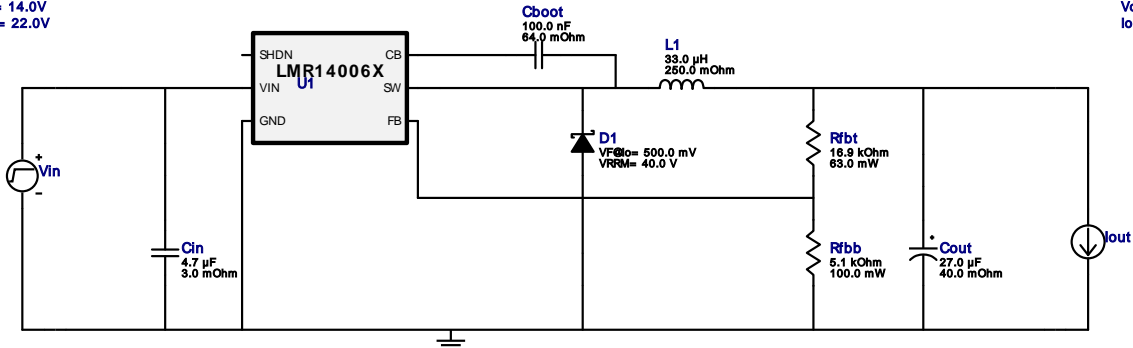










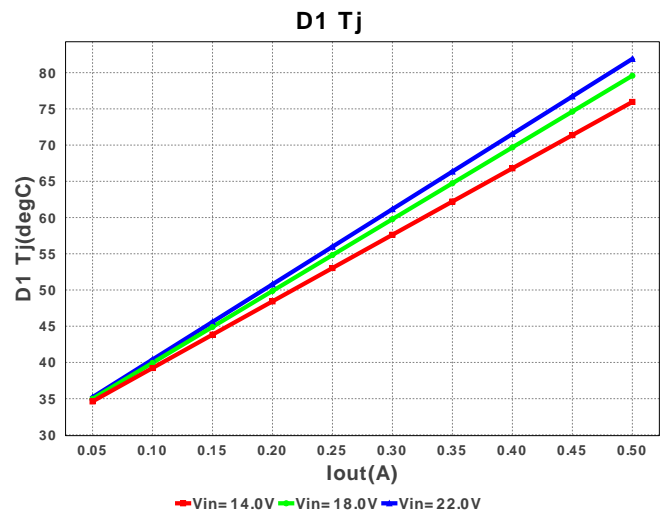
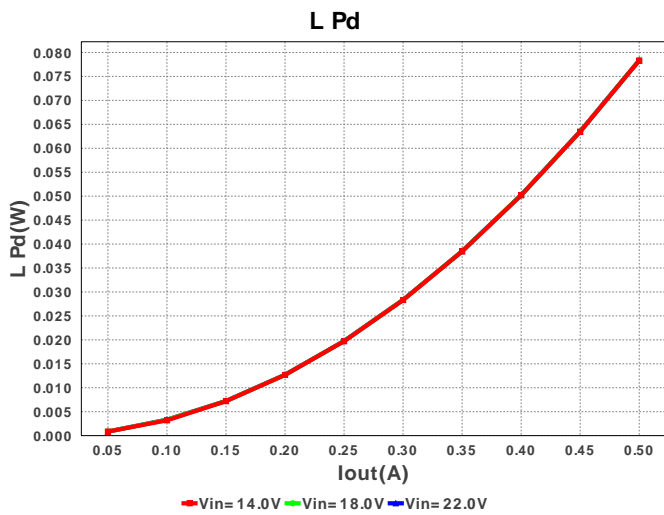
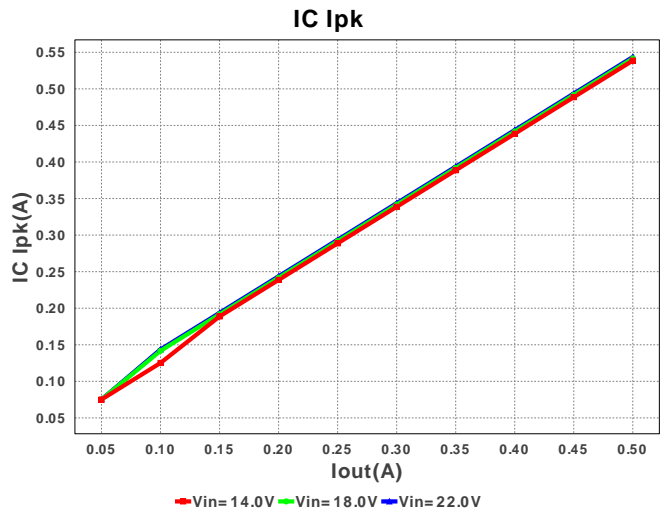
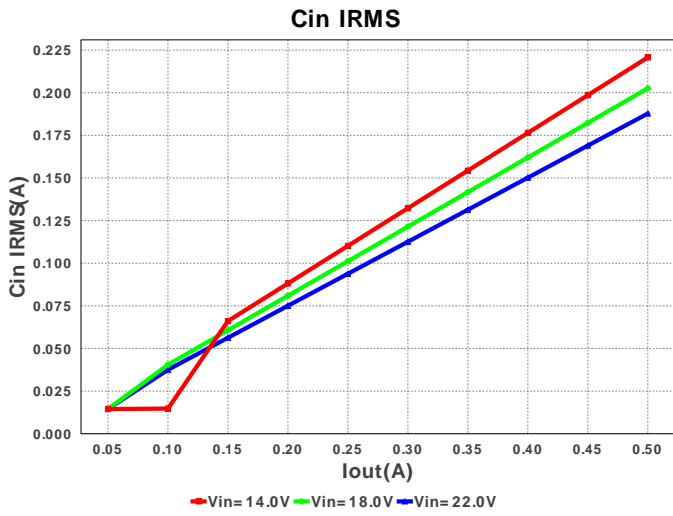
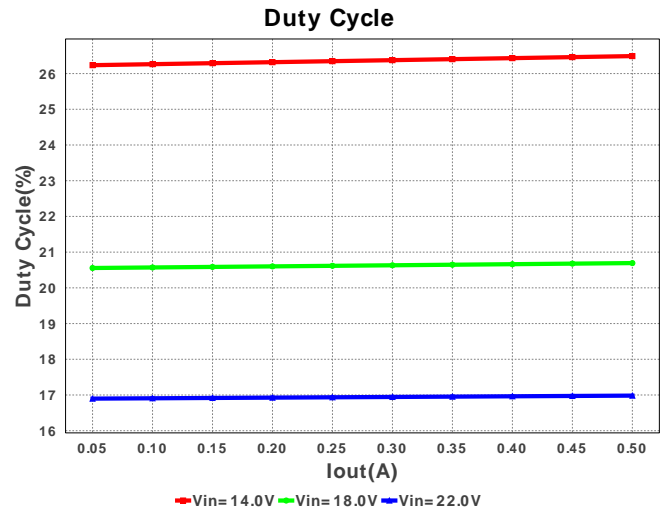
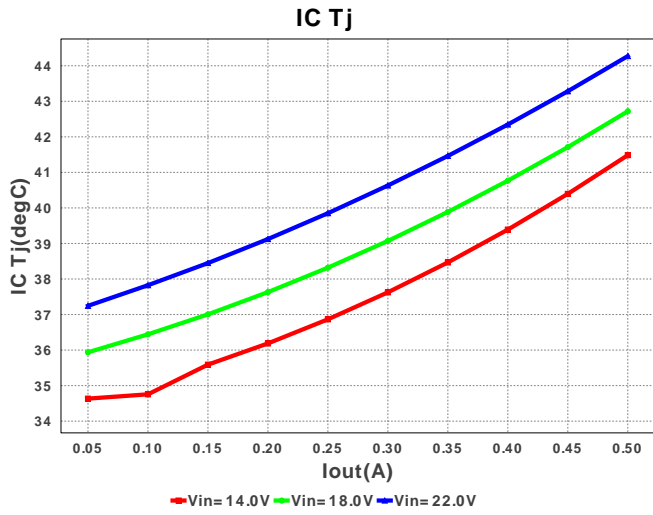
**WEBENCH® Design Report**

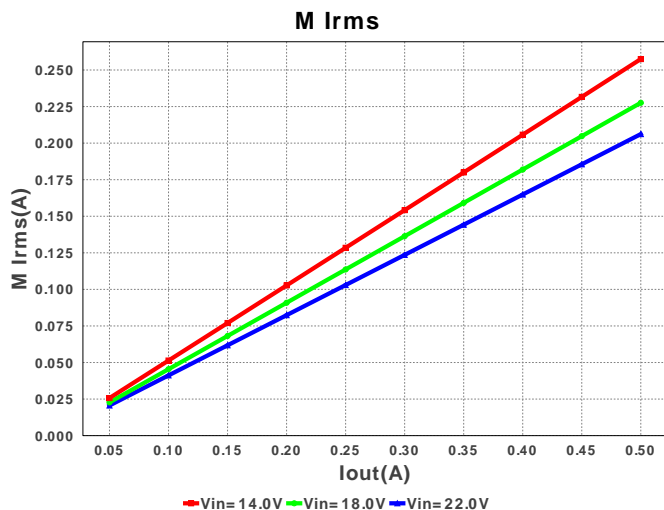
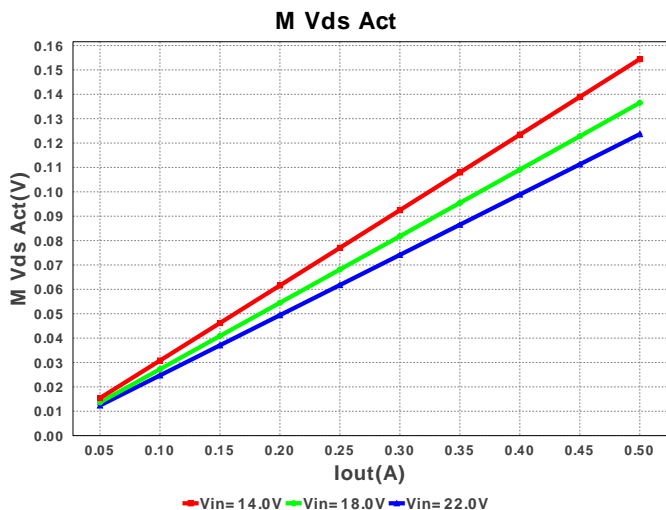
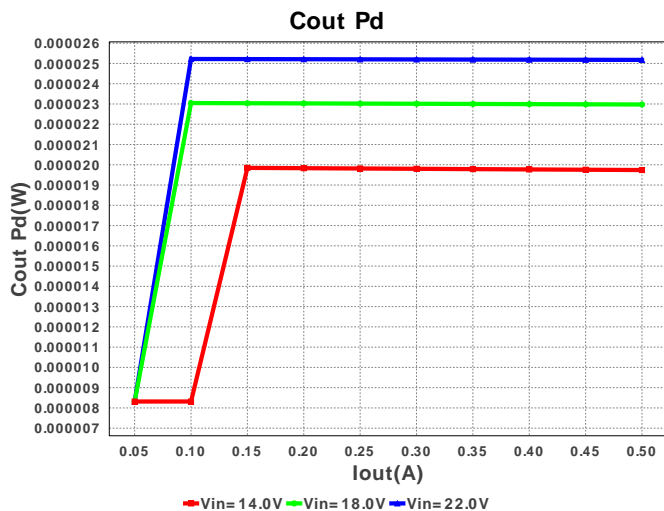
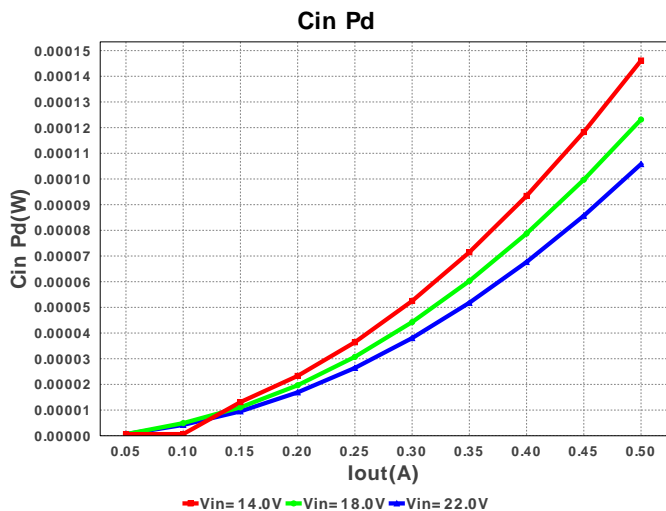
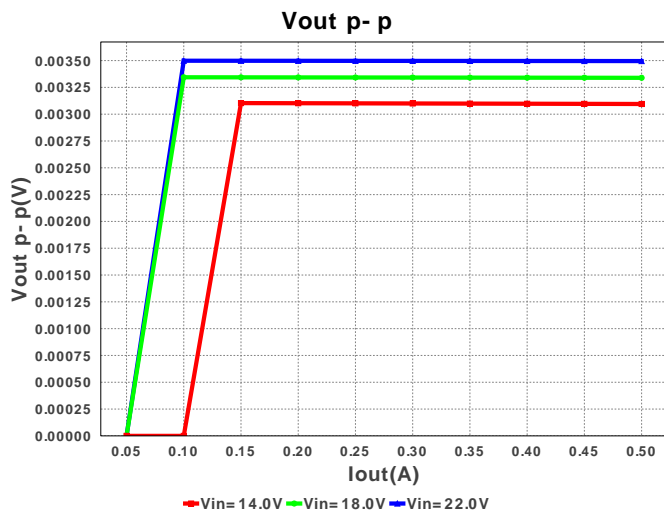
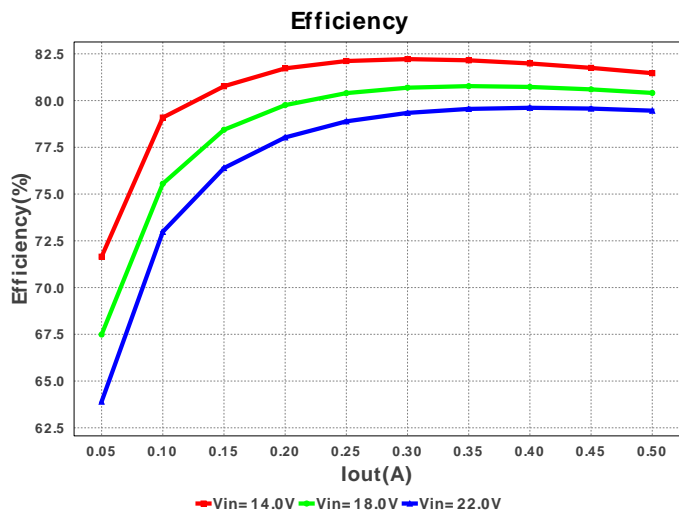
 Design : 3610905/1 LMR14006XDDCR  
 LMR14006XDDCT 14.0V-22.0V to 3.3000000000000003V @ 0.5A

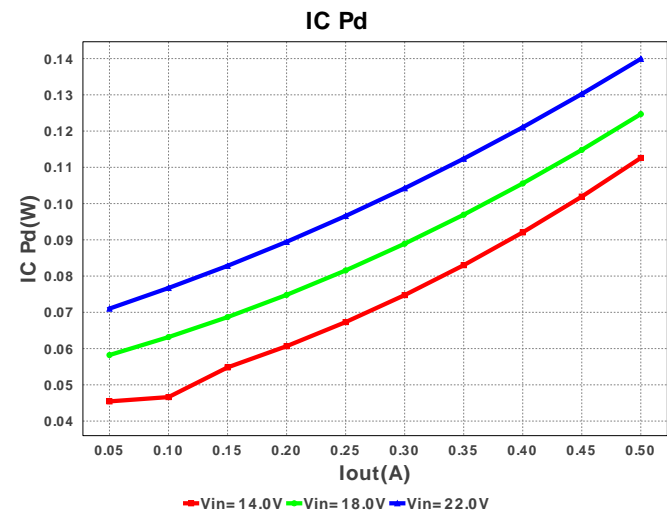
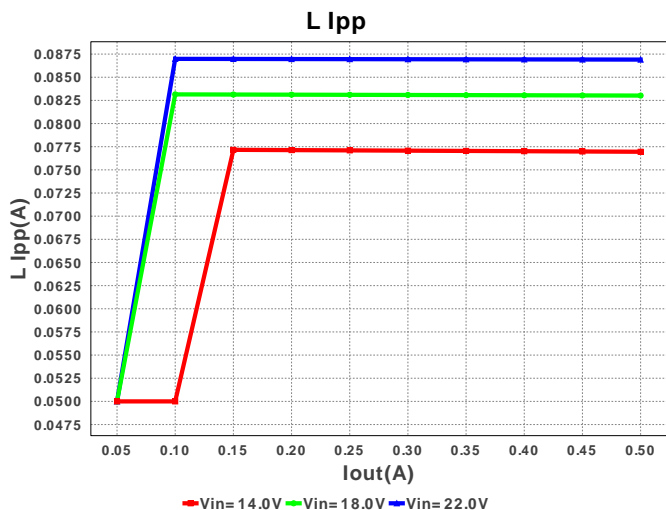
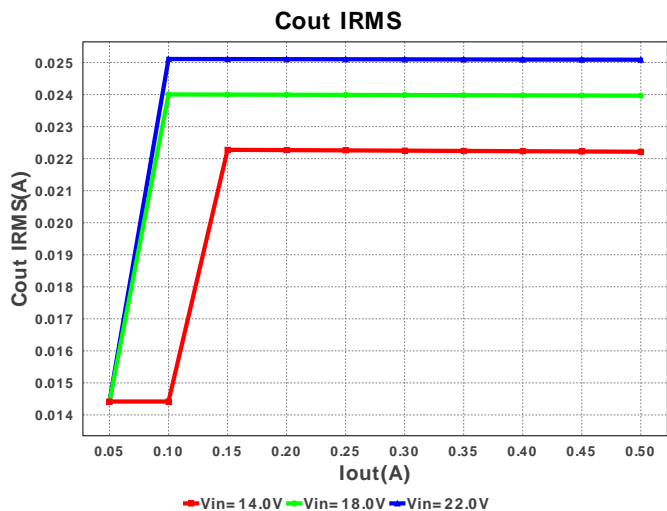
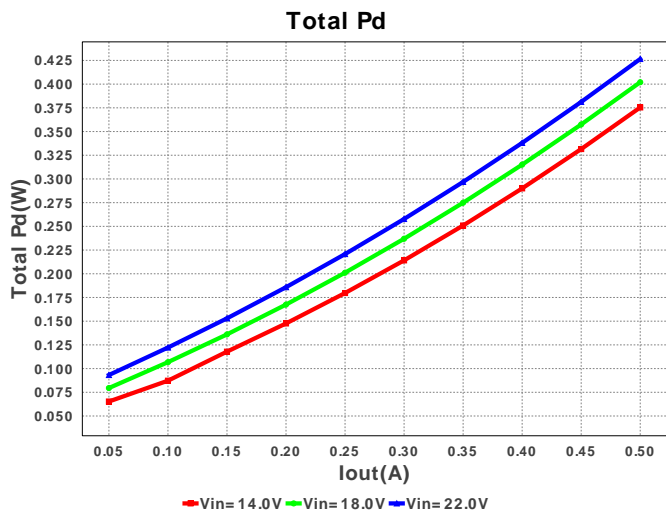
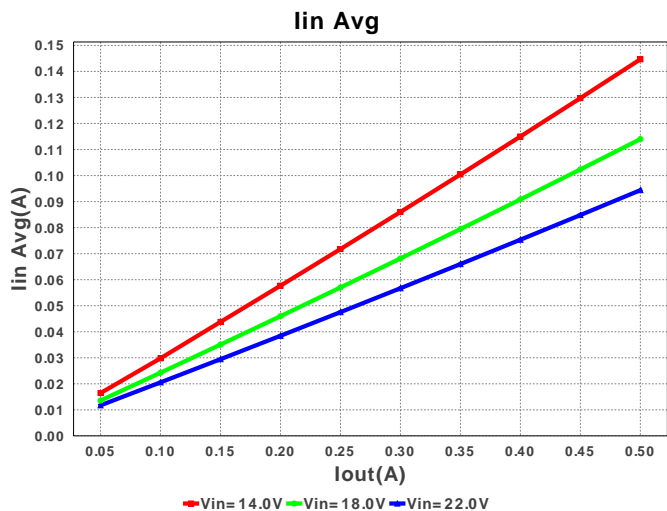
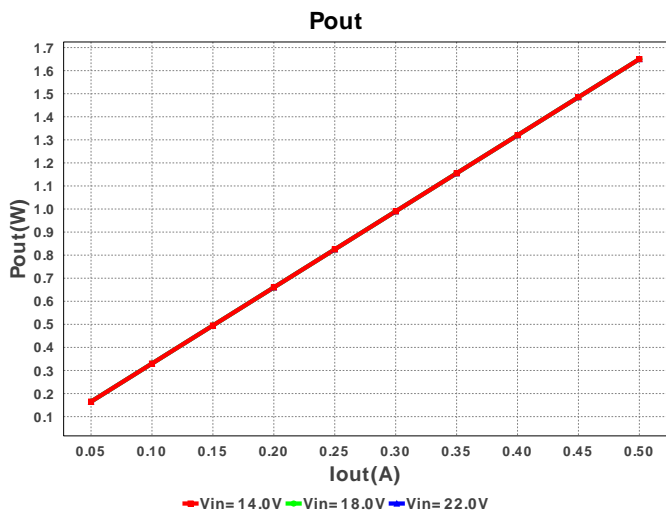
 VinMin = 14.0V  
 VinMax = 22.0V

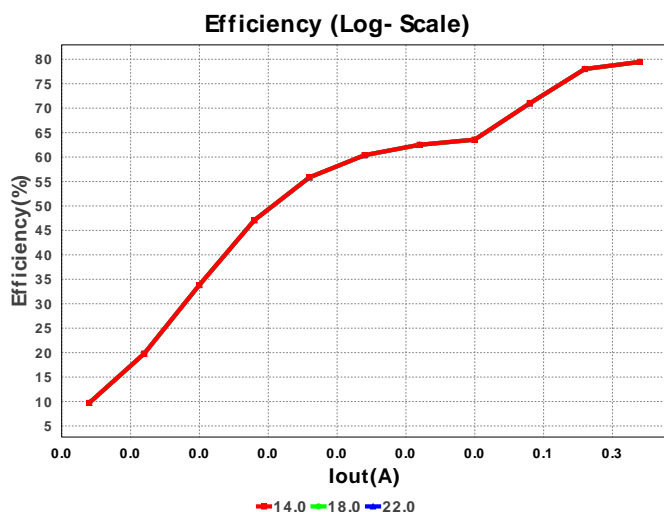
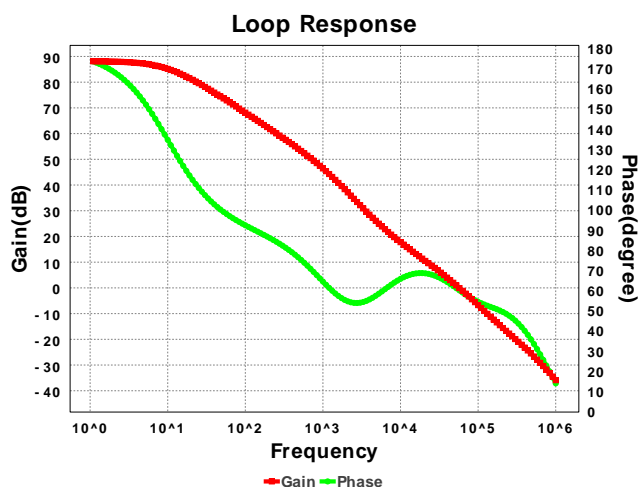
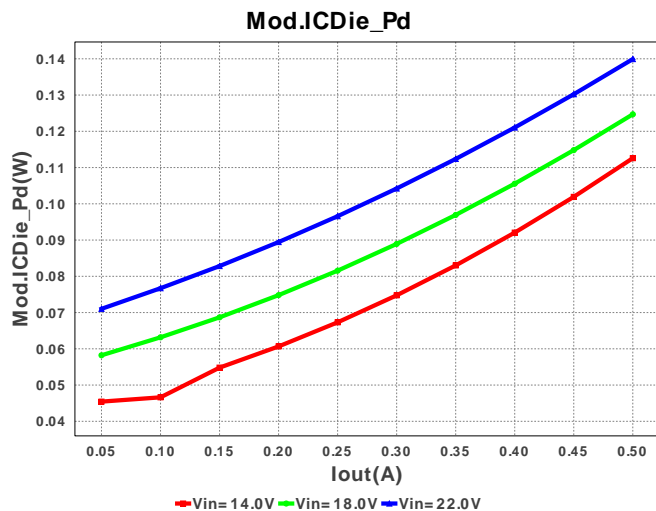
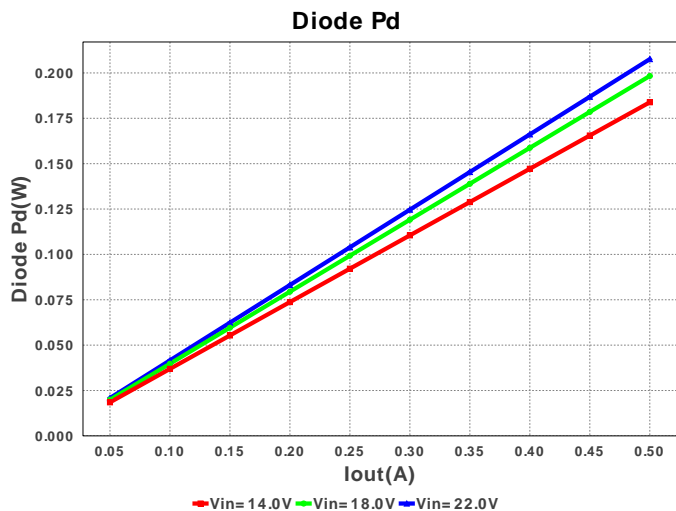
 Vout = 3.3V  
 Iout = 0.5A

**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 7mm2
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	\$0.10	 1206 11mm2
3.	Cout	Panasonic	25SVPF27MX Series= 1273	Cap= 27.0 µF ESR= 40.0 mOhm VDC= 25.0 V IRMS= 2.45 A	1	\$0.35	 CAPSMT_62_E61 53mm2
4.	D1	Diodes Inc.	B140-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.06	 SMA 37mm2
5.	L1	Bourns	SDR0604-330KL	L= 33.0 µH DCR= 250.0 mOhm	1	\$0.17	 SDR0604 61mm2
6.	Rfbb	Yageo America	RC0603FR-075K1L Series= 233	Res= 5.1 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5mm2
7.	Rfbt	Vishay-Dale	CRCW040216K9FKED Series= CRCW..e3	Res= 16.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
8.	U1	Texas Instruments	LMR14006XDDCT	Switcher	1	\$1.27	 MK06A 11mm2









### Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	187.795 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	25.088 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	543.603 mA	Current	Peak switch current in IC
4.	Iin Avg	94.387 mA	Current	Average input current
5.	L Ipp	86.906 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	206.174 mA	Current	MOSFET RMS current
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	187.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	1.1 MHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	123.666 mV	General	Voltage drop across the MosFET
12.	Pout	1.65 W	General	Total output power
13.	Total BOM	\$1.98	General	Total BOM Cost
14.	D1 Tj	81.902 degC	Op_Point	D1 junction temperature
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Cross Freq	57.208 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	16.982 %	Op_point	Duty cycle
18.	Efficiency	79.46 %	Op_point	Steady state efficiency
19.	IC Tj	44.272 degC	Op_point	IC junction temperature
20.	ICThetaJA	102.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	500.0 mA	Op_point	Iout operating point
22.	Phase Marg	60.361 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	22.0 V	Op_point	Vin operating point
24.	Vout p-p	3.495 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	105.8 μW	Power	Input capacitor power dissipation
26.	Cout Pd	25.175 μW	Power	Output capacitor power dissipation
27.	Diode Pd	207.607 mW	Power	Diode power dissipation
28.	IC Pd	139.919 mW	Power	IC power dissipation
29.	L Pd	78.369 mW	Power	Inductor power dissipation
30.	Total Pd	426.516 mW	Power	Total Power Dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	500.0 mA	Maximum Output Current
2.	Iout1	500.0 mAmps	Output Current #1
3.	VinMax	22.0 V	Maximum input voltage
4.	VinMin	14.0 V	Minimum input voltage
5.	Vout	3.3 V	Output Voltage
6.	Vout1	3.3 Volt	Output Voltage #1
7.	base_pn	LMR14006X	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

## Design Assistance

1. LMR14006X Product Folder : <http://www.ti.com/product/LMR14006> : contains the data sheet and other resources.

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