Features

Unregulated Converters

- 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

RECOM
DC/DC Converter

R1DX

1 Watt SMD Dual Output

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

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) [µF]
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

R1 DX- ___ / ___

- Output Power
- Dual
- nom. Input Voltage
- nom. Output Voltage
- Isolation Voltage (3)
- *"Packaging (4)"*

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

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

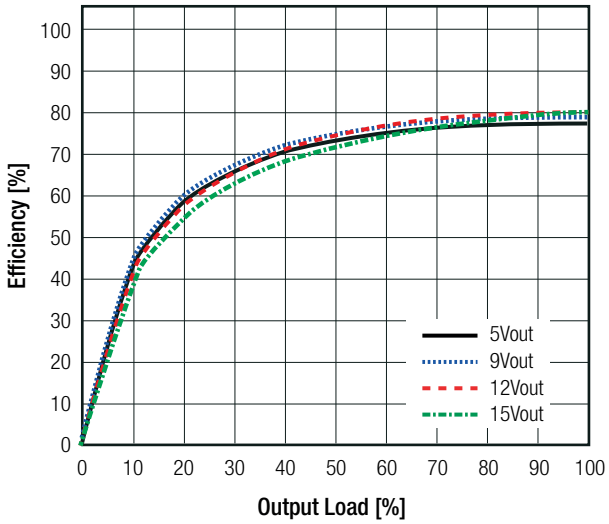
BASIC CHARACTERISTICS

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

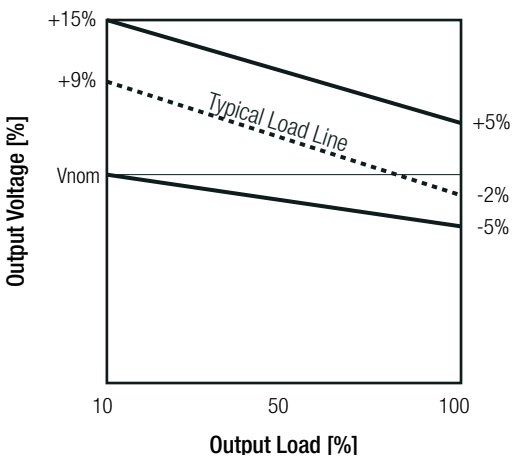


REGULATIONS

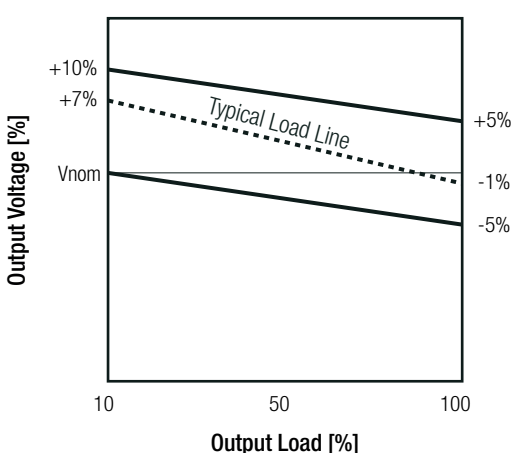
Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line		±1.2% typ. at ±1.0% of Vin typ.
Load Regulation	10% to 100% load	±5Vout all others	10.0% typ. / 15.0% max. 8.0% typ. / 10.0% max.
Cross Regulation			±6.5% max.

Tolerance Envelope

R1DX-0505(/H)



R1DX-0509(/H)



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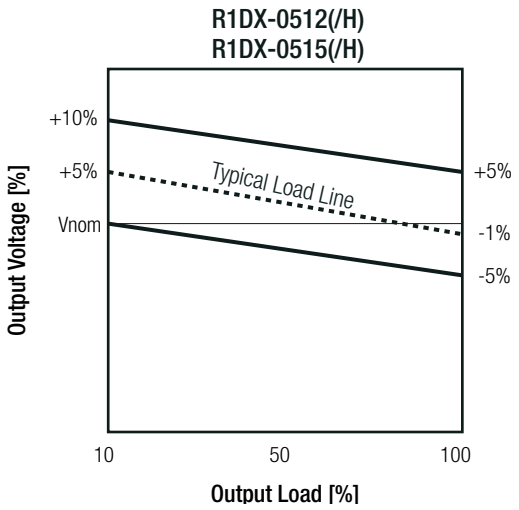
Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

Tolerance Envelope



PROTECTIONS

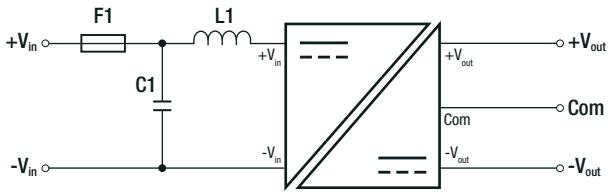
Parameter	Type			Value
Isolation Voltage	I/P to O/P	standard	tested for 1 second rated for 1 minute (6)	1kVDC 500VAC
		with suffix "/H"	tested for 1 second rated for 1 minute (6)	3kVDC 1.5kVAC
Isolation Resistance				10GΩ min.
Isolation Capacitance				100pF max.
Leakage Current	standard with suffix "/H"			1µA max. 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 +95°C	20900 x 10³ hours 7200 x 10³ hours

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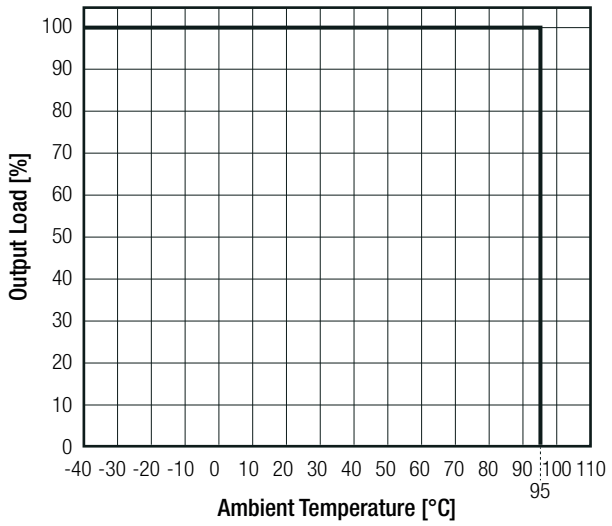
Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

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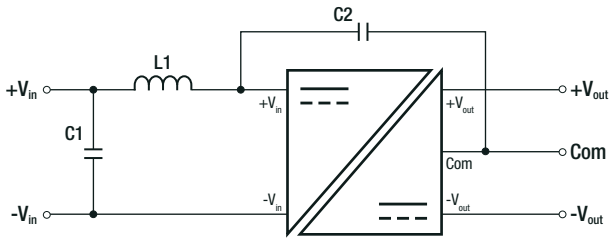
Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

EMC Filtering Suggestions for EN55032



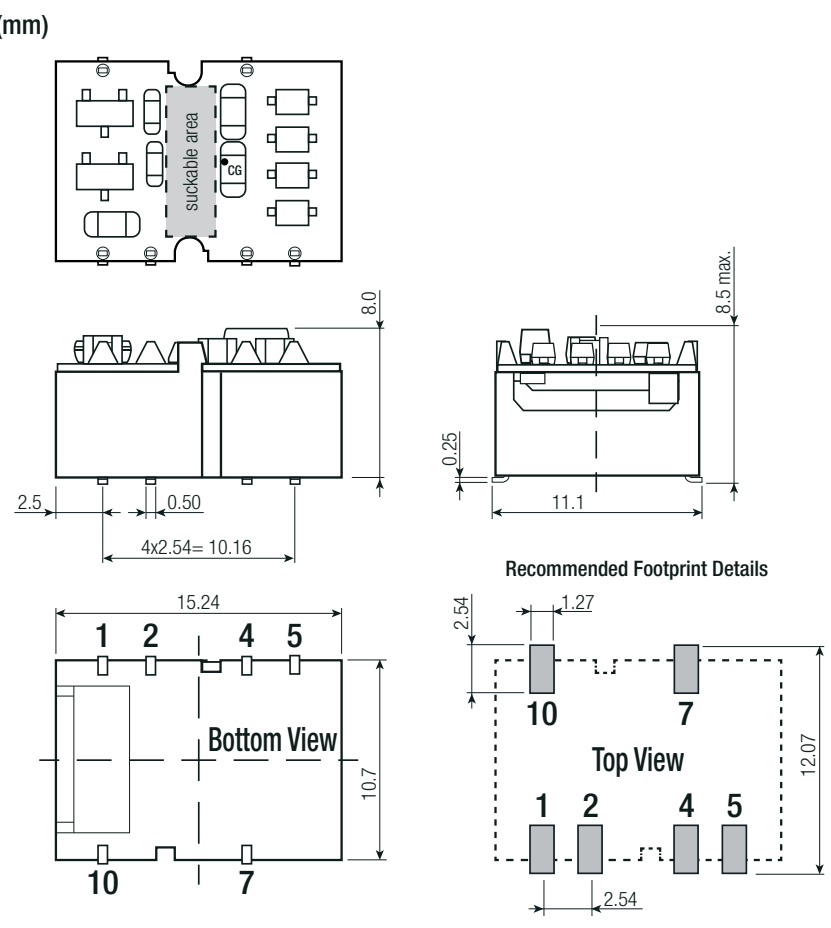
Component List Class A		
C1	C2	L1
4.7µF MLCC	470pF/4kVDC	10µH SMD Inductor

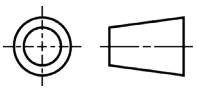
Component List Class B		
C1	C2	L1
10µF MLCC	470pF/4kVDC	10µH SMD Inductor

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

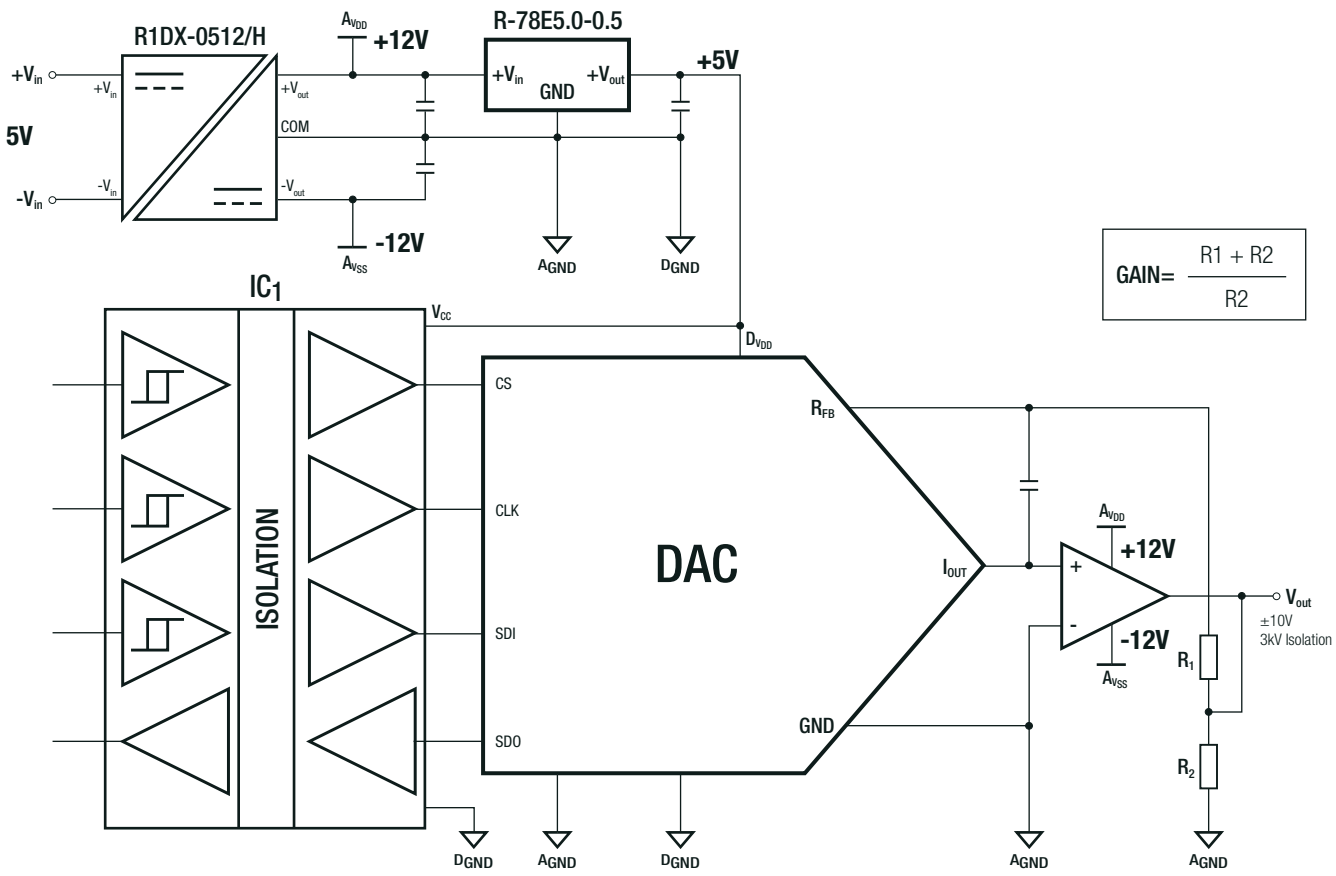
CG= center of gravity
NC= no connection
Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

Pin
Thickness: ±0.05mm
Lenght: +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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