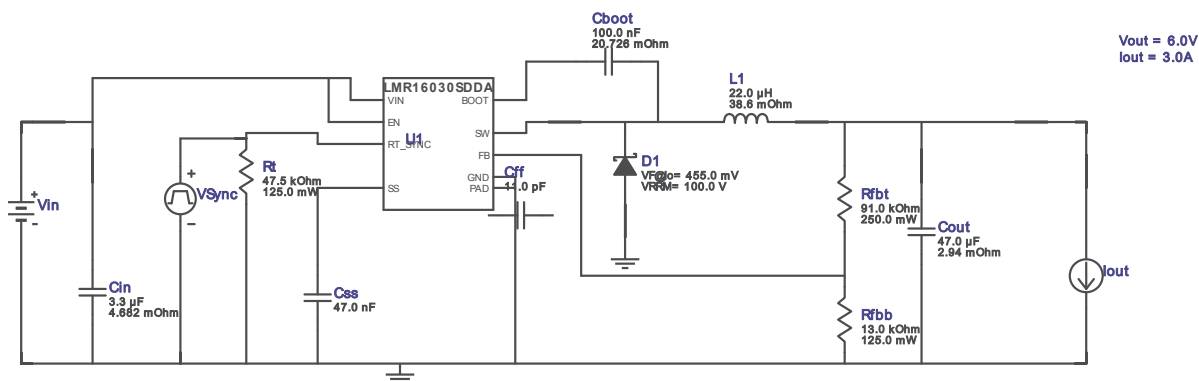


WEBENCH® Design Report

Design : 679521/50 LMR16030SDDAR
Design 49fromstanley@metermatic.co.za



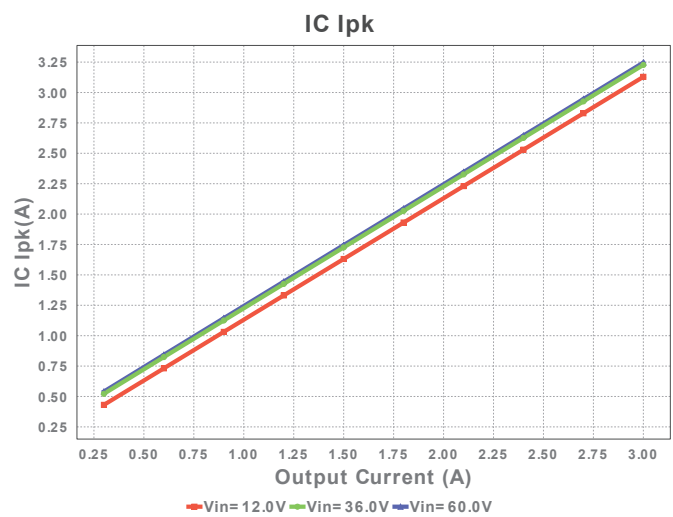
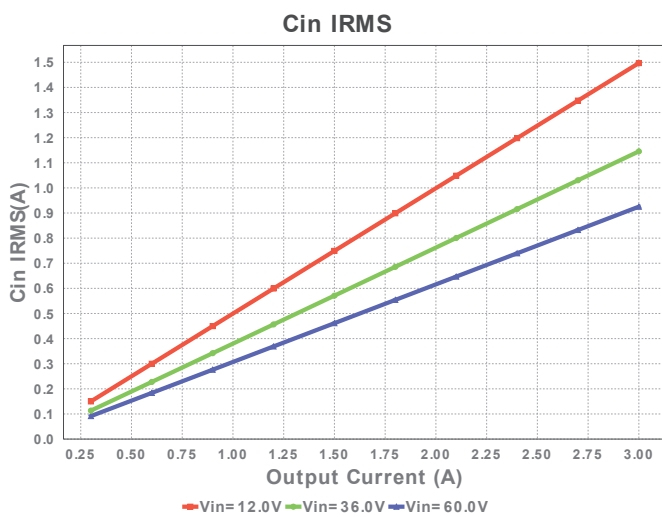
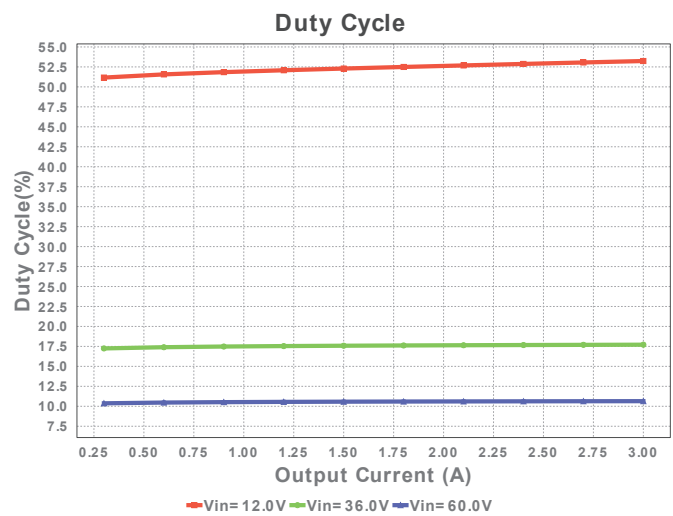
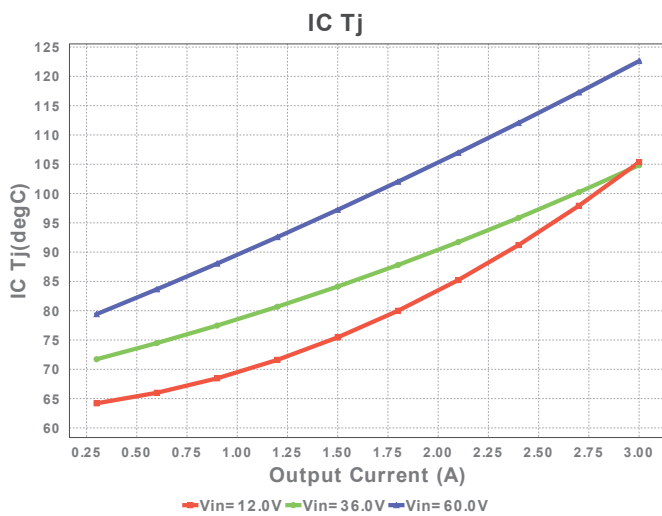
My Comments

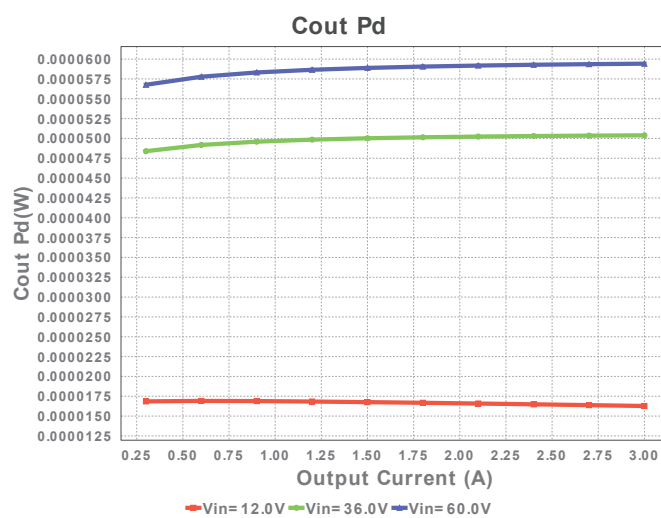
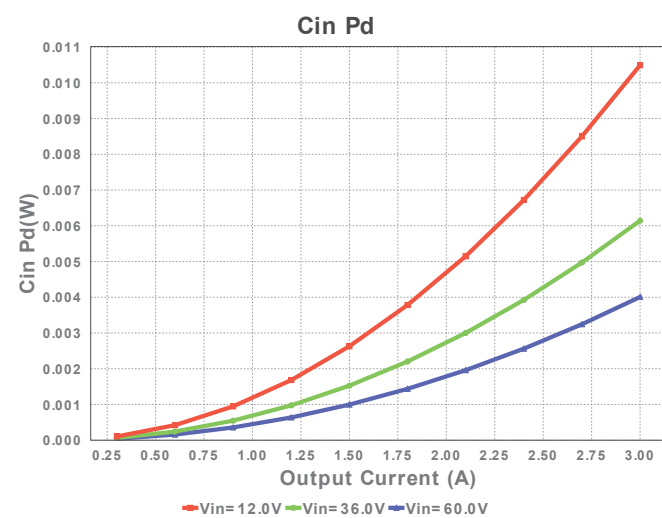
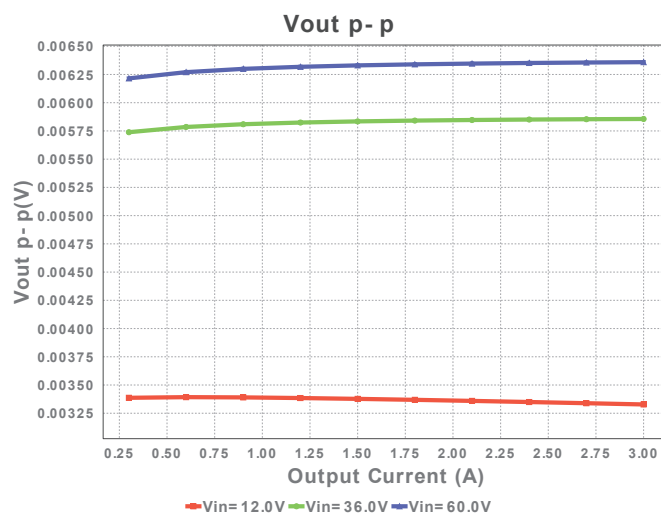
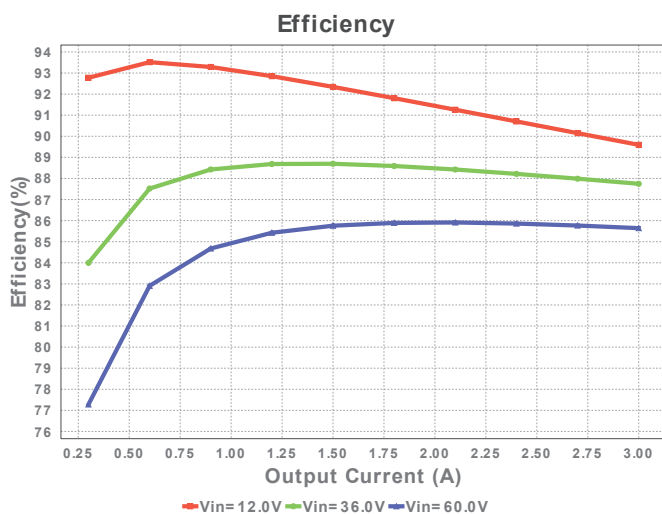
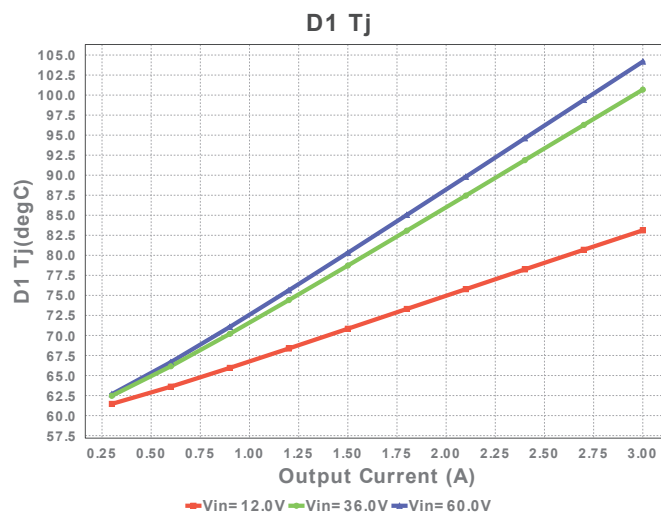
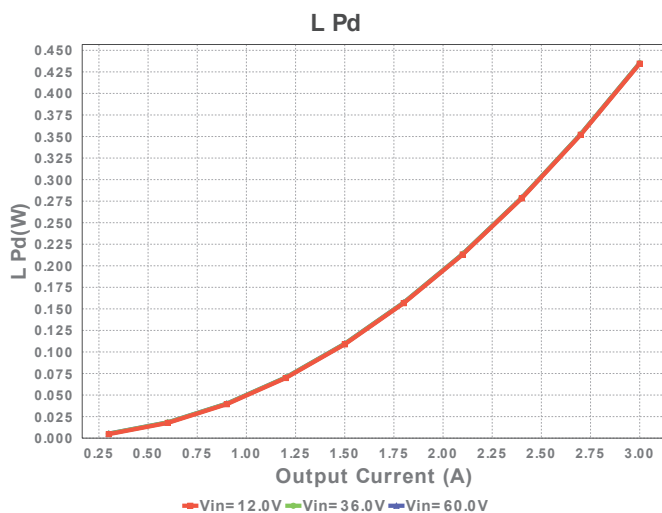
No comments

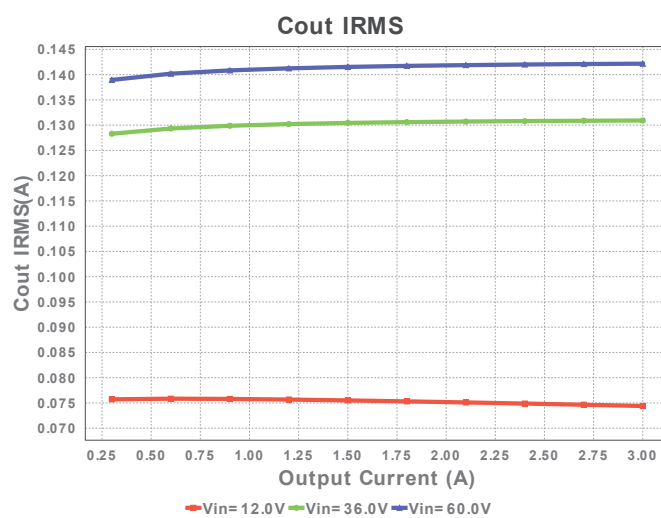
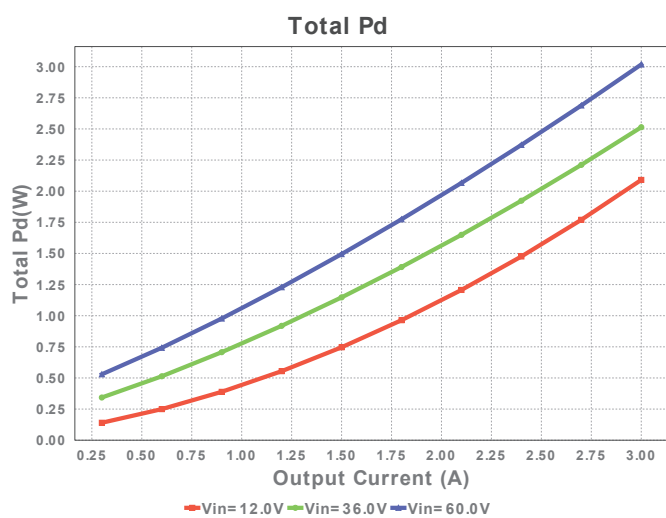
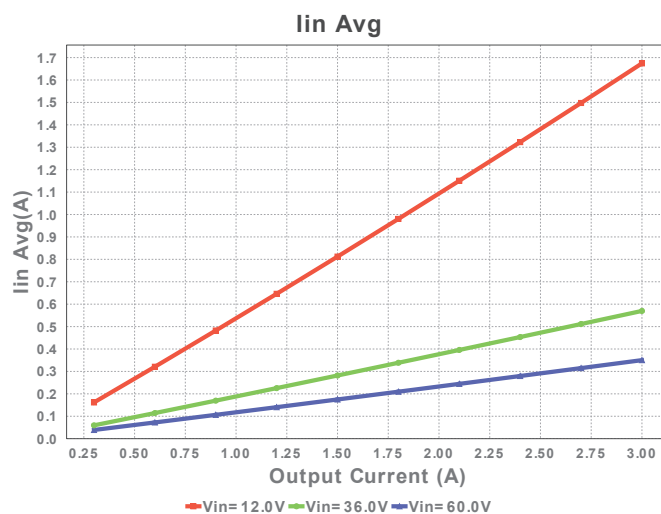
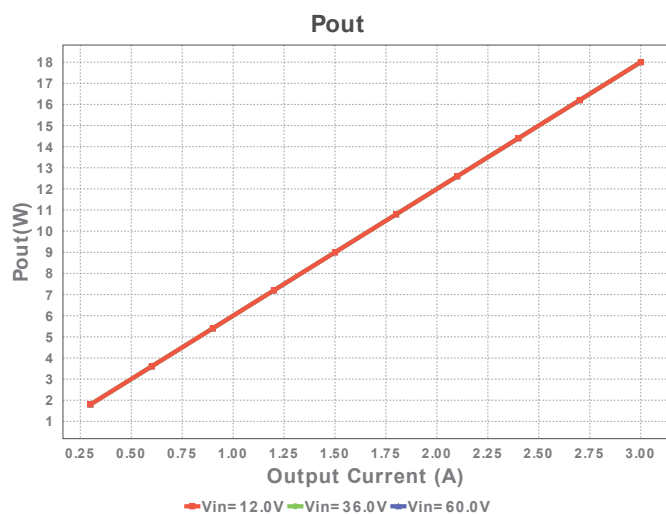
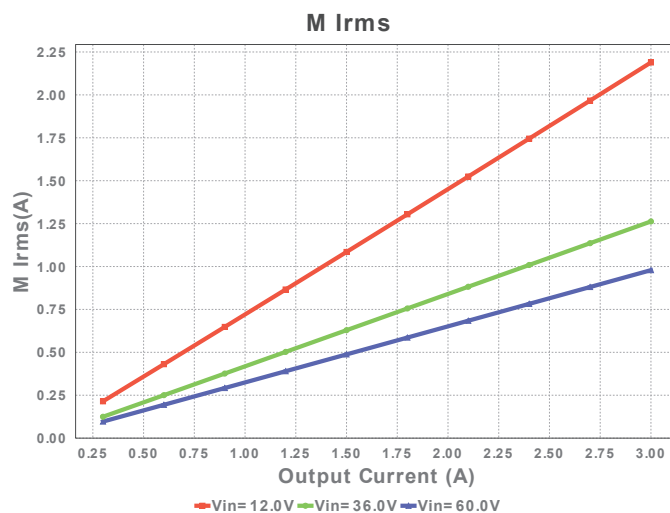
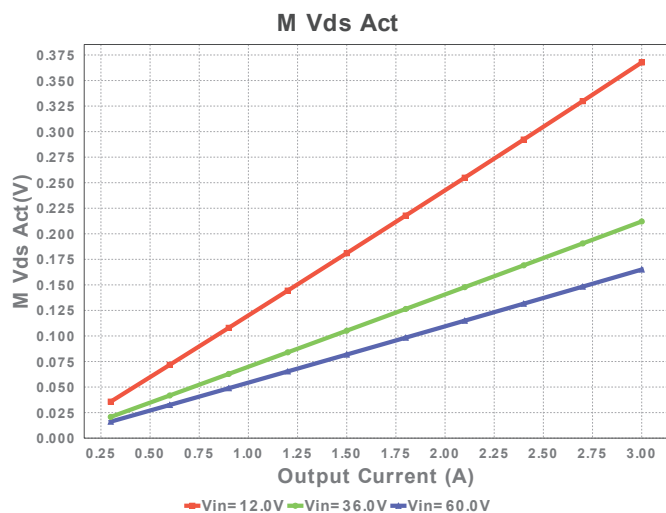
Electrical BOM

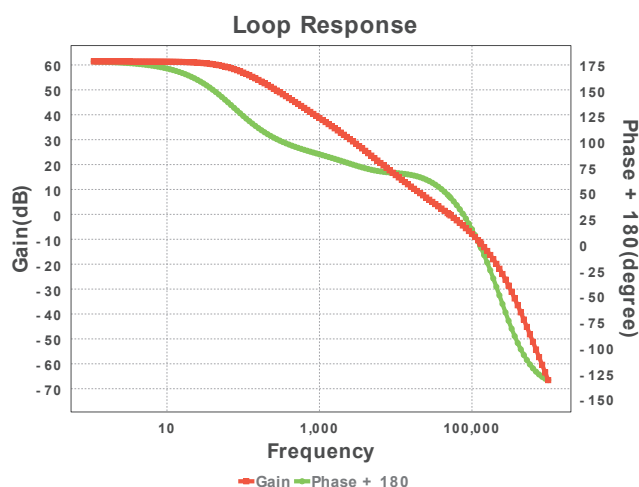
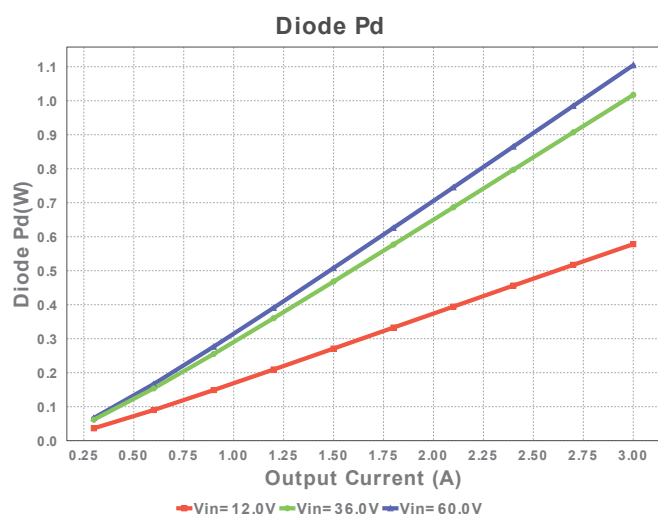
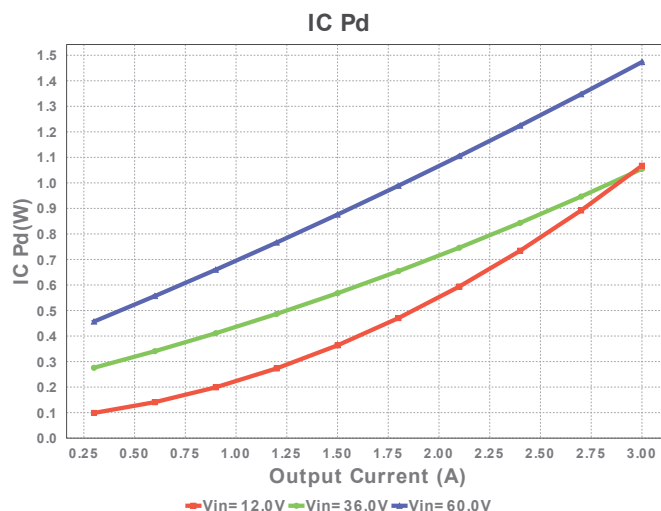
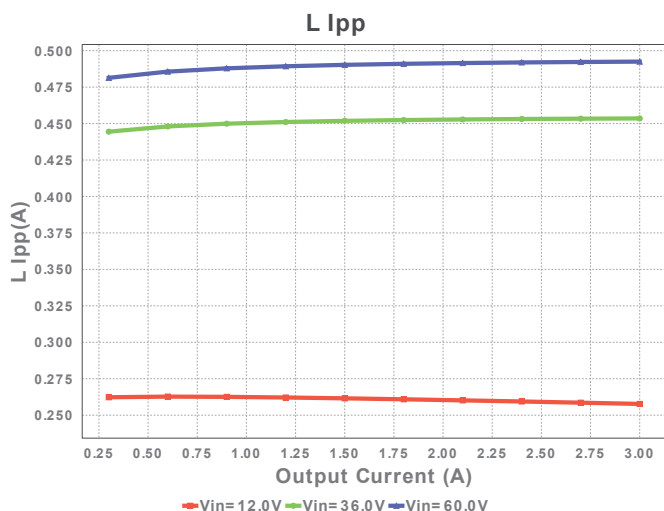
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	TDK	C2012X5R2A104K125AA Series= X5R	Cap= 100.0 nF ESR= 20.726 mOhm VDC= 100.0 V IRMS= 1.456 A	1	\$0.04	0805 7 mm ²
2.	Cff	Kemet	C0805C110J5GACTU Series= C0G/NP0	Cap= 11.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.05	0805 7 mm ²
3.	Cin	TDK	CGA6M3X7S2A335K200AB Series= X7S	Cap= 3.3 uF ESR= 4.682 mOhm VDC= 100.0 V IRMS= 3.39944 A	1	\$0.41	1210_220 15 mm ²
4.	Cout	TDK	C2012X5R1A476M125AC Series= X5R	Cap= 47.0 uF ESR= 2.94 mOhm VDC= 10.0 V IRMS= 3.80451 A	1	\$0.29	0805 7 mm ²
5.	Css	Kemet	C0805C473J3GACTU Series= C0G/NP0	Cap= 47.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.19	0805 7 mm ²
6.	D1	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	\$1.39	DDPAK 210 mm ²
7.	L1	Bourns	SRR1280-220M	L= 22.0 uH DCR= 38.6 mOhm	1	\$0.42	SRR1280 210 mm ²
8.	Rfbb	Vishay-Dale	CRCW080513K0FKEA Series= CRCW..e3	Res= 13.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
9.	Rfbb	Yageo America	RC1206FR-0791KL Series= ?	Res= 91.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rt	Vishay-Dale	CRCW080547K5FKEA Series= CRCW..e3	Res= 47.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
11.	U1	Texas Instruments	LMR16030SDDAR	Switcher	1	\$1.95	 DDA0008E_N 57 mm ²









Operating Values

#	Name	Value	Category	Description
1.	BOM Count	11		Total Design BOM count
2.	Total BOM	\$4.77		Total BOM Cost
3.	Cin IRMS	925.174 mA	Current	Input capacitor RMS ripple current
4.	Cout IRMS	142.167 mA	Current	Output capacitor RMS ripple current
5.	IC Ipk	3.246 A	Current	Peak switch current in IC
6.	Iin Avg	350.3 mA	Current	Average input current
7.	L Ipp	492.482 mA	Current	Peak-to-peak inductor ripple current
8.	M1 Irms	978.721 mA	Current	Q lavg
9.	FootPrint	543.0 mm ²	General	Total Foot Print Area of BOM components
10.	Frequency	528.823 kHz	General	Switching frequency
11.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	165.024 mV	General	Voltage drop across the MosFET
13.	Mode	CCM	General	Conduction Mode
14.	Pout	18.0 W	General	Total output power
15.	D1 Tj	104.18 degC	Op_Point	D1 junction temperature
16.	Vout Actual	6.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	6.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	50.333 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	10.643 %	Op_point	Duty cycle
20.	Efficiency	85.643 %	Op_point	Steady state efficiency
21.	IC Tj	122.62 degC	Op_point	IC junction temperature
22.	ICThetaJA	42.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	3.0 A	Op_point	Iout operating point
24.	Phase Marg	48.063 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	60.0 V	Op_point	Vin operating point
26.	Vout p-p	6.359 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	4.008 mW	Power	Input capacitor power dissipation
28.	Cout Pd	59.422 μW	Power	Output capacitor power dissipation
29.	Diode Pd	1.104 W	Power	Diode power dissipation
30.	IC Pd	1.473 W	Power	IC power dissipation

#	Name	Value	Category	Description
31.	L Pd	435.242 mW	Power	Inductor power dissipation
32.	Total Pd	3.018 W	Power	Total Power Dissipation
33.	Vout Tolerance	4.21 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	SoftStart	10.0 ms	Soft Start Time (ms)
3.	VinMax	60.0	Maximum input voltage
4.	VinMin	12.0	Minimum input voltage
5.	Vout	6.0	Output Voltage
6.	base_pn	LMR16030S	Base Product Number
7.	source	DC	Input Source Type
8.	Ta	60.0	Ambient temperature
9.	UserFsw	516.735 k	Customer Selected Frequency

Design Assistance

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

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).