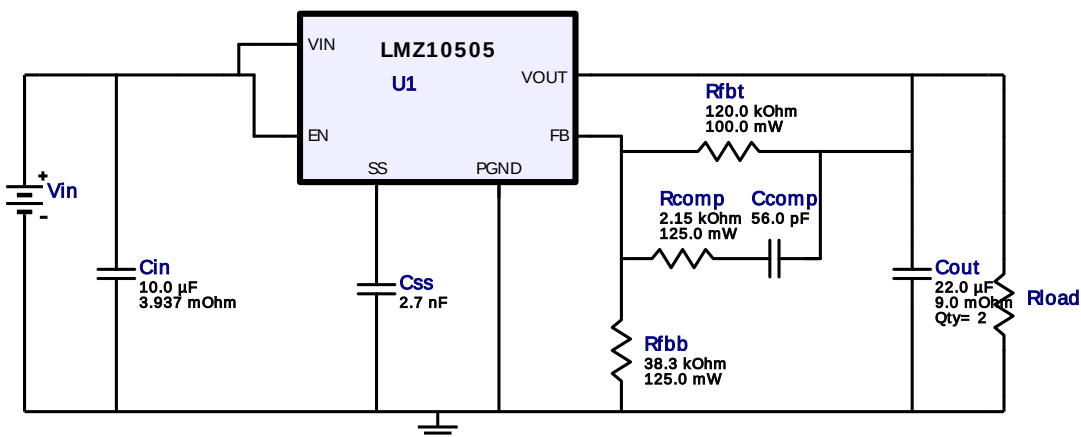


WEBENCH® Design Report

Design : 4716106/1 LMZ10505TZX-ADJ/NOPB
LMZ10505TZX-ADJ/NOPB 4.5V-5.5V to 3.30V @ 4.0A

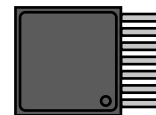
Vout = 3.3V
Iout = 4.0A



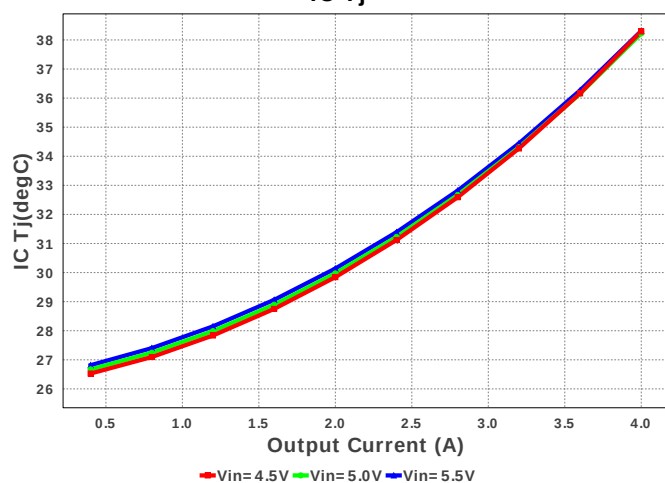
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Yageo America	CC0805JRNPO9BN560 Series= C0G/NP0	Cap= 56.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	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
3.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	2	\$0.04	0805 7 mm ²
4.	Css	Yageo America	CC0805KRX7R9BB272 Series= X7R	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	Rcomp	Panasonic	ERJ-6ENF2151V Series= ERJ-6E	Res= 2.15 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
6.	Rfbb	Panasonic	ERJ-6ENF3832V Series= ERJ-6E	Res= 38.3 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
7.	Rf	Yageo America	RC0603FR-07120KL Series= ?	Res= 120.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	0603 5 mm ²

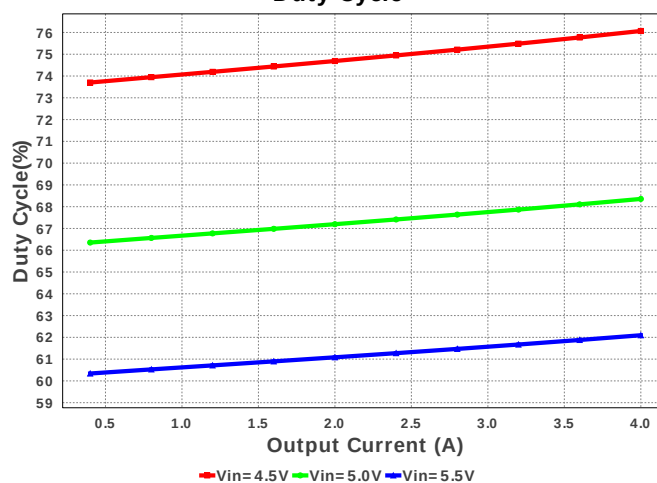
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	U1	Texas Instruments	LMZ10505TZX-ADJ/NOPB	Switcher	1	\$4.70	

TZA07A 199 mm²

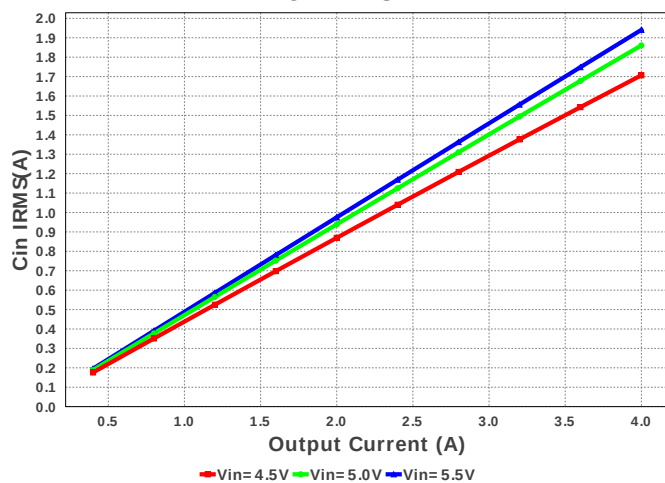
IC Tj



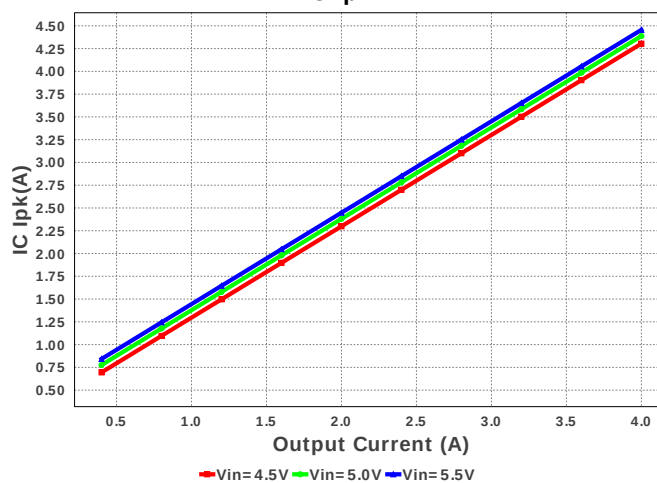
Duty Cycle

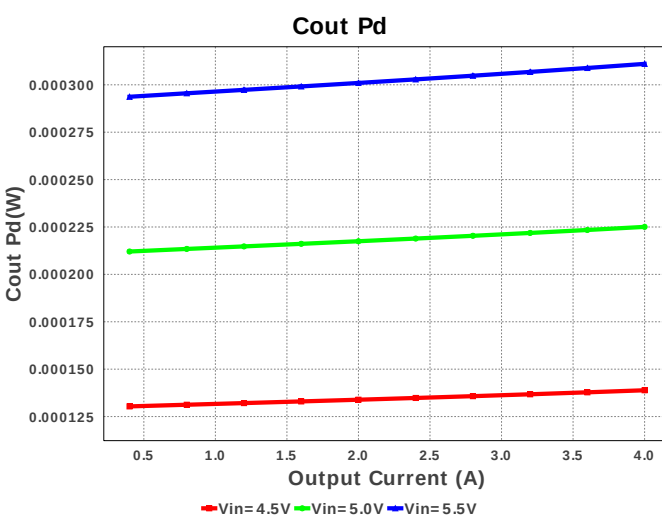
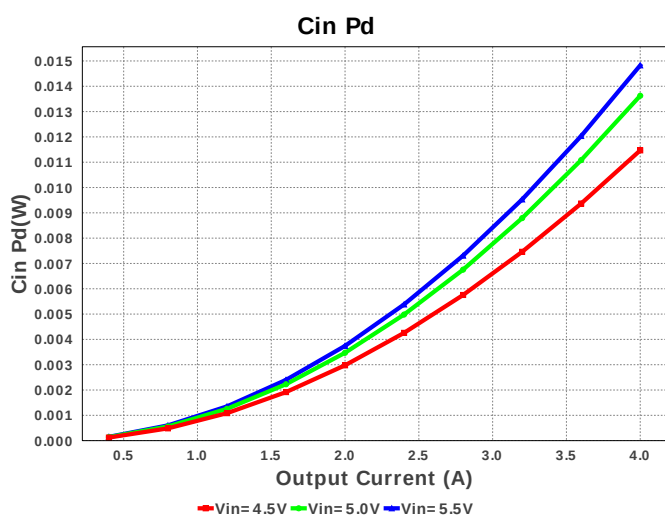
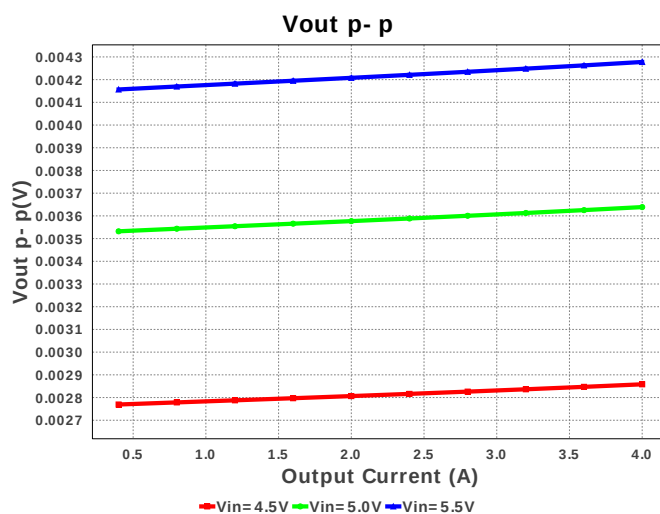
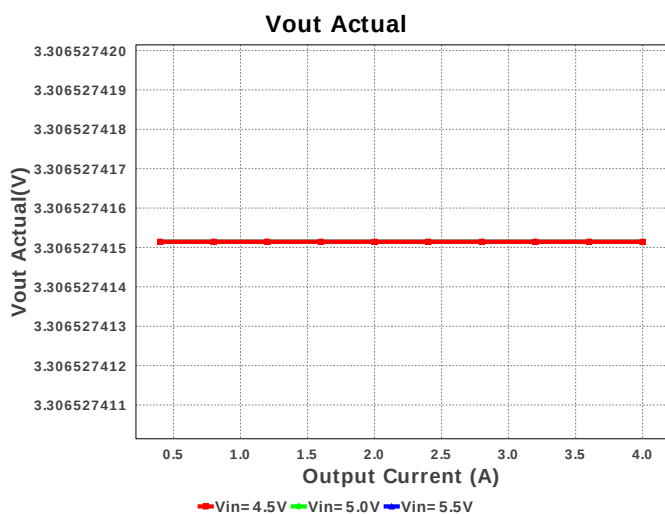
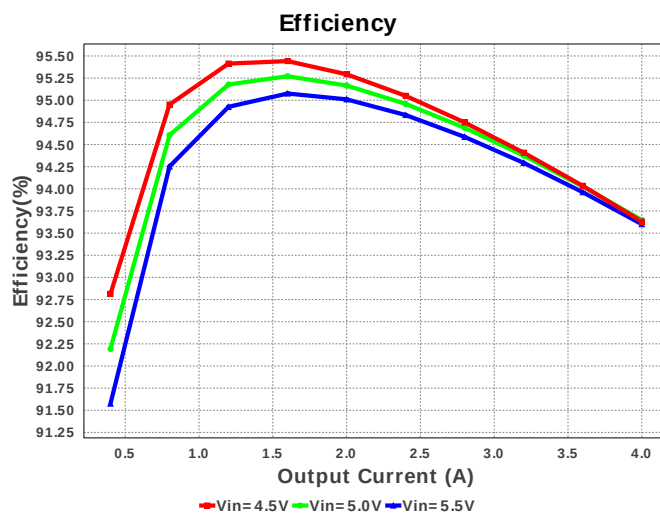
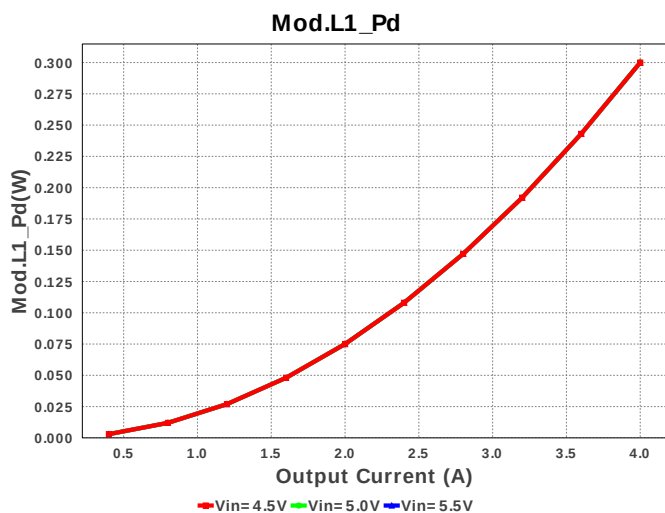


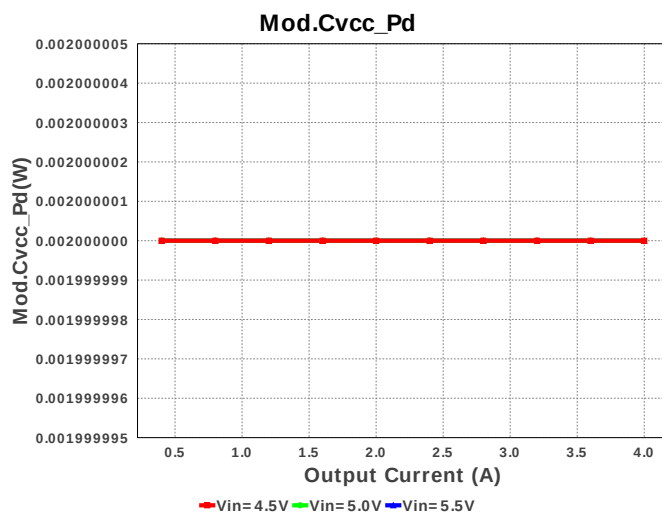
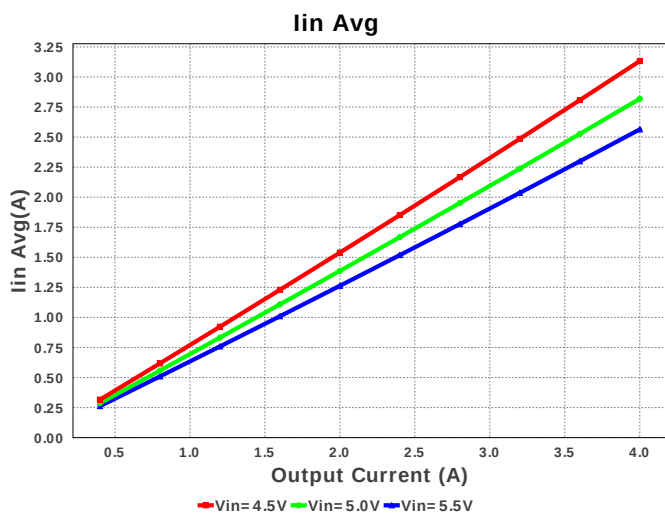
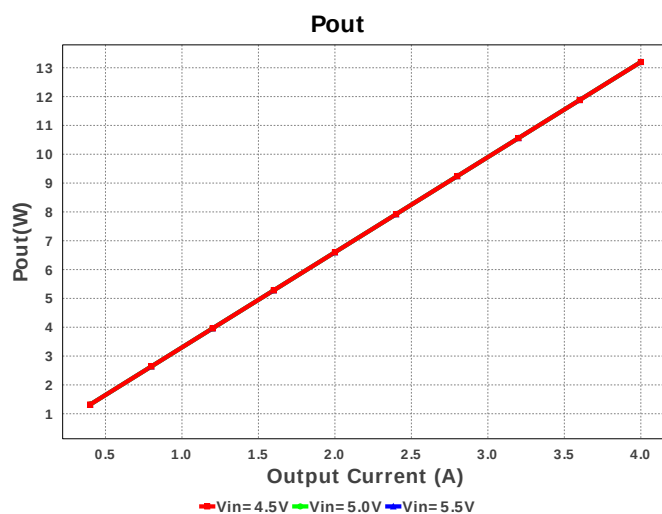
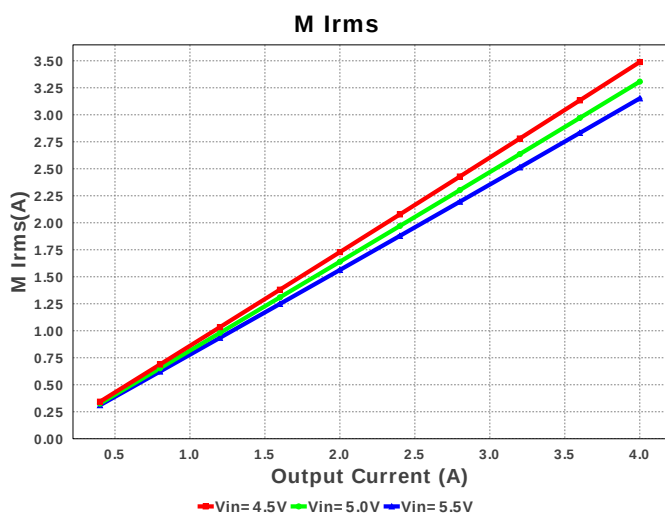
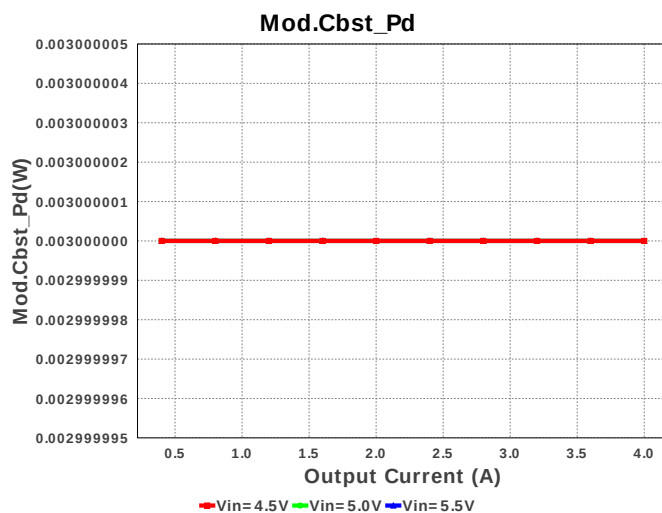
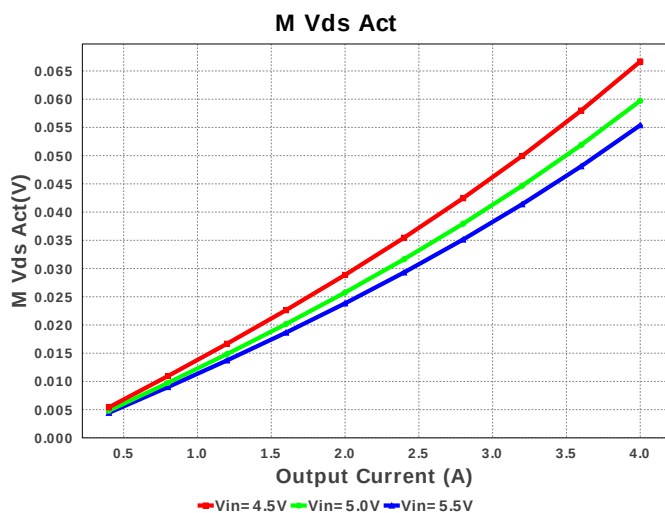
Cin IRMS

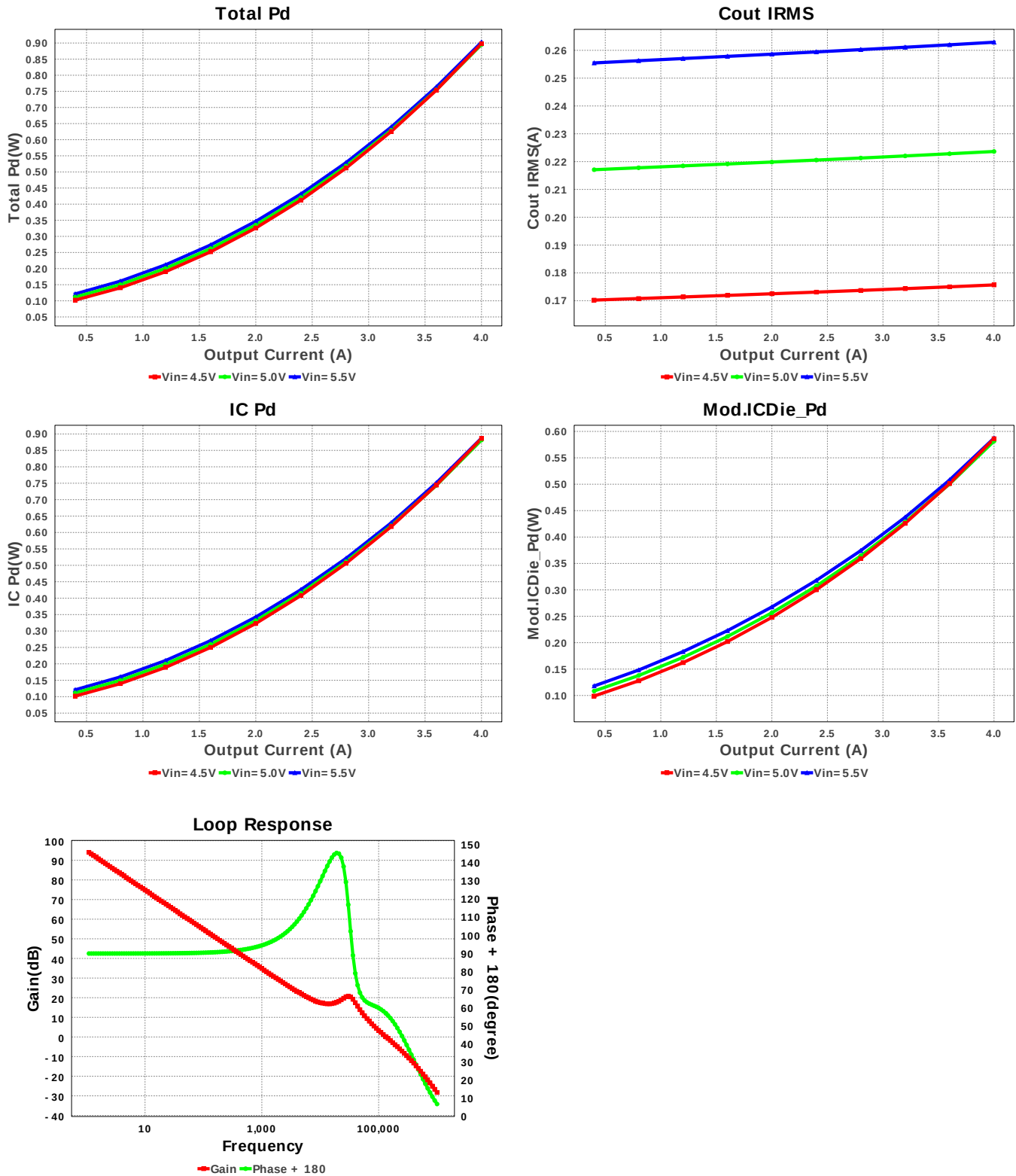


IC Ipk









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.941 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	262.909 mA	Current	Output capacitor RMS ripple current
3.	IC IpK	4.455 A	Current	Peak switch current in IC
4.	Iin Avg	2.564 A	Current	Average input current
5.	M Irms	3.152 A	Current	MOSFET RMS current
6.	BOM Count	9	General	Total Design BOM count
7.	FootPrint	251.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	1000.0 kHz	General	Switching frequency
9.	IC Tolerance	20.0 mV	General	IC Feedback Tolerance
10.	M Vds Act	55.386 mV	General	Voltage drop across the MosFET
11.	Pout	13.2 W	General	Total output power

#	Name	Value	Category	Description
12.	Total BOM	\$4.86	General	Total BOM Cost
13.	Low Freq Gain	94.017 dB	Op_Point	Gain at 10Hz
14.	Vout Actual	3.307 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Cross Freq	134.539 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	62.096 %	Op_point	Duty cycle
18.	Efficiency	93.601 %	Op_point	Steady state efficiency
19.	Gain Marg	-33.187 dB	Op_point	Bode Plot Gain Margin
20.	IC Tj	38.308 degC	Op_point	IC junction temperature
21.	ICThetaJA	15.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	4.0 A	Op_point	Iout operating point
23.	Phase Marg	56.836 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	5.5 V	Op_point	Vin operating point
25.	Vout p-p	4.278 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	14.826 mW	Power	Input capacitor power dissipation
27.	Cout Pd	311.045 µW	Power	Output capacitor power dissipation
28.	IC Pd	887.208 mW	Power	IC power dissipation
29.	Mod.Cbst_Pd	3.0 mW	Power	Internal Module Cbst Power Dissipation
30.	Mod.Cvcc_Pd	2.0 mW	Power	Internal Module Cvcc Power Dissipation
31.	Mod.ICDie_Pd	587.208 mW	Power	Internal Module IC Power Dissipation
32.	Mod.L1_Pd	300.0 mW	Power	Internal Module Inductor Power Dissipation
33.	Total Pd	902.422 mW	Power	Total Power Dissipation
34.	Vout Tolerance	4.07 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	4.0	Maximum Output Current
2.	SoftStart	1.0 ms	Soft Start Time (ms)
3.	VinMax	5.5	Maximum input voltage
4.	VinMin	4.5	Minimum input voltage
5.	Vout	3.3	Output Voltage
6.	base_pn	LMZ10505	Texas Instruments Base Part Number
7.	source	DC	Input Source Type
8.	ta	25.0	Ambient temperature

Design Assistance

1. LMZ10505 Product Folder : <http://www.ti.com/product/LMZ10505> : contains the data sheet and other resources.

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