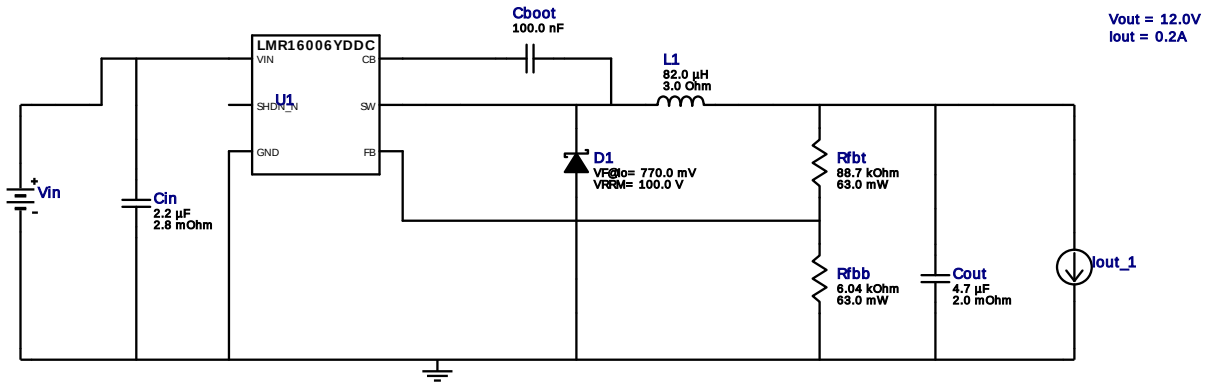
WEBENCH® Design Report

VinMin = 13.0V
VinMax = 60.0V
Vout = 12.0V
Iout = 0.2A

Device = LMR16006YDDCR
Topology = Buck
Created = 1/25/16 9:24:00 AM
BOM Cost = $1.87
BOM Count = 8
Total Pd = 0.47W

Design : 702229/60 LMR16006YDDCR
LMR16006YDDCR 13.0V-60.0V to 12.00V @ 0.2A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM188R72A104KA35D Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	$0.03	0603 5 mm²
2.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 2.8 mOhm VDC= 100.0 V IRMS= 9.8247 A	1	$0.19	1210 15 mm²
3.	Cout	MuRata	GRM21BR61E475MA12L Series= X5R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A	1	$0.06	0805 7 mm²
4.	D1	Diodes Inc.	DFLS1100-7	VF@Io= 770.0 mV VRRM= 100.0 V	1	$0.14	PowerDI123 13 mm²
5.	L1	Coilcraft	ME3220-823KLB	L= 82.0 µH DCR= 3.0 Ohm	1	$0.23	ME3220 16 mm²
6.	Rfbb	Vishay-Dale	CRCW04026K04FKED Series= CRCW..e3	Res= 6.04 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbt	Vishay-Dale	CRCW040288K7FKED Series= CRCW..e3	Res= 88.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	U1	Texas Instruments	LMR16006YDDCR	Switcher	1	$1.20	DDC0006A 10 mm²

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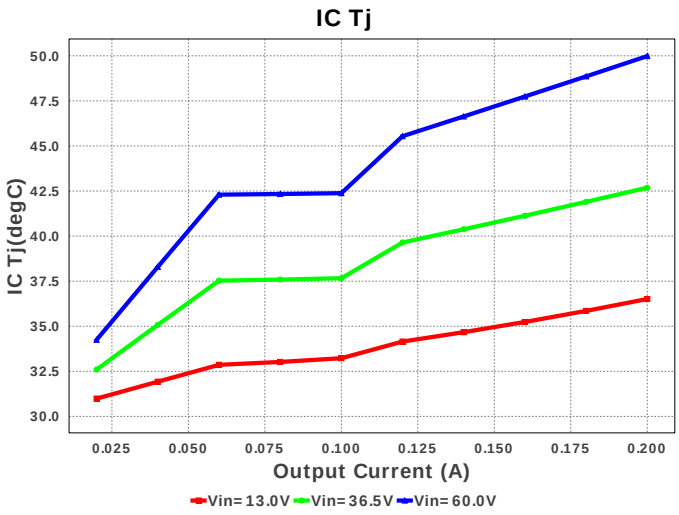

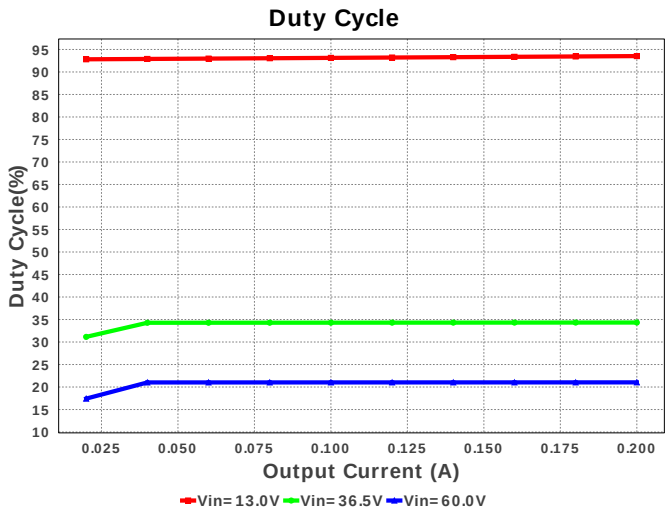

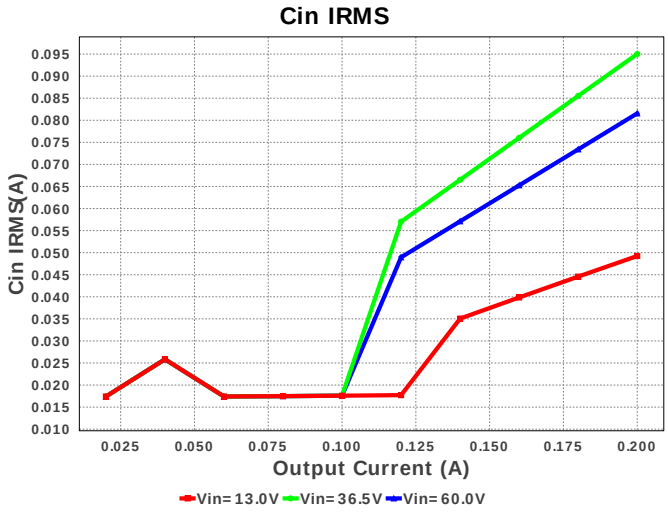

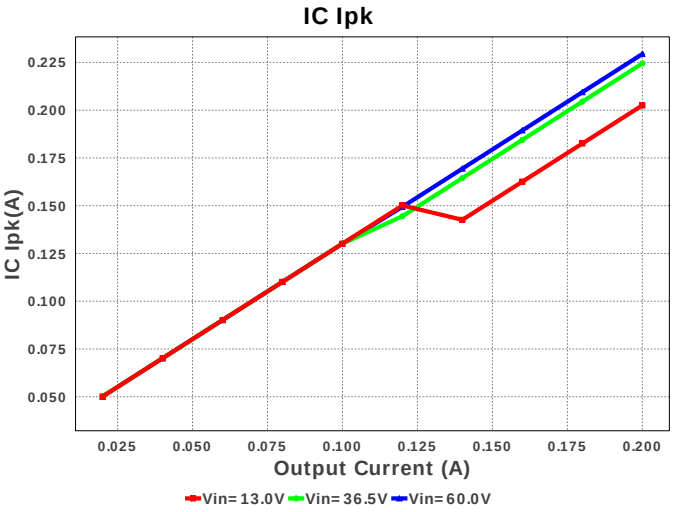

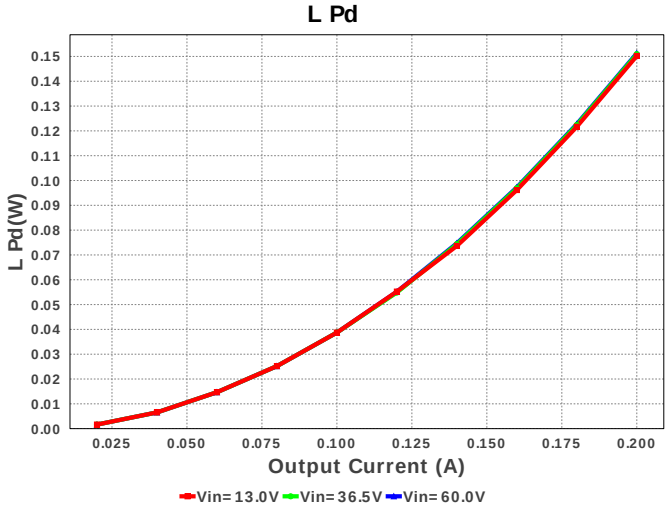

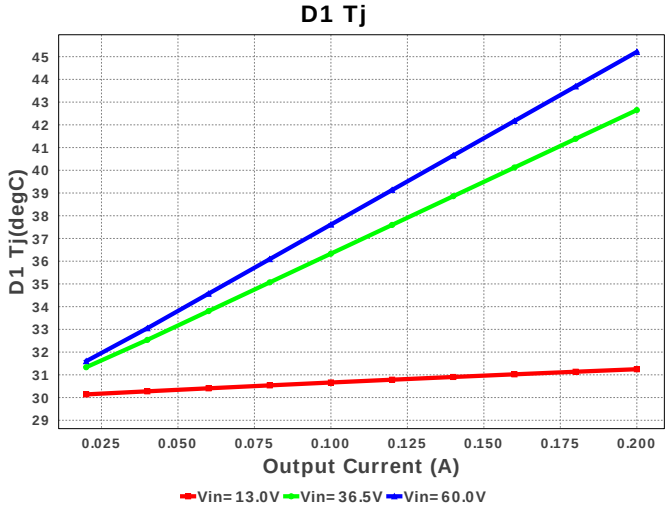

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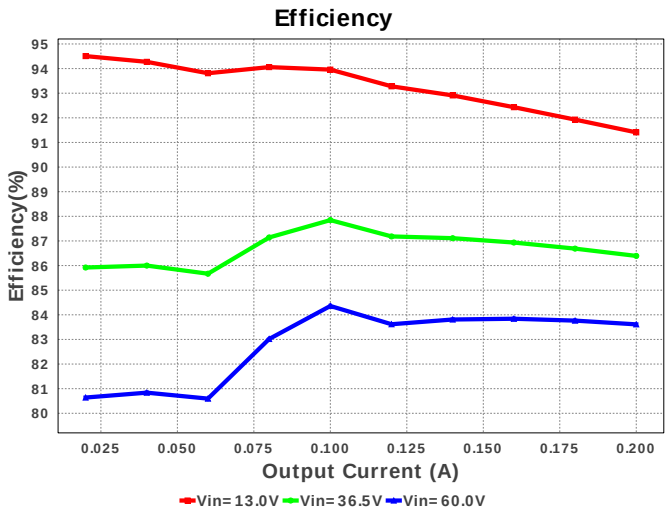

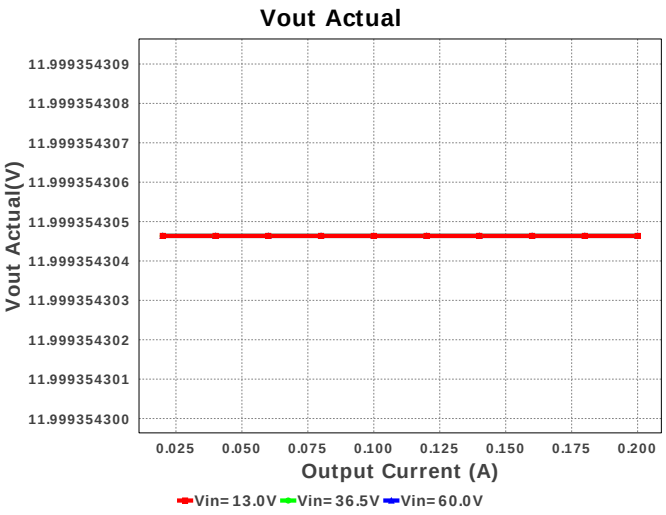

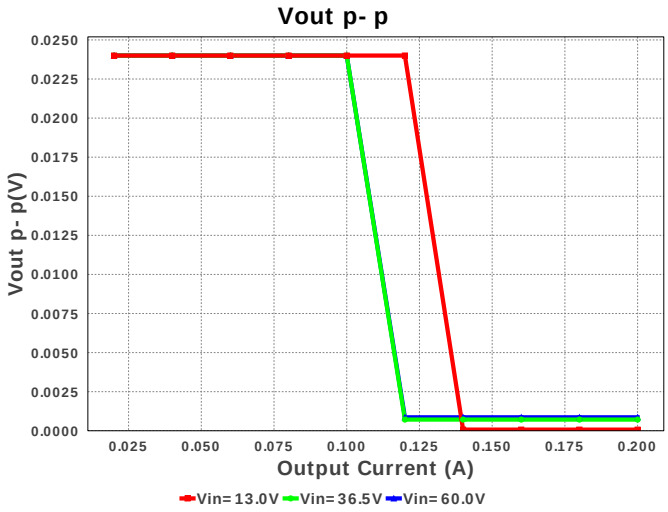

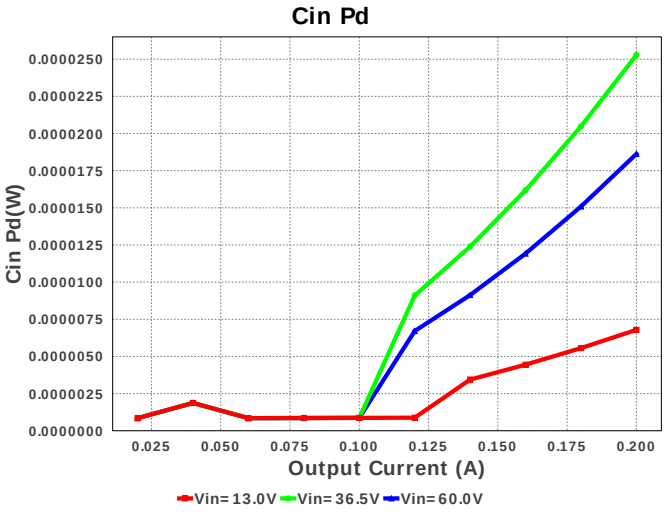

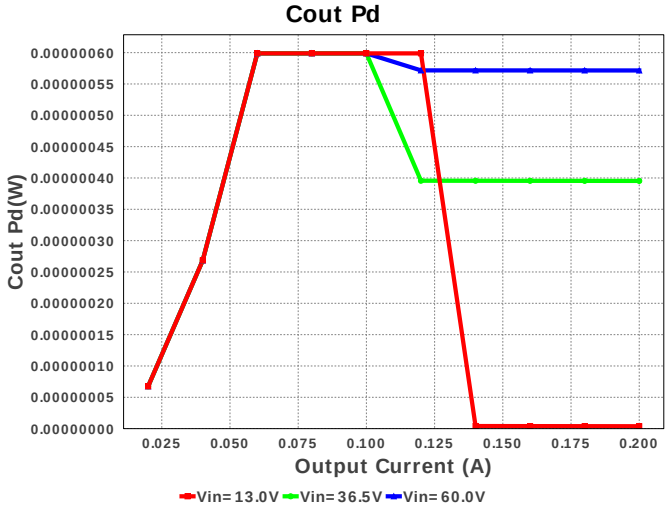

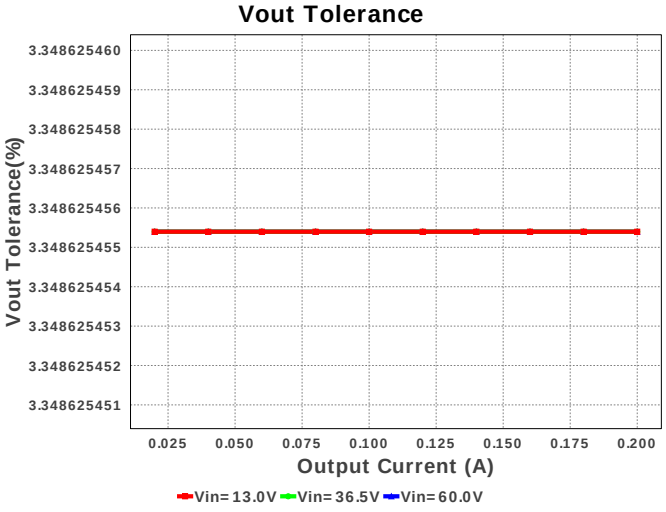

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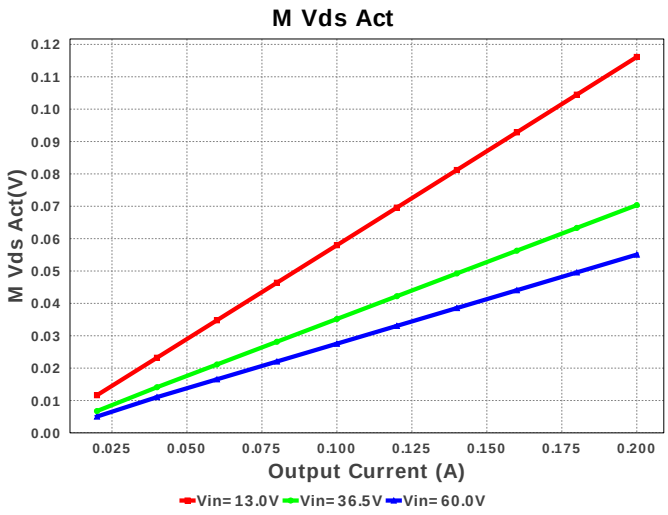

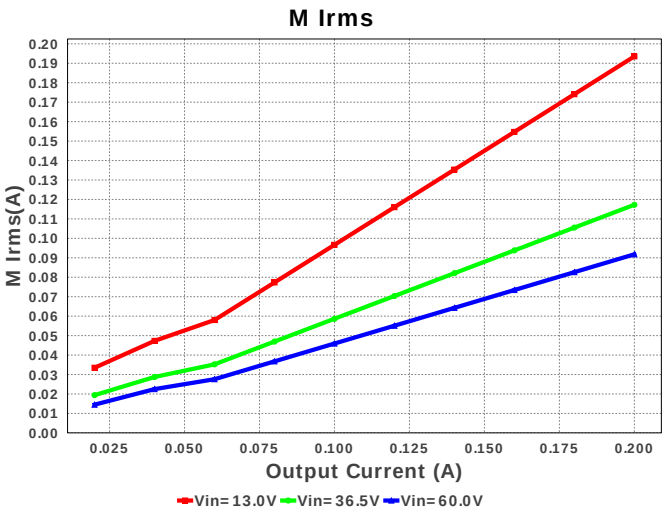

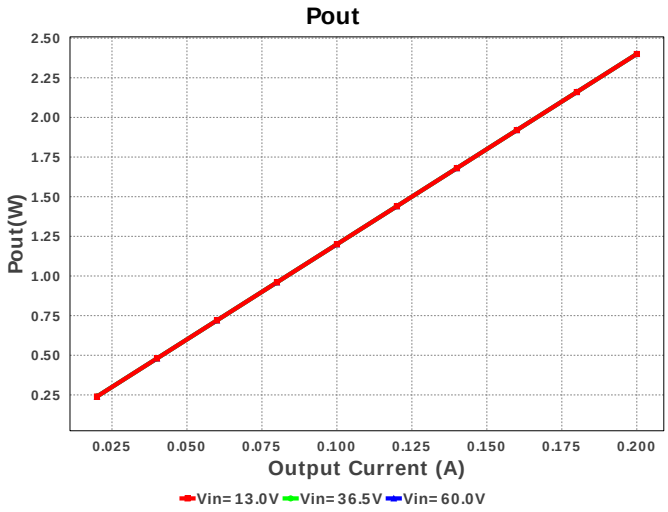

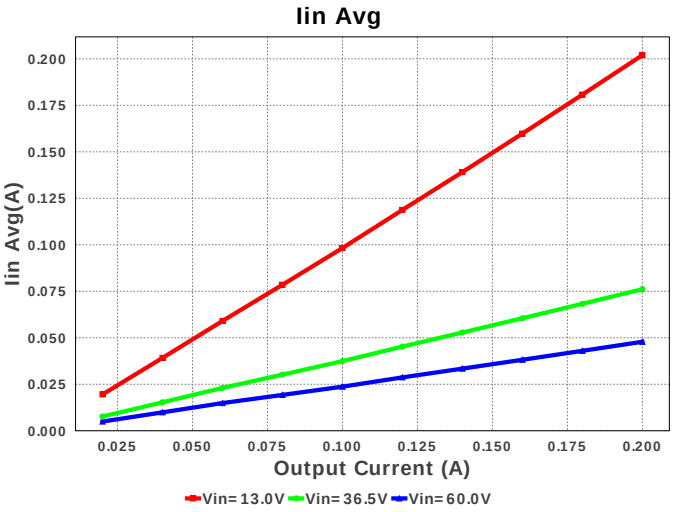

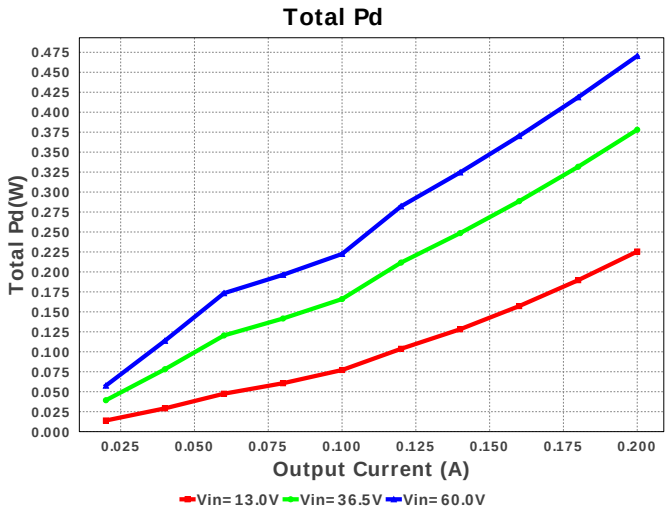

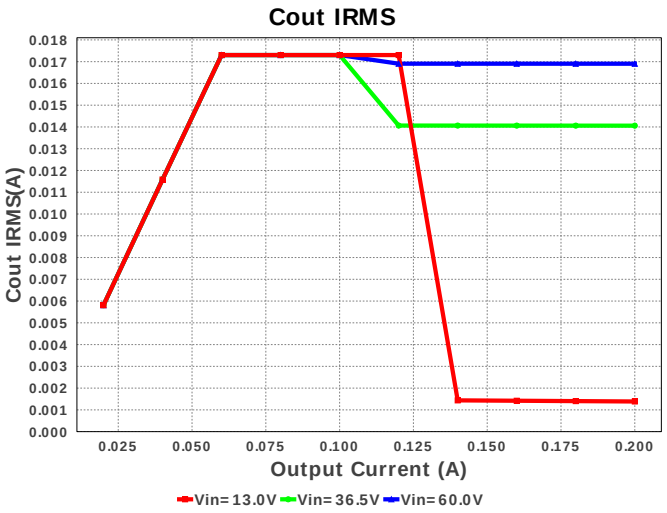

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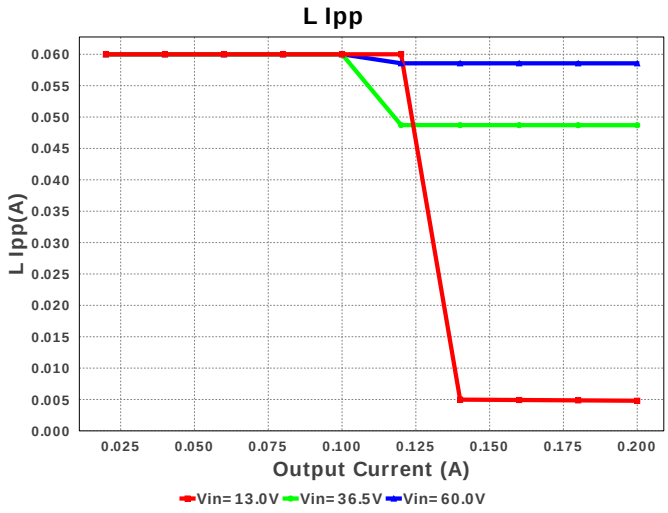

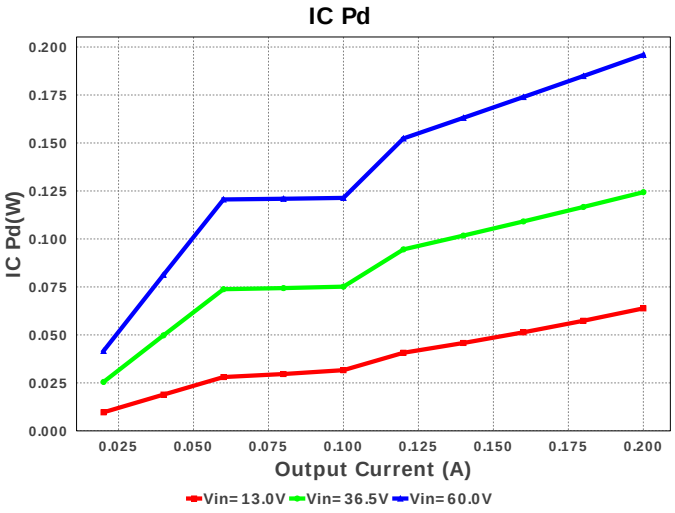

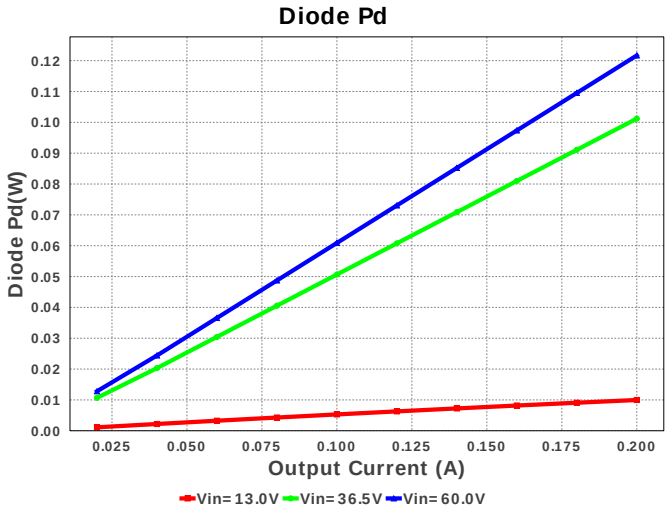

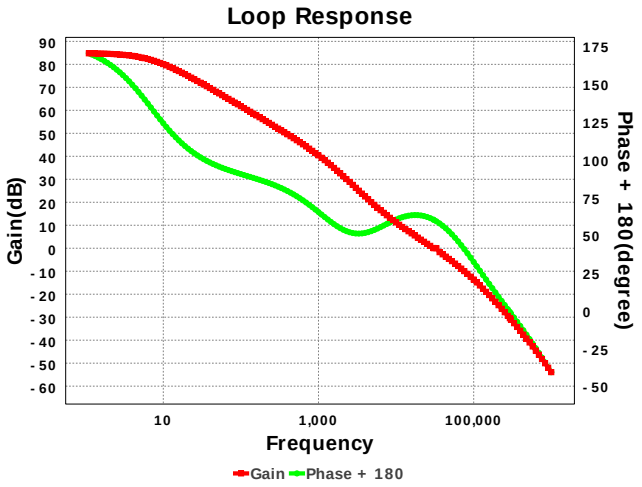

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	81.56 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	16.905 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	229.407 mA	Current	Peak switch current in IC
4.	Iin Avg	47.84 mA	Current	Average input current
5.	L Ipp	58.561 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	91.794 mA	Current	Q Iavg
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	72.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	2.1 MHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	55.069 mV	General	Voltage drop across the MosFET
12.	Pout	2.4 W	General	Total output power
13.	Total BOM	$1.87	General	Total BOM Cost
14.	D1 Tj	45.211 degC	Op_Point	D1 junction temperature
15.	Vout Actual	11.999 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	30.627 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	21.033 %	Op_point	Duty cycle
19.	Efficiency	83.612 %	Op_point	Steady state efficiency
20.	IC Tj	49.984 degC	Op_point	IC junction temperature
21.	ICThetaJA	102.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	200.0 mA	Op_point	Iout operating point
23.	Phase Marg	60.869 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	60.0 V	Op_point	Vin operating point
25.	Vout p-p	860.066 µV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	18.626 µW	Power	Input capacitor power dissipation
27.	Cout Pd	571.556 nW	Power	Output capacitor power dissipation
28.	Diode Pd	121.687 mW	Power	Diode power dissipation
29.	IC Pd	195.92 mW	Power	IC power dissipation
30.	L Pd	151.262 mW	Power	Inductor power dissipation

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#	Name	Value	Category	Description
31.	Total Pd	470.401 mW	Power	Total Power Dissipation
32.	Vout Tolerance	3.349 %	Unknown	Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	60.0	Maximum input voltage
3.	VinMin	13.0	Minimum input voltage
4.	Vout	12.0	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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