

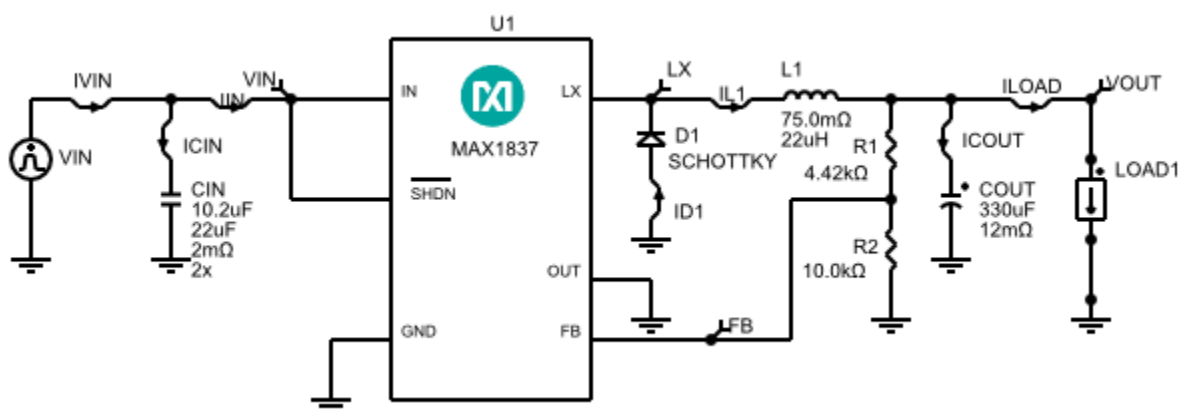
Initial Design

1.0

Design Requirements

| Parameter | Value |
|------------------------------|-----------------------------|
| Min. Input Voltage | 11.5V |
| Max. Input Voltage | 12.5V |
| Typ. Input Voltage | 12V |
| Input Voltage Ripple | 0.5V |
| Output Voltage | 3.3V |
| Output Current | 0.1A |
| Output Voltage Ripple | 1V |
| Load Step Start Current | A |
| Load Step Current | A |
| Performance Priority | Balance Efficiency and Size |
| BOM Priority | Cost |
| Switching Frequency | Hz |
| Inductor Current Ratio (LIR) | |

Schematic



BOM

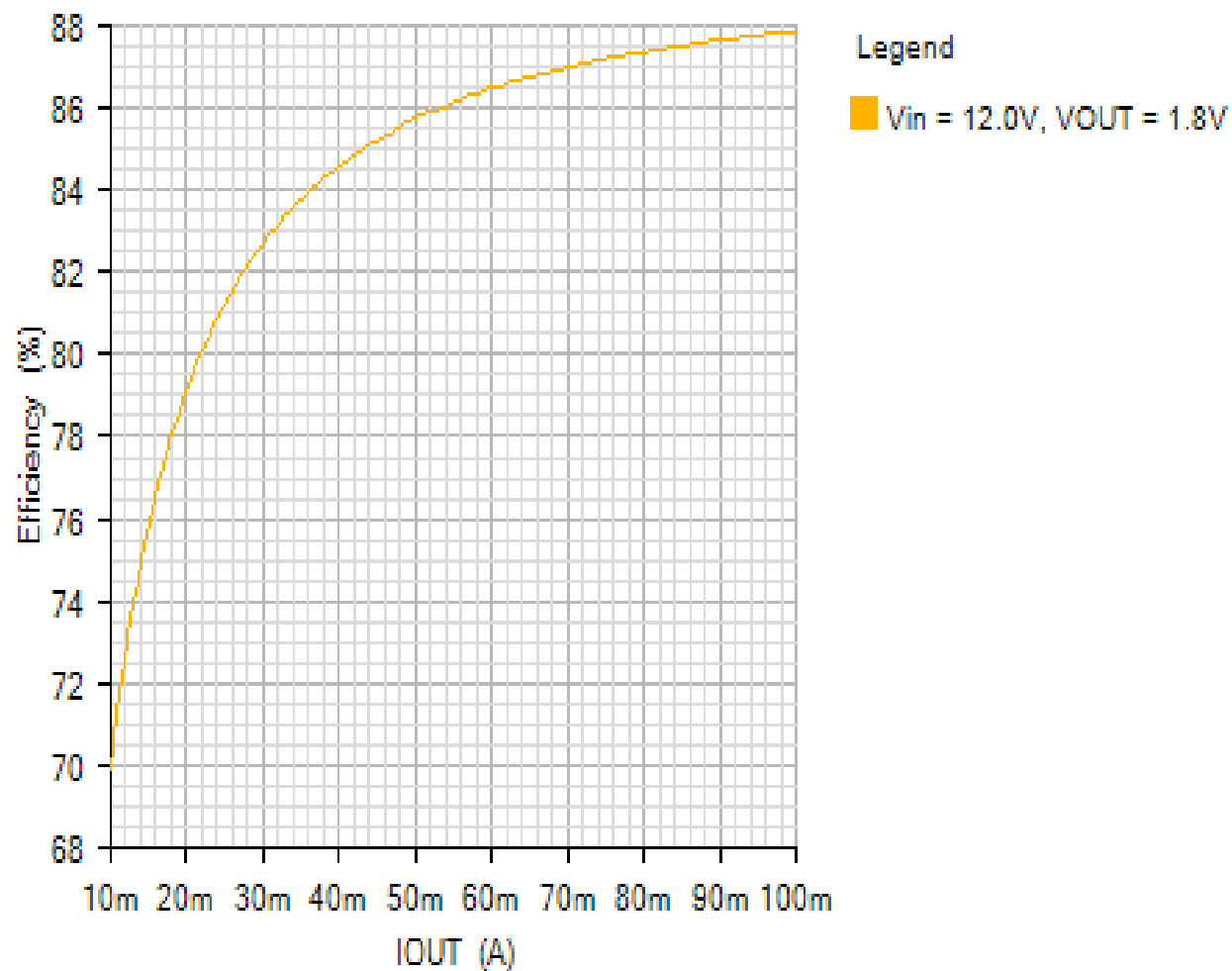
| Ref | Qty | Part Number | Manufacturer | Description |
|------|-----|-----------------------------------|------------------|--|
| U1 | 1 | MAX1837ETT33+T | Maxim Integrated | 24V Internal Switch, 100% Duty Cycle, Step-Down Converter |
| CIN | 2 | GRM32ER71E226ME15 | Murata | Cap Ceramic 22uF 25V 1210 125C |
| COUT | 1 | TCJD337M006R0012 | AVX | Cap Conductive Polymer 330uF 6.3V SMT |
| D1 | 1 | PMEG2005AESF | Nexperia | Diode Schottky 20V 0.71A 2-Pin DSN |
| L1 | 1 | VLP8040T-220M | TDK | Inductor Power Shielded Wirewound 22uH 20% 100KHz Ferrite 2.5A 75mOhm DCR Embossed Carrier T/R |
| R1 | 1 | ERJ3EKF4421V | Panasonic | Res Thick Film 0603 4.42K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R |
| R2 | 1 | ERJ2RKF1002X | Panasonic | Res Thick Film 0402 10K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R |

Simulation Results

Efficiency - Tue Nov 20 2018 10:10:22

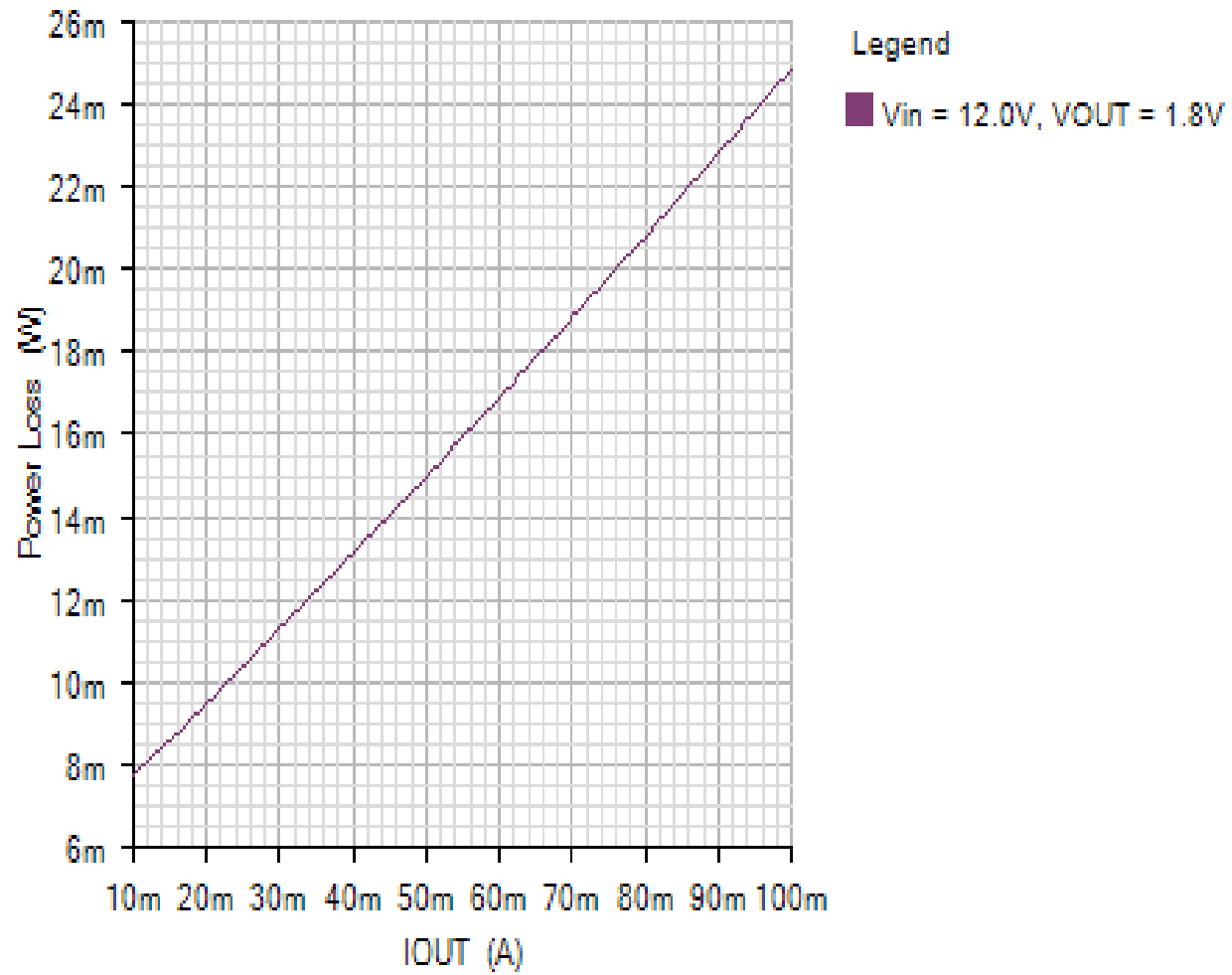
EFFICIENCY_PLOT

Default



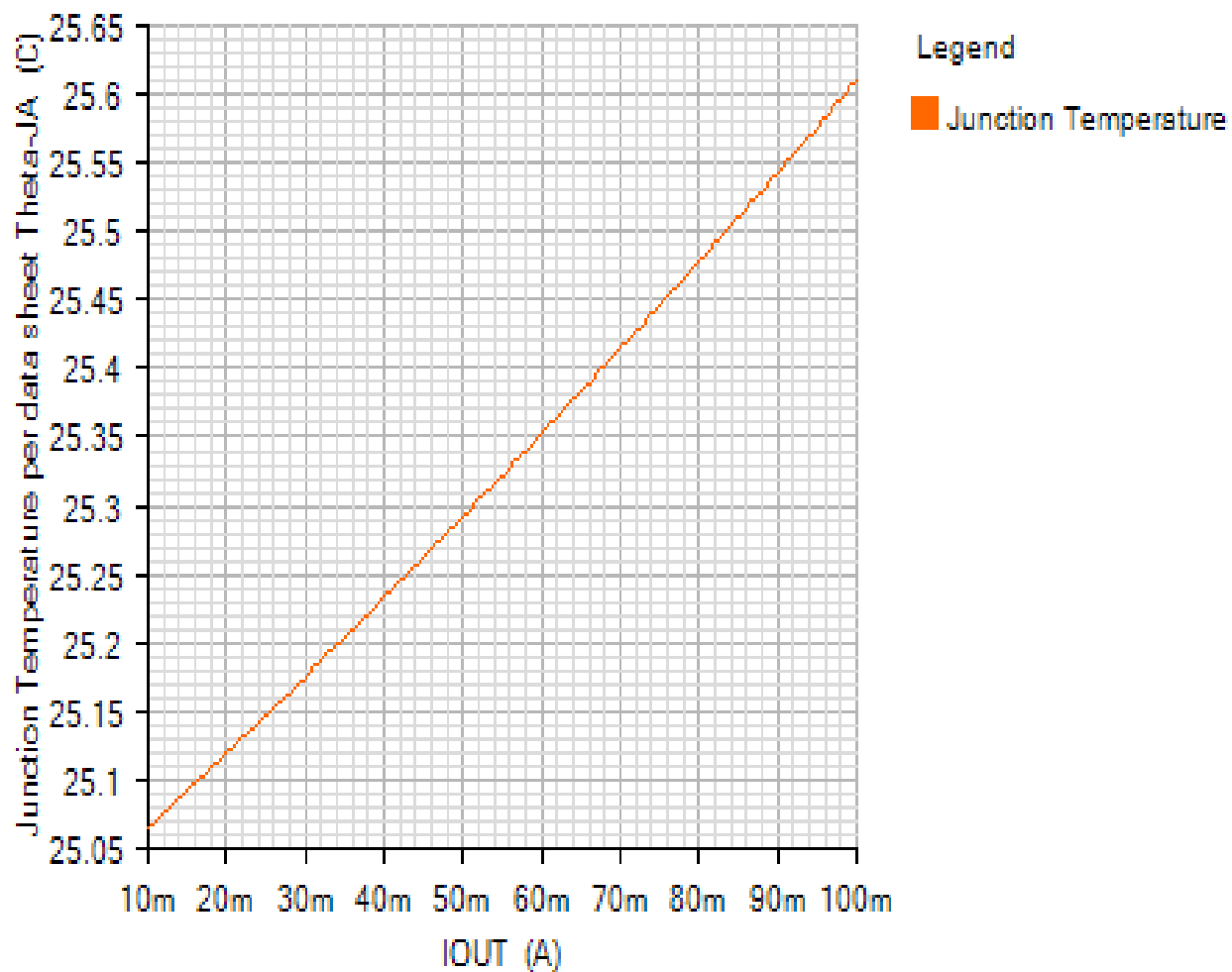
POWER_LOSS_PLOT

Default

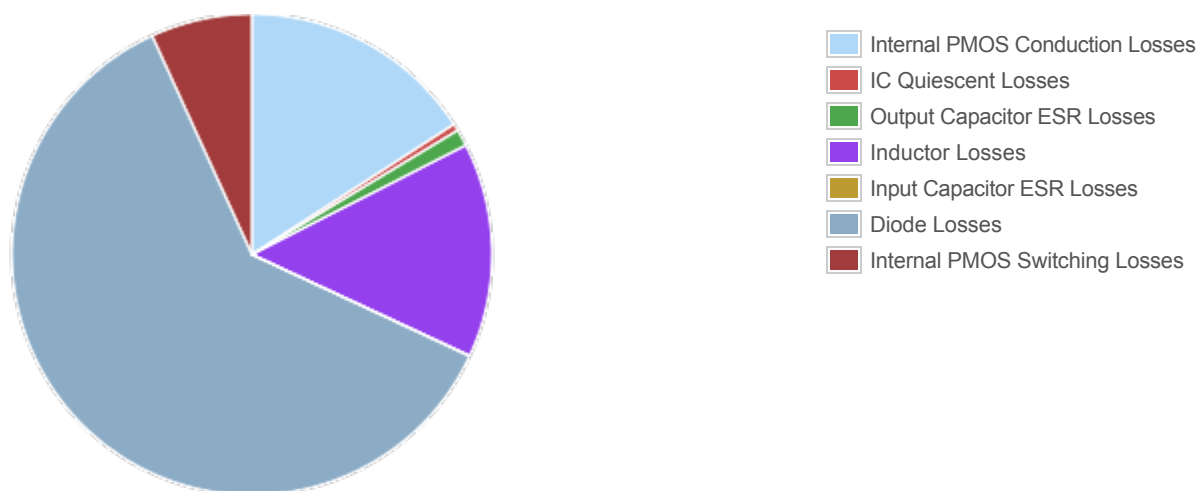


JUNCTION_TEMPERATURE_PLOT

Default



Losses



Component

Loss (W)

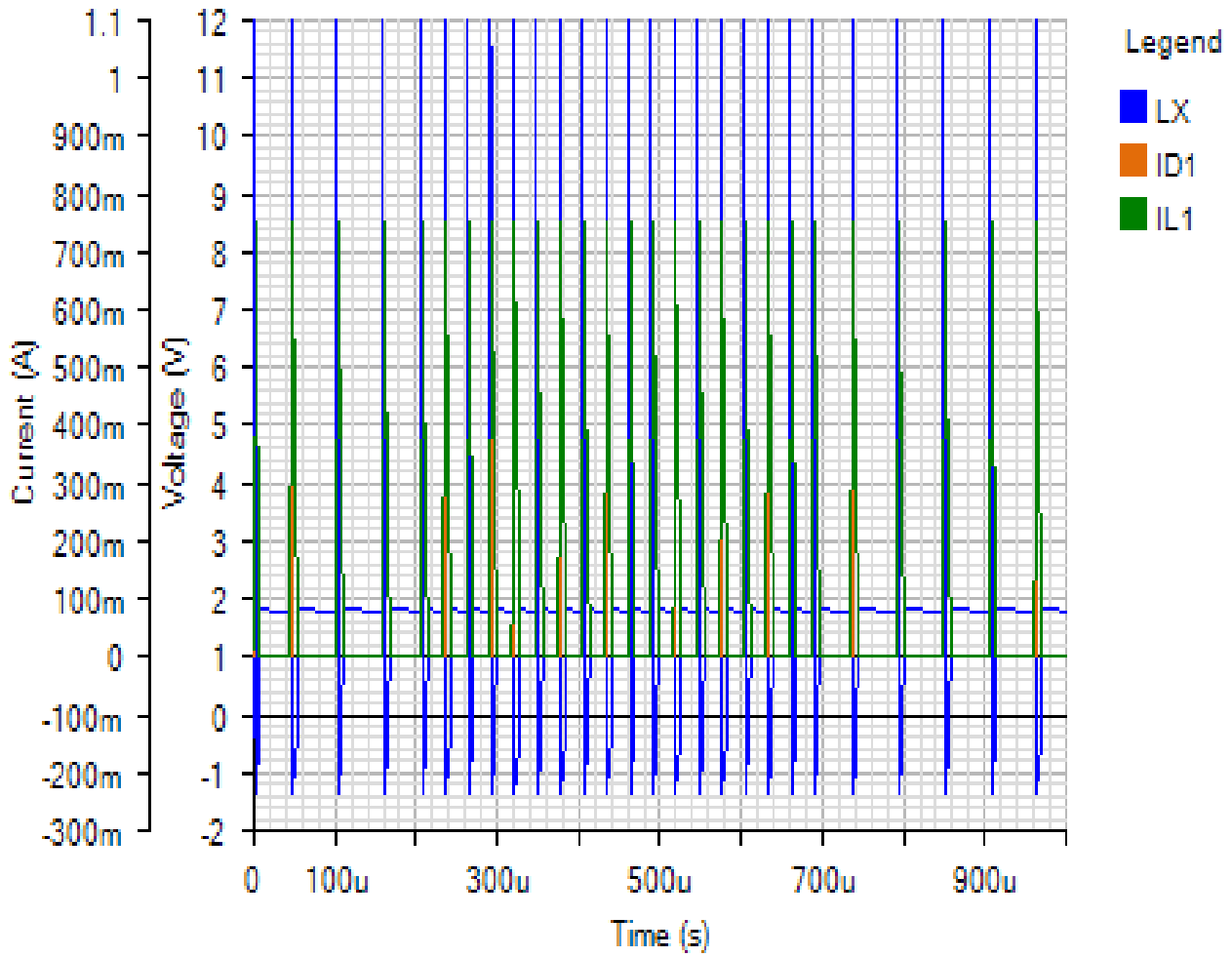
% of total

| Component | Loss (W) | % of total |
|---------------------------------|----------|------------|
| Internal PMOS Conduction Losses | 0.159009 | 15.9 |
| IC Quiescent Losses | 0.004677 | 0.5 |
| Output Capacitor ESR Losses | 0.011263 | 1.1 |
| Inductor Losses | 0.144199 | 14.4 |
| Input Capacitor ESR Losses | 0.000251 | 0 |
| Diode Losses | 0.61232 | 61.2 |
| Internal PMOS Switching Losses | 0.068281 | 6.8 |
| Total | 1 | 100 |

Load Step - Tue Nov 20 2018 10:10:22

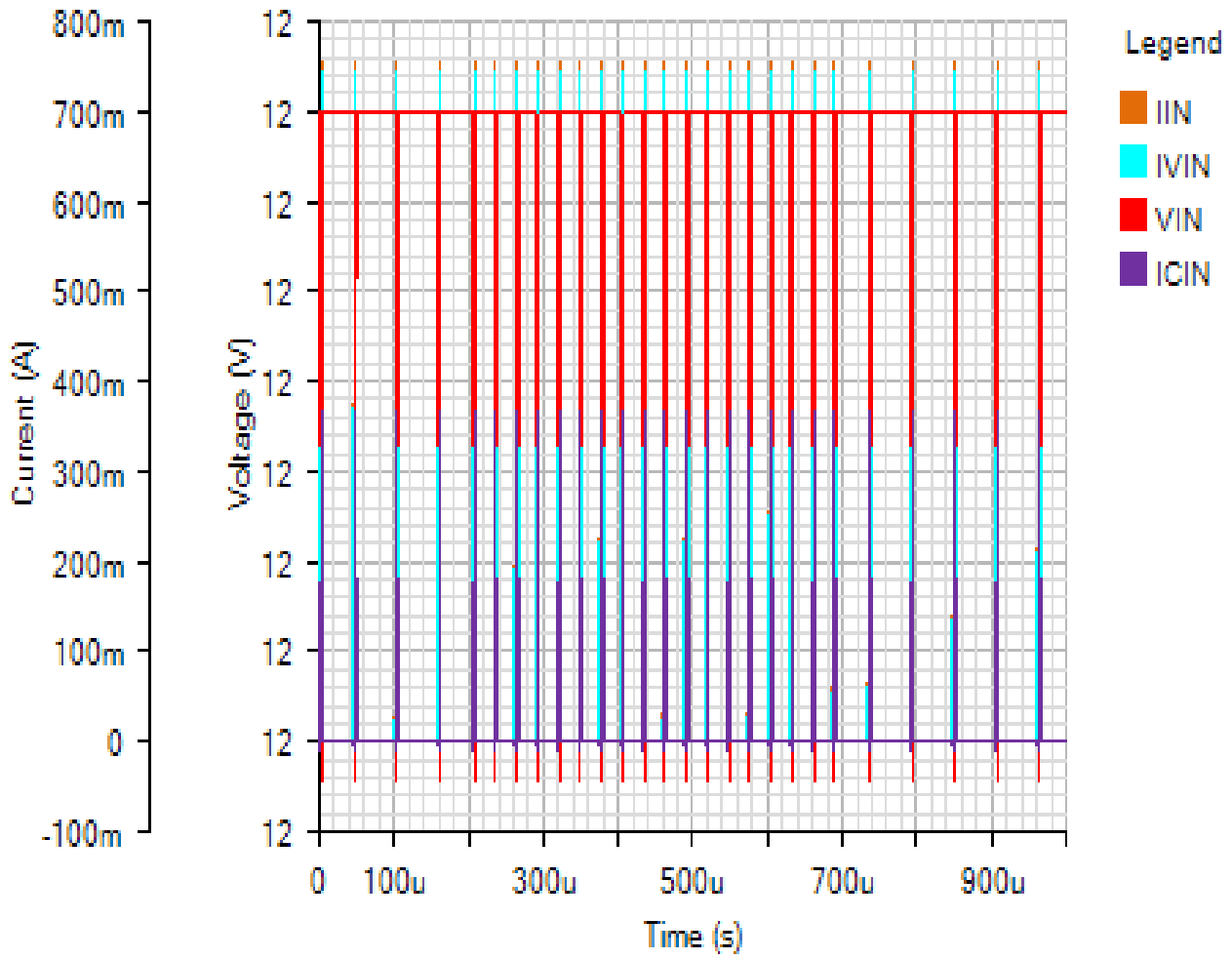
SWITCHING

Default



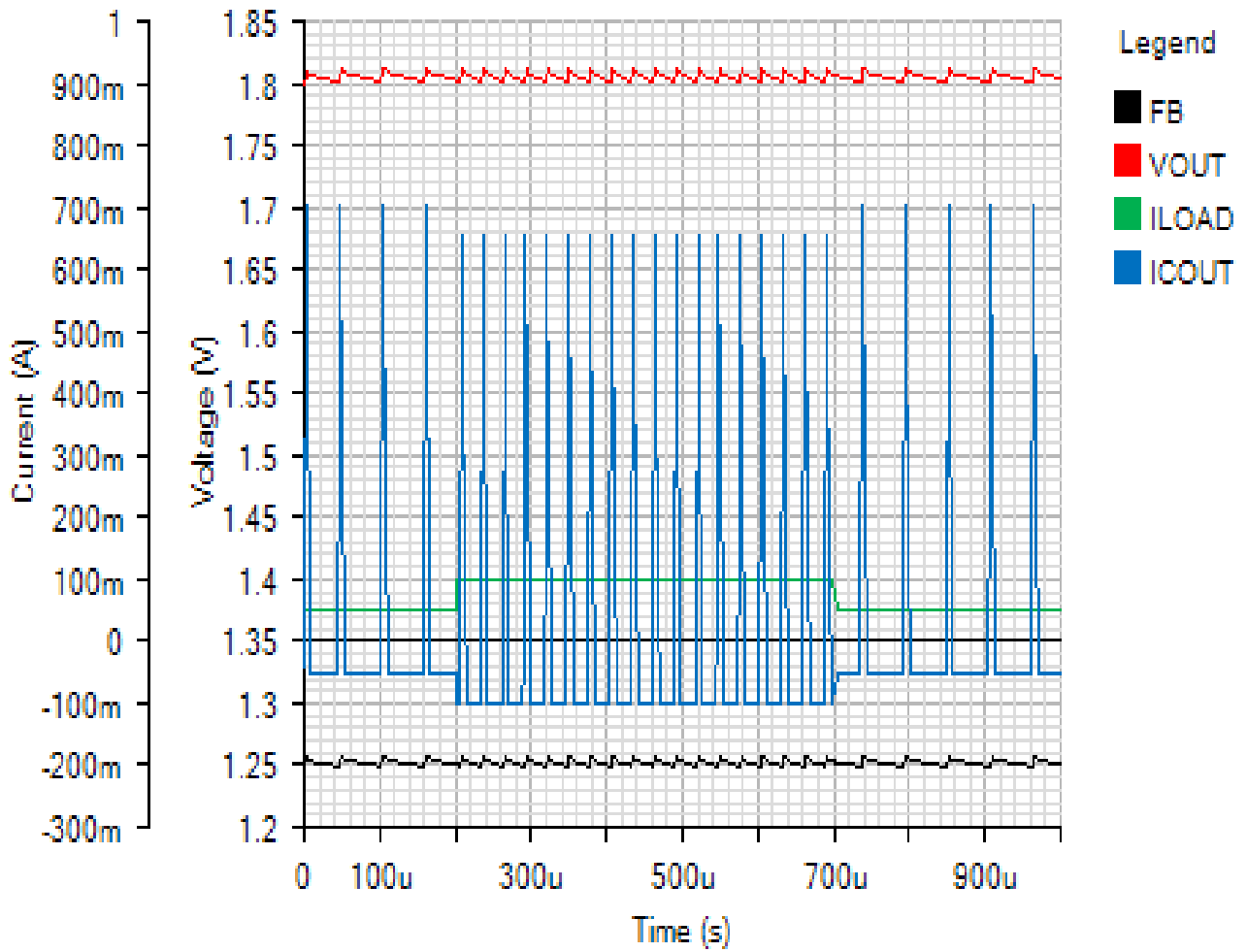
INPUT

Default



OUTPUT

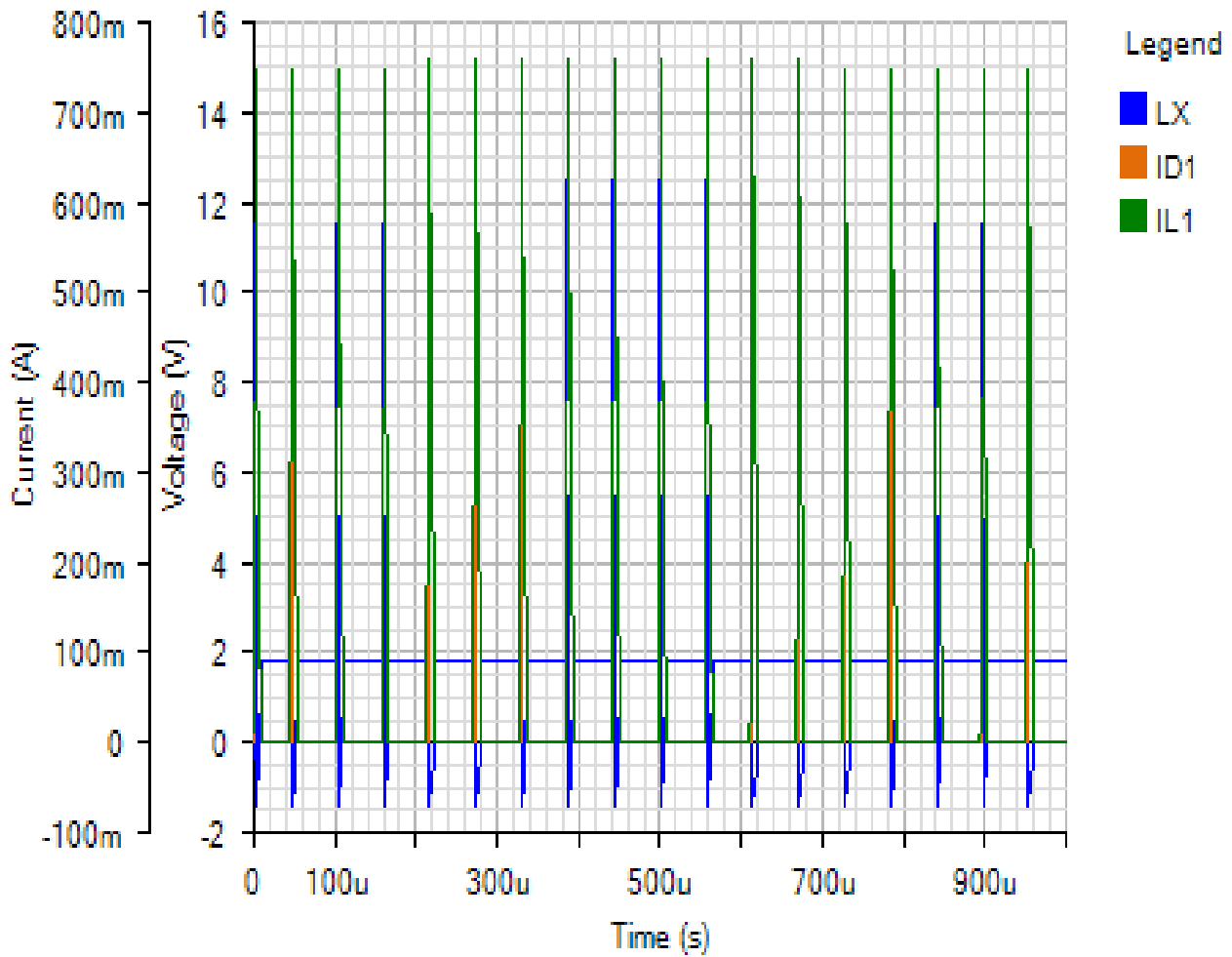
Default

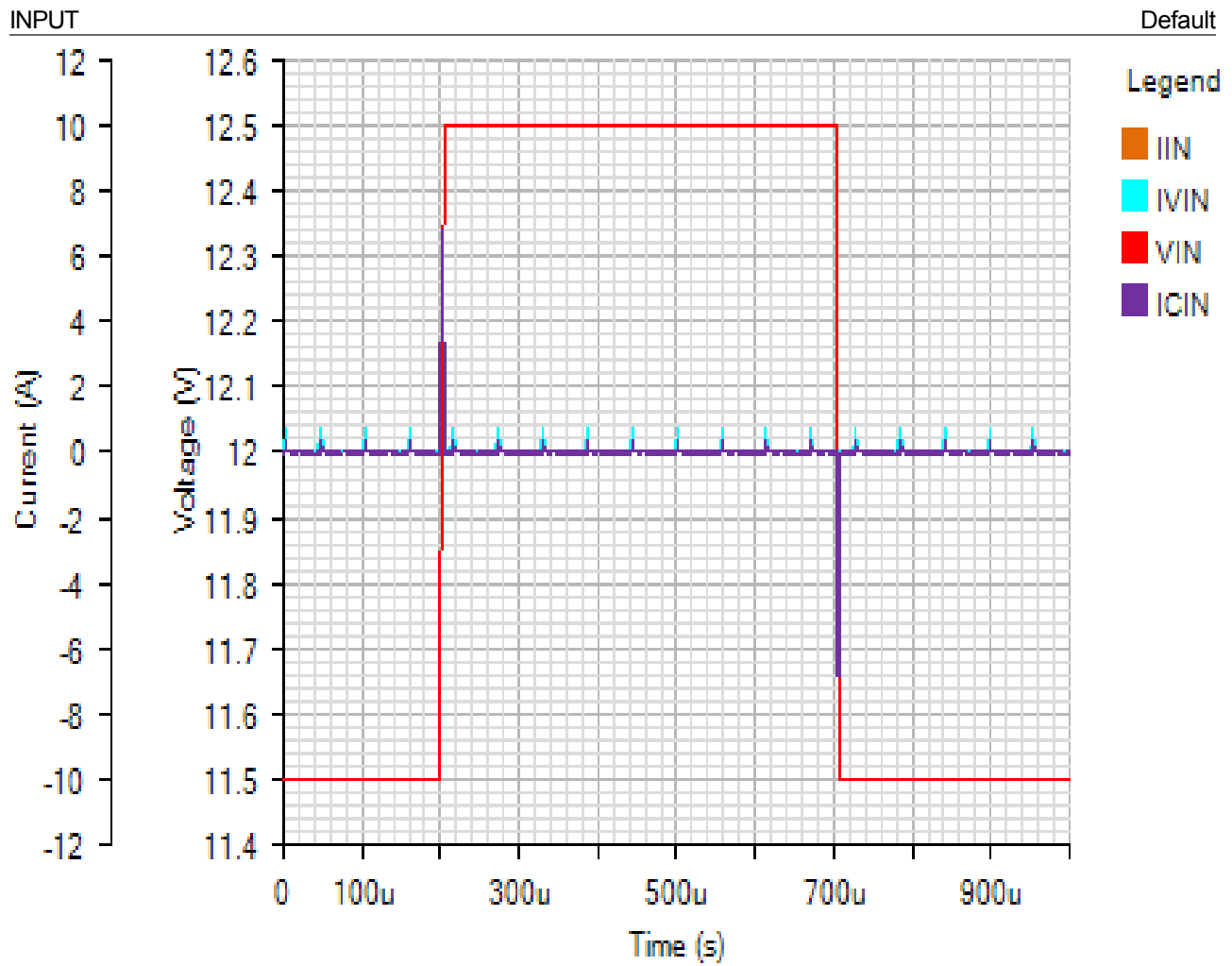


Line Transient - Tue Nov 20 2018 10:10:22

SWITCHING

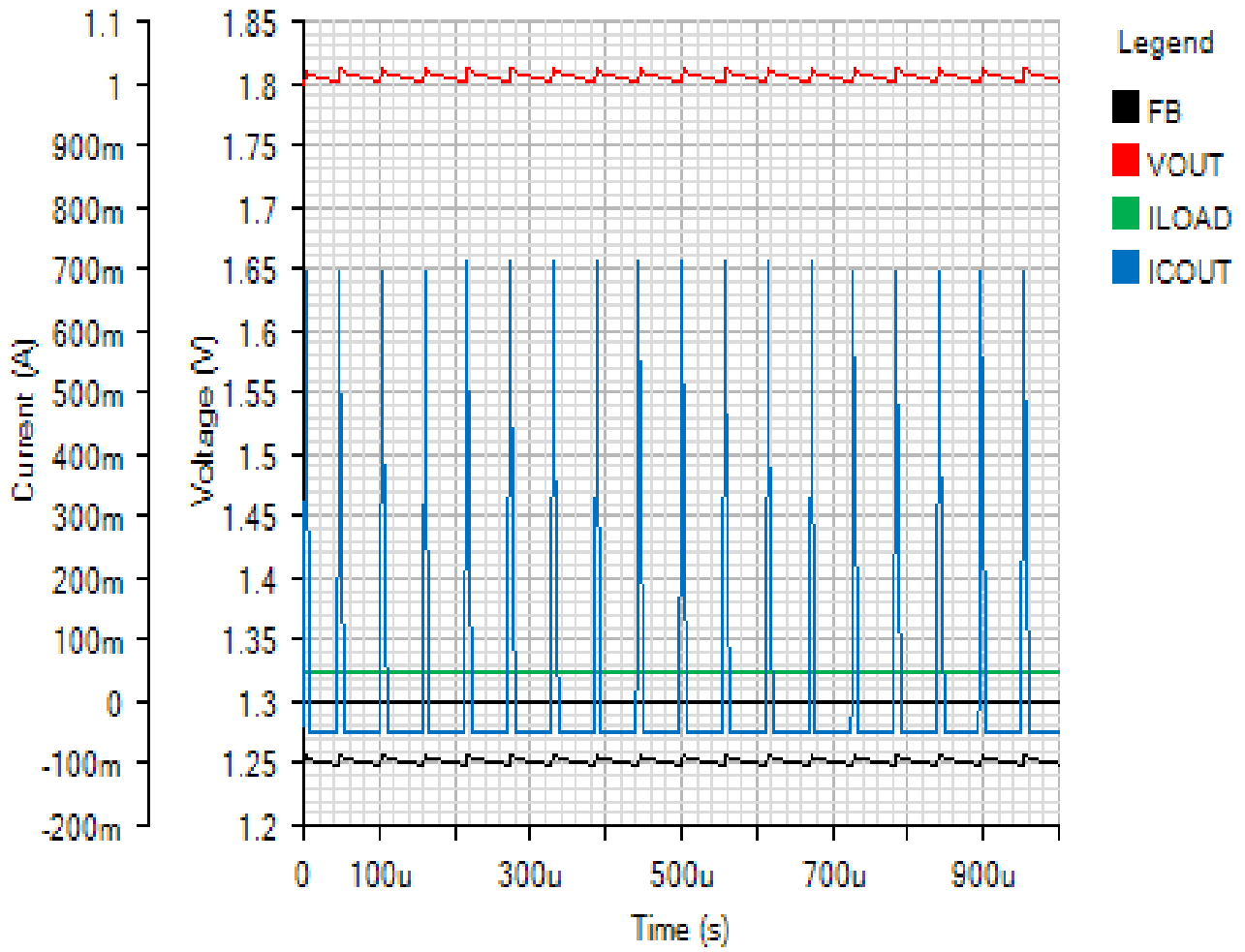
Default





OUTPUT

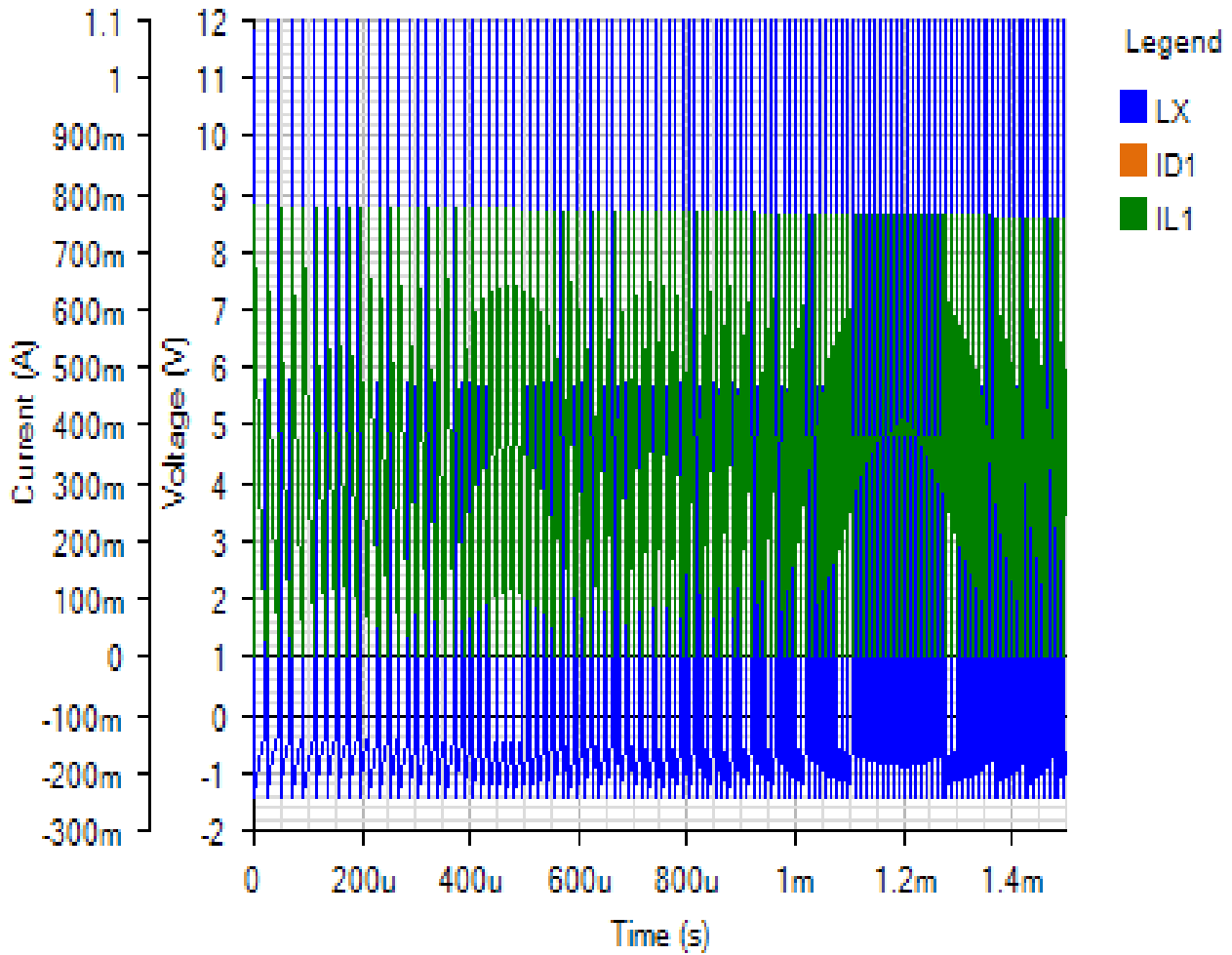
Default



Start Up - Tue Nov 20 2018 10:10:22

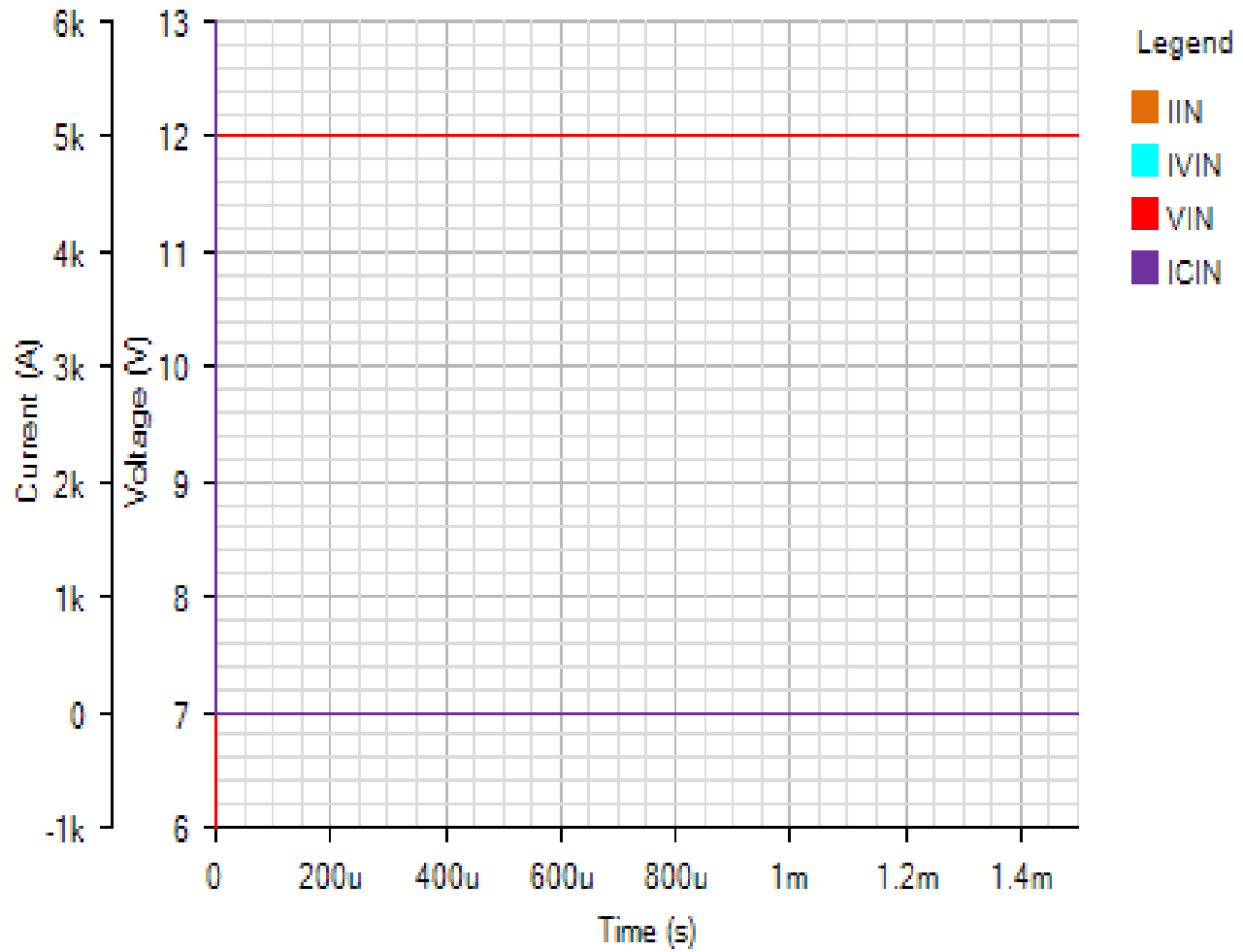
SWITCHING

Default



INPUT

Default



OUTPUT

Default

