Features

Regulated Converters

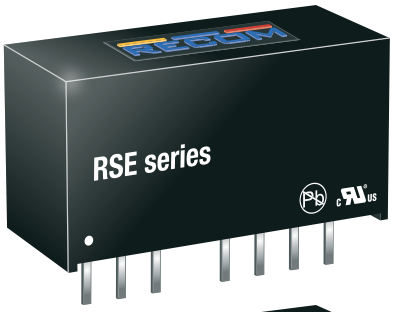
- 2:1 or 4:1 wide input range
- 2kVDC/1 second isolation
- -40°C to +75°C operating temperature @ full load
- Industry standard pinout (SIP8)
- EN/UL62368 and UL60950 certified, CB report
- Low cost

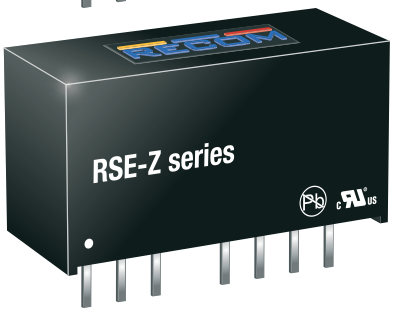
RECOM
DC/DC Converter

RSE(-Z)

2 Watt SIP8 Single Output

3 YEAR warranty





Description

The RSE(-Z) is a low cost isolated, regulated and short-circuit protected DC/DC converter designed for industrial applications. A compact SIP8 case size, 2:1 input or 4:1 input, 2kVDC isolation and a wide operating temperature range of -40°C to +75°C without derating makes the RSE(-Z) series ideal for industrial, transport and general-purpose on-board 5V power supplies. Industrial Class A EMC levels can be met with a simple Pi-filter and the converters come with a three year warranty.

Selection Guide

Part Number	Input Voltage Range [VDC]	Input Current @ full load [mA]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. (1) [%]	max. Capacitive Load (2) [µF]
RSE-0505S/H2	4.5 - 9	526	5	400	76	6800
RSE-2405S/H2	18 - 36	103	5	400	80	6800
RSE-1205SZ/H2	4.5 - 18	215	5	400	77	6800
RSE-2405SZ/H2	9 - 36	105	5	400	79	6800

Notes:

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

Note2: Max. cap load is tested at minimum input and full resistive load

Model Numbering

RSE-__ __S__ /__

- nom. Input Voltage
- Output Voltage
- Single
- Isolation Voltage (3)
- Input Voltage Range (4)

Notes:

Note3: suffix "/H2" standard isolation voltage 2kVDC/1 second

Note4: without suffix 2:1 input voltage range
with suffix "Z" 4:1 input voltage range

Ordering Examples:

RSE-1205SZ/H2	12Vin	4:1 input voltage range	5Vout	2kVDC/1 second isolation
RSE-0505S/H2	5Vin	2:1 input voltage range	5Vout	2kVDC/1 second isolation

c UL us
E224736

UL62368-1 certified
C22.2 No. 62368-1-14 certfied
UL60950 certified
C22.2 No. 60950-1-07 certified
IEC/EN62368-1 certified
EN55032/55024 compliant
CB Report

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

BASIC CHARACTERISTICS

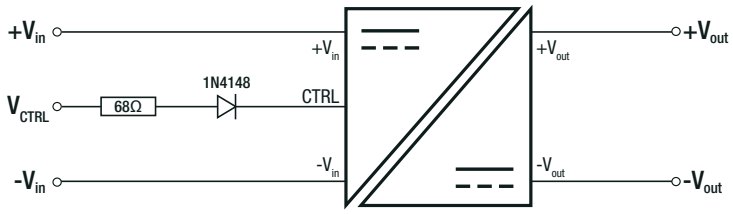
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter					capacitor
Input Voltage Range	2:1 input	nom. Vin= 5VDC nom. Vin= 24VDC	4.5VDC 18VDC	5VDC 24VDC	9VDC 36VDC
	4:1 input (suffix "Z")	nom. Vin= 12VDC nom. Vin= 24VDC	4.5VDC 9VDC	12VDC 24VDC	18VDC 36VDC
Maximum Reverse Voltage					0VDC
Input Surge Voltage	100ms max.	nom. Vin= 5VDC nom. Vin= 12VDC nom. Vin= 24VDC		15VDC 25VDC 50VDC	
Quiescent Current	2:1 input	nom. Vin= 5VDC nom. Vin= 24VDC		40mA 3mA	
	4:1 input (suffix "Z")	nom. Vin= 12VDC nom. Vin= 24VDC		10mA 5mA	
Start-up time				500µs	3ms
Rise time				450µs	
Hold-up time				10µs	
Internal Operating Frequency	2:1 input 4:1 input (suffix "Z")		130kHz 250kHz		
Minimum Load (5)	2:1 input 4:1 input (suffix "Z")		0% 10%		
Output Ripple and Noise (6)	20MHz BW	2:1 input 4:1 input (suffix "Z")			75mVp-p 100mVp-p
ON/OFF CTRL	DC-DC ON DC-DC OFF				Open or 0VDC< V_{CTRL}<0.8VDC 2VDC< V_{CTRL}<6VDC
Input Current of CTRL Pin	V_{CTRL}= 5VDC V_{CTRL}= 3.3VDC			15mA 10mA	
Standby Current				0.75mA	1.5mA

Notes:

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

Note6: Measurements are made with a 0.1µF MLCC across output (low ESR)

ON/OFF CTRL Circuit



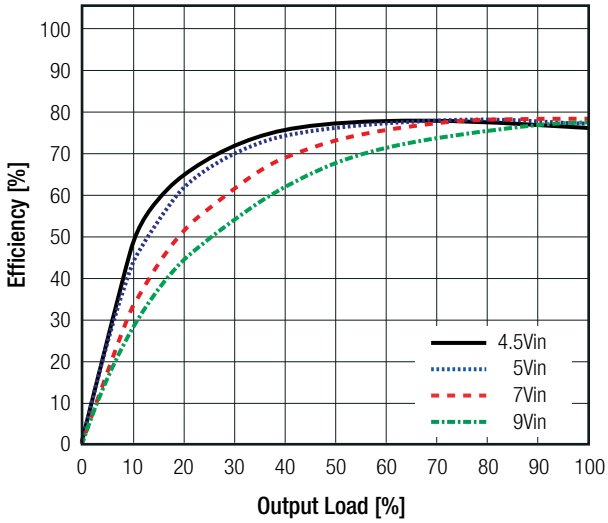
DC-DC ON: Open or 0VDC<V_{CTRL}<0.8VDC
DC-DC OFF: 2VDC<V_{CTRL}<6VDC

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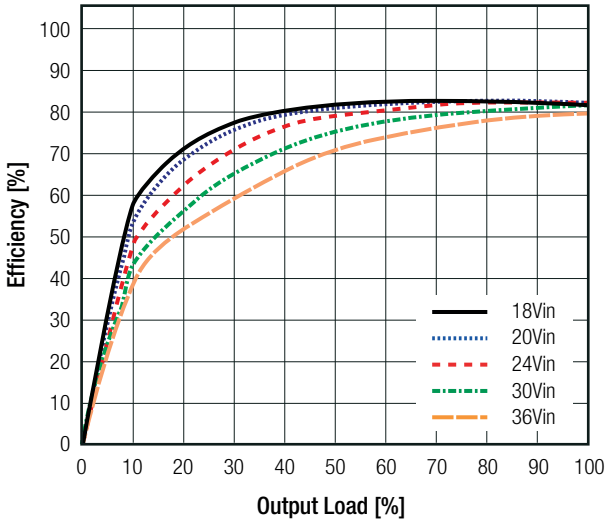
Specifications (measured @ Ta= 25°C, nominal Vin, full load unless otherwise specified)

Efficiency vs. Load

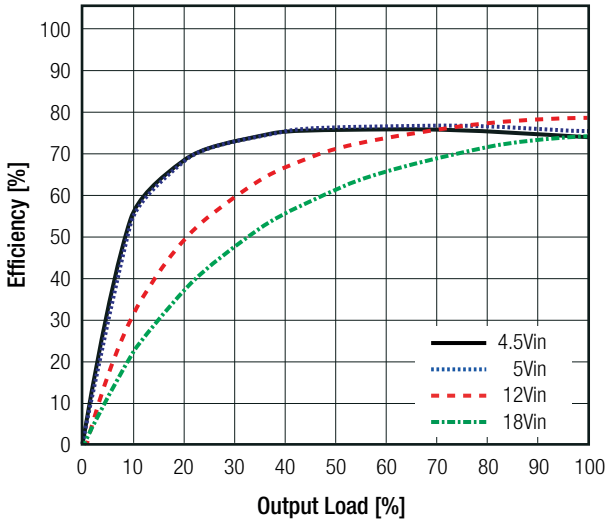
RSE-0505S/H2



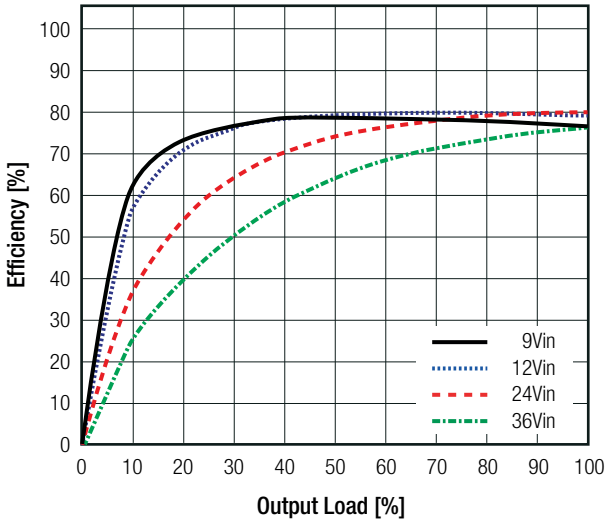
RSE-2405S/H2



RSE-1205SZ/H2



RSE-2405SZ/H2



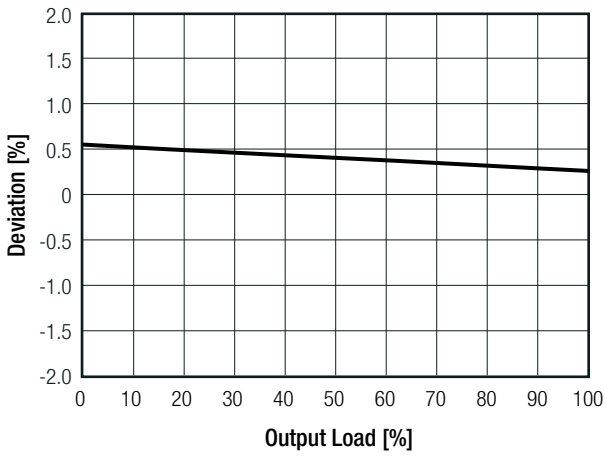
REGULATIONS			
Parameter	**Condition**		**Value**
Output Accuracy			±2.0% max.
Line Regulation	low line to high line, full load	2:1 input 4:1 input (suffix "Z")	±0.2% max. ±0.5% typ.
Load Regulation	0% to 100% load	2:1 input 4:1 input (suffix "Z")	0.5% max. 0.5% typ.

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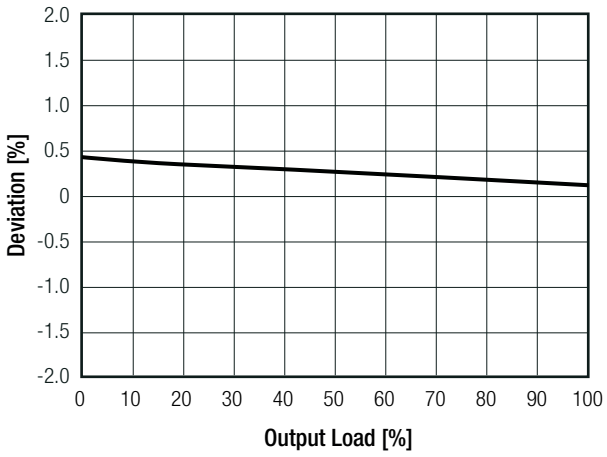
Specifications (measured @ Ta= 25°C, nominal Vin, full load unless otherwise specified)

Deviation vs. Load

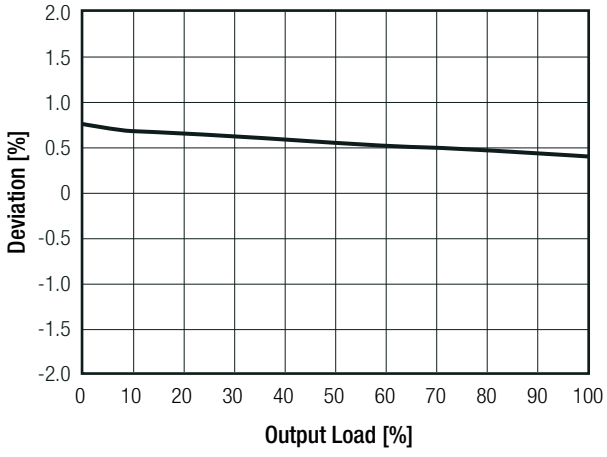
RSE-0505S/H2



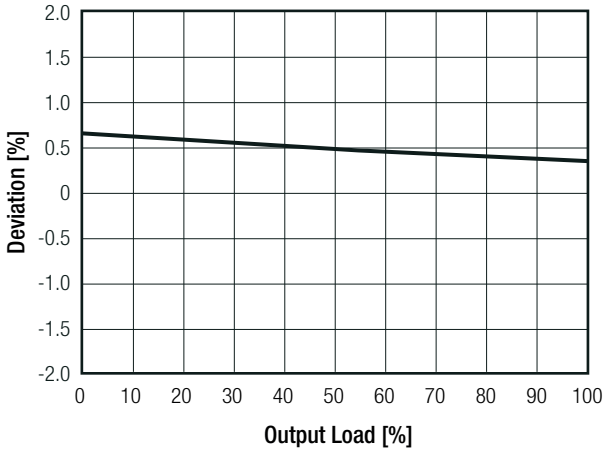
RSE-2405S/H2



RSE-1205SZ/H2



RSE-2405SZ/H2



PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)	below 100mΩ		continuous, auto recovery
Isolation Voltage [7]	I/P to O/P	tested for 1 minute	2kVDC
Isolation Resistance			1GΩ min.
Isolation Capacitance			100pF max.
Insulation Grade			functional

Notes:

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

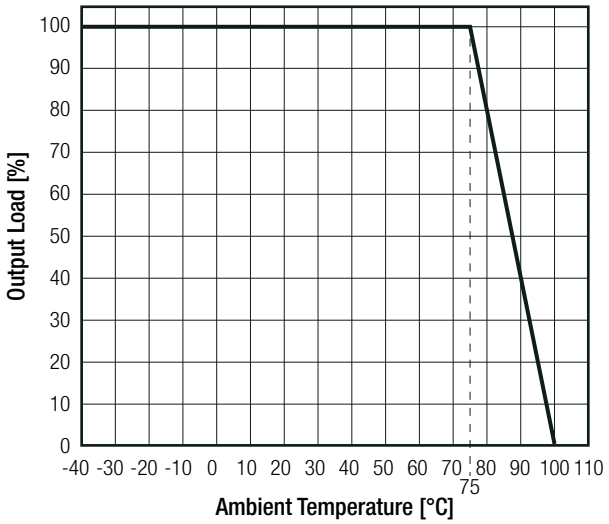
Note8: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

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

ENVIRONMENTAL				
Parameter	**Condition**			**Value**
Operating Temperature Range	without derating (refer to ***"Derating Graph")***			-40°C to +75°C
Maximum Case Temperature				+105°C
Temperature Coefficient				±0.05%/K
Operating Altitude				5000m
Operating Humidity	non-condensing			5% - 95% RH max.
Pollution Degree				PD2
Vibration				MIL-STD-202G
MTBF	according to MIL-HDBK-217F, G.B.	2:1 input	+25°C +75°C	2289 x 10^3 hours 781 x 10^3 hours
		4:1 input (suffix "Z")	+25°C +75°C	1769 x 10^3 hours 683 x 10^3 hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)



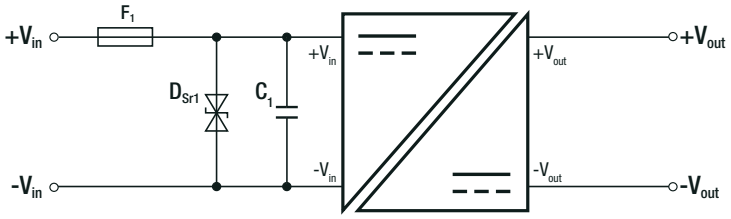
SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	**Report / File Number**	**Standard**
Information Technology Equipment, General Requirements for Safety	E224736-A48	UL60950-1, 2nd Edition, 2014 CSA C22.2 No. 60950-1-07, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements		UL62368-1, 2nd Edition, 2014 CSA C22.2 Nr. 62368-1-14, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements (CB Scheme)	L0339m37-CB-1-B1	IEC/EN62368-1, 2nd Edition, 2014
RoHS2		RoHS 2011/65/EU + AM2015/863

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

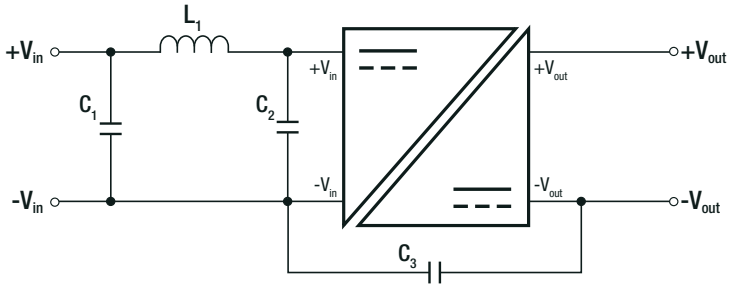
EMC Compliance	Conditions	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter (see filter suggestion below)	EN55032, Class A EN55032, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024, 2015
ESD Electrostatic discharge immunity test	±8kV Air; ±4kV Contact	IEC61000-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	IEC61000-4-3, Criteria A
Fast Transient and Burst Immunity	DC Power Port: ±0.5kV	IEC61000-4-4, Criteria A
Surge Immunity	DC Power Port: ±0.5kV	IEC61000-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	DC Power Port: 3V	IEC61000-4-6, Criteria A
Power Magnetic Field	50Hz, 1A/m	IEC61000-4-8, Criteria A

Surge Protection Circuit according to EN61000-4-5, Criteria A



Model	D_{Sr1}	C_1
RSE-0505S/H2	P4SMAJ11A	N/A
RSE-2405S/H2	P4SMAJ18A	220µF/100V
RSE-1205SZ/H2	P4SMAJ36A	470µF/100V
RSE-2405SZ/H2	P4SMAJ36A	470µF/100V

EMC Filtering Suggestions for EN55032

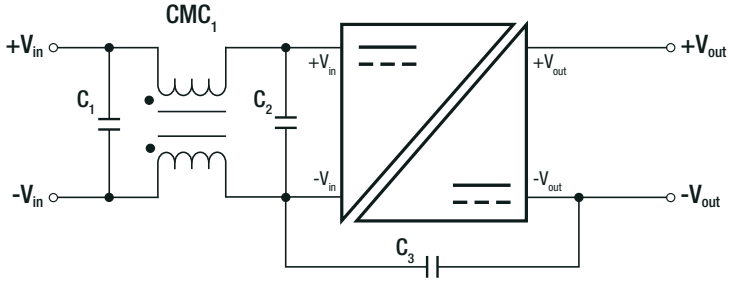


Component List Class A

Model	C1	C2	C3	L1
RSE-0505S/H2	22µF/50V MLCC	22µF/50V MLCC	N/A	3µH choke
RSE-2405S/H2				

Component List Class A

Model	C1	C2	C3	L1
RSE-1205SZ/H2	22µF/50V MLCC	22µF/50V MLCC	150pF/3kV	3µH choke
RSE-2405SZ/H2				



Component List Class B

Model	C1	C2	C3	CMC1
RSE-0505S/H2	22µF/50V MLCC	22µF/50V MLCC	1000pF/3kV	0.45mH CMC
RSE-2405S/H2				

Component List Class B

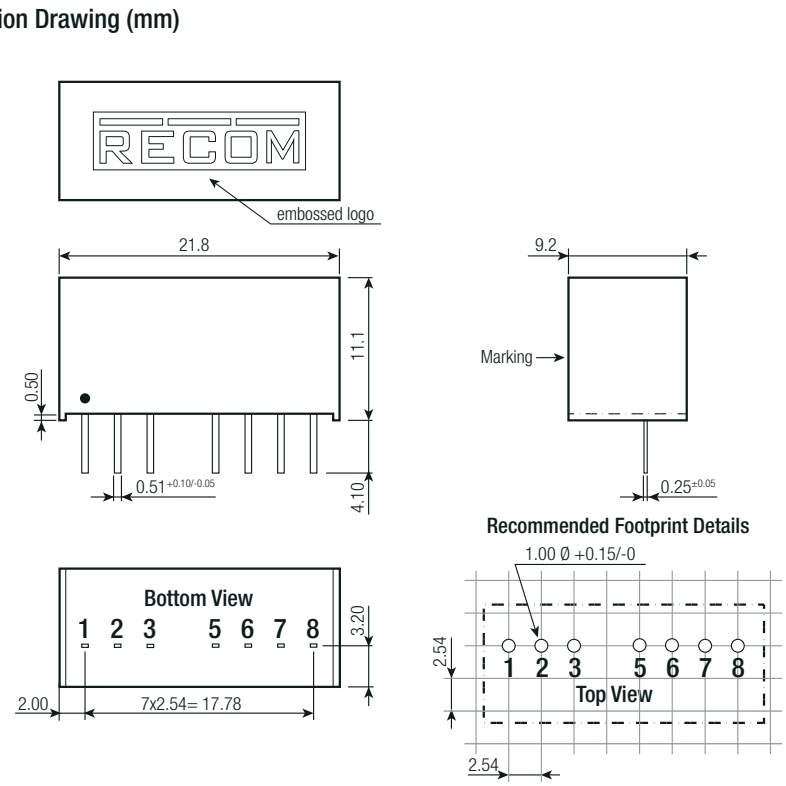
Model	C1	C2	C3	CMC1
RSE-1205SZ/H2	22µF/50V MLCC	22µF/50V MLCC	1000pF/3kV	0.45mH CMC
RSE-2405SZ/H2				

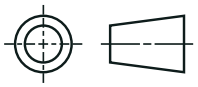
Specifications (measured @ Ta= 25°C, nominal Vin, full load unless otherwise specified)

DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case potting PCB	non-conductive black plastic (UL94V-0) epoxy (UL94V-0) FR4 (UL94V-0)
Dimension (LxWxH)		21.8 x 9.2 x 11.1mm
Weight		4.7g typ.

Dimension Drawing (mm)





Pinning Information

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

NC= no connection
Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

PACKAGING INFORMATION

Packaging Dimension (LxWxH)	tube	520.0 x 11.2 x 18.2mm
Packaging Quantity		22pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	5% - 95% RH max.

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