SERIES: P78A-0500 | DESCRIPTION: DC-DC CONVERTER

FEATURES

- up to 500 mA current output
- pin compatible with LM78XX linear regulators
- non-isolated switching regulator
- high start-up current capability
- wide input voltage range
- efficiency up to 95%
- low ripple and noise
- short circuit protection
- ultra-compact SIP3 package
- -40°C to +85°C temperature range



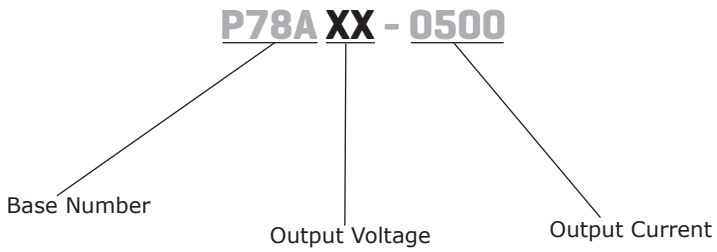
RoHS

MODEL

MODEL	input voltage typ (Vdc)	input voltage range (Vdc)	output voltage (Vdc)	output current min[3] (mA)	output current max (mA)	output power max (W)	ripple & noise[1] typ (mVp-p)	efficiency[2] typ (%)
P78A03-0500	24	6~28	3.3	10	500	1.65	50	88
P78A05-0500	24	7~28	5	10	500	2.5	50	92

Notes:
1. At full load, nominal input, 20 MHz bandwidth oscilloscope.
2. At min Vin.
3. Operation under minimum load will not affect the reliability of the converter; however, the ripple and noise may exceed the specified values.
4. All specifications measured at: Ta=25°C, nominal input voltage, rated output load, and after warm up unless otherwise specified.

PART NUMBER KEY



Please read our datasheet & drawing disclaimer here.

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INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	3.3 Vdc model 5 Vdc model	6 7	24 24	28 28	Vdc Vdc
no load input current			1.5		mA

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load[1]				220	µF
line regulation	measured from low to high line, full load		±0.5		%
load regulation	measured from 10~100% load		±1		%
voltage accuracy			±3		%
switching frequency			570		kHz

Note: 1. Maximum capacitive load is tested at minimum input voltage and full load.

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, auto recovery				

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
conducted emissions	EN55022, class A, class B (external circuit required, see Figure 2)				
radiated emissions	EN55022, class A, class B (external circuit required, see Figure 2)				
MTBF	as per MIL-HDBK-217F, full load, 25 °C as per MIL-HDBK-217F, full load, 85 °C	4,185,000 2,182,000			hours hours
RoHS	yes				

ENVIRONMENTAL

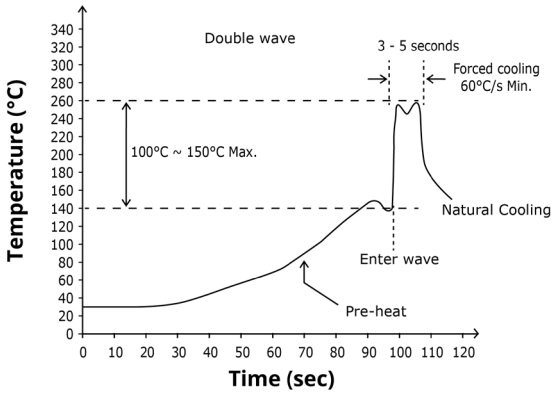
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		85	°C
storage temperature		-55		125	°C
vibration	10~55 Hz, 30 minutes along each axis		2		G

SOLDERABILITY

parameter	conditions/description	min	typ	max	units
wave soldering	see wave solder profile			260	°C

Note: 2. The wave solder profile is measured on lead temperature.
3. Need to keep the solder parts internal temperature less than about 210°C.

WAVE SOLDERING PROFILE
(Lead-free)



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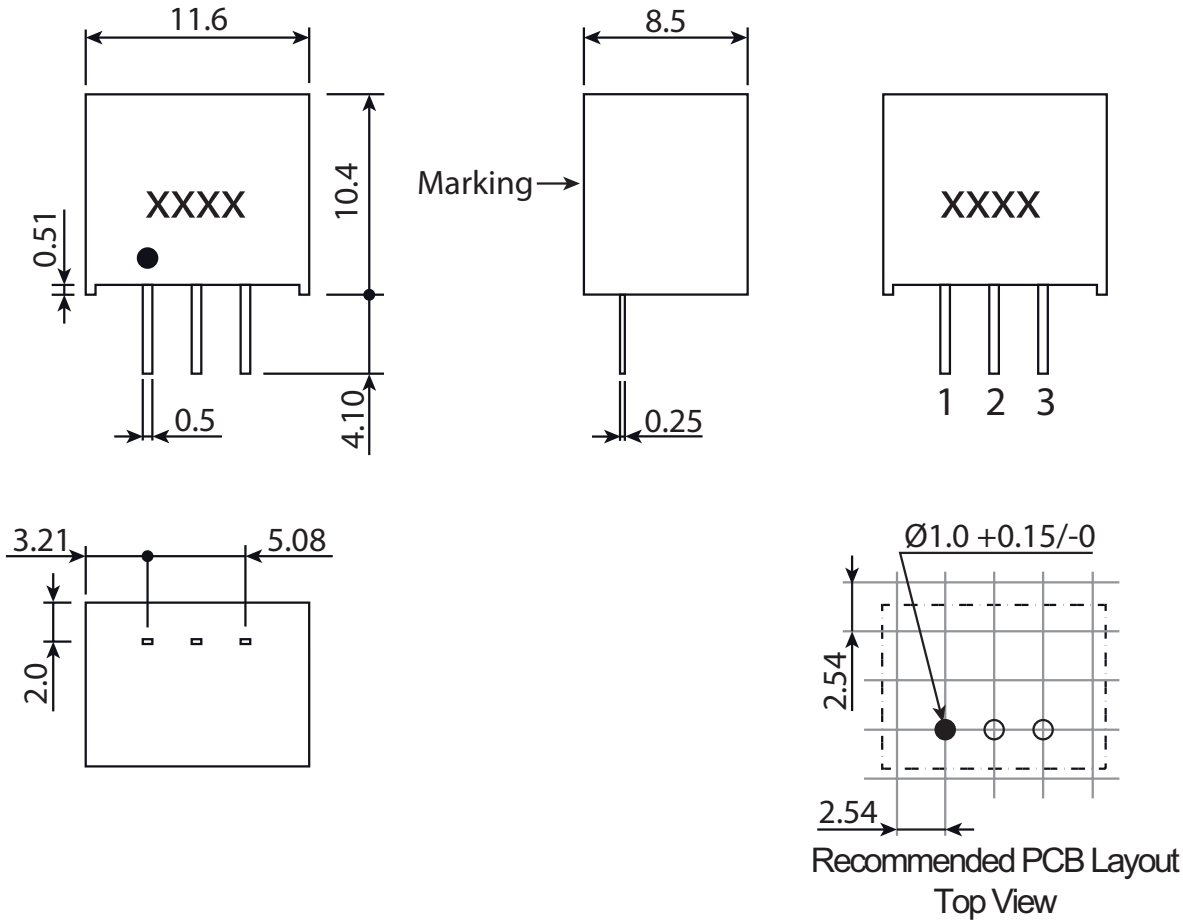
MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	11.6 x 8.5 x 10.4				mm
case material	non-conductive black plastic (UL94V-0)				
potting material	silicone (UL94V-0)				
weight			2		g

MECHANICAL DRAWING

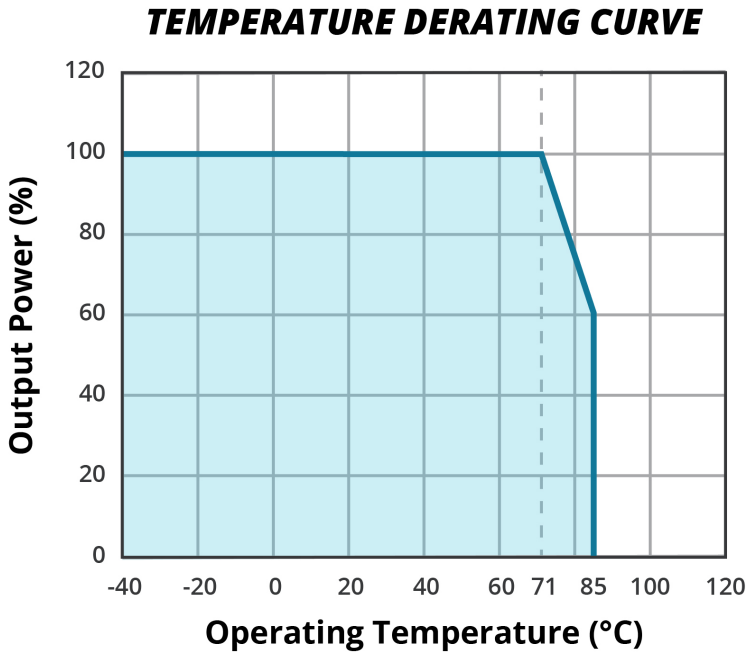
units: mm
tolerance: XX.X=±0.50 mm
XX.XX=±0.25 mm

PIN CONNECTIONS	
PIN	Function
1	+Vin
2	GND
3	+Vout

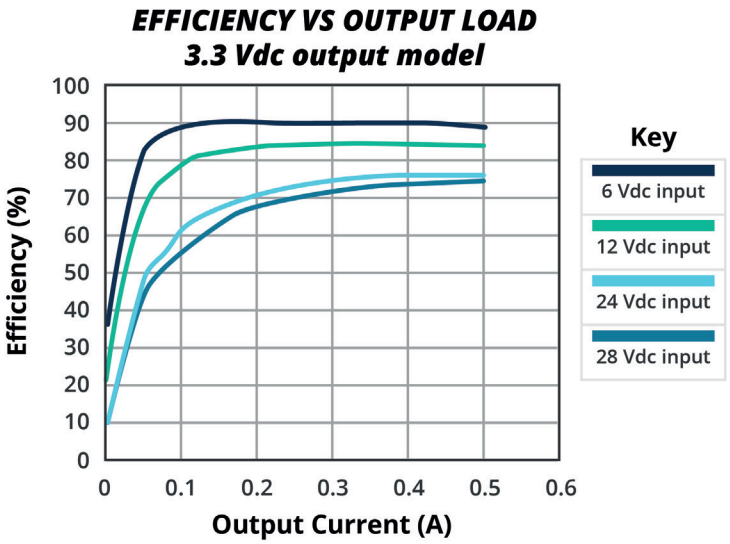


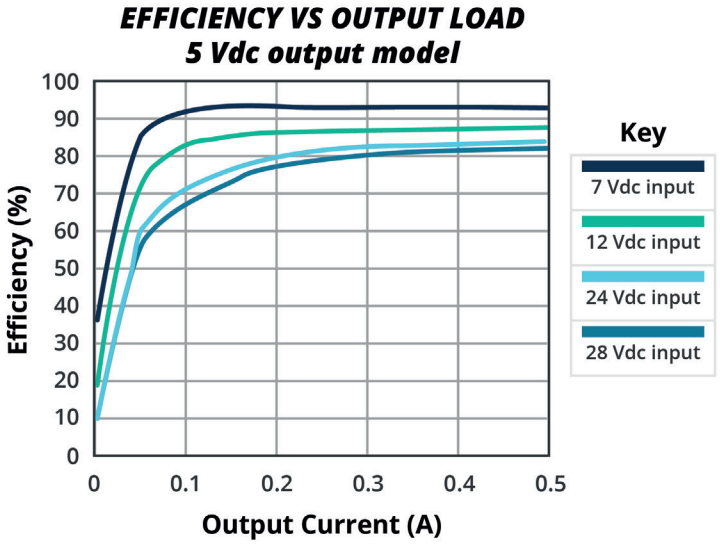
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DERATING CURVE



EFFICIENCY CURVES





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APPLICATION CIRCUIT

Figure 1

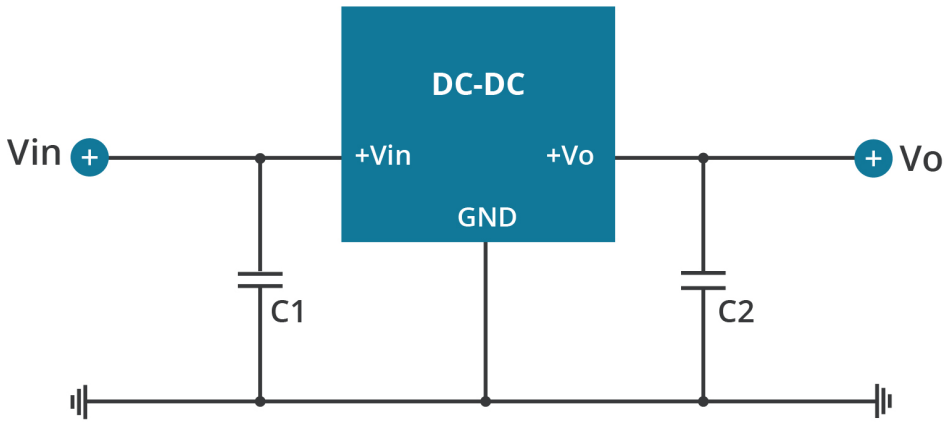


Table 1

Optional External Components	
C1	10µF MLCC
C2	10µF MLCC

Notes: 1. The converter cannot be used as a positive to negative converter.

EMC RECOMMENDED CIRCUIT

EMC FILTERING

Figure 2

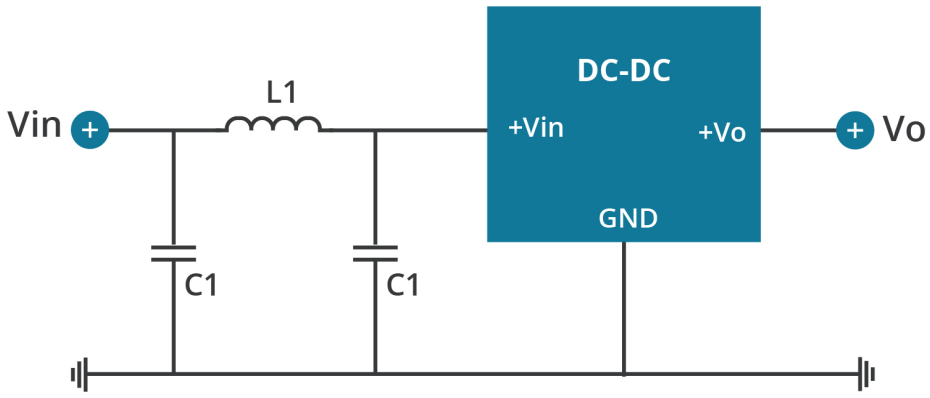


Table 2

EN55022 Class A Recommended External Circuit Components		
C1	L1	C2
1206 4.7µF, 50V MLCC	3.3µH	NC

Table 3

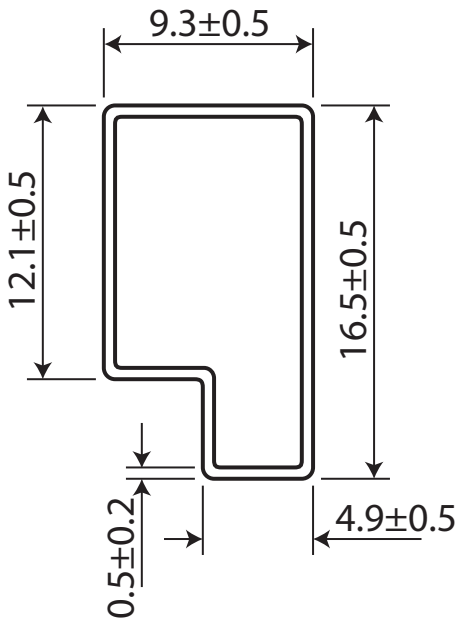
EN55022 Class B Recommended External Circuit Components		
C1	L1	C2
1210 10µF, 50V MLCC	10µH	1206 4.7µF, 50V MLCC

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PACKAGING

units: mm

Tube Size: 520 x 16.5 x 9.3 mm
QTY: 42 pcs



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REVISION HISTORY

rev.	description	date
1.0	initial release	05/25/2016
1.01	company logo updated	04/14/2021
1.02	derating curve, efficiency curves and circuit figures updated	09/20/2021
1.03	datasheet updated	05/29/2025

The revision history provided is for informational purposes only and is believed to be accurate.

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