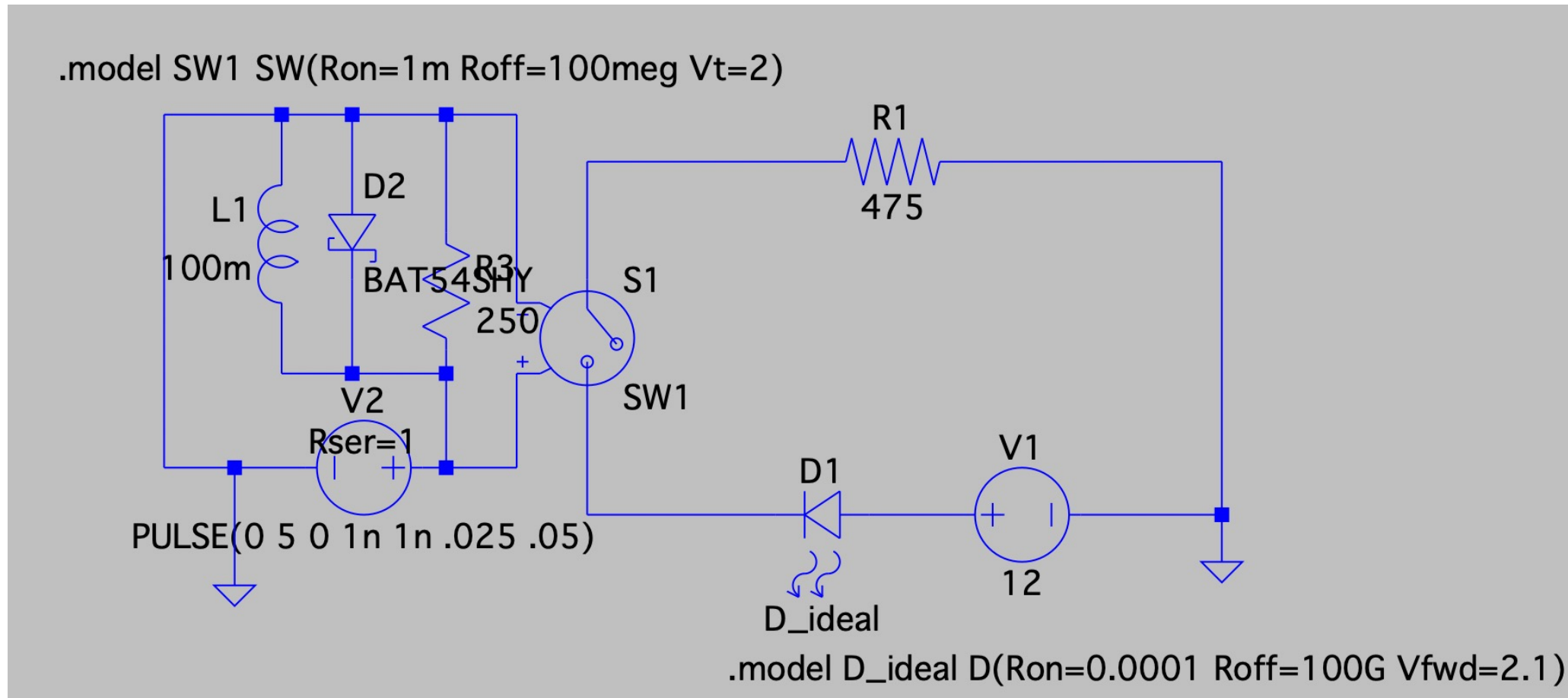


# Signal Relay Analysis

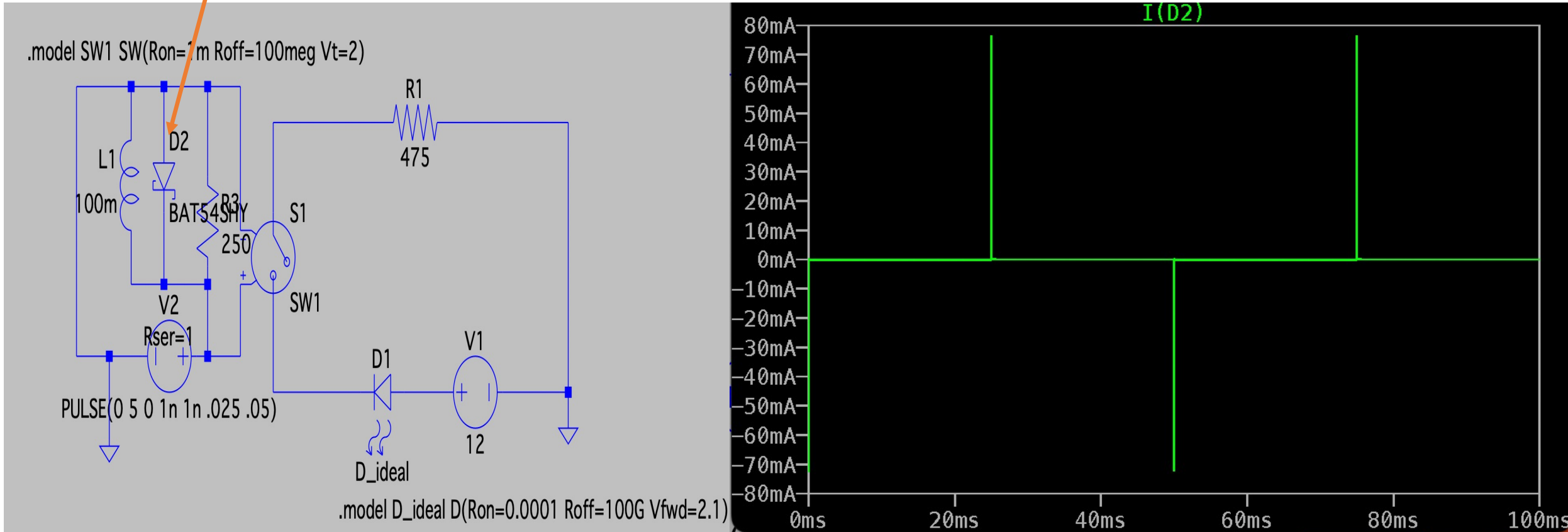
August 2023

# Schematic



Since LTSpice doesn't have an existing model for this relay, I use R3 as the relay's resistance, L1 as the coil inside the relay, and S1 as the switch of the relay.

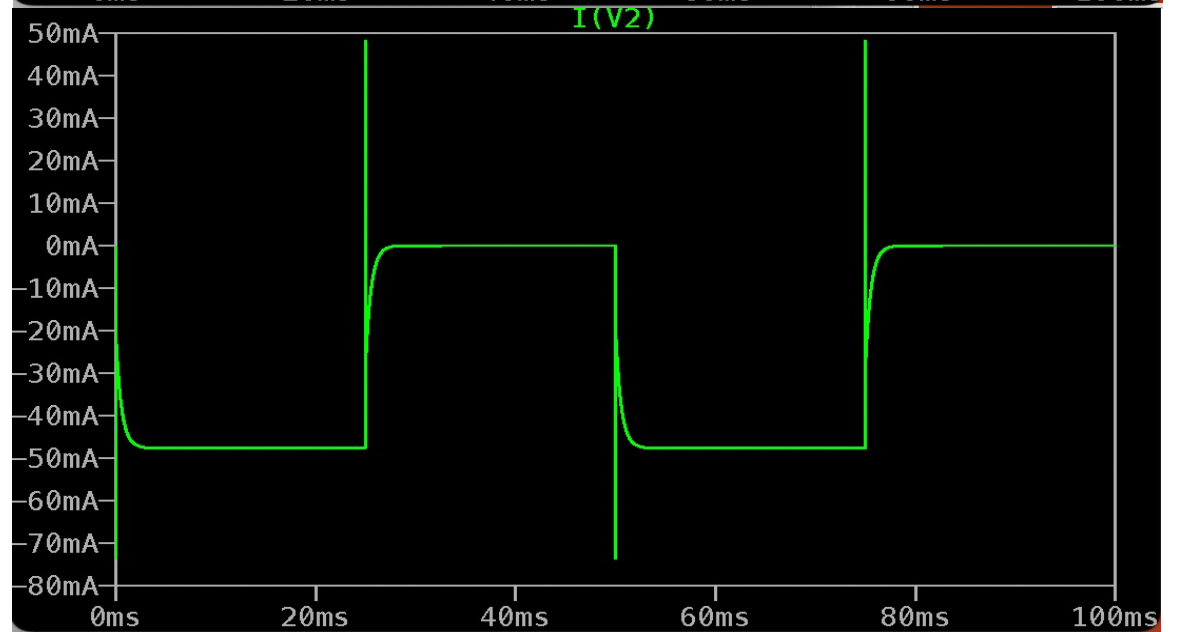
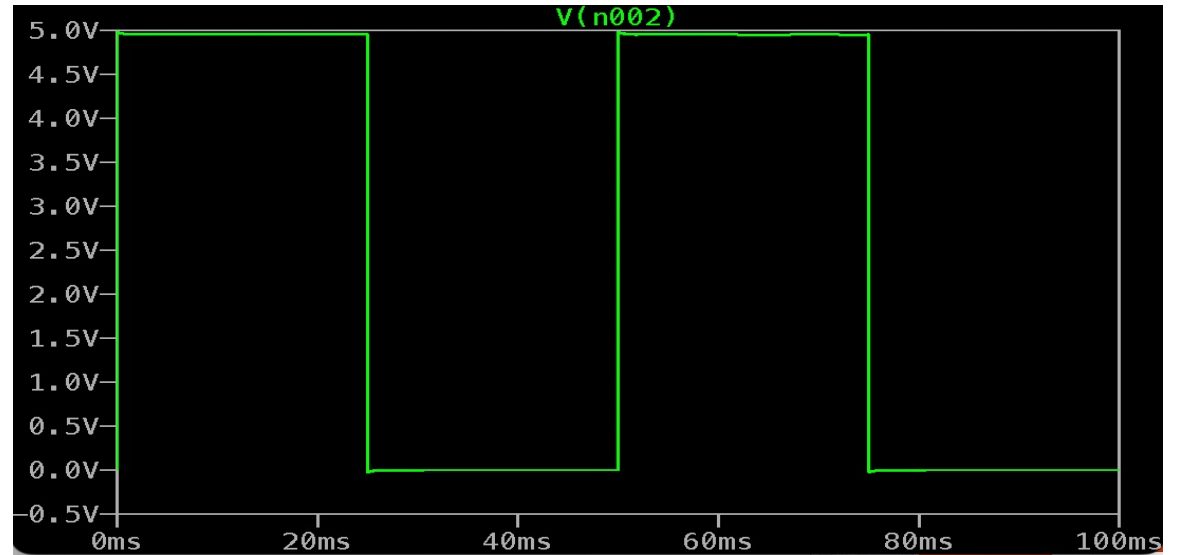
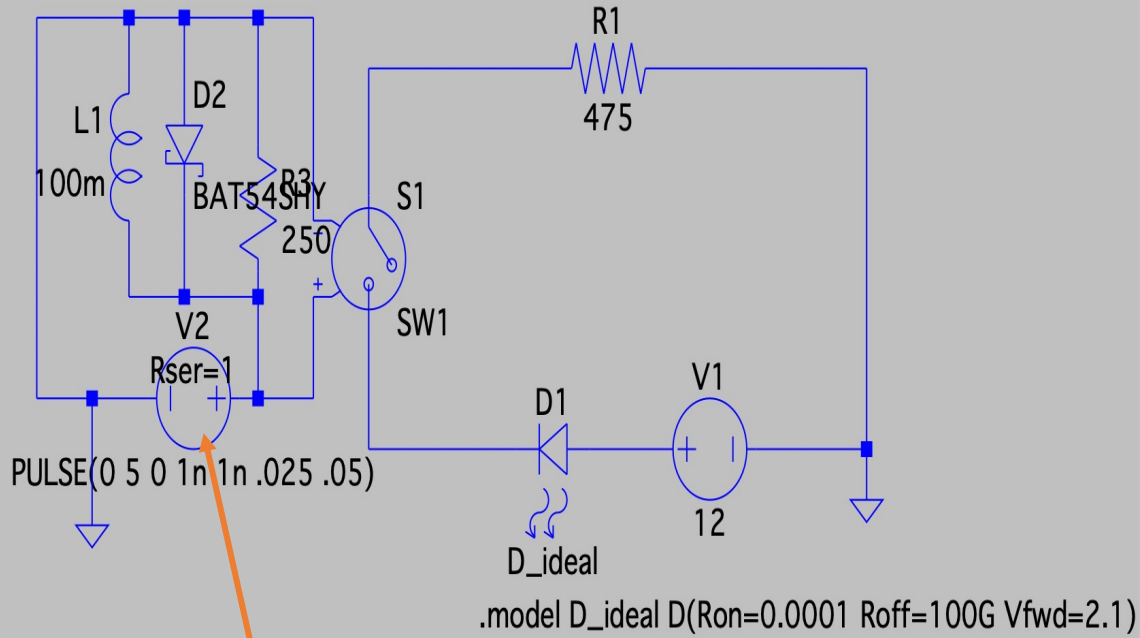
# D2 (Flyback Diode in Primary Circuit)



The flyback diode is used to protect the primary circuit when the voltage changes suddenly.

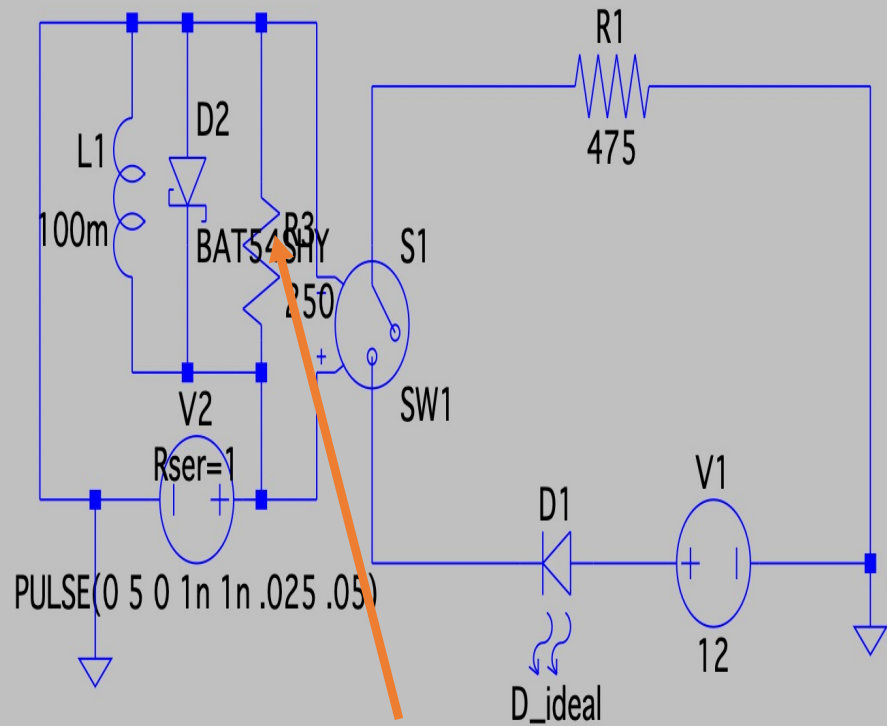
# V2 (Power Supply in Primary Circuit)

```
.model SW1 SW(Ron=1m Roff=100meg Vt=2)
```

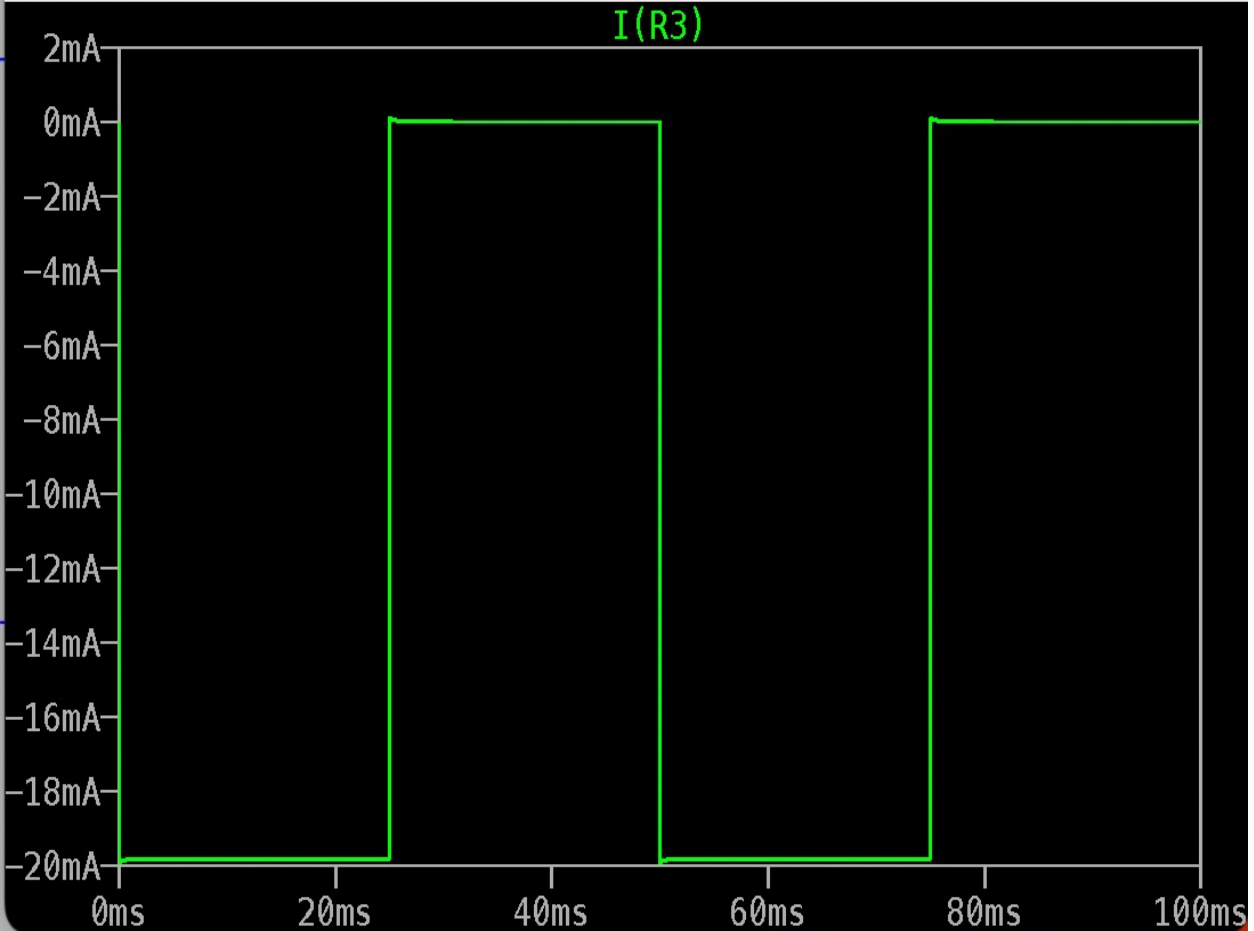


# R3 (Resistance of Relay)

.model SW1 SW(Ron=1m Roff=100meg Vt=2)

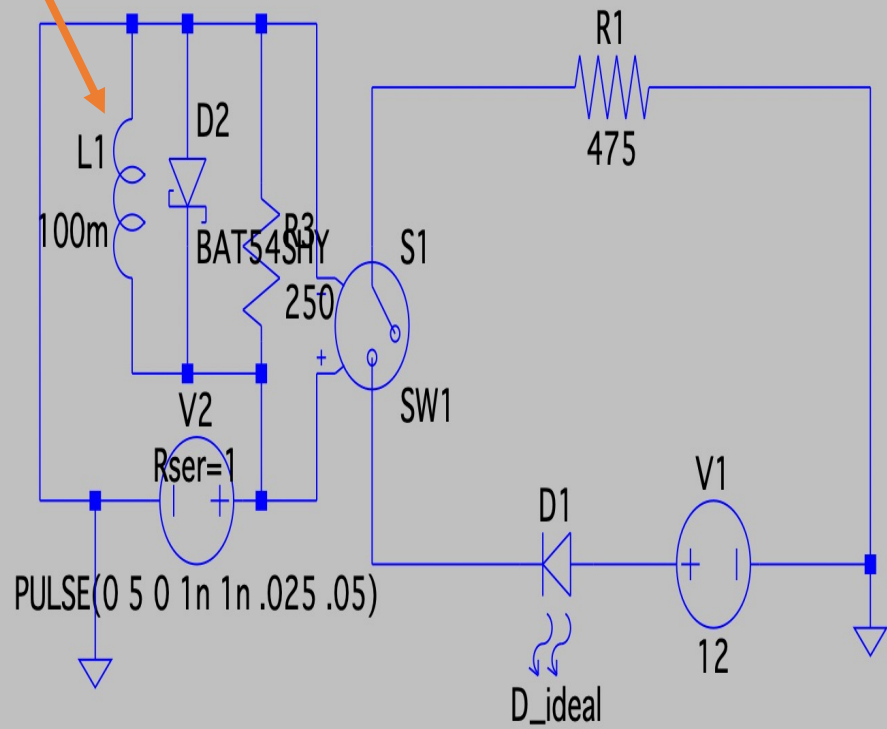


.model D\_ideal D(Ron=0.0001 Roff=100G Vfwd=2.1)

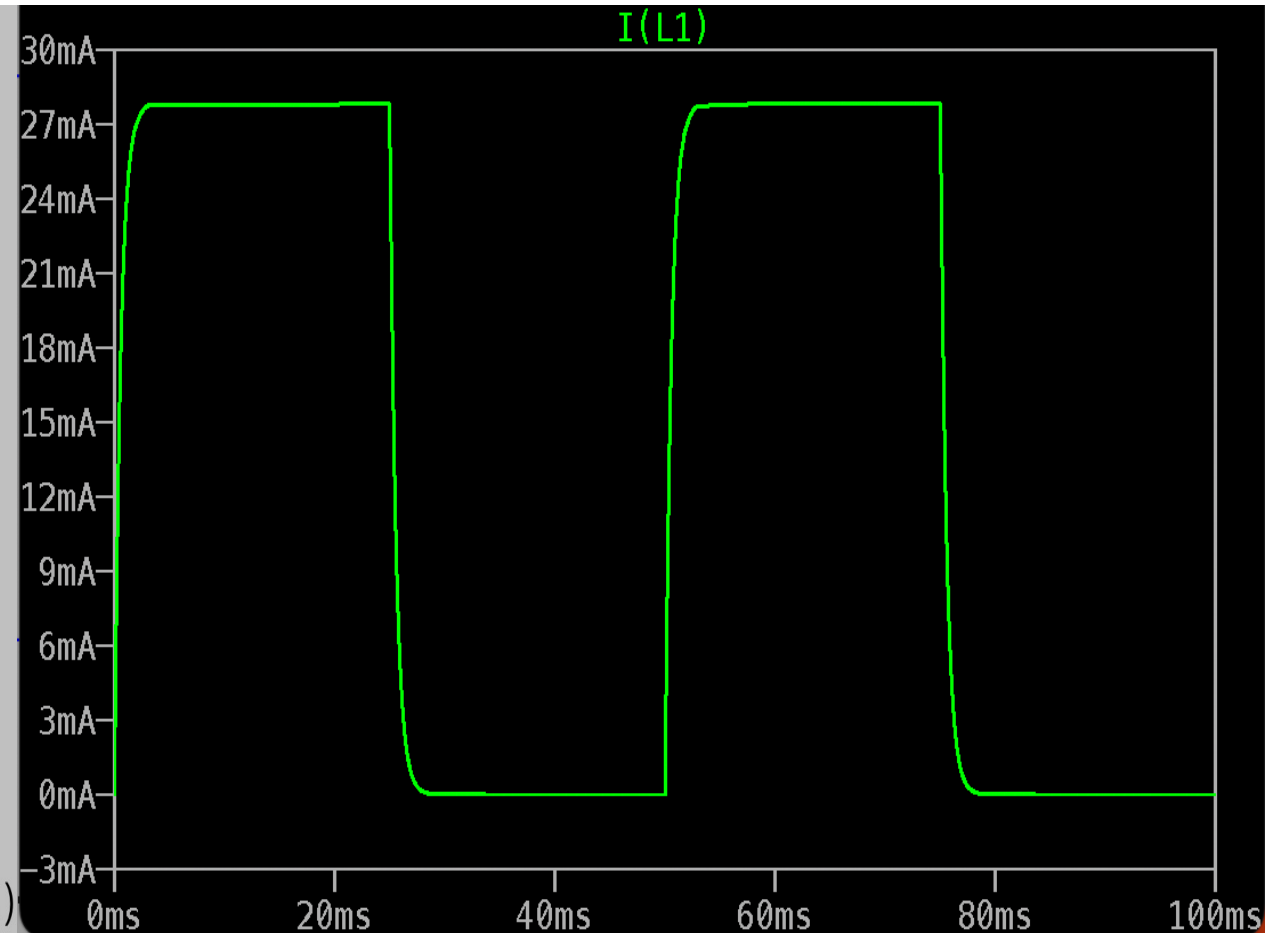


# L1 (Coil inside Relay)

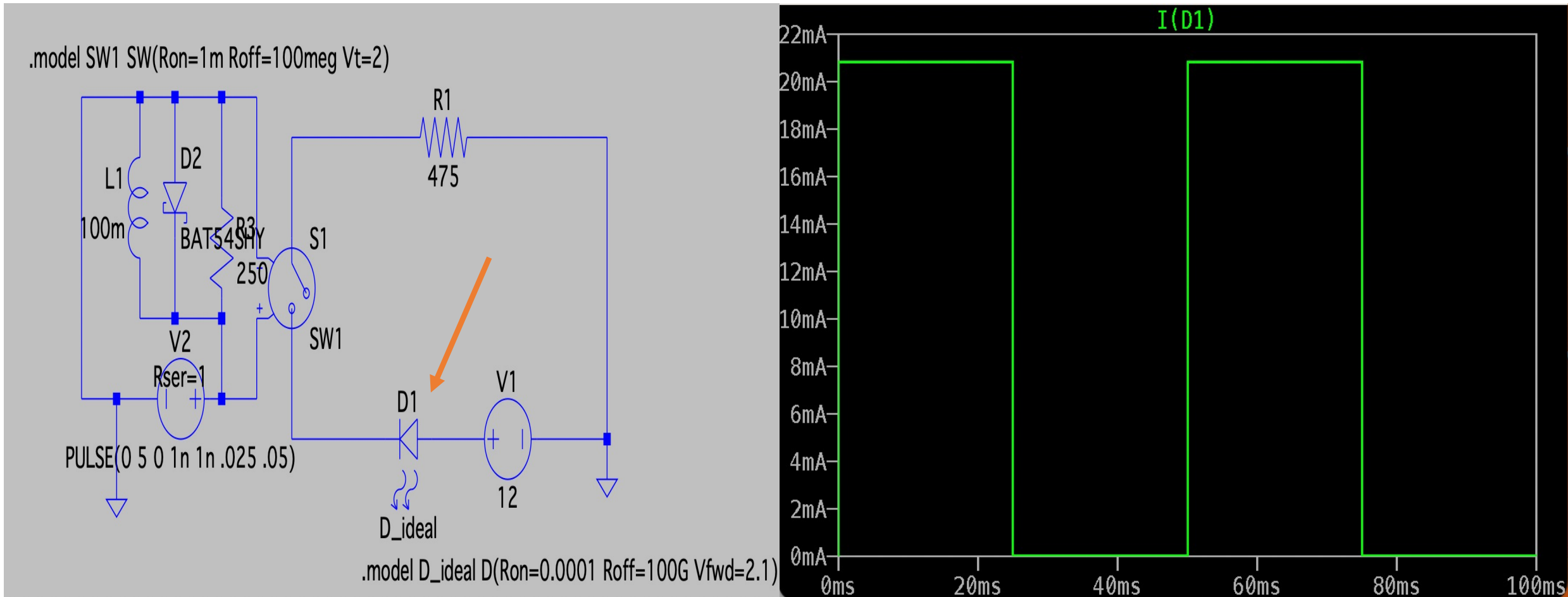
.model SW1 SW(Ron=1m Roff=100meg Vt=2)



.model D\_ideal D(Ron=0.0001 Roff=100G Vfwd=2.1)



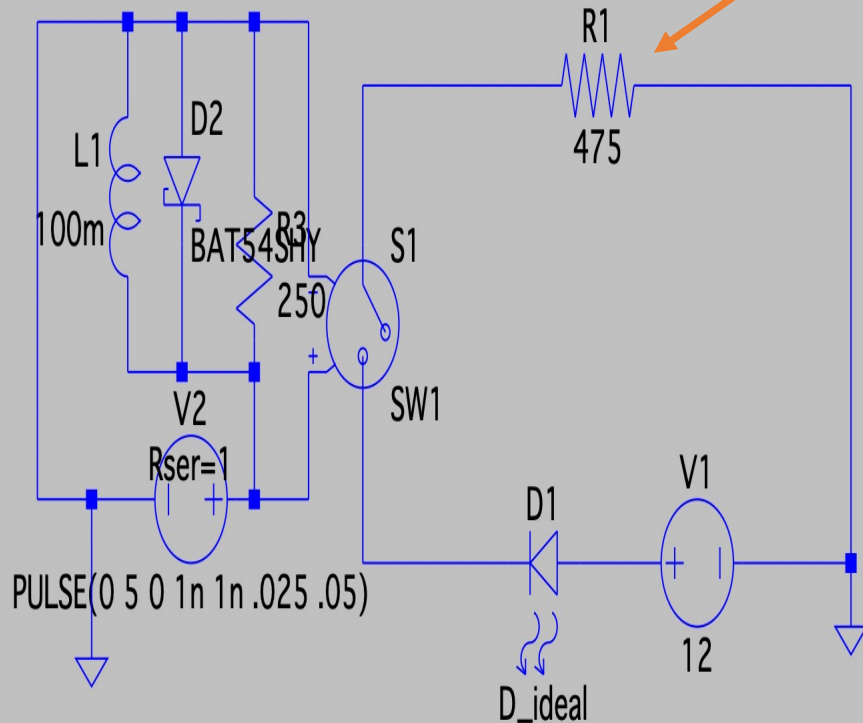
# D1 (LED Light in Secondary Circuit)



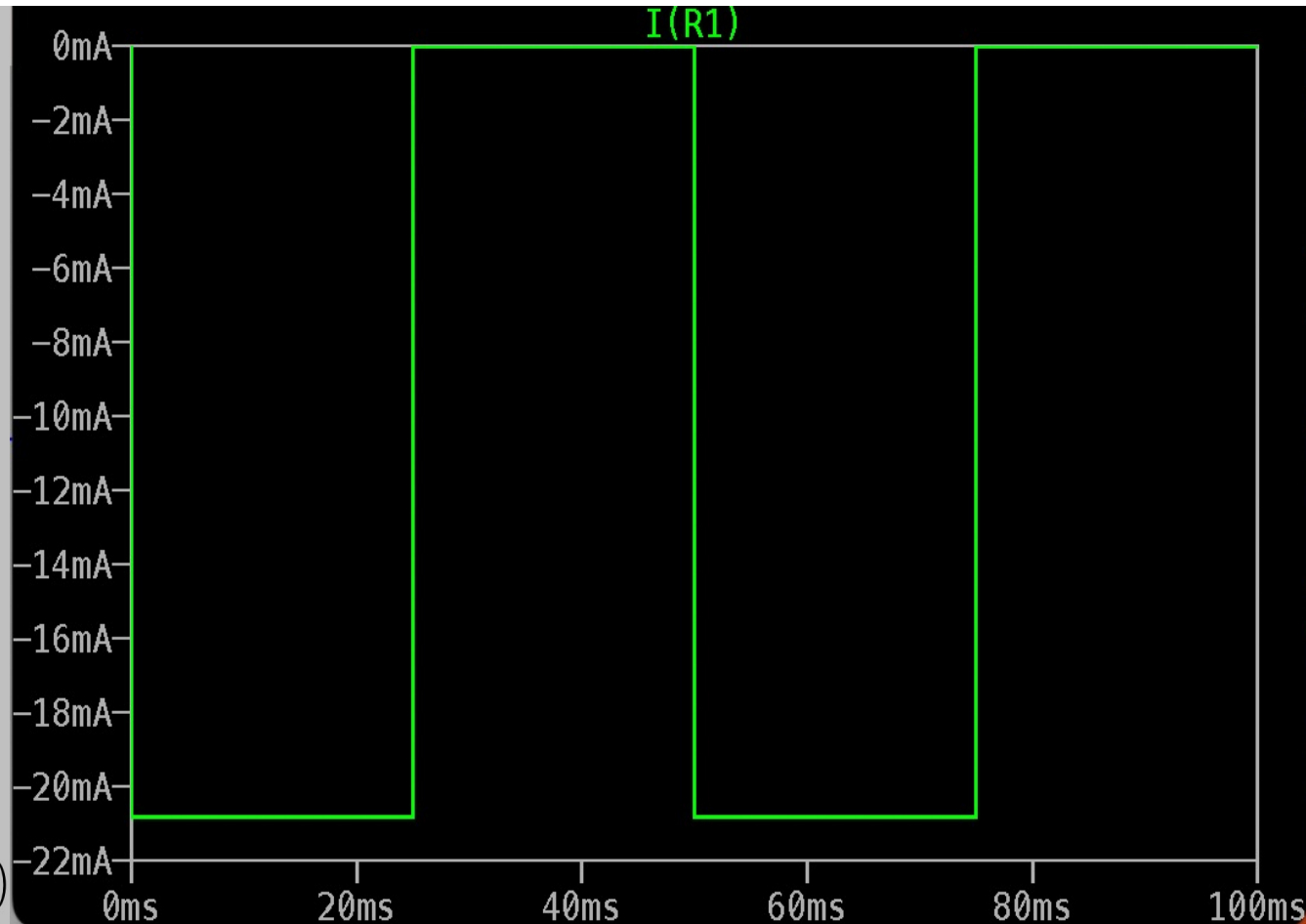
The light is used to check whether current appears in the secondary circuit.

# R1 (Resistor in Secondary Circuit)

```
.model SW1 SW(Ron=1m Roff=100meg Vt=2)
```



```
.model D_ideal D(Ron=0.0001 Roff=100G Vfwd=2.1)
```

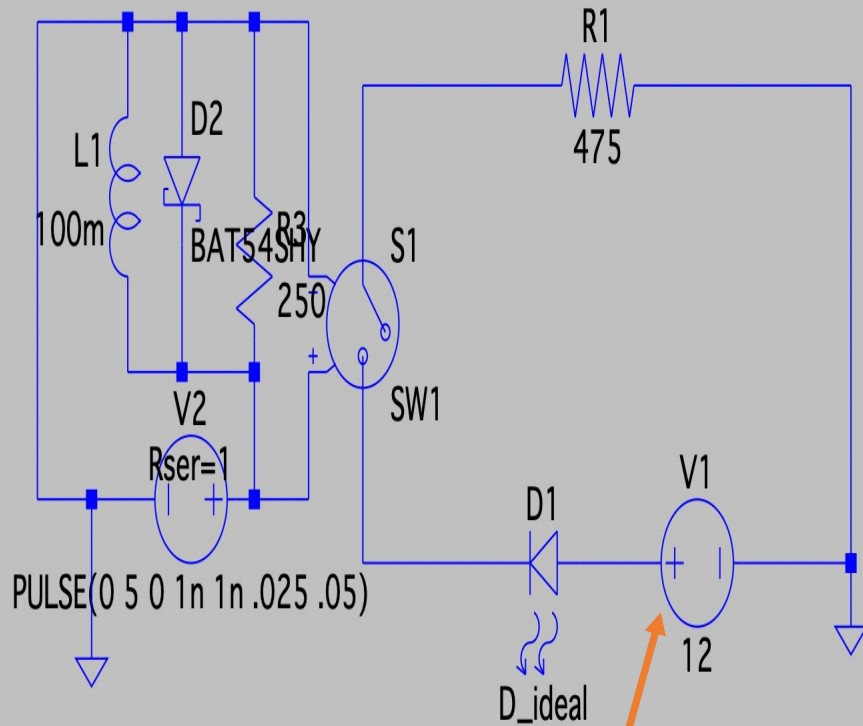


The resistor is used to protect secondary circuit.

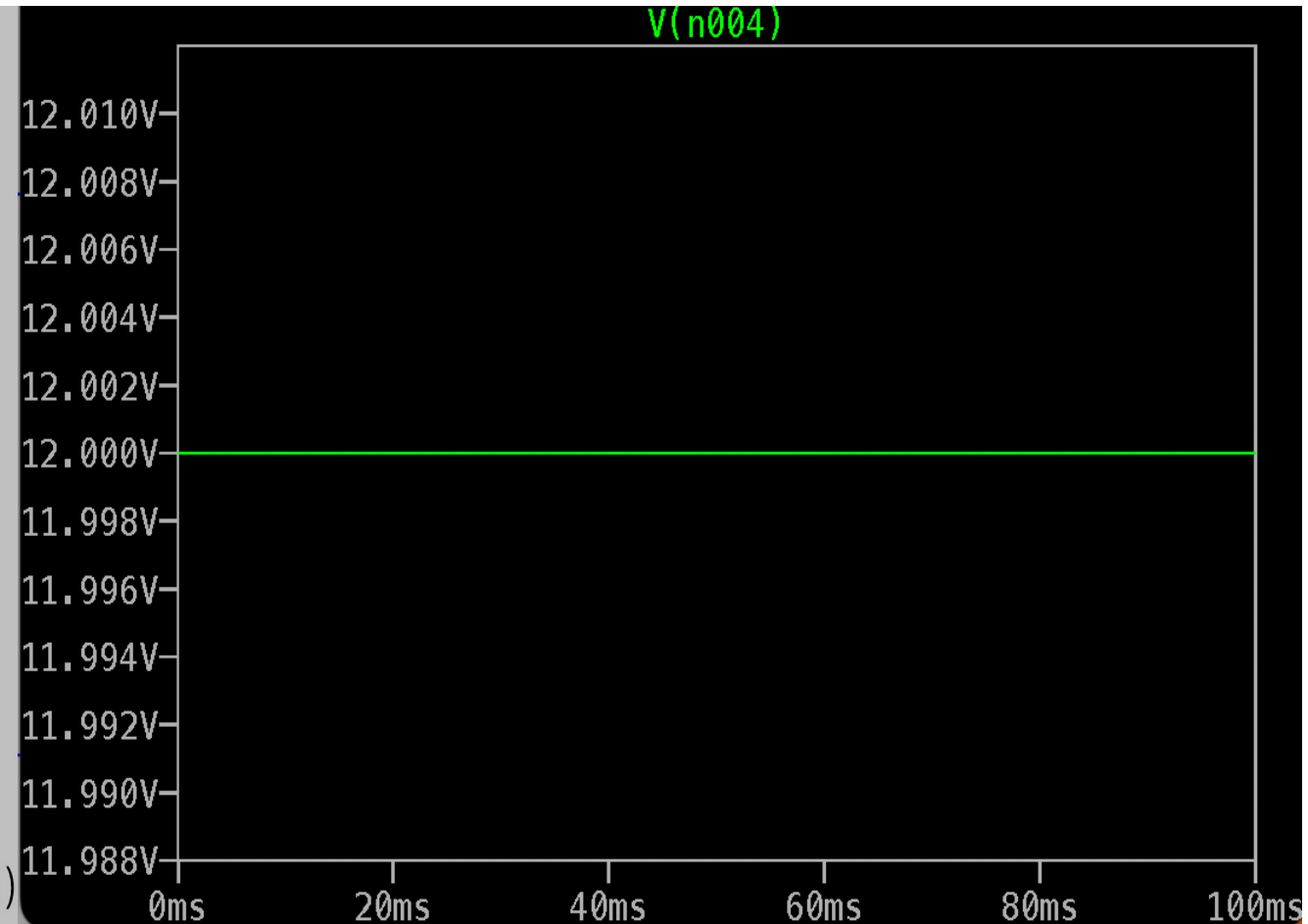


# V1 (Power Supply of Secondary Circuit)

```
.model SW1 SW(Ron=1m Roff=100meg Vt=2)
```

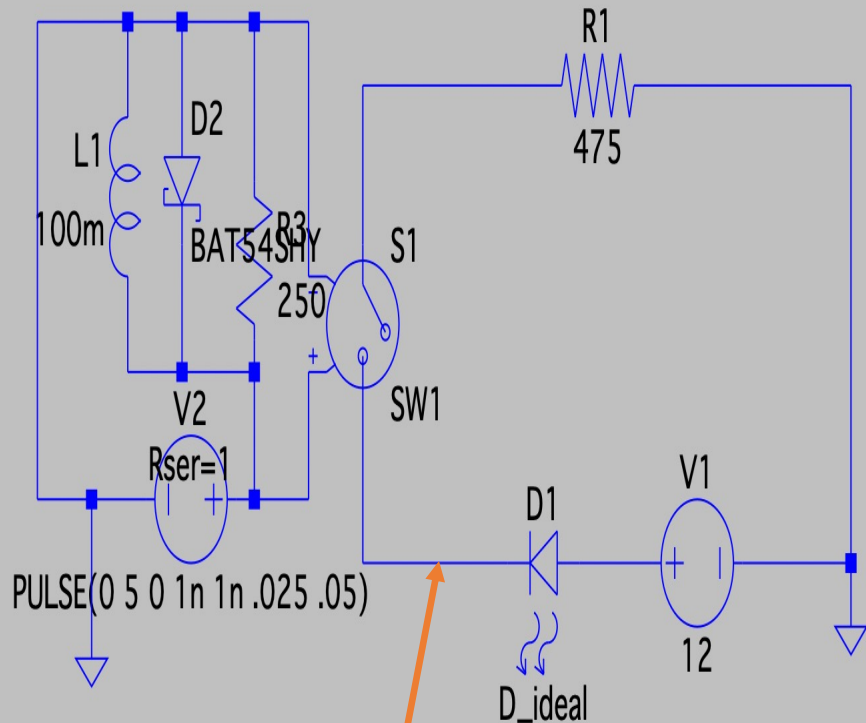


```
.model D_ideal D(Ron=0.0001 Roff=100G Vfwd=2.1)
```

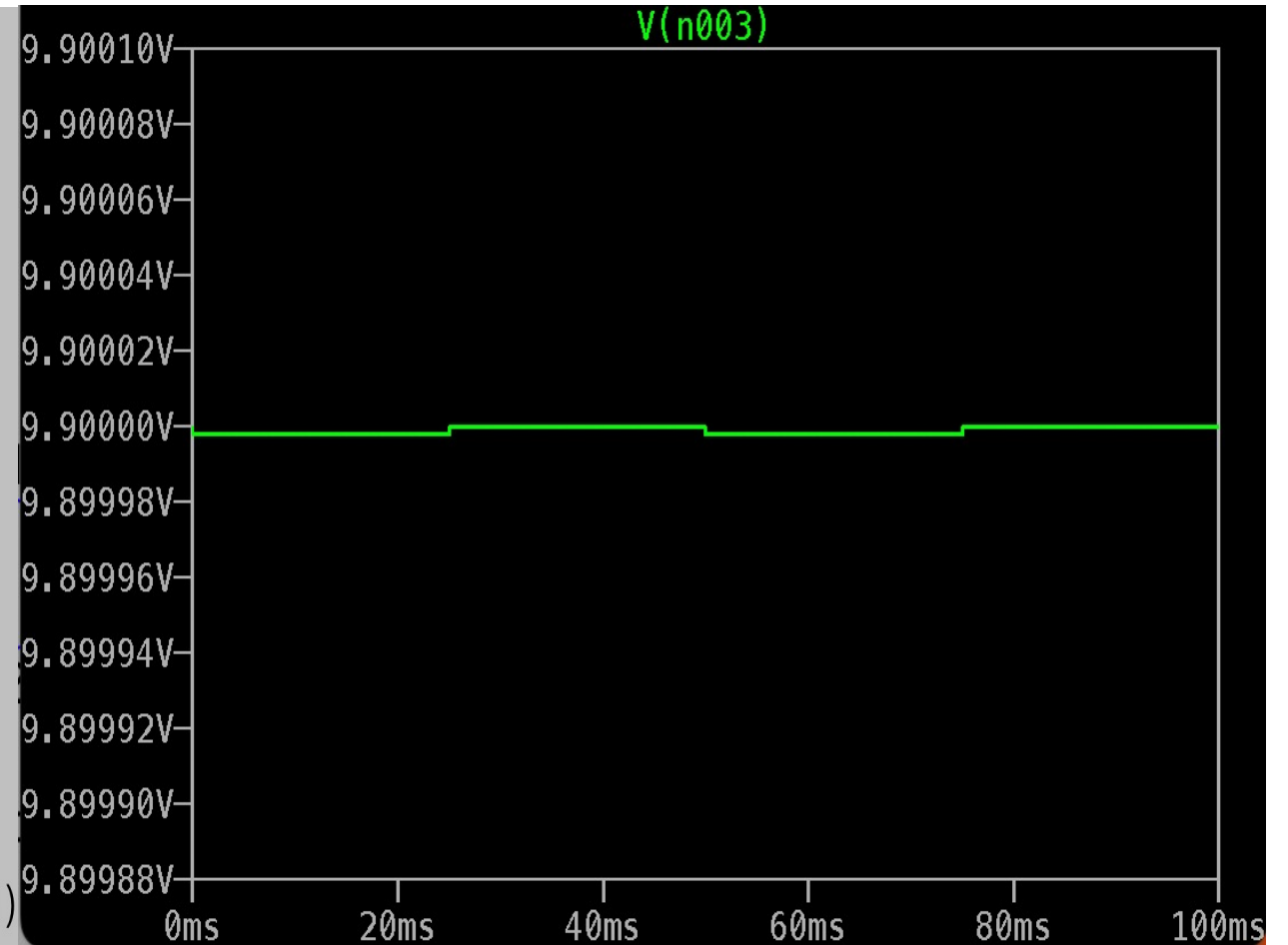


# Voltage near LED Light

.model SW1 SW(Ron=1m Roff=100meg Vt=2)

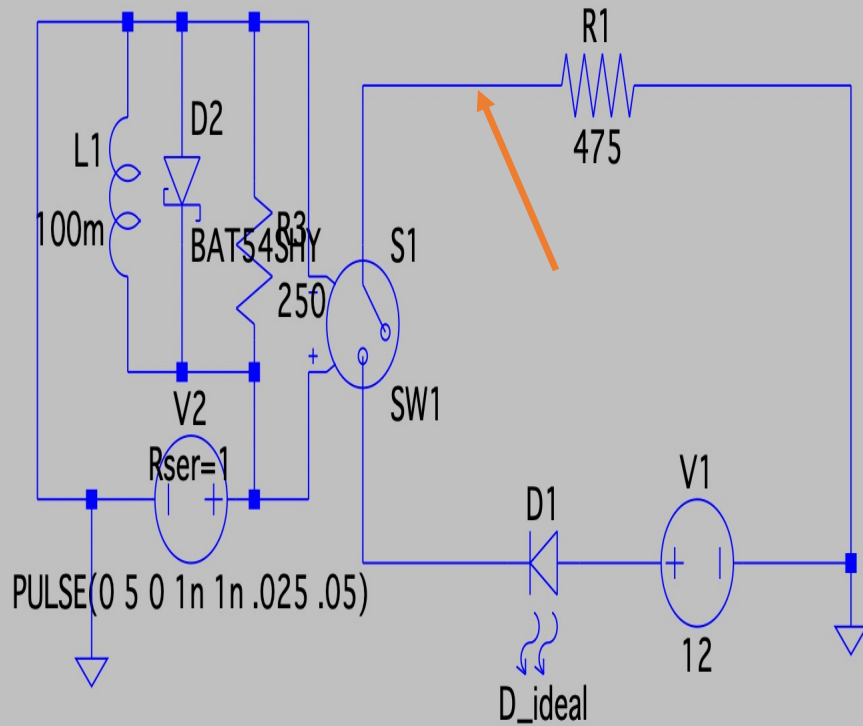


.model D\_ideal D(Ron=0.0001 Roff=100G Vfwd=2.1)

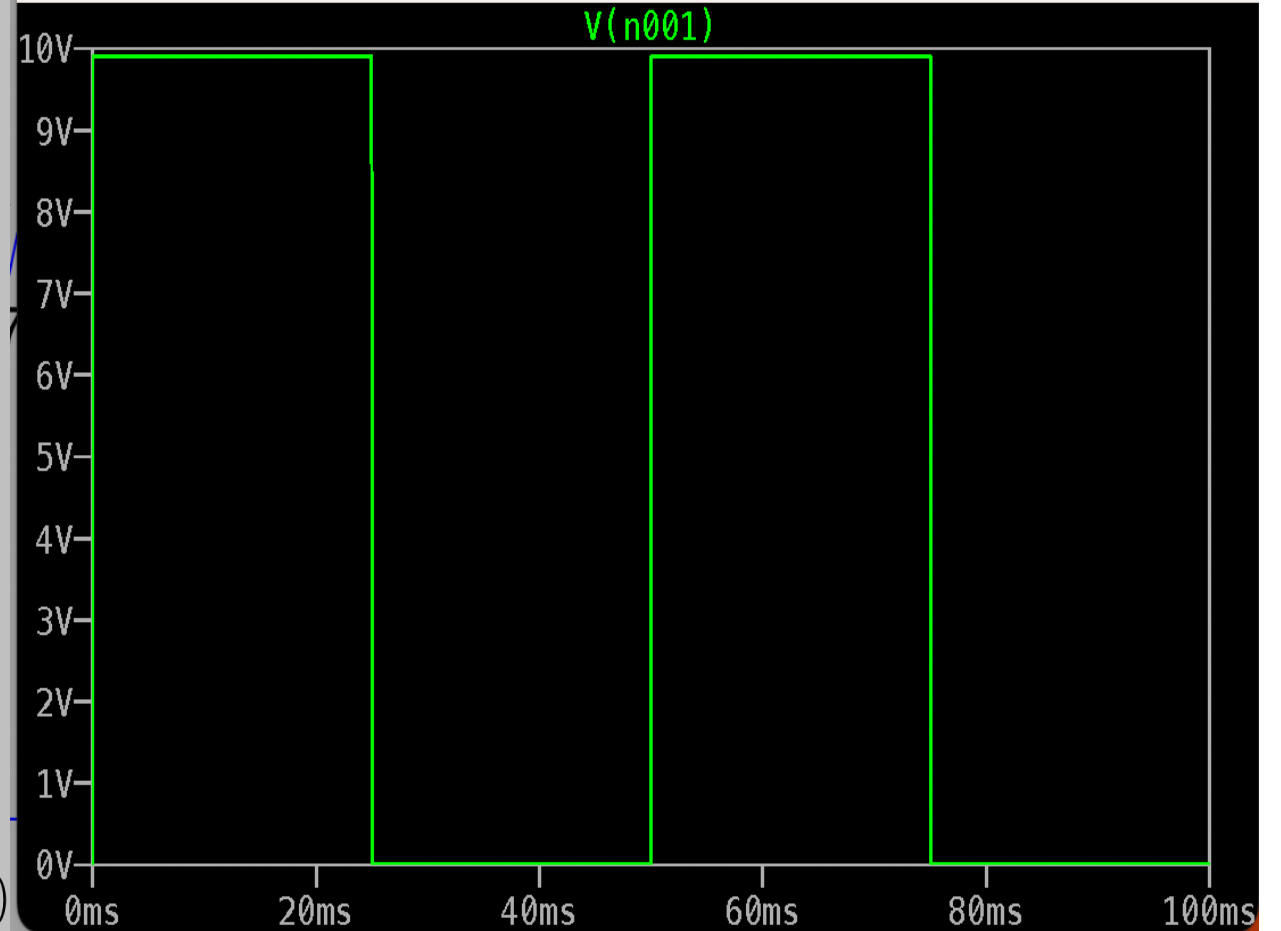


# Voltage near Resistor

```
.model SW1 SW(Ron=1m Roff=100meg Vt=2)
```



```
.model D_ideal D(Ron=0.0001 Roff=100G Vfwd=2.1)
```



# BOM (Bill of Material)

Qty	Description	Long Description	ROHS
1 (3)	Relay, Telecom, DPDT 2A 5VDC	Telecom Relay DPDT (2 Form C) Surface Mount	10
1 (0.27)	LED Red Clear 5mm round T/H	Red 624 nm LED Indication - Discrete 2.1V Radial	10
1 (0.3)	Res 475 ohm 0.4W 1% AXIAL	475 Ohms +-1% 0.4W Through Hole Resistor Axial Metal Film	10
1 (2.31)	Switch Pushbutton SPST 1A 30V	Pushbutton Switch SPST Standard Through Hole	3
1 (0.34)	Diode Schottky 40V 1A DO41	Diode 40V 1A Through Hole DO-41	10
1 (0.48)	Diode Schottky 30V 200MA DO35	Diode 30V 200mA Through Hole DO-35 (DO-204AH)	10