

Features

- 1W Power in SMD package
- Pin compatible with R1D series
- -40°C to +95°C operating temperature @ full load
- High 3kVDC/1 second or 1kVDC/1 second isolation
- IEC/EN/UL62368-1 certified, CB Report
- 5000m operation

Unregulated Converters

R1DX

**1 Watt
SMD
Dual Output**



Description

Low cost, low profile, open-frame 1W SMD isolated DC/DC dual output converters. The R1DX operates from 5V and offers ± 5 , ± 9 , ± 12 or ± 15 dual outputs. There is no minimum load requirement and the quiescent consumption is less than 150mW. Standard isolation is 1kVDC/1s and a /H version with 3kVDC/1s is available. The operating temperature is from -40°C up to +95°C without derating. The pin-out is industry standard and compatible with the R1D series, but at half the height. The converters are fully certified to IEC/EN/UL62368 and IEC/EN/UL60950 and are 10/10 RoHS-conform. Class A EMC conformity requires only an input capacitor and a simple low cost LC filter is all that is needed for Class B EMC.

Selection Guide

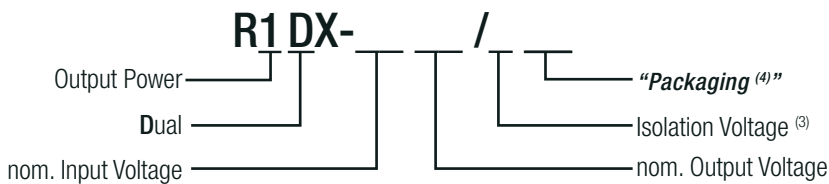
| Part Number | nom. Input Voltage [VDC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ. ⁽¹⁾ [%] | max. Capacitive Load ⁽²⁾ [μ F] |
|-------------|--------------------------|----------------------|---------------------|------------------------------------|--|
| R1DX-0505 | 5 | ± 5 | ± 100 | 78 | ± 1000 |
| R1DX-0509 | 5 | ± 9 | ± 56 | 78 | ± 470 |
| R1DX-0512 | 5 | ± 12 | ± 42 | 80 | ± 220 |
| R1DX-0515 | 5 | ± 15 | ± 33 | 80 | ± 220 |

Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Max Cap Load is tested at nominal input and full resistive load

Model Numbering



Notes:

Note3: without suffix, standard isolation voltage (1kVDC/1 second)
with suffix „/H“, high isolation voltage (3kVDC/1 second)

Note4: with suffix „-R“, standard packaging Tape and Reel
with suffix „-Tray“ for optional tray packaging

Ordering Examples:

| | | | | |
|------------------|------|---------------|--------------------------|-------------------------|
| R1DX-0505-R | 5Vin | ± 5 Vout | 1kVDC/1 second isolation | tape and reel packaging |
| R1DX-0515/H-Tray | 5Vin | ± 15 Vout | 3kVDC/1 second isolation | tray packaging |

IEC/EN62368-1 certified
UL62368-1 certified
IEC/EN60950-1 certified
C22.2 No. 62368-1-14 certified
CB Report
EN55032 compliant
EN55024 compliant

Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

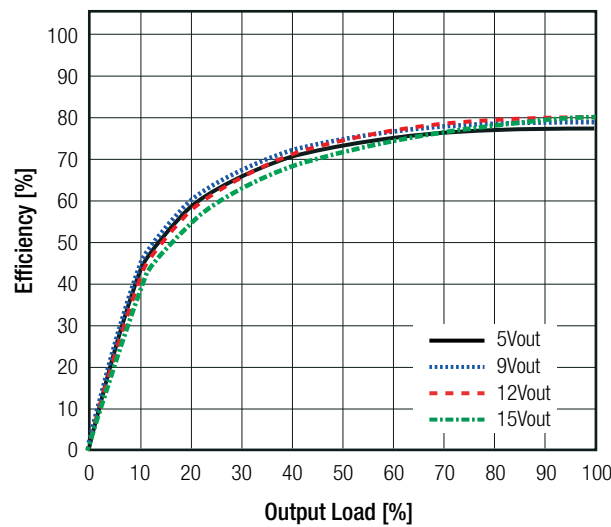
BASIC CHARACTERISTICS

| Parameter | Condition | Min. | Typ. | Max. |
|--|-----------|-------|--------|-----------|
| Internal Input Filter | | | | capacitor |
| Input Voltage Range | | | ±10.0% | |
| Quiescent Current | | | | 40mA |
| Minimum Load | | 0% | | |
| Internal Operating Frequency | | 20kHz | 60kHz | 100kHz |
| Output Ripple and Noise ⁽⁵⁾ | 20MHz BW | | | 100mVp-p |

Notes:

Note5: Measurements are made with a 0.1µF MLCC across output (low ESR)

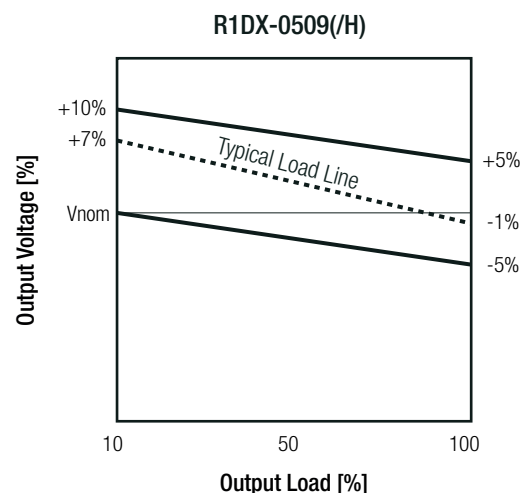
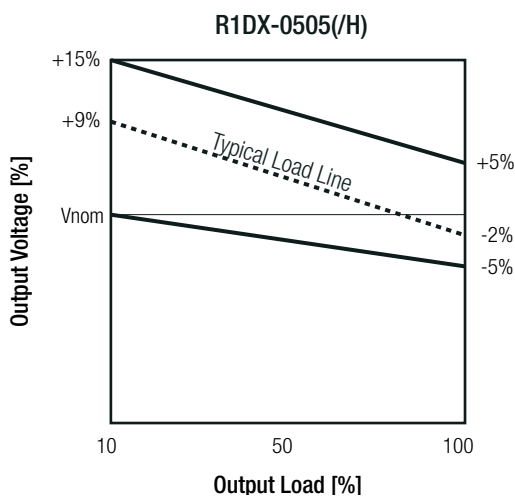
Efficiency vs. Load



REGULATIONS

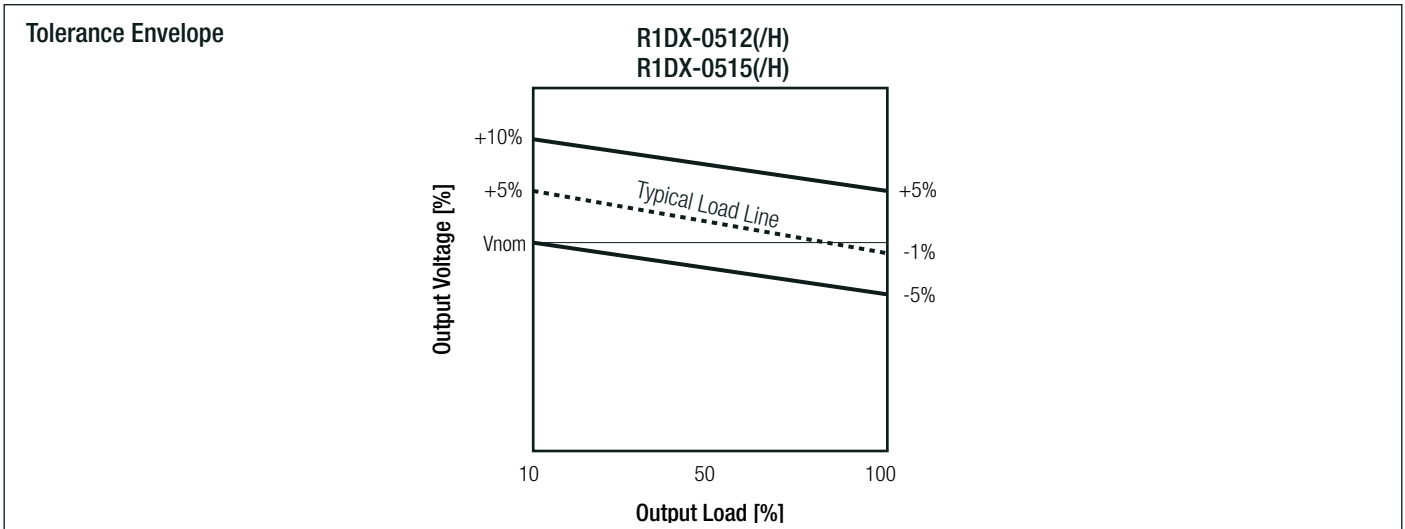
| Parameter | Condition | | Value |
|------------------|-----------------------|----------------------|---|
| Output Accuracy | | | ±5.0% max. |
| Line Regulation | low line to high line | | ±1.2% typ. at ±1.0% of Vin typ. |
| Load Regulation | 10% to 100% load | ±5Vout all others | 10.0% typ. / 15.0% max. 8.0% typ. / 10.0% max. |
| Cross Regulation | | | ±6.5% max. |

Tolerance Envelope



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Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)



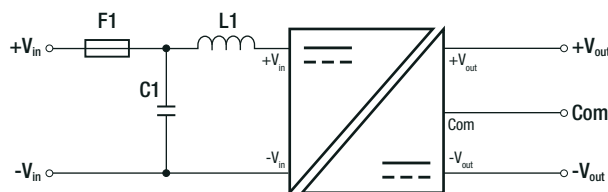
| PROTECTIONS | | | |
|-----------------------|------------------|------------------|--|
| Parameter | Type | | Value |
| Isolation Voltage | I/P to O/P | standard | tested for 1 second rated for 1 minute ⁽⁶⁾ 1kVDC 500VAC |
| | | with suffix "/H" | tested for 1 second rated for 1 minute ⁽⁶⁾ 3kVDC 1.5kVAC |
| Isolation Resistance | | | 10GΩ min. |
| Isolation Capacitance | | | 100pF max. |
| Leakage Current | standard | | 1μA max. |
| | with suffix "/H" | | 3μA max. |
| Insulation Grade | | | functional |

Notes:

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

Protection Circuit



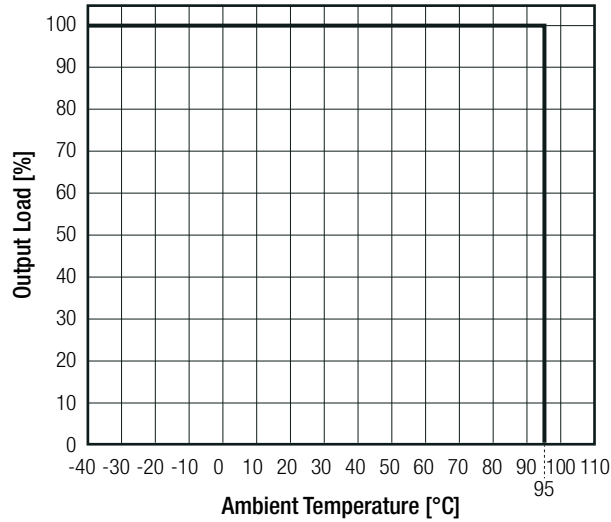
| ENVIRONMENTAL | | | |
|-----------------------------|--|-------|-------------------------------|
| Parameter | Condition | | Value |
| Operating Temperature Range | @ natural convection and full load (refer to derating graph) | | -40°C to +95°C |
| Operating Altitude | | | 5000m |
| Operating Humidity | non-condensing | | 5% - 95% RH max. |
| Pollution Degree | | | PD2 |
| Vibration | | | according to MIL-STD-202G |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C | 20900 x 10 ³ hours |
| | | +95°C | 7200 x 10 ³ hours |

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Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

Derating Graph

(@ Chamber and natural convection 0.1m/s)



SAFETY AND CERTIFICATIONS

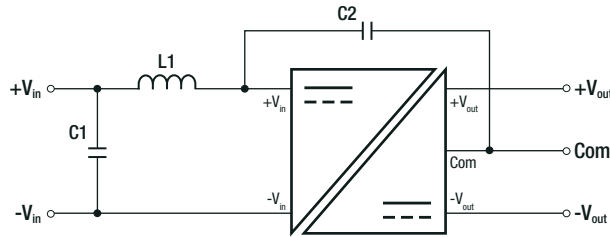
| Certificate Type (Safety) | Report / File Number | Standard |
|---|----------------------|--|
| Information Technology Equipment, General Requirements for Safety | E224736 | UL60950-1, 2nd Edition 2014 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition 2014 |
| Information Technology Equipment, General Requirements for Safety (CB Scheme) | E224736-4788277362-2 | IEC60950-1:2005 2nd Edition + A2:2013 |
| Information Technology Equipment, General Requirements for Safety | | EN60950-1:2006 + A2:2013 |
| Audio/video, information and communication technology equipment - Safety requirements (LVD) | E224736 | UL62368, 2nd Edition, 2014 CAN/CSA -C22.2 No. 62368-1-14, 2nd Edition, 2014 |
| Audio/video, information and communication technology equipment - Safety requirements | E224736-4788277362-1 | EN62368-1:2014 + A11:2017 |
| Audio/video, information and communication technology equipment - Safety requirements (CB Scheme) | | IEC62368-1:2014 2nd Edition |
| RoHS2+ | | RoHS 2011/65/EU + AM2015/863 |

| EMC Compliance | Condition | Standard / Criterion |
|--|---|---|
| Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement | with external filter (see filter suggestion) | EN55032:2015, Class A and B |
| Information technology equipment - Immunity characteristics Limits and methods of measurement | | EN55024:2010 +A1:2015 |
| ESD Electrostatic discharge immunity test | Air: ±2, 4, 6, 8kV Contact: ±2, 4kV | IEC61000-4-2:2008, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test | 3 V/m | IEC61000-4-3:2006 + A2:2010, Criteria A |
| Fast Transient and Burst Immunity | ±0.5kV | IEC61000-4-4:2012, Criteria A |
| Surge Immunity | ±0.5kV | IEC61000-4-5:2014, Criteria B |
| Immunity to conducted disturbances, induced by radio-frequency fields | 3V r.m.s. | IEC61000-4-6:2013, Criteria A |
| Power Magnetic Field Immunity | 50Hz / 1A/m | IEC61000-4-8:2009, Criteria A |

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Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

EMC Filtering Suggestions for EN55032



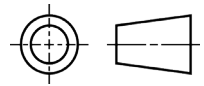
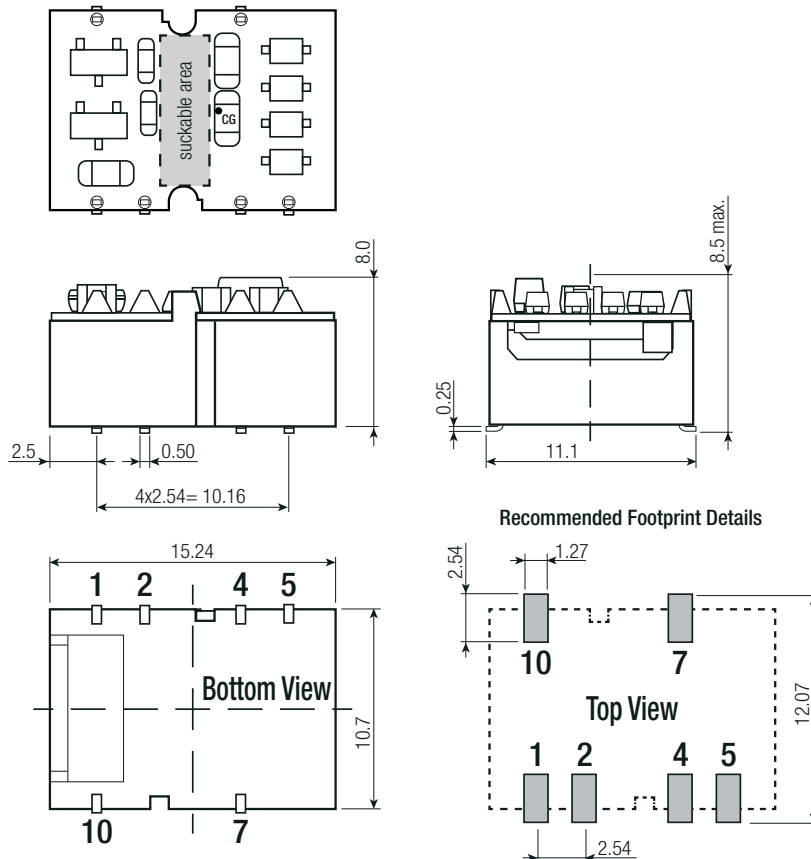
| Component List Class A | | |
|------------------------|-------------|-------------------|
| C1 | C2 | L1 |
| 4.7µF MLCC | 470pF/4kVDC | 10µH SMD Inductor |

| Component List Class B | | |
|------------------------|-------------|-------------------|
| C1 | C2 | L1 |
| 10µF MLCC | 470pF/4kVDC | 10µH SMD Inductor |

DIMENSION and PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|-------------------|-------------|--|
| Material | case PCB | black plastic (UL94V-0) FR4 (UL94V-0) |
| Dimension (LxWxH) | | 15.24 x 11.10 x 8.00mm |
| Weight | | 1.2g typ. |

Dimension Drawing (mm)



Pin Connection

| Pin # | Dual |
|-------|-------|
| 1 | -Vin |
| 2 | +Vin |
| 4 | Com |
| 5 | -Vout |
| 7 | +Vout |
| 10 | NC |

CG= center of gravity

NC= no connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

Pin

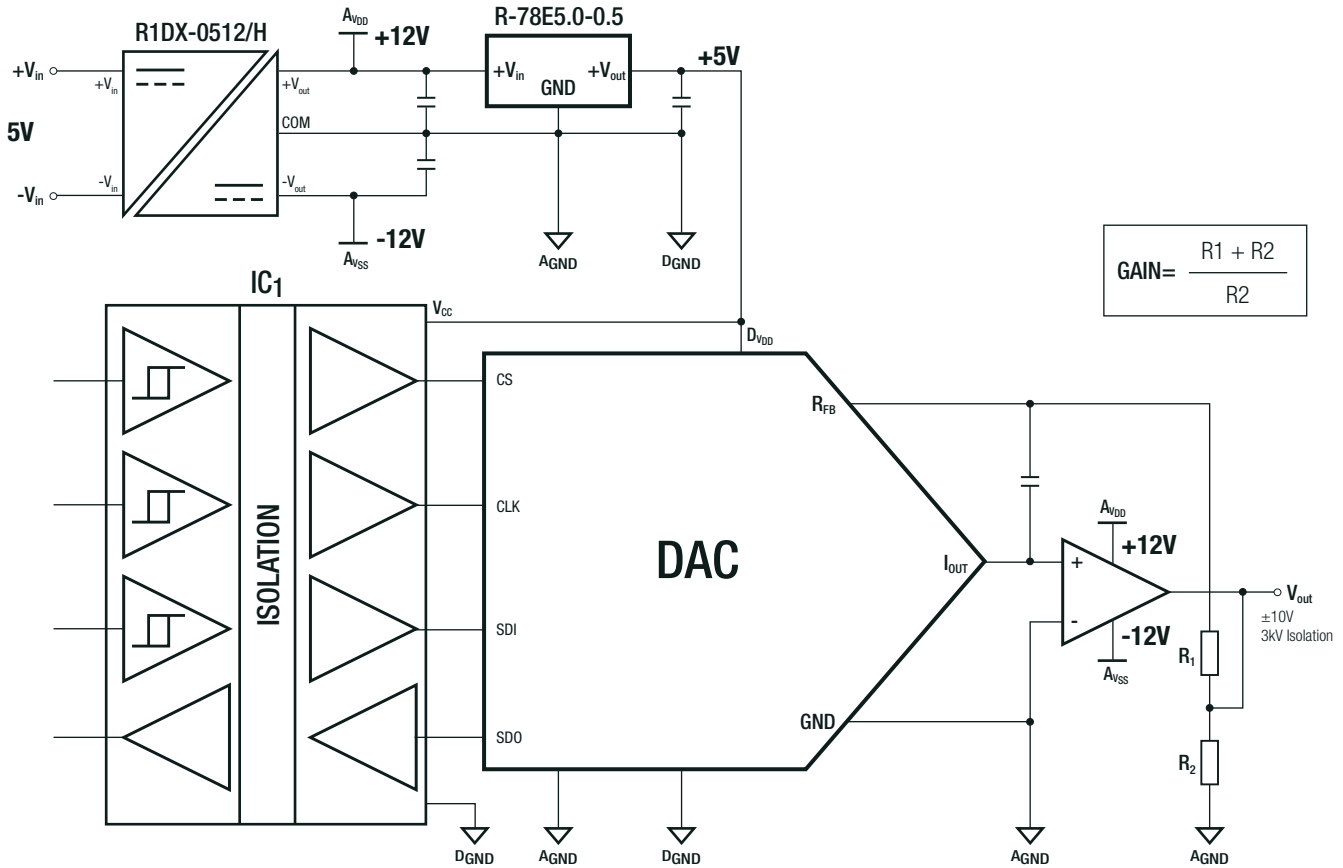
Thickness: ±0.05mm

Length: +0.25/-0.50mm

Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

INSTALLATION and APPLICATION

Isolated DAC (±10VDC)



PACKAGING INFORMATION

| | | |
|-----------------------------|------------------------|------------------------|
| Packaging Dimension (LxWxH) | tape and reel (carton) | 355.0 x 340.0 x 35.0mm |
| | reel | 330.2 x 330.2 x 30.0mm |
| | tray | 260.0 x 205.0 x 27.0mm |
| Packaging Quantity | tape and reel | 250pcs |
| | tray | 30pcs |
| Tape Width | | 24.0mm |
| Storage Temperature Range | non-condensing | -55°C to +125°C |
| Storage Humidity | | 5% - 95% RH max. |

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