

## PT5071 Voltage Adjustment Note

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### ABSTRACT

There are two adjustment features for the PT5070 Series. One feature allows the output voltage to be adjusted to something other than the preset voltages. The second feature allows adjustment to the undervoltage lockout (UVLO) set-point, where, an initial internal reference voltage to the input voltage level initiates a power-up sequence level.

### 1 Output Voltage Adjustment ( $V_O$ Adjust)

*If no adjustment is required - Pin 14 is open, no pull-up components.* The output voltage can be adjusted higher or lower than the factory set value with the addition of a single external resistor. To increase the voltage, add a resistor R2, from  $V_O$ Adjust (pin 14) to ground (pins 7,8,9 or 10). To decrease the voltage, add a resistor R1, from  $V_O$ Adjust (pin 14) to  $+V_{OUT}$  (pins 11, 12 or 13). Do not use resistors R1 and R2 simultaneously.

Do not add any capacitors from  $V_O$ Adjust (pin 14) to GND or  $V_{OUT}$  as any capacitance at this node as it affects the stability of the device. The device can be adjusted up to a maximum of 15 V, and the minimum output voltage is 10 V.

To decrease the output voltage, choose the  $R_1$  value described in [Equation 1](#).

$$R_1 = \frac{R_0(V_A - V_R)}{(V_O - V_A)} - R_S \text{ (k}\Omega\text{)} \quad (1)$$

To increase the output voltage, choose the  $R_2$  value described in [Equation 2](#).

$$R_2 = \frac{R_0(V_R)}{(V_A - V_O)} - R_S \text{ (k}\Omega\text{)} \quad (2)$$

### 2 Undervoltage Lockout Adjustment (UVLO)

*If no adjustment is required - Pin 2 is open, no pull-up components.* This adjustment presets the nominal voltage power-on reference which initiates power-output transition. UVLO can be adjusted to a lower or higher set point by adding a single resistor. To increase UVLO, add resistor R4 from the UVLO Adj pin 2 to ground (pins 7,8,9 or 10). To adjust the voltage down, add a resistor R3, from  $V_{out}$ Adjust (pin 12) to  $+V_{out}$  (pins 4, 5, 6). Do not use resistors R3 and R4 simultaneously or the device does not function. UVLO can be adjusted up to 10 V, and the minimum output voltage is 4.5 V.

To decrease the undervoltage lockout threshold voltage, choose the  $R_3$  value described in [Equation 3](#)

$$R_{3(UVLO)} = \frac{R_{01}(V_{nUV} - V_R)}{(V_{OUV} - V_{nUV})} - R_S \text{ (k}\Omega\text{)} \quad (3)$$

To increase the undervoltage lockout threshold, choose the  $R_4$  value described in [Equation 4](#).

$$R_{4(UVLO)} = \frac{R_{O1}(V_R)}{(V_{nUV} - V_{OUV})} - R_S \text{ (k}\Omega\text{)} \quad (4)$$

### 3 Resistor Values

#### 3.1 ISR Adjustment Range and Formula Parameters

**Table 1. Output Voltage Adjustment Table**

SYMBOL	PARAMETER	VALUE	UNIT
R <sub>O</sub>	Output resistance	56.6	kΩ
V <sub>OUT</sub>	Output voltage	12	V
V <sub>REF</sub>	Voltage reference	1.27	
V <sub>A</sub>	New adjusted output voltage	-	
R <sub>S</sub>		22.1	kΩ

**Table 2. Undervoltage (Low Limit) Adjustment Table**

SYMBOL	PARAMETER	VALUE	UNIT
R <sub>O1</sub>	Output resistance	22.1	kΩ
V <sub>OUV</sub>	Original preset undervoltage lockout	6.65	V
V <sub>REF</sub>	Undervoltage reference	1.225	
V <sub>A</sub>	New adjusted undervoltage lockout	-	
R <sub>S1</sub>		6.34	kΩ

**Table 3. Resistor Values for Decreasing Output Voltage**

OUTPUT VOLTAGE (V) V <sub>O</sub>	RESISTANCE (kΩ) R <sub>ADJ</sub>
15.0	0.6
14.5	5.1
14.0	11.9
13.5	23.3
13.0	45.9
12.5	114.0
12.0	-

**Table 4. Resistor Values for Increasing Output Voltage**

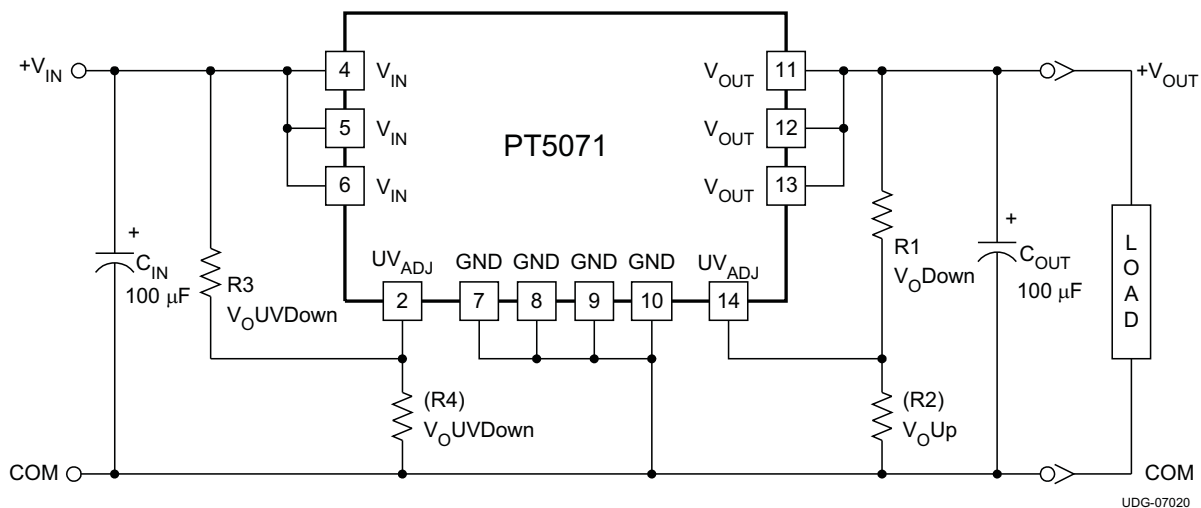
OUTPUT VOLTAGE (V) V <sub>O</sub>	RESISTANCE (kΩ) R <sub>ADJ</sub>
10.0	211.7
10.5	307.5
11.0	499.1
11.5	1073.9
12.0	-

**Table 5. Resistor Values for Decreasing Undervoltage**

OUTPUT VOLTAGE (VnUV) (V)	UNDervOLTAGE LOCKOUT RESISTANCE (R4) (kΩ)
10.5	0.7
10.0	1.7
9.5	3.2
9.0	5.2
8.5	8.3
8.0	13.7
7.5	25.5
7.0	71.1
6.65	-

**Table 6. Resistor Values for Increasing Undervoltage**

OUTPUT VOLTAGE (VnUV) (V)	UNDervOLTAGE LOCKOUT RESISTANCE (R4) (kΩ)
4.5	27.3
5.0	44.2
5.5	75.8
6.0	155.9
6.5	769.0
6.65	-



**Figure 1. Design Example Schematic**

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