APPLICATION INFORMATION

Adjusting the Output Voltage of the PTN78060 Wide-Output Adjust Power Modules

General

A resistor must be connected between the *V_O Adjust* control (pin 4) and *GND* (pin 1) to set the output voltage. The adjustment range is from 2.5 V to 12.6 V for PTN78060W. The adjustment range is from 11.85 V to 22 V for PTN78060H. If pin 4 is left open, the output voltage defaults to the lowest value.

Table 2 gives the standard resistor value for a number of common voltages, and with the actual output voltage that the value produces. For other output voltages, the resistor value can either be calculated using Equation 1 and the constants for the applicable product in Table 1. Alternatilvey, R_{SET} can be simply selected from the range of values given in Table 3 and Table 4. Figure 27 shows the placement of the required resistor.

$$R_{SET} = 54.9\ k\Omega \times \frac{1.25\ V}{V_O - V_{min}} - R_P \quad (1)$$

Table 1. R_{SET} Formula Constants

PRODUCT	V_{MIN}	R_P
PTN780x0W	2.5 V	6.49 kΩ
PTN780x0H	11.824 V	6.65 kΩ

Input Voltage Considerations

The PTN78060 is a step-down switching regulator. In order that the output remains in regulation, the input voltage must exceed the output by a minimum differential voltage.

Another consideration is the pulse width modulation (PWM) range of the regulator's internal control circuit. For stable operation, its operating duty cycle should not be lower than some minimum percentage. This defines the maximum advisable ratio between the regulator input and output voltage magnitudes.

For satisfactory performance, the operating input voltage range of the PTN78060x must adhere to the following requirements.

1. For PTN78060W output voltages lower than 10 V, the minimum input voltage is (V_O+ 2 V) or 7 V, whichever is higher.
2. For PTN78060W output voltages equal to 10 V and higher, the minimum input voltage is (V_O+ 2.5 V).
3. The maximum input voltage for PTN78060W is (10 × V_O) or 36 V, whichever is less.
4. For PTN78060H output voltages lower than 19 V, the minimum input voltage is (V_O + 3 V) or 15 V, whichever is higher.
5. For PTN78060H output voltages equal to 19 V and higher, the minimum input voltage is (V_O+ 4 V) .

As an example, Table 2 gives the operating input voltage range for the common output bus voltages. In addition, the Electrical Characteristics table defines the available output voltage adjust range for various input voltages.

Table 2. Standard Values of R_{set} for Common Output Voltages

PRODUCT	V_O (Required)	R_{SET} (Standard Value)	V_O (Actual)	Operating V_I Range
PTN780x0W	2.5 V	Open	2.5 V	7 V to 25 V
	3.3 V	78.7 kΩ	3.306 V	7 V to 33 V
	5 V	21 kΩ	4.996 V	7 V to 36 V
	12 V	732 Ω	12.002 V	14.5 V to 36 V
PTN780x0H	12 V	383 kΩ	12.000 V	15 V to 36 V
	15 V	15 kΩ	14.994 V	18 V to 36 V
	18 V	4.42 kΩ	18.023 V	21 V to 36 V
	22 V	95.3	21.998 V	26 V to 36 V