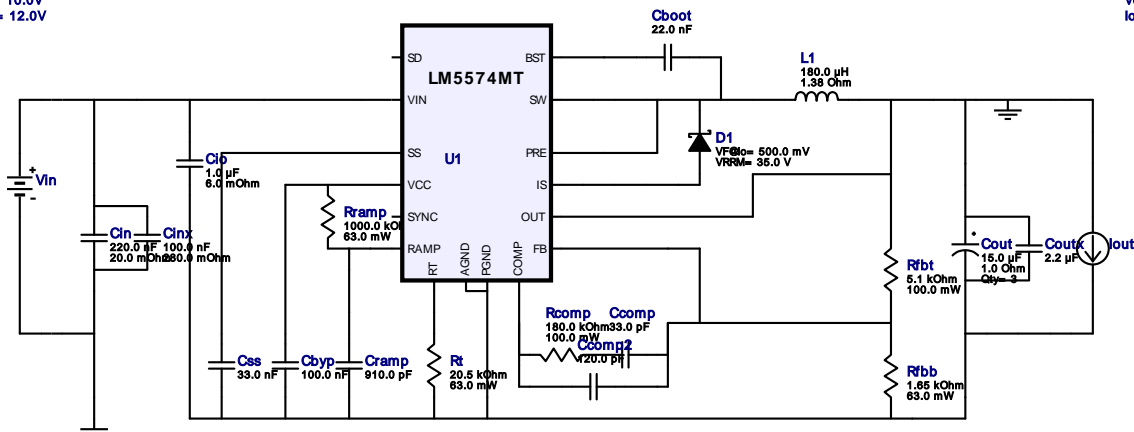


WEBENCH® Design Report

Design : 3886784/21 LM5574MTX/NOPB
LM5574MTX/NOPB 10.0V-12.0V to -5.0V @ 0.1A







VinMin = 10.0V
VinMax = 12.0V

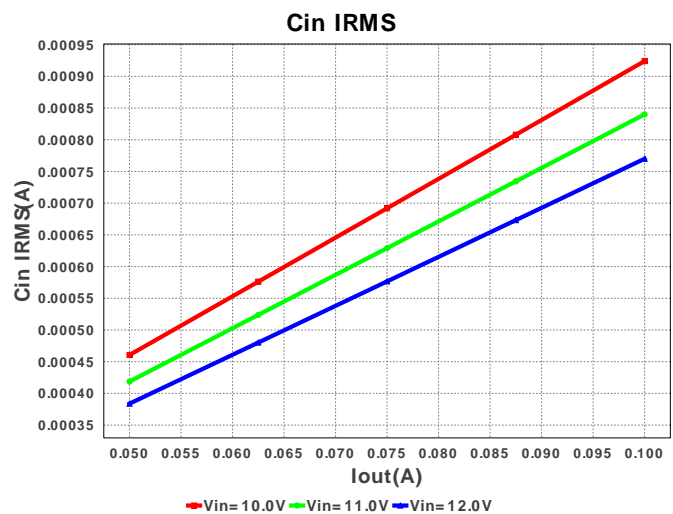
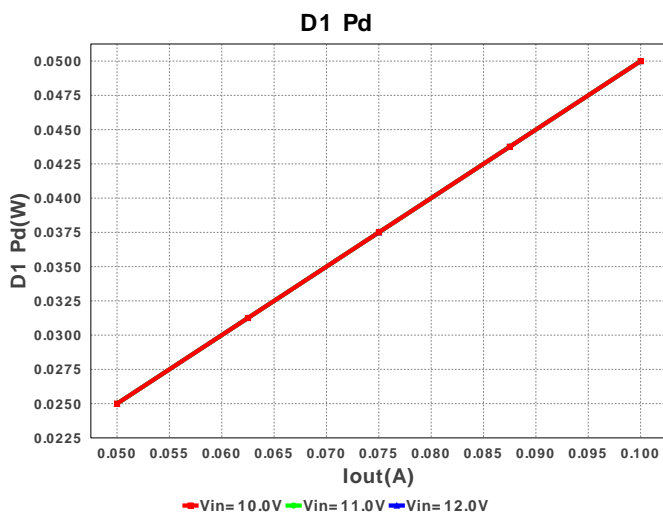
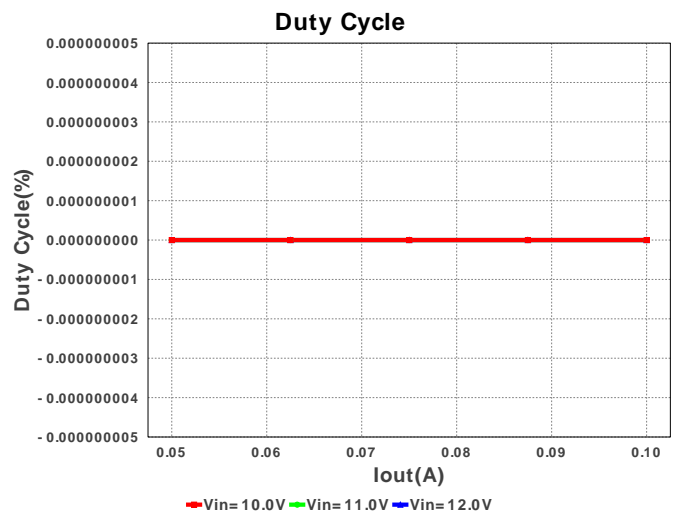
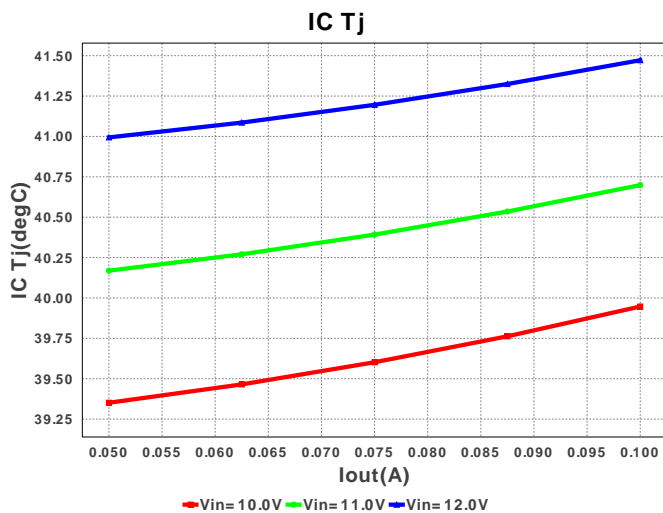
Vout = -5.0V
Iout = 0.1A

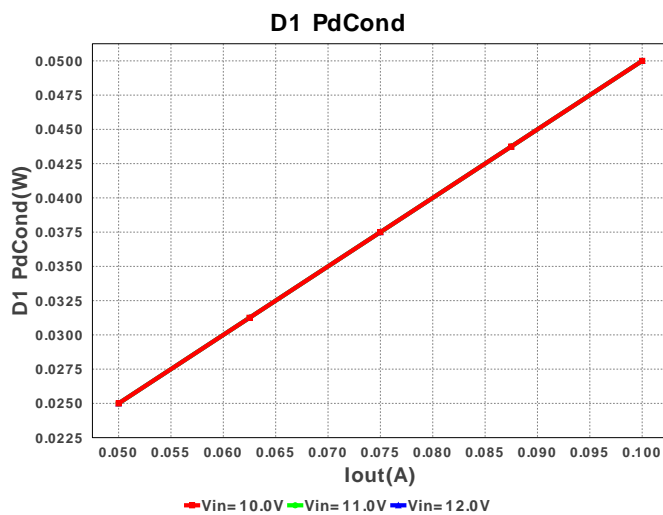
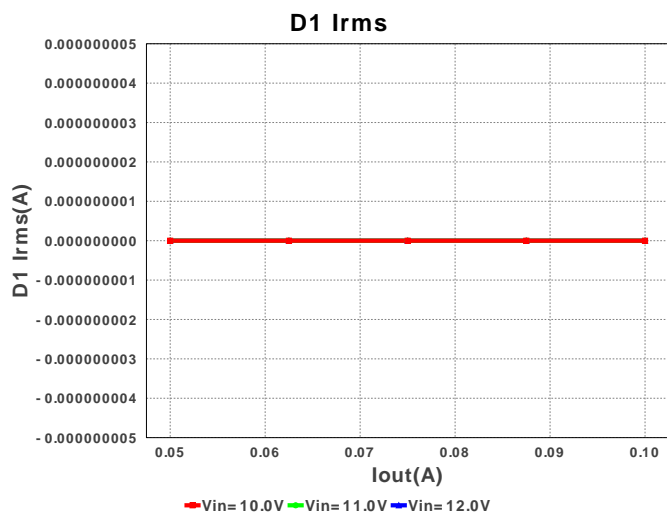
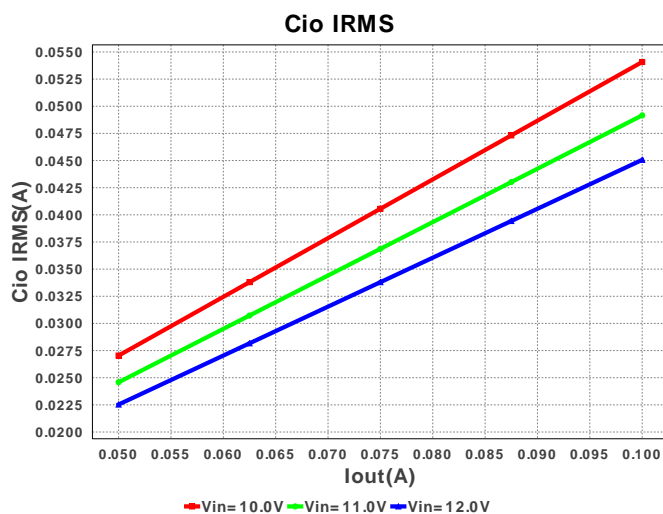
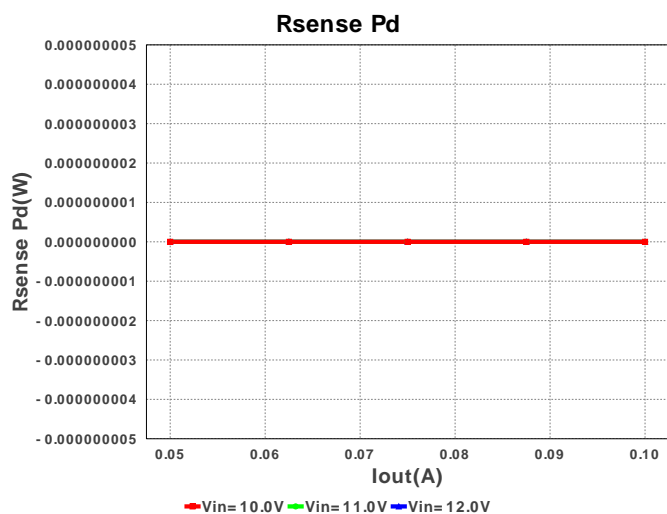
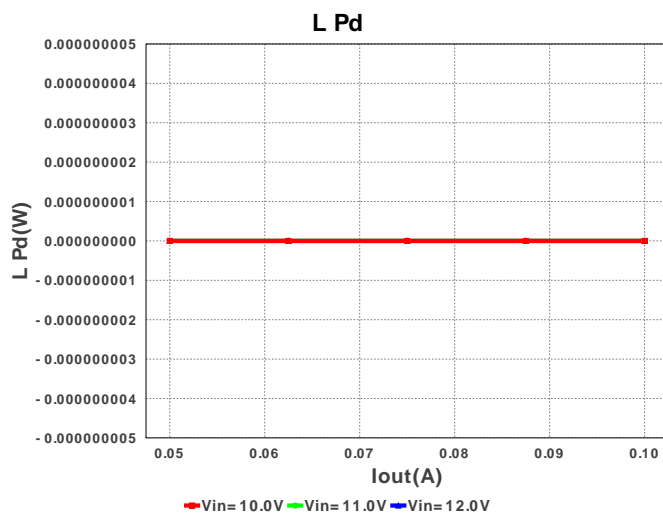
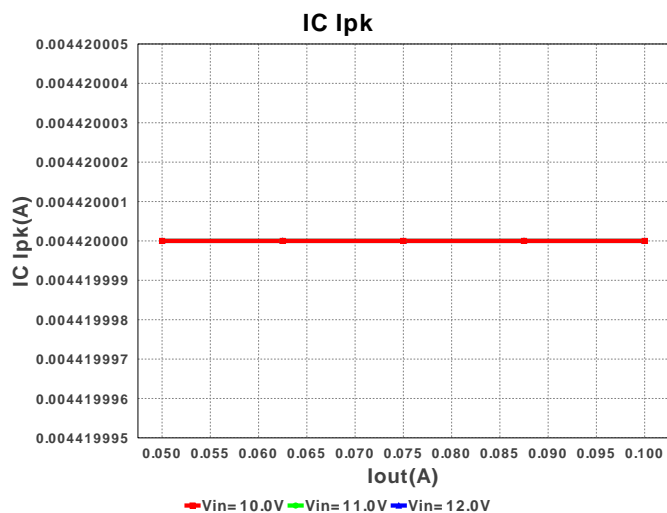


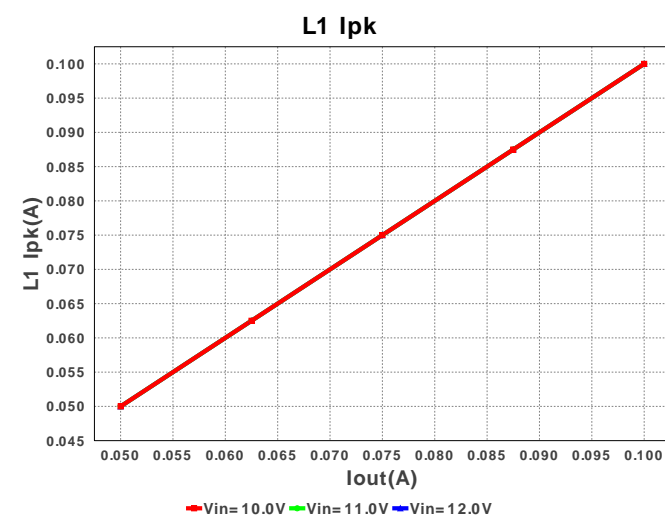
Electrical BOM

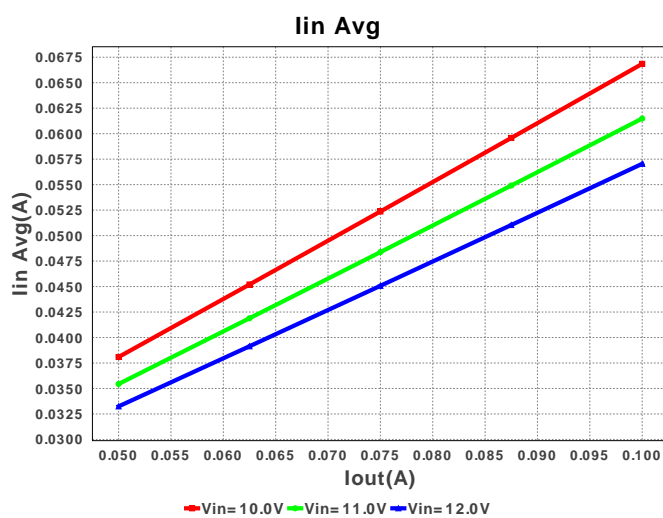
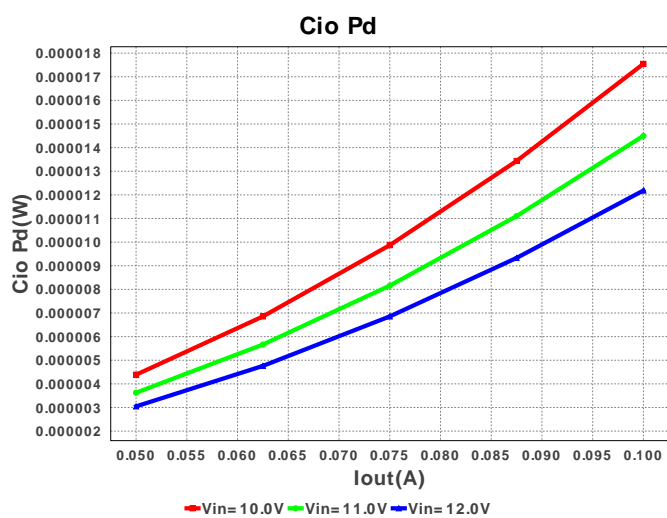
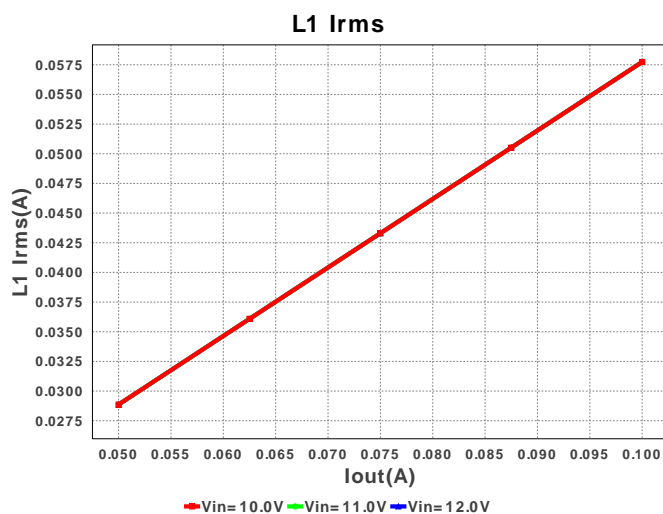
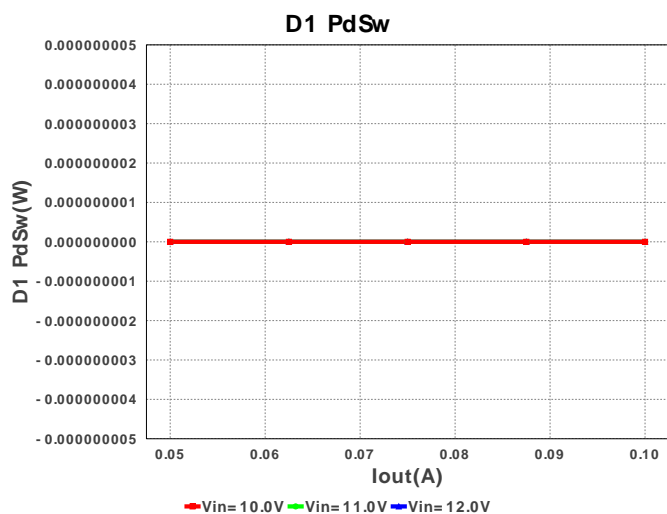
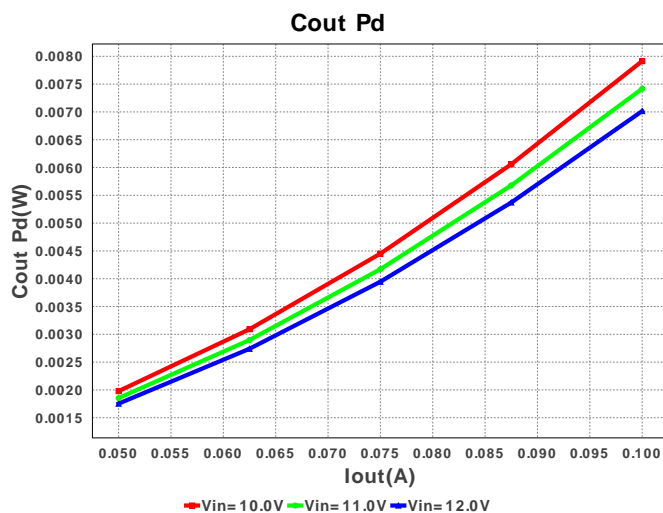
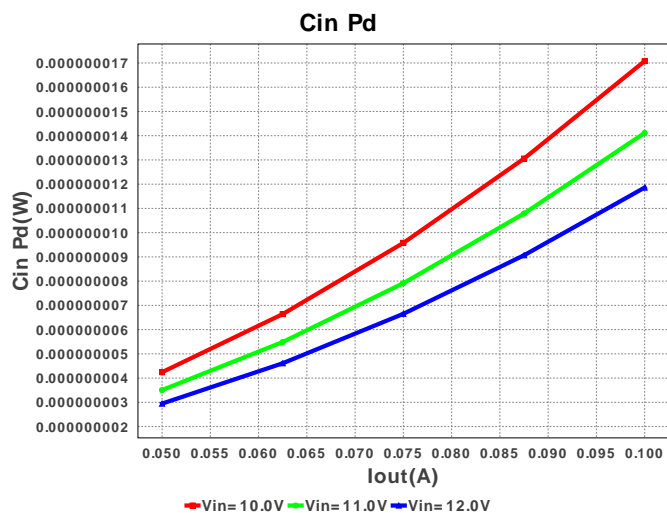
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61C223KA01D Series= X5R	Cap= 22.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
2.	Cbyp	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
3.	Ccomp	Yageo America	CC0805JRNP09BN330 Series= C0G/NP0	Cap= 33.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
4.	Ccomp2	Yageo America	CC0805JRNP09BN121 Series= C0G/NP0	Cap= 120.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
5.	Cin	MuRata	GRM188R71C224KA01D Series= X7R	Cap= 220.0 nF ESR= 20.0 mOhm VDC= 16.0 V IRMS= 2.83 A	1	\$0.02	0603 5mm2
6.	Cinx	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
7.	Cio	MuRata	GRM219R71E105KA88D Series= X7R	Cap= 1.0 µF ESR= 6.0 mOhm VDC= 25.0 V IRMS= 3.87 A	1	\$0.04	0805 7mm2
8.	Cout	AVX	TPSA156K010R1000 Series= TPS	Cap= 15.0 µF ESR= 1.0 Ohm VDC= 10.0 V IRMS= 246.0 mA	3	\$0.23	3216-18 11mm2
9.	Coutx	MuRata	GRM188R61A225KE34D Series= X5R	Cap= 2.2 µF VDC= 10.0 V IRMS= 0.0 A	1	\$0.02	0603 5mm2
10.	Cramp	MuRata	GRM1555C1E911JA01D Series= C0G/NP0	Cap= 910.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
11.	Css	MuRata	GRM033R60J333KE01D Series= X5R	Cap= 33.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0201 2mm2

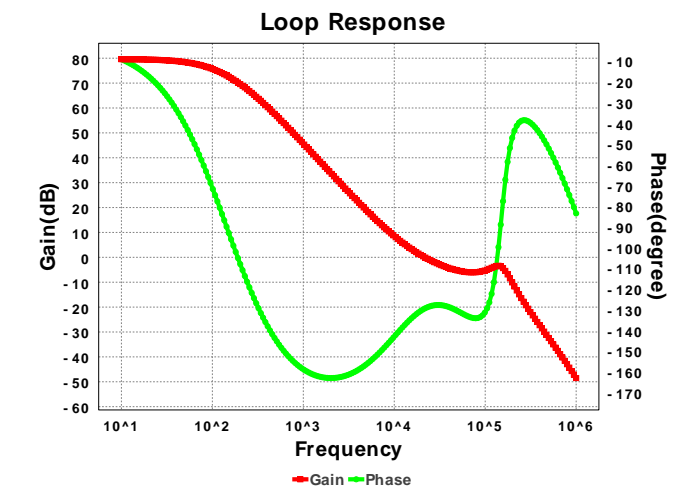
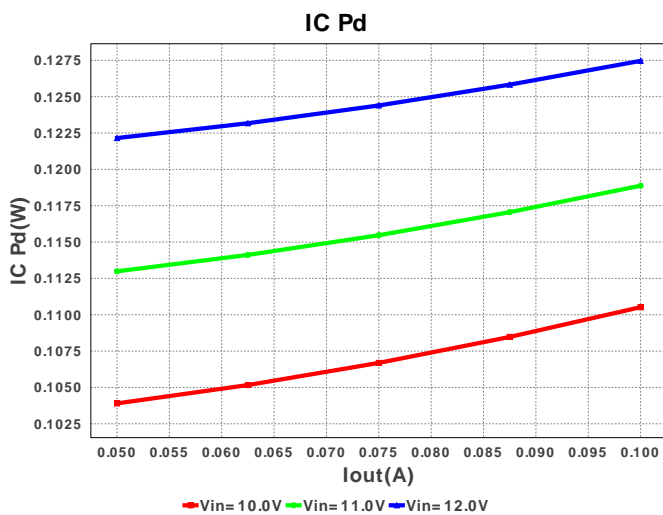
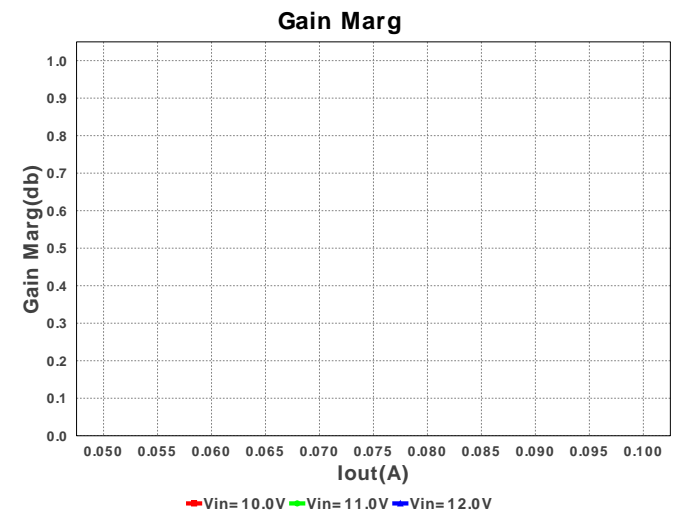
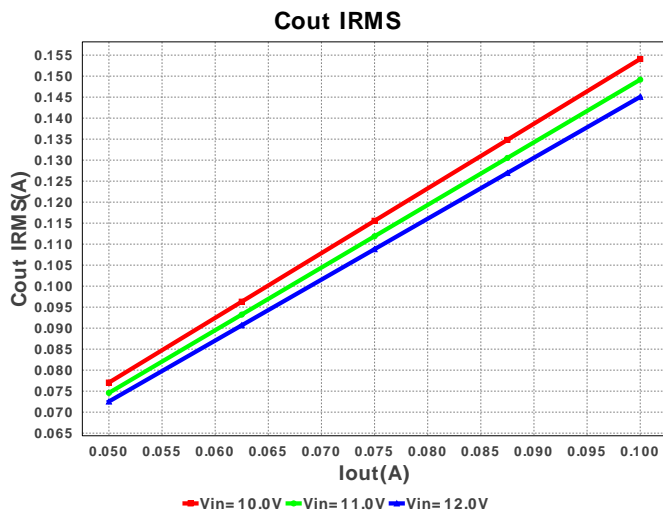
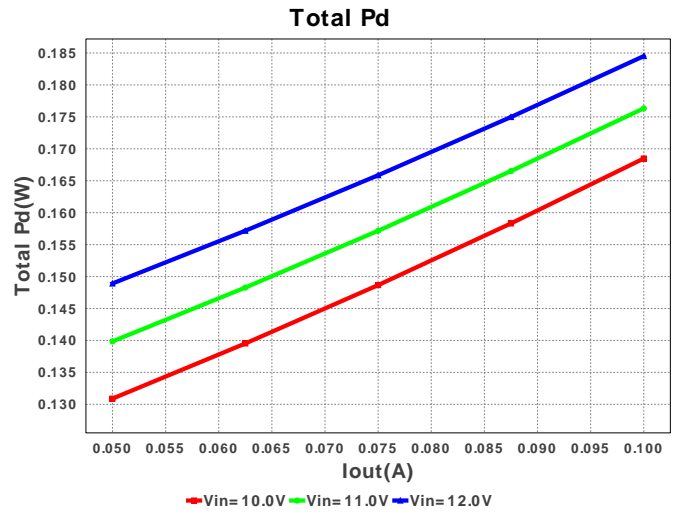
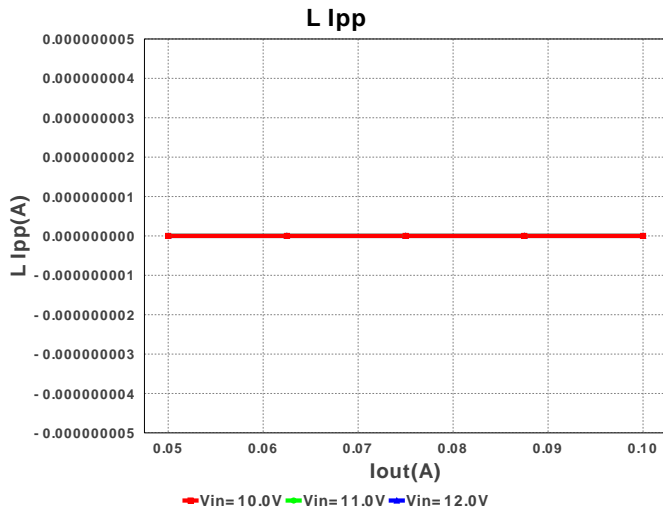
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	D1	Bourns	CD0603-B0230	VF@Io= 500.0 mV VRRM= 35.0 V	1	\$0.11	 Diode_0603 5mm2
13.	L1	Bourns	SDR0604-181KL	L= 180.0 µH DCR= 1.38 Ohm	1	\$0.17	 SDR0604 61mm2
14.	Rcomp	Yageo America	RC0603FR-07180KL Series= 233	Res= 180.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5mm2
15.	Rfbb	Vishay-Dale	CRCW04021K65FKED Series= CRCW..e3	Res= 1.65 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
16.	Rfbb	Yageo America	RC0603FR-075K1L Series= 233	Res= 5.1 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5mm2
17.	Rramp	Vishay-Dale	CRCW04021M00FKED Series= CRCW..e3	Res= 1000.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
18.	Rt	Vishay-Dale	CRCW040220K5FKED Series= CRCW..e3	Res= 20.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
19.	U1	Texas Instruments	LM5574MTX/NOPB	Switcher	1	\$1.55	 MTC16 59mm2











Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	4.38 mA	Current	Input capacitor RMS ripple current
2.	Cio IRMS	42.351 mA	Current	Input to output capacitor RMS ripple current
3.	Cout IRMS	55.292 mA	Current	Output capacitor RMS ripple current
4.	D1 Irms	61.146 mA	Current	D1 Irms
5.	IC Ipk	4.42 mA	Current	Peak switch current in IC
6.	Iin Avg	59.194 mA	Current	Average input current
7.	L Ipp	70.217 mA	Current	Peak-to-peak output inductor ripple current
8.	L1 Ipk	184.362 mA	Current	Inductor peak current
9.	L1 Irms	106.441 mA	Current	Inductor ripple current
10.	BOM Count	21	General	Total Design BOM count
11.	FootPrint	223.0 mm2	General	Total Foot Print Area of BOM components

#	Name	Value	Category	Description
12.	Frequency	300.0 kHz	General	Switching frequency
13.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
14.	Total BOM	\$2.72	General	Total BOM Cost
15.	D1 Tj	50.0 degC	Op_Point	D1 junction temperature
16.	Vin p-p	14.608 mV	Op_Point	Peak-to-peak input voltage
17.	Cross Freq	20.729 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	33.0 %	Op_point	Duty cycle
19.	Efficiency	70.39 %	Op_point	Steady state efficiency
20.	Gain Marg	48.507 db	Op_point	Bode Plot Gain Margin
21.	IC Tj	41.472 degC	Op_point	IC junction temperature
22.	IOUT_OP	100.0 mA	Op_point	Iout operating point
23.	Phase Marg	50.663 deg	Op_point	Bode Plot Phase Margin
24.	Phase Shift	17.523 deg	Op_point	Bode Plot Phase Shift
25.	VIN_OP	12.0 V	Op_point	Vin operating point
26.	Vout p-p	49.841 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	383.658 nW	Power	Input capacitor power dissipation
28.	Cio Pd	10.761 μ W	Power	Input to output capacitor power dissipation
29.	Cout Pd	1.019 mW	Power	Output capacitor power dissipation
30.	D1 Pd	50.0 mW	Power	Diode power dissipation
31.	D1 PdCond	50.0 mW	Power	Diode conduction losses
32.	D1 PdSw	0.0 W	Power	Diode switching losses
33.	IC Pd	127.465 mW	Power	IC power dissipation
34.	L Pd	28.336 mW	Power	Inductor power dissipation
35.	Rsense Pd	3.43 mW	Power	LED Current Rns Power Dissipation
36.	Total Pd	210.324 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	100.0 mA	Maximum Output Current
2.	Iout1	100.0 mAmps	Output Current #1
3.	VinMax	12.0 V	Maximum input voltage
4.	VinMin	10.0 V	Minimum input voltage
5.	Vout	-5.0 V	Output Voltage
6.	Vout1	-5.0 Volt	Output Voltage #1
7.	base_pn	LM5574	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. LM5574 Product Folder : <http://www.ti.com/product/lm5574> : contains the data sheet and other resources.

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