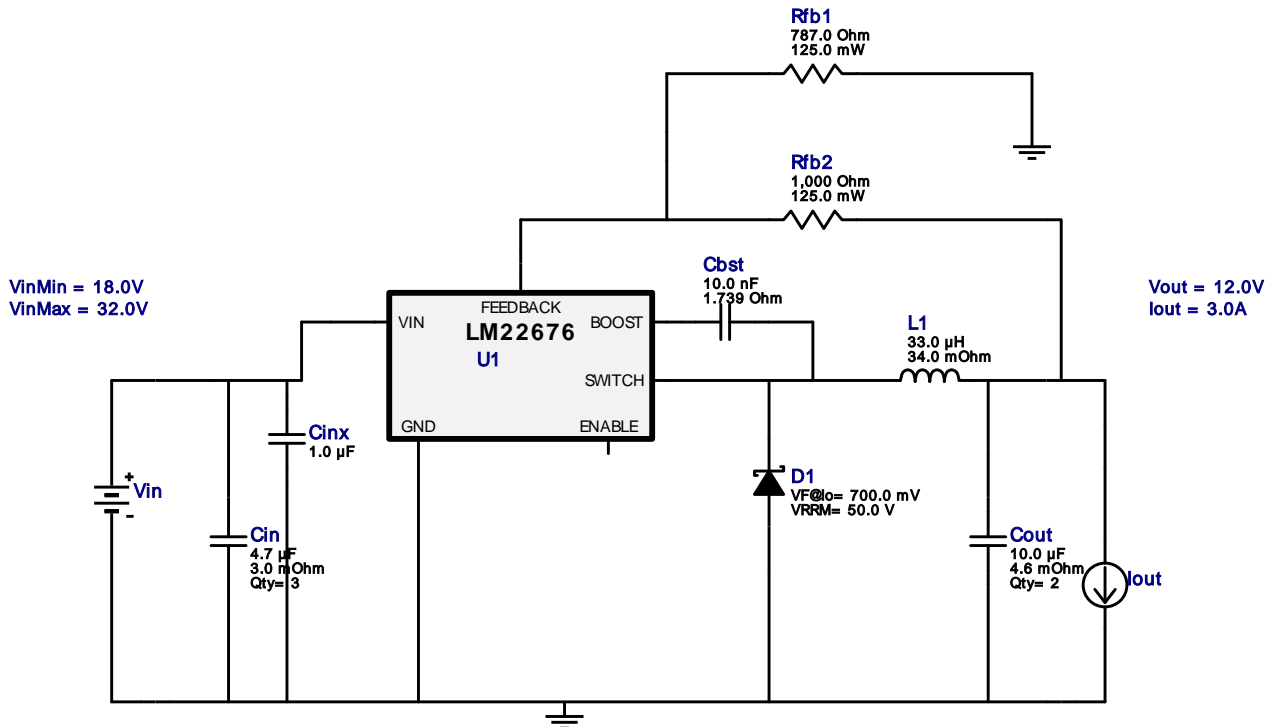





WEBENCH® Design Report

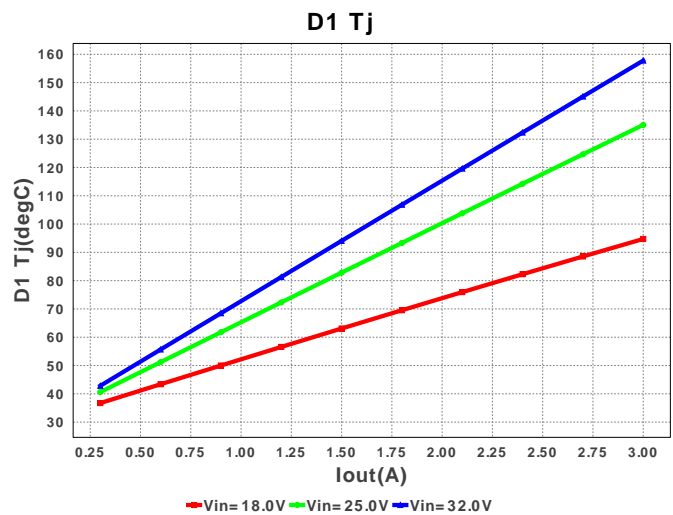
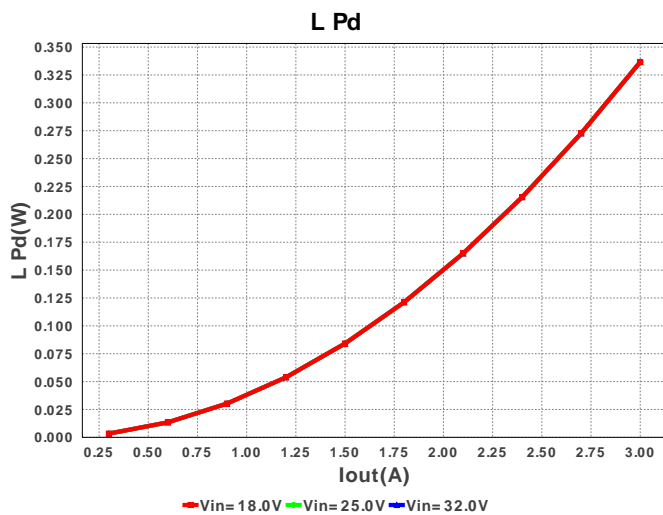
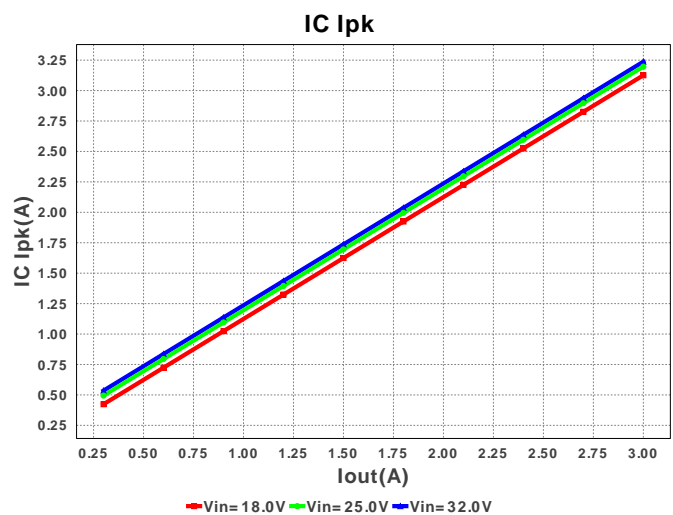
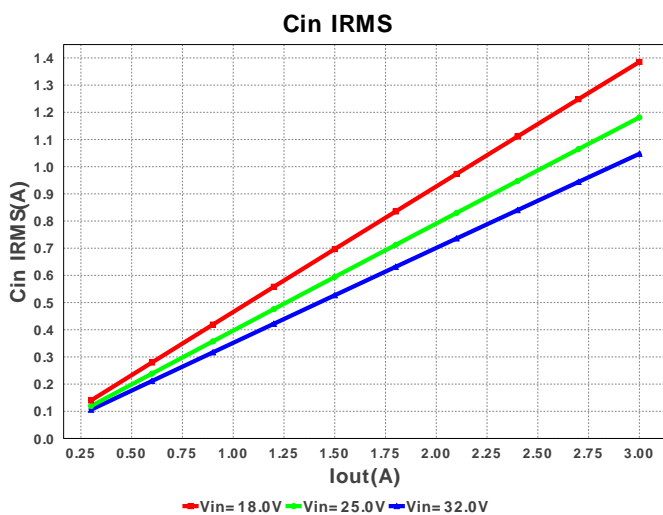
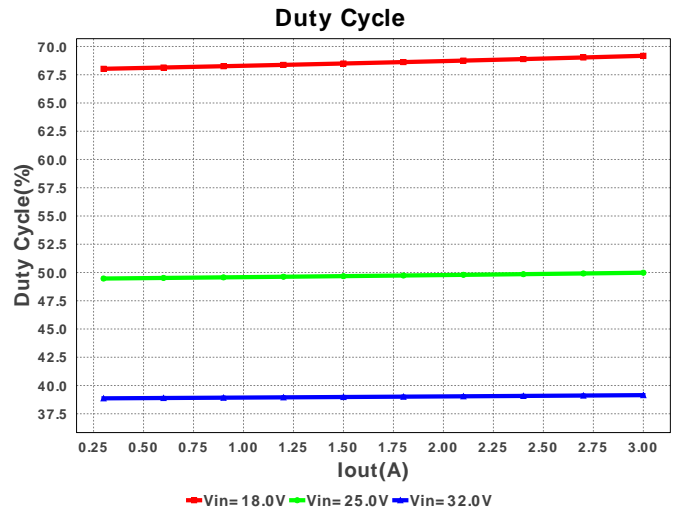
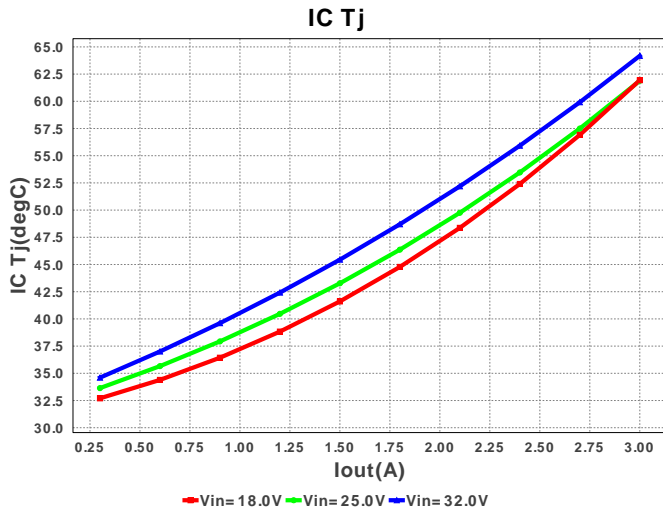
Design : 1382630/540 LM22676TJ-5.0/NOPB
LM22676TJ-5.0/NOPB 18.0V-32.0V to 12.0V @ 3.0A

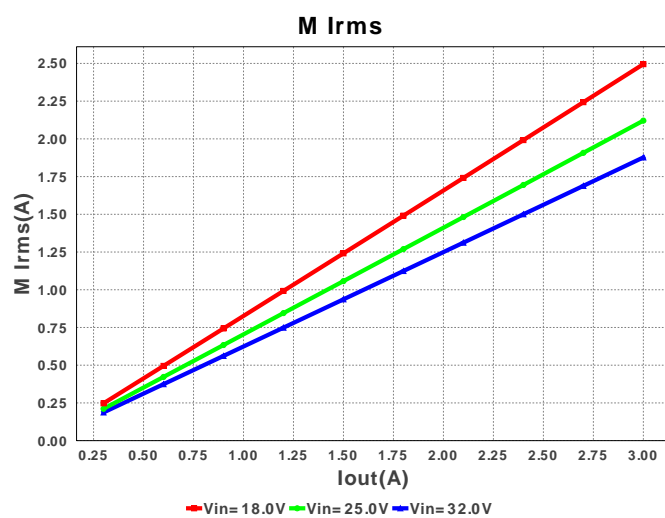
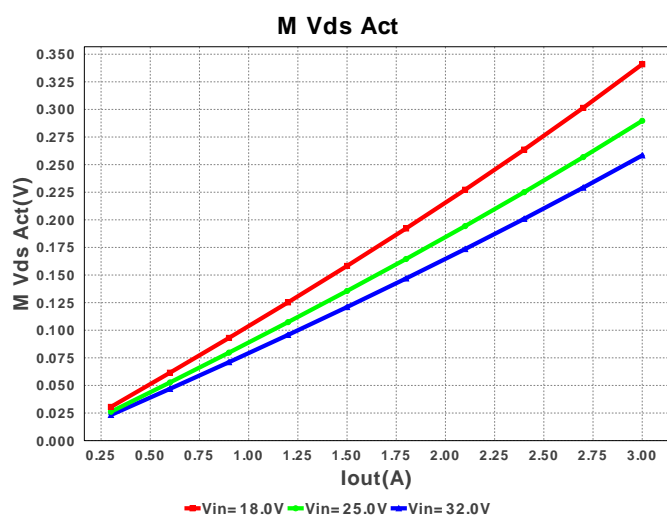
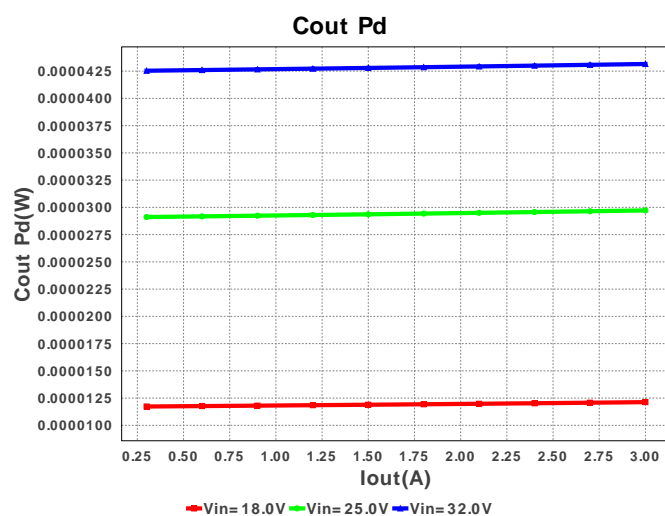
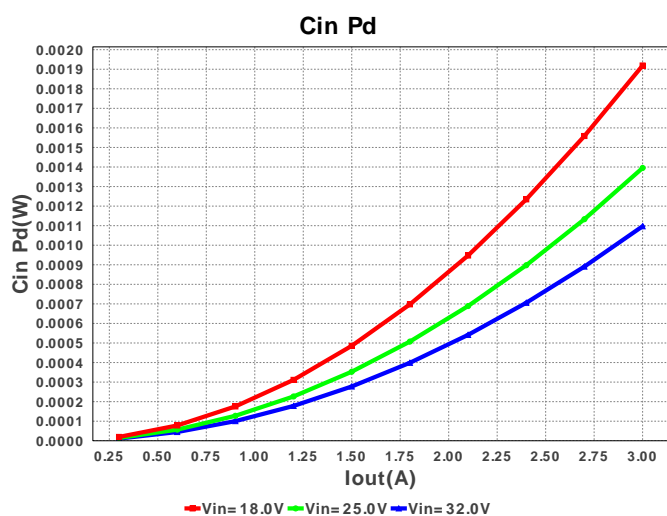
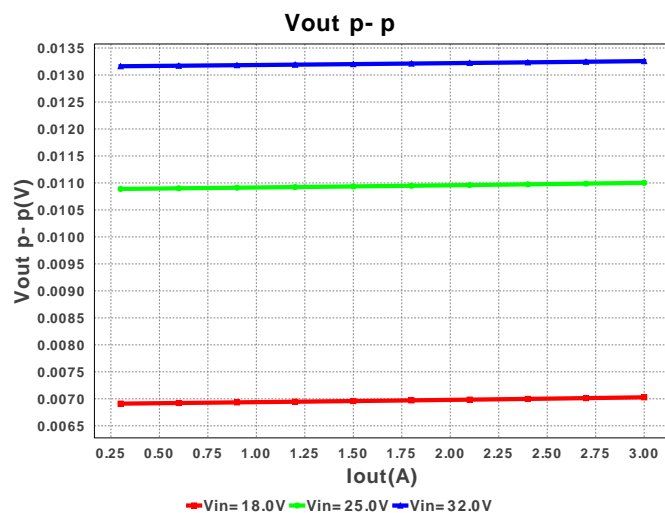
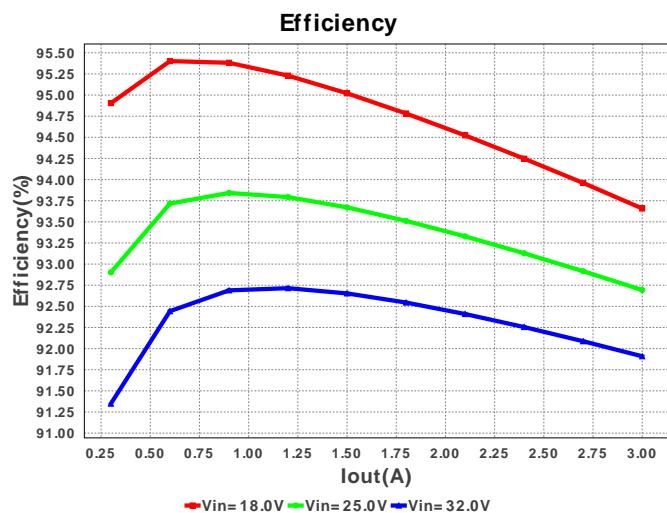


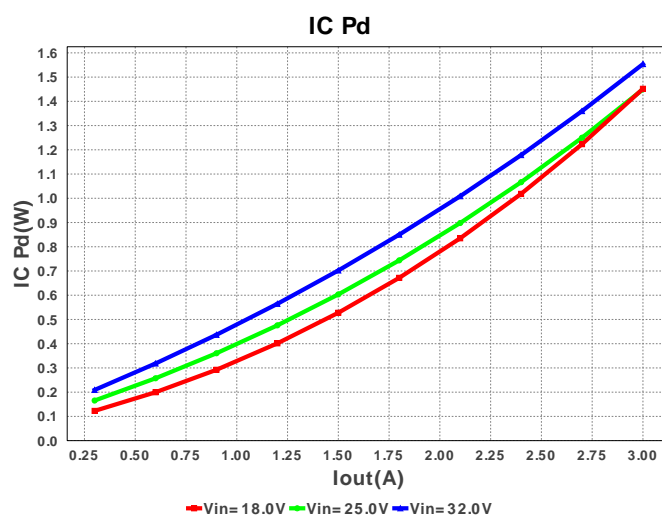
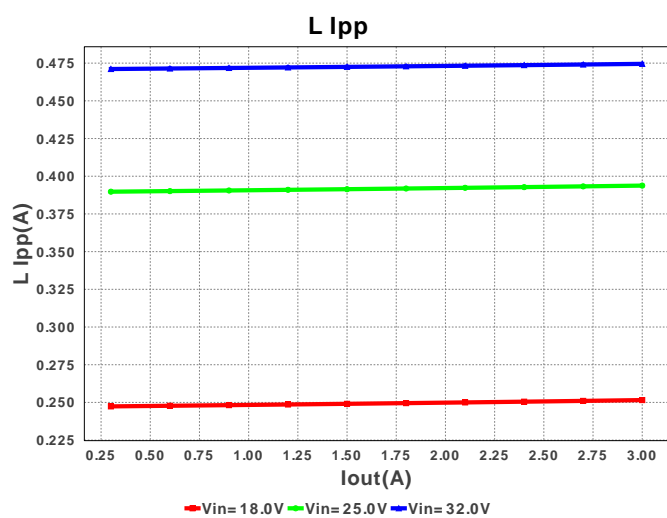
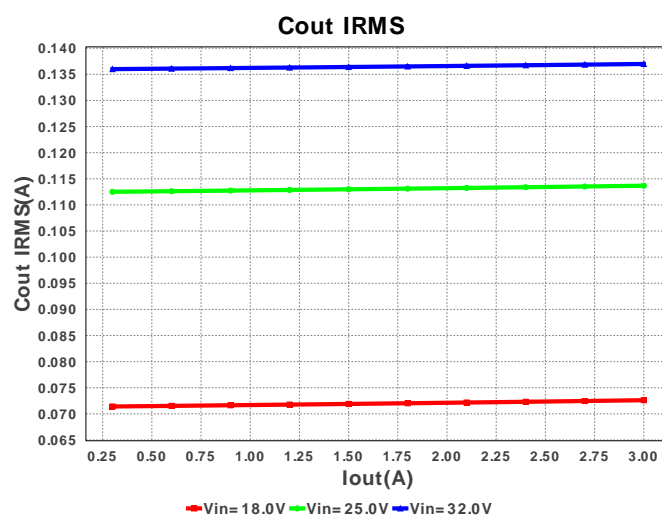
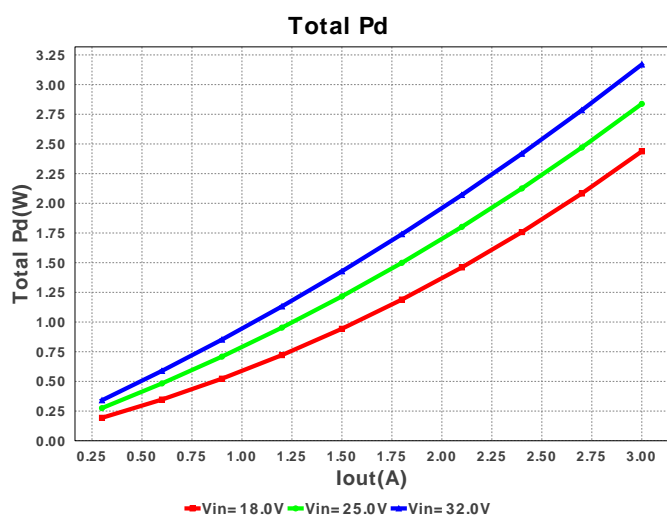
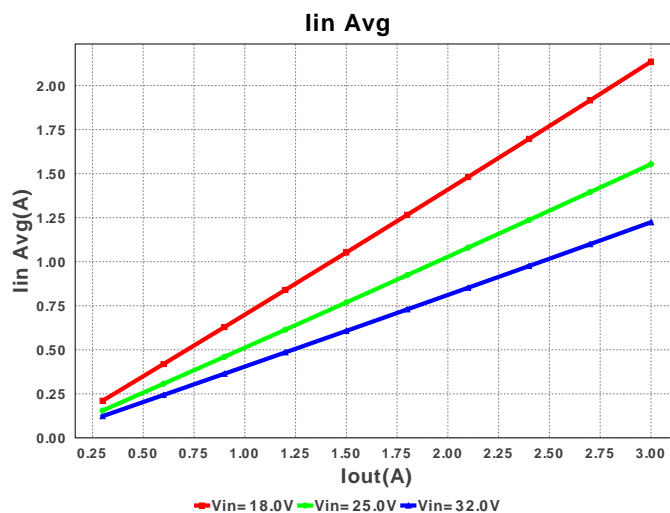
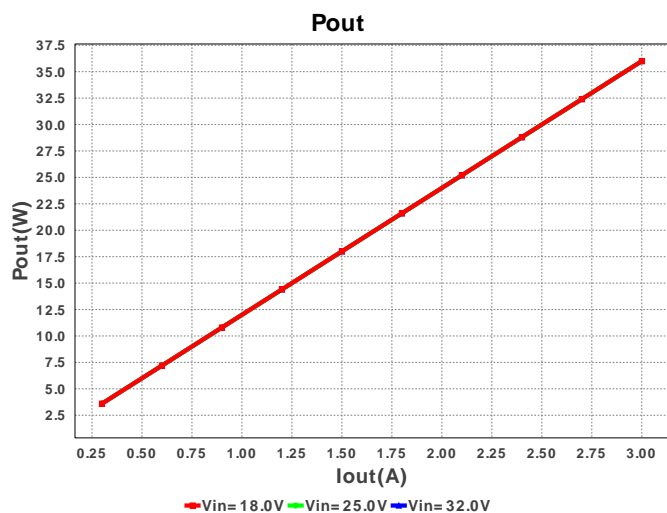
Electrical BOM

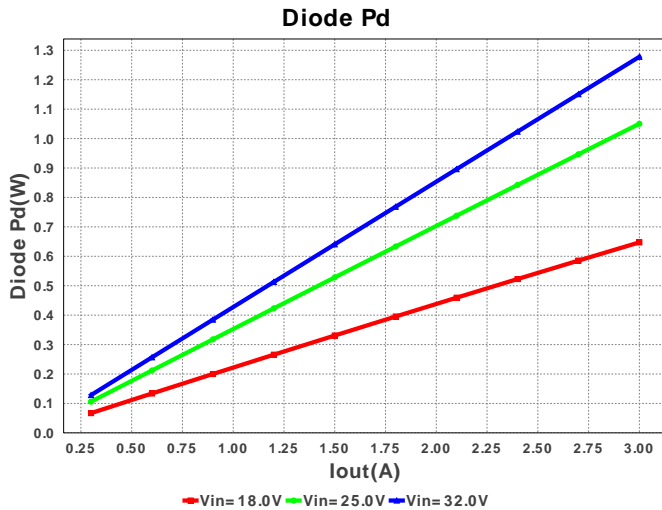
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	 0805 7mm2
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	3	\$0.10	 1206 11mm2
3.	Cinx	MuRata	GRM21BR71H105KA12L Series= X7R	Cap= 1.0 µF VDC= 50.0 V IRMS= 0.0 A	1	\$0.10	 0805 7mm2
4.	Cout	TDK	C3216X5R1C106M Series= X5R	Cap= 10.0 µF ESR= 4.6 mOhm VDC= 16.0 V IRMS= 2.7 A	2	\$0.06	 1206 11mm2
5.	D1	Diodes Inc.	B350A-13-F	VF@Io= 700.0 mV VRRM= 50.0 V	1	\$0.14	 SMA 37mm2
6.	L1	Coilcraft	MSS1210-333MEB	L= 33.0 µH DCR= 34.0 mOhm	1	\$0.81	 MSS1210 204mm2
7.	Rfb1	Vishay-Dale	CRCW0805787RFKEA Series= CRCW..e3	Res= 787.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7mm2

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Rfb2	Panasonic	ERJ-6ENF1001V Series= 225	Res= 1,000 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7mm2
9.	U1	Texas Instruments	LM22676TJ-5.0/NOPB	Switcher	1	\$1.80	 TJ7A 199mm2









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.047 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	136.98 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	3.237 A	Current	Peak switch current in IC
4.	Iin Avg	1.224 A	Current	Average input current
5.	L Ipp	474.511 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.877 A	Current	Q lavg
7.	BOM Count	12	General	Total Design BOM count
8.	FootPrint	522.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	500.0 kHz	General	Switching frequency
10.	IC Tolerance	75.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	258.339 mV	General	Voltage drop across the MosFET
12.	Pout	36.0 W	General	Total output power
13.	Total BOM	\$3.3	General	Total BOM Cost
14.	D1 Tj	157.791 degC	Op_Point	D1 junction temperature
15.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
16.	Cross Freq	57.432 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	39.147 %	Op_point	Duty cycle
18.	Efficiency	91.909 %	Op_point	Steady state efficiency
19.	IC Tj	64.182 degC	Op_point	IC junction temperature
20.	ICThetaJA	22.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	3.0 A	Op_point	Iout operating point
22.	Phase Marg	45.494 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	32.0 V	Op_point	Vin operating point
24.	Vout p-p	13.257 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	1.097 mW	Power	Input capacitor power dissipation
26.	Cout Pd	43.156 μW	Power	Output capacitor power dissipation
27.	Diode Pd	1.278 W	Power	Diode power dissipation
28.	IC Pd	1.554 W	Power	IC power dissipation
29.	L Pd	336.6 mW	Power	Inductor power dissipation
30.	Total Pd	3.169 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	3.0 A	Maximum Output Current
2.	Iout1	3.0 Amps	Output Current #1
3.	VinMax	32.0 V	Maximum input voltage
4.	VinMin	18.0 V	Minimum input voltage
5.	Vout	12.0 V	Output Voltage
6.	Vout1	12.0 Volt	Output Voltage #1
7.	base_pn	LM22676	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. Why WEBENCH recommends the 5.0 option for your 12.0V output: The internal compensation for the ADJ version of the LM22676 is optimized for output voltages below 5V. Therefore it is recommended that for outputs greater than 5V, the 5.0 option be used with an additional external resistive feedback divider. Part Description The LM22676 is a monolithic integrated circuit that provides all of the active functions for a step-down (buck) switching regulator capable of driving up to 3.0A loads with excellent line and load regulation characteristics. High efficiency (>90%) is obtained through the use of a low ON-resistance N-channel MOSFET.

2. **LM22676** Product Folder : <http://www.ti.com/product/lm22676> : contains the data sheet and other resources.

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You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

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