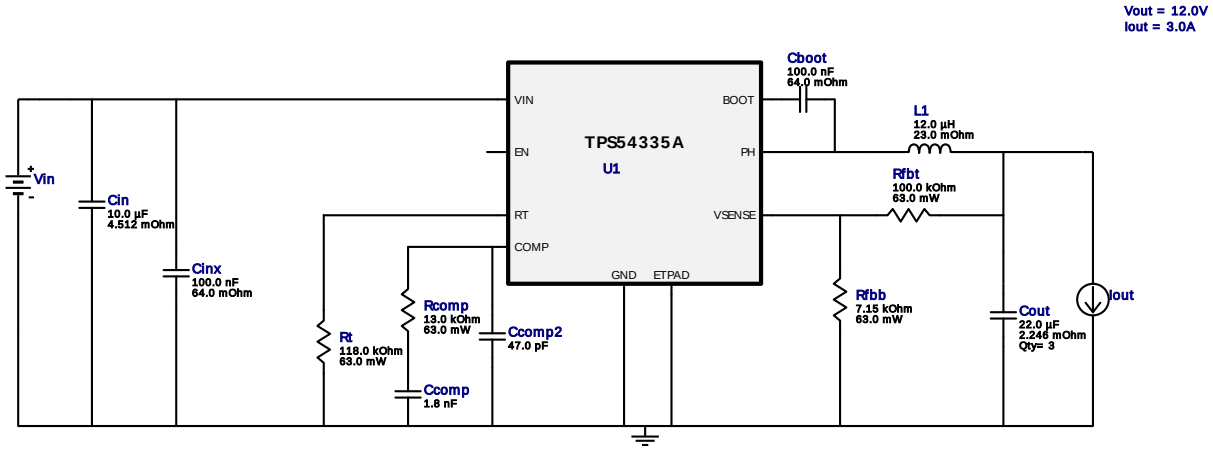
WEBENCH® Design Report

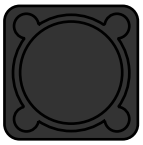
VinMin = 14.0V
VinMax = 18.0V
Vout = 12.0V
Iout = 3.0A

Device = TPS54335ADDAR
Topology = Buck
Created = 12/2/15 5:34:25 AM
BOM Cost = $2.41
BOM Count = 14
Total Pd = 2.22W

Design : 4079392/1 TPS54335ADDAR
TPS54335ADDAR 14.0V-18.0V to 12.00V @ 3.0A

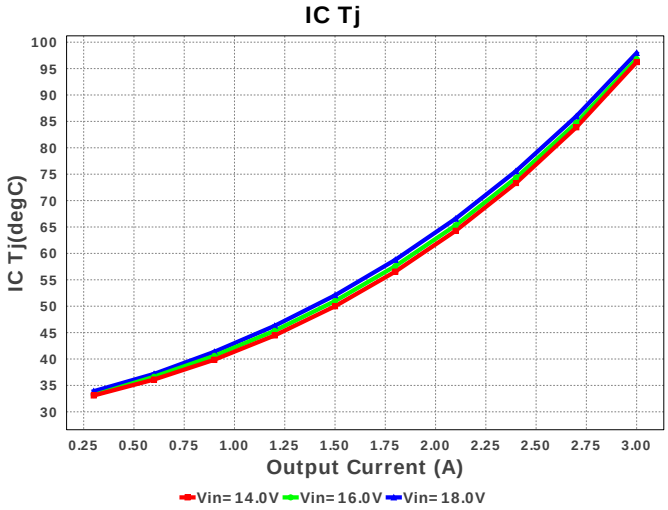


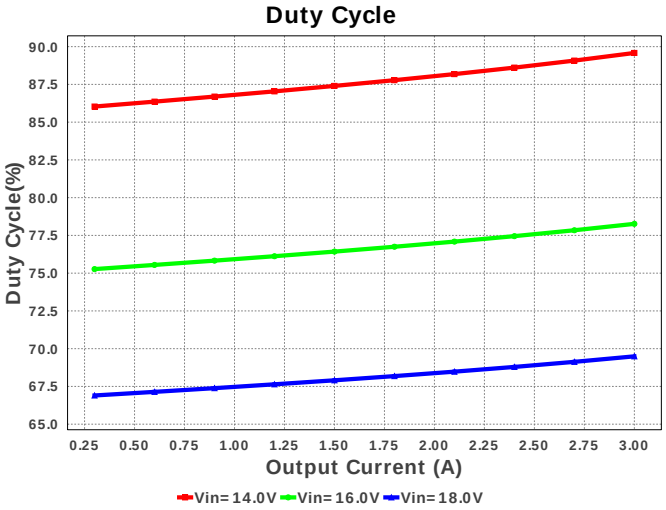
Electrical BOM

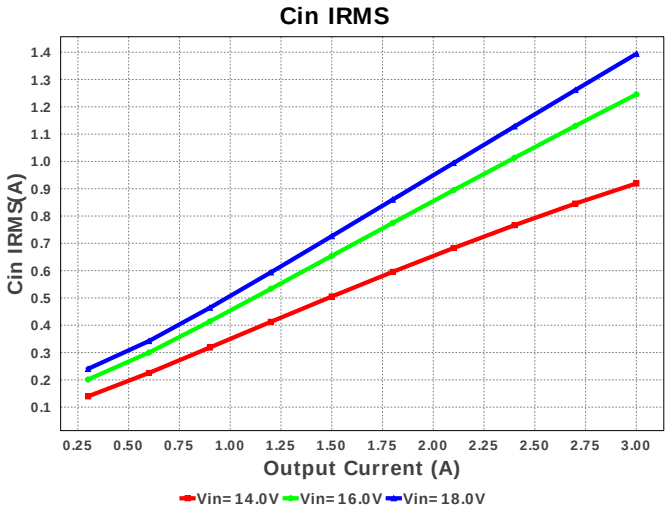
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Ccomp	MuRata	GRM033R71A182KA01D Series= X7R	Cap= 1.8 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
3.	Ccomp2	Kemet	C0805C470K5GACTU Series= C0G/NP0	Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM31CR61E106KA12L Series= X5R	Cap= 10.0 uF ESR= 4.512 mOhm VDC= 25.0 V IRMS= 2.447 A	1	$0.06	1206_190 11 mm²
5.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
6.	Cout	TDK	C3216JB1E226M Series= JB	Cap= 22.0 uF ESR= 2.246 mOhm VDC= 25.0 V IRMS= 0.0 A	3	$0.32	1206 11 mm²
7.	L1	Bourns	SRR1260-120M	L= 12.0 µH DCR= 23.0 mOhm	1	$0.41	 SRR1260 210 mm²
8.	Rcomp	Vishay-Dale	CRCW040213K0FKED Series= CRCW..e3	Res= 13.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW04027K15FKED Series= CRCW..e3	Res= 7.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

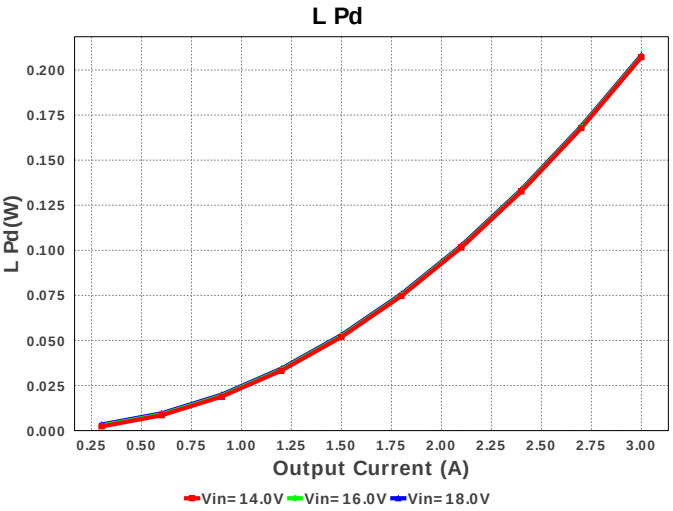
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
11.	Rt	Vishay-Dale	CRCW0402118KFKED Series= CRCW..e3	Res= 118.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	TPS54335ADDAR	Switcher	1	$0.90	

R-PDSO-G8 57 mm^2

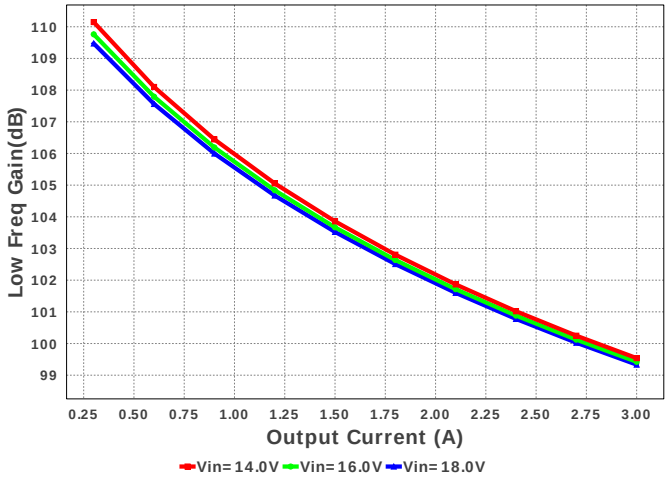




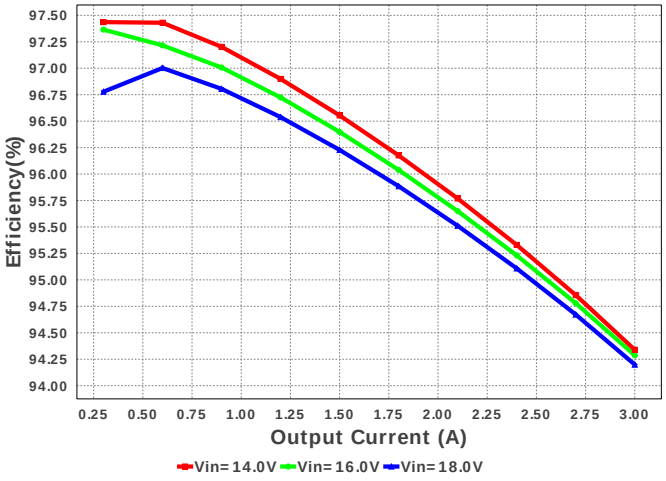




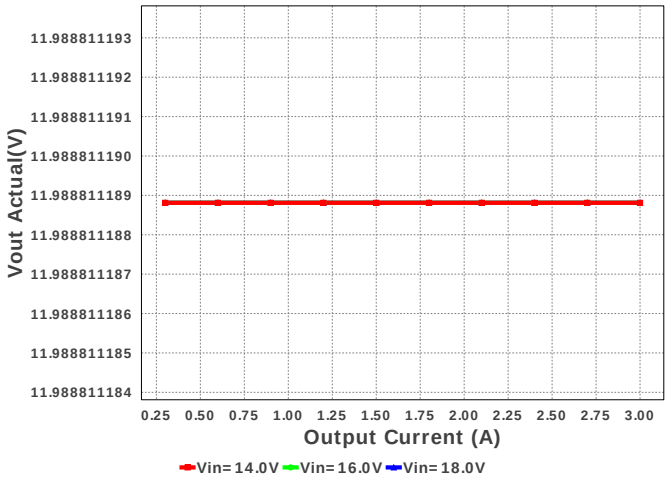
Low Freq Gain



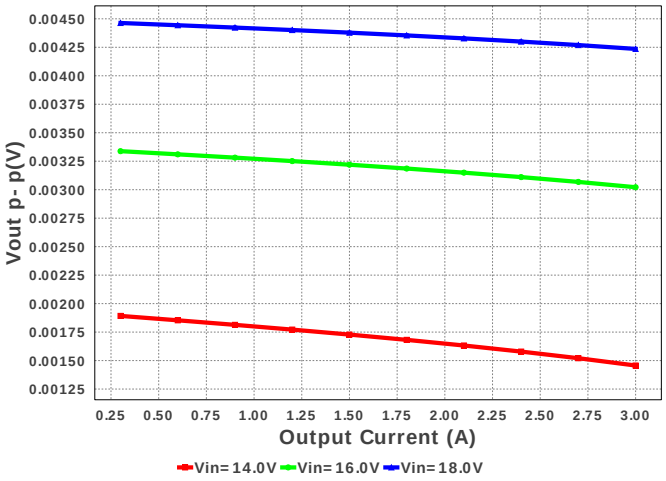
Efficiency



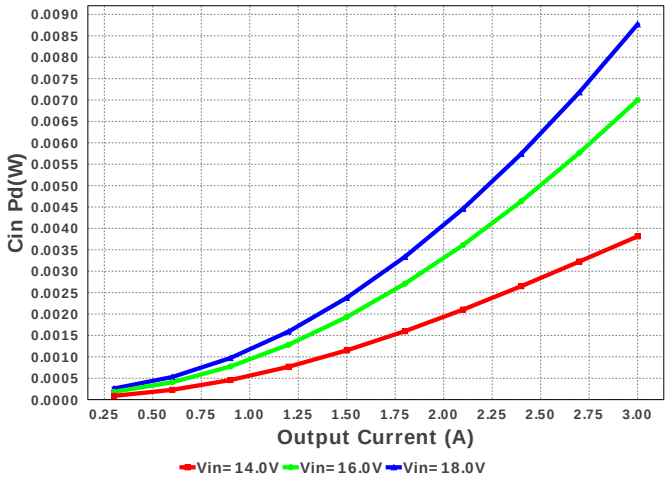
Vout Actual



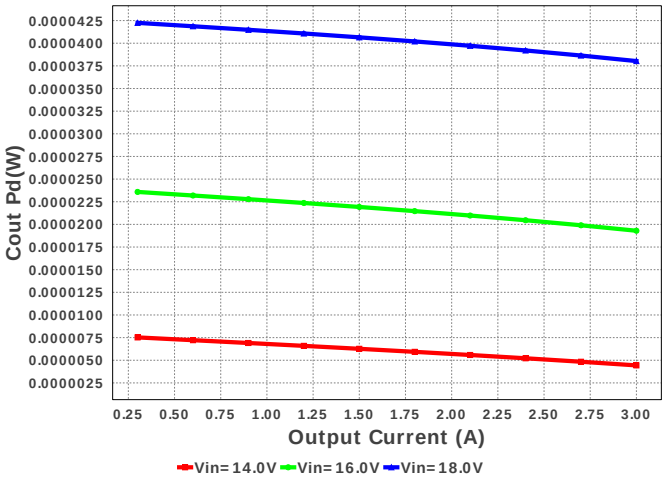
Vout p- p

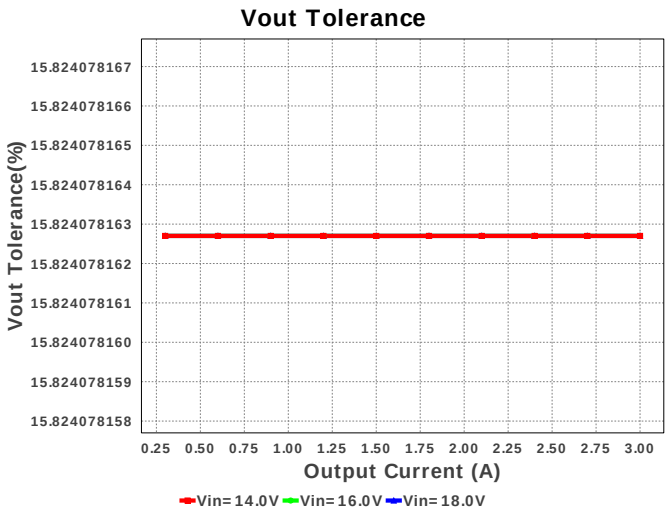


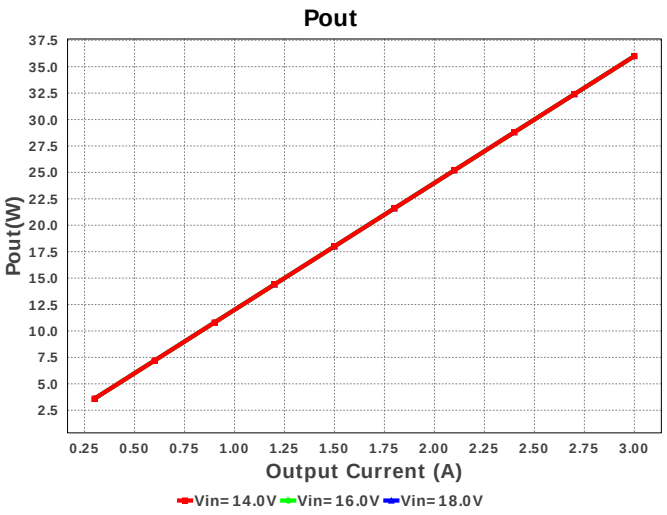
Cin Pd

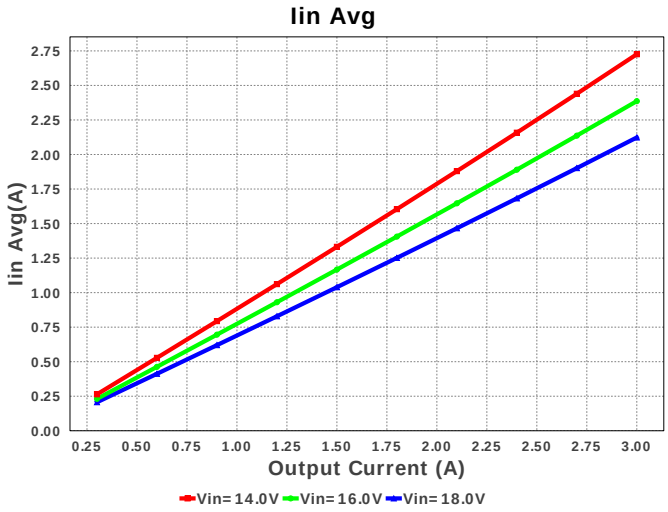


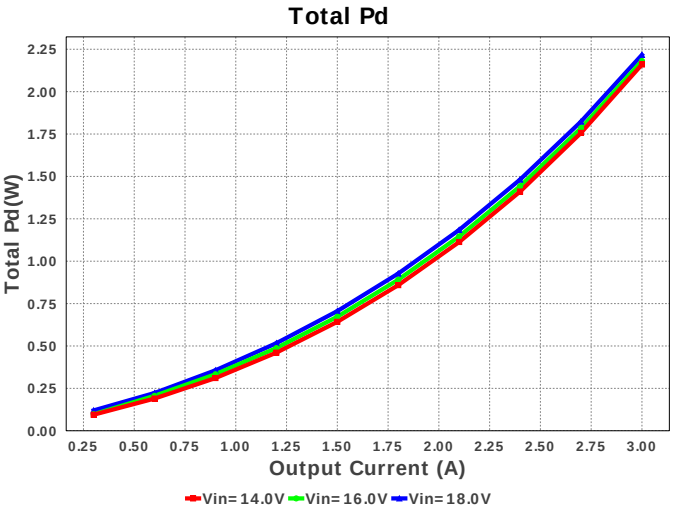
Cout Pd

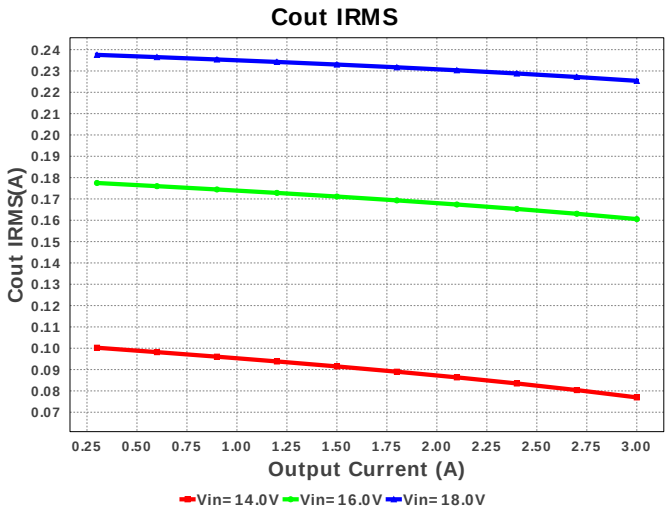


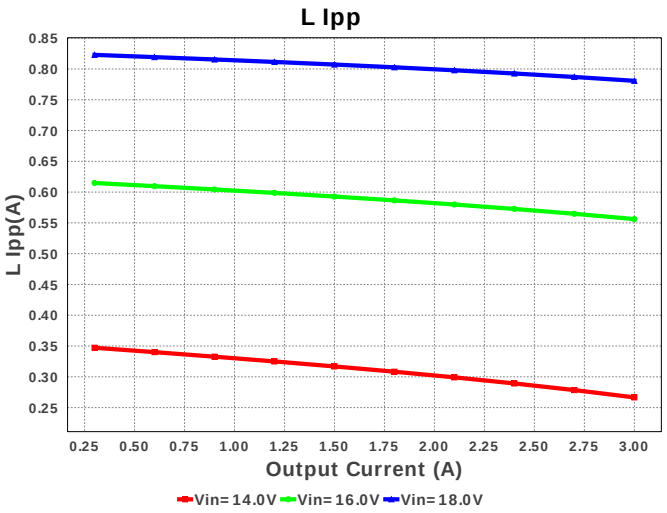


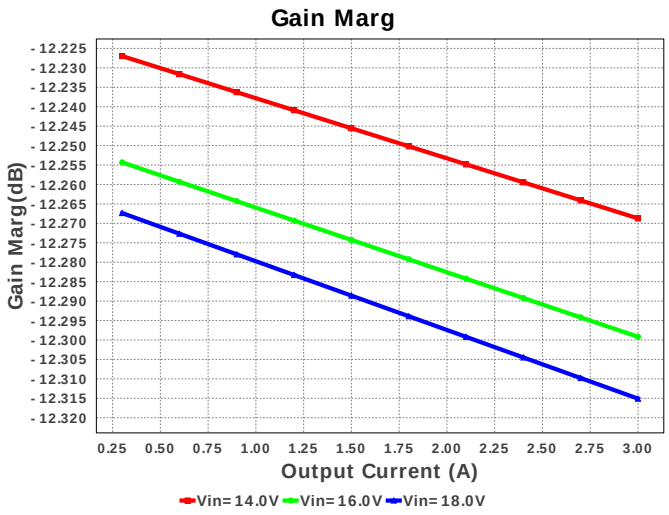


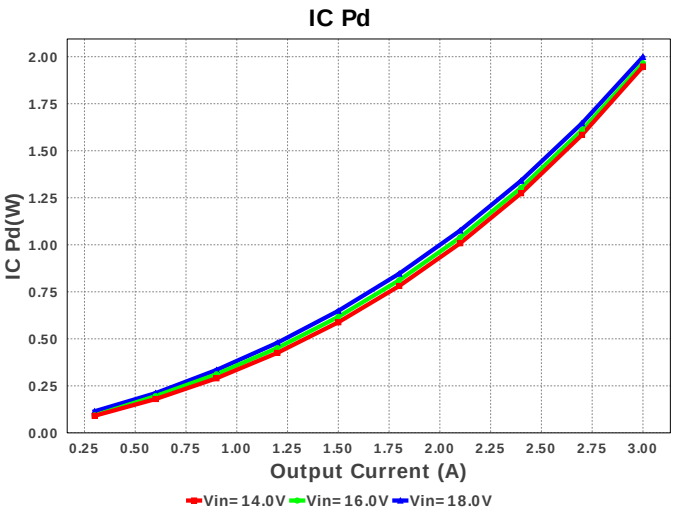


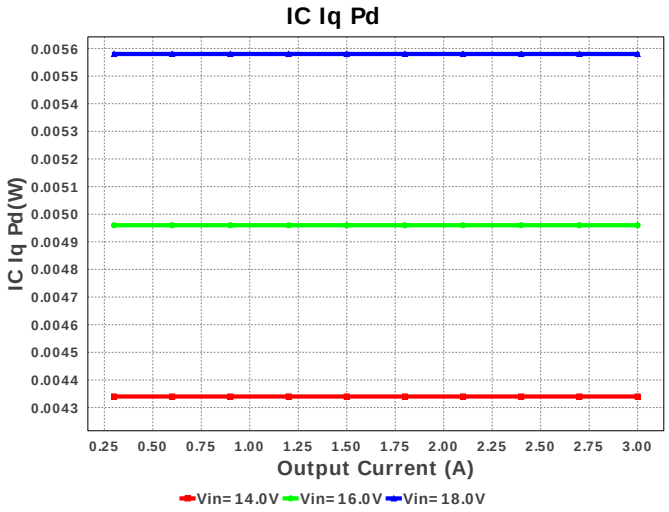


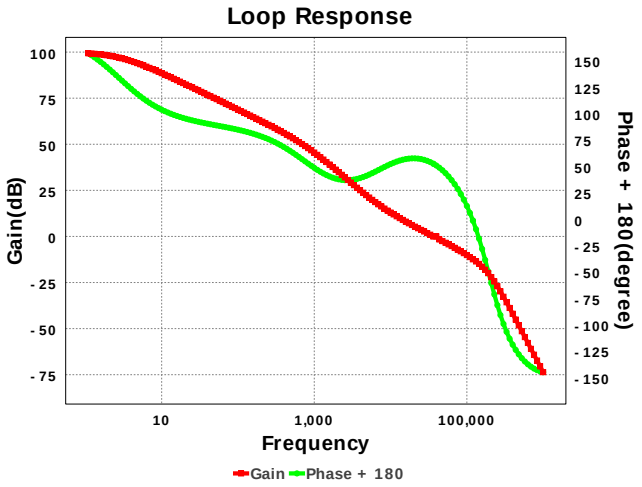












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.394 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	225.379 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.123 A	Current	Average input current
4.	L Ipp	780.74 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	14	General	Total Design BOM count
6.	FootPrint	346.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	403.338 kHz	General	Switching frequency
8.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
9.	Pout	36.0 W	General	Total output power
10.	Total BOM	$2.41	General	Total BOM Cost
11.	ICThetaJA Effective	34.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	99.334 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	11.989 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
15.	Cross Freq	36.654 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	69.492 %	Op_point	Duty cycle
17.	Efficiency	94.199 %	Op_point	Steady state efficiency
18.	Gain Marg	-12.315 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	97.959 degC	Op_point	IC junction temperature
20.	IOUT_OP	3.0 A	Op_point	Iout operating point
21.	Phase Marg	53.713 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	18.0 V	Op_point	Vin operating point
23.	Vout p-p	4.236 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	8.768 mW	Power	Input capacitor power dissipation
25.	Cout Pd	38.029 µW	Power	Output capacitor power dissipation
26.	IC Iq Pd	5.58 mW	Power	IC Iq Pd
27.	IC Pd	1.999 W	Power	IC power dissipation
28.	L Pd	208.168 mW	Power	Inductor power dissipation
29.	Total Pd	2.217 W	Power	Total Power Dissipation
30.	Vout Tolerance	15.824 %	Unknown	Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	VinMax	18.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	TPS54335A	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54335A** Product Folder : http://www.ti.com/product/TPS54335A : contains the data sheet and other resources.