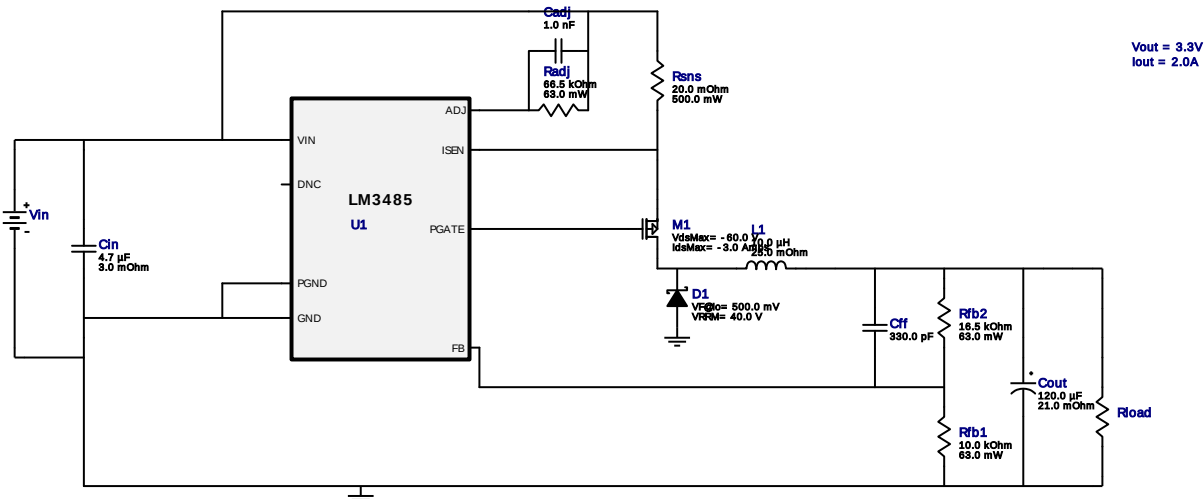


WEBENCH® Design Report

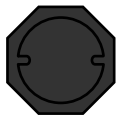
Design : 4778710/6 LM3485MM/NOPB
LM3485MM/NOPB 14.0V-22.0V to 3.30V @ 2.0A

VinMin = 14.0V
VinMax = 22.0V
Vout = 3.3V
Iout = 2.0A

Device = LM3485MM/NOPB
Topology = Buck
Created = 8/29/16 8:10:20 PM
BOM Cost = \$1.69
BOM Count = 12
Total Pd = 1.14W

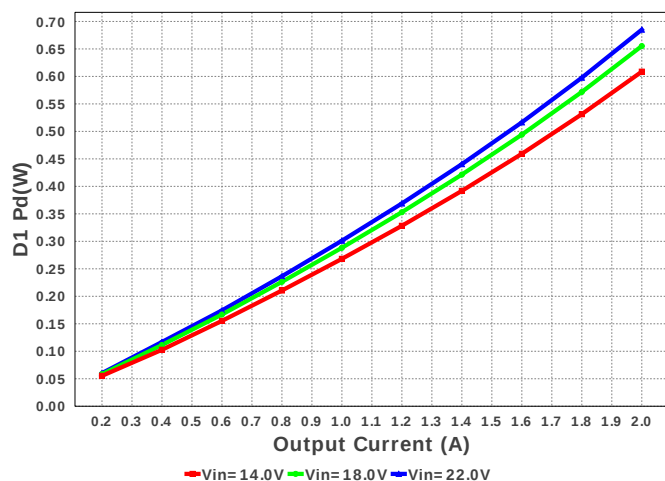


Electrical BOM

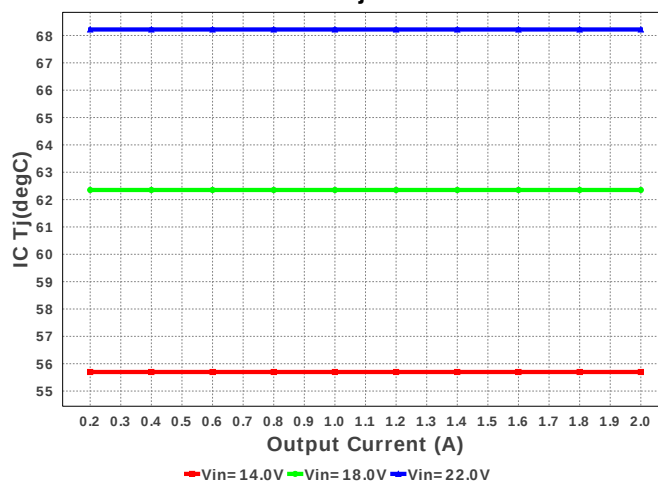
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cadj	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
2.	Cff	Samsung Electro-Mechanics	CL21C331JBANFNC Series= C0G/NP0	Cap= 330.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	\$0.07	 1206 11 mm ²
4.	Cout	Panasonic	6SVPC120MV Series= SVPC	Cap= 120.0 uF ESR= 21.0 mOhm VDC= 6.3 V IRMS= 2.66 A	1	\$0.28	 SM_RADIAL_5MM 58 mm ²
5.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMA 37 mm ²
6.	L1	Bourns	SRU1038-100Y	L= 10.0 uH DCR= 25.0 mOhm	1	\$0.33	 SRU1038 144 mm ²
7.	M1	Fairchild Semiconductor	FDC5614P	VdsMax= -60.0 V IdsMax= -3.0 Amps	1	\$0.23	 SOT-23-6 15 mm ²
8.	Radj	Vishay-Dale	CRCW040266K5FKED Series= CRCW..e3	Res= 66.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rfb2	Vishay-Dale	CRCW040216K5FKED Series= CRCW..e3	Res= 16.5 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

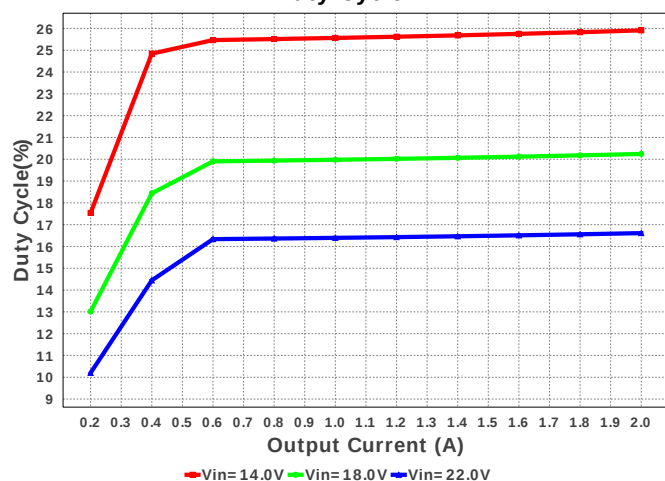
D1 Pd



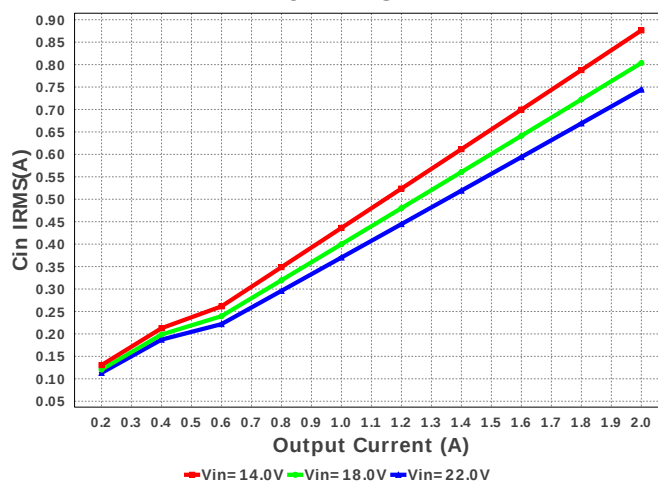
IC Tj

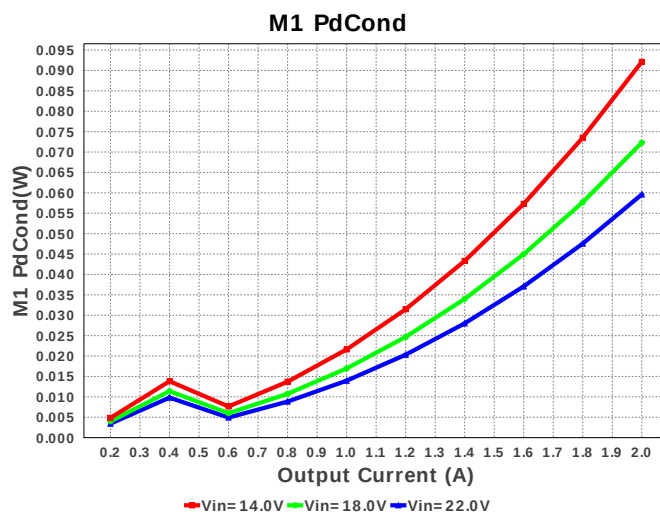
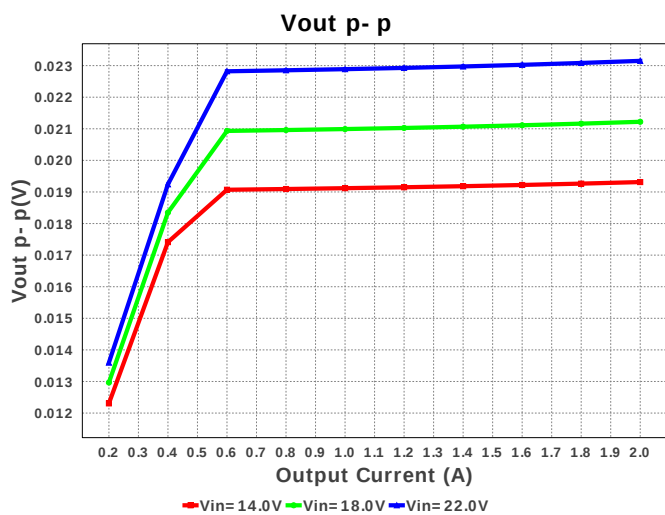
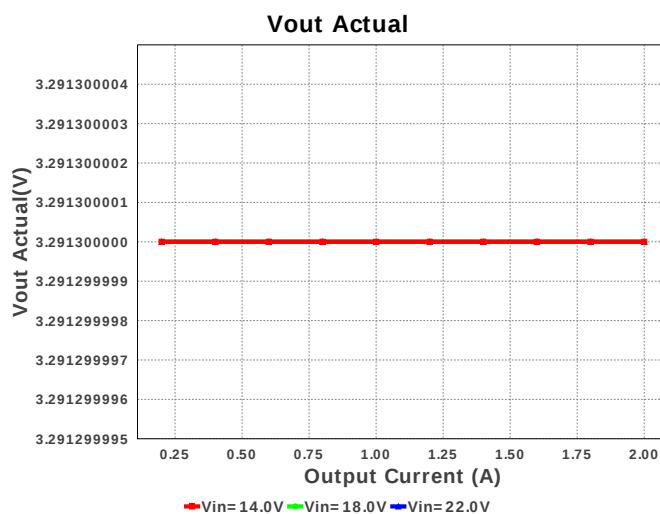
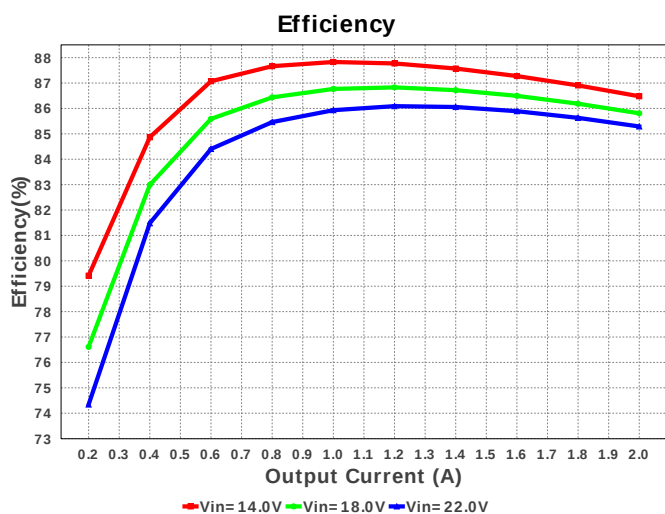
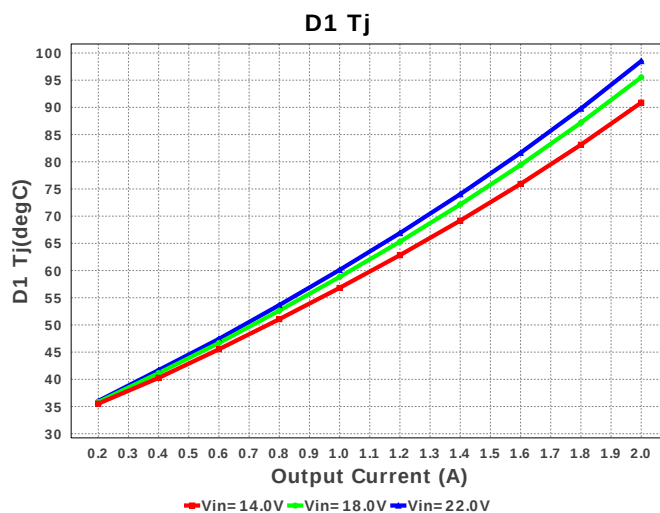
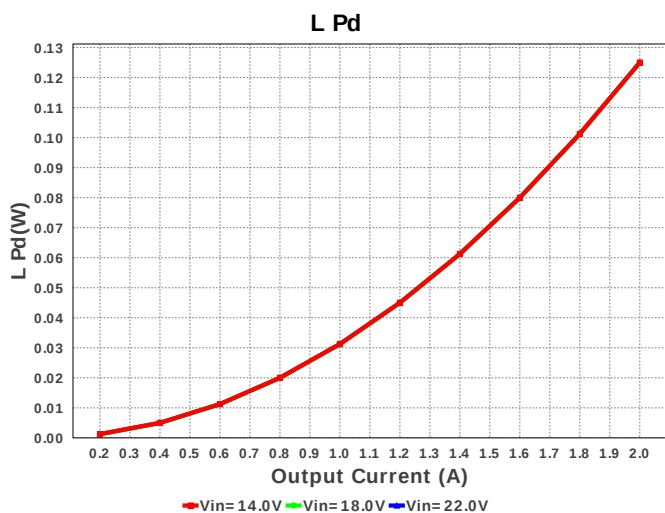


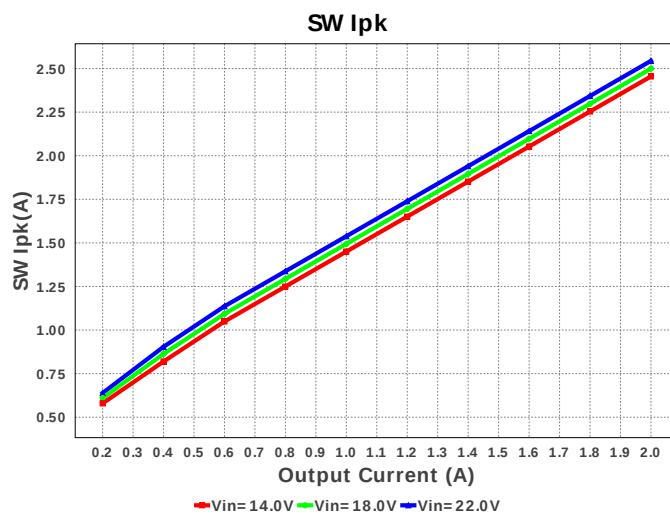
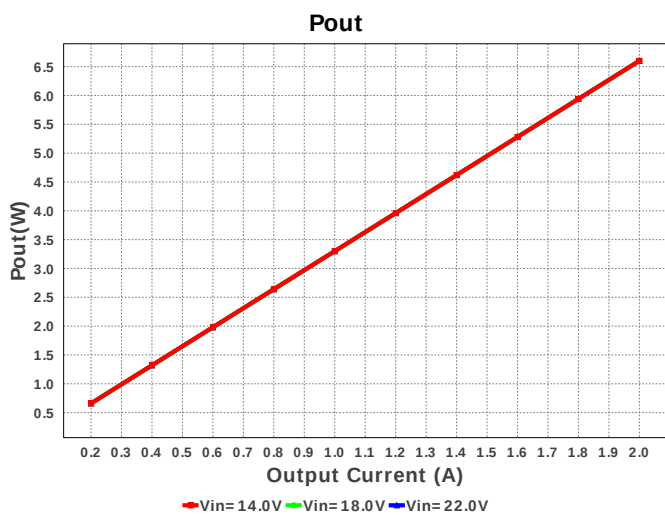
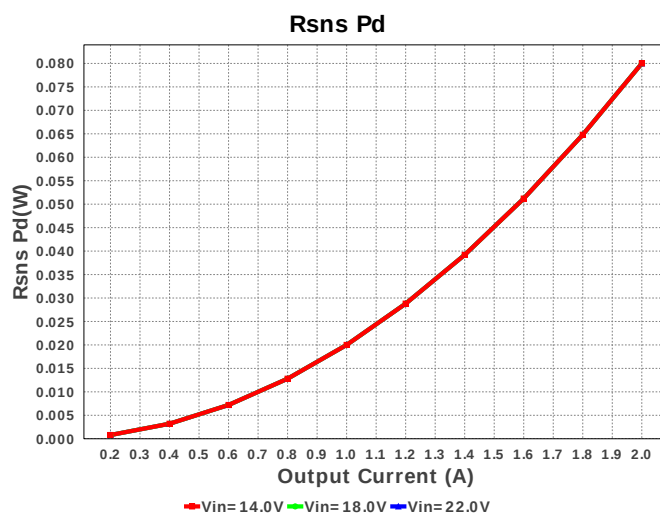
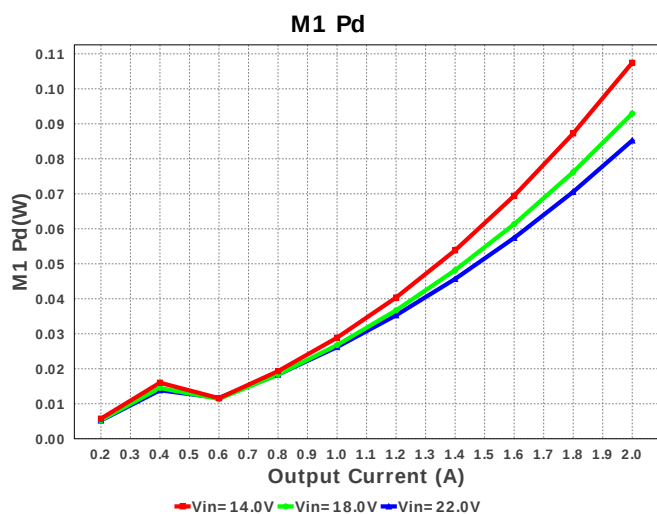
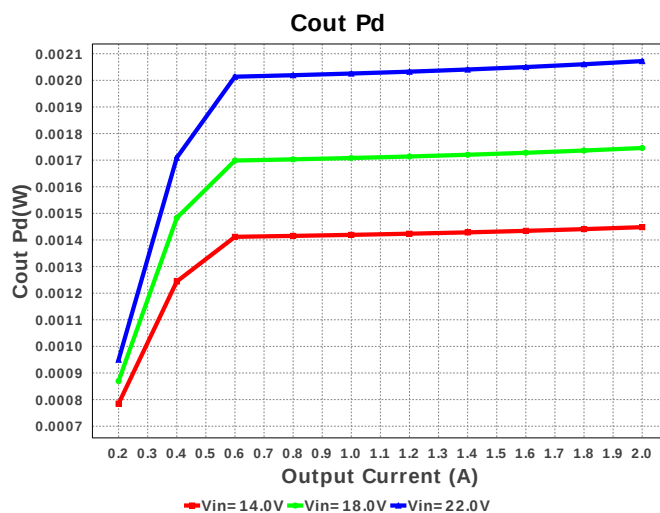
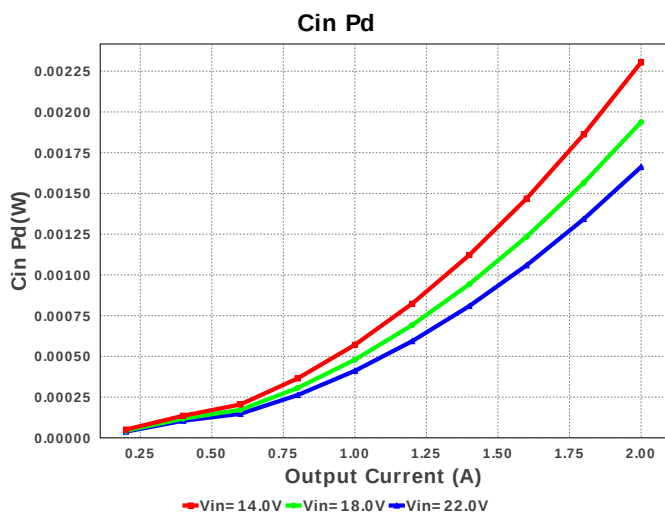
Duty Cycle

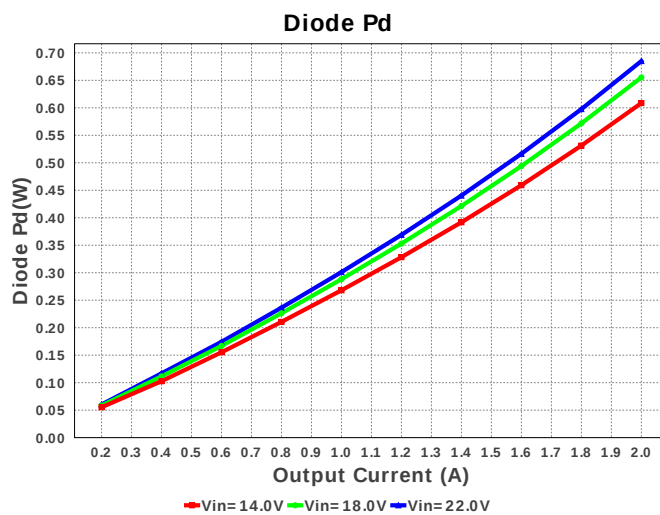
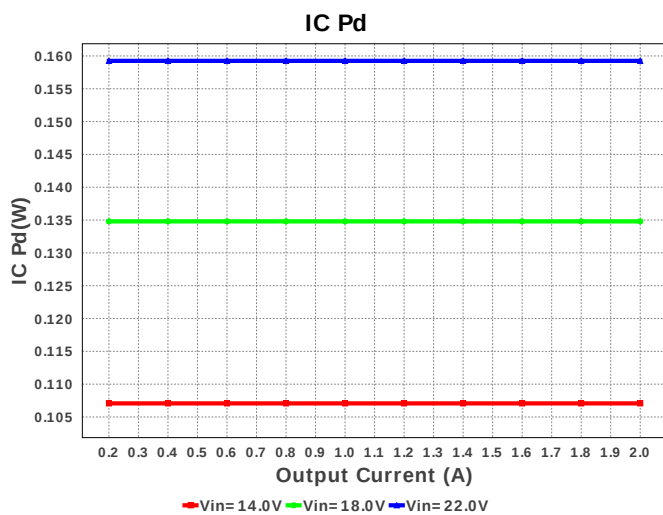
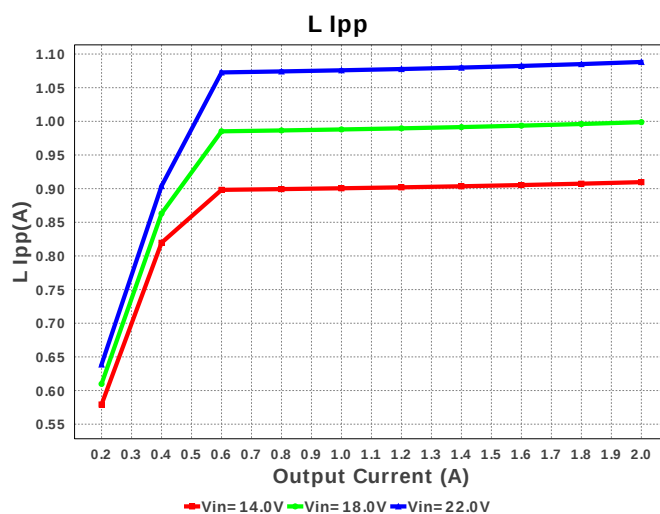
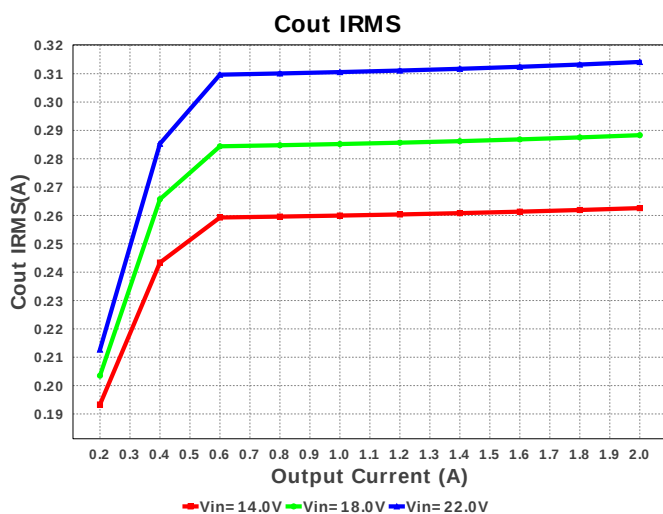
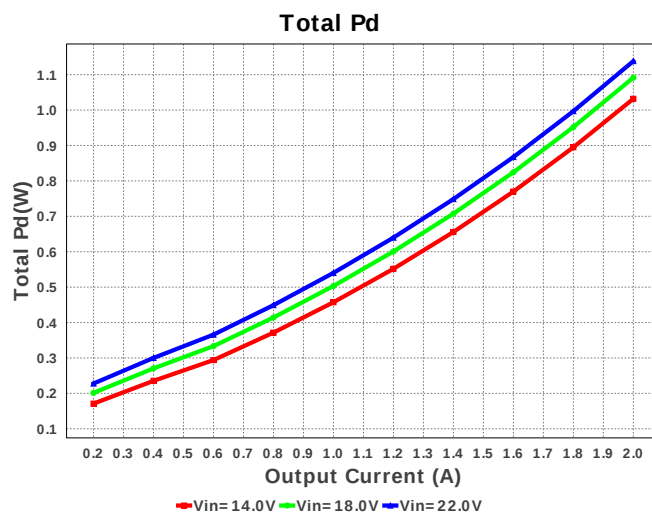
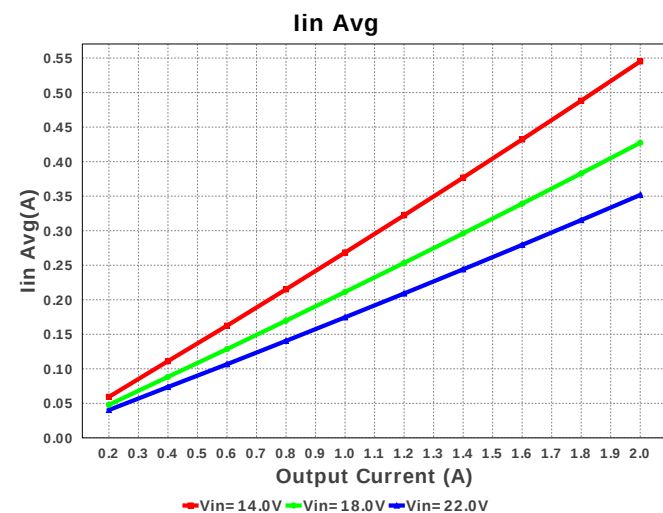


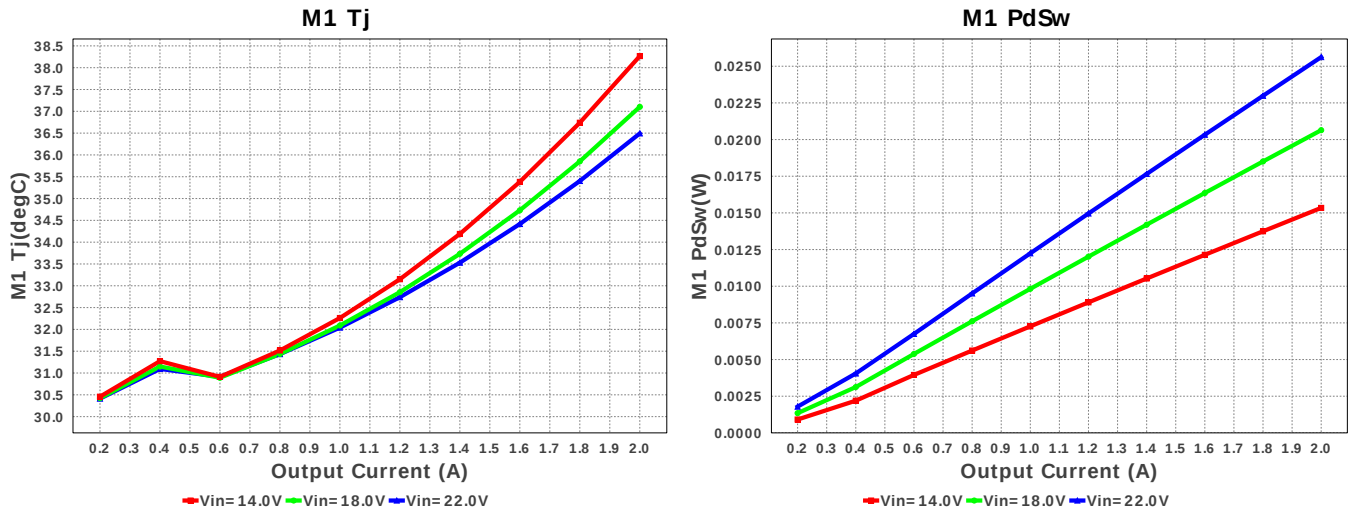
Cin IRMS











Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	744.392 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	307.126 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	351.77 mA	Current	Average input current
4.	L Ipp	1.064 A	Current	Peak-to-peak inductor ripple current
5.	SW Ipk	2.532 A	Current	Peak switch current
6.	BOM Count	12	General	Total Design BOM count
7.	FootPrint	323.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	306.159 kHz	General	Switching frequency
9.	IC Tolerance	0.0 V	General	IC Feedback Tolerance
10.	Mode	CCM	General	Conduction Mode
11.	Pout	6.6 W	General	Total output power
12.	Total BOM	\$1.69	General	Total BOM Cost
13.	D1 Tj	98.507 degC	Op_Point	D1 junction temperature
14.	Vout Actual	3.291 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	16.613 %	Op_point	Duty cycle
17.	Efficiency	85.283 %	Op_point	Steady state efficiency
18.	IC Tj	61.85 degC	Op_point	IC junction temperature
19.	ICThetaJA	200.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	M1 Tj	36.493 degC	Op_point	M1 MOSFET junction temperature
22.	VIN_OP	22.0 V	Op_point	Vin operating point
23.	Vout p-p	22.634 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	1.662 mW	Power	Input capacitor power dissipation
25.	Cout Pd	1.981 mW	Power	Output capacitor power dissipation
26.	D1 Pd	685.069 mW	Power	Output Diode Power Dissipation
27.	Diode Pd	685.069 mW	Power	Diode power dissipation
28.	IC Pd	159.249 mW	Power	IC power dissipation
29.	L Pd	125.0 mW	Power	Inductor power dissipation
30.	M1 Pd	85.94 mW	Power	M1 MOSFET total power dissipation
31.	M1 PdCond	60.317 mW	Power	M1 MOSFET conduction losses
32.	M1 PdSw	25.623 mW	Power	M1 MOSFET switching losses
33.	Rsns Pd	80.0 mW	Power	LED Current Rsns Power Dissipation
34.	Total Pd	1.139 W	Power	Total Power Dissipation
35.	Vout Tolerance	1.258 %		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	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.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).