78B1 SERIES

1.0A Non-Isolated DC-DC Converter

78xxB1H

78xxB1

78xxB1C

78xxB1W

FEATURES

- **Single in line package**
- **Wide input range up to 36V**
- **High efficiency up to 96%**
- **Over temperature protection**
- **Over load protection**
- **Support negative output**
- **Short circuit protection**
- **Pin-out compatible with LM78xx / LM79xx**

APPLICATIONS

- **Voltage step down**
- **Power supplies**
- **Industrial PC**
- **Digital set-top boxes**
- **Data communications**
- **Microcontroller related applications**
- **Point of load regulator in distributed power system**

DESCRIPTION

78B1 series converters are high efficiency switching regulators can suit to replace LM78xx / LM79xx linear regulators and its pin-out can be compatible with LM78xx / LM79xx IC. One of the key features is the model can be chosen positive or negative output voltage according to the application. It also features high efficiency up to 96% meant low power loss, wide working temperature range of –40°C up to +85°C with no additional heat sink, compliance with EN55032 radiated Class B without external components, and so on.

MODEL ENCODING

78	05	B1	C
Series Name	**Output Voltage**	**Output Current**	**Package Type**
	03 : 3.3V 05 : 5V 09 : 9V 12 : 12V 15 : 15V	1.0A	Blank : open frame with vertical mount H : open frame with horizontal mount C : potting W : wired

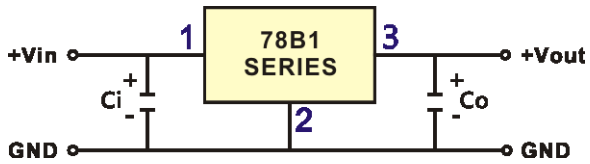
■ MODEL SELECTION TABLE

MODEL NUMBER	INPUT				OUTPUT		EFF. (%) @Vin Min.	CAPACITOR LOAD (Max.)
	VOLTAGE (VDC)		CURRENT (mA)		VOLTAGE (VDC)	CURRENT (mA)		
	NOMINAL	RANGE	NO LOAD	FULL LOAD				
7803B1(H/C/W)	12	6~36	6	611	3.3	0 ~ 1000	90	680uF
7805B1(H/C/W)	12	8~36	8	672	5	0 ~ 1000	93	470uF
	12	8~27	12	355	-5	0 ~ -500	88	470uF
7809B1(H/C/W)	24	13~36	10	729	9	0 ~ 1000	95	220uF
7812B1(H/C/W)	24	16~36	10	781	12	0 ~ 1000	96	220uF
	12	8~20	20	506	-12	0 ~ -300	89	220uF
7815B1(H/C/W)	24	20~36	10	781	15	0 ~ 1000	96	150uF
	12	8~18	25	630	-15	0 ~ -300	89	150uF

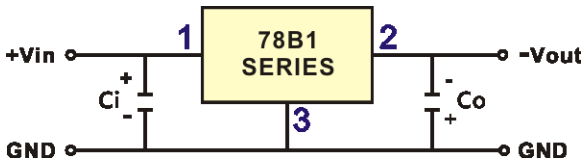
Note: For input voltages higher than 30VDC, an input capacitor (22uF) is required.
Efficiency and input current are measured at minimum input voltage and full load.
Other input to output voltages may be available. Please contact factory.

■ TYPICAL APPLICATIONS

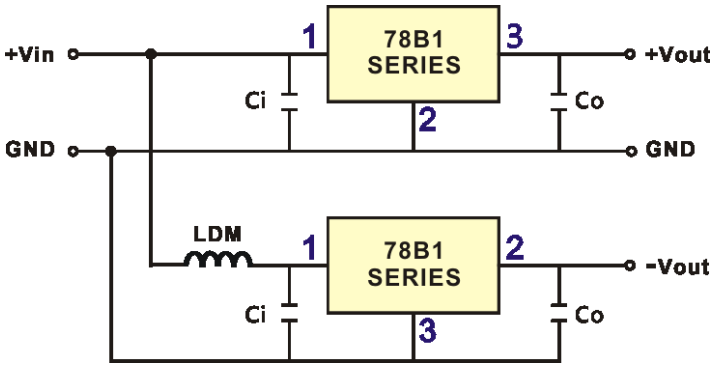
Positive output application circuit



Negative output application circuit



Positive and negative output paralleling application circuit



External capacitor table

Model Number	Ci (MLCC)	Co (MLCC)
7803B1	10uF / 50V	22uF / 10V
7805B1	10uF / 50V	22uF / 10V
7809B1	10uF / 50V	22uF / 25V
7812B1	10uF / 50V	22uF / 25V
7815B1	10uF / 50V	22uF / 25V

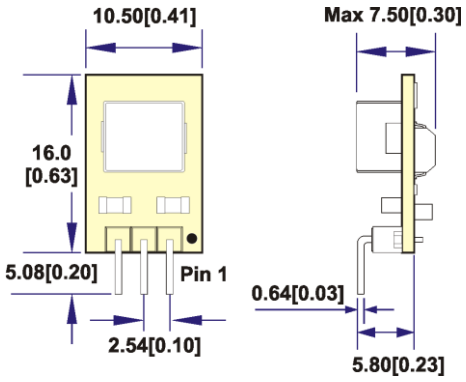
Note: 1. Ci & Co are required and should be connected as close as possible to the module pins.
2. In order to further reduce the output ripple, Co can be added according to requirement and would be recommended to use tantalum or low ESR electrolytic capacitors.
3. In using parallel application circuit, input voltage range should be taken notice of and a 10 µH LDM component is recommended to reduce the interference.

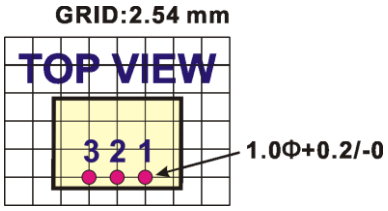
■ SPECIFICATION

INPUT	Voltage Range	36V max.		
	Surge Voltage(100ms max.)	40V max.		
	Filter	Capacitor type		
	Protection	Fuse recommended (see page 5)		
	Internal Power Dissipation	500mW		
OUTPUT	Voltage Accuracy	±3% max.		
	Rated Power	3.3W~15W		
	Ripple & Noise[1]	100mVp-p max.		
	Line Regulation[2]	Others: ±0.2%	3.3V: ±0.3%	
	Load Regulation[3]	Others: ±0.3%	3.3V: ±0.4%	
	Switching Frequency	500KHz typ.		
PROTECTION	Short Circuit	Protection type : continuous, recovery		
	Overload	200%~300%		
		Protection type : recovers automatically after fault condition is removed		
	OTP	Protection type : recovers automatically after fault condition is removed		
ENVIRONMENT	Cooling	Free-air convection		
	Working Temperature	-40~ +85°C (refer to “Derating Curve”)		
	Case Temperature	+110 °C max.		
	Working Humidity	5% ~ 95% RH non-condensing		
	Storage Temp., Humidity	-55 ~ +125°C,10 ~ 95% RH non-condensing		
	Temperature Coefficient	0.03% / °C (0~71°C)		
	Soldering Temperature	1.5mm from case of 3~5 sec./265°C(max.)		
	Vibration	10~500Hz, 2G 10min./1cycle, period for 60 min. each along X, Y, Z axes		
SAFETY & EMC	Isolation Voltage	Non-Isolation		
	EMC Emission	**Parameter**	**Standard**	**Test Level / Note**
		Conducted	EN55032(CISPR32)	N/A
		Radiated	EN55032(CISPR32)	Class B
	EMC Immunity	**Parameter**	**Standard**	**Test Level / Note**
		ESD	EN61000-4-2	Air discharge ±8KV
		Radiated Susceptibility	EN61000-4-3	3V/m
		EFT/Burst	EN61000-4-4	±0.5KV
		Surge	EN61000-4-5	Line-Line ±0.5KV
		Conducted	EN61000-4-6	3Vrms
OTHERS	MTBF[4]	>2,800,000Hours		
	Weight	78B1 & 78B1H	2.0g typ.	
		78B1C	4.0g typ.	
		78B1W	5.5g typ.	
	Dimension(L*W*H)	Open frame size	10.5mm*7.5mm*16mm	
		Case size	11.5mm*9.0mm*17.5mm	
	Case Material	Non-conductive plastic		
NOTE	**[1] Ripple & noise are measured at 20MHz with 1uF ceramic capacitor connect to the output pins.** **[2] High line to low line.** **[3] Load regulation is for output load current change from 0% to 100%.** **[4] MIL-HDBK-217F @25 °C, Ground Benign.** ***All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.**			

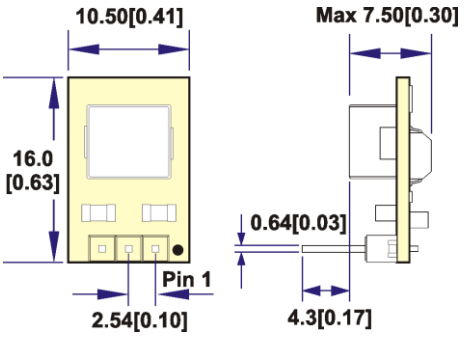
■ MECHANICAL SPECIFICATION(1)

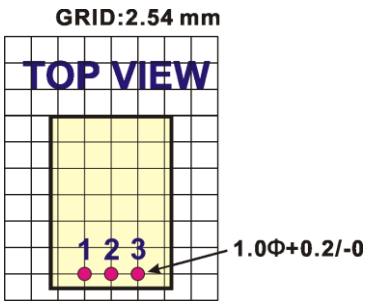
78xxB1



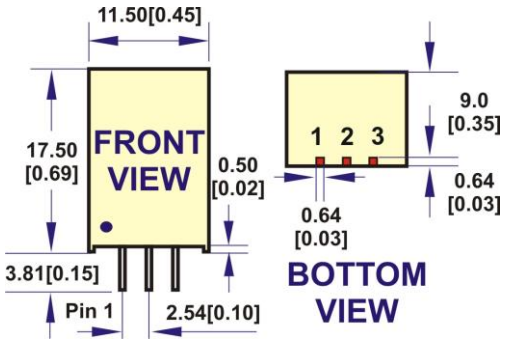


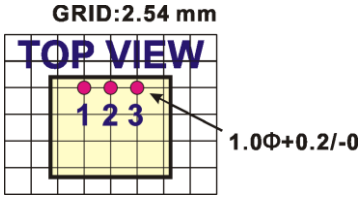
78xxB1H





78xxB1C





PIN CONNECTION		
PIN	+OUTPUT	-OUTPUT
1	+Vin	+Vin
2	GND	-Vout
3	+Vout	GND

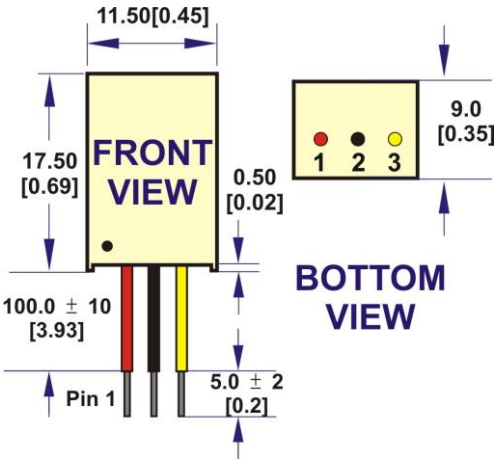
All dimensions are in mm[Inches]

Pin size is 0.64*0.64mm ±0.10mm

Tolerance .X or .XX= ±0.5mm

■ MECHANICAL SPECIFICATION(2)

78xxB1W



PIN CONNECTION		
PIN	+OUTPUT	-OUTPUT
1 (RED)	+Vin	+Vin
2 (BLACK)	GND	-Vout
3 (YELLOW)	+Vout	GND

All dimensions are in mm[Inches]

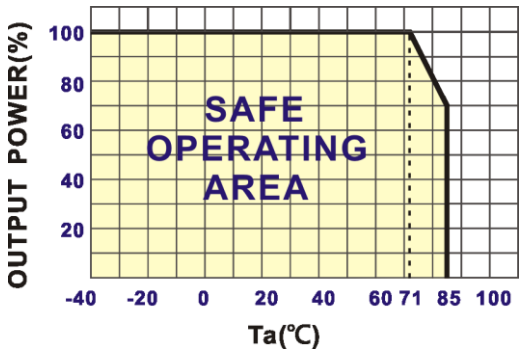
Tolerance .X or .XX= ±0.5mm

Wire outside diameter=1.6mm±0.1

Wire core diameter=0.75mm±0.1

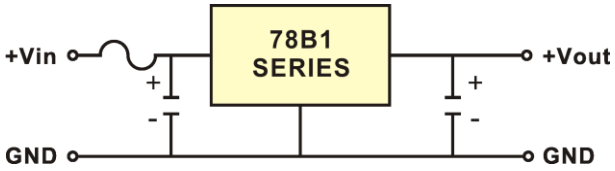
Wire is UL 3385/CAS tem listed #22AWG /300V /105°C Rated

■ DERATING CURVE



■ INPUT FUSE SELECTION GUIDE

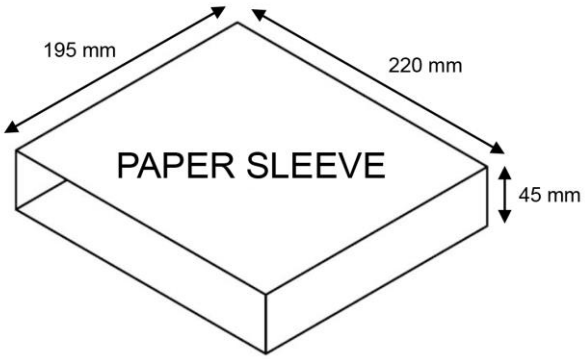
1500mA Slow-Blow Type

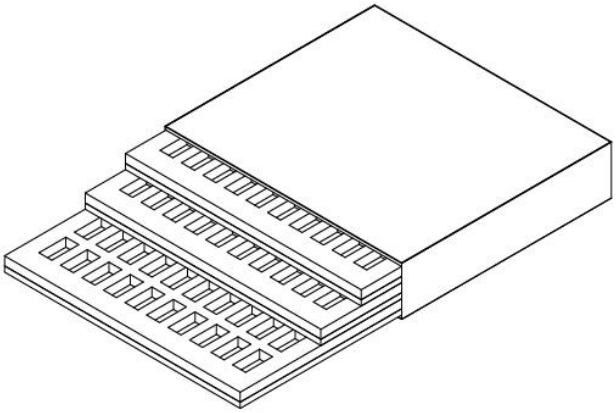


Note: Certain applications may require the installation of external fuse in front of the input.

■ PACKAGING INFORMATION(1)

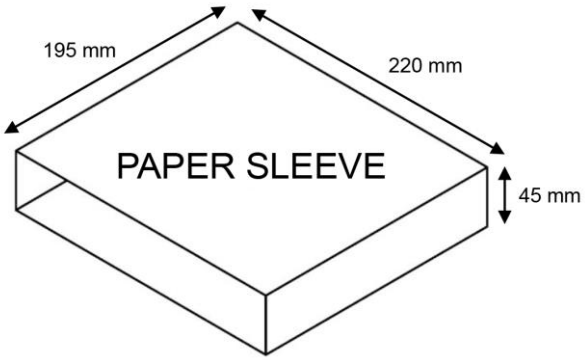
78xxB1(H)

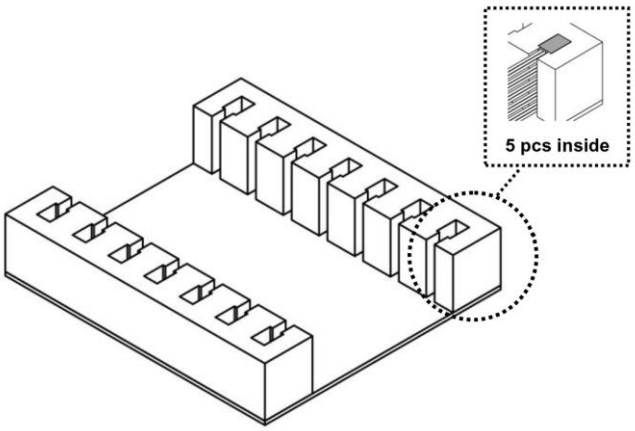




Packaging Quantity: **50 pcs converter per tray**
3 trays per paper sleeve

78xxB1W

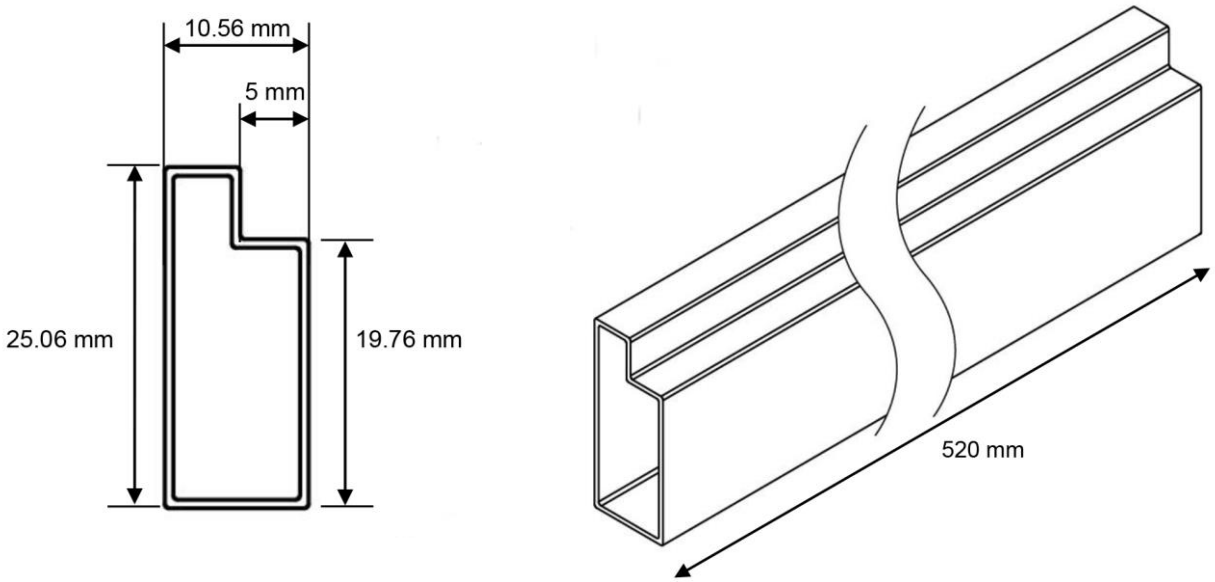




Packaging Quantity: **70 pcs converter per tray**
1 tray per paper sleeve

■ PACKAGING INFORMATION(2)

78xxB1C



Packaging Quantity: 42 pcs converter per tube

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