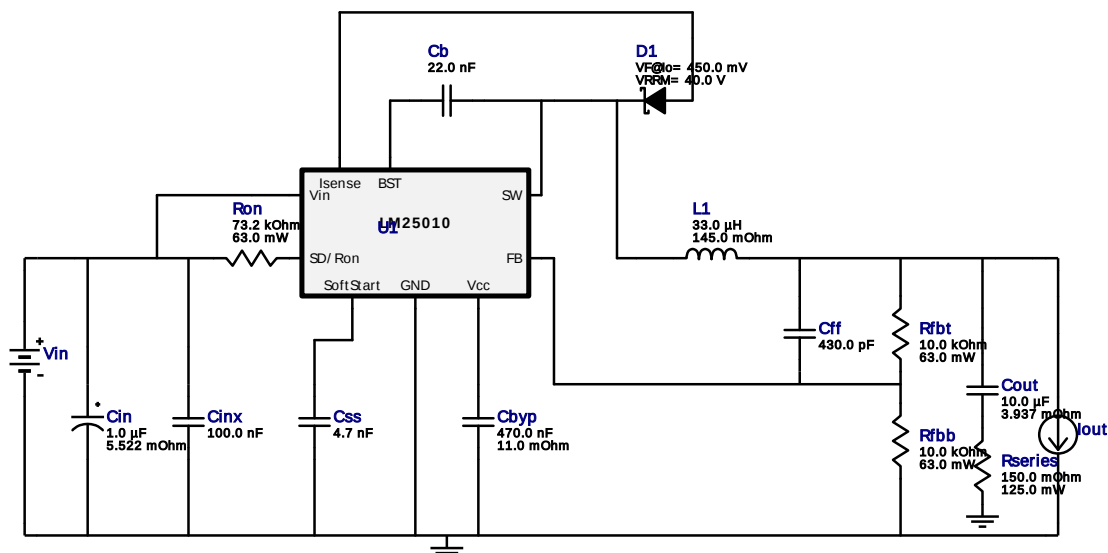
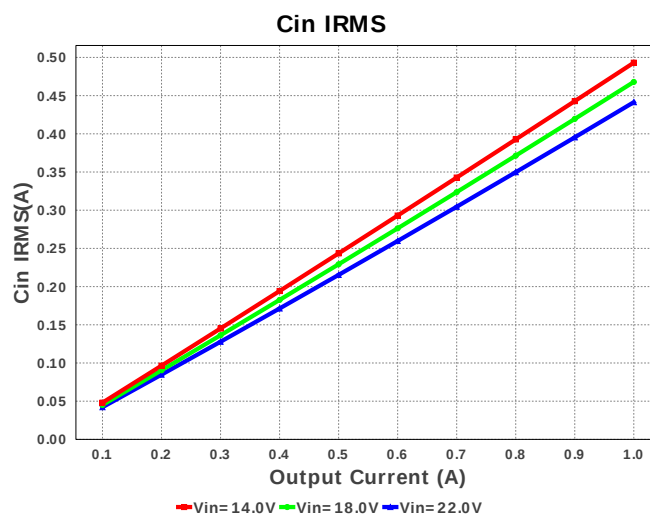
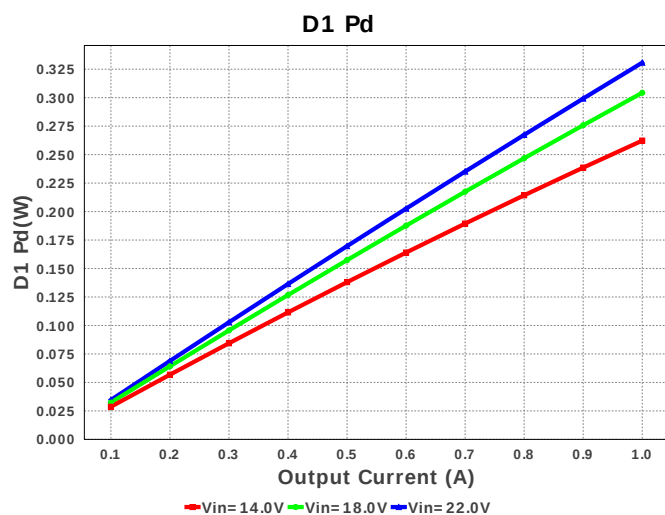
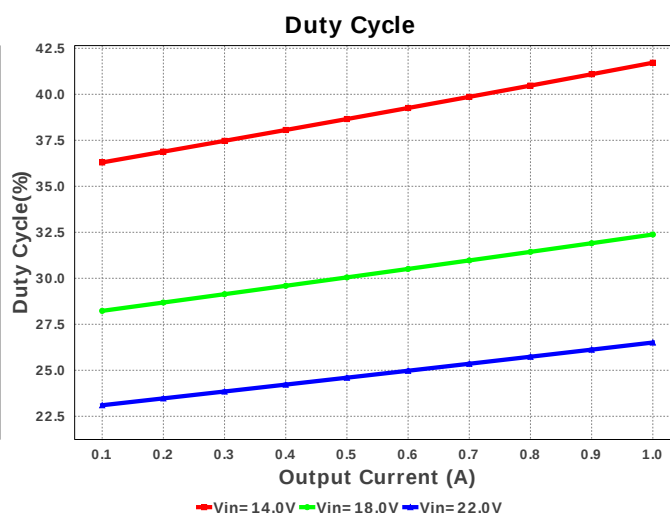
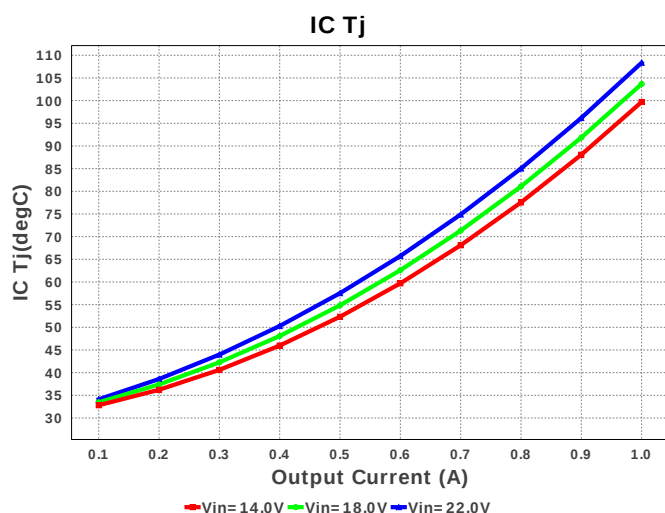


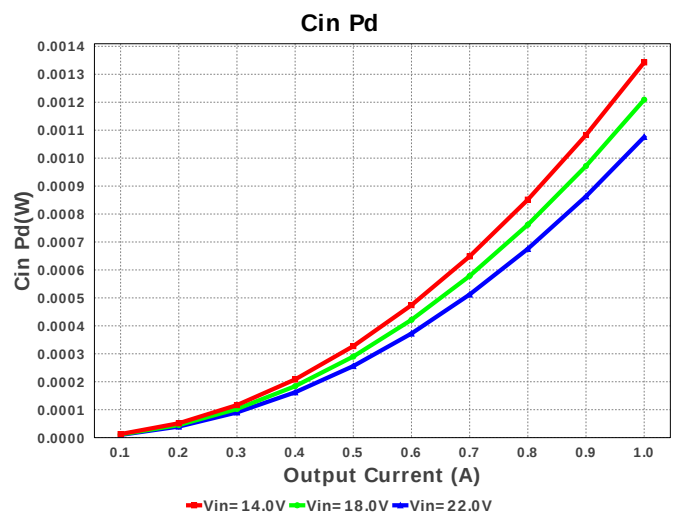
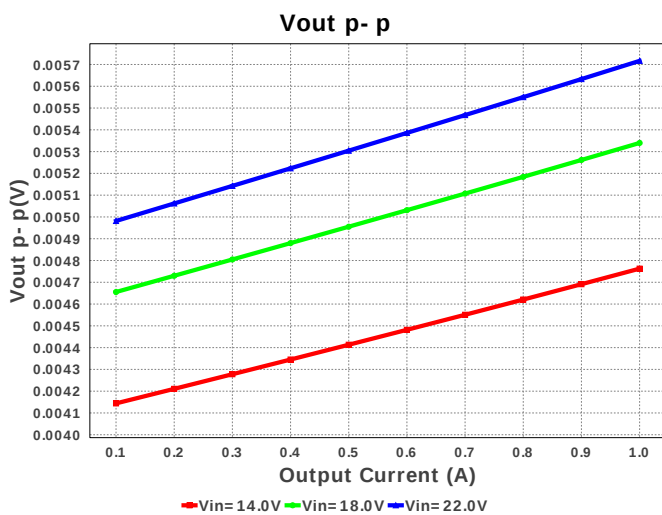
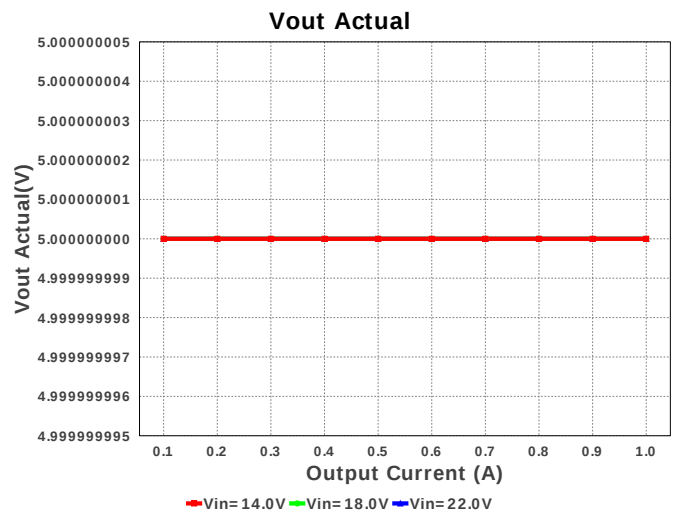
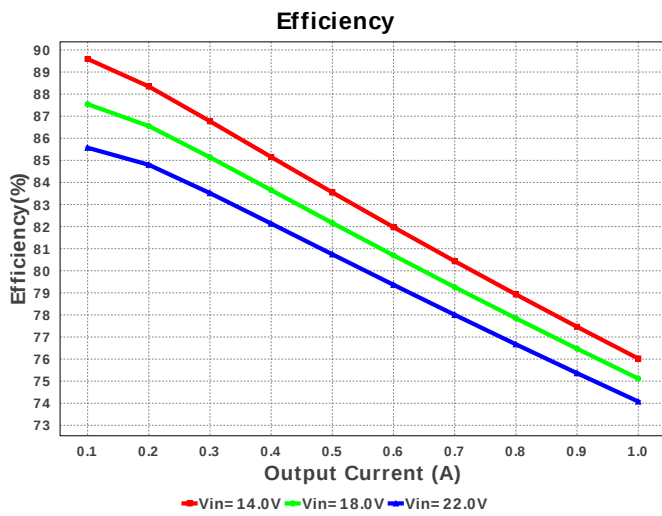
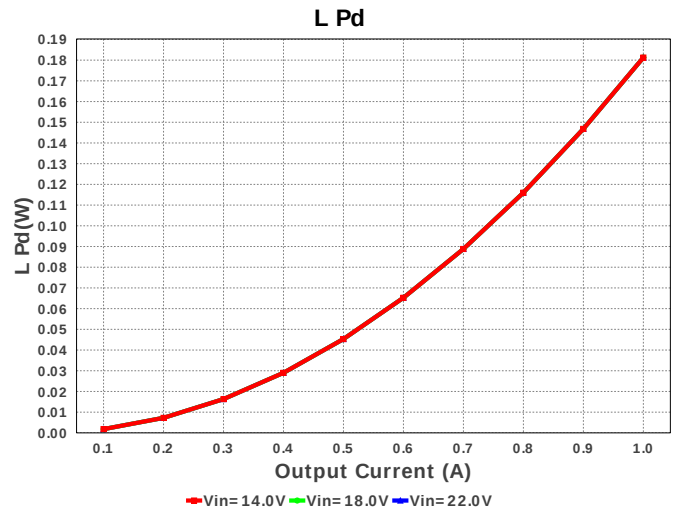
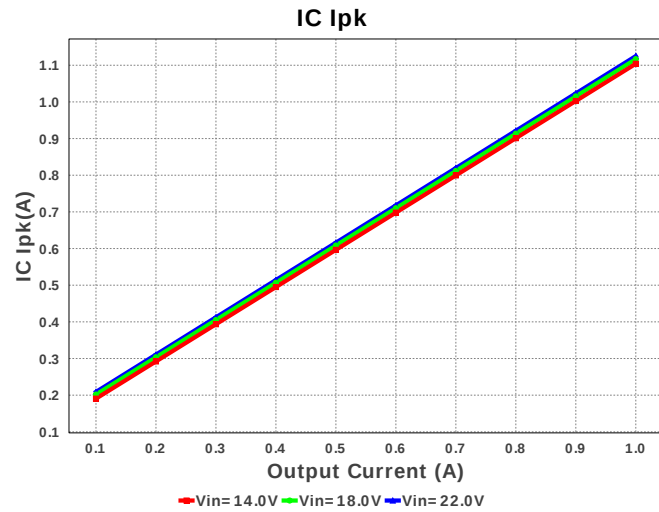


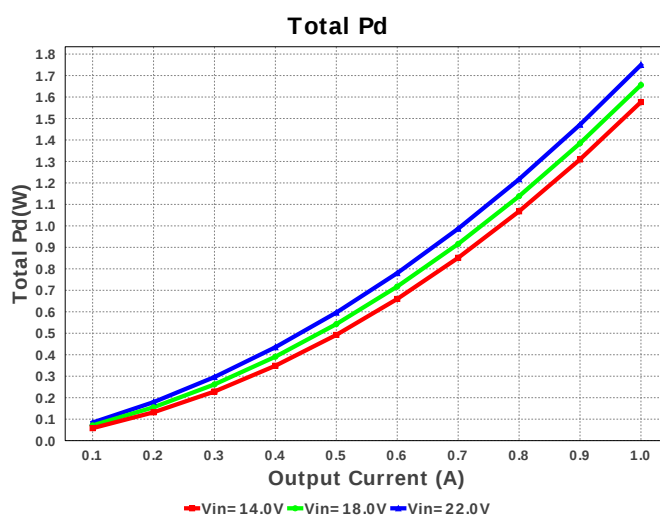
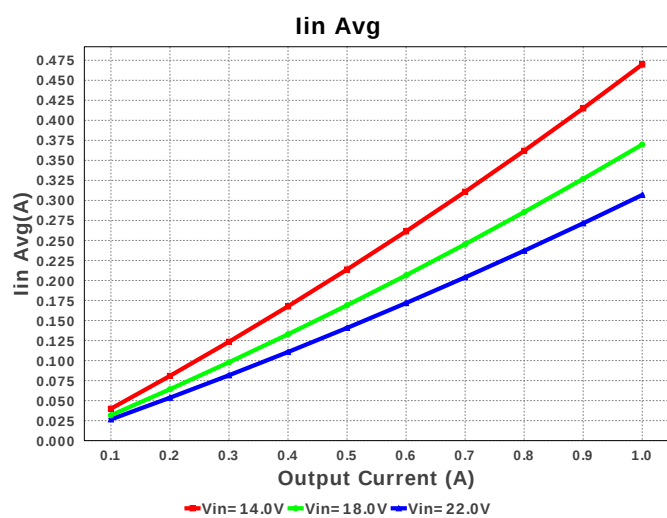
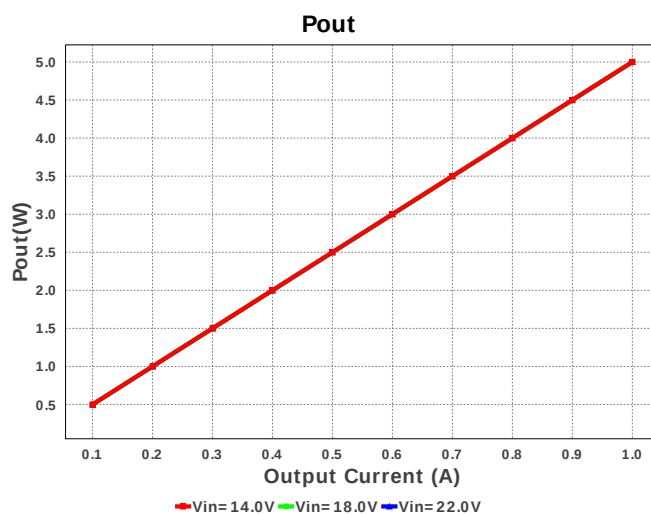
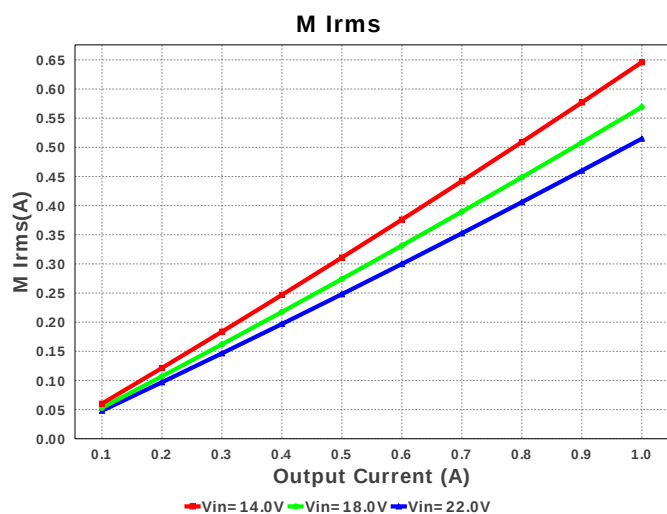
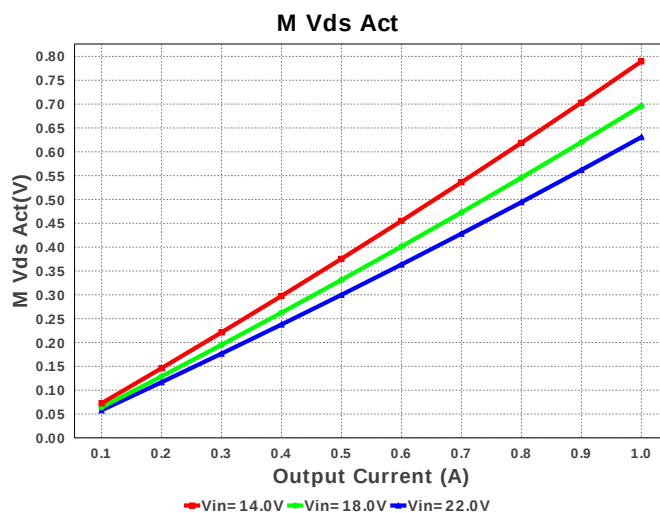
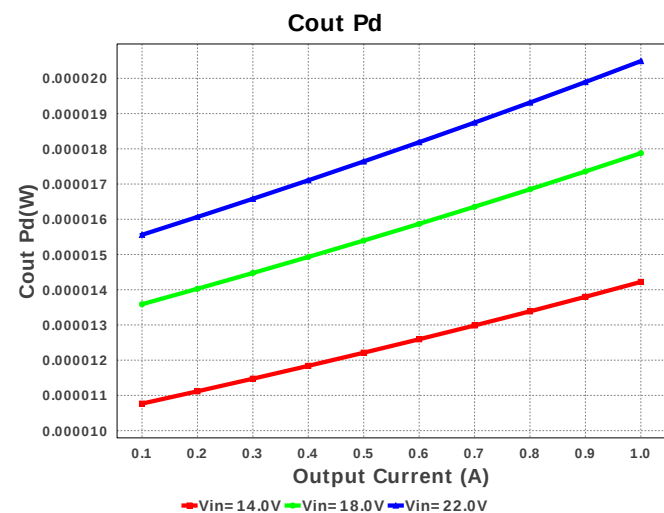
Electrical BOM

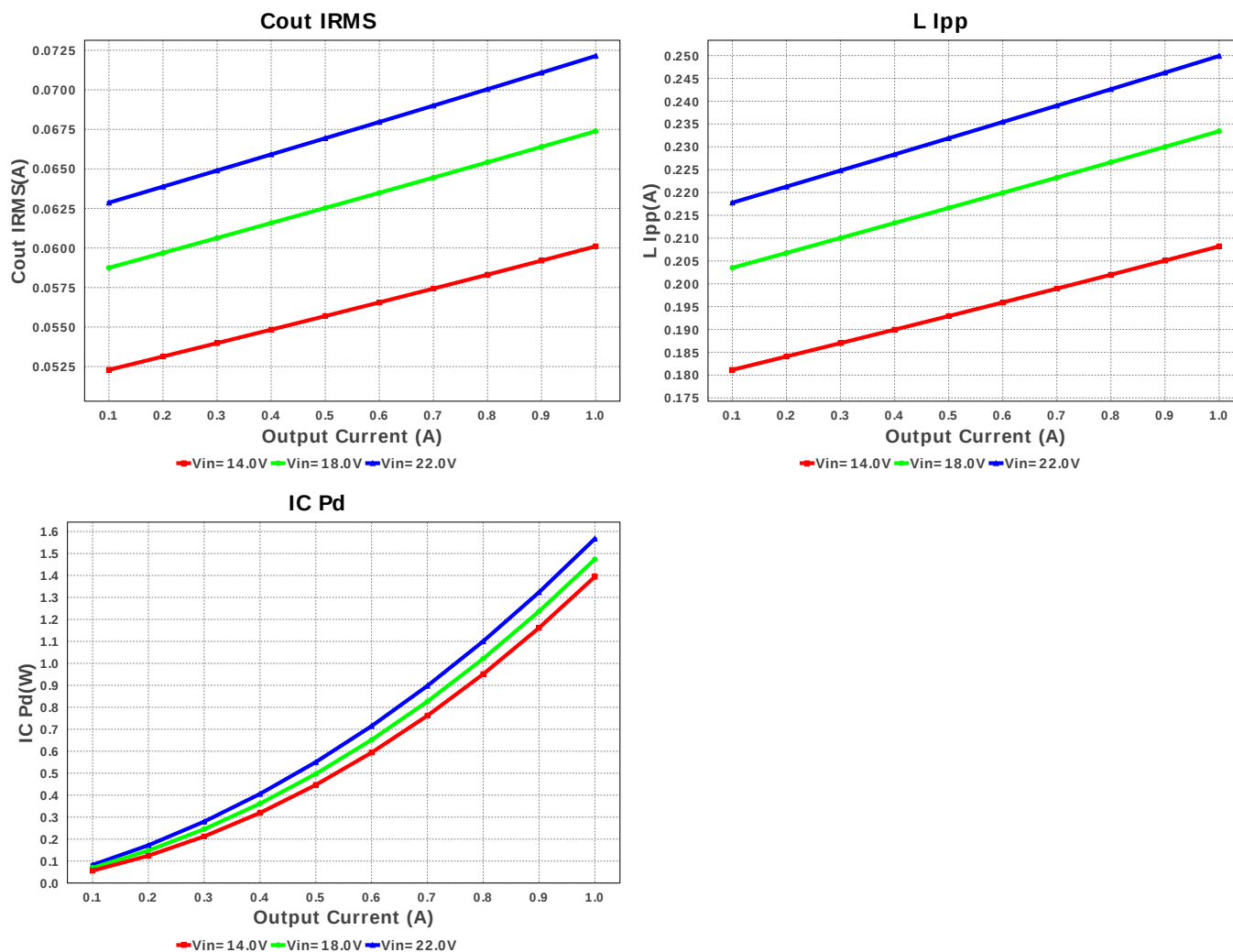
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM155R61C223KA01D Series= X5R	Cap= 22.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm²
2.	Cbyp	AVX	0805YC474KAT2A Series= X7R	Cap= 470.0 nF ESR= 11.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.02	 0805 7 mm²
3.	Cff	MuRata	GRM1555C1H431GA01D Series= C0G/NP0	Cap= 430.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	 0402 3 mm²
4.	Cin	TDK	C1608X7R1V105K080AC Series= X7R	Cap= 1.0 uF ESR= 5.522 mOhm VDC= 35.0 V IRMS= 2.2162 A	1	\$0.05	 0603 5 mm²
5.	Cinx	Kemet	C0603C104K3RACTU Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm²
6.	Cout	MuRata	GRM219R61A106KE44D Series= X5R	Cap= 10.0 uF ESR= 3.937 mOhm VDC= 10.0 V IRMS= 2.7713 A	1	\$0.03	 0805 7 mm²
7.	Css	MuRata	GRM155R61C472KA01D Series= X5R	Cap= 4.7 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm²
8.	D1	Diodes Inc.	1N5819HW-7-F	VF@Io= 450.0 mV VRRM= 40.0 V	1	\$0.08	 SOD-123 13 mm²
9.	L1	Bourns	SRN8040-330M	L= 33.0 uH DCR= 145.0 mOhm	1	\$0.22	 SRN8040 100 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	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
11.	Rfbt	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
12.	Ron	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
13.	Rseries	Panasonic	ERJ-2BSFR15X Series= ERJ-2B	Res= 150.0 mOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.06	 0402 3 mm ²
14.	U1	Texas Instruments	LM25010MH/NOPB	Switcher	1	\$0.95	 PWP0014A 59 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	441.381 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	72.142 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.125 A	Current	Peak switch current in IC
4.	Iin Avg	306.8 mA	Current	Average input current
5.	L Ipp	249.91 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	514.868 mA	Current	Q lavg
7.	BOM Count	14	General	Total Design BOM count
8.	FootPrint	216.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	546.448 kHz	General	Switching frequency
10.	IC Tolerance	50.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	630.718 mV	General	Voltage drop across the MosFET
12.	Pout	5.0 W	General	Total output power
13.	Total BOM	\$1.49	General	Total BOM Cost
14.	Vout Actual	5.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	26.509 %	Op_point	Duty cycle
17.	Efficiency	74.079 %	Op_point	Steady state efficiency
18.	IC Tj	108.359 degC	Op_point	IC junction temperature
19.	ICThetaJA	50.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	1.0 A	Op_point	Iout operating point
21.	VIN_OP	22.0 V	Op_point	Vin operating point
22.	Vout p-p	5.717 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	1.076 mW	Power	Input capacitor power dissipation
24.	Cout Pd	20.49 μW	Power	Output capacitor power dissipation
25.	D1 Pd	330.71 mW	Power	Output Diode Power Dissipation
26.	IC Pd	1.567 W	Power	IC power dissipation
27.	L Pd	181.25 mW	Power	Inductor power dissipation
28.	Total Pd	1.75 W	Power	Total Power Dissipation
29.	Vout Tolerance	3.03 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	22.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	LM25010	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. For a Constant On Time device to be stable, we need to provide a ripple at the feedback comparator. There are various methods to implement the ripple. Depending on the circuit complexity vs. the allowable ripple, we have three options to choose from. The simplest option, 'Low Complexity', would require only a high ESR cap at the output. This means that the BOM count will be small, but the output voltage ripple will be quite large. The 'Optimal Solution' would require a feed-forward cap in parallel with the upper feedback resistor to AC couple the ripple to the feedback node. This increases the BOM count slightly, but now we have more control over the output voltage ripple. If the output voltage requirement is very tight, then the best option is to go for the 'Low Output Ripple' solution. In this option we can go with very low ESR output caps and have very good control over the output voltage ripple.

2. **LM25010** Product Folder : <http://www.ti.com/product/LM25010> : 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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