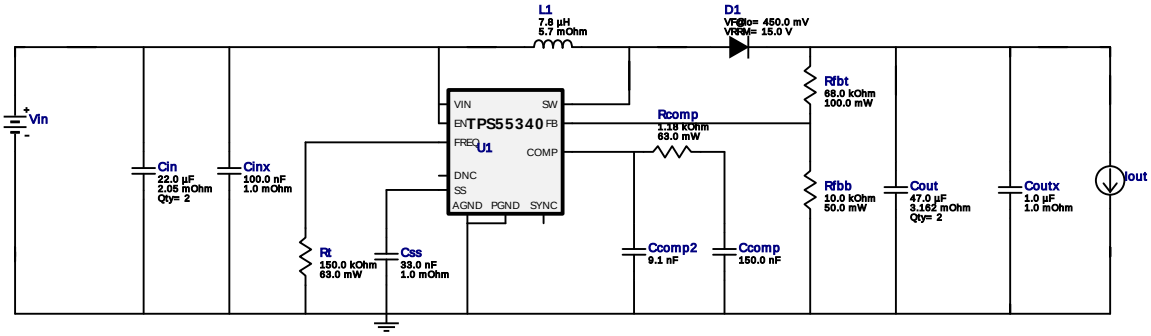
WEBENCH® Design Report

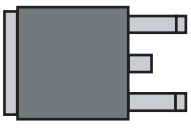
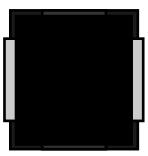
VinMin = 3.5V
VinMax = 7.4V
Vout = 9.5V
Iout = 1.5A

Device = TPS55340RTER
Topology = Boost
Created = 2018-10-10 13:23:35.080
BOM Cost = $7.74
BOM Count = 16
Total Pd = 1.45W

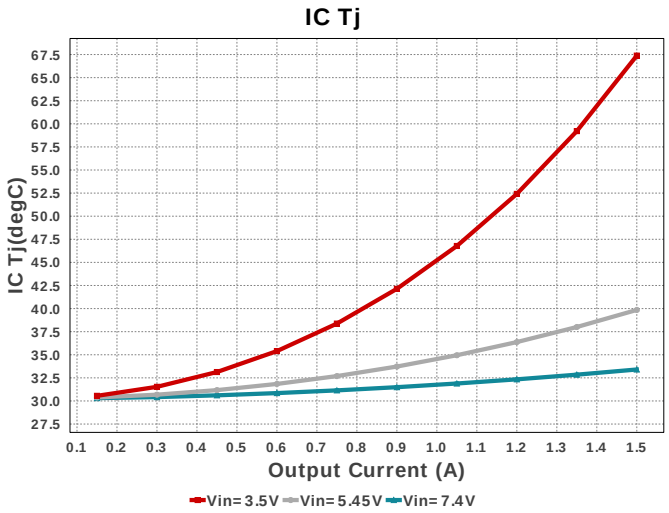
Design : TPS55340RTER
TPS55340RTER 3.5V-7.4V to 9.50V @ 1.5A

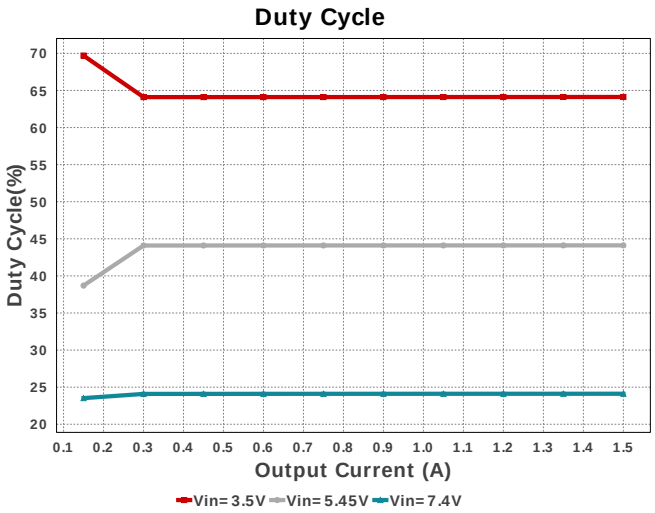


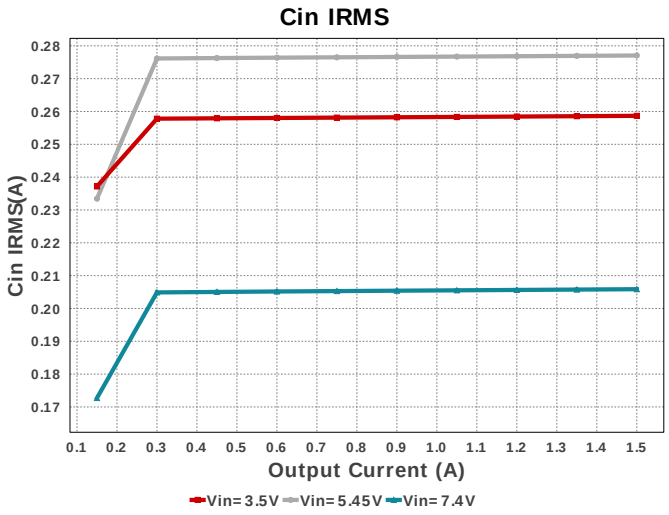
Electrical BOM

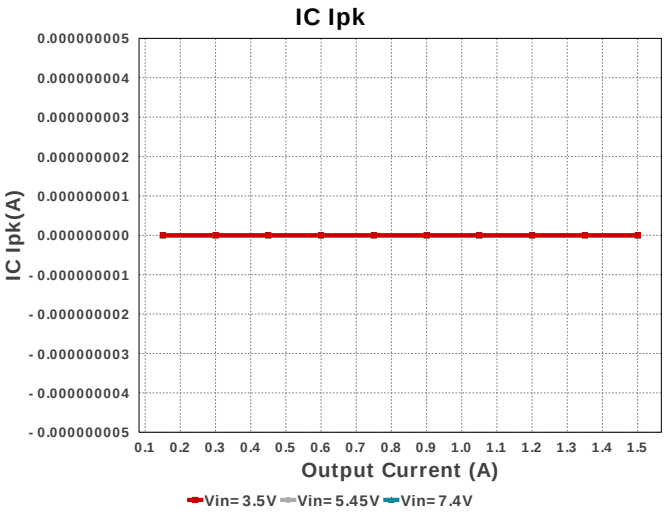
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Panasonic	ECPU1C154MA5 Series= ECPU(A)	Cap= 150.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.17	 1206 11 mm²
2.	Ccomp2	Kemet	C0603C912J3GAC7867 Series= C0G/NP0	Cap= 9.1 nF VDC= 5.0 V IRMS= 0.0 A	1	$0.14	 0603 5 mm²
3.	Cin	TDK	C2012X5R1V226M125AC Series= X5R	Cap= 22.0 uF ESR= 2.05 mOhm VDC= 35.0 V IRMS= 4.5559 A	2	$0.38	 0805 7 mm²
4.	Cinx	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.01	 0402 3 mm²
5.	Cout	TDK	C5750X7R1C476M230KB Series= X7R	Cap= 47.0 uF ESR= 3.162 mOhm VDC= 16.0 V IRMS= 5.1344 A	2	$1.20	 2220_250 54 mm²
6.	Coutx	Taiyo Yuden	EMK107B7105KA-T Series= X7R	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.02	 0603 5 mm²
7.	Css	MuRata	GRM033R60J333KE01D Series= X5R	Cap= 33.0 nF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	$0.01	 0201 2 mm²
8.	D1	ON Semiconductor	MBRB2515LT4G	VF@Io= 450.0 mV VRRM= 15.0 V	1	$1.05	 DDPAK 210 mm²
9.	L1	Coiltronics	HC1-7R8-R	L= 7.8 µH DCR= 5.7 mOhm	1	$1.74	 HC1 225 mm²

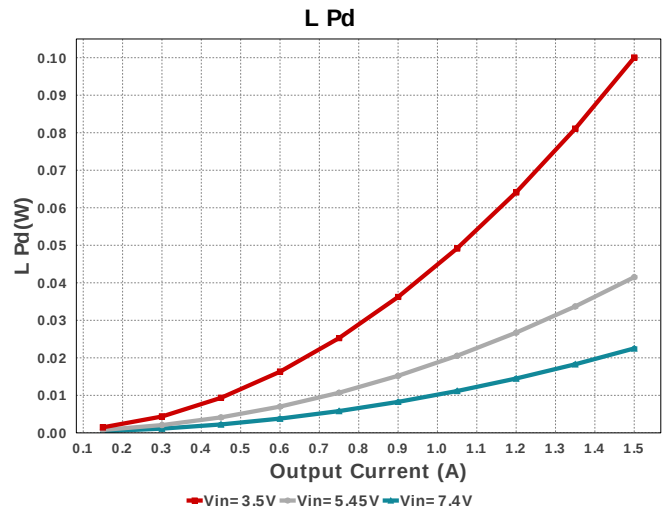
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rcomp	Vishay-Dale	CRCW04021K18FKED Series= CRCW..e3	Res= 1.18 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
11.	Rfbb	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
12.	Rfbt	Susumu Co Ltd	RR1220P-683-D Series= RR12	Res= 68.0 kOhm Power= 100.0 mW Tolerance= 0.5%	1	$0.01	0805 7 mm^2
13.	Rt	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
14.	U1	Texas Instruments	TPS55340RTER	Switcher	1	$1.40	S-PWQFN-N16 17 mm^2

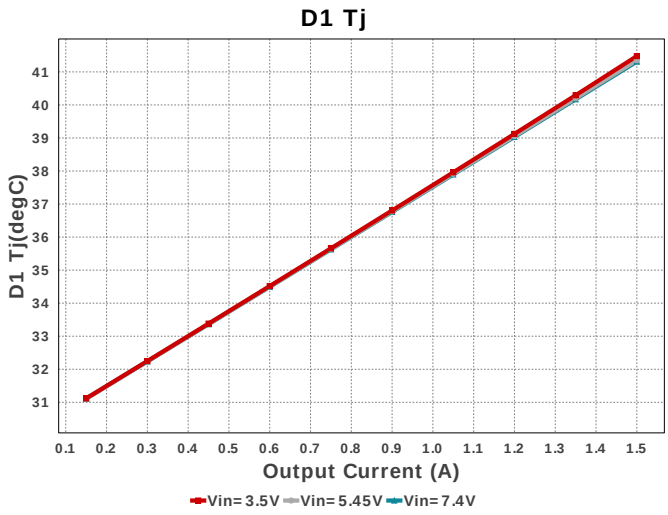


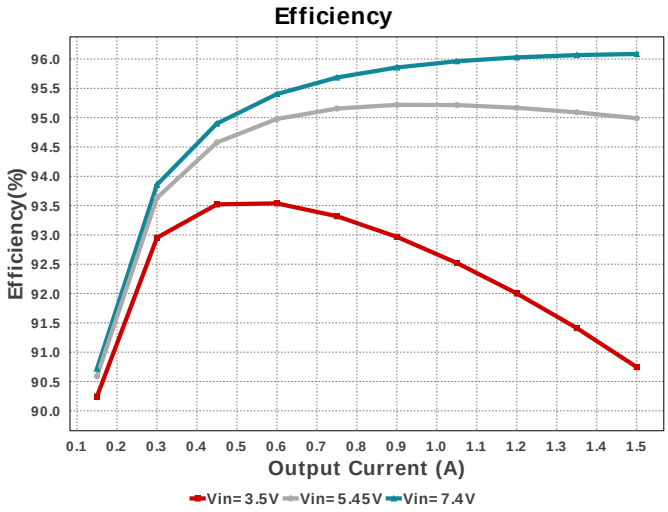


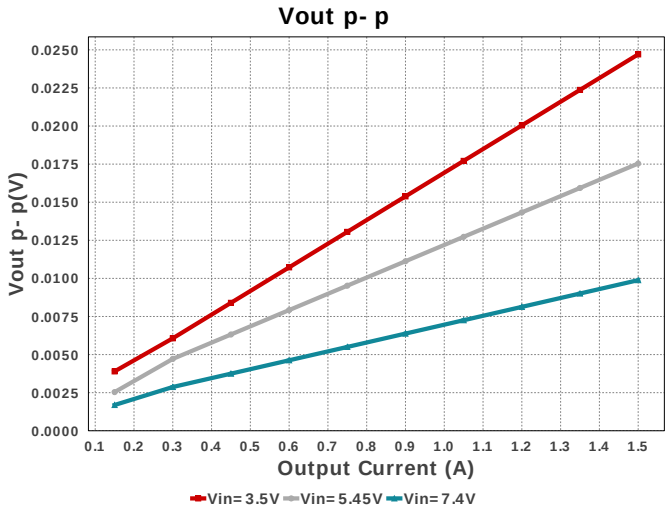


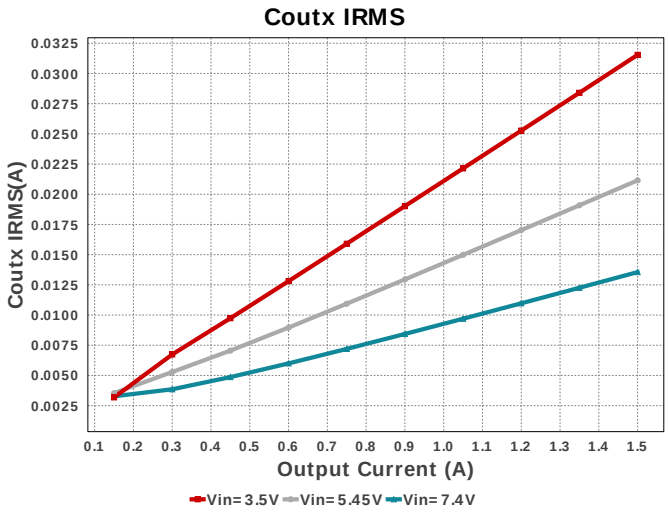


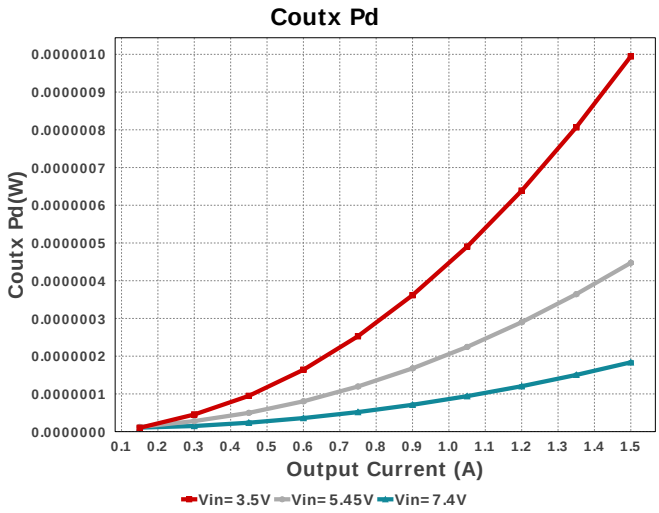


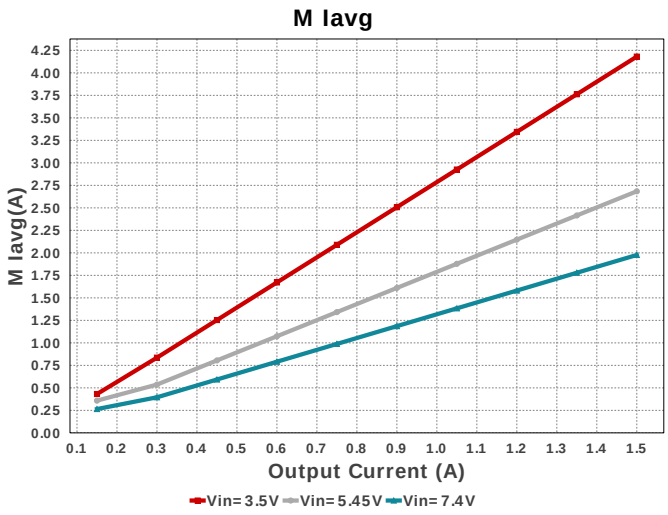


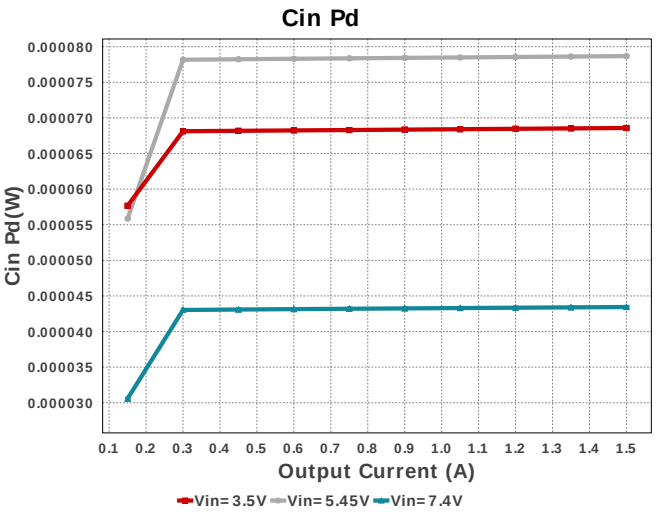


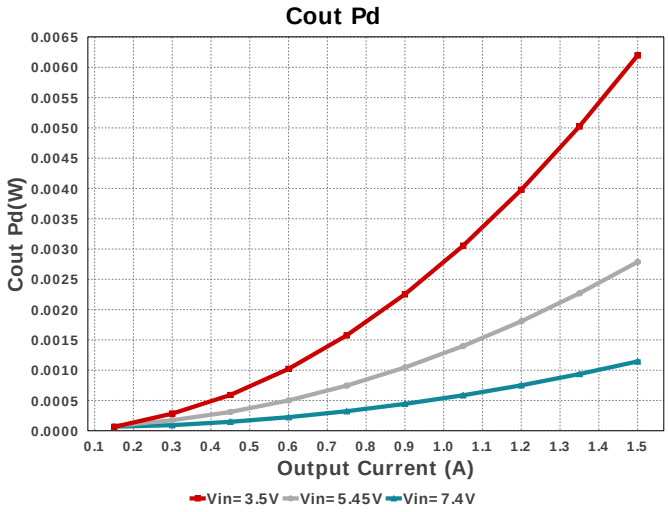


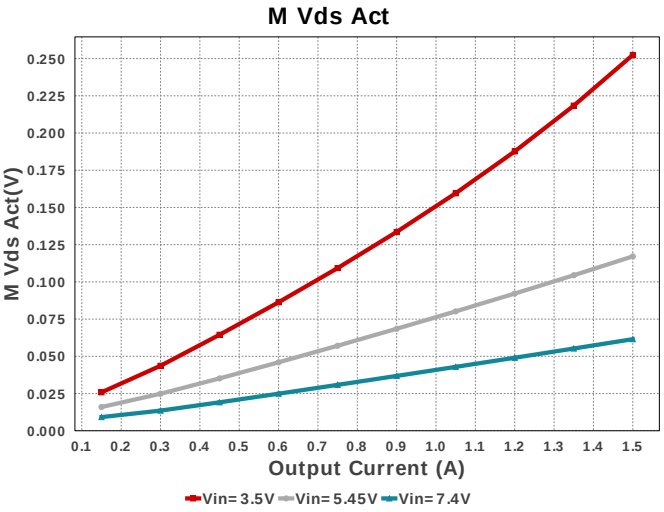


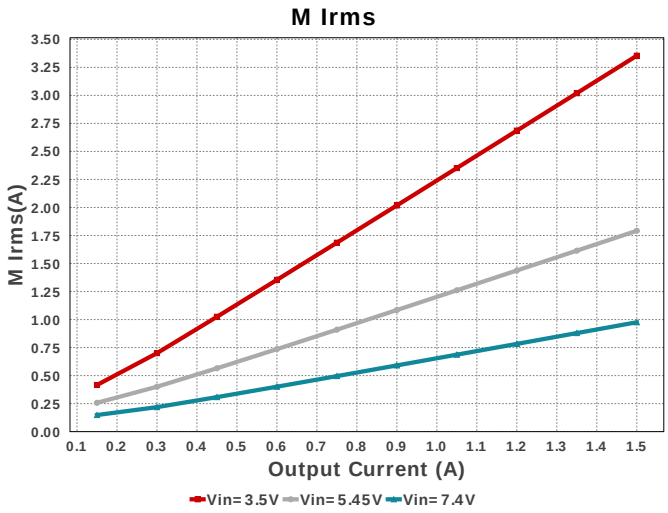


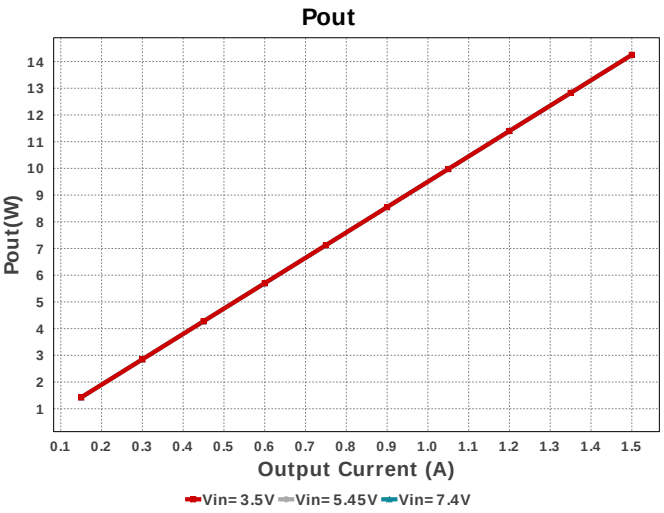


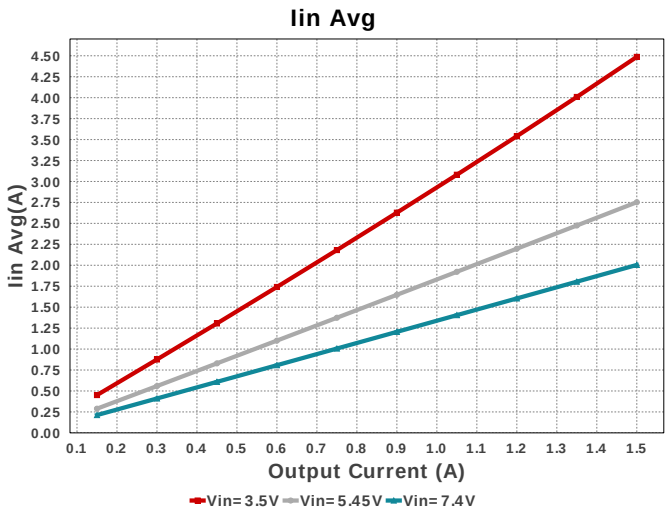


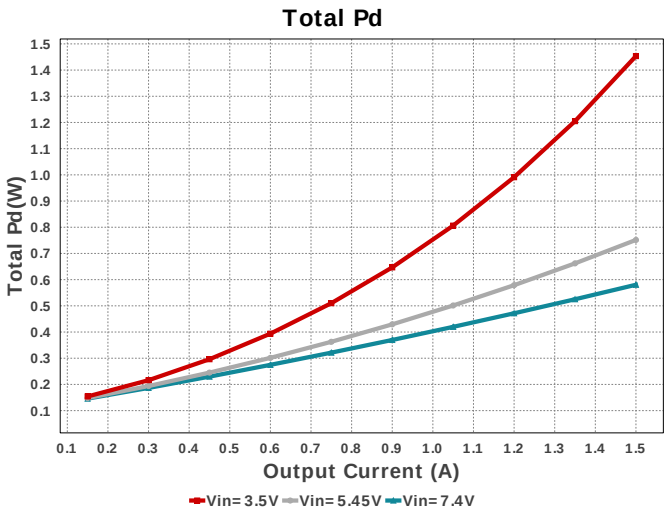


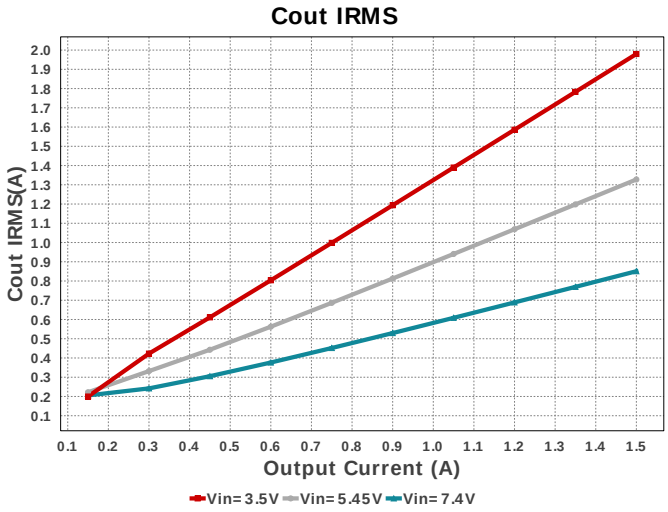


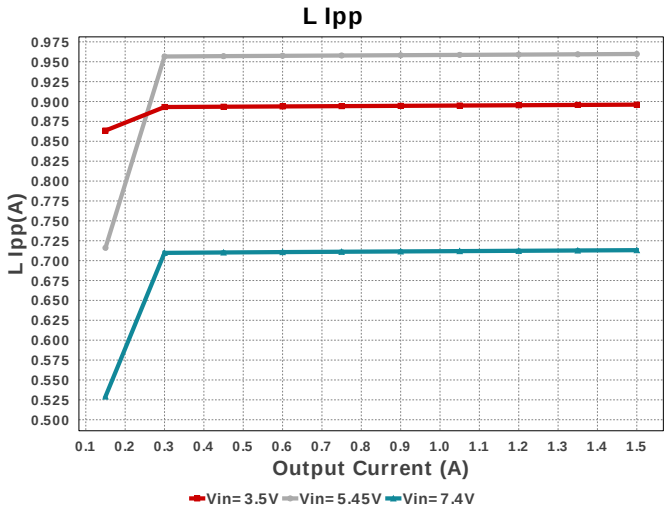


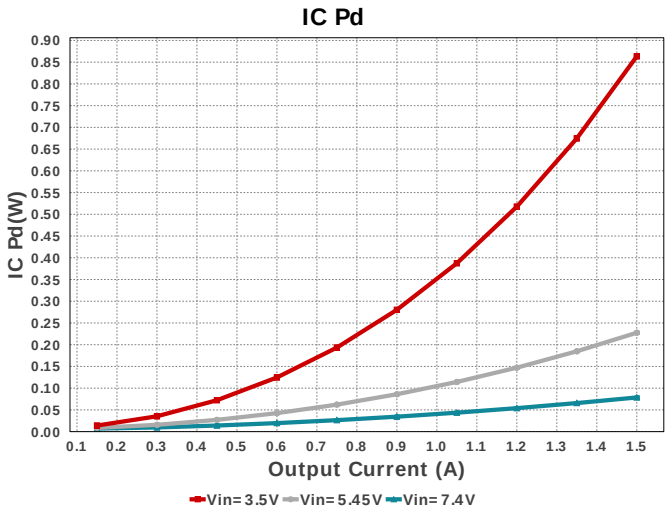


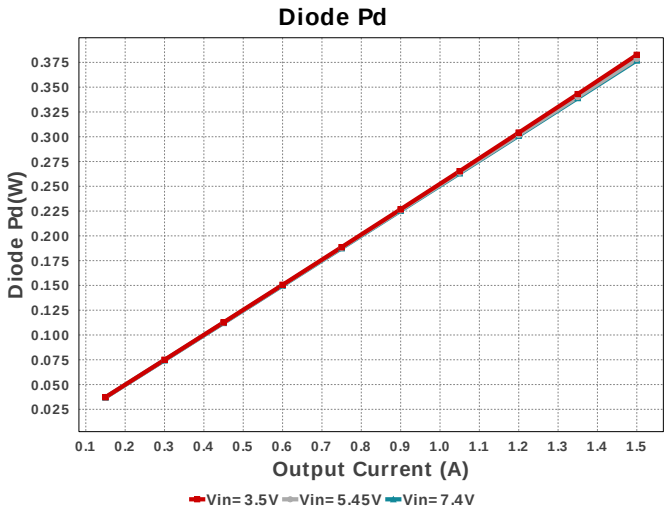


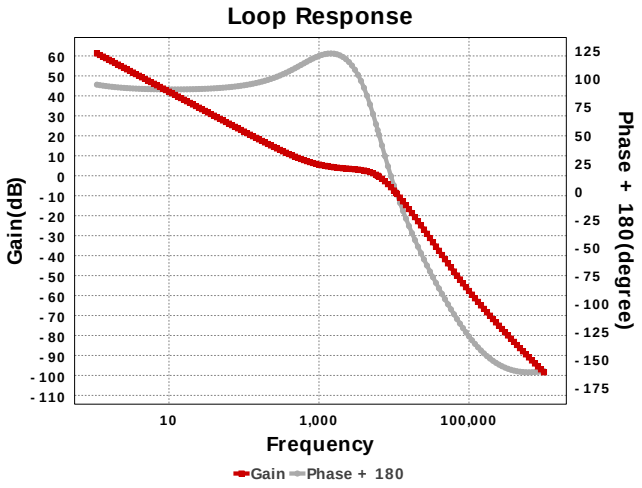












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	258.673 mA	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	68.55 µW	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	1.98 A	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	6.192 mW	Capacitor	Output capacitor power dissipation
5.	Coutx IRMS	31.54 mA	Capacitor	Output capacitor_x RMS ripple current
6.	Coutx Pd	994.06 nW	Capacitor	Output capacitor_x power loss
7.	D1 Tj	41.478 degC	Diode	D1 junction temperature
8.	Diode Pd	375.94 mW	Diode	Diode power dissipation
9.	IC Ipk	0.0 A	IC	Peak switch current in IC
10.	IC Pd	862.17 mW	IC	IC power dissipation
11.	IC Tj	67.384 degC	IC	IC junction temperature
12.	IC Tolerance	9.0 mV	IC	IC Feedback Tolerance
13.	ICThetaJA	43.3 degC/W	IC	IC junction-to-ambient thermal resistance
14.	Iin Avg	4.487 A	IC	Average input current
15.	L Ipp	896.069 mA	Inductor	Peak-to-peak inductor ripple current
16.	L Pd	99.919 mW	Inductor	Inductor power dissipation
17.	M Iavg	4.181 A	Mosfet	MOSFET Average current
18.	M Irms	3.354 A	Mosfet	MOSFET RMS ripple current
19.	M Vds Act	252.428 mV	Mosfet	Voltage drop across the MosFET
20.	Cin Pd	68.584 µW	Power	Input capacitor power dissipation
21.	Cout Pd	6.196 mW	Power	Output capacitor power dissipation
22.	Coutx Pd	994.76 nW	Power	Output capacitor_x power loss
23.	Diode Pd	382.59 mW	Power	Diode power dissipation
24.	IC Pd	863.37 mW	Power	IC power dissipation
25.	L Pd	100.01 mW	Power	Inductor power dissipation
26.	Total Pd	1.453 W	Power	Total Power Dissipation
27.	BOM Count	16	System Information	Total Design BOM count
28.	Cross Freq	3.207 kHz	System Information	Bode plot crossover frequency
29.	Duty Cycle	64.121 %	System Information	Duty cycle
30.	Efficiency	90.745 %	System Information	Steady state efficiency
31.	FootPrint	613.0 mm^2	System Information	Total Foot Print Area of BOM components
32.	Frequency	322.318 kHz	System Information	Switching frequency
33.	Gain Marg	-8.631 dB	System Information	Bode Plot Gain Margin
34.	Iout	1.5 A	System Information	Iout operating point
35.	Low Freq Gain	62.714 dB	System Information	Gain at 1Hz
36.	Mode	CCM	System Information	Conduction Mode
37.	Phase Marg	56.157 deg	System Information	Bode Plot Phase Margin
38.	Pout	14.25 W	System Information	Total output power
39.	Total BOM	$7.74	System Information	Total BOM Cost

#	Name	Value	Category	Description
40.	Vin	3.5 V	System Information	Vin operating point
41.	Vout	9.5 V	System Information	Operational Output Voltage
42.	Vout Actual	9.586 V	System Information	Vout Actual calculated based on selected voltage divider resistors
43.	Vout Tolerance	2.063 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
44.	Vout p-p	24.702 mV	System Information	Peak-to-peak output ripple voltage

Design Inputs

#	Name	Value	Description
1.	Iout	1.5	Maximum Output Current
2.	VinMax	7.4	Maximum input voltage
3.	VinMin	3.5	Minimum input voltage
4.	Vout	9.5	Output Voltage
5.	acFrequency	0.0	AC Frequency
6.	base_pn	TPS55340	Base Product Number
7.	source	DC	Input Source Type
8.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS55340** Product Folder : http://www.ti.com/product/TPS55340 : contains the data sheet and other resources.