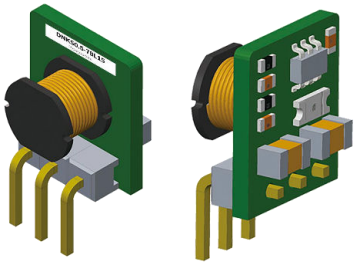
Descriptions

0.5A Non-Isolated Regulator



RoHS

UL62368-1 EN62368-1 BS EN62368-1

Features

- High efficiency up to 95%
- No-load input current as low as 0.2mA
- Operating ambient temperature range: -40℃ to +85℃
- Negative output available
- Output short-circuit protection

Applications

- Industrial control
- Instrumentation
- Electric power

Selection Guide

Certification	Part No.	Input Voltage (VDC)*	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DNKS0.5-78L03	24 (4.75-36)	3.3	500	86/80	680
EN/BS EN	DNKS0.5-78L05	24 (6.5-36)	5.0	500	90/84	680
		12 (7-31)	-5.0	-300	80/81	330
EN/BS EN	DNKS0.5-78L12	24 (15-36)	12	500	94/91	680
		12 (8-24)	-12	-150	84/85	330
UL/EN/BS EN	DNKS0.5-78L15	24 (19-36)	15	500	95/93	680
		12 (8-21)	-15	-150	85/87	330

Note: * For input voltage exceeding 30 VDC, an input electrolytic capacitor of 22uF/50V is required to prevent the module from being damaged by voltage spikes.

Specifications

Product characteristics	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	No-load Input Current	Positive output		--	0.2	1.5	mA
	Reverse Polarity at Input			Avoid / Not protected			
	Input Filter			Capacitance filter			
Output Specifications	Voltage Accuracy	Full load, input voltage range	3.3VDC output	--	±2	±4	%
			Others	--	±2	±3	
	Linear Regulation	Full load, input voltage range		--	±0.2	±0.4	
	Load Regulation	Nominal input , 10% -100% load	3.3/±5 VDC output	--	±0.6	--	
			±12/±15 VDC output	--	±0.3	--	
	Ripple & Noise①	20MHz bandwidth, nominal input, 10% -100% load		--	20	75	mVp-p
	Temperature Coefficient	Operating temperature -40℃ to +85℃		--	--	±0.03	%/℃
	Transient Response Deviation②	Nominal input, 25% load step change		--	50	250	mV
	Transient Recovery Time	Nominal input, 25% load step change		--	0.2	1	ms
	Short-circuit Protection	Nominal input		Continuous, self-recovery			
General Specifications	Operating Temperature	Derating when operating temperature≥71℃ (see Fig. 1)		-40	--	85	℃
	Storage Temperature			-55	--	125	
	Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	260	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Switching Frequency	Full load, nominal input		550	--	850	kHz
	MTBF	MIL-HDBK-217F@25℃		2000	--	--	k hours
Mechanical Specifications	Dimensions	10.00 x 7.20 x 11.00 mm					
	Weight	1.0g (Typ.)					
	Cooling Method	Free air convection					

Notes:

① The "parallel cable" method is used for ripple and noise test.

② With light loads at or below 10%, Ripple & Noise for 3.3V/5V output parts increases to 150mVp-p max., and for 12V/15V output parts to 2%Vo max.

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 5-② for recommended circuit)	
		RE	CISPR32/EN55032 CLASS B (see Fig. 5-② for recommended circuit)	
	Immunity	ESD	IEC/EN 61000-4-2 Contact ±4KV	perf. Criteria B
		RS	IEC/EN 61000-4-3 10V/m	perf. Criteria A
		EFT	IEC/EN 61000-4-4 ±1kV (see Fig. 5-① for recommended circuit)	perf. Criteria B
		CS	IEC/EN 61000-4-6 3Vr.m.s	perf. Criteria A
		CE	CISPR32/EN55032 CLASS B (see Fig. 5-② for recommended circuit)	

Characteristic Curve

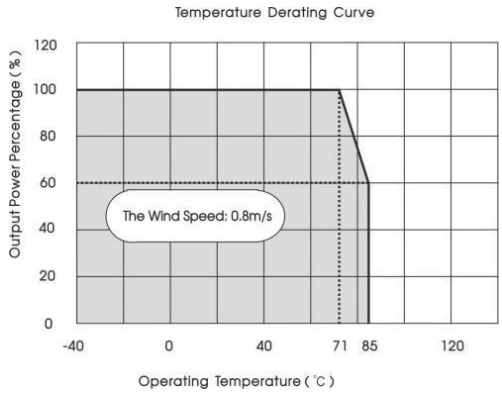
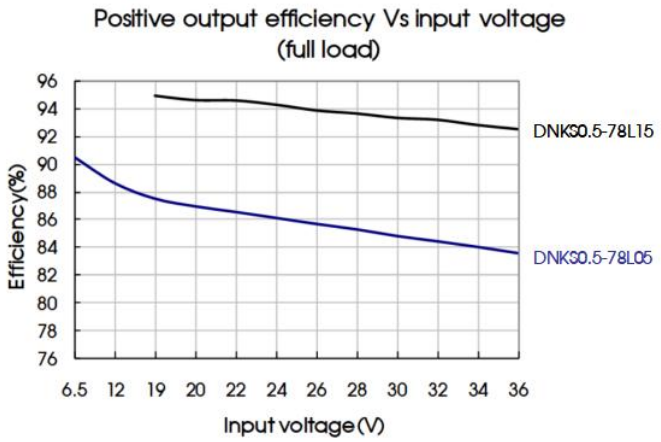
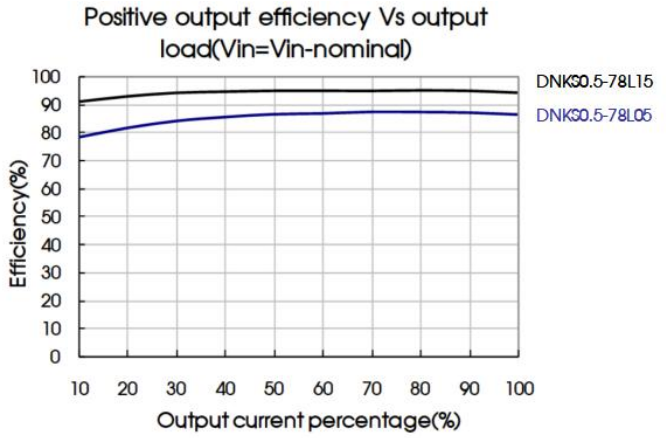
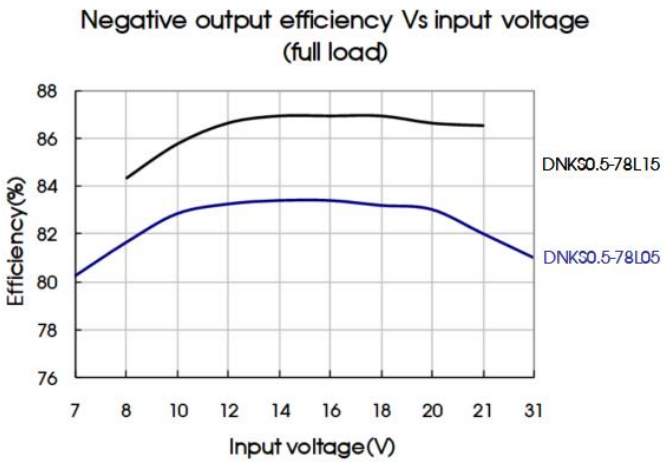
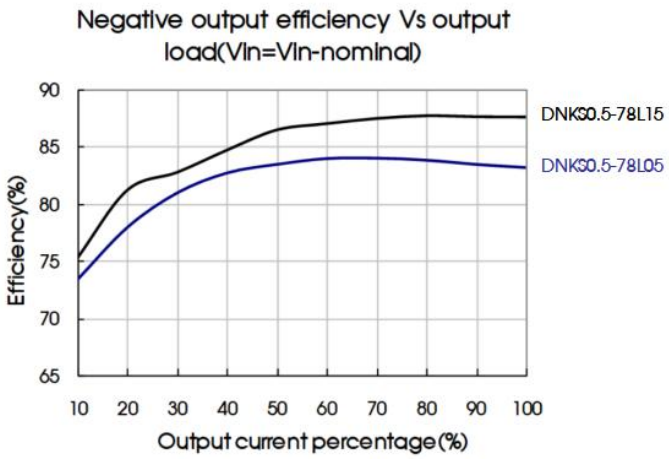


Fig. 1









Design Reference

1. Typical application

Fig. 2 Typical application circuit

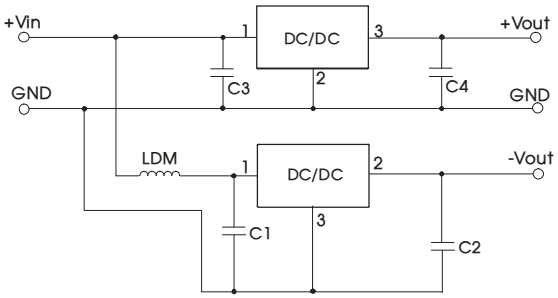


Fig. 3 Positive and negative output application circuit

Table 1

Part No.	C1/C3 (ceramic capacitor)	C2/C4 (ceramic capacitor)
DNKS0.5-78L03	10μF/50V	22μF/10V
DNKS0.5-78L05		22μF/10V
DNKS0.5-78L12		22μF/25V
DNKS0.5-78L15		22μF/25V

Notes:

1. C1 and C2(C3 and C4) are required and should be connected close to the pin terminal of the module.
2. Refer to Table 1 for C1 and C2 (C3 and C4) capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead.
3. When using configurations as shown in figure 3, we recommended to add an inductor (LDM) with a value of up to 10μH which helps reducing mutual interference.
4. Converter cannot be used for hot swap and with output in parallel.
5. Connecting a "LC" filter at the converter output helps to further reduced the output ripple. The recommended inductor value (L) is 10μH-47μH.

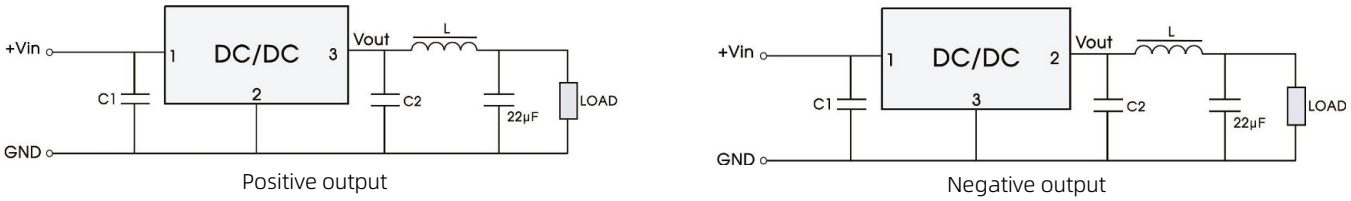


Fig. 4 External "LC" output filter circuit diagram

2. EMC compliance circuit

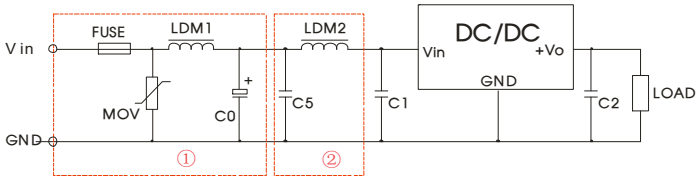
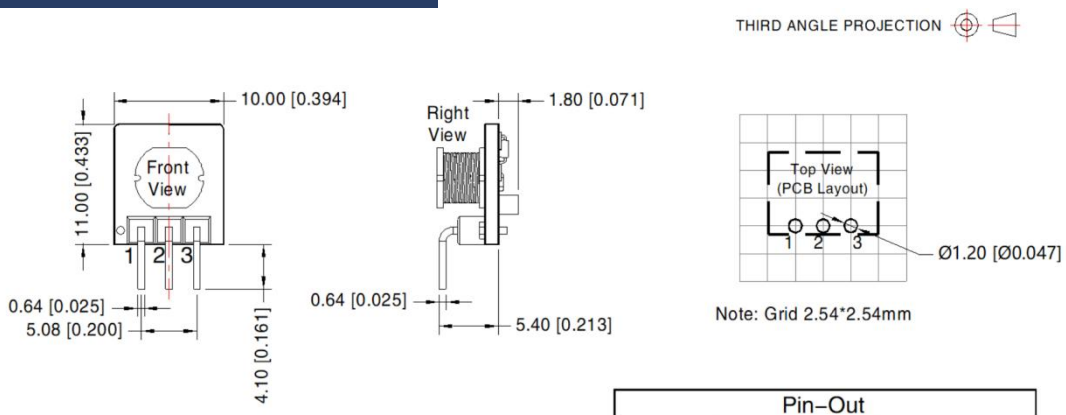


Fig. 5 Recommended compliance circuit

FUSE	MOV	LDM1	C0	C1/C2	C5	LDM2
Selected fuse value according to actual input current	S20K30	82μH	680μF /50V	Refer to table 1	4.7μF /50V	12μH

Note: For EMC tests we use Part ① in Fig. 5 for immunity and part ② for emissions test. Selecting based on needs.

Dimensions and Recommended



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

Pin–Out		
Pin	Positive Output	Negative Output
1	Vin	Vin
2	GND	–Vo
3	+Vo	GND

Notes:
1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. Products are related to laws and regulations: see "Features" and "EMC"
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.