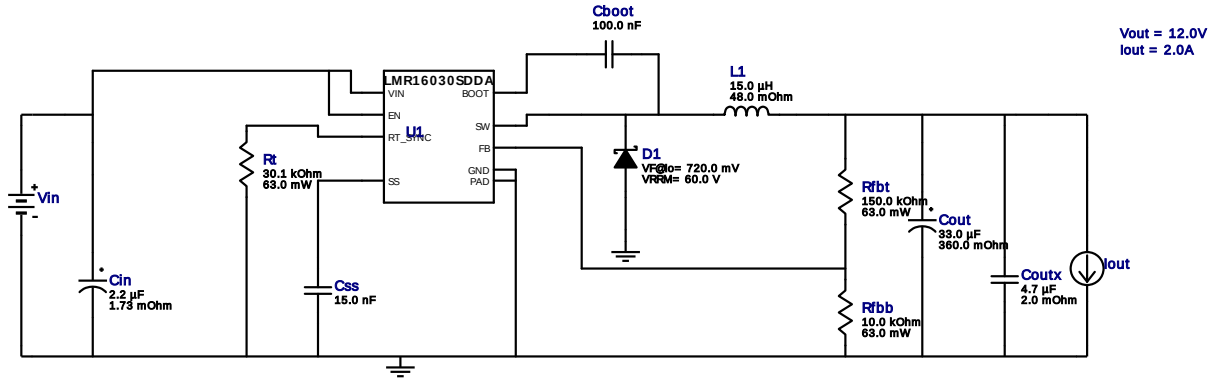
VinMin = 32.0V
VinMax = 38.0V
Vout = 12.0V
Iout = 2.0A

Device = LMR16030SDDAR
Topology = Buck
Created = 9/23/16 7:57:35 PM
BOM Cost = $2.90
BOM Count = 12
Total Pd = 2.05W

WEBENCH® Design Report

Design : 4802645/3 LMR16030SDDAR
LMR16030SDDAR 32.0V-38.0V to 12.00V @ 2.0002249999999995A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Taiyo Yuden	HMK212B7104KG-T Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
2.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 1.73 mOhm VDC= 100.0 V IRMS= 5.5932 A	1	$0.19	1210_250 15 mm²
3.	Cout	Panasonic	EEE-FK1E330P Series= FK	Cap= 33.0 uF ESR= 360.0 mOhm VDC= 25.0 V IRMS= 240.0 mA	1	$0.11	SM_RADIAL_D 84 mm²
4.	Coutx	MuRata	GRM21BR61E475MA12L Series= X5R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A	1	$0.02	0805 7 mm²
5.	Coutx	MuRata	GRM21BR61E475MA12L Series= X5R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A	1	$0.02	0805 7 mm²
6.	Css	MuRata	GRM155R71C153KA01D Series= X7R	Cap= 15.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
7.	D1	ON Semiconductor	SS16T3G	VF@Io= 720.0 mV VRRM= 60.0 V	1	$0.08	SMA 37 mm²
8.	L1	TDK	CLF10040T-150M	L= 15.0 µH DCR= 48.0 mOhm	1	$0.46	CLF10040 148 mm²
9.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

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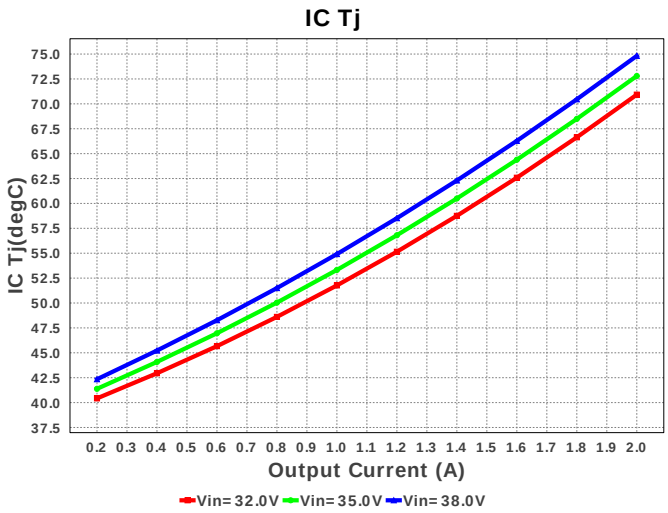
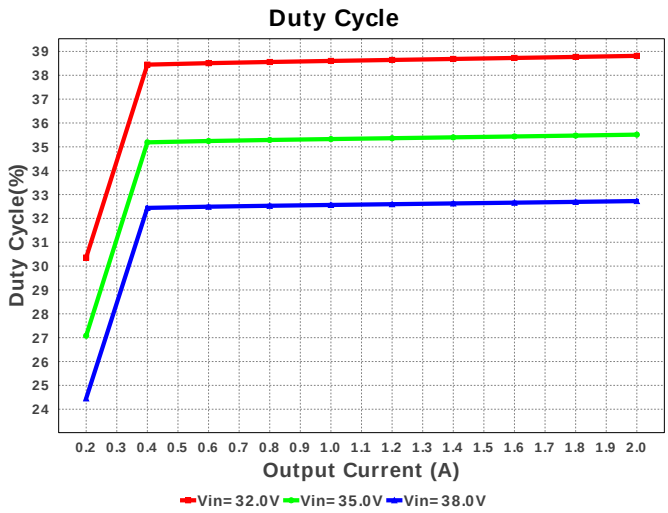
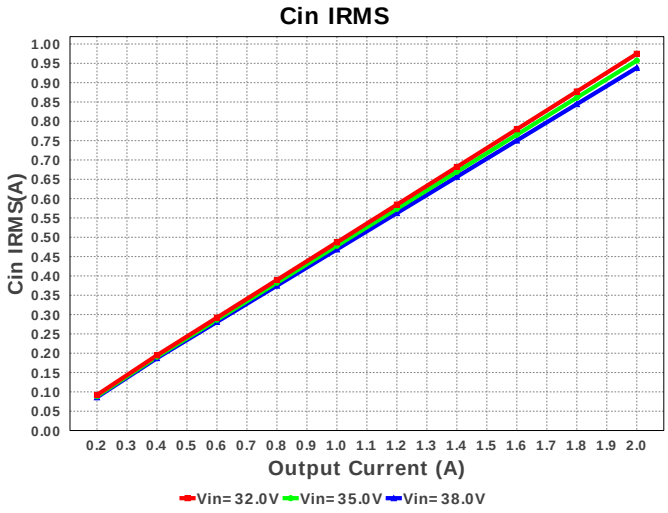
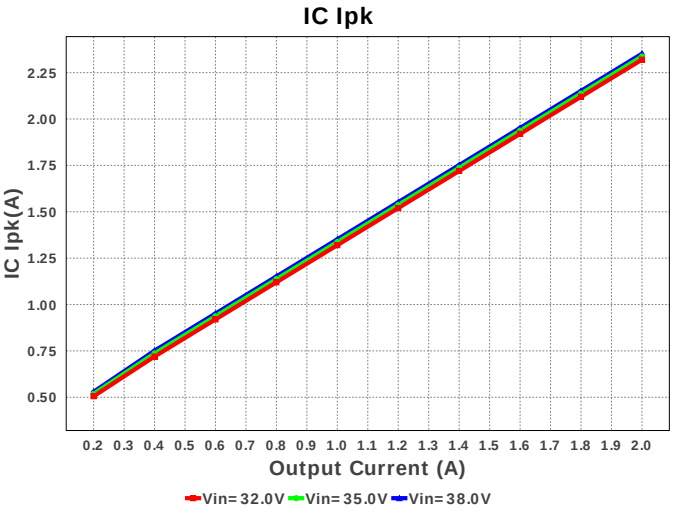
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rt	Vishay-Dale	CRCW040230K1FKED Series= CRCW..e3	Res= 30.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	LMR16030SDDAR	Switcher	1	$1.95	DDA0008E_N 57 mm^2









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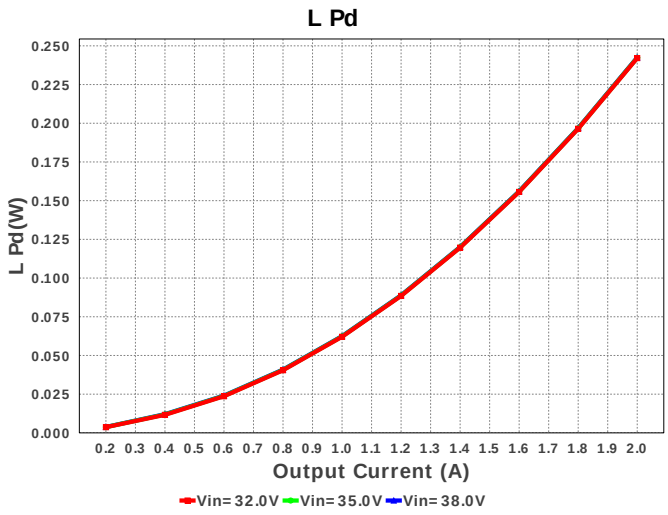

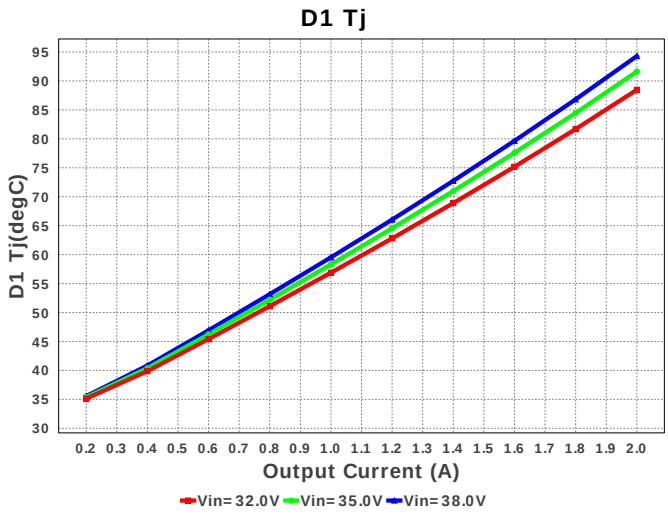

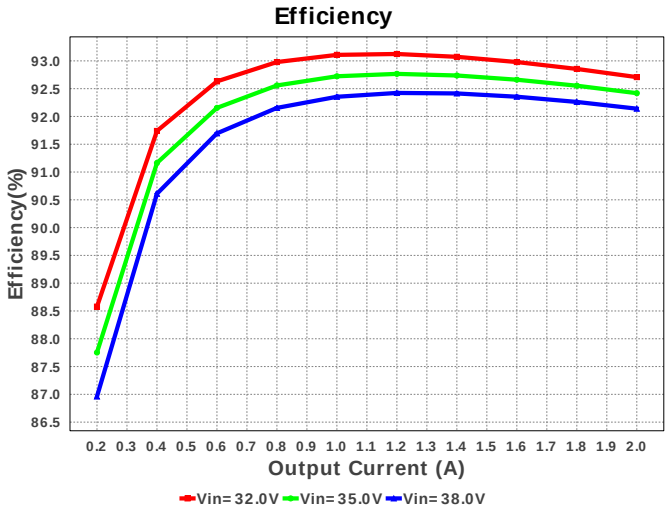

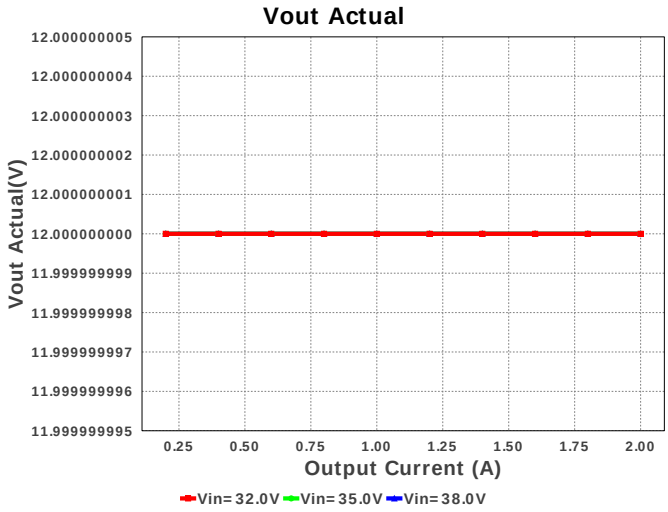

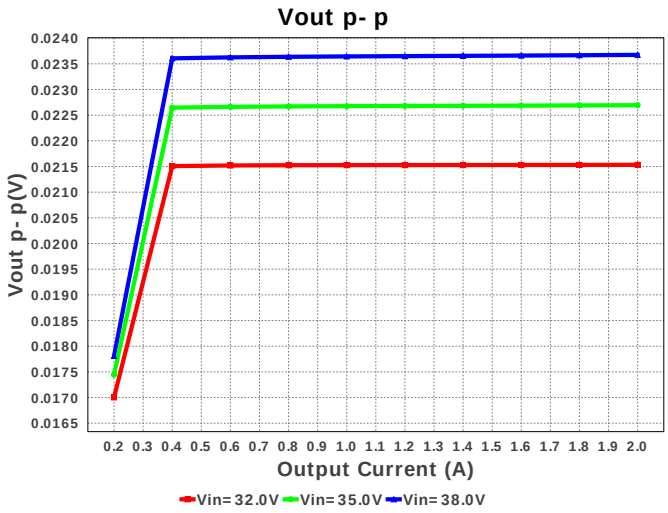

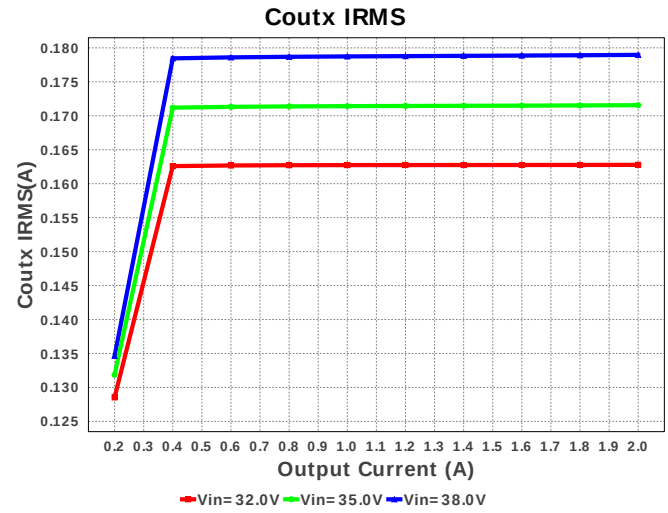

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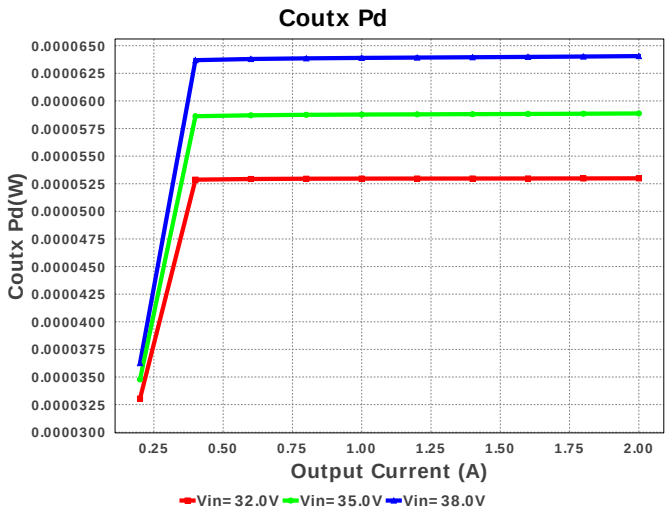

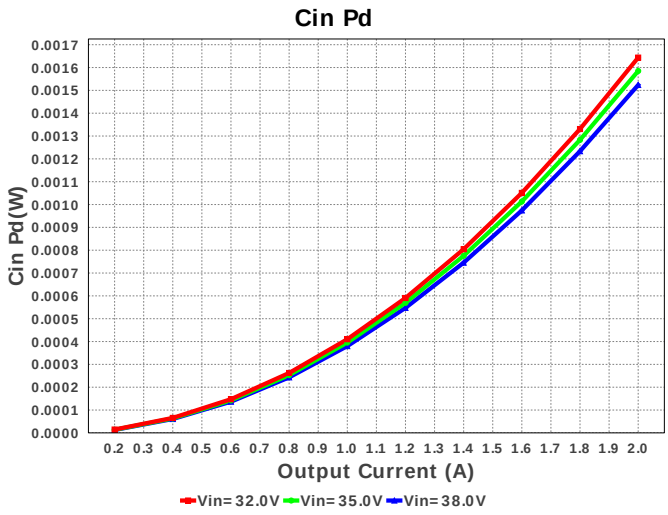

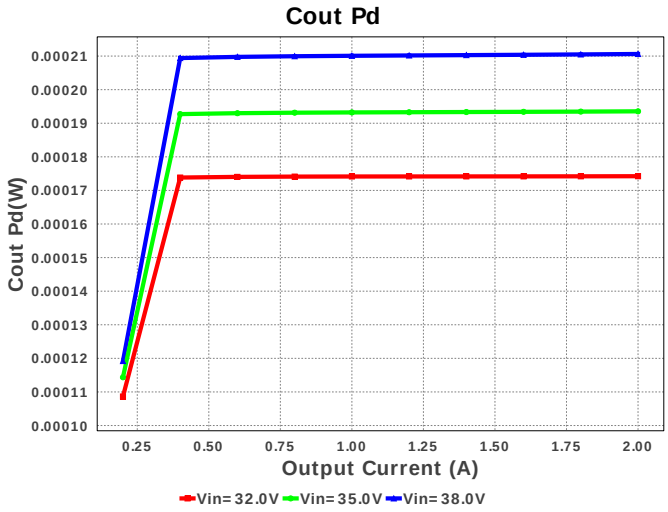

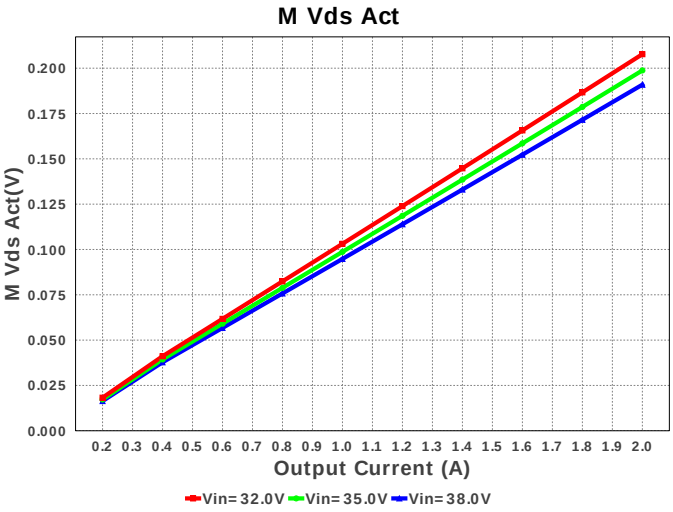

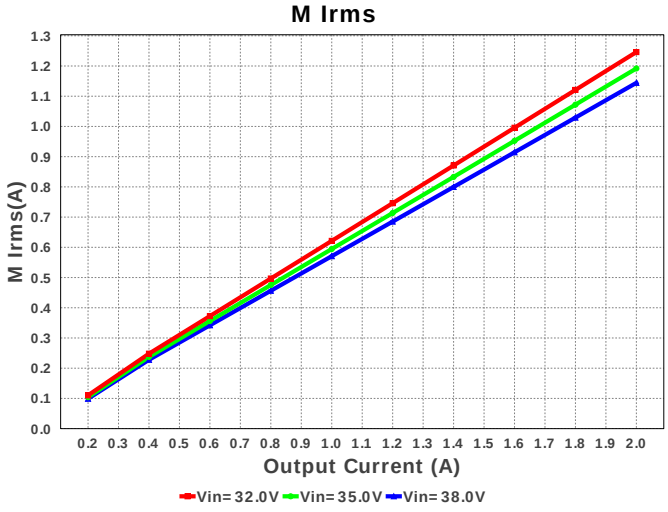

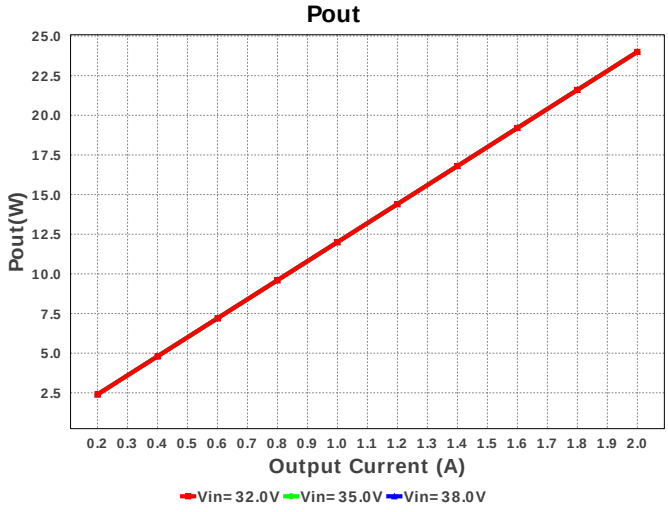

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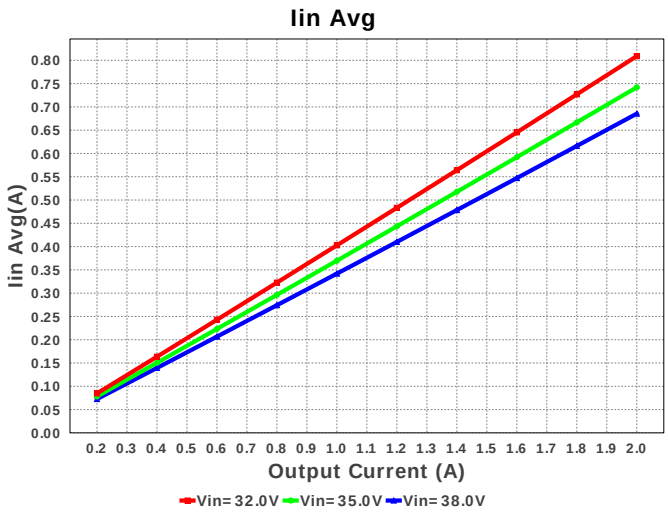

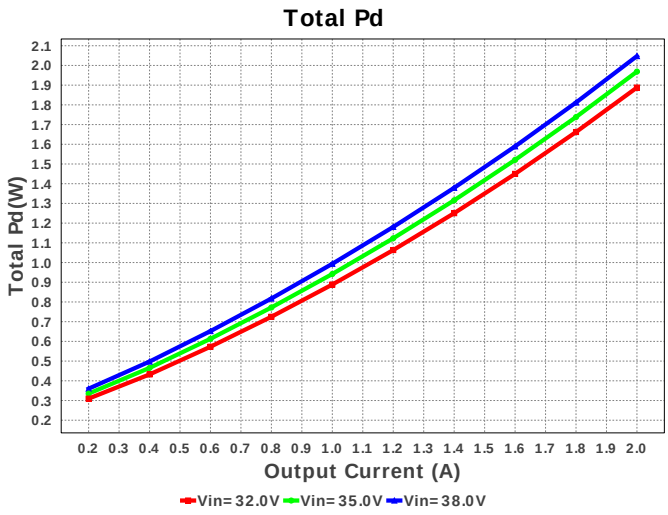

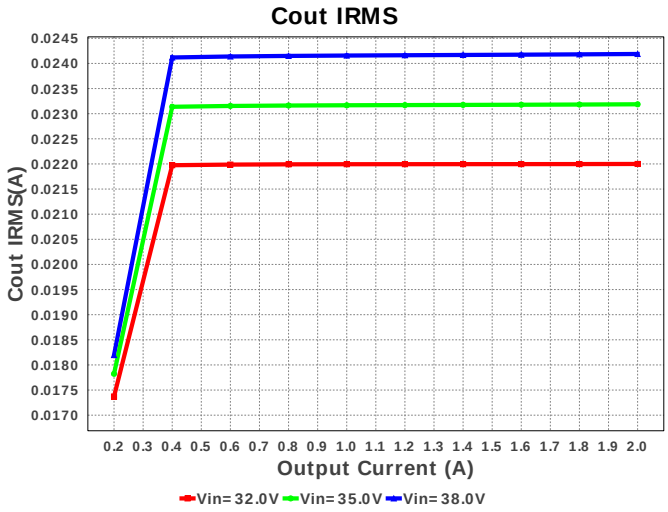

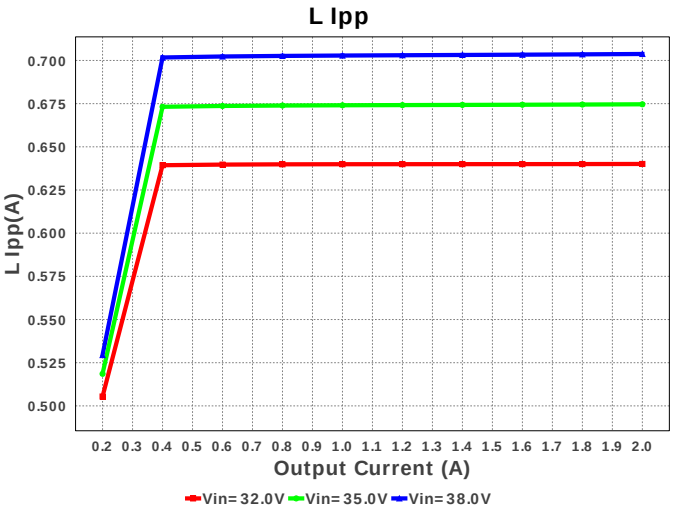

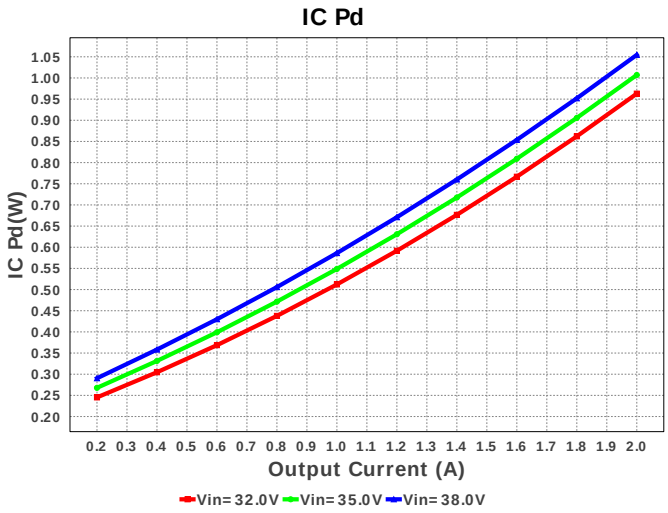

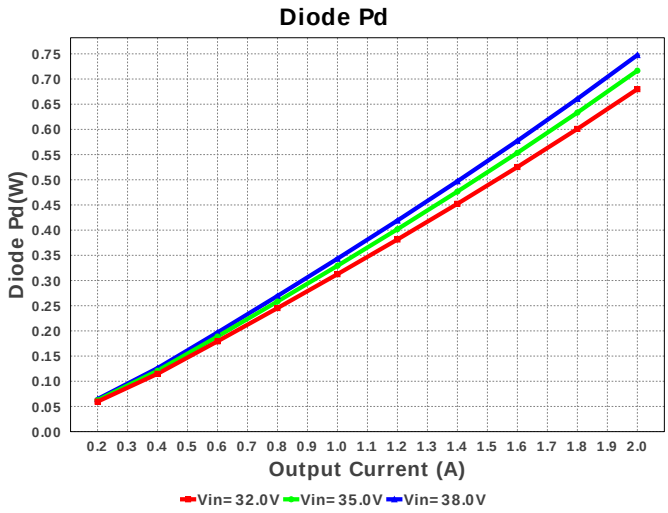

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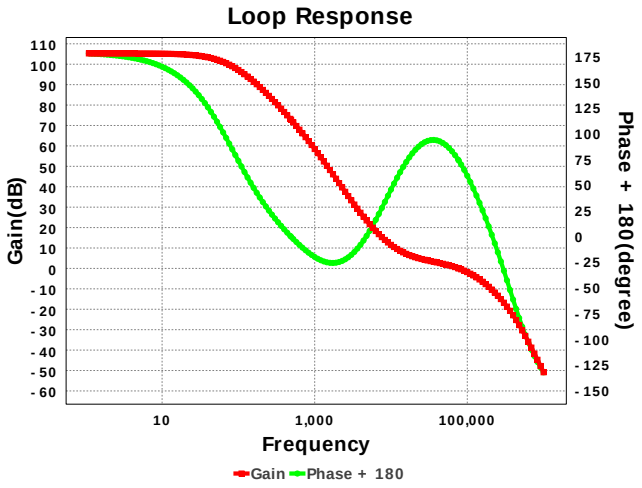

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	938.468 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	24.188 mA	Current	Output capacitor RMS ripple current
3.	Coutx IRMS	178.967 mA	Current	Output capacitor_x RMS ripple current
4.	IC Ipk	2.352 A	Current	Peak switch current in IC
5.	Iin Avg	685.48 mA	Current	Average input current
6.	L Ipp	703.75 mA	Current	Peak-to-peak inductor ripple current
7.	M1 Irms	1.144 A	Current	Q Iavg
8.	BOM Count	12	General	Total Design BOM count
9.	FootPrint	374.0 mm^2	General	Total Foot Print Area of BOM components
10.	Frequency	800.145 kHz	General	Switching frequency
11.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	190.879 mV	General	Voltage drop across the MosFET
13.	Mode	CCM	General	Conduction Mode
14.	Pout	24.0 W	General	Total output power
15.	Total BOM	$2.9	General	Total BOM Cost
16.	D1 Tj	94.289 degC	Op_Point	D1 junction temperature
17.	Vout Actual	12.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
19.	Cross Freq	84.012 kHz	Op_point	Bode plot crossover frequency
20.	Duty Cycle	32.727 %	Op_point	Duty cycle
21.	Efficiency	92.14 %	Op_point	Steady state efficiency
22.	IC Tj	74.29 degC	Op_point	IC junction temperature
23.	ICThetaJA	42.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	2.0 A	Op_point	Iout operating point
25.	Phase Marg	66.794 deg	Op_point	Bode Plot Phase Margin
26.	VIN_OP	38.0 V	Op_point	Vin operating point
27.	Vout p-p	23.674 mV	Op_point	Peak-to-peak output ripple voltage
28.	Cin Pd	1.524 mW	Power	Input capacitor power dissipation
29.	Cout Pd	210.622 µW	Power	Output capacitor power dissipation
30.	Coutx Pd	64.059 µW	Power	Output capacitor_x power loss
31.	Diode Pd	747.546 mW	Power	Diode power dissipation
32.	IC Pd	1.055 W	Power	IC power dissipation
33.	L Pd	242.494 mW	Power	Inductor power dissipation
34.	Total Pd	2.047 W	Power	Total Power Dissipation
35.	Vout Tolerance	4.339 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	38.0	Maximum input voltage
3.	VinMin	32.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	LMR16030S	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMR16030S** Product Folder : http://www.ti.com/product/LMR16030 : contains the data sheet and other resources.

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