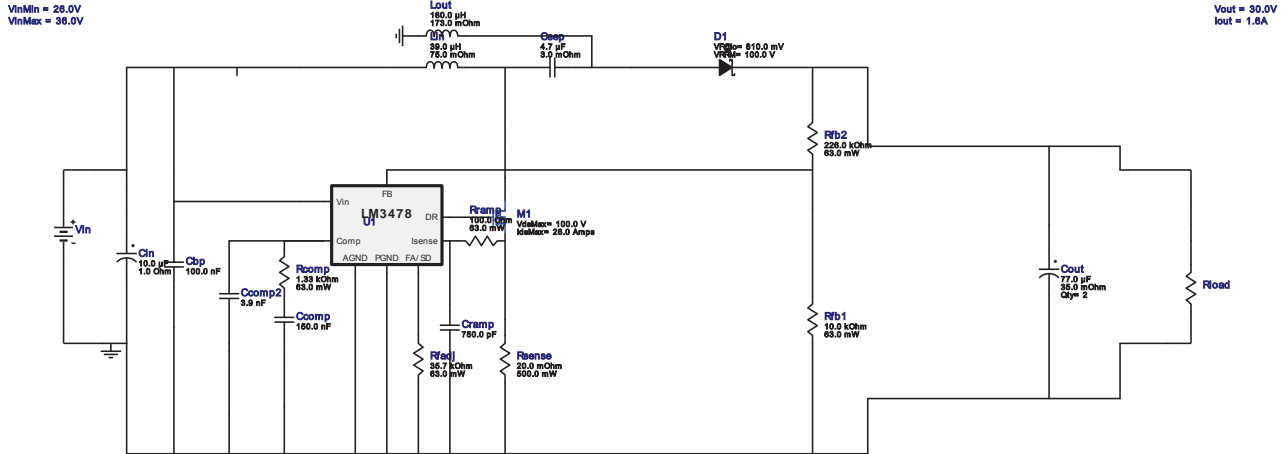











WEBENCH[®] Design Report

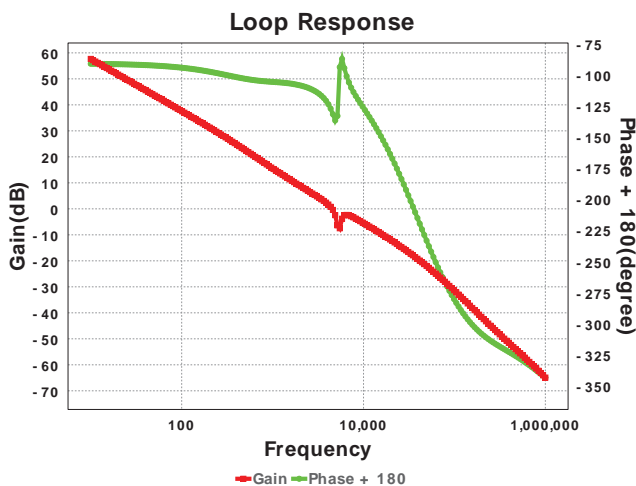
Design : 4393193/8 LM3478MM/NOPB
 LM3478MM/NOPB 26.0V-36.0V to 30.00V @ 1.6A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbp	MuRata	GRM188R72A104KA35D Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	\$0.03	0603 5 mm ²
2.	Ccomp	MuRata	GRM155R61A154KE19D Series= X5R	Cap= 150.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB392 Series= X7R	Cap= 3.9 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	Vishay-Sprague	293D106X9063E2TE3 Series= 293D	Cap= 10.0 uF ESR= 1.0 Ohm VDC= 63.0 V IRMS= 580.0 mA	1	\$3.11	3216-18 11 mm ²
5.	Cout	Panasonic	50SVPF18M Series= 1273	Cap= 77.0 uF ESR= 35.0 mOhm VDC= 50.0 V IRMS= 2.7 A	2	\$0.53	CAPSMT_62_E7 106 mm ²
6.	Cramp	MuRata	GRM1555C1E751JA01D Series= C0G/NP0	Cap= 750.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.02	0402 3 mm ²
7.	Csep	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	\$0.07	1206 11 mm ²
8.	D1	Vishay-Semiconductor	30WQ10FNPBF	VF@Io= 810.0 mV VRRM= 100.0 V	1	\$0.37	DPAK 102 mm ²
9.	Lin	Bourns	SDR1307-390KL	L= 39.0 uH DCR= 75.0 mOhm	1	\$0.35	SDR1307 227 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Lout	Coilcraft	MSS1210-184KEB	L= 180.0 μ H DCR= 173.0 mOhm	1	\$0.81	 MSS1210 204 mm ²
11.	M1	Infineon Technologies	BSZ160N10NS3 G	VdsMax= 100.0 V IdsMax= 28.0 Amps	1	\$0.49	 PG-TSDSON-8 19 mm ²
12.	Rcomp	Vishay-Dale	CRCW04021K33FKED Series= CRCW..e3	Res= 1.33 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
13.	Rfadj	Vishay-Dale	CRCW040235K7FKED Series= CRCW..e3	Res= 35.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	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
15.	Rfb2	Vishay-Dale	CRCW0402226KFKED Series= CRCW..e3	Res= 226.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	Rramp	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Rsense	Stackpole Electronics Inc	CSR1206FK20L0 Series= ?	Res= 20.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11 mm ²
18.	U1	Texas Instruments	LM3478MM/NOPB	Switcher	1	\$0.80	 MUA08A 24 mm ²



Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	2.499 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.689 A	Current	Output capacitor RMS ripple current
3.	Csep IRMS	1.686 A	Current	SEPIC capacitor RMS ripple current
4.	D1 Irms	2.27 A	Current	D1 Irms
5.	IC Ipk	11.075 mA	Current	Peak switch current in IC
6.	Iin Avg	2.013 A	Current	Average input current
7.	Iin Ipk	2.217 A	Current	Iin peak current
8.	Iin Ipp	856.462 mA	Current	Peak-to-peak input inductor ripple current
9.	Iin Irms	1.817 A	Current	Iin ripple current
10.	Iout Ipk	1.66 A	Current	Iout peak current
11.	Iout Ipp	187.302 mA	Current	Peak-to-peak output inductor ripple current
12.	Iout Irms	1.576 A	Current	Iout ripple current
13.	M1 Irms	2.516 A	Current	M1 MOSFET Irms

#	Name	Value	Category	Description
14.	BOM Count	19	General	Total Design BOM count
15.	FootPrint	853.0 mm ²	General	Total Foot Print Area of BOM components
16.	Frequency	425.0 kHz	General	Switching frequency
17.	IC Tolerance	24.3 mV	General	IC Feedback Tolerance
18.	Total BOM	\$7.28	General	Total BOM Cost
19.	D1 Tj	65.168 degC	Op_Point	D1 junction temperature
20.	SEPIC Resonance Freq	5.681 kHz	Op_Point	SEPIC Resonance Frequency
21.	V SEPIC damping factor	113.496 m	Op_Point	V SEPIC damping factor
22.	Vin p-p	8.48 mV	Op_Point	Peak-to-peak input voltage
23.	Vsep p-p	502.936 mV	Op_Point	Peak-to-peak sepic voltage
24.	Cross Freq	4.347 kHz	Op_point	Bode plot crossover frequency
25.	Duty Cycle	55.0 %	Op_point	Duty cycle
26.	Efficiency	91.712 %	Op_point	Steady state efficiency
27.	Gain Marg	14.736 db	Op_point	Bode Plot Gain Margin
28.	IC Tj	83.74 degC	Op_point	IC junction temperature
29.	IOUT_OP	1.6 A	Op_point	Iout operating point
30.	M1 TjOP	4.04 degC	Op_point	M1 MOSFET junction temperature
31.	Phase Marg	53.649 deg	Op_point	Bode Plot Phase Margin
32.	Phase Shift	57.165 deg	Op_point	Bode Plot Phase Shift
33.	VIN_OP	26.0 V	Op_point	Vin operating point
34.	Vout p-p	115.621 mV	Op_point	Peak-to-peak output ripple voltage
35.	Cin Pd	6.245 μW	Power	Input capacitor power dissipation
36.	Cout Pd	49.917 mW	Power	Output capacitor power dissipation
37.	Csep Pd	8.526 mW	Power	SEPIC capacitor power dissipation
38.	D1 Pd	1.359 W	Power	Diode power dissipation
39.	D1 PdCond	1.296 W	Power	Diode conduction losses
40.	D1 PdSw	63.295 mW	Power	Diode switching losses
41.	IC Pd	398.7 mW	Power	IC power dissipation
42.	Lin Pd	254.945 mW	Power	Lin power dissipation
43.	Lout Pd	429.756 mW	Power	Lout power dissipation
44.	M1 Pd	1.788 W	Power	M1 MOSFET total power dissipation
45.	M1 PdCond	139.153 mW	Power	M1 MOSFET conduction losses
46.	M1 PdSw	1.649 W	Power	M1 MOSFET switching losses
47.	Rsense Pd	126.569 mW	Power	Rsense Power Dissipation
48.	Total Pd	4.338 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.6	Maximum Output Current
2.	Iout1	1.6	Output Current #1
3.	VinMax	36.0	Maximum input voltage
4.	VinMin	26.0	Minimum input voltage
5.	Vout	30.0	Output Voltage
6.	Vout1	30.0	Output Voltage #1
7.	base_pn	LM3478	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	4.0	Ambient temperature

Design Assistance

1. LM3478 Product Folder : <http://www.ti.com/product/LM3478> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).