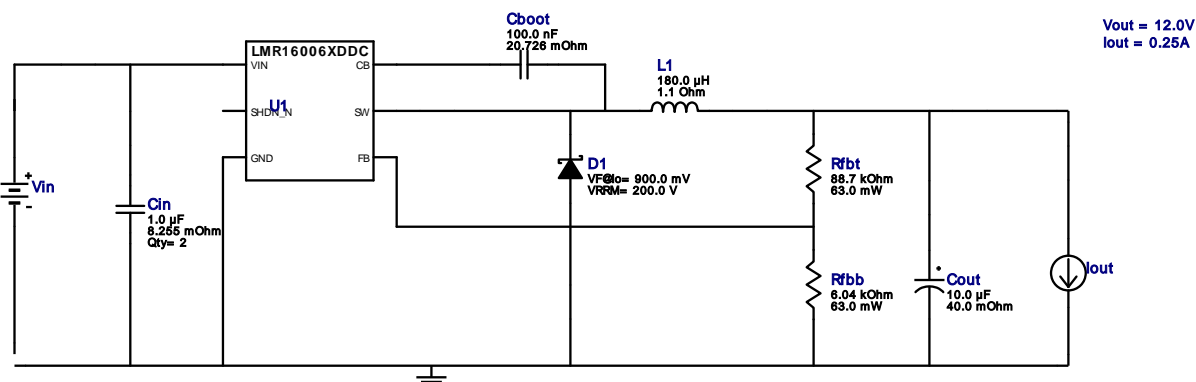


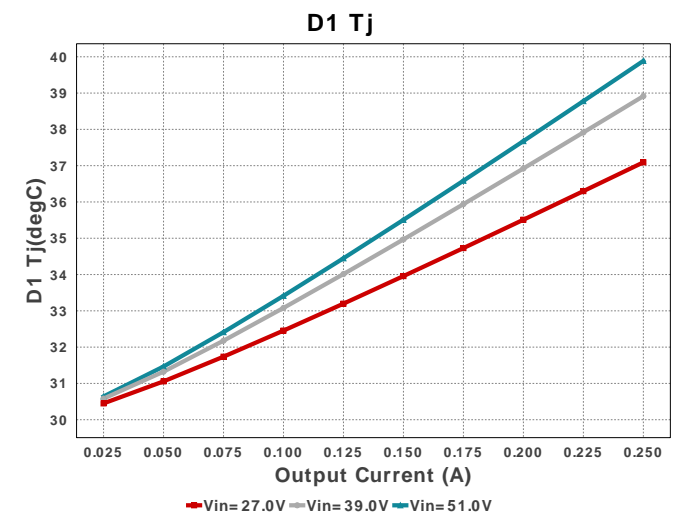
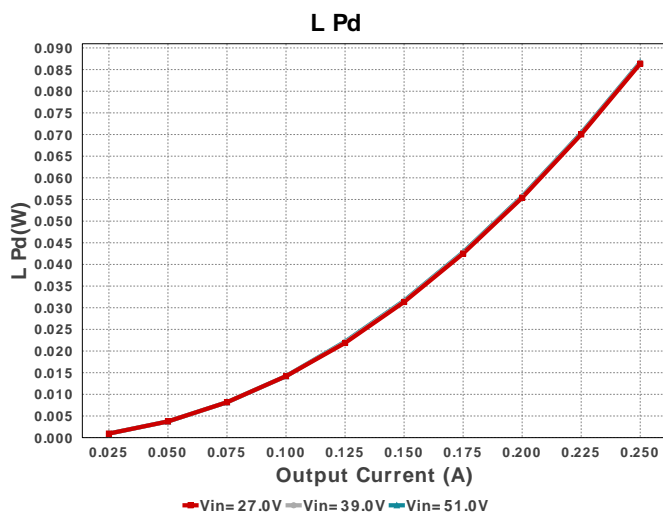
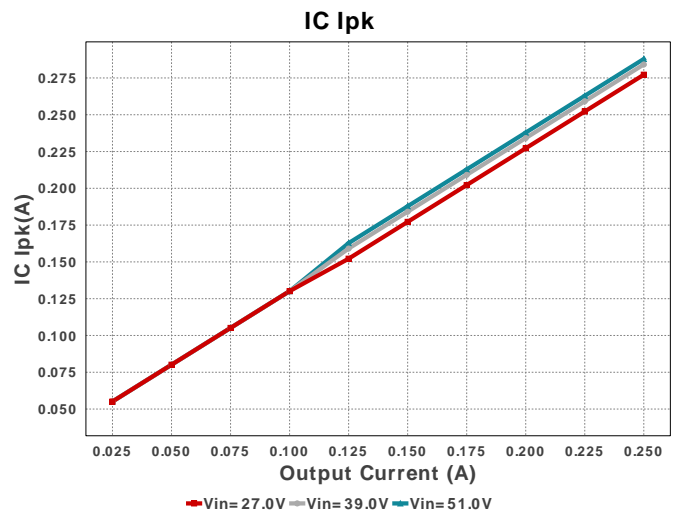
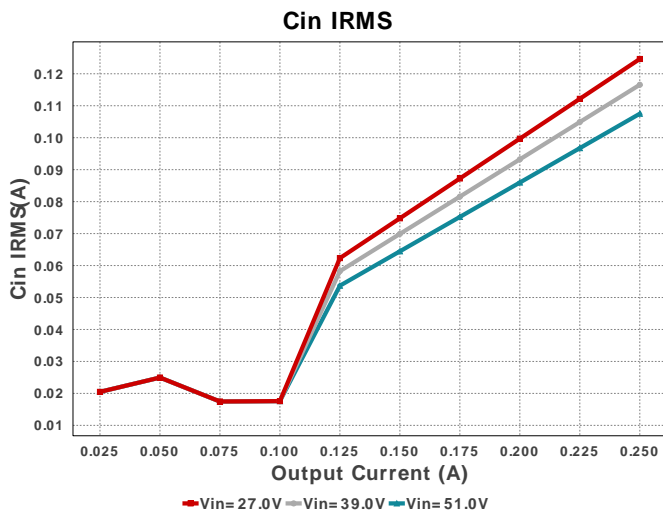
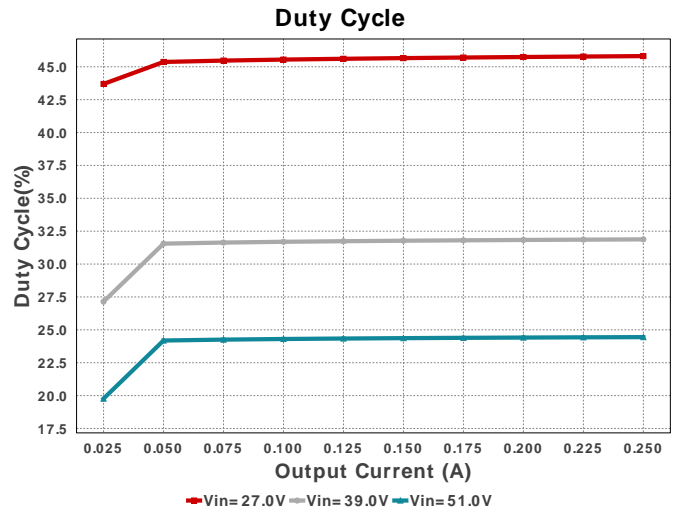
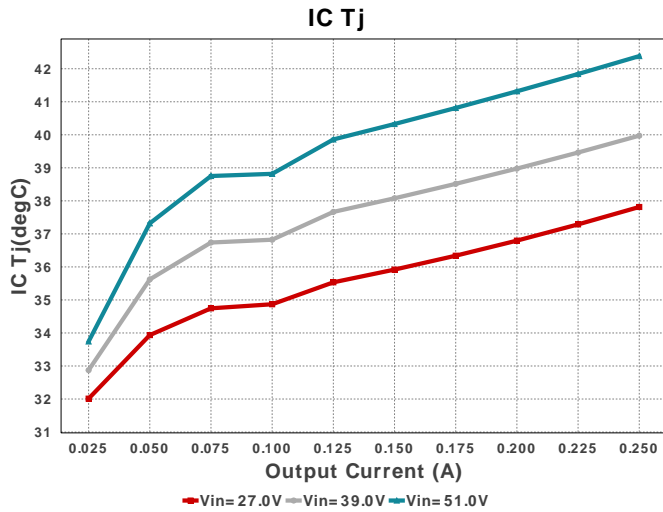
## WEBENCH® Design Report

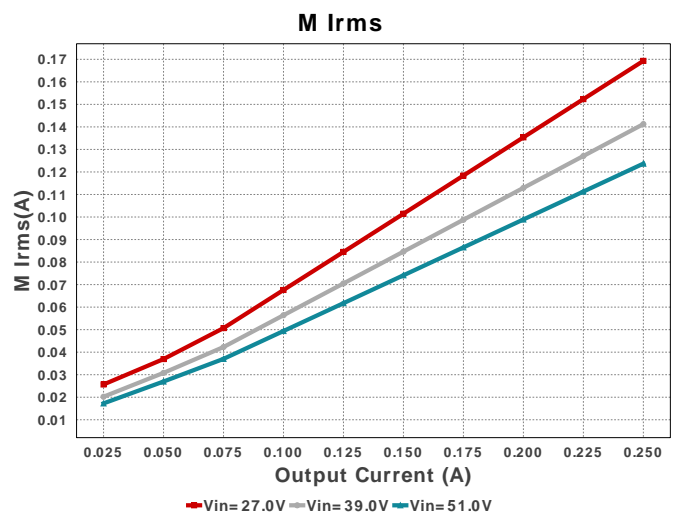
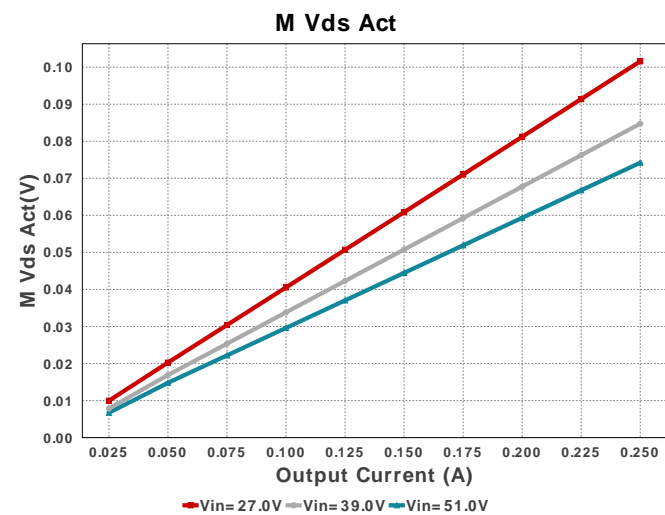
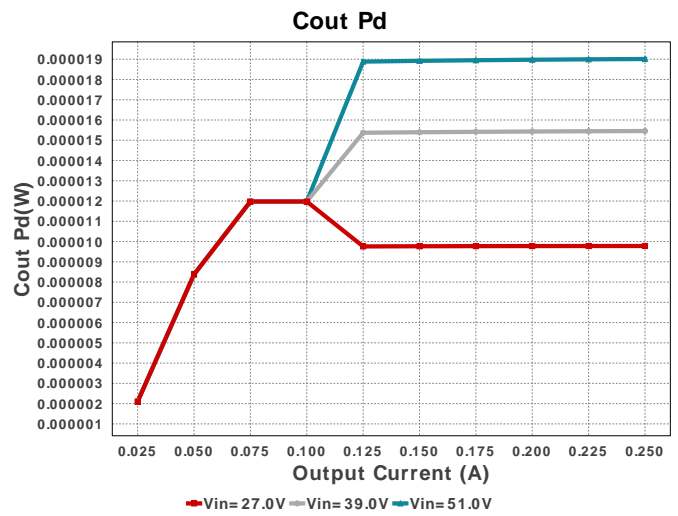
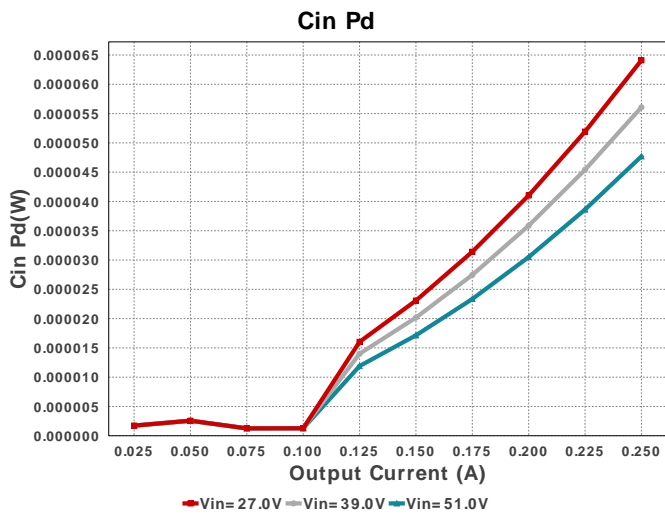
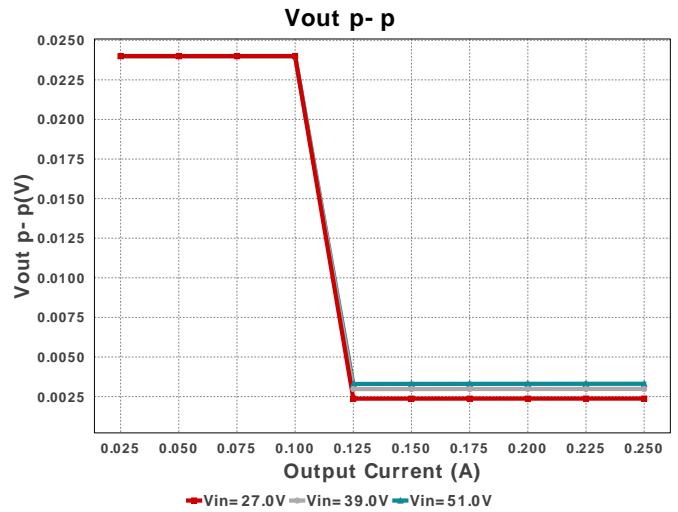
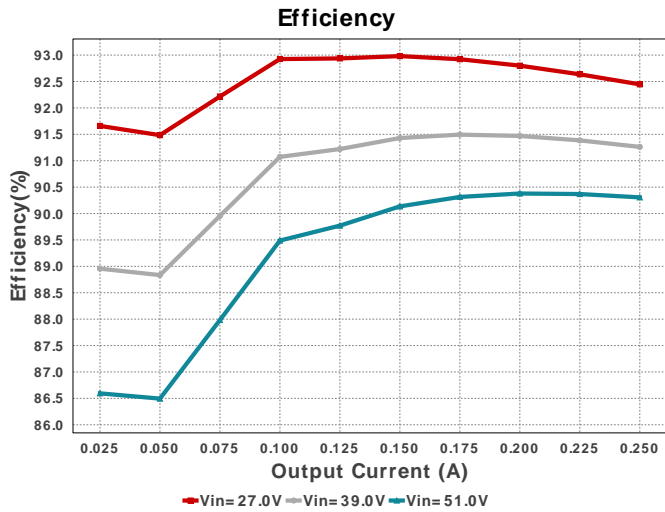
Design : 3569363/120 LMR16006XDDCR  
LMR16006XDDCR 27.0V-51.0V to 12.00V @ 0.25A

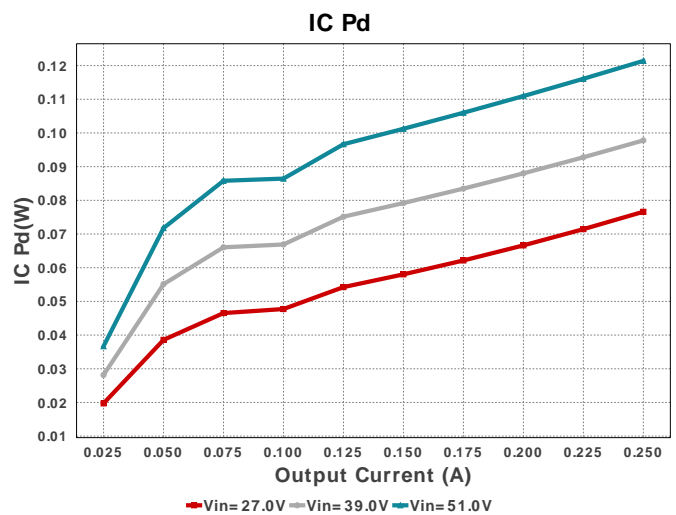
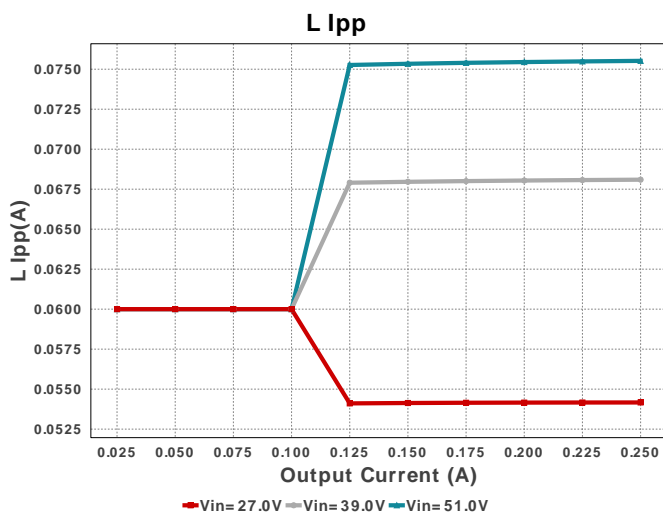
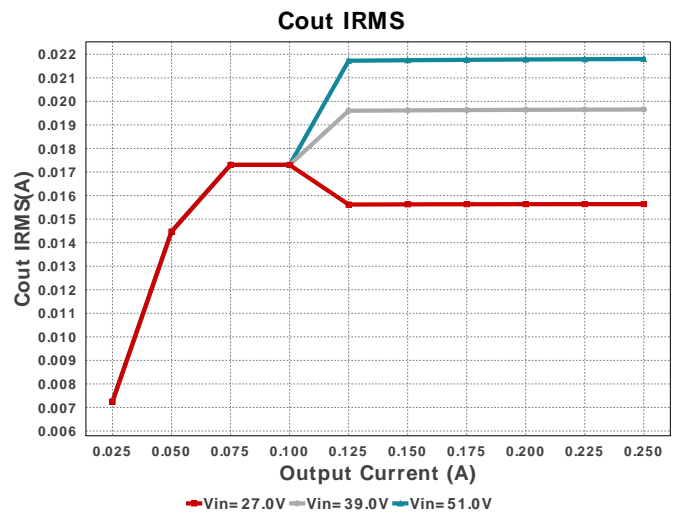
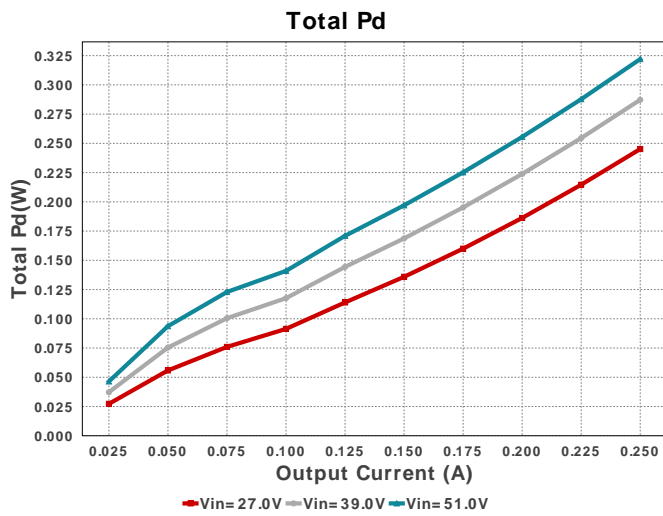
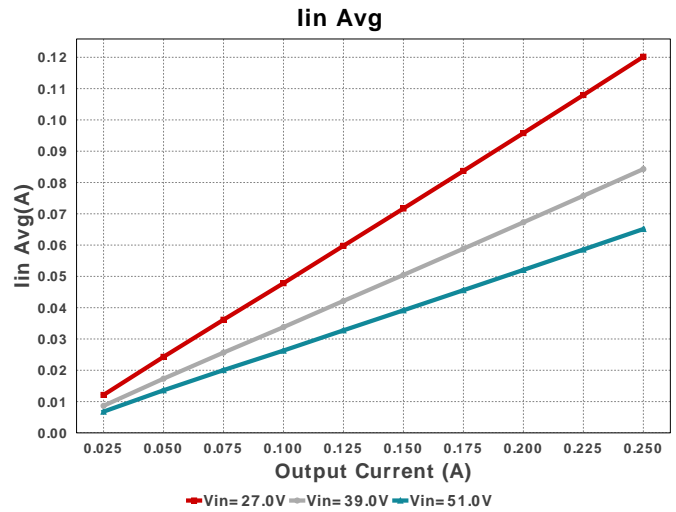
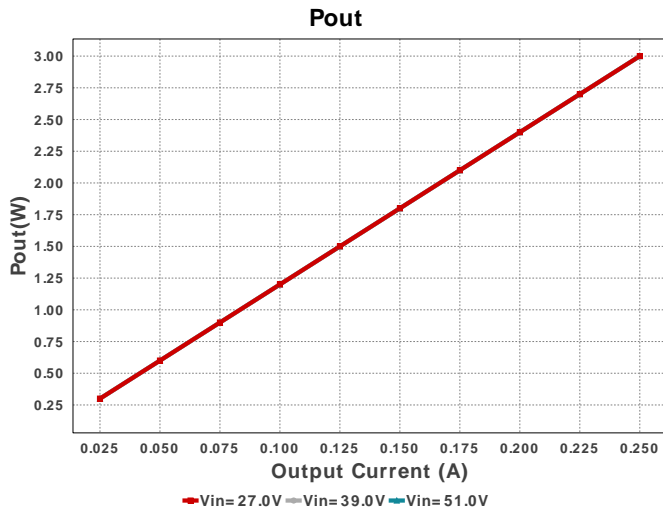


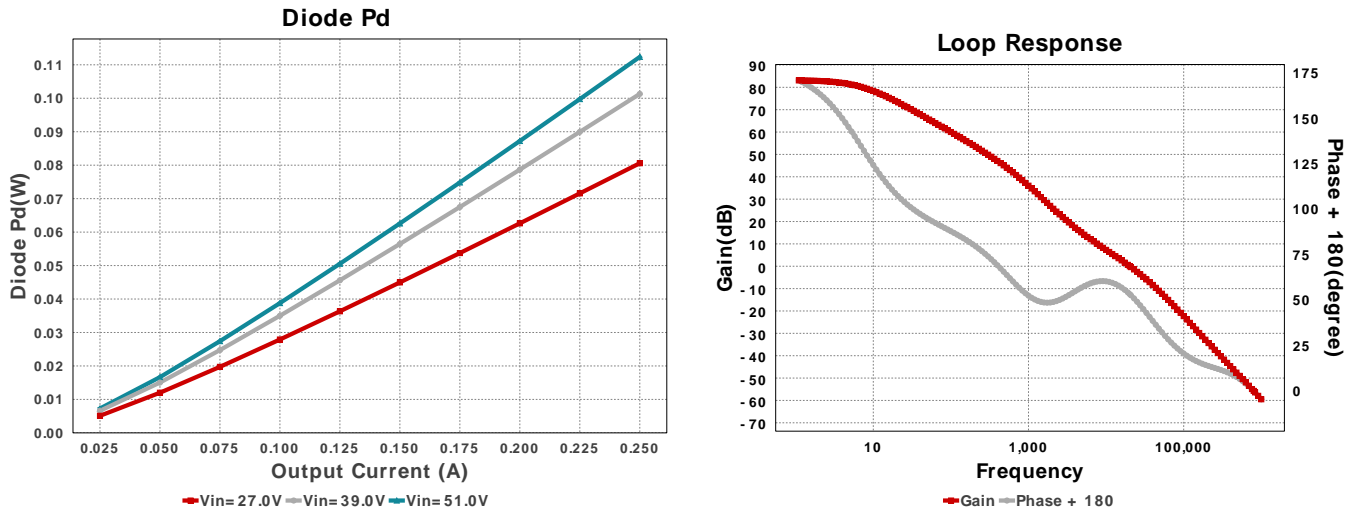
## Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	TDK	C2012X5R2A104K125AA Series= X5R	Cap= 100.0 nF ESR= 20.726 mOhm VDC= 100.0 V IRMS= 1.456 A	1	\$0.04	 0805 7 mm <sup>2</sup>
2.	Cin	TDK	CGA4J3X7S2A105K125AB Series= X7S	Cap= 1.0 uF ESR= 8.255 mOhm VDC= 100.0 V IRMS= 2.27442 A	2	\$0.13	 0805 7 mm <sup>2</sup>
3.	Cout	Panasonic	50SVPF10M Series= SVPF	Cap= 10.0 uF ESR= 40.0 mOhm VDC= 50.0 V IRMS= 2.5 A	1	\$0.47	 CAPSMT_62_F61 74 mm <sup>2</sup>
4.	D1	SMC Diode Solutions	SK220ATR	VF@Io= 900.0 mV VRRM= 200.0 V	1	\$0.04	 SMA 37 mm <sup>2</sup>
5.	L1	NIC Components	NPI54C181KTRF	L= 180.0 uH DCR= 1.1 Ohm	1	\$0.09	 IND_NPI54C 61 mm <sup>2</sup>
6.	Rfbb	Vishay-Dale	CRCW04026K04FKED Series= CRCW..e3	Res= 6.04 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
7.	Rfbb	Vishay-Dale	CRCW040288K7FKED Series= CRCW..e3	Res= 88.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
8.	U1	Texas Instruments	LMR16006XDDCR	Switcher	1	\$1.20	 DDC0006A 10 mm <sup>2</sup>









## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	107.496 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	21.801 mA	Current	Output capacitor RMS ripple current
3.	IC IpK	287.887 mA	Current	Peak switch current in IC
4.	Iin Avg	65.138 mA	Current	Average input current
5.	L Ipp	75.521 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	123.699 mA	Current	Q lavg
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	209.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
9.	Frequency	700.0 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	74.202 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	3.0 W	General	Total output power
14.	Total BOM	\$2.12	General	Total BOM Cost
15.	D1 Tj	39.887 degC	Op_Point	D1 junction temperature
16.	Vout Actual	11.999 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	20.192 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	24.446 %	Op_point	Duty cycle
20.	Efficiency	90.306 %	Op_point	Steady state efficiency
21.	IC Tj	42.383 degC	Op_point	IC junction temperature
22.	ICThetaJA	102.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	250.0 mA	Op_point	Iout operating point
24.	Phase Marg	53.275 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	51.0 V	Op_point	Vin operating point
26.	Vout p-p	3.308 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	47.695 μW	Power	Input capacitor power dissipation
28.	Cout Pd	19.012 μW	Power	Output capacitor power dissipation
29.	Diode Pd	112.357 mW	Power	Diode power dissipation
30.	IC Pd	121.399 mW	Power	IC power dissipation
31.	L Pd	86.678 mW	Power	Inductor power dissipation
32.	Total Pd	322.038 mW	Power	Total Power Dissipation
33.	Vout Tolerance	4.289 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

## Design Inputs

#	Name	Value	Description
1.	Iout	250.0 m	Maximum Output Current
2.	VinMax	51.0	Maximum input voltage
3.	VinMin	27.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	LMR16006X	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

## Design Assistance

1. **LMR16006X** Product Folder : <http://www.ti.com/product/LMR16006> : contains the data sheet and other resources.

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