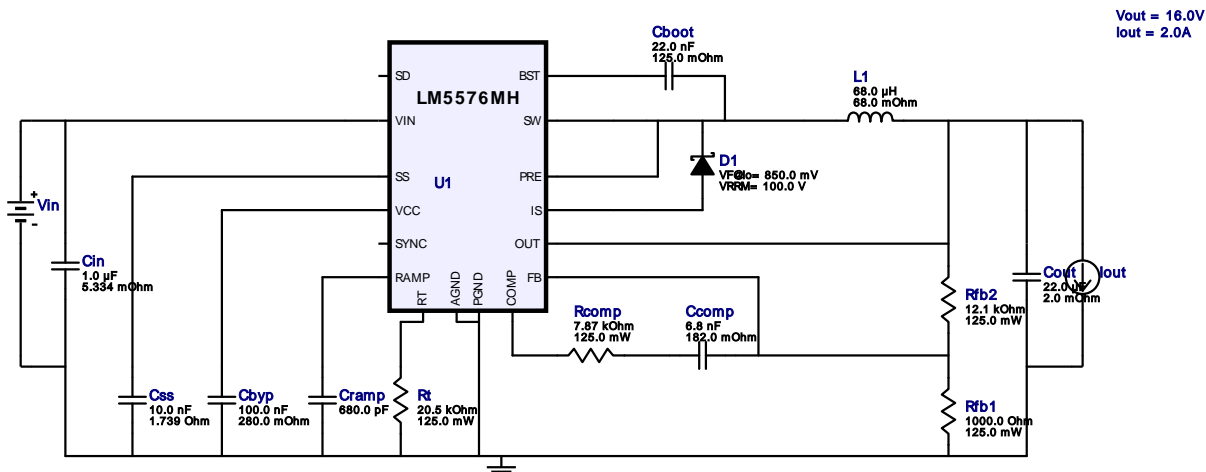



## WEBENCH® Design Report

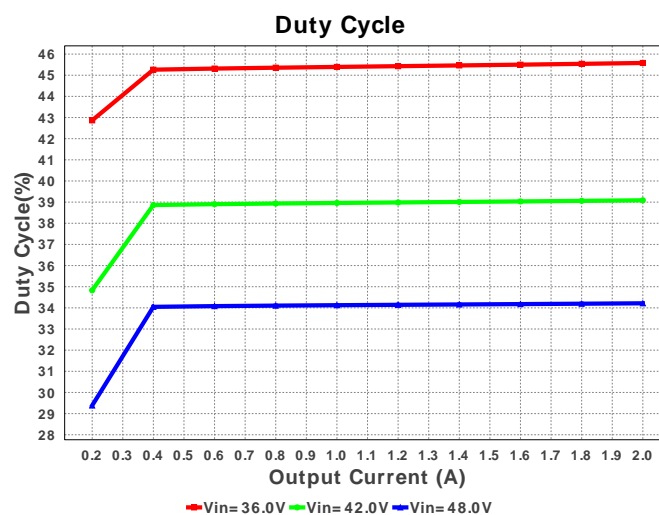
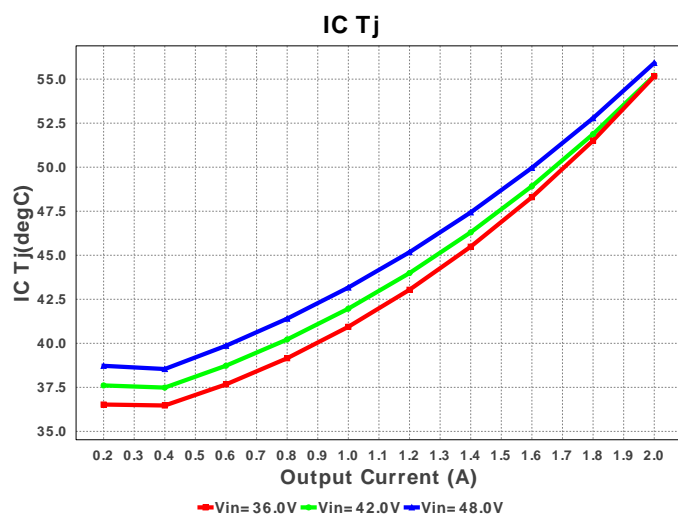
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LM5576MHX/NOPB 36.0V-48.0V to 16.00V @ 2.0A

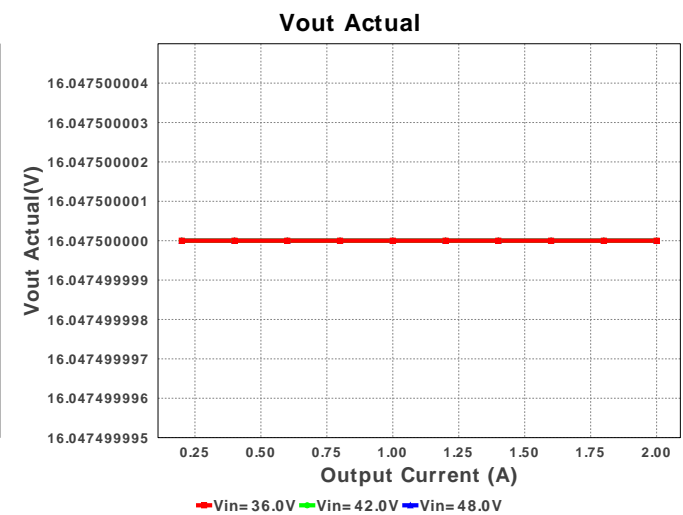
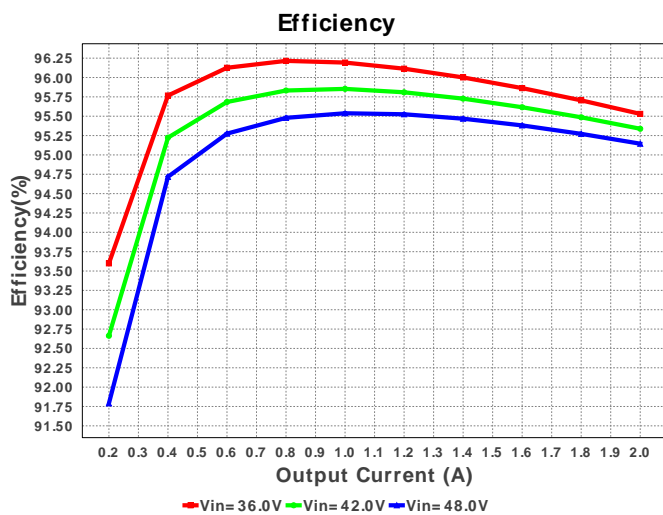
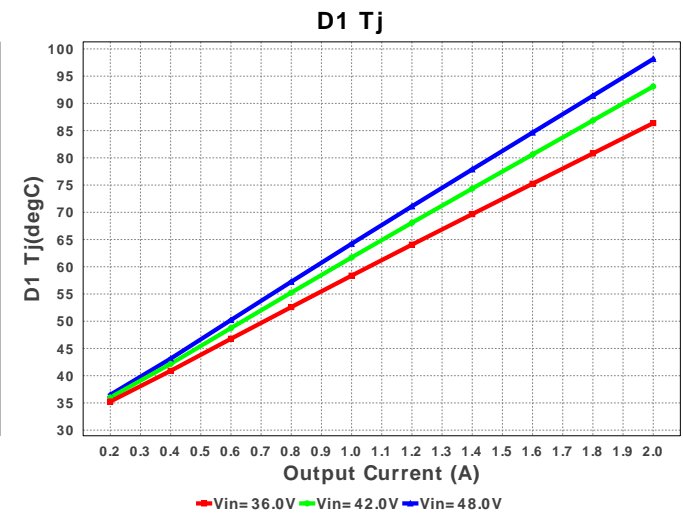
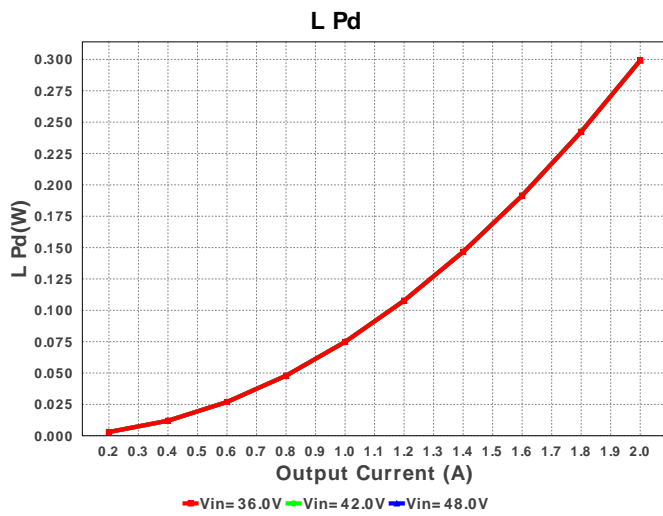
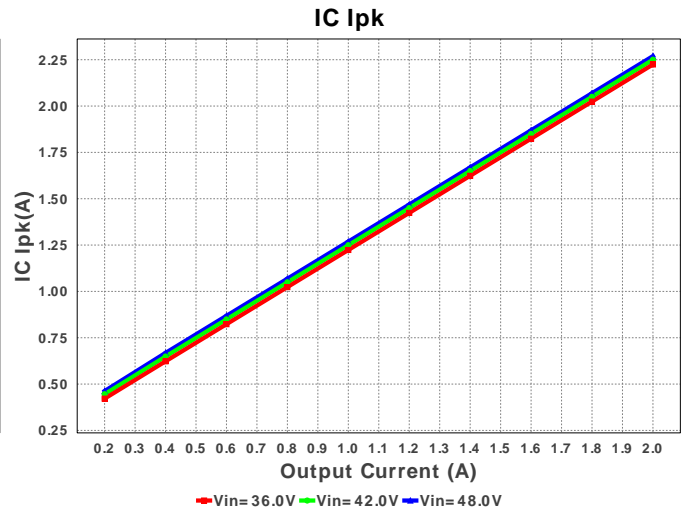
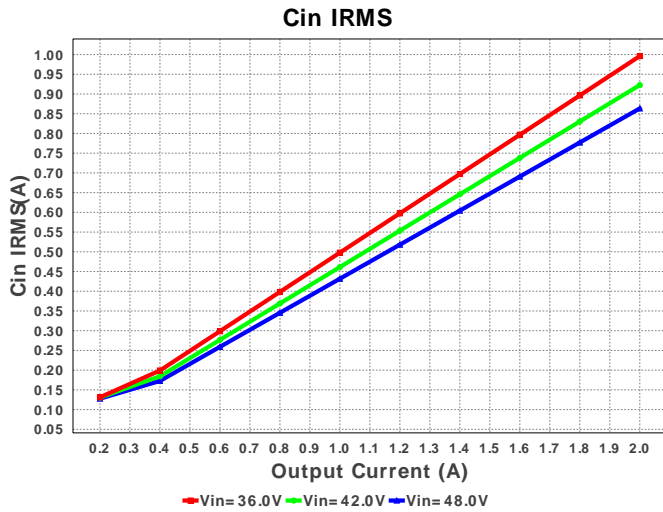


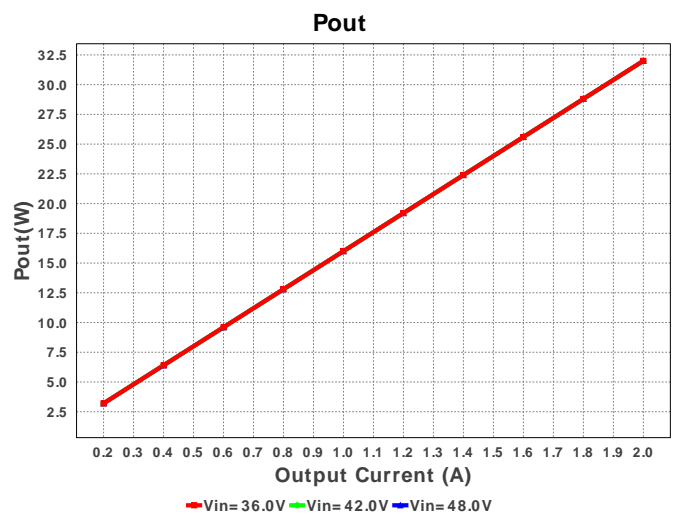
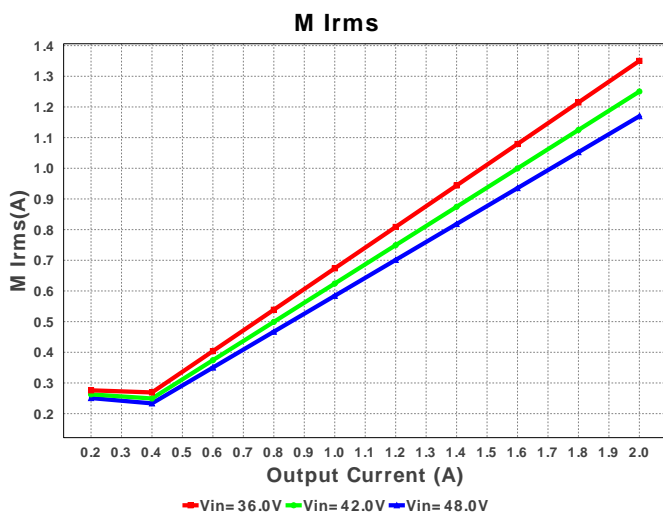
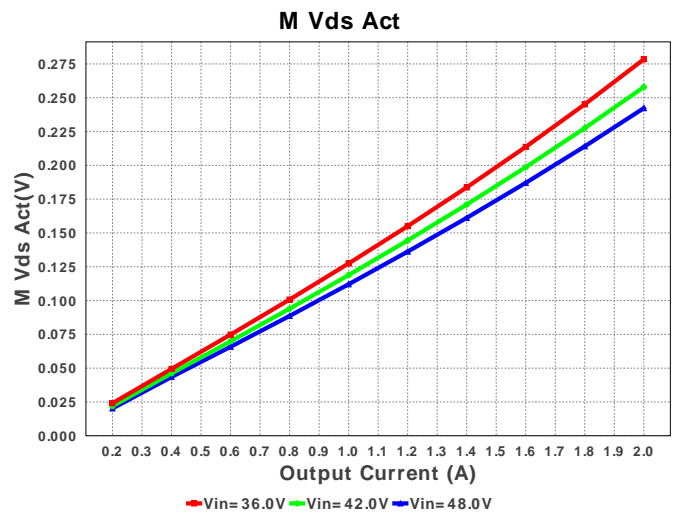
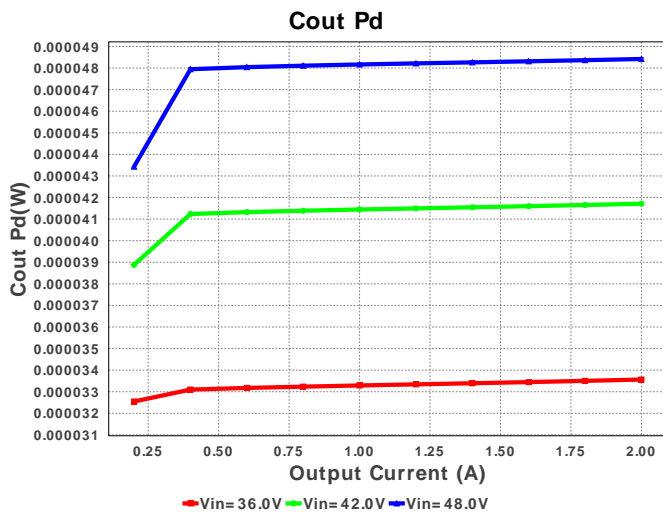
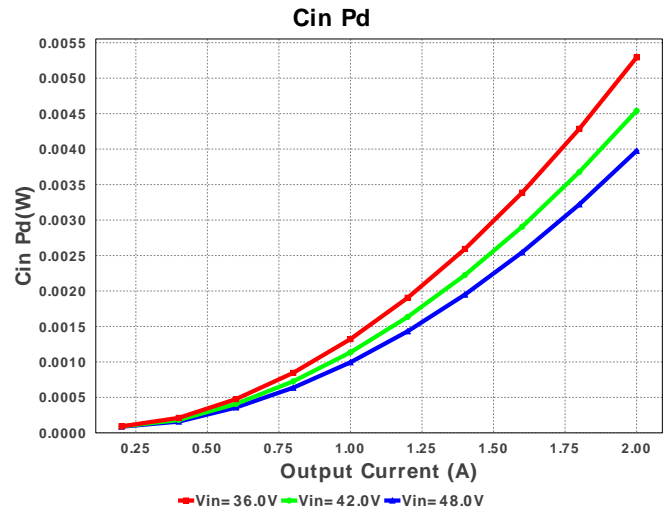
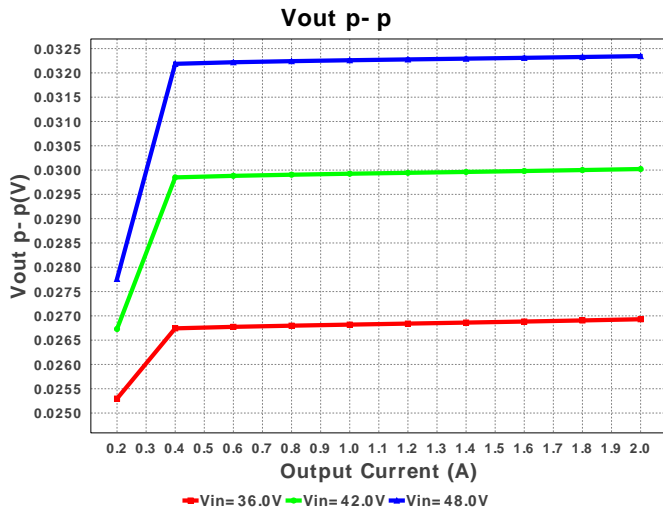
## Electrical BOM

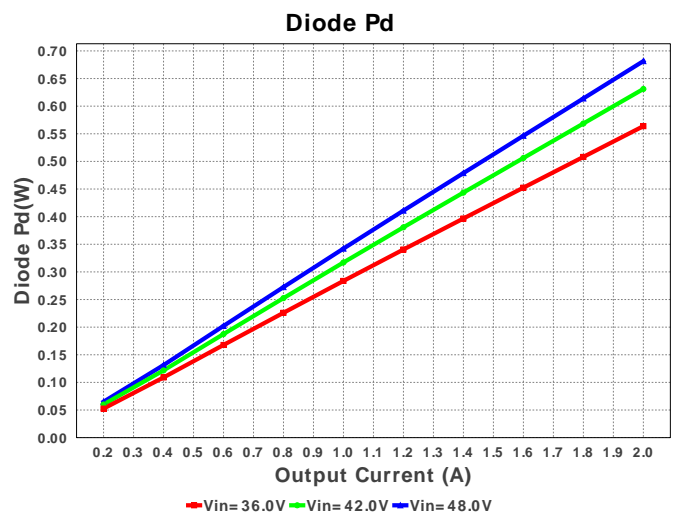
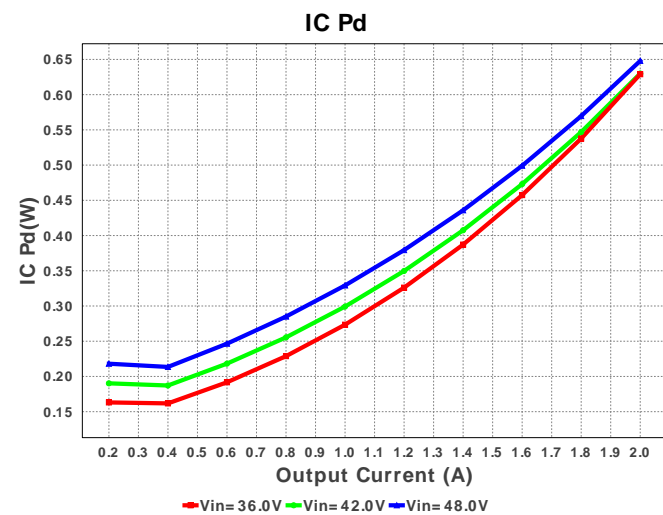
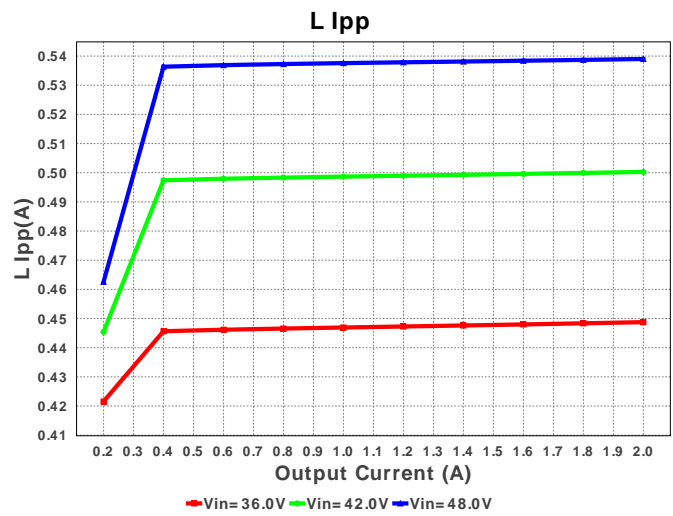
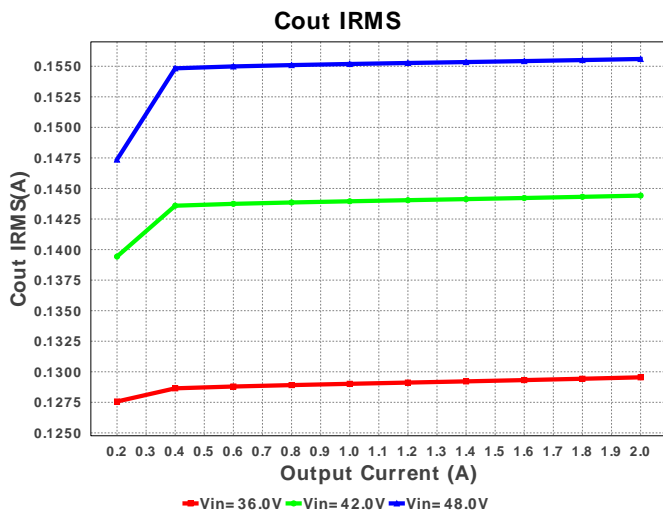
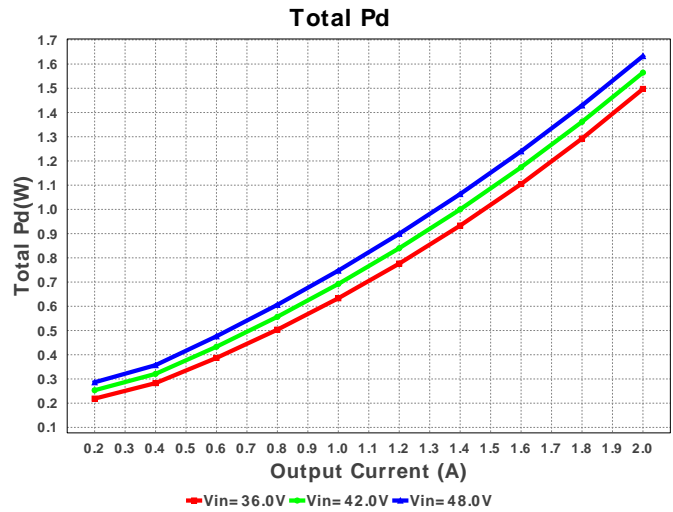
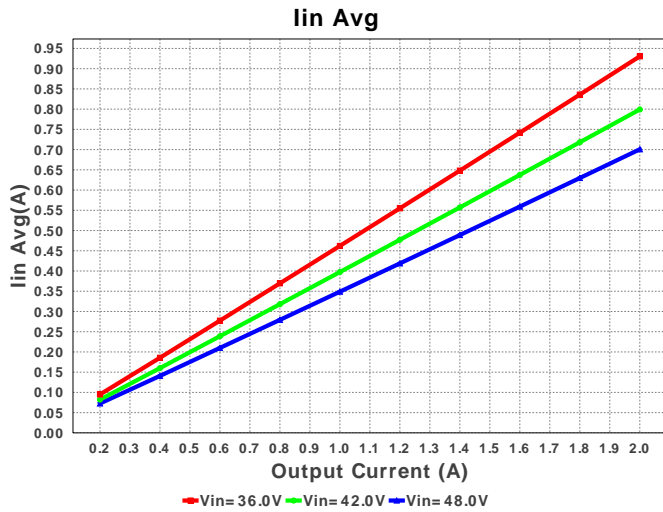
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C223K5RACTU Series= X7R	Cap= 22.0 nF ESR= 125.0 mOhm VDC= 50.0 V IRMS= 645.0 mA	1	\$0.01	0805 7 mm <sup>2</sup>
2.	Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
3.	Ccomp	Kemet	C0805C682K5RACTU Series= X7R	Cap= 6.8 nF ESR= 182.0 mOhm VDC= 50.0 V IRMS= 336.0 mA	1	\$0.01	0805 7 mm <sup>2</sup>
4.	Cin	MuRata	GRM31CR72A105KA01L Series= X7R	Cap= 1.0 uF ESR= 5.334 mOhm VDC= 100.0 V IRMS= 1.55432 A	1	\$0.11	1206_190 11 mm <sup>2</sup>
5.	Cout	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	\$0.16	1210 15 mm <sup>2</sup>
6.	Cramp	Yageo America	CC0805KRX7R9BB681 Series= X7R	Cap= 680.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
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 <sup>2</sup>
8.	D1	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	\$0.10	SMA 37 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	L1	Coilcraft	MSS1210-683MEB	L= 68.0 $\mu$ H DCR= 68.0 mOhm	1	\$0.81	 MSS1210 204 mm <sup>2</sup>
10.	Rcomp	Panasonic	ERJ-6ENF7871V Series= ERJ-6E	Res= 7.87 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
11.	Rfb1	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
12.	Rfb2	Panasonic	ERJ-6ENF1212V Series= ERJ-6E	Res= 12.1 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
13.	Rt	Panasonic	ERJ-6ENF2052V Series= ERJ-6E	Res= 20.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
14.	U1	Texas Instruments	LM5576MHX/NOPB	Switcher	1	\$2.60	 MXA20A 71 mm <sup>2</sup>









## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	863.386 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	155.597 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.268 A	Current	Peak switch current in IC
4.	Iin Avg	700.68 mA	Current	Average input current
5.	L Ipp	539.0 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.17 A	Current	Q lavg
7.	BOM Count	14	General	Total Design BOM count
8.	FootPrint	400.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
9.	Frequency	298.73 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	242.285 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	32.0 W	General	Total output power
13.	Total BOM	\$3.87	General	Total BOM Cost
14.	D1 Tj	98.153 degC	Op_Point	D1 junction temperature
15.	Vout Actual	16.048 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	16.0 V	Op_Point	Operational Output Voltage
17.	Duty Cycle	34.216 %	Op_point	Duty cycle
18.	Efficiency	95.145 %	Op_point	Steady state efficiency
19.	IC Tj	55.918 degC	Op_point	IC junction temperature
20.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	2.0 A	Op_point	Iout operating point
22.	VIN_OP	48.0 V	Op_point	Vin operating point
23.	Vout p-p	32.346 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	3.976 mW	Power	Input capacitor power dissipation
25.	Cout Pd	48.421 µW	Power	Output capacitor power dissipation
26.	Diode Pd	681.532 mW	Power	Diode power dissipation
27.	IC Pd	647.948 mW	Power	IC power dissipation
28.	L Pd	299.2 mW	Power	Inductor power dissipation
29.	Total Pd	1.633 W	Power	Total Power Dissipation
30.	Vout Tolerance	3.363 %		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	48.0	Maximum input voltage
3.	VinMin	36.0	Minimum input voltage
4.	Vout	16.0	Output Voltage
5.	base_pn	LM5576	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

## Design Assistance

1. **LM5576** Product Folder : <http://www.ti.com/product/LM5576> : contains the data sheet and other resources.

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