LTspice Model
Inductor Built-in Step-Down DC/DC Converters
TOREX SEMICONDUCTOR LTD.
XCL205A333CR-G

Model Information

Model   A macro model
Call Name   MDC_XCL205A333_LT
Pin Assign   1:Lx 2:Vss 3:Vout/FB 4:CE/MODE 5:Vss 6:VIN 7:L1 8:L2
File List   Model Library   MDC_ XCL205A333CR-G _LT01.lib
                  Model Report   MDC_ XCL205A333CR-G _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   JTR2801-015
       ●Product name   XCL205A333CR-G
       ●Company name   TOREX

     [Characteristics listed]
       ●Characteristics   Fixed PWM control
                              Current Limit
                              UVLO Protection
                              Soft Start
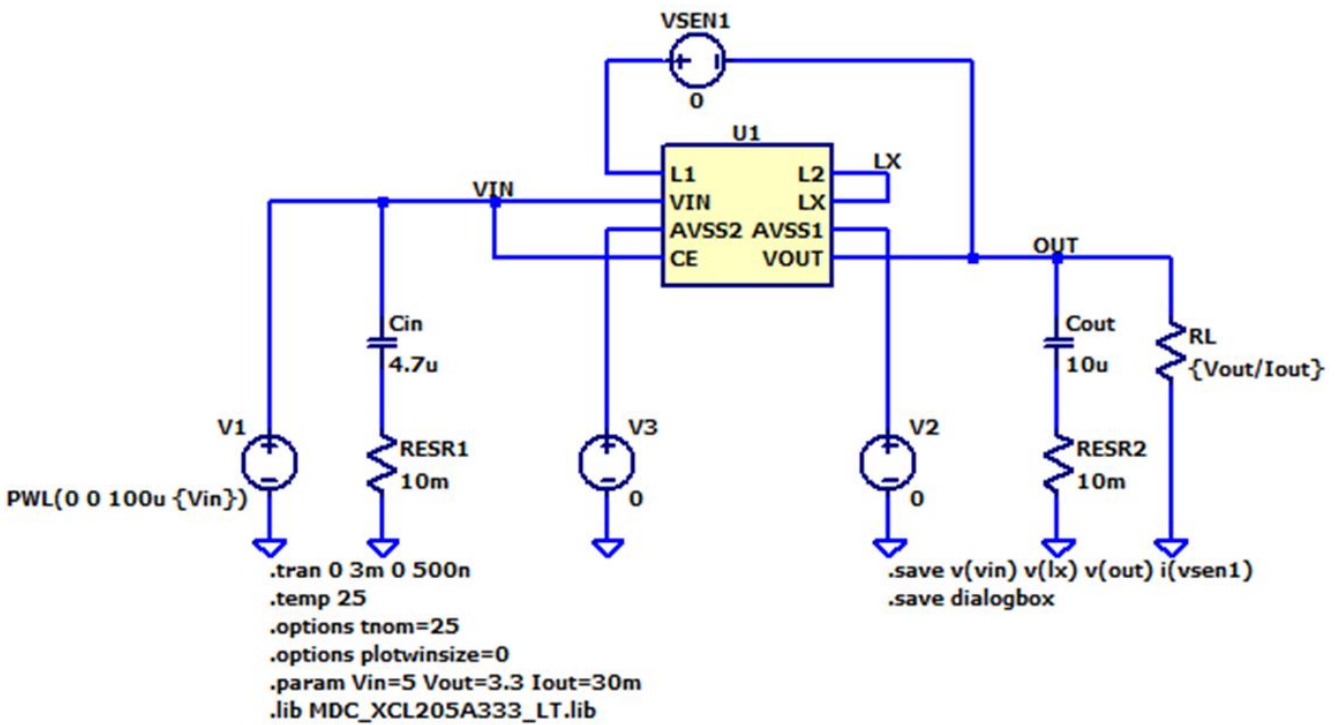   CE/MODE Pin Function

Simulation Condition

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

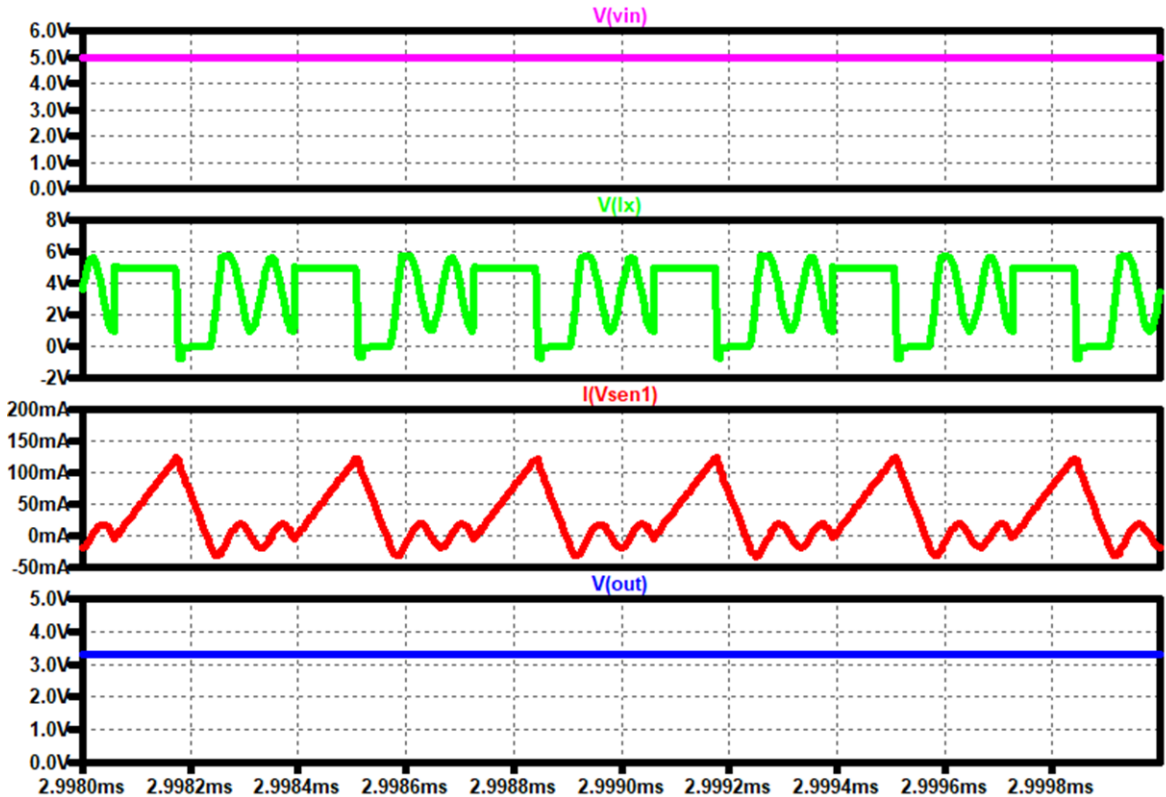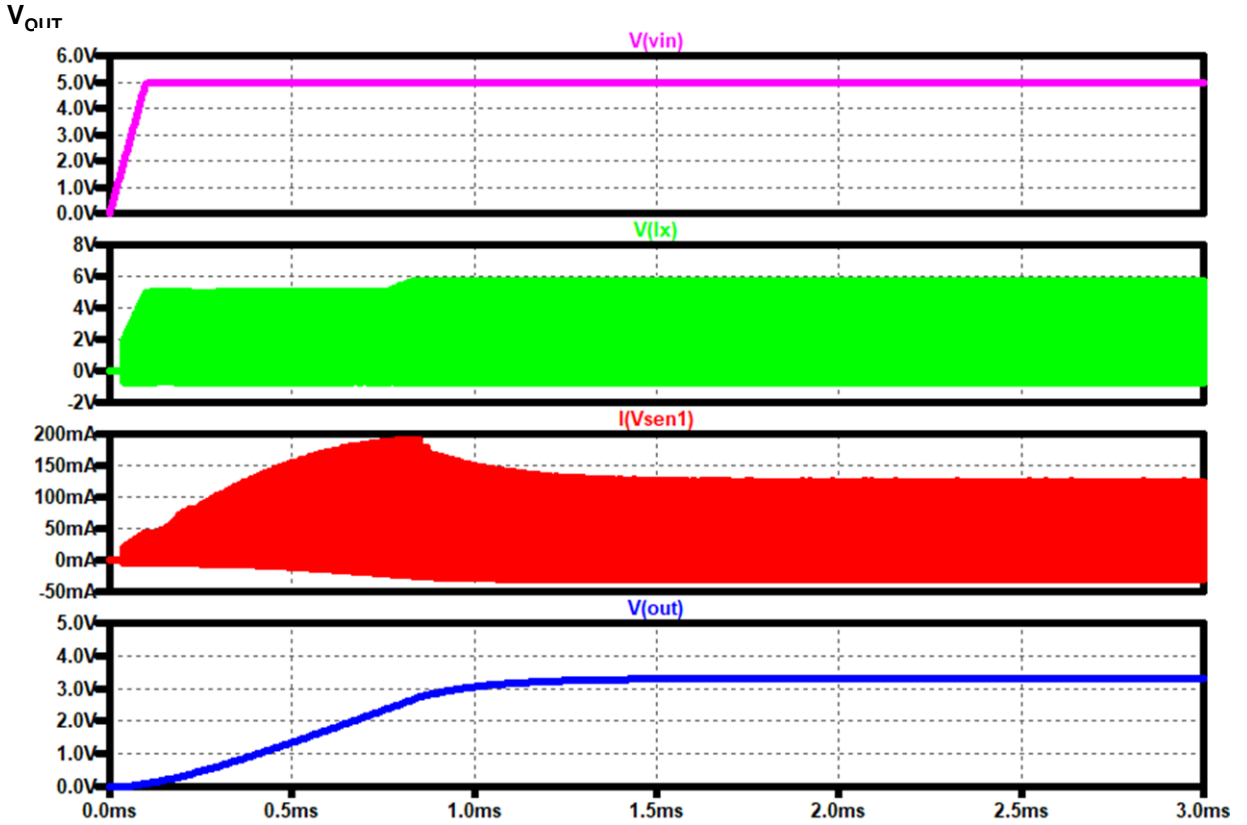| Item	Condition	Unit
Temperature	25	deg C

2

Model Functions Table

Functions	Implemented
Fixed PWM control	O
Current Limit	O
UVLO Protection	O
Soft Start	O
CE/MODE Pin Function	O

V$_{OUT}$ Testbench

Referred to Data Sheet


```
.tran 0 3m 0 500n
.temp 25
.options tnom=25
.options plotwinsize=0
.param Vin=5 Vout=3.3 Iout=30m
.lib MDC_XCL205A333_LT.lib
```

```
.save v(vin) v(lx) v(out) i(vsen1)
.save dialogbox
```

Simulation results are following.
Explanatory notes — : simulated

V_{OUT}

5

CE Function Testbench

Referred to Data Sheet

VSEN1

0

U1

L1	L2	LX
VIN	LX
AVSS2	AVSS1
CE	VOUT

VIN

CE

V4

PWL(0 0 0.1m {Vin} 2m {Vin} 2.1m 0 3m 0 3.1m {Vin})

Cin
4.7u

OUT

CL1
10u

RL
{Vout/Iout}

V1

RESR1
10m

V3

0

V2

0

RESR2
10m

PWL(0 0 0.1m {Vin})

.tran 0 4m 0 200n
.temp 25
.options tnom=25
.options plotwinsize=0
.param Vin=5 Vout=3.3 Iout=30m
.lib MDC_XCL205A333_LT.lib

.save v(vin) v(lx) v(out) i(vsen1) v(ce)
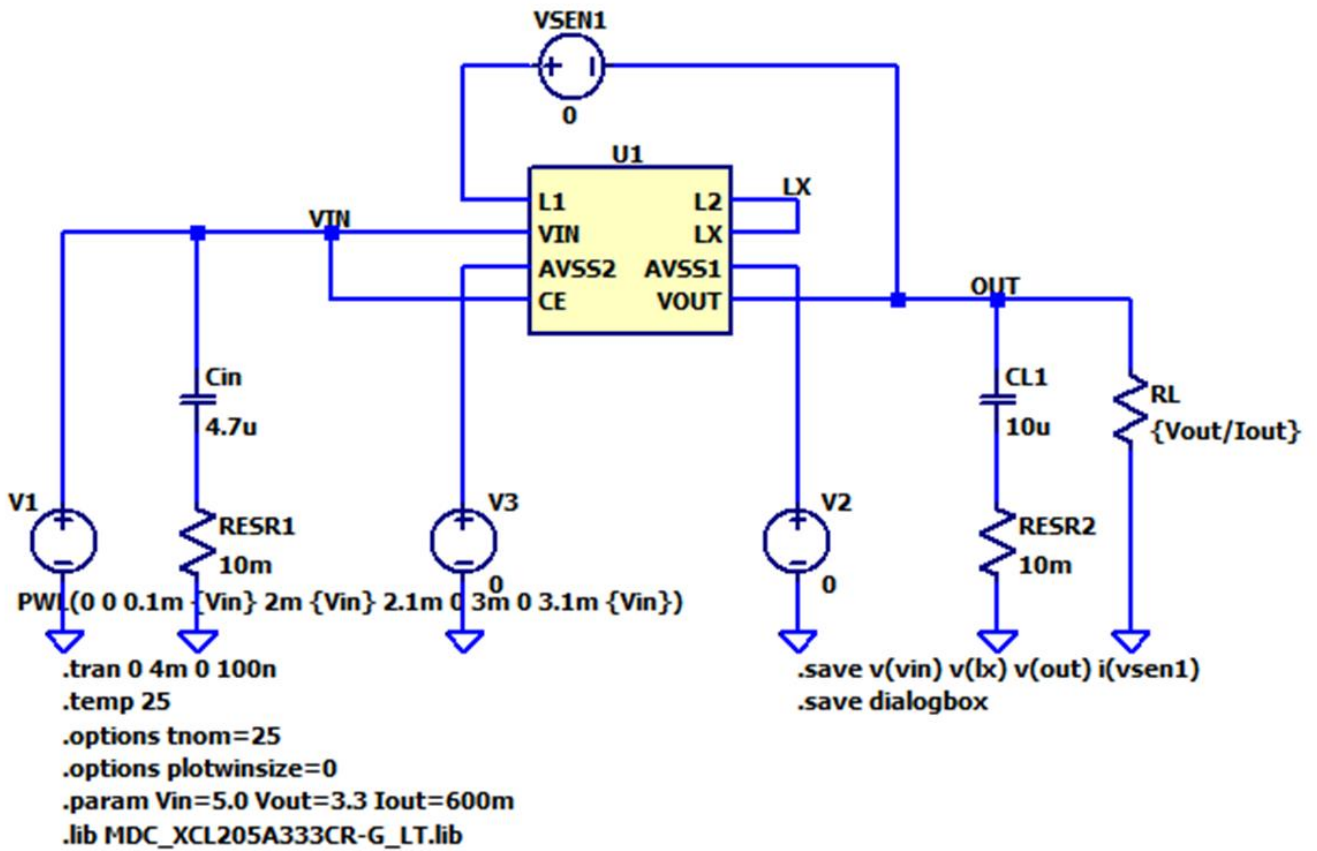.save dialogbox

Simulation results are following.
Explanatory notes　　— : simulated

CE Function
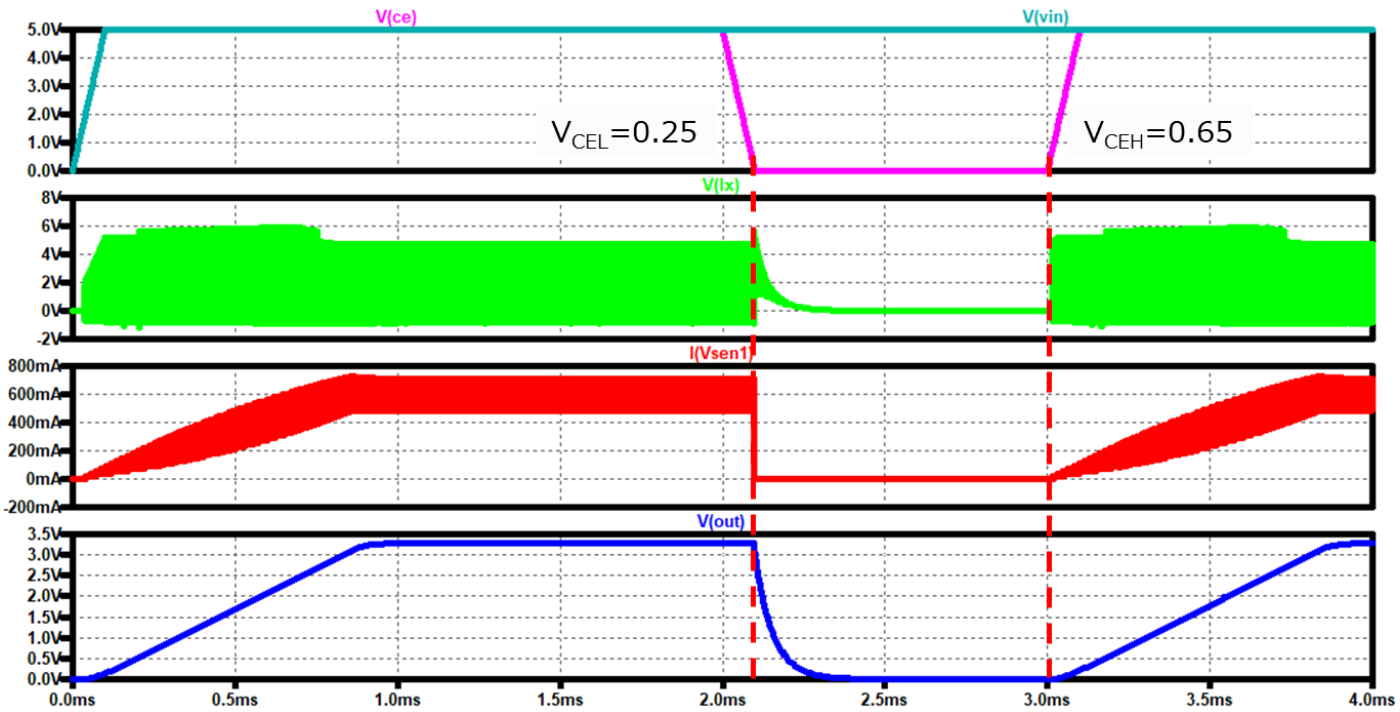
UVLO Protection Testbench

Referred to Data Sheet

VSEN1

U1

L1   L2   LX
VIN   LX
AVSS2 AVSS1
CE   VOUT

VIN

OUT

Cin
4.7u

CL1
10u

RL
{Vout/Iout}

V1

RESR1
10m

V3

V2

RESR2
10m

PWL(0 0 0.1m {Vin} 2m {Vin} 2.1m 0 3m 0 3.1m {Vin})

.save v(vin) v(lx) v(out) i(vsen1)
.save dialogbox

.tran 0 4m 0 100n
.temp 25
.options tnom=25
.options plotwinsize=0
.param Vin=5.0 Vout=3.3 Iout=600m
.lib MDC_XCL205A333CR-G_LT.lib

Simulation results are following.
Explanatory notes　　― : simulated

UVLO Protection

$V_{UVLO}=1.4$　　$V_{IN}=1.8$
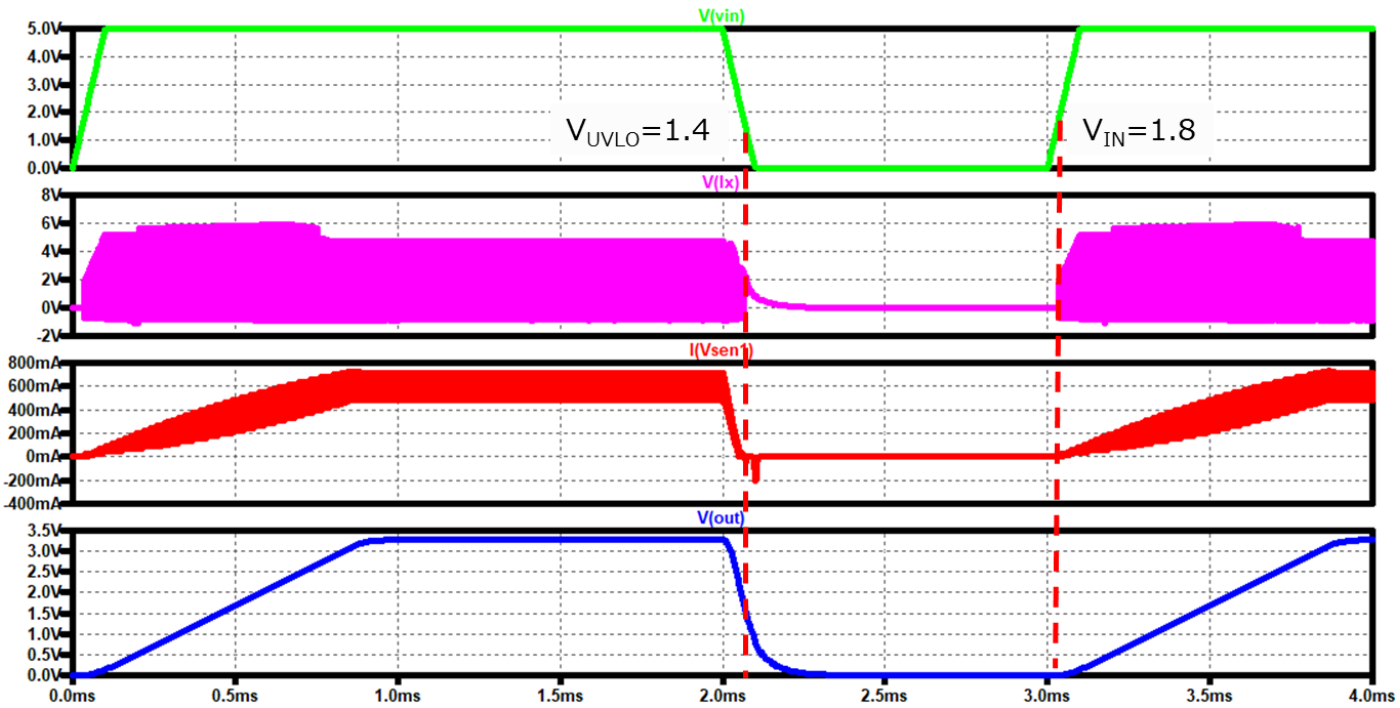
Soft Start Testbench

Referred to Data Sheet

```
VSEN1
  (+  )
    0
```

```
          U1
VIN    L1      L2    LX
       VIN     LX
       AVSS2   AVSS1
VCE    CE      VOUT    OUT
```

```
Cin                    Cout        RL
4.7u                   10u         {Vout/Iout}
```

```
V1        V4      V3           V2
{Vin}     RESR1                RESR2
          10m                  10m
                    0                0
```

PWL(0 0 100u {Vce})

.tran 0 2m 0 200n
.temp 25
.options tnom=25
.options plotwinsize=0
.param Vin=5 Vout=3.3 Iout=1m Vce=5
.lib MDC_XCL205A333CR-G_LT.lib

.save v(vin) v(ce) v(lx) v(out) i(vsen1)
.save dialogbox
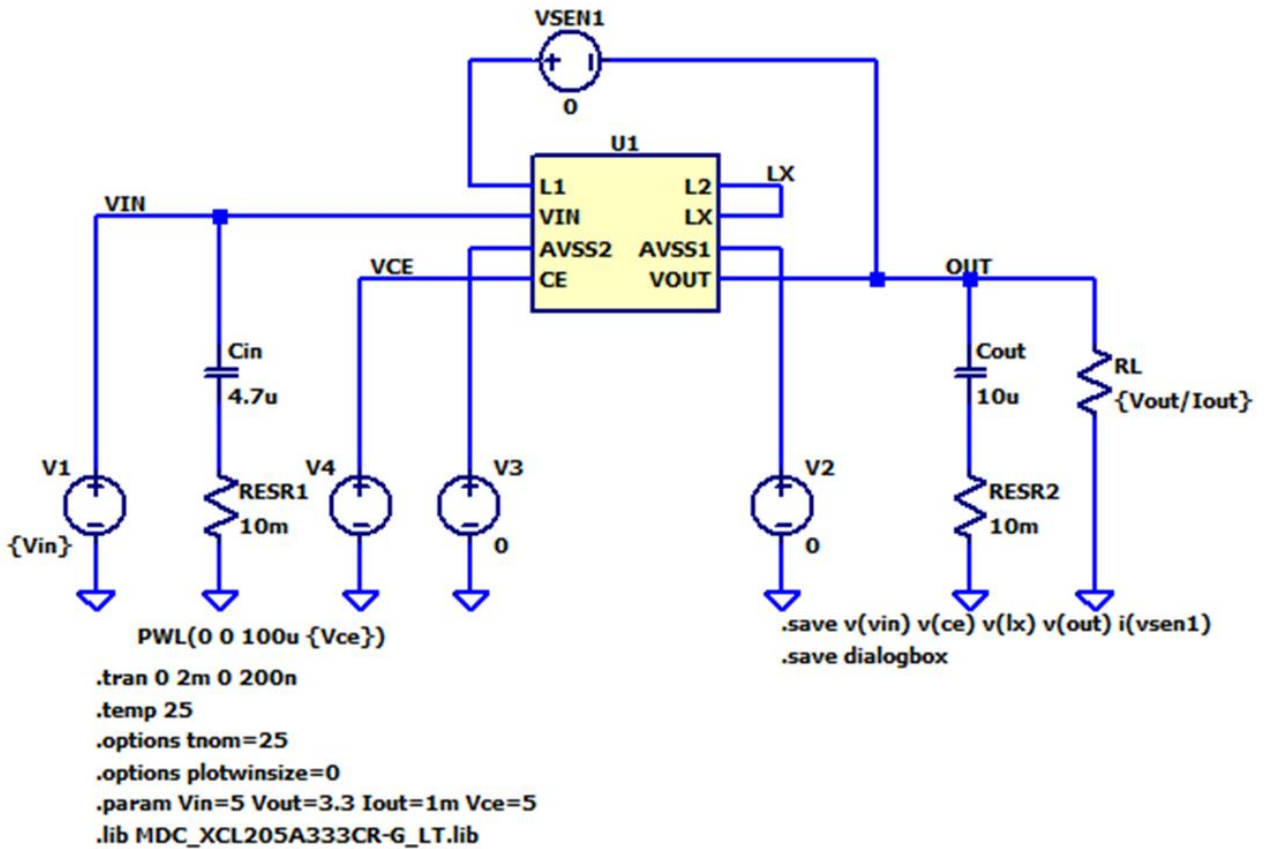
Simulation results are following.
Explanatory notes ー : simulated

Soft Start
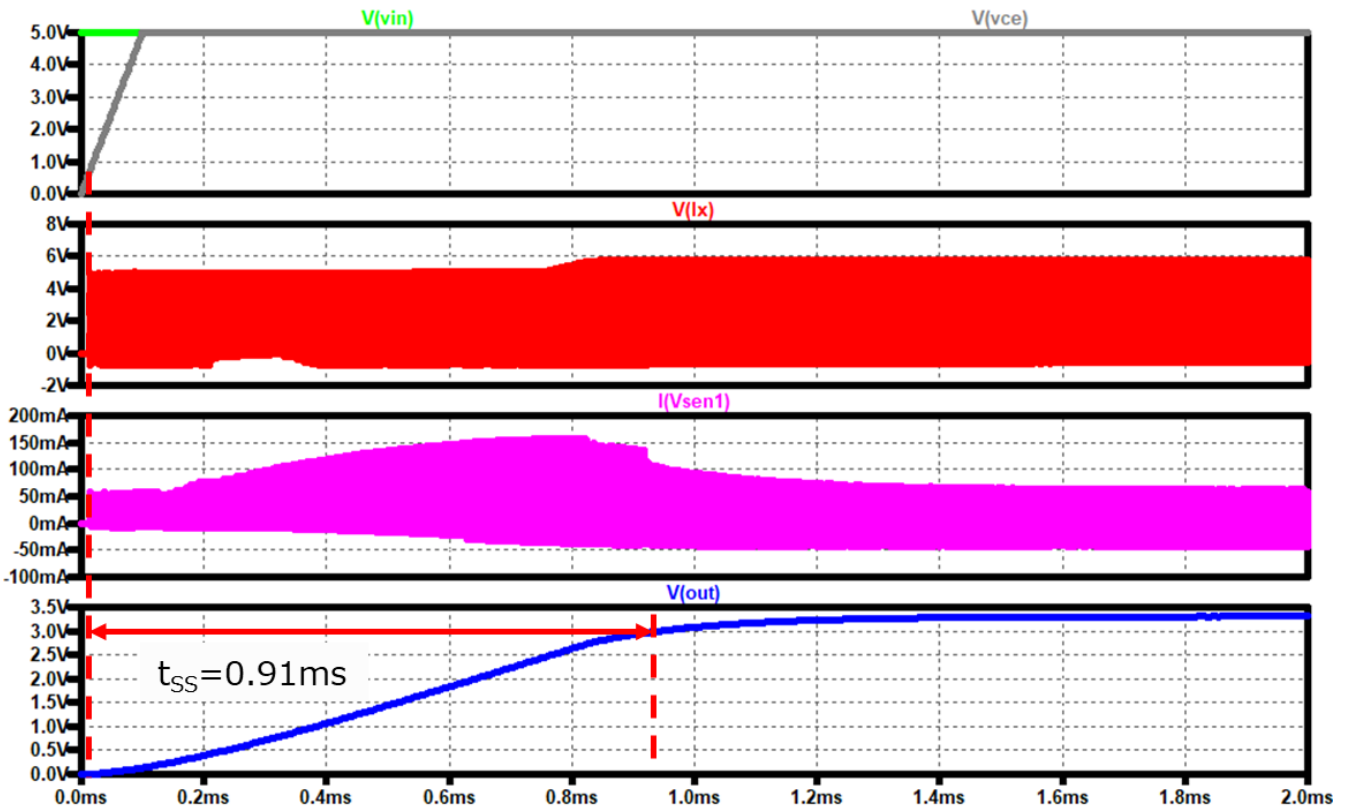
DISCLAIMER

1. This SPICE (Simulation Program with Integrated Circuit Emphasis) model and its content (the "Contents") are copyright of MoDeCH Inc. All rights reserved. Any redistribution or reproduction of any or all part of the Contents in any form is prohibited without express written permission made by MoDeCH Inc.

2. MoDeCH Inc. as licensor (the" Licensor") hereby grants to you, as licensee (the "Licensee"), a non-exclusive, non-transferable license to use the Contents as long as you abide by the terms and conditions of this DISCLAIMER.

3. The Licensee is not authorized to sell, loan, rent and redistribute or license the Contents in whole or in part, or in modified form, to anyone.

4. The Licensor shall in no way be liable to the Licensee or any third party for any loss or damage (including ,but not limited to, lost profits, or other incidental, consequential, or punitive damages), however caused (including through negligence) which may be directly or indirectly suffered from, arising out of, or in connection with, any use of the Contents .

5. Notwithstanding anything contained in this DISCLAIMER, in no event shall Licensor be liable for any claims, damages or loss which may arise from the modification, combination, operation or use of the Contents with the Licensee's computer programs.

6. The Licensor does not warrant that the Contents will function in any environment.

7. The Contents may be changed or updated without notice. MoDeCH Inc. may also make improvements and/or changes in the products, pricing and/or the programs related to the Contents at any time without notice.

MoDeCH

Modeling Design Technology

MoDeCH Inc.

Head Office
Location: 5-15 Yokoyama-cho, Hachioji-Shi, Tokyo 192-0081, Japan
Tel:+81-42-656-3360
E-Mail:model-on-support@modech.co.jp
URL:http://www.modech.com/en/

Feb 26,2021
Rev. 1.0