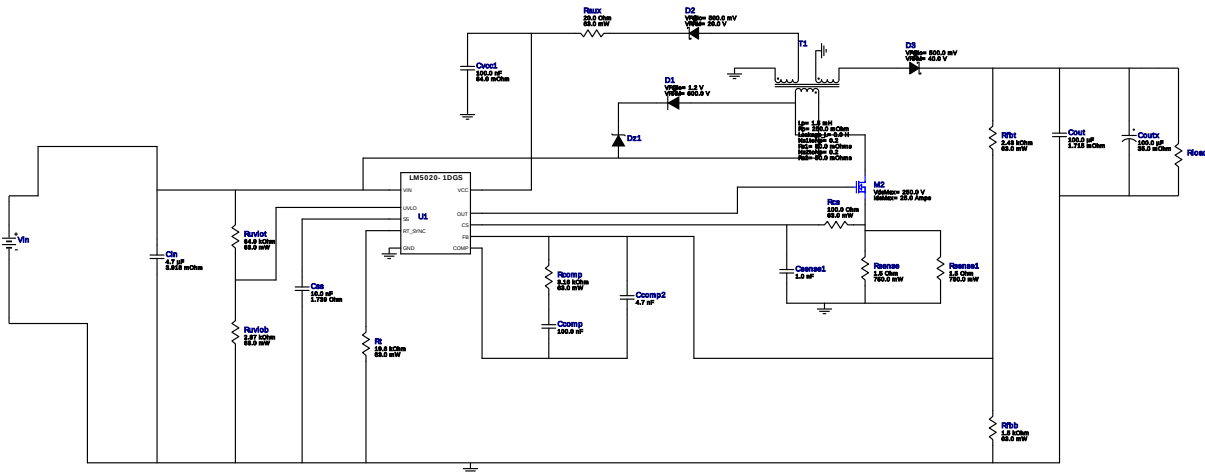


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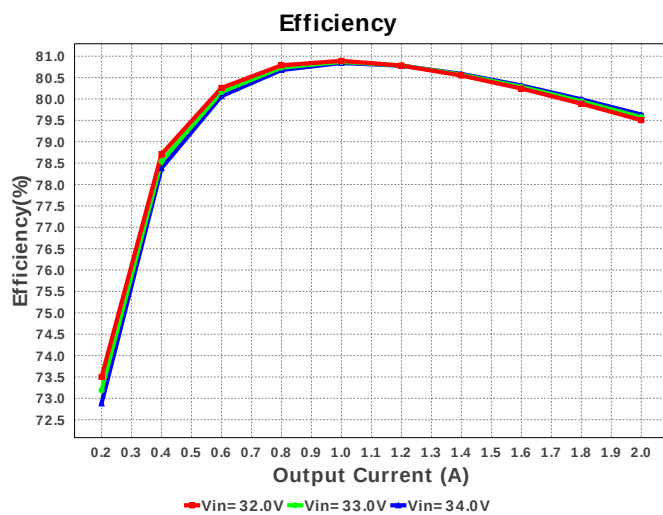
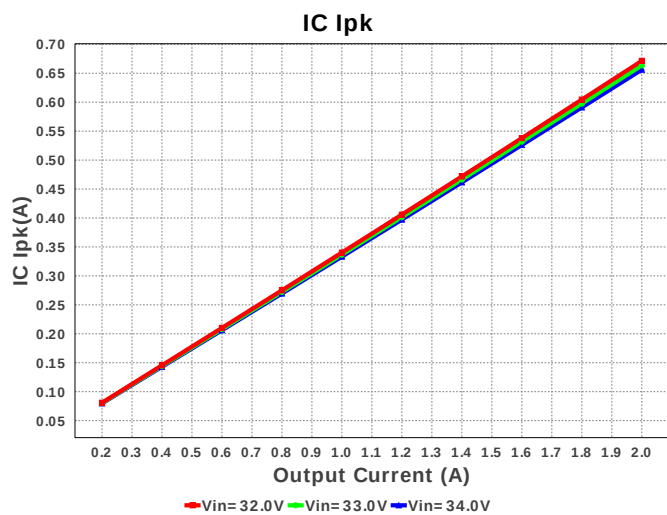
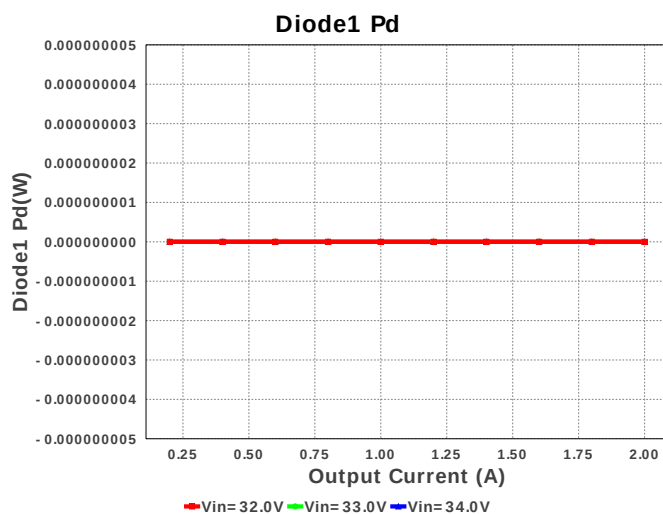
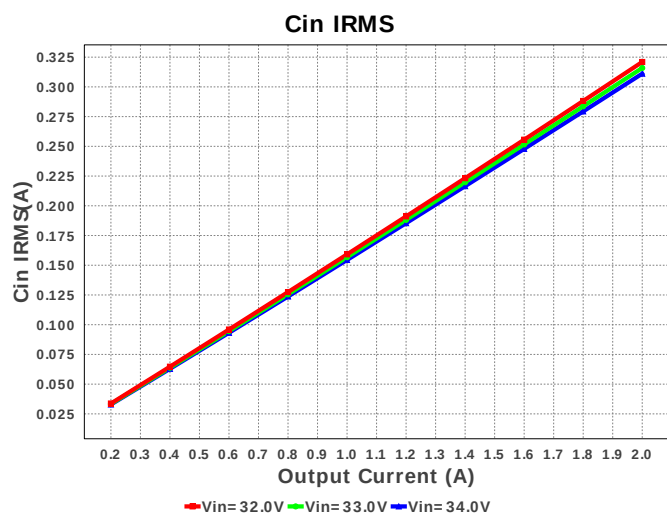
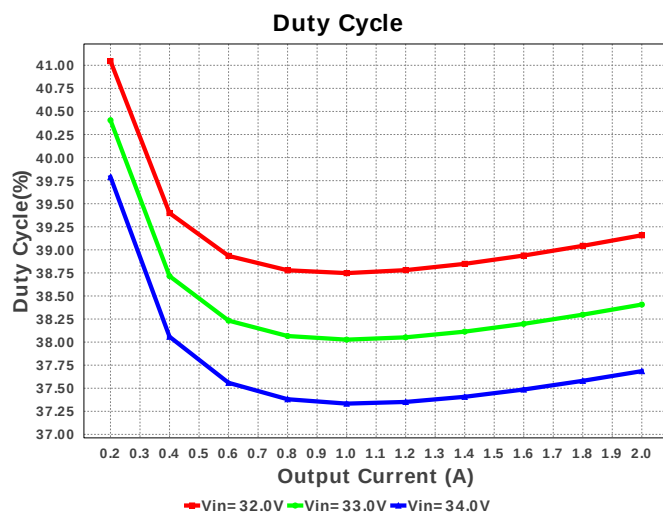
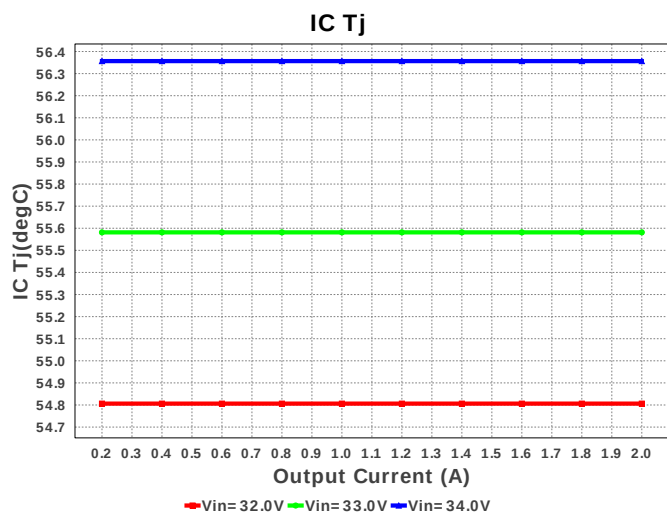
Design : 4738744/15 LM5020MM-1/NOPB
LM5020MM-1/NOPB 32.0V-34.0V to 3.30V @ 2.0A

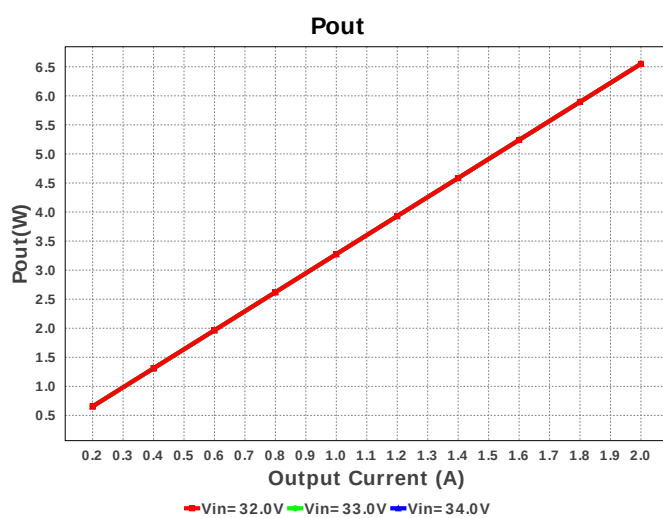
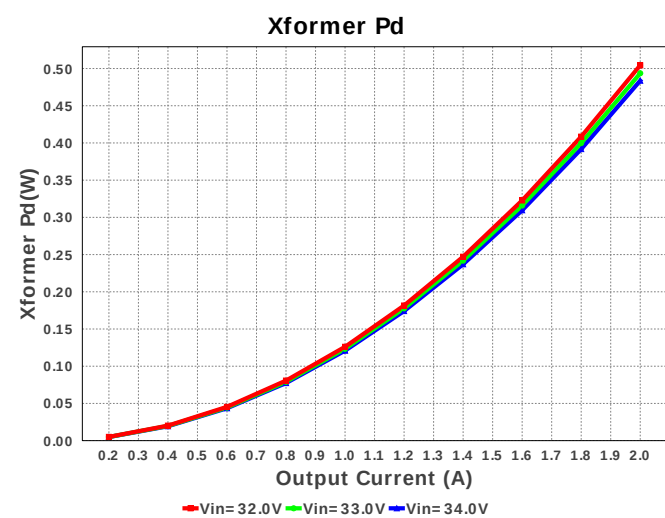
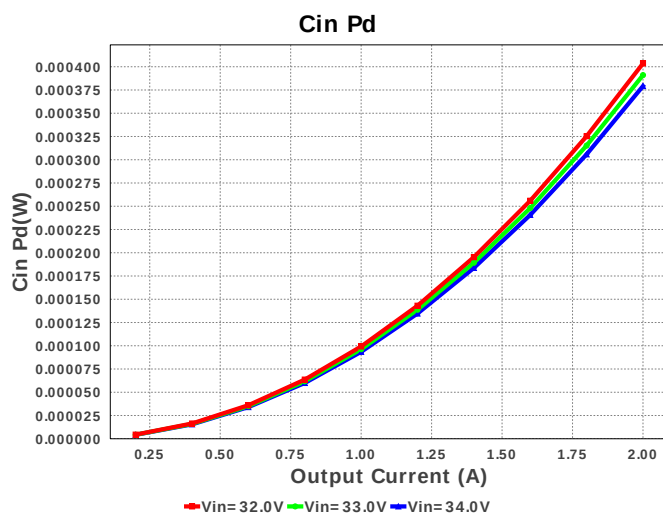
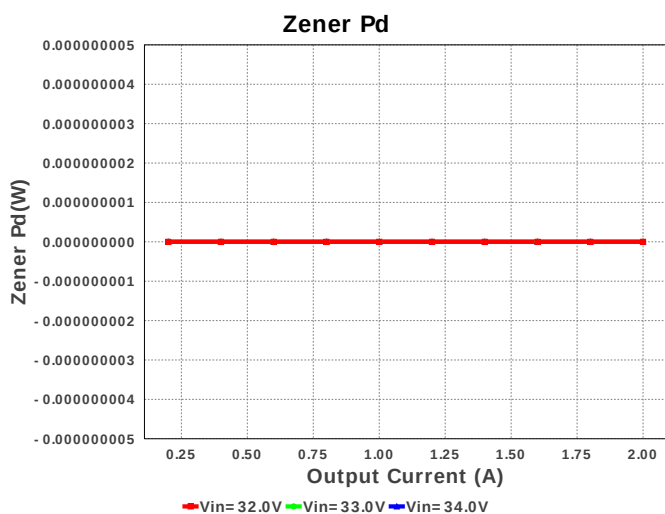
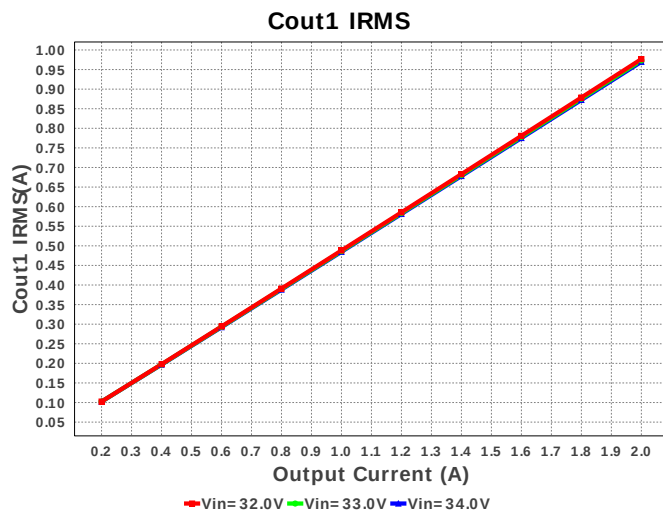
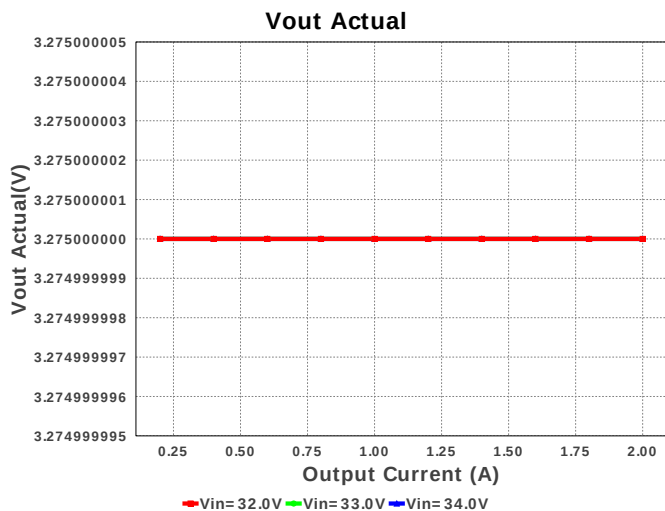


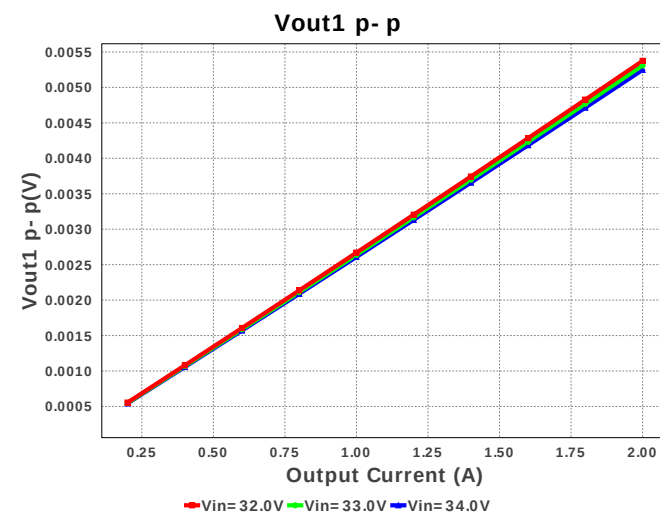
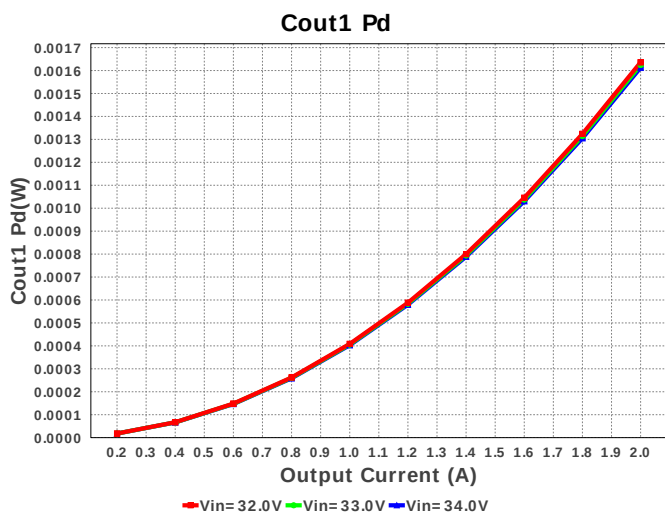
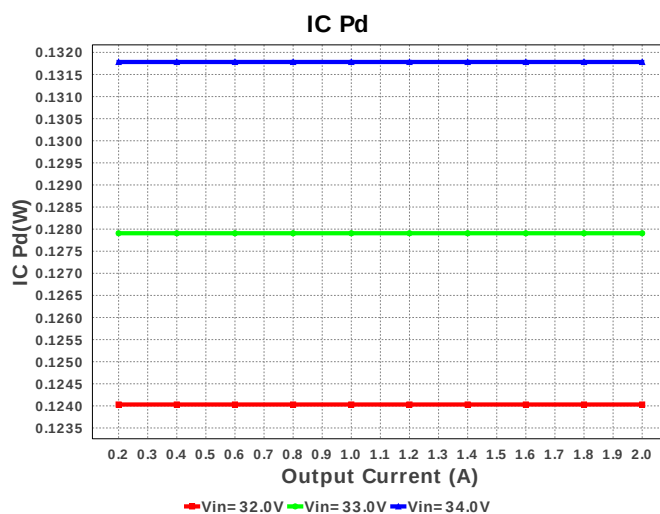
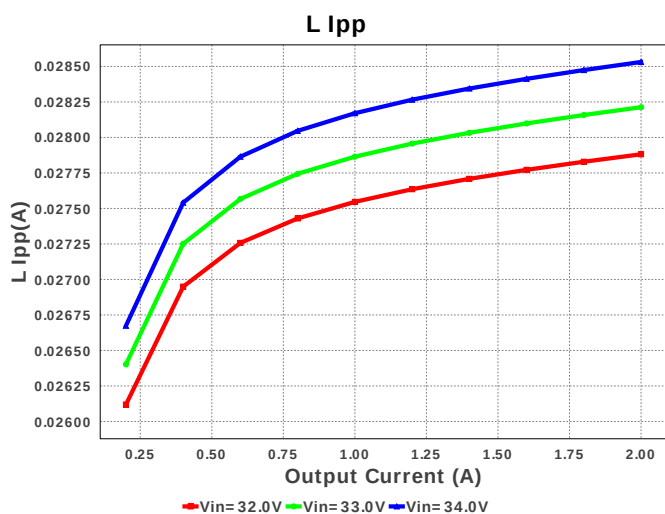
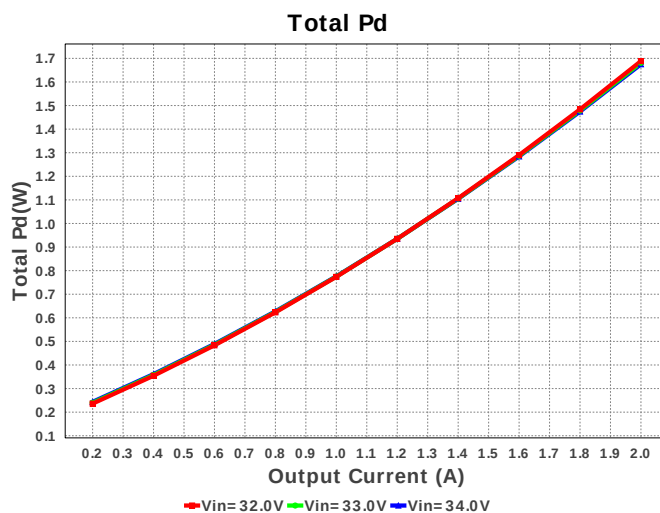
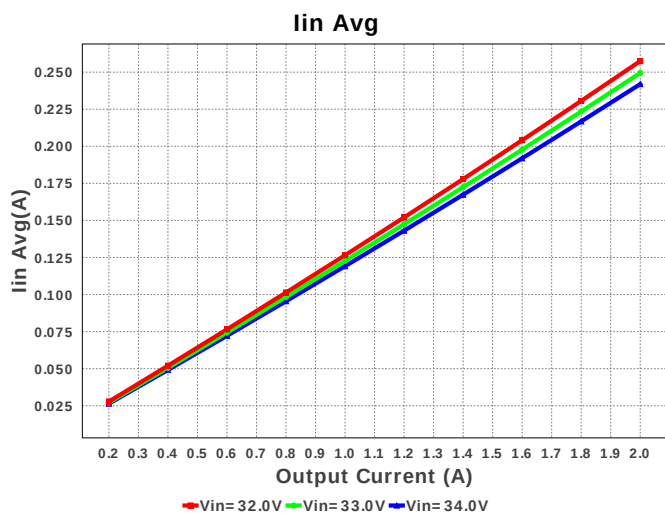
Electrical BOM

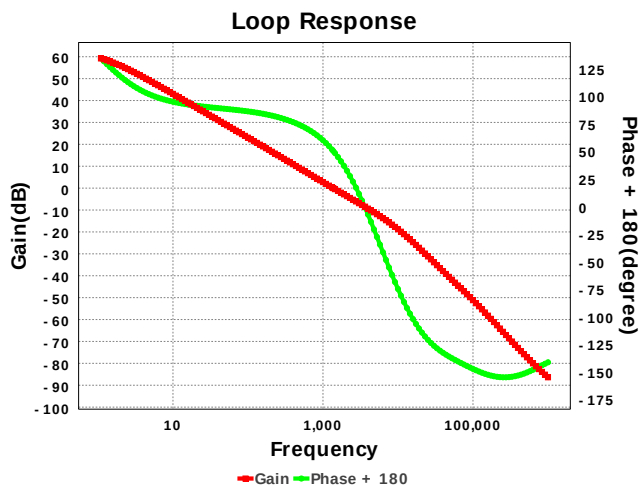
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
2.	Ccomp2	Yageo America	CC0805KRX7R9BB472 Series= X7R	Cap= 4.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Cin	TDK	C3216JB1V475K Series= JB	Cap= 4.7 uF ESR= 3.918 mOhm VDC= 35.0 V IRMS= 0.0 A	1	\$0.13	 1206 11 mm ²
4.	Cout	TDK	C3216JB0J107M Series= JB	Cap= 100.0 uF ESR= 1.715 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.39	 1206 11 mm ²
5.	Coutx	Chemi-Con	APXC6R3ARA101ME60G Series= PXC	Cap= 100.0 uF ESR= 35.0 mOhm VDC= 6.3 V IRMS= 1.78 A	1	\$0.40	 CAPSMT_62_E60 53 mm ²
6.	Csense1	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
7.	Css	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	 0805 7 mm ²
8.	Cvcc1	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
9.	D1	Bourns	CD214B-F3600	VF@Io= 1.2 V VRRM= 600.0 V	1	\$0.14	 SMB 44 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	D2	Vishay-Semiconductor	SS12-E3/61T	VF@Io= 500.0 mV VRRM= 20.0 V	1	\$0.08	 SMA 37 mm ²
11.	D3	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMA 37 mm ²
12.	Dz1	Micro Commercial Components	3SMAJ5933B-TP	Zener	1	\$0.12	 SMA 37 mm ²
13.	M2	Infineon Technologies	BSC600N25NS3 G	VdsMax= 250.0 V IdsMax= 25.0 Amps	1	\$1.41	 PG-TDSON-8 55 mm ²
14.	Raux	Vishay-Dale	CRCW040220R0FKED Series= CRCW..e3	Res= 20.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	Rcomp	Vishay-Dale	CRCW04023K16FKED Series= CRCW..e3	Res= 3.16 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	Rcs	Vishay-Dale	CRCW0402100R0FKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Rfbb	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	Rfbt	Vishay-Dale	CRCW04022K43FKED Series= CRCW..e3	Res= 2.43 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
19.	Rsense	Stackpole Electronics Inc	RMCF2010FT1R50 Series= ?	Res= 1.5 Ohm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	 2010 32 mm ²
20.	Rsense1	Stackpole Electronics Inc	RMCF2010FT1R50 Series= ?	Res= 1.5 Ohm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	 2010 32 mm ²
21.	Rt	Vishay-Dale	CRCW040219K6FKED Series= CRCW..e3	Res= 19.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
22.	Ruvlob	Vishay-Dale	CRCW04022K87FKED Series= CRCW..e3	Res= 2.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
23.	Ruvlot	Vishay-Dale	CRCW040264K9FKED Series= CRCW..e3	Res= 64.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
24.	T1	GCI Technologies	G044050	Lp= 1.5 mH Rp= 250.0 mOhm Leakage_L= 0.0 H Ns1toNp= 0.2 Rs1= 50.0 mOhms Ns2toNp= 0.2 Rs2= 50.0 mOhms	1	NA	GCI_G044050 0 mm ²
25.	U1	Texas Instruments	LM5020MM-1/NOPB	Switcher	1	\$0.80	mpds035b 35 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	319.886 mA	Current	Input capacitor RMS ripple current
2.	Cout1 IRMS	1.002 A	Current	Output capacitor1 RMS ripple current
3.	IC Ipk	669.64 mA	Current	Peak switch current
4.	Iin Avg	255.76 mA	Current	Average input current
5.	L Ipp	27.771 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	25	General	Total Design BOM count
7.	FootPrint	443.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	325.0 kHz	General	Switching frequency
9.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
10.	Pout	6.55 W	General	Total output power
11.	Total BOM	\$0.0	General	Total BOM Cost
12.	Low Freq Gain	59.034 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	3.275 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Cross Freq	1.351 kHz	Op_point	Bode plot crossover frequency
15.	Duty Cycle	39.002 %	Op_point	Duty cycle
16.	Efficiency	80.03 %	Op_point	Steady state efficiency
17.	Gain Marg	-8.18 dB	Op_point	Bode Plot Gain Margin
18.	IC Tj	54.966 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.	Phase Marg	50.567 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	32.0 V	Op_point	Vin operating point
23.	Vout1 OP	3.275 V	Op_point	Operational Voltage 1
24.	Vout1 p-p	5.36 mV	Op_point	Peak-to-peak output1 ripple voltage
25.	Cin Pd	400.916 μ W	Power	Input capacitor power dissipation
26.	Cout1 Pd	1.722 mW	Power	Output capacitor1 power dissipation
27.	Cout1 Pd	1.722 mW	Power	Output capacitor1 power dissipation
28.	Diode1 Pd	0.0 W	Power	Diode1 power dissipation
29.	IC Pd	124.832 mW	Power	IC power dissipation
30.	Total Pd	1.634 W	Power	Total Power Dissipation
31.	Xformer Pd	630.054 mW	Power	Transformer power dissipation
32.	Zener Pd	0.0 W	Power	Zener power dissipation
33.	Vout Tolerance	3.274 %		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.	Iout1	2.0	Output Current #1
3.	Iout2	3.0	Output Current #2
4.	Iout3	2.0	Output Current #3
5.	VinMax	34.0	Maximum input voltage
6.	VinMin	32.0	Minimum input voltage
7.	Vout	3.3	Output Voltage
8.	Vout1	3.3	Output Voltage #1
9.	Vout2	5.0	Output Voltage #2
10.	Vout3	5.0	Output Voltage #3
11.	base_pn	LM5020-1	Texas Instruments Base Part Number
12.	source	DC	Input Source Type
13.	ta	30.0	Ambient temperature

Design Assistance

1. LM5020-1 Product Folder : <http://www.ti.com/product/LM5020-1> : contains the data sheet and other resources.

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