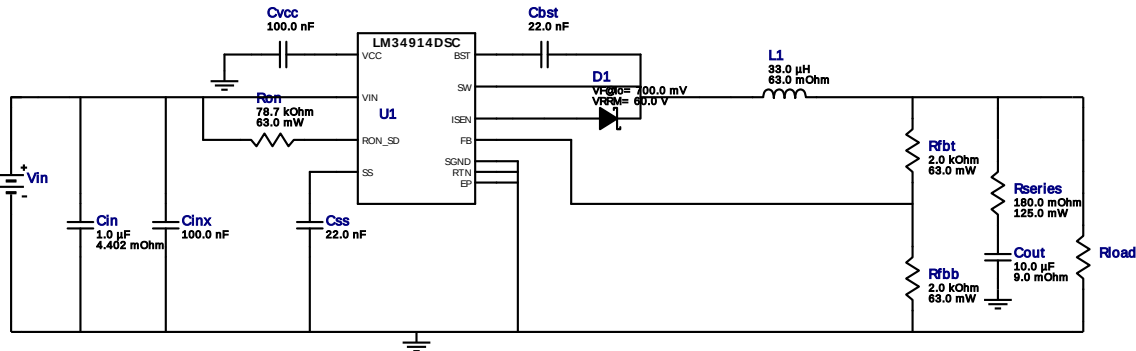


WEBENCH® Design Report

Design : 4742013/88 LM34914SD/NOPB
LM34914SD/NOPB 30.0V-37.0V to 5.00V @ 1.0A

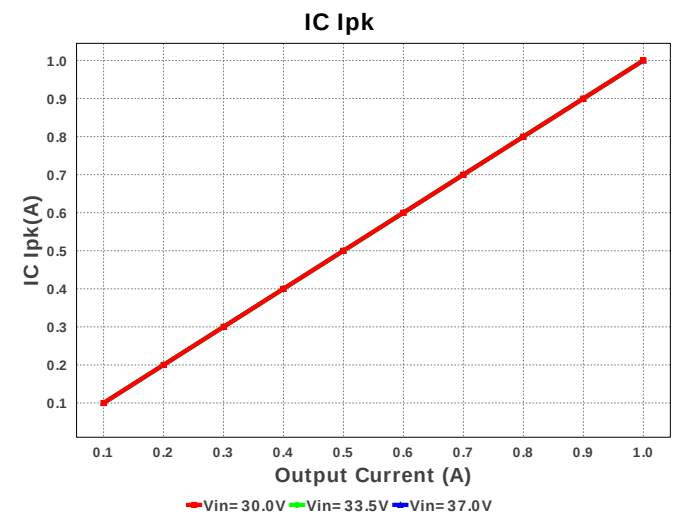
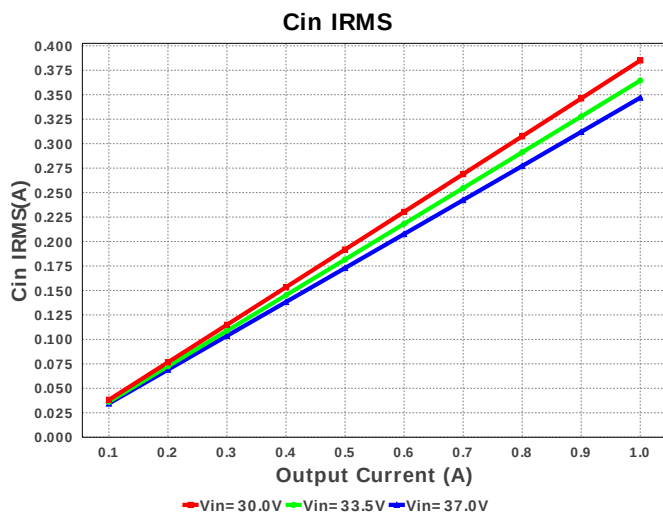
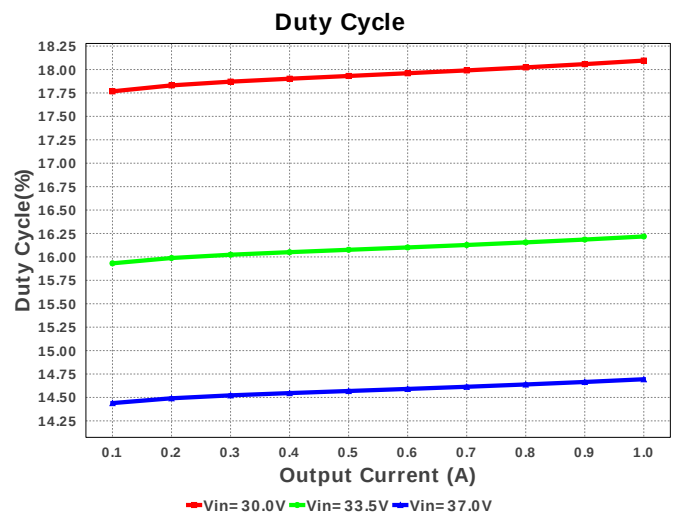
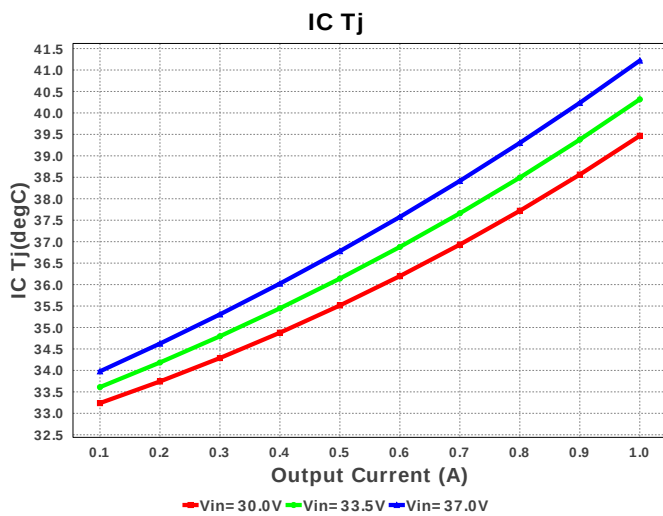
Vout = 5.0V
Iout = 1.0A

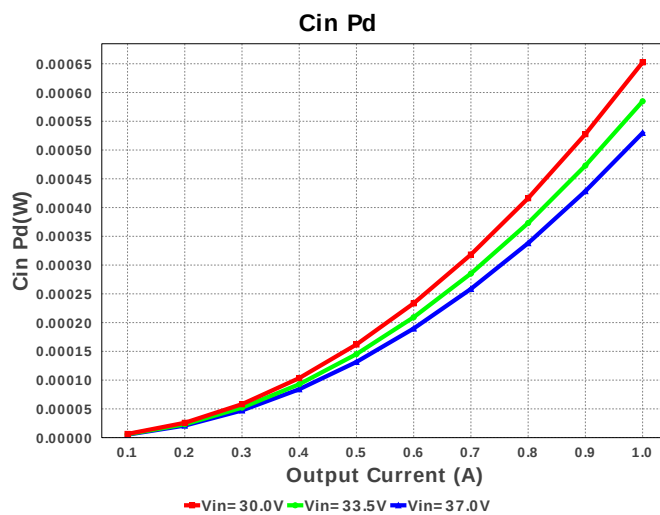
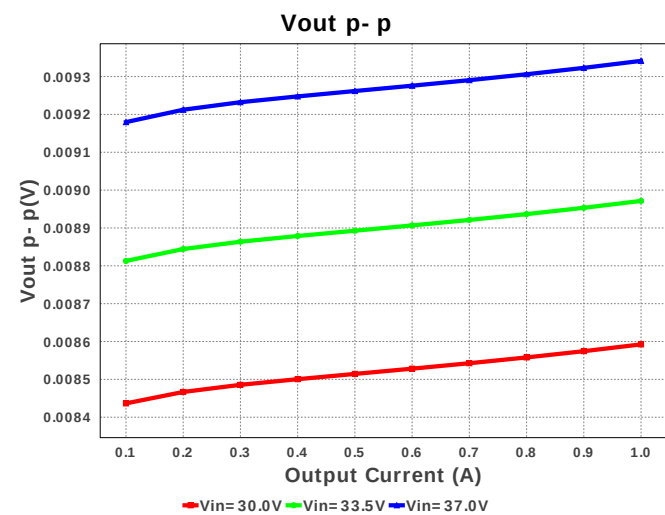
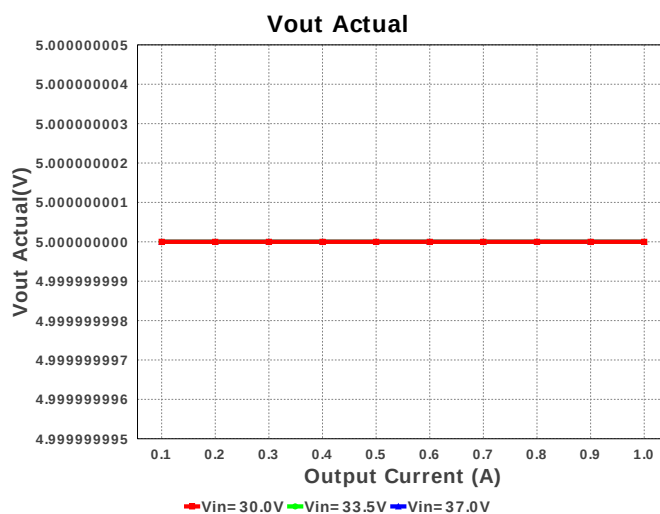
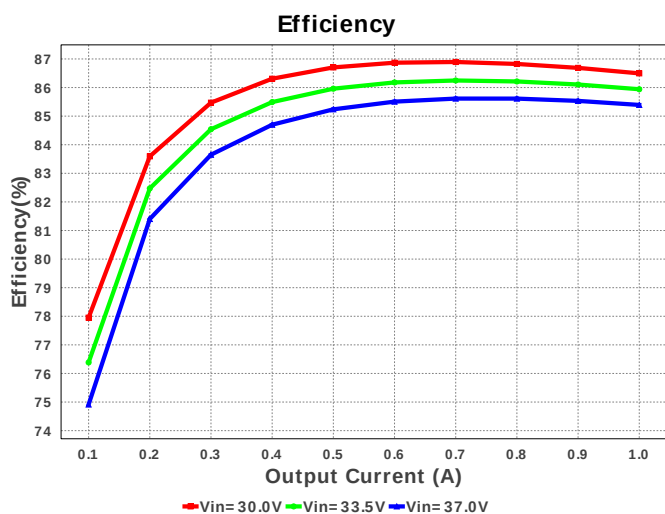
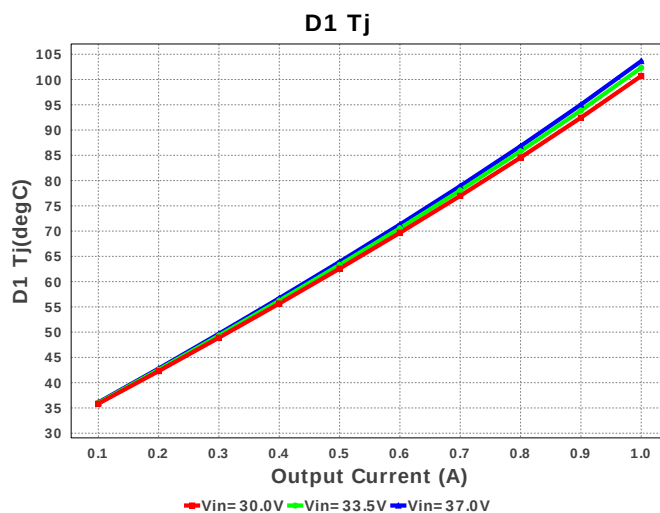
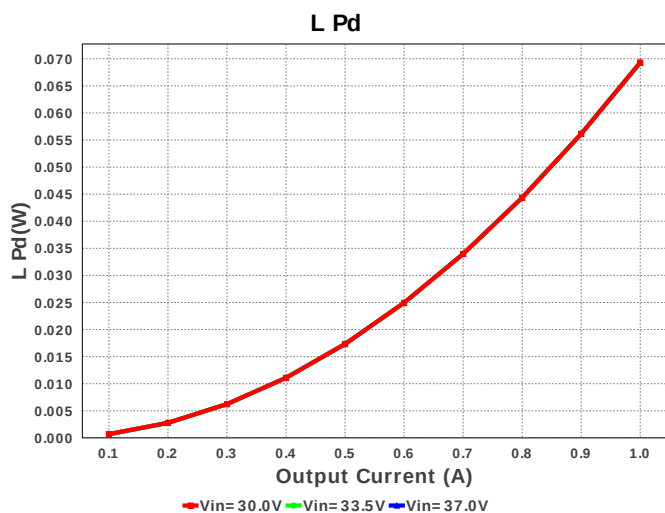


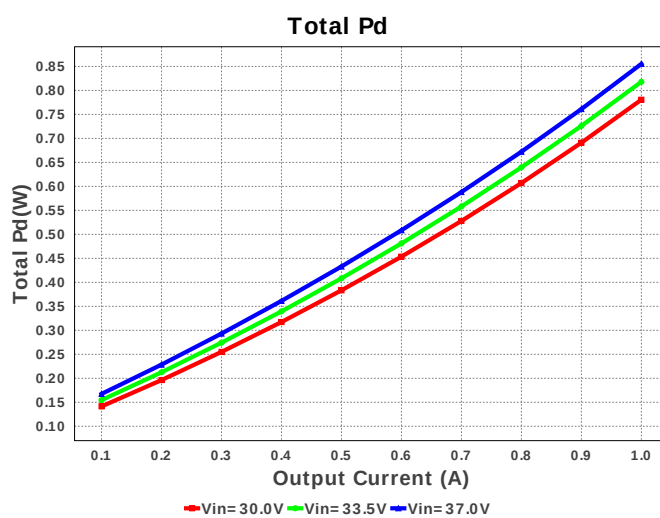
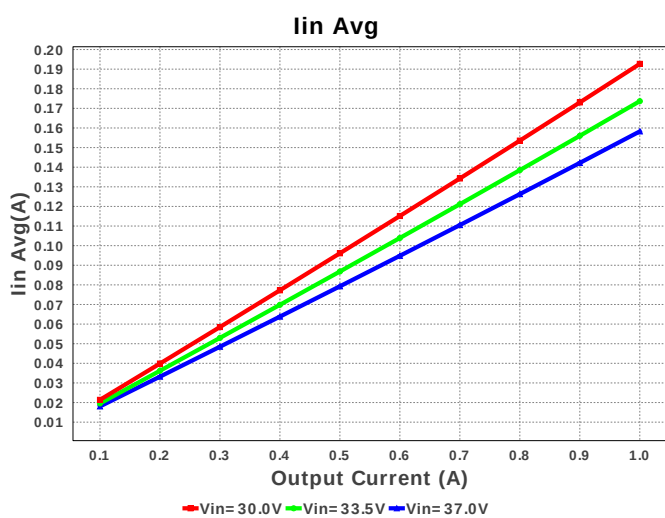
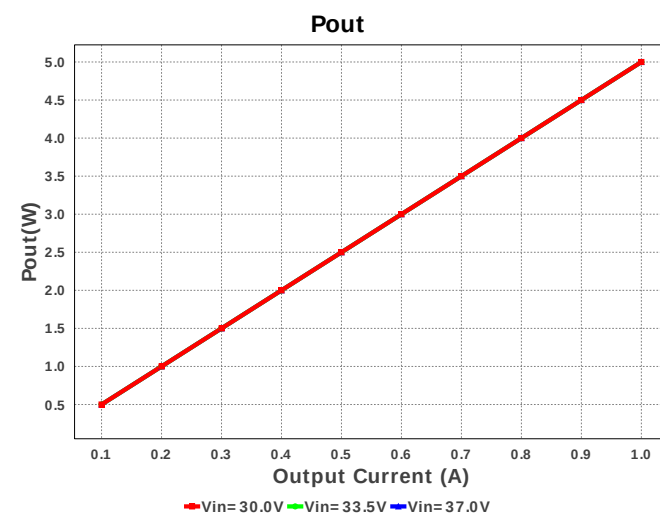
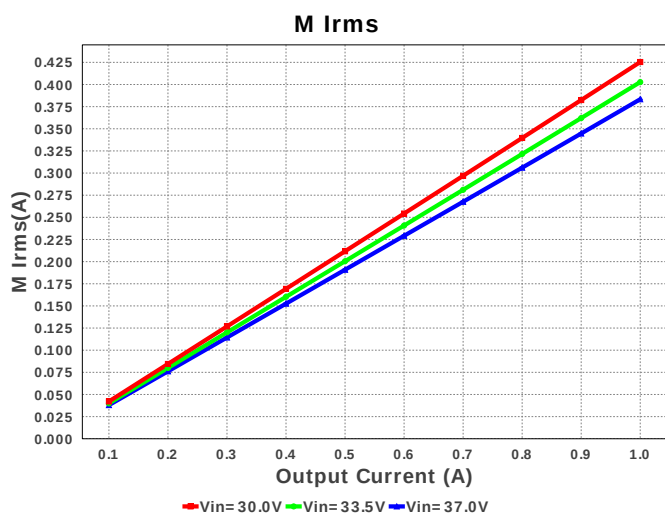
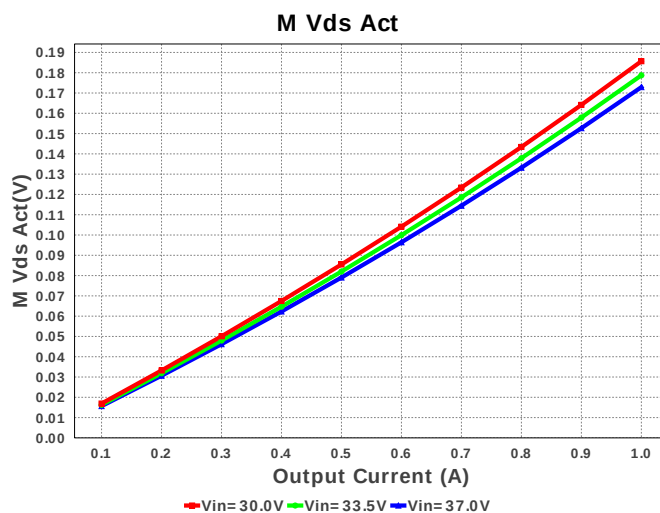
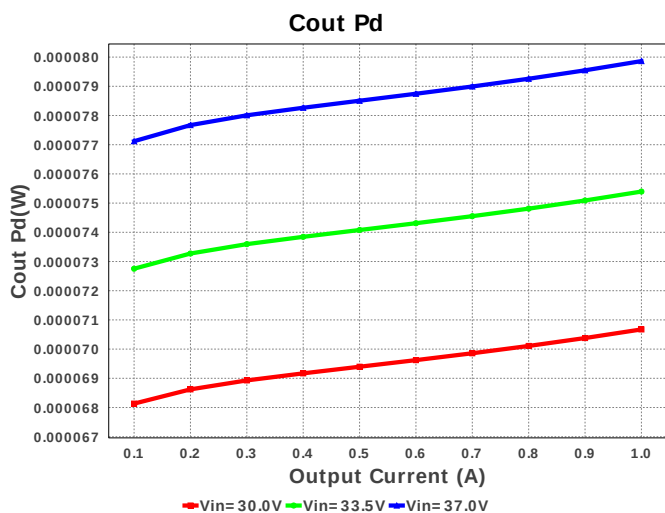
Electrical BOM

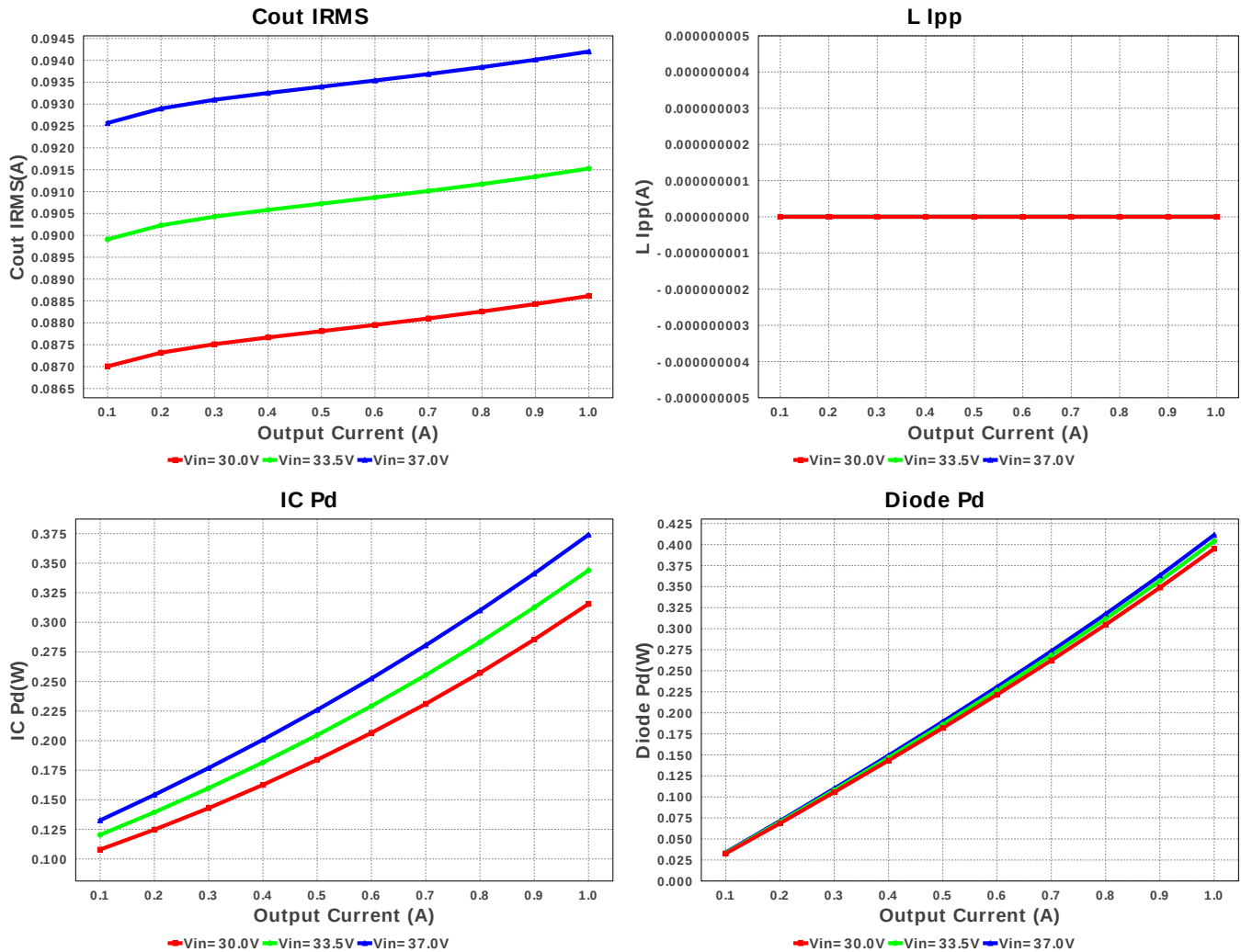
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM033C80J223KE01D Series= X6S	Cap= 22.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0201 2 mm ²
2.	Cin	MuRata	GRM21BR71H105KA12L Series= X7R	Cap= 1.0 uF ESR= 4.402 mOhm VDC= 50.0 V IRMS= 1.677 A	1	\$0.05	0805 7 mm ²
3.	Cinx	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cout	MuRata	GRM188R60J106ME47D Series= X5R	Cap= 10.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 2.74 A	1	\$0.02	0603 5 mm ²
5.	Css	MuRata	GRM155R61C223KA01D Series= X5R	Cap= 22.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
6.	Cvcc	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	D1	Diodes Inc.	B160-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.06	SMA 37 mm ²
8.	L1	Bourns	SRU1048-330Y	L= 33.0 uH DCR= 63.0 mOhm	1	\$0.33	SRU1048 144 mm ²
9.	Rfbb	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
10.	Rfbt	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	Ron	Vishay-Dale	CRCW040278K7FKED Series= CRCW..e3	Res= 78.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	Rseries	Panasonic	ERJ-2BSFR18X Series= ERJ-2B	Res= 180.0 mOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.06	 0402 3 mm²
13.	U1	Texas Instruments	LM34914SD/NOPB	Switcher	1	\$1.35	 DSC0010B 16 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	346.933 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	94.2 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.149 A	Current	Peak switch current in IC
4.	Iin Avg	158.25 mA	Current	Average input current
5.	L Ipp	298.89 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	383.329 mA	Current	Q lavg
7.	BOM Count	13	General	Total Design BOM count
8.	FootPrint	239.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	436.654 kHz	General	Switching frequency
10.	IC Tolerance	5.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	172.896 mV	General	Voltage drop across the MosFET
12.	Pout	5.0 W	General	Total output power
13.	Total BOM	\$1.94	General	Total BOM Cost
14.	D1 Tj	103.643 degC	Op_Point	D1 junction temperature
15.	Vout Actual	5.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
17.	Duty Cycle	14.694 %	Op_point	Duty cycle
18.	Efficiency	85.392 %	Op_point	Steady state efficiency
19.	IC Tj	41.22 degC	Op_point	IC junction temperature
20.	ICThetaJA	30.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	1.0 A	Op_point	Iout operating point
22.	VIN_OP	37.0 V	Op_point	Vin operating point
23.	Vout p-p	63.142 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	529.837 μW	Power	Input capacitor power dissipation
25.	Cout Pd	79.863 μW	Power	Output capacitor power dissipation
26.	Diode Pd	411.415 mW	Power	Diode power dissipation
27.	IC Pd	373.991 mW	Power	IC power dissipation
28.	L Pd	69.3 mW	Power	Inductor power dissipation
29.	Total Pd	855.335 mW	Power	Total Power Dissipation
30.	Vout Tolerance	1.212 %		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	37.0	Maximum input voltage
3.	VinMin	30.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	LM34914	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. **LM34914** Product Folder : <http://www.ti.com/product/LM34914> : 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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