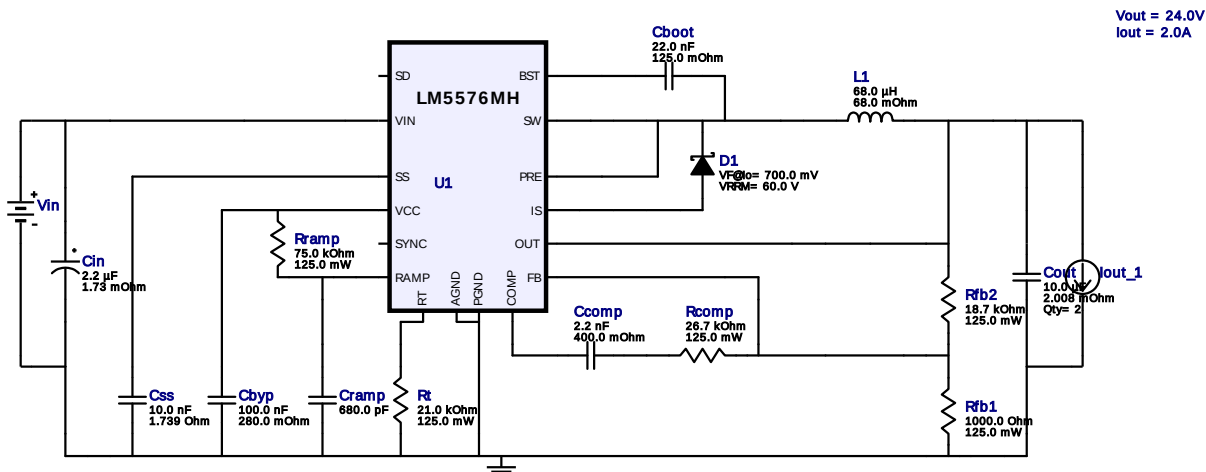


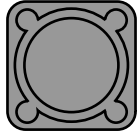
WEBENCH® Design Report

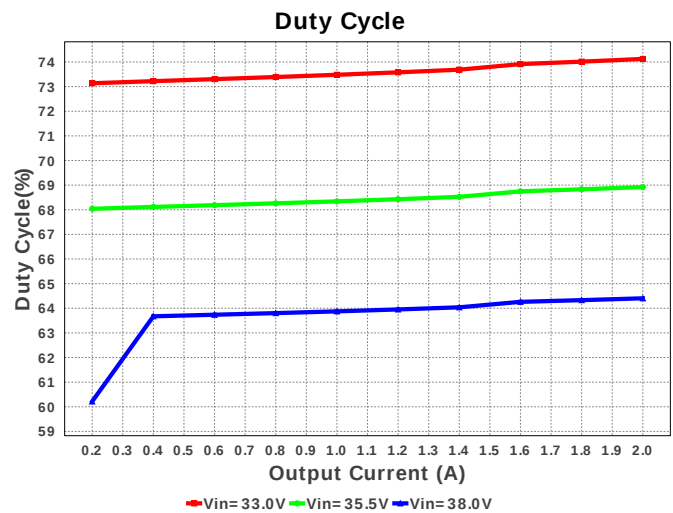
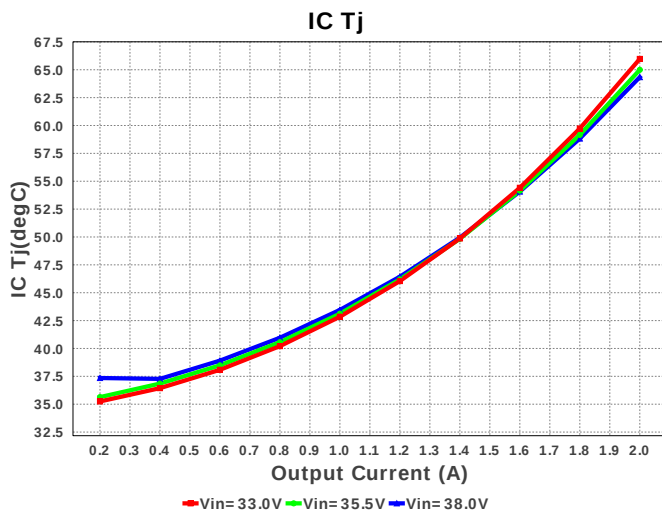
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LM5576MHX/NOPB 33.0V-38.0V to 24.00V @ 2.0A

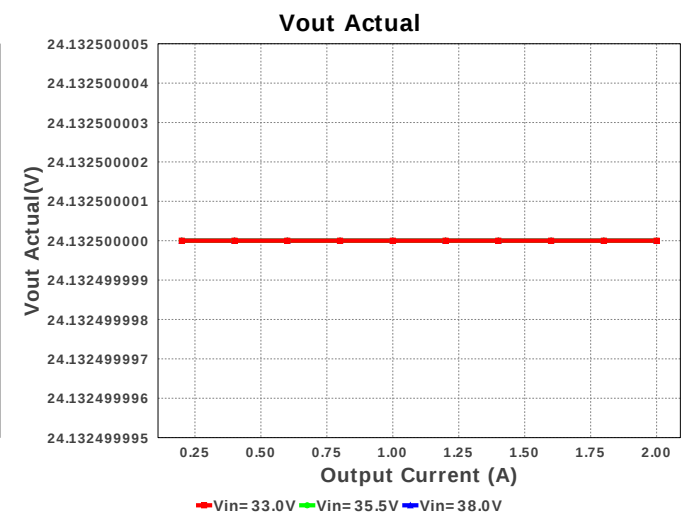
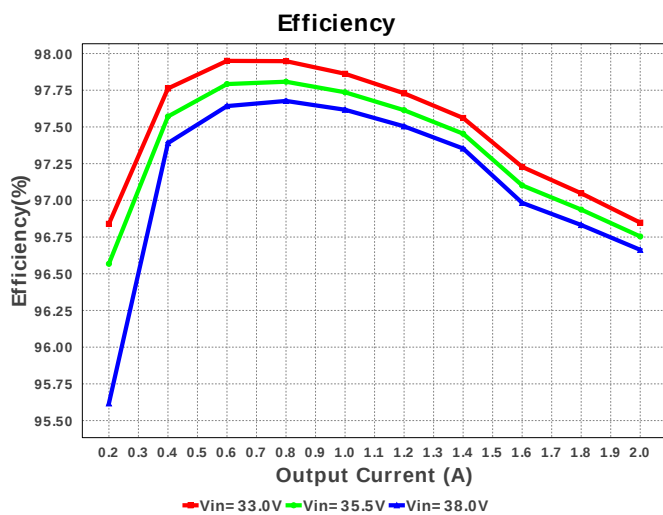
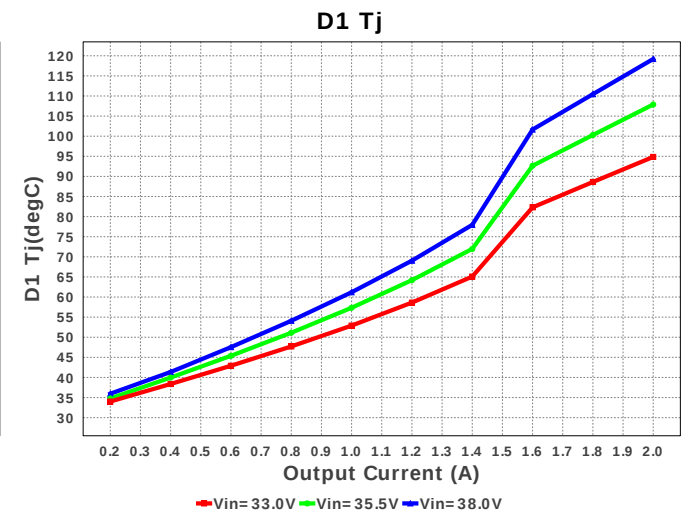
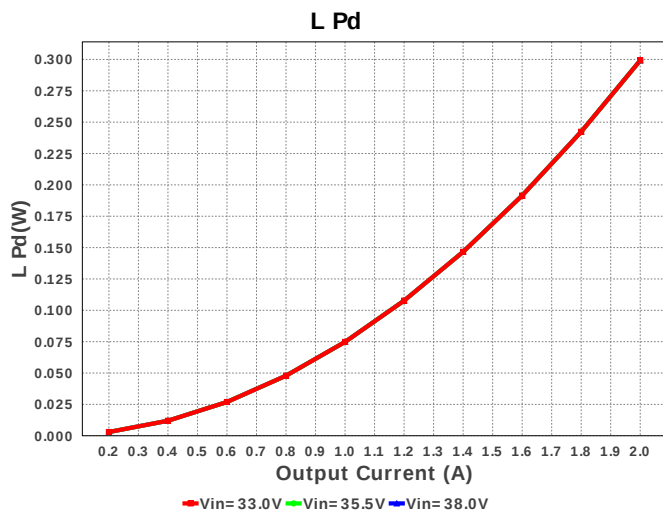
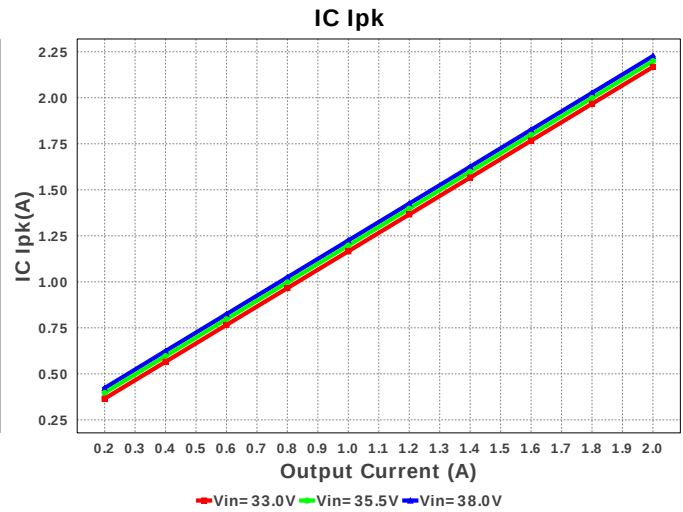
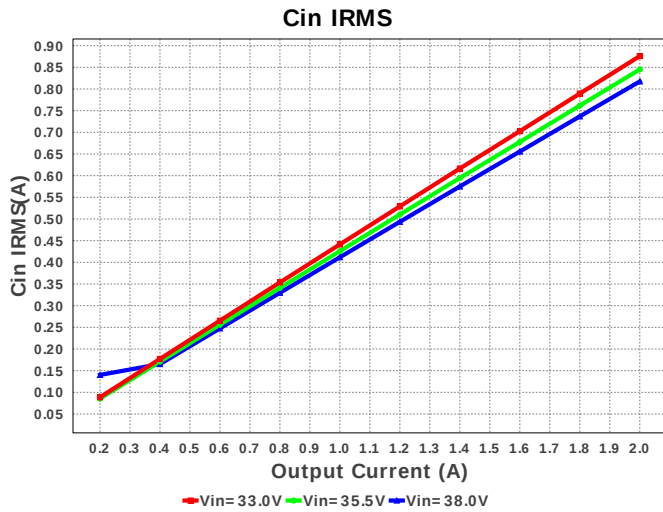


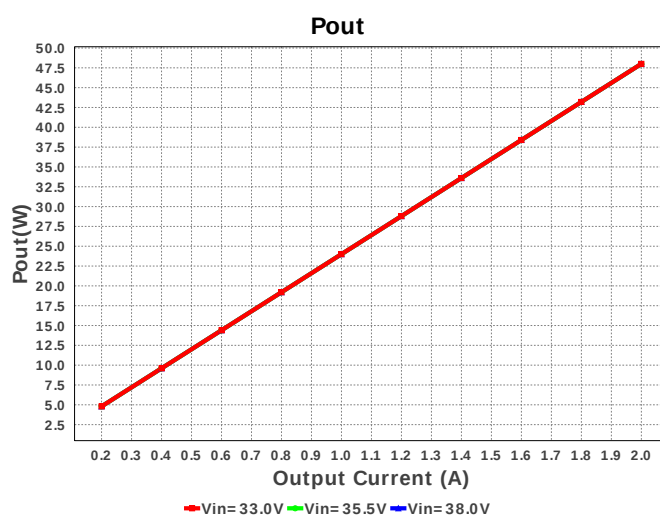
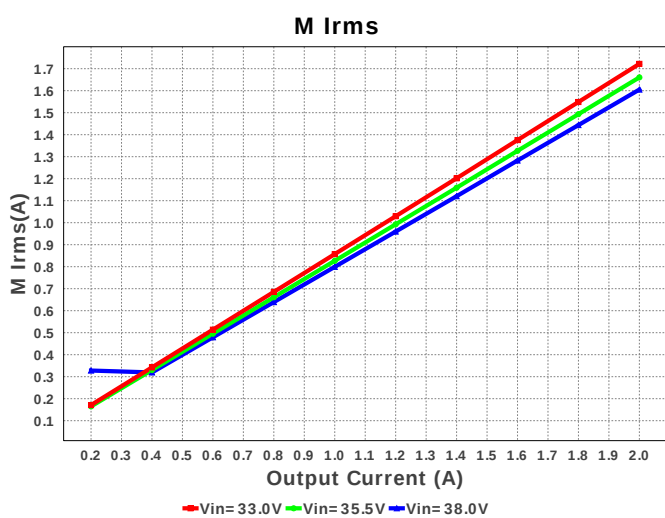
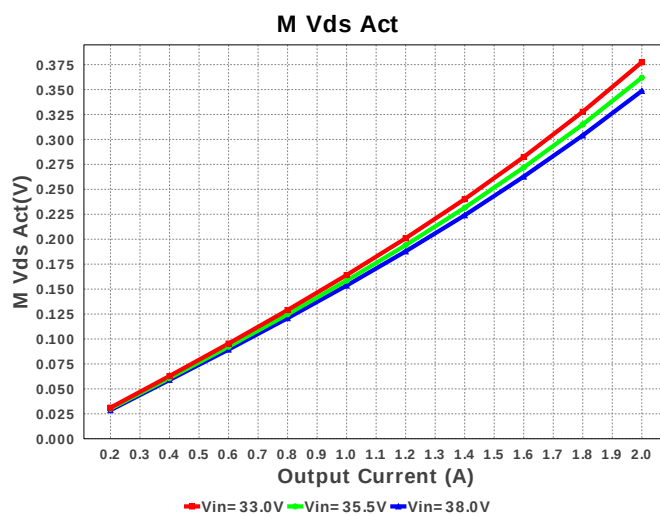
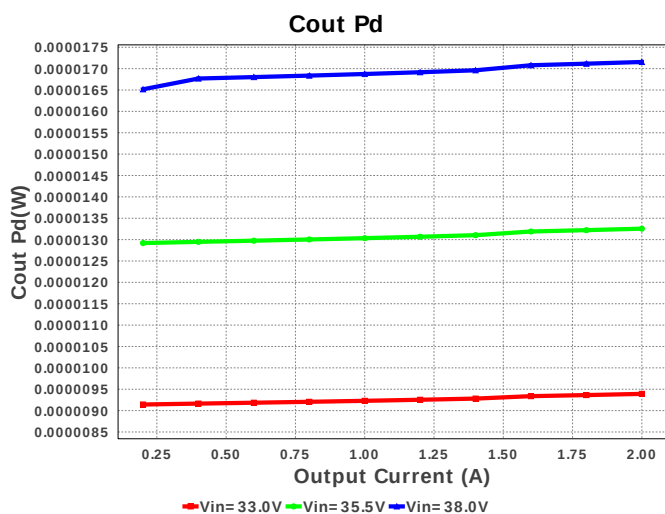
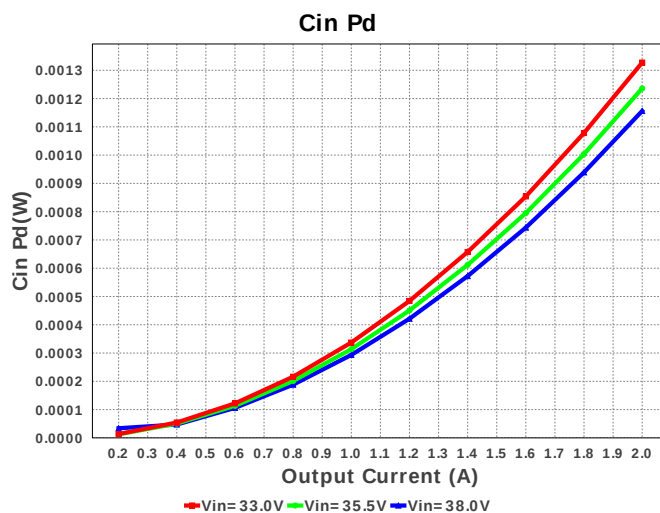
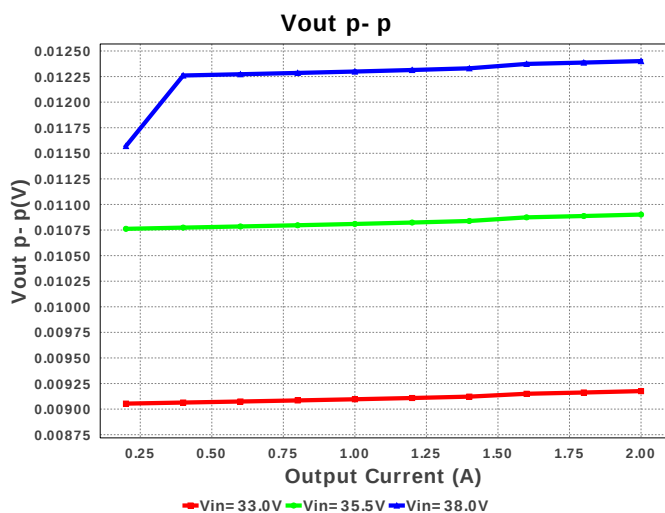
Electrical BOM

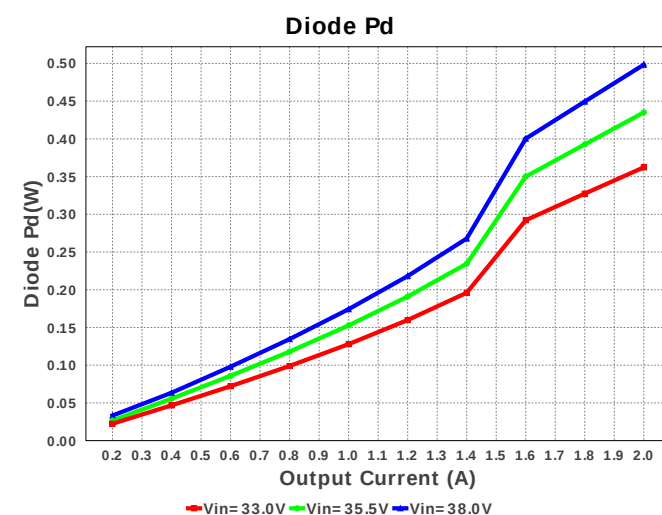
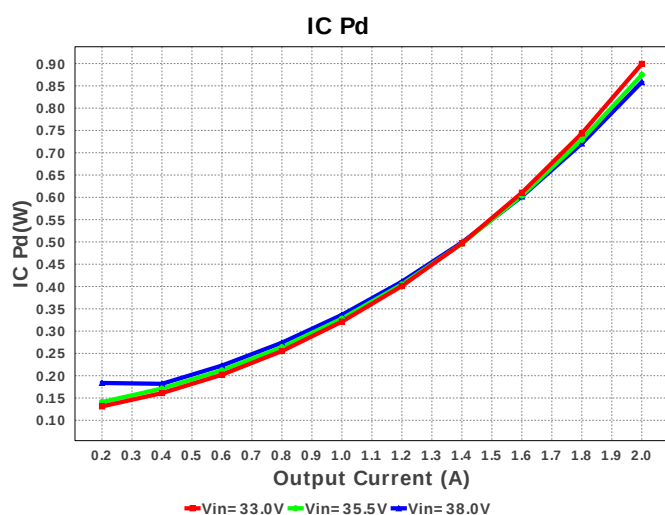
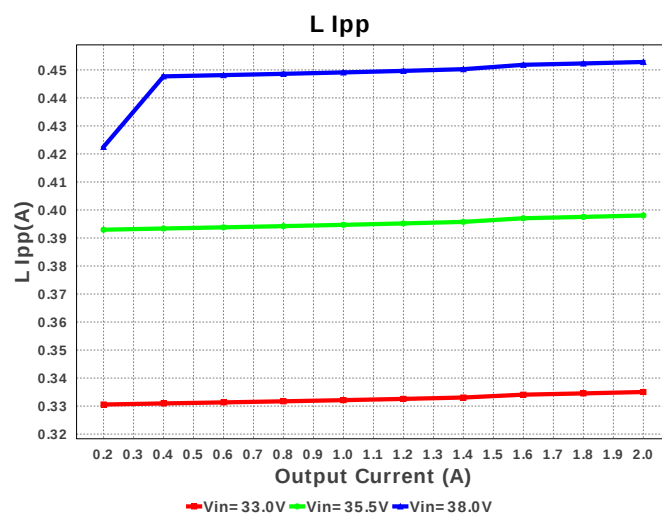
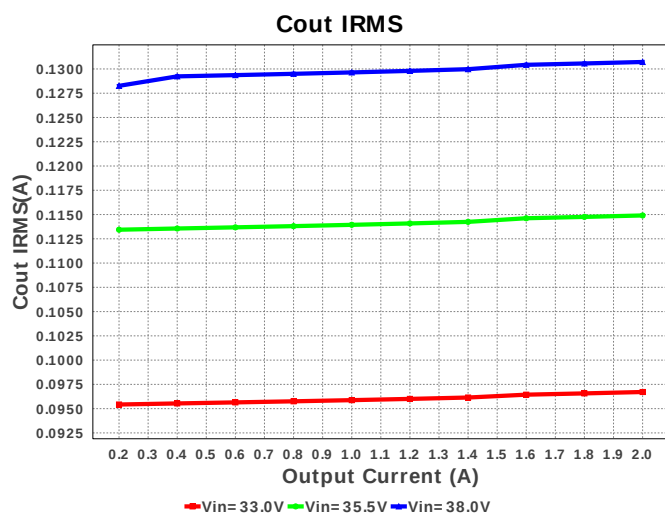
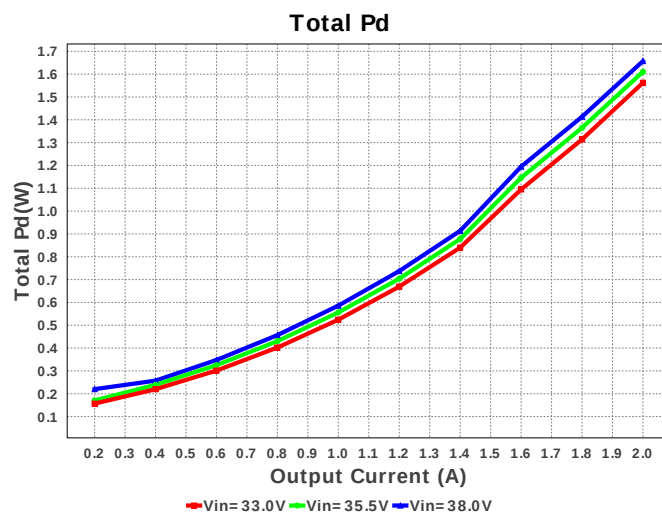
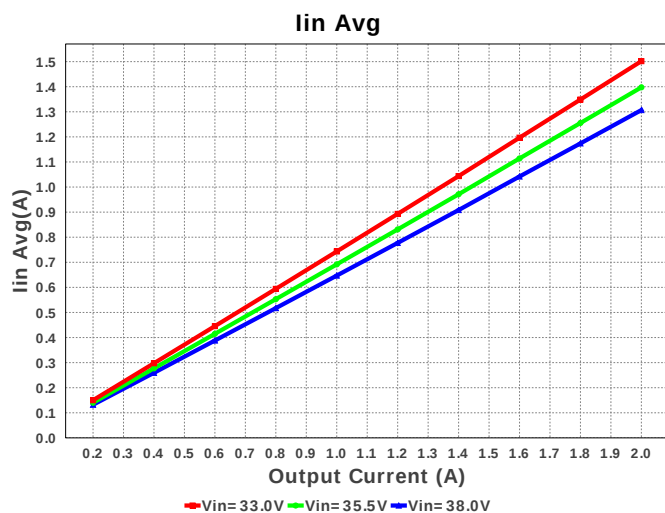
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C223K5RACTU Series= X7R	Cap= 22.0 nF ESR= 125.0 mOhm VDC= 50.0 V IRMS= 645.0 mA	1	\$0.01	0805 7 mm ²
2.	Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp	Kemet	C0805C222K5RACTU Series= X7R	Cap= 2.2 nF ESR= 400.0 mOhm VDC= 50.0 V IRMS= 251.0 mA	1	\$0.01	0805 7 mm ²
4.	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
5.	Cout	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	2	\$0.22	1210_280 15 mm ²
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 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.	D1	Diodes Inc.	B160-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.05	SMA 37 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	L1	Coilcraft	MSS1210-683MEB	L= 68.0 μ H DCR= 68.0 mOhm	1	\$0.81	 MSS1210 204 mm ²
10.	Rcomp	Panasonic	ERJ-6ENF2672V Series= ERJ-6E	Res= 26.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
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 ²
12.	Rfb2	Panasonic	ERJ-6ENF1872V Series= ERJ-6E	Res= 18.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
13.	Rramp	Panasonic	ERJ-6ENF7502V Series= ERJ-6E	Res= 75.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
14.	Rt	Panasonic	ERJ-6ENF2102V Series= ERJ-6E	Res= 21.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
15.	U1	Texas Instruments	LM5576MHX/NOPB	Switcher	1	\$2.60	 MXA20A 71 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	817.474 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	130.718 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.227 A	Current	Peak switch current in IC
4.	Iin Avg	1.307 A	Current	Average input current
5.	L Ipp	452.82 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.605 A	Current	Q lavg
7.	BOM Count	16	General	Total Design BOM count
8.	FootPrint	425.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	292.826 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	348.621 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Mode	CCM	General	Conduction Mode
13.	Pout	48.0 W	General	Total output power
14.	Total BOM	\$4.19	General	Total BOM Cost
15.	D1 Tj	119.202 degC	Op_Point	D1 junction temperature
16.	Vout Actual	24.132 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	24.0 V	Op_Point	Operational Output Voltage
18.	Duty Cycle	64.404 %	Op_point	Duty cycle
19.	Efficiency	96.663 %	Op_point	Steady state efficiency
20.	IC Tj	64.337 degC	Op_point	IC junction temperature
21.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	VIN_OP	38.0 V	Op_point	Vin operating point
24.	Vout p-p	12.401 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	1.156 mW	Power	Input capacitor power dissipation
26.	Cout Pd	17.156 μ W	Power	Output capacitor power dissipation
27.	Diode Pd	498.338 mW	Power	Diode power dissipation
28.	IC Pd	858.427 mW	Power	IC power dissipation
29.	L Pd	299.2 mW	Power	Inductor power dissipation
30.	Total Pd	1.657 W	Power	Total Power Dissipation
31.	Vout Tolerance	3.415 %		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	33.0	Minimum input voltage
4.	Vout	24.0	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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