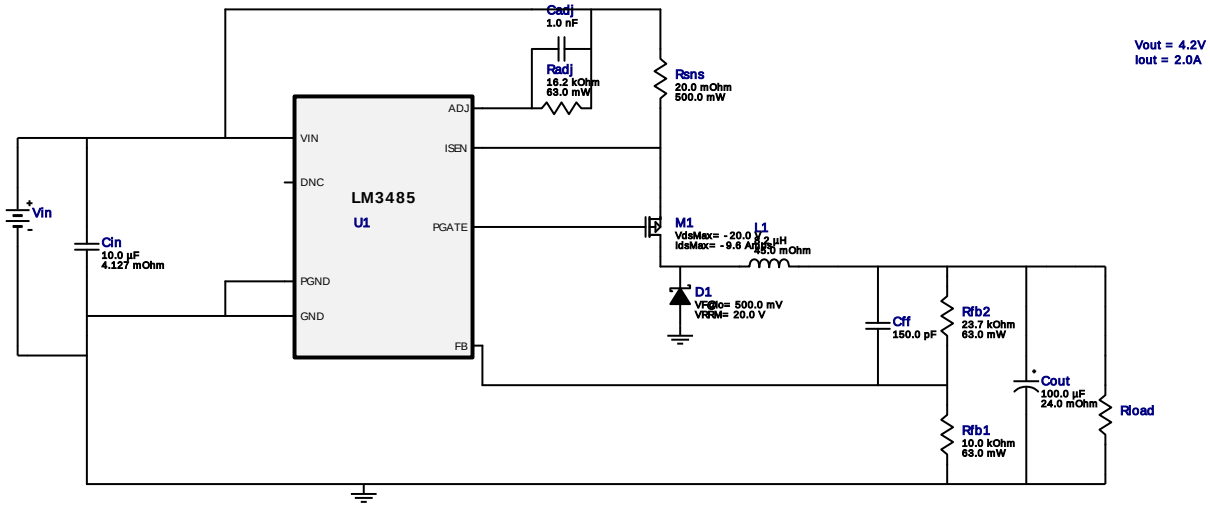
WEBENCH® Design Report

VinMin = 6.0V
VinMax = 8.4V
Vout = 4.2V
Iout = 2.0A

Device = LM3485MM/NOPB
Topology = Buck
Created = 7/17/16 11:03:07 PM
BOM Cost = $1.49
BOM Count = 12
Total Pd = 0.79W

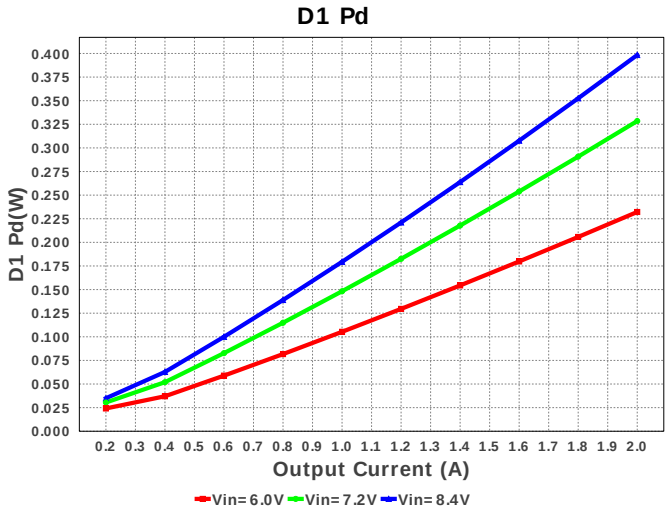
Design : 4743359/45 LM3485MM/NOPB
LM3485MM/NOPB 6.0V-8.4V to 4.20V @ 2.0A

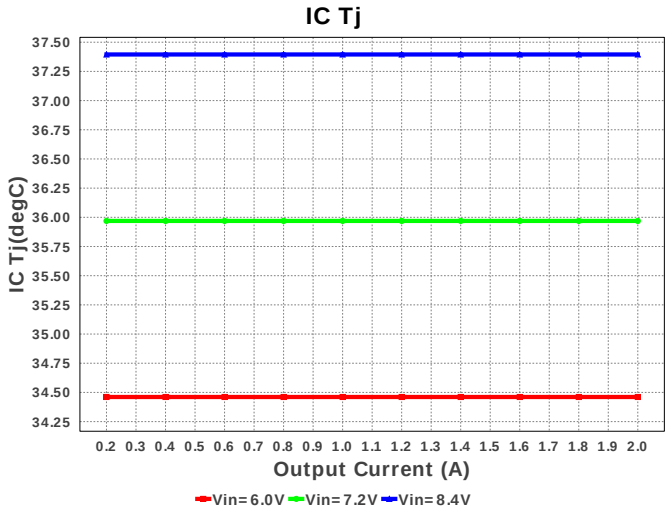


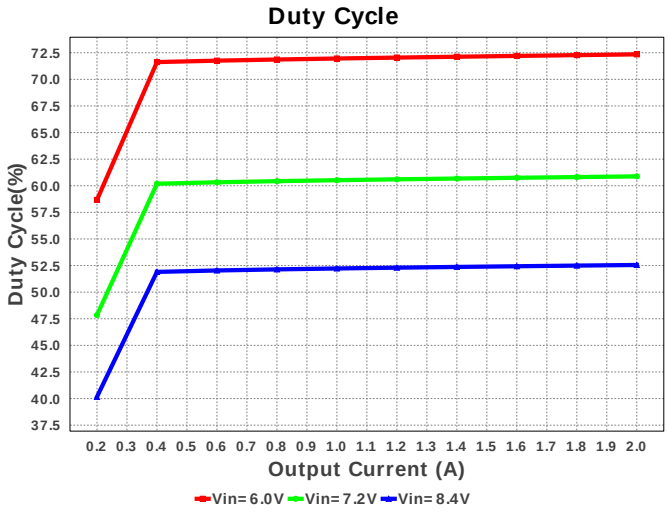
Electrical BOM

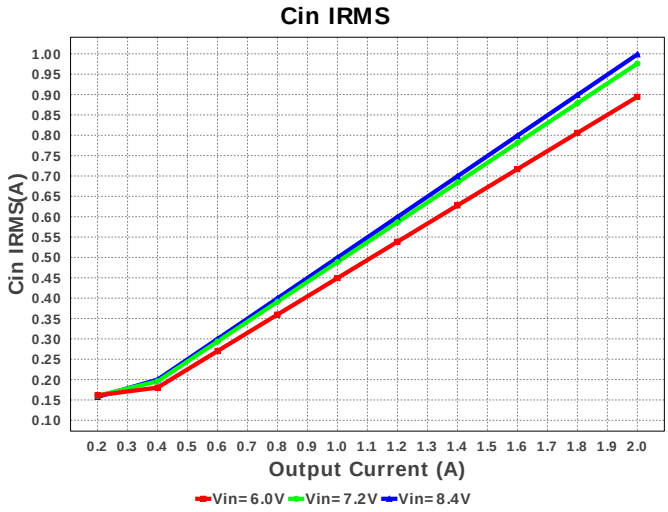
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cadj	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cff	TDK	C2012C0G1H151J Series= C0G/NP0	Cap= 150.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	1	$0.03	0805 7 mm²
4.	Cout	Panasonic	16SVPC100M Series= SVPC	Cap= 100.0 uF ESR= 24.0 mOhm VDC= 16.0 V IRMS= 2.49 A	1	$0.29	SM_RADIAL_6.3AMM 80 mm²
5.	D1	Diodes Inc.	B220-13-F	VF@Io= 500.0 mV VRRM= 20.0 V	1	$0.08	SMB 44 mm²
6.	L1	Bourns	SRN8040-8R2Y	L= 8.2 µH DCR= 45.0 mOhm	1	$0.22	SRN8040 100 mm²
7.	M1	Texas Instruments	CSD25310Q2	VdsMax= -20.0 V IdsMax= -9.6 Amps	1	$0.20	TRANS_NexFET_Q2 9 mm²
8.	Radj	Vishay-Dale	CRCW040216K2FKED Series= CRCW..e3	Res= 16.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

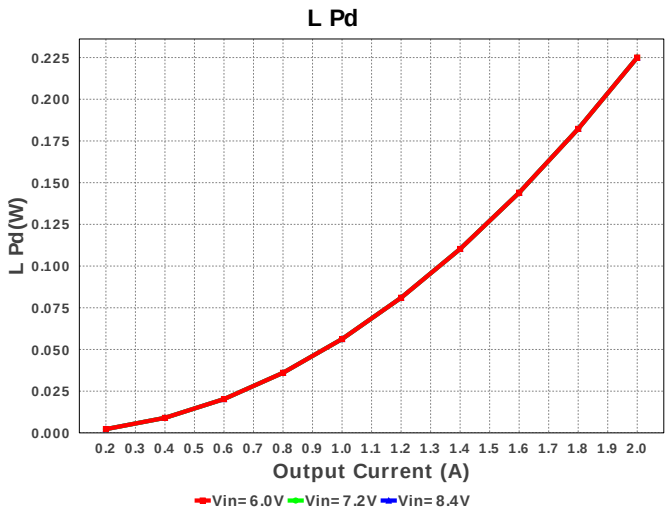
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rfb2	Vishay-Dale	CRCW040223K7FKED Series= CRCW..e3	Res= 23.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
11.	Rsns	Stackpole Electronics Inc	CSR1206FK20L0 Series= ?	Res= 20.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.10	1206 11 mm^2
12.	U1	Texas Instruments	LM3485MM/NOPB	Switcher	1	$0.52	MUA08A 24 mm^2

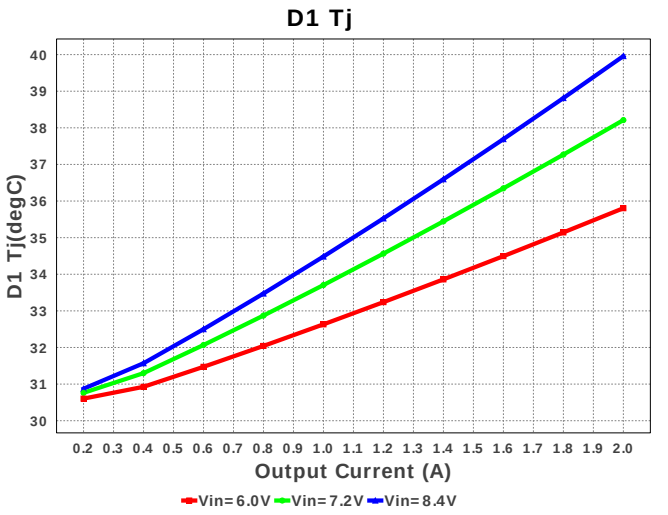


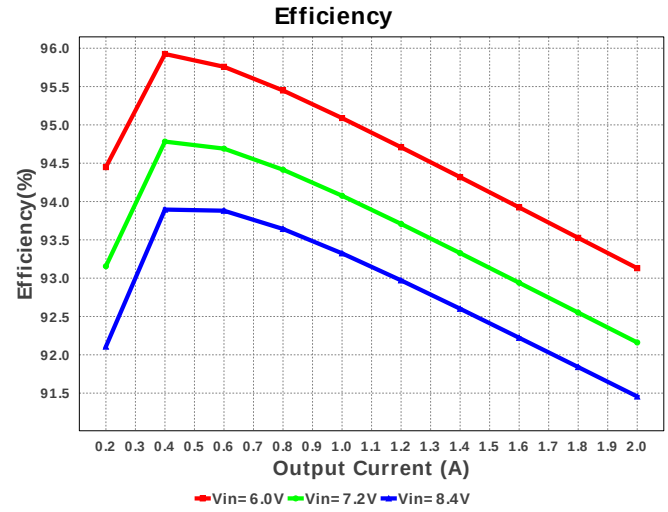


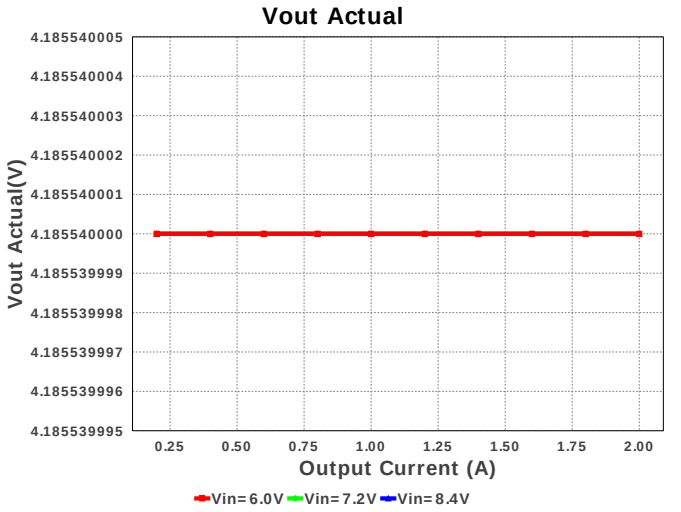


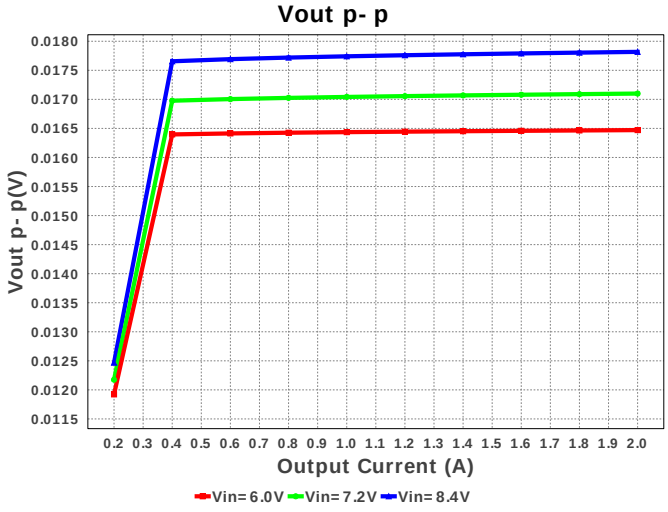


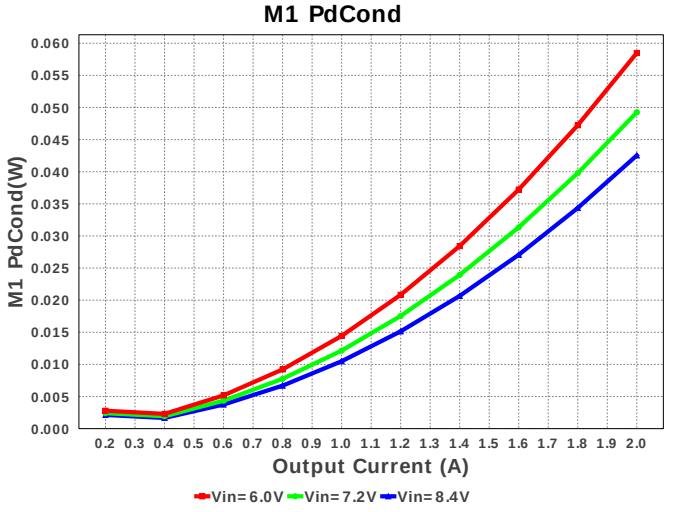


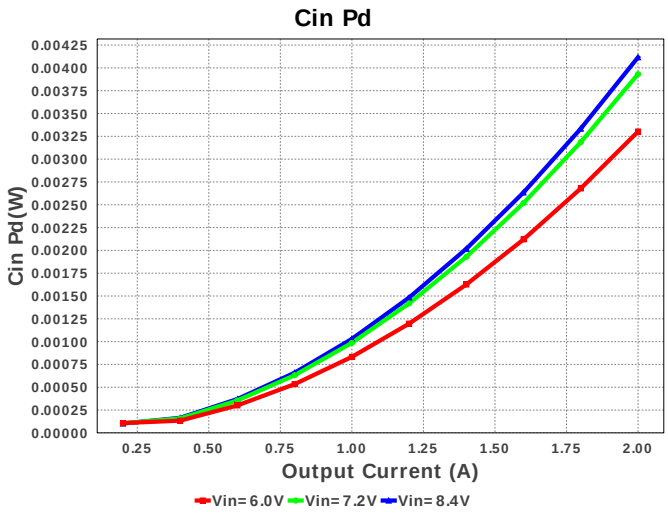


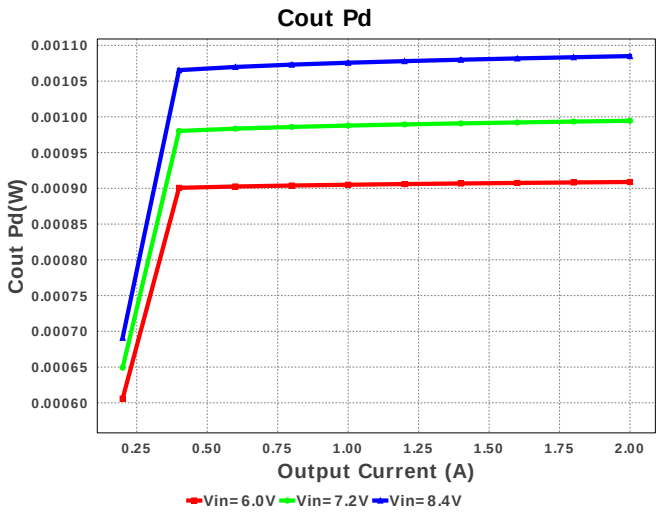


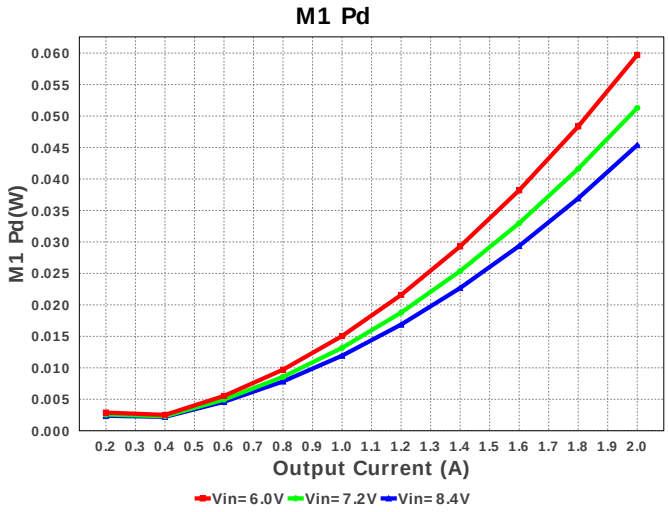


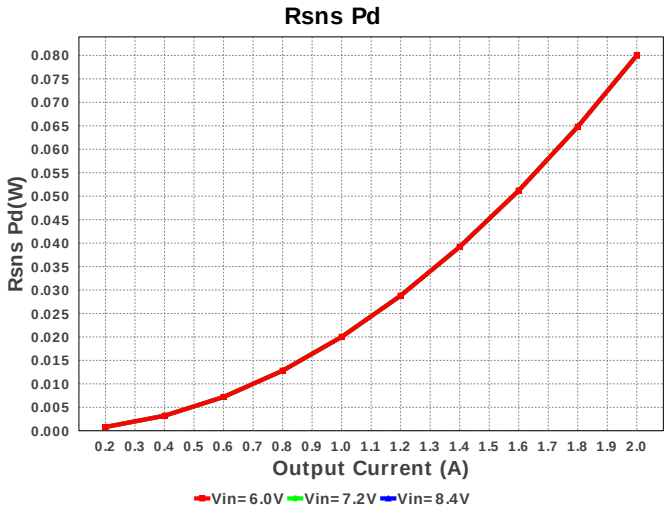


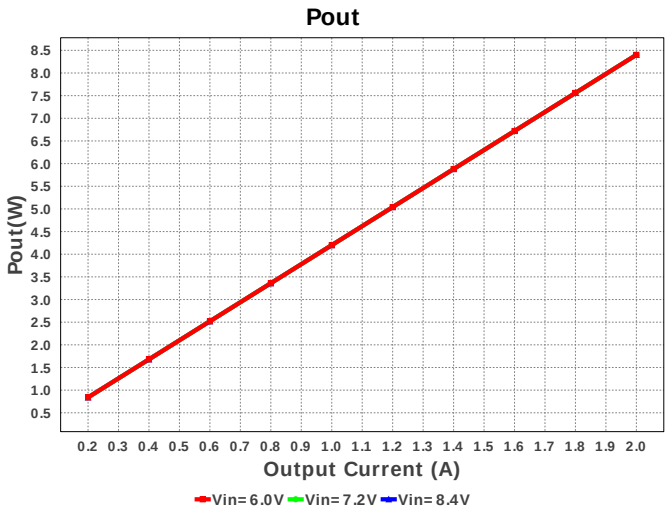


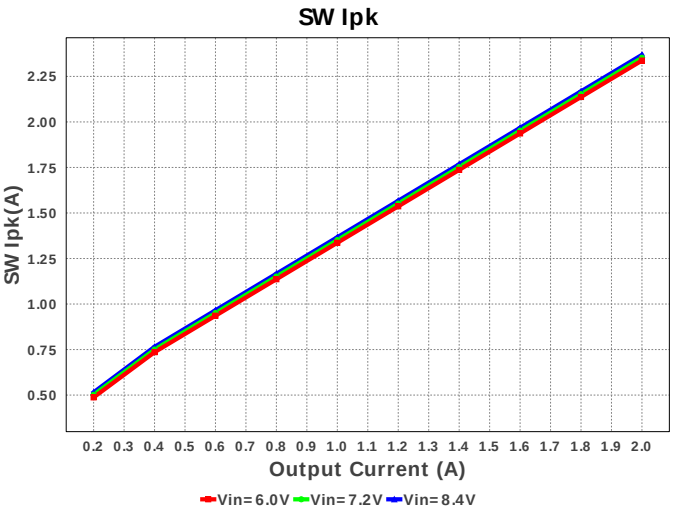


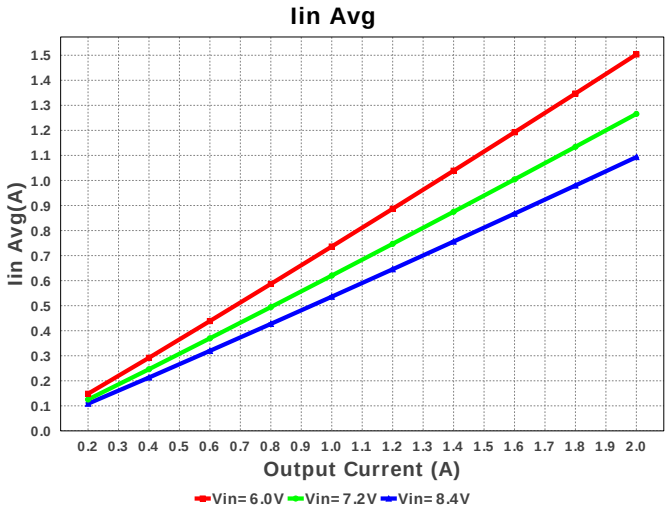


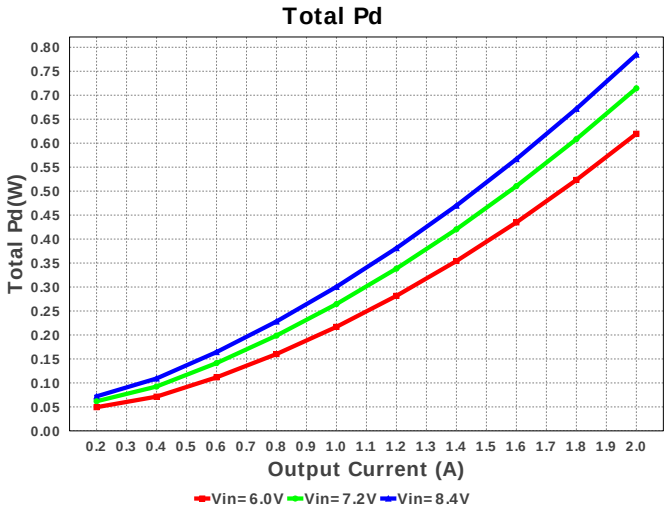


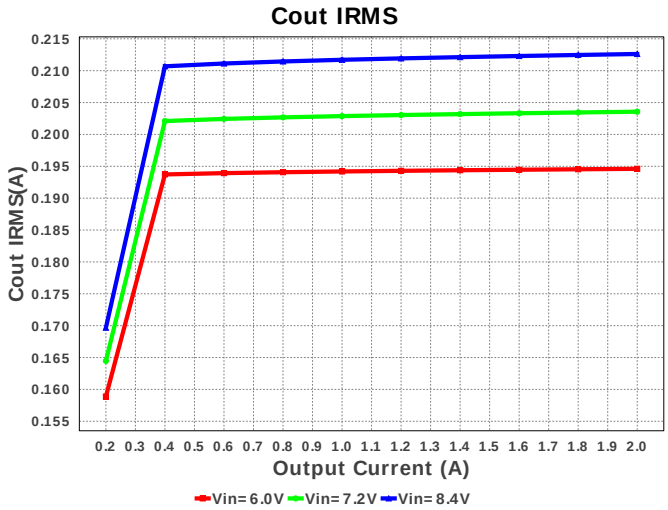


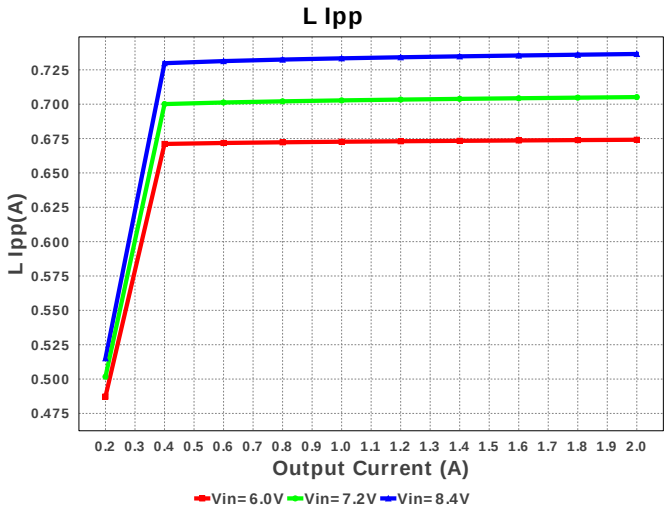


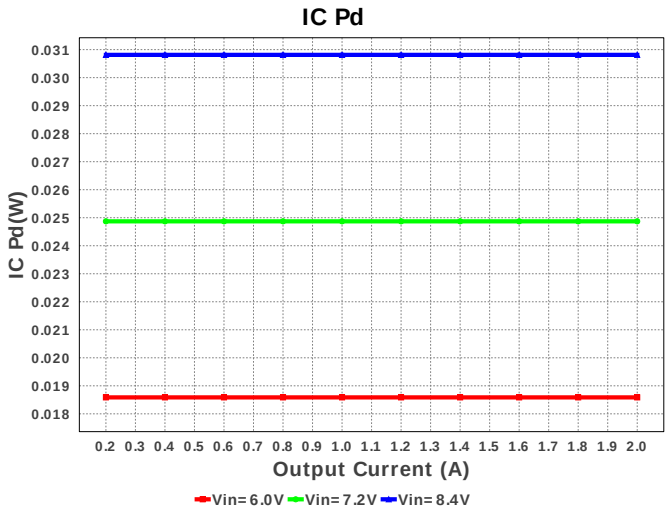


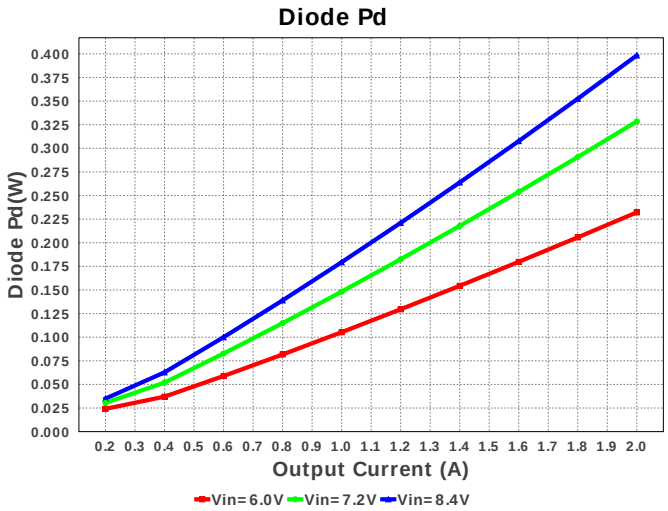


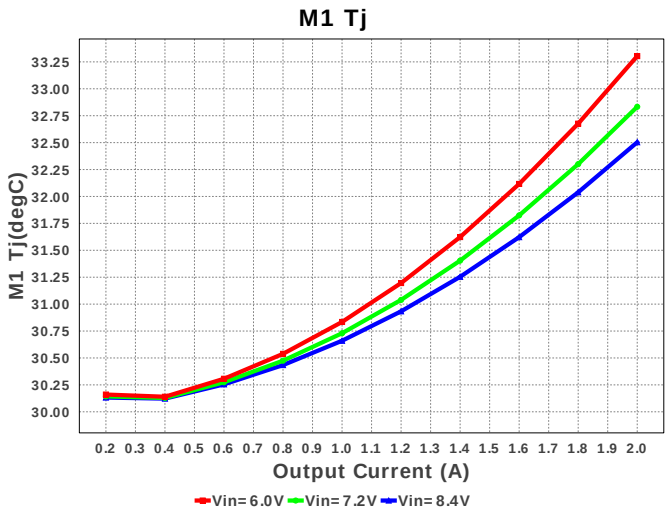


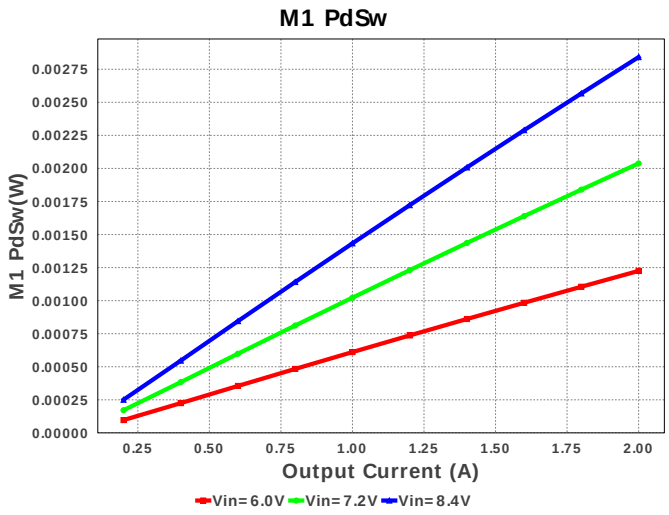












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	998.693 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	156.617 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.094 A	Current	Average input current
4.	L Ipp	542.54 mA	Current	Peak-to-peak inductor ripple current
5.	SW Ipk	2.271 A	Current	Peak switch current
6.	BOM Count	12	General	Total Design BOM count
7.	FootPrint	297.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	412.034 kHz	General	Switching frequency
9.	IC Tolerance	0.0 V	General	IC Feedback Tolerance
10.	Pout	8.4 W	General	Total output power
11.	Total BOM	$1.49	General	Total BOM Cost
12.	D1 Tj	39.959 degC	Op_Point	D1 junction temperature
13.	Vout Actual	4.186 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	4.2 V	Op_Point	Operational Output Voltage
15.	Duty Cycle	52.555 %	Op_point	Duty cycle
16.	Efficiency	91.421 %	Op_point	Steady state efficiency
17.	IC Tj	36.949 degC	Op_point	IC junction temperature
18.	ICThetaJA	200.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	2.0 A	Op_point	Iout operating point
20.	M1 Tj	32.503 degC	Op_point	M1 MOSFET junction temperature
21.	VIN_OP	8.4 V	Op_point	Vin operating point
22.	Vout p-p	13.124 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	4.116 mW	Power	Input capacitor power dissipation
24.	Cout Pd	588.692 µW	Power	Output capacitor power dissipation
25.	D1 Pd	398.354 mW	Power	Output Diode Power Dissipation
26.	Diode Pd	398.354 mW	Power	Diode power dissipation
27.	IC Pd	34.745 mW	Power	IC power dissipation
28.	L Pd	225.0 mW	Power	Inductor power dissipation
29.	M1 Pd	45.464 mW	Power	M1 MOSFET total power dissipation
30.	M1 PdCond	42.623 mW	Power	M1 MOSFET conduction losses
31.	M1 PdSw	2.842 mW	Power	M1 MOSFET switching losses
32.	Rsns Pd	80.0 mW	Power	LED Current Rsns Power Dissipation
33.	Total Pd	788.232 mW	Power	Total Power Dissipation
34.	Vout Tolerance	1.421 %		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	8.4	Maximum input voltage
3.	VinMin	6.0	Minimum input voltage
4.	Vout	4.2	Output Voltage
5.	base_pn	LM3485	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Outline The LM3485 is a hysteretic PFET controller. The hysteretic control architecture provides for a stable design without the use of a control loop. The switching frequency depends on the inductance value, output capacitor ESR, and the input voltage. Therefore depending on the chosen BOM, the frequency at different input voltages would vary.

2. **LM3485** Product Folder : http://www.ti.com/product/LM3485 : contains the data sheet and other resources.