Technical Data Sheet

RS3K-Z Series ◊ Regulated SIP8

3W ◊ Isolated Single & Dual Output ◊ 4:1 & 2:1 Input

RECOM DC/DC Converter

FEATURES

- 4.5-9 and 9-36VDC Input voltage ranges
- Continuous short circuit protection
- 3kVDC/sec isolation
- Operating temperature range up to 105°C
- High efficiency
- 3 year warranty



Dimensions (LxWxH): 21.8 x 9.2 x 11.1mm (0.86 x 0.36 x 0.44inch)
4.7g (0.01lbs)

APPLICATIONS



SAFETY & EMC

RoHS² compliant 10 from 10 | Reach compliant | IECEE CB SCHEME | c UL us E224736

DESCRIPTION

The RS3K-Z series is a state-of-the-art DC/DC converter with a wide 4:1 input voltage range from 9 to 36 VDC or a 2:1 input voltage range from 4.5 to 9VDC, ensuring reliable performance in a wide range of applications. The RS3K-Z is also equipped with an ON/OFF control, allowing for quick and easy power management. High accuracy and tight line and load regulation ensure stable operation even under challenging conditions. It is also equipped with continuous short circuit protection and undervoltage lockout (UVLO) for added safety. With IEC/EN/UL 62368-1 certification, 3W maximum output power, 0% minimum load, and high 86% typical efficiency, the RS3K-Z is an excellent choice for industrial applications. Select models are designed to operate within an industrial temperature range of -40°C to +85°C without derating.

SELECTION GUIDE 2:1 INPUT

Part Number	Input Voltage Range [VDC]	Output Voltage nom. [VDC]	Output Current max. [mA]	Efficiency typ. (1) [%]	max. Capacitive Load (2) [µF]
RS3K-053.3S/H3	4.5-9	3.3	910	70	5200
RS3K-0505S/H3	4.5-9	5	600	74	4700
RS3K-0509S/H3	4.5-9	9	330	79	3500
RS3K-0512S/H3	4.5-9	12	250	80	2500
RS3K-0515S/H3	4.5-9	15	200	85	2500
RS3K-0524S/H3	4.5-9	24	125	85	1500
RS3K-0505D/H3	4.5-9	±5	±300	70	2500
RS3K-0512D/H3	4.5-9	±12	±125	83	1200
RS3K-0515D/H3	4.5-9	±15	±100	83	1000
RS3K-0524D/H3	4.5-9	±24	±63	79	500

Note1: Efficiency is tested at minimum input and full load at +25°C ambient
Note2: Max Cap Load is tested at nominal input an full resistive load

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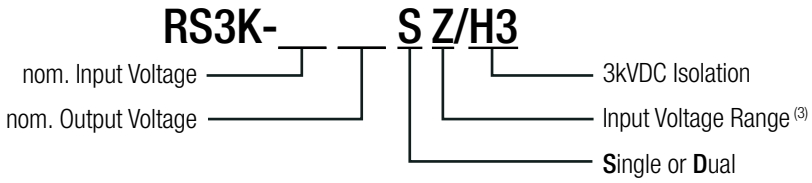
RECOM DC/DC Converter

SELECTION GUIDE 4:1 INPUT

Part Number	Input Voltage Range [VDC]	Output Voltage nom. [VDC]	Output Current max. [mA]	Efficiency typ. (1) [%]	max. Capacitive Load (2) [µF]
RS3K-243.3SZ/H3	9-36	3.3	910	79	5000
RS3K-2405SZ/H3	9-36	5	600	84	4700
RS3K-2409SZ/H3	9-36	9	330	80	4000
RS3K-2412SZ/H3	9-36	12	250	82	3000
RS3K-2415SZ/H3	9-36	15	200	83	2000
RS3K-2424SZ/H3	9-36	24	125	86	1500
RS3K-2405DZ/H3	9-36	±5	±300	78	2500
RS3K-2412DZ/H3	9-36	±12	±125	82	1000
RS3K-2415DZ/H3	9-36	±15	±100	79	800
RS3K-2424DZ/H3	9-36	±24	±63	83	500

Note1: Efficiency is tested at minimum input and full load at +25°C ambient
Note2: Max Cap Load is tested at nominal input an full resistive load

MODEL NUMBERING



Note3: without suffix= 2:1 input voltage range (4.5-9VDC)
with suffix "**Z**"= 4:1 input voltage range (9-36VDC)

BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

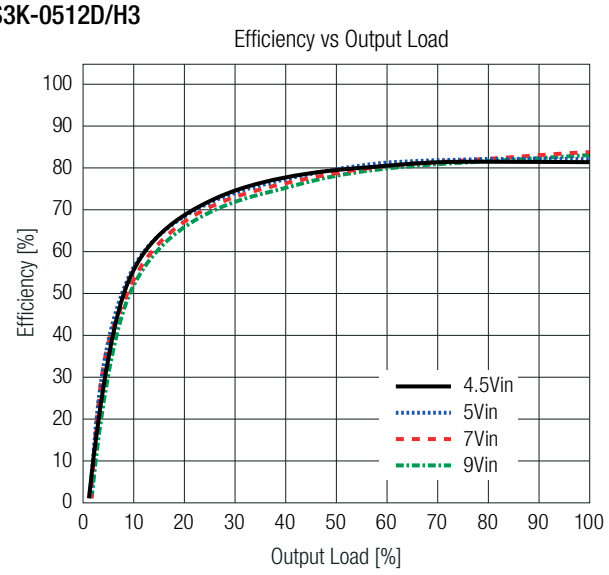
Parameter	Conditions		Min.	Typ.	Max.
Input Voltage Range	2:1 input voltage; nom. V_{IN}= 5VDC		4.5VDC	5VDC	9VDC
	4:1 input voltage; nom. V_{IN}= 24VDC		9VDC	24VDC	36VDC
Under Voltage Lockout	DC-DC ON	nom. V_{IN}= 5VDC	4VDC		4.3VDC
	DC-DC OFF		3.2VDC		3.6VDC
	DC-DC ON	nom. V_{IN}= 24VDC	8.2VDC		8.8VDC
	DC-DC OFF		5.6VDC		6.2VDC
Quiescent Current	2:1 input voltage			20mA	30mA
	4:1 input voltage			10mA	20mA
Minimum Load			0%		
ON/OFF CTRL	DC-DC ON		open or V_{CTRL} >1.5VDC (max. 5VDC)		
	DC-DC OFF		short to -Vin or V_{CTRL}<1.5VDC		
Input Current of CTRL pin	DC-DC ON				1mA
Standby Current	DC-DC OFF			3mA	6mA
Internal Operating Frequency			100kHz		400kHz
Output Ripple and Noise (4)	20MHz BW	nom. V_{IN}= 5VDC		100mVp-p	150mVp-p
		nom. V_{IN}= 24VDC		50mVp-p	80mVp-p

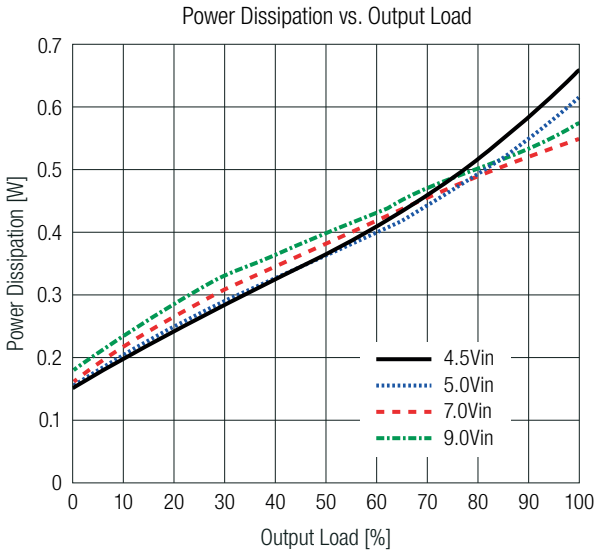
Note4: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

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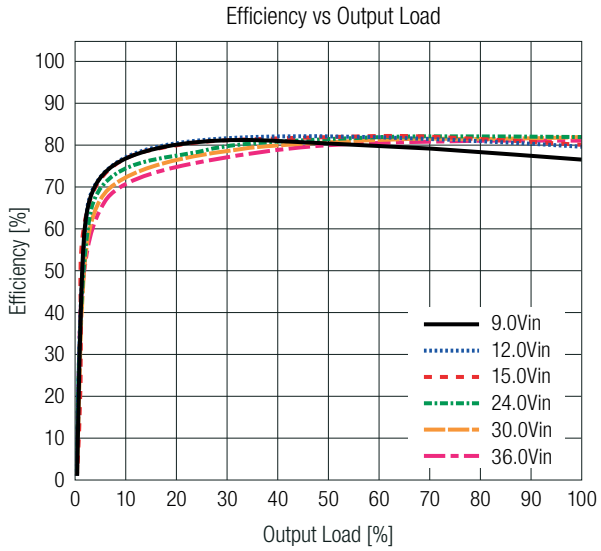
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

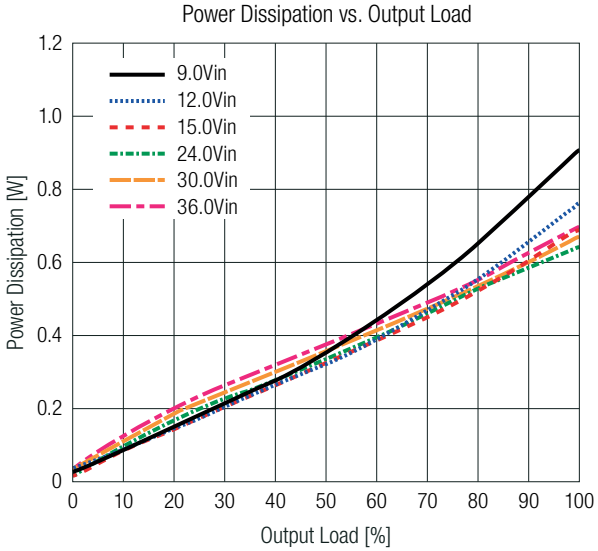
RS3K-0512D/H3



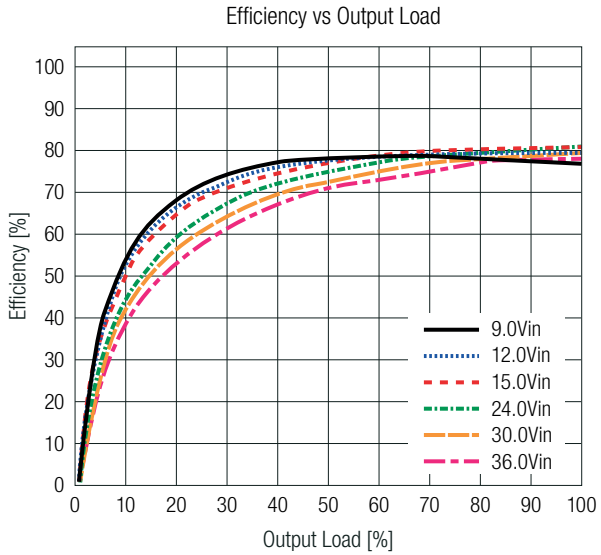


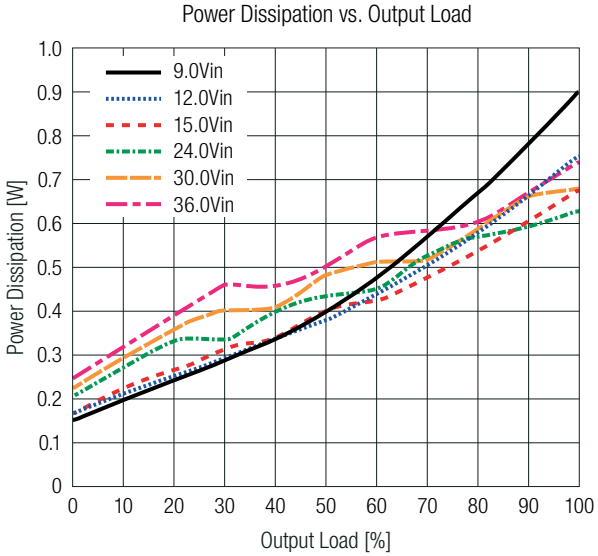
RS3K-2405SZ/H3





RS3K-2412DZ/H3





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RS3K-Z Series ◊ Regulated SIP8

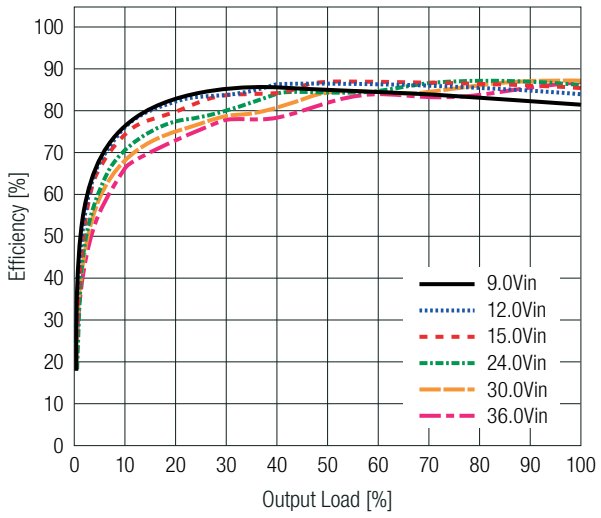
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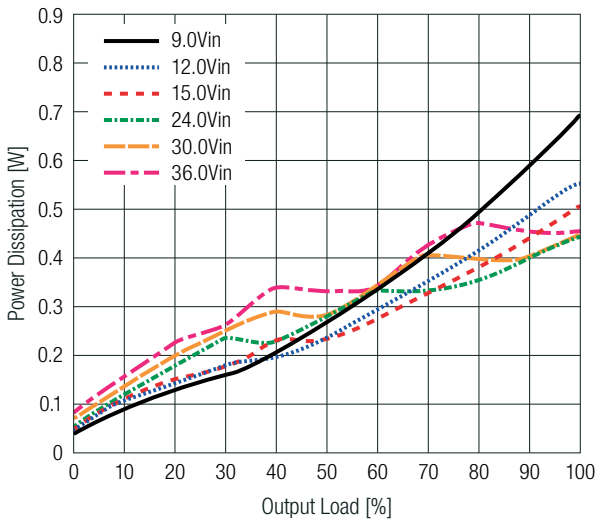
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

RS3K-2424SZ/H3

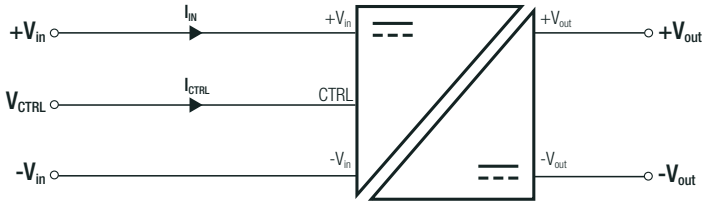
Efficiency vs Output Load



Power Dissipation vs. Output Load



ON/OFF CTRL



DC-DC ON	open or V_{CTRL} >1.5VDC (max. 5VDC)
DC-DC OFF	short to -Vin or V_{CTRL}<1.5VDC

REGULATIONS

Parameter	Conditions	Value
Output Accuracy	nom. V_{IN}= 5VDC	±2.0% typ.
	nom. V_{IN}= 24VDC	±3.0% typ.
Line Regulation	low line to high line, full load	±2.0% typ.
Load Regulation (5)	10%-100% full load	±2.0% typ.
Cross Regulation	10%-100% full load and nom. V_{IN}	±5.0% typ.

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)			continuous, auto recovery
Short Circuit Input Current			120mA max.
Over Temperature Protection (OTP)	auto restart after cool down		150°C typ.
Isolation Voltage (6)	I/P to O/P	1 second	3kVDC
		rated for 1 minute	1.5kVAC/50Hz
Isolation Resistance	I/P to O/P, V_{ISO}= 500VDC		1GΩ min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V		50pF max.
Insulation Grade	according to 62368-1		functional

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

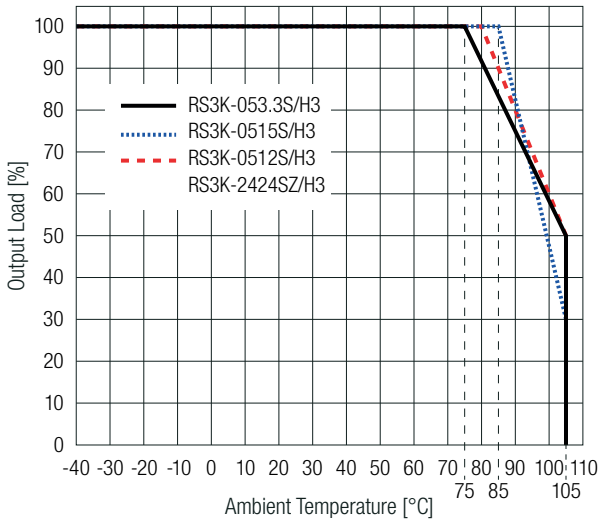
Note7: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

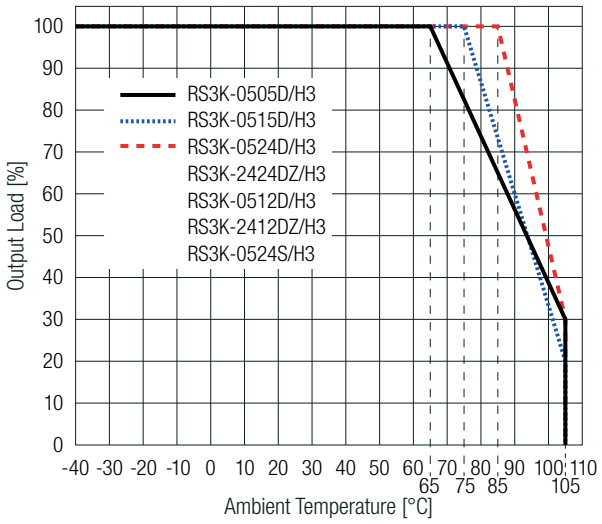
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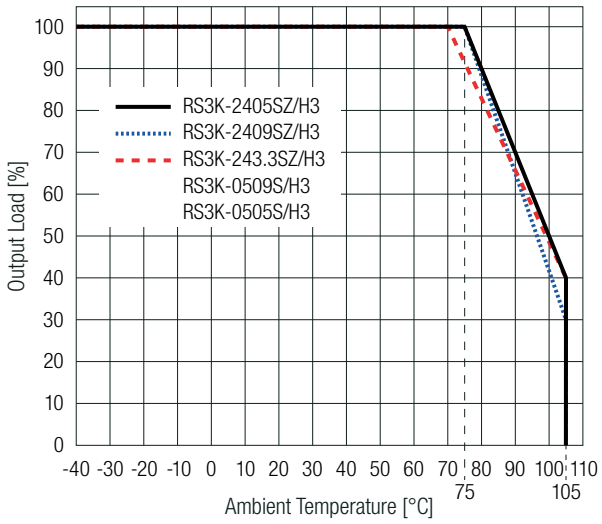
ENVIRONMENTAL

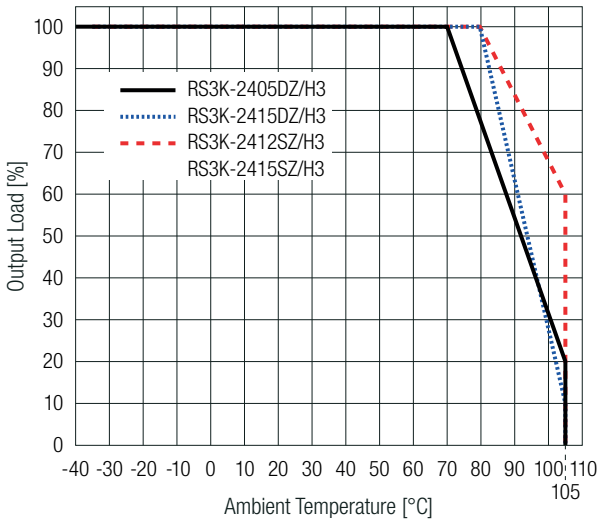
Parameter	Conditions			Value
Operating Temperature Range	with derating, refer to **„Derating Graph“**			-40°C to +105°C
Maximum Case Temperature				+115°C max.
Temperature Coefficient				0.02%/K
Thermal Impedance	natural convection 0.1m/s			39.0K/W
Operating Altitude	according to 62368-1			5000m
Operating Humidity	non-condensing			95% RH max.
Pollution Degree				PD2
MTBF	according to MIL-HDBK-217F, G.B.	RS3K-0509SZ/H3, RS3K-0524D/H3	T_{AMB}= +25°C	2000 x 10³ hours
			T_{AMB}= +80°C	700 x 10³ hours
		RS3K-0512SZ/H3, RS3K-0505D/H3, RS3K-0515D/H3	T_{AMB}= +25°C	1500 x 10³ hours
			T_{AMB}= +80°C	700 x 10³ hours
		others	T_{AMB}= +25°C	2500 x 10³ hours
			T_{AMB}= +80°C	800 x 10³ hours

Derating Graph
(@ Chamber and natural convection 0.1m/s)









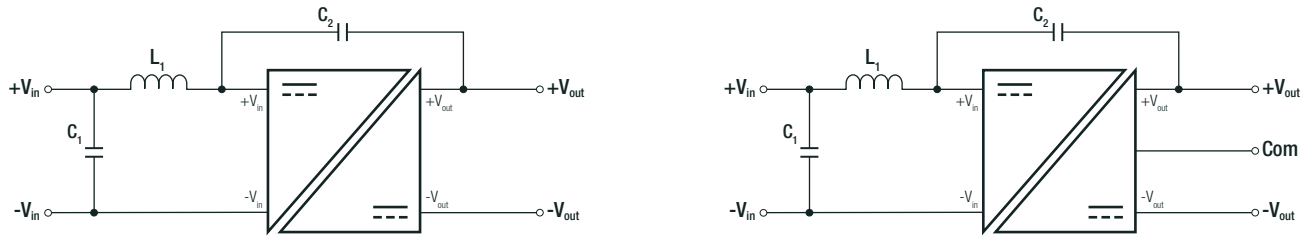
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SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	E491408-A6022-UL	UL62368-1, 3nd Edition, 2019
		CAN/CSA-C22.2 No. 62368-1-19 3rd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition (CB Scheme)	085-220181001-100	IEC62368-1:2018 3rd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition		EN IEC 62368-1:2020+A11:2020
RoHS2		RoHS 2011/65/EU + AM2015/863

EMC Compliance	Conditions	Standard / Criterion
Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements	with external filter [8]	EN55032, Class A
		EN55032, Class B

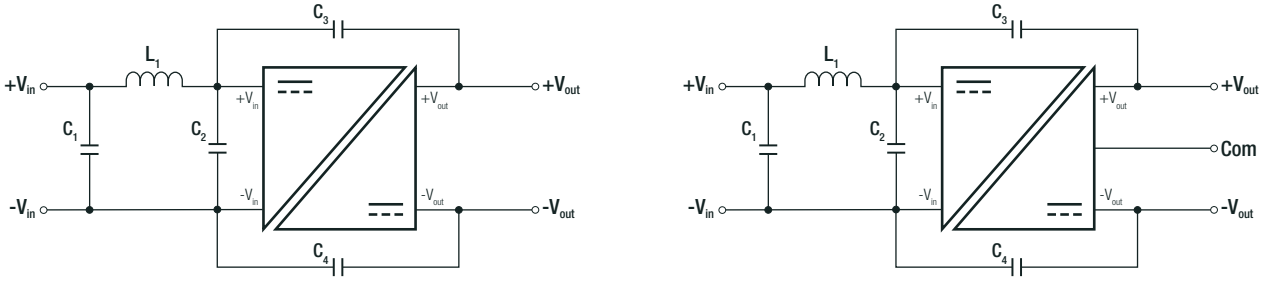
EMC Filtering Suggestion according to EN55032



Component List Class A

Part Number [8]	C1	C2	L1
RS3K-2424SZ/H3; RS3K-0512D/H3; RS3K-2412DZ/H3; RS3K-0524S/H3; RS3K-0505S/H3; RS3K-2405SZ/H3	10µF	470pF	5.6µH, RLS-567

EMC Filtering Suggestion according to EN55032



Component List Class B

Part Number [8]	C1/C2	C3/C4	L1
RS3K-2424SZ/H3; RSK3-0509S/H3; RSK3-0512S/H3; RSK3-0515S/H3; RS3K-0524S/H3; RS3K-0505S/H3; RS3K-2405SZ/H3; RS3K-0512D/H3; RS3K-0515D/H3; RS3K-0524D/H3; RS3K-2405DZ/H3; RS3K-2412DZ/H3; RS3K-2424DZ/H3	10µF	470pF	5.6µH, RLS-567

Note8: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

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RS3K-Z Series ◊ Regulated SIP8

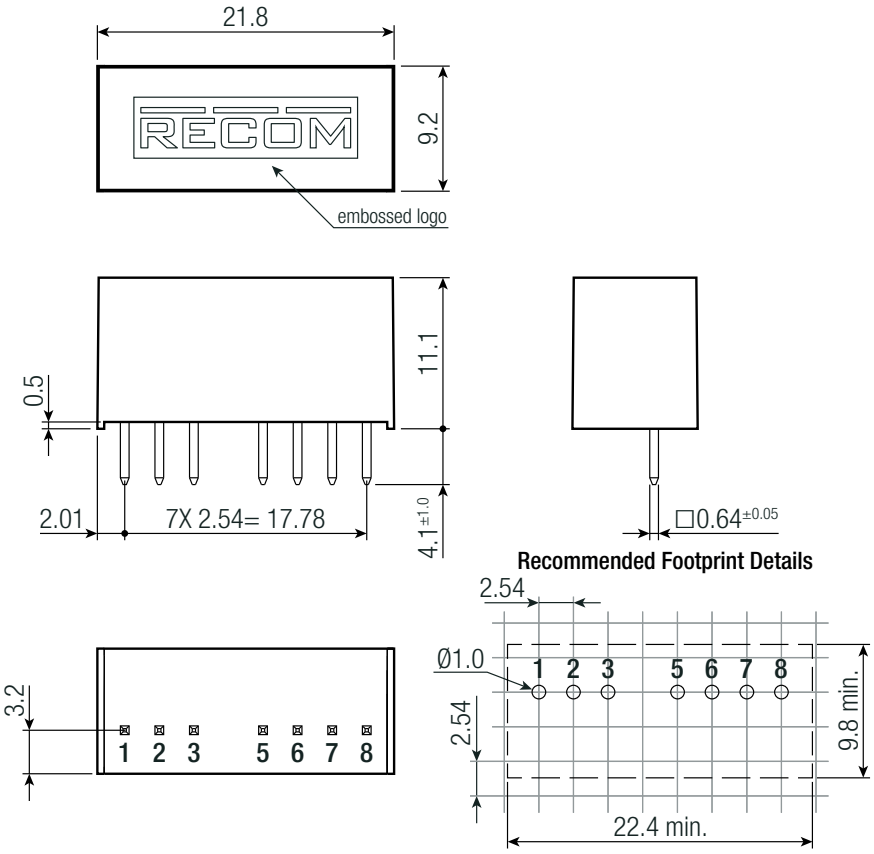
3W ◊ Isolated Single & Dual Output ◊ 4:1 & 2:1 Input

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DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	black plastic, (UL94 V-0)
	potting	PU, (UL94 V-0)
	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		21.8 x 9.2 x 11.1mm 0.86 x 0.36 x 0.44 inch
Weight		4.7g typ. 0.01 lbs

Dimension Drawing (mm)



Recommended Footprint Details

Pinning Information

Pin #	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	CTRL	CTRL
5	NC	NC
6	+Vout	+Vout
7	-Vout	Com
8	NC	-Vout

NC= no connection

Tolerance:
xx.x = ±0.5mm
xx.xx = ±0.25mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 11.5 x 19.0mm
Packaging Quantity		22pcs
Storage Temperature Range		-50°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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