

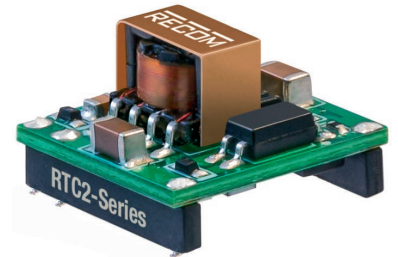
# Features

# Regulated Converters

- 2:1 Wide input range regulated converter
- 2W in compact SMD package
- -40°C to +85°C operating temperature @ full load
- High 3kVDC/1 second (1kVAC/1 minute)
- Continuous short circuit protection
- IEC/EN62368-1 certified (CB scheme)

## RTC2

**2 Watt  
SMD  
Single Output**



### Description

The RTC2 is a 2W, open-frame, SMD, isolated DC/DC converter with 2:1 input voltage range. It is available with 5V (4.5-9V) or 24V (18-36V) inputs and offers a single 5V output which is short circuit protected. The output is tightly regulated with less than 50mV output ripple. There is no minimum load requirement. The operating temperature is -40°C up to 100°C (with derating). Isolation is 3kVDC/1kVAC (functional Isolation) and a control pin is fitted as standard. The converter is IEC/EN62368-1 certified and is 10/10 RoHS-conform. Class B EMC conformity can be reached with a simple external LC filter.

### Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
RTC2-0505SRW	4.5 - 9	5	400	76	4700
RTC2-2405SRW	18 - 36	5	400	80	4700

#### 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



#### Notes:

Note3: without suffix, standard tray packaging  
add suffix „-R“ for Tape and Reel packaging

#### Ordering Examples:

RTC2-0505SRW = nom.Vin=5VDC, nom. Vout= 5VDC, standard 3kVDC/1 second isolation, tray packaging  
RTC2-2405SRW-R = nom.Vin= 24DC, nom. Vout= 5VDC, standard 3kVDC/1 second isolation, tape and reel packaging

### Specifications (measured @ Ta= 25°C, nominal Vin, full load and after warm up unless otherwise specified)

BASIC CHARACTERISTICS					
Parameter	Condition	Min.	Typ.	Max.	
Internal Input Filter				capacitor	
Input Voltage Range	nom. Vin= 5VDC 24VDC	4.5VDC 18VDC	5VDC 24VDC	9VDC 36VDC	
Input Surge Voltage	100ms max. nom. Vin= 5VDC 24VDC		15VDC 50VDC		
Quiescent Current	nom. Vin= 5VDC 24VDC		40mA 3mA		

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IEC/EN62368-1 certified  
CB Report  
EN55022

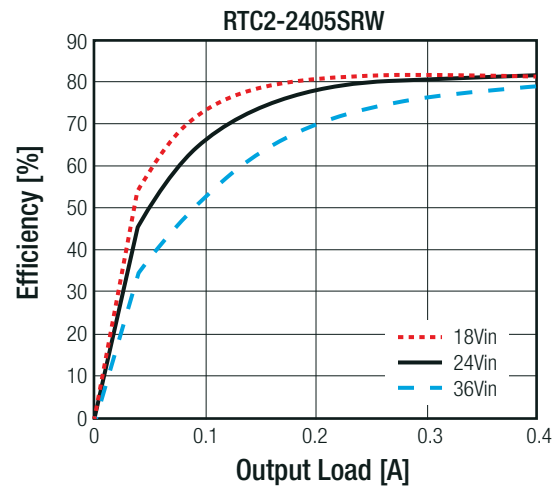
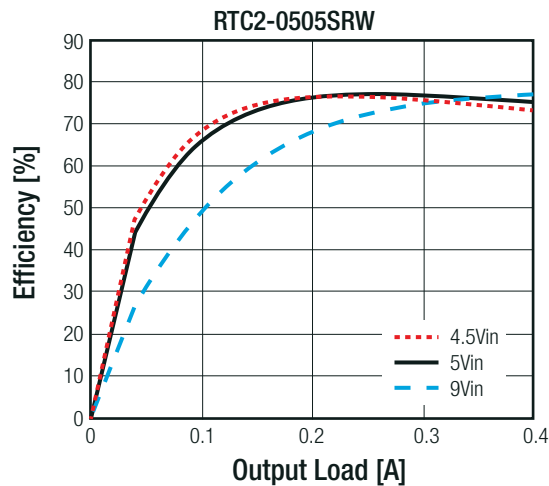
**Specifications** (measured @ Ta= 25°C, nominal Vin, full load and after warm up unless otherwise specified)

Parameter	Condition	Min.	Typ.	Max.
Start-up time			500µs	
Rise Time			450µs	
Hold-up Time			10µs	
Internal Operating Frequency	nom Vin= 5VDC 24VDC		180kHz 210kHz	
Minimum Load		0%		
Output Ripple and Noise <sup>(4)</sup>	20MHz BW			50mVp-p
ON/OFF CTRL	DC-DC ON DC-DC OFF			Open or 0.0V<Vr<0.8VDC 2V<Vr<6VDC
Input Current of CTRL Pin	nom Vin= 5VDC 24VDC		40mA 16mA	
Standby Current			0.75mA	1.5mA

**Notes:**

Note4: Measurements are made with a 0.1µF MLCC across output. (low ESR)

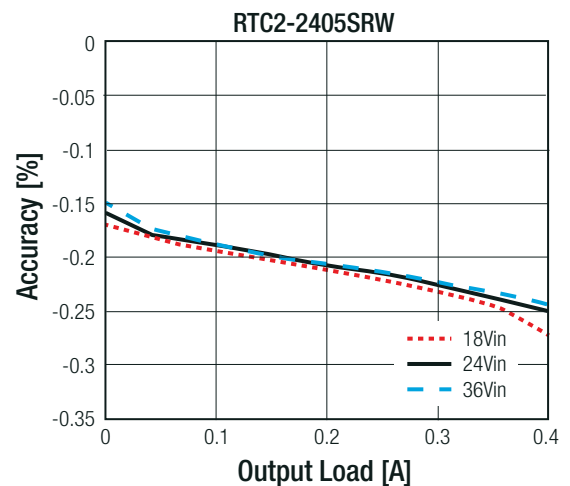
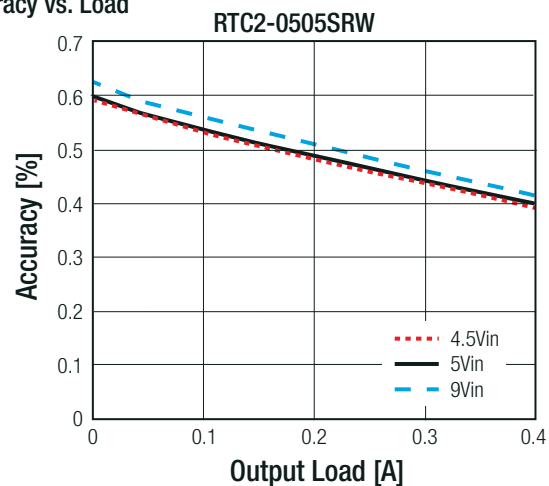
**Efficiency vs. Load**



**REGULATIONS**

Parameter	Condition	Value
Output Accuracy		±2.0% typ.
Line Regulation	low line to high line, full load	±0.2% max.
Load Regulation	0% to 100% load	±0.5% max.

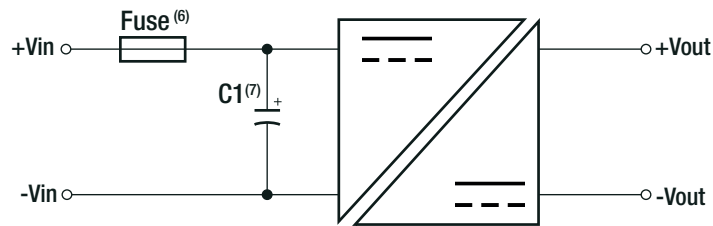
**Accuracy vs. Load**



**Specifications** (measured @ Ta= 25°C, nominal Vin, full load and after warm up unless otherwise specified)

PROTECTIONS			
Parameter	Type	Value	
Short Circuit Protection (SCP)	below 100mΩ	continuous, auto recovery	
Isolation Voltage <sup>(6)</sup>	I/P to O/P	tested for 1 second	3kVDC
		rated for 1 minute	1kVAC <sup>(7)</sup>
Isolation Resistance		1GΩ min.	
Isolation Capacitance		25pF typ.	
Insulation Grade		functional	

**Protection Circuit**



**Notes:**

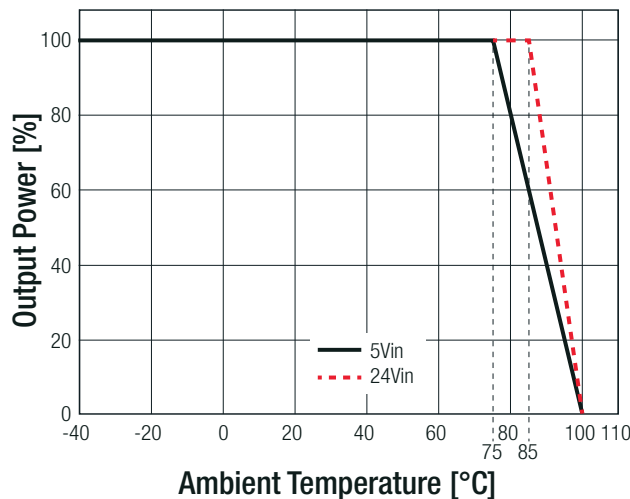
- Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage
- Note6: An input fuse is required if the main supply is not over-current protected. Recommended fuse: T2A slow blow type
- Note7: An external input filter capacitor is required if the model has to meet EN6100-4-4 and EN61000-4-5  
Recom suggested: Nippon chemi-con KY Series, 220µF/100V ESR 48mΩ

**ENVIRONMENTAL**

Parameter	Condition	Value
Operating Temperature Range	with derating (see graph)	-40°C to +100°C
Temperature Coefficient		±0.05%/°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	2145 x 10 <sup>3</sup> hours

**Derating Graph**

(@ Chamber and natural convection 0.1 m/s)



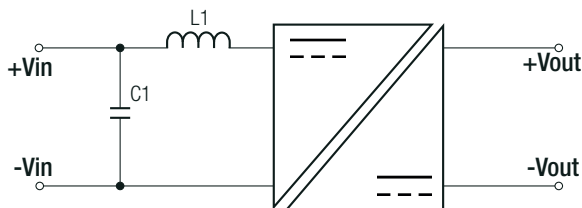
**Specifications** (measured @ Ta= 25°C, nominal Vin, full load and after warm up unless otherwise specified)

### SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Audio/Video, information and communication technology equipment - Safety requirements (CB Scheme)	L0339m43-CB-1-B1	IEC62368-1, 2nd Edition, 2014 EN62368-1, 2014
RoHS2		RoHS-2011/65/EU + AM2 (10/10)

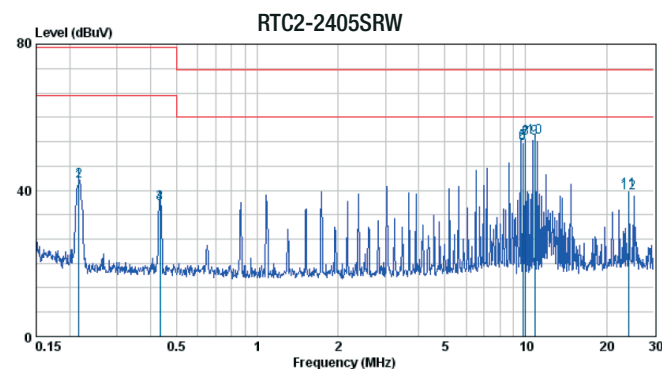
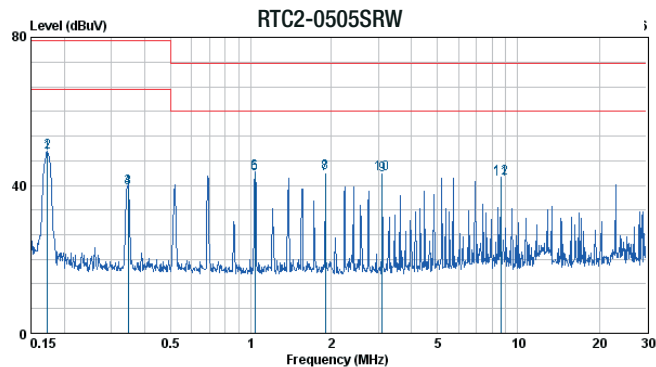
EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external filter (see filter suggestion below)	EN55022, Class A EN55022, Class B
Electromagnetic compatibility of multimedia equipment - Emission requirements		EN55032, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024
ESD Electrostatic discharge immunity test	Air: ±8kV; Contact: ±4kV	EN61000-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	EN61000-4-3, Criteria A
Fast Transient and Burst Immunity	DC Port: ±0.5kV	EN61000-4-4, Criteria A
Surge Immunity	DC Port: ±1kV	EN61000-4-5, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	DC Port: 3V	EN61000-4-6, Criteria A
Power Magnetic Field Immunity	50Hz 1A/m	EN61000-4-8, Criteria A

### EMC Filtering Suggestions according to EN55022 Class A



nom. Vin	C1	L1
5VDC	22µF/16V MLCC	12µH SMD Inductor
24VDC	22µF/50V MLCC	22µH SMD Inductor

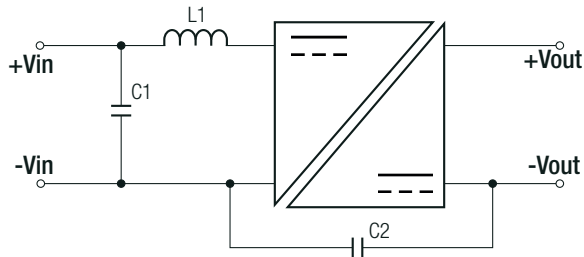
### EN55022 Class A Conducted Emissions



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**Specifications** (measured @ Ta= 25°C, nominal Vin, full load and after warm up unless otherwise specified)

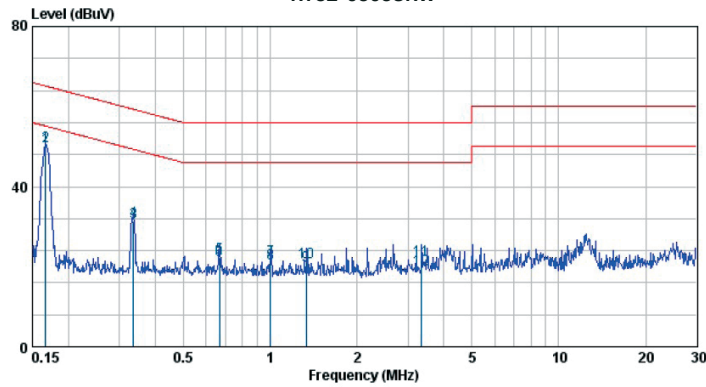
### EMC Filtering Suggestions according to EN55022 Class B



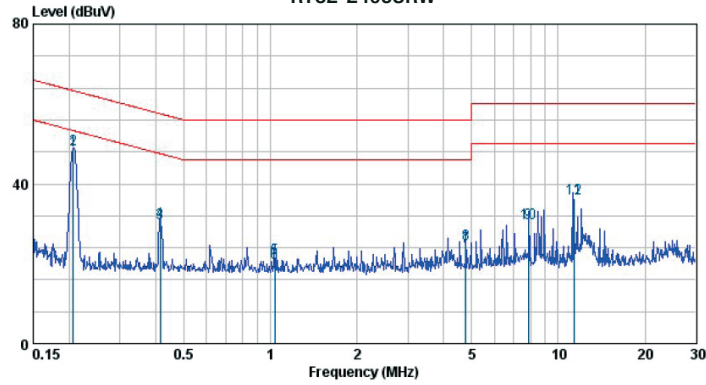
nom. Vin	C1	C2	L1
5VDC	22μF/16V MLCC	220pF/4kV	12μH SMD Inductor
24VDC	22μF/50V MLCC	Disc ceramic	

### EN55022 Class B Conducted Emissions

RTC2-0505SRW



RTC2-2405SRW



### DIMENSION and PHYSICAL CHARACTERISTICS

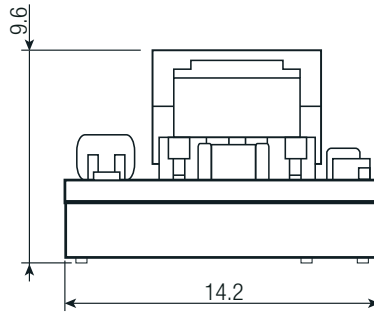
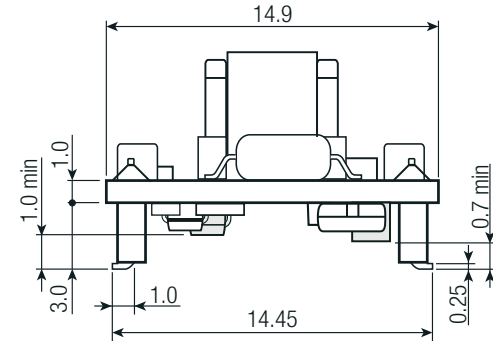
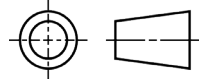
Parameter	Type	Value
Material	case (spacers) PCB	plastic (JL94 V-0) FR4 (JL94 V-0)
Dimension (LxWxH)		14.99 x 14.22 x 9.6mm
Weight		2.0g typ.

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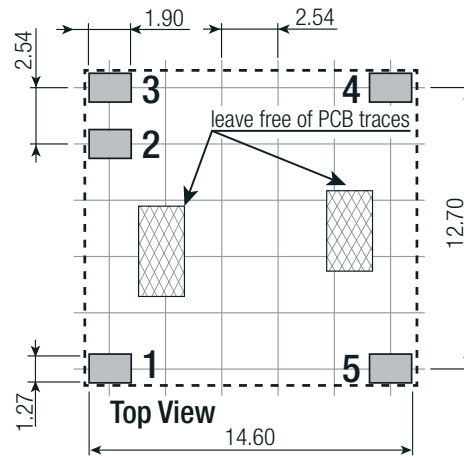
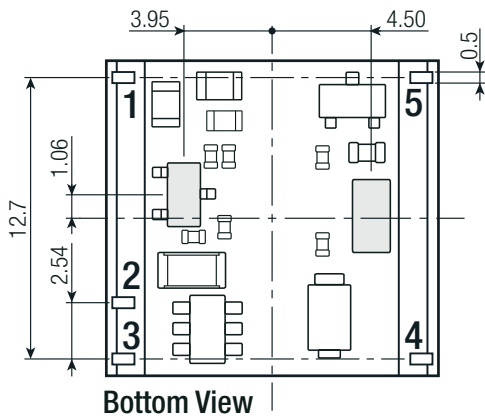
**Specifications** (measured @  $T_a = 25^\circ\text{C}$ , nominal  $V_{in}$ , full load and after warm up unless otherwise specified)

### Derating Graph

(@ Chamber and natural convection 0.1 m/s)



### Recommended Footprint Details



### Pin Connection

Pin #	Function
1	+Vin
2	-Vin
3	CTRL
4	+Vout
5	-Vout

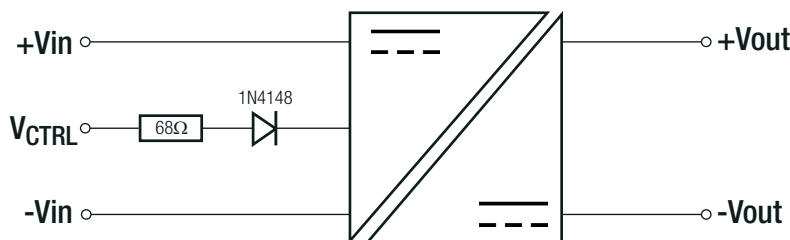
Tolerance: xx.x±0.5mm

xx.xx ±0.25mm

Pin dimension: ±0.1mm

## INSTALLATION and APPLICATION

### ON/OFF CTRL Circuit

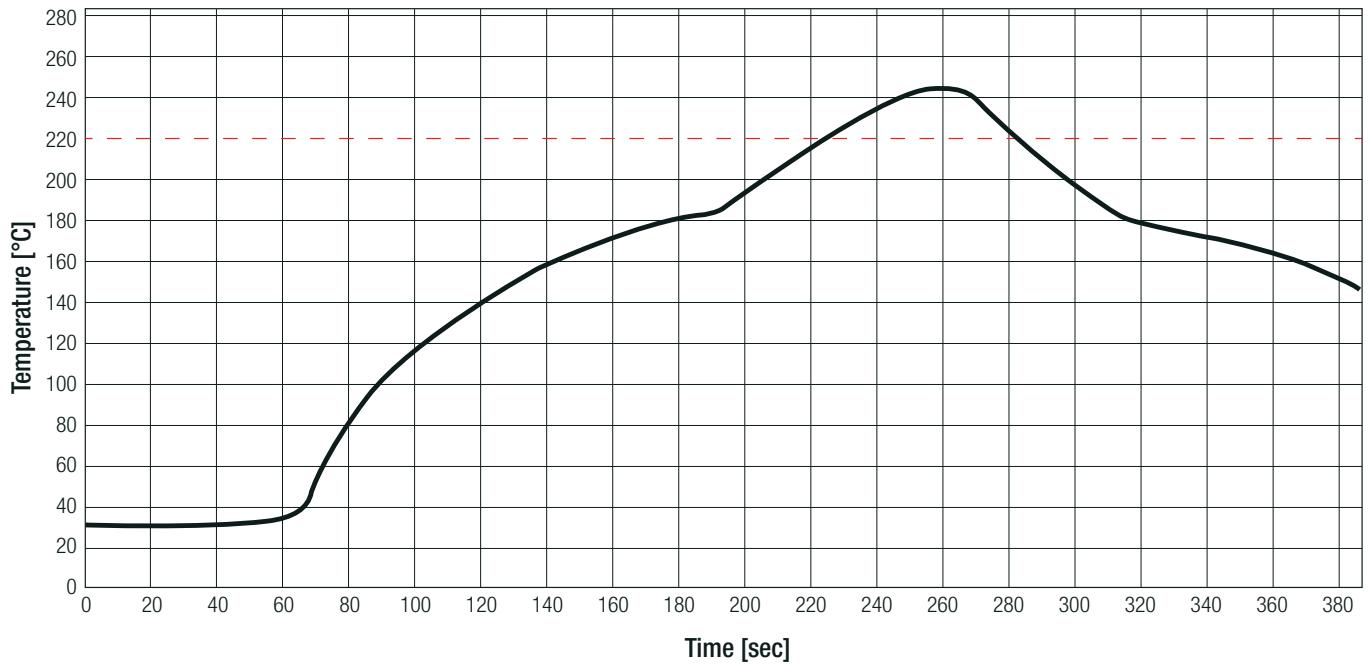


DC-DC ON: Open or  $0V < V_r < 0.8V_{DC}$   
 DC-DC OFF:  $2V < V_r < 6V_{DC}$

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**Specifications** (measured @ Ta= 25°C, nominal Vin, full load and after warm up unless otherwise specified)

**Lead-free Recommended Solder Profile according to JEDEC STD-020D-01**



**PACKAGING INFORMATION**

Packaging Dimension (LxWxH)	tray carton	260.0 x 205.0 x 25.0mm
	tray	240.0 x 200.0 x 20.0mm
	tape and reel (-R) carton	385.0 x 375.0 x 70.0mm
	reel	330.0 x 50.0 x 330.0mm
Packaging Quantity	tray	30pcs
	tape and reel (-R)	200pcs
Tape Width		44mm
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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