DNKM1-78xx Series

Descriptions

1A Non-isolated Regulator

RoHS

Report EN62368-1

Report BS EN62368-1

Features

- No-load input current as low as 0.3mA
- Operating ambient temperature range: -40℃ to +85℃
- High efficiency up to 96%
- Output short-circuit protection
- Support the negative output

Applications

- Industrial control
- Electric power
- Instrumentation

Selection Guide

Certification	Part No.	Input Voltage (VDC)*	Output		Full Load Efficiency (%) Vin Min. / Vin Max.	Capacitive Load (μF)Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max.		
EN/BS EN	DNKM1-7803	24 (6-36)	3.3	1000	90/80	680
	DNKM1-7805	24 (8-36)	5	1000	93/85	680
		12 (8-27)	-5	-500	85/81	330
	DNKM1-78X6	24 (10-36)	6.5	1000	93/85	680
	DNKM1-7809	24 (13-36)	9	1000	94/89	680
	DNKM1-7812	24 (16-36)	12	1000	95/92	680
		12 (8-20)	-12	-300	88/87	330
	DNKM1-7815	24 (20-36)	15	1000	96/93	680
		12 (8-18)	-15	-300	87/88	330

Note: For input voltage exceeding 30 VDC, an input capacitor of 22uF/50V is required.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	No-load Input Current	Positive output		--	0.3	1	mA
		Negative output		--	1	4	
	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 output	--	±1.5	±3	
	Linear Regulation	Full load, input voltage range		--	±0.2	±0.4	
	Load Regulation	Nominal input voltage, 10% -100% load	Positive output	--	±0.4	±0.6	
			Negative output	--	±0.4	±0.8	
	Ripple & Noise①	20MHz bandwidth, nominal input voltage, 20% -100% load		--	25	75	mVp-p
	Temperature Coefficient	100% load		--	--	±0.03	%/℃
	Transient Response Deviation	Nominal input voltage, 25% load step change		--	±60	±200	mV
	Transient Recovery Time			--	--	1	ms
	Short-circuit Protection	Nominal input voltage		Continuous, self-recovery			
General Specifications	Operating Temperature②	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		--	--	95	%RH
	Switching Frequency	Full load, nominal input		--	520	--	KHz
	MTBF	MIL-HDBK-217F@25℃		2000	--	--	K hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)					
	Dimensions	11.60 × 8.00 × 10.40 mm					
	Weight	1.9g (Typ.)					
	Cooling Method	Free air convection					

Note:

①The "parallel cable" method is used for ripple and noise test; with light loads at or below 20%, the maximum Ripple and Noise for 3.3/5V output parts increase to 100mVp-p and for 6.5/9/12/15V output parts increase to 2%Vo.

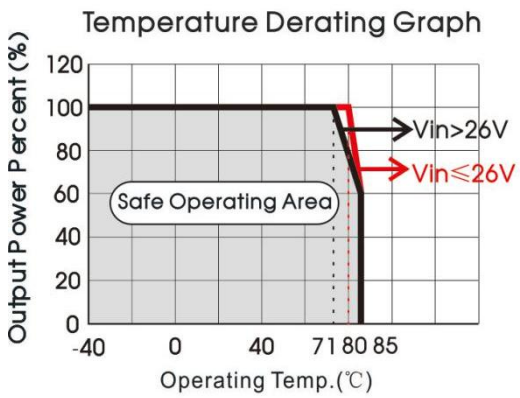
②When Vin >30V, for positive output of 6.5V/9V/12V/15V, product start to derating from temperature≥55℃ and derating to 40%Io if the temperature is 85℃.

Electromagnetic Compatibility (EMC)

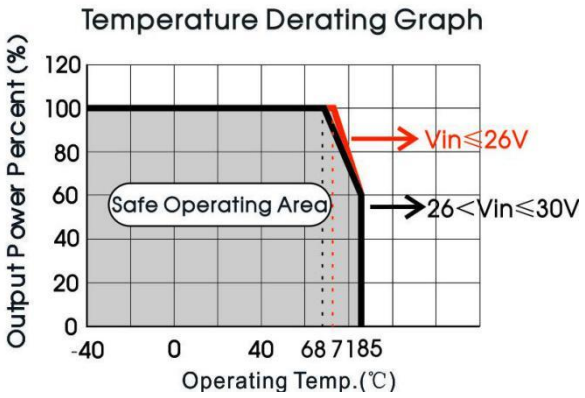
Electromagnetic Compatibility (EMC)	Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 4-② for recommended circuit)	
		RE	CISPR32/EN55032 CLASS B (see Fig. 4-② for recommended circuit)	
	Immunity	ESD	IEC/EN 61000-4-2 Contact ±4KV	perf. Criteria B
		RS	IEC/EN 61000-4-3 10V/m	perf. Criteria A
		EFT	IEC/EN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

Characteristic Curve

3.3V/5V Positive output



6.5V/9V/12V/15V Positive output



Negative output

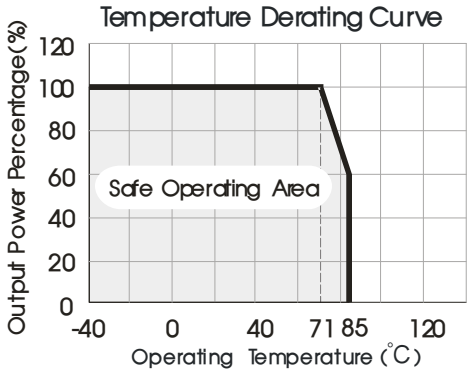
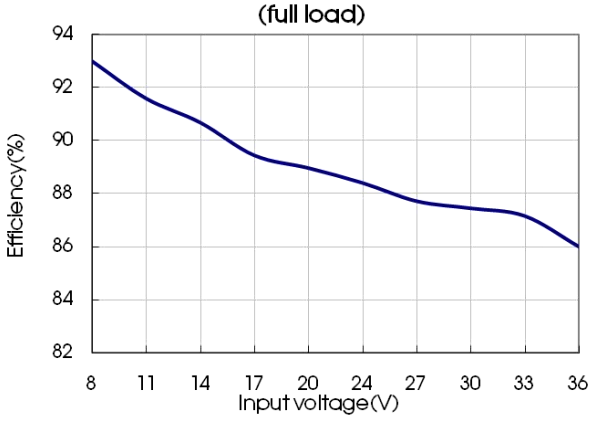


Fig. 1

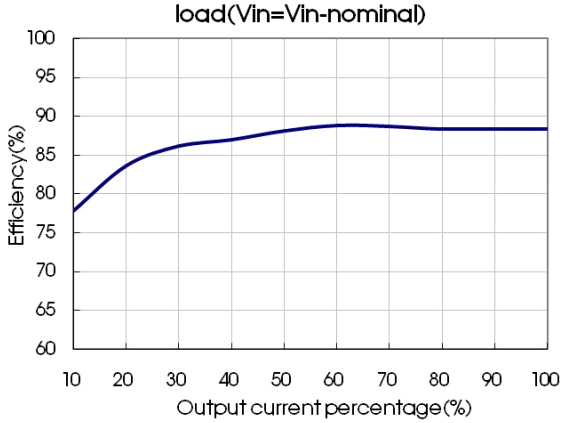
DNKM1-7805

Positive output Efficiency Vs input voltage (full load)

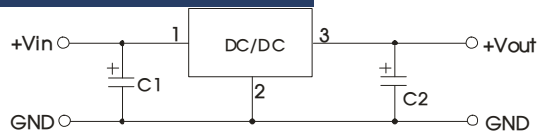


DNKM1-7805

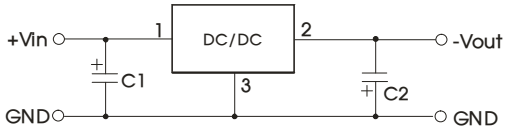
Positive output Efficiency Vs output load(Vin=Vin-nominal)



Design Reference



Positive output application circuit



Negative output application circuit

Fig. 2 Typical application circuit

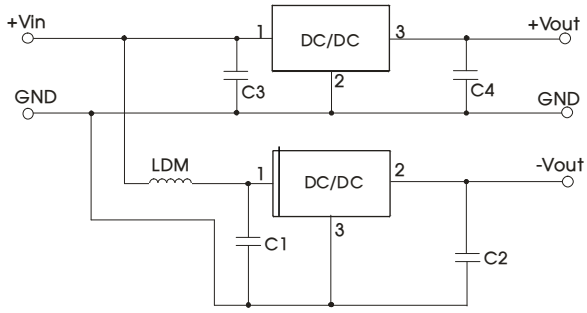


Fig. 3 Positive and Negative output application circuit

Table 1

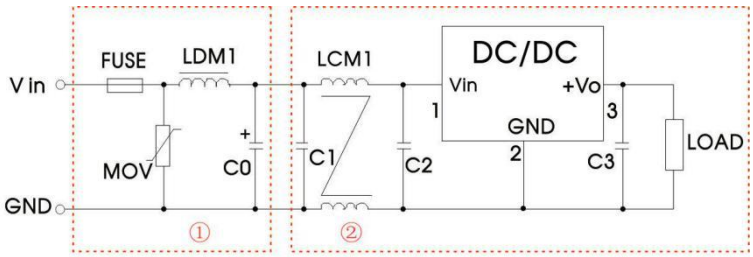
Part No.	C1/C3 (ceramic	C2/C4 (ceramic capacitor)
DNKM1-7803	10μF/50V	22μF/10V
DNKM1-7805		22μF/10V
DNKM1-78X6		22μF/16V
DNKM1-7809		22μF/16V
DNKM1-7812		22μF/25V
DNKM1-7815		22μF/25V

Note:

1. The required capacitors C1 and C2 (C3 and C4) must be connected close as possible to the terminals of the module.
2. Refer to Table 1 for C1 and C2 (C3 and C4) capacitor values.
3. For certain applications, increased values for C2 and C4 and/or tantalum or low ESR electrolytic capacitors may also be used instead .
4. 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.
5. Converter cannot be used for hot swap and with output in parallel.

2. EMC compliance recommended circuit

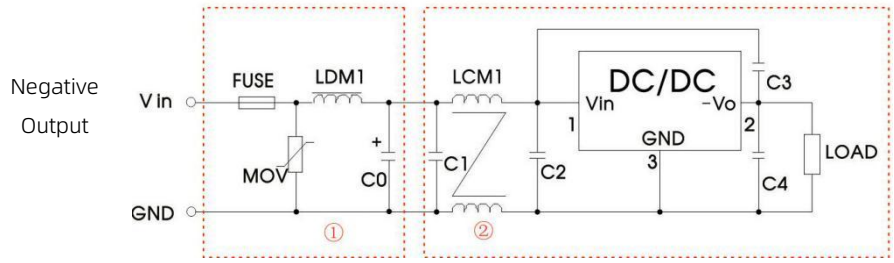
EMC recommended compliance circuit



Parameter description

FUSE	Select fuse value according to actual input current
MOV	S20K30
LDM1	82μH
C0	680μF /50V
LCM1	4.7mH
C1/C2	4.7μF /50V
C3	Refer to the Cout in table 1

EMC recommended compliance circuit



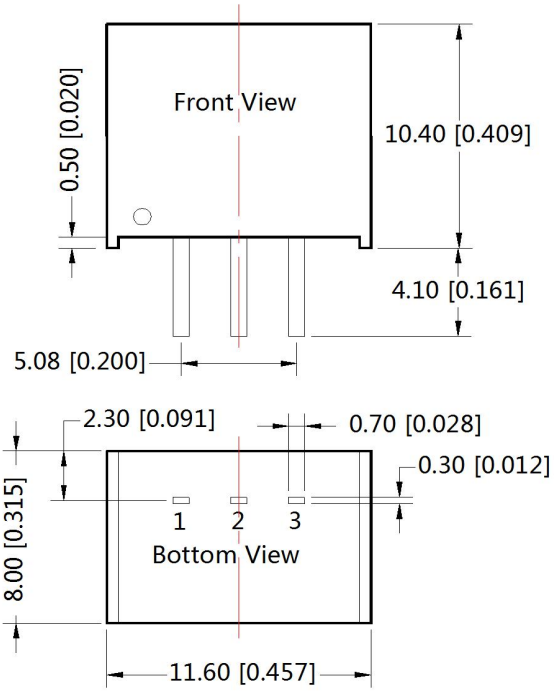
Parameter description

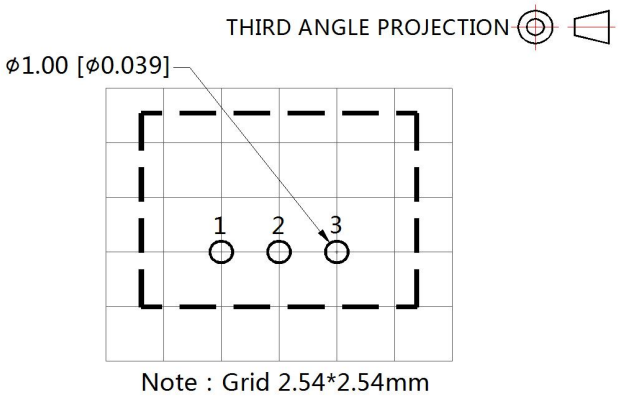
FUSE	Select fuse value according to actual input current
MOV	S20K30
LDM1	82μH
C0	680μF /50V
LCM1	4.7mH
C1/C3/C4	4.7μF /50V
C2	10μF /50V

Fig. 4 Recommended compliance circuit

Note:For EMC tests we use Part ① in Fig. 4 for immunity and part ② for emissions test. Selecting based on needs.

Dimensions and Recommended Layout





Pin-Out		
Pin	Positive Output	Nagetive Output
1	Vin	Vin
2	GND	-Vo
3	+Vo	GND

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

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% 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.