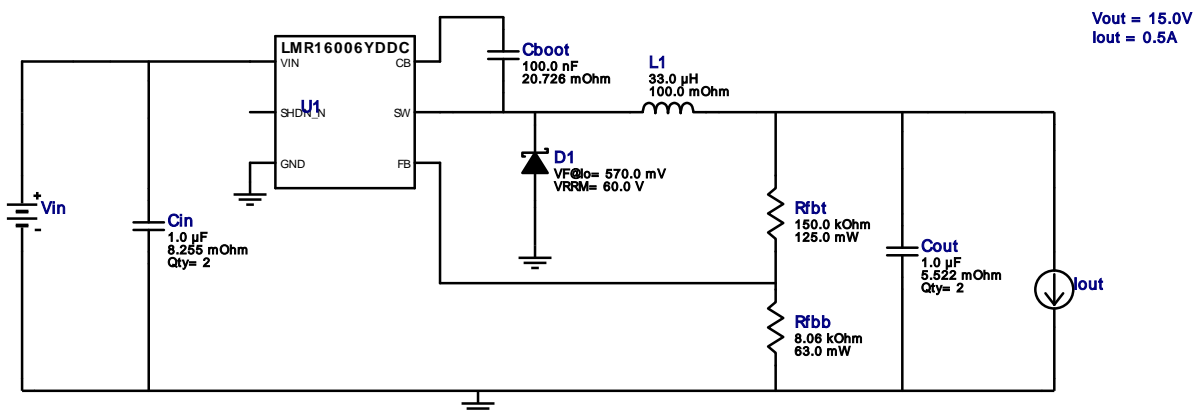


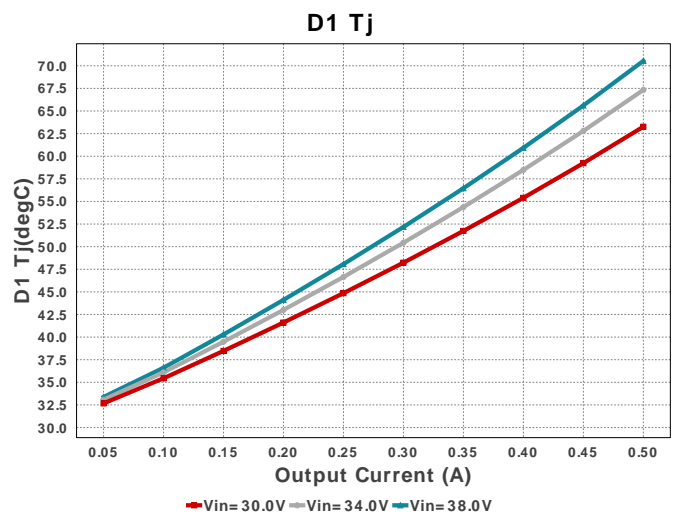
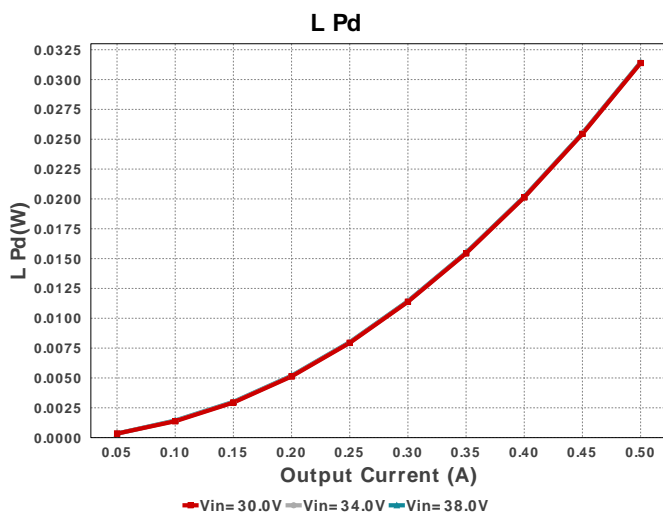
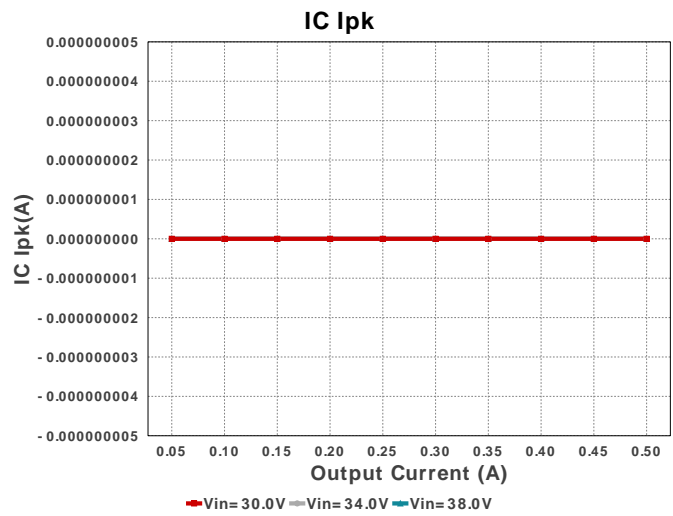
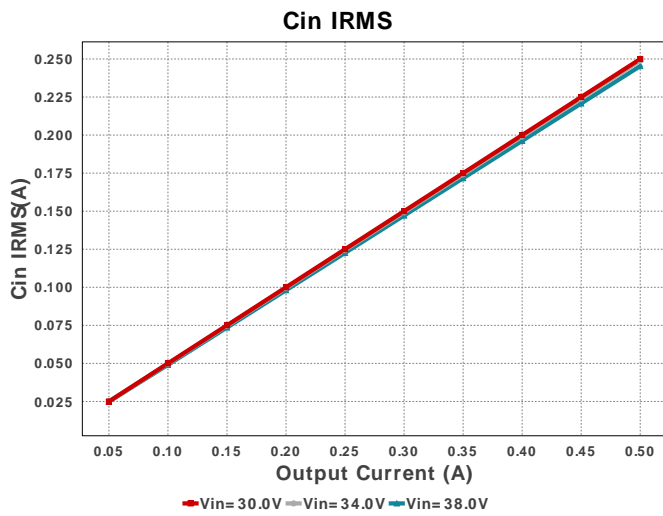
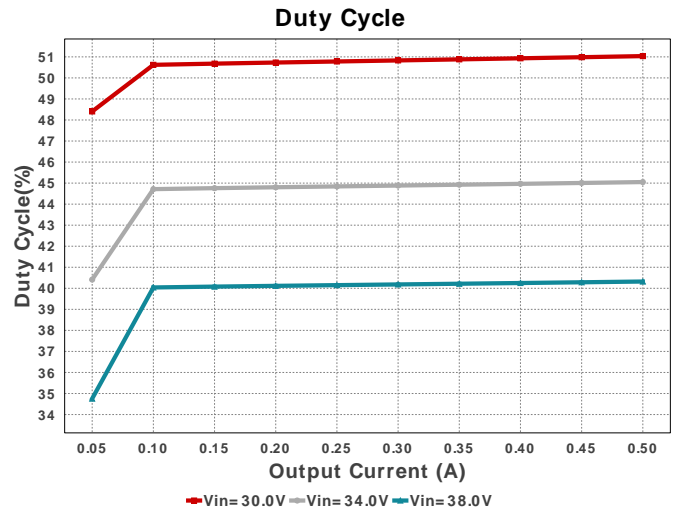
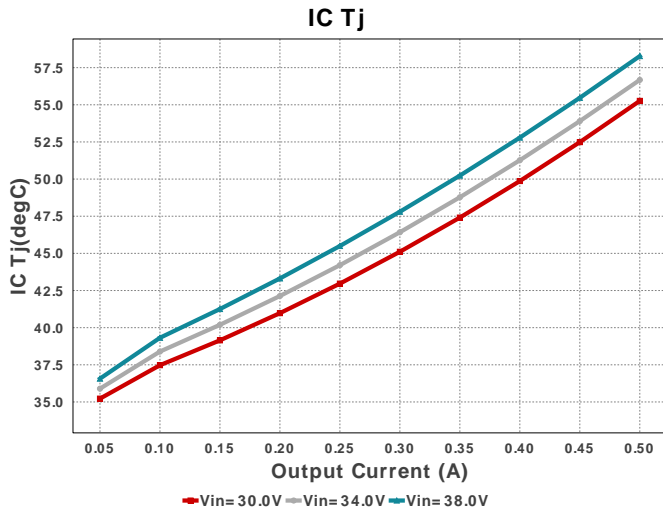
## WEBENCH® Design Report

Design : LMR16006YDDCR  
LMR16006YDDCR 30V-38V to 15.00V @ 0.5A

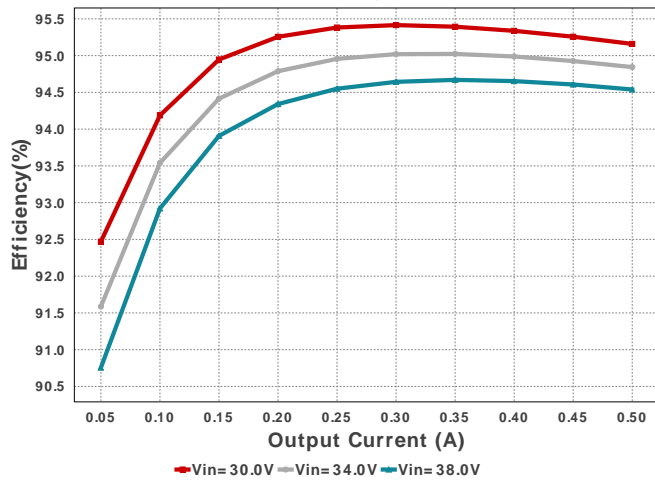


## Electrical BOM

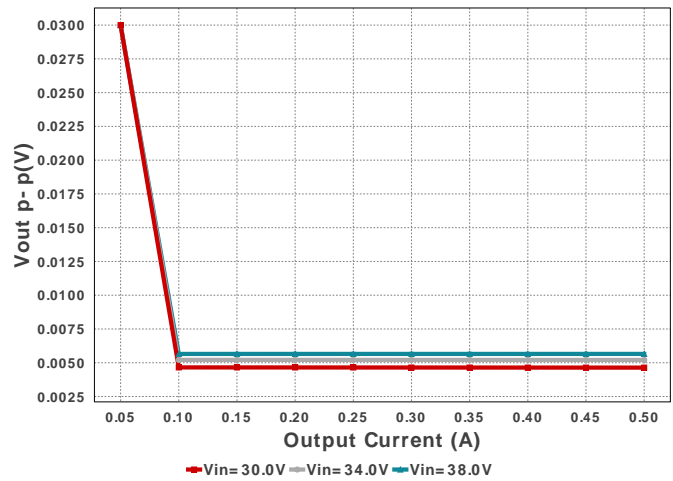
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	TDK	CGA4J2X7R2A104K125AA Series= X7R	Cap= 100.0 nF ESR= 20.726 mOhm VDC= 100.0 V IRMS= 1.456 A	1	\$0.04	 0805 7 mm <sup>2</sup>
2.	Cin	TDK	C2012X7S2A105K125AB Series= X7S	Cap= 1.0 µF ESR= 8.255 mOhm VDC= 100.0 V IRMS= 2.27442 A	2	\$0.14	 0805 7 mm <sup>2</sup>
3.	Cout	TDK	C1608X5R1H105K080AB Series= X5R	Cap= 1.0 µF ESR= 5.522 mOhm VDC= 50.0 V IRMS= 2.2162 A	2	\$0.04	 0603 5 mm <sup>2</sup>
4.	D1	Nexperia	PMEG6010CEH,115	Vf@Io= 570.0 mV VRRM= 60.0 V	1	\$0.04	 SOD-123F 12 mm <sup>2</sup>
5.	L1	Bourns	SRU8043-330Y	L= 33.0 µH DCR= 100.0 mOhm	1	\$0.41	 SRU8043 100 mm <sup>2</sup>
6.	Rfbb	Vishay-Dale	CRCW04028K06FKED Series= CRCW..e3	Res= 8060.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
7.	Rfbs	Panasonic	ERJ-6ENF1503V Series= ERJ-6E	Res= 150000.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
8.	U1	Texas Instruments	LMR16006YDDCR	Switcher	1	\$1.20	 DDC0006A 10 mm <sup>2</sup>



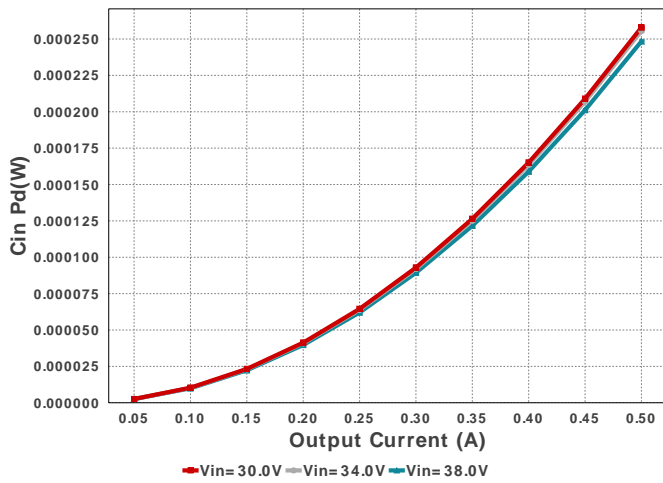
Efficiency



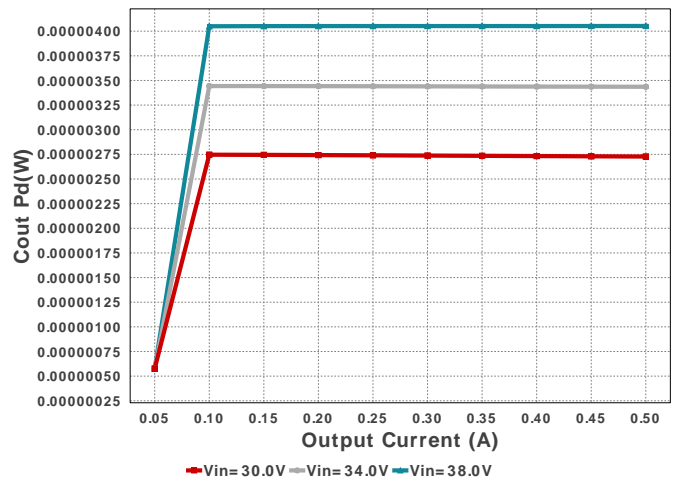
Vout p-p



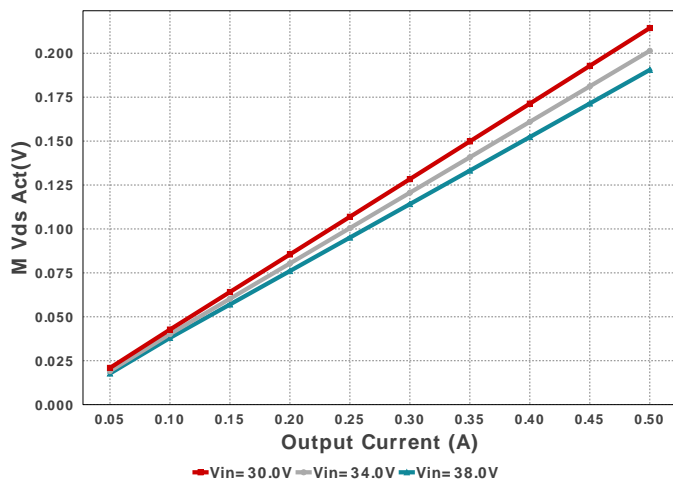
Cin Pd



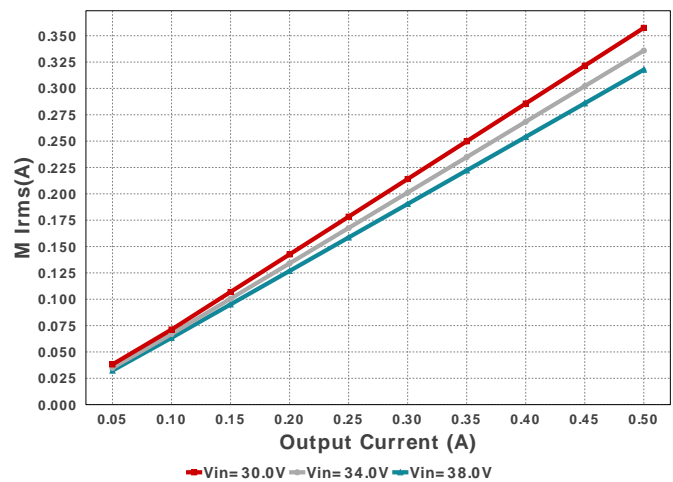
Cout Pd

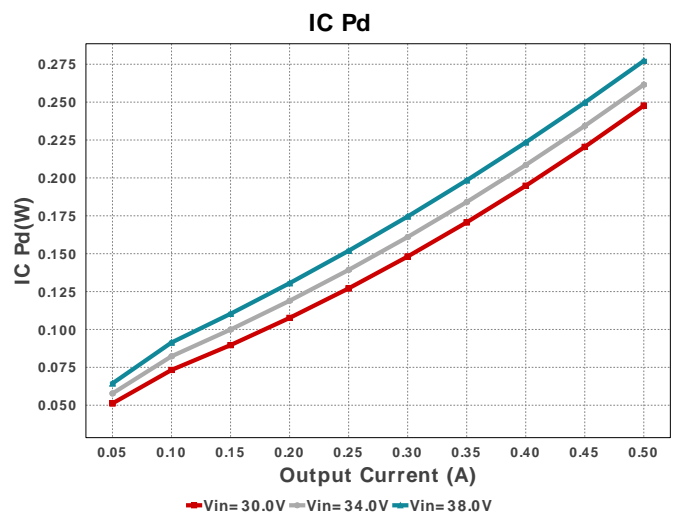
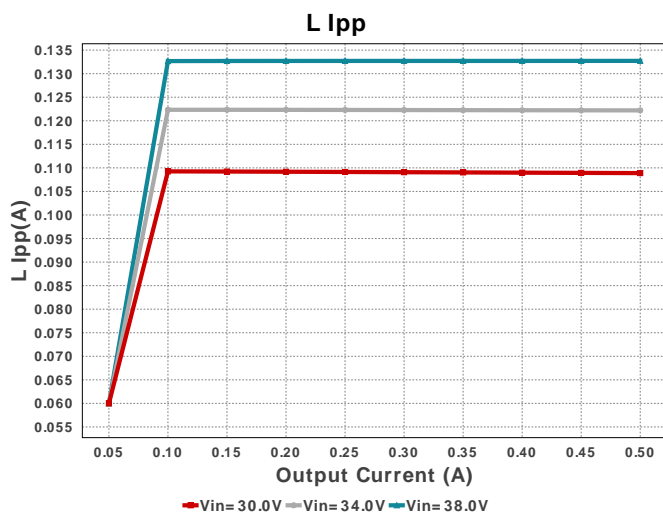
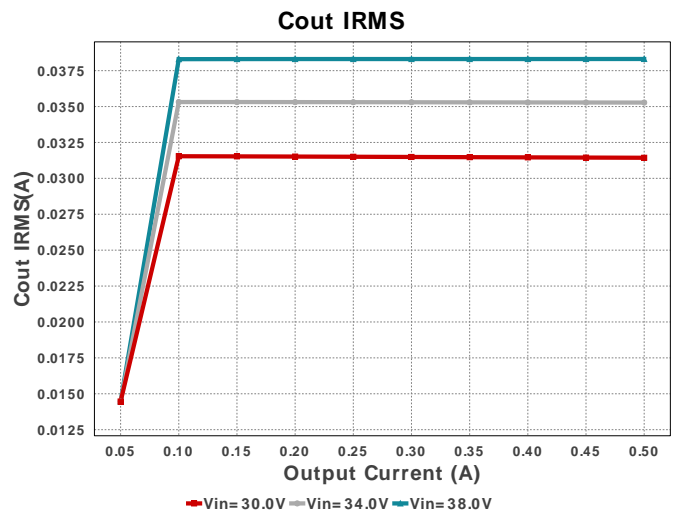
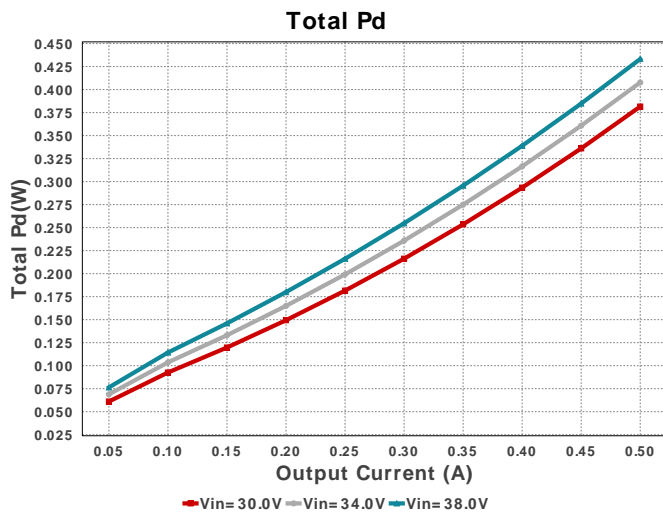
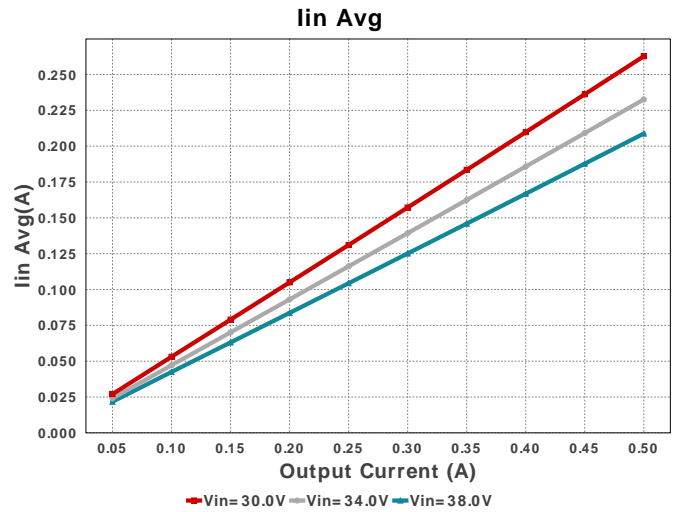
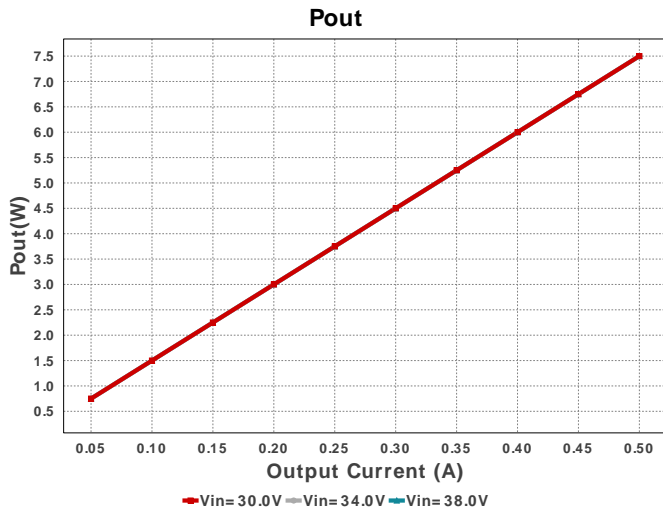


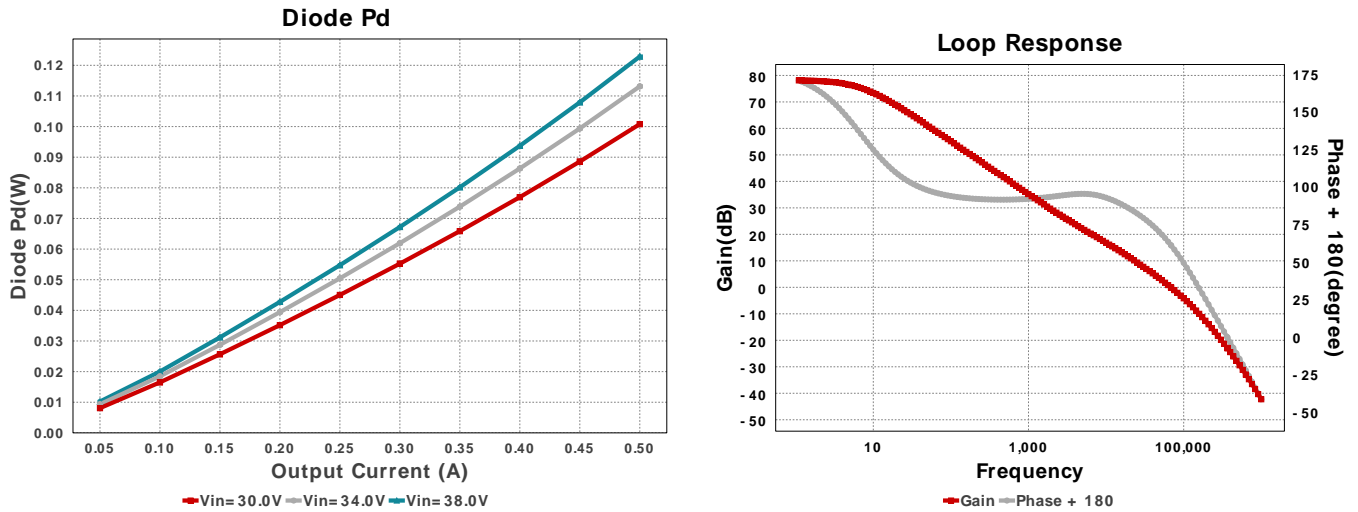
M Vds Act



M Irms







## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	245.319 mA	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	248.4 $\mu$ W	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	38.312 mA	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	4.053 $\mu$ W	Capacitor	Output capacitor power dissipation
5.	D1 Tj	70.544 degC	Diode	D1 junction temperature
6.	Diode Pd	122.86 mW	Diode	Diode power dissipation
7.	IC Ipk	0.0 A	IC	Peak switch current in IC
8.	IC Pd	277.23 mW	IC	IC power dissipation
9.	IC Tj	58.277 degC	IC	IC junction temperature
10.	IC Tolerance	18.0 mV	IC	IC Feedback Tolerance
11.	ICThetaJA	102.0 degC/W	IC	IC junction-to-ambient thermal resistance
12.	Iin Avg	208.77 mA	IC	Average input current
13.	L Ipp	132.72 mA	Inductor	Peak-to-peak inductor ripple current
14.	L Pd	31.445 mW	Inductor	Inductor power dissipation
15.	M Irms	317.793 mA	Mosfet	MOSFET RMS ripple current
16.	M Vds Act	190.536 mV	Mosfet	Voltage drop across the MosFET
17.	Cin Pd	248.4 $\mu$ W	Power	Input capacitor power dissipation
18.	Cout Pd	4.053 $\mu$ W	Power	Output capacitor power dissipation
19.	Diode Pd	122.86 mW	Power	Diode power dissipation
20.	IC Pd	277.23 mW	Power	IC power dissipation
21.	L Pd	31.445 mW	Power	Inductor power dissipation
22.	Total Pd	433.235 mW	Power	Total Power Dissipation
23.	BOM Count	10	System	Total Design BOM count
24.	Cross Freq	68.487 kHz	System	Bode plot crossover frequency
25.	Duty Cycle	40.322 %	System	Duty cycle
26.	Efficiency	94.539 %	System	Steady state efficiency
27.	FootPrint	162.0 mm <sup>2</sup>	System	Total Foot Print Area of BOM components
28.	Frequency	2.1 MHz	System	Switching frequency
29.	Iout	500.0 mA	System	Iout operating point
30.	Mode	CCM	System	Conduction Mode
31.	Phase Marg	61.538 deg	System	Bode Plot Phase Margin
32.	Pout	7.5 W	System	Total output power
33.	Total BOM	\$2.07	System	Total BOM Cost
34.	Vin	38.0 V	System	Vin operating point
35.	Vout	15.0 V	System	Operational Output Voltage
36.	Vout Actual	15.002 V	System	Vout Actual calculated based on selected voltage divider resistors

#	Name	Value	Category	Description
37.	Vout Tolerance	4.315 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
38.	Vout p-p	5.655 mV	System Information	Peak-to-peak output ripple voltage

## Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	38.0	Maximum input voltage
3.	VinMin	30.0	Minimum input voltage
4.	Vout	15.0	Output Voltage
5.	base_pn	LMR16006Y	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

## Design Assistance

1. **LMR16006Y** Product Folder : <http://www.ti.com/product/LMR16006> : contains the data sheet and other resources.

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