

Descriptions

3A Non-isolated Regulator



RoHS



EN62368-1



BS EN62368-1

Features

- High efficiency up to 97%
- No-load input current as low as 2mA
- Operating ambient temperature range: -40°C to +85°C
- Output short-circuit protection

Applications

- Industrial control
- Electricity
- Instrumentation

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	DNKS3-7803	24 (8-36)	3.3	3000	90/83	1000
	DNKS3-7805	24 (8-36)	5	3000	93/89	680
	DNKS3-78X6	24 (10-36)	6.5	3000	94/90	330
	DNKS3-7809	24 (13-36)	9	3000	95/91	330
	DNKS3-7812	24 (16-36)	12	3000	97/93	330
	DNKS3-7815	24 (19-36)	15	3000	97/94	330

Note: * For input voltages exceeding 30 VDC, an input capacitor of 22μF/50V is required.

Specifications

Product Specifications	Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Input Specifications	No-load Input Current		--	2	4	mA	
	Reverse Polarity at Input		Avoid / Not protected				
	Input Filter		Capacitance filter				
	Ctrl ^①	Module on		Ctrl pin open or pulled high (TTL 4.5-14VDC)			
Module off			Ctrl pin pulled low to GND (0-0.8VDC)				
Input current when off			--	--	4	mA	
Output Specifications	Voltage Accuracy	0%-100% load, input voltage range	--	±2	±3	%	
	Linear Regulation	Full load, input voltage range	--	±0.5	±1		
	Load Regulation	Nominal input voltage, 10% -100% load	--	±0.5	±1		
	Ripple & Noise ^②	20MHz bandwidth, nominal input voltage, 100% load	3.3V/5V/6.5V/9V output	--	40	70	mVp-p
			12V/15V output	--	50	100	
	Temperature Coefficient	Operating ambient temperature -40°C to +85°C		--	--	±0.03	%/°C
	Transient Response Deviation	Nominal input voltage, 50% load step change	3.3V output	--	--	5	%Vo
			5V/6.5V output	--	--	4	
			9V/12V output	--	--	3	
			15V output	--	--	2	
Transient Recovery Time	Nominal input voltage, 50% load step change		--	0.1	0.2	ms	
Short-circuit Protection	Nominal input voltage		Continuous, self-recovery				
General Specifications	Operating Temperature	See Fig. 1	-40	--	+85	°C	
	Storage Temperature		-55	--	+125		
	Pin Soldering Resistance Temperature	Soldering time: 10s (Max)	--	--	+260		
	Storage Humidity	Non-condensing	5	--	95	%RH	
	Switching Frequency ^③	PWM mode	100	250	400	kHz	
	MTBF	MIL-HDBK-217F@25°C	2000	--	--	k hours	
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	32.15 x 14.85 x 9.05 mm					
	Weight	9.3g(Typ.)					
	Cooling Method	Free air convection					

Note:

①The Ctrl pin voltage is referenced to input GND;

②The "parallel cable" method is used for Ripple and Noise test;

③Different switching frequencies of different output voltages.

Electromagnetic Compatibility (EMC)

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

Characteristic Curve

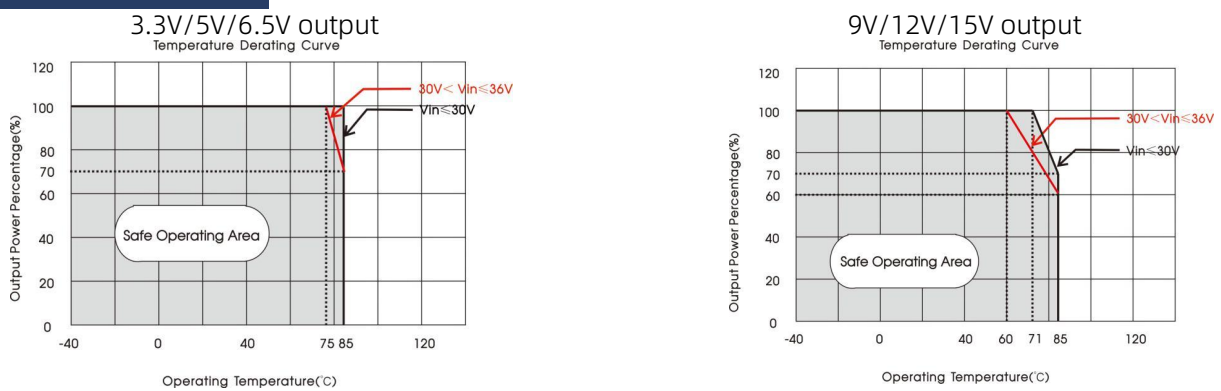


Fig. 1

Design Reference

1. Typical application

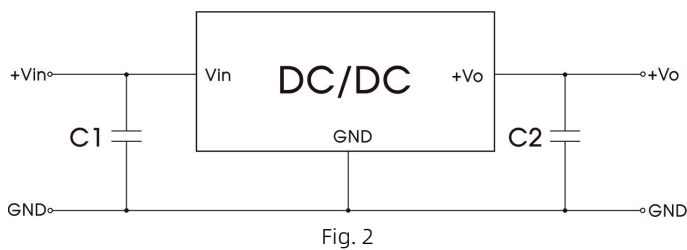


Fig. 2

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

Table 1

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
DNKS3-7803	10μF/50V	22μF/10V
DNKS3-7805		22μF/10V
DNKS3-78X6		22μF/10V
DNKS3-7809		22μF/16V
DNKS3-7812		22μF/25V
DNKS3-7815		22μF/25V

2. EMC compliance circuit

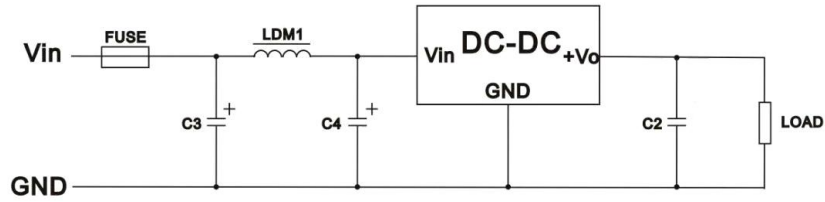


Fig.3 EMC compliance circuit

	FUSE	C3	LDM1	C4	C2
Emissions	Select fuse value according to actual input current	100μF /50V	22μH	100μF /50V	Refer to the C2 in Fig. 2
Immunity				680μF /50V	

3. Trim Function for Output Voltage Adjustment (open if unused)

application: connect trim resistor to GND/Vo respectively for adjusting up/down.

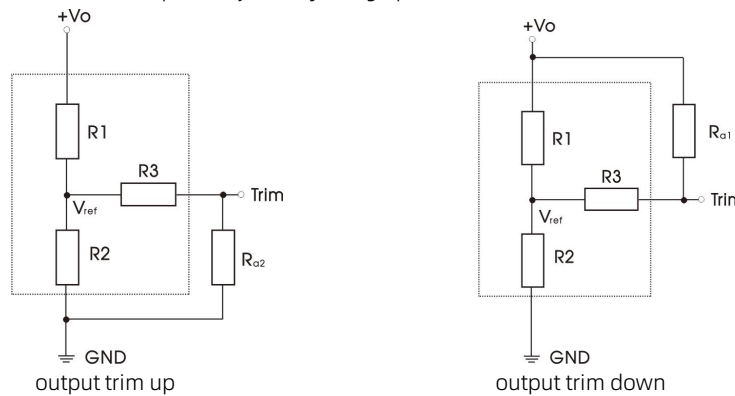


Fig. 4 Circuit diagram of Vtrim up and down (dashed line shows internal part of module)

Calculating Trim resistor values:

$$\text{Trim up: } R_{a2} = \frac{aR_2}{R_2 - a} - R_3, \quad a = R_2 // (R_3 + R_{a2}) = \frac{V_{ref}}{V_o' - V_{ref}} R_1$$

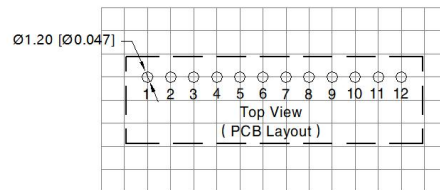
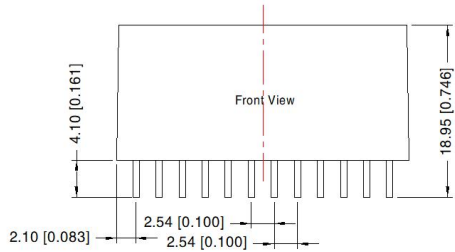
$$\text{Trim down: } R_{a1} = \frac{aR_1}{R_1 - a} - R_3, \quad a = R_1 // (R_3 + R_{a1}) = \frac{V_o' - V_{ref}}{V_{ref}} R_2$$

Vo(V)	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
3.3	75	32.68	10	1
5	68	17.01	10	1
6.5	75	13.64	10	1
9	75	9.38	10	1
12	120	10.91	10	1
15	100	7.14	10	1

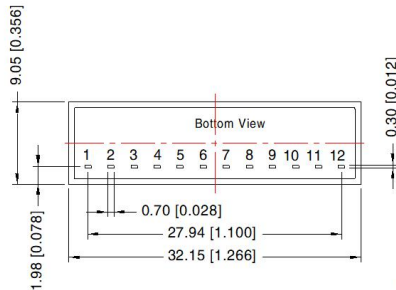
Vout nom(Vo)	3.3VDC		5.0VDC		6.5VDC		9.0VDC		12VDC		15VDC	
Vout adj(Vo')	R _{a1}	R _{a2}	R _{a1}	R _{a2}	R _{a1}	R _{a2}	R _{a1}	R _{a2}	R _{a1}	R _{a2}	R _{a1}	R _{a2}
3	498.5k	--	--	--	--	--	--	--	--	--	--	--
3.3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	96.4k	194.5k	--	--	--	--	--	--	--	--	--
4.5	--	52.2k	468.2k	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
5.5	--	--	--	125.4k	328.0k	--	--	--	--	--	--	--
6	--	--	--	57.8k	742.2k	--	--	--	--	--	--	--
6.5	--	--	--	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	139.6k	215.5k	--	--	--	--	--
8	--	--	--	--	--	40.0k	517.2k	--	--	--	--	--
9	--	--	--	--	--	--	--	--	--	--	--	--
10	--	--	--	--	--	--	--	64.7k	530.2k	--	--	--
11	--	--	--	--	--	--	--	27.4k	1191.1k	--	--	--
12	--	--	--	--	--	--	--	--	--	--	--	--
13	--	--	--	--	--	--	--	--	--	109.9k	588.3k	--
14	--	--	--	--	--	--	--	--	--	50.0k	1282.8k	--
15	--	--	--	--	--	--	--	--	--	--	--	--
16	--	--	--	--	--	--	--	--	--	--	--	90.6k
17	--	--	--	--	--	--	--	--	--	--	--	40.1k

Dimensions and Recommended

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm



Pin-Out	
Pin	Mark
1	Ctrl
2,3,4	Vin
5,6,7,8	GND
9,10	+Vo
11	+Vo
12	Trim

Note:
 Unit: mm[inch]
 Pin diameter tolerances: $\pm 0.10[\pm 0.004]$
 General tolerances: $\pm 0.50[\pm 0.020]$

Notes:

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