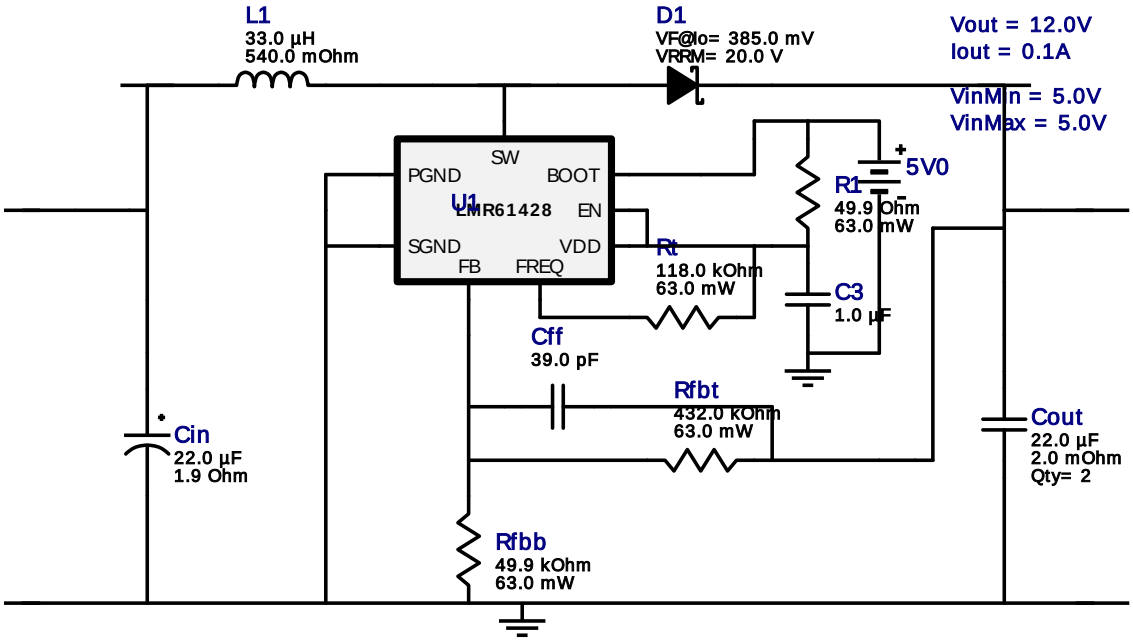
WEBENCH® Design Report

VinMin = 5.0V
VinMax = 5.0V
Vout = 12.0V
Iout = 0.1A

Device = LMR61428XMM/NOPB
Topology = Boost
Created = 11/25/13 3:21:29 PM
BOM Cost = $1.58
Total Pd = 0.11W
Footprint = 132.0mm2
BOM Count = 12

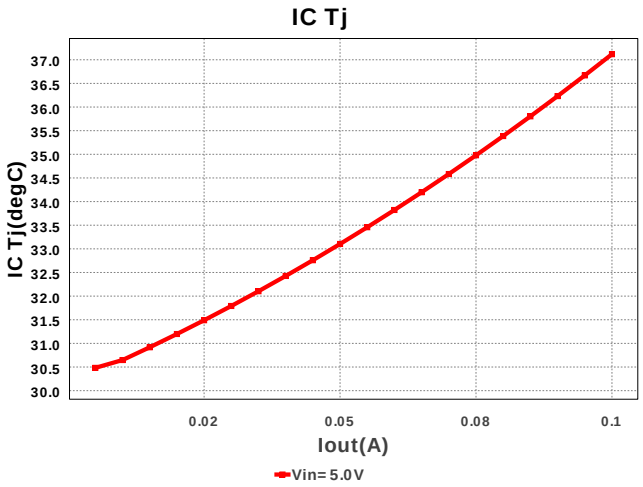
Design : 1982346/18 LMR61428XMM/NOPB
LMR61428XMM/NOPB 5.0V-5.0V to 12.0V @ 0.1A

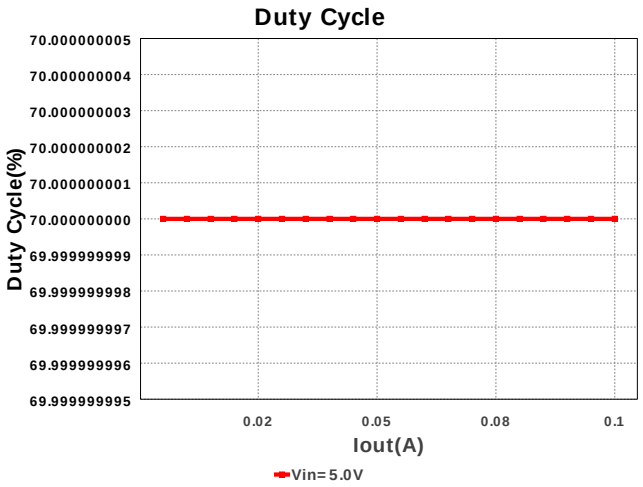


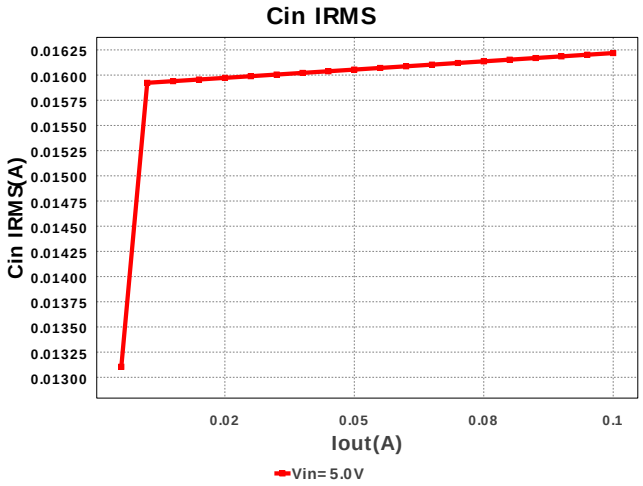
Electrical BOM

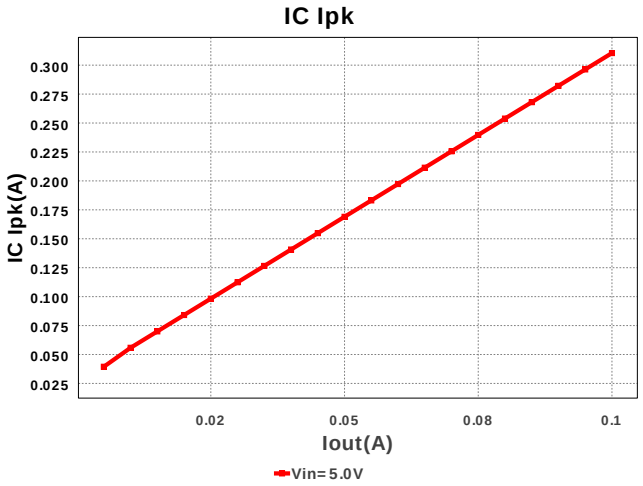
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C3	MuRata	GRM155R61A105KE15D Series= X5R	Cap= 1.0 µF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3mm2
2.	Cff	Yageo America	CC0805JRNP09BN390 Series= C0G/NP0	Cap= 39.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7mm2
3.	Cin	Vishay-Sprague	293D226X9016B2TE3 Series= 293D	Cap= 22.0 µF ESR= 1.9 Ohm VDC= 16.0 V IRMS= 210.0 mA	1	$0.22	3528-21 17mm2
4.	Cout	TDK	C3225X5R1C226M Series= X5R	Cap= 22.0 µF ESR= 2.0 mOhm VDC= 16.0 V IRMS= 3.5 A	2	$0.20	1210 15mm2
5.	D1	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 13mm2
6.	L1	Bourns	SDR0403-330KL	L= 33.0 µH DCR= 540.0 mOhm	1	$0.19	SDR0403 28mm2
7.	R1	Vishay-Dale	CRCW040249R9FKED Series= CRCW..e3	Res= 49.9 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
8.	Rfbb	Vishay-Dale	CRCW040249K9FKED Series= CRCW..e3	Res= 49.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
9.	Rfbt	Vishay-Dale	CRCW0402432KFKED Series= CRCW..e3	Res= 432.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2

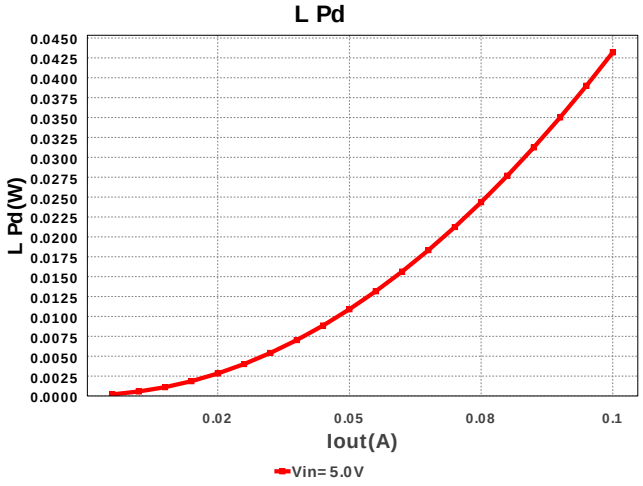
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rt	Vishay-Dale	CRCW0402118KFKED Series= CRCW..e3	Res= 118.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
11.	U1	Texas Instruments	LMR61428XMM/NOPB	Switcher	1	$0.65	MUA08A 24mm2

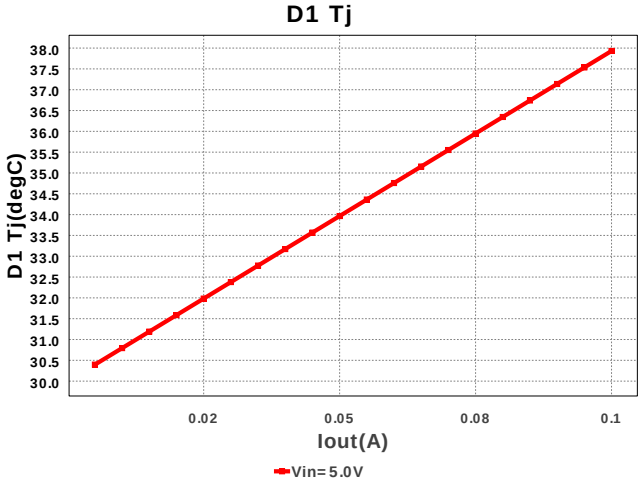




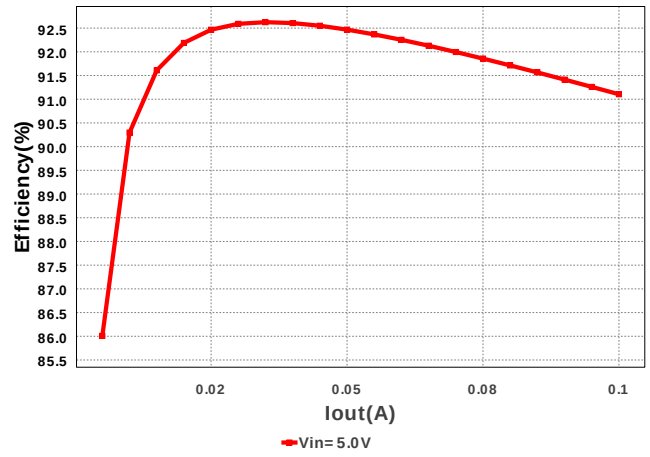




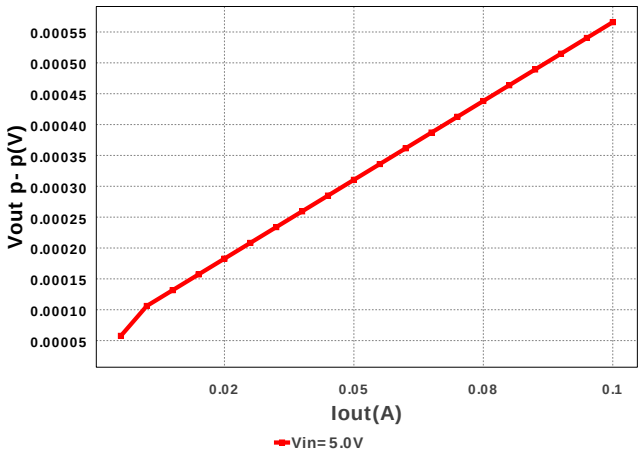




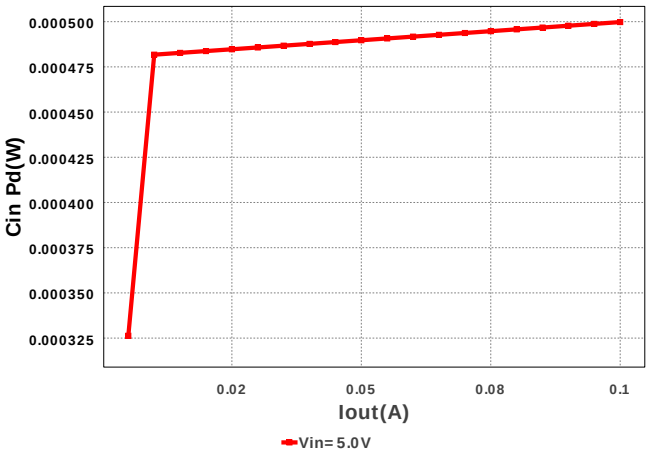
Efficiency



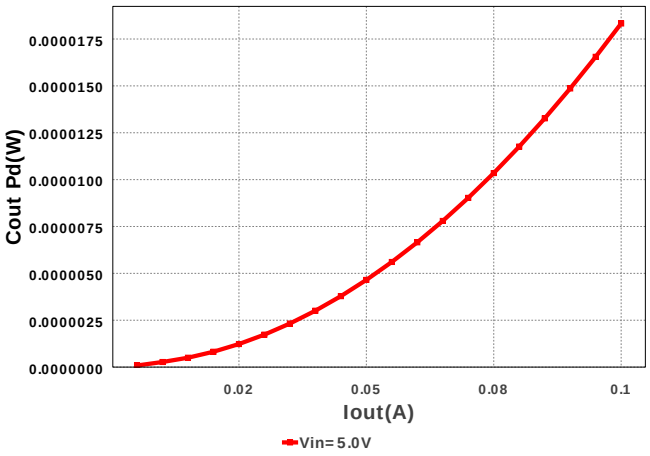
Vout p- p



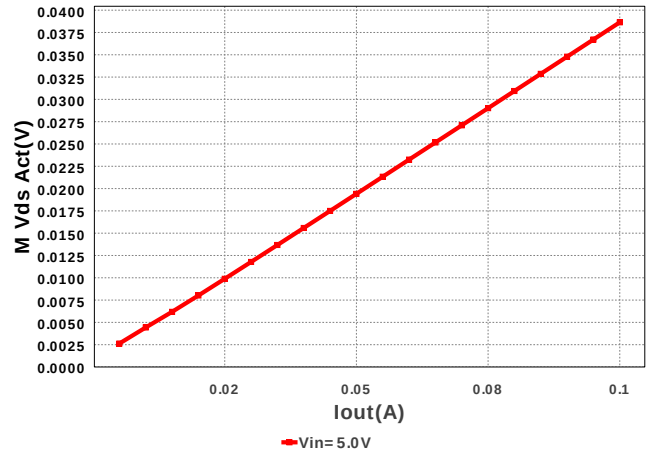
Cin Pd



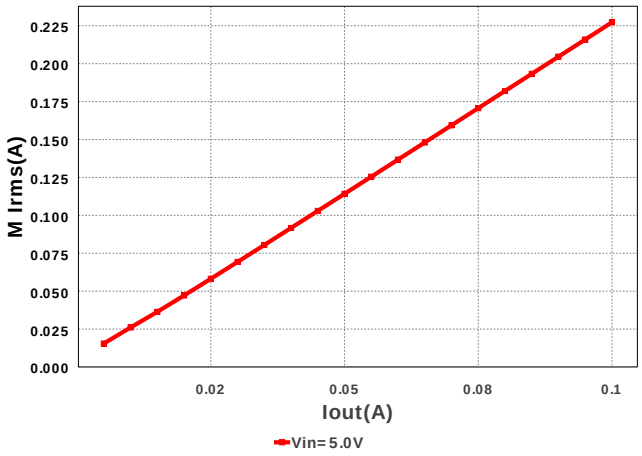
Cout Pd

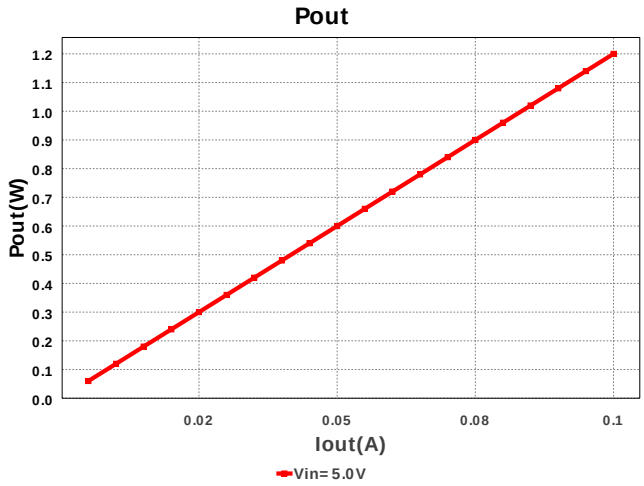


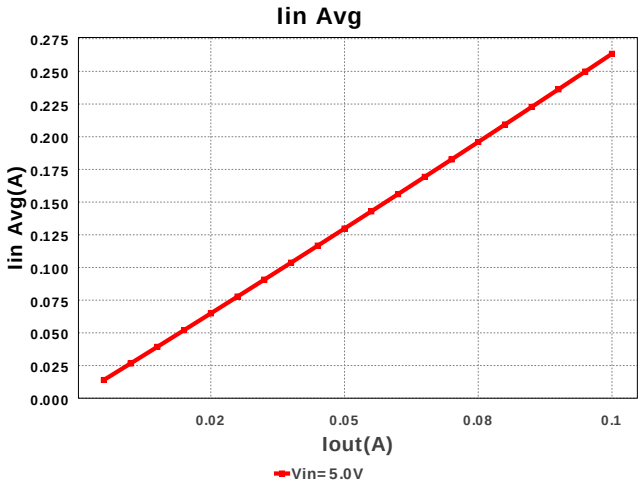
M Vds Act

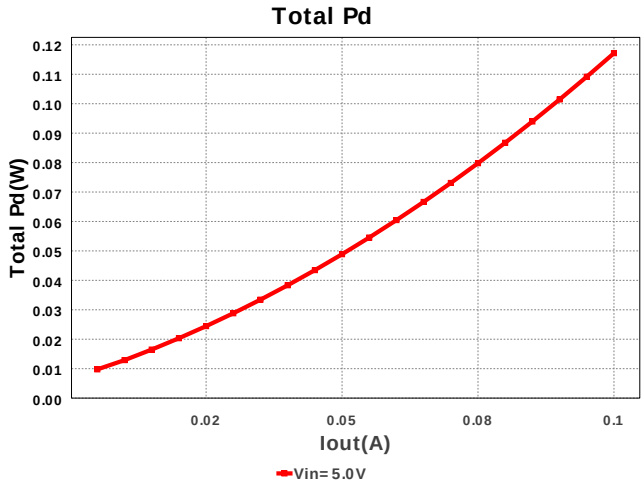


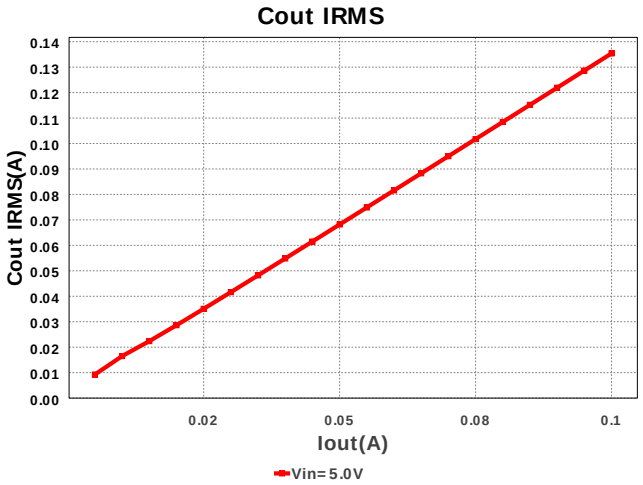
M Irms

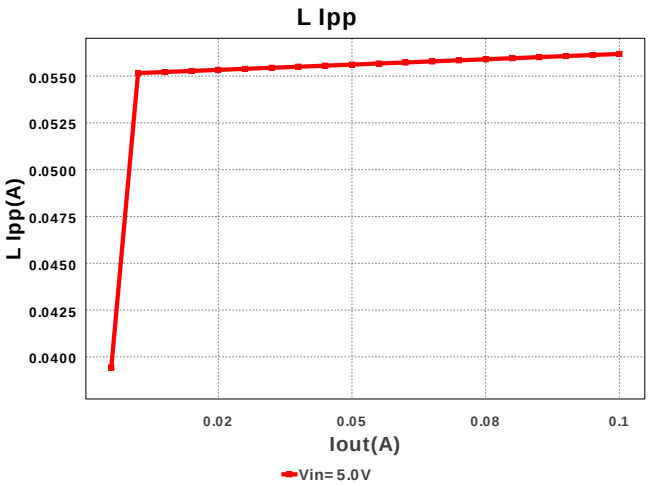


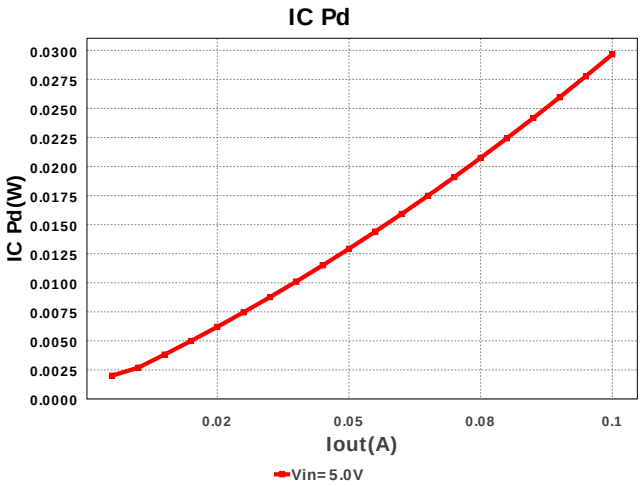


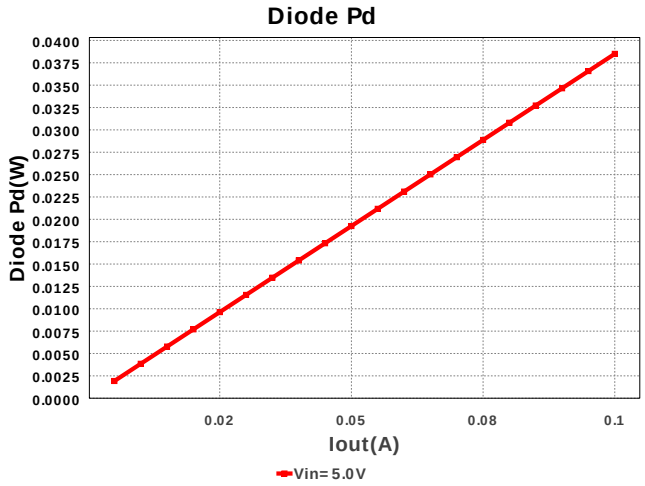












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	20.306 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	135.578 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	317.524 mA	Current	Peak switch current in IC
4.	Iin Avg	262.69 mA	Current	Average input current
5.	L Ipp	70.343 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	227.495 mA	Current	Q Iavg
7.	BOM Count	12	General	Total Design BOM count
8.	FootPrint	132.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	1.15 MHz	General	Switching frequency
10.	IC Tolerance	37.2 mV	General	IC Feedback Tolerance
11.	M Vds Act	38.674 mV	General	Voltage drop across the MosFET
12.	Pout	1.2 W	General	Total output power
13.	Total BOM	$1.58	General	Total BOM Cost
14.	D1 Tj	37.931 degC	Op_Point	D1 junction temperature
15.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	70.0 %	Op_point	Duty cycle
17.	Efficiency	91.362 %	Op_point	Steady state efficiency
18.	IC Tj	36.14 degC	Op_point	IC junction temperature
19.	ICThetaJA	240.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	100.0 mA	Op_point	Iout operating point
21.	VIN_OP	5.0 V	Op_point	Vin operating point
22.	Vout p-p	708.518 µV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	783.457 µW	Power	Input capacitor power dissipation
24.	Cout Pd	18.381 µW	Power	Output capacitor power dissipation
25.	Diode Pd	38.5 mW	Power	Diode power dissipation
26.	IC Pd	25.584 mW	Power	IC power dissipation
27.	L Pd	43.273 mW	Power	Inductor power dissipation
28.	Total Pd	113.456 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	100.0 mA	Maximum Output Current
2.	Iout1	100.0 mAmps	Output Current #1
3.	VinMax	5.0 V	Maximum input voltage
4.	VinMin	5.0 V	Minimum input voltage
5.	Vout	12.0 V	Output Voltage
6.	Vout1	12.0 Volt	Output Voltage #1
7.	base_pn	LMR61428	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LMR61428** Product Folder : http://www.ti.com/product/lmr61428 : contains the data sheet and other resources.