

# RDD05U SERIES

DC - DC CONVERTER  
5 ~ 6W SINGLE & DUAL OUTPUT



## FEATURES

- 2:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT Pi FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- UL/cUL/TUV/CE
- 3 YEARS WARRANTY



EN 60950-1

## MODEL LIST

MODEL NO.	INPUT VOLTAGE	INPUT CURRENT		OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	CAPACITOR LOAD (max.)
		(typ.)	(max.)						

### Single Output Models

RDD05 - 03S1U	9~18 VDC	0.52A	0.73A	5 WATTS	+3.3 VDC	1500 mA	79%	81%	2200 $\mu$ F
RDD05 - 05S1U	9~18 VDC	0.51A	0.72A	5 WATTS	+ 5 VDC	1000 mA	80%	82%	1500 $\mu$ F
RDD05 - 12S1U	9~18 VDC	0.60A	0.83A	6 WATTS	+ 12 VDC	500 mA	83%	85%	270 $\mu$ F
RDD05 - 15S1U	9~18 VDC	0.60A	0.83A	6 WATTS	+ 15 VDC	400 mA	83%	85%	180 $\mu$ F
RDD05 - 03S2U	18~36 VDC	0.26A	0.36A	5 WATTS	+3.3 VDC	1500 mA	78%	80%	2200 $\mu$ F
RDD05 - 05S2U	18~36 VDC	0.25A	0.36A	5 WATTS	+ 5 VDC	1000 mA	80%	82%	1500 $\mu$ F
RDD05 - 12S2U	18~36 VDC	0.30A	0.42A	6 WATTS	+ 12 VDC	500 mA	81%	83%	270 $\mu$ F
RDD05 - 15S2U	18~36 VDC	0.30A	0.42A	6 WATTS	+ 15 VDC	400 mA	81%	83%	180 $\mu$ F
RDD05 - 03S3U	35~75 VDC	0.13A	0.19A	5 WATTS	+3.3 VDC	1500 mA	78%	80%	2200 $\mu$ F
RDD05 - 05S3U	35~75 VDC	0.13A	0.18A	5 WATTS	+ 5 VDC	1000 mA	80%	82%	1500 $\mu$ F
RDD05 - 12S3U	35~75 VDC	0.15A	0.22A	6 WATTS	+ 12 VDC	500 mA	80%	82%	270 $\mu$ F
RDD05 - 15S3U	35~75 VDC	0.15A	0.22A	6 WATTS	+ 15 VDC	400 mA	81%	83%	180 $\mu$ F

### Dual Output Models

RDD05 - 05D1U	9~18 VDC	0.51A	0.72A	5 WATTS	$\pm$ 5 VDC	$\pm$ 500 mA	80%	82%	$\pm$ 680 $\mu$ F
RDD05 - 12D1U	9~18 VDC	0.60A	0.83A	6 WATTS	$\pm$ 12 VDC	$\pm$ 250 mA	82%	84%	$\pm$ 150 $\mu$ F
RDD05 - 15D1U	9~18 VDC	0.59A	0.83A	6 WATTS	$\pm$ 15 VDC	$\pm$ 200 mA	83%	85%	$\pm$ 68 $\mu$ F
RDD05 - 05D2U	18~36 VDC	0.26A	0.36A	5 WATTS	$\pm$ 5 VDC	$\pm$ 500 mA	79%	81%	$\pm$ 680 $\mu$ F
RDD05 - 12D2U	18~36 VDC	0.30A	0.42A	6 WATTS	$\pm$ 12 VDC	$\pm$ 250 mA	81%	83%	$\pm$ 150 $\mu$ F
RDD05 - 15D2U	18~36 VDC	0.31A	0.42A	6 WATTS	$\pm$ 15 VDC	$\pm$ 200 mA	80%	82%	$\pm$ 68 $\mu$ F
RDD05 - 05D3U	35~75 VDC	0.13A	0.19A	5 WATTS	$\pm$ 5 VDC	$\pm$ 500 mA	80%	82%	$\pm$ 680 $\mu$ F
RDD05 - 12D3U	35~75 VDC	0.15A	0.22A	6 WATTS	$\pm$ 12 VDC	$\pm$ 250 mA	81%	83%	$\pm$ 150 $\mu$ F
RDD05 - 15D3U	35~75 VDC	0.15A	0.22A	6 WATTS	$\pm$ 15 VDC	$\pm$ 200 mA	80%	82%	$\pm$ 68 $\mu$ F

### SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

#### GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
Switching frequency	Vi nom, Io nom		280		KHz
Isolation voltage	Input / Output	1500			VDC
Isolation resistance	Input / Output, @ 500VDC	100			MΩ
Isolation capacitance	100KHz / IV		1000		PF
Ambient temperature	Operating at Vi nom, Io nom	-40		+ 71	°C
Case temperature	Operating at Vi nom, Io nom			+ 100	°C
Derating	Vi nom	See derating curve			
Storage temperature	Non operational	-40		+ 100	°C
Relative humidity	Vi nom, Io nom	20		95	% RH
Temperature coefficient	Vi nom, Io min			± 0.02	% / °C
Dimension		L31.8 x W20.3 x H10.2			mm
MTBF	Bellcore issue 6@40°C, GB		1120000		Hours
Cooling	Free air convection				

#### INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Input voltage range	Ta min ... Ta max, Io nom	9	12	18	VDC
		18	24	36	VDC
		35	48	75	VDC
No load input current	Vi nom, Io = 0	12V models		30	mA
		24V models		25	mA
		48V models		20	mA
Input voltage w/o damage	Io nom	12V models		20	VDC
		24V models		40	VDC
		48V models		80	VDC
Startup voltage	Io nom	12V models	8.7		VDC
		24V models	17.4		VDC
		48V models	31.5		VDC
Input filter	Pi type				

#### OUTPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom			± 2	%
Minimum load	Vi nom single output models	0			%
	Vi nom dual output models (each output)	10			%
Line regulation	Io nom, Vi min ... Vi max			± 0.5	%
Load regulation	Vi nom, Io 0 ... Io nom, single output models			± 0.5	%
	Vi nom, Io min ... Io nom, dual output models			± 1	%
Cross regulation (Dual model)	Aymmetrical load 10% - 100% FL			± 5	%
Startup time	Vi nom, Io nom			700	ms
Transient recovery time	Vi nom, I ~ 0.5 Io nom			1	ms
Ripple & noise	Vi nom, Io nom, BW = 20MHz			50	mV
Efficiency	Vi nom, Io nom, Po / Pi	Up to 85%, See model list and efficiency curve			

### SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

### CONTROL AND PROTECTION

Input reversed	Shunt diode built in, external fuse recommended 1A
Output short circuit	Current limited (Auto-recovery)
Rated over load protection	110%min....140%max

### APPROVALS AND STANDARD

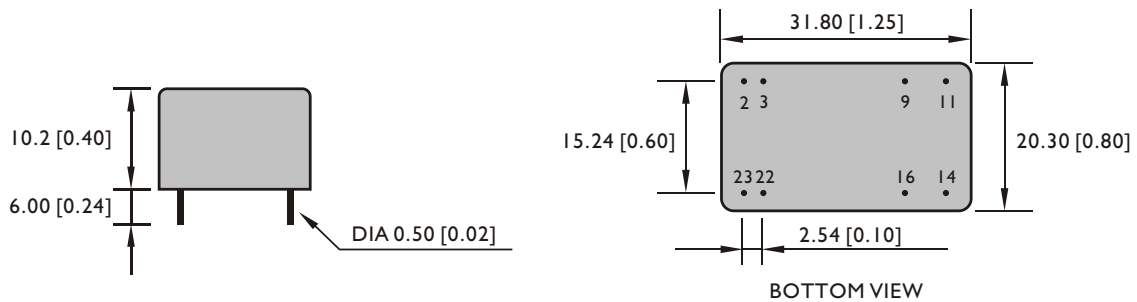
UL/cUL	UL 60950-1 Recognized
TUV	EN 60950-1, CB scheme
CE	EN 61204-3, EN 55022 Class A, EN 61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-6
Vibration	meet IEC 60068-2-6 (10-500 Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis)

### PHYSICAL CHARACTERISTICS

Case size	31.8 x 20.3 x 10.2 mm (1.25 x 0.8 x 0.4 inches)
Case material	Plastic base / Metal case
Weight	18 g
Patting material	Silicone

### MECHANISM & PIN CONFIGURATION

mm [inch]



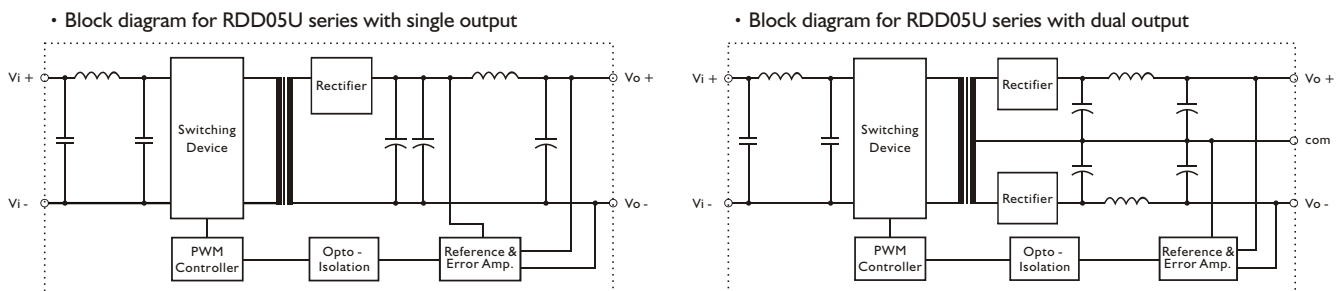
GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]

### PIN ASSIGNMENT

#### GENERAL

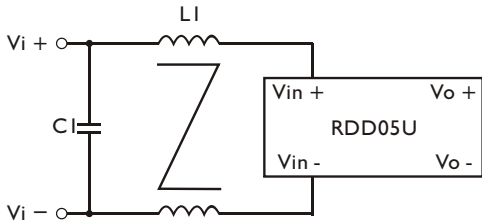
PIN NO.	2 & 3	9	11	14	16	22 & 23
SINGLE	Vi -	N. C.	N. C.	Vo+	Vo -	Vi+
DUAL	Vi -	com	Vo -	Vo+	com	Vi+

### CIRCUIT SCHEMATIC



### RECOMMENDED CIRCUIT

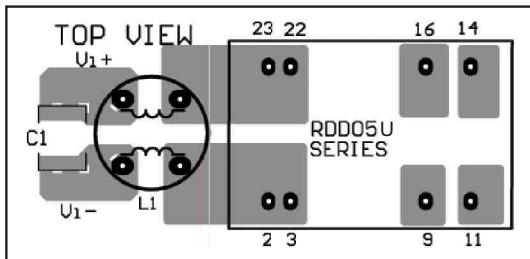
- Recommended filter for EN55022 Class B compliance



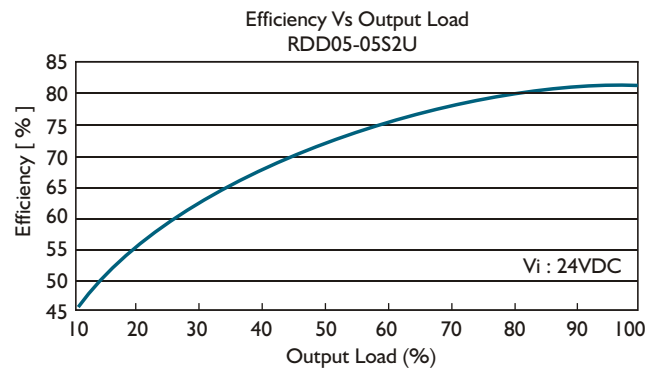
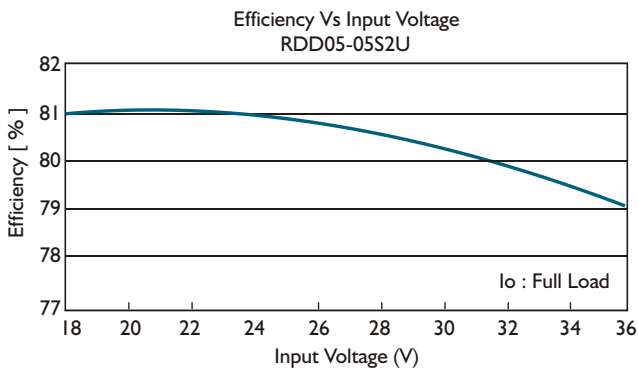
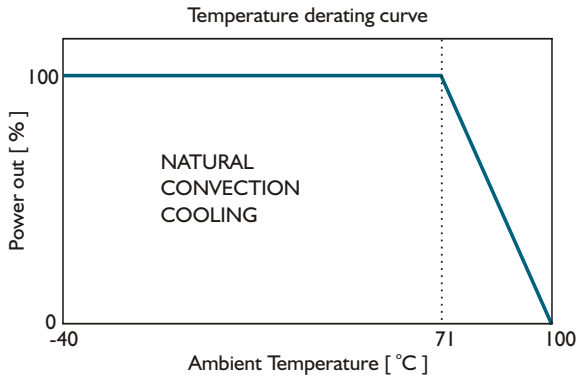
- The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

	CI	LI
RDD05-XXX1U	2.2 $\mu$ F / 50V MLCC	1.5mH common choke
RDD05-XXX2U	2.2 $\mu$ F / 50V MLCC	1.5mH common choke
RDD05-XXX3U	2.2 $\mu$ F / 100V MLCC	1.5mH common choke

- Recommended EN 55022 Class B filter circuit layout.



### DERATING AND EFFICIENCY CURVE



# RDD05U SERIES

DC - DC CONVERTER  
4 ~ 6W SINGLE & DUAL OUTPUT



## FEATURES

- 4:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT Pi FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- UL/cUL/TUV/CE
- 3 YEARS WARRANTY



EN 60950-1

## MODEL LIST

MODEL NO.	INPUT VOLTAGE	INPUT CURRENT (typ.)   (max.)		OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (TYP.)	CAPACITOR LOAD (max.)
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### Single Output Models

RDD05 - 03S4U	9~36 VDC	0.22A	0.62A	4 WATTS	+3.3 VDC	1200 mA	75%	77%	2200 $\mu$ F
RDD05 - 05S4U	9~36 VDC	0.27A	0.76A	5 WATTS	+ 5 VDC	1000 mA	77%	79%	1500 $\mu$ F
RDD05 - 12S4U	9~36 VDC	0.31A	0.87A	6 WATTS	+ 12 VDC	500 mA	80%	82%	270 $\mu$ F
RDD05 - 15S4U	9~36 VDC	0.31A	0.87A	6 WATTS	+ 15 VDC	400 mA	80%	82%	180 $\mu$ F
RDD05 - 03S5U	18~75 VDC	0.11A	0.31A	4 WATTS	+3.3 VDC	1200 mA	75%	77%	2200 $\mu$ F
RDD05 - 05S5U	18~75 VDC	0.13A	0.38A	5 WATTS	+ 5 VDC	1000 mA	77%	79%	1500 $\mu$ F
RDD05 - 12S5U	18~75 VDC	0.15A	0.43A	6 WATTS	+ 12 VDC	500 mA	80%	82%	270 $\mu$ F
RDD05 - 15S5U	18~75 VDC	0.15A	0.43A	6 WATTS	+ 15 VDC	400 mA	80%	82%	180 $\mu$ F

### Dual Output Models

RDD05 - 05D4U	9~36 VDC	0.27A	0.76A	5 WATTS	$\pm$ 5 VDC	$\pm$ 500 mA	77%	79%	$\pm$ 680 $\mu$ F
RDD05 - 12D4U	9~36 VDC	0.31A	0.87A	6 WATTS	$\pm$ 12 VDC	$\pm$ 250 mA	80%	82%	$\pm$ 150 $\mu$ F
RDD05 - 15D4U	9~36 VDC	0.31A	0.87A	6 WATTS	$\pm$ 15 VDC	$\pm$ 200 mA	80%	82%	$\pm$ 68 $\mu$ F
RDD05 - 05D5U	18~75 VDC	0.13A	0.38A	5 WATTS	$\pm$ 5 VDC	$\pm$ 500 mA	77%	79%	$\pm$ 680 $\mu$ F
RDD05 - 12D5U	18~75 VDC	0.15A	0.43A	6 WATTS	$\pm$ 12 VDC	$\pm$ 250 mA	80%	82%	$\pm$ 150 $\mu$ F
RDD05 - 15D5U	18~75 VDC	0.15A	0.43A	6 WATTS	$\pm$ 15 VDC	$\pm$ 200 mA	80%	82%	$\pm$ 68 $\mu$ F

### SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

#### GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
Switching frequency	Vi nom, Io nom		280		KHz
Isolation voltage	Input / Output	1500			VDC
Isolation resistance	Input / Output, @ 500VDC	100			MΩ
Isolation capacitance	100KHz / IV		1000		PF
Ambient temperature	Operating at Vi nom, Io nom	-40		+ 71	°C
Case temperature	Operating at Vi nom, Io nom			+ 100	°C
Derating	Vi nom	See derating curve			
Storage temperature	Non operational	-40		+ 100	°C
Relative humidity	Vi nom, Io nom	20		95	% RH
Temperature coefficient	Vi nom, Io min			± 0.02	% / °C
Dimension		L31.8 x W20.3 x H10.2			mm
MTBF	Bellcore issue 6@40°C, GB		1140000		Hours
Cooling	Free air convection				

#### INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Input voltage range	Ta min ... Ta max, Io nom	9	24	36	VDC
		18	48	75	VDC
No load input current	Vi nom, Io = 0	24V models		30	mA
		48V models		25	mA
Input voltage w/o damage	Io nom	24V models		40	VDC
		48V models		80	VDC
Startup voltage	Io nom	24V models	8.7		VDC
		48V models	17.4		VDC
Input filter	Pi type				

#### OUTPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom			± 2	%
Minimum load	Vi nom	0			%
	single output models				%
	dual output models (each output)	10			%
Line regulation	Io nom, Vi min ... Vi max			± 0.5	%
Load regulation	Vi nom, Io 0 ... Io nom, single output models			± 0.5	%
	Vi nom, Io min ... Io nom, dual output models			± 1	%
Cross regulation (Dual model)	Aymmetrical load 10% - 100% FL			± 5	%
Startup time	Vi nom, Io nom			700	ms
Transient recovery time	Vi nom, I ~ 0.5 Io nom			1	ms
Ripple & noise	Vi nom, Io nom, BW = 20MHz			50	mV
Efficiency	Vi nom, Io nom, Po / Pi	Up to 82%, See model list and efficiency curve			

### SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

### CONTROL AND PROTECTION

Input reversed	Shunt diode built in, external fuse recommended 1A
Output short circuit	Current limited (Auto-recovery)
Rated over load protection	110%min....140%max

### APPROVALS AND STANDARD

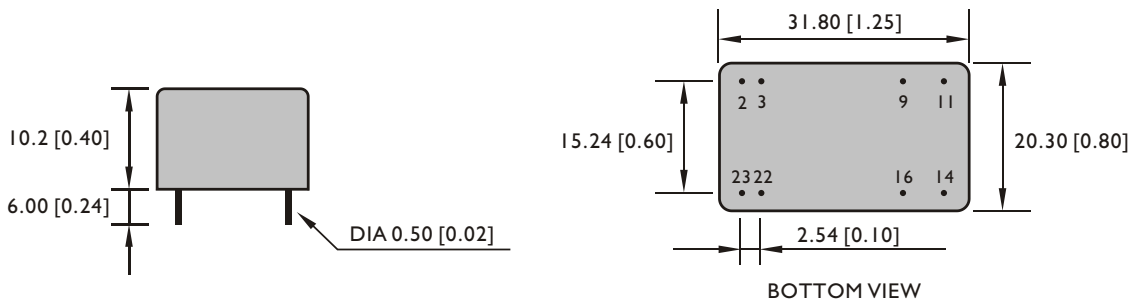
UL/cUL	UL 60950-1 Recognized
TUV	EN 60950-1, CB scheme
CE	EN 61204-3, EN 55022 Class A, EN 61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-6
Vibration	meet IEC 60068-2-6 (10-500 Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis)

### PHYSICAL CHARACTERISTICS

Case size	31.8 x 20.3 x 10.2 mm (1.25 x 0.8 x 0.4 inches)
Case material	Plastic base / Metal case
Weight	18 g
Patting material	Silicone

### MECHANISM & PIN CONFIGURATION

mm [inch]



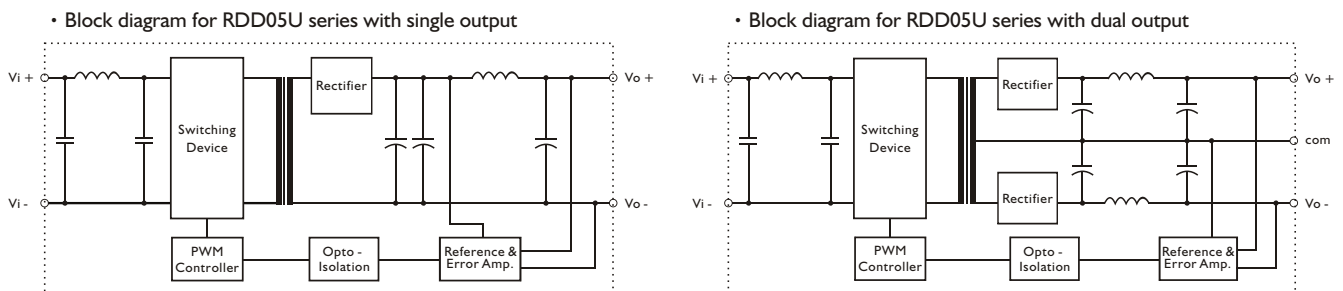
GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]

### PIN ASSIGNMENT

#### GENERAL

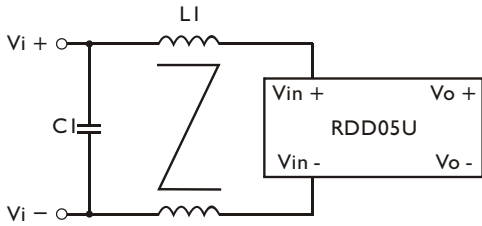
PIN NO.	2 & 3	9	11	14	16	22 & 23
SINGLE	Vi -	N. C.	N. C.	Vo+	Vo -	Vi+
DUAL	Vi -	com	Vo -	Vo+	com	Vi+

### CIRCUIT SCHEMATIC



### RECOMMENDED CIRCUIT

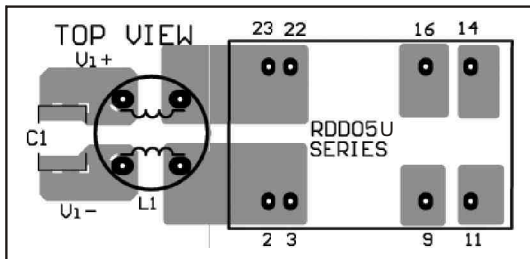
- Recommended filter for EN55022 Class B compliance



- The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

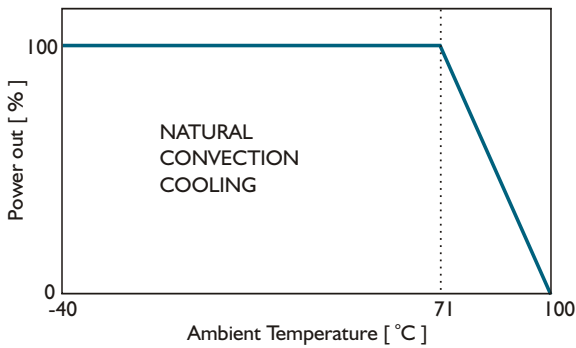
	C1	L1
RDD05-XXX4U	2.2 $\mu$ F / 50V MLCC	1.5mH common choke
RDD05-XXX5U	2.2 $\mu$ F / 100V MLCC	1.5mH common choke

- Recommended EN 55022 Class B filter circuit layout.

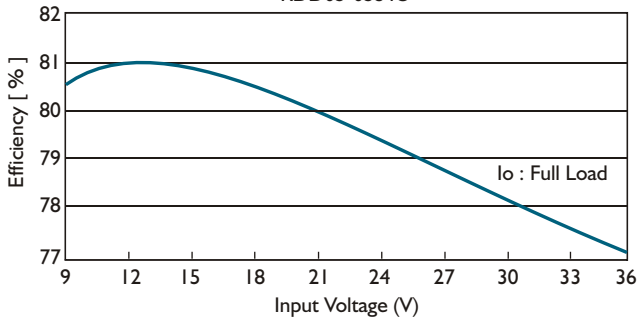


### DERATING AND EFFICIENCY CURVE

Temperature derating curve



Efficiency Vs Input Voltage  
RDD05-05S4U



Efficiency Vs Output Load  
RDD05-05S4U

