GAPTEC®
GREEN TECHNOLOGY

LMW78_0.5 Series

Wide Input Non-Isolated & Regulated, Single Output

Switching Regulator

- Efficiency up to 95%
- Ultra wide input voltage range can up to 8:1
- Operating temperature: -40°C ~ +85°C
- Pin-out compatible with LM78XX Linear
- Short circuit protection (SCP), thermal shutdown
- Low ripple and noise
- Micro miniature SIP package, meet UL94-V0 requirement
- No heatsink required
- Industry standard pinout
- MTBF>2,000,000Hours

SCP RoHS cULus

The LMW78_0.5 series high efficiency switching regulators are ideally suited to replace LM78xx linear regulators and are pin compatible. It has ultra wide input voltage range, the efficiency of up to 95% means that very little energy is wasted as heat so there is no need for any heatsinks with their additional space and mounting costs.

Model selection:
LMW78_yy-pp
LM=Series**; W=**case**; ##=**Vout**; pp=**output current
Example:
LMW78_05-0.5
LM=Series; W=wide input; ##= 5Vout; pp=0.5A

Common specifications	
Temperature rise at full load:	25°C MAX, 15°C TYP
Cooling:	Free air convection
Operating temperature range (power derating above 71°C):	-40°C~+85°C
Storage temperature range:	-55°C ~+125°C
Lead temperature:	300°C MAX, 1.5mm from case for 10 sec
Operating case temperature:	100°C MAX, 65°C TYP
Storage humidity range:	< 95%
Case material:	Plastic [UL94-V0]
MTBF:	>3,500,000 hours: 25°C, MIL-HDBK-217F >1,500,000 hours: 71°C, MIL-HDBK-217F
Hop swap:	Not supported
Thermal resistance:	60 °C/W
EMI conducted (Refer to figure 7):	EN55022, CLASS B
RFI conducted:	EN55022, CLASS B
Electrostatic discharge:	IEC/EN 61000-4-2 level 4
Safety approvals:	EN-60950-1 standards
Weight:	4g

Note:
1. The load shouldn't be less than 10%, and the output external capacitor should not be too large (recommend <10μF), otherwise ripple will increase dramatically.
2. Operation under 10% load will not damage the converter; However, they may not meet all specification listed
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate

Output specifications					
Item	Test conditions	Min	Typ	Max	Units
Output voltage accuracy	100% load		±2	±3	%
Line regulation	Vin= min. to max. at full load		±0.4	±1.0	%
Load regulation	From 10% to 100% load		±0.3	±0.6	%
Ripple + Noise	20MHz bandwidth, from 10% to 100% Load (refer to figure 2)		20	60	mVp-p
Short circuit input power	Vin=Nominal		0.72	1.2	W
Short circuit protection		Continuous, automatic recovery			
Switching frequency	100% full load	120		800	KHz
Output current limit	Vin=Nominal		700	1200	mA
Quiescent current	Vin=Nominal , Min. Load		1	5	mA
Thermal shutdown			160		°C
Temperature coefficient	-40 °C to +85 °C ambient			±0.015	%/°C
Tendencies load	From 10% to 100% Load		1.0	±100 1.5	mV ms
Max capacitance load				100	μF

Note: "GND" Pin can not vacant, or it will damage the module.

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA, Max]	Efficiency [Vin. min]	Efficiency [Vin. max]
LMW78_03-0.5	9.0-72.0	3.3	500	82	75
LMW78_05-0.5	9.0-72.0	5.0	500	87	81
LMW78_6.5-0.5	9.0-72.0	6.5	500	91	84
LMW78_09-0.5	14.0-72.0	9.0	500	92	86
LMW78_12-0.5	17.0-72.0	12.0	500	93	89
LMW78_15-0.5	20.0-72.0	15.0	500	94	90
LMW78_24-0.3	36.0-72.0	24.0	500	95	91

Add suffix "L" for 90° bend pins, for example: LMW78_05-1.0L.

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Typical characteristics

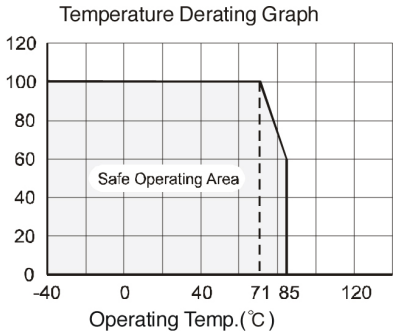


figure 1

Typical application circuit

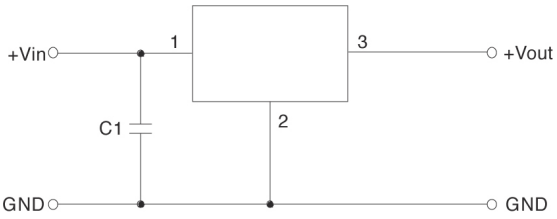
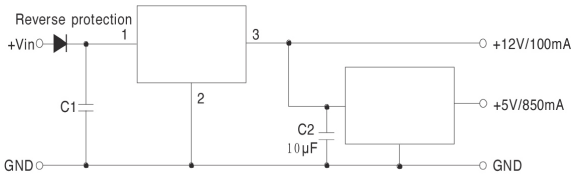


figure 2

Note:
1. The regulator proposed to establish the input voltage by soft-start, no plug and play, if the input voltage changes from low voltage to high voltage abruptly, the regulator might be damaged.
2. If the applications is high-voltage input, the regulator must add an external capacitor C1(≤47μF/100V),to prevent voltage spikes caused by damage to the module.
3. No parallel connection.

Application example

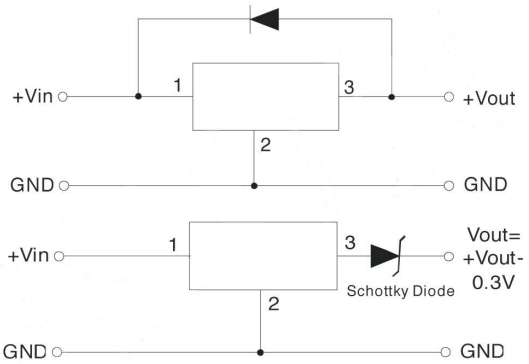
High voltage input, multiple outputs, with greater load (figure 3)



Note:
1. The input current amount of the back-grade regulator and the pre-class load should be less than or equal the max load current of the pre-class regulator.
2. If further filtering is required, please add components as per the above circuit (We recommend not to add components), if request, please make sure the capacitors C1 ≤47μF,C2≤10μF more close to the back-grade regulator.

Modules protect recommended cir-

figure 4



Test configurations (TA=25°C)

1 Full load output ripple & noise measured graph

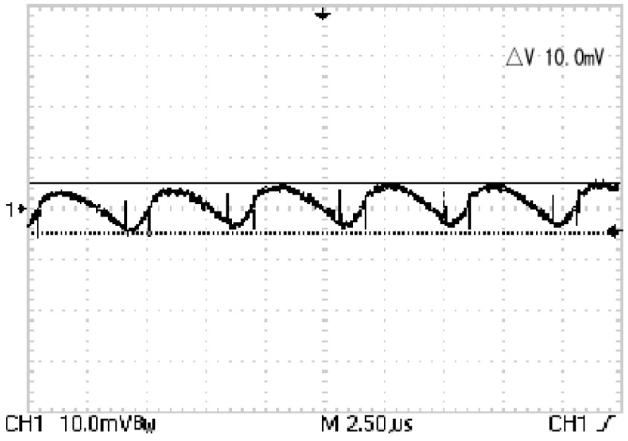


figure 5

2 Load transient response waveform

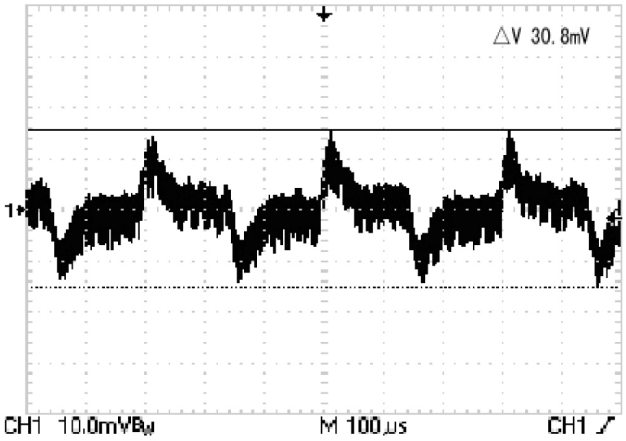


figure 6

EMC recommended circuit

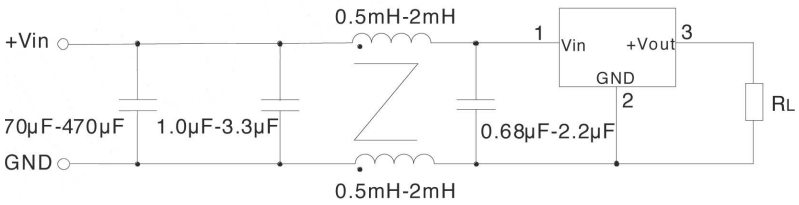
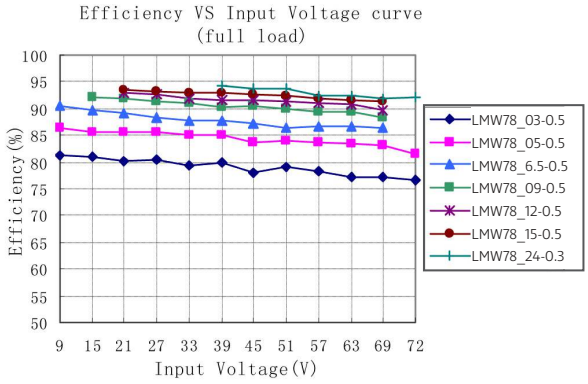
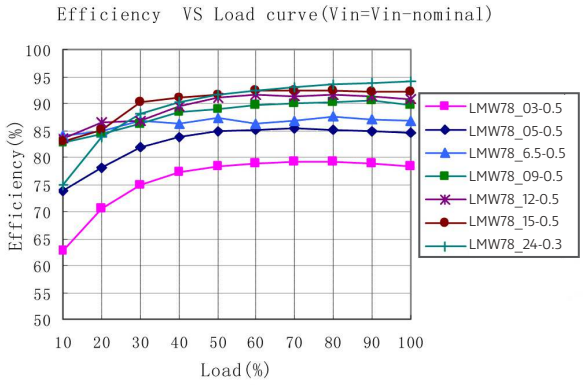


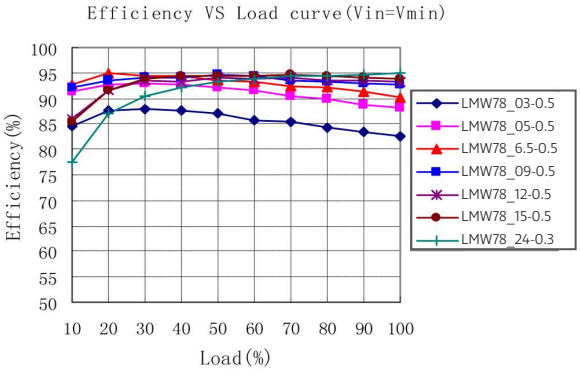
figure 7

Characteristics curve

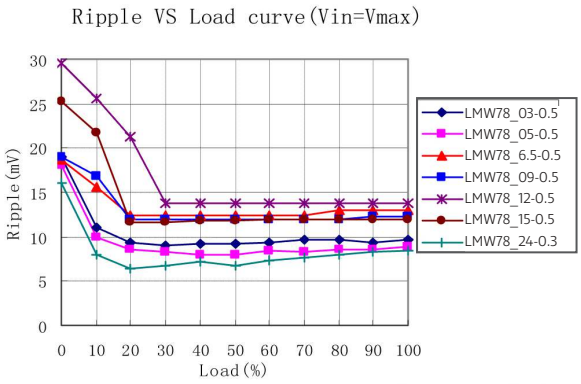
Efficiency

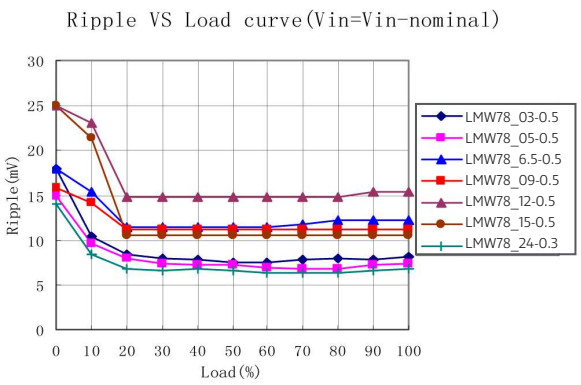


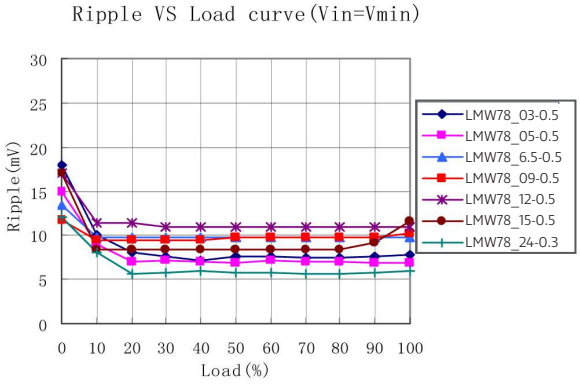




Ripple

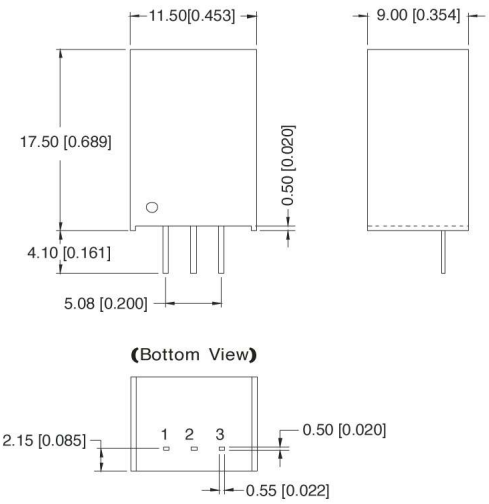






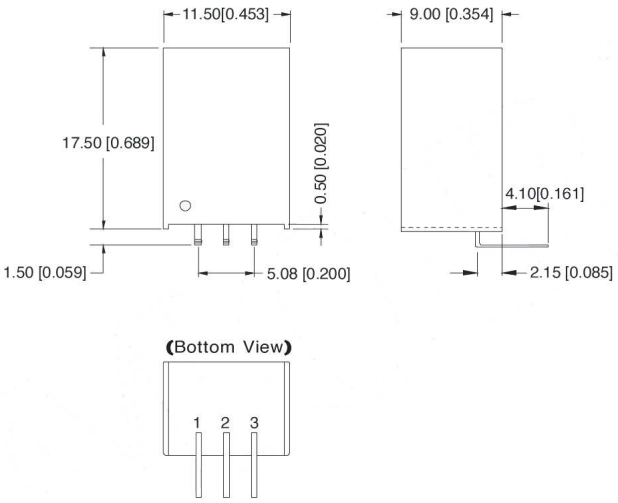
Mechanical dimensions

LMW78_xx_0.5



Note:
Unit: mm[inch]
Pin selection tolerances: ±0.10mm [±0.004inch]
General tolerances: ±0.25mm [±0.010inch]

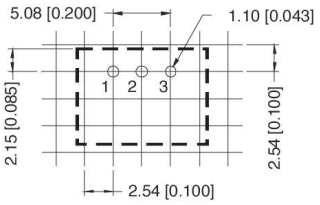
LMW78_xx_0.5L



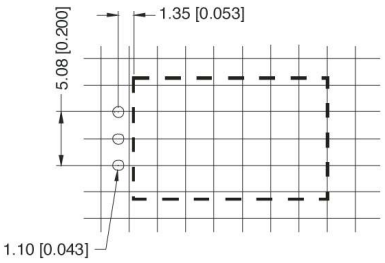
Note:
Unit: mm[inch]
Pin selection tolerances: ±0.10mm [±0.004inch]
General tolerances: ±0.50mm [±0.020inch]

Recommended footprint

LMW78_xx_0.5

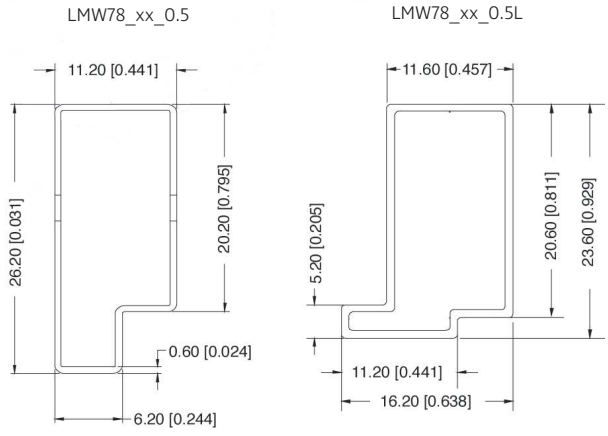


LMW78_xx_0.5L



FOOTPRINT DETAILS	
pin	Function
1	+Vin
2	GND
3	+Vout

Tube outline dimensions



Note:
Unit: mm[inch]
General tolerances: ±0.50mm [±0.020inch]

L=530mm [20.866inch]
Devices per tube quantity: 44pcs
L=220mm [8.661inch]
Devices per tube quantity: 17pcs

Short tube inner packaging dimensions: L*W*H=255*170*80mm
Short tube outer packaging dimensions: L*W*H=375*280*270mm

Long tube inner packaging dimensions L*W*H=580*200*100mm
Long tube outer packaging dimensions (with two inner packaging boxes): L*W*H=600*215*220mm
Long tube outer packaging dimensions (with two inner packaging boxes): L*W*H=600*215*325mm