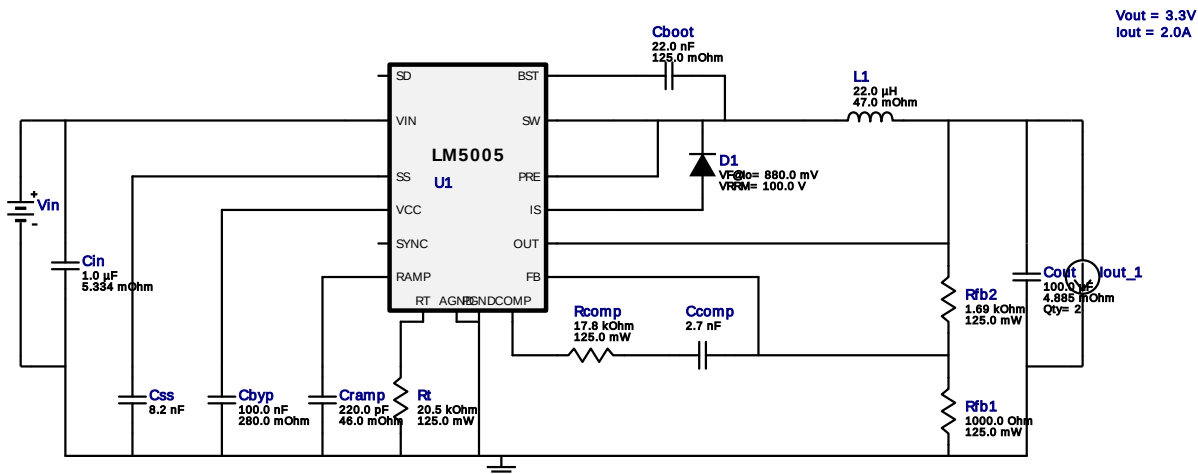


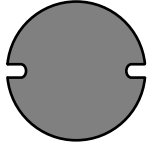
WEBENCH® Design Report

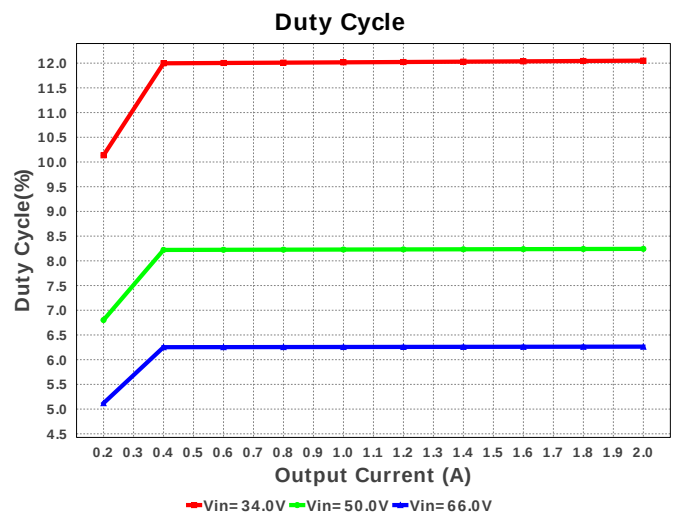
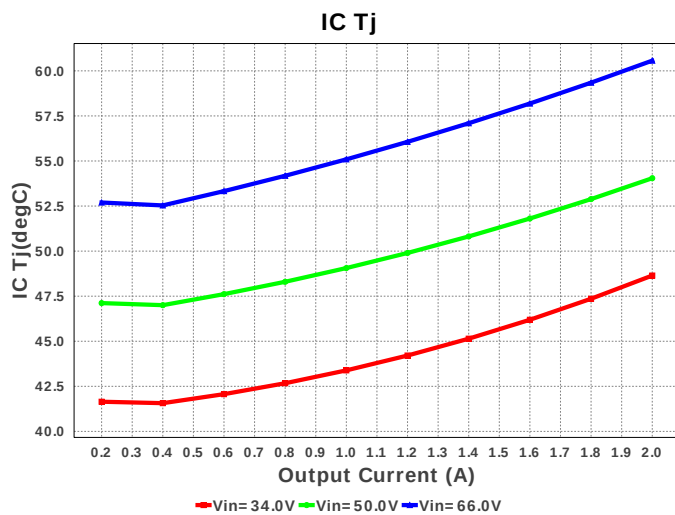
Design : 4766207/10 LM5005MHX/NOPB
LM5005MHX/NOPB 34.0V-66.0V to 3.30V @ 2.0A



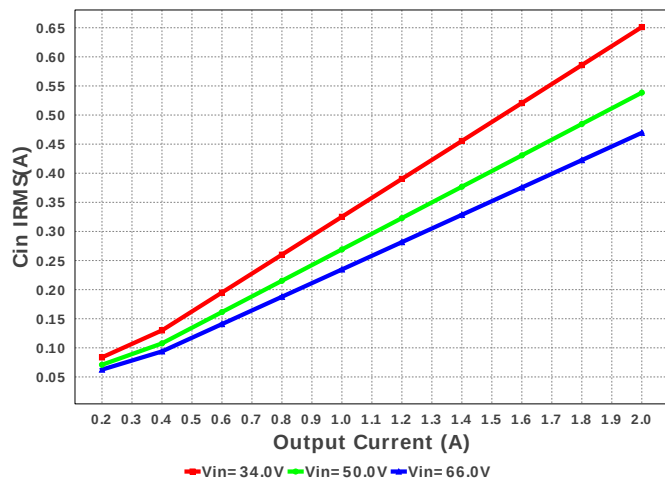
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C223K5RACTU Series= X7R	Cap= 22.0 nF ESR= 125.0 mOhm VDC= 50.0 V IRMS= 645.0 mA	1	\$0.01	0805 7 mm ²
2.	Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp	Yageo America	CC0805KRX7R9BB272 Series= X7R	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	MuRata	GRM31CR72A105KA01L Series= X7R	Cap= 1.0 uF ESR= 5.334 mOhm VDC= 100.0 V IRMS= 1.55432 A	1	\$0.11	1206_190 11 mm ²
5.	Cout	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	2	\$0.14	1206_190 11 mm ²
6.	Cramp	Kemet	C0805C221J5GACTU Series= C0G/NP0	Cap= 220.0 pF ESR= 46.0 mOhm VDC= 50.0 V IRMS= 888.0 mA	1	\$0.01	0805 7 mm ²
7.	Css	MuRata	GRM155R71E822KA01D Series= X7R	Cap= 8.2 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
8.	D1	Vishay-Semiconductor	SS10PH10-M3/86A	VF@Io= 880.0 mV VRRM= 100.0 V	1	\$0.29	TO-277A 56 mm ²

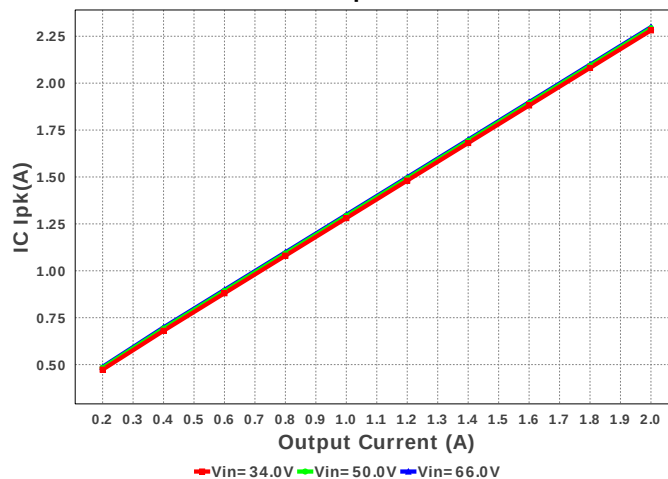
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	L1	Bourns	SDR1307-220ML	L= 22.0 μ H DCR= 47.0 mOhm	1	\$0.35	 SDR1307 227 mm ²
10.	Rcomp	Panasonic	ERJ-6ENF1782V Series= ERJ-6E	Res= 17.8 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
11.	Rfb1	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
12.	Rfb2	Panasonic	ERJ-6ENF1691V Series= ERJ-6E	Res= 1.69 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
13.	Rt	Panasonic	ERJ-6ENF2052V Series= ERJ-6E	Res= 20.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
14.	U1	Texas Instruments	LM5005MHX/NOPB	Switcher	1	\$1.75	 MXA20A 71 mm ²



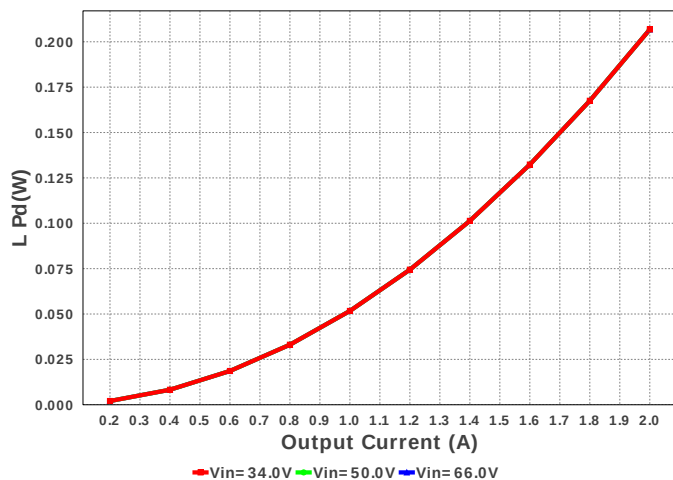
Cin IRMS



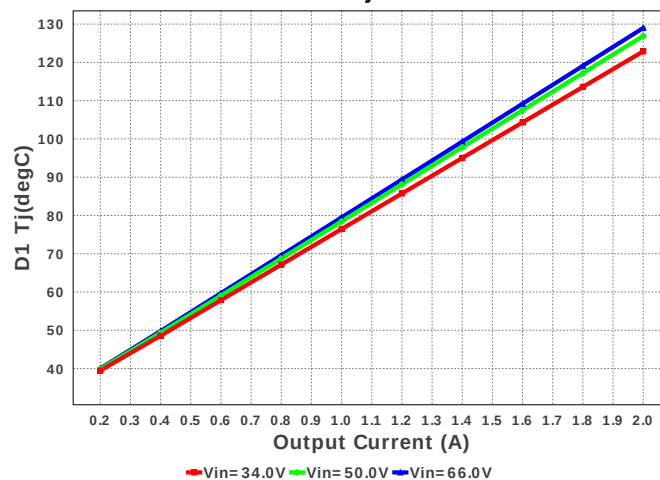
IC Ipk



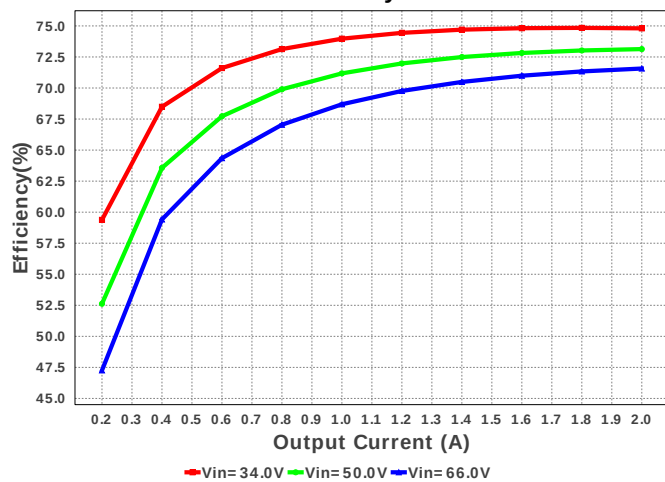
L Pd



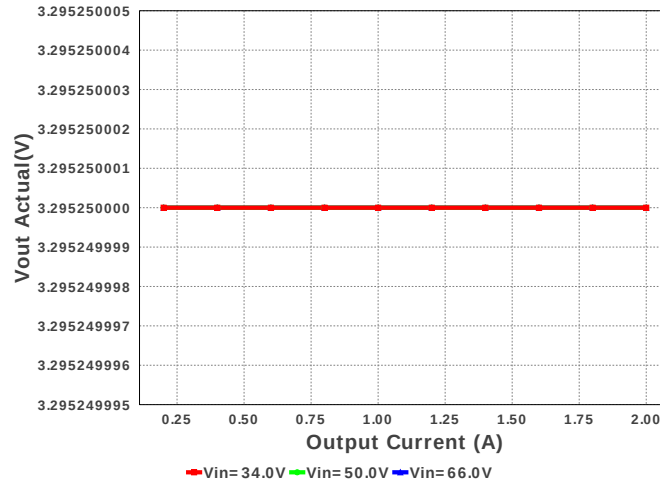
D1 Tj

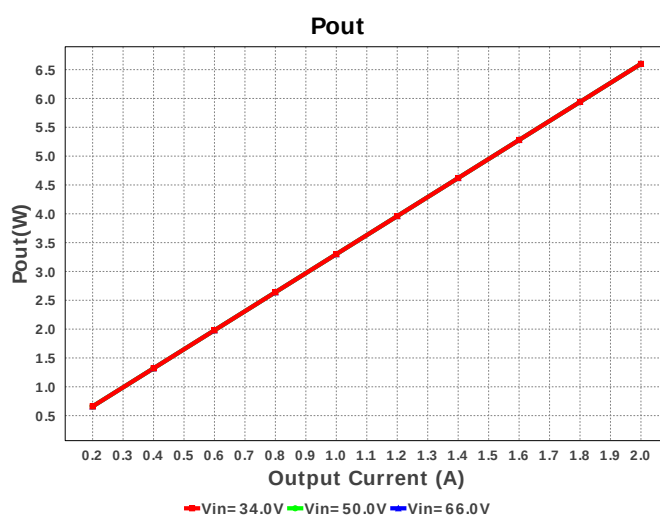
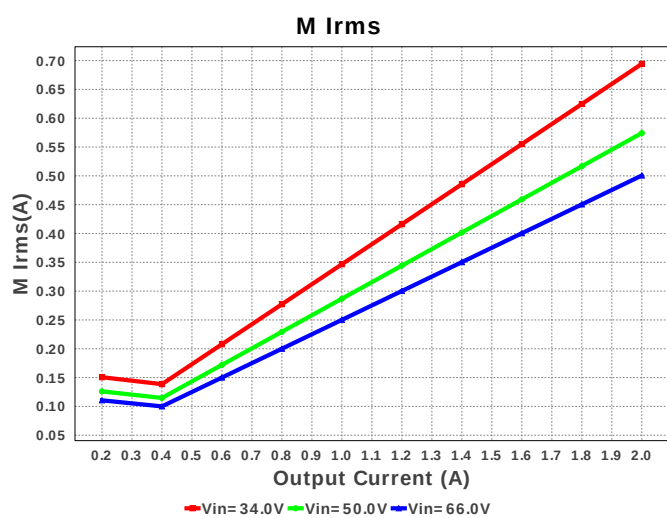
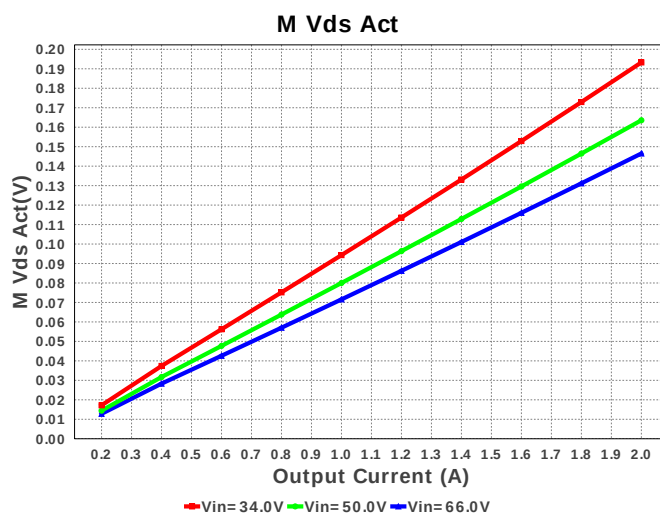
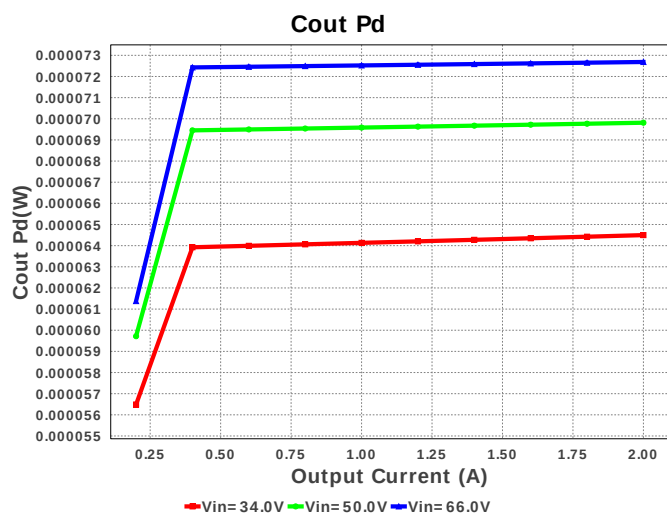
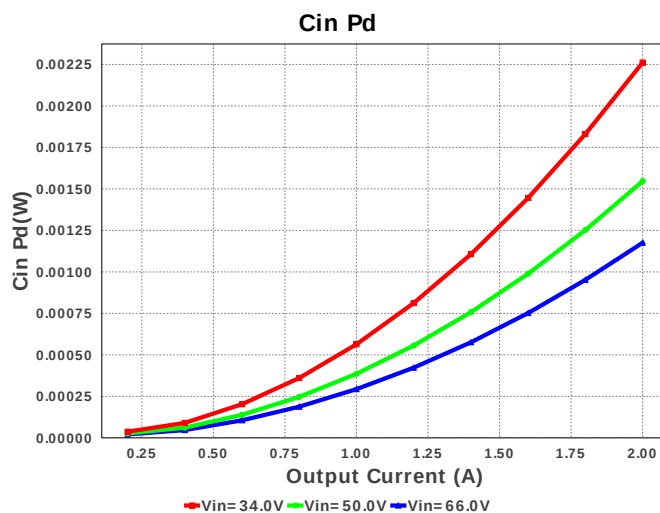
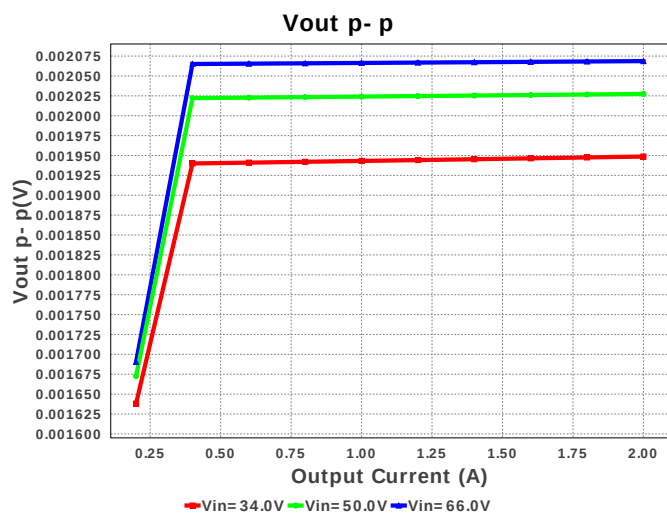


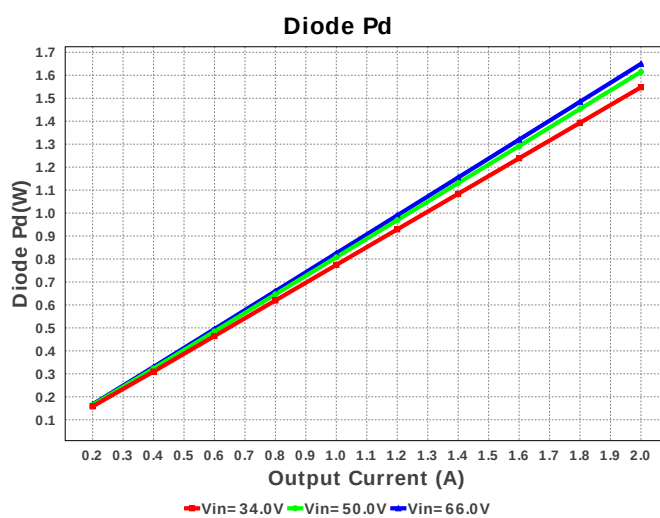
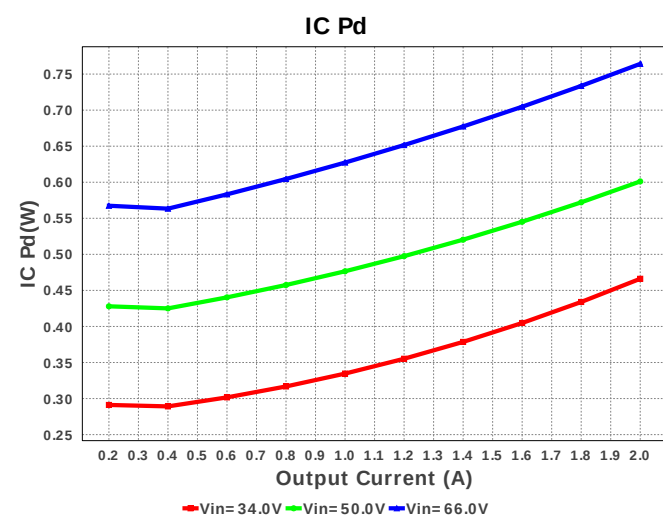
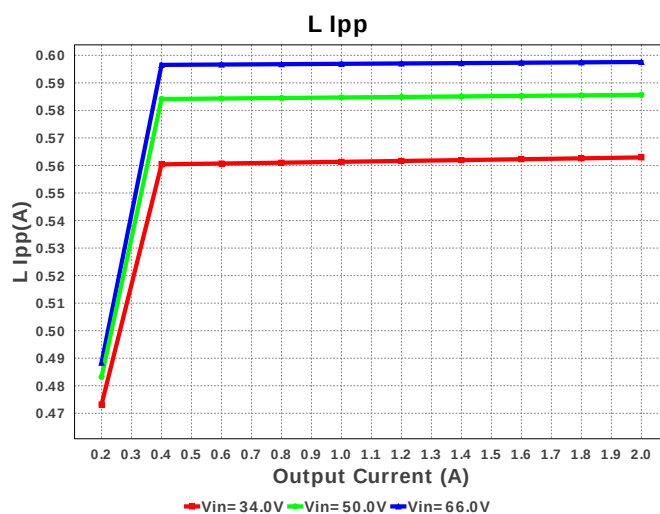
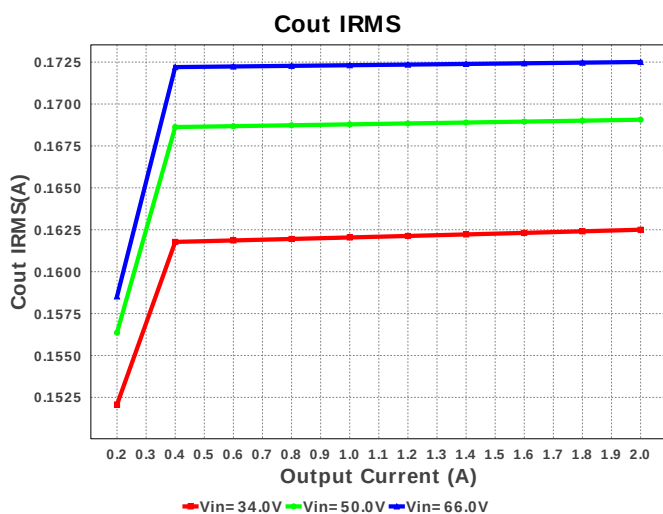
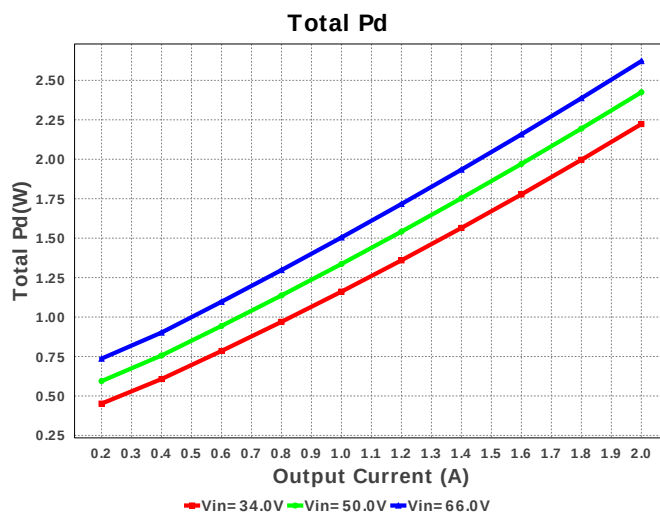
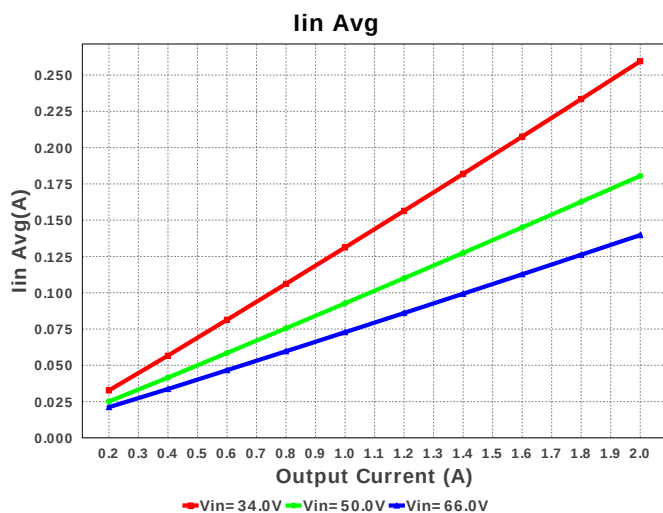
Efficiency



Vout Actual







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	469.464 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	172.507 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.298 A	Current	Peak switch current in IC
4.	Iin Avg	139.73 mA	Current	Average input current
5.	L Ipp	597.58 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	500.549 mA	Current	Q lavg
7.	BOM Count	15	General	Total Design BOM count
8.	FootPrint	444.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	298.73 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	146.501 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Mode	CCM	General	Conduction Mode
13.	Pout	6.6 W	General	Total output power
14.	Total BOM	\$2.87	General	Total BOM Cost
15.	D1 Tj	128.986 degC	Op_Point	D1 junction temperature
16.	Vout Actual	3.295 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
18.	Duty Cycle	6.264 %	Op_point	Duty cycle
19.	Efficiency	71.568 %	Op_point	Steady state efficiency
20.	IC Tj	60.567 degC	Op_point	IC junction temperature
21.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	VIN_OP	66.0 V	Op_point	Vin operating point
24.	Vout p-p	2.069 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	1.176 mW	Power	Input capacitor power dissipation
26.	Cout Pd	72.686 μW	Power	Output capacitor power dissipation
27.	Diode Pd	1.65 W	Power	Diode power dissipation
28.	IC Pd	764.168 mW	Power	IC power dissipation
29.	L Pd	206.8 mW	Power	Inductor power dissipation
30.	Total Pd	2.622 W	Power	Total Power Dissipation
31.	Vout Tolerance	2.757 %		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	66.0	Maximum input voltage
3.	VinMin	34.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LM5005	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM5005 Product Folder** : <http://www.ti.com/product/LM5005> : contains the data sheet and other resources.

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