LTspice Model
PWM Controller
TEXAS INSTRUMENTS
LM5021-1

Model Information

Model A macro model
Call Name MDC_LM5021-1_LT
Pin Assign 1:COMP 2]VIN 3:VCC 4:OUT 5:GND 6: CS 7:RT 8:SS
File List Model Library MDC_LM5021--1.lib
Model Report MDC_LM5021-1.pdf(this file)

Verified Simulator Version LTspice XVII

Note Please set Compression OFF in Control Panel-Compression

References

The information which was used for modeling is as follow:

[Data Sheet]
- ●Date/Version SNVS359E –MAY 2005–REVISED DECEMBER 2014
- ●Product name LM5021
- ●Company name TEXAS INSTRUMENTS

[Characteristics listed]
- ●Characteristics
  - Transient
  - SoftStat
  - Frequency-RT
  - External Clock

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

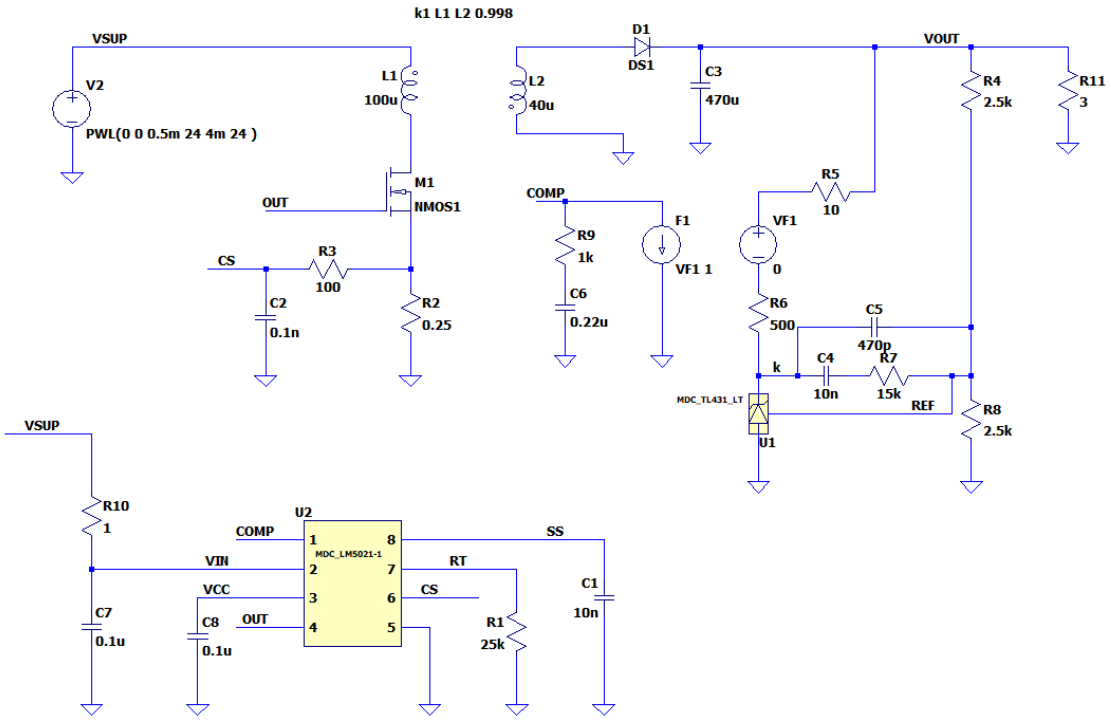
Model Functions Table

Functions	Implemented
Single Resistor Programmable Oscillator	○
Synchronizable Oscillator	○
Adjustable Soft-Start	○
Undervoltage Lockout (UVLO) with Hysteresis	○
Cycle-by-Cycle Overcurrent Protection	○
Skip Cycle Mode for Low Standby Power	○
Hiccup Mode for Continuous Overload Protection	×

Transient Testbench

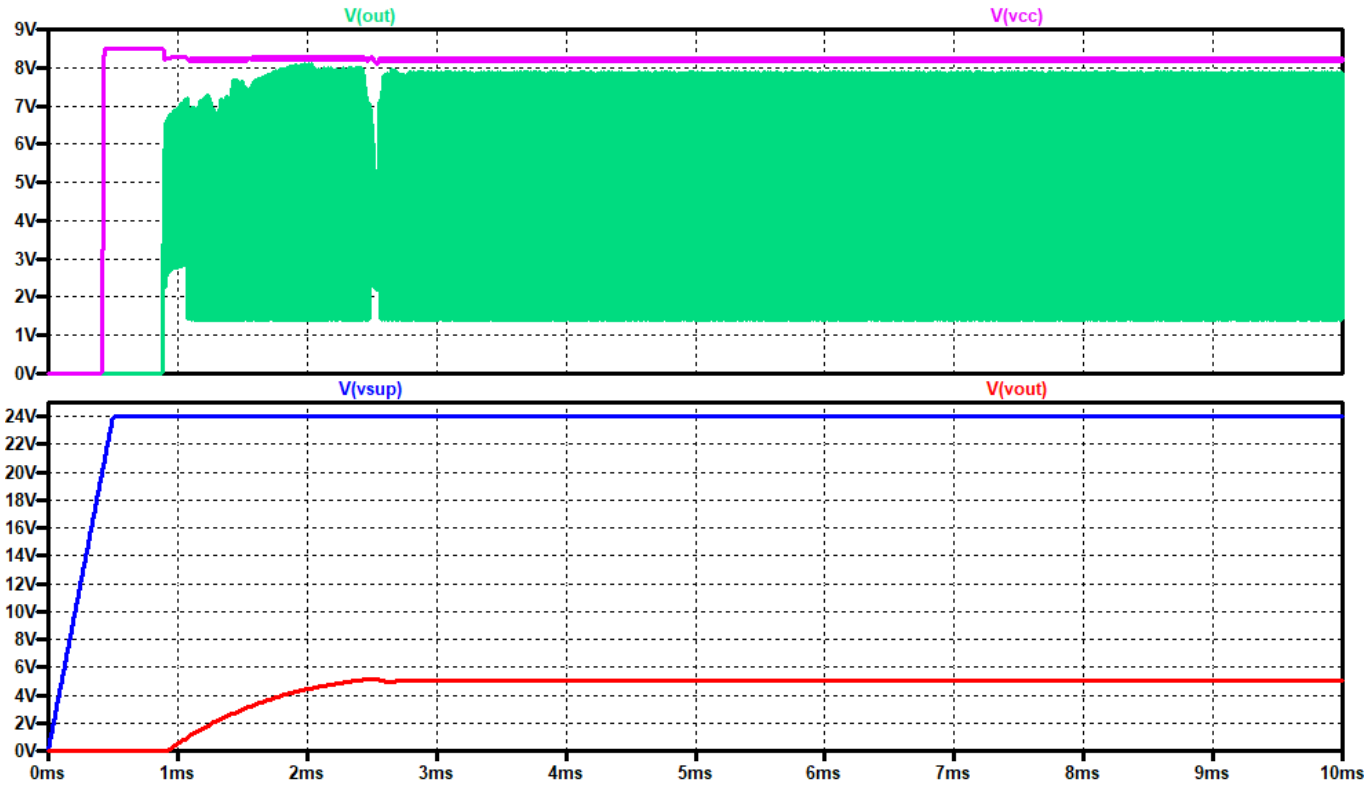
Referred to Data Sheet

```
.Model NMOS1 NMOS
+ Level=3
+ Gamma=0
+ Tox=100n
+ Kp=20u
+ W=.3
+ L=2u
+ Vto=2.8
+ Is=100n
+ Cgso=1000p
+ Cbd=2000p
+ Cbs=2000p

.MODEL DS1 D
+ IS=10n
+ RS=10m
+ N=1.0
+ BV=1000
+ IBV=100m
+ CJO=10p
+ VJ=0.7
+ M=0.33
+ TT=2n
+ EG=0.7
+ XTI=2

.OPTION TNOM=25
.TEMP 25

.tran 0 10m 0 10u
```



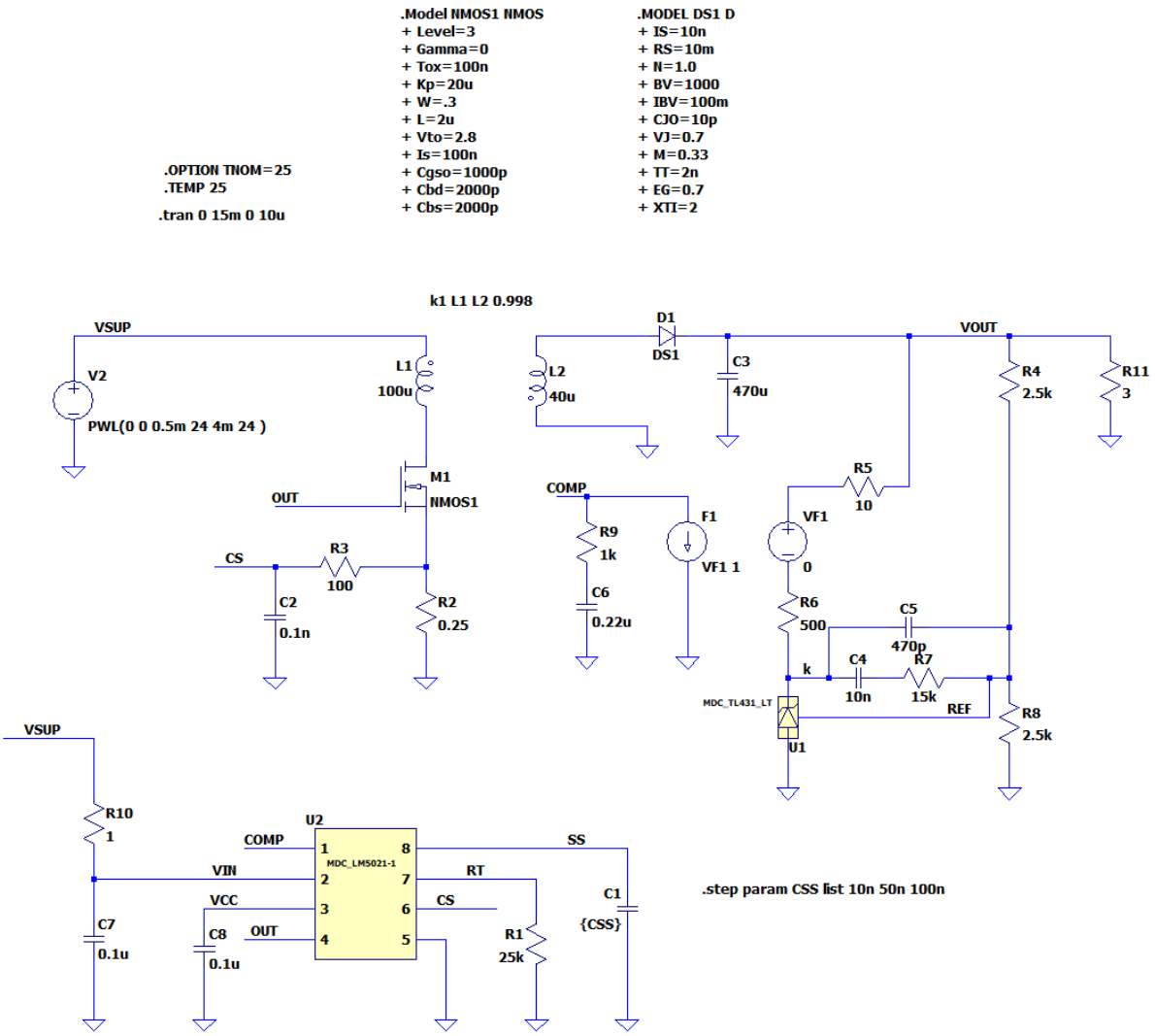
Simulation results are following.
Explanatory notes — : simulated

Transient



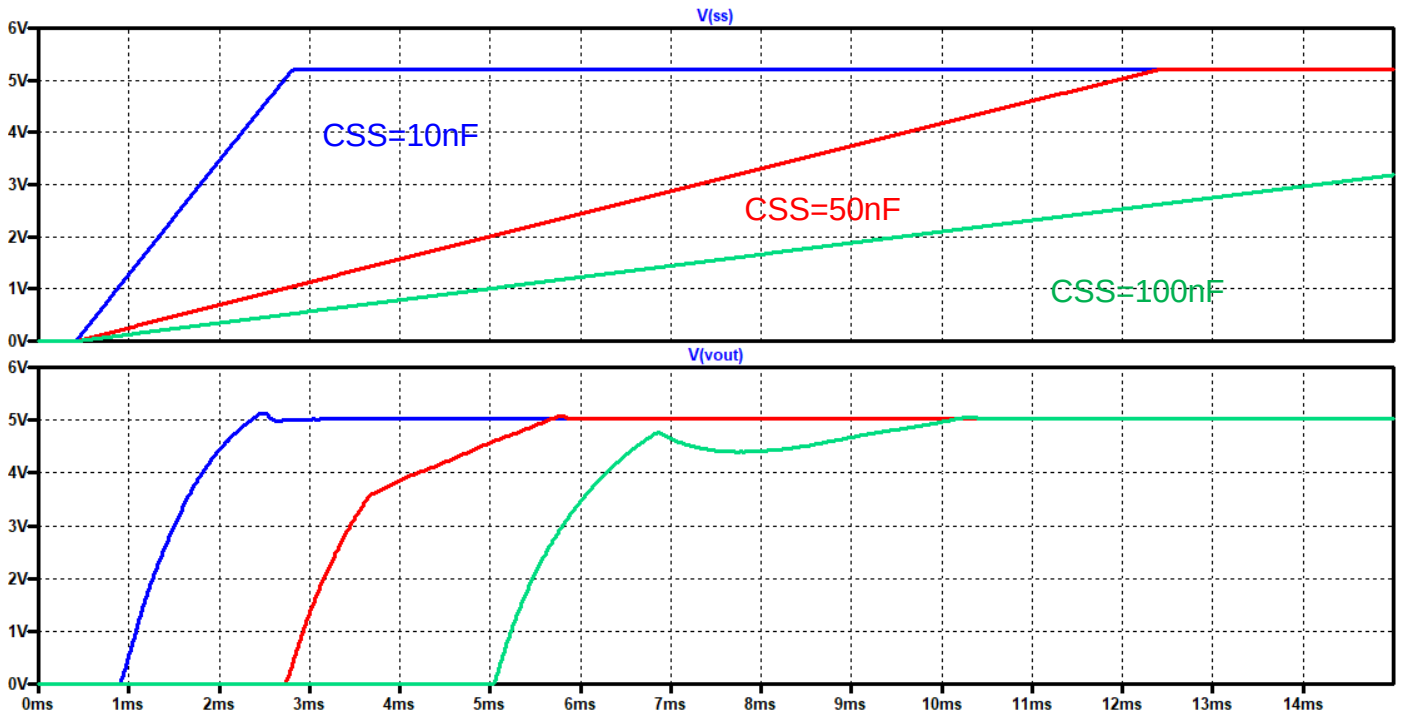
Soft Start Testbench

Referred to Data Sheet



Simulation results are following.
Explanatory notes — : simulated

Soft Start



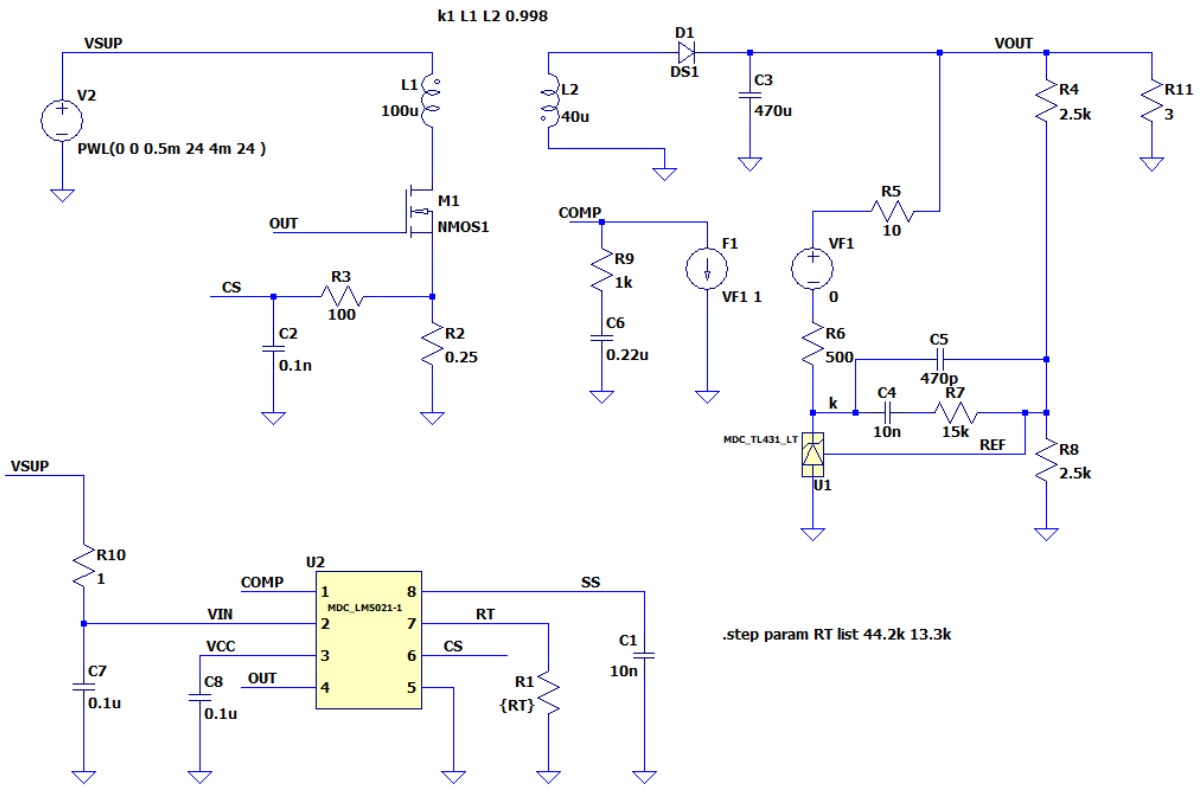
Freq-RT Testbench

Referred to Data Sheet

```
.OPTION TNOM=25
.TEMP 25

.tran 0 5m 0 10u
```

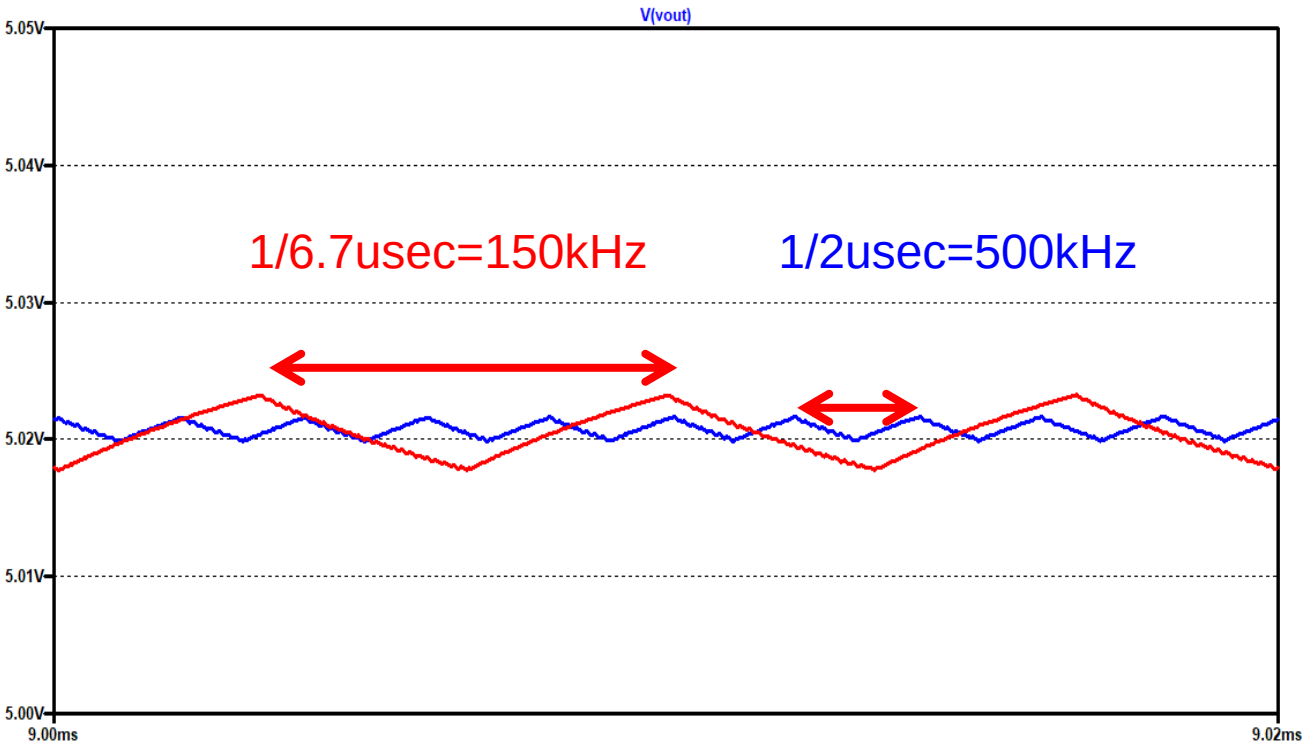
```
.Model NMOS1 NMOS
+ Level=3
+ Gamma=0
+ Tox=100n
+ Kp=20u
+ W=.3
+ L=2u
+ Vto=2.8
+ Is=100n
+ Cgso=1000p
+ Cbd=2000p
+ Cbs=2000p
```

```
.MODEL DS1 D
+ IS=10n
+ RS=10m
+ N=1.0
+ BV=1000
+ IBV=100m
+ CJO=10p
+ VJ=0.7
+ M=0.33
+ TT=2n
+ EG=0.7
+ XTI=2
```



Simulation results are following.
Explanatory notes — : simulated

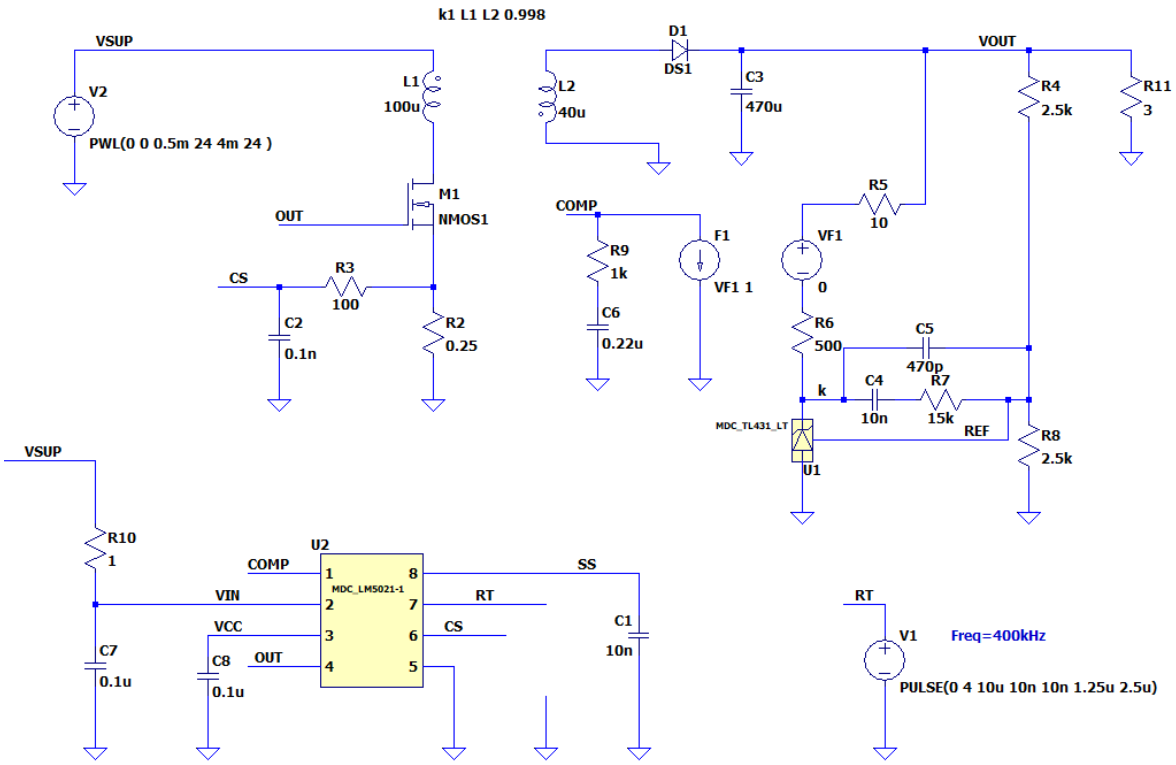
Freq-RT



External Clock Testbench

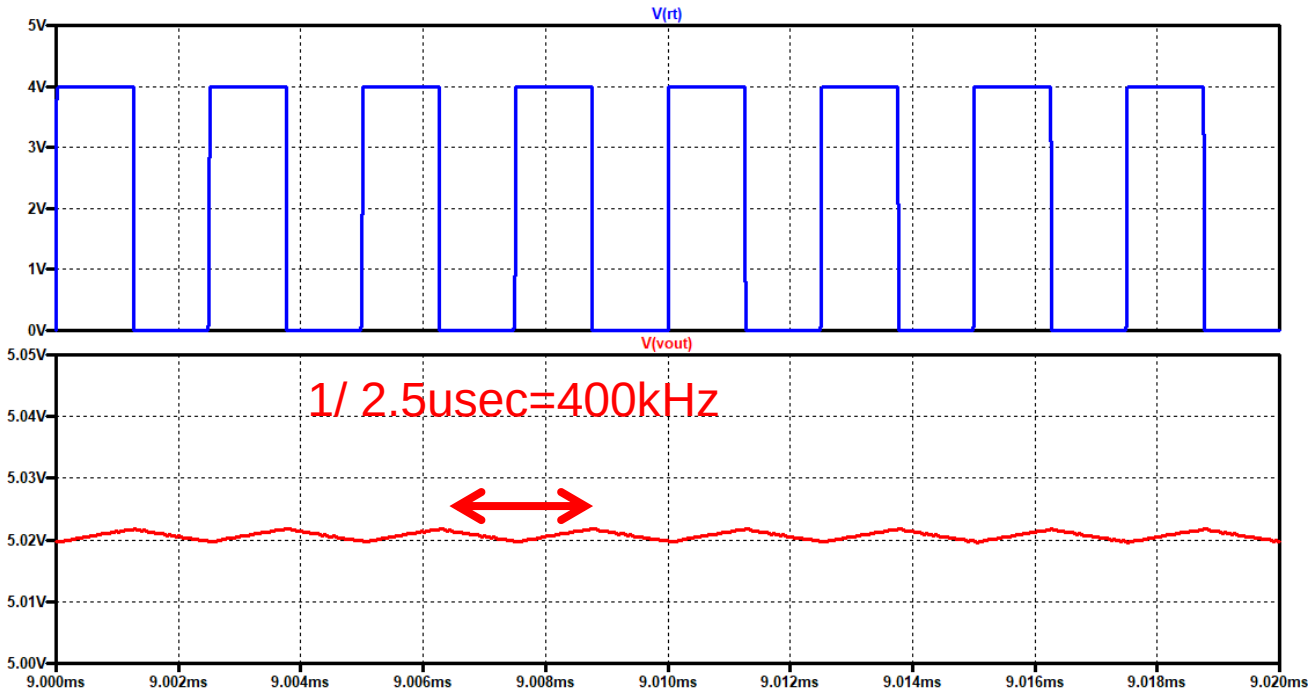
Referred to Data Sheet

```
.Model NMOS1 NMOS
+ Level=3
+ Gamma=0
+ Tox=100n
+ Kp=20u
+ W=.3
+ L=2u
+ Vto=2.8
+ Is=100n
+ Cgso=1000p
+ Cbd=2000p
+ Cbs=2000p

.MODEL DS1 D
+ IS=10n
+ RS=10m
+ N=1.0
+ BV=1000
+ IBV=100m
+ CJO=10p
+ VJ=0.7
+ M=0.33
+ TT=2n
+ EG=0.7
+ XTI=2

.OPTION TNOM=25
.TEMP 25

.tran 0 5m 0 10u
```



Simulation results are following.
Explanatory notes — : simulated

External Clock



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