

Features

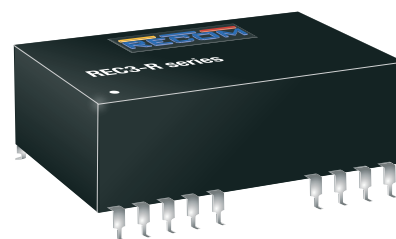
Regulated Converters

- 1.6kVDC, 2kVDC, 4kVDC or 6kVDC isolation
- Industry standard 3W DIP24 or SMD package
- Feedback regulated output
- Continuous short circuit protection
- Wide 2:1 or 4:1 input
- 3 case styles
- CTRL pin option ("A" pinning only)
- Efficiency up to 86%

RECOM
DC/DC Converter

REC3-RW(Z)

3 Watt
DIP24 or
SMD Case
Single and Dual



UL
E358085

IEC60950-1 certified
UL60950-1 certified
CAN/CSA-C22.2 No. 60950-1-03 certified
EN55032 compliant

PREFERRED ALTERNATIVES

For new medical applications:

REM3.5E



Description

Besides the standard isolation of 2kVDC/1s, this series offers options of 4kVDC/1s (= „/H4“) or 6kVDC (= „/H6“) making it suitable for sophisticated industrial applications. Packaging can be either DIP-24 plastic or 5-side-shielded DIP24 metal case (=option „/M“) as well as SMD pinning (= option „/SMD“). For all the above variants, 2 industry-standard pinout (= option „/A“ or „/C“) are available, and B pinning is available with 1.6kVDC/1s isolation. ON/OFF CTRL is possible with the /CTRL option (A pinning only). The converters can deliver 140% rated power for short periods of time to cope with applications with large capacitive loads or high start up currents.

Selection Guide

Part Number	Input Voltage Range ⁽¹⁾ [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽²⁾ [%]	max. Capacitive Load ⁽³⁾ [μF]
REC3-xx3.3SRW	4.5-9, 9-18, 18-36, 36-72	3.3	900	66-76	4700
REC3-xx05SRW	4.5-9, 9-18, 18-36, 36-72	5	600	71-79	4700
REC3-xx09SRW	4.5-9, 9-18, 18-36, 36-72	9	330	74-83	3300
REC3-xx12SRW	4.5-9, 9-18, 18-36, 36-72	12	250	75-85	2200
REC3-xx15SRW	4.5-9, 9-18, 18-36, 36-72	15	200	75-86	2200
REC3-xx05DRW	4.5-9, 9-18, 18-36, 36-72	±5	±300	74-83	±2200
REC3-xx09DRW	4.5-9, 9-18, 18-36, 36-72	±9	±165	74-83	±1000
REC3-xx12DRW	4.5-9, 9-18, 18-36, 36-72	±12	±125	75-85	±1000
REC3-xx15DRW	4.5-9, 9-18, 18-36, 36-72	±15	±100	75-86	±1000
REC3-xx3.3SRWZ	9-36, 18-72	3.3	900	77-79	4700
REC3-xx05SRWZ	9-36, 18-72	5	600	78-80	4700
REC3-xx09SRWZ	9-36, 18-72	9	330	80-83	3300
REC3-xx12SRWZ	9-36, 18-72	12	250	83-85	2200
REC3-xx15SRWZ	9-36, 18-72	15	200	83-85	2200
REC3-xx05DRWZ	9-36, 18-72	±5	±300	77-80	±2200
REC3-xx09DRWZ	9-36, 18-72	±9	±165	77-80	±1000
REC3-xx12DRWZ	9-36, 18-72	±12	±125	83-85	±1000
REC3-xx15DRWZ	9-36, 18-72	±15	±100	83-85	±1000

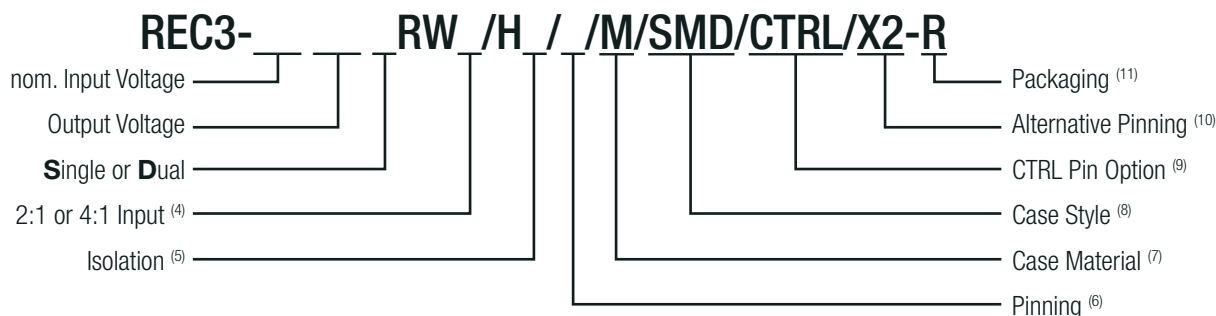
Notes:

Note1: Refer to "Input Voltage Range"

Note2: Efficiency is tested at nominal input and full load at +25°C ambient

Note3: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter

Model Numbering



Notes:

- Note4: add suffix „Z“ for 4:1 Input Voltage (24= 9-36VDC or 48= 18-72VDC)
- Note5: add suffix „/H“ = 1.6kVDC/1s isolation (B pinning only)
 „/H2“ = 2kVDC/1s isolation (A, A/X2 or C pinning available only)
 „/H4“ = 4kVDC/1s isolation (A, A/X2 or C pinning available only)
 „/H6“ = 6kVDC/1s isolation (A, A/X2 or C pinning available only)
- Note6: „/A“ & „/A/X2“ = A pinning; „/B“ = B pinning or „/C“ for C pinning.
 „/B“ Pinning is restricted to 1.6kV isolation due to the closeness of the input and output pins.
 For more details please refer to **“DIMENSION AND PHYSICAL CHARACTERISTICS”**
- Note7: add suffix „/M“ for 5-side-shielded metal case, without suffix non-conductive black plastic case
- Note8: add suffix „/SMD“ for SMD package, without suffix = standard DIP24 THT package. (If the options „/M“ and „/SMD“ are combined, the maximum allowed isolation voltage is 2kVDC/1s because of the shorter distance between pins and the metal case; DIP24 THT case and SMD plastic case are not affected and offer the full isolation barriers of 2kVDC/1s through to 6kVDC/1s)
- Note9: add „/CTRL“ for control pin option (A pinning only). If CTRL option is not chosen, Pin 1 will be absent.
- Note10: add suffix „/X2“ for alternative pinout (THT package with A-pinning and single output only)
- Note11: add suffix „-R“ for tape and reel packaging (available for SMD case style only)
 without suffix = standard tube packaging

Ordering Examples:

REC3-0505SRW/H4/A/M/CTRL	4.5-9Vin	5Vout	Single Output	2:1 input	4kVDC/1s isolation	A pinning	metal case	with CTRL Pin	THT	tube packaging
REC3-2412DRWZ/H2/C/SMD-R	9-36Vin	±12Vout	Dual Output	4:1 input	2kVDC/1s isolation	C pinning	plastic case	no CTRL function	SMD	tape and reel packaging
REC3-1212SRWZ/H/B/M	9-36Vin	12Vout	Single Output	4:1 input	6kVDC/1s isolation	B pinning	metal case	no CTRL Pin	THT	tube packaging
REC3-1215DRW/H/B/M/SMD-R	9-18Vin	±15Vout	Dual Output	2:1 input	1.6kVDC/1s isolation	B pinning	metal case	no CTRL function	SMD	tape and reel packaging

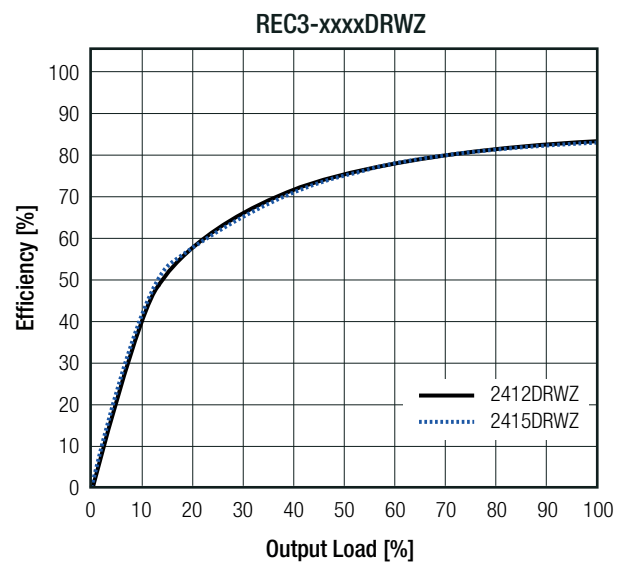
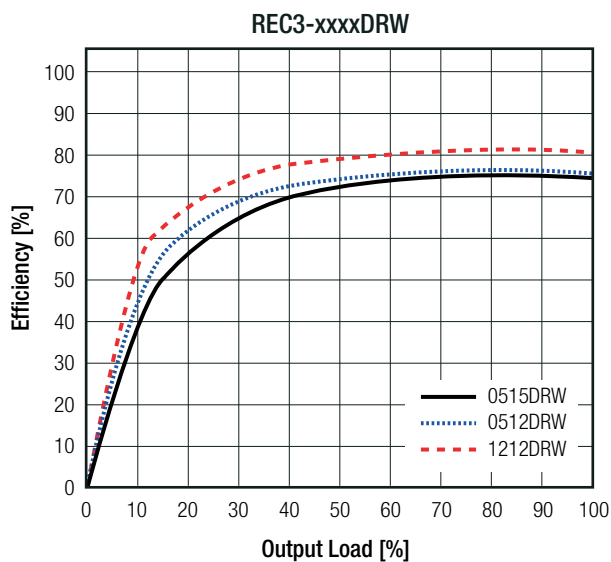
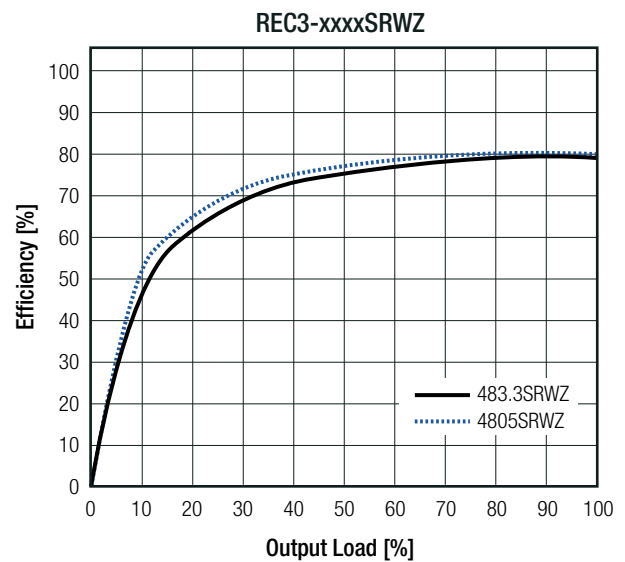
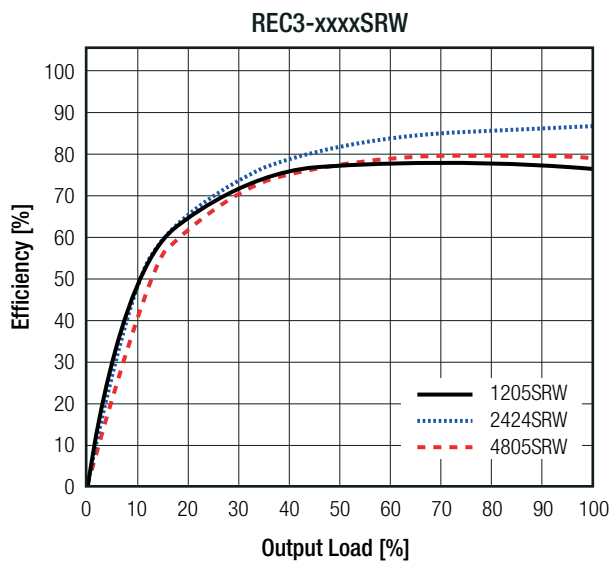
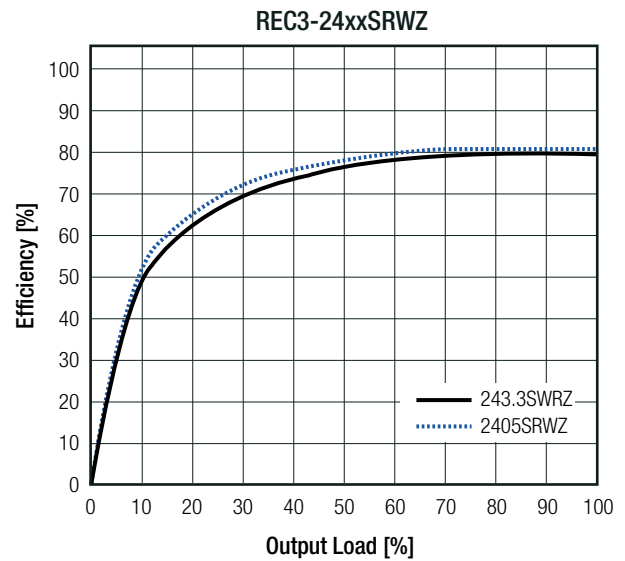
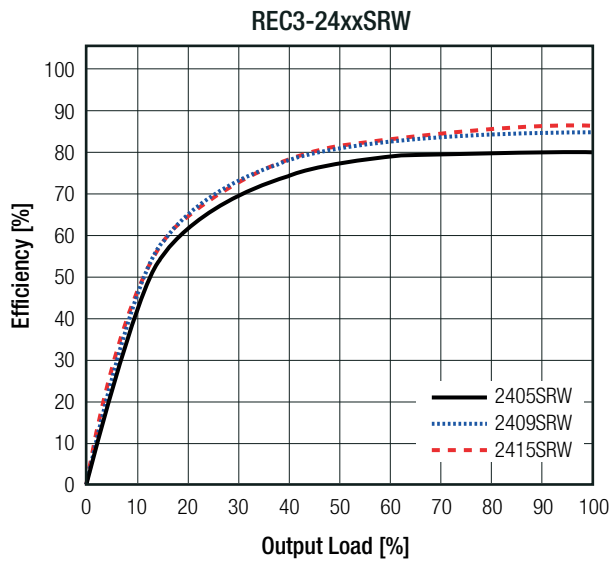
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			Pi Network		
Input Voltage Range	2:1 Input	5VDC	4.5VDC		9VDC
		12VDC	9VDC		18VDC
		24VDC	18VDC		36VDC
		48VDC	36VDC		72VDC
	4:1 Input („Z“)	24VDC	9VDC		36VDC
		48VDC	18VDC		72VDC
No Load Power Consumption					300mW
Minimum Load ⁽¹²⁾			10%		
ON/OFF CTRL ⁽¹³⁾	DC-DC ON DC-DC OFF		Open or 0VDC<V _{CTRL} <1.2VDC 2.2VDC<V _{CTRL} <12VDC		
Internal Operating Frequency	2:1 Input		90kHz		150kHz
	4:1 Input		120kHz		180kHz
Output Ripple and Noise ⁽¹⁴⁾	20MHz BW				50mVp-p
Notes:					
Note12: Operation below 10% load will not harm the converter, but specifications may not be met					
Note13: “A”-pinning only. Refer to ”ON/OFF CTRL (A pinning only)”					
Note14: Measurements are made with a 0.1µF MLCC across output. (low ESR)					
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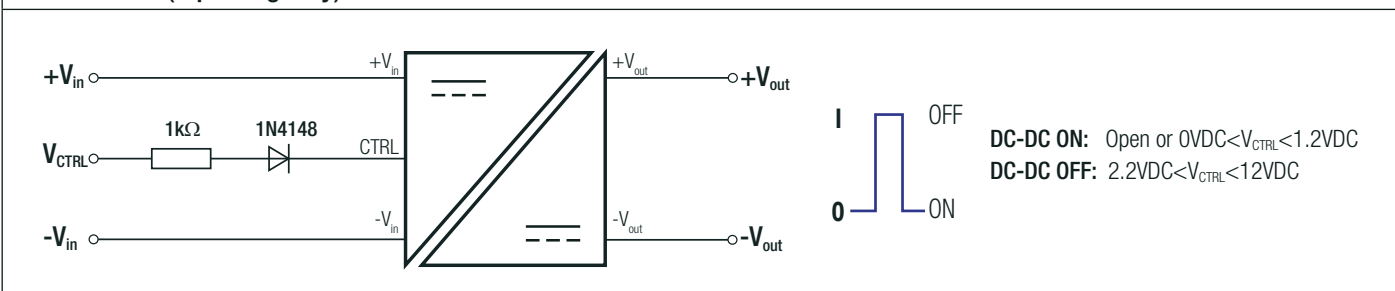
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Efficiency vs. Load



Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

ON/OFF CTRL (A pinning only)



REGULATIONS

Parameter	Condition	Value
Output Accuracy		$\pm 2.0\%$ max.
Line Regulation	low line to high line, full load	$\pm 0.4\%$ max.
Load Regulation ⁽¹⁵⁾	20% to 100% load	0.6% max.

Notes:

Note15: Operation below 20% load will not harm the converter, but specifications may not be met.

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP) ⁽¹⁶⁾	below 100mΩ		continuous, auto recovery
Isolation Voltage ⁽¹⁷⁾	with suffix "/H"	tested for 1 second rated for 1 minute	1.6kVDC 500VAC/ 60Hz
	with suffix "/H2"	tested for 1 second rated for 1 minute	2kVDC 1kVAC/ 60Hz
	with suffix "/H4"	tested for 1 second rated for 1 minute	4kVDC 2kVAC/ 60Hz
	with suffix "/H6"	tested for 1 second rated for 1 minute	6kVDC 3kVAC/ 60Hz
Isolation Resistance			1GΩ min.
Isolation Capacitance	2:1 Input		20pF min. / 60pF max.
	4:1 Input		40pF min. / 80pF max.

Notes:

Note16: Max. ambient Temperature = $+60^\circ\text{C}$ during the short circuit conditions

Note17: For repeat Hi-Pot testing, reduce the time and/or the test voltage

ENVIRONMENTAL

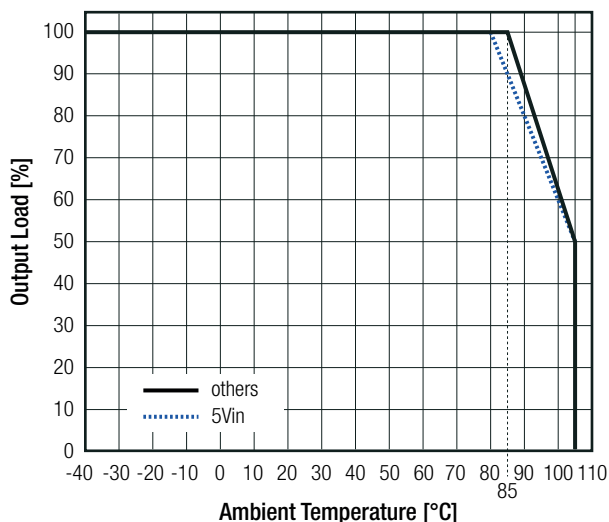
Parameter	Condition		Value
Operating Temperature Range	with derating @ free air convection (refer to "Derating Graph")		-40°C to $+105^\circ\text{C}$
Thermal Impedance	plastic case		20K/W
	metal case		12K/W
Operating Altitude	according to 60601-1		3000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	$+25^\circ\text{C}$	1043×10^3 hours
		$+85^\circ\text{C}$	186×10^3 hours

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Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

Derating Graph

(@ Chamber and free air convection 0.1 m/s)



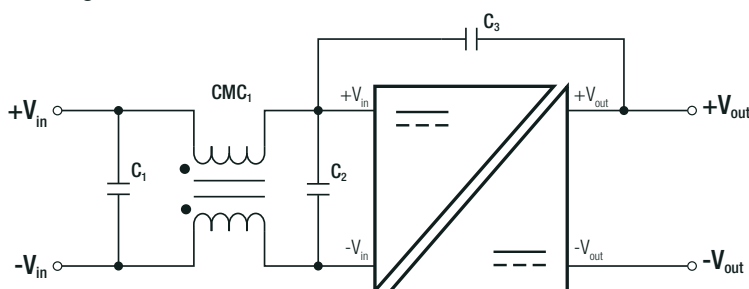
SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E358085-A5	UL60950-1, 1st Edition, 2007 CAN/CSA-C22.2 No. 60950-1-03, 1st Edition, 2006
Information Technology Equipment, General Requirements for Safety (LVD)	LVD1605077-10	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	SPC1006048	IEC60601-1:1988 + A2:1995 EN60601-1:1990 + A13:1996
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance

Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements ⁽¹⁸⁾	with external filter (see filter suggestion below) EN55032, Class A/B

EMC Filtering Suggestions according to EN55032



Component List Class A

MODEL	C1	C2	C3	CMC1
REC3-0505SRW/H4	N/A	10μF/100V MLCC	N/A	N/A
REC3-1215SRW/H4			150pF	
REC3-2412SRW/H4			330pF	
REC3-4805SRW/H6			470pF	

Component List Class B

MODEL	C1	C2	C3	CMC1
REC3-0505SRW/H4	10μF/100V MLCC	10μF/100V MLCC	N/A	250μH
REC3-1215SRW/H4			1nF	
REC3-2412SRW/H4				
REC3-4805SRW/H6				470μH

Notes:

Note18: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact Recom tech support for advice

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

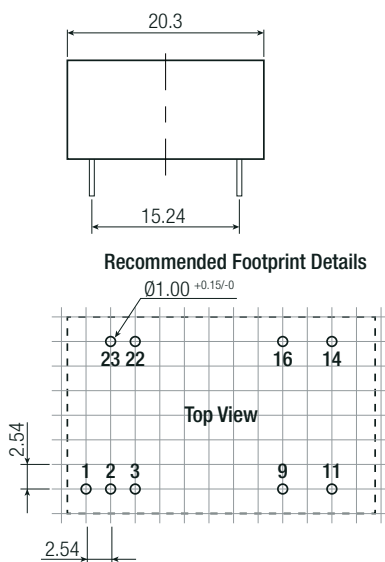
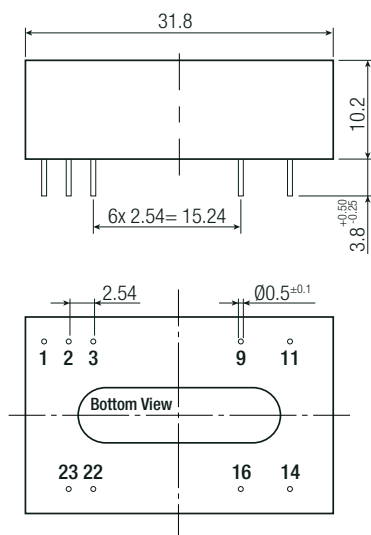
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type		Value
Material	plastic case		non-conductive black plastic, (UL94 V-0)
	metal case		nickel plated copper
	PCB		FR4, (UL94 V-0)
Dimension (LxWxH)	DIP24	plastic case	31.8 x 20.3 x 10.2mm
		metal case	32.0 x 20.3 x 10.5mm
	SMD	plastic case	31.8 x 20.3 x 11.2mm
		metal case	32.0 x 20.3 x 11.2mm
Weight			13g typ.

Dimension Drawing DIP24 plastic case (mm)



„A“ Pinning (/H2, /H4, /H6)



„A“ Pinning information (/H2, /H4, /H6)

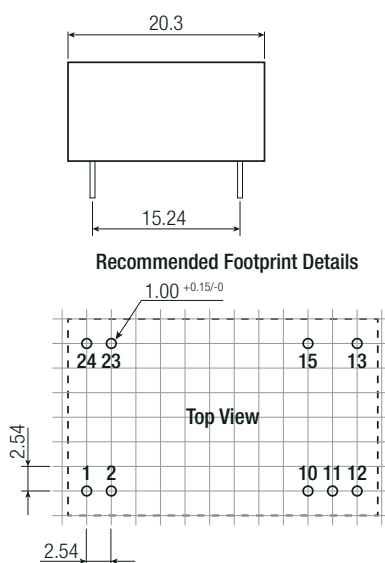
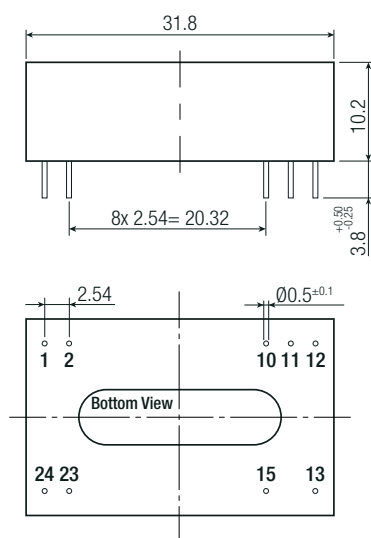
Pin #	Single	Single/X2	Dual
1 (option)	CTRL ⁽⁹⁾	CTRL ⁽⁹⁾	CTRL ⁽⁹⁾
2,3	-Vin	-Vin	-Vin
9	NC	no pin	Com
11	NC	NC	-Vout
14	+Vout	+Vout	+Vout
16	-Vout	-Vout	Com
22,23	+Vin	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

„C“ Pinning (/H2, /H4, /H6)



„C“ Pinning information (/H2, /H4, /H6)

Pin #	Single	Dual
1,2	+Vin	+Vin
10,11	NC	Com
12	-Vout	NC
13	+Vout	-Vout
15	NC	+Vout
23,24	-Vin	-Vin

NC= No Connection

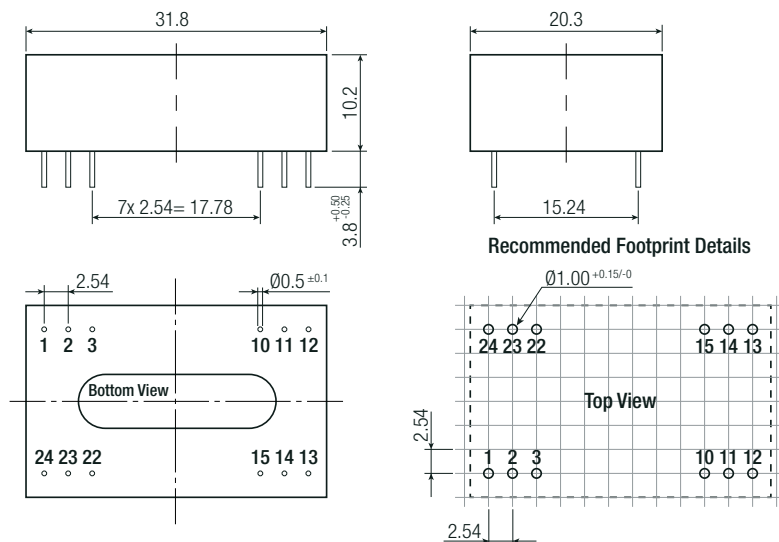
Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

„B“ Pinning (/H only)



„B“ Pinning information (/H only)

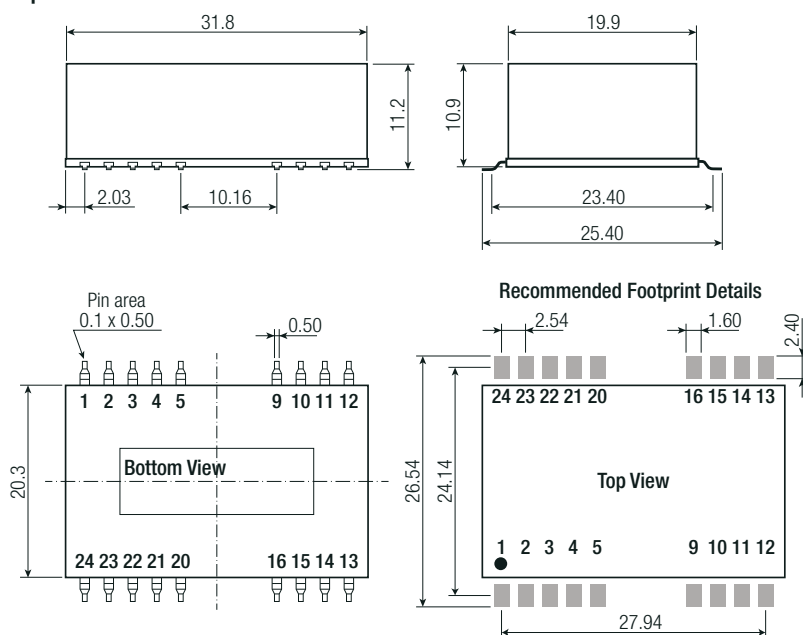
Pin #	Single	Dual
1	+Vin	+Vin
2	no pin	-Vout
3	no pin	Com
10	-Vout	Com
11,14	+Vout	+Vout
12,13	-Vin	-Vin
15	-Vout	Com
22	no pin	Com
23	no pin	-Vout
24	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

SMD plastic case ⁽⁹⁾



„A“ Pinning information

Pin #	Single	Dual
1 (option)	CTRL	CTRL
2,3	-Vin	-Vin
4,5	NC	NC
9	NC	Com
10,12,13,15	NC	NC
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Com
20,21,24	NC	NC
22,23	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

„C“ Pinning information

Pin #	Single	Dual
1,2	+Vin	+Vin
3,4,5,9	NC	NC
10,11	NC	Com
12	-Vout	NC
13	+Vout	-Vout
14	NC	NC
15	NC	+Vout
16,20,21,22	NC	NC
23,24	-Vin	-Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

„B“ Pinning information

Pin #	Single	Dual
1	+Vin	+Vin
2	NC	-Vout
3	NC	Com
4,5,9	NC	NC
10	-Vout	Com
11	+Vout	+Vout
12,13	-Vin	-Vin
14	+Vout	+Vout
15	-Vout	Com
16,20,21	NC	NC
22	NC	Com
23	NC	-Vout
24	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

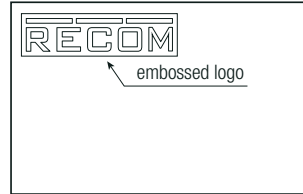
xx.xx= ±0.25mm

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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

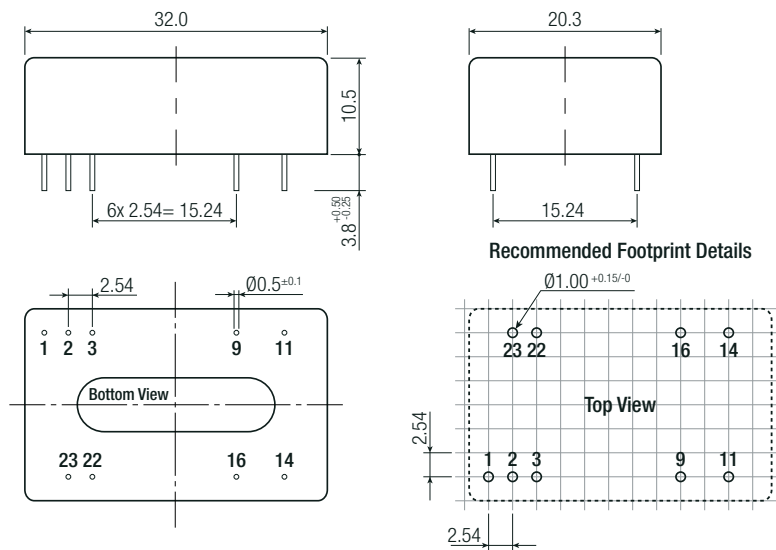
Notes:

Note19: All models with plastic case have embossed logo. See top view below:



Dimension Drawing DIP24 metal case (mm)

“A” Pinning (/H2, /H4, /H6)



„A“ Pinning information

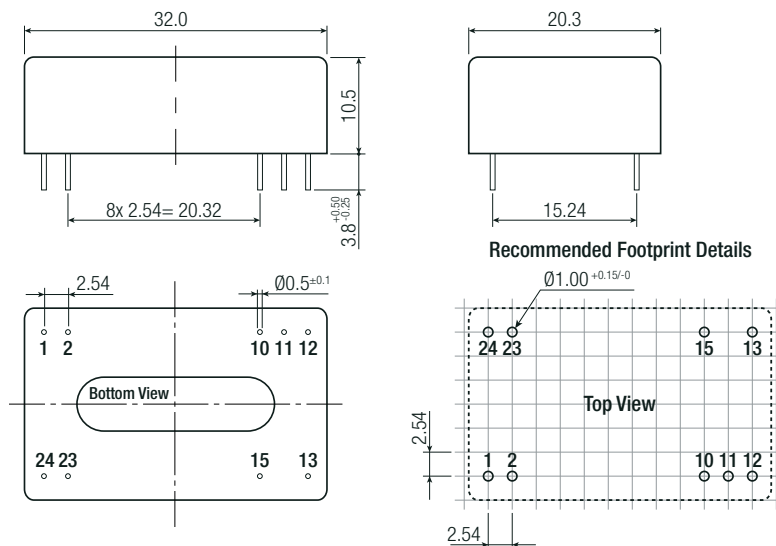
Pin #	Single	Single/X2	Dual
1 (option)	CTRL ⁽⁹⁾	CTRL ⁽⁹⁾	CTRL ⁽⁹⁾
2,3	-Vin	-Vin	-Vin
9	NC	no pin	Com
11	NC	NC	-Vout
14	+Vout	+Vout	+Vout
16	-Vout	-Vout	Com
22,23	+Vin	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

“C” Pinning (/H2, /H4, /H6)



„C“ Pinning information

Pin #	Single	Dual
1,2	+Vin	+Vin
10,11	NC	Com
12	-Vout	NC
13	+Vout	-Vout
15	NC	+Vout
23,24	-Vin	-Vin

NC= No Connection

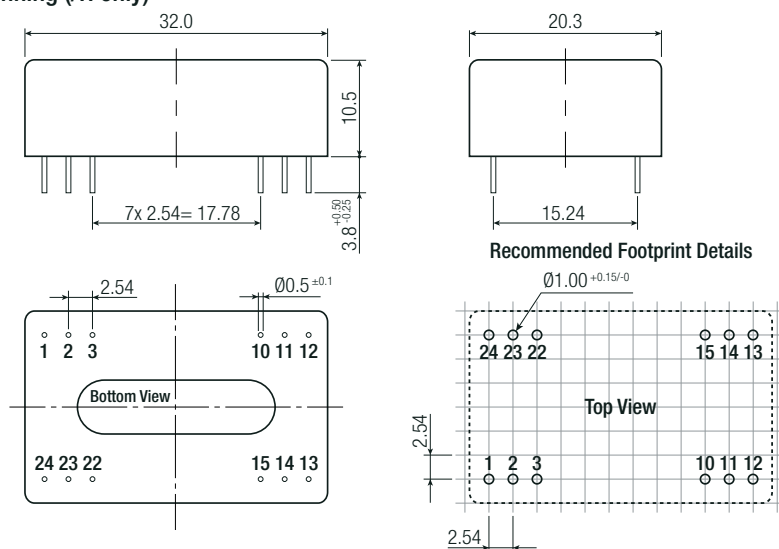
Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

„B“ Pinning (/H only)



„B“ Pinning information

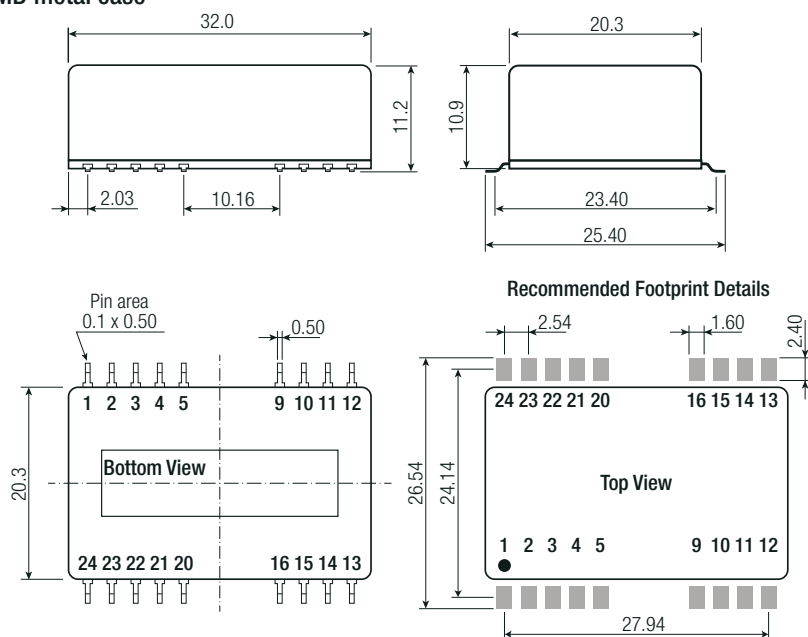
Pin #	Single	Dual
1	+Vin	+Vin
2	no pin	-Vout
3	no pin	Com
10	-Vout	Com
11,14	+Vout	+Vout
12,13	-Vin	-Vin
15	-Vout	Com
22	no pin	Com
23	no pin	-Vout
24	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

SMD metal case ⁽⁹⁾



„A“ Pinning information

Pin #	Single	Dual
1 (option)	CTRL	CTRL
2,3	-Vin	-Vin
4,5	NC	NC
9	NC	Com
10,12,13,15	NC	NC
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Com
20,21,24	NC	NC
22,23	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

„C“ Pinning information

Pin #	Single	Dual
1,2	+Vin	+Vin
3,4,5,9	NC	NC
10,11	NC	Com
12	-Vout	NC
13	+Vout	-Vout
14	NC	NC
15	NC	+Vout
16,20,21,22	NC	NC
23,24	-Vin	-Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

„B“ Pinning information

Pin #	Single	Dual
1	+Vin	+Vin
2	NC	-Vout
3	NC	Com
4,5,9	NC	NC
10	-Vout	Com
11	+Vout	+Vout
12,13	-Vin	-Vin
14	+Vout	+Vout
15	-Vout	Com
16,20,21	NC	NC
22	NC	Com
23	NC	-Vout
24	+Vin	+Vin

NC= No Connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	DIP24	tube	530.0 x 23.0 x 19.0mm
	SMD	tube	530.0 x 32.0 x 19.0mm
		tape and reel (carton)	355.0 x 342.0 x 70.0mm
Packaging Quantity	tube		15pcs
	tape and reel		100pcs
Tape Width			44mm
Storage Temperature Range			-55°C to +125°C
Storage Humidity	non-condensing		95% RH max.

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