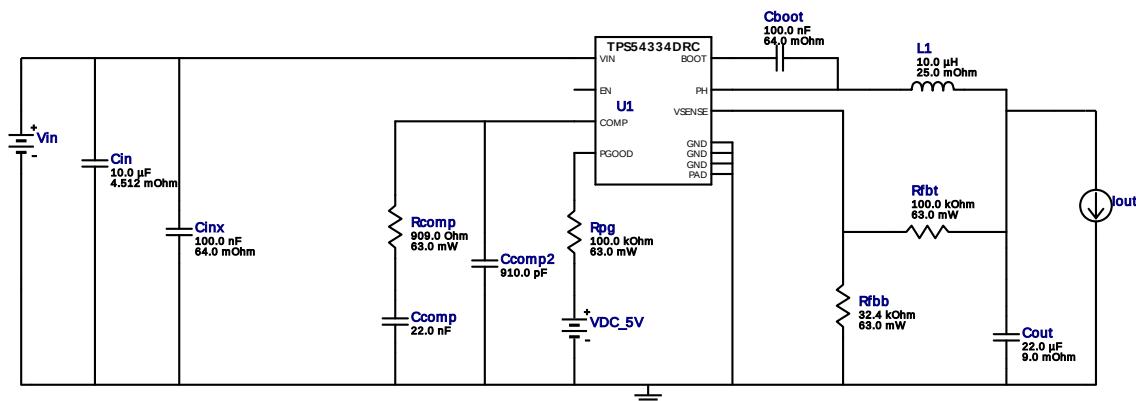


WEBENCH® Design Report

Design : 1512703/3 TPS54334DRCR
TPS54334DRCR 14.0V-22.0V to 3.30V @ 2.0A

Vout = 3.3V
Iout = 2.0A

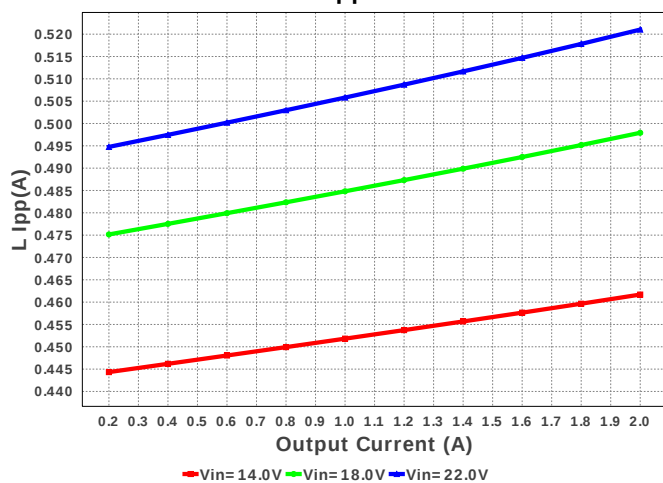


Electrical BOM

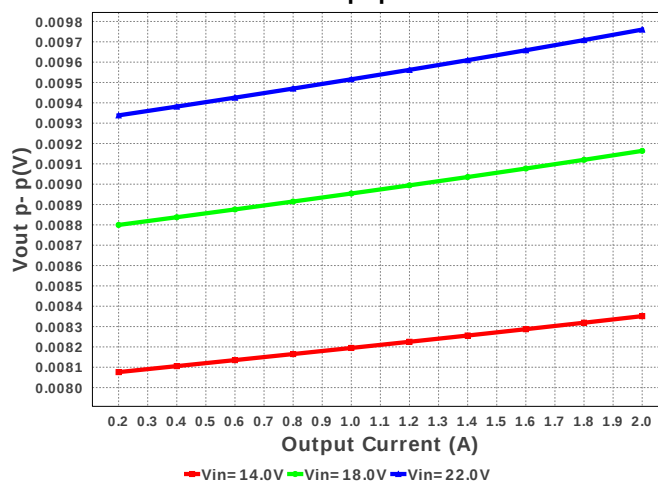
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	 0805 7 mm²
2.	Ccomp	Yageo America	CC0805KRX7R9BB223 Series= X7R	Cap= 22.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm²
3.	Ccomp2	Samsung Electro-Mechanics	CL21C911JBCNNNC Series= C0G/NP0	Cap= 910.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.03	 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	\$0.05	 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	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	1	\$0.04	 0805 7 mm²
7.	L1	Bourns	SRU1038-100Y	L= 10.0 uH DCR= 25.0 mOhm	1	\$0.33	 SRU1038 144 mm²
8.	Rcomp	Vishay-Dale	CRCW0402909RFKED Series= CRCW..e3	Res= 909.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040232K4FKED Series= CRCW..e3	Res= 32.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
10.	Rfbt	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
11.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
12.	U1	Texas Instruments	TPS54334DRCR	Switcher	1	\$0.95	 DRC0010J 16 mm²

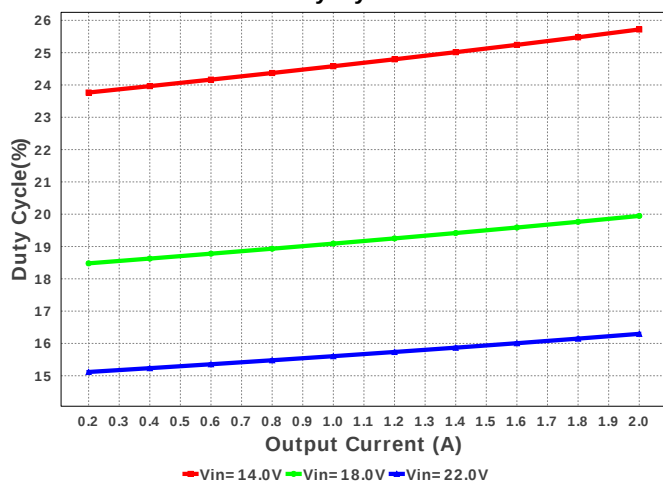
L Ipp



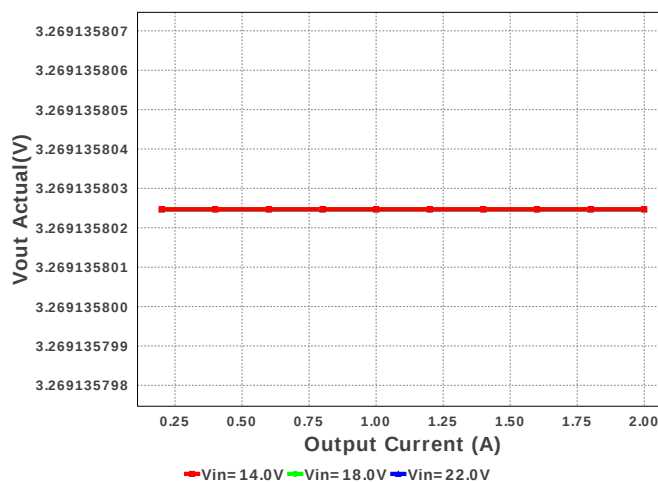
Vout p- p

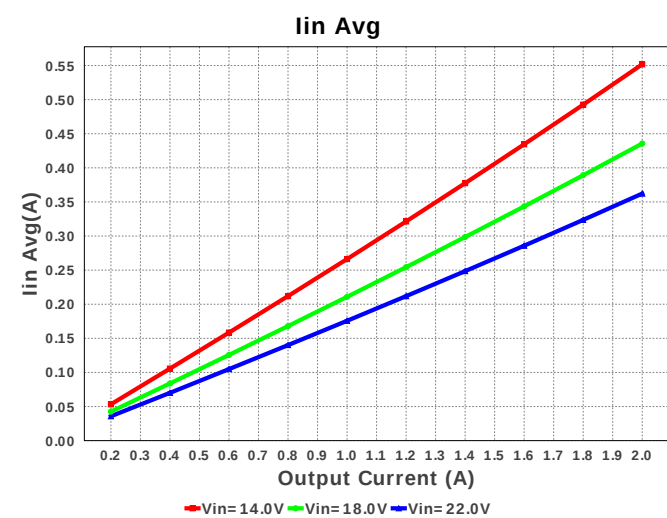
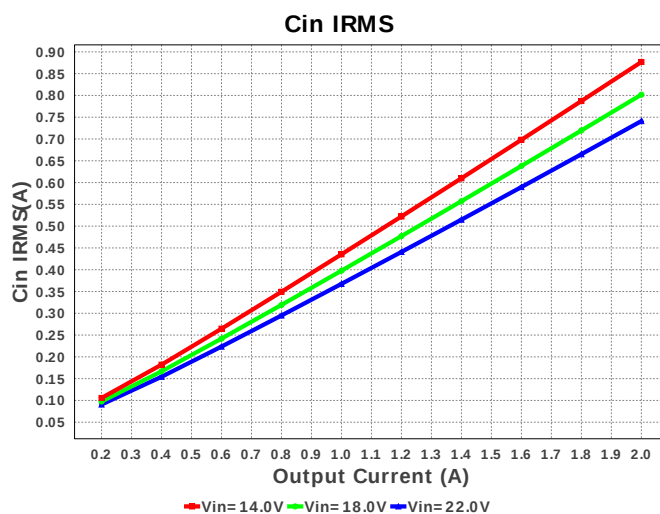
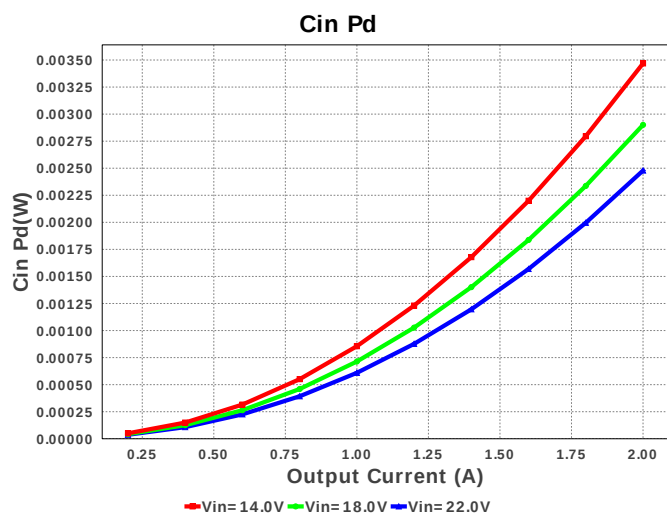
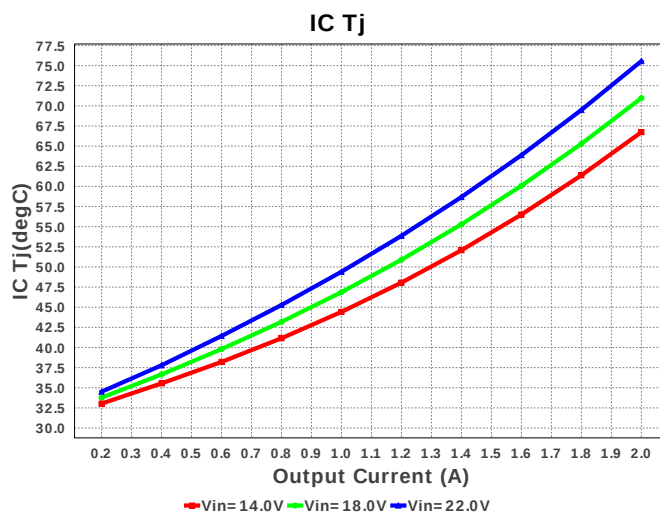
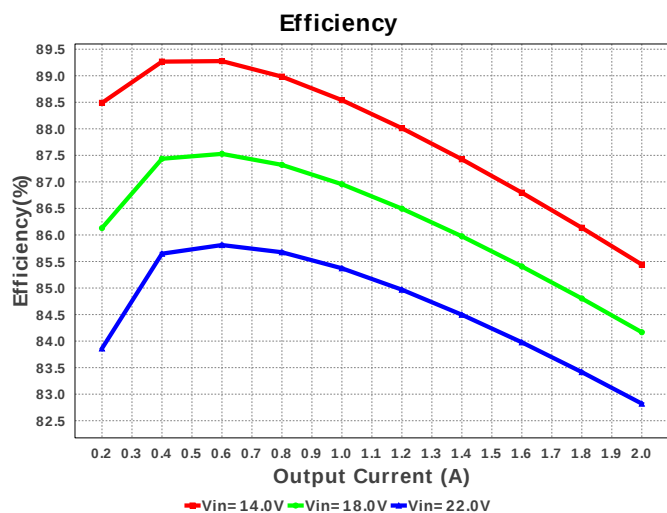


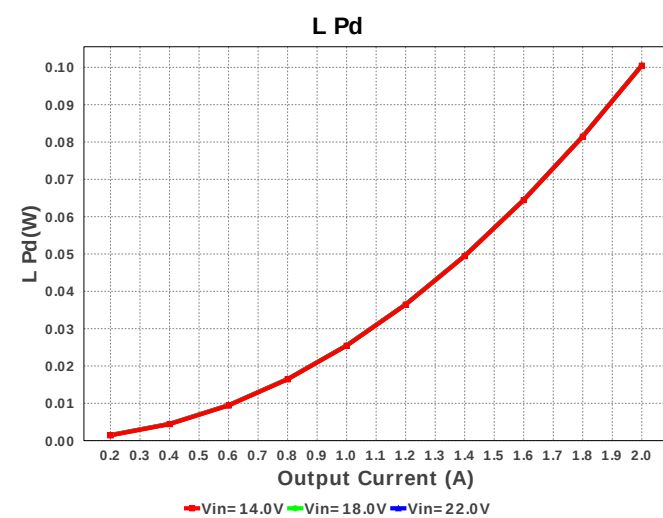
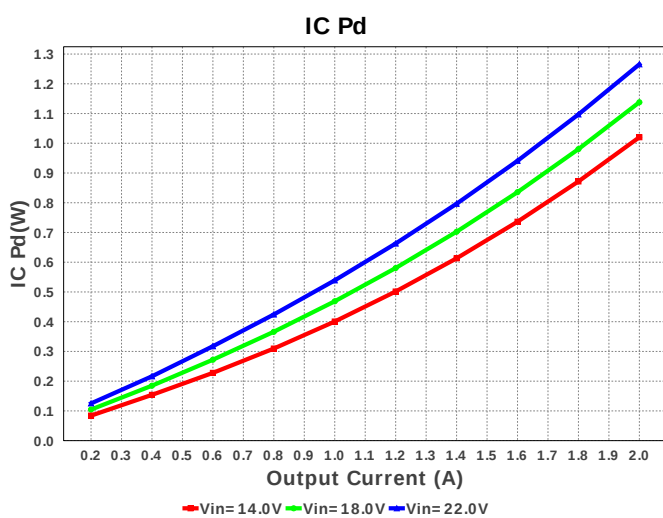
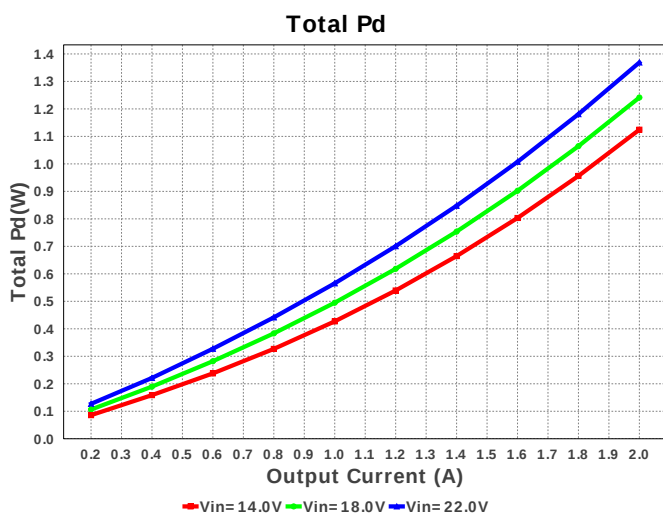
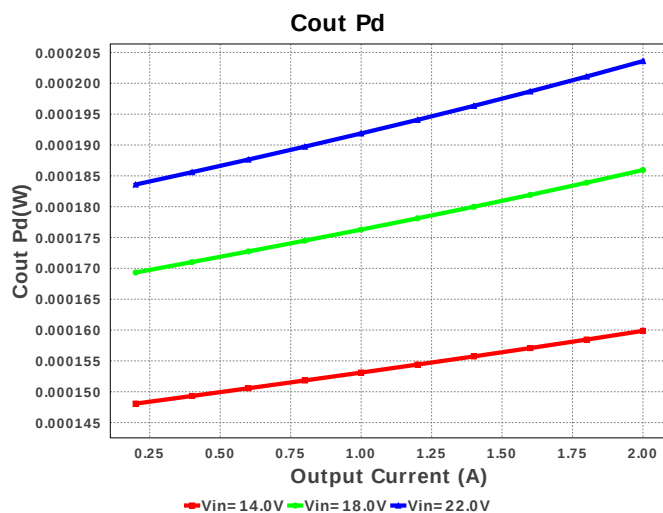
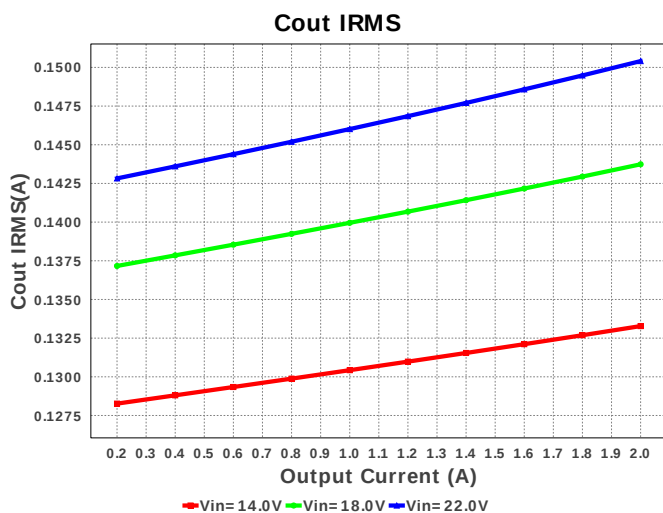
Duty Cycle

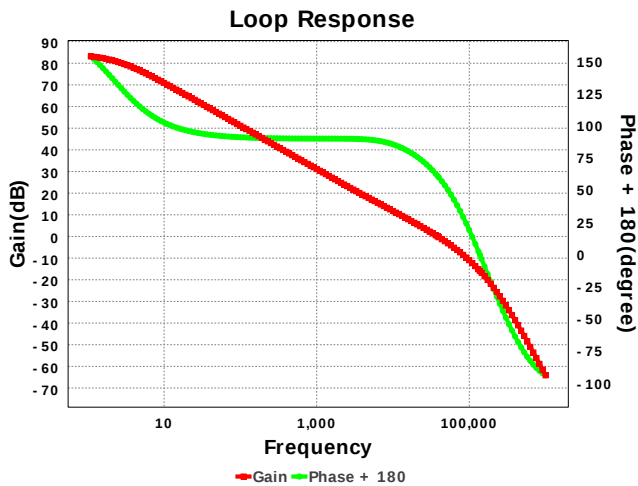


Vout Actual









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	741.159 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	150.408 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	362.22 mA	Current	Average input current
4.	L Ipp	521.03 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	217.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	570.0 kHz	General	Switching frequency
8.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
9.	Pout	6.6 W	General	Total output power
10.	Total BOM	\$1.47	General	Total BOM Cost
11.	ICThetaJA Effective	36.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	83.146 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	3.269 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
15.	Cross Freq	38.375 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	16.297 %	Op_point	Duty cycle
17.	Efficiency	82.822 %	Op_point	Steady state efficiency
18.	Gain Marg	-15.899 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	75.559 degC	Op_point	IC junction temperature
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	Phase Marg	61.294 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	22.0 V	Op_point	Vin operating point
23.	Vout p-p	9.76 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	2.479 mW	Power	Input capacitor power dissipation
25.	Cout Pd	203.602 μ W	Power	Output capacitor power dissipation
26.	IC Iq Pd	6.82 mW	Power	IC Iq Pd
27.	IC Pd	1.266 W	Power	IC power dissipation
28.	L Pd	100.566 mW	Power	Inductor power dissipation
29.	Total Pd	1.369 W	Power	Total Power Dissipation
30.	Vout Tolerance	2.795 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	22.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS54334	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54334** Product Folder : <http://www.ti.com/product/TPS54334> : contains the data sheet and other resources.

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