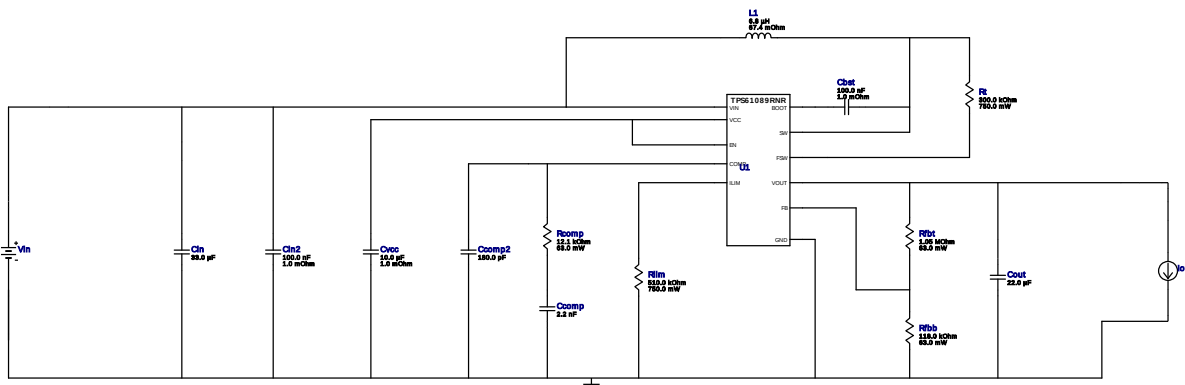


WEBENCH® Design Report

Design : 395938/2 TPS61089RNRR
TPS61089RNRR 4.0V-9.0V to 12.00V @ 0.2A



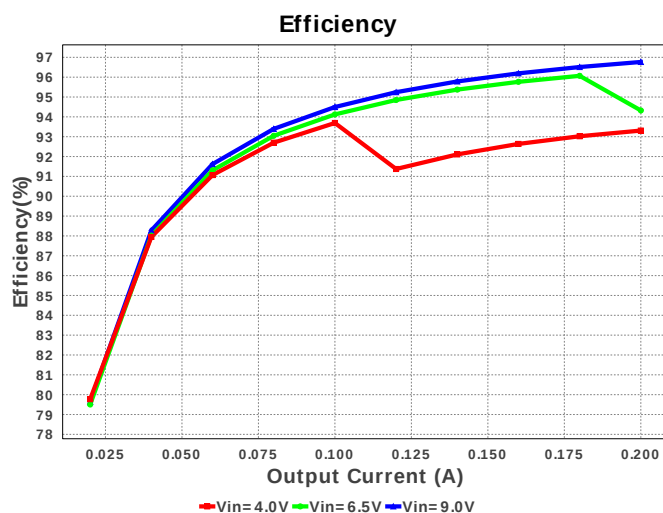
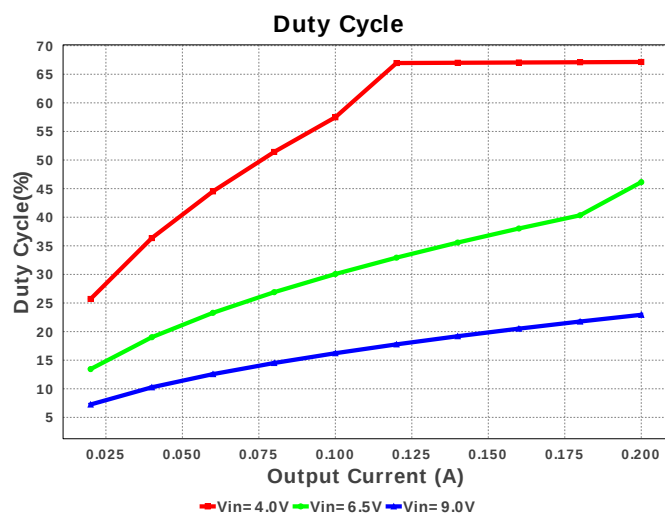
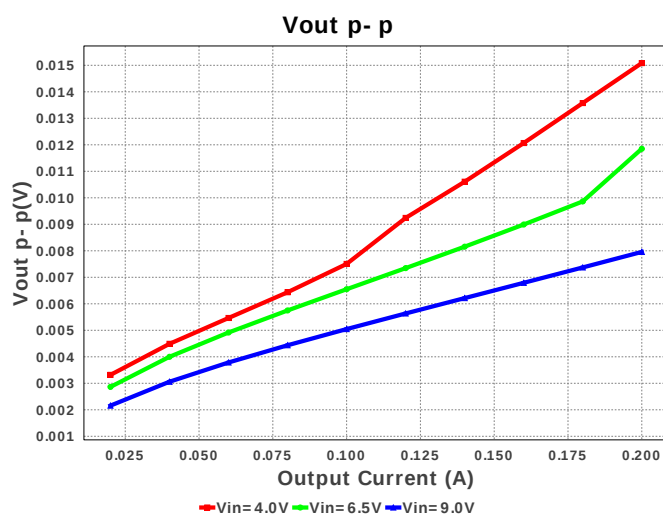
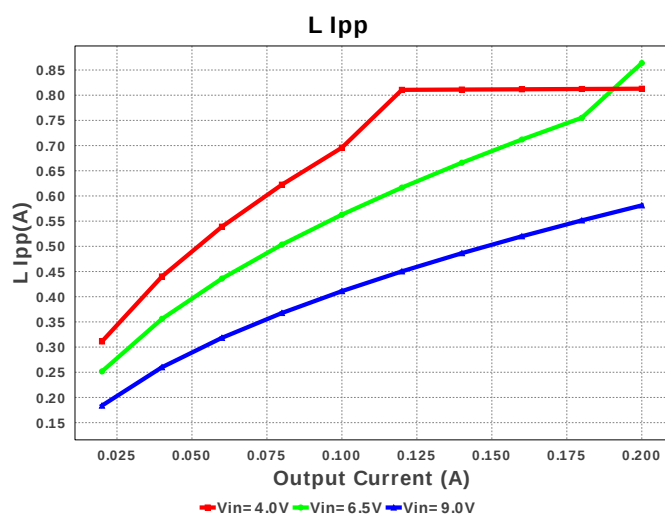
My Comments

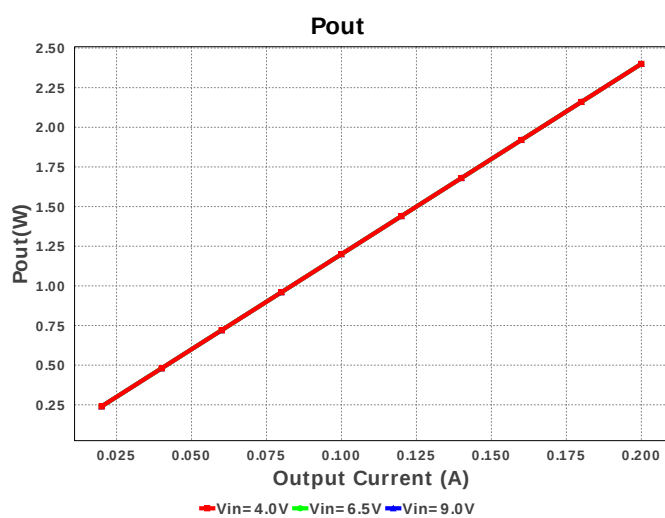
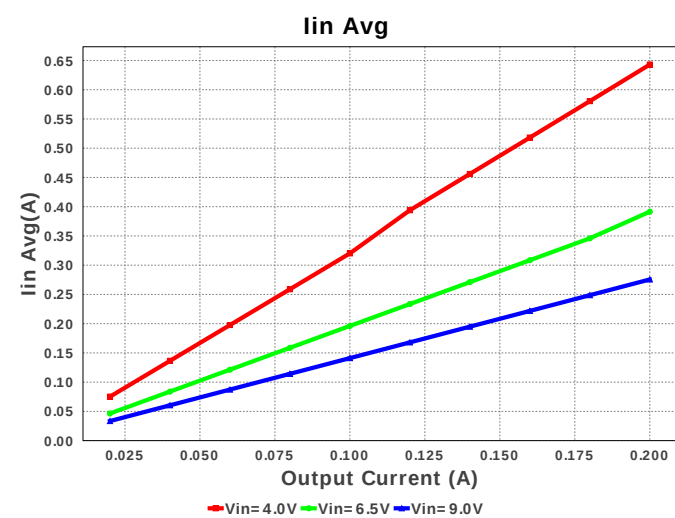
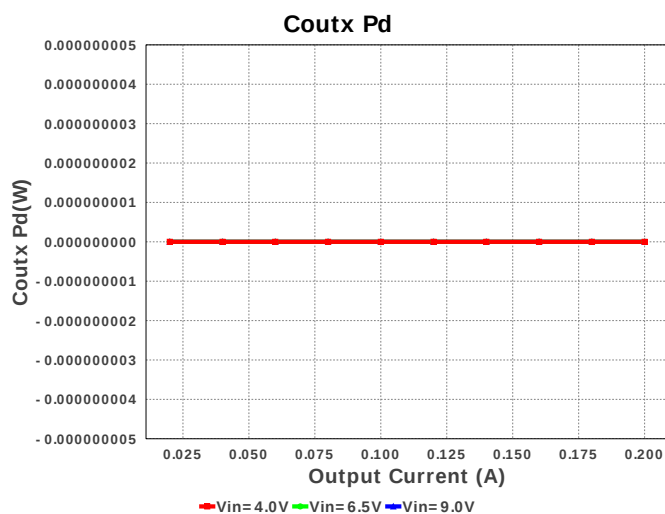
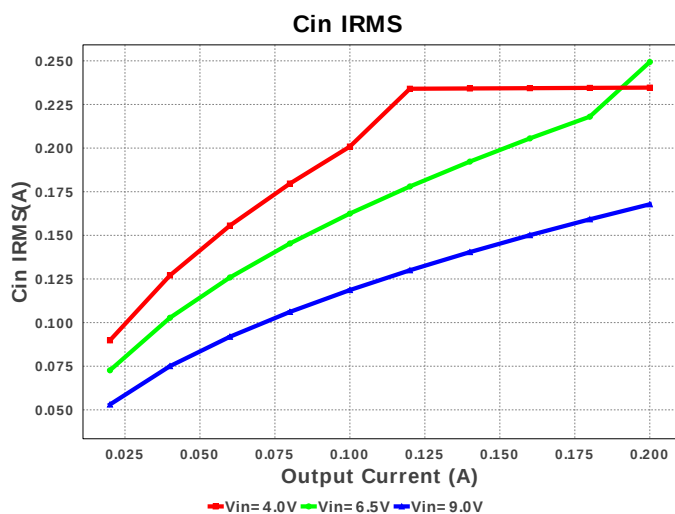
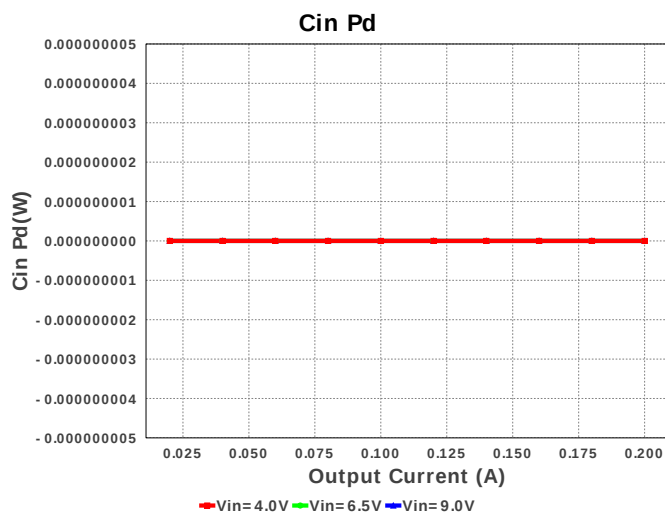
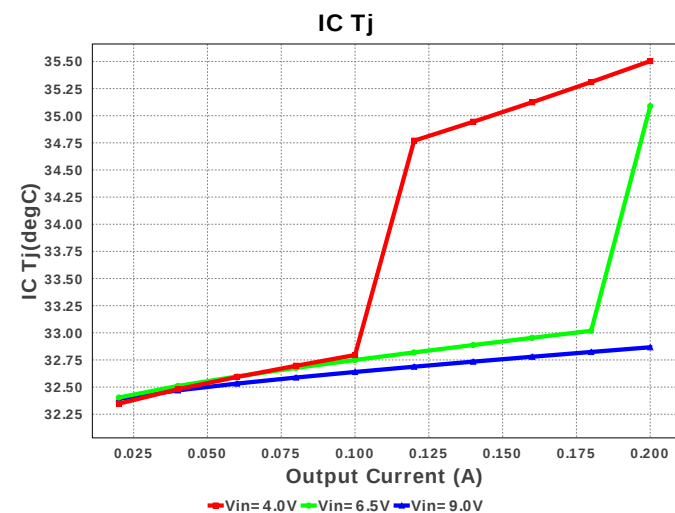
12 Volt SW Regulator

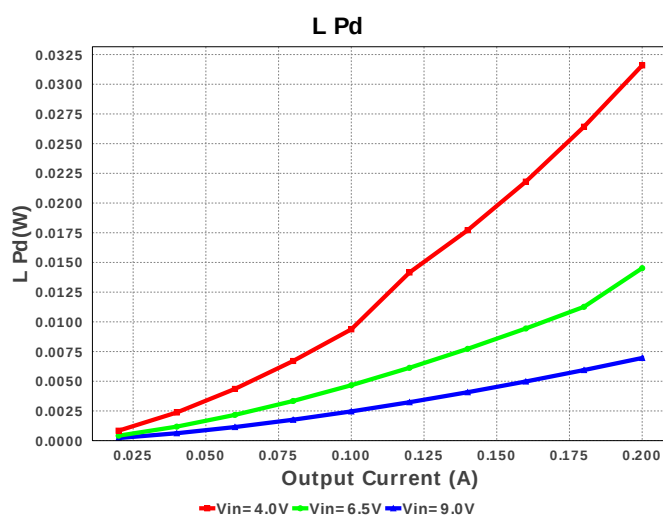
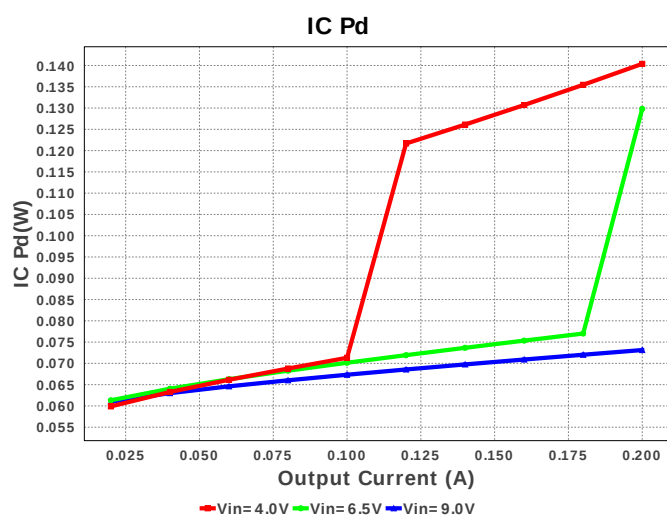
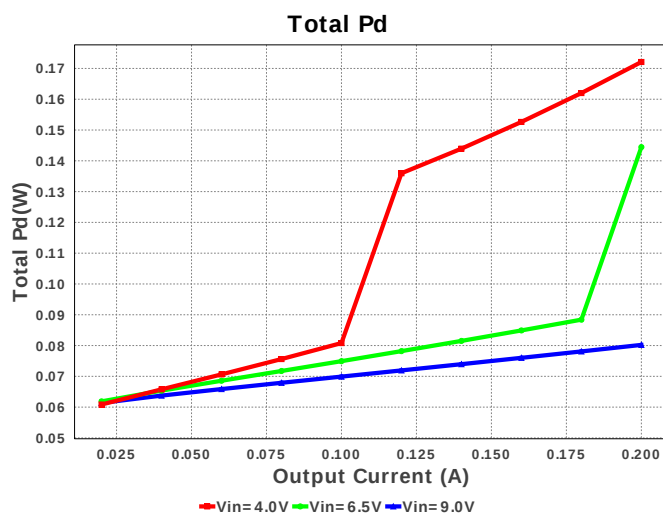
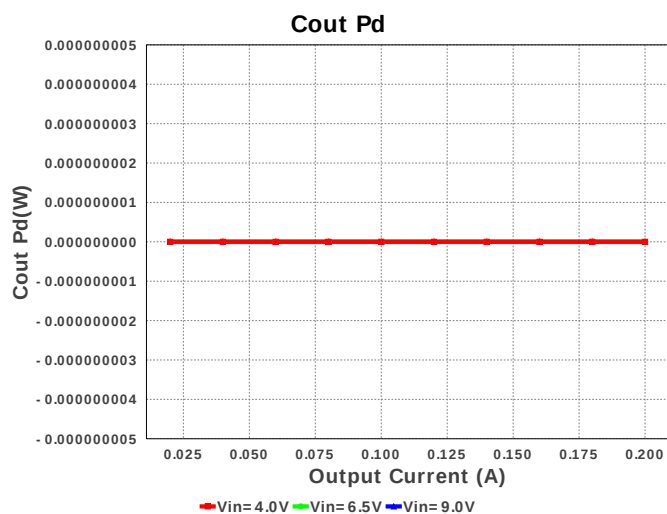
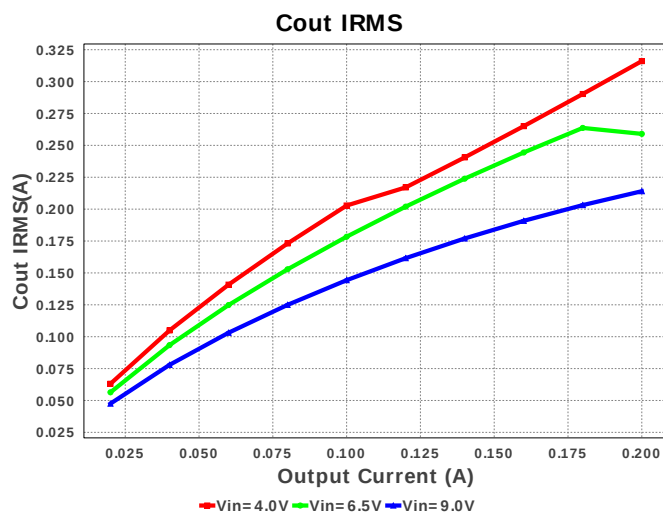
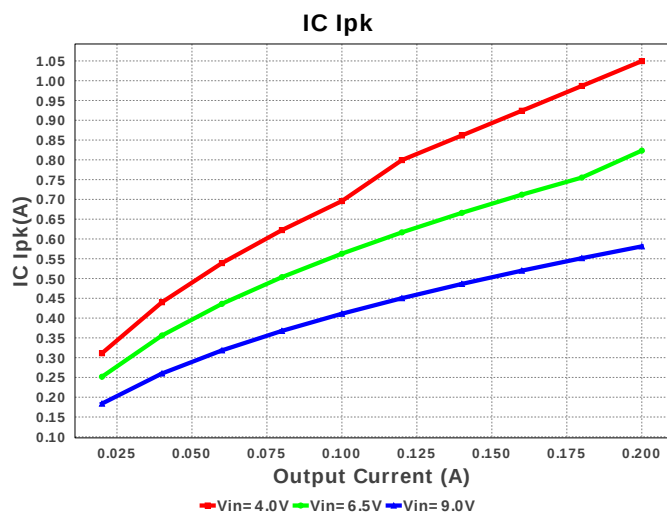
Electrical BOM

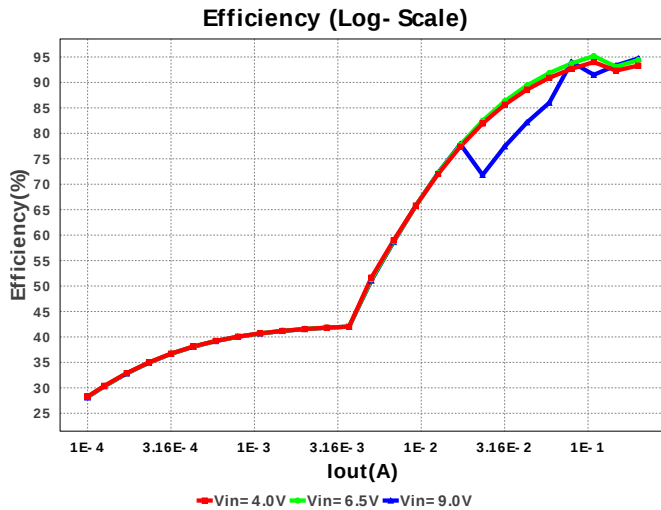
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	AVX	04025A221JAT2A Series= C0G/NP0	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	Ccomp2	Samsung Electro-Mechanics	CL21C181JBANNNC Series= C0G/NP0	Cap= 180.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
4.	Cin	MuRata	KCM55WR7YA336MH01K Series= X7R	Cap= 33.0 uF VDC= 35.0 V IRMS= 0.0 A	1	\$2.20	 KCM55W 59 mm ²
5.	Cin2	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
6.	Cout	MuRata	KCM55QR71E226KH01K Series= X7R	Cap= 22.0 uF VDC= 25.0 V IRMS= 0.0 A	1	\$1.44	 KCM55Q 59 mm ²
7.	Cvcc	MuRata	GRM21BR61A106KE19L Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm ²
8.	L1	Coilcraft	XAL4030-682MEB	L= 6.8 uH DCR= 67.4 mOhm	1	\$0.72	 XAL4030 25 mm ²
9.	Rcomp	Vishay-Dale	CRCW040212K1FKED Series= CRCW..e3	Res= 12.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	Rfbb	Vishay-Dale	CRCW0402118KFKED Series= CRCW..e3	Res= 118.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rfbt	Vishay-Dale	CRCW04021M05FKED Series= CRCW..e3	Res= 1.05 MOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	Rlim	Vishay-Dale	CRCW2010510KFKEF Series= ?	Res= 510.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	2010 32 mm ²
13.	Rt	Vishay-Dale	CRCW2010300KFKEF Series= ?	Res= 300.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	2010 32 mm ²
14.	U1	Texas Instruments	TPS61089RNRR	Switcher	1	\$1.10	RNR0011A 10 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	234.66 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	316.063 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.05 A	Current	Peak switch current in IC
4.	Iin Avg	643.02 mA	Current	Average input current
5.	L Ipp	812.89 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	14	General	Total Design BOM count
7.	FootPrint	248.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	485.909 kHz	General	Switching frequency
9.	Mode	BOOST CCM	General	PWM/PFM Mode
10.	Pout	2.4 W	General	Total output power
11.	Total BOM	\$5.62	General	Total BOM Cost
12.	ICThetaJA Effective	39.2 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Low Freq Gain	104.27 dB	Op_Point	Gain at 1Hz
14.	Vout Actual	11.997 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Cross Freq	16.929 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	67.148 %	Op_point	Duty cycle
17.	Efficiency	93.309 %	Op_point	Steady state efficiency
18.	Gain Marg	-18.616 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	35.503 degC	Op_point	IC junction temperature
20.	IOUT_OP	200.0 mA	Op_point	Iout operating point
21.	Phase Marg	53.656 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	4.0 V	Op_point	Vin operating point
23.	Vout p-p	15.084 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
25.	Cout Pd	0.0 W	Power	Output capacitor power dissipation
26.	Coutx Pd	0.0 W	Power	Output capacitor_x power loss
27.	IC Pd	140.382 mW	Power	IC power dissipation
28.	L Pd	31.588 mW	Power	Inductor power dissipation
29.	Total Pd	172.098 mW	Power	Total Power Dissipation
30.	Vout Tolerance	4.462 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	9.0	Maximum input voltage
3.	VinMin	4.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	TPS61089	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS61089** Product Folder : <http://www.ti.com/product/TPS61089> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).