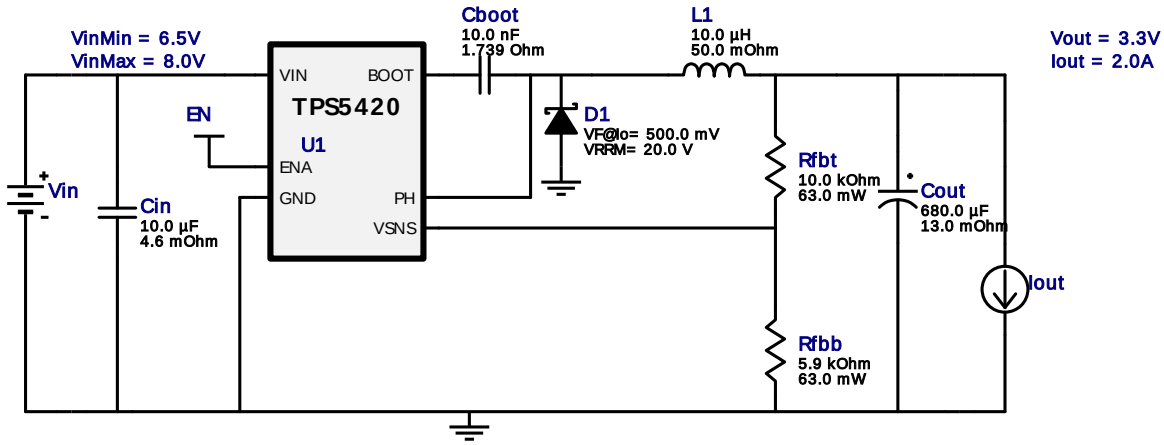
VinMin = 6.5V
VinMax = 8.0V
Vout = 3.3V
Iout = 2.0A

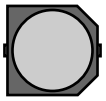
Device = TPS5420DR
Topology = Buck
Created = 6/11/13 11:54:00 AM
BOM Cost = $3.08
Total Pd = 1.06W
Footprint = 348.0mm2
BOM Count = 8

WEBENCH® Design Report

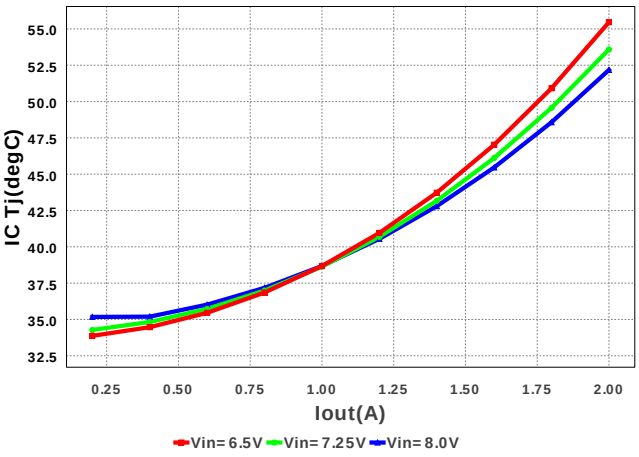
Design : 3729827/2 TPS5420DR
TPS5420DR 6.5V-8.0V to 3.3V @ 2.0A



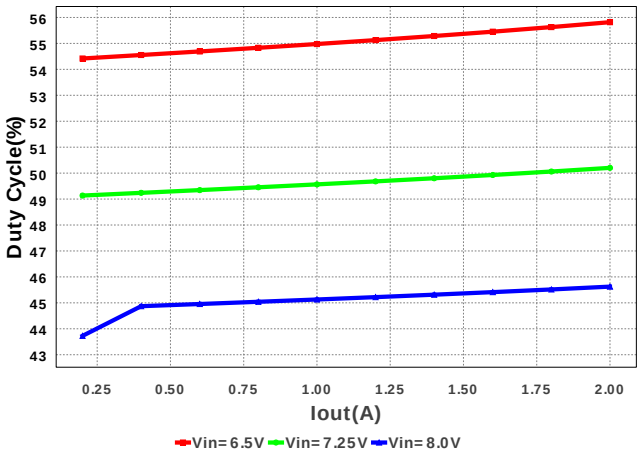
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	$0.01	 0805 13mm2
2.	Cin	TDK	C3216X5R1C106M Series= X5R	Cap= 10.0 µF ESR= 4.6 mOhm VDC= 16.0 V IRMS= 2.7 A	1	$0.06	 1206 19mm2
3.	Cout	Nippon Chemi-Con	APXE4R0ARA681MH80G Series= PXE	Cap= 680.0 µF ESR= 13.0 mOhm VDC= 4.0 V IRMS= 3.95 A	1	$0.99	 CAPSMT_62_H80 106mm2
4.	D1	Diodes Inc.	B220A-13-F	VF@Io= 500.0 mV VRRM= 20.0 V	1	$0.09	 SMA 37mm2
5.	L1	Bourns	SRN8040-100M	L= 10.0 µH DCR= 50.0 mOhm	1	$0.21	 SRN8040 100mm2
6.	Rfbb	Vishay-Dale	CRCW04025K90FKED Series= CRCW..e3	Res= 5.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 8mm2
7.	Rfbt	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 8mm2
8.	U1	Texas Instruments	TPS5420DR	Switcher	1	$1.70	 R-PDSO-G8 57mm2

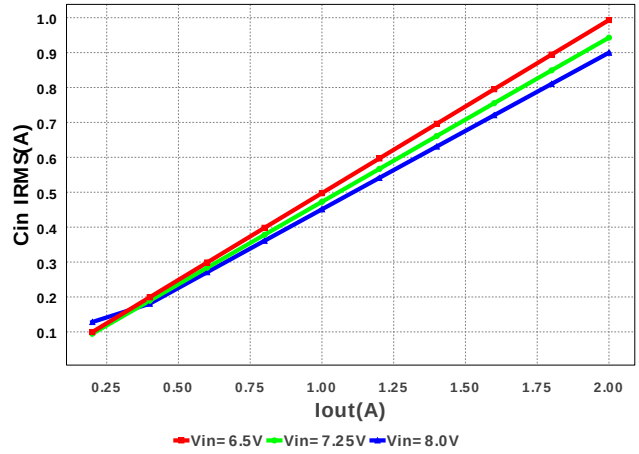
IC Tj



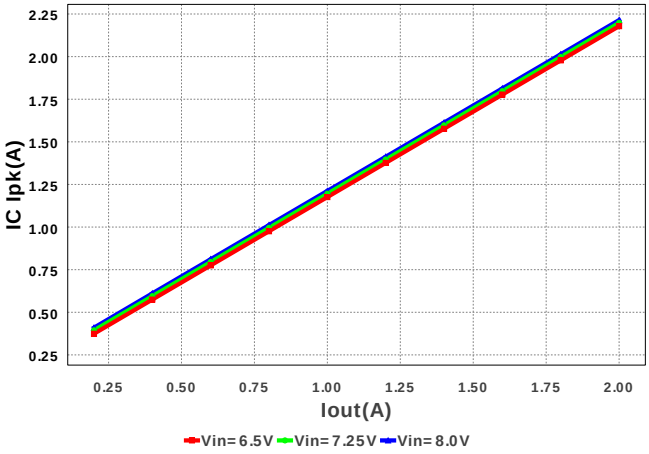
Duty Cycle



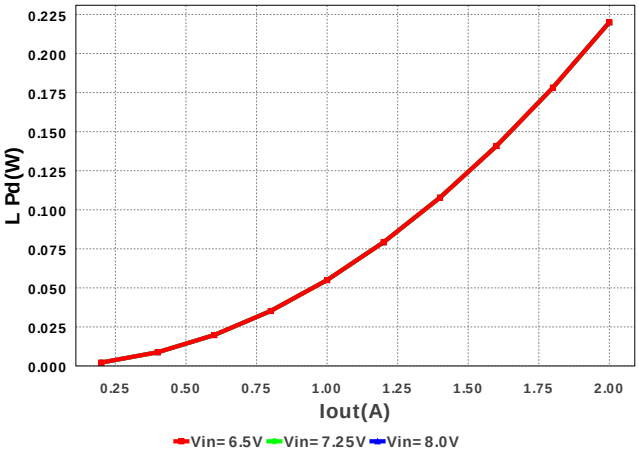
Cin IRMS



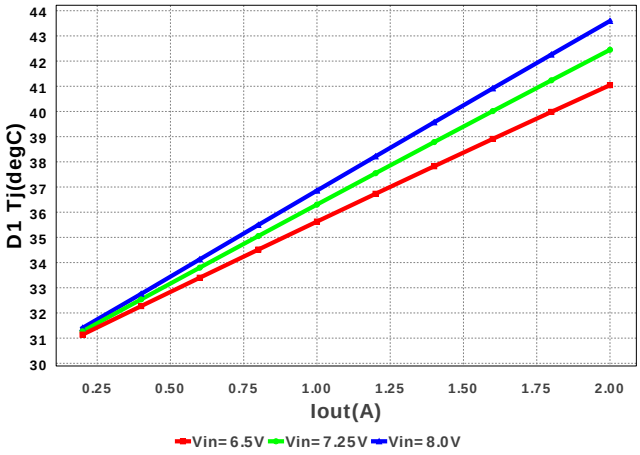
IC Ipk



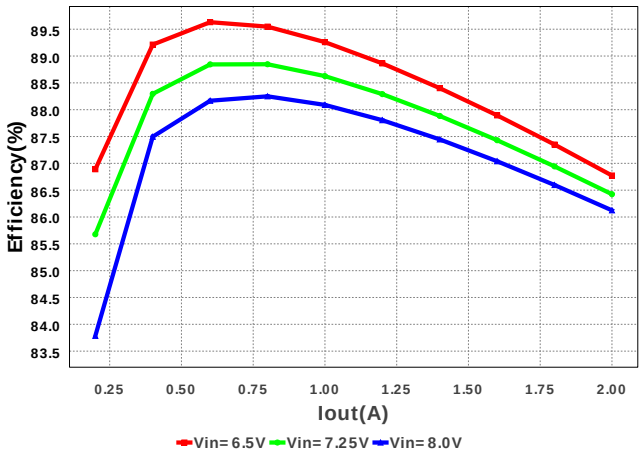
L Pd



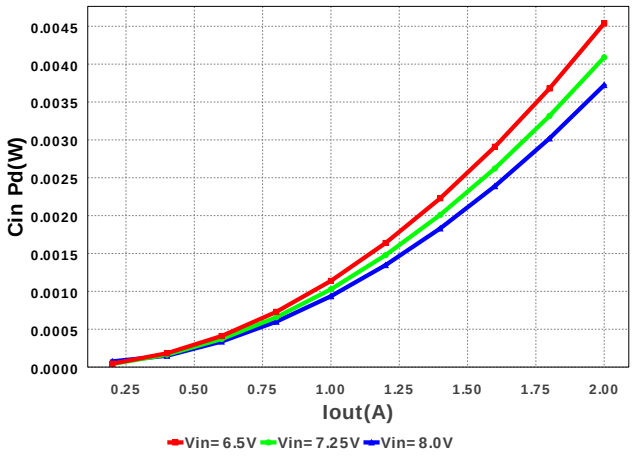
D1 Tj



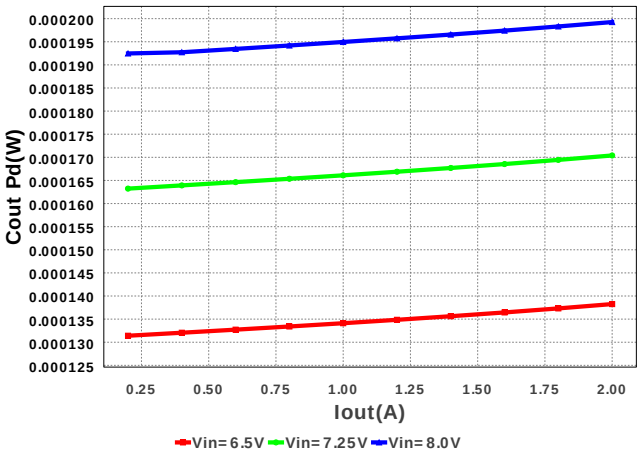
Efficiency



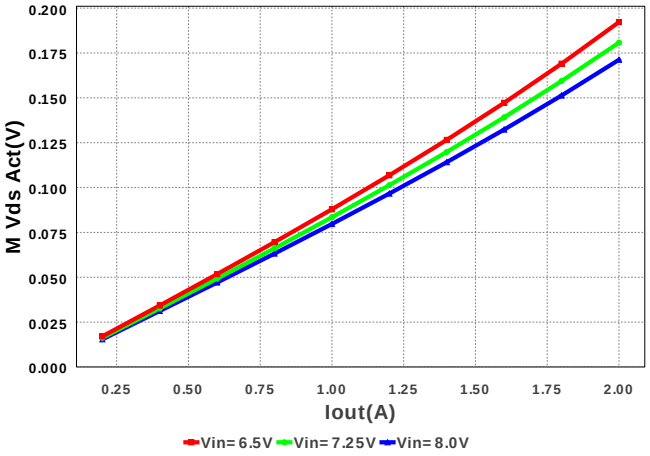
Cin Pd



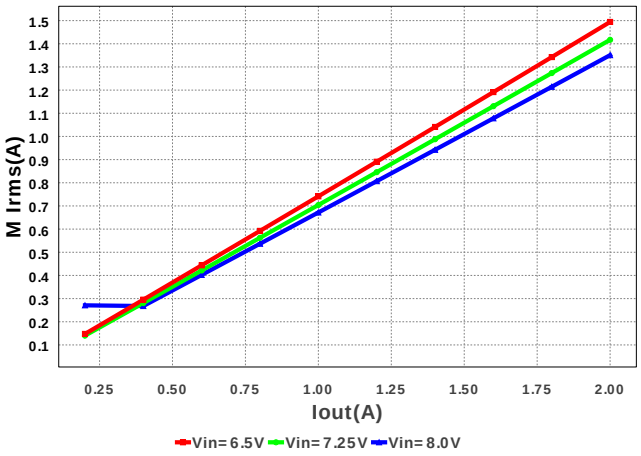
Cout Pd

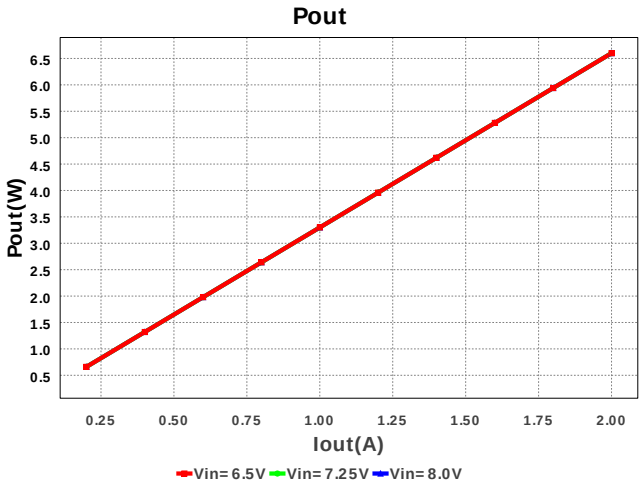


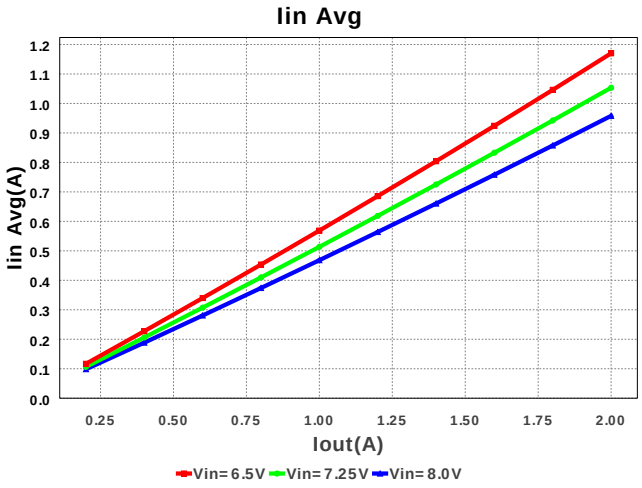
M Vds Act

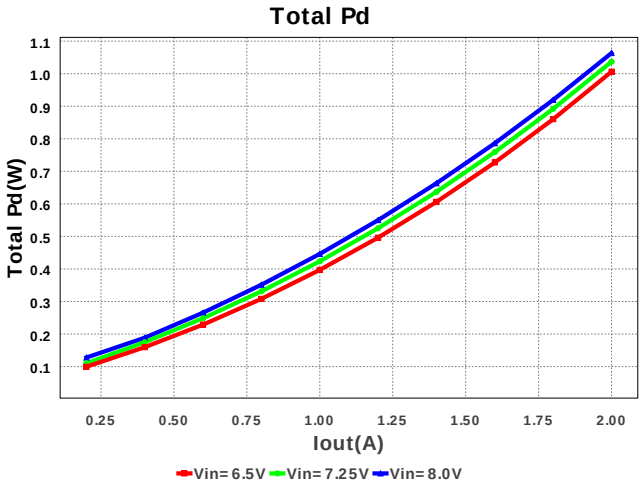


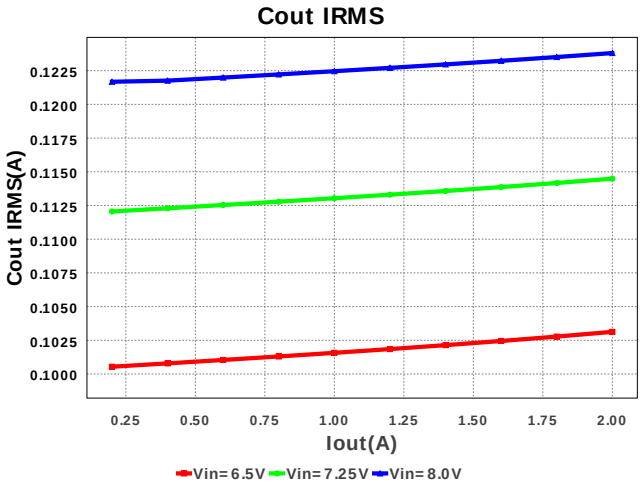
M Irms

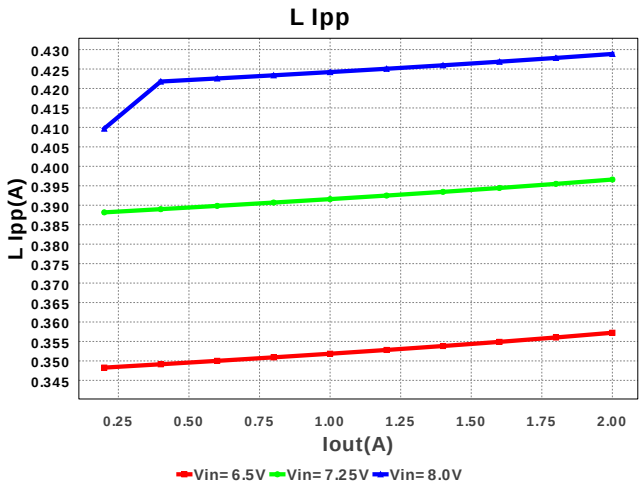


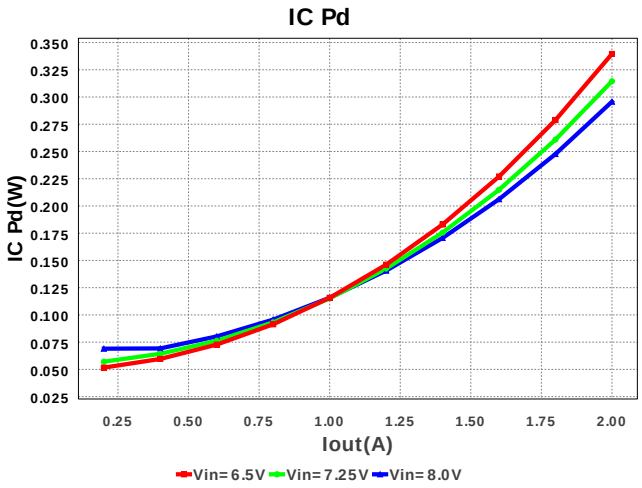


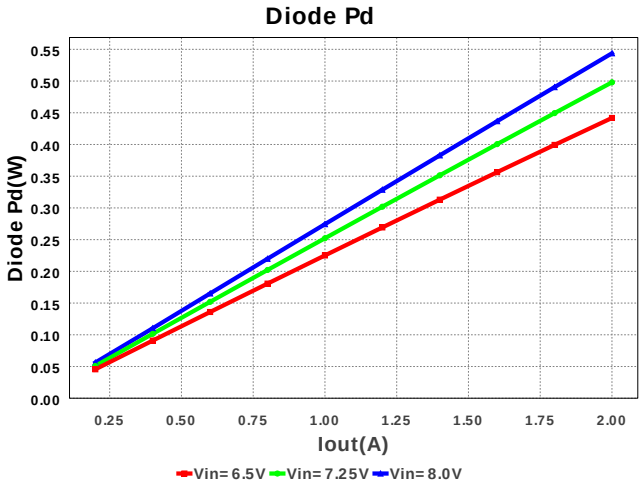


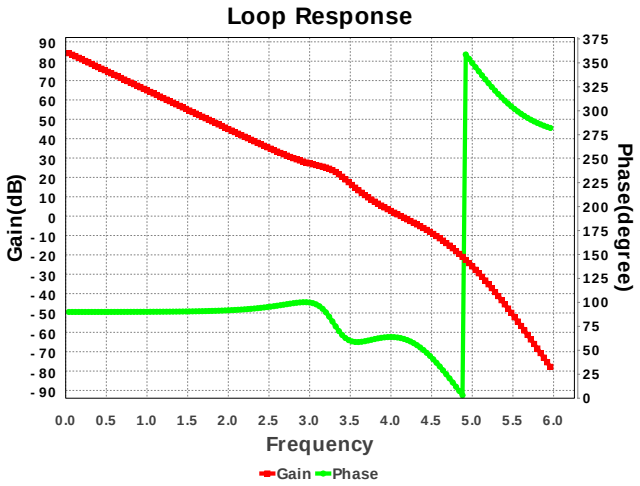












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	899.691 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	123.805 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.214 A	Current	Peak switch current in IC
4.	Iin Avg	957.92 mA	Current	Average input current
5.	L Ipp	428.874 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.351 A	Current	Q Iavg
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	348.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	500.0 kHz	General	Switching frequency
10.	IC Tolerance	18.315 mV	General	IC Feedback Tolerance
11.	M Vds Act	171.214 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	6.6 W	General	Total output power
14.	Total BOM	$3.08	General	Total BOM Cost
15.	D1 Tj	43.594 degC	Op_Point	D1 junction temperature
16.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
17.	Cross Freq	13.262 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	45.625 %	Op_point	Duty cycle
19.	Efficiency	86.124 %	Op_point	Steady state efficiency
20.	IC Tj	52.177 degC	Op_point	IC junction temperature
21.	ICThetaJA	75.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	Phase Marg	62.702 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	8.0 V	Op_point	Vin operating point
25.	Vout p-p	5.578 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	3.723 mW	Power	Input capacitor power dissipation
27.	Cout Pd	199.261 µW	Power	Output capacitor power dissipation
28.	Diode Pd	543.751 mW	Power	Diode power dissipation
29.	IC Pd	295.697 mW	Power	IC power dissipation
30.	L Pd	220.0 mW	Power	Inductor power dissipation
31.	Total Pd	1.063 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.0 A	Maximum Output Current
2.	Iout1	2.0 Amps	Output Current #1
3.	VinMax	8.0 V	Maximum input voltage
4.	VinMin	6.5 V	Minimum input voltage
5.	Vout	3.3 V	Output Voltage
6.	Vout1	3.3 Volt	Output Voltage #1
7.	base_pn	TPS5420	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. Feature Highlights: 2A, 500kHz Fixed Switching Frequency, Internal Compensation
2. **TPS5420** Product Folder : http://www.ti.com/product/tps5420 : contains the data sheet and other resources.