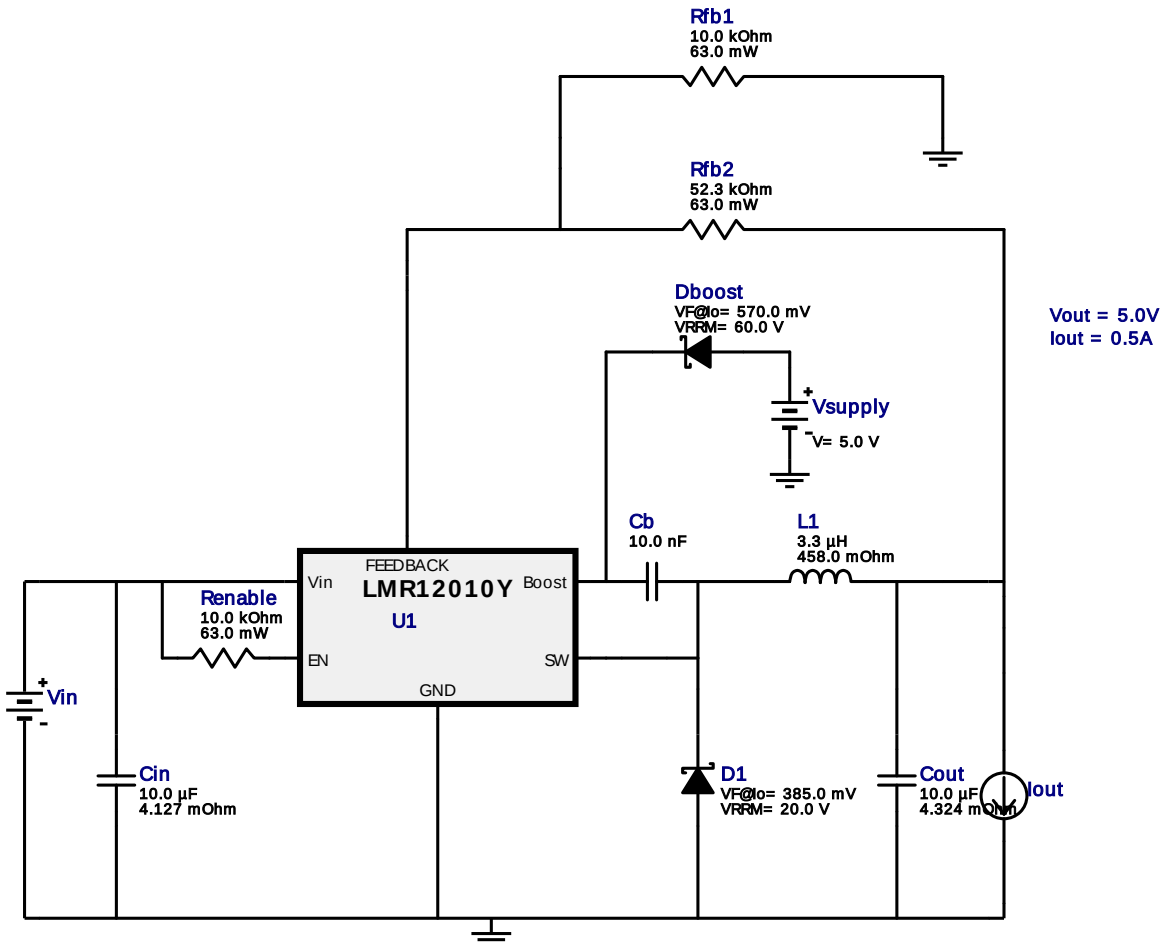


WEBENCH® Design Report

Design : 4742013/253 LMR12010YMK/NOPB
LMR12010YMK/NOPB 10.0V-12.0V to 5.00V @ 0.5A

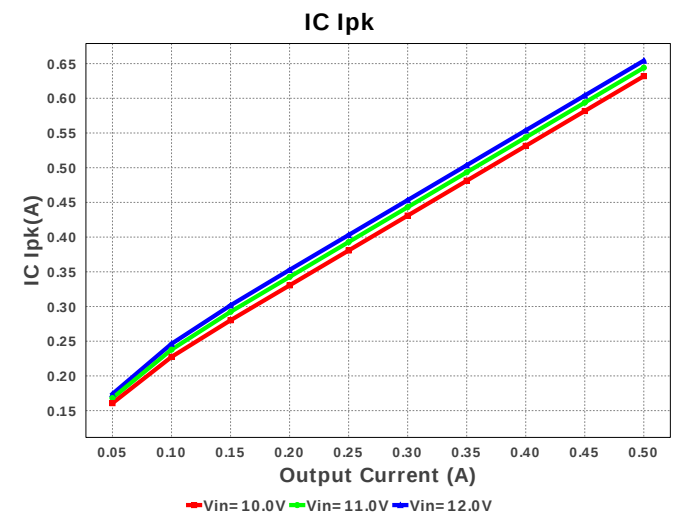
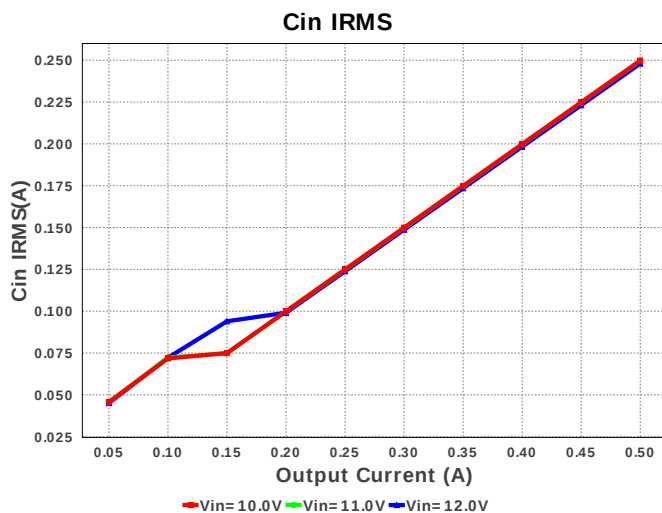
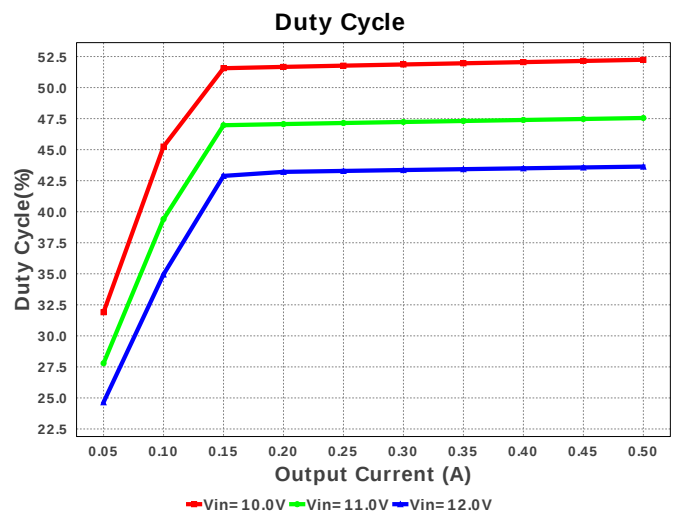
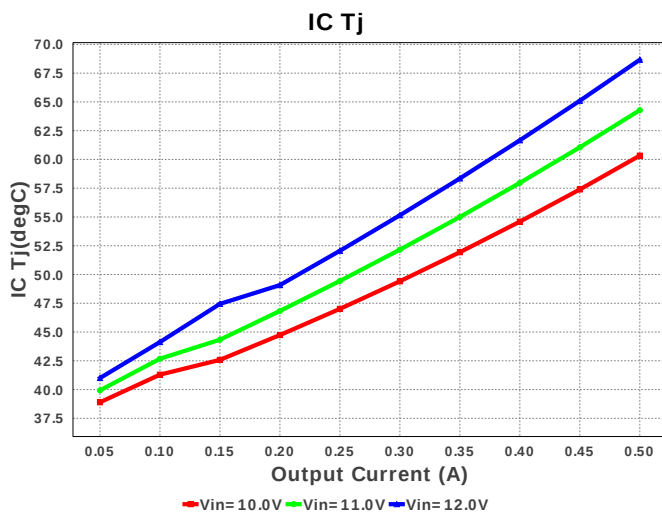


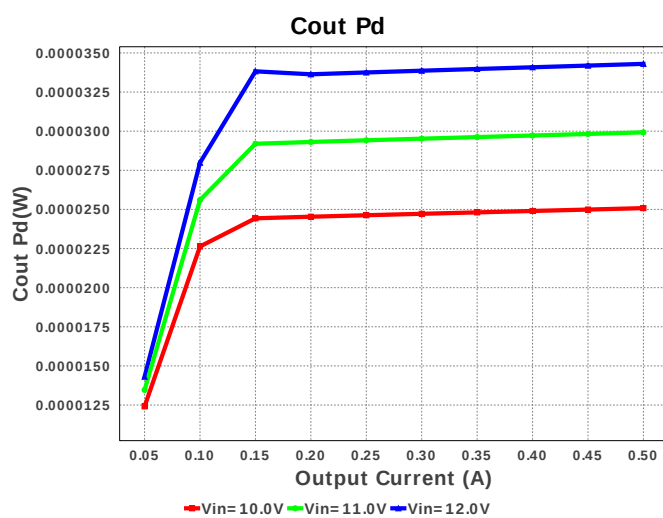
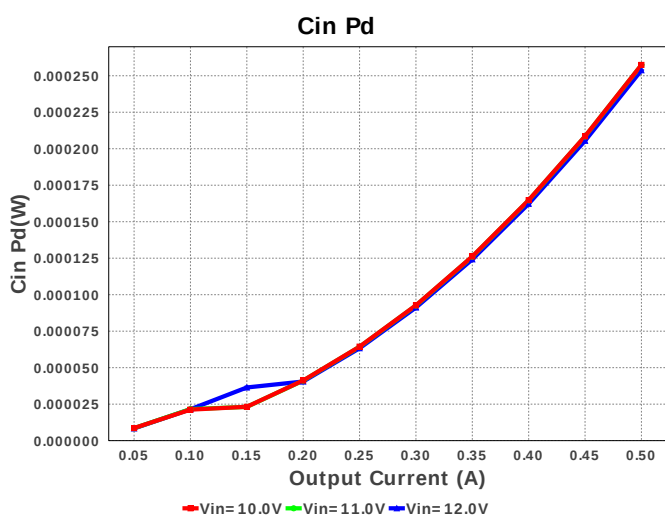
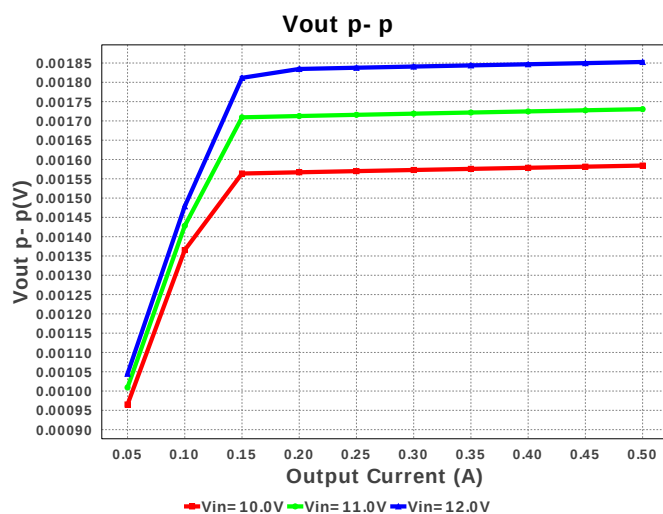
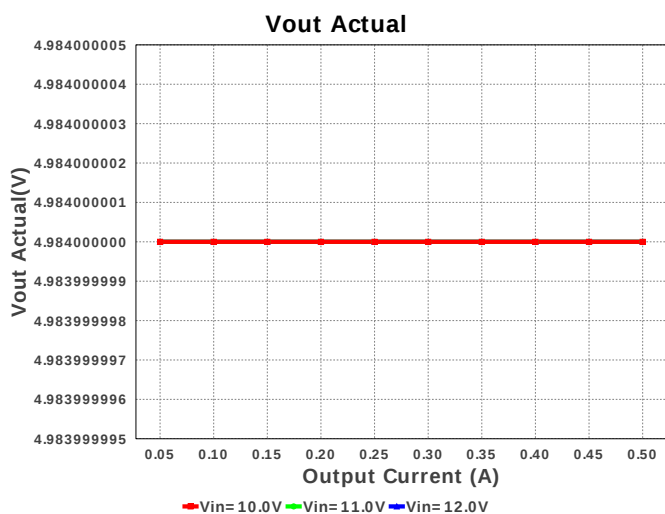
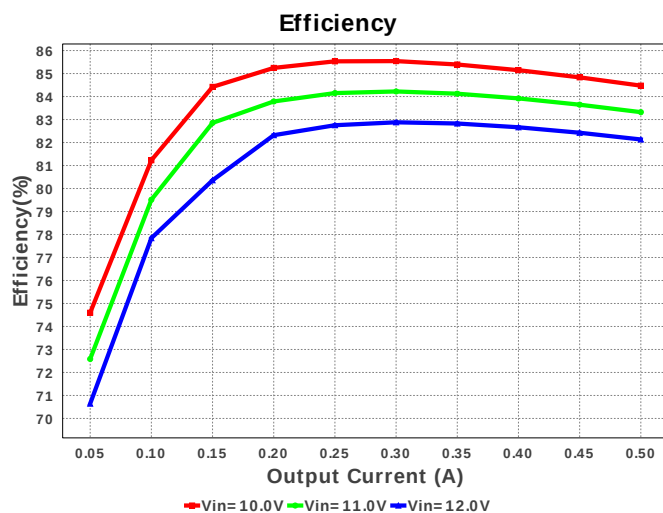
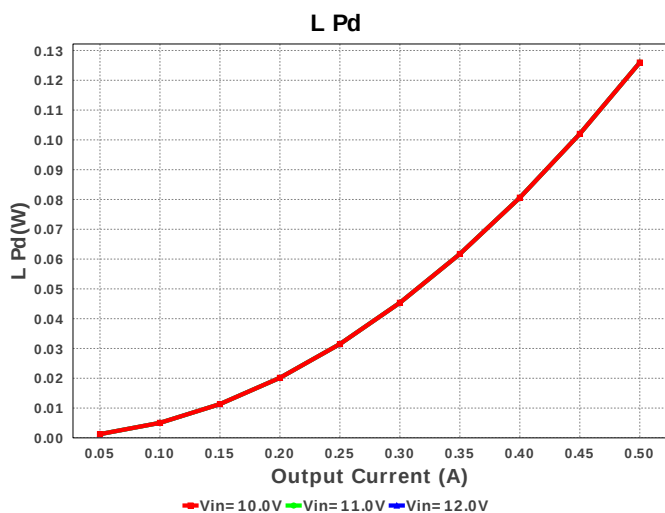
1. The Boost pin voltage must be supplied from a source of less than 5.5V. Recommended methods are described in the LM2734 datasheet Application Information.

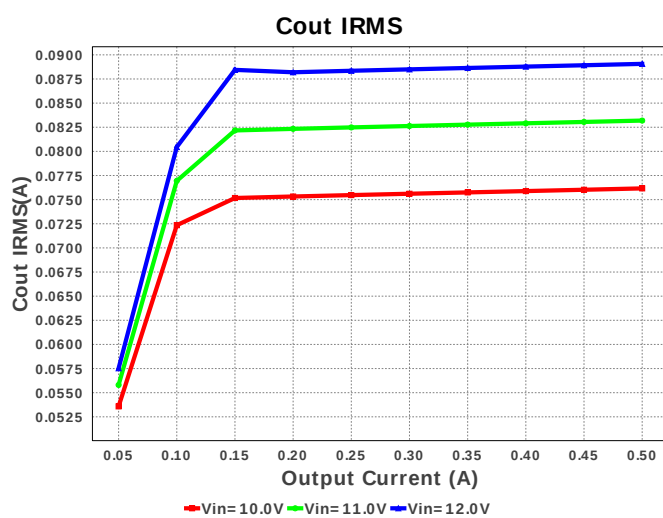
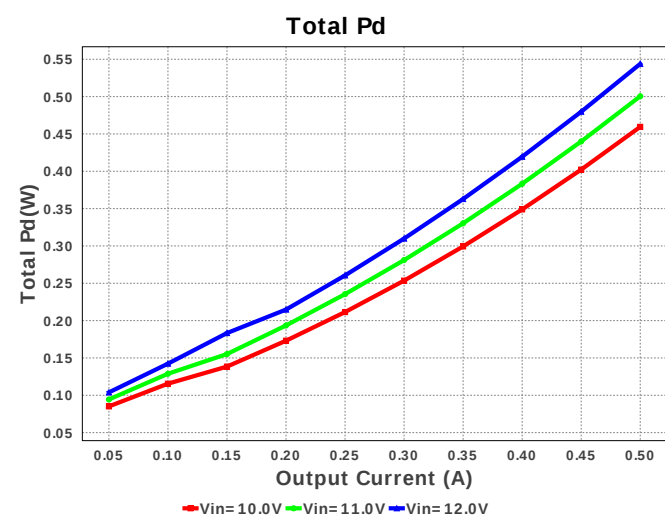
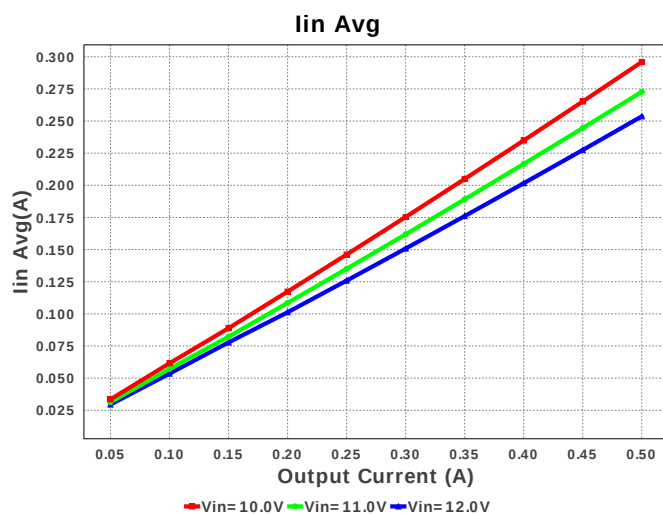
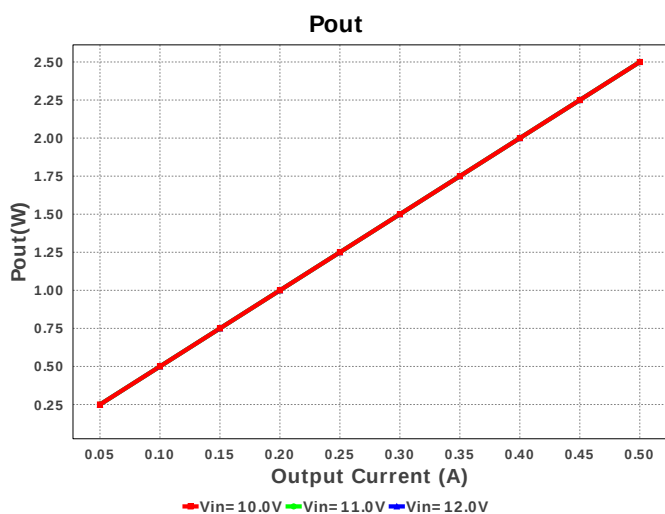
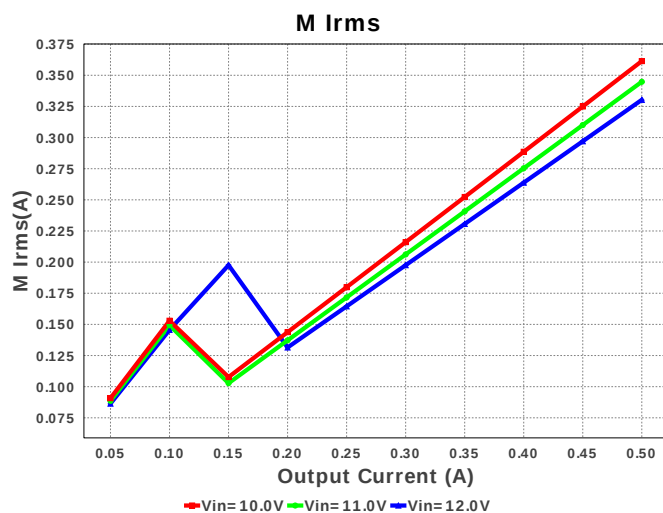
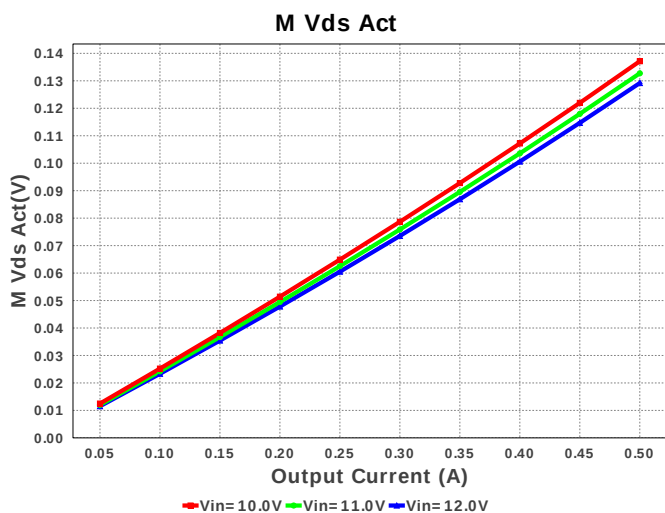
Electrical BOM

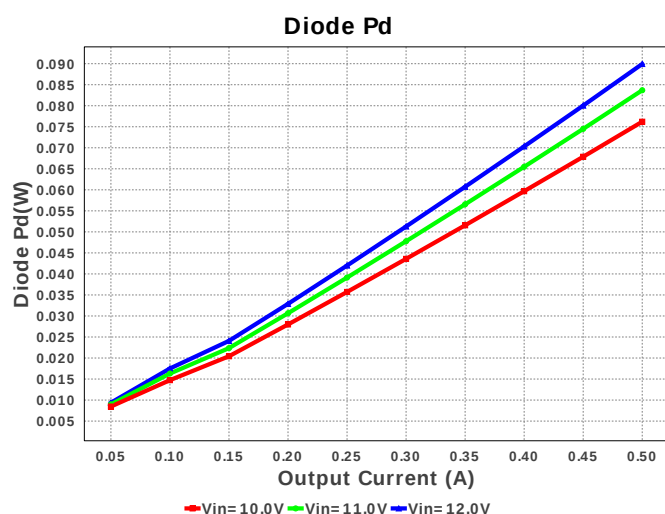
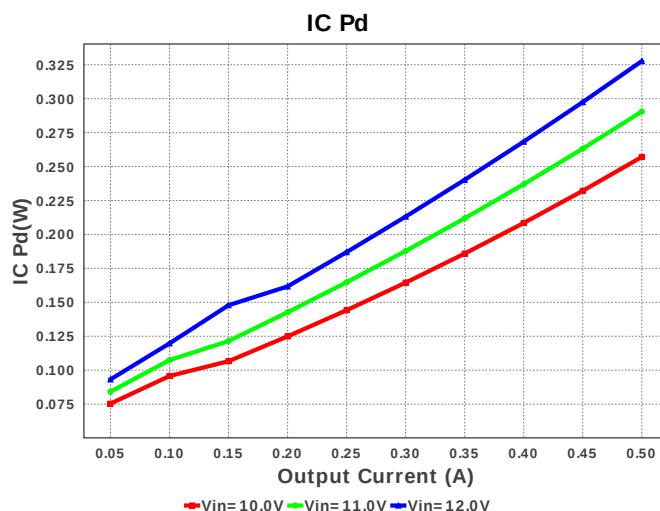
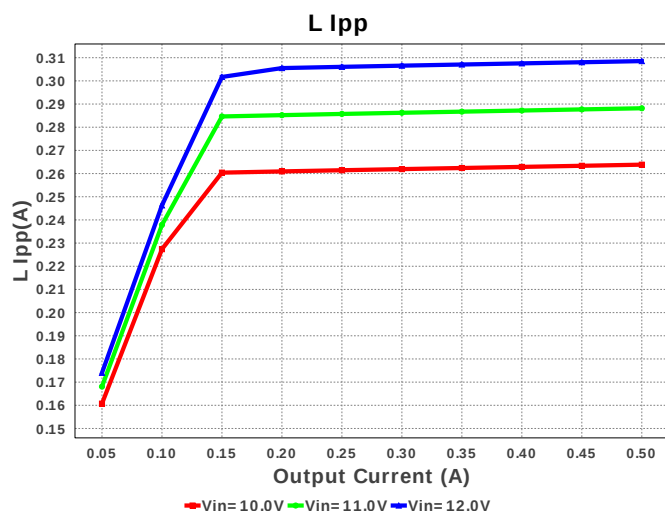
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	1	\$0.03	0805 7 mm ²
3.	Cout	MuRata	GRM219R60J106KE19D Series= X5R	Cap= 10.0 uF ESR= 4.324 mOhm VDC= 6.3 V IRMS= 2.8728 A	1	\$0.02	0805 7 mm ²
4.	D1	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	\$0.06	SOD-123 13 mm ²
5.	Dboost	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	\$0.04	SOD-123F 12 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	L1	TDK	VLS201610ET-3R3M	L= 3.3 μ H DCR= 458.0 mOhm	1	\$0.17	 VLS201610ET 8 mm ²
7.	Renale	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
8.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rfb2	Vishay-Dale	CRCW040252K3FKED Series= CRCW..e3	Res= 52.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	U1	Texas Instruments	LMR12010YMK/NOPB	Switcher	1	\$0.99	 MK06A 11 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	247.933 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	88.96 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	654.084 mA	Current	Peak switch current in IC
4.	Iin Avg	253.39 mA	Current	Average input current
5.	L Ipp	308.17 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	330.09 mA	Current	Q Iavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	73.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	3.0 MHz	General	Switching frequency
10.	IC Tolerance	16.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	129.105 mV	General	
12.	Pout	2.5 W	General	Total output power
13.	Total BOM	\$1.35	General	Total BOM Cost
14.	Vout Actual	4.984 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Duty Cycle	43.584 %	Op_point	Duty cycle
16.	Efficiency	82.217 %	Op_point	Steady state efficiency
17.	IC Tj	68.659 degC	Op_point	IC junction temperature
18.	ICThetaJA	118.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	500.0 mA	Op_point	Iout operating point
20.	VIN_OP	12.0 V	Op_point	Vin operating point
21.	Vout p-p	1.85 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	253.69 μW	Power	Input capacitor power dissipation
23.	Cout Pd	34.22 μW	Power	Output capacitor power dissipation
24.	Diode Pd	86.886 mW	Power	Diode power dissipation
25.	IC Pd	327.616 mW	Power	IC power dissipation
26.	L Pd	125.95 mW	Power	Inductor power dissipation
27.	Total Pd	540.724 mW	Power	Total Power Dissipation
28.	Vout Tolerance	3.73 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	LMR12010Y	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMR12010Y** Product Folder : <http://www.ti.com/product/LMR12010> : contains the data sheet and other resources.

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