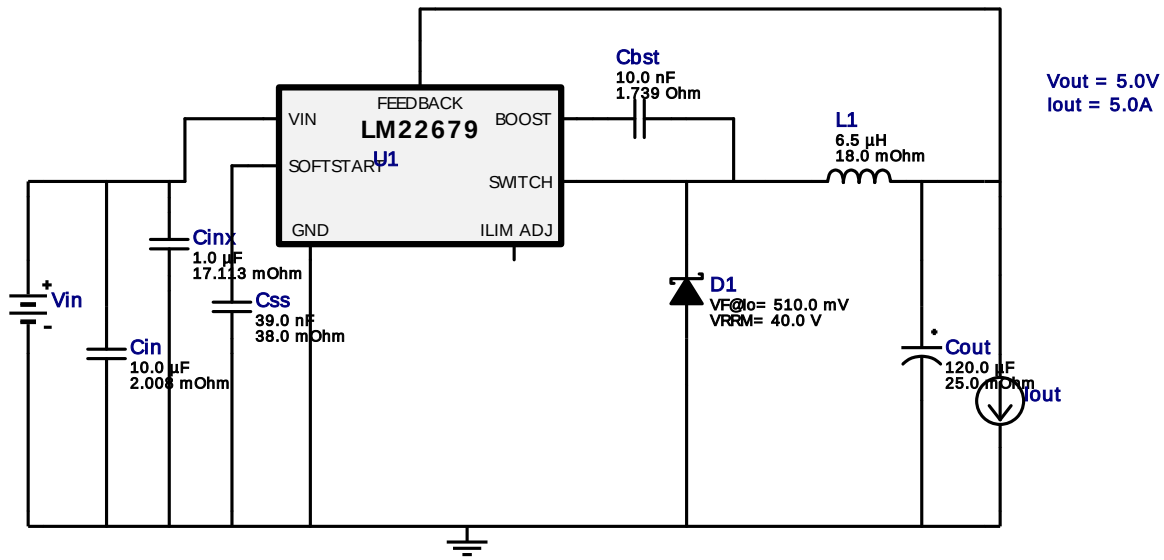
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 20.0V
Vout = 5.0V
Iout = 5.0A

Device = LM22679TJ-5.0/NOPB
Topology = Buck
Created = 3/6/16 5:47:36 PM
BOM Cost = $3.89
BOM Count = 8
Total Pd = 3.91W

Design : 4613839/4 LM22679TJ-5.0/NOPB
LM22679TJ-5.0/NOPB 10.0V-20.0V to 5.00V @ 5.0A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	1	$0.25	1210_280 15 mm²
3.	Cinx	MuRata	GRM188R61E105KA12D Series= X5R	Cap= 1.0 uF ESR= 17.113 mOhm VDC= 25.0 V IRMS= 979.39 mA	1	$0.01	0603 5 mm²
4.	Cout	Chemi-Con	APXE100ARA121MF61G Series= PXE	Cap= 120.0 uF ESR= 25.0 mOhm VDC= 10.0 V IRMS= 2.53 A	1	$0.43	CAPSMT_62_F61 74 mm²
5.	Css	AVX	08055C393KAT2A Series= X7R	Cap= 39.0 nF ESR= 38.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
6.	D1	Vishay-Semiconductor	50WQ04FNPBF	VF@Io= 510.0 mV VRRM= 40.0 V	1	$0.40	DPAK 102 mm²

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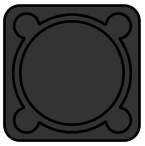
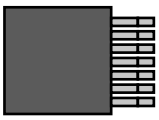
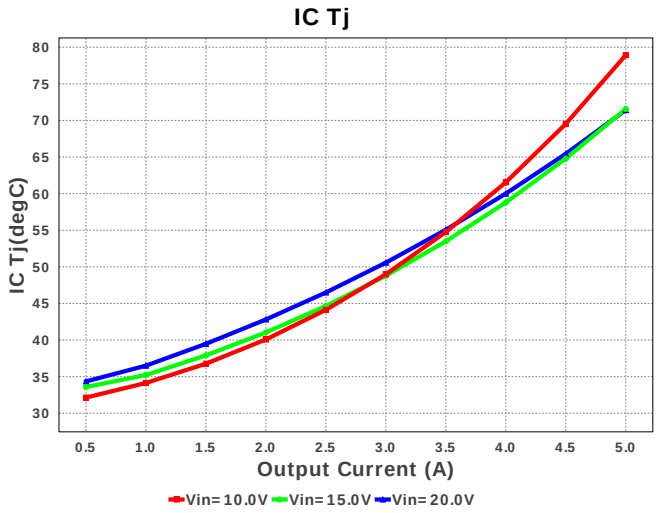
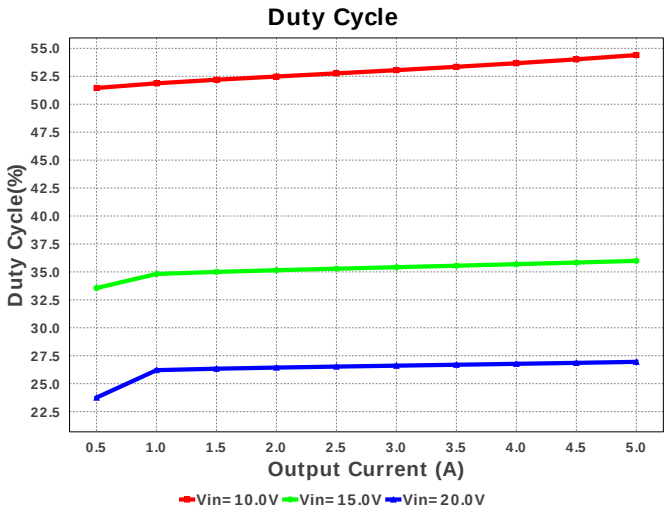
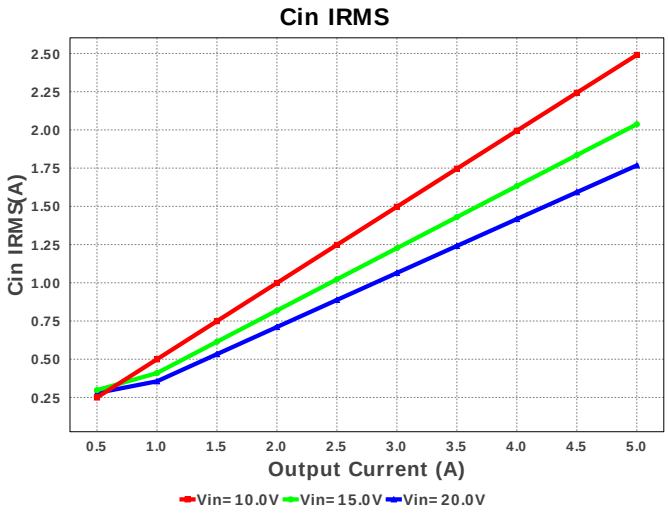
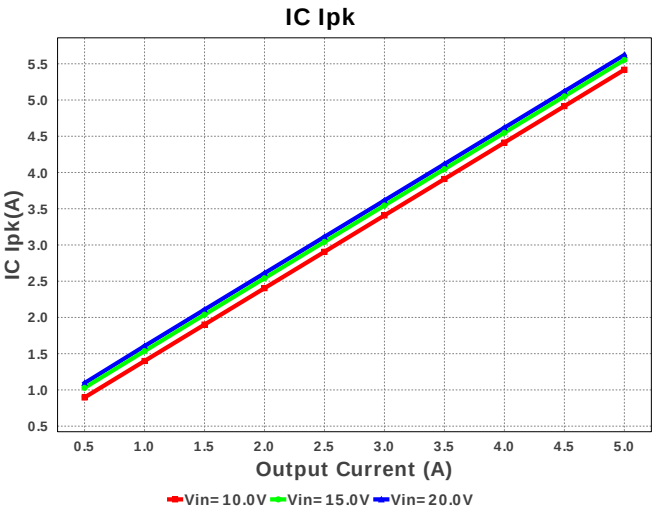
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	L1	Bourns	SRR1208-6R5ML	L= 6.5 µH DCR= 18.0 mOhm	1	$0.37	 SRR1208 216 mm^2
8.	U1	Texas Instruments	LM22679TJ-5.0/NOPB	Switcher	1	$2.40	 TJ7A 199 mm^2









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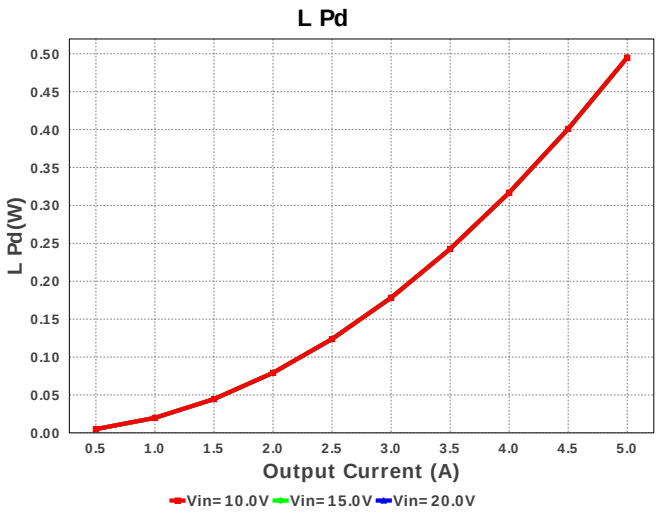

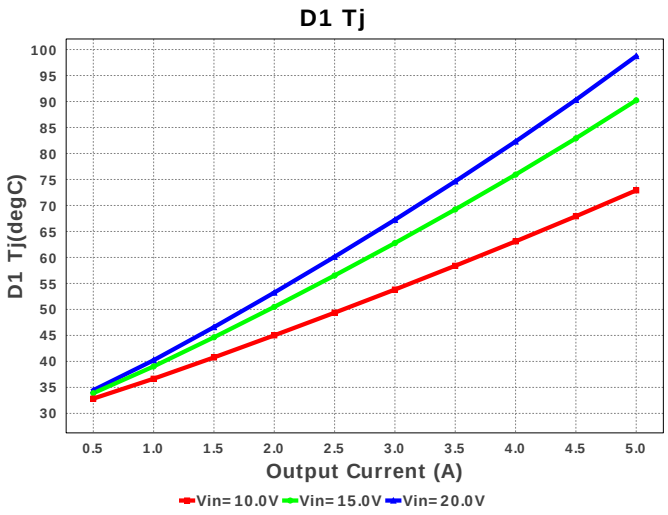

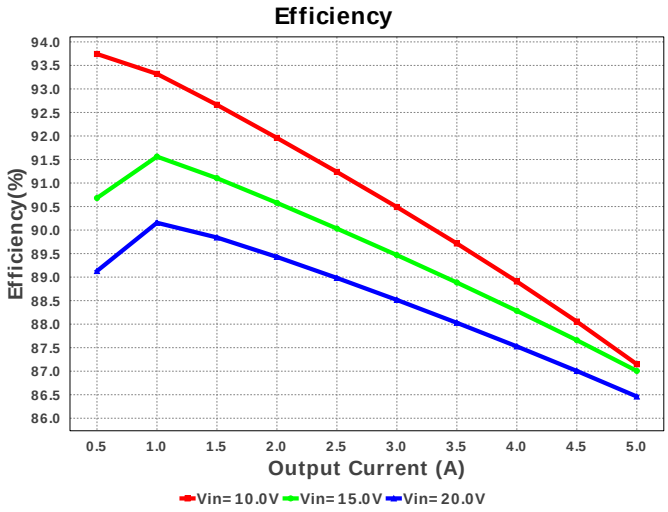

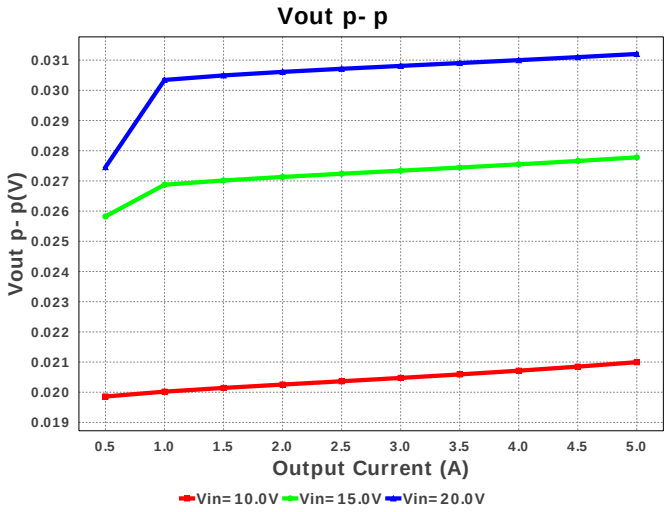

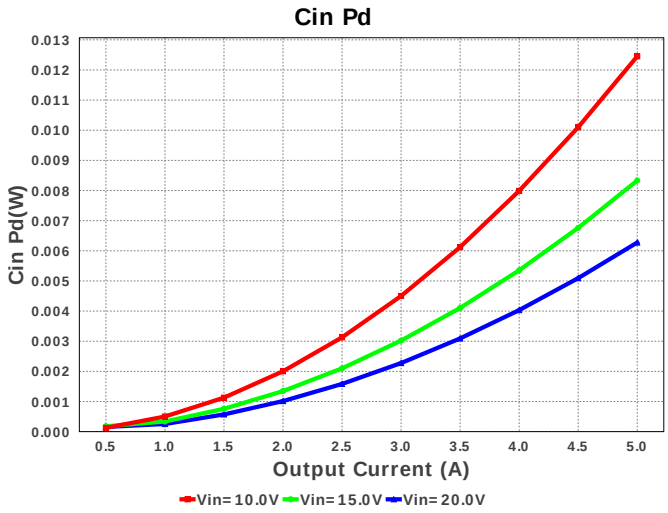

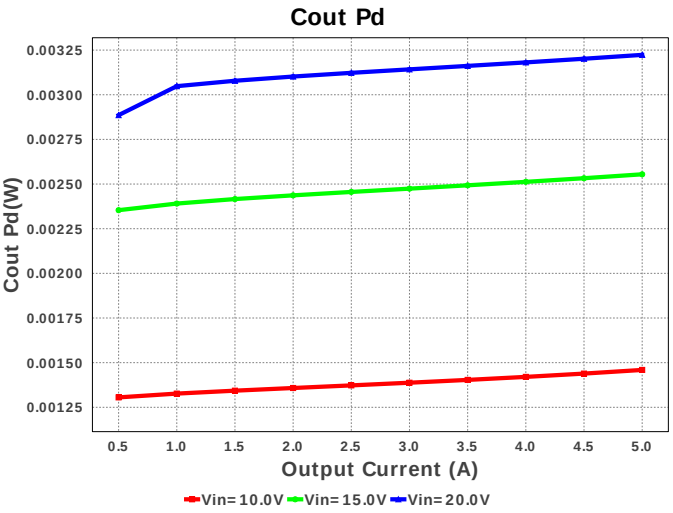

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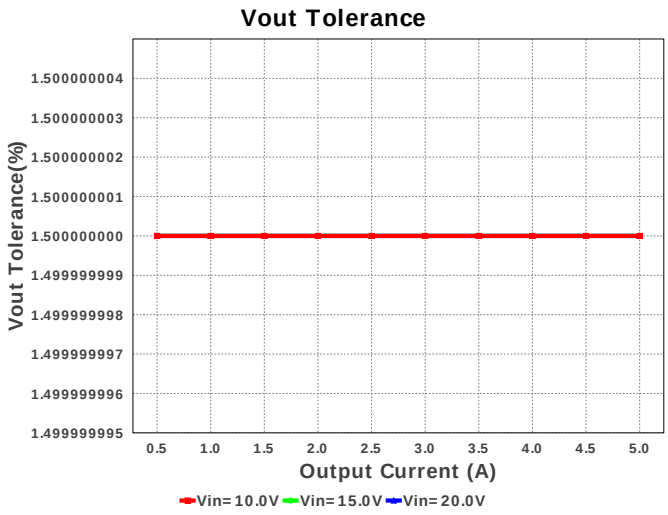

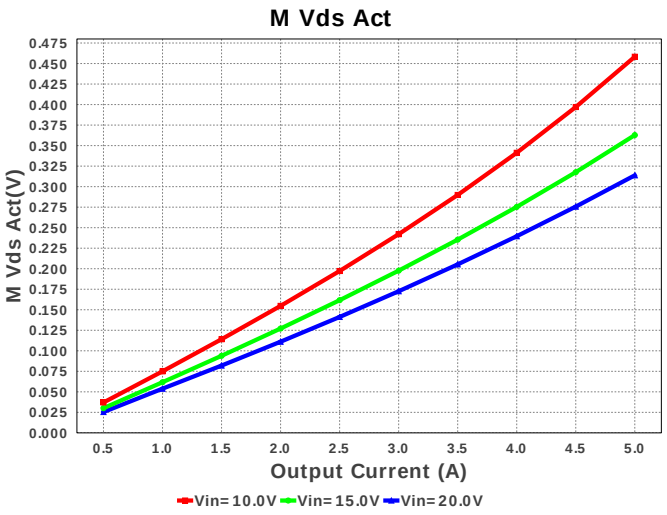

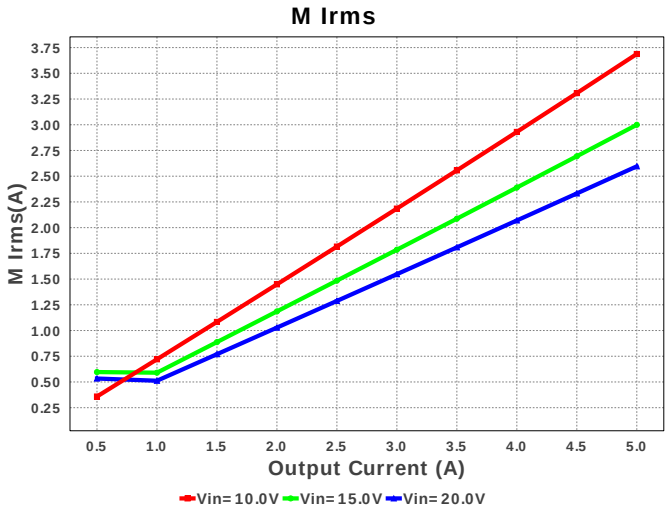

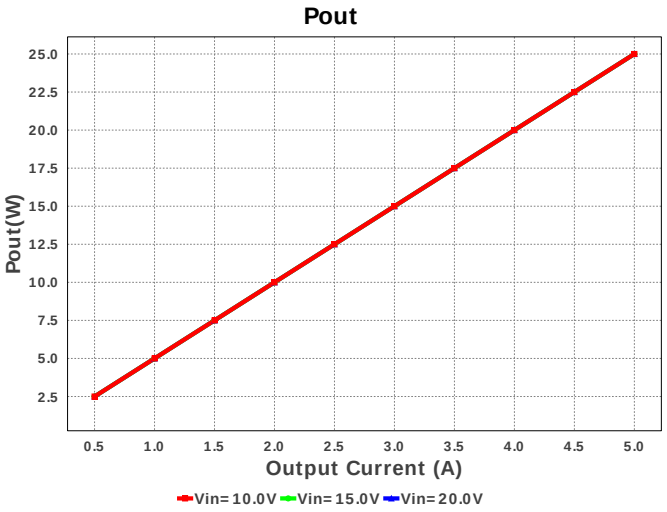

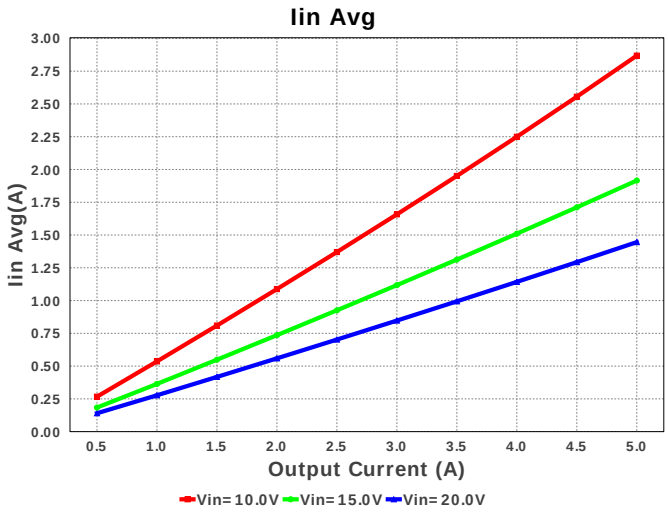

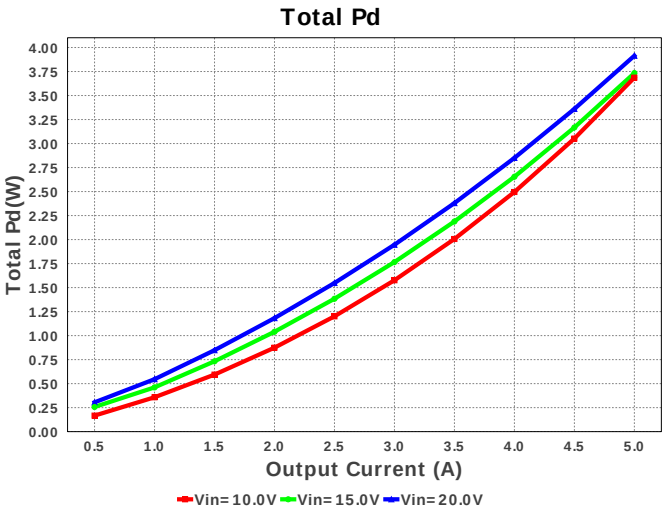

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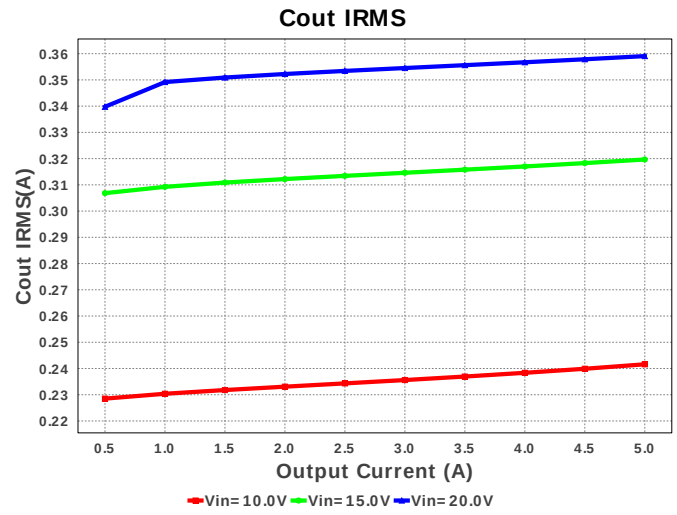

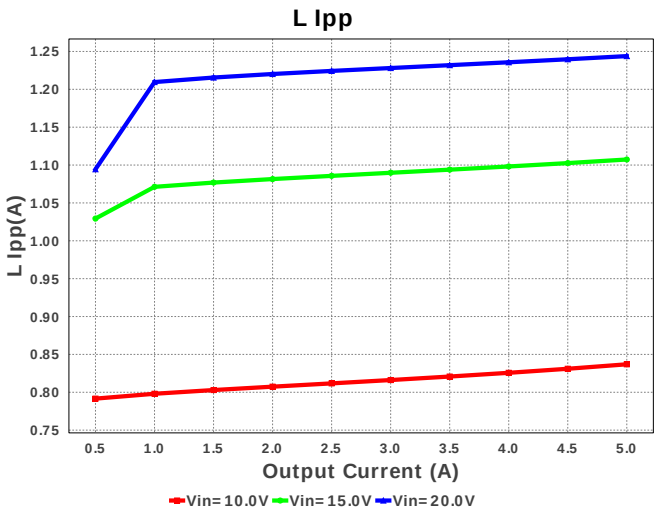

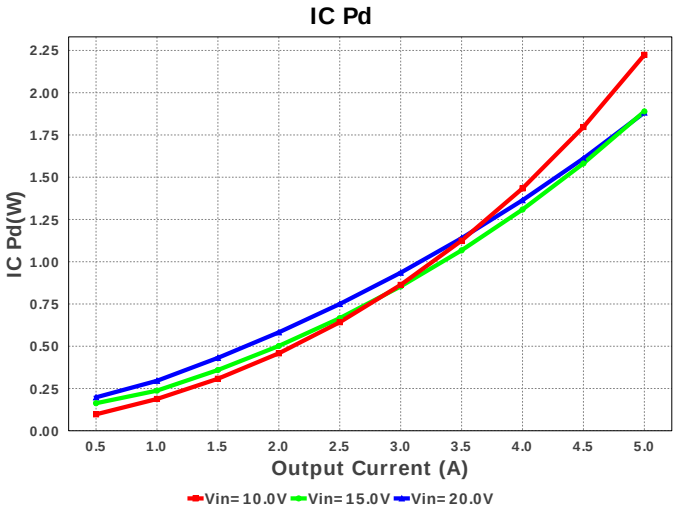

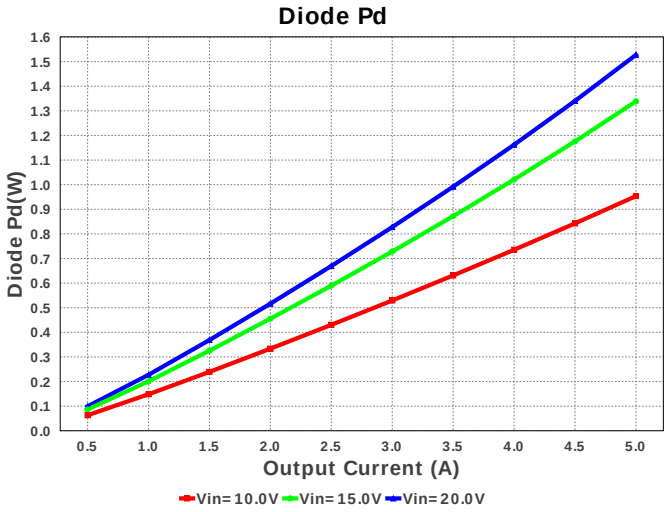

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.768 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	359.071 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	5.622 A	Current	Peak switch current in IC
4.	Iin Avg	1.446 A	Current	Average input current
5.	L Ipp	1.244 A	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	2.596 A	Current	Q Iavg
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	623.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	500.0 kHz	General	Switching frequency
10.	IC Tolerance	75.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	313.783 mV	General	Voltage drop across the MosFET
12.	Pout	25.0 W	General	Total output power
13.	Total BOM	$3.89	General	Total BOM Cost
14.	D1 Tj	98.734 degC	Op_Point	D1 junction temperature
15.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
16.	Cross Freq	79.691 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	26.95 %	Op_point	Duty cycle
18.	Efficiency	86.462 %	Op_point	Steady state efficiency
19.	IC Tj	71.415 degC	Op_point	IC junction temperature
20.	ICThetaJA	22.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	5.0 A	Op_point	Iout operating point
22.	Phase Marg	91.412 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	20.0 V	Op_point	Vin operating point
24.	Vout p-p	31.204 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	6.274 mW	Power	Input capacitor power dissipation
26.	Cout Pd	3.223 mW	Power	Output capacitor power dissipation
27.	Diode Pd	1.527 W	Power	Diode power dissipation
28.	IC Pd	1.882 W	Power	IC power dissipation
29.	L Pd	495.0 mW	Power	Inductor power dissipation
30.	Total Pd	3.914 W	Power	Total Power Dissipation

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#	Name	Value	Category	Description
31.	Vout Tolerance	1.5 %	Unknown	Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	5.0	Maximum Output Current
2.	VinMax	20.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	LM22679	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Part Description The LM22679 is a monolithic integrated circuit that provides all of the active functions for a step-down (buck) switching regulator capable of driving up to 5.0A loads with excellent line and load regulation characteristics. High efficiency (>90%) is obtained through the use of a low ON-resistance N-channel MOSFET.

2. **LM22679** Product Folder : http://www.ti.com/product/LM22679 : contains the data sheet and other resources.

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