

## DCK78Uxx-0.5A Series



### FEATURES

- Operating ambient temperature range: -40°C to +85°C
- No-load input current as low as 1.5 mA
- Input voltage range up to 10:1
- High efficiency up to 93%
- Output short-circuit protection

### DESCRIPTION

Wide Voltage Input, Output 500mA, Non Isolated, Stabilized, Single Output, SIP3 Packaging

### MODEL NUMBERING

## DCK78Uxx-0.5A



### SELECTION GUIDE

Product model	Input Voltage Standard Value(range)	Output Voltage	Output Current (mA) (Max./Min.)	Efficiency % (Min./Typ.)	Maximum capacitive load ( $\mu$ F)
DCK78U03 -0.5A	48 (9-90)	3.3	500	82/69	100
DCK78U05 -0.5A	48 (9-90)	5	500	87/75	100
DCK78U06 -0.5A	48 (9-90)	6.5	500	91/78	100
DCK78U09 -0.5A	48 (14-90)	9	500	91/80	100
DCK78U12 -0.5A	48 (18-90)	12	500	91/83	100
DCK78U15 -0.5A	48 (20-90)	15	500	93/84	100
DCK78U24 -0.3A	48 (36-90)	24	300	93/85	100

## INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Current (Rated Load)	Nominal Input Voltage	--	--	1.5	mA
Reverse Polarity At Input		Avoid / Not Protected			
Input Filter		Capacitive Filtering			

Remarks: This product does not support hot plug

## OUTPUT CHARACTERISTIC

Parameter	Conditions	Min.	Typ.	Max.	Units	
Output Voltage Accuracy	10%-100%, Input Voltage Range	3.3V Output	--	±3.5	±4.5	%
		Others	--	±2	±3	%
Linear Regulation	Full Load, Input Voltage Range	03V, 05V	--	±0.6	±1.5	%
		09V, 12V, 15V	--	±0.6	±2.0	%
		24V	--	±1.2	±2.5	%
Load Regulation Rate	Nominal Input Voltage, 10%- 100% Load	--	±1.0	±2.0	%	
Ripple & Noise*	20MHz Bandwidth, Nominal Input Voltage, Full Load	--	40	80	mVp-p	
Temperature Drift Coefficient	Operating Temperature -40°C To +85°C	--	--	±0.03	%/°C	
Transient Response Deviation	Nominal Input Voltage, 25% Load Step Change	--	±0.4	±1.5	%	
Transient Recovery Time	Nominal Input Voltage, 25% Load Step Change	--	0.2	1	ms	
Short-Circuit Protection	Nominal Input Voltage	Sustainable, Self-Healing				

Note: The testing method for ripple and noise is the parallel line testing method.

## GENERAL CHARACTERISTIC

	Conditions	Min.	Typ.	Max.	Units
Working Temperature	Temperature ≥ 71 °C For Derating (See Figure 4)	-40	--	+85	°C
Storage Temperature		-55	--	+125	°C
Storage Humidity	No Condensation	5	--	95	%RH
Soldering Temperature Resistance Of Pins	The Distance From The Welding Spot To The Shell Is 1.5mm, 10 Seconds	--	--	+300	°C
Switching Frequency	Full Load, Nominal Input Voltage	--	300	--	kHz
Mean Time Between Failures	MIL-HDBK-217F@25°C	2000	--	--	kHours

### PHYSICAL CHARACTERISTICS

Parameter	Contents
Housing Material	Black Flame Retardant And Heat-Resistant Plastic (UL94V-0)
Overall Dimensions	11.50 × 9.00 × 17.50 mm
Weight	3.8g (Typ.)
Cooling Mode	Natural Air Cooling

### EMC CHARACTERISTICS

Parameter	Category	Content	
EMI	CE	CISPR32/EN55032 CLASS B (see Fig.2-② for recommended circuit)	
	RE	CISPR32/EN55032 CLASS B (see Fig.2-② for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2 Contact ±4kV	Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	Perf. Criteria B
	EFT	IEC/EN61000-4-4 100kHz ±1kV (see Fig.2-① for recommended circuit)	Perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±1kV (see Fig.2-① for recommended circuit)	Perf. Criteria B
	CS	IEC/EN61000-4-6 3Vr.m.s	Perf. Criteria B

### CIRCUIT DESIGN AND APPLICATION

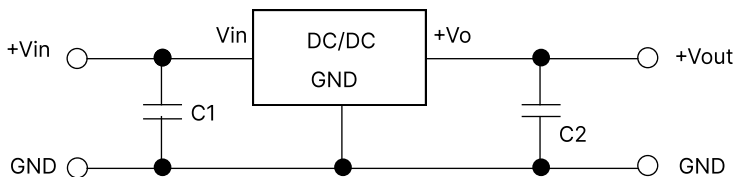


Figure 1: Application circuit

Table 1:  
Recommended Capacitive Load Values

Product model	C1	C2
DCK78U03 -0.5A	10μF/100V	22μF/10V
DCK78U05 -0.5A		22μF/10V
DCK78U09 -0.5A		22μF/16V
DCK78U12 -0.5A		22μF/25V
DCK78U15 -0.5A		22μF/25V
DCK78U24 -0.3A		10μF/50V

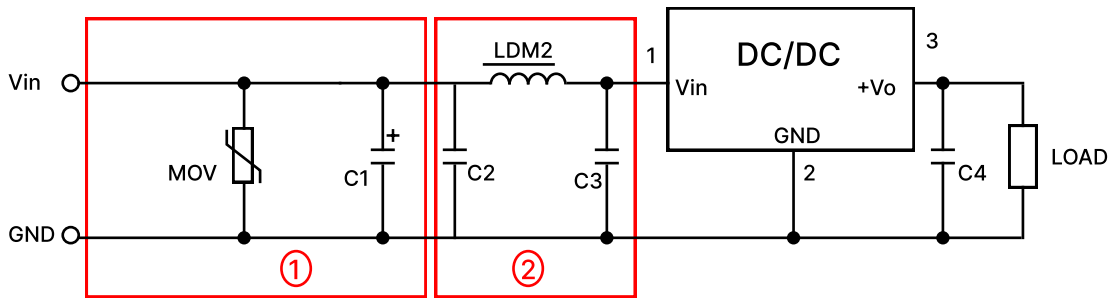


Figure 2: EMC Typical Recommended Circuits

Table 2:  
Recommended Circuit Parameter Values

Category	Component	Value
EMI	MOV	S10K75
	C1	680 $\mu$ F /100V
	C2	4.7 $\mu$ F/100V
	LMD2	120 $\mu$ H
	C3	4.7 $\mu$ F/100V
	C4	10 $\mu$ F/50V

1. The required C1 and C2 capacitors 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.

**PRODUCT CHARACTERISTIC CURVE**

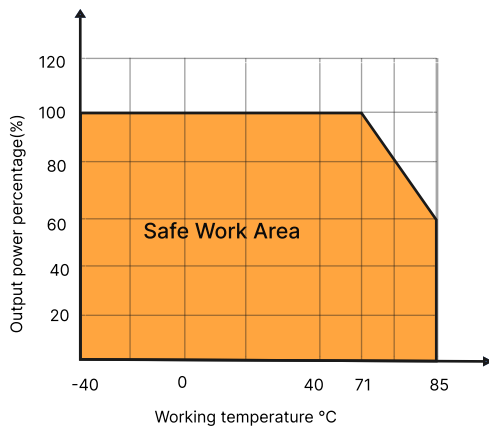


Figure 3: Temperature Derating Curve  
DCK78U15-0.5A , DCK78U24-0.3A (Vin<60V)

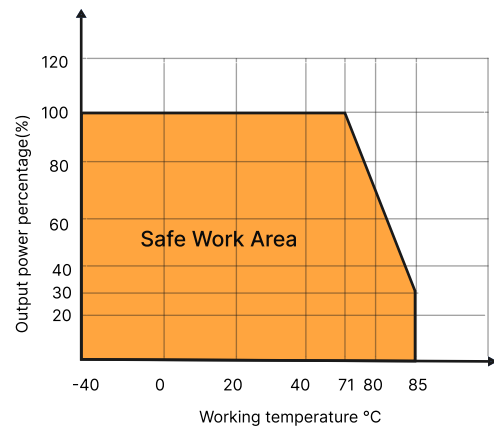


Figure 4: Temperature Derating Curve  
DCK78U24-0.3A (Vin>60V)

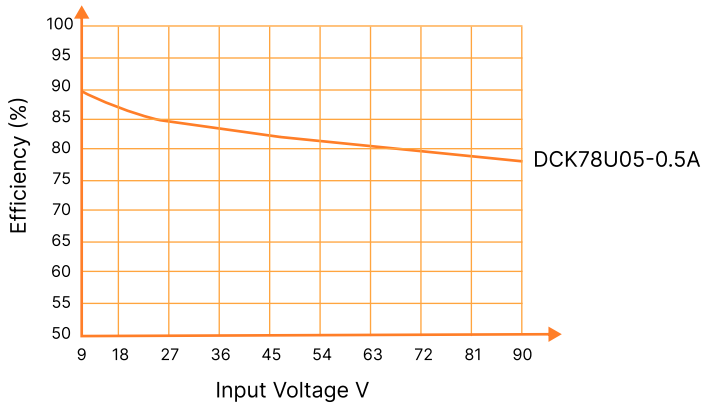


Figure 5: Efficiency Vs Input Voltage

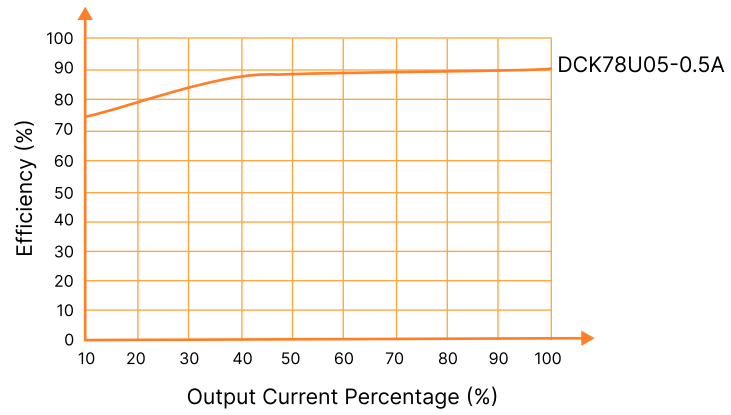


Figure 6: Efficiency Vs Output Load

OVERALL DIMENSIONS AND PIN FUNCTIONS

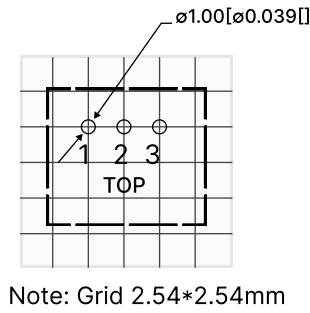
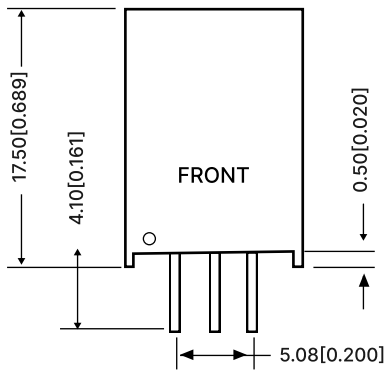


Table 3: Pin Function Table

Pin	Positive output
1	Vin
2	GND
3	+0V

Note:  
Dimensions in mm[inch]  
Terminal diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]  
Undeclared tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]

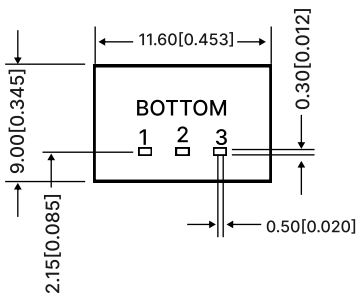
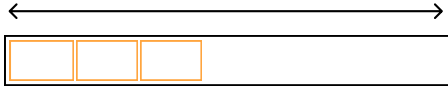
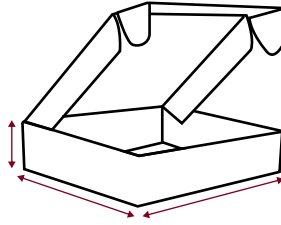


Figure 7: Overall dimensions

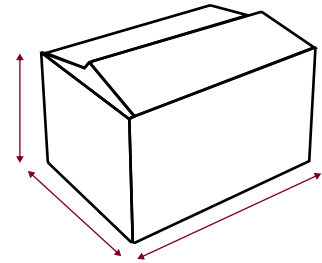
PACKAGING METHOD



30 Pieces/Tube



1500 Pieces/Inner box



7500 Pieces/Outer box

NOTES & INSTRUCTIONS

- 1.The input voltage shall not exceed the specified range value, otherwise permanent and unrecoverable damage maybe caused.
2. Unless otherwise specified, the parameters in this manual are measured at 25 °C, 40%~75% humidity, input nominal voltage and output pure resistance mode under full load.
- 3.All index test methods are based on the company's enterprise standards.
- 4.The copyright and the final interpretation right of the product belong to RHENXV.