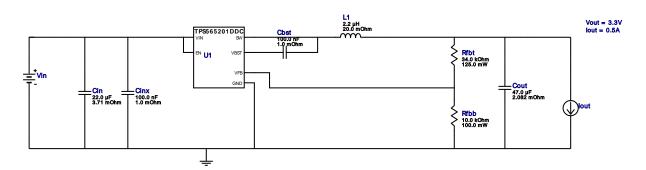


WEBENCH® Design Report

 $\begin{aligned} & \text{VinMin} = 5.0 \text{V} \\ & \text{VinMax} = 5.0 \text{V} \\ & \text{Vout} = 3.3 \text{V} \\ & \text{Iout} = 0.5 \text{A} \end{aligned}$

Device = TPS565201DDCR Topology = Buck Created = 2018-04-20 08:00:30.044 BOM Cost = \$1.89 BOM Count = 8 Total Pd = 0.06W

Design: 5286684/42 TPS565201DDCR TPS565201DDCR 5.0V-5.0V to 3.30V @ 0.5A

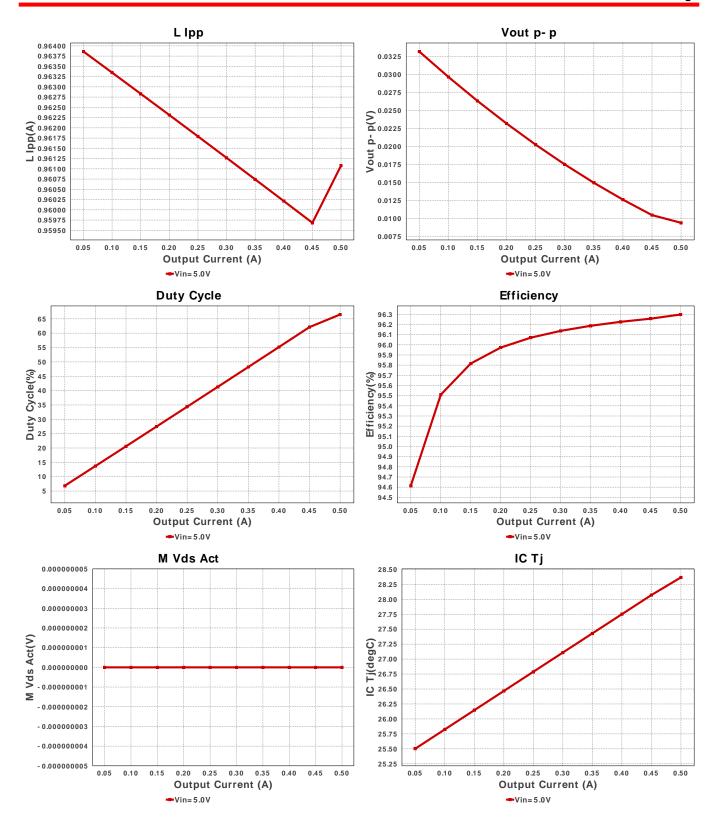


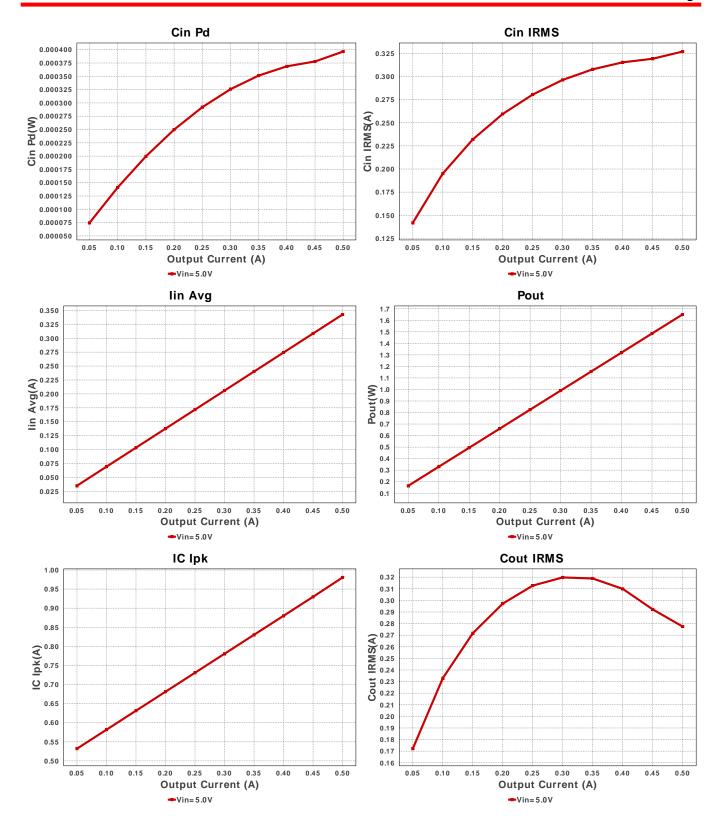
My Comments

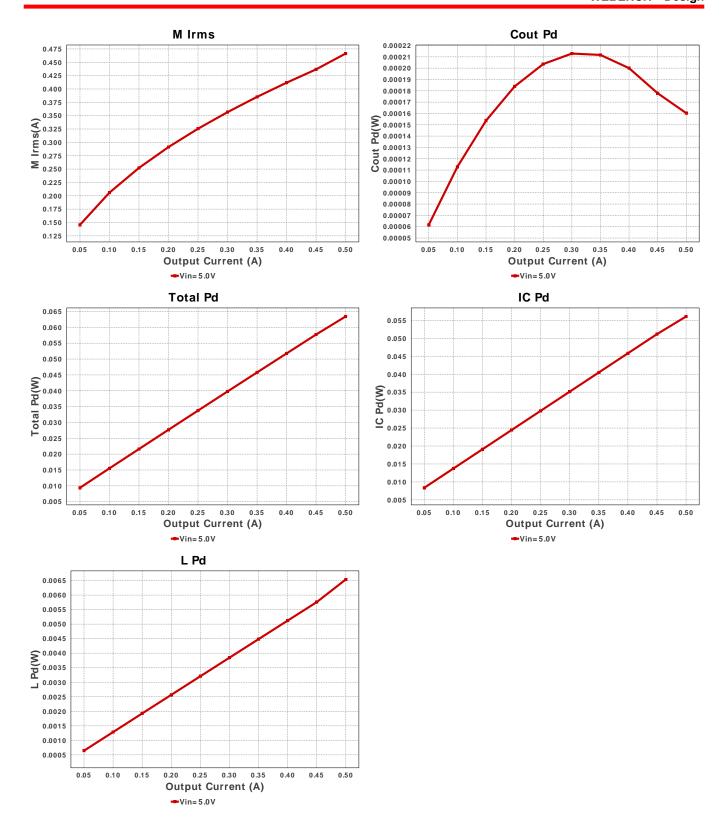
No comments

Electrical BOM

# Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
. Cbst	Kemet	C0603C104Z3VACTU Series= Y5V	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
2. Cin	TDK	C1608X5R1A226M080AC Series= X5R	Cap= 22.0 uF ESR= 3.71 mOhm VDC= 10.0 V IRMS= 2.69936 A	1	\$0.16	0603 5 mm ²
3. Cinx	MuRata	GRM155R60J104KA01D Series= X5R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
l. Cout	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	1	\$0.50	1206 11 mm ²
5. L1	TDK	CLF6045T-2R2N	L= 2.2 µH DCR= 20.0 mOhm	1	\$0.39	CLF6045 68 mm ²
6. Rfbb	Yageo America	RC0603FR-0710KL Series= ?	Res= 10.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	0603 5 mm ²
7. Rfbt	Vishay-Dale	CRCW080534K0FKEA Series= CRCWe3	Res= 34.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
3. U1	Texas Instruments	TPS565201DDCR	Switcher	1	\$0.80	DDC0006A_N 10 mm²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	326.925 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	277.439 mA	Current	Output capacitor RMS ripple current
3.	IC lpk	980.539 mA	Current	Peak switch current in IC
4.	lin Avg	342.69 mA	Current	Average input current
5.	L lpp	961.08 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	466.321 mA	Current	Q lavg
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	113.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	526.407 kHz	General	Switching frequency
10.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	0.0 V	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Mode	CCM	General	Conduction Mode
13.	Pout	1.65 W	General	Total output power
14.	Total BOM	\$1.89	General	Total BOM Cost
15.	Duty Cycle	66.506 %	Op Point	Duty cycle
16.	Efficiency	96.298 %	Op Point	Steady state efficiency
17.	IC Tj	28.365 degC	Op Point	IC junction temperature
18.	ICThetaJA	60.0 degC/W	Op Point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	500.0 mA	Op Point	lout operating point
20.	VIN_OP	5.0 V	Op Point	Vin operating point
21.	Vout Actual	3.366 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
22.	Vout OP	3.3 V	Op Point	Operational Output Voltage
23.	Vout Tolerance	2.889 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
24.	Vout p-p	9.368 mV	Op Point	Peak-to-peak output ripple voltage
25.	Cin Pd	396.525 μW	Power	Input capacitor power dissipation
26.	Cout Pd	160.257 µW	Power	Output capacitor power dissipation
27.	IC Pd	56.089 mW	Power	IC power dissipation
28.	L Pd	6.539 mW	Power	Inductor power dissipation
29.	Total Pd	63.432 mW	Power	Total Power Dissipation

Design Inputs

	5 1		
#	Name	Value	Description
1.	lout	500.0 m	Maximum Output Current
2.	VinMax	5.0	Maximum input voltage
3.	VinMin	5.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS565201	Base Product Number
6.	source	DC	Input Source Type
7.	Та	25.0	Ambient temperature

Design Assistance

1. TPS565201 Product Folder: http://www.ti.com/product/TPS565201: contains the data sheet and other resources.

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