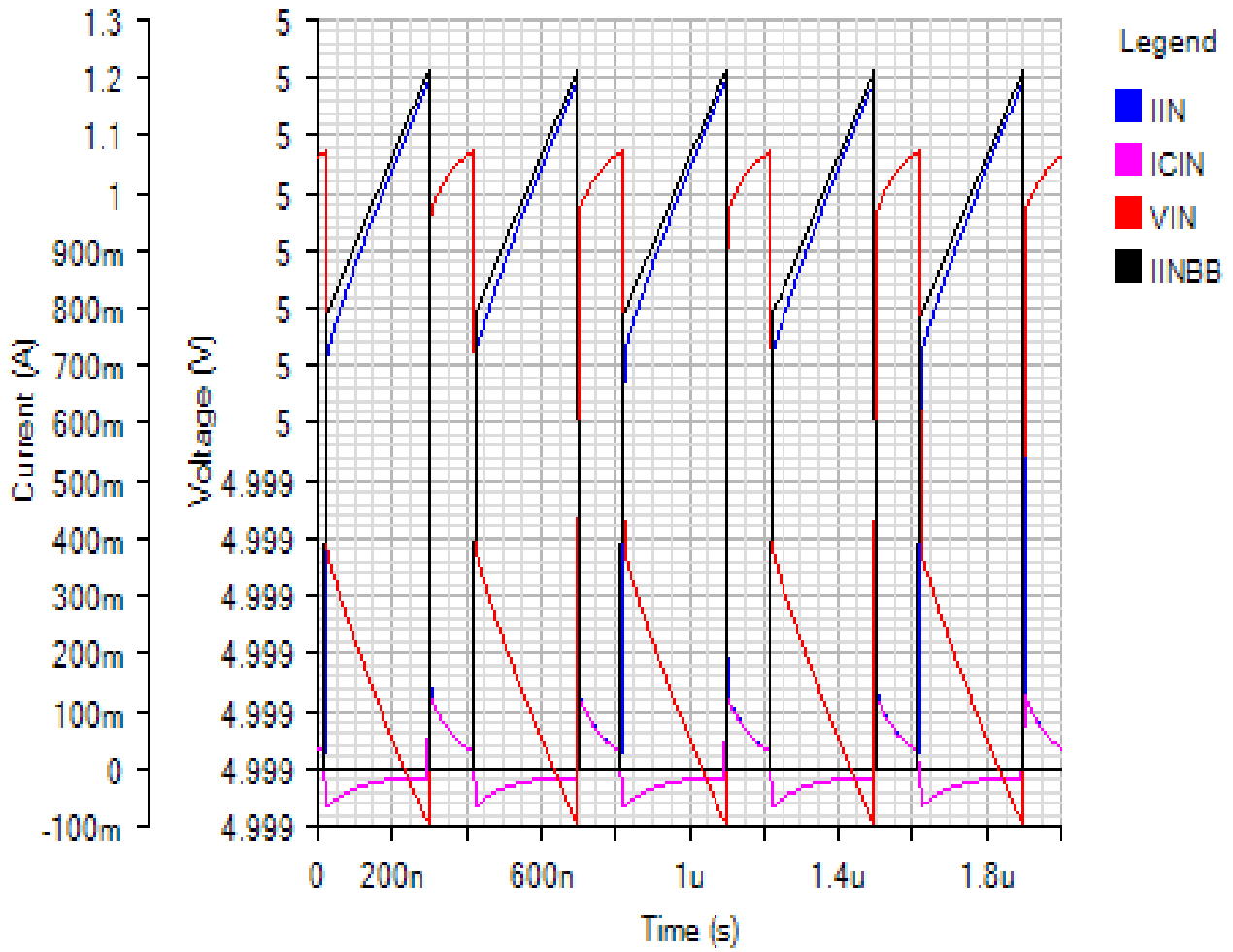
Default



Steady State - Fri Jan 04 2019 11:27:56

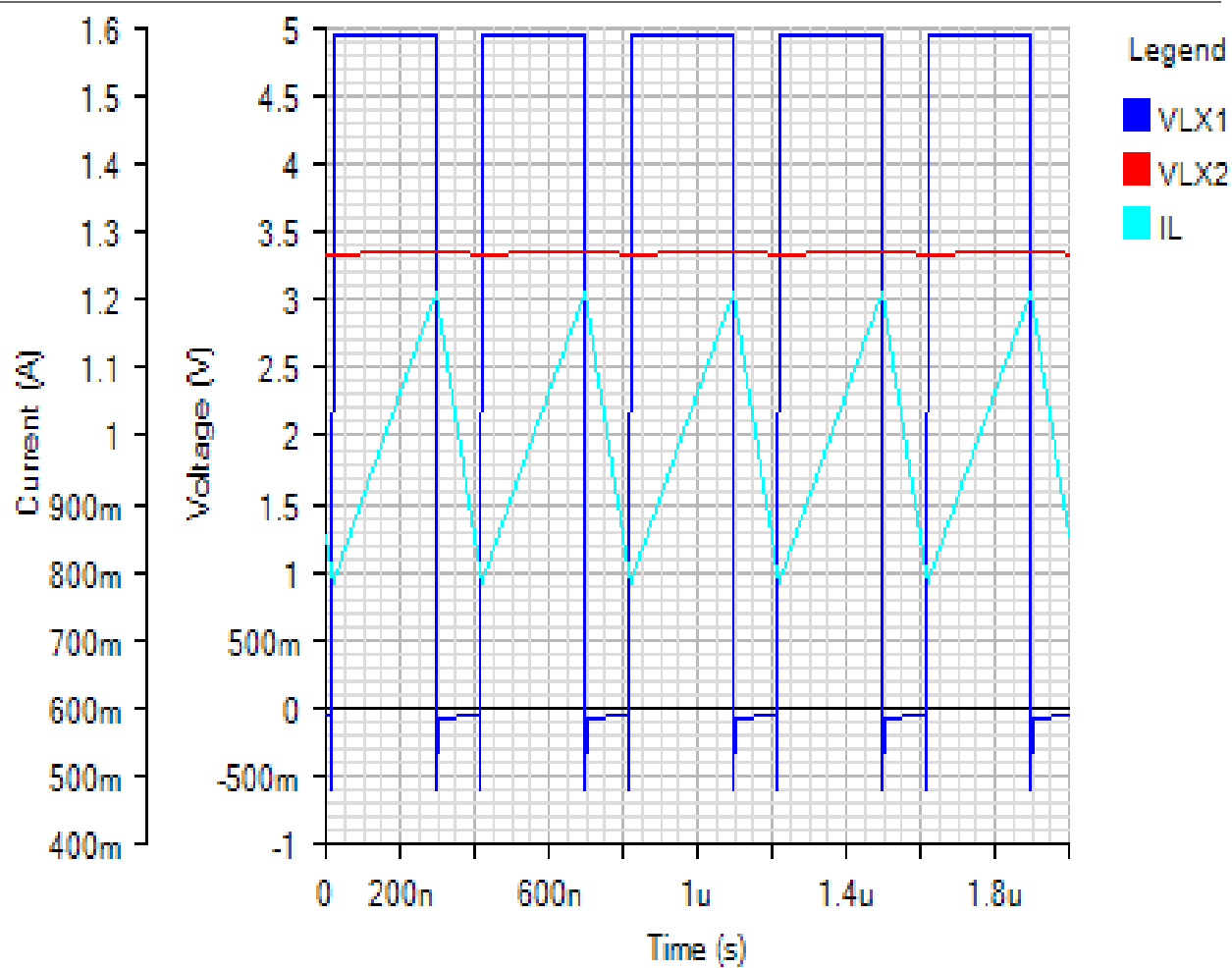
INPUT

Default



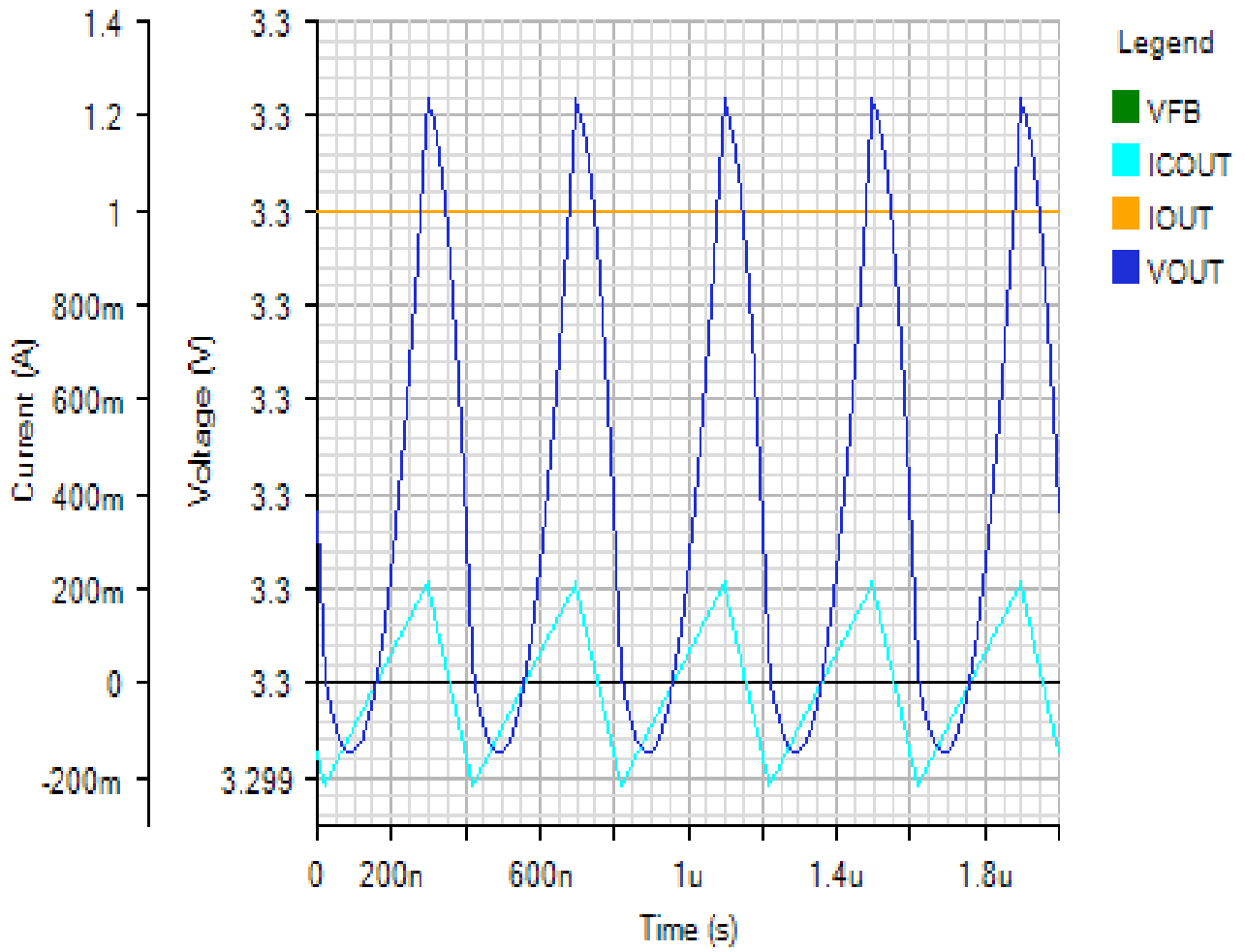
SWITCHING

Default



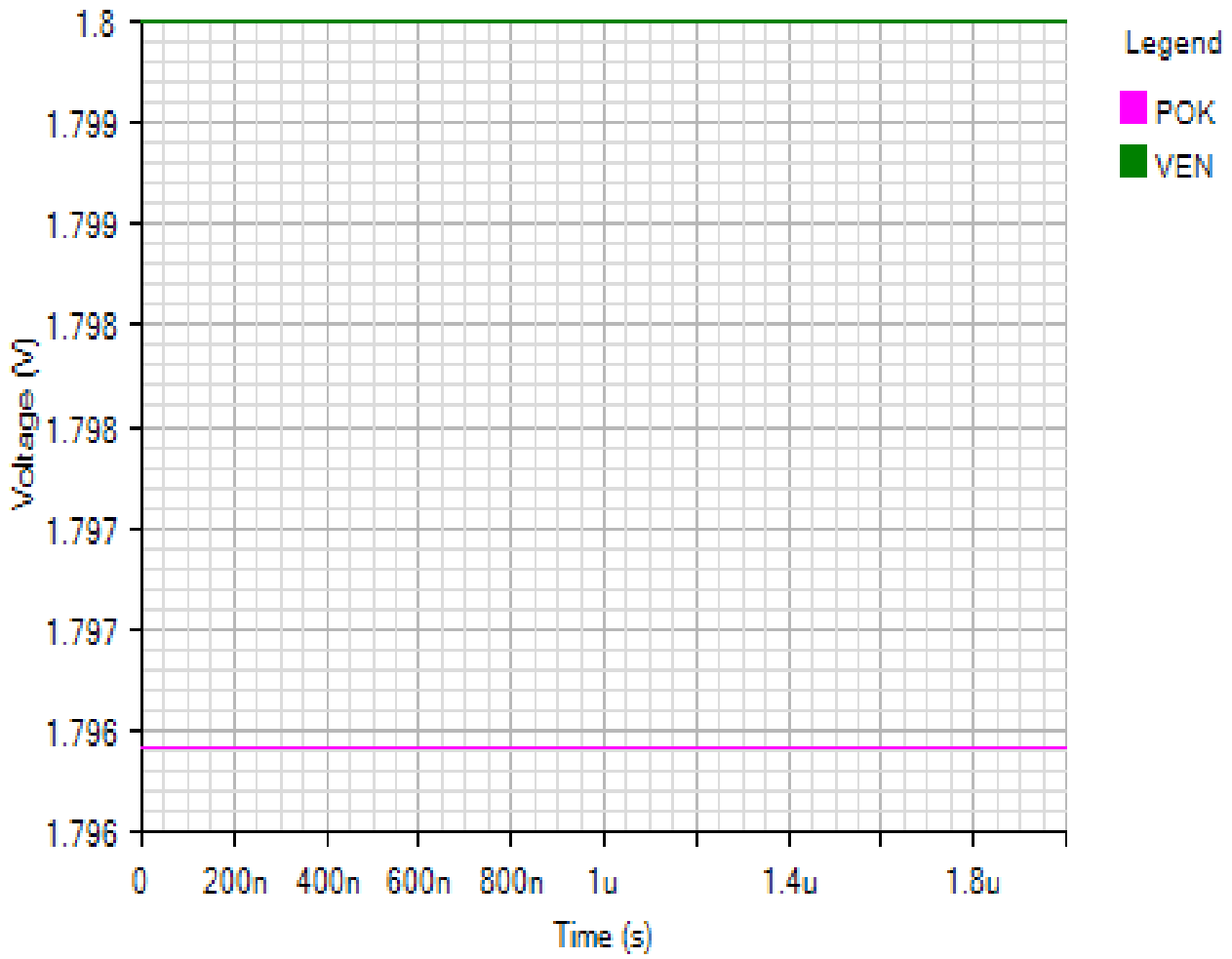
OUTPUT

Default



IC

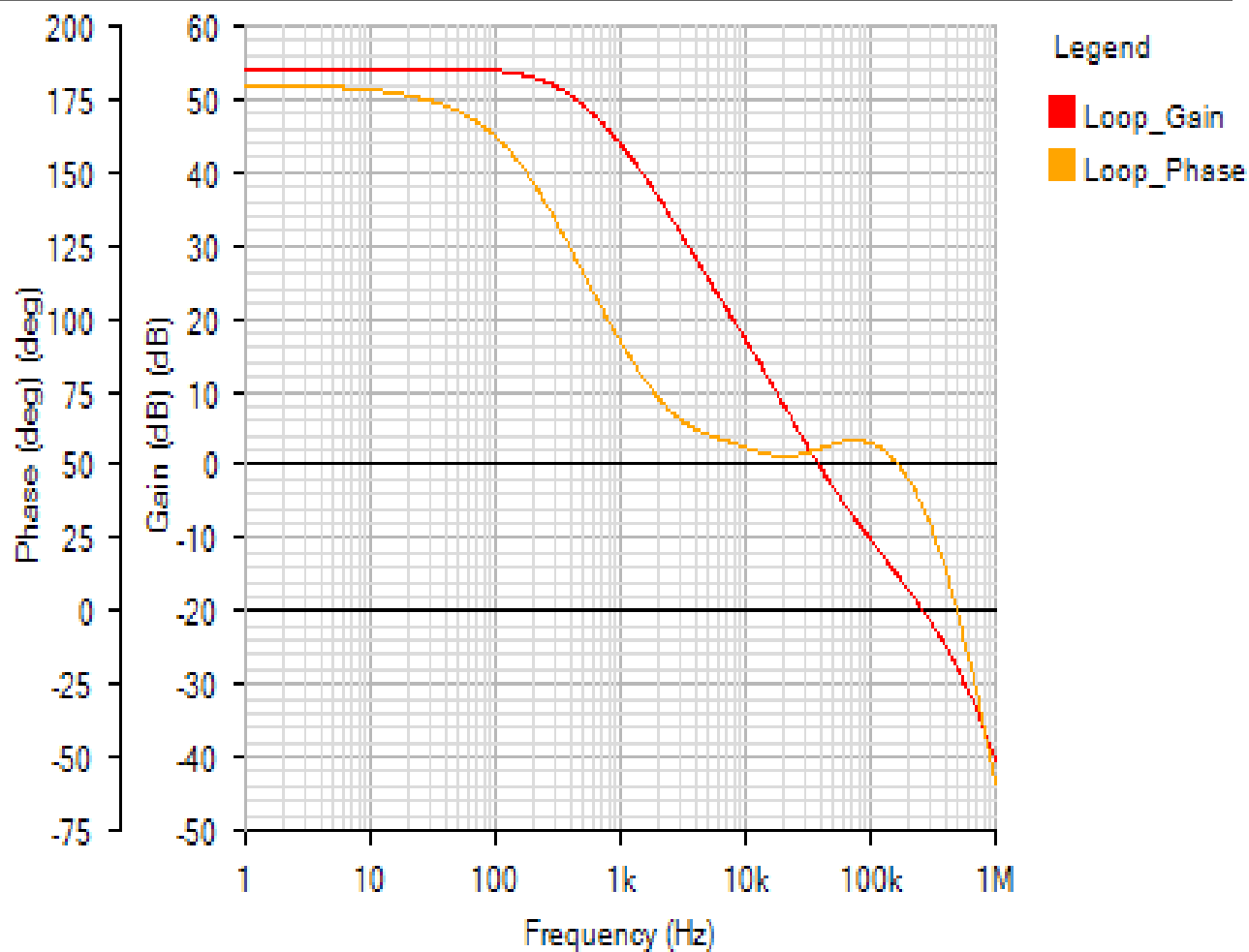
Default



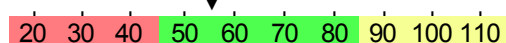
AC Loop - Fri Jan 04 2019 11:27:56

BODE

Default



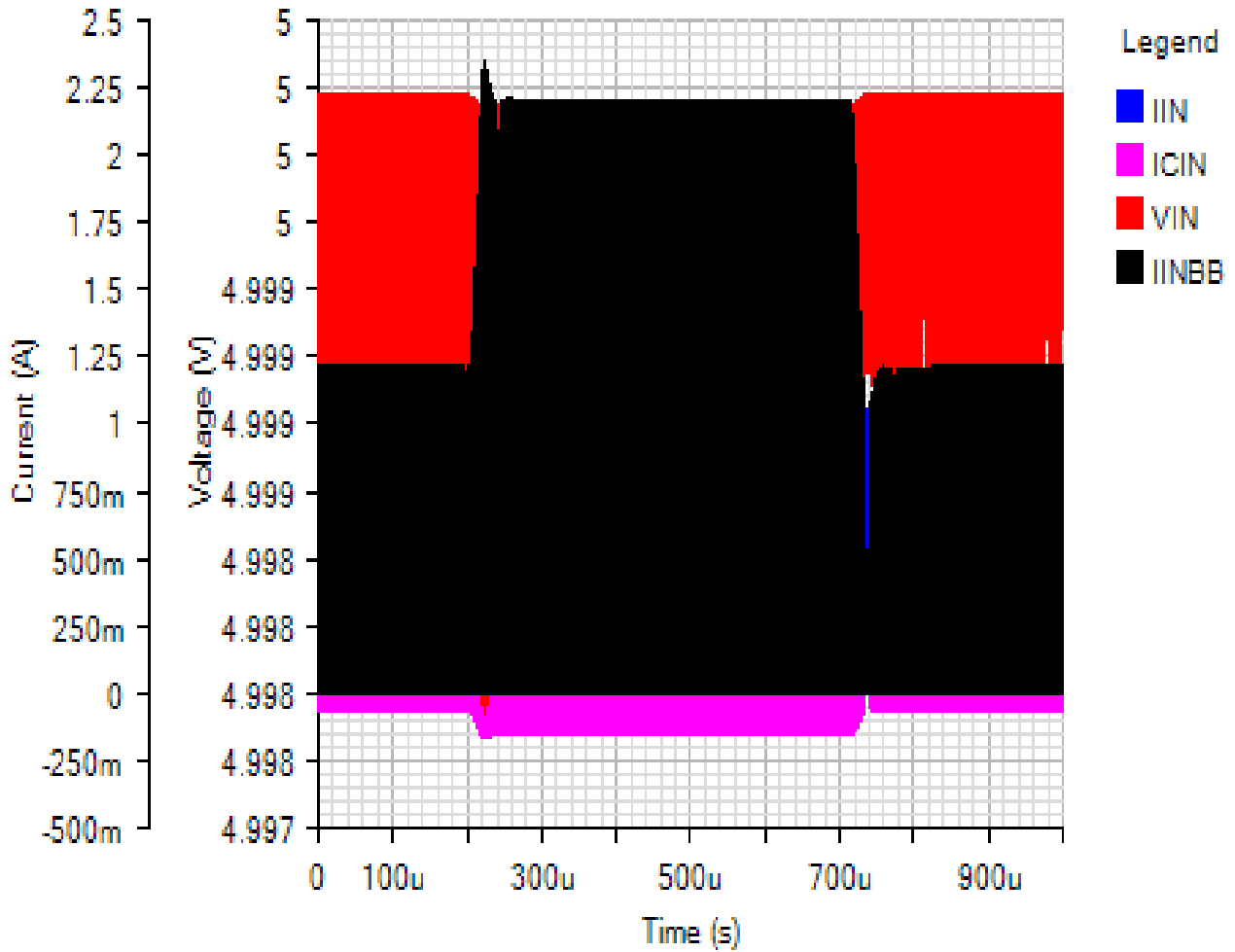
Phase Margin: 55.39° at a crossover frequency of 38.6kHz



Load Transient - Fri Jan 04 2019 11:27:56

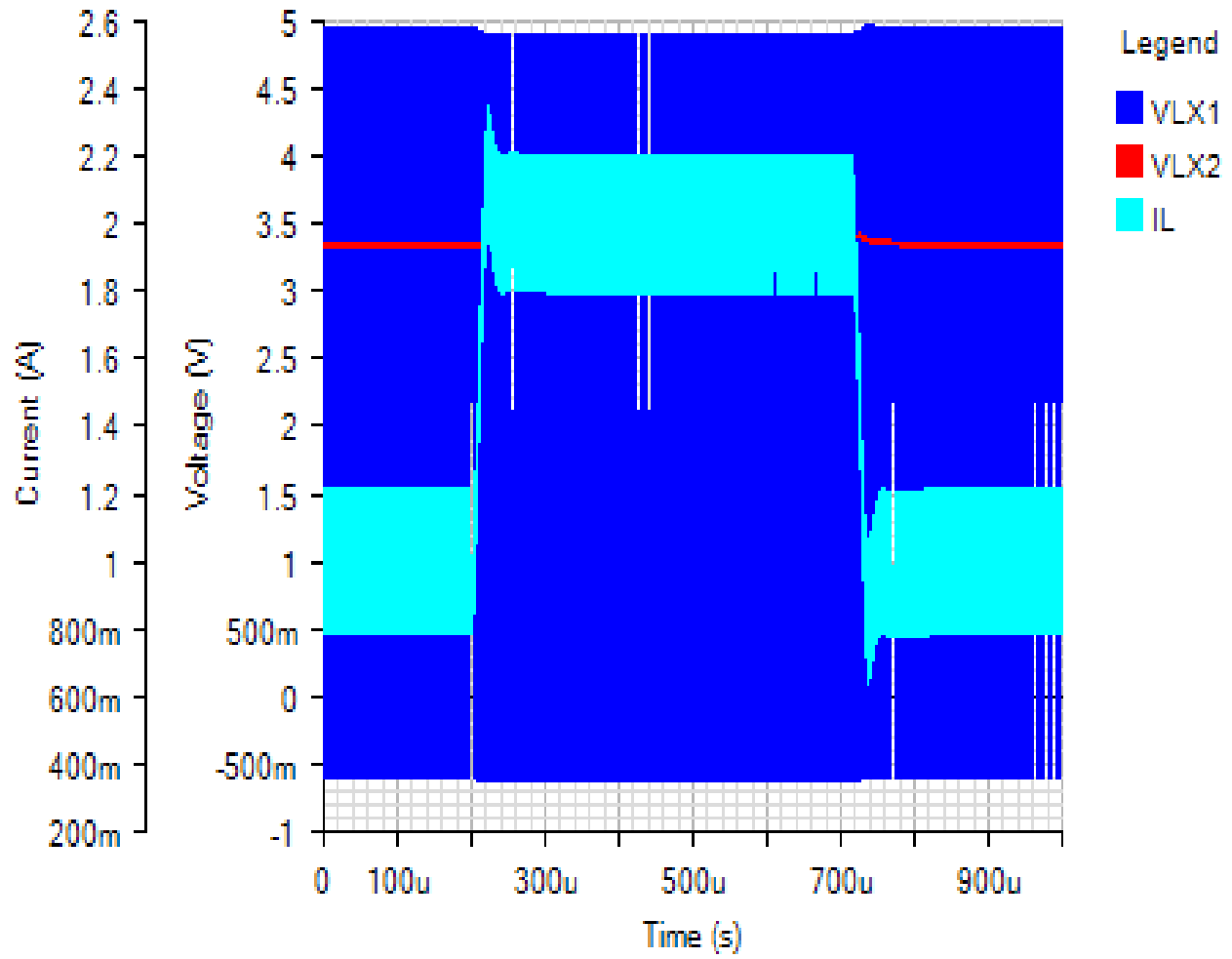
INPUT

Default



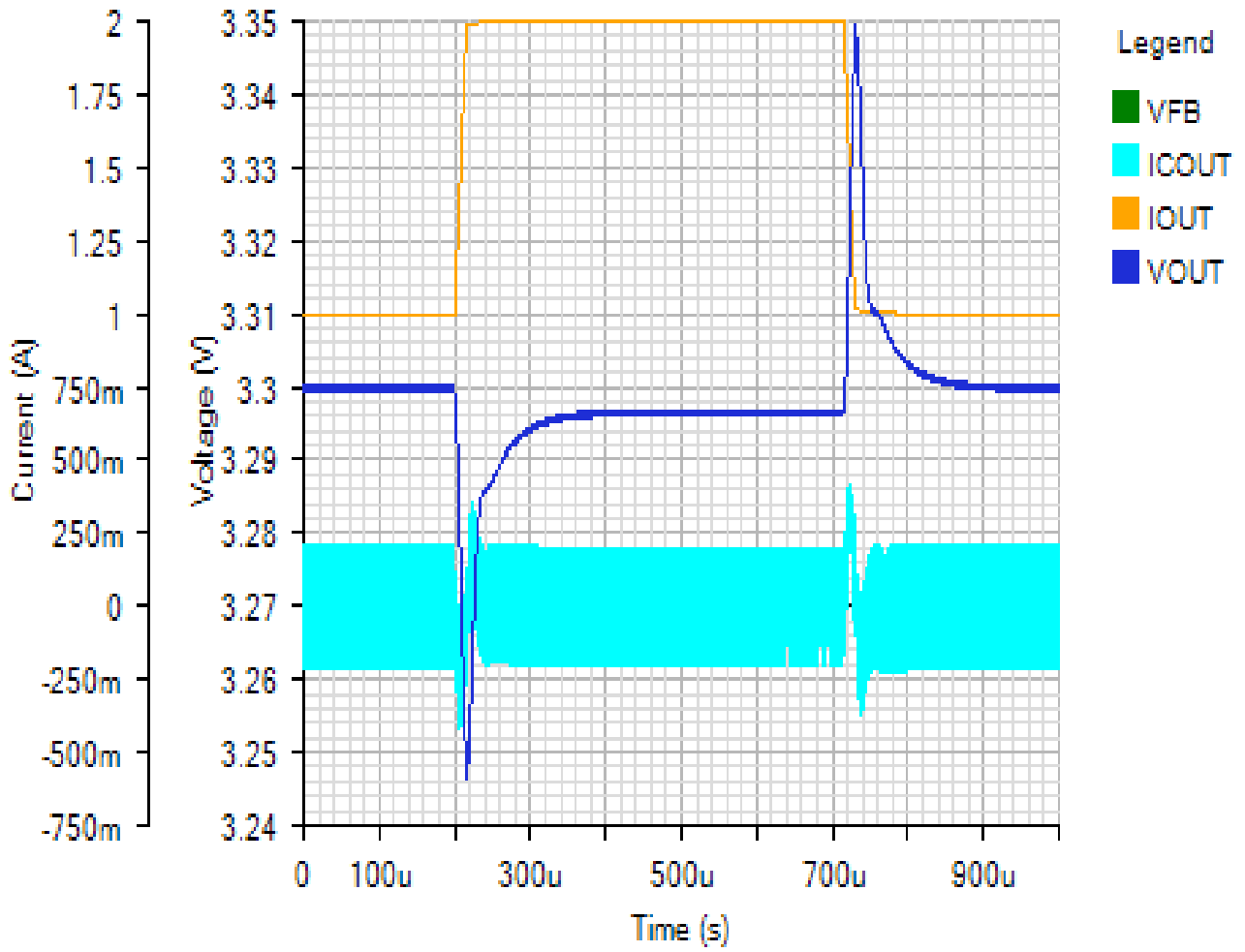
SWITCHING

Default



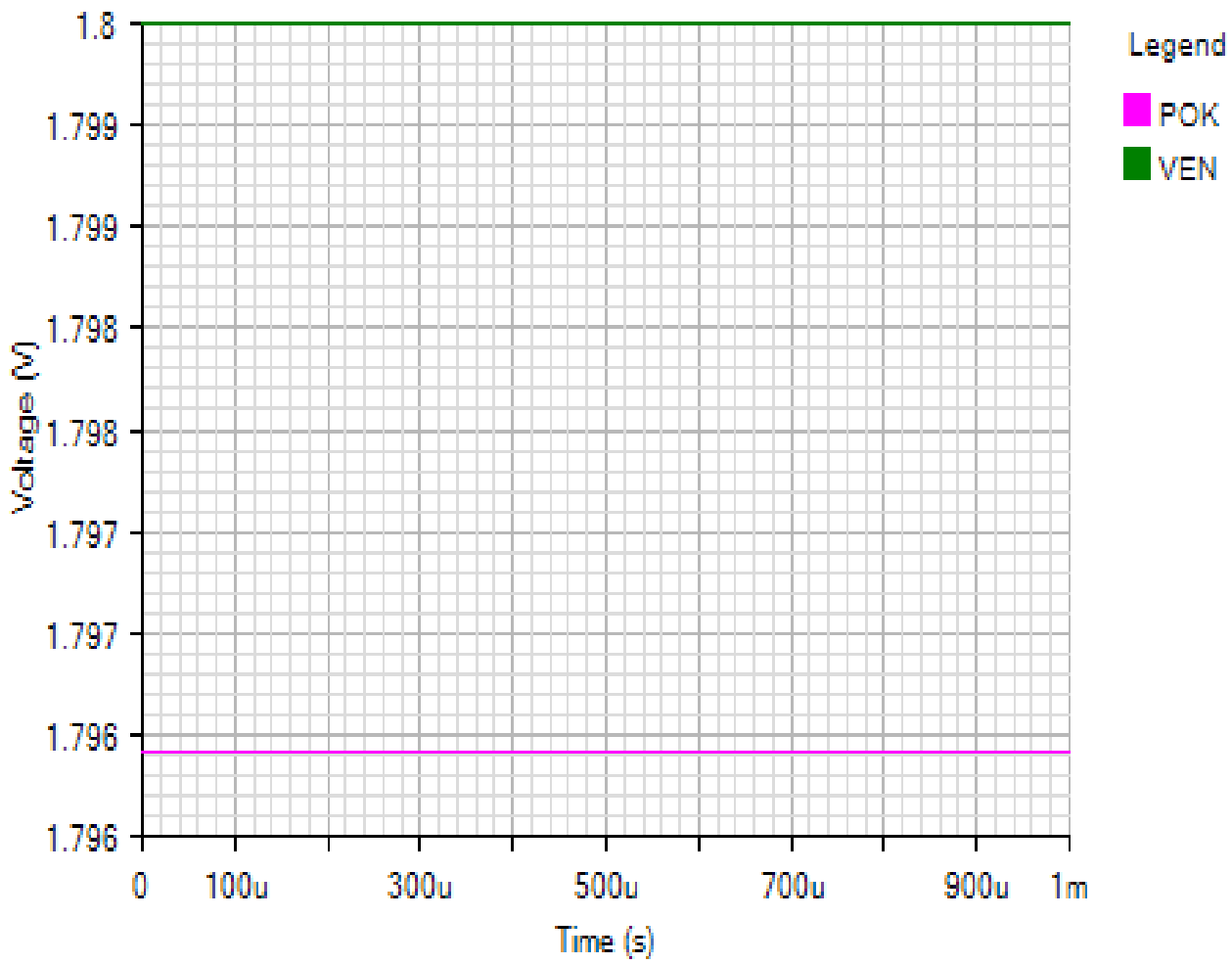
OUTPUT

Default

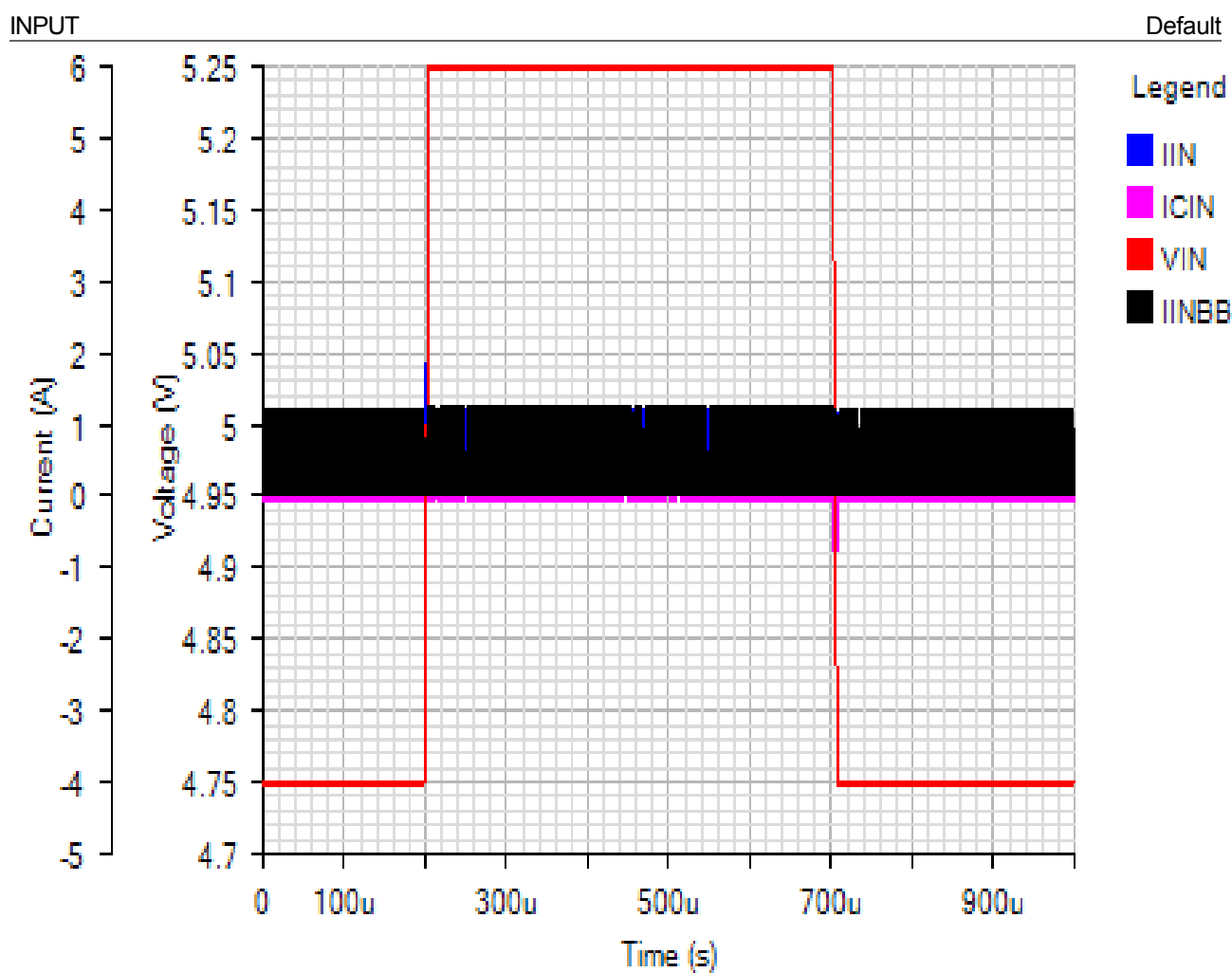


IC

Default

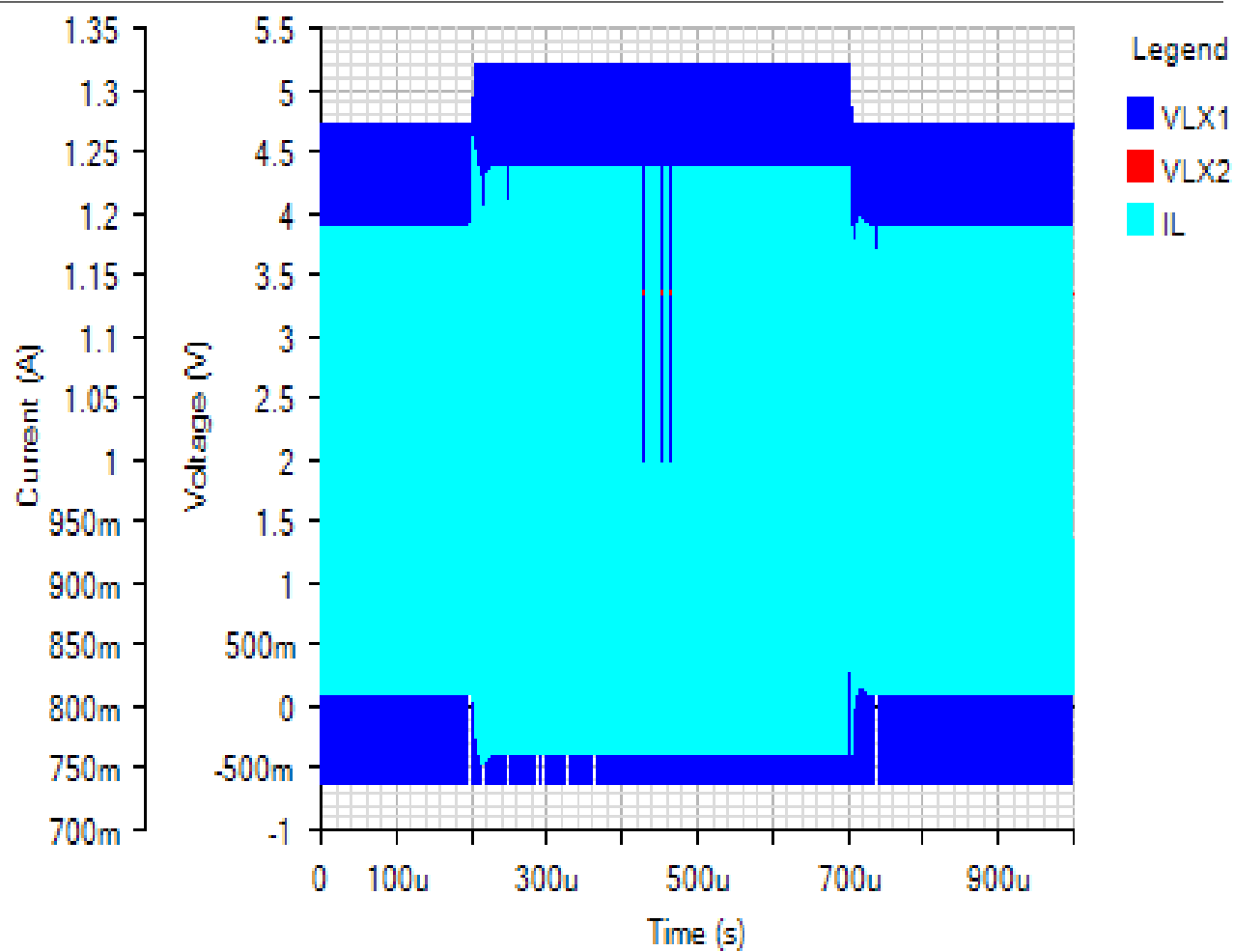


Line Transient - Fri Jan 04 2019 11:27:56



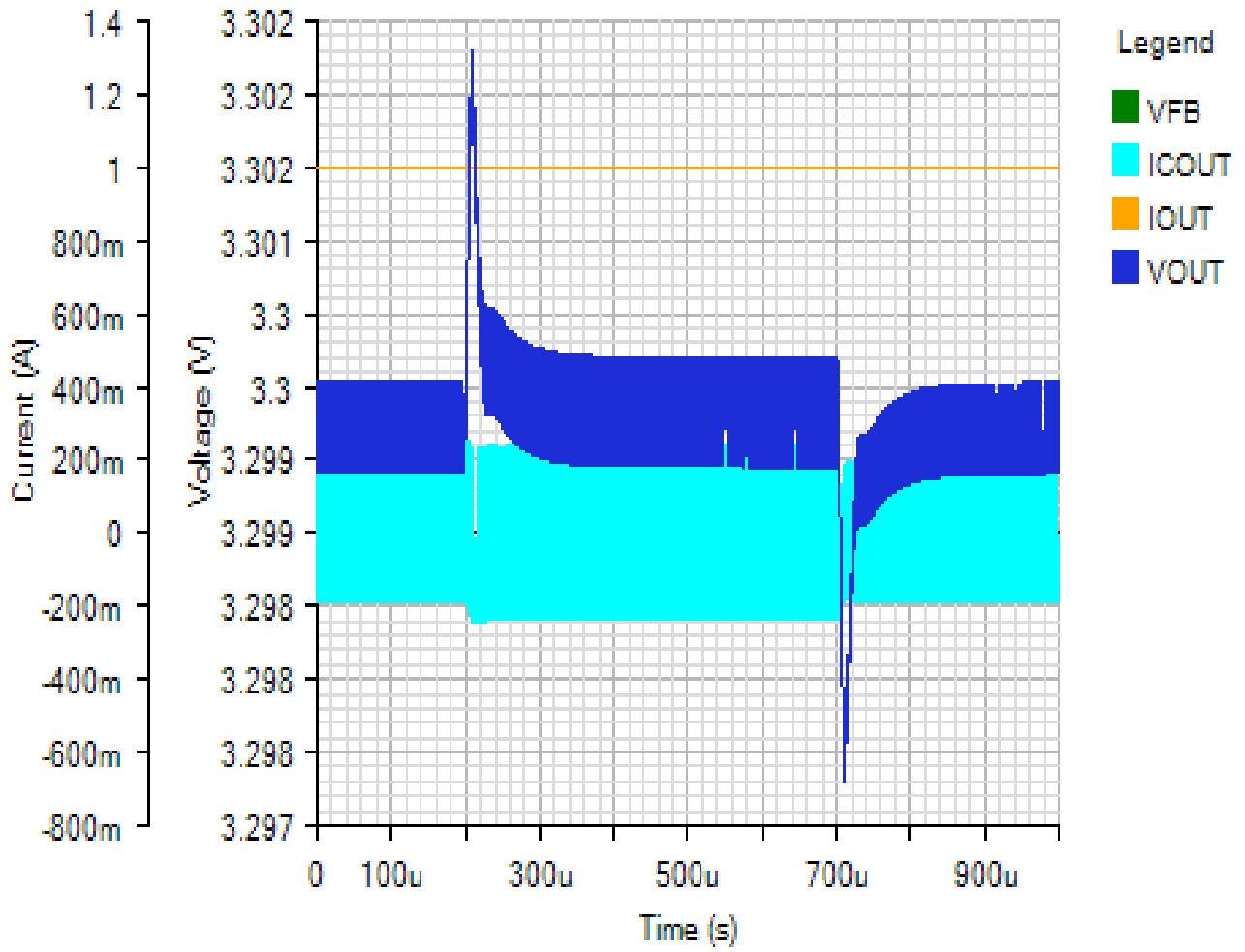
SWITCHING

Default



OUTPUT

Default



IC

Default

