

Features

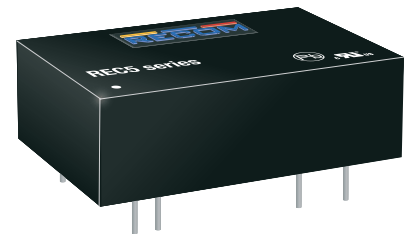
Regulated Converters

- 1.6kVDC, 2kVDC, 4kVDC or 6kVDC isolation
- Industry standard 5W 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)



REC5-S(D)RW(Z)

5 Watt
DIP24 or
SMD Case
Single and Dual



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

Description

This series offers standard isolation of 2kVDC/1s with 4kVDC/1s (= „/H4“) or 6kVDC/1s (= „/H6“) options making it ideal for both industrial, medical and other sophisticated high end applications. Packaging can be either DIP24 non-conductive plastic or 5-side-shielded DIP24 metal case (= option „/M“) as well as DIP24-SMD case (= option „/SMD“). For all the above variants, 2 industry-standard pinouts (= option „/A“ or „/C“) are available. “B” pinning is also available with “/H” isolation of 1.6kVDC. Remote on/off control 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] |
|----------------|--|----------------------|---------------------|------------------------------------|--|
| REC5-xx3.3SRW | 4.5-9, 9-18, 18-36, 36-72 | 3.3 | 1000 | 75-77 | 6800 |
| REC5-xx05SRW | 9-18, 18-36, 36-72 4.5-9 | 5 | 1000 | 79-81 75 | 6800 |
| REC5-xx09SRW | 9-18, 18-36, 36-72 4.5-9 | 9 | 556 | 82-83 73 | 6800 |
| REC5-xx12SRW | 9-18, 18-36, 36-72 4.5-9 | 12 | 420 | 84-85 74 | 6800 |
| REC5-xx15SRW | 9-18, 18-36, 36-72 4.5-9 | 15 | 340 | 85-86 75 | 6800 |
| REC5-xx05DRW | 9-18, 18-36, 36-72 4.5-9 | ±5 | ±500 | 79-81 72 | ±2200 |
| REC5-xx09DRW | 9-18, 18-36, 36-72 4.5-9 | ±9 | ±278 | 82-84 74 | ±2200 |
| REC5-xx12DRW | 9-18, 18-36, 36-72 4.5-9 | ±12 | ±210 | 84-85 75 | ±2200 |
| REC5-xx15DRW | 9-18, 18-36, 36-72 4.5-9 | ±15 | ±170 | 85-86 75 | ±2200 |
| REC5-xx3.3SRWZ | 9-36, 18-72 | 3.3 | 1000 | 75-76 | 6800 |
| REC5-xx05SRWZ | 9-36, 18-72 | 5 | 1000 | 81-82 | 6800 |
| REC5-xx09SRWZ | 9-36, 18-72 | 9 | 556 | 82-83 | 6800 |
| REC5-xx12SRWZ | 9-36, 18-72 | 12 | 420 | 83-84 | 6800 |
| REC5-xx15SRWZ | 9-36, 18-72 | 15 | 340 | 84-85 | 6800 |
| REC5-xx05DRWZ | 9-36, 18-72 | ±5 | ±500 | 81-82 | ±2200 |
| REC5-xx09DRWZ | 9-36, 18-72 | ±9 | ±278 | 82-84 | ±2200 |
| REC5-xx12DRWZ | 9-36, 18-72 | ±12 | ±210 | 82-83 | ±2200 |
| REC5-xx15DRWZ | 9-36, 18-72 | ±15 | ±170 | 84-85 | ±2200 |

Notes:

- Note1: Refer to “Input Voltage Range”
 Note2: Efficiency is tested at nominal input and full load at +25°C ambient
 Note3: Max Cap Load is tested at nominal input and full resistive load

Model Numbering



Notes:

- Note4: add "Z" for 4:1 Input Voltage (24= 9-36VDC or 48= 18-72VDC), without suffix= standard 2:1 input voltage range
 Note5: "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 pinning; "B"= B pinning or "C" for C pinning. For more details please refer to "DIMENSION AND PHYSICAL CHARACTERISTICS"
 "B" Pinning is restricted to 1.6kV isolation due to the closeness of the input and output pins.
 Note7: add suffix "M" for 5-side-shielded metal case, without suffix = 5-side-shielded non-conductive plastic case.
 Note8: add "CTRL" for control function. If CTRL is not used, pin 1 is omitted for THT version. (option for "A"-pinning only)
 Note9: 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)
 Note10: add suffix "-R" for tape and reel packaging, without suffix standard tube packaging. (tape and reel option only available for SMD case style)

Ordering Examples:

| | | | | | | | | | | |
|--------------------------|----------|---------|---------------|-----------|-------------------|-----------|--------------|------------------|-----|-------------------------|
| REC5-0505SRW/H4/A/M/CTRL | 4.5-9Vin | 5Vout | Single output | 2:1 input | 4kVDC isolation | A pinning | metal case | with CTRL Pin | THT | tube packaging |
| REC5-2412DRWZ/H2/C/SMD-R | 9-36Vin | ±12Vout | Dual output | 4:1 input | 2kVDC isolation | C pinning | plastic case | no CTRL function | SMD | tape and reel packaging |
| REC5-1212SRWZ/H/B/M | 9-36Vin | 12Vout | Single Output | 4:1 input | 6kVDC isolation | B pinning | metal case | no CTRL Pin | THT | tube packaging |
| REC5-1215DRW/H/B/M/SMD-R | 9-18Vin | ±15Vout | Dual Output | 2:1 input | 1.6kVDC 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 | nom. Vin= | 5VDC | 4.5VDC | | 9VDC |
| | | | 12VDC | 9VDC | | 18VDC |
| | | | 24VDC | 18VDC | | 36VDC |
| | | | 48VDC | 36VDC | | 72VDC |
| | 4:1 Input („Z“) | nom. Vin= | 24VDC | 9VDC | | 36VDC |
| | | | 48VDC | 18VDC | | 72VDC |
| Input Surge Voltage | 100ms max. | nom. Vin= | 5VDC | | | 16VDC |
| | | | 12VDC | | | 25VDC |
| | | | 24VDC | | | 50VDC |
| | | | 48VDC | | | 100VDC |
| Minimum Load ⁽¹¹⁾ | | | | 10% | | |
| No Load Power Consumption | | | | | | 300mW |
| ON/OFF CTRL ⁽¹²⁾ | DC-DC ON | | | Open or 0V < V _{CTRL} < 1.2V | | |
| | DC-DC OFF | | | Short or 2.2V < V _{CTRL} < 12VDC | | |
| Internal Operating Frequency | 2:1 Input | | | 120kHz | | |
| | 4:1 Input | | | 200kHz | | |
| Output Ripple and Noise ⁽¹³⁾ | 20MHz BW | | | | | 50mVp-p |

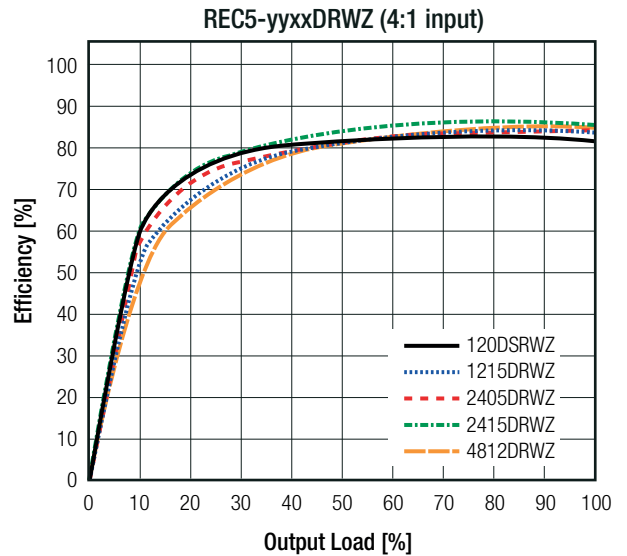
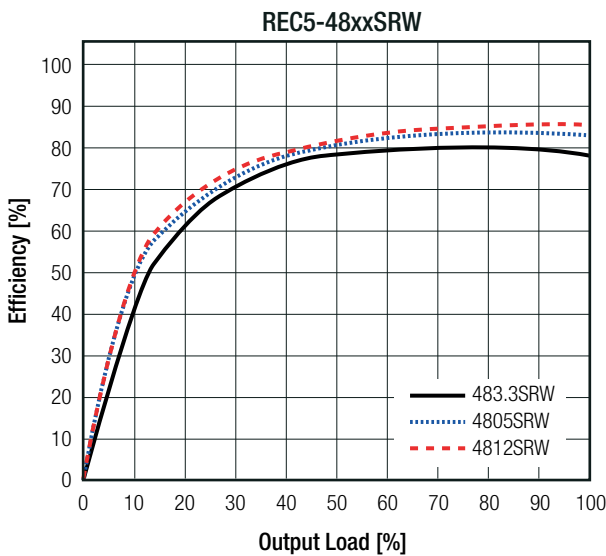
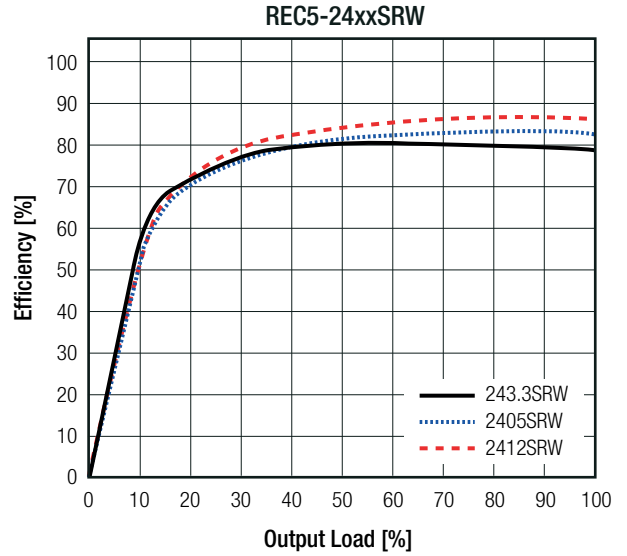
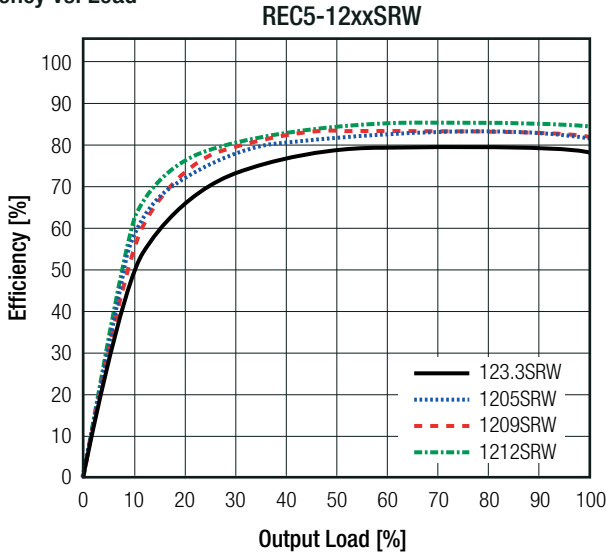
Notes:

- Note11: Operation below 10% load won't harm the converter, but specifications may not be met
 Note12: "A"-pinning only. Please refer to "ON/OFF CTRL ("A" pinning only)" for CTRL pin circuit.
 Note13: Measurements are made with a 0.1µF MLCC across output. (low ESR)

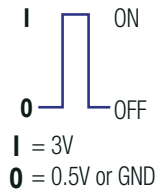
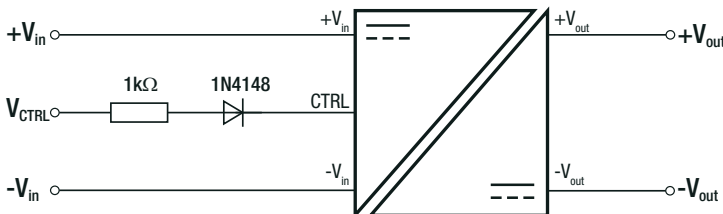
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Efficiency vs. Load



ON/OFF CTRL ("A" pinning only)



DC-DC ON: Open or $0V < V_{CTRL} < 1.2VDC$
DC-DC OFF: Short or $2.2V < V_{CTRL} < 12VDC$

REGULATIONS

| Parameter | Condition | Value |
|-----------------|-----------------------|------------|
| Output Accuracy | | ±2.0% max. |
| Line Regulation | low line to high line | ±0.3% max. |
| Load Regulation | 20% to 100% load | ±0.6% max. |

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

PROTECTIONS

| Parameter | Type | Value | |
|--|---------------------|---------------------------|-------------|
| Short Circuit Protection (SCP) ⁽¹⁴⁾ | below 100mΩ | continuous, auto recovery | |
| Isolation Voltage ⁽¹⁵⁾ | with suffix "/H" | tested for 1 second | 1.6kVDC |
| | | rated for 1 minute | 500VAC/60Hz |
| | with suffix "/H2" | tested for 1 second | 2kVDC |
| | | rated for 1 minute | 1kVAC/60Hz |
| | with suffix "/H3" | tested for 1 second | 4kVDC |
| | | rated for 1 minute | 2kVAC/60Hz |
| with suffix "/H6" | tested for 1 second | 6kVDC | |
| | rated for 1 minute | 3kVAC/60Hz | |
| Isolation Resistance | | 1GΩ min. | |
| Isolation Capacitance | | 60pF typ. | |
| Insulation Grade | | functional | |

Notes:

Note14: Max. Temperature = +50°C during the short circuit conditions.

Note15: For repeat Hi-Pot testing, reduce the time and/or the test voltage

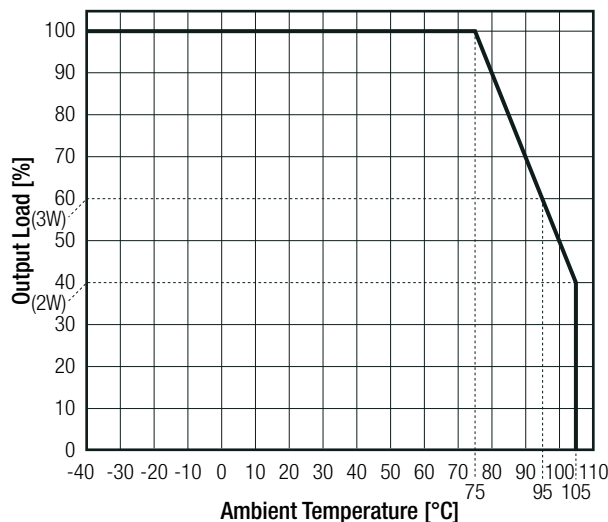
Note16: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

ENVIRONMENTAL

| Parameter | Condition | Value | |
|-----------------------------|---|-----------------|-----------------------------|
| Operating Temperature Range | with derating @ free air convection (refer to <i>"Derating Graph"</i>) | -40°C to +105°C | |
| Thermal Impedance | plastic case | 20K/W | |
| | metal case | 12K/W | |
| Operating Altitude | | 2000m | |
| Operating Humidity | non-condensing | 95% RH max. | |
| Pollution Degree | | PD2 | |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C | 850 x 10 ³ hours |
| | | +75°C | 206 x 10 ³ hours |

Derating Graph

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



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

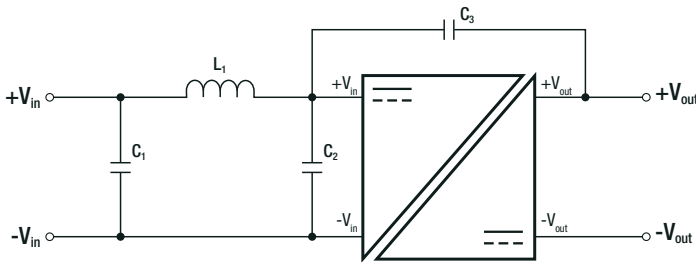
SAFETY AND CERTIFICATIONS

| Certificate Type (Safety) | Report / File Number | Standard |
|---|----------------------|---|
| Information Technology Equipment, General Requirements for Safety | E358085 | UL60950-1, 1st Edition, 2007 CAN/CSA-C22.2 No. 60950-1-03, 1st Edition, 2006 |
| Information Technology Equipment, General Requirements for Safety | LVD1605077-10 | IEC60950-1:2005, 2nd Edition + A2:2013 |
| Medical Electric Equipment, General Requirements for Safety and Essential Performance | WD-SE-R-180675-A0 | IEC60601-1:2005, 3rd Edition, + A1:2012 EN60601-1:2006 + A12:2014 |
| EAC | RU-AT.AB49.B.09571 | TP TC 004/2011 |
| RoHS2 | TWNC00677039 | RoHS, 2011/65/EU + AM-2015/863 |

EMC Compliance

| Condition | Standard / Criterion |
|---|---|
| Electromagnetic compatibility of multimedia equipment - Emission requirements ⁽¹⁷⁾ | 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 | L1 |
|-------------------|-----|--------------|-------|------------------------------|
| REC5-0505SRW/H4/A | N/A | 10µF MLCC | 150pF | N/A |
| REC5-1205SRW/H4/A | | | | 12µH RLS-126 |
| REC5-2405SRW/H4/A | | | 330pF | 22µH RLS-226 |
| REC5-4805SRW/H2/A | | | | |

Component List Class B

| MODEL | C1 | C2 | C3 | L1 |
|-------------------|--------------|--------------|-------|-------------------------------|
| REC5-0505SRW/H4/A | 10µF MLCC | 10µF MLCC | 150pF | 18µH RLS-186 |
| REC5-1205SRW/H4/A | | | | 12µH RLS-126 |
| REC5-2405SRW/H4/A | | | 1nF | 22µH RLS-226 |
| REC5-4805SRW/H2/A | | | | 100µH RLS-105 |

Notes:

Note17: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact Recom tech support advice

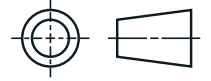
DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value | |
|-------------------|-------------------------|--|----------------------|
| Material | plastic case | non-conductive black plastic, (UL94 V-0) | |
| | metal case ("M" option) | nickel plated copper | |
| | PCB | FR4, (UL94 V-0) | |
| | potting | epoxy, (UL94 V-0) | |
| Dimension (LxWxH) | DIP24 | plastic case | 31.8 x 20.3 x 10.2mm |
| | | metal case ("M" option) | 32.0 x 20.3 x 10.2mm |
| | SMD | plastic case | 31.8 x 20.3 x 10.9mm |
| | | metal case ("M" option) | 32.0 x 20.3 x 10.9mm |
| Weight | | 13g typ. | |

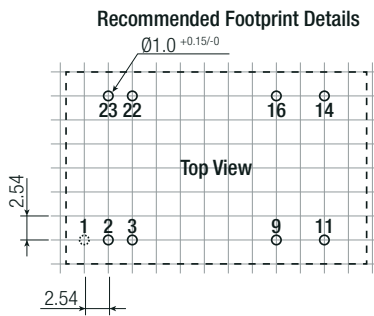
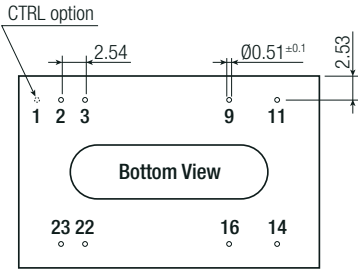
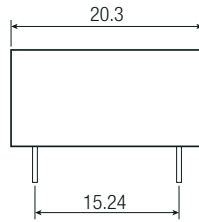
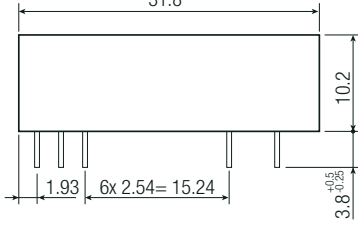
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing DIP24 plastic case (mm)



„A“ Pinning (/H2, /H4, /H6)

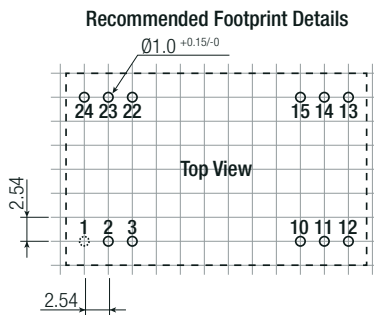
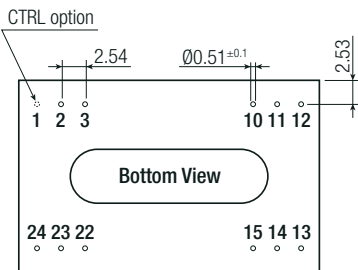
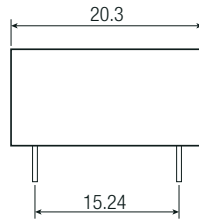
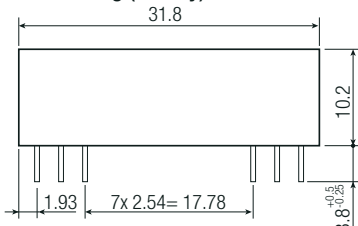


„A“ Pinning (/H2,/H4,/H6)

| Pin # | Single | Single/X2 | Dual |
|-----------|--------|-----------|-------|
| 1 „NoteB“ | CTRL | CTRL | CTRL |
| 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

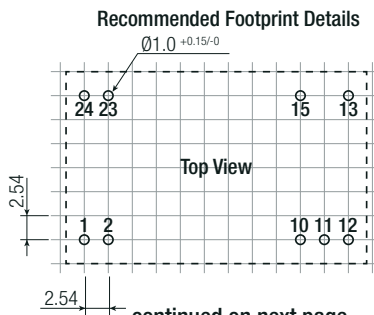
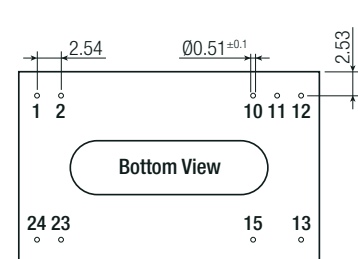
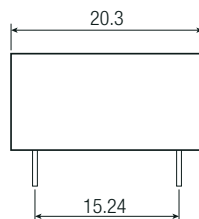
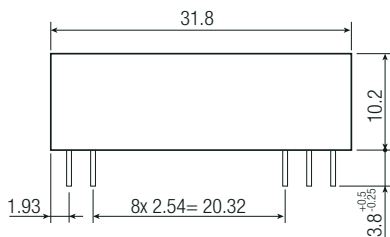
„B“ Pinning (/H only)



„B“ Pinning (/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 |

„C“ Pinning (/H2, /H4, /H6)



„C“ Pinning (/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 |

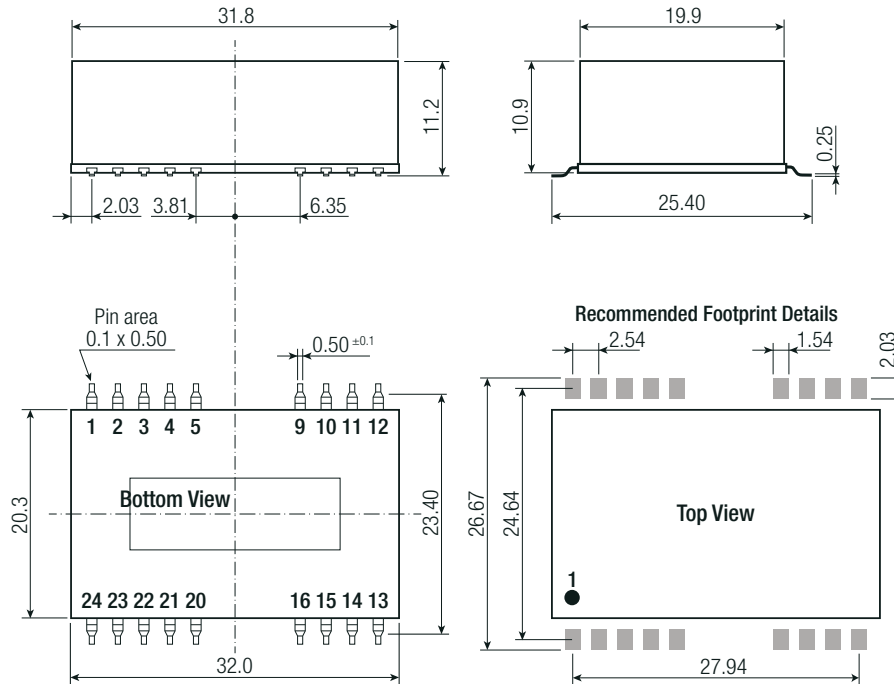
NC= No Connection

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tolerance ±0.25mm

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

Dimension Drawing SMD plastic case (mm)



„A“ Pinning

| Pin # | Single | Dual |
|--------------------------|--------|-------|
| 1 <small>„Note8“</small> | 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

„B“ Pinning

| 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

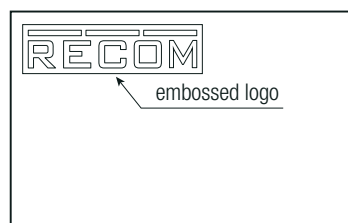
„C“ Pinning

| 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

Notes:

Note18: All models with plastic housings have an embossed RECOM logo. See below, top view:

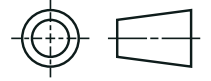


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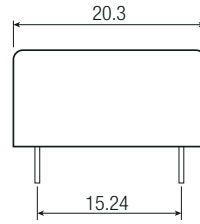
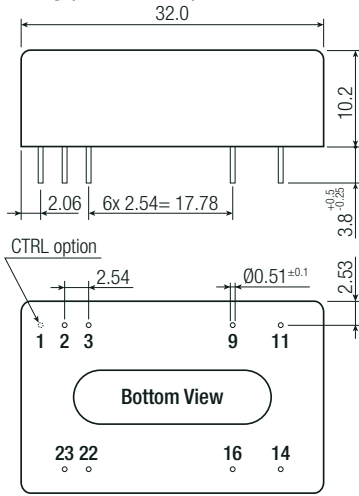
tolerance ± 0.35 mm

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

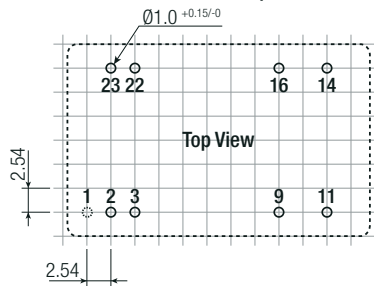
Dimension Drawing DIP24 metal case (mm)



„A“ Pinning (/H2, /H4, /H6)



Recommended Footprint Details

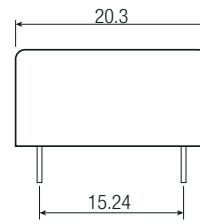
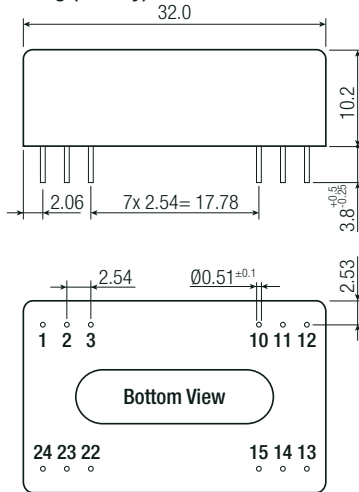


„A“ Pinning (/H2,/H4,/H6)

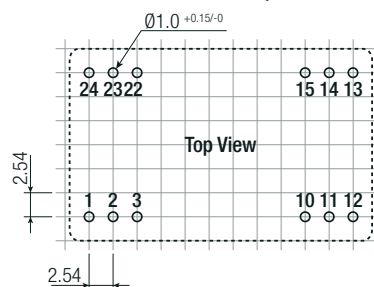
| Pin # | Single | Single/X2 | Dual |
|-----------|--------|-----------|-------|
| 1 „Note8“ | CTRL | CTRL | CTRL |
| 2,3 | -Vin | -Vin | -Vin |
| 9 | NC | no pin | Com |
| 11 | NC | NC | -Vout |
| 14 | +Vout | +Vout | +Vout |
| 16 | -Vout | -Vout | Com |
| 22,23 | +Vin | +Vin | +Vin |

NC: No Connection

„B“ Pinning (/H only)



Recommended Footprint Details

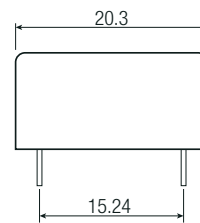
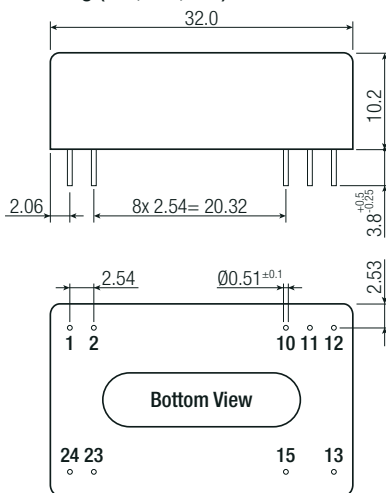


„B“ Pinning (/H only)

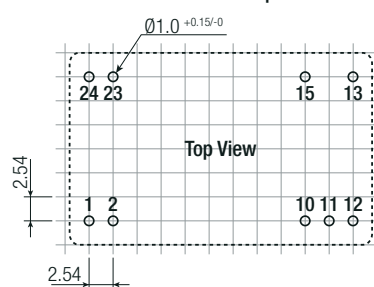
| Pin # | Single | Dual |
|-------|--------|-------|
| 1 | +Vin | +Vin |
| 2 | no pin | -Vout |
| 3 | no pin | Com |
| 10 | -Vout | Com |
| 11,14 | +Vout | +Vout |
| 12,13 | -Vin | -Vin |
| 15 | -Vout | Com |
| 22 | no pin | Com |
| 23 | no pin | -Vout |
| 24 | +Vin | +Vin |

NC= No Connection

„C“ Pinning (/H2, /H4, /H6)



Recommended Footprint Details



„C“ Pinning (/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 |

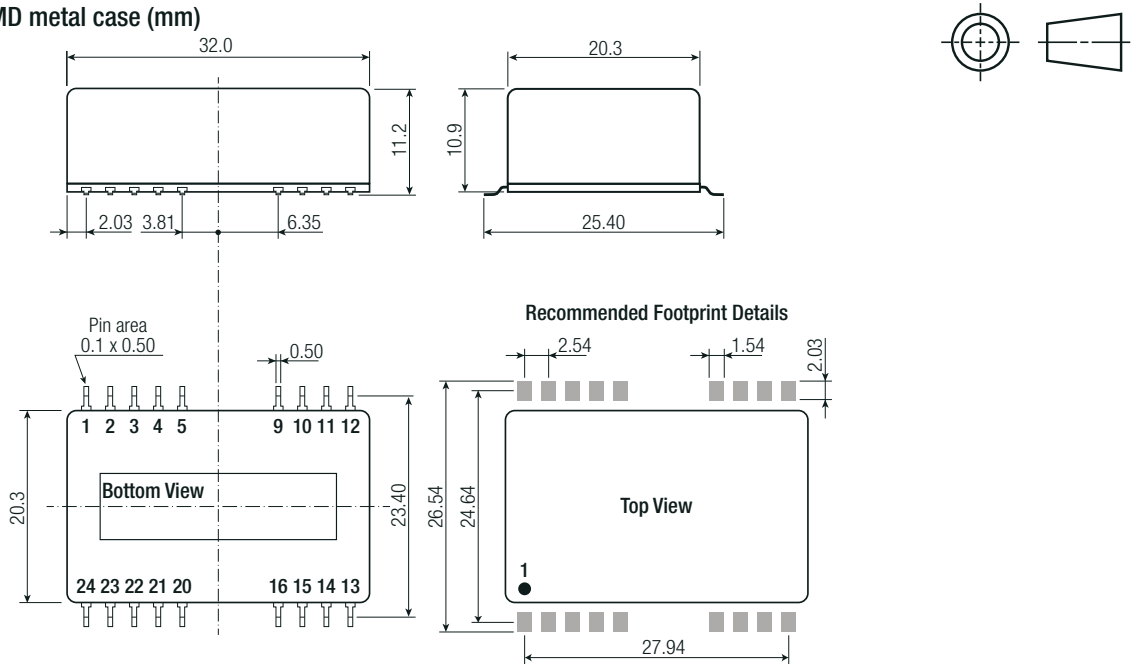
NC= No Connection

tolerance ±0.25mm

continued on next page

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

Dimension Drawing SMD metal case (mm)



„A“ Pinning

| Pin # | Single | Dual |
|-------------|--------|-------|
| 1 „Note8“ | 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

„B“ Pinning

| 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

„C“ Pinning

| 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 ±0.35mm

PACKAGING INFORMATION

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

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