

# PSpice Model

## High Speed Current Sensor IC

### Melexis

### MLX91216LDC-ACV-001-RE

#### Model Information

**Model** A macro model  
**Call Name** MDC\_MLX91216LDC-ACV-001-RE\_PS  
**Pin Assign** 1:VDEC 2:NC 3:GND 4:TEST 5:VDD 6:OUT 7:NC 8:NC 9:IP 10:IN  
**File List** Model Library MDC\_MLX91216LDC-ACV-001-RE\_PS01.lib  
 Model Report MDC\_MLX91216LDC-ACV-001-RE\_PS.pdf(this file)

**Verified Simulator Version** PSpice version 17.2

#### References

The information which was used for modeling is as follow:

[Data Sheet]

- Date/Version Rev.002 / 02-Apr-2020
- Product name MLX91216
- Company name Melexis

[Characteristics listed]

- Characteristics
  - Current to Tesla
  - Supply Current
  - Output Impedance
  - Under-voltage detection
  - Clamped Output Level
  - Power on Delay
  - Step Response Time

#### 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

Note

① Each parameters need to be defined in Symbol.

Double clicking on the symbol and describe each parameter in the PSpice Template as follows (Figure 1.).

```
X^@REFDES %VDEC %NC %GND %TEST %VDD %OUT %NC %NC %IP %IN @MODEL PARAMS:
?Sensitivity|Sensitivity=@Sensitivity||Sensitivity=30|
?CLAMP_LEVEL|CLAMP_LEVEL=@CLAMP_LEVEL||CLAMP_LEVEL=0| . . . . .
```

Add a new property and display the parameter name and value on the schematic (Figure 2.).

This allows you to edit this parameter value on the schematic by double clicking on the property (Figure 3. ).

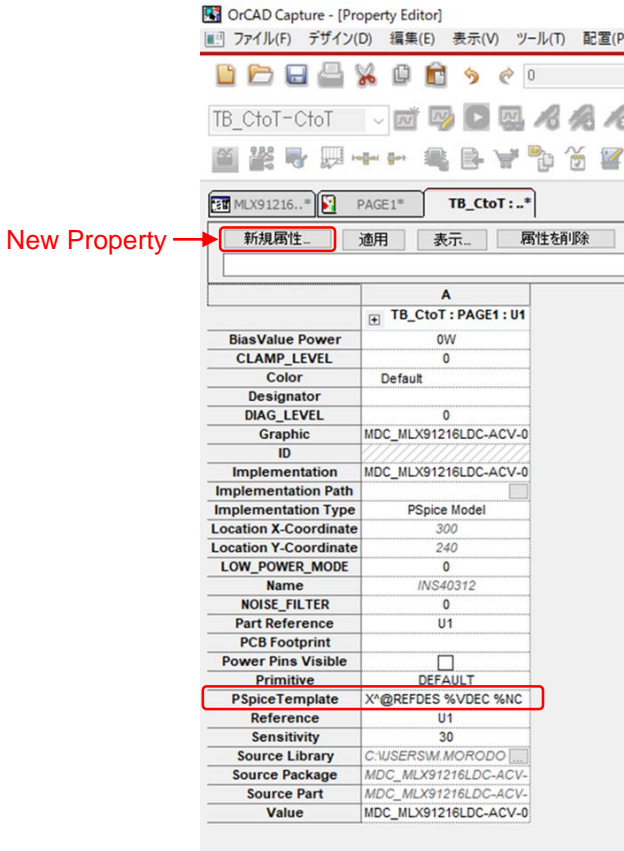


Figure 1.

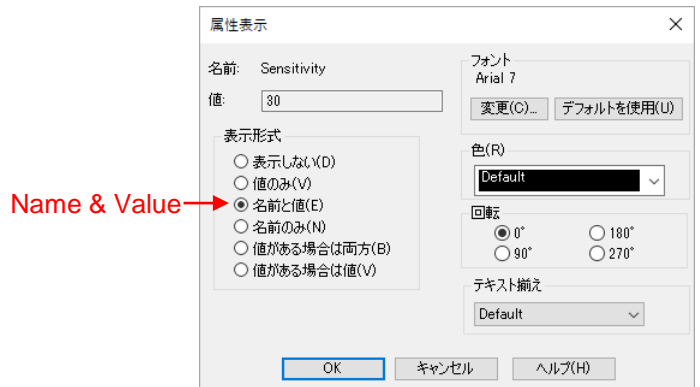
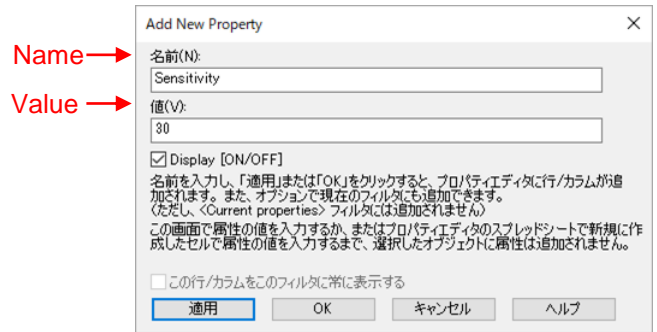


Figure 2.

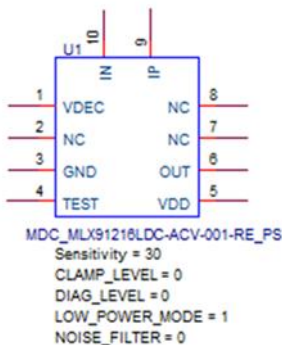


Figure 3.

**Note**

② Converts current into magnetism. The format of the expression is shown below.

Ex)

```
E_C2T      TESLA 0 TABLE { V(CURRENT, 0) }
+ (Current 1, Magnetic flux density 1)
+ (Current 2, Magnetic flux density 2)
+ (Current 3, Magnetic flux density 3)
+ (Current 4, Magnetic flux density 4)
+      ... )
```

Each values are described as a pair of current and magnetic flux density.  
 Except for the specified value, linear interpolation is performed.  
 For out of range, the minimum or maximum value of the specified value is output.

```
.subckt MDC_MLX91216LDC-ACV-001-RE_PS VDEC NC GND TEST VDD OUT NC NC IP IN
+ PARAMS: Sensitivity=30↓
+ CLAMP_LEVEL=0↓
+ DIAG_LEVEL=0↓
+ LOW_POWER_MODE=0↓
+ NOISE_FILTER=0↓
↓
X_MLX91216LDC-ACV-001-RE_U1          VDEC GND TEST VDD OUT TESLA MLX91216LDC
+ PARAMS: ↓
+ Sensitivity={Sensitivity}↓
+ CLAMP_LEVEL={CLAMP_LEVEL}↓
+ DIAG_LEVEL={DIAG_LEVEL}↓
+ LOW_POWER_MODE={LOW_POWER_MODE}↓
+ NOISE_FILTER={NOISE_FILTER}↓
↓
V_Imeas      IP IN 0Vdc↓
E_E1        CURRENT 0 VALUE { I(V_Imeas) }↓
↓
E_C2T        TESLA 0 TABLE { V(CURRENT, 0) } ↓
+ ( ↓
+ (-30, -1) ↓
+ (-30m, -1m), ↓
+ (0, 0) ↓
+ (30m, 1m), ↓
+ (30, 1) ↓
+ ) ↓
↓
.ENDS MDC_MLX91216LDC-ACV-001-RE_PS ↓
↓
$CDNENCSTART ↓
eee8c5c7a2bc4b01f045f303678664e7916da0bae22e8cb0bba041dd67c69ce448ea70148a9:
024b0131832074f1071cc04d8797d81a601c9fb415233308877057e568ff0e0c1ad6d7ca439'
a978e94c36773adbbaa78b47fb353ab357c6c0eff19be7b0a3921dc3665ae8bf76179b7f8b8l
```

Figure 4.

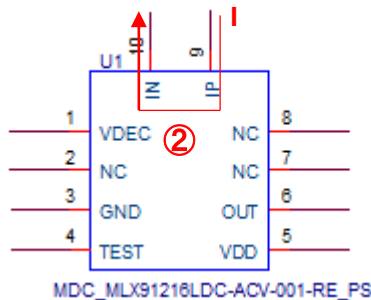
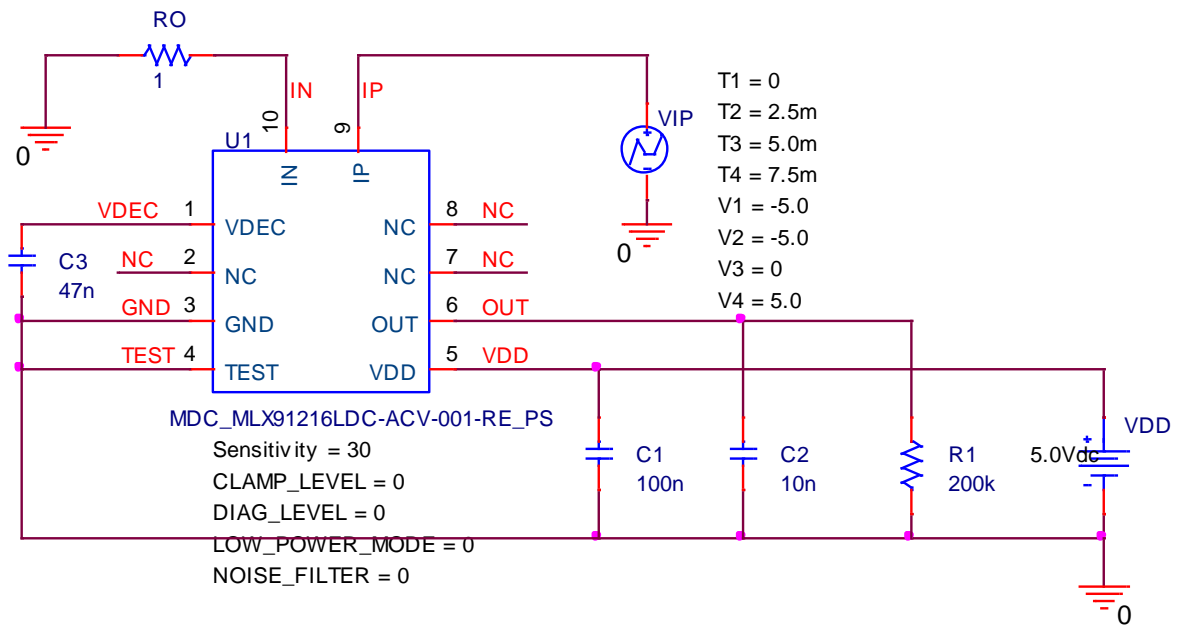


Figure 5.

**Model Functions Table**

Functions	Implemented
Current to Tesla	○
Supply Current	○
Output Impedance	○
Under-voltage detection	○
Clamped Output Level	○
Power on Delay	○
Step Response Time	○

**Current to Tesla Testbench  
Referred to Data Sheet**

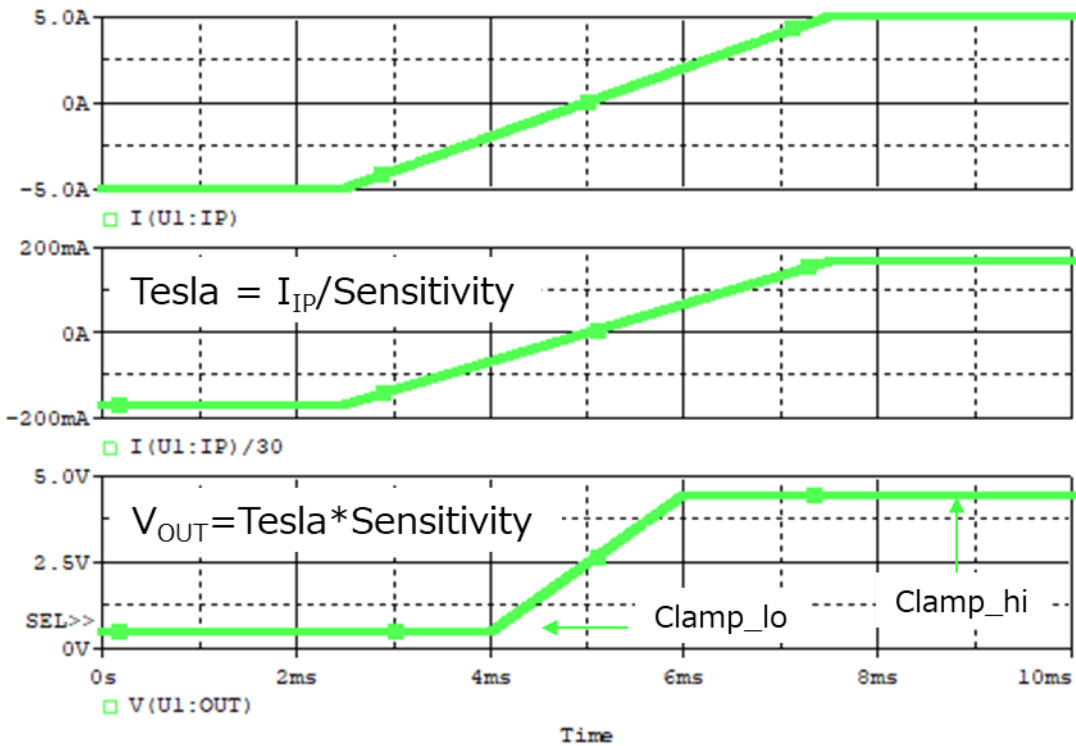


Simulation results are following.  
 Explanatory notes — : simulated

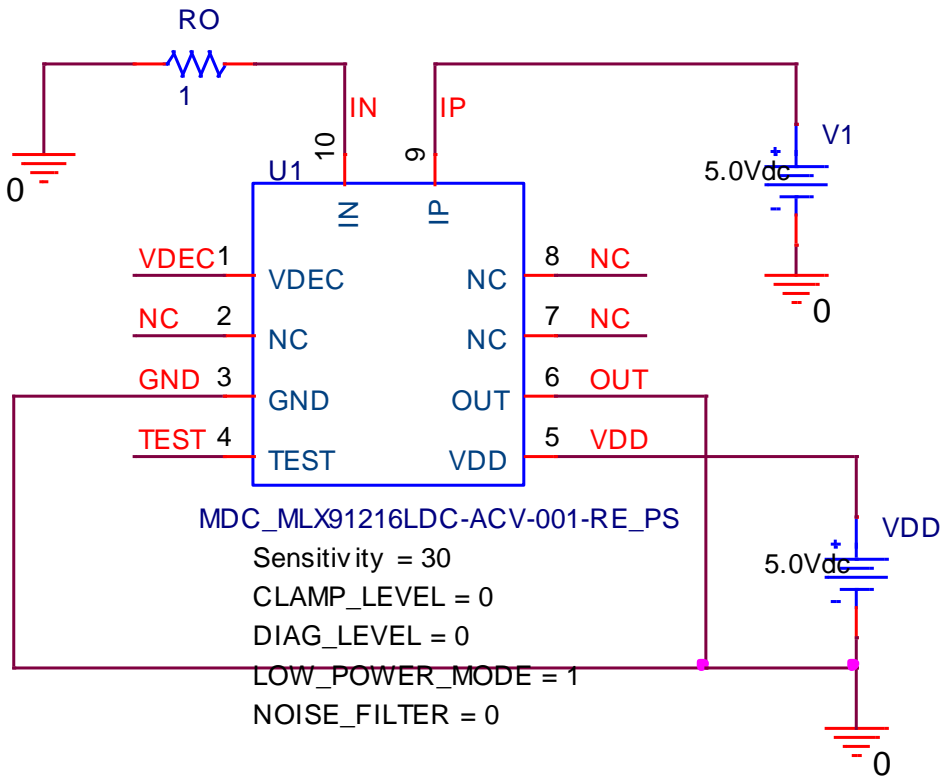
**Current to Tesla**

● TABLE

```
E_C2T      TESLA 0 TABLE { V(CURRENT, 0) }
+ (
+ (-30,-1)
+ (-30m,-1m),
+ (0,0)
+ (30m,1m),
+ (30,1)
+ )
```

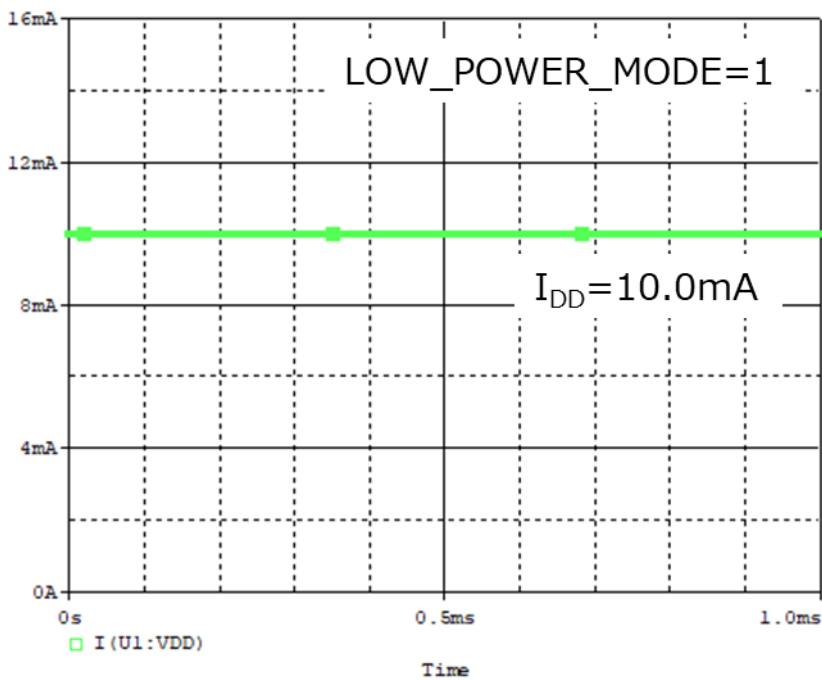
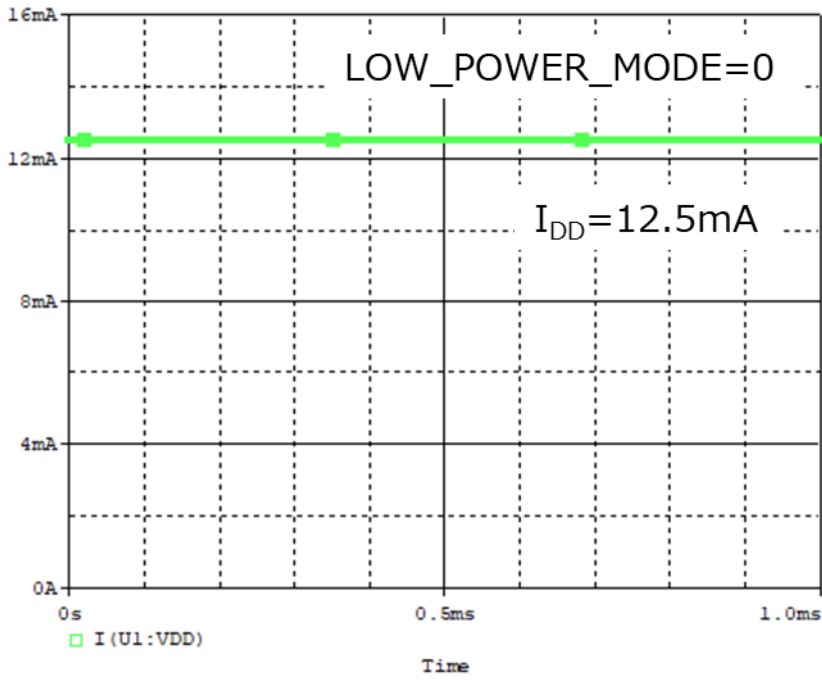


**Supply Current Testbench**  
**Referred to Data Sheet**



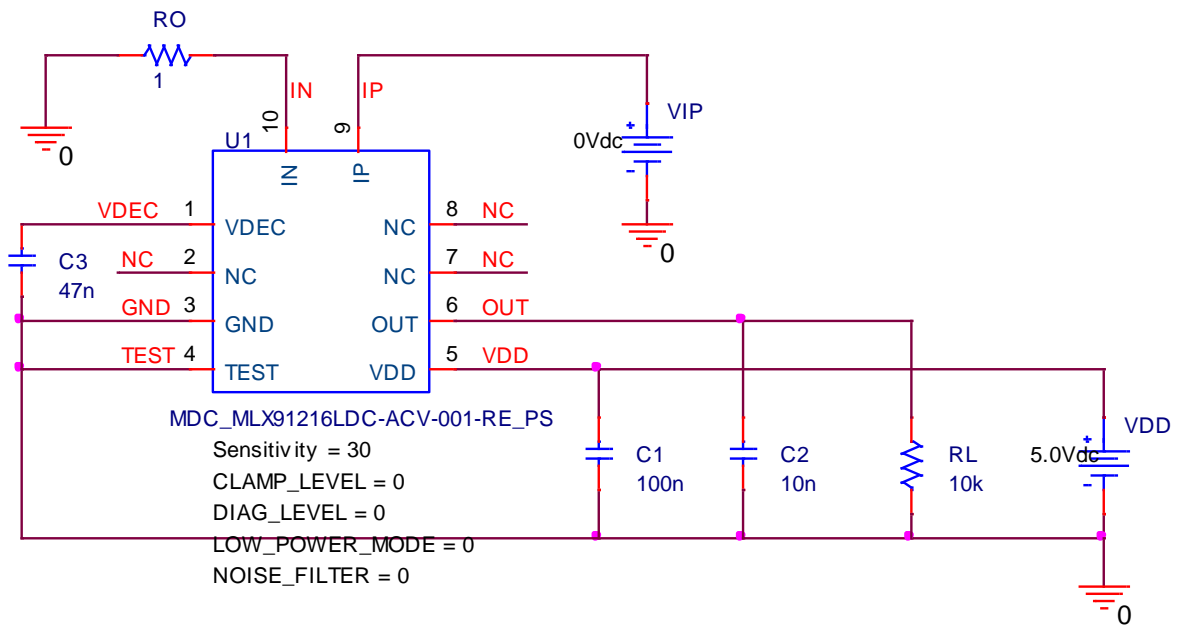
Simulation results are following.  
Explanatory notes — : simulated

Supply Current



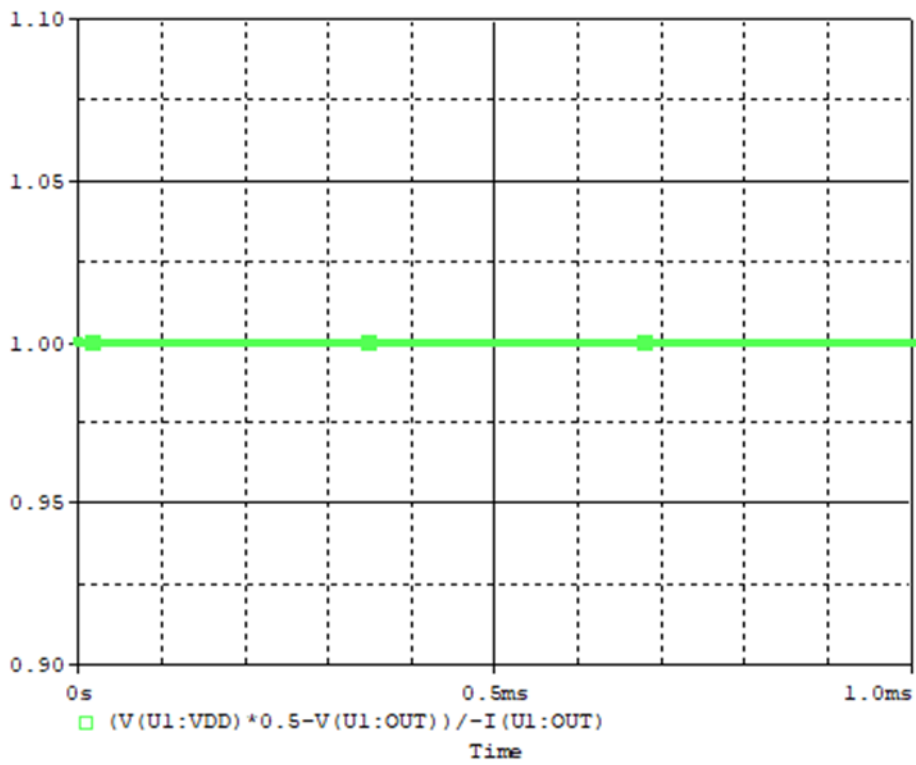


**Output Impedance Testbench**  
**Referred to Data Sheet**

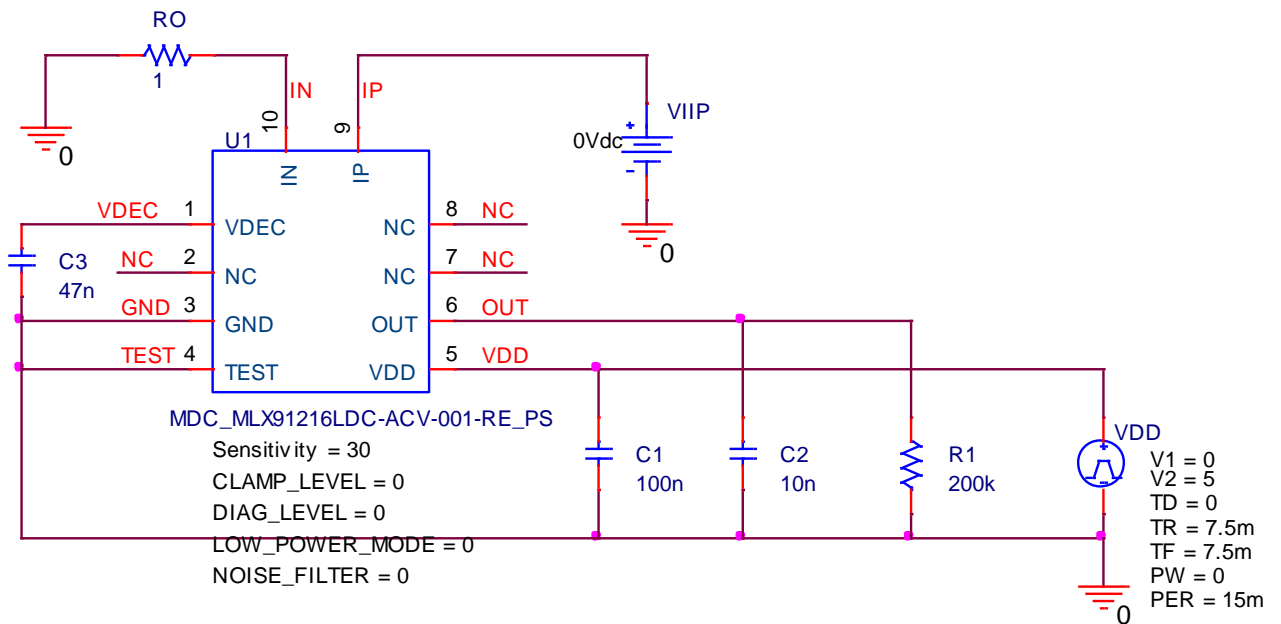


Simulation results are following.  
Explanatory notes — : simulated

**Output Impedance**

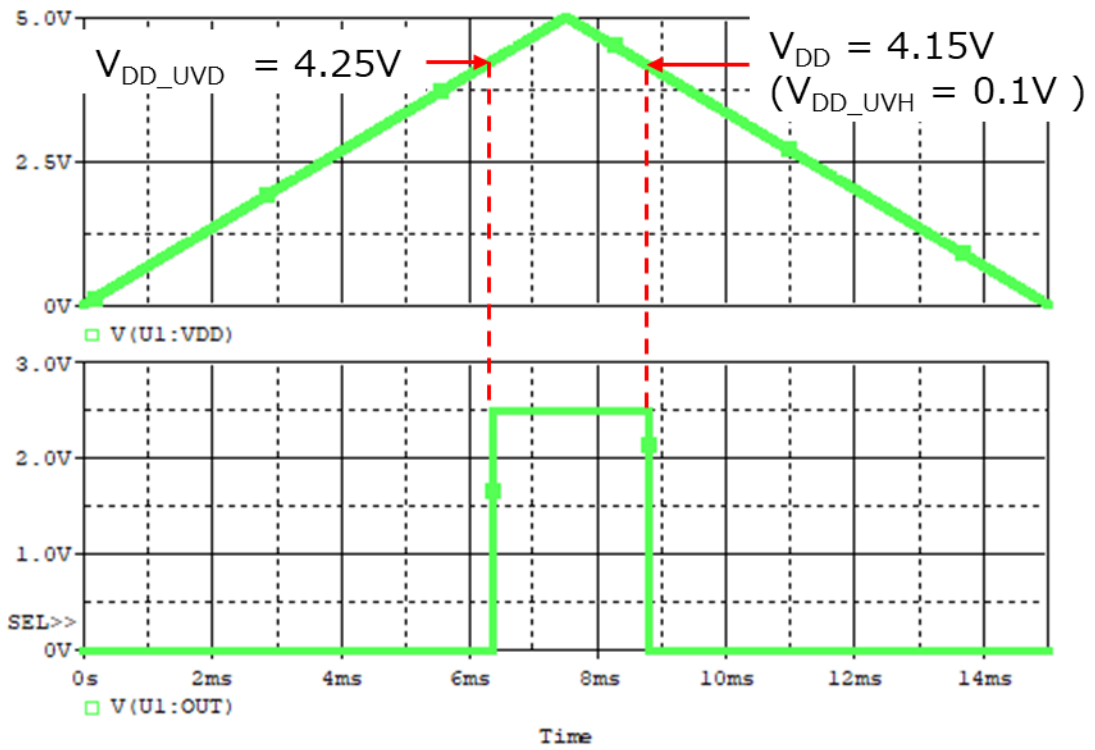


**Under-voltage detection Testbench**  
**Referred to Data Sheet**

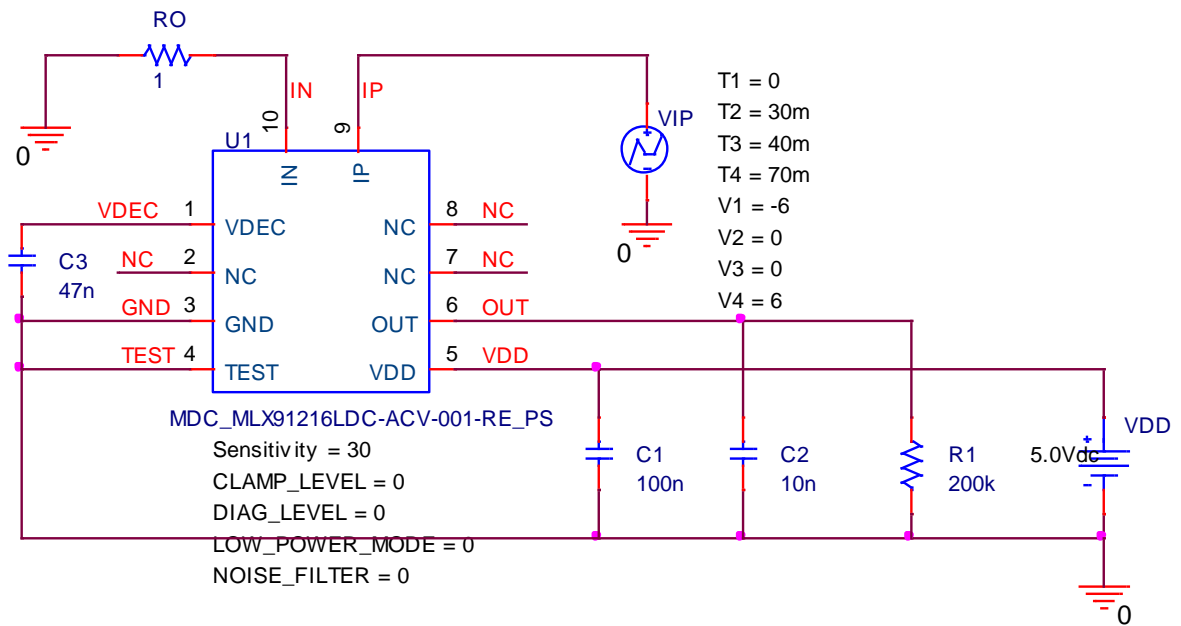


Simulation results are following.  
Explanatory notes — : simulated

**Under-voltage detection**



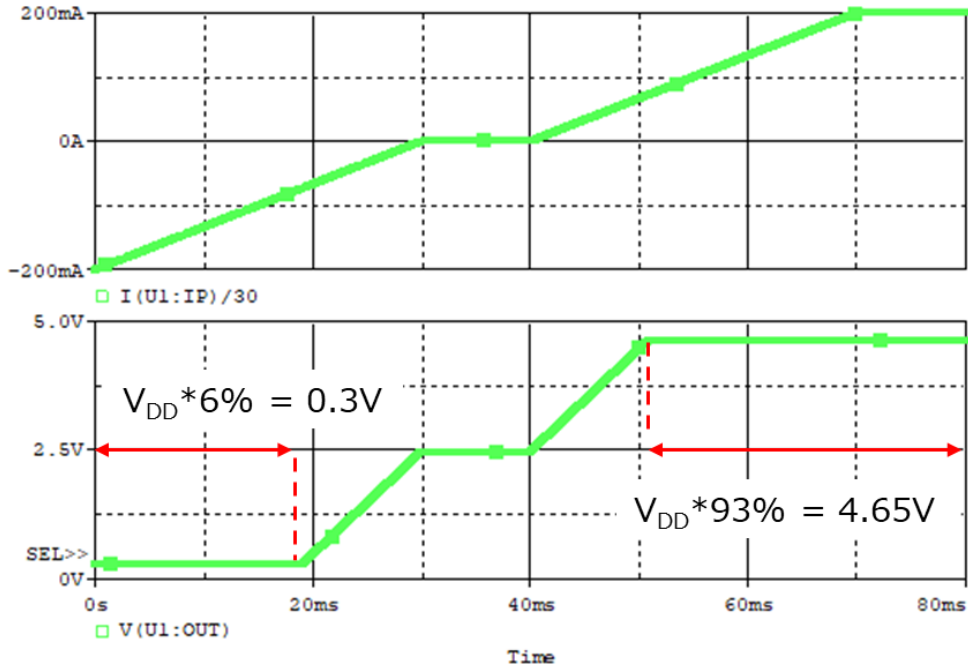
**Clamped Output Level Testbench**  
**Referred to Data Sheet**



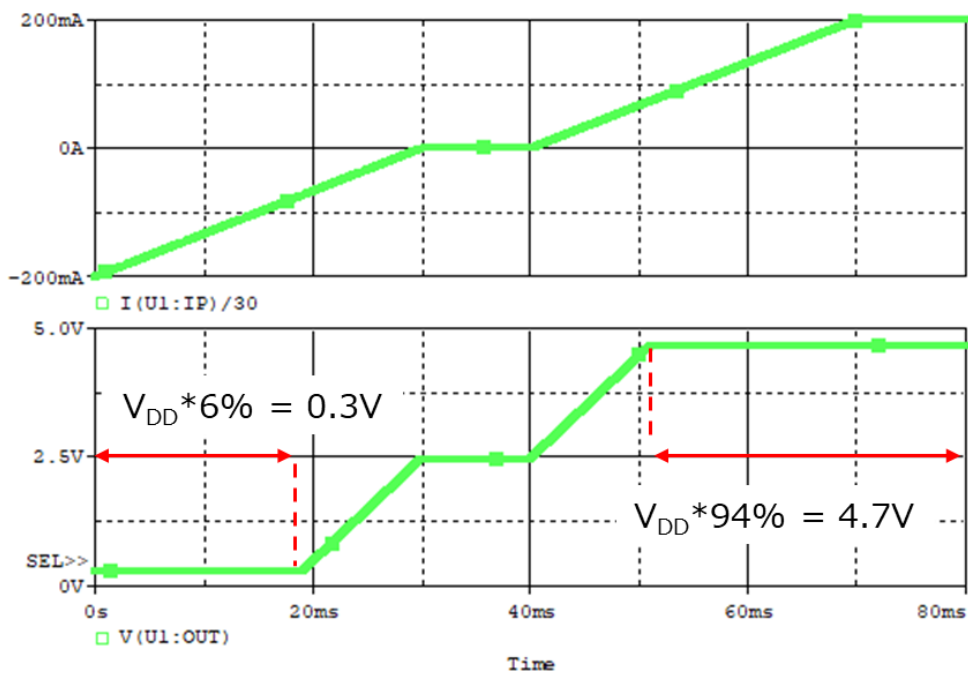
Simulation results are following.  
 Explanatory notes — : simulated

**Clamped Output Level**

● **CLAMP\_LEVEL = 0**



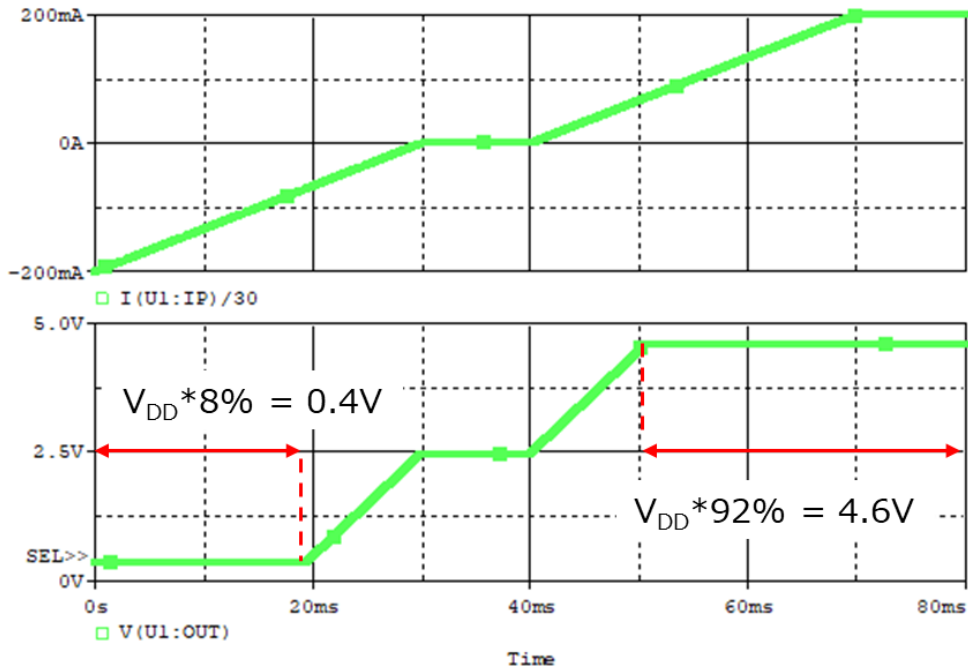
● **CLAMP\_LEVEL = 1**



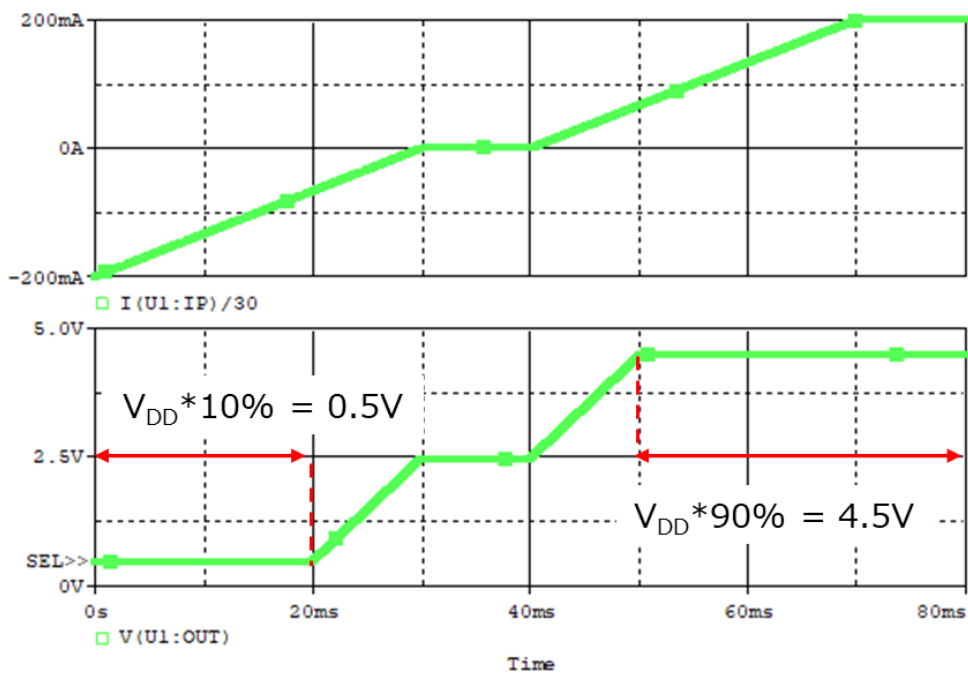
Simulation results are following.  
Explanatory notes — : simulated

**Clamped Output Level**

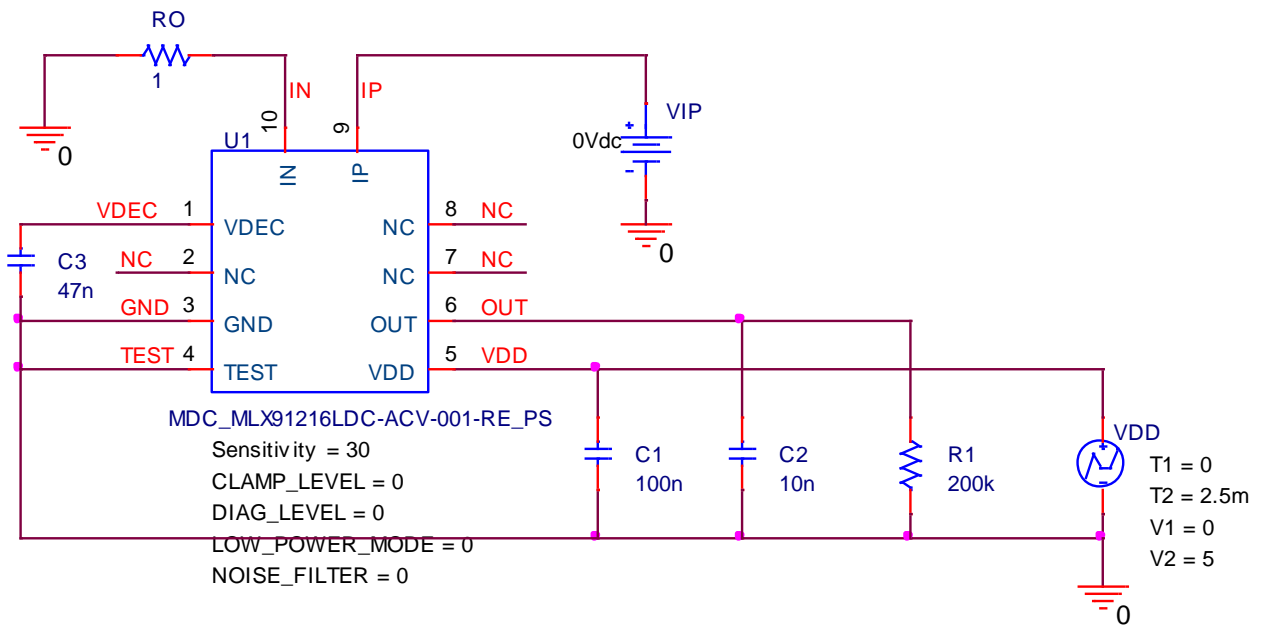
●CLAMP\_LEVEL = 2



●CLAMP\_LEVEL = 3



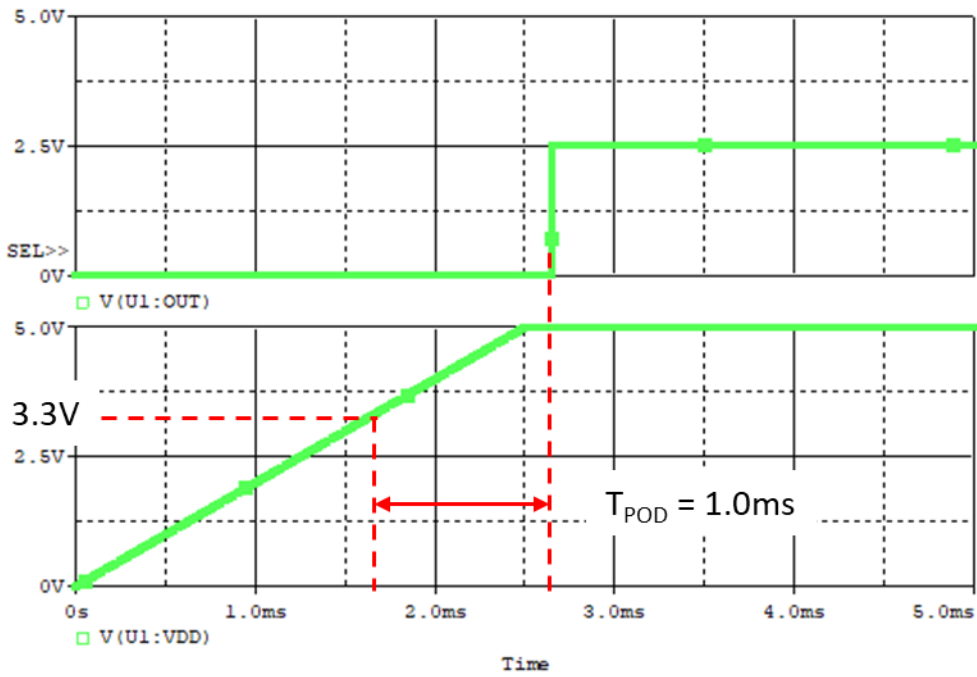
**Power on Delay Testbench**  
**Referred to Data Sheet**



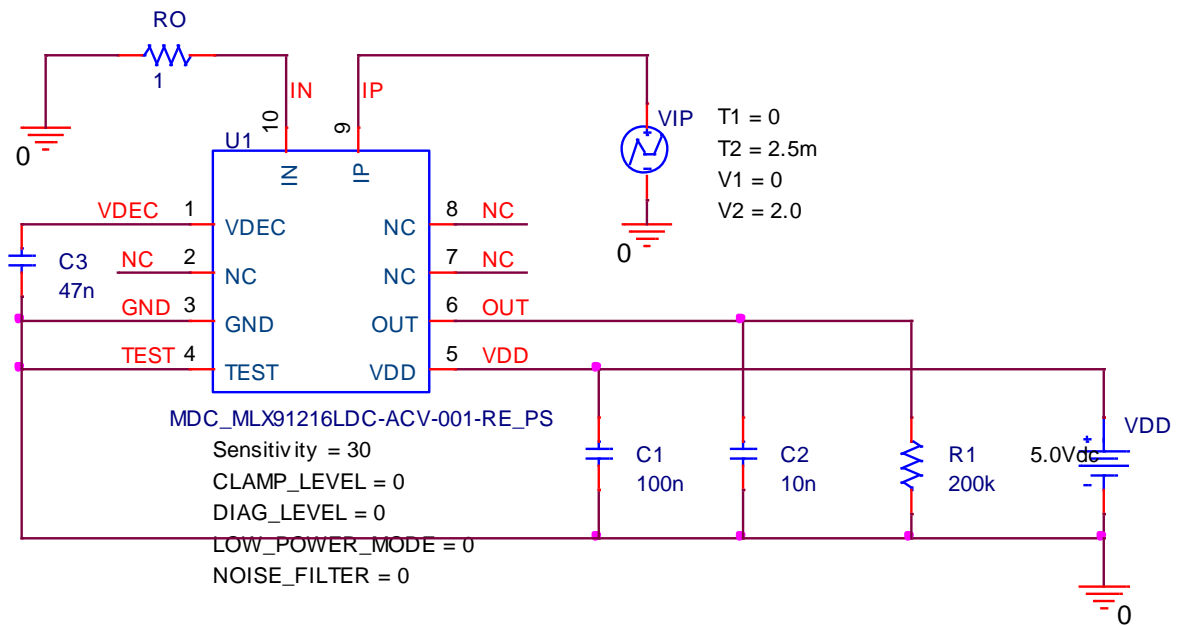


Simulation results are following.  
Explanatory notes — : simulated

**Power on Delay**



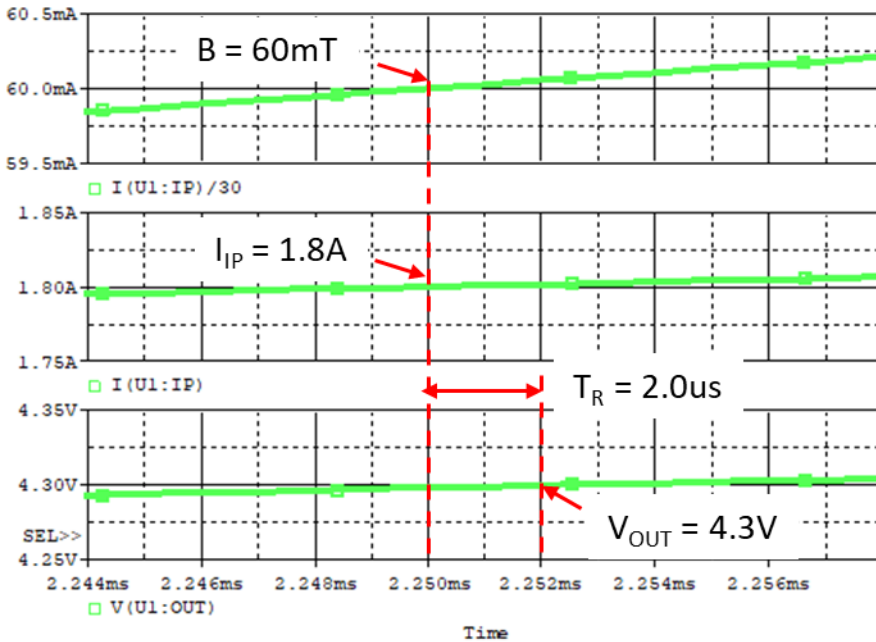
**Step Response Time Testbench**  
**Referred to Data Sheet**



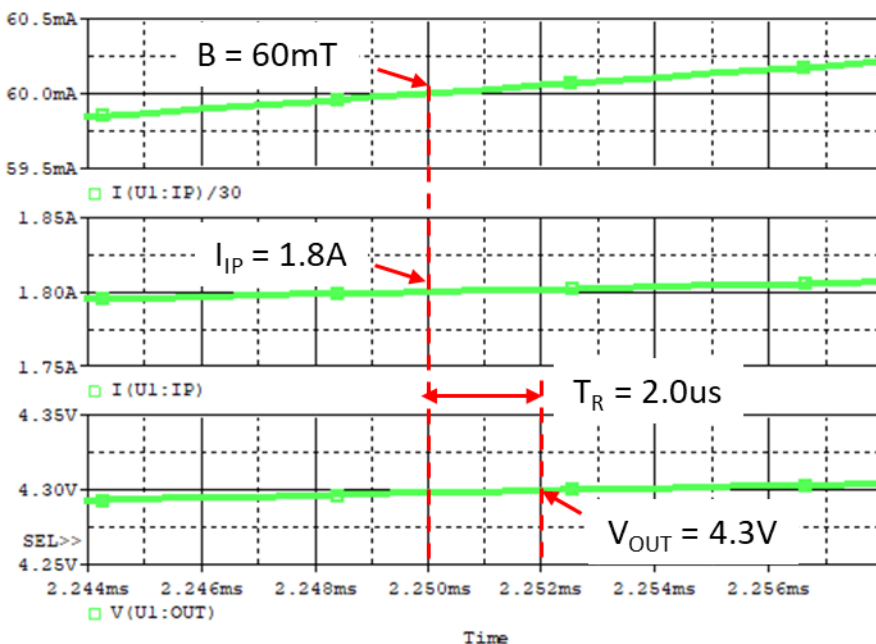
Simulation results are following.  
 Explanatory notes — : simulated

**Step Response Time**

● Sensitivity = 30, NOISE\_FILTER = 0, POWER\_MODE = 0



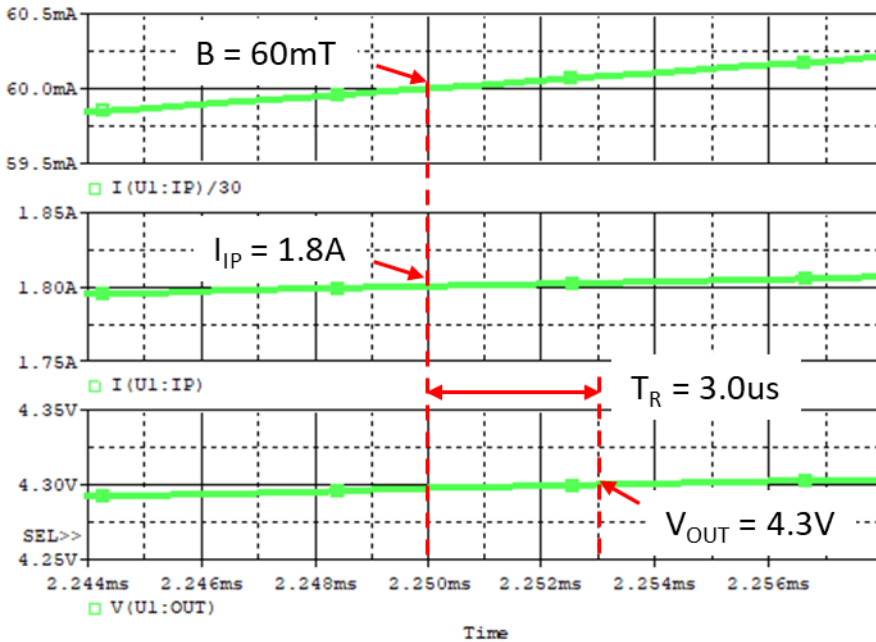
● Sensitivity = 30, NOISE\_FILTER = 1, POWER\_MODE = 1



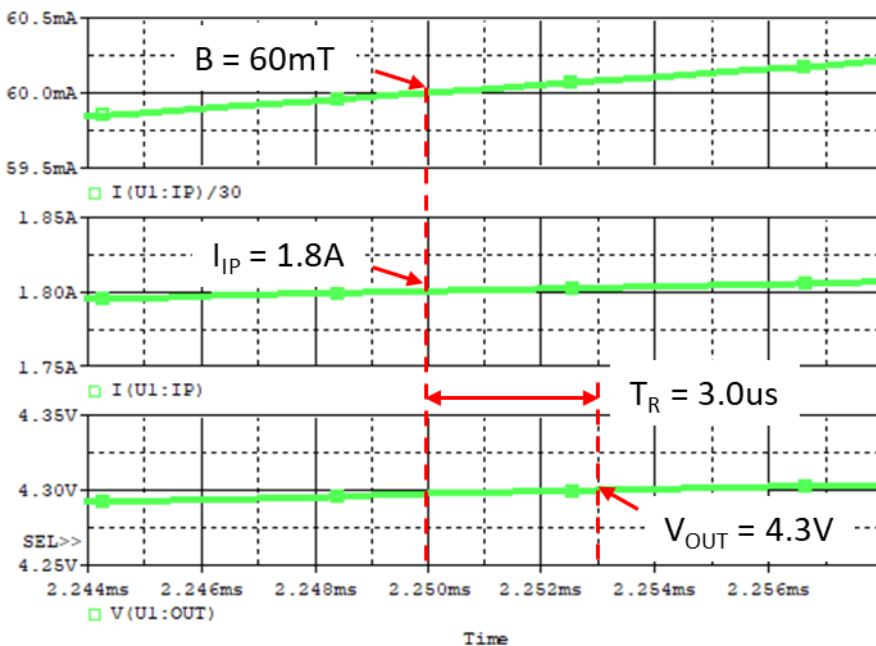
Simulation results are following.  
 Explanatory notes — : simulated

**Step Response Time**

● Sensitivity = 30, NOISE\_FILTER = 1, POWER\_MODE = 0



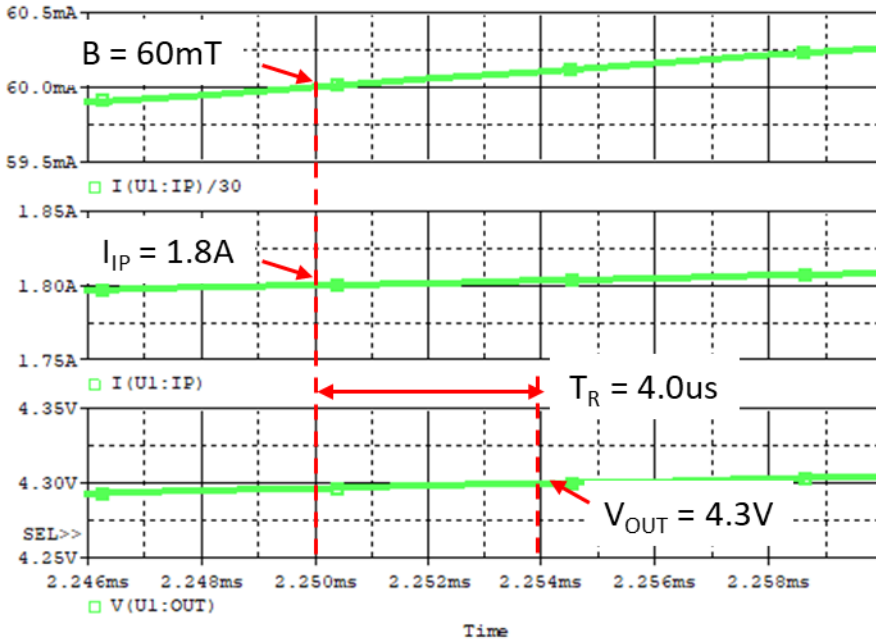
● Sensitivity = 30, NOISE\_FILTER = 1, POWER\_MODE = 1



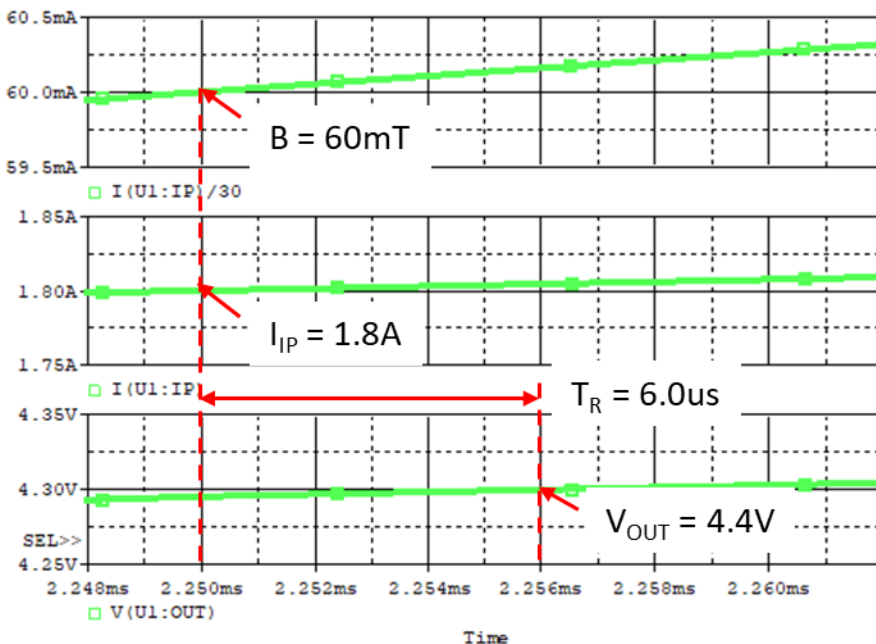
Simulation results are following.  
 Explanatory notes — : simulated

**Step Response Time**

● Sensitivity = 30, NOISE\_FILTER = 2, POWER\_MODE = 0



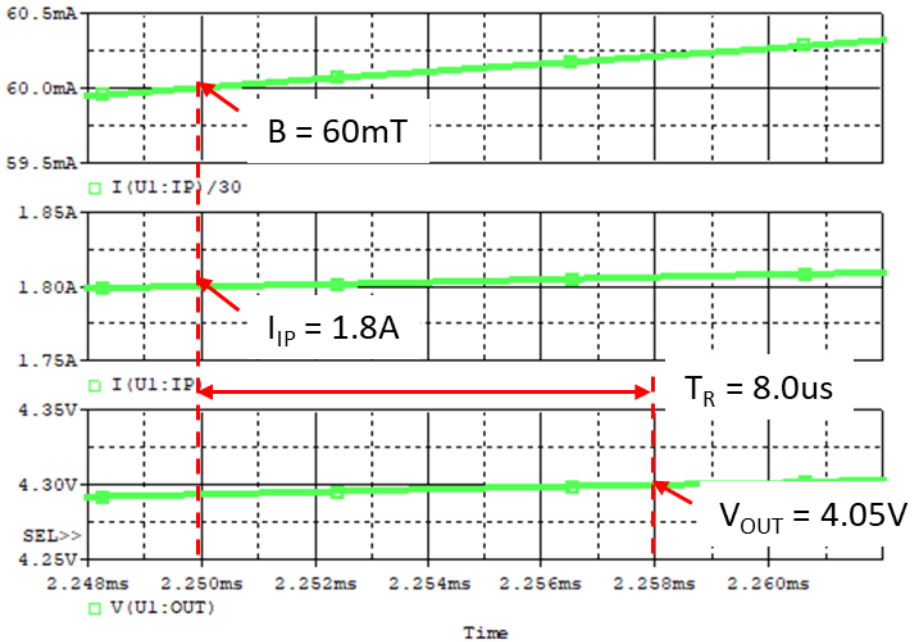
● Sensitivity = 30, NOISE\_FILTER = 2, POWER\_MODE = 1



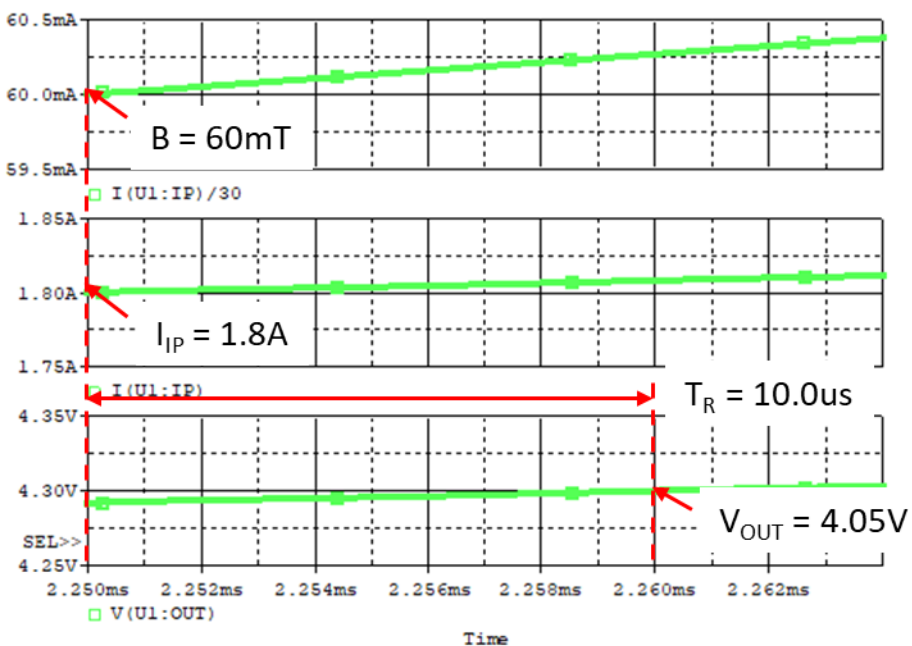
Simulation results are following.  
 Explanatory notes — : simulated

**Step Response Time**

● Sensitivity = 30, NOISE\_FILTER = 3, POWER\_MODE = 0



● Sensitivity = 30, NOISE\_FILTER = 3, POWER\_MODE = 1



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