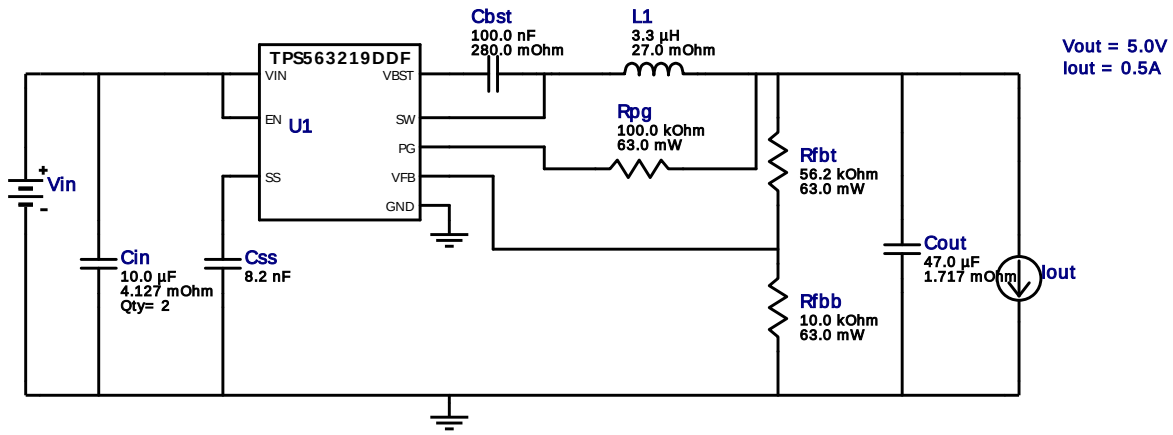
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 0.5A

Device = TPS563219DDFR
Topology = Buck
Created = 7/21/16 9:11:14 PM
BOM Cost = $1.51
BOM Count = 10
Total Pd = 0.16W

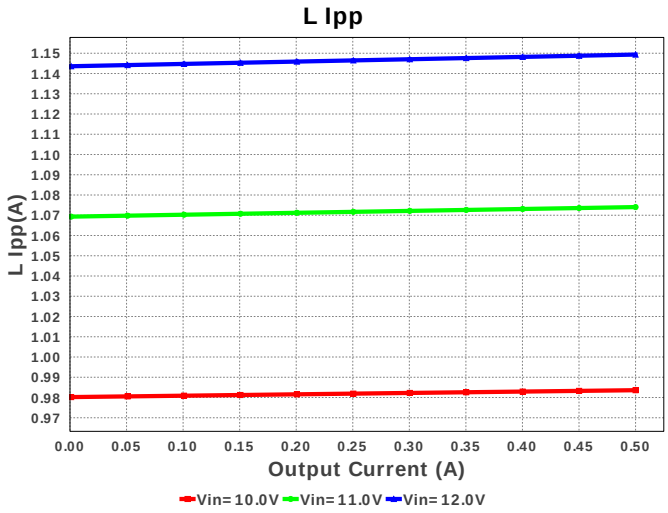
Design : 4742013/261 TPS563219DDFR
TPS563219DDFR 10.0V-12.0V to 5.00V @ 0.5A

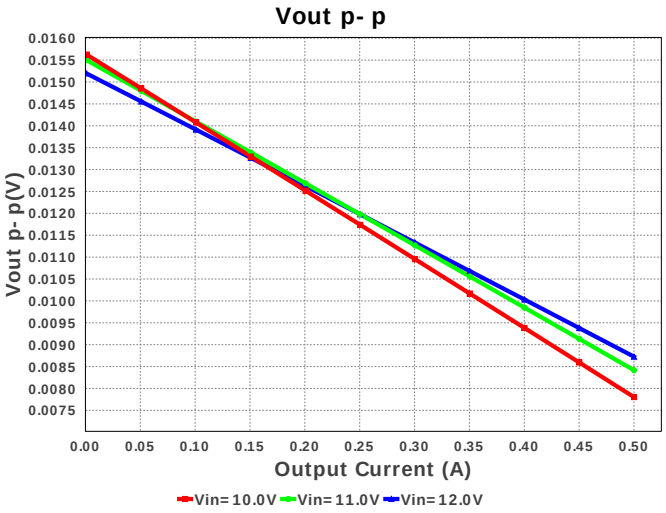


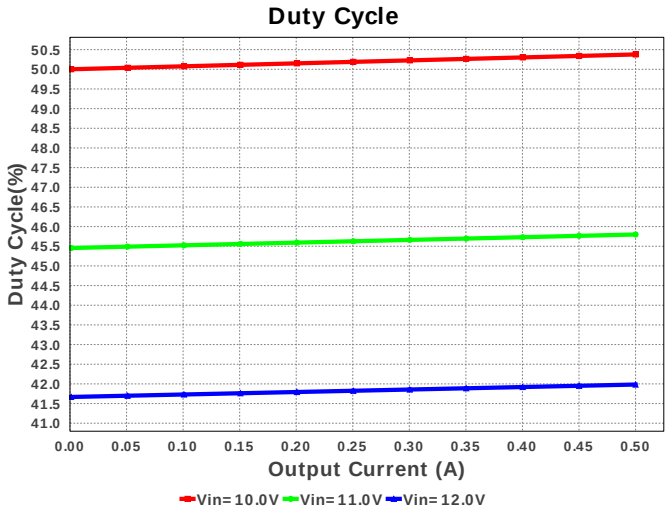
Electrical BOM

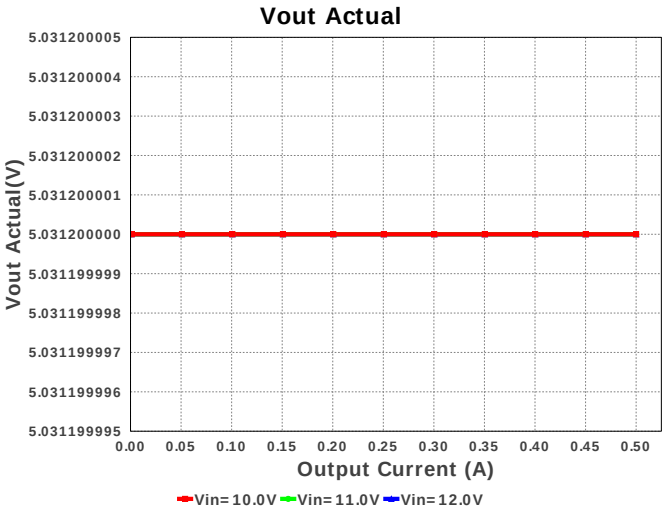
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	2	$0.03	0805 7 mm²
3.	Cout	TDK	C3216JB1A476M Series= JB	Cap= 47.0 uF ESR= 1.717 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.34	1206 11 mm²
4.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
5.	L1	Bourns	SRR7032-3R3M	L= 3.3 µH DCR= 27.0 mOhm	1	$0.26	SRR7032 81 mm²
6.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbt	Vishay-Dale	CRCW040256K2FKED Series= CRCW..e3	Res= 56.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	TPS563219DDFR	Switcher	1	$0.80	DDF0008A 10 mm²

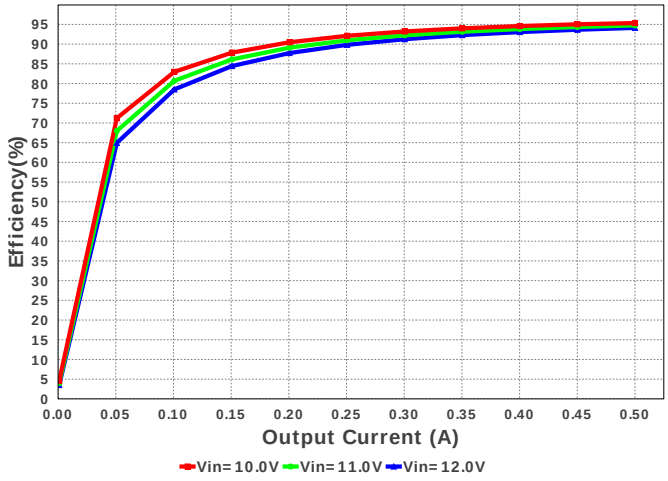




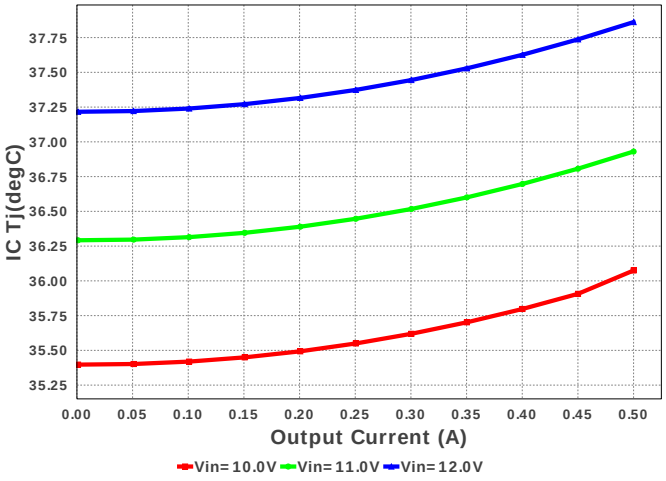




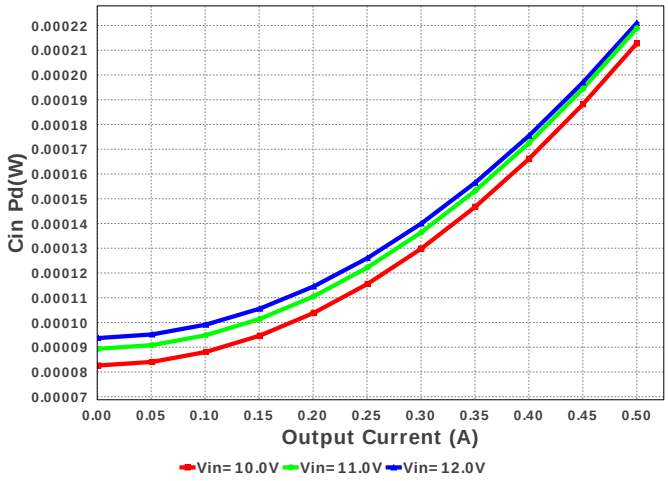
Efficiency



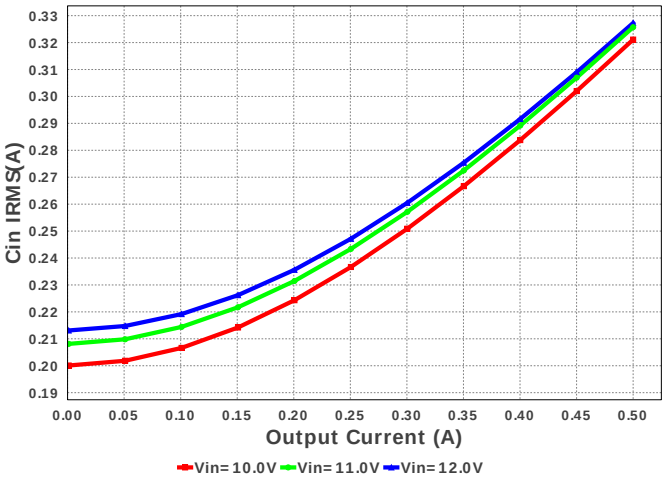
IC Tj



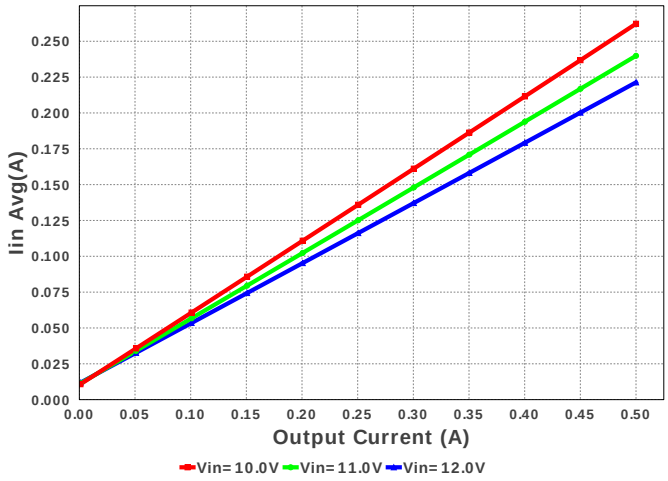
Cin Pd



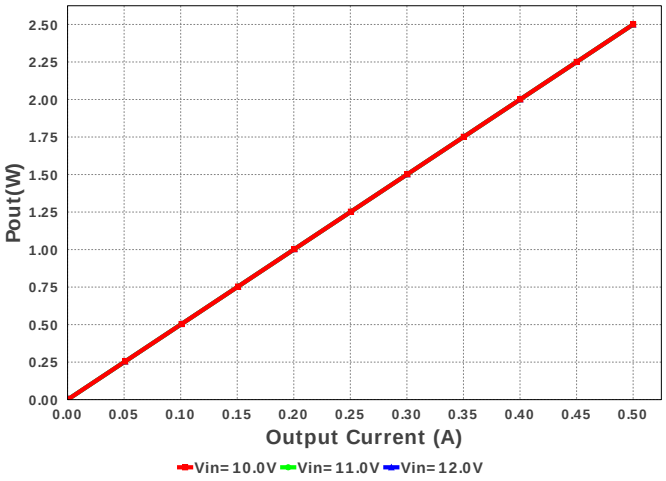
Cin IRMS

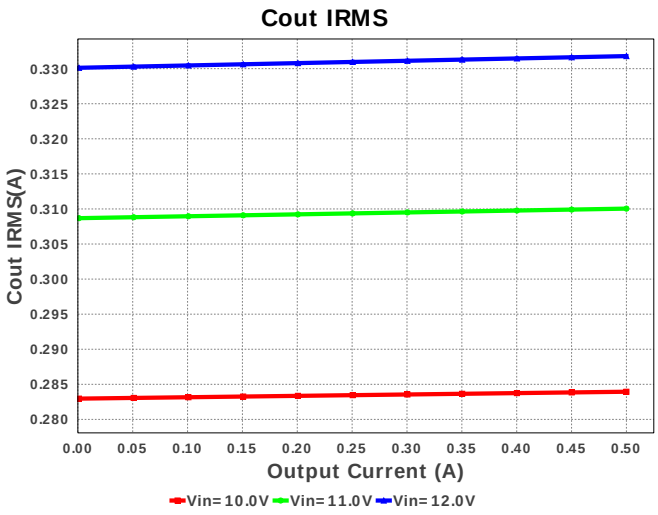


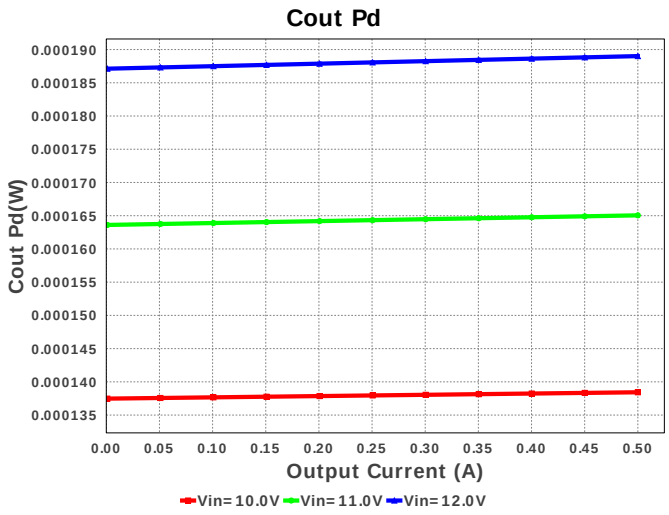
Iin Avg

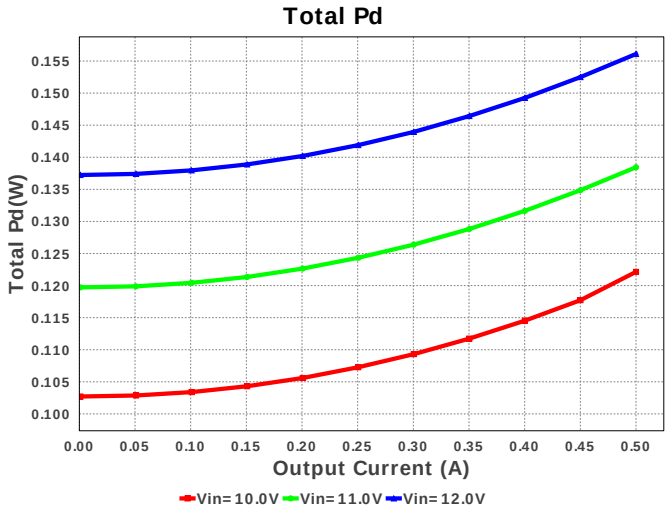


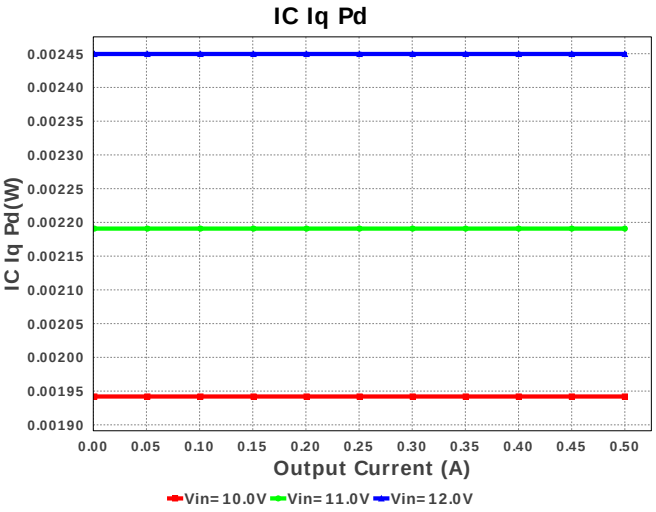
Pout

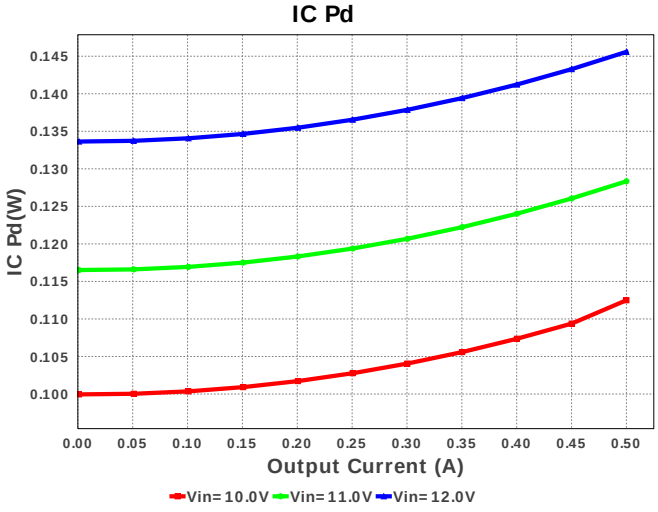


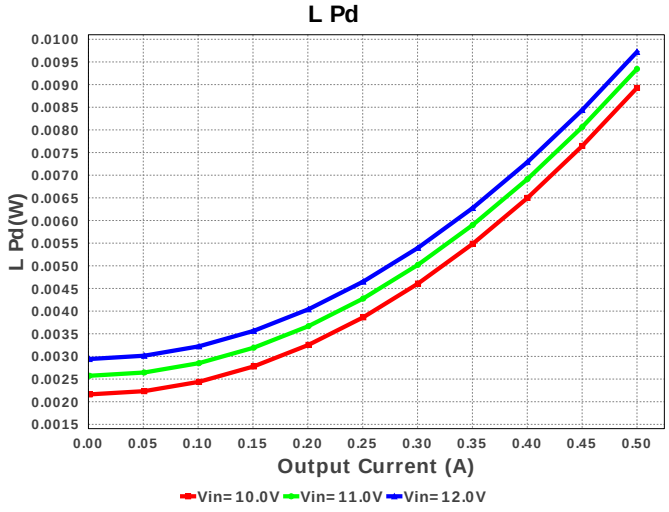












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	327.277 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	331.789 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	221.34 mA	Current	Average input current
4.	L Ipp	1.149 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	10	General	Total Design BOM count
6.	FootPrint	133.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	770.647 kHz	General	Switching frequency
8.	Pout	2.5 W	General	Total output power
9.	Total BOM	$1.51	General	Total BOM Cost
10.	Vout Actual	5.031 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
11.	Vout OP	5.0 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
12.	Duty Cycle	41.983 %	Op_point	Duty cycle
13.	Efficiency	94.123 %	Op_point	Steady state efficiency
14.	IC Tj	37.861 degC	Op_point	IC junction temperature
15.	ICThetaJA	54.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	500.0 mA	Op_point	Iout operating point
17.	VIN_OP	12.0 V	Op_point	Vin operating point
18.	Vout p-p	15.446 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	221.022 µW	Power	Input capacitor power dissipation
20.	Cout Pd	189.014 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	2.45 mW	Power	IC Iq Pd
22.	IC Pd	145.581 mW	Power	IC power dissipation
23.	L Pd	9.722 mW	Power	Inductor power dissipation
24.	Total Pd	156.098 mW	Power	Total Power Dissipation
25.	Vout Tolerance	3.053 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS563219	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS563219** Product Folder : http://www.ti.com/product/TPS563219 : contains the data sheet and other resources.