National Semiconductor

WEBENCH® Design Report

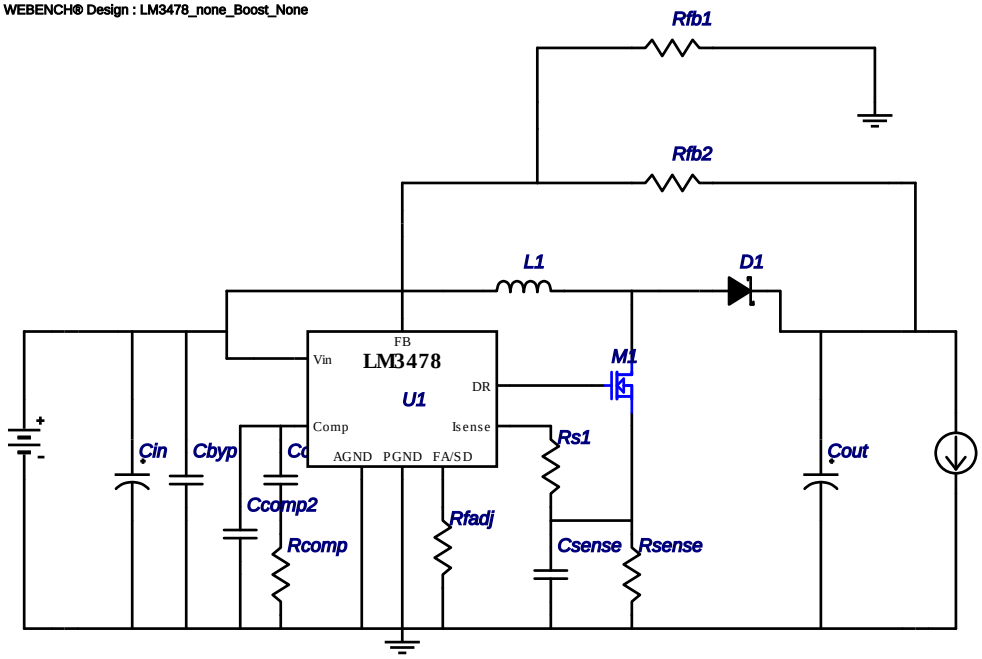
Design : 1167085/7 LM3478MM

Design 7 - LM3478MM

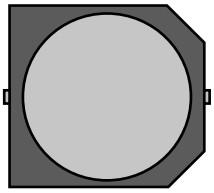
WEBENCH® Design : LM3478_none_Boost_None

VinMin = 9.5V
VinMax = 18.0V
Vout = 26.5V
Iout = 0.41A

Device = LM3478MM
Topology = Boost
Creation date = 10/22/10 6:12:46 PM
Total BOM Cost = $3.43
Total Pd = 0.86 W
Footprint = 1,171.0 mm2
BOM Count = 1



BOM

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
1.	Cbyp	AVX	08053C104KAT2A Series= X7R	1	$0.01	Cap= 100.0 nF IRMS= 0.00 A VDC= 25.00 V	 0805 13mm2
2.	Ccomp	MuRata	GRM216R71H223KA01D Series= X7R	1	$0.01	Cap= 22.0 nF IRMS= 0.00 A VDC= 50.00 V	 0805 13mm2
3.	Ccomp2	Yageo America	CC0805KRX7R9BB102 Series= X7R	1	$0.01	Cap= 1.0 nF IRMS= 0.00 A VDC= 50.00 V	 0805 13mm2
4.	Cin	Panasonic	EEE-FK1E220R Series= FK	1	$0.11	Cap= 22.0 µF IRMS= 160.0 mA VDC= 25.00 V	 SM_RADIAL_C 62mm2
5.	Cout	Panasonic	EEV-FK2A101M Series= FK	2	$0.79	Cap= 100.0 µF IRMS= 793.0 mA VDC= 100.00 V	 SM_RADIAL_J16 399mm2
6.	Csense	Yageo America	CC0805KRX7R9BB103 Series= X7R	1	$0.01	Cap= 10.0 nF IRMS= 0.00 A VDC= 50.00 V	 0805 13mm2
7.	D1	Diodes Inc.	B240A-13-F	1	$0.09	VF@Io= 500.0 mA VRRM= 40.00 V	 SMA 37mm2
8.	L1	Bourns	SDR0805-390KL	1	$0.24	L= 39.0 µH DCR= 160.0 mOhm	 SDR0805 96mm2

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
9.	M1	Infineon Technologies	BSC340N08NS3 G	1	$0.31	VdsMax= 80.00 V IdsMax= 23.00 Amps	 PG-TDSON-8 55mm2
10.	Rcomp	Vishay-Dale	CRCW04024K12FKED Series= CRCW..e3	1	$0.01	Res= 4.12 KOhm Power= 63.0 mW Tolerance= 1.00 %	 0402 8mm2
11.	Rfadj	Vishay-Dale	CRCW040230K1FKED Series= CRCW..e3	1	$0.01	Res= 30.1 KOhm Power= 63.0 mW Tolerance= 1.00 %	 0402 8mm2
12.	Rfb1	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	1	$0.01	Res= 1,000 Ohm Power= 63.0 mW Tolerance= 1.00 %	 0402 8mm2
13.	Rfb2	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	1	$0.01	Res= 20.0 KOhm Power= 63.0 mW Tolerance= 1.00 %	 0402 8mm2
14.	Rs1	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	1	$0.01	Res= 100.00 Ohm Power= 63.0 mW Tolerance= 1.00 %	 0402 8mm2
15.	Rsense	Stackpole Electronics Inc	CSR 1/2 0.05 1 I Series= ?	1	$0.08	Res= 50.0 mOhm Power= 500.0 mW Tolerance= 1.00 %	 1206 19mm2
16.	U1	National Semiconductor	LM3478MM	1	$0.93	Switcher	 MUA08A 34mm2

Op Vals

#	Name	Value	Category	Description
1.	Total BOM	$3.43		Total BOM Cost
2.	Cin IRMS	93.131 mA	Current	Input capacitor RMS ripple current
3.	Cout IRMS	553.536 mA	Current	Output capacitor RMS ripple current
4.	Iin Avg	1.234 A	Current	Average input current
5.	L Ipp	322.614 mA	Current	Peak-to-peak inductor ripple current
6.	L1 Irms	1.173 A	Current	Inductor ripple current
7.	M Irms	1.419 A	Current	MOSFET RMS ripple current
8.	SW Ipk	1.331 A	Current	Peak switch current
9.	BOM Count	1.00	General	Total Design BOM count
10.	FootPrint	1.171 Kmm2	General	Total Foot Print Area of BOM components
11.	Frequency	492.79 KHz	General	Switching frequency
12.	M Rdson	38.08 mOhm	General	Drain-Source On-resistance
13.	M Vds Act	54.049 mV	General	M Vds
14.	Mode	CCM	General	Conduction Mode
15.	Pout	10.865 W	General	Total output power
16.	D1 Tj	40.00 degC	Op_Point	D1 junction temperature
17.	Duty Cycle	66.768 %	Op_point	Duty cycle
18.	Efficiency	92.68 %	Op_point	Steady state efficiency
19.	IC Tj	55.24 degC	Op_point	IC junction temperature
20.	ICThetaJA	200.00 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	410.0 mA	Op_point	Iout operating point
22.	M ThetaJA	50.00 degC/W	Op_point	MOSFET junction-to-ambient thermal resistance
23.	M TjOp	49.827 degC	Op_point	MOSFET junction temperature
24.	VIN_OP	9.50 V	Op_point	Vin operating point
25.	Vout p-p	27.422 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	6.071 mW	Power	Input capacitor power dissipation
27.	Cout Pd	26.044 mW	Power	Output capacitor power dissipation
28.	Diode Pd	205.0 mW	Power	Diode power dissipation
29.	IC Pd	76.201 mW	Power	IC power dissipation
30.	L Pd	264.308 mW	Power	Inductor power dissipation
31.	M Pd	196.533 mW	Power	MOSFET power dissipation
32.	M1 PdCond	87.531 mW	Power	M1 MOSFET conduction losses
33.	M1 PdSw	109.002 mW	Power	M1 MOSFET switching losses
34.	Rfb Pd	33.44 mW	Power	Rfb Power Dissipation
35.	Total Pd	858.124 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	ErrorFeature	I	Error feature
2.	FET_Used	N	
3.	Iout	410.0 mA	Maximun Output Current
4.	Iout1	410.0 mAmps	Output Current #1
5.	NumOutPuts	2.00	Number of Output
6.	SoftStart	0.00 ms	Soft Start Time (ms)

#	Name	Value	Description
7.	SyncFeature	I	External Sync feature
8.	VinMax	18.00 V	Maximum input voltage
9.	VinMin	9.50 V	Minimum input voltage
10.	Vout	26.50 V	Output Voltage
11.	Vout1	26.50 Volt	Output Voltage #1
12.	base_pn	LM3478	National Based Product Number
13.	customfreq	N	Use Customer Frequency
14.	fsw	492.791 K	
15.	onOff	I	On/Off feature
16.	optfactor	3.00	Optimization factor to tune up the design
17.	pricefactor	0.00	Price factor to tune up the design cost
18.	ta	40.00 degC	Ambient temperature
19.	usecustomfsw	N	
20.	userfsw	492.791 KHz	Customer Selected Frequency