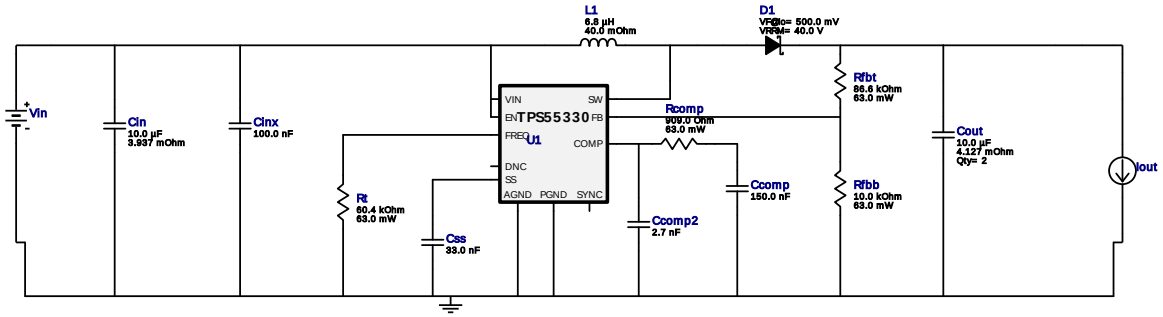
VinMin = 4.5V
VinMax = 5.0V
Vout = 12.0V
Iout = 0.75A

Device = TPS55330RTER
Topology = Boost
Created = 10/11/16 10:48:19 PM
BOM Cost = $2.26
BOM Count = 15
Total Pd = 0.85W

WEBENCH® Design Report

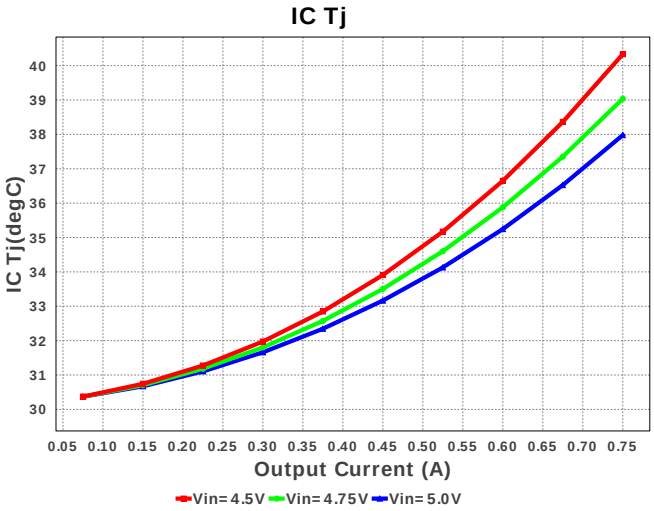
Design : 3962751/3 TPS55330RTER
TPS55330RTER 4.5V-5.0V to 12.00V @ 0.75A

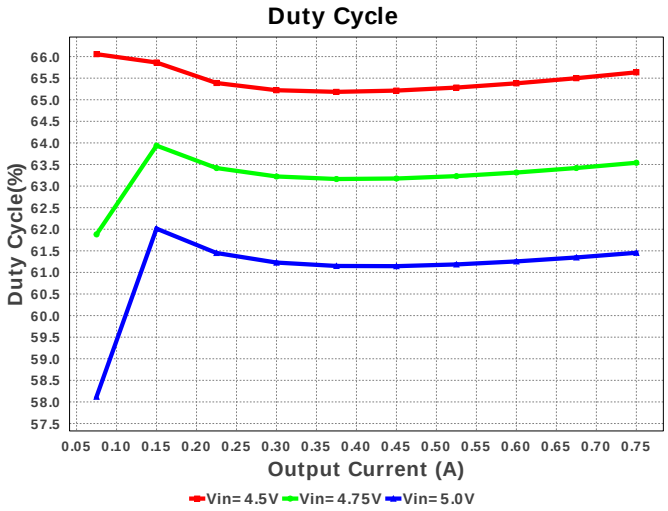


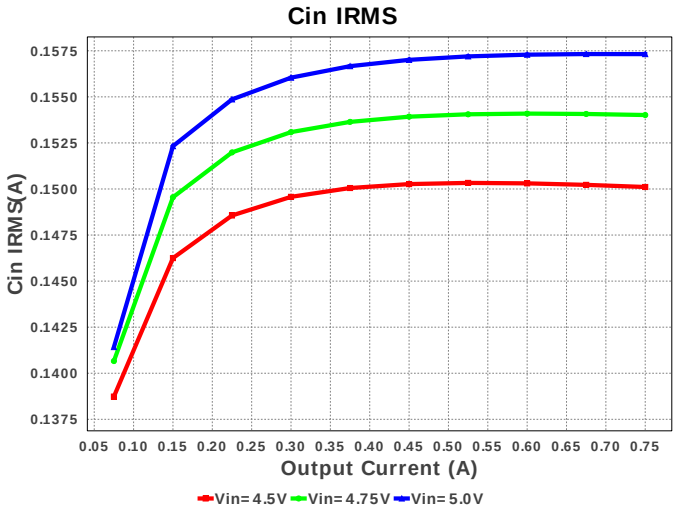
Electrical BOM

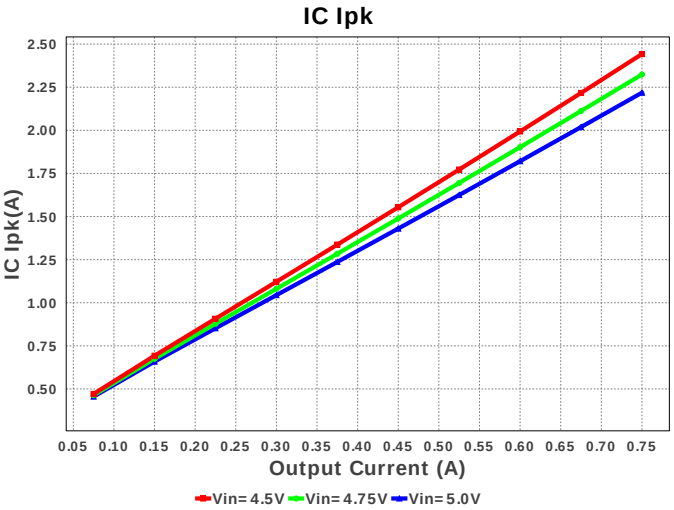
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	MuRata	GRM155R60J154KE01D Series= X5R	Cap= 150.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Ccomp2	Yageo America	CC0805KRX7R9BB272 Series= X7R	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cin	MuRata	GRM219R61A106KE44D Series= X5R	Cap= 10.0 uF ESR= 3.937 mOhm VDC= 10.0 V IRMS= 2.7713 A	1	$0.03	0805 7 mm²
4.	Cinx	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
5.	Cout	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
6.	Css	MuRata	GRM033R60J333KE01D Series= X5R	Cap= 33.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
7.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	$0.11	SMA 37 mm²
8.	L1	Bourns	SDR0805-6R8ML	L= 6.8 µH DCR= 40.0 mOhm	1	$0.22	SDR0805 96 mm²
9.	Rcomp	Vishay-Dale	CRCW0402909RFKED Series= CRCW..e3	Res= 909.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	Rfbt	Vishay-Dale	CRCW040286K6FKED Series= CRCW..e3	Res= 86.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
12.	Rt	Vishay-Dale	CRCW040260K4FKED Series= CRCW..e3	Res= 60.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
13.	U1	Texas Instruments	TPS55330RTER	Switcher	1	$1.75	 S-PWQFN-N16 17 mm^2

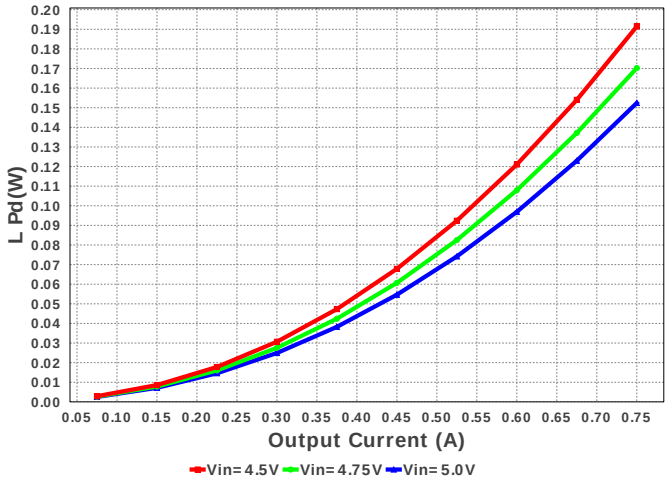




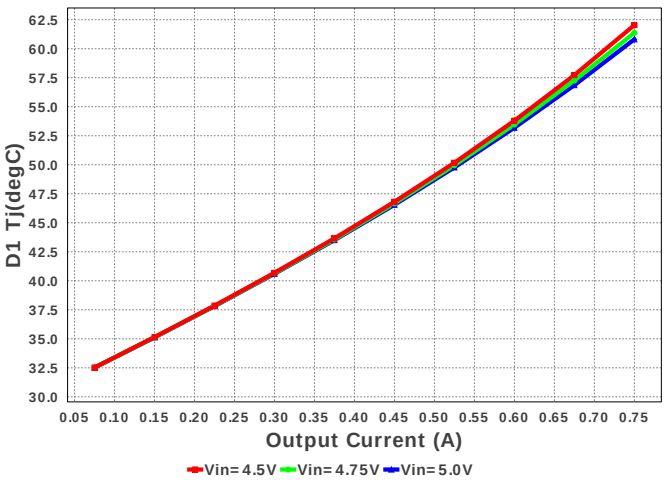




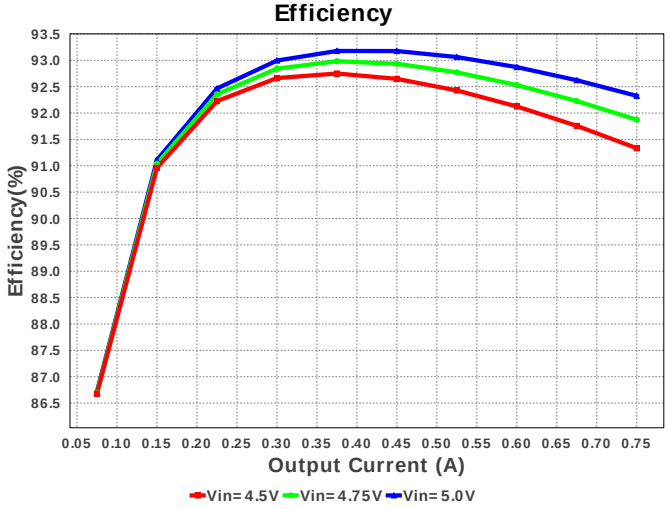
L Pd



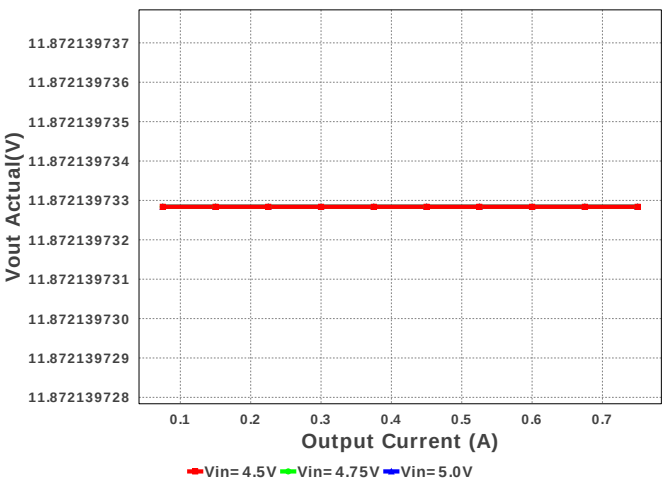
D1 Tj



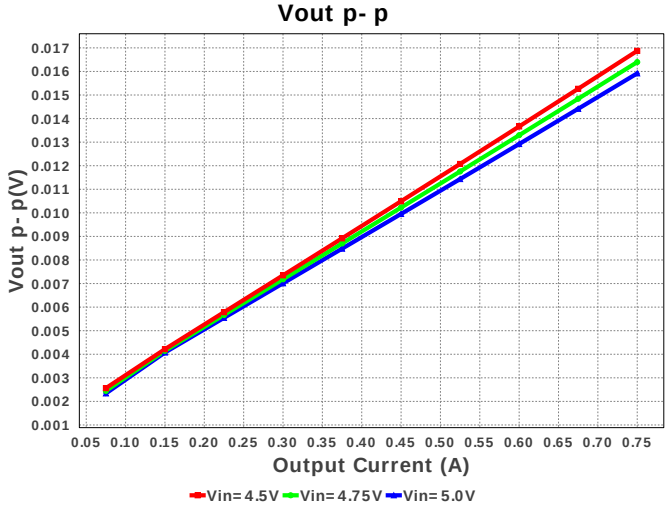
Efficiency



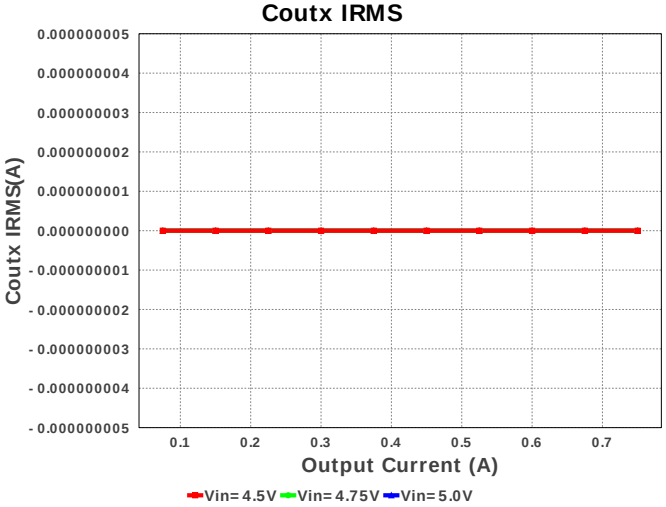
Vout Actual

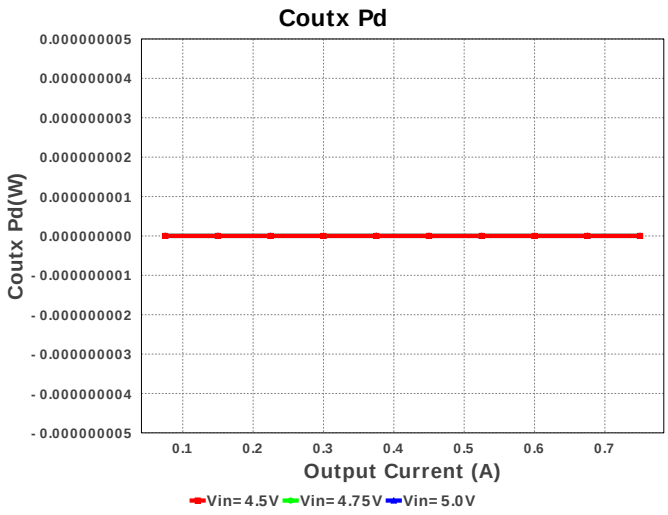


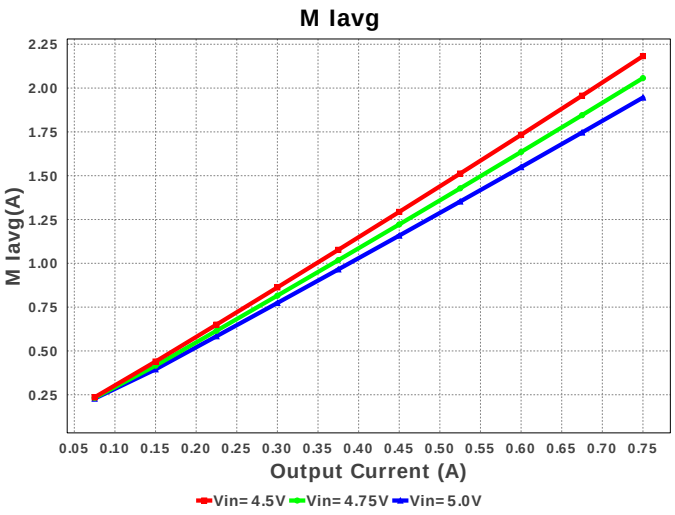
Vout p- p

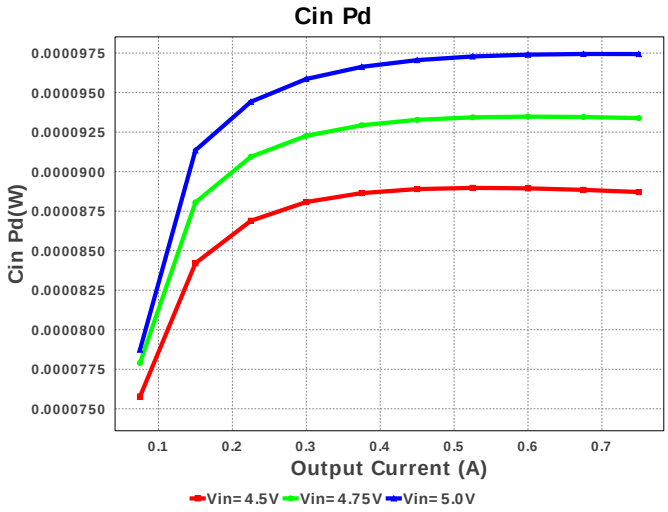


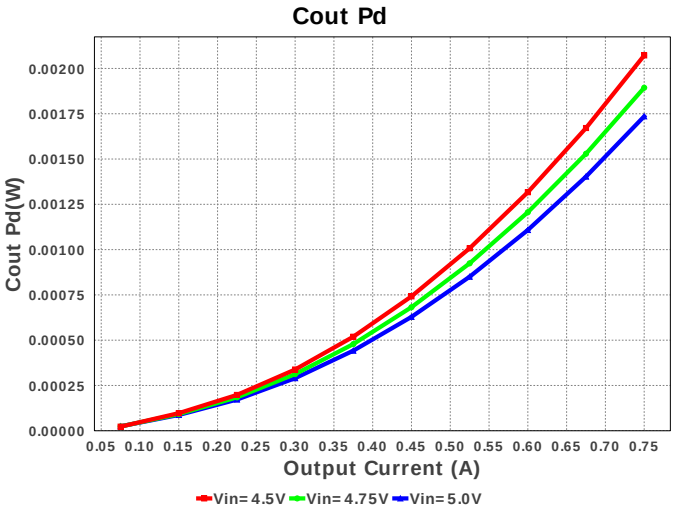
Coutx IRMS

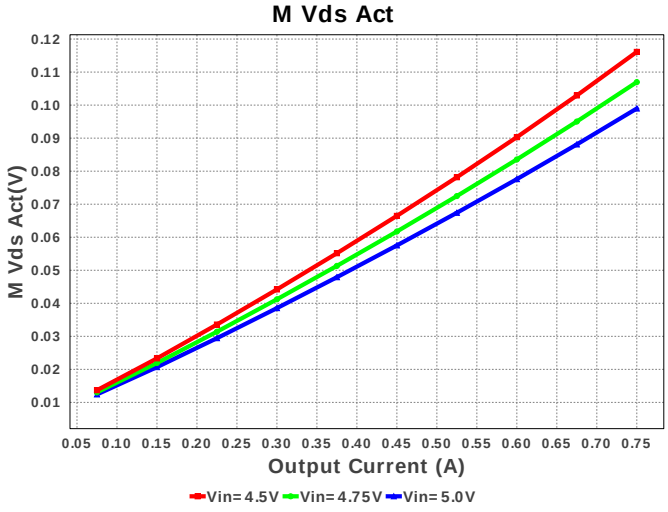


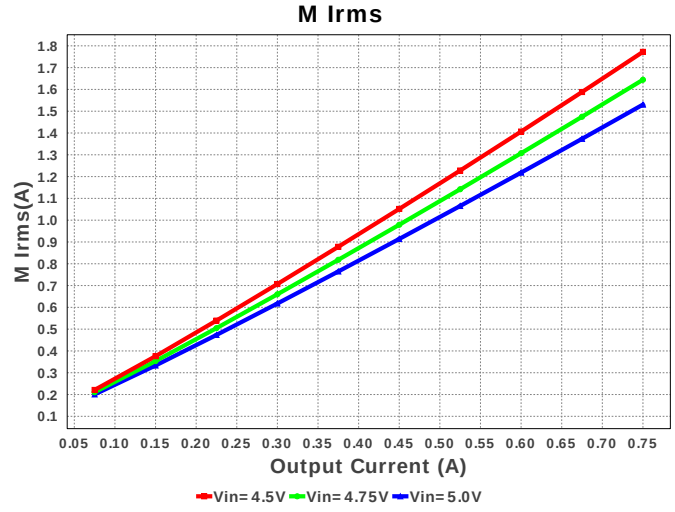


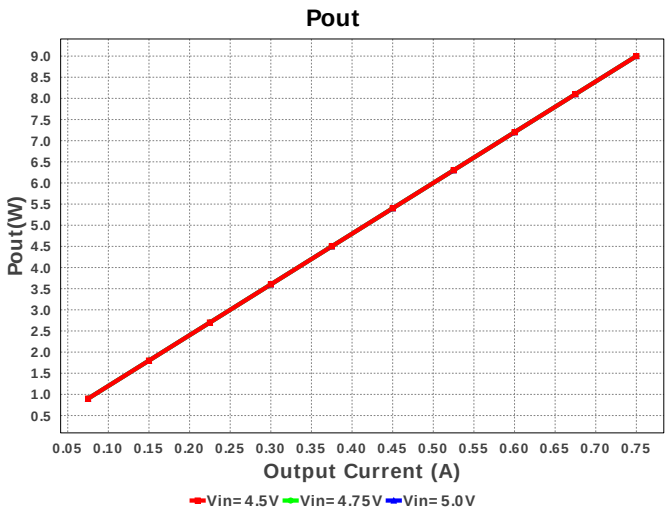


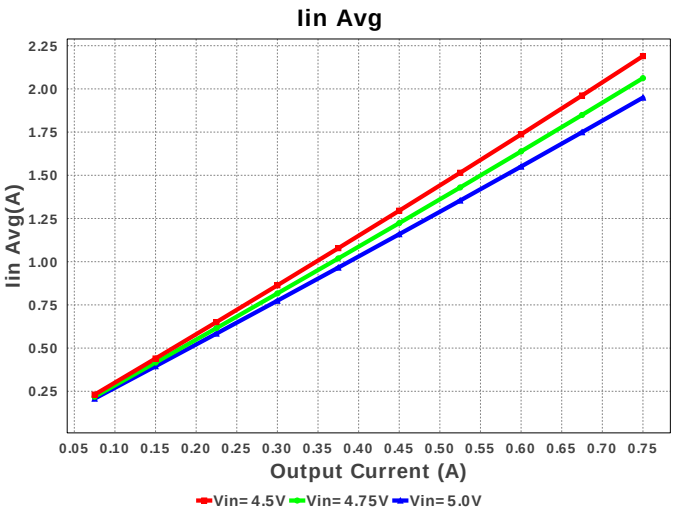


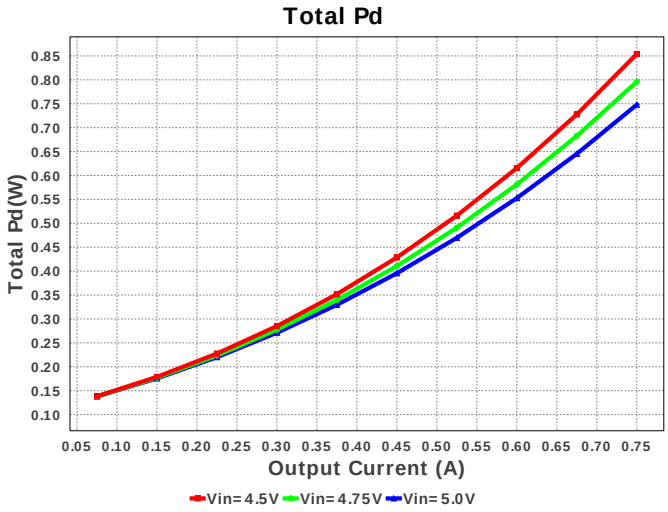


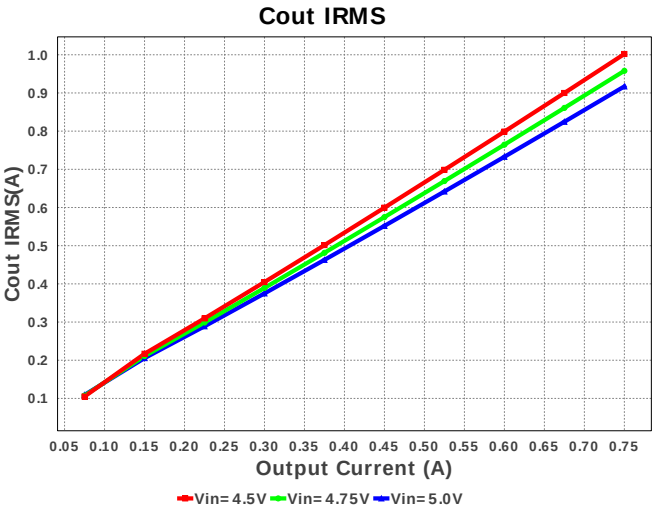


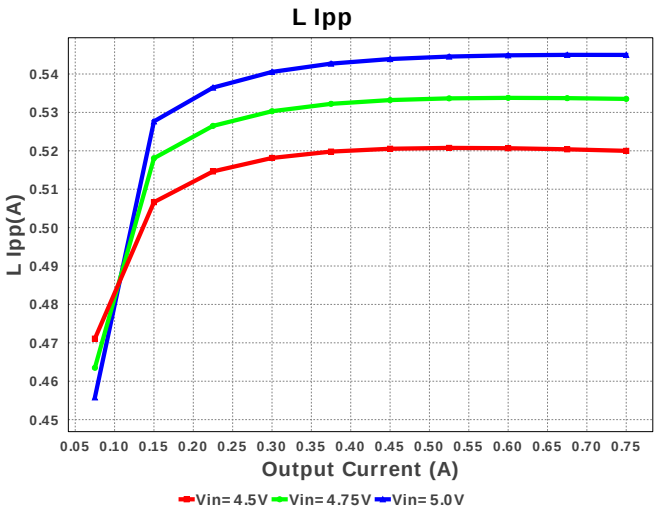


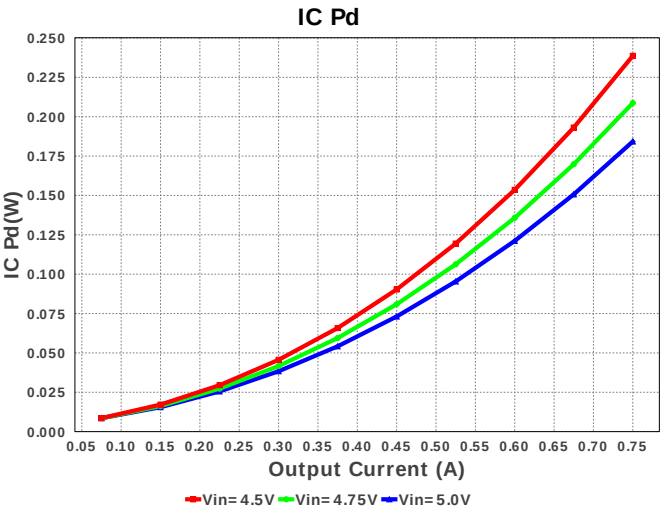


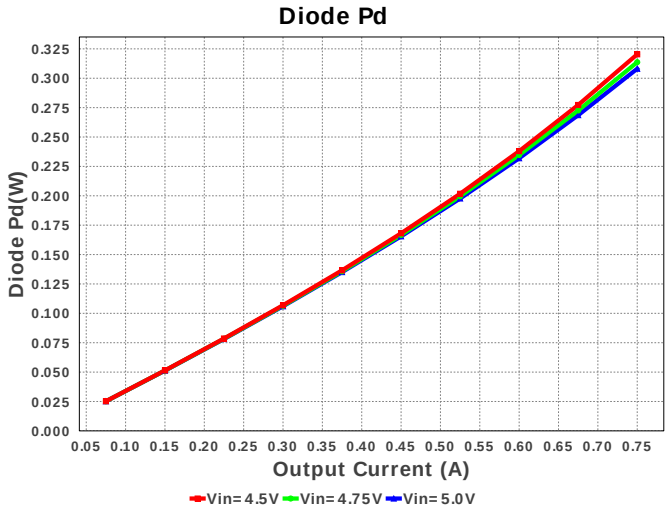


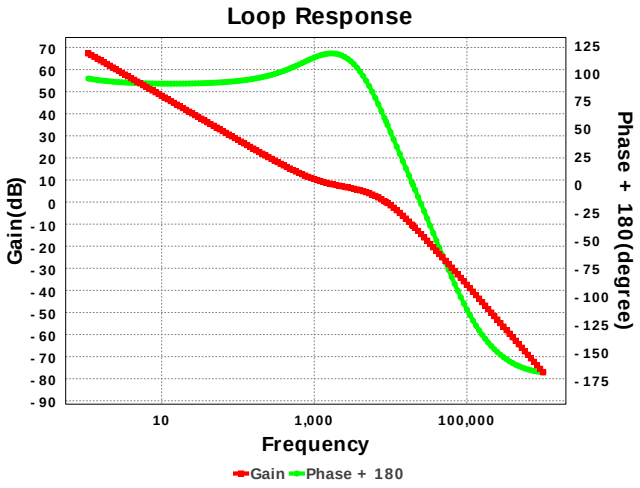












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	150.109 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	990.157 mA	Current	Output capacitor RMS ripple current
3.	Coutx IRMS	0.0 A	Current	Output capacitor_x RMS ripple current
4.	IC Ipk	2.442 A	Current	Peak switch current in IC
5.	Iin Avg	2.19 A	Current	Average input current
6.	L Ipp	519.99 mA	Current	Peak-to-peak inductor ripple current
7.	M Iavg	2.182 A	Current	MOSFET Average current
8.	M1 Irms	1.772 A	Current	Q Iavg
9.	BOM Count	15	General	Total Design BOM count
10.	FootPrint	202.0 mm^2	General	Total Foot Print Area of BOM components
11.	Frequency	778.91 kHz	General	Switching frequency
12.	IC Tolerance	9.0 mV	General	IC Feedback Tolerance
13.	M Vds Act	116.12 mV	General	Voltage drop across the MosFET
14.	Mode	CCM	General	Conduction Mode
15.	Pout	9.0 W	General	Total output power
16.	Total BOM	$2.26	General	Total BOM Cost
17.	D1 Tj	62.035 degC	Op_Point	D1 junction temperature
18.	Low Freq Gain	67.196 dB	Op_Point	Gain at 10Hz
19.	Vout Actual	11.872 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
20.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
21.	Cross Freq	7.867 kHz	Op_point	Bode plot crossover frequency
22.	Duty Cycle	65.635 %	Op_point	Duty cycle
23.	Efficiency	91.333 %	Op_point	Steady state efficiency
24.	Gain Marg	-10.387 dB	Op_point	Bode Plot Gain Margin
25.	IC Tj	40.333 degC	Op_point	IC junction temperature
26.	ICThetaJA	43.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
27.	IOUT_OP	750.0 mA	Op_point	Iout operating point
28.	Phase Marg	56.829 deg	Op_point	Bode Plot Phase Margin
29.	VIN_OP	4.5 V	Op_point	Vin operating point
30.	Vout p-p	22.226 mV	Op_point	Peak-to-peak output ripple voltage
31.	Cin Pd	88.711 µW	Power	Input capacitor power dissipation
32.	Cout Pd	2.023 mW	Power	Output capacitor power dissipation
33.	Coutx Pd	0.0 W	Power	Output capacitor_x power loss
34.	Diode Pd	320.355 mW	Power	Diode power dissipation
35.	IC Pd	238.646 mW	Power	IC power dissipation
36.	L Pd	191.422 mW	Power	Inductor power dissipation
37.	Total Pd	854.055 mW	Power	Total Power Dissipation
38.	Vout Tolerance	2.557 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	750.0 m	Maximum Output Current
2.	VinMax	5.0	Maximum input voltage
3.	VinMin	4.5	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	TPS55330	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS55330** Product Folder : http://www.ti.com/product/TPS55330 : contains the data sheet and other resources.