LTspice Model
Inductor Built-in Step-Down DC/DC Converters
TOREX SEMICONDUCTOR LTD.
XCL213B253DR

Model Information

Model	A macro model	
Call Name	MDC_ XCL213B253DR _LT	
Pin Assign	1:Vin 2:NC 3:Lx 4:Vout 5:AGND 6:CE 7:PGND 8:L1 9:L2	
File List	Model Library	MDC_XCL213B253DR_LT01.lib
	Model Report	MDC_XCL213B253DR_LT.pdf (this file)
Verified Simulator Version		LTspice XVII
Note		

References

The information which was used for modeling is as follow:

[Data Sheet]

- ●Date/Version JTR28005-004
- ●Product name XCL213B253DR
- ●Company name TOREX

[Characteristics listed]

- ●Characteristics PWM Control
  Current Limit
  Short Protection(Latched)
  UVLO Protection
  Soft Start
  CL Highspeed Discharge
  CE Function

Simulation Condition

This table shows the range of evaluated simulation range that was not occurs any convergence problems in this area.

Item	Condition	Unit
Temperature	25	deg C

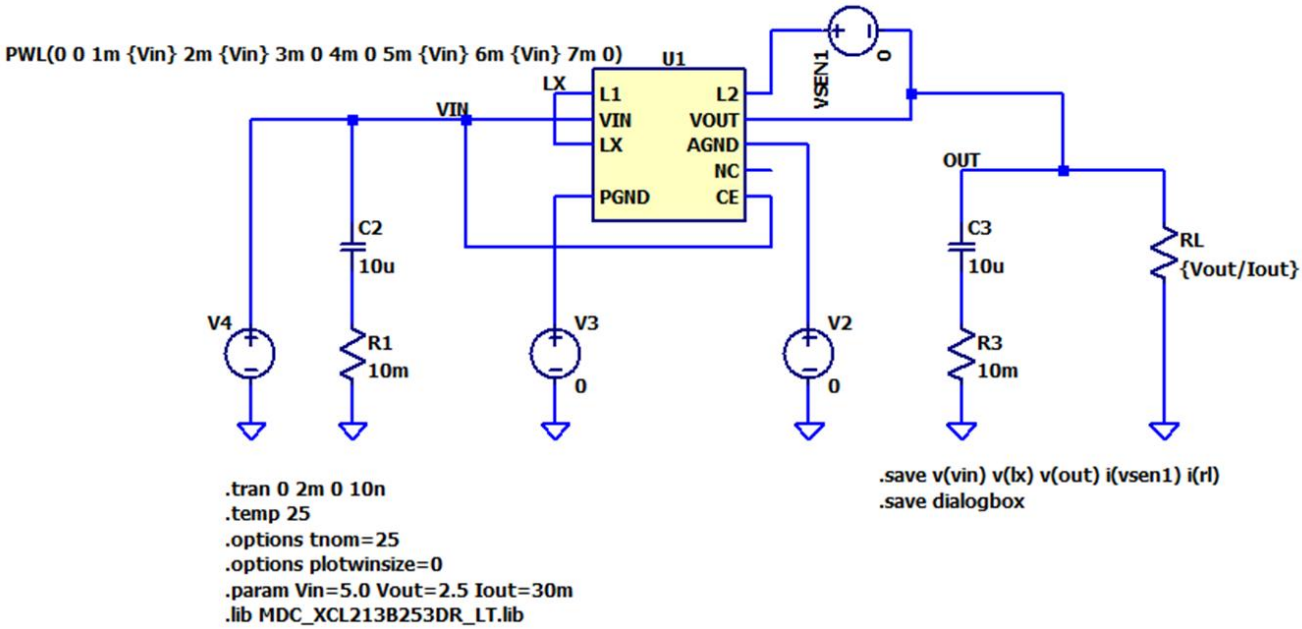
Switching Regulator

○ : Implemented
× : Not Implemented
— : Not applicable

Model Functions Table

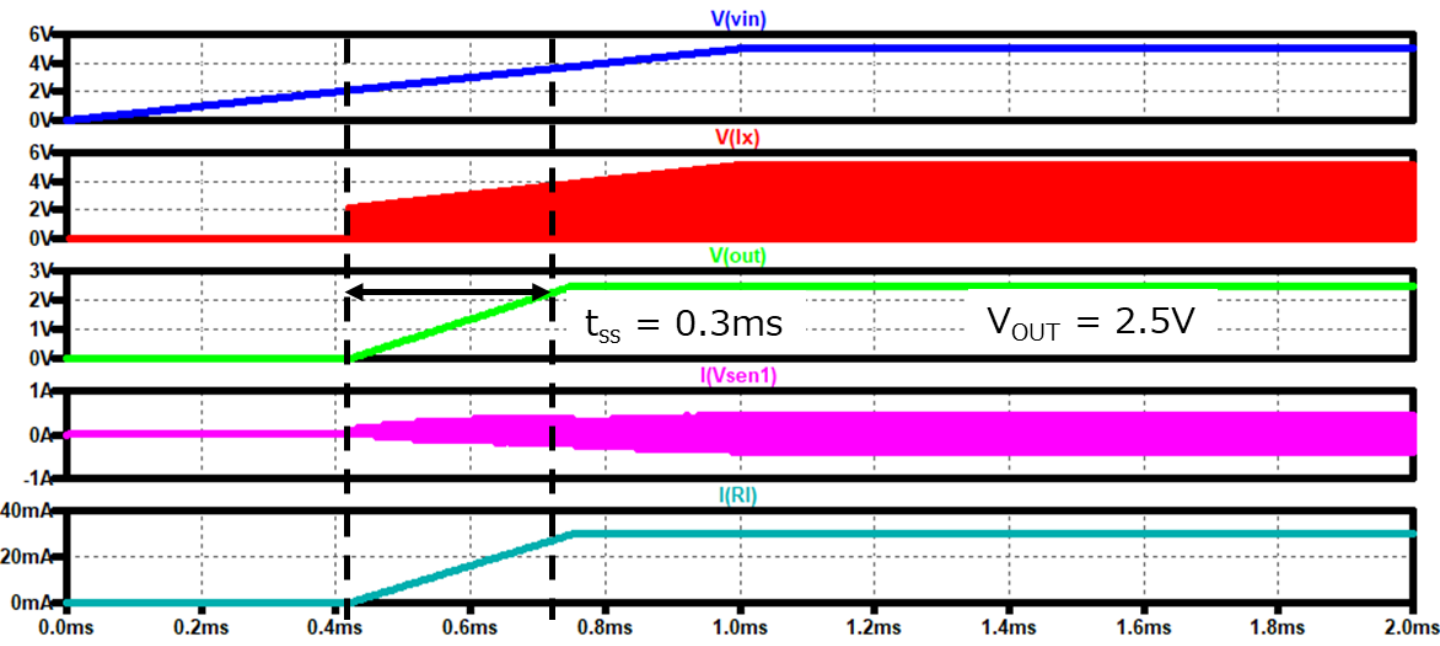
Functions	RANK=2 RANK	Implemented
Control Method(PWM,PFM)	1	○
Enable Function	1	○
Soft Start	1	○
Line Regulation	1	–
Load Regulation	1	–
Synchronous External Oscillation	1	–
UVLO	1	○
Line Transient	2	–
Load Transient	2	○
Light Load Current Mode	2	–
Spread Spectrum	2	×
Over Current Protection	2	○
Over Voltage Protection	2	–
Forard/Flyback Other Device in Circuit	3	–
Brown IN/OUT Function	—	–
ZT Pin OVP Function	—	–

V_{OUT} / Soft start Testbench

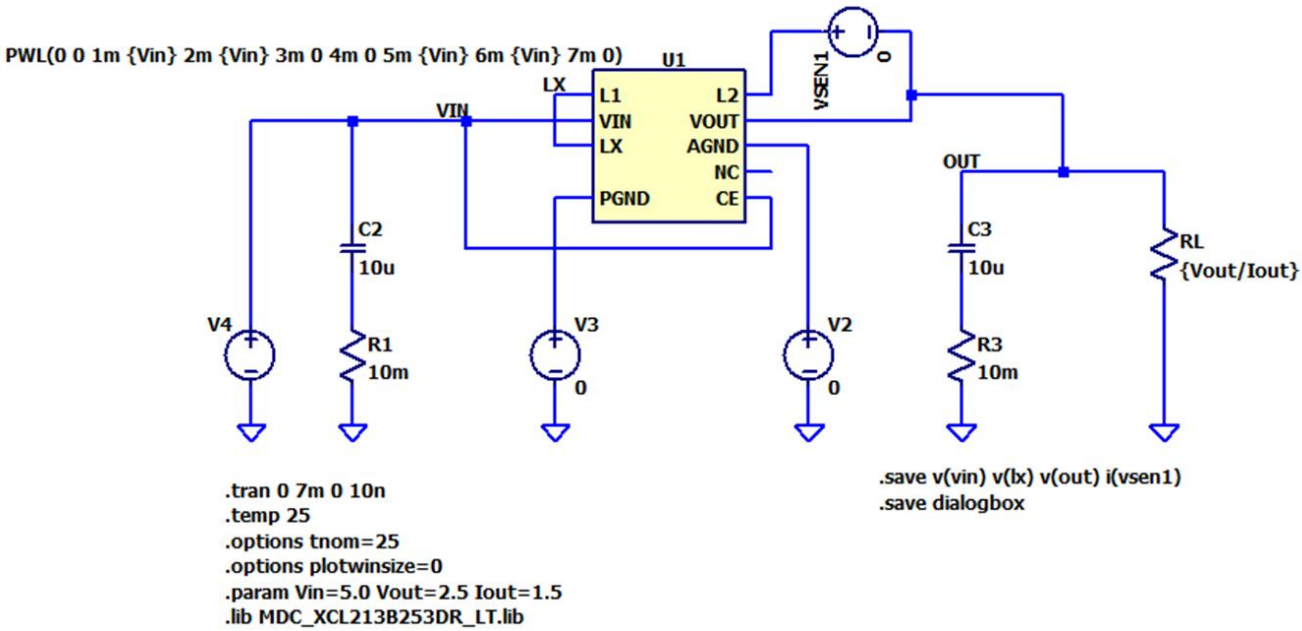


Simulation results are following.
Explanatory notes — : simulated

V_{OUT} / Soft start

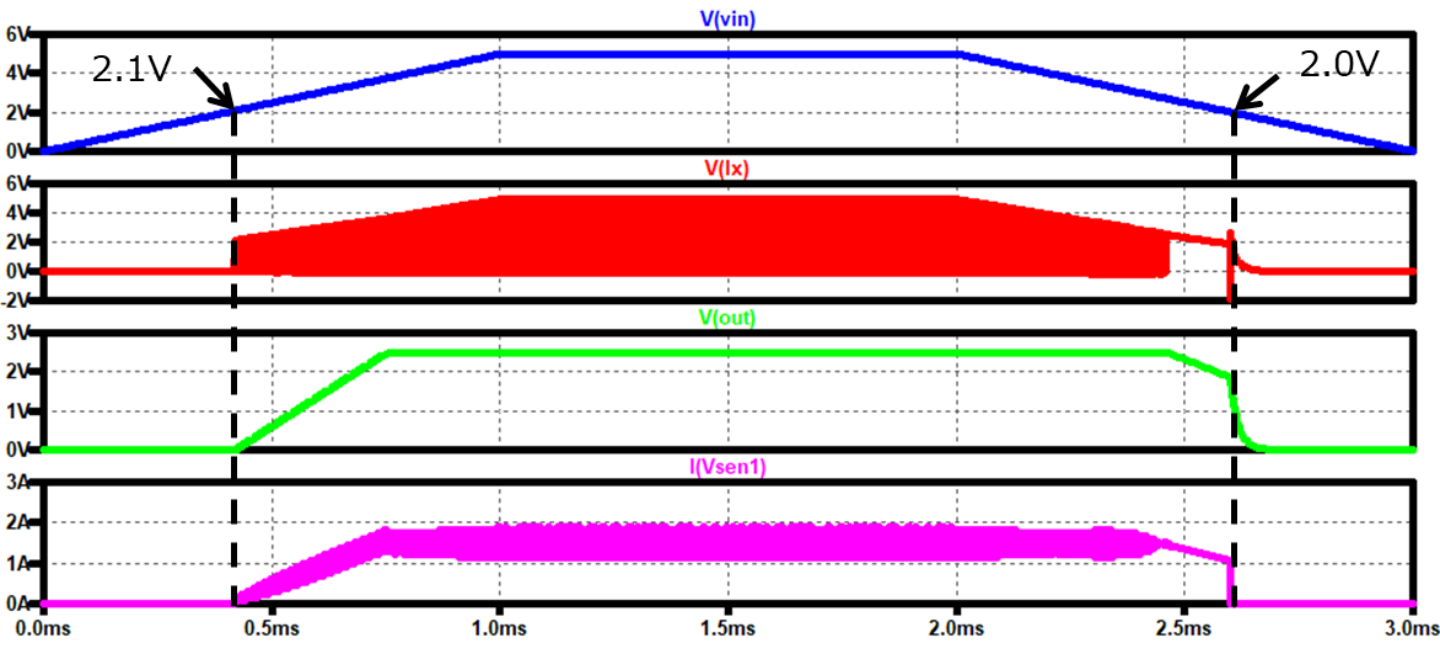


UVLO Testbench

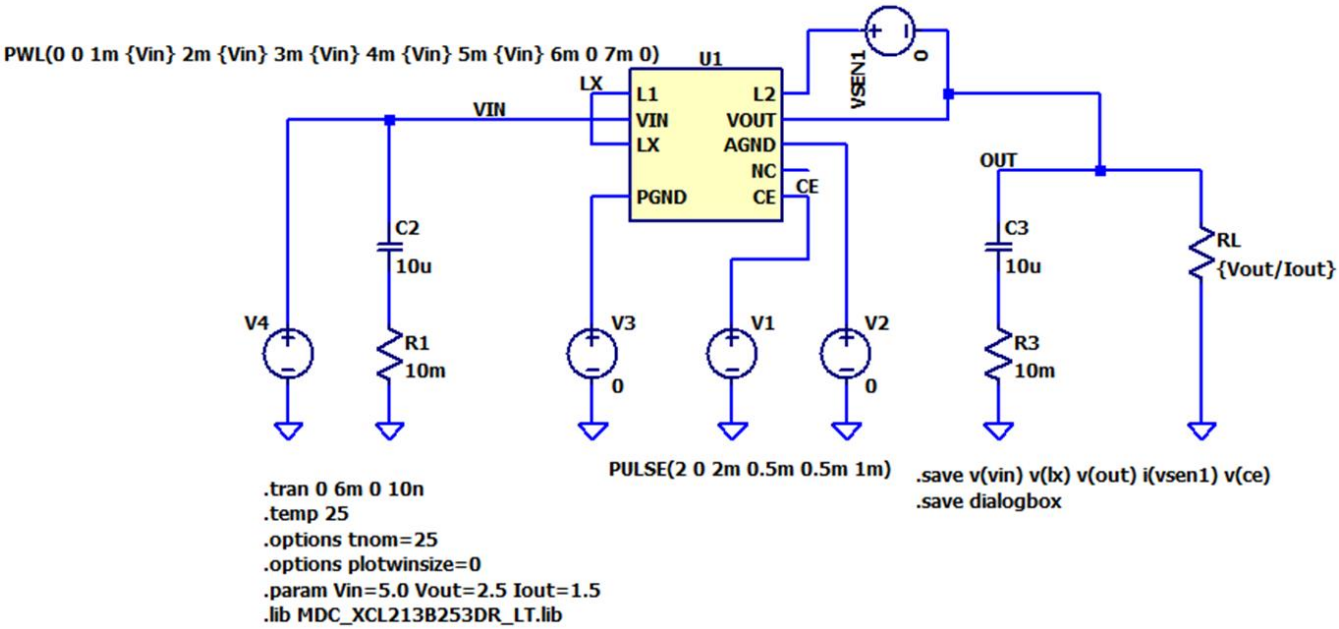


Simulation results are following.
Explanatory notes — : simulated

UVLO

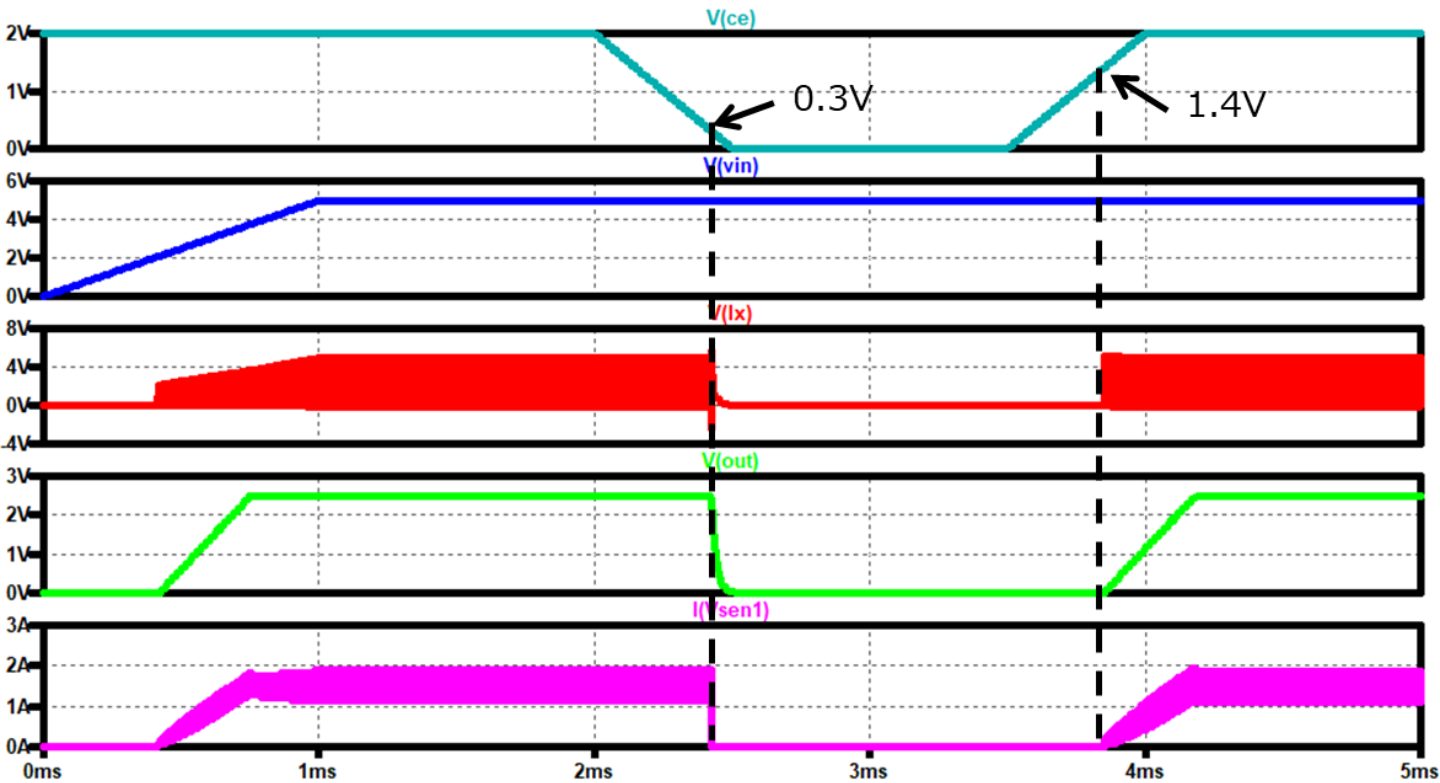


CE Testbench

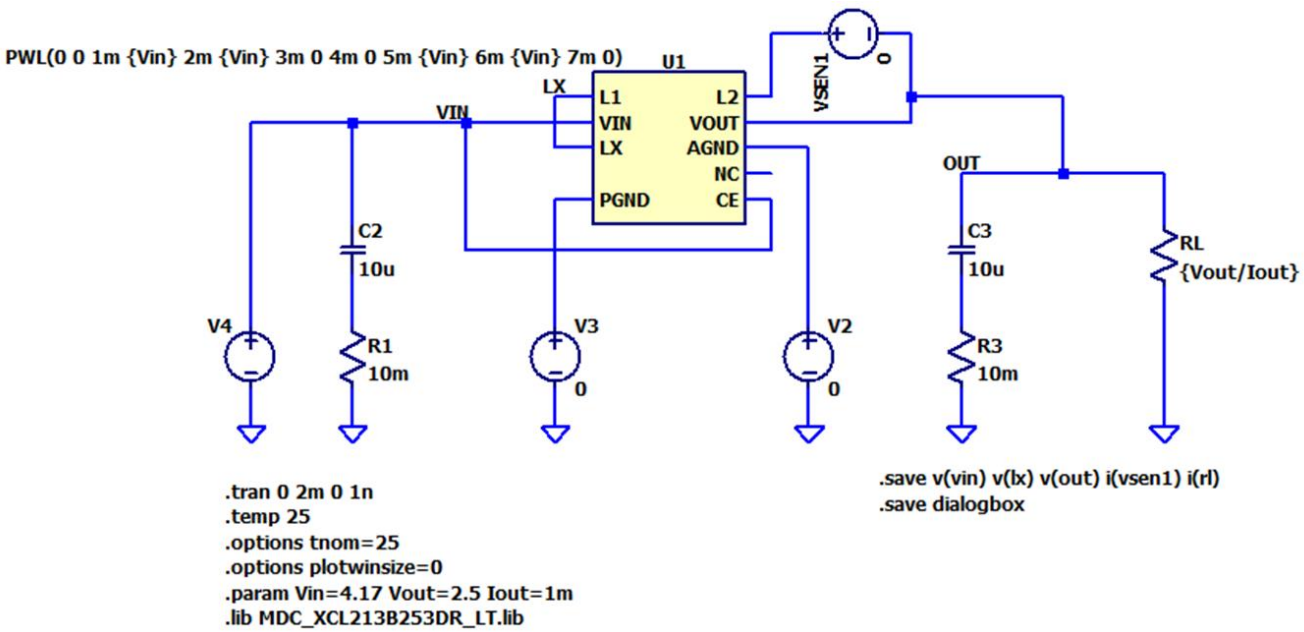


Simulation results are following.
Explanatory notes　　— : simulated

CE

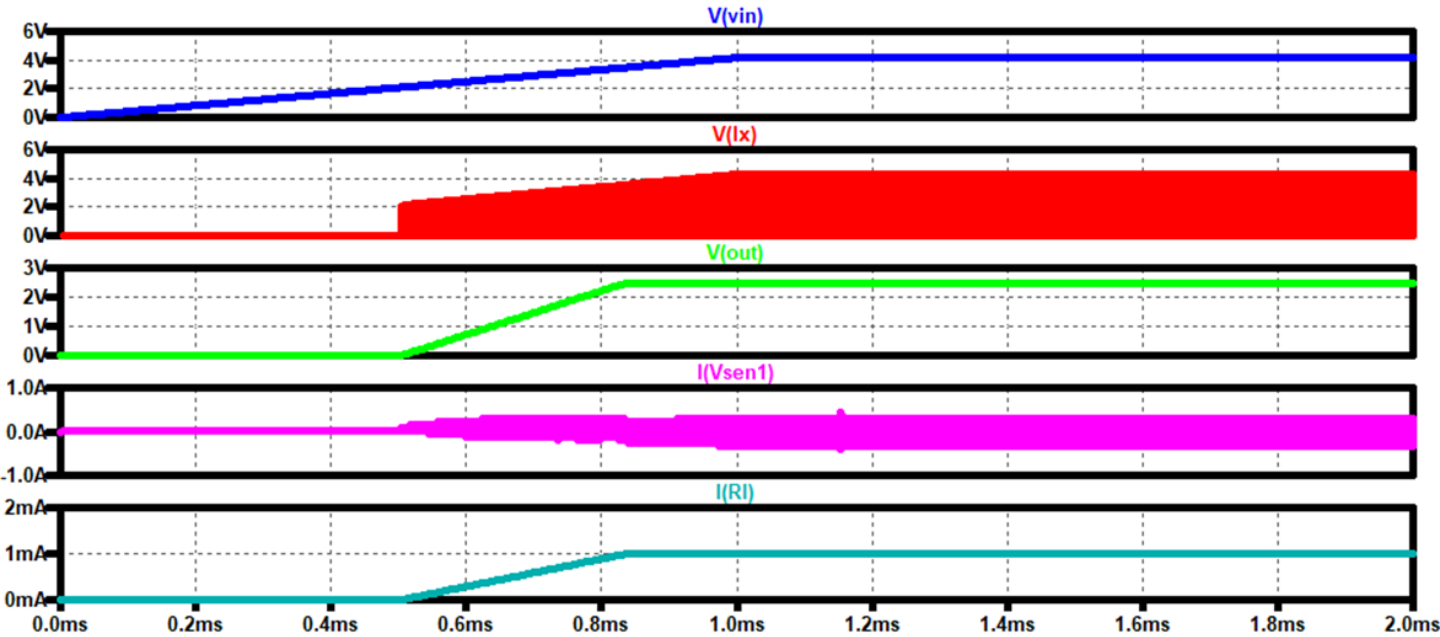


PWM Switching (Iout = 1.0mA) Testbench

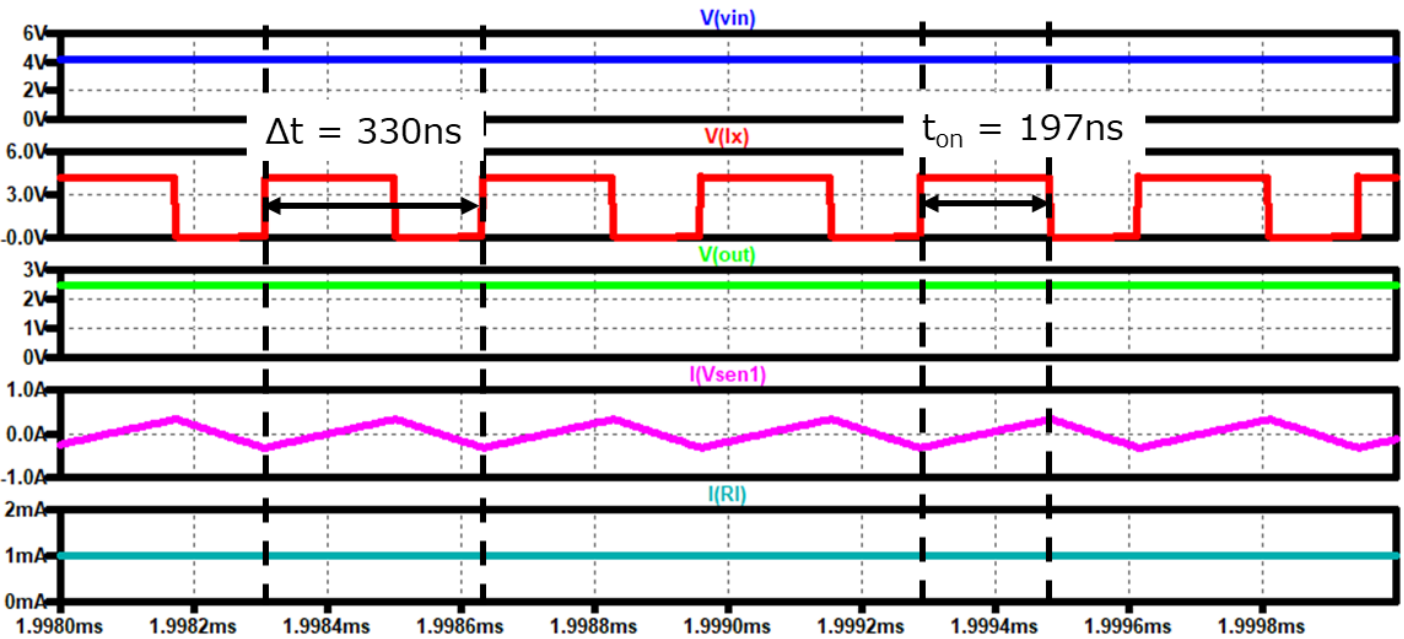


Simulation results are following.
Explanatory notes — : simulated

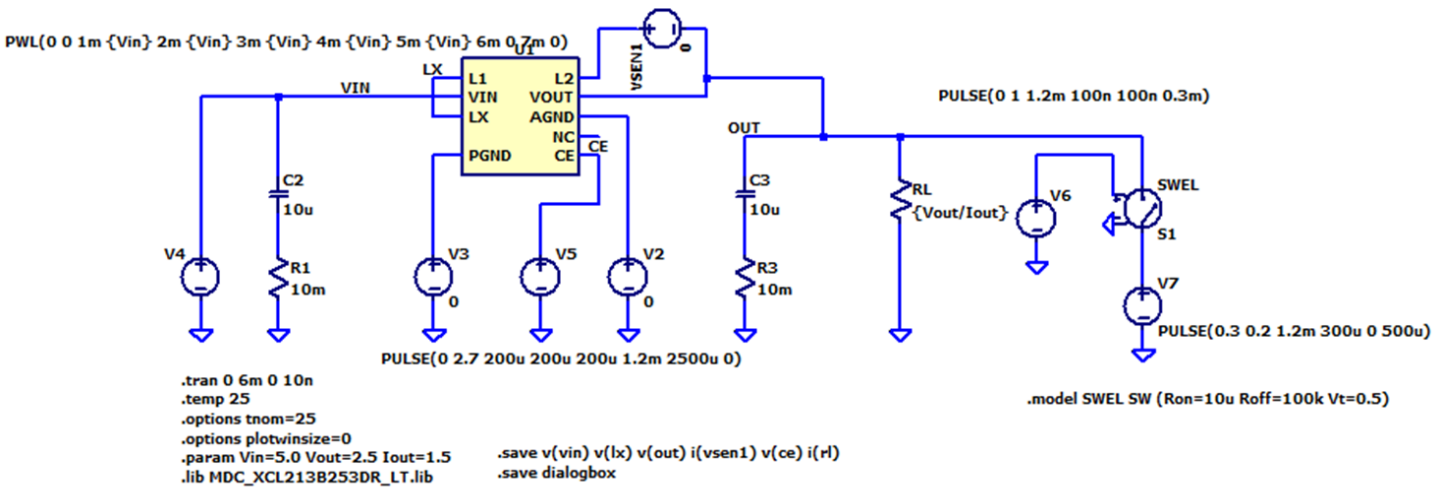
PWM Switching (0 – 2.0ms)



PWM Switching (1.998ms – 2.0ms)

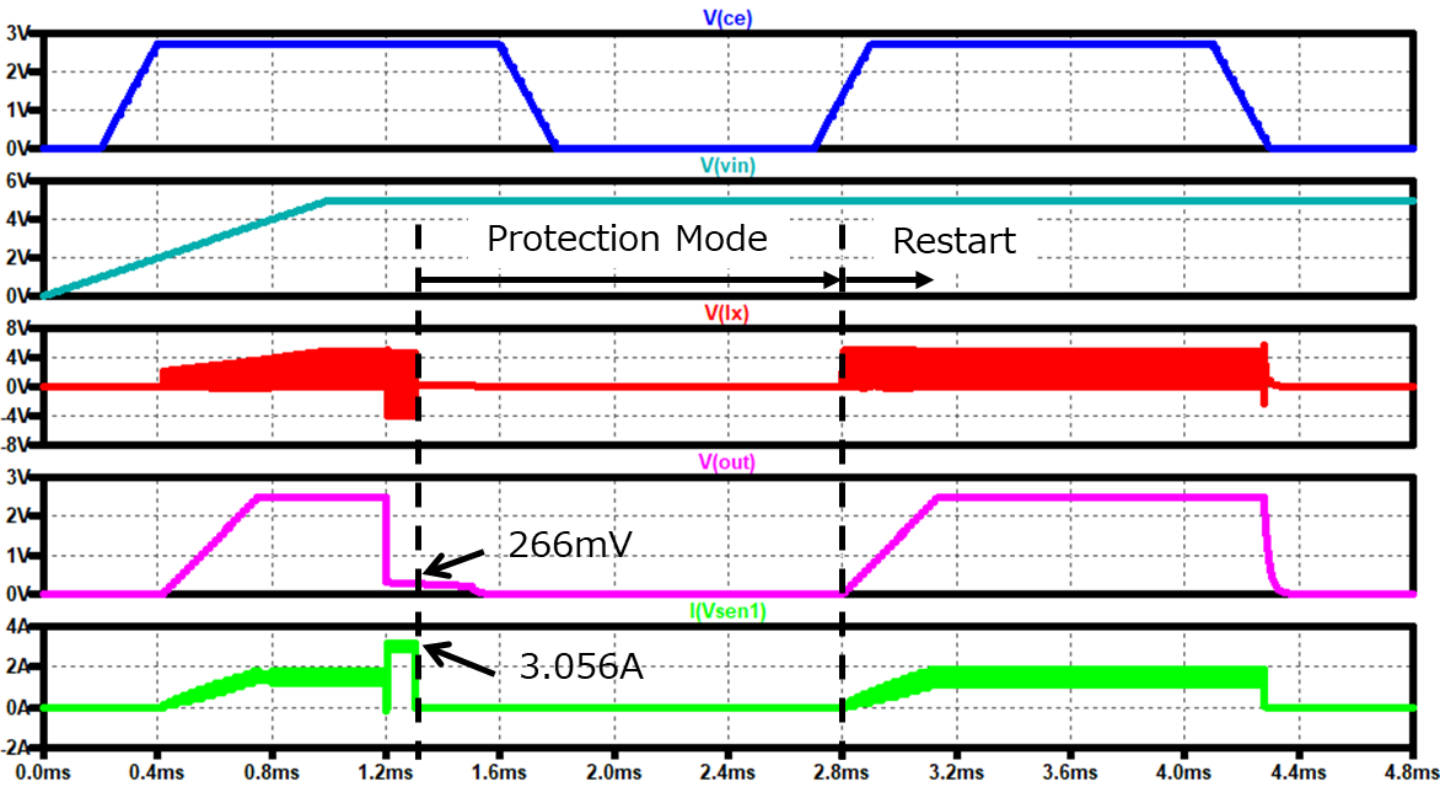


Short Protection(Latched) Testbench

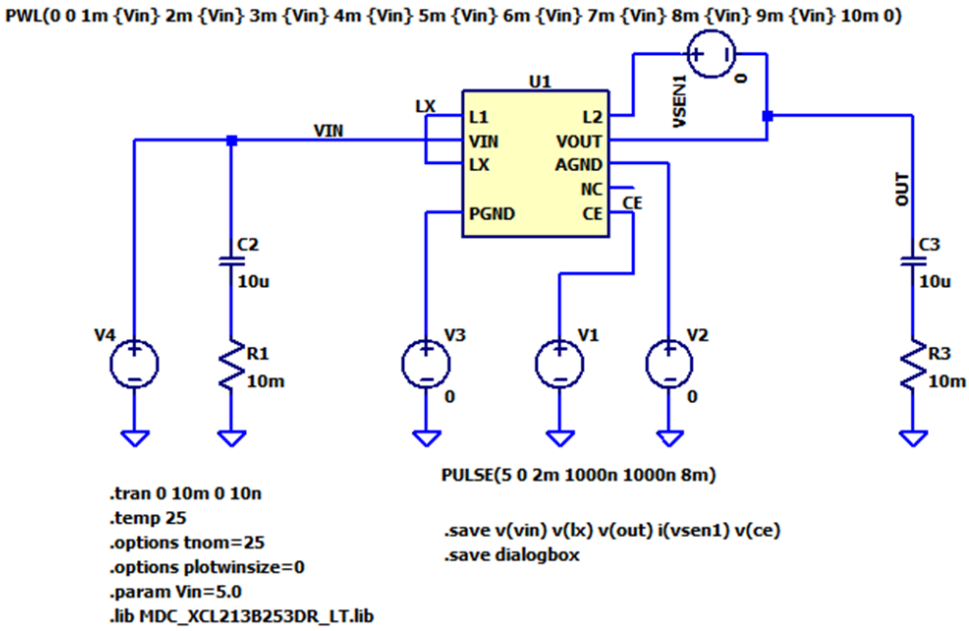


Simulation results are following.
Explanatory notes — : simulated

Short Protection(Latched)

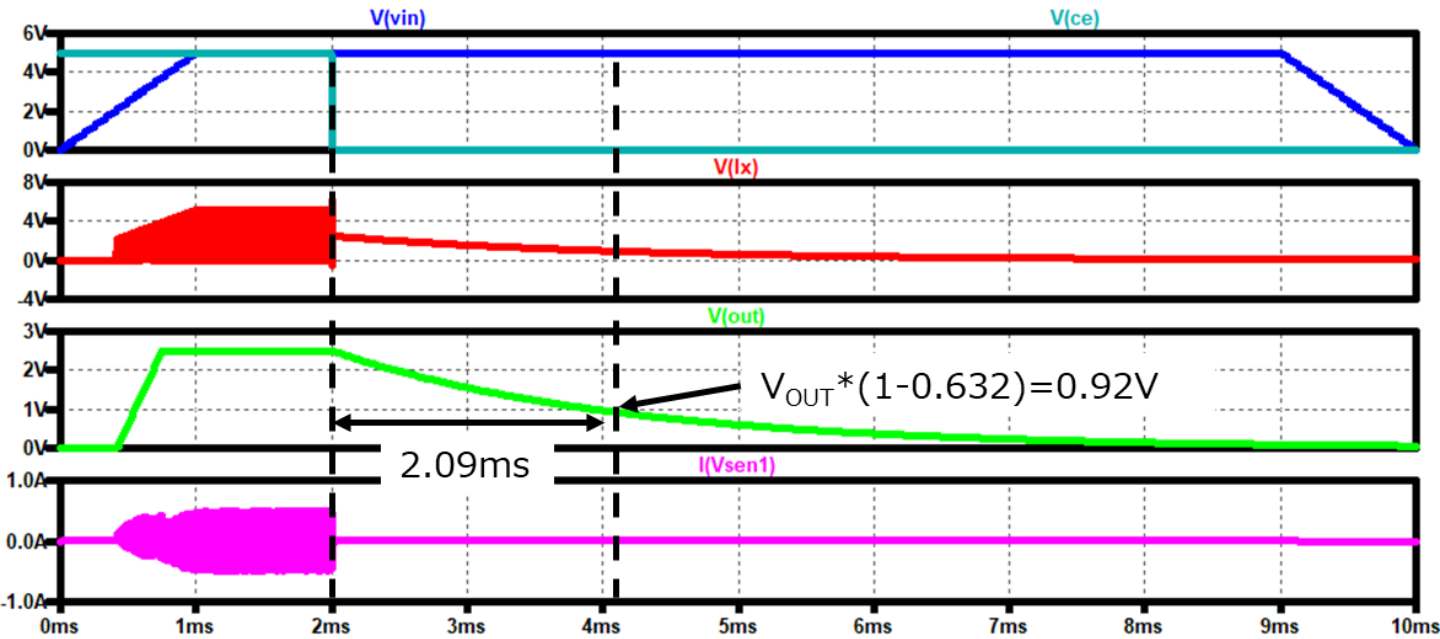


CL Highspeed Discharge Testbench



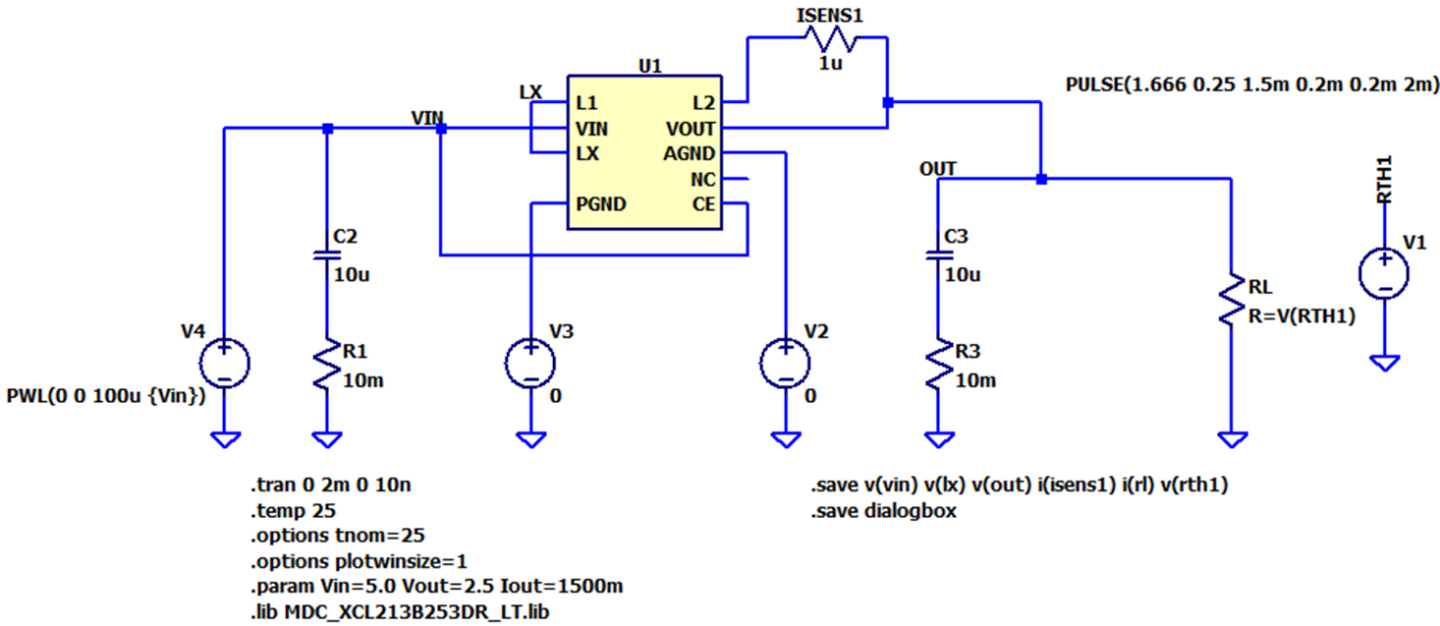
Simulation results are following.
Explanatory notes — : simulated

CL Highspeed Discharge



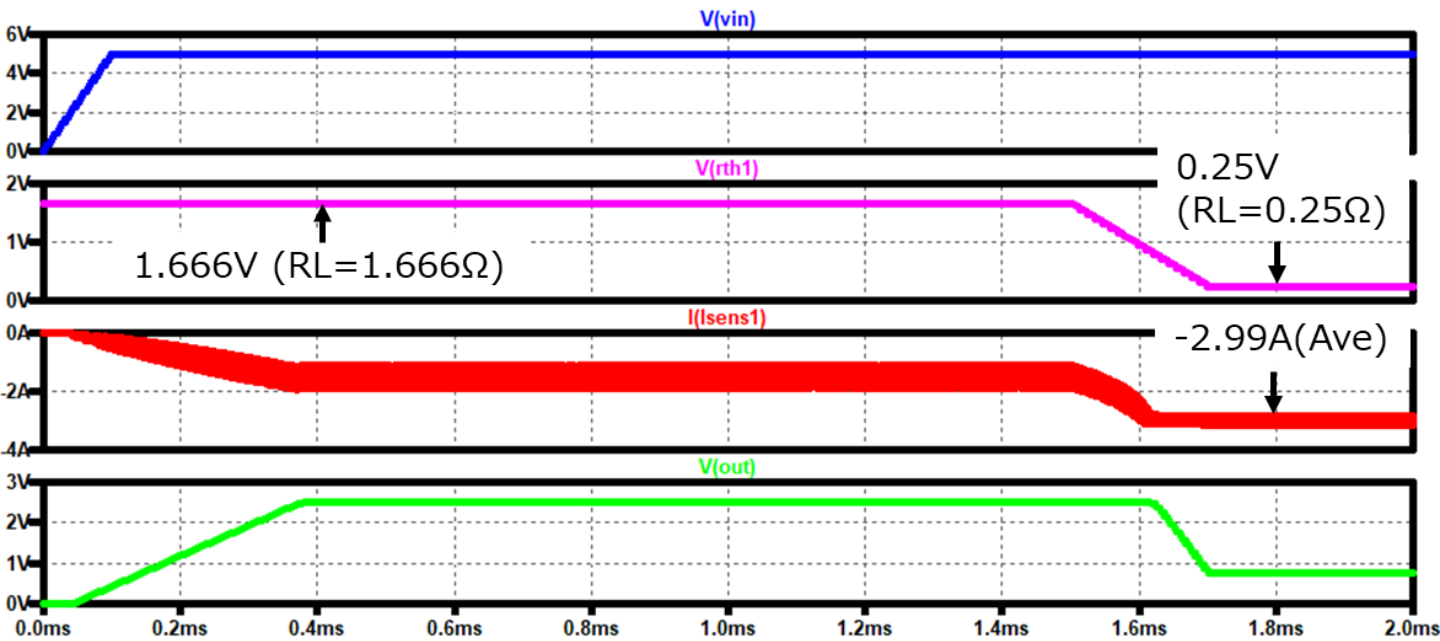
Discharge time	Value
Calculated	2.099ms

Current Limit Testbench



Simulation results are following.
Explanatory notes — : simulated

Current Limit



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