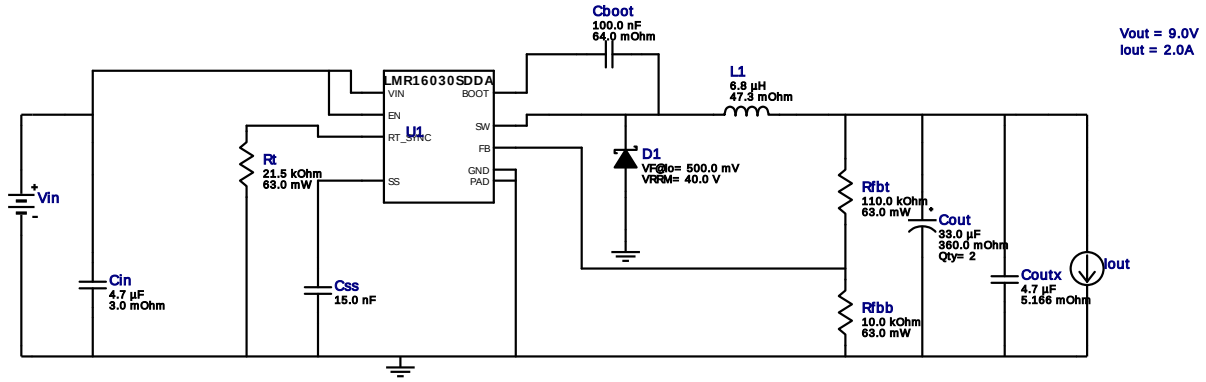
VinMin = 14.0V
VinMax = 25.0V
Vout = 9.0V
Iout = 2.0A

Device = LMR16030SDDAR
Topology = Buck
Created = 7/15/16 7:40:14 PM
BOM Cost = $2.56
BOM Count = 12
Total Pd = 1.72W

WEBENCH® Design Report

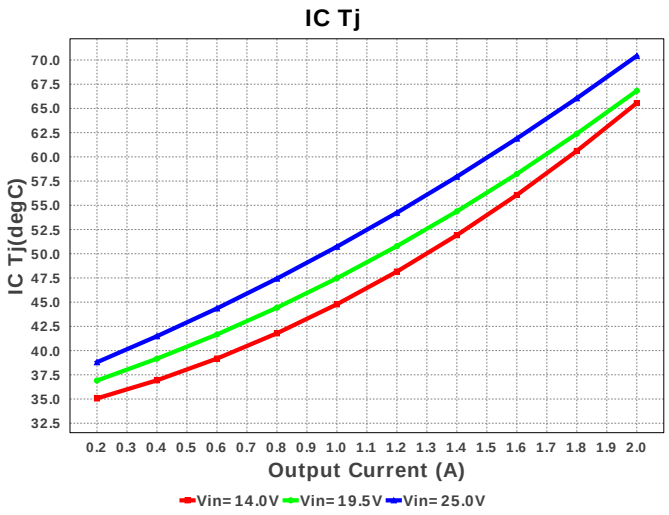
Design : 4742013/26 LMR16030SDDAR
LMR16030SDDAR 14.0V-25.0V to 9.00V @ 2.0002249999999995A

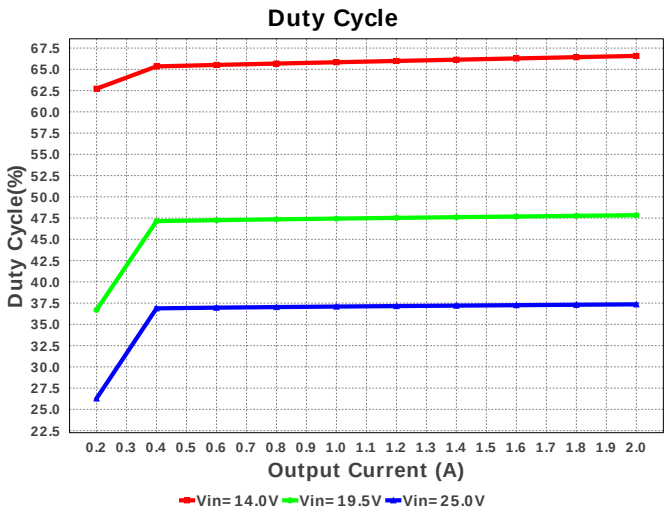


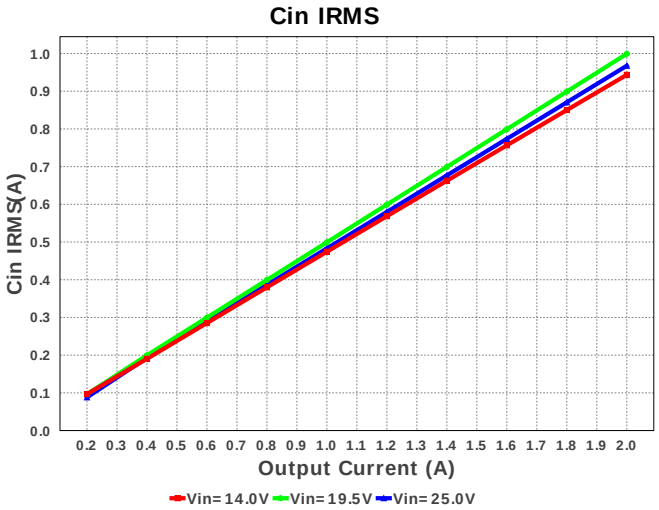
Electrical BOM

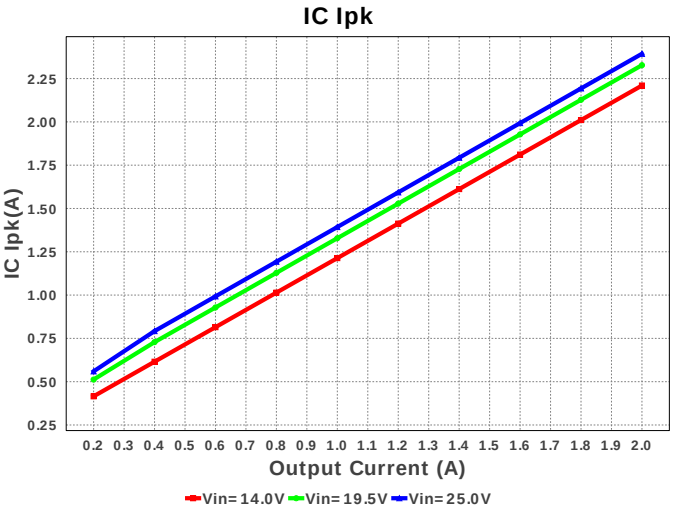
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	$0.07	1206 11 mm²
3.	Cout	Panasonic	EEE-FK1E330P Series= FK	Cap= 33.0 uF ESR= 360.0 mOhm VDC= 25.0 V IRMS= 240.0 mA	2	$0.11	SM_RADIAL_D 84 mm²
4.	Coutx	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	$0.02	0805 7 mm²
5.	Css	MuRata	GRM155R71C153KA01D Series= X7R	Cap= 15.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
6.	D1	Diodes Inc.	B240A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	$0.09	SMA 37 mm²
7.	L1	Bourns	SRN6045-6R8Y	L= 6.8 µH DCR= 47.3 mOhm	1	$0.16	SRN6045 64 mm²
8.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbt	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rt	Vishay-Dale	CRCW040221K5FKED Series= CRCW..e3	Res= 21.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

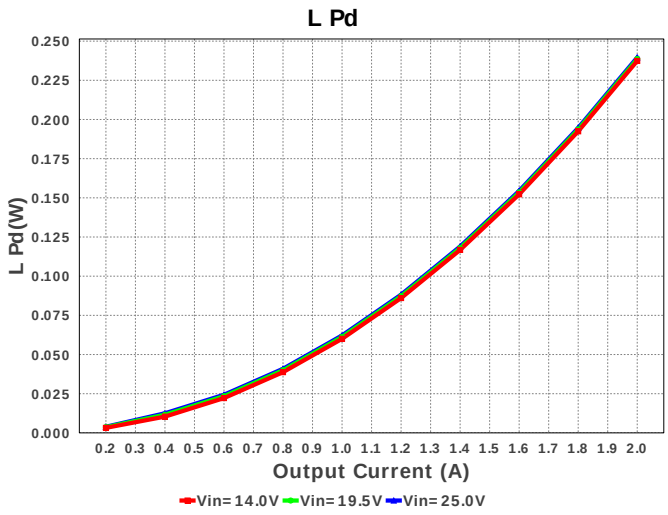
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	LMR16030SDDAR	Switcher	1	$1.95	DDA0008E_N 57 mm²

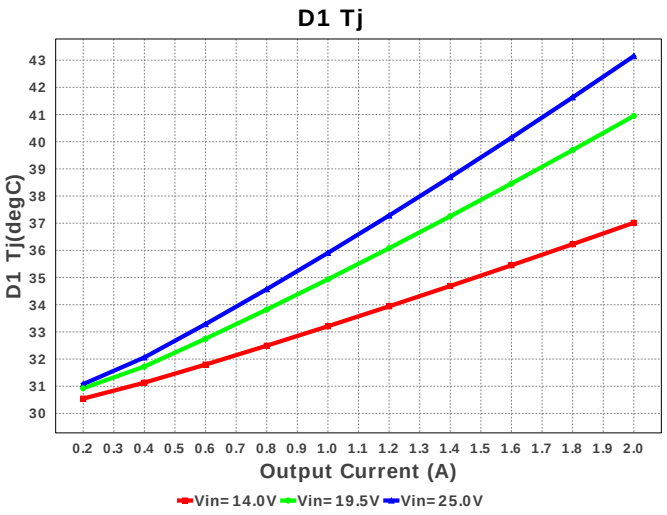


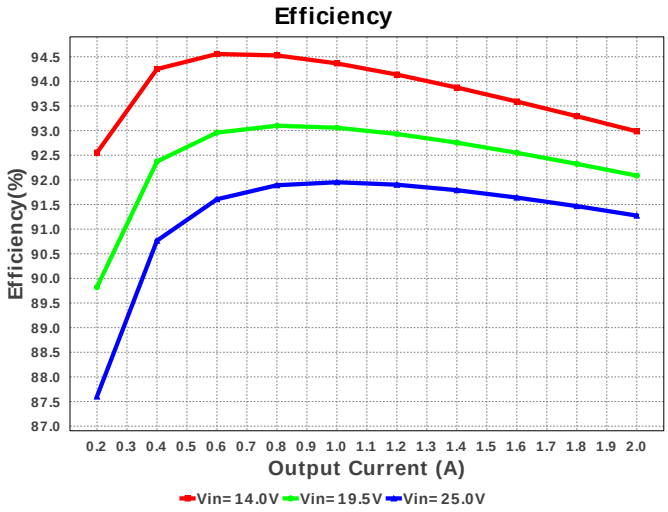


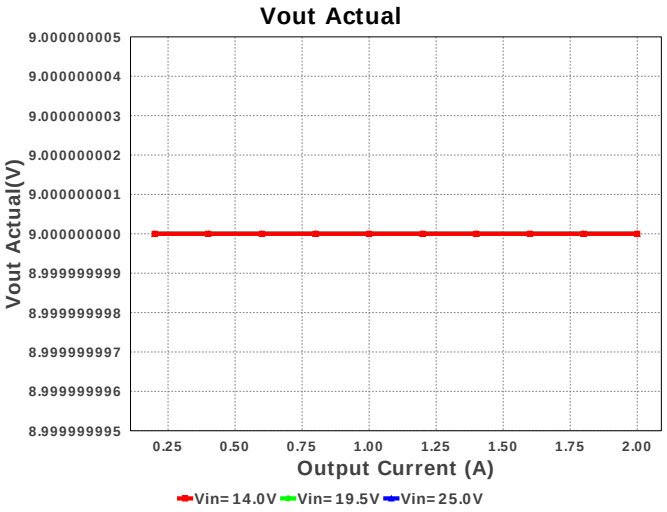


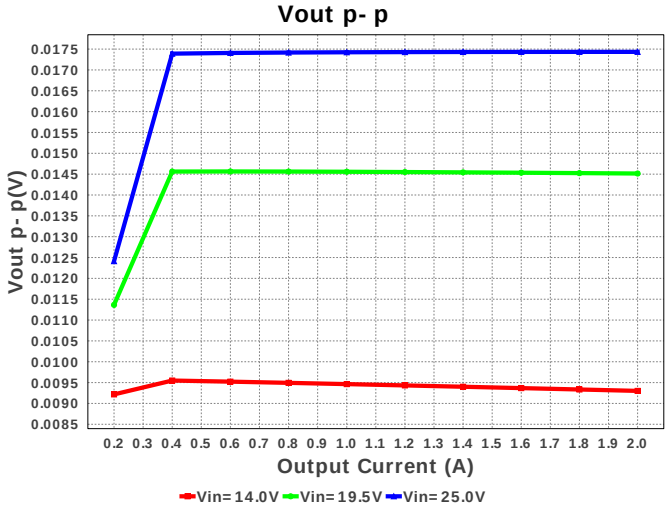


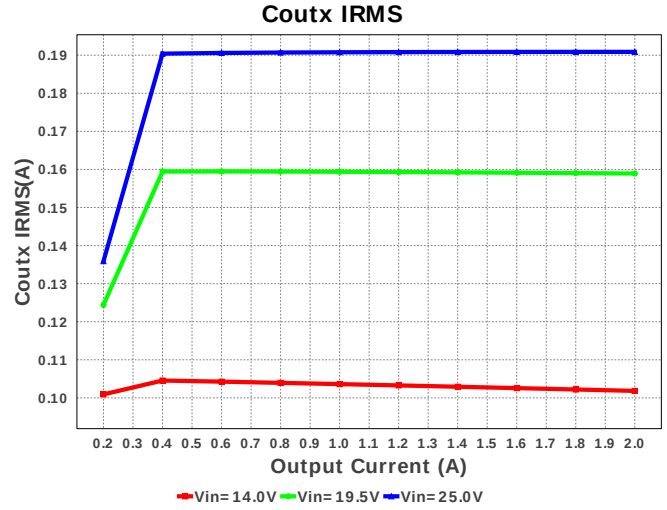


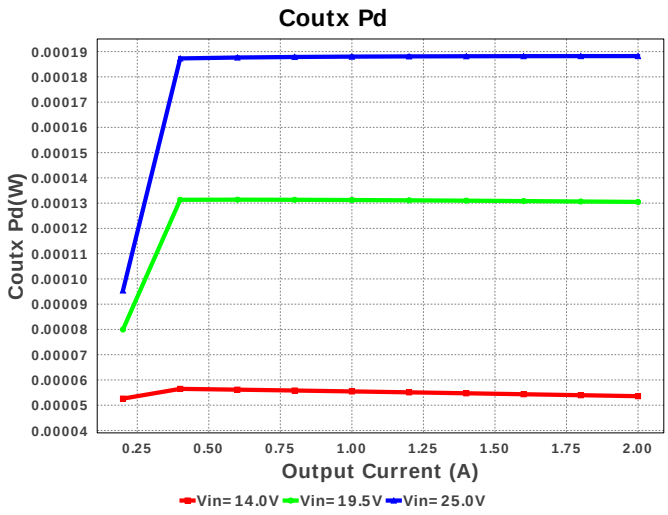


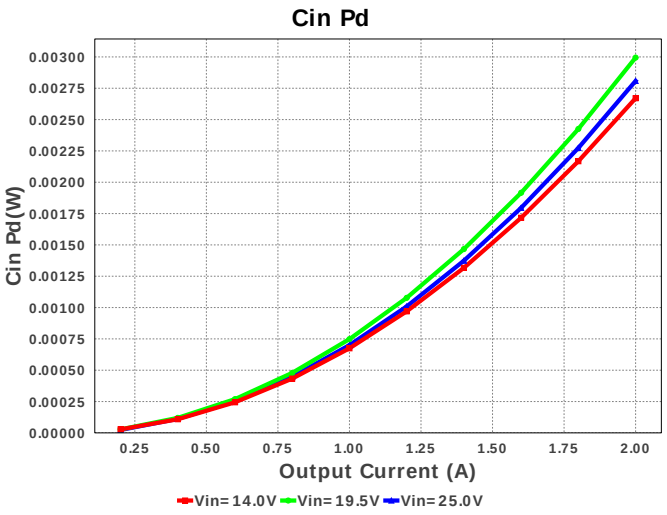


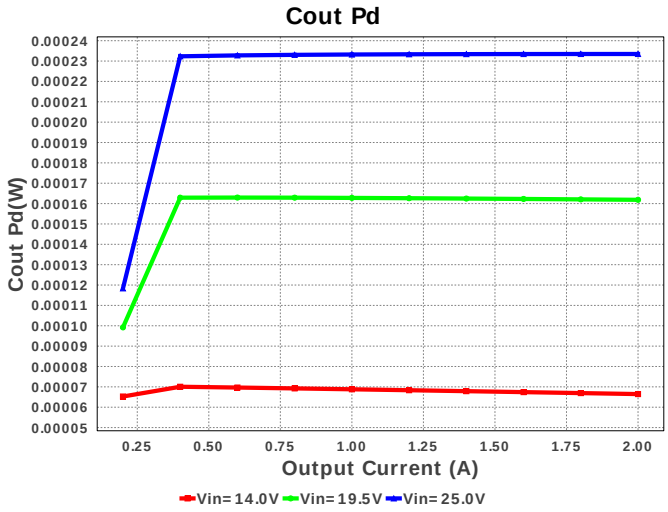


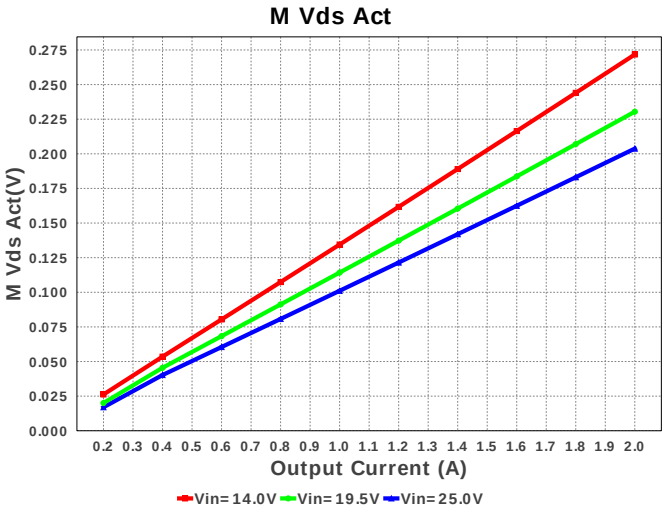


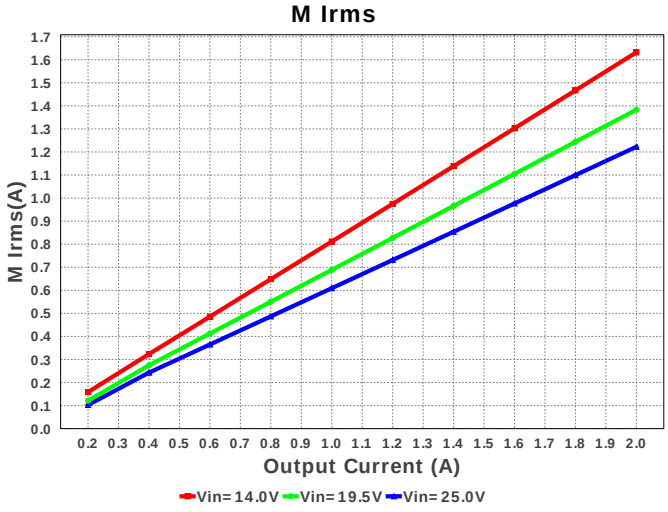


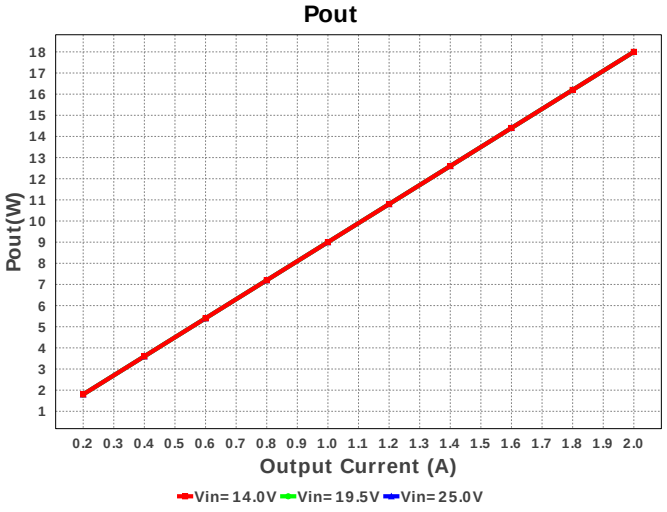


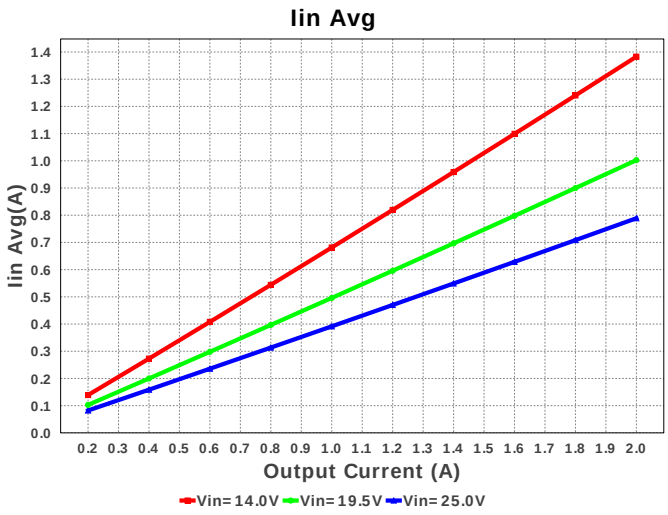


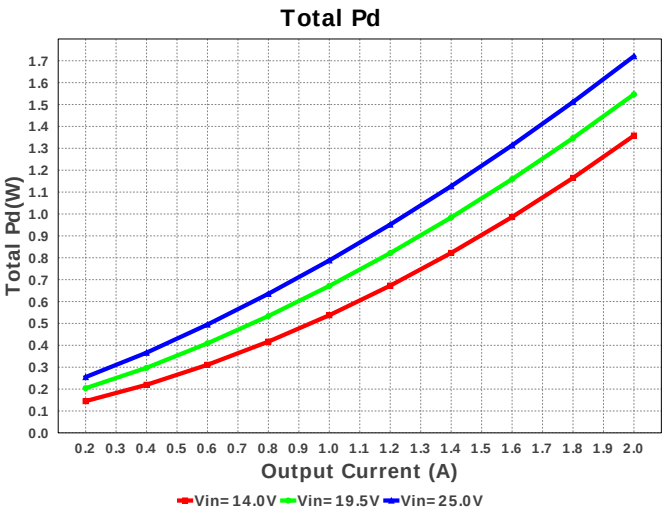


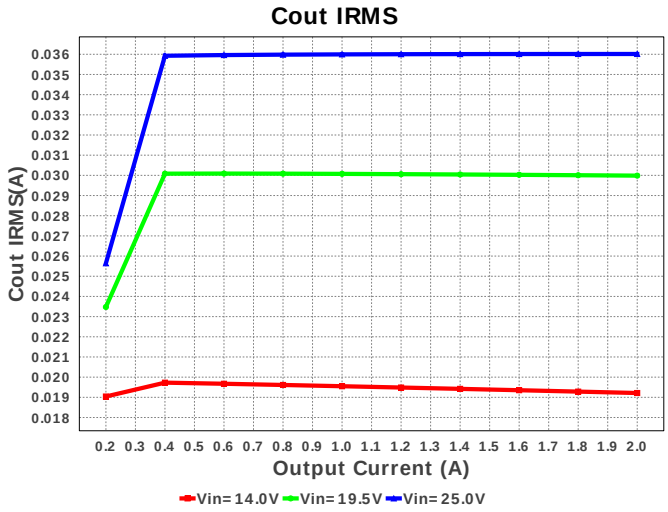


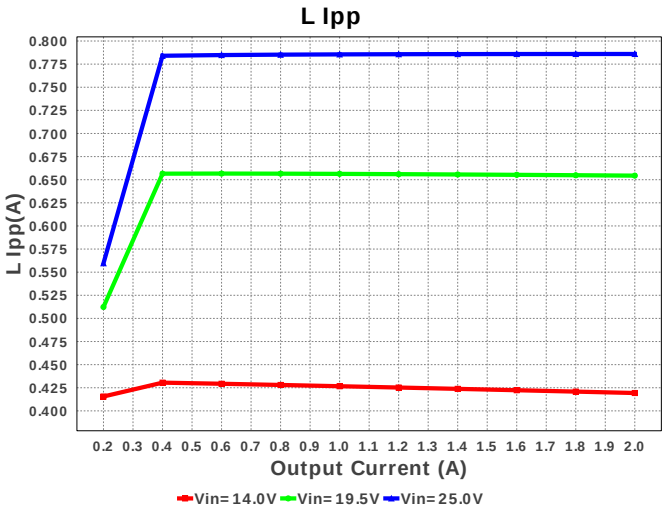


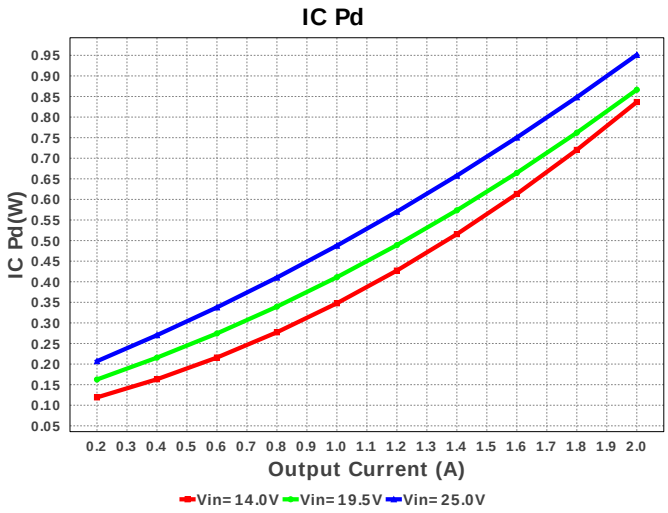


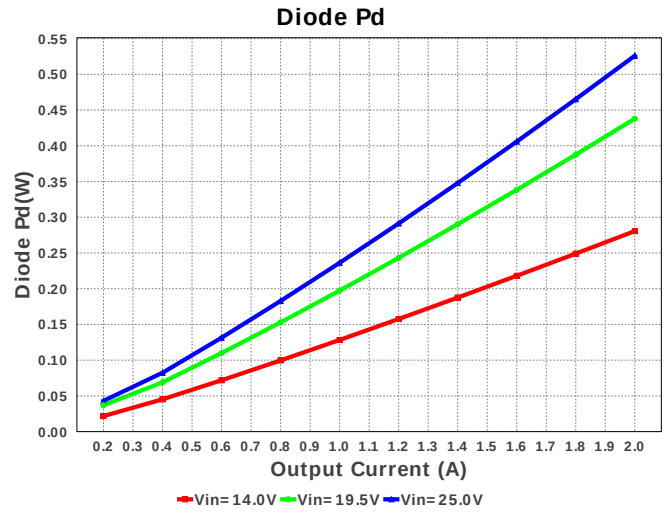


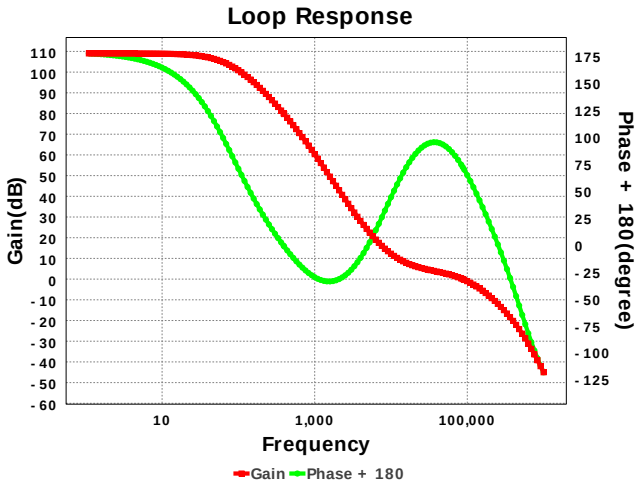












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	967.536 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	36.015 mA	Current	Output capacitor RMS ripple current
3.	Coutx IRMS	190.875 mA	Current	Output capacitor_x RMS ripple current
4.	IC Ipk	2.393 A	Current	Peak switch current in IC
5.	Iin Avg	788.85 mA	Current	Average input current
6.	L Ipp	785.97 mA	Current	Peak-to-peak inductor ripple current
7.	M1 Irms	1.222 A	Current	Q Iavg
8.	BOM Count	12	General	Total Design BOM count
9.	FootPrint	364.0 mm^2	General	Total Foot Print Area of BOM components
10.	Frequency	1.104 MHz	General	Switching frequency
11.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	203.737 mV	General	Voltage drop across the MosFET
13.	Pout	18.0 W	General	Total output power
14.	Total BOM	$2.56	General	Total BOM Cost
15.	D1 Tj	43.15 degC	Op_Point	D1 junction temperature
16.	Vout Actual	9.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	9.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	93.282 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	37.356 %	Op_point	Duty cycle
20.	Efficiency	91.276 %	Op_point	Steady state efficiency
21.	IC Tj	69.947 degC	Op_point	IC junction temperature
22.	ICThetaJA	42.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	2.0 A	Op_point	Iout operating point
24.	Phase Marg	66.348 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	25.0 V	Op_point	Vin operating point
26.	Vout p-p	17.434 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	2.808 mW	Power	Input capacitor power dissipation
28.	Cout Pd	233.474 µW	Power	Output capacitor power dissipation
29.	Coutx Pd	188.215 µW	Power	Output capacitor_x power loss
30.	Diode Pd	525.985 mW	Power	Diode power dissipation
31.	IC Pd	951.121 mW	Power	IC power dissipation
32.	L Pd	239.561 mW	Power	Inductor power dissipation
33.	Total Pd	1.72 W	Power	Total Power Dissipation
34.	Vout Tolerance	4.296 %		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	25.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	9.0	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.