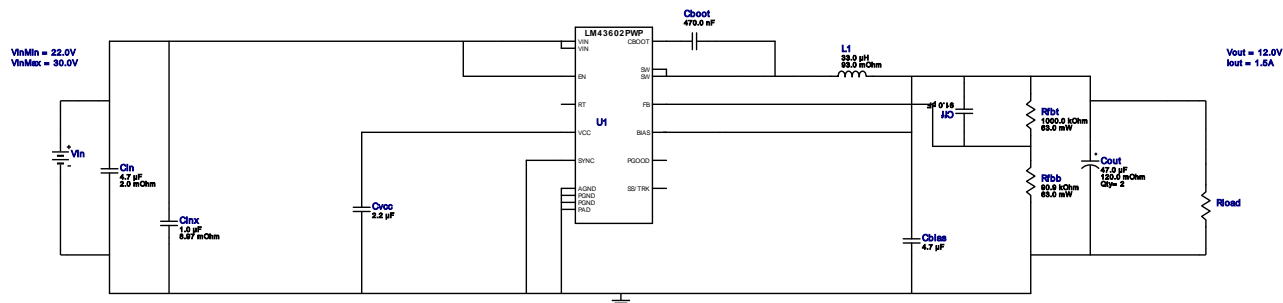




WEBENCH® Design Report

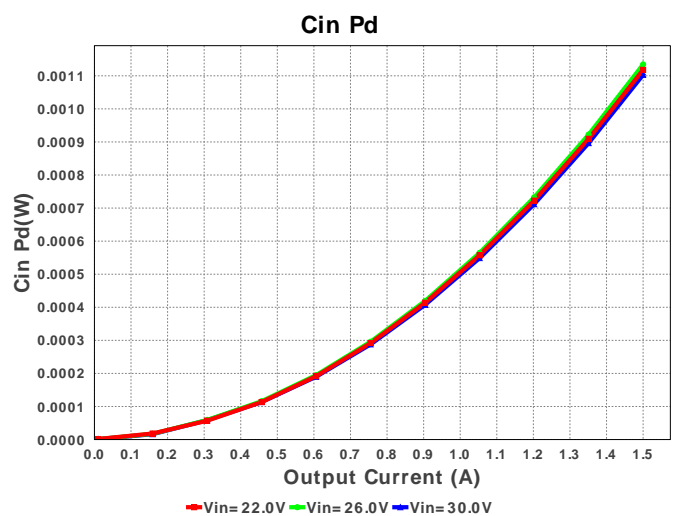
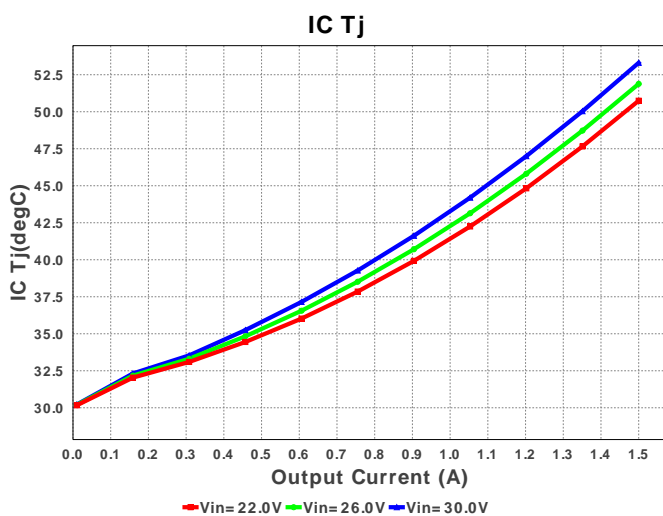
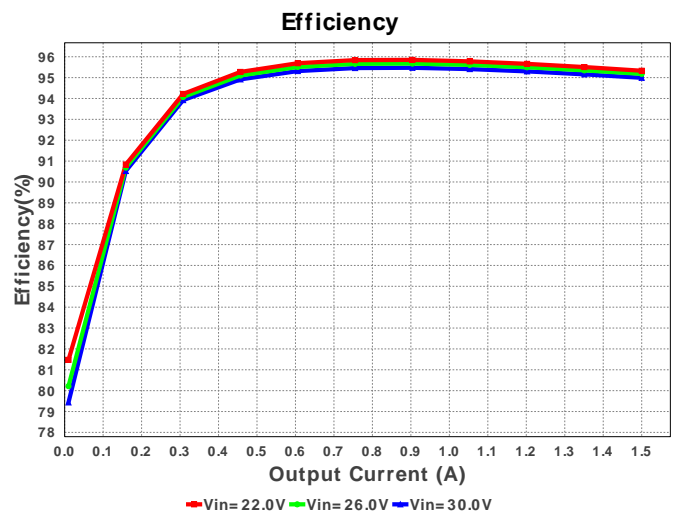
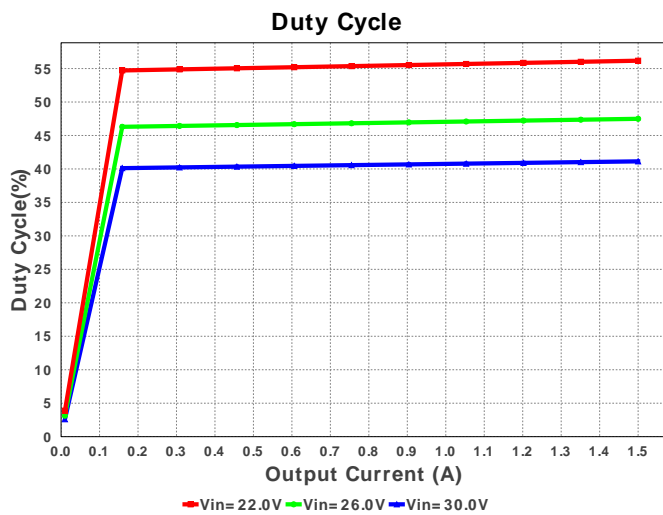
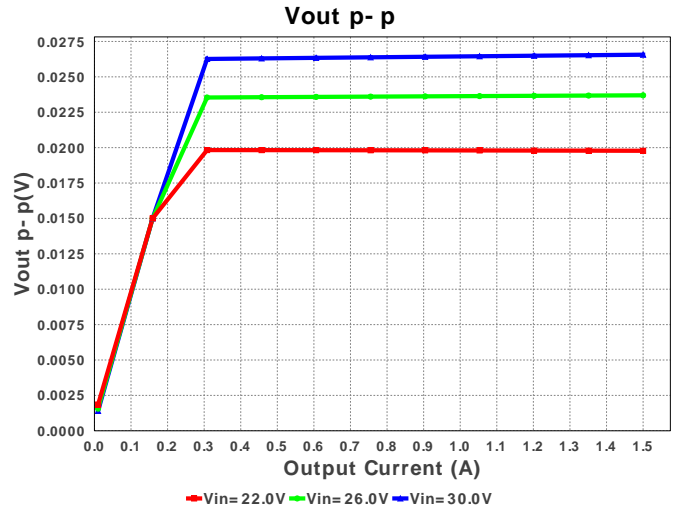
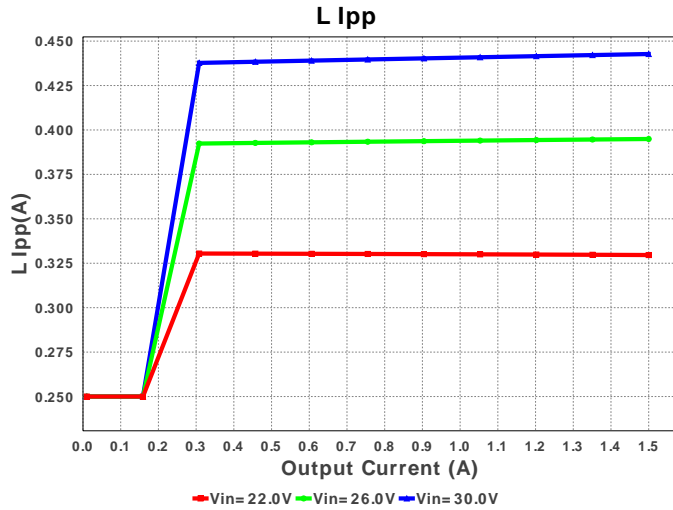
Design : 4270138/3 LM43602PWPR
LM43602PWPR 22.0V-30.0V to 12.00V @ 1.5A


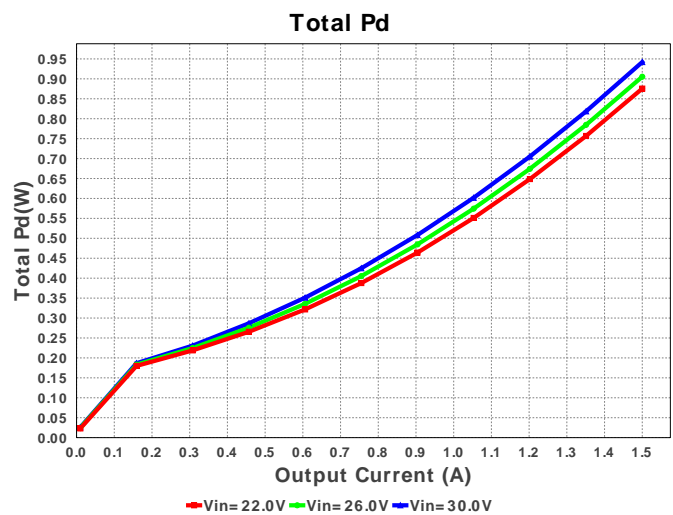
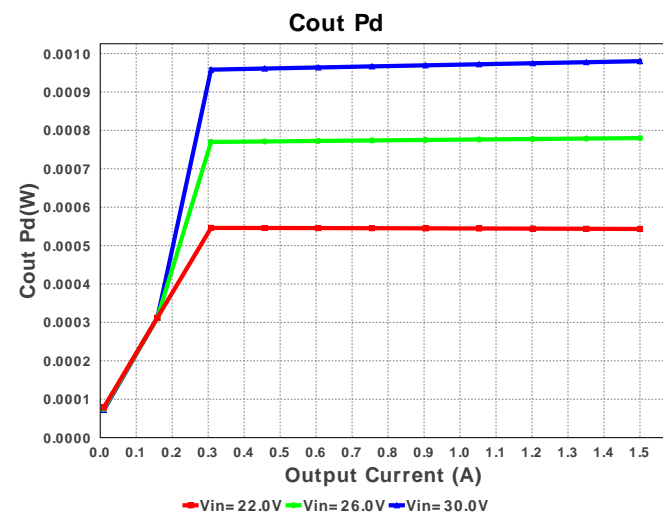
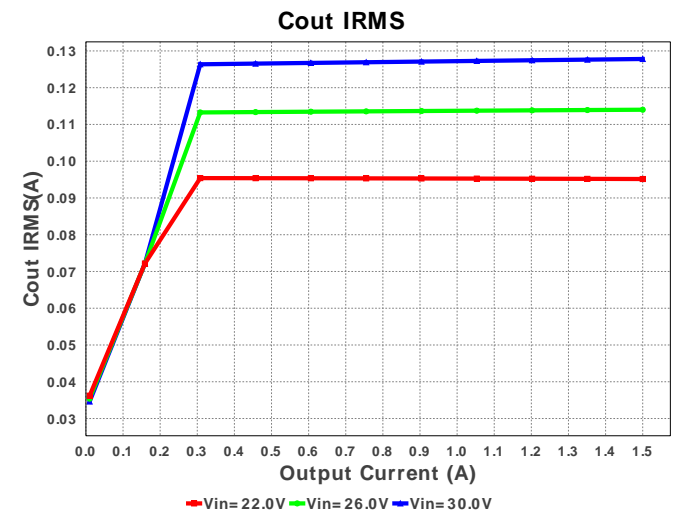
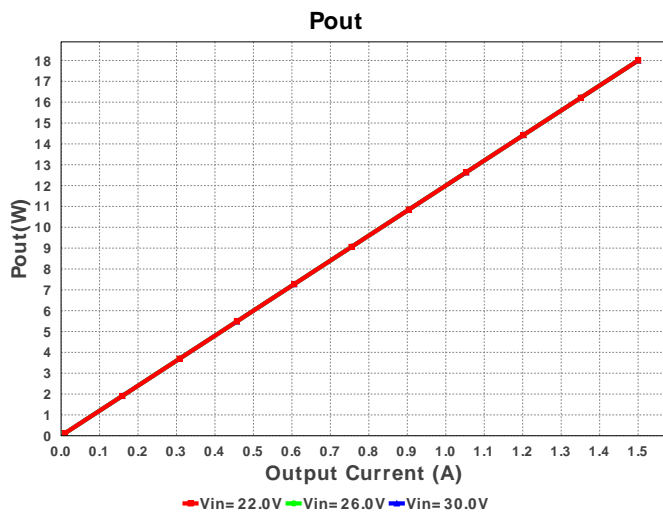
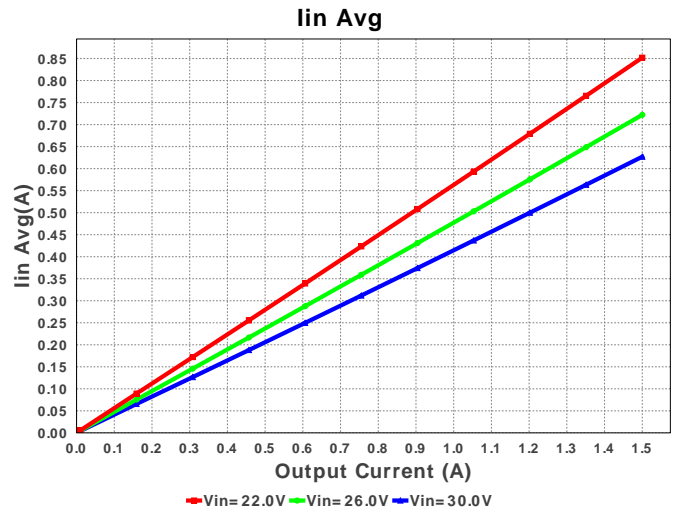
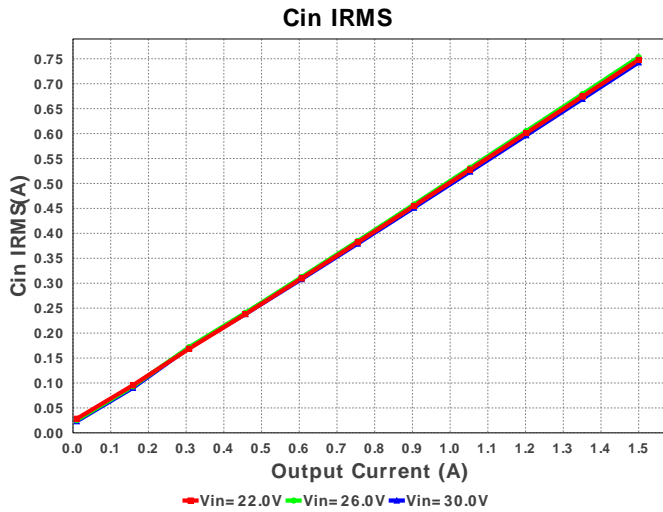
1. The input capacitor included in the BOM only contains a small filter capacitor that should be placed near the IC. Depending on where the power supply is laid out in the system additional bulk capacitance may need to be added to filter the line ripple.
2. If there is no VinTyp specified, WEBENCH will use the VinMax value. To change the VinTyp value, click on the "Change Design Inputs" button under the Optimization Tuning knob. In some applications, while the design requires the input voltage to be a wide range, for a majority of the time, it is operating at a much lower voltage than the maximum input voltage. Sizing the inductor based on the maximum input voltage may yield an inductance much larger than typically needed, causing a larger footprint for the overall design. At the same time, components such as the input capacitor must be rated based on the maximum input voltage. WEBENCH now supports the use of this additional input voltage specification.

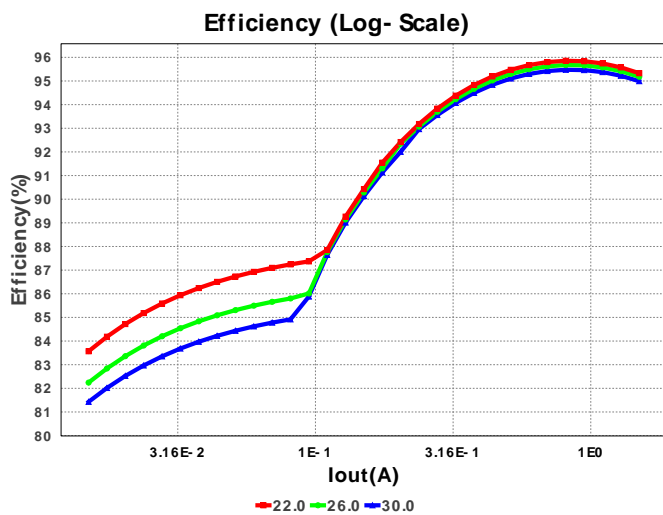
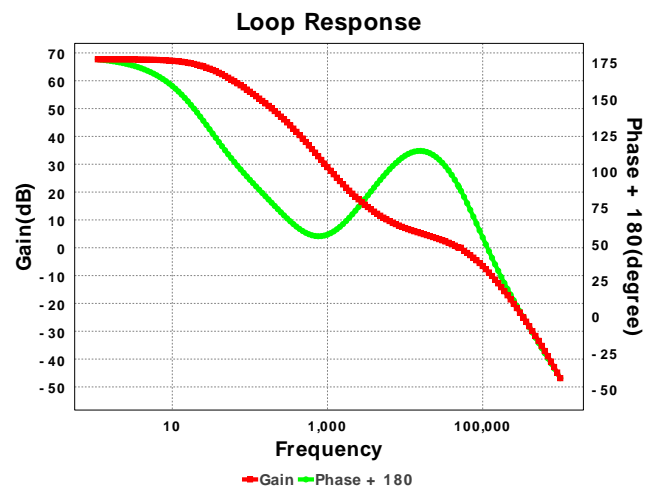
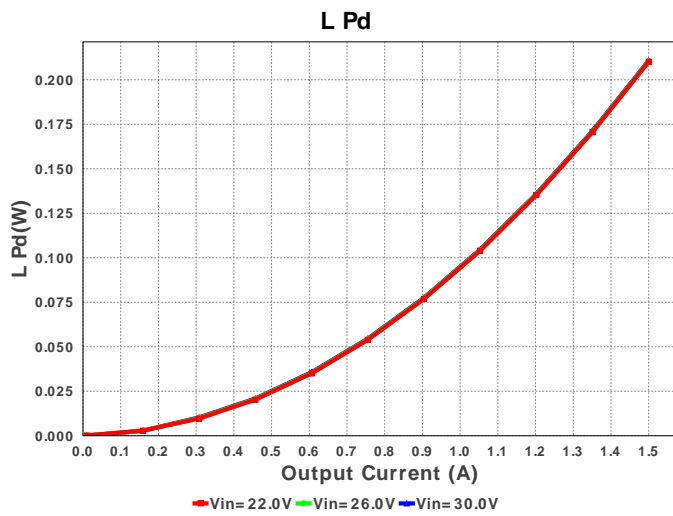
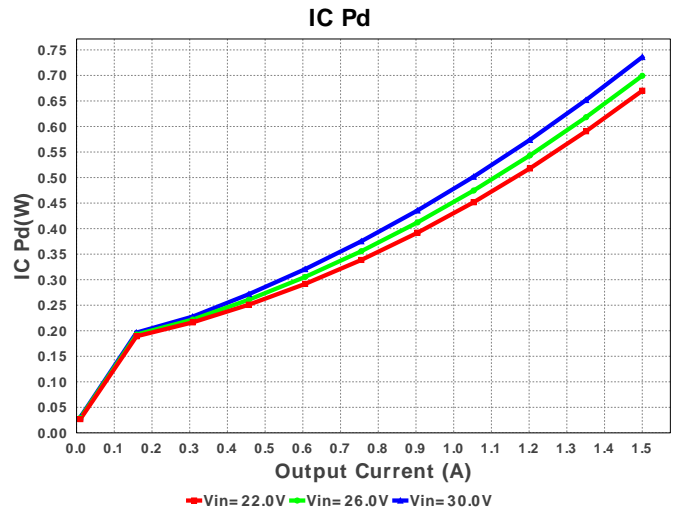
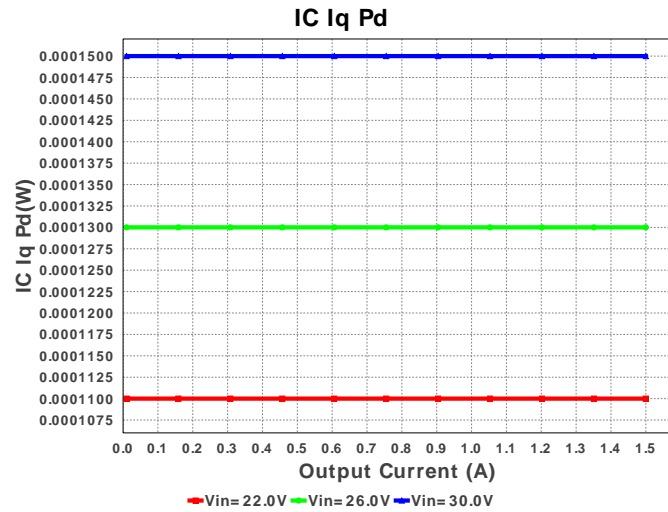
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbias	MuRata	GRM21BC81E475KA12L Series= 379	Cap= 4.7 uF VDC= 25.0 V IRMS= 0.0 A	1	\$0.04	 0805 7 mm ²
2.	Cboot	MuRata	GRM21BR71H474KA88L Series= X7R	Cap= 470.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.05	 0805 7 mm ²
3.	Cff	MuRata	GRM0335C1E910JA01D Series= C0G	Cap= 91.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
4.	Cin	MuRata	GRM32ER71H475KA88L Series= X7R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 50.0 V IRMS= 5.35 A	1	\$0.31	 1210 15 mm ²
5.	Cinx	TDK	C3216X5R1H105K Series= 285	Cap= 1.0 uF ESR= 8.97 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.04	 1206 11 mm ²
6.	Cout	Kemet	T495D476M025ATE120 Series= T495	Cap= 47.0 uF ESR= 120.0 mOhm VDC= 25.0 V IRMS= 1.006 A	2	\$0.73	 7343-31 59 mm ²
7.	Cvcc	Kemet	C0603C225K9PACTU Series= X5R	Cap= 2.2 uF VDC= 6.3 V IRMS= 0.0 A	1	\$0.02	 0603 5 mm ²
8.	L1	Coilcraft	MSS1038-333MLB	L= 33.0 uH DCR= 93.0 mOhm	1	\$0.50	 MSS1038 151 mm ²
9.	Rfb	Vishay-Dale	CRCW040290K9FKED Series= CRCW..e3	Res= 90.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rfbt	Vishay-Dale	CRCW04021M00FKED Series= CRCW..e3	Res= 1000.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
11.	U1	Texas Instruments	LM43602PWPR	Switcher	1	\$1.75	 PWP0016F 42 mm²







Operating Values

#	Name	Value	Category	Description
1.	BOM Count	12		Total Design BOM count
2.	Total BOM	\$4.2		Total BOM Cost
3.	Cin IRMS	742.652 mA	Current	Input capacitor RMS ripple current
4.	Cout IRMS	127.807 mA	Current	Output capacitor RMS ripple current
5.	Iin Avg	627.07 mA	Current	Average input current
6.	L Ipp	442.736 mA	Current	Peak-to-peak inductor ripple current
7.	FootPrint	362.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	500.0 kHz	General	Switching frequency
9.	Pout	18.0 W	General	Total output power
10.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
11.	Cross Freq	49.319 kHz	Op_point	Bode plot crossover frequency

#	Name	Value	Category	Description
12.	Duty Cycle	41.134 %	Op_point	Duty cycle
13.	Efficiency	94.992 %	Op_point	Steady state efficiency
14.	IC Tj	53.307 degC	Op_point	IC junction temperature
15.	ICThetaJA	38.9 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	1.5 A	Op_point	Iout operating point
17.	Phase Marg	89.75 deg	Op_point	Bode Plot Phase Margin
18.	VIN_OP	30.0 V	Op_point	Vin operating point
19.	Vout p-p	26.564 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	1.103 mW	Power	Input capacitor power dissipation
21.	Cout Pd	980.074 μ W	Power	Output capacitor power dissipation
22.	IC Iq Pd	150.0 μ W	Power	IC Iq Pd
23.	IC Pd	735.948 mW	Power	IC power dissipation
24.	L Pd	210.769 mW	Power	Inductor power dissipation
25.	Total Pd	942.11 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.5	Maximum Output Current
2.	Iout1	1.5	Output Current #1
3.	VinMax	30.0	Maximum input voltage
4.	VinMin	22.0	Minimum input voltage
5.	Vout	12.0	Output Voltage
6.	Vout1	12.0	Output Voltage #1
7.	base_pn	LM43602	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM43602** Product Folder : <http://www.ti.com/product/lm43602> : contains the data sheet and other resources.

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