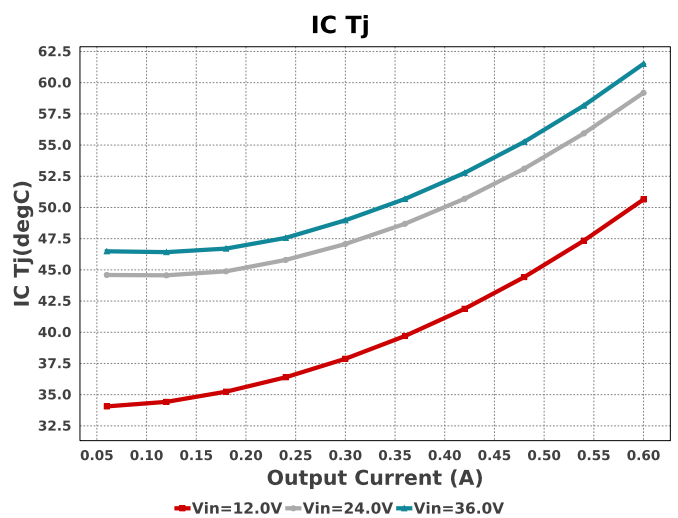
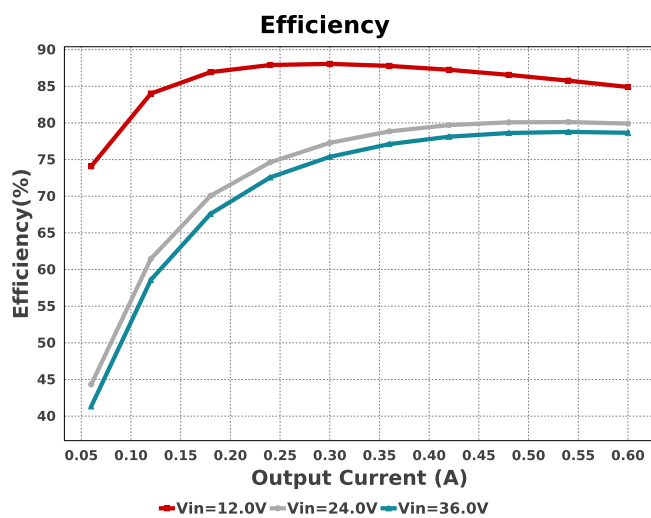
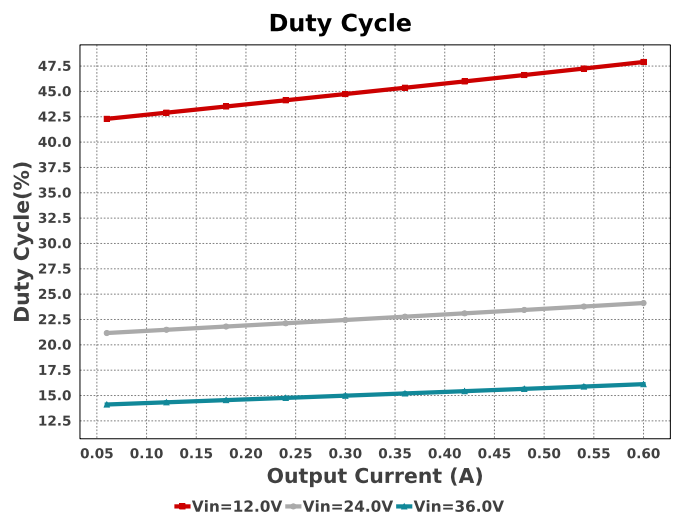
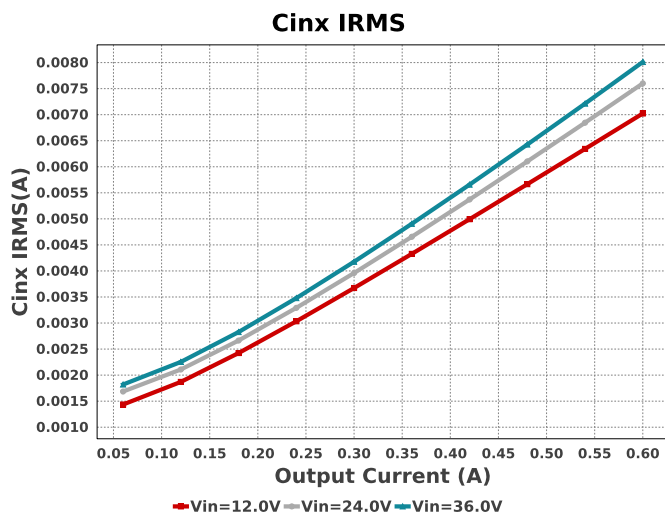
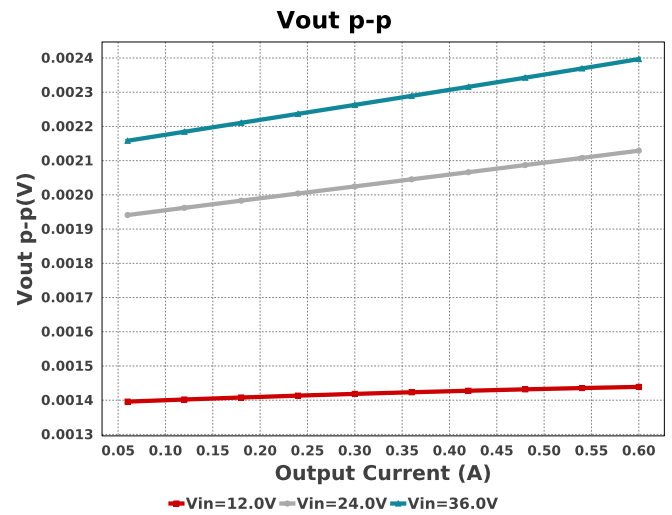
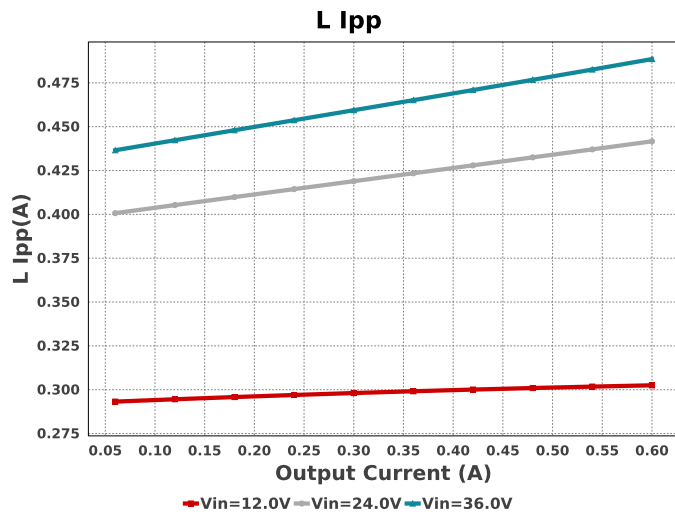
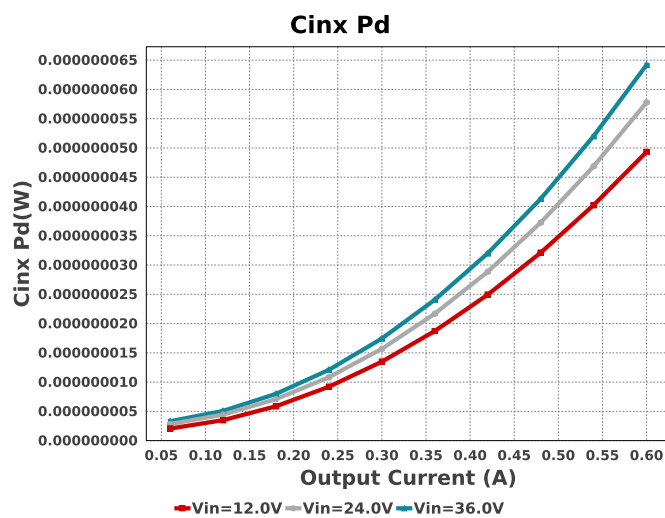
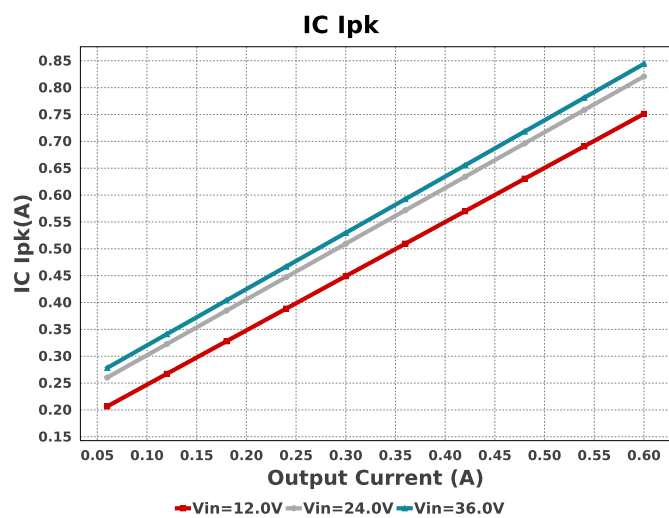
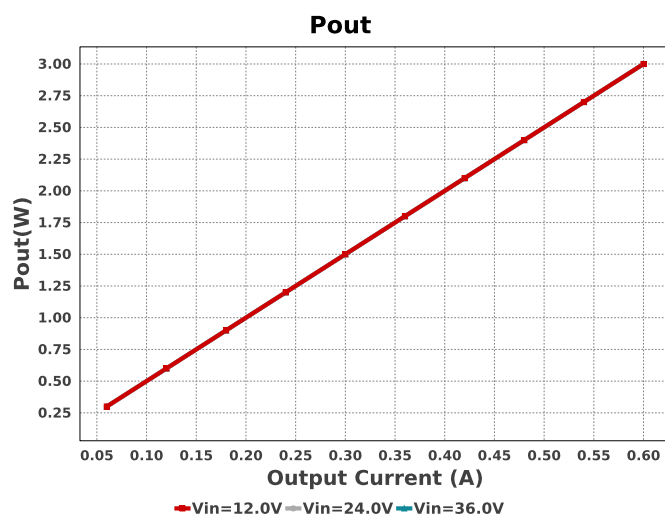
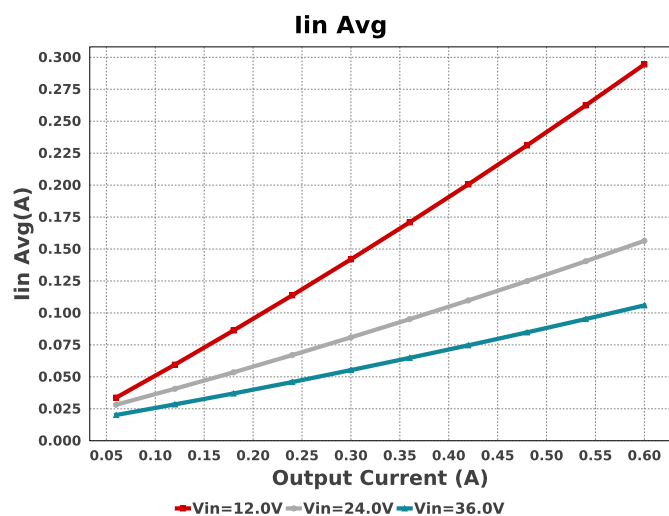
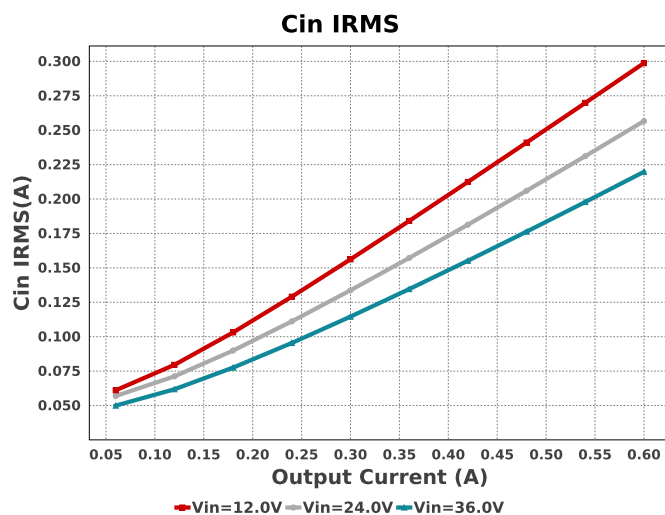
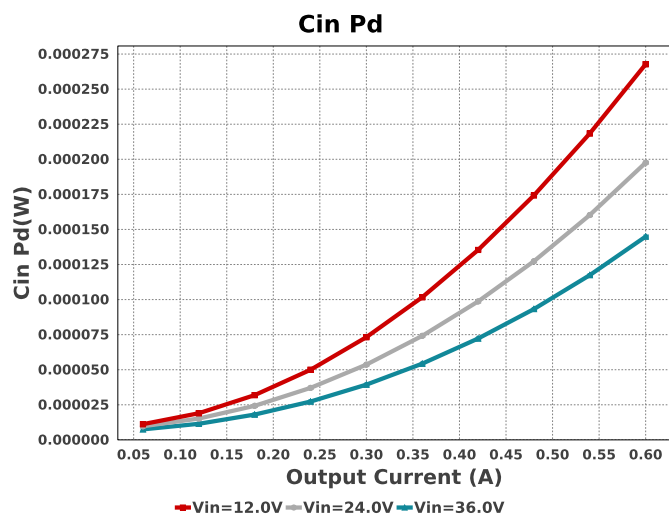
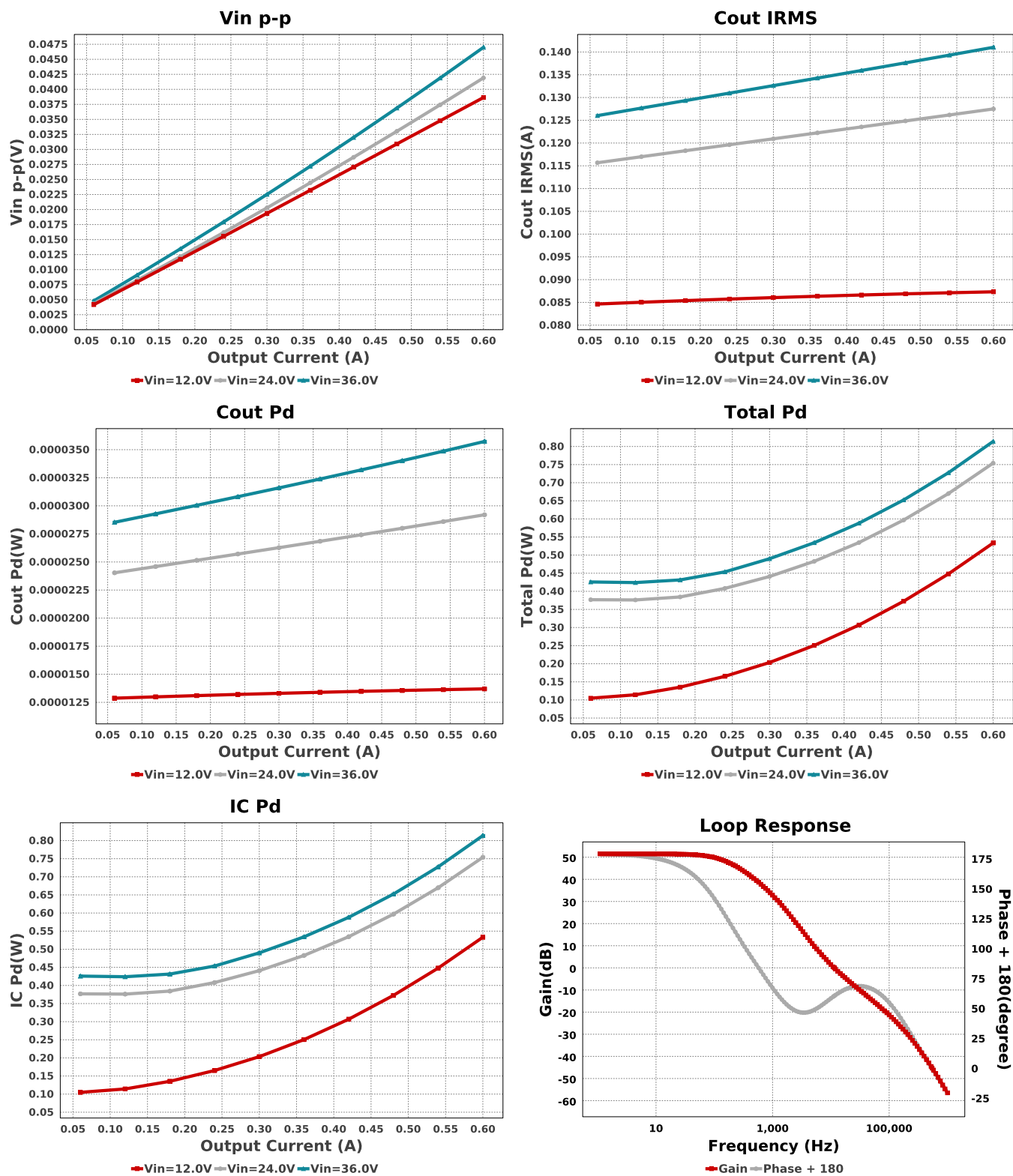




Device = TPSM365R6V5RDNR
Topology = Buck
Created = 2026-07-13 09:20:17.524
BOM Cost = \$2.30
BOM Count = 7
Total Pd = 0.81W







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	219.77 mA	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	144.9 μ W	Capacitor	Input capacitor power dissipation
3.	Cinx IRMS	8.012 mA	Capacitor	Bulk capacitor RMS ripple current
4.	Cinx Pd	64.185 nW	Capacitor	Bulk capacitor power dissipation
5.	Cout IRMS	141.031 mA	Capacitor	Output capacitor RMS ripple current
6.	Cout Pd	35.732 μ W	Capacitor	Output capacitor power dissipation
7.	IC Ipk	844.273 mA	IC	Peak switch current in IC
8.	IC Pd	813.71 mW	IC	IC power dissipation
9.	IC Tj	61.507 degC	IC	IC junction temperature
10.	IC Tolerance	70.0 mV	IC	IC Feedback Tolerance
11.	ICThetaJA Effective	38.72 degC/W	IC	Effective IC Junction-to-Ambient Thermal Resistance

#	Name	Value	Category	Description
12.	Iin Avg	105.94 mA	IC	Average input current
13.	Cin Pd	144.9 μ W	Power	Input capacitor power dissipation
14.	Cinx Pd	64.185 nW	Power	Bulk capacitor power dissipation
15.	Cout Pd	35.732 μ W	Power	Output capacitor power dissipation
16.	IC Pd	813.71 mW	Power	IC power dissipation
17.	Total Pd	813.873 mW	Power	Total Power Dissipation
18.	BOM Count	7	System	Total Design BOM count
19.	Cross Freq	11.449 kHz	System	Bode plot crossover frequency
20.	Duty Cycle	16.12 %	System	Duty cycle
21.	Efficiency	78.66 %	System	Steady state efficiency
22.	FootPrint	72.0 mm ²	System	Total Foot Print Area of BOM components
23.	Frequency	1000.0 kHz	System	Switching frequency
24.	Gain Marg	-45.242 dB	System	Bode Plot Gain Margin
25.	Iout	600.0 mA	System	Iout operating point
26.	L Ipp	488.55 mA	System	Peak-to-peak inductor ripple current
27.	Low Freq Gain	51.513 dB	System	Gain at 1Hz
28.	Mode	CCM	System	Conduction Mode
29.	Phase Marg	60.866 deg	System	Bode Plot Phase Margin
30.	Pout	3.0 W	System	Total output power
31.	Total BOM	\$2.3	System	Total BOM Cost
32.	Vin	36.0 V	System	Vin operating point
33.	Vin p-p	46.996 mV	System	Peak-to-peak input voltage
34.	Vout	5.0 V	System	Operational Output Voltage
35.	Vout Tolerance	1.4 %	System	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
36.	Vout p-p	2.397 mV	System	Peak-to-peak output ripple voltage

Design Inputs

Name	Value	Description
Iout	600.0 m	Maximum Output Current
VinMax	36.0	Maximum input voltage
VinMin	12.0	Minimum input voltage
Vout	5.0	Output Voltage
base_pn	TPSM365R6V5	Base Product Number
source	DC	Input Source Type
Ta	30.0	Ambient temperature

WEBENCH® Assembly

Component Testing

Some published data on components in datasheets such as Capacitor ESR and Inductor DC resistance is based on conservative values that will guarantee that the components always exceed the specification. For design purposes it is usually better to work with typical values. Since this data is not always available it is a good practice to measure the Capacitance and ESR values of C_{in} and C_{out} , and the inductance and DC resistance of $L1$ before assembly of the board. Any large discrepancies in values should be electrically simulated in WEBENCH to check for instabilities and thermally simulated in WebTHERM to make sure critical temperatures are not exceeded.

Soldering Component to Board

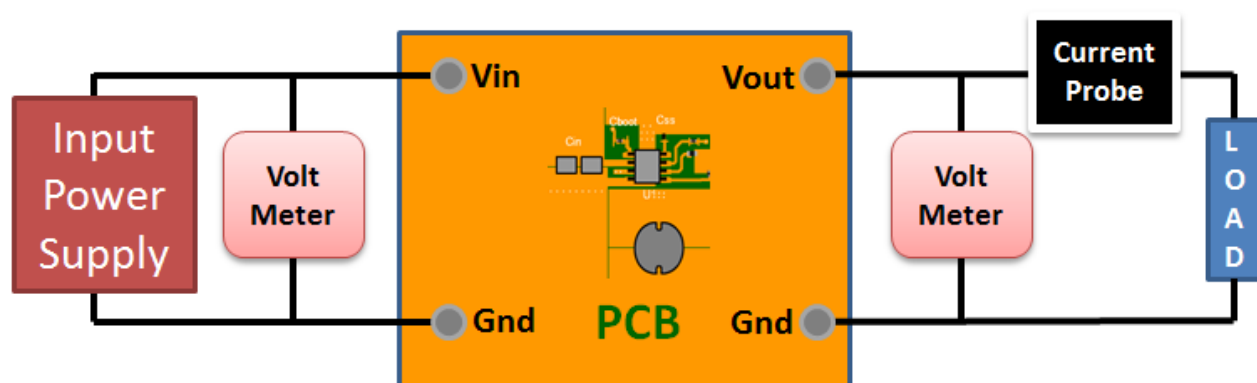
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. To solder the tab down to the board place the iron down on the board while resting against the tab, heating both surfaces simultaneously. Apply light pressure to the top of the plastic case until the solder flows around the part and the part is flush with the PCB. If the solder is not flowing around the board you may need a higher wattage iron (generally 25W to 30W is enough).

Initial Startup of Circuit

It is best to initially power up the board by setting the input supply voltage to the lowest operating input voltage 12.0V and set the input supply's current limit to zero. With the input supply off connect up the input supply to V_{in} and GND. Connect a digital volt meter and a load if needed to set the minimum load of the design from V_{out} and GND. Turn on the input supply and slowly turn up the current limit on the input supply. If the voltage starts to rise on the input supply continue increasing the input supply current limit while watching the output voltage. If the current increases on the input supply, but the voltage remains near zero, then there may be a short or a component misplaced on the board. Power down the board and visually inspect for solder bridges and recheck the diode and capacitor polarities. Once the power supply circuit is operational then more extensive testing may include full load testing, transient load and line tests to compare with simulation results.

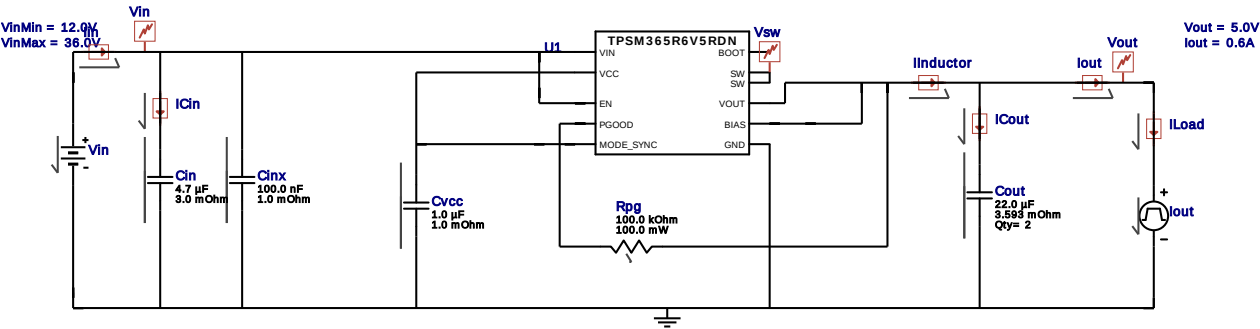
Load Testing

The setup is the same as the initial startup, except that an additional digital voltmeter is connected between V_{in} and GND, a load is connected between V_{out} and GND and a current meter is connected in series between V_{out} and the load. The load must be able to handle at least rated output power + 50% (7.5 watts for this design). Ideally the load is supplied in the form of a variable load test unit. It can also be done in the form of suitably large power resistors. When using an oscilloscope to measure waveforms on the prototype board, the ground leads of the oscilloscope probes should be as short as possible and the area of the loop formed by the ground lead should be kept to a minimum. This will help reduce ground lead inductance and eliminate EMI noise that is not actually present in the circuit.



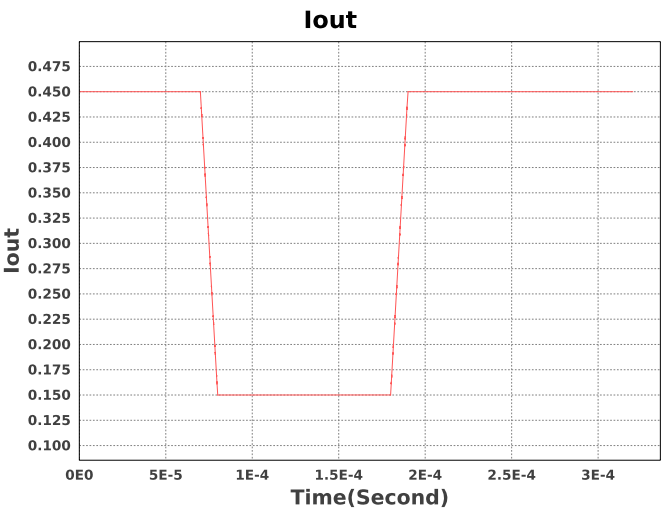
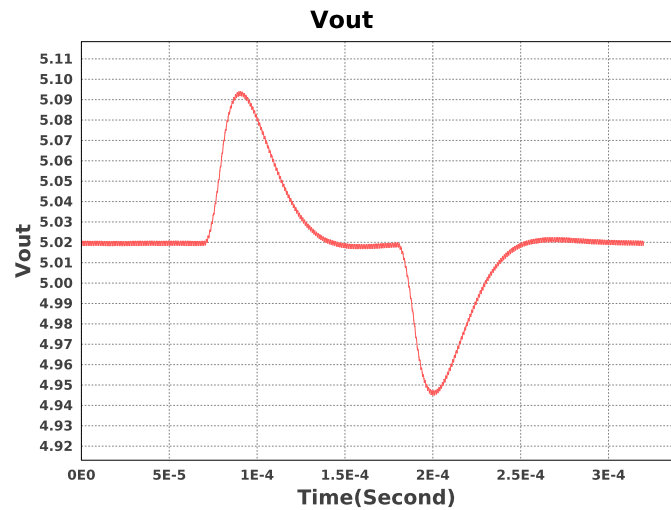
WEBENCH® Electrical Simulation Report

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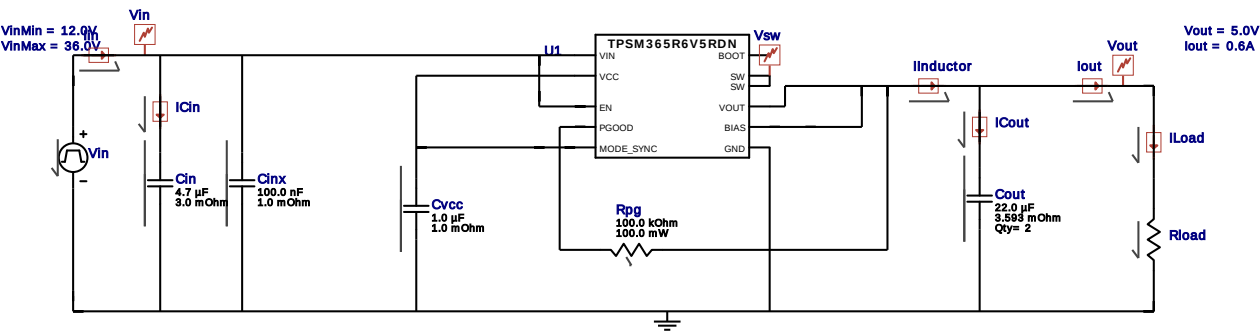


Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cvcc	IC	no description	5.0
2.	Iout	signal_type	Signal Type	PULSE
		I1	Initial Load Current	0.44999999999999996 A
		I2	Minimum Load Current	0.15 A
		Td	Initial Time Delay	70u s
		Tf	Fall Time	10u s
		Tr	Rise Time	10u s
		Pw	Pulse Width	100u s

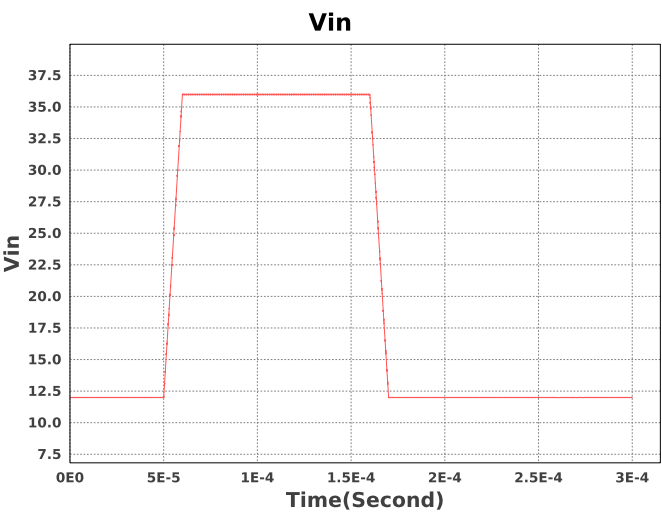
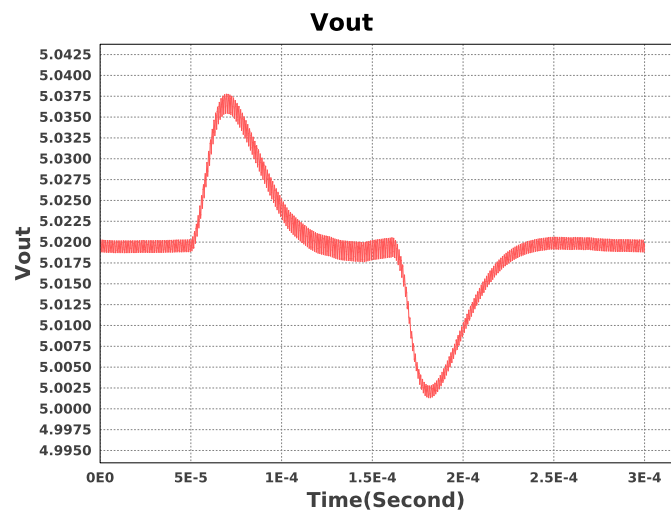


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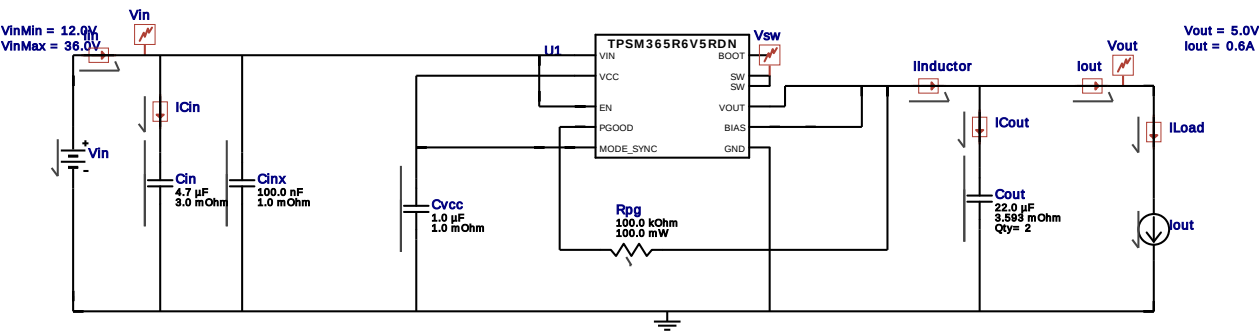


Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cvc	IC	no description	5.0
2.	Rload	R	load resistance	8.333333333333334 ohm

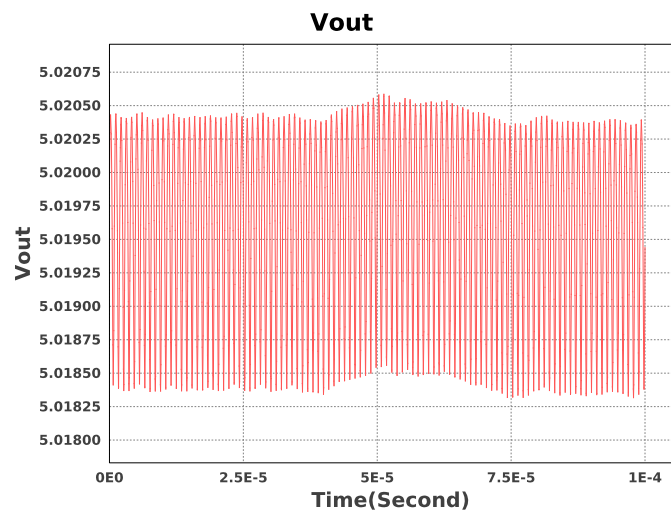


Design Id = 3
sim_id = 5
Simulation Type = Steady State



Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cvcc	IC	no description	5.0
2.	Iout	I	output current	0.6 A



Design Assistance

- Master key : DE5EF4FEB16E0A82774A8B8733283EA0[v1]
- TPSM365R6V5 Product Folder : <http://www.ti.com/product/TPSM365R6> : contains the data sheet and other resources.

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