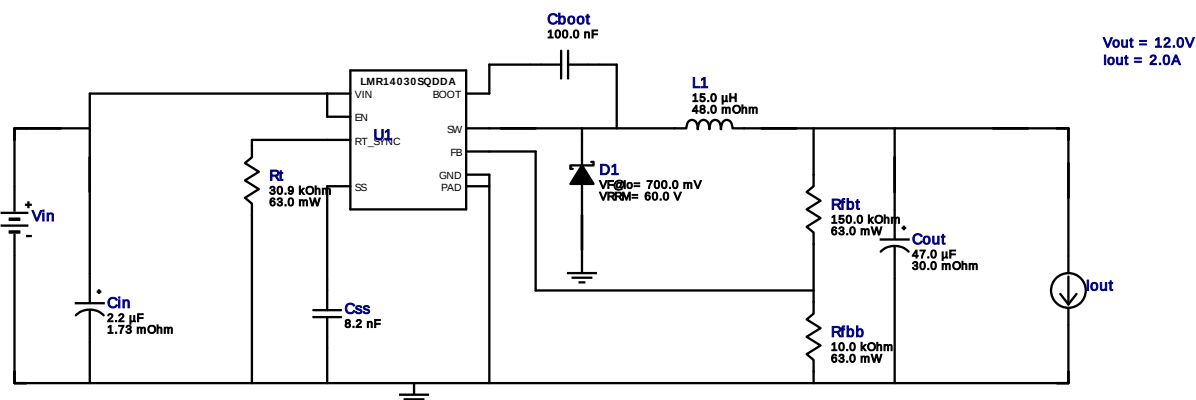


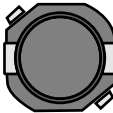
WEBENCH® Design Report

Design : 4802645/5 LMR14030SQDDARQ1
LMR14030SQDDARQ1 32.0V-38.0V to 12.00V @ 2.0002249999999995A

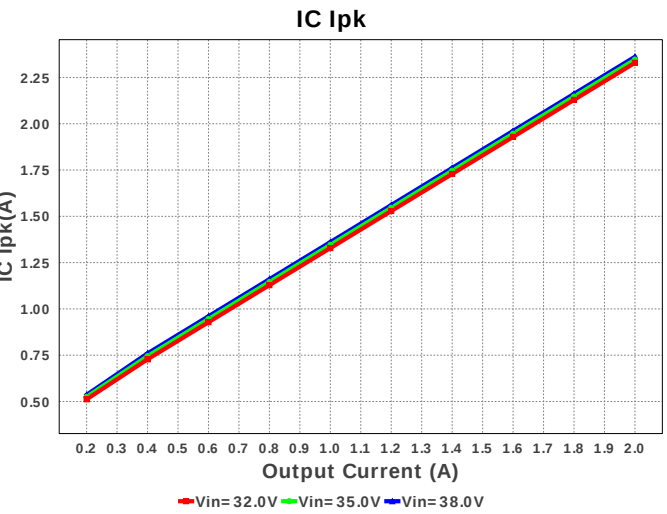
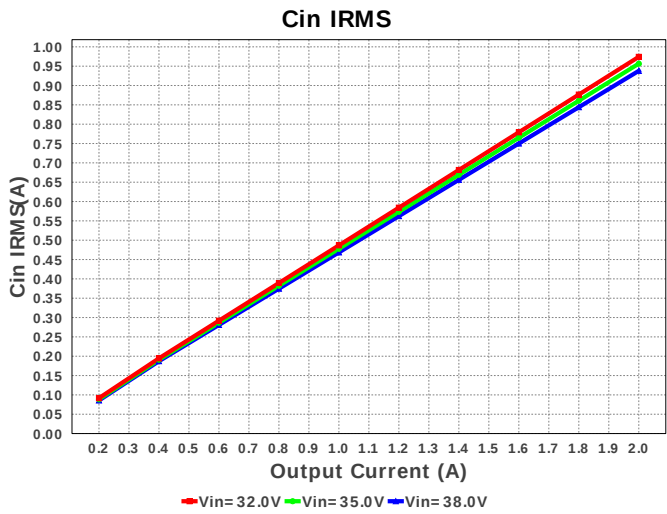
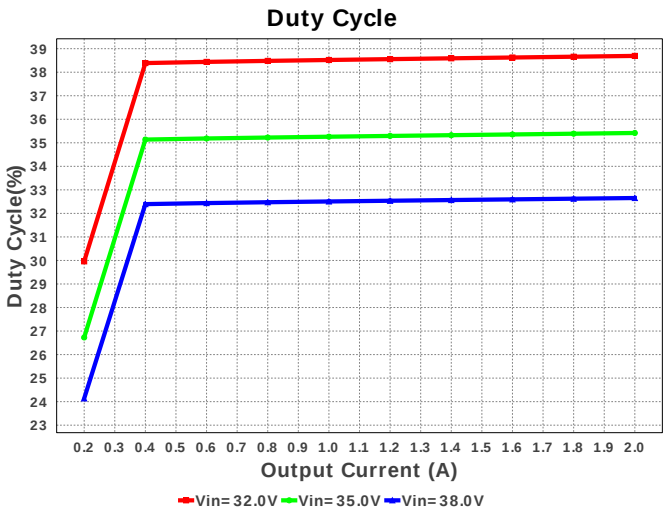
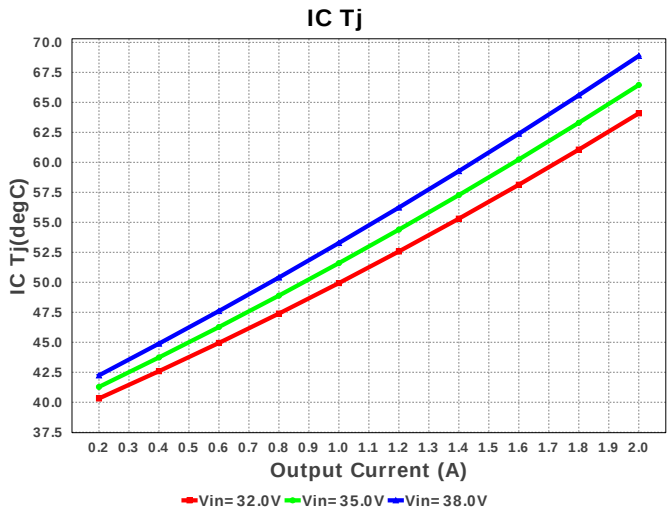


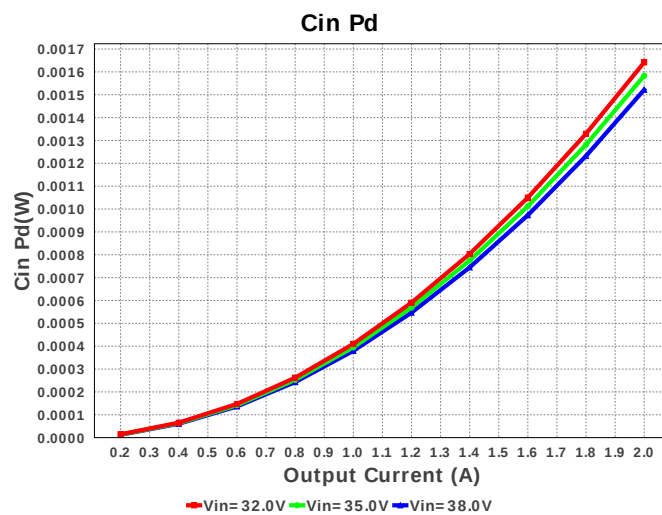
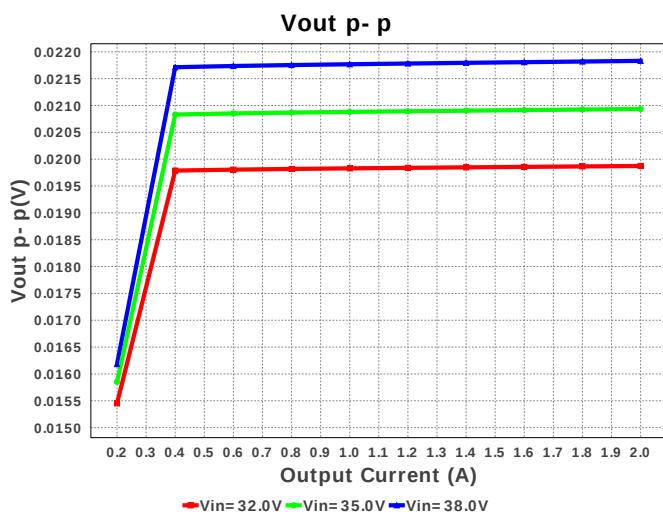
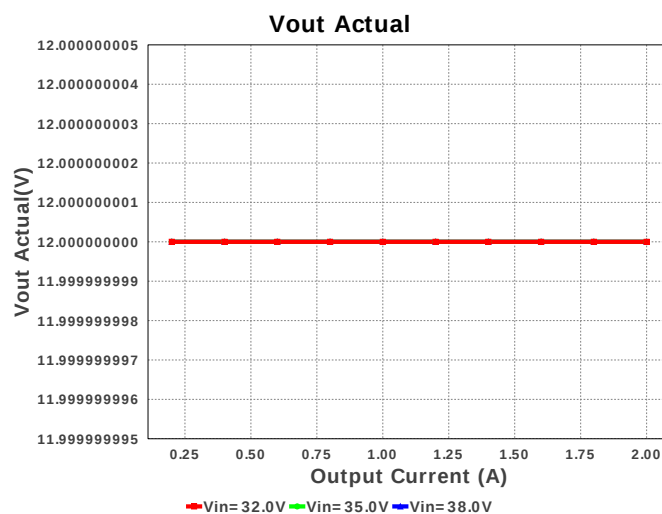
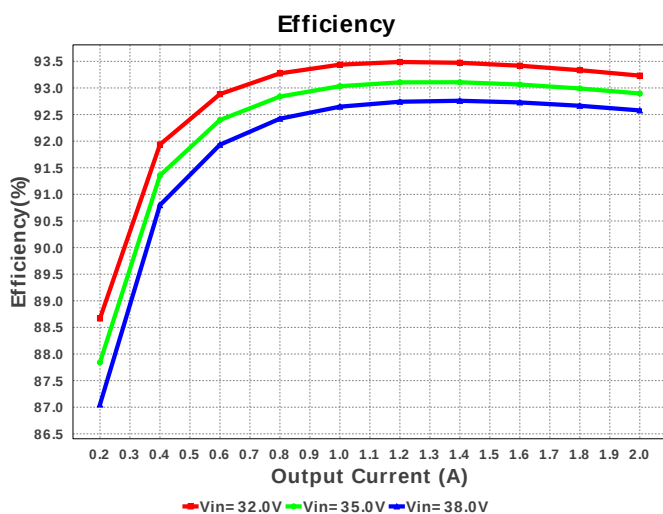
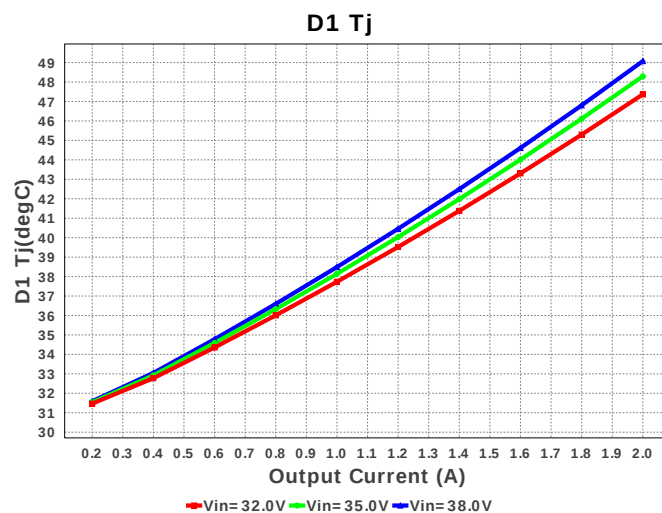
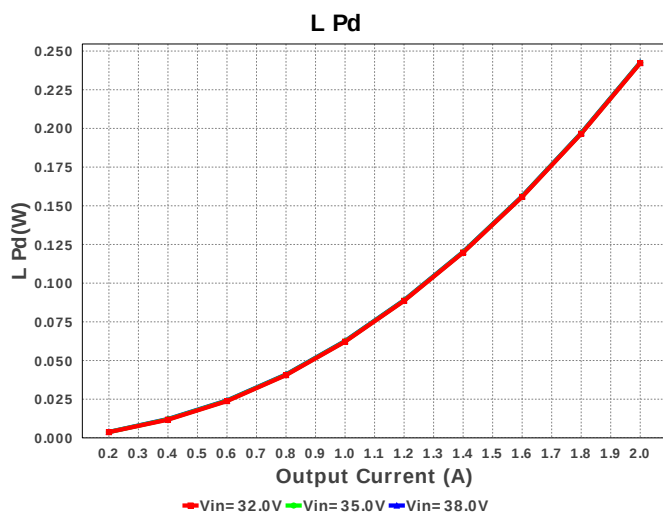
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application. View WEBENCH(R) Disclaimer.

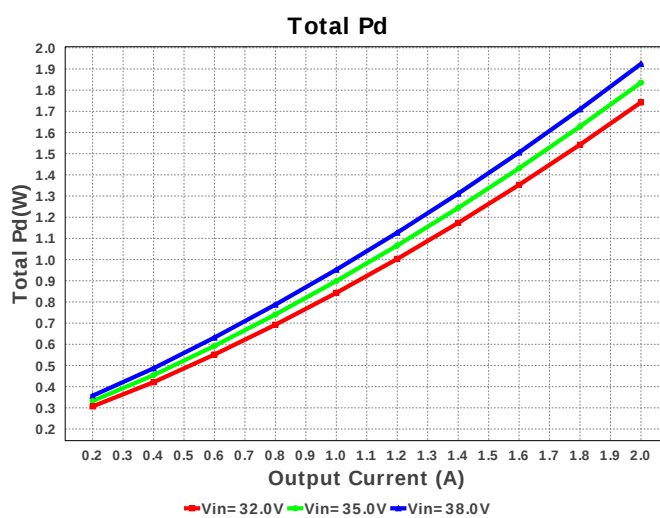
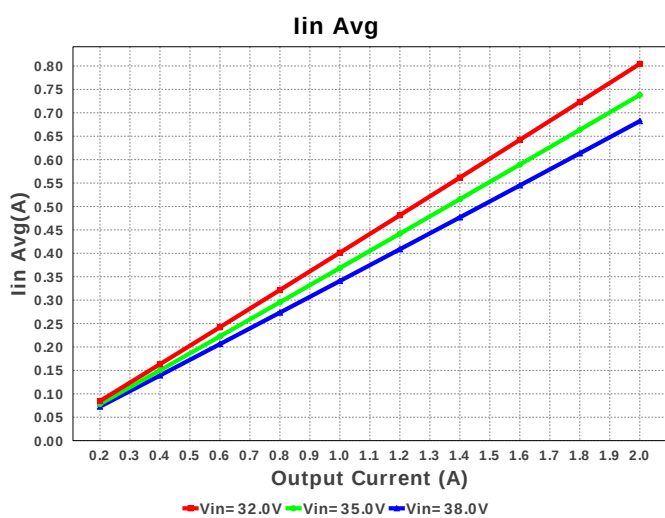
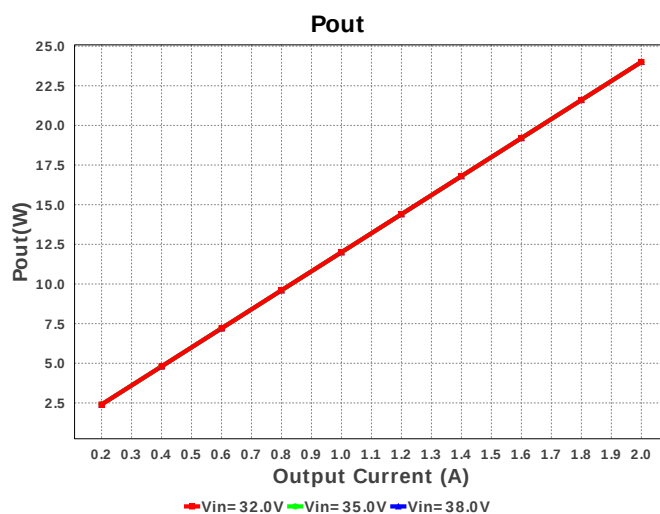
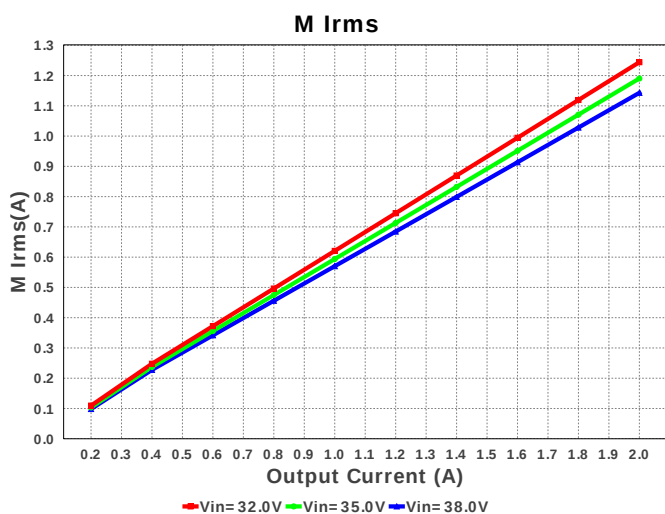
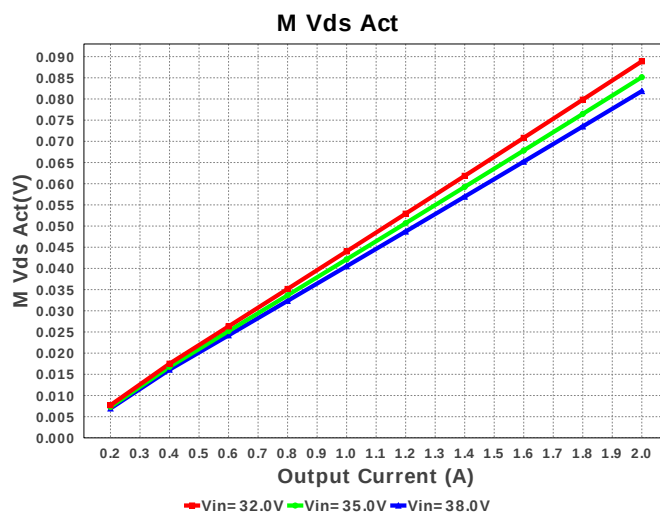
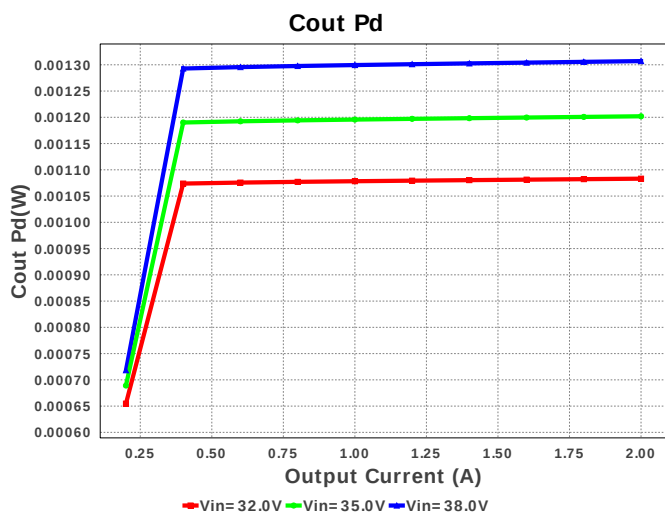
Electrical BOM

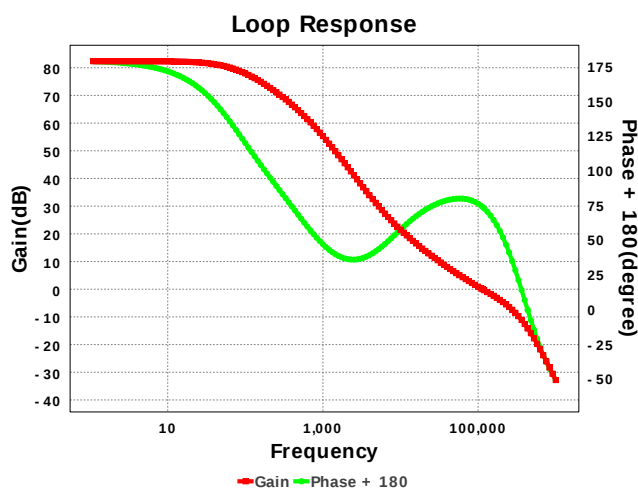
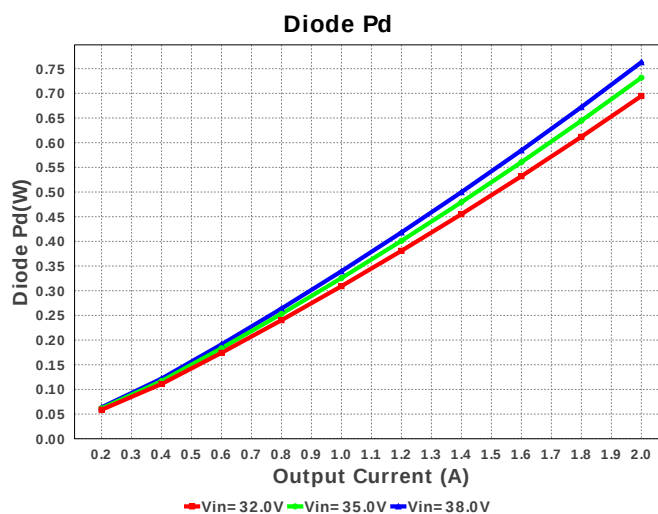
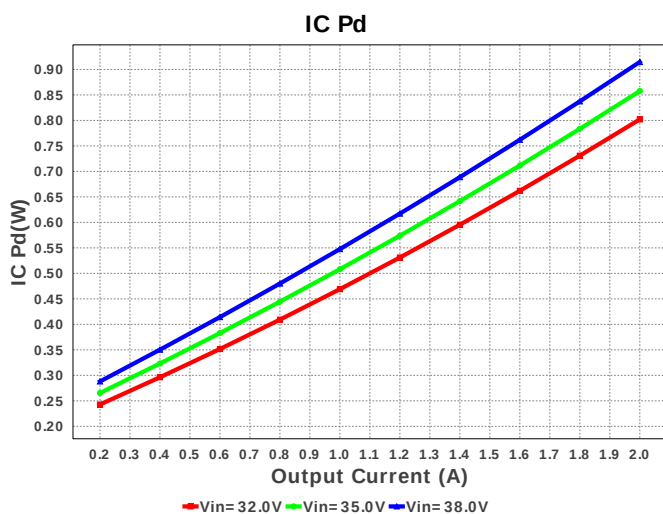
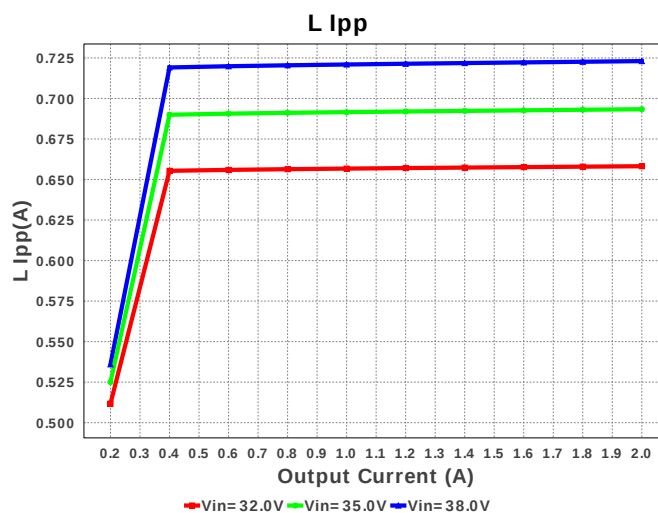
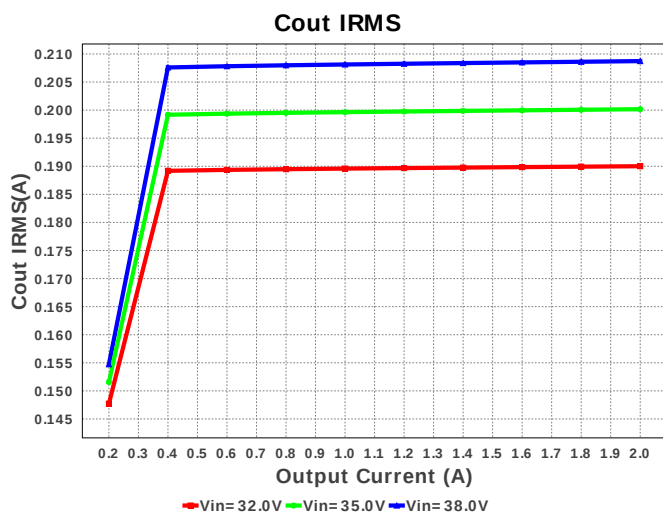
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Taiyo Yuden	HMK212B7104KG-T Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm ²
2.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 1.73 mOhm VDC= 100.0 V IRMS= 5.5932 A	1	\$0.19	 1210_250 15 mm ²
3.	Cout	Panasonic	25SVPF47M Series= ?	Cap= 47.0 uF ESR= 30.0 mOhm VDC= 25.0 V IRMS= 2.8 A	1	\$0.43	 CAPSMT_62_F61 74 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.	B260A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.09	 SMA 37 mm ²
6.	L1	TDK	CLF10040T-150M	L= 15.0 uH DCR= 48.0 mOhm	1	\$0.46	 CLF10040 148 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	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rt	Vishay-Dale	CRCW040230K9FKED Series= CRCW..e3	Res= 30.9 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	LMR14030SQDDARQ1	Switcher	1	\$1.98	 DDA0008E_N 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	937.924 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	208.728 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.362 A	Current	Peak switch current in IC
4.	Iin Avg	682.23 mA	Current	Average input current
5.	L Ipp	723.06 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.143 A	Current	Q lavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	350.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	780.31 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	81.839 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Mode	CCM	General	Conduction Mode
13.	Pout	24.0 W	General	Total output power
14.	Total BOM	\$3.22	General	Total BOM Cost
15.	D1 Tj	49.076 degC	Op_Point	D1 junction temperature
16.	Vout Actual	12.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	113.979 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	32.653 %	Op_point	Duty cycle
20.	Efficiency	92.579 %	Op_point	Steady state efficiency
21.	IC Tj	68.413 degC	Op_point	IC junction temperature
22.	ICThetaJA	42.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	2.0 A	Op_point	Iout operating point
24.	Phase Marg	74.102 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	38.0 V	Op_point	Vin operating point
26.	Vout p-p	21.831 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	1.522 mW	Power	Input capacitor power dissipation
28.	Cout Pd	1.307 mW	Power	Output capacitor power dissipation
29.	Diode Pd	763.044 mW	Power	Diode power dissipation
30.	IC Pd	914.592 mW	Power	IC power dissipation
31.	L Pd	242.632 mW	Power	Inductor power dissipation
32.	Total Pd	1.924 W	Power	Total Power Dissipation
33.	Vout Tolerance	4.339 %		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	38.0	Maximum input voltage
3.	VinMin	32.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	LMR14030S-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMR14030S-Q1** Product Folder : <http://www.ti.com/product/LMR14030%2DQ1> : contains the data sheet and other resources.

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