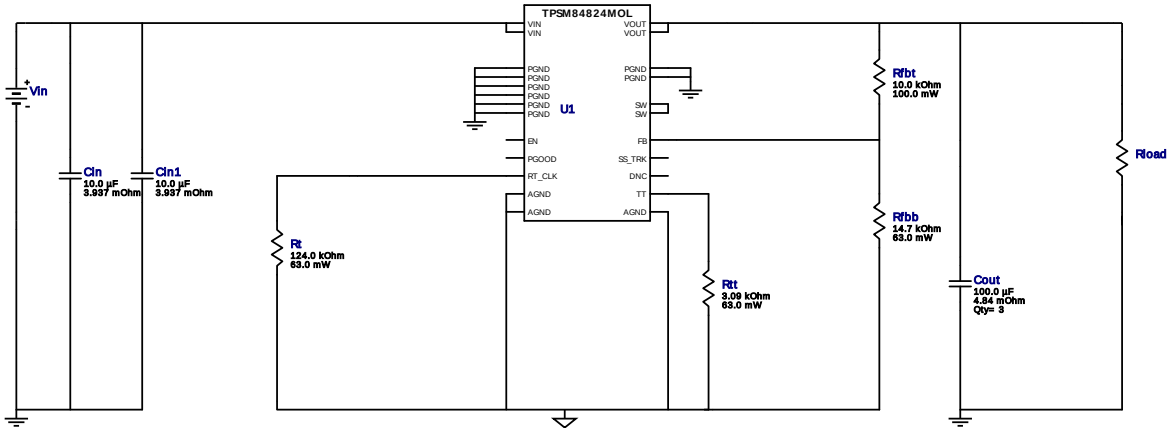
WEBENCH® Design Report

VinMin = 5.0V
VinMax = 5.0V
Vout = 1.0V
Vout Sch = 1.0V
Iout = 8.0A

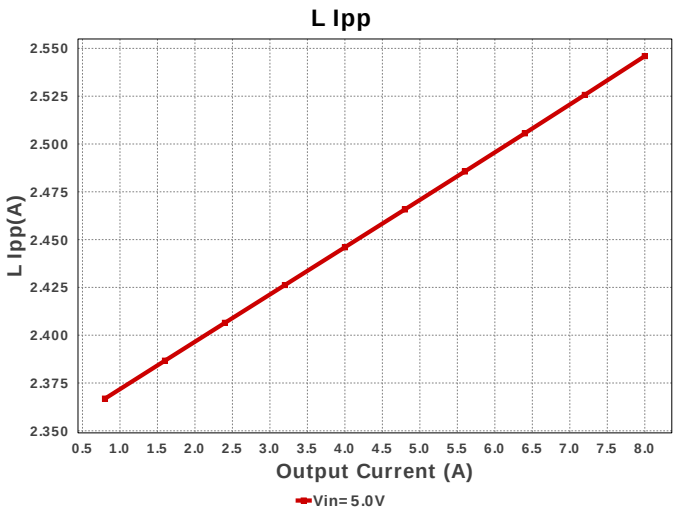
Device = TPSM84824MOLR
Topology = Buck
Created = 2018-02-12 01:04:20.719
BOM Cost = $5.53
BOM Count = 10
Total Pd = 1.52W

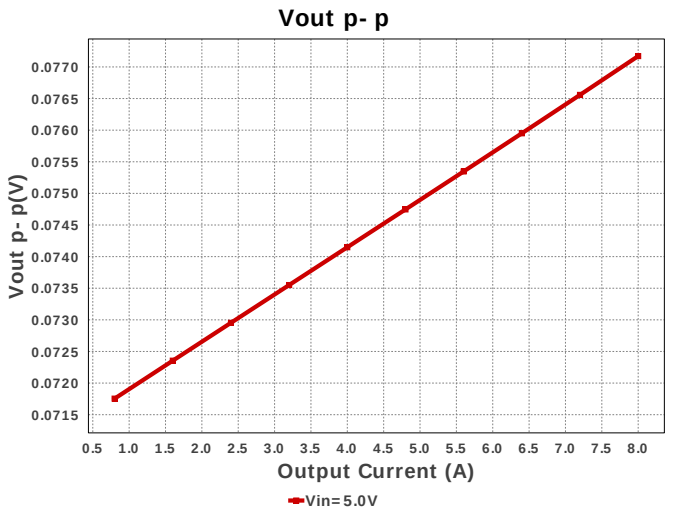
Design : 1269753/1 TPSM84824MOLR
TPSM84824MOLR 5.0V-5.0V to 1.00V @ 8.0A

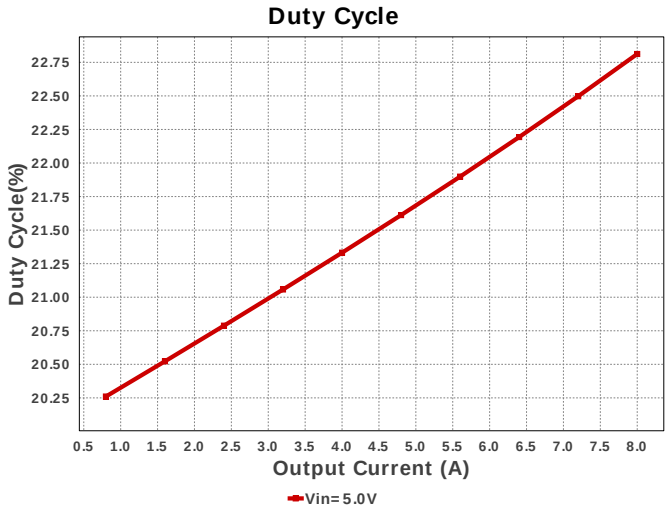


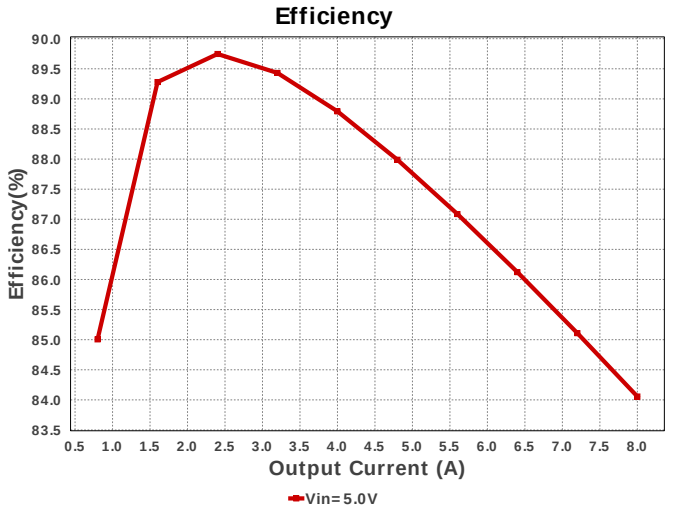
Electrical BOM

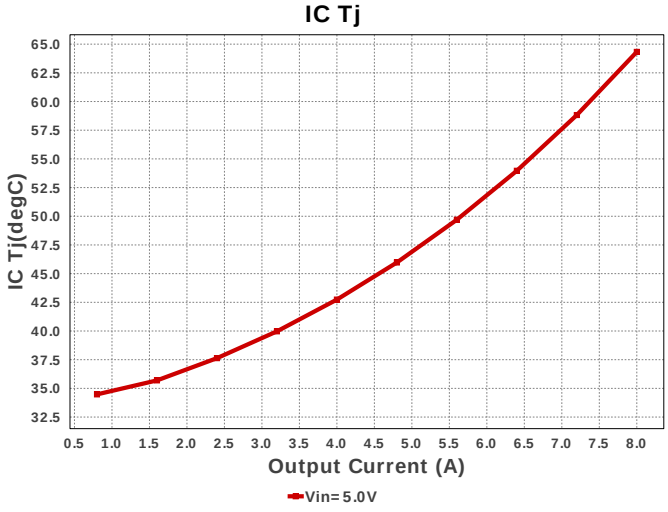
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM219R61A106KE44D Series= X5R	Cap= 10.0 uF ESR= 3.937 mOhm VDC= 10.0 V IRMS= 2.7713 A	1	$0.03	0805 7 mm^2
2.	Cin1	MuRata	GRM219R61A106KE44D Series= X5R	Cap= 10.0 uF ESR= 3.937 mOhm VDC= 10.0 V IRMS= 2.7713 A	1	$0.03	0805 7 mm^2
3.	Cout	MuRata	GRM31CR60G107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.84 mOhm VDC= 4.0 V IRMS= 4.3381 A	3	$0.16	1206_190 11 mm^2
4.	Rfbb	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
5.	Rfbt	Susumu Co Ltd	RR1220P-103-D Series= RR12	Res= 10.0 kOhm Power= 100.0 mW Tolerance= 0.5%	1	$0.01	0805 7 mm^2
6.	Rt	Vishay-Dale	CRCW0402124KFKED Series= CRCW..e3	Res= 124.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
7.	Rtt	Vishay-Dale	CRCW04023K09FKED Series= CRCW..e3	Res= 3.09 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
8.	U1	Texas Instruments	TPSM84824MOLR	Switcher	1	$4.95	MOL0024A 90 mm^2

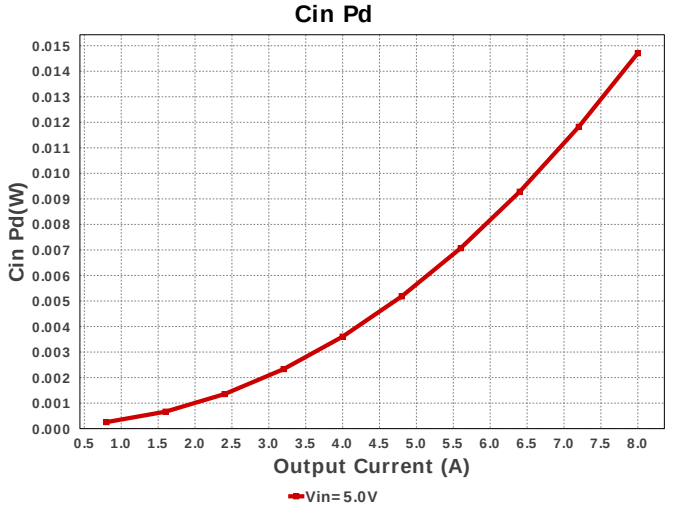


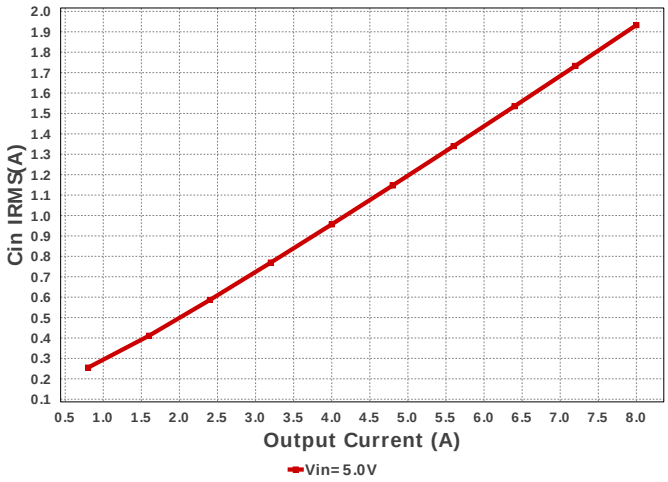


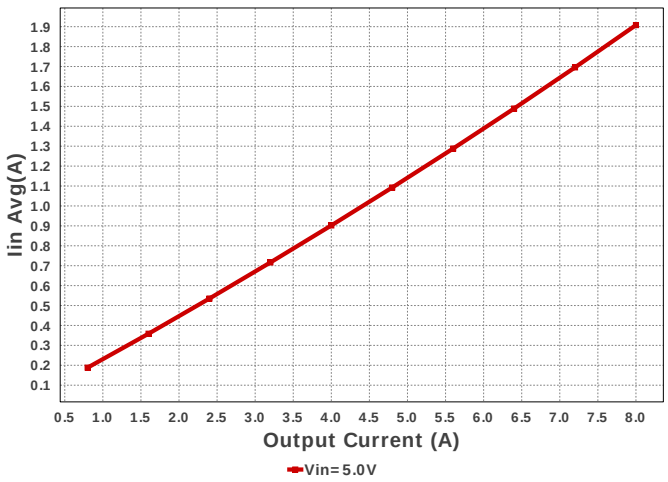


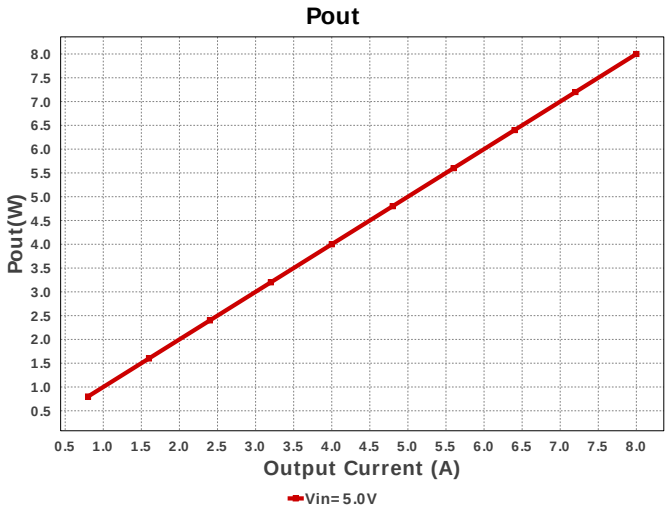


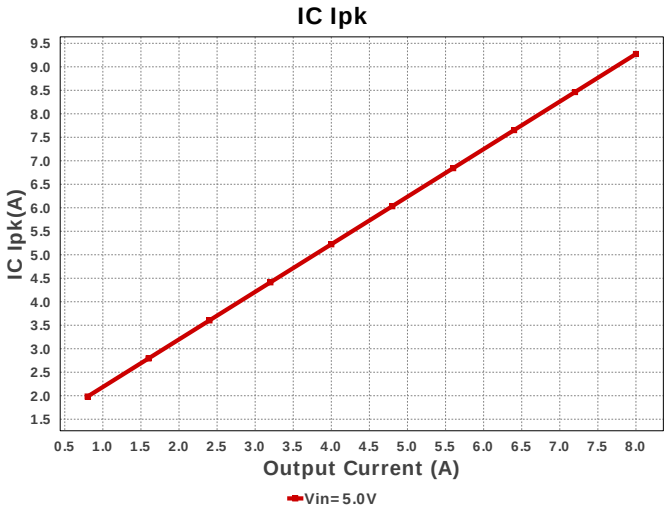


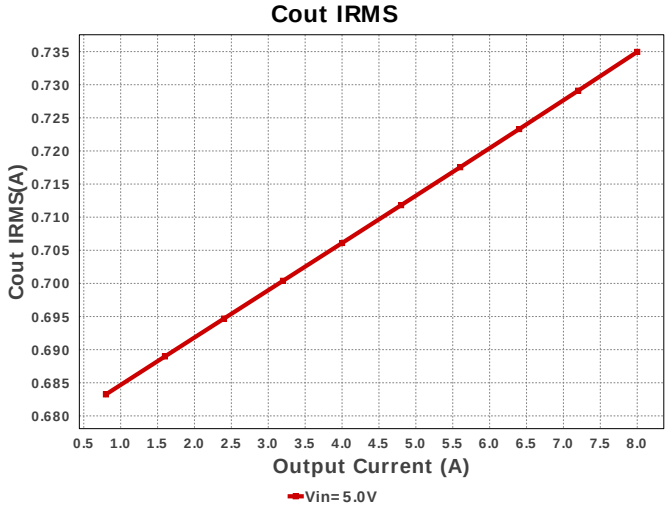


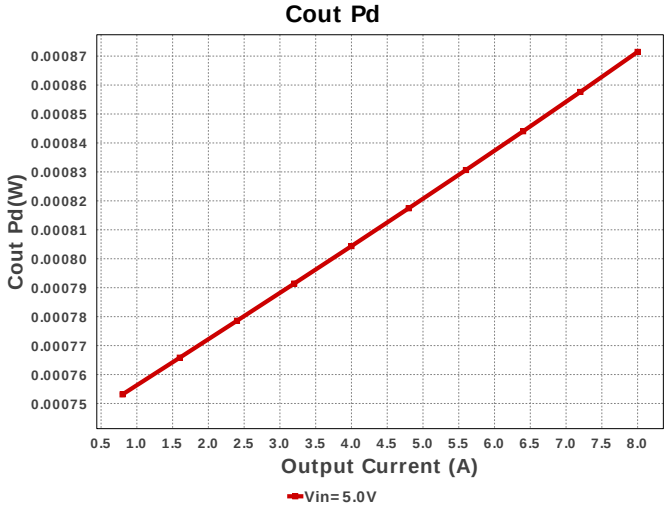


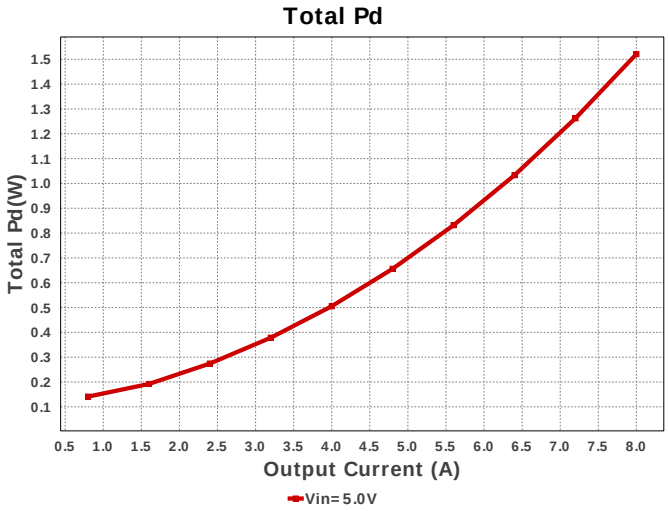


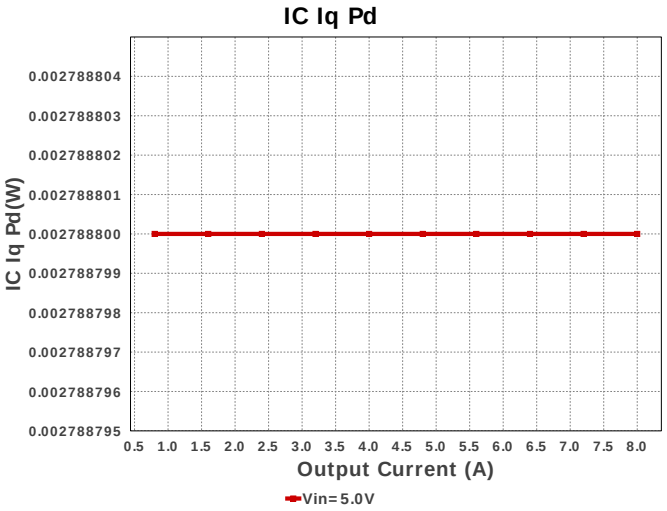


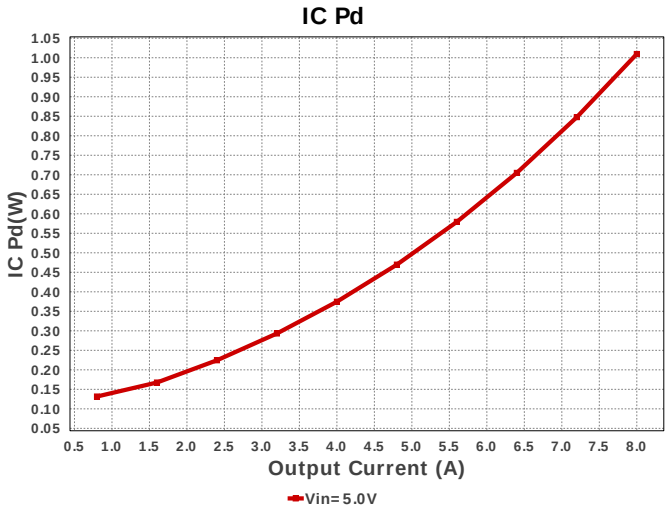


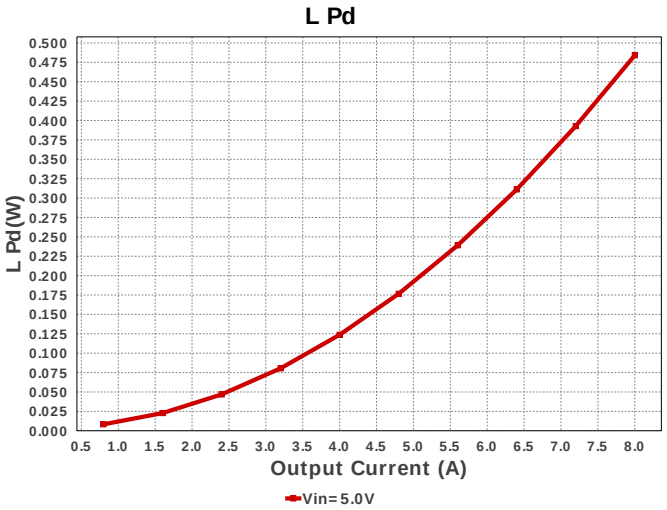












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.933 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	734.958 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	9.273 A	Current	Peak switch current in IC
4.	Iin Avg	1.908 A	Current	Average input current
5.	L Ipp	2.546 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	10	General	Total Design BOM count
7.	FootPrint	152.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	401.037 kHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	8.0 W	General	Total output power
11.	Total BOM	$5.53	General	Total BOM Cost
12.	ICThetaJA Effective	34.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Vout Actual	1.008 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	1.0 V	Op_Point	Operational Output Voltage
15.	Duty Cycle	22.812 %	Op_point	Duty cycle
16.	Efficiency	84.056 %	Op_point	Steady state efficiency
17.	IC Tj	64.327 degC	Op_point	IC junction temperature
18.	IOUT_OP	8.0 A	Op_point	Iout operating point
19.	VIN_OP	5.0 V	Op_point	Vin operating point
20.	Vout p-p	77.724 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	14.705 mW	Power	Input capacitor power dissipation
22.	Cout Pd	871.464 µW	Power	Output capacitor power dissipation
23.	IC Iq Pd	2.789 mW	Power	IC Iq Pd
24.	IC Pd	1.01 W	Power	IC power dissipation
25.	L Pd	484.051 mW	Power	Inductor power dissipation
26.	Total Pd	1.521 W	Power	Total Power Dissipation
27.	Vout Tolerance	2.29 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	8.0	Maximum Output Current
2.	VinMax	5.0	Maximum input voltage
3.	VinMin	5.0	Minimum input voltage
4.	Vout	1.0	Output Voltage
5.	base_pn	TPSM84824	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature
1.	Vout Sch	1.0	Output voltage selected

Design Assistance

1. **TPSM84824** Product Folder : http://www.ti.com/product/TPSM84824 : contains the data sheet and other resources.