Features

Unregulated Converters

- Full power at 100°C ambient temperature
- 1kVDC/1s or 3kVDC/1s isolation option
- UL and EN certified, CB report
- Suitable for fully automated assembly (including vapor phase soldering)
- Optional continuous short circuit protection
- Efficiency up to 85%

RECOM
DC/DC Converter

R2S & R2D

2 Watt SMD Single and Dual Output

3 YEAR warranty

Description

The R2S and R2D converters are of the enclosed open frame type, meaning that they are un-potted. The converters are typically used in general purpose and industrial low power isolation and voltage matching applications where an SMD converter is required. The converter series feature an extended ambient temperature operating range of -40°C to +100°C without derating and optional continuous short circuit protection. In addition to two isolation options and three different case formats, the converters are also available prepacked as tape and reel for use with automatic insertion machines.

Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ.(1) [%]	max. Capacitive Load(2) [µF]
R2S (3)-xx3.3 (4,5)	5, 12, 15, 24	3.3	606	70-75	3300
R2S (3)-xx05 (4,5)	5, 12, 15, 24	5	400	76-84	1200
R2S (3)-xx09 (4,5)	5, 12, 15, 24	9	222	76-84	1200
R2S (3)-xx12 (4,5)	5, 12, 15, 24	12	167	76-85	680
R2S (3)-xx15 (4,5)	5, 12, 15, 24	15	133	76-85	680
R2S (3)-xx24 (4,5)	5, 12, 15, 24	24	83	76-85	220
R2D (3)-xx05 (4,5)	5, 12, 15, 24	±5	±200	75-80	±470
R2D (3)-xx09 (4,5)	5, 12, 15, 24	±9	±111	75-80	±470
R2D (3)-xx12 (4,5)	5, 12, 15, 24	±12	±83	75-83	±330
R2D (3)-xx15 (4,5)	5, 12, 15, 24	±15	±66	75-85	±330
R2D (3)-xx24 (4,5)	5, 12, 15, 24	±24	±42	75-85	±330

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 and is defined as the capacitive load that will allow start up in under 1s without damage to the converter

RoHS 2+ compliant 10 from 10 — RECOM-CONVERTERS COMPLIANT PRODUCTS

REACH compliant — RECOM-CONVERTERS COMPLIANT PRODUCTS

c UL us E358085

EAC

IECEE CB SCHEME

UL60950-1 certified
CAN/CSA-C22.2 No. 60950-1-07 certified
IEC/EN60950-1 certified
EN55032 compliant
CB report

Model Numbering

R2S _ - _ _ _ / _ -

- **S**ingle or **D**ual
- **"Pinning (3)"**
- nom. Input Voltage
- Output Voltage
- **"Protection and Isolation Option (4)"**
- **"Packaging (5)"**

Notes:

Note3: R2S: without marking denotes 5 pins out of 8 fitted (includes /H option)
with marking "8" denotes 8 pins out of 8 fitted (/H option not available)
with marking "12" denotes 10 pins out of 12 fitted (includes /H option)
R2D: without marking denotes "6" pins out of 10 fitted (includes /H option)
with marking "10" denotes 10 pins out of 10 fitted (/H option not available)
with marking "12" denotes 10 pins out of 12 fitted (includes /H option)

Note4: standard part is without continuous short circuit protection
add suffix „/P" for continuous short circuit protection
add suffix „/H" for 3kVDC/1s isolation (not available for R2S8 and R2D10)
or add suffix „/HP" for 3kVDC/1s isolation and continuous short circuit protection

Note5: add suffix „-R" for tape and reel packaging (compatible with all other suffixes)

Ordering Examples:

R2S12-2405/P: Single Output, 10 pins out of 12 fitted, 24Vin, 5Vout with continuous short circuit protection
R2D10-0505-R: Dual Output, 10 pins fitted, 5Vin, 5Vout, tape and reel packaging
R2D-0505/HP: Dual Output, 5 pins out of 8 fitted, 5Vin, 5Vout with 3kVDC/1s isolation and continuous short circuit protection

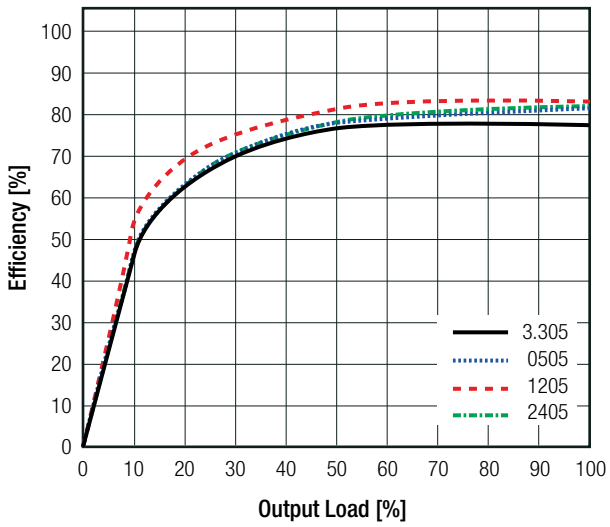
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

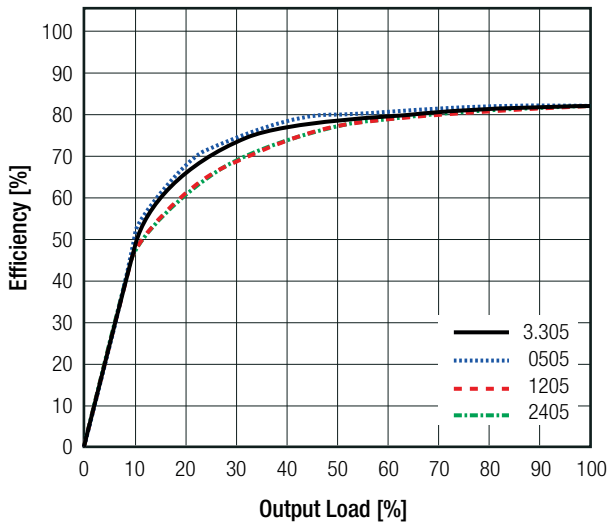
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load		0%		
Internal Operating Frequency		20kHz	40kHz	85kHz
Output Ripple and Noise	20MHz BW			150mVp-p

Efficiency vs. Load

R2S-xx05



R2D-xx05



REGULATIONS

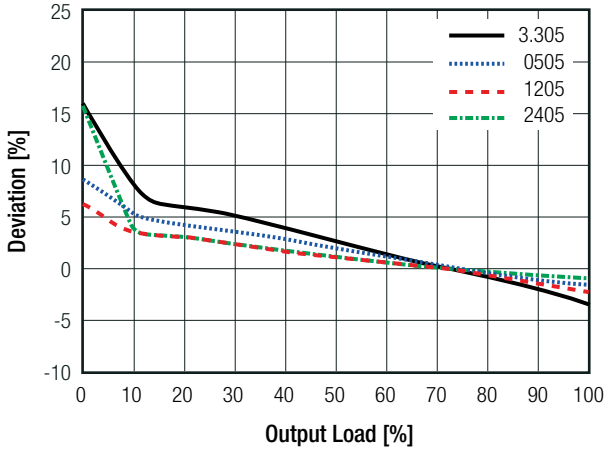
Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line, full load		±1.2% of 1.0% Vin typ.
Load Regulation (6)	10% to 100% load	3.3Vout	20.0% max.
		5Vout	15.0% max.
		9, 12, 15 & 24Vout	10.0% max.

Notes:

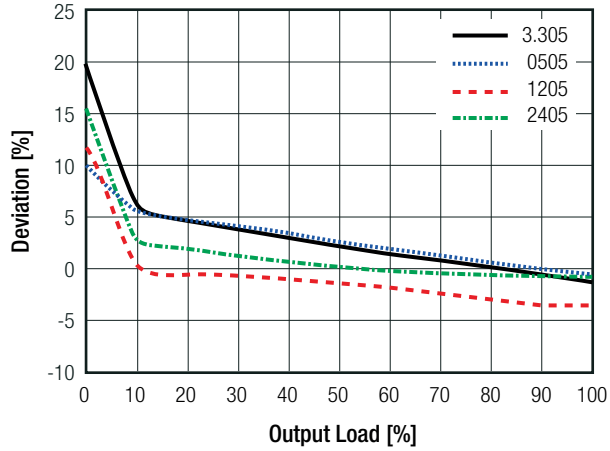
Note6: Operation below 10% load will not harm the converter, but specifications may not be met

Deviation vs. Load

R2S-xx05



R2D-xx05



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

PROTECTIONS

Parameter	Type			Value
Short Circuit Protection (SCP)	below 100mΩ	without suffix with suffix "/P"		1 second continuous
Isolation Voltage [7]	I/P to O/P	without suffix	tested for 1 second rated for 1 minute	1kVDC 500VAC/60Hz
		with suffix "/H"	tested for 1 second rated for 1 minute	3kVDC 1.5kVAC/60Hz
Isolation Resistance	Viso=500V			10GΩ min.
Isolation Capacitance				115pF max.
Insulation Grade	according to 60950-1			functional

Notes:

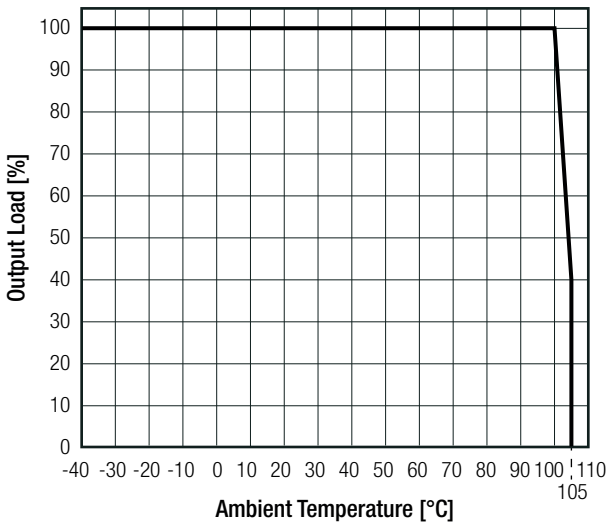
Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note8: 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	full load @ free air convection		-40°C to +100°C
Operating Altitude	according to 60950-1		2000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +85°C	886 x 10^3 hours 128 x 10^3 hours

Derating Graph
(@ free air convection)



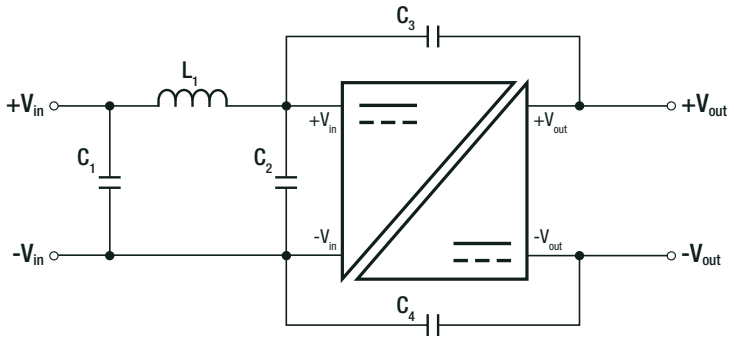
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E358085-A2-UL	UL60950-1, 2nd Edition:2007 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition:2007
Information Technology Equipment, General Requirements for Safety	LVD1605077-08	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Information Technology Equipment, General Requirements for Safety (CB Scheme)	E322406-A2-CB-1	IEC60950-1:2001, 1st Edition
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	SPC1005061	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	with external filter (see filter suggestion below)	EN55032, Class A and B

EMC Filter Suggestion according to EN55032



Component List Class A

MODEL	C1	L1	C2	C3 (safety)
R2S-0505	N/A	N/A	22µF 16V MLCC	N/A
R2S-0512				
R2S-1212				
R2S-2405				

Component List Class B

MODEL	C1	L1	C3 (safety)	C4 (safety)
R2S-0505	10µF 100V MLCC	12µH choke RLS-126	330pF	330pF
R2S-0512				
R2S-1212				
R2S-2405				

Notes:

Note9: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	non-conductive black plastic, (UL94 V-0)
Dimension (LxWxH)	R2S, R2S8	12.75 x 10.7 x 9.0mm
	R2S12, R2D, R2D10, R2D12	15.24 x 10.7 x 9.0mm
	R2S12-05xx/HP	15.24 x 10.7 x 9.4mm
Weight	R2S, R2S8	1.4g typ.
	R2D, R2D10,	1.5g typ.
	R2S12, R2D12	1.6g typ.

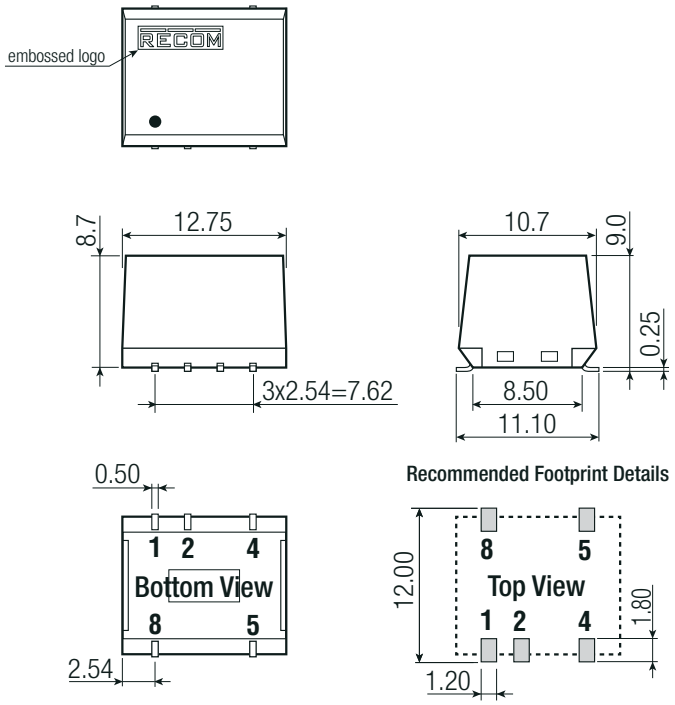
continued on next page

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

Dimension Drawing (mm)

5 Pin Single SMD Package

/H option is available in this pin package



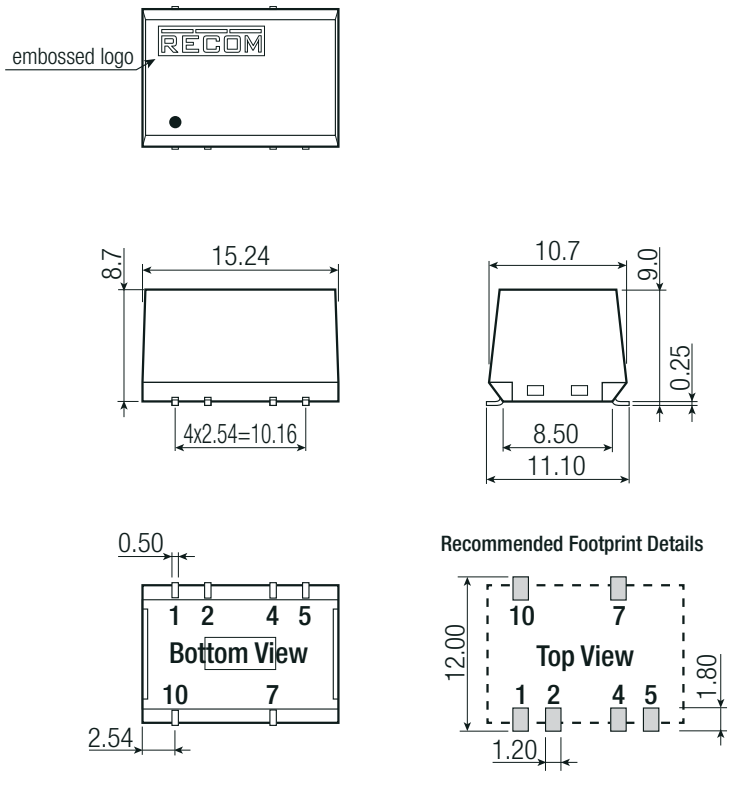
Pinning Information

Pin #	Single
1	-Vin
2	+Vin
4	-Vout
5	+Vout
8	NC

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

6 Pin Dual SMD Package

/H option is available in this pin package



Pinning Information

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

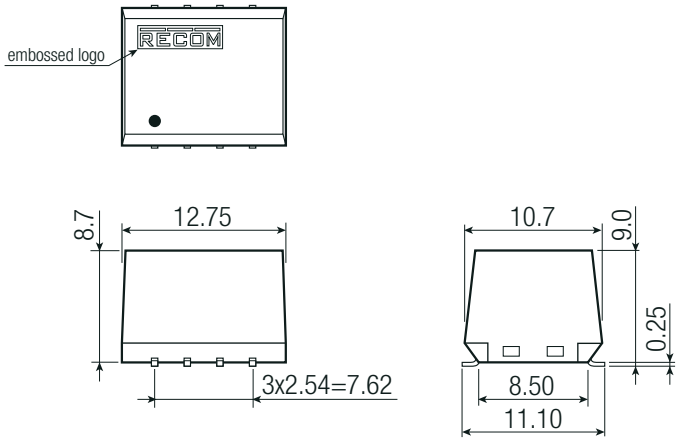
NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

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

Dimension Drawing (mm)

8 Pin Single SMD Package

/H option is not available in this pin package



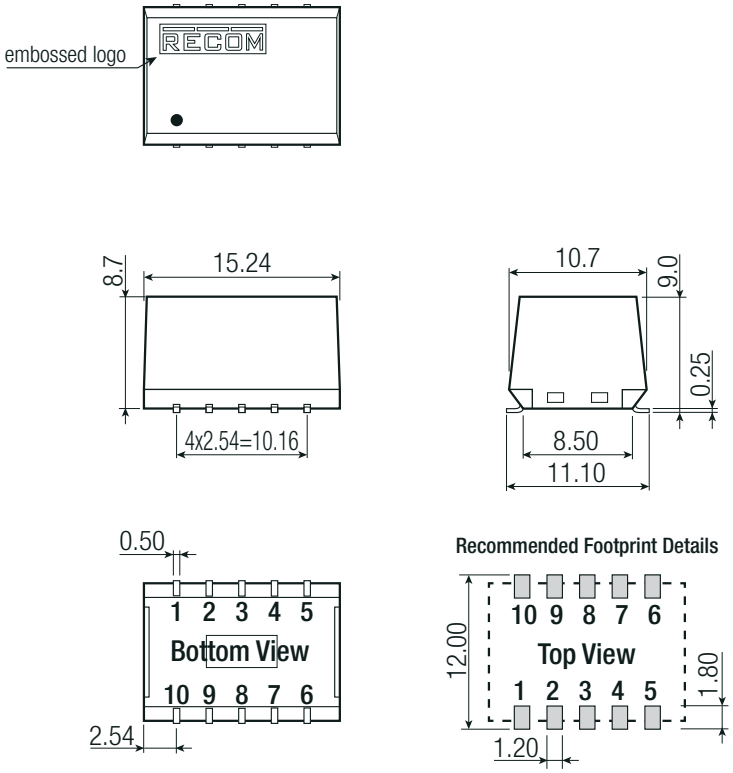
Pinning Information

Pin #	Single
1	-Vin
2	+Vin
3	NC
4	-Vout
5	+Vout
6, 7, 8	NC

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

10 Pin Dual SMD Package

/H option is not available in this pin package



Pinning Information

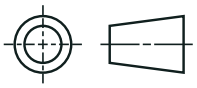
Pin #	Dual
1	-Vin
2	+Vin
3	NC
4	Com
5	-Vout
6	NC
7	+Vout
8, 9, 10	NC

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

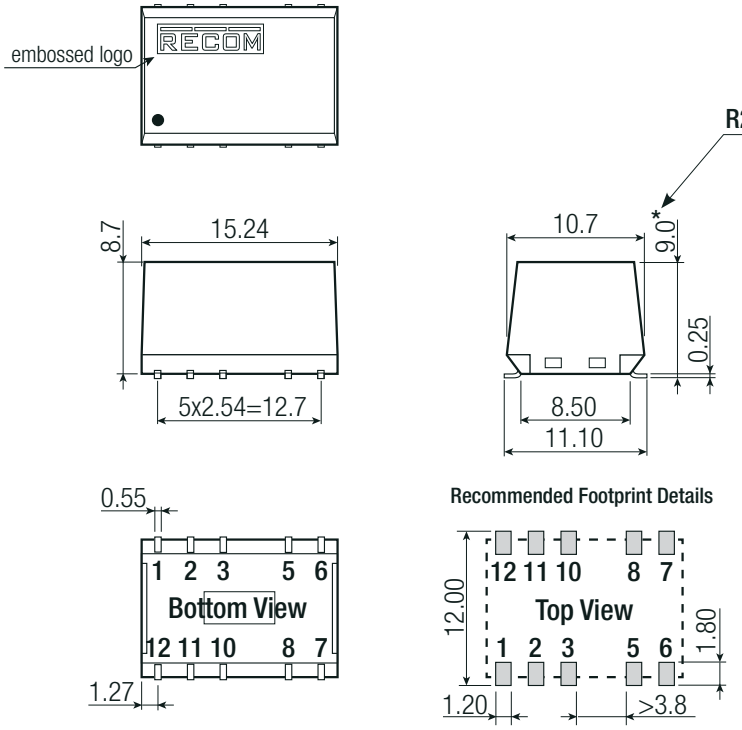
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm)

12 Pin Single and Dual SMD Package



/H option is available in this pin package



Pinning Information

Pin #	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	NC	NC
5	-Vout	Com
6	NC	-Vout
7	NC	NC
8	+Vout	+Vout
9, 10, 12	NC	NC

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	tube		530.0 x 17.0 x 13.0mm
	tape and reel (carton)		355.0 x 342.0 x 36.0mm
Packaging Quantity	tube	R2S, R2S8	39pcs
		R2S12, R2D, R2D10, R2D12	33pcs
	tape and reel		250pcs
Tape Width			24mm
Storage Temperature Range			-55°C to +125°C
Storage Humidity	non-condensing		95% RH max.