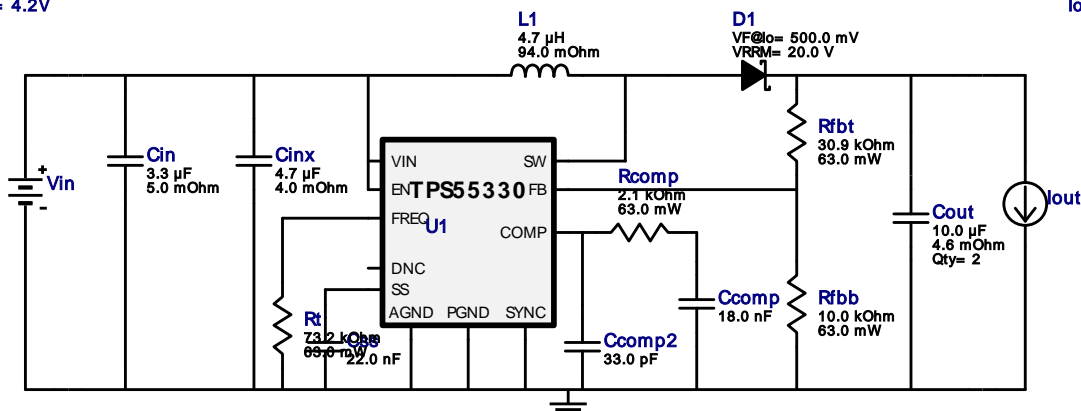


WEBENCH® Design Report

Design : 3886784/17 TPS55330RTER
TPS55330RTER 3.5V-4.2V to 5.0V @ 0.7A



VinMax = 4.2V

Iout = 0.7A

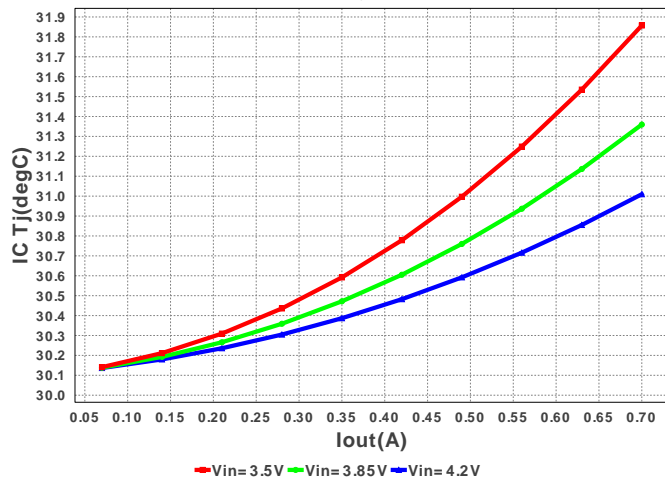


Electrical BOM

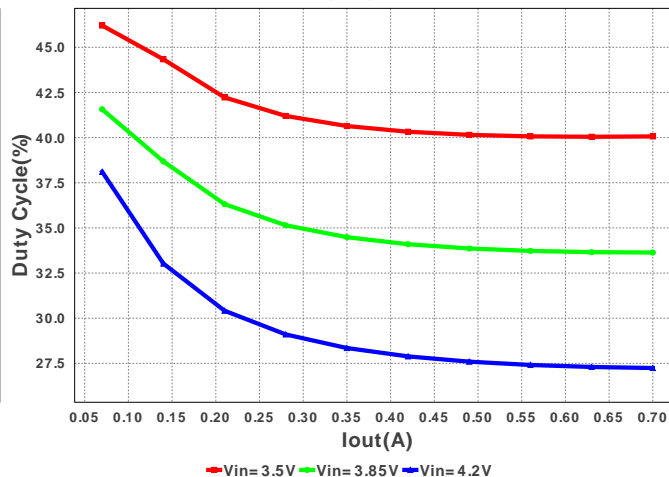
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Yageo America	CC0805KRX7R9BB183 Series= X7R	Cap= 18.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
2.	Ccomp2	MuRata	GRM1555C1E330JA01D Series= C0G/NP0	Cap= 33.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
3.	Cin	MuRata	GRM188R61A335KE15D Series= X5R	Cap= 3.3 µF ESR= 5.0 mOhm VDC= 10.0 V IRMS= 1.7 A	1	\$0.05	0603 5mm2
4.	Cinx	Kemet	C0805C475K8PACTU Series= X5R	Cap= 4.7 µF ESR= 4.0 mOhm VDC= 10.0 V IRMS= 9.89 A	1	\$0.03	0805 7mm2
5.	Cout	TDK	C3216X5R1A106M Series= X5R	Cap= 10.0 µF ESR= 4.6 mOhm VDC= 10.0 V IRMS= 2.7 A	2	\$0.06	1206 11mm2
6.	Css	MuRata	GRM033R60J223KE01D Series= X5R	Cap= 22.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0201 2mm2
7.	D1	Diodes Inc.	B220A-13-F	VF@Io= 500.0 mV VRRM= 20.0 V	1	\$0.09	SMA 37mm2
8.	L1	Bourns	SDR0403-4R7ML	L= 4.7 µH DCR= 94.0 mOhm	1	\$0.17	SDR0403 28mm2
9.	Rcomp	Vishay-Dale	CRCW04022K10FKED Series= CRCW..e3	Res= 2.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
10.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
11.	Rfbbt	Vishay-Dale	CRCW040230K9FKED Series= CRCW..e3	Res= 30.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	Rt	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
13.	U1	Texas Instruments	TPS55330RTER	Switcher	1	\$1.75	 S-PWQFN-N16 17mm2

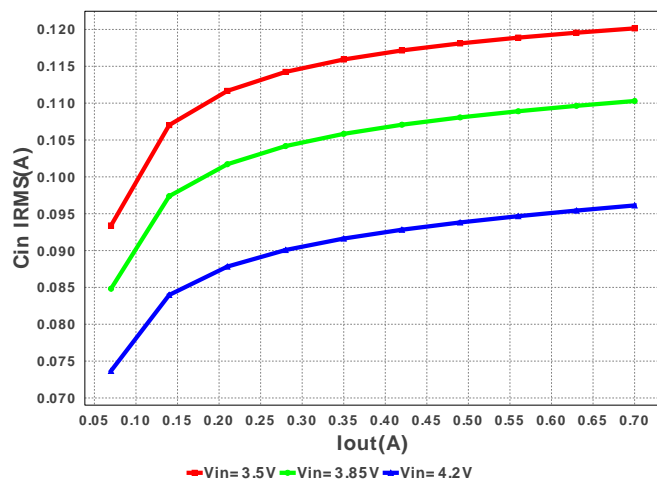
IC Tj



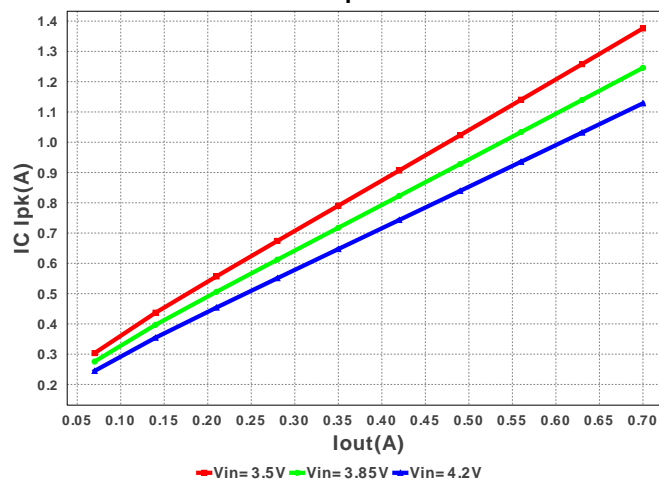
Duty Cycle



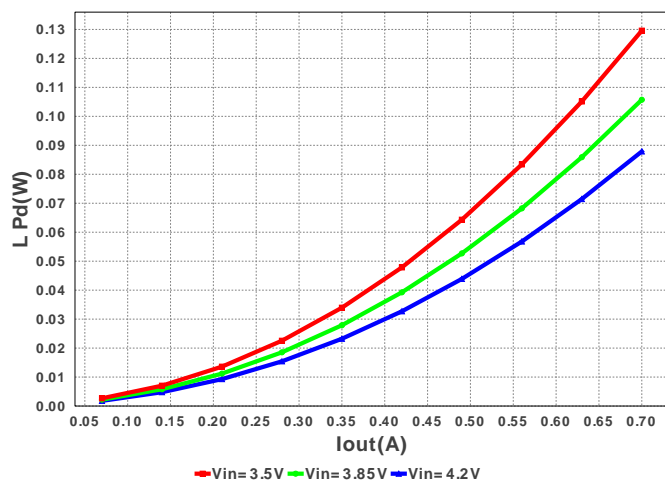
Cin IRMS



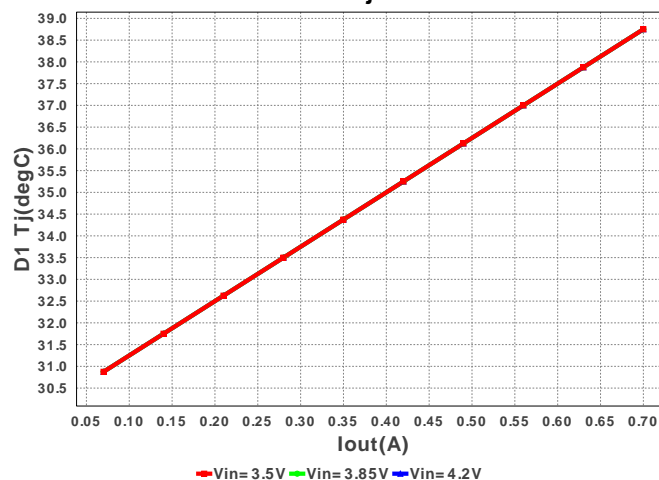
IC Ipk

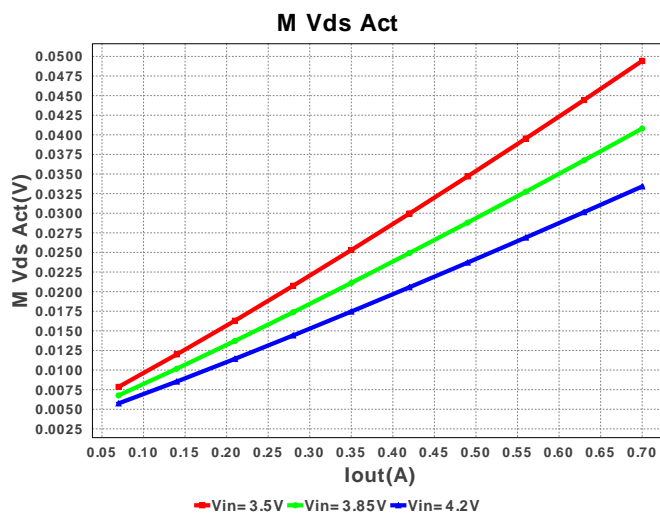
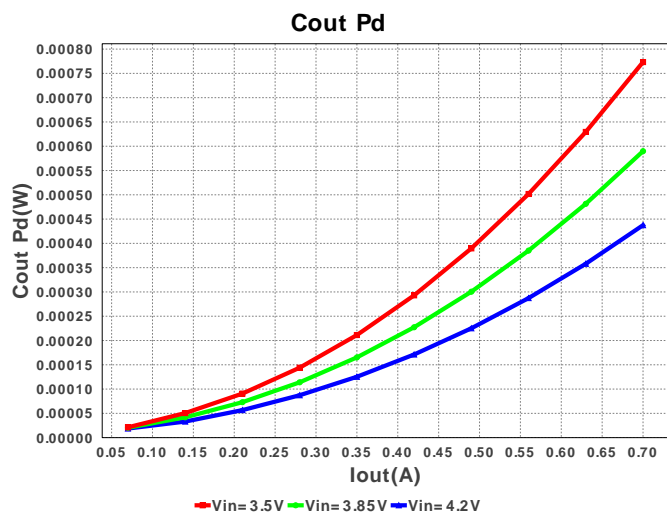
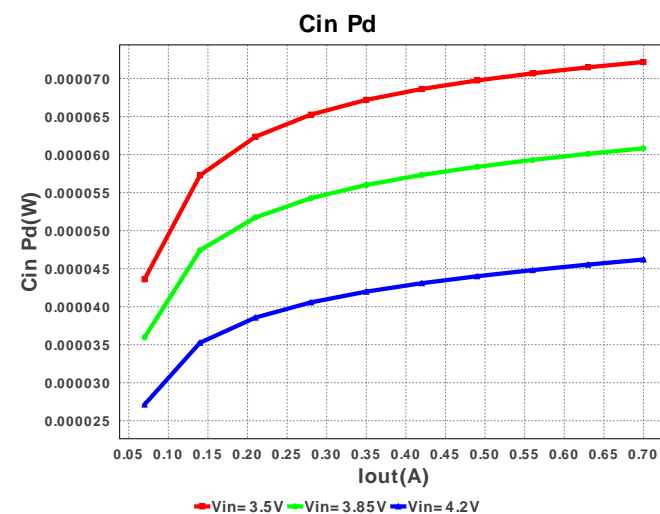
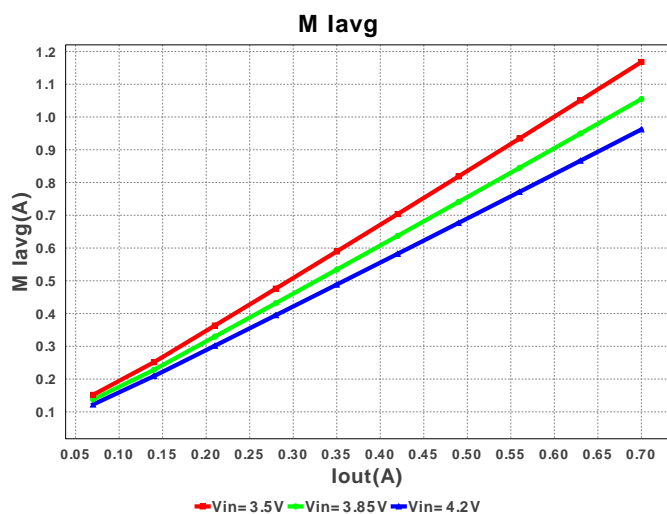
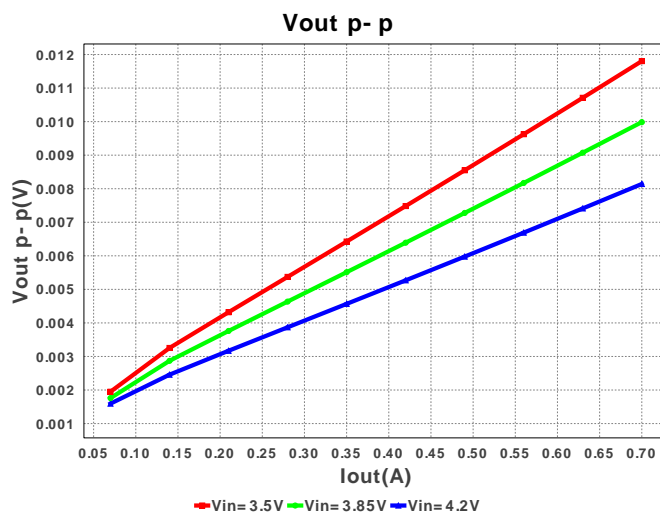
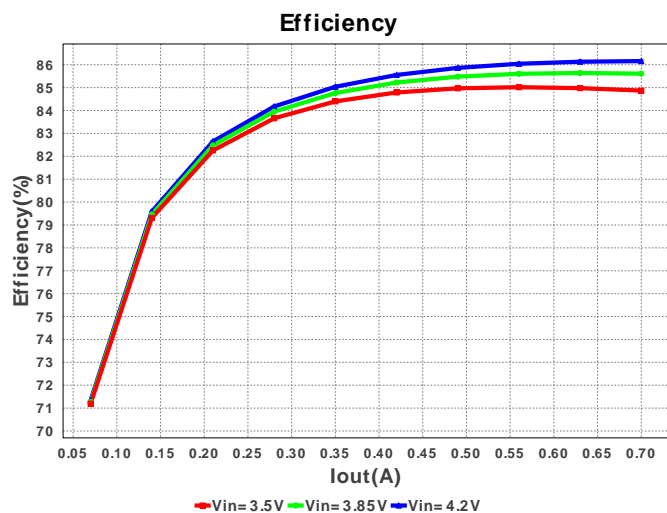


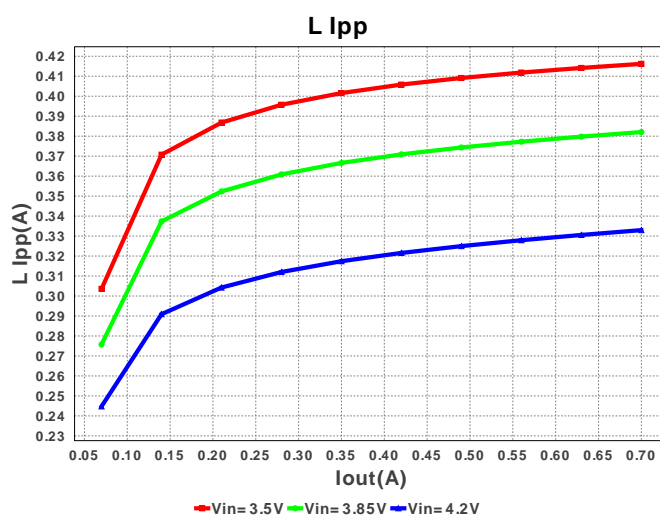
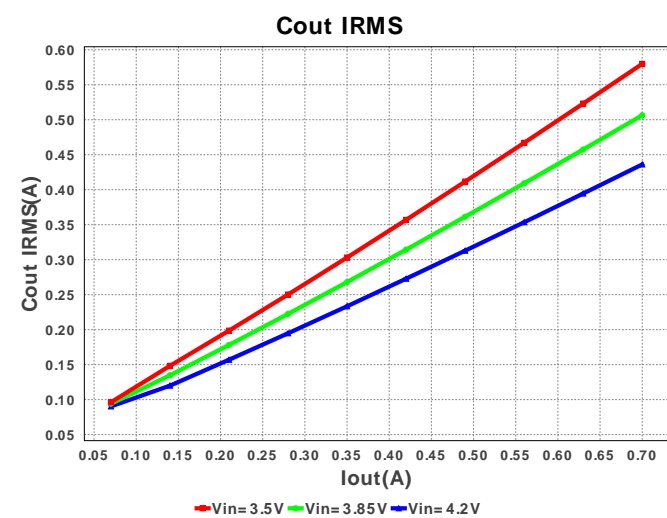
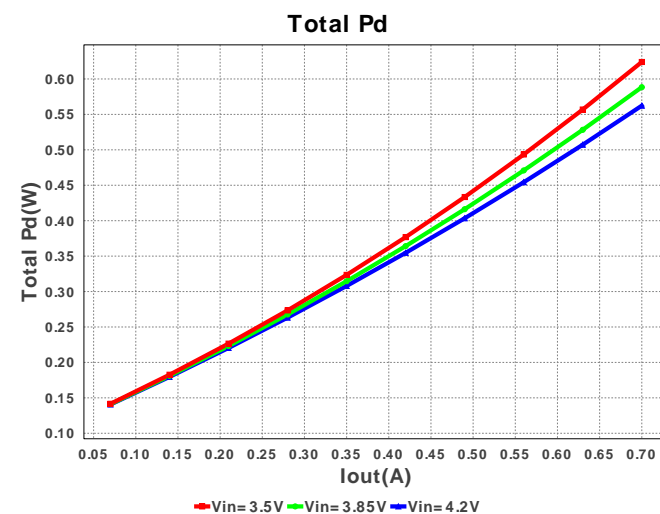
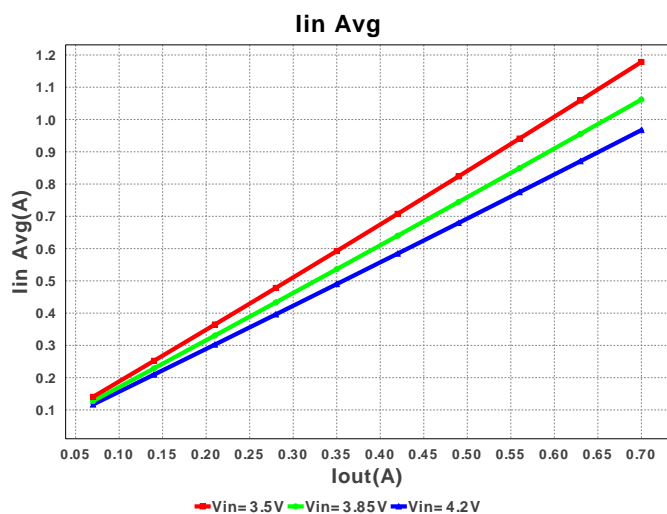
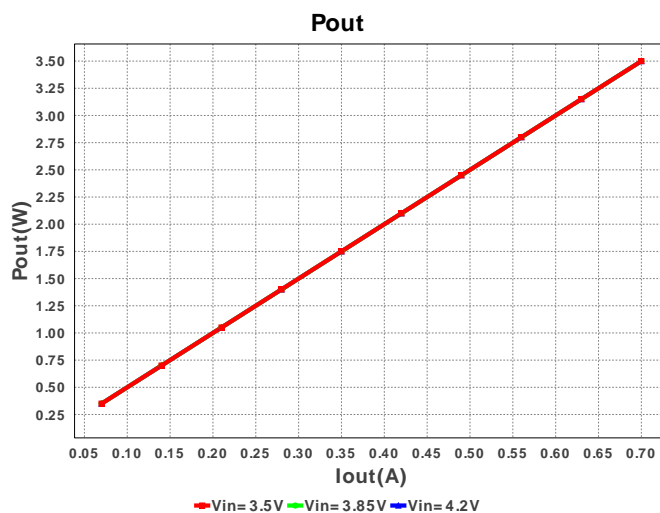
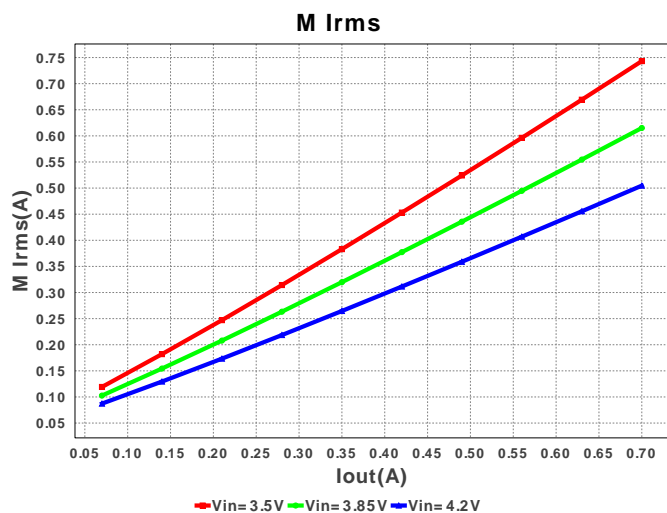
L Pd

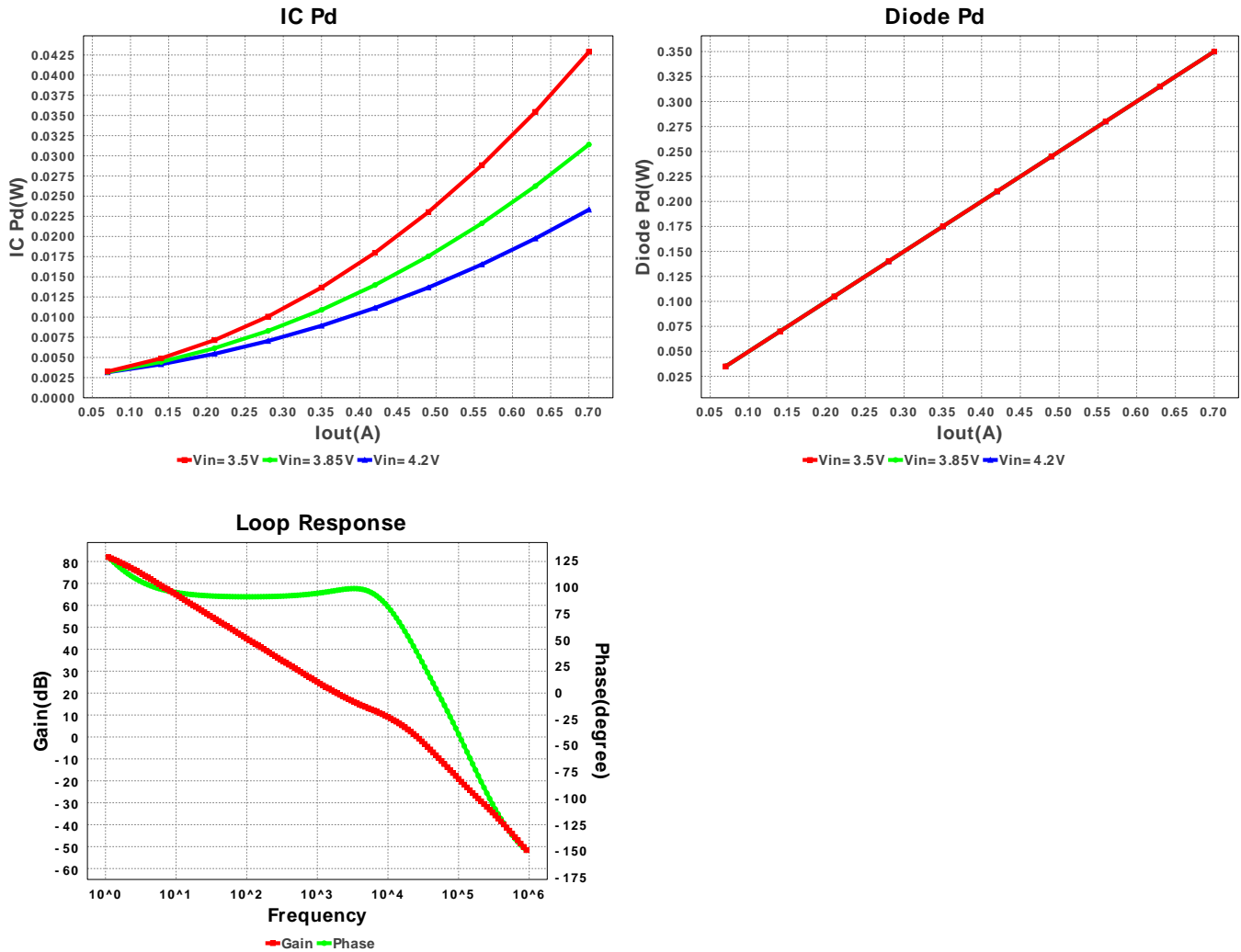


D1 Tj









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	120.145 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	579.843 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.376 A	Current	Peak switch current in IC
4.	Iin Avg	1.178 A	Current	Average input current
5.	L Ipp	416.195 mA	Current	Peak-to-peak inductor ripple current
6.	M Iavg	1.168 A	Current	MOSFET Average current
7.	M Irms	743.188 mA	Current	MOSFET RMS current
8.	BOM Count	14	General	Total Design BOM count
9.	FootPrint	139.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	646.424 kHz	General	Switching frequency
11.	IC Tolerance	9.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	49.432 mV	General	Voltage drop across the MosFET
13.	Pout	3.5 W	General	Total output power
14.	Total BOM	\$2.28	General	Total BOM Cost
15.	D1 Tj	38.75 degC	Op_Point	D1 junction temperature
16.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	22.711 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	40.066 %	Op_point	Duty cycle
19.	Efficiency	84.87 %	Op_point	Steady state efficiency
20.	IC Tj	31.857 degC	Op_point	IC junction temperature
21.	ICThetaJA	43.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	700.0 mA	Op_point	Iout operating point
23.	Phase Marg	34.732 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	3.5 V	Op_point	Vin operating point
25.	Vout p-p	11.804 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	72.174 μW	Power	Input capacitor power dissipation
27.	Cout Pd	773.3 μW	Power	Output capacitor power dissipation
28.	Diode Pd	350.0 mW	Power	Diode power dissipation
29.	IC Pd	42.891 mW	Power	IC power dissipation
30.	L Pd	129.583 mW	Power	Inductor power dissipation
31.	Total Pd	623.969 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	700.0 mA	Maximum Output Current
2.	Iout1	700.0 mAmps	Output Current #1
3.	VinMax	4.2 V	Maximum input voltage
4.	VinMin	3.5 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	TPS55330	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. [TPS55330 Product Folder](http://www.ti.com/product/tps55330) : <http://www.ti.com/product/tps55330> : contains the data sheet and other resources.

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