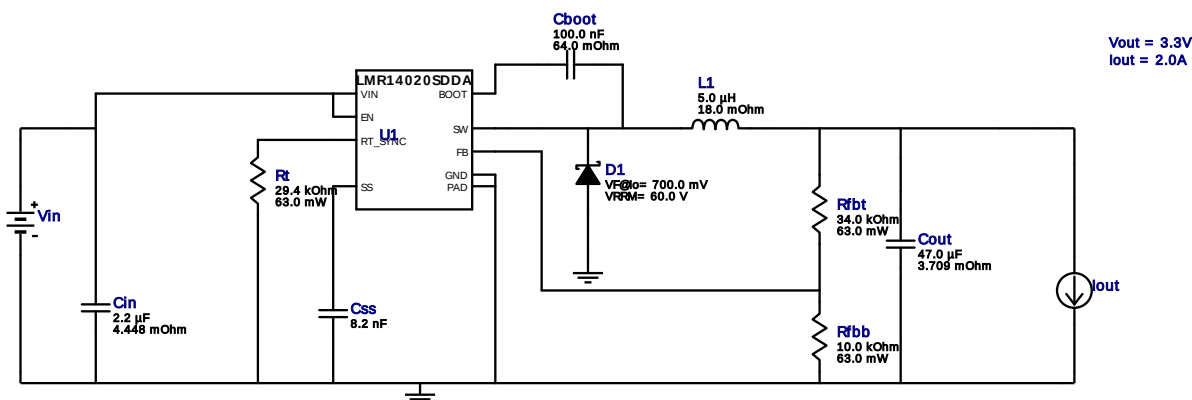


WEBENCH® Design Report

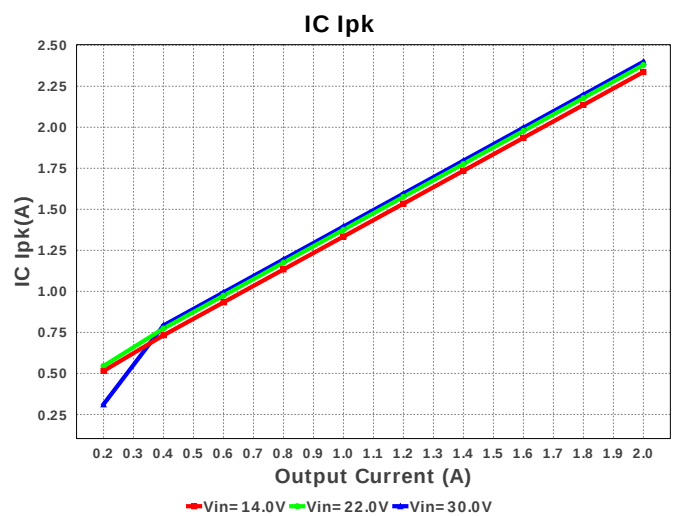
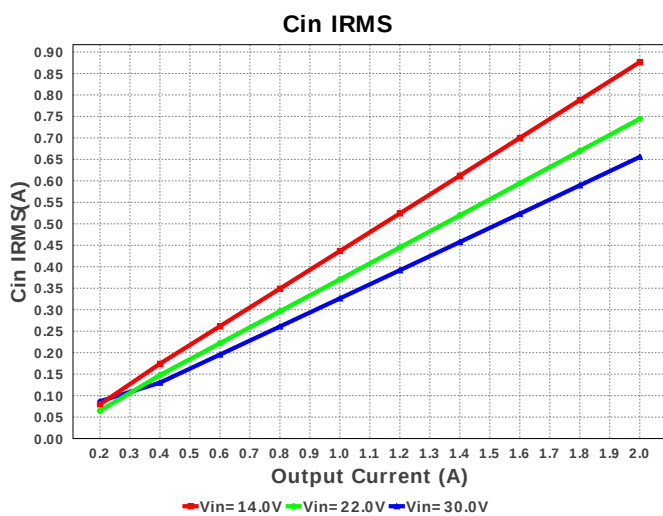
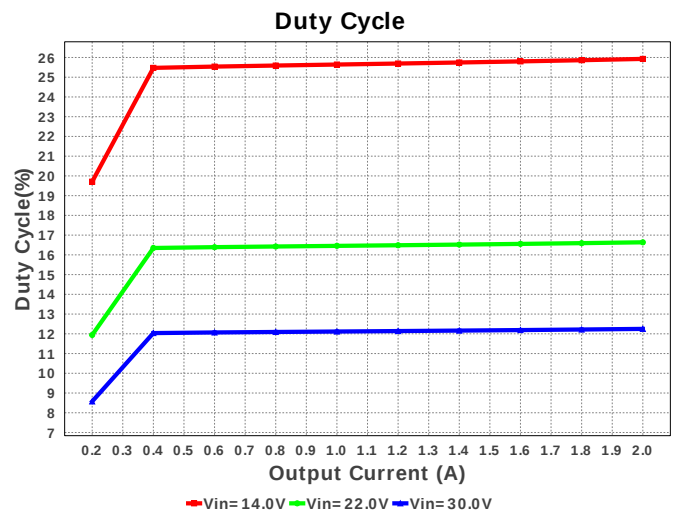
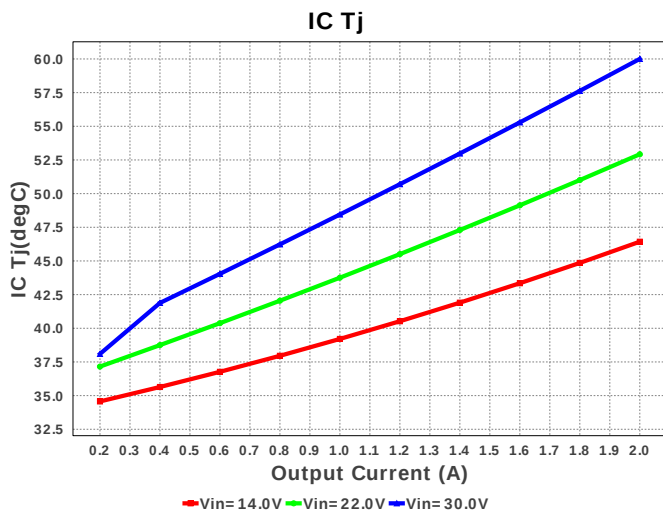
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LMR14020SDDAR 14.0V-30.0V to 3.30V @ 2.0002249999999995A

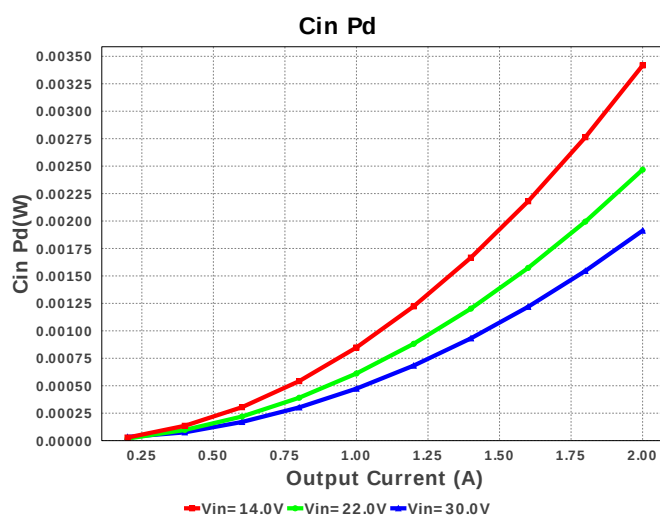
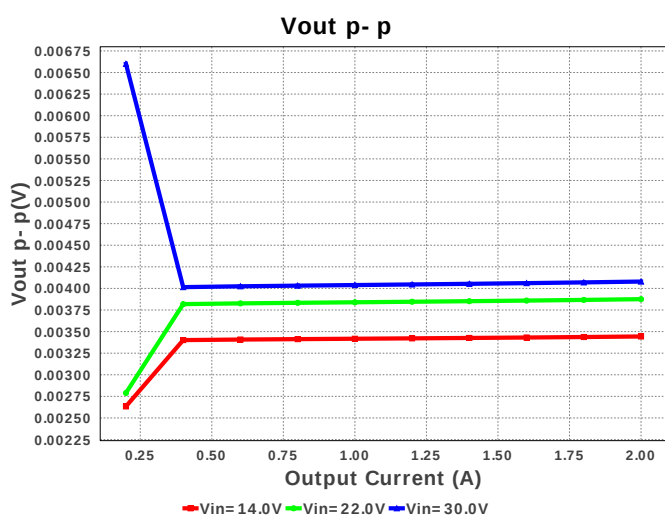
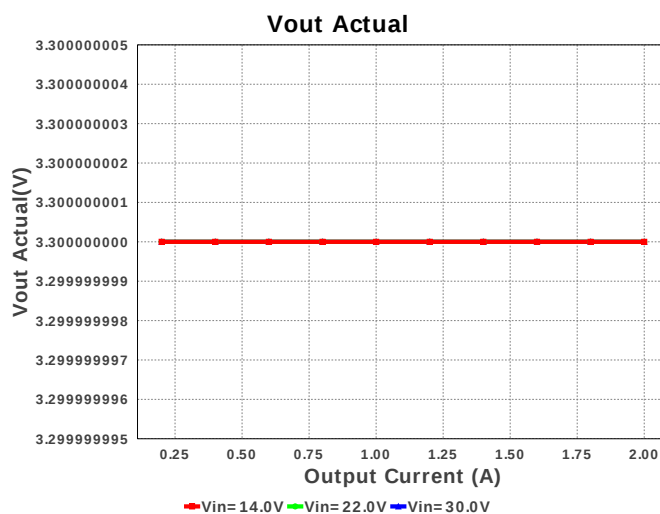
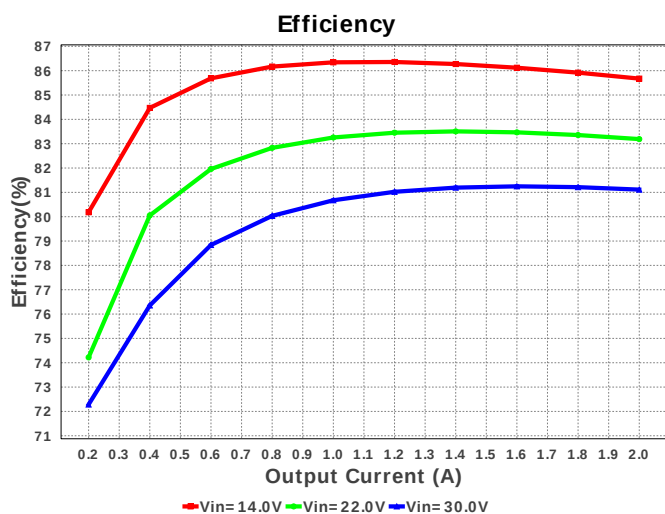
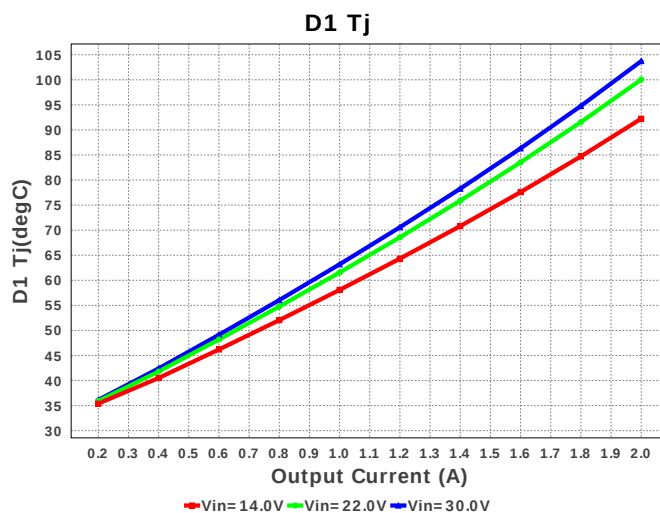
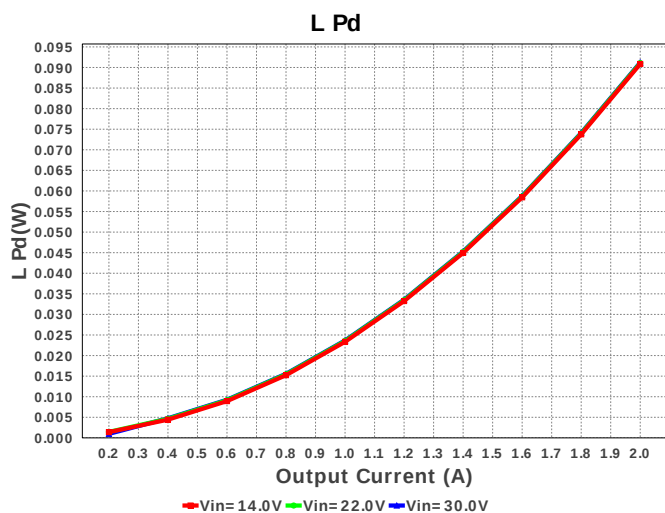


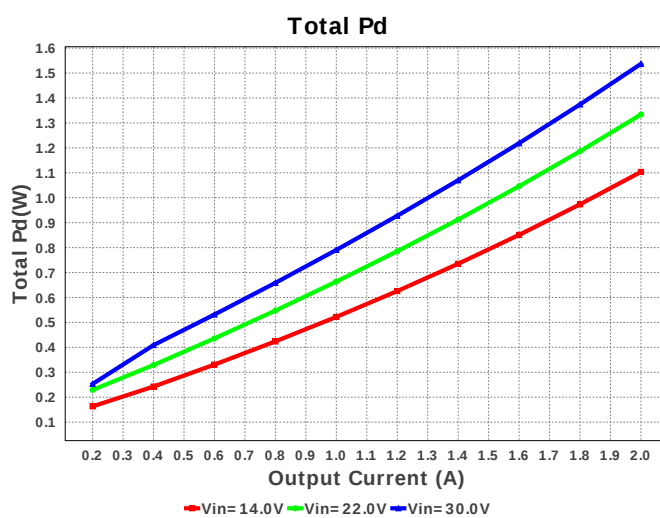
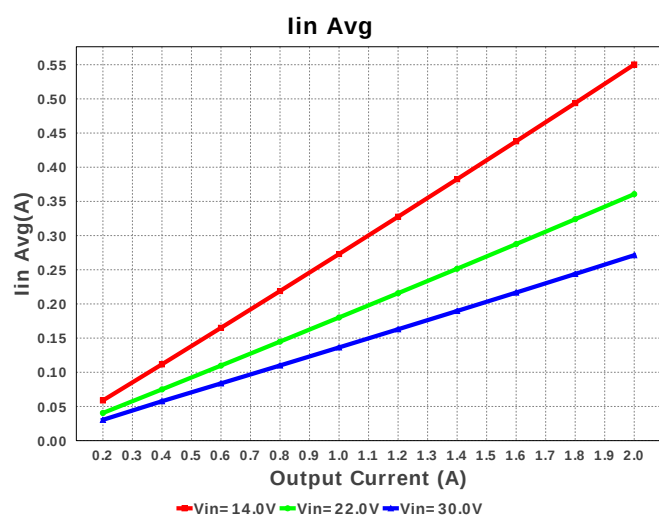
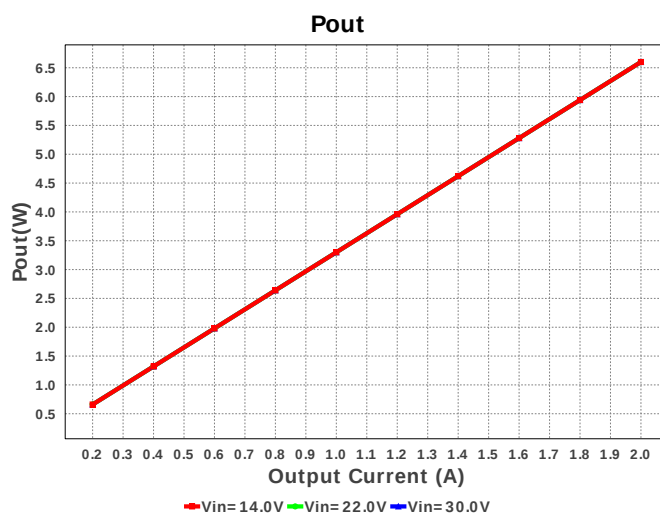
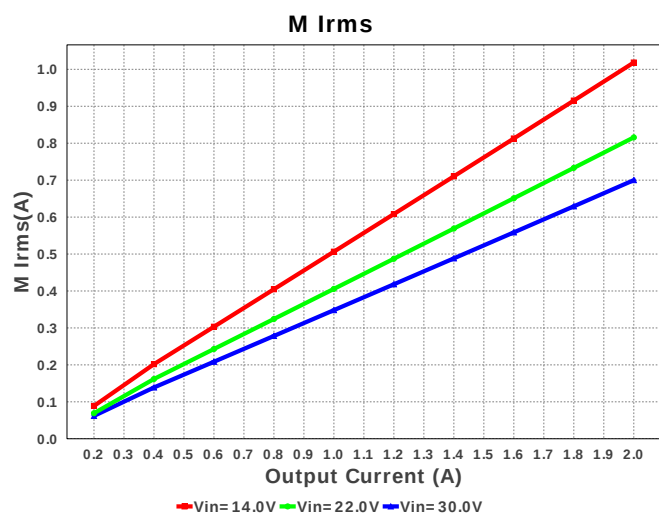
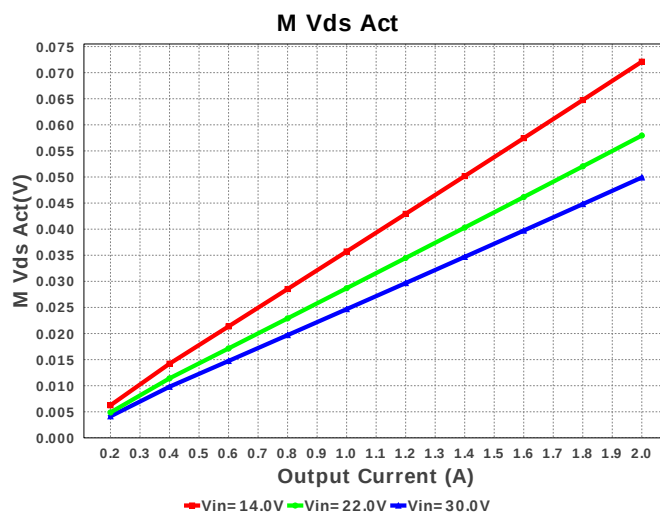
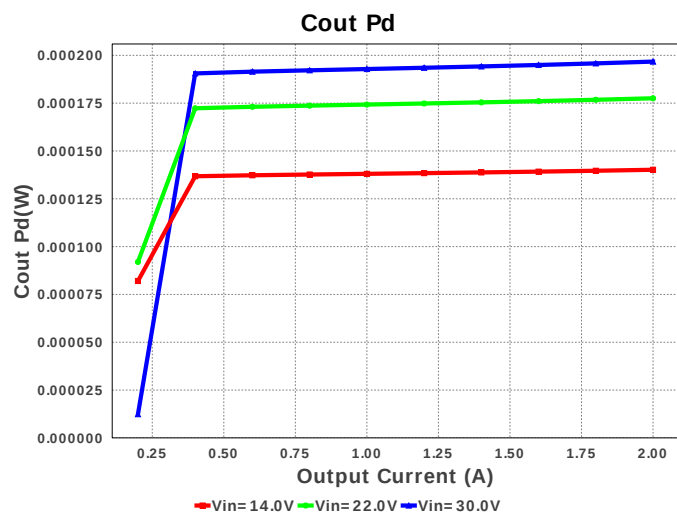
Electrical BOM

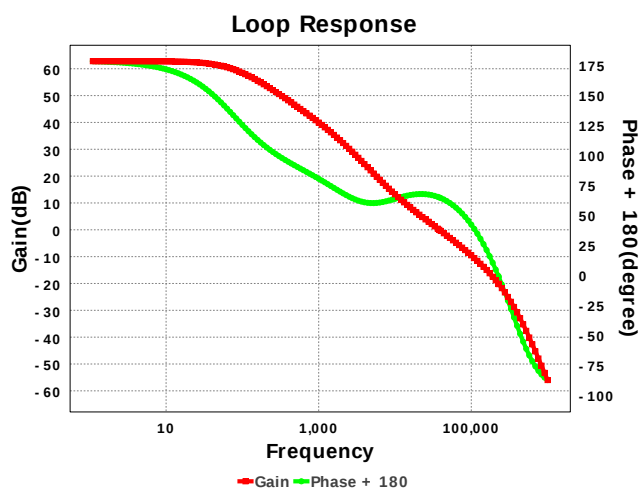
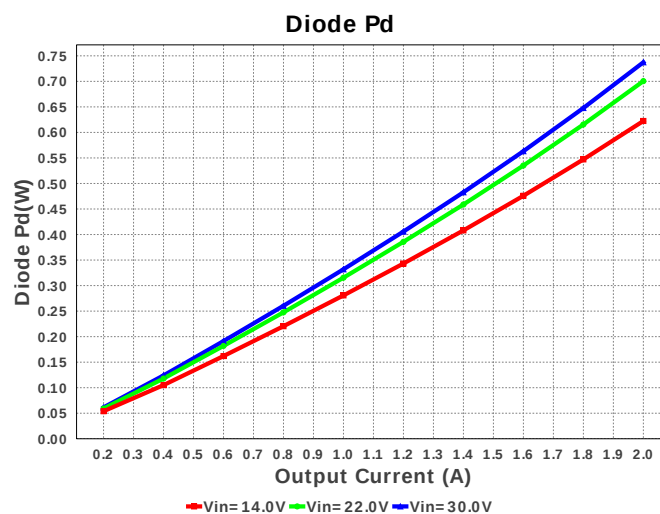
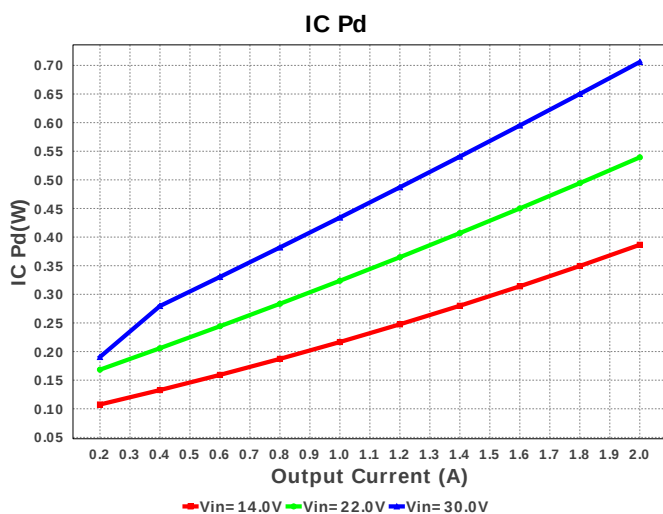
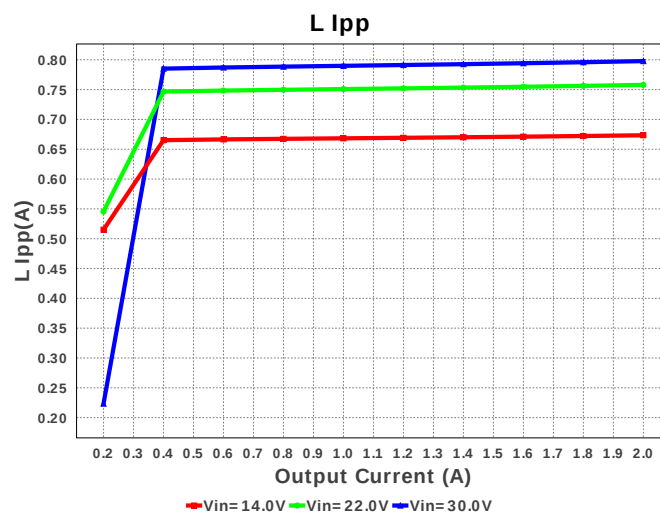
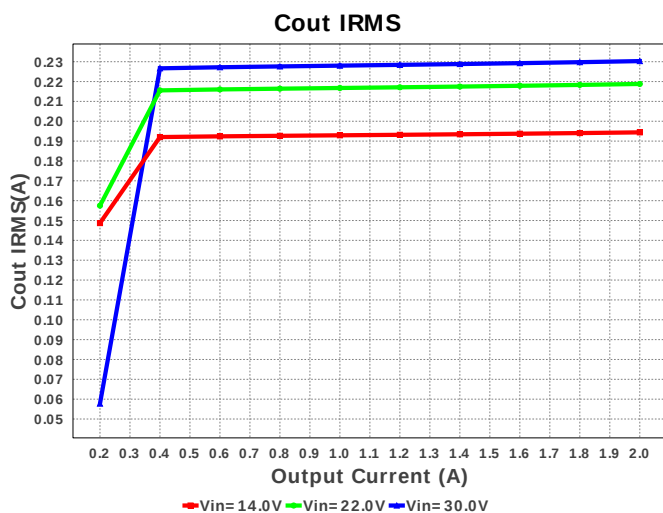
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	0805 7 mm ²
2.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	\$0.05	1206_190 11 mm ²
3.	Cout	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	\$0.15	1206_190 11 mm ²
4.	Css	MuRata	GRM155R71C822KA01D Series= X7R	Cap= 8.2 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
5.	D1	Diodes Inc.	B360A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.12	SMA 37 mm ²
6.	L1	Coilcraft	MSS7341T-502NLB	L= 5.0 uH DCR= 18.0 mOhm	1	\$0.50	MSS7341T 83 mm ²
7.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
8.	Rfbbt	Vishay-Dale	CRCW040234K0FKED Series= CRCW..e3	Res= 34.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
9.	Rt	Vishay-Dale	CRCW040229K4FKED Series= CRCW..e3	Res= 29.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	LMR14020SDDAR	Switcher	1	\$1.46	 DDA0008E_N 57 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	655.731 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	230.302 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.399 A	Current	Peak switch current in IC
4.	Iin Avg	271.24 mA	Current	Average input current
5.	L Ipp	797.79 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	700.003 mA	Current	Q lavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	218.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	818.366 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	49.898 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	6.6 W	General	Total output power
13.	Total BOM	\$2.33	General	Total BOM Cost
14.	D1 Tj	103.732 degC	Op_Point	D1 junction temperature
15.	Vout Actual	3.3 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
17.	Cross Freq	38.039 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	12.249 %	Op_point	Duty cycle
19.	Efficiency	81.113 %	Op_point	Steady state efficiency
20.	IC Tj	59.651 degC	Op_point	IC junction temperature
21.	ICThetaJA	42.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	Phase Marg	65.495 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	30.0 V	Op_point	Vin operating point
25.	Vout p-p	4.079 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	1.913 mW	Power	Input capacitor power dissipation
27.	Cout Pd	196.722 μ W	Power	Output capacitor power dissipation
28.	Diode Pd	737.322 mW	Power	Diode power dissipation
29.	IC Pd	705.967 mW	Power	IC power dissipation
30.	L Pd	91.2 mW	Power	Inductor power dissipation
31.	Total Pd	1.537 W	Power	Total Power Dissipation
32.	Vout Tolerance	3.998 %		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	30.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LMR14020S	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMR14020S** Product Folder : <http://www.ti.com/product/LMR14020> : contains the data sheet and other resources.

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