



**THE DATASHEET OF
R15P12S/X2**



Features

- Qualified with 65kV/ μ s @ Vcommon mode =1KV
- UL/CSA and IEC/EN safety certified
- High isolation 6.4kVDC/1s
- Optional continuous short circuit protection
- /X2 version with >9mm input/output clearance
- Suitable for IGBT applications

Unregulated Converters

RxxPxx

**1 Watt
SIP7
Single and Dual
Output**

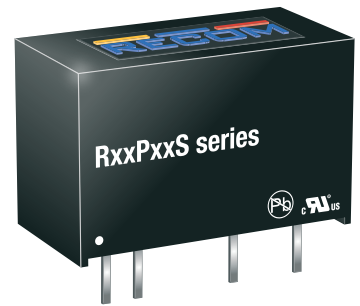


Description

The RxxPxxS_D Series of DC/DC Converters are certified to UL/CSA60950-1 as well as EN60950-1. This makes them ideal for safety applications where approved isolation is required.

Selection Guide

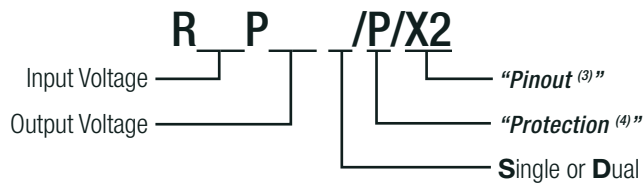
| Part Number | nom. Input Voltage [VDC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ. ⁽¹⁾ [%] | max. Capacitive Load ⁽²⁾ [μ F] |
|---------------------------|--------------------------|----------------------|---------------------|------------------------------------|--|
| RxxP3.3S ^(3,4) | 5, 9, 12, 15, 24 | 3.3 | 303 | 70 | 2200 |
| RxxP05S ^(3,4) | 5, 9, 12, 15, 24 | 5 | 200 | 70 - 75 | 1000 |
| RxxP09S ^(3,4) | 5, 9, 12, 15, 24 | 9 | 111 | 70 - 75 | 1000 |
| RxxP12S ^(3,4) | 5, 9, 12, 15, 24 | 12 | 84 | 70 - 75 | 470 |
| RxxP15S ^(3,4) | 5, 9, 12, 15, 24 | 15 | 66 | 75 - 80 | 470 |
| RxxP3.3D ⁽⁴⁾ | 5, 9, 12, 15, 24 | \pm 3.3 | \pm 151 | 70 | \pm 1000 |
| RxxP05D ⁽⁴⁾ | 5, 9, 12, 15, 24 | \pm 5 | \pm 100 | 70 - 75 | \pm 470 |
| RxxP09D ⁽⁴⁾ | 5, 9, 12, 15, 24 | \pm 9 | \pm 55 | 70 - 75 | \pm 470 |
| RxxP12D ⁽⁴⁾ | 5, 9, 12, 15, 24 | \pm 12 | \pm 41 | 70 - 75 | \pm 220 |
| RxxP15D ⁽⁴⁾ | 5, 9, 12, 15, 24 | \pm 15 | \pm 33 | 75 - 80 | \pm 220 |
| RxxP1509D ⁽⁴⁾ | 12, 24 | +15/-9 | +33/-56 | 70 - 80 | \pm 220 |
| R05P1509D ⁽⁴⁾ | 5 | +15/-9 | \pm 42 | 70 - 80 | +68/-220 |



Notes:

- Note1: Efficiency is tested at nominal input and full load at +25°C ambient
 Note2: Max. Capacitive Load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter

Model Numbering



Notes:

- Note3: add suffix „/X2“ for single output with alternative pinout
 Note4: add suffix „P“ for continuous short circuit protection

Ordering Examples:

- R05P05S/P = 5V Input, 5V Output, Single Output, Continuous Short Circuit Protection
 R05P3.3D/P = 5V Input, 3.3V Output, Dual Output, Continuous Short Circuit Protection
 R05P05S/P/X2 = 5V Input, 5V Output, Single Output, Continuous Short Circuit Protection, Alternative Pinout

IEC/EN62368-1 certified
 UL/CSA60950-1 certified
 UL/CSA62368-1 certified
 EN55032 compliant
 CB Report



www.recom-power.com/eval-ref-boards

www.recom-power.com/bjier

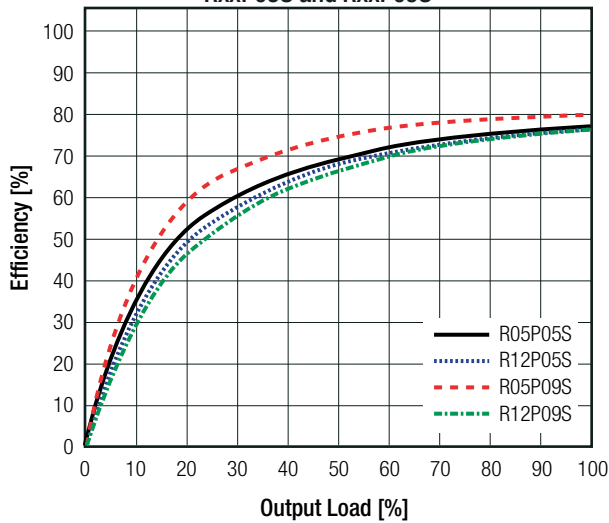
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

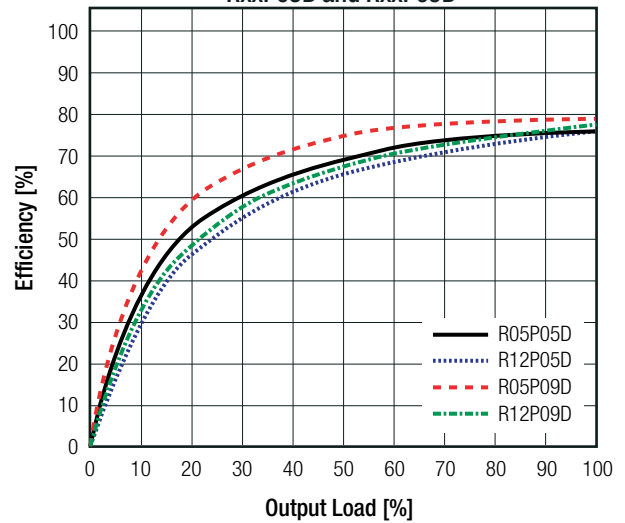
| Parameter | Condition | Min. | Typ. | Max. |
|------------------------------|------------------------|----------------|----------------|----------|
| Input Voltage Range | | | ±10% | |
| Minimum Load | | 0% | | |
| Internal Operating Frequency | all types PxxP1509D | 20kHz 20kHz | 50kHz 60kHz | 85kHz |
| Output Ripple and Noise | 20MHz BW | | | 200mVp-p |

Efficiency vs. Load

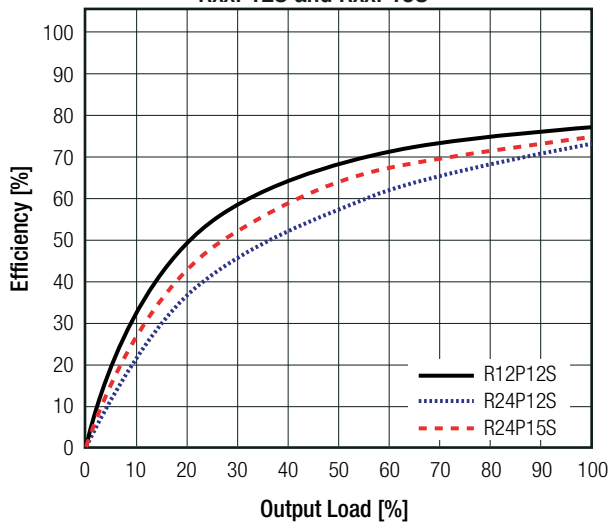
RxxP05S and RxxP09S



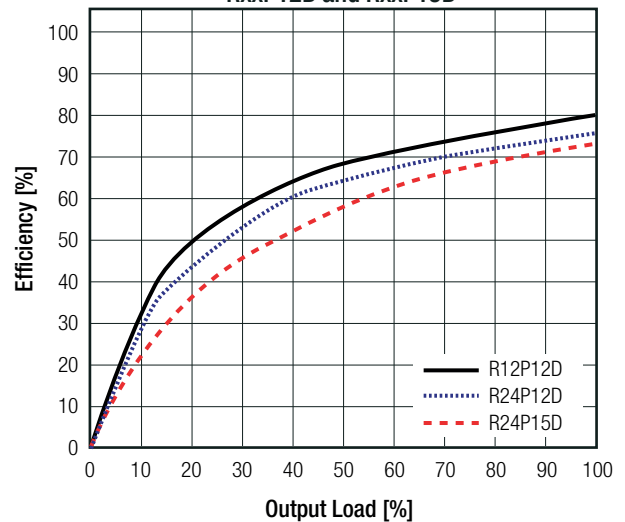
RxxP05D and RxxP09D



RxxP12S and RxxP15S



RxxP12D and RxxP15D



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 ⁽⁵⁾ | 10% to 100% load | 3.3, 5VDC 9, 12, 15VDC | 15% typ. 10% typ. |

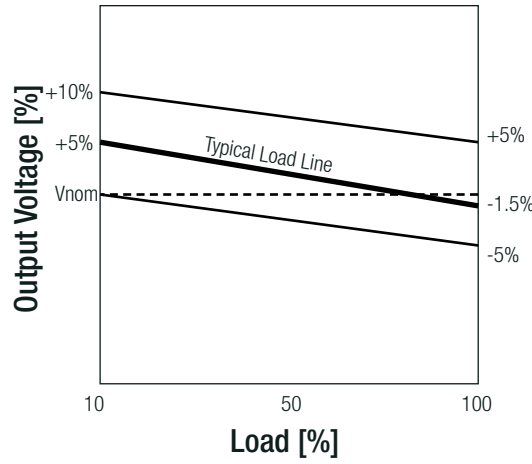
Notes:

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

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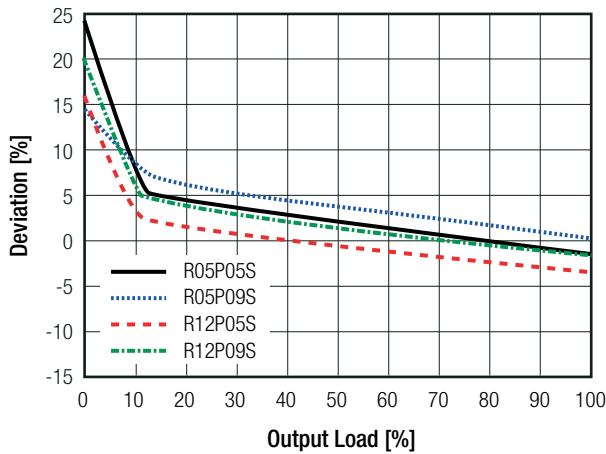
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Tolerance Envelope

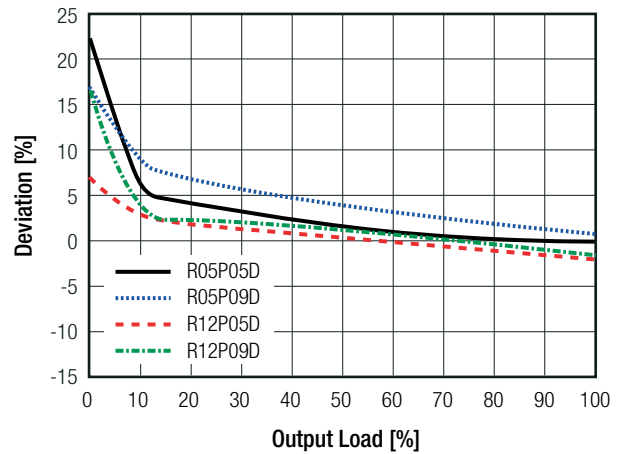


Deviation vs. Load

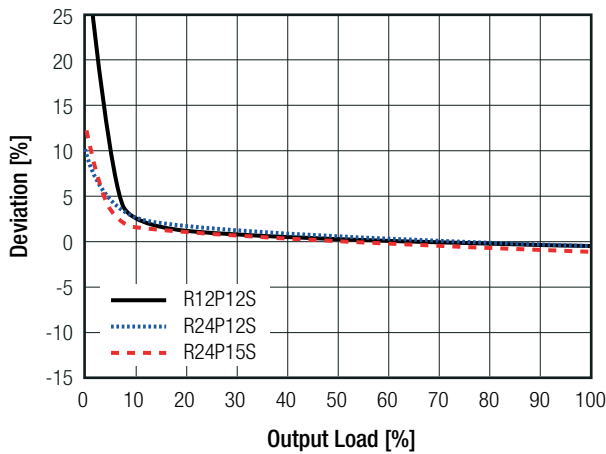
RxxP05S and RxxP09S



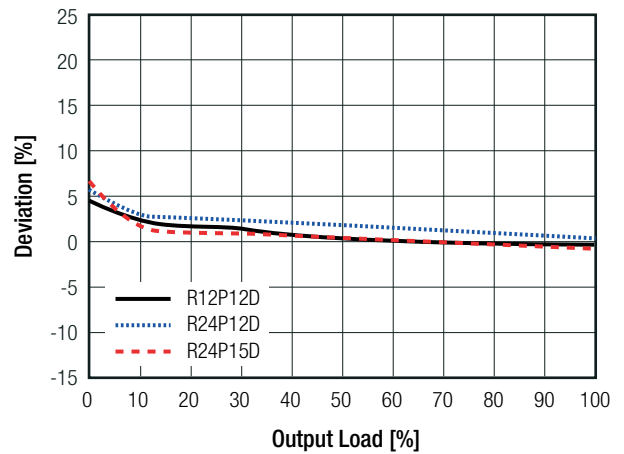
RxxP05D and RxxP09D



RxxP12S and RxxP15S



RxxP12D and RxxP15D



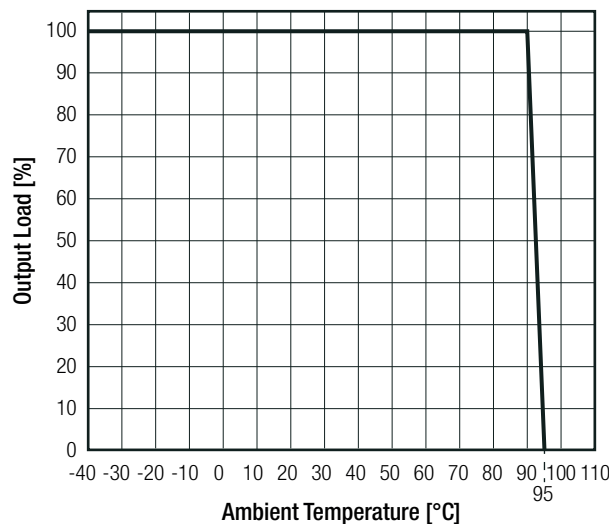
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| PROTECTIONS | | | |
|---|------------------------------------|------------------------|--------------|
| Parameter | Type | Value | |
| Short Circuit Protection (SCP) | without suffix with suffix "/P" | 1 second continuous | |
| Isolation Voltage ⁽⁶⁾ | I/P to O/P | tested for 1 second | 6.4kVDC |
| | | rated for 1 minute | 3.2kVAC/60Hz |
| | | working voltage | 250VACrms |
| Isolation Resistance | | 15GΩ min. | |
| Isolation Capacitance | | 4.0pF min. / 10pF max. | |
| Insulation Grade | according to 62368-1 | basic | |
| 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 required. Recommended fuse: slow blow type | | | |

| ENVIRONMENTAL | | | |
|-----------------------------|--|----------------|------------------------------|
| Parameter | Condition | Value | |
| Operating Temperature Range | without derating @ free air convection | -40°C to +90°C | |
| Operating Altitude | according to 62368-1 | 2000m | |
| | according to 60601-1 | 3000m | |
| Operating Humidity | non-condensing | 95% RH max. | |
| Pollution Degree | | PD2 | |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C | 2974 x 10 ³ hours |
| | | +85°C | 728 x 10 ³ hours |

Derating Graph

(@ Chamber and free air convection)

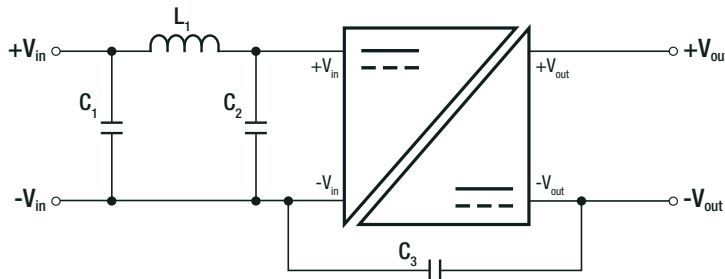


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| SAFETY AND CERTIFICATIONS | | |
|--|----------------------|--|
| Certificate Type (Safety) | Report / File Number | Standard |
| Information Technology Equipment, General Requirements for Safety | E224736-A56-UL | UL60950-1, 2nd Edition, 2014 CAN/CSA C22.2 No. 60950-1, 2nd Edition, 2014 |
| Information Technology Equipment, General Requirements for Safety | LVD1602031 | EN60950-1:2006 + A2:2013 IEC60950-1:2005 2nd Edition + A2:2013 |
| Audio/Video, information and communication technology equipment. Safety requirements | E224736-A56-UL | UL62368-1, 2nd Edition, 2014 CAN/CSA C22.2 No. 62368-1, 2nd Edition, 2014 |
| Audio/Video, information and communication technology equipment - Part1: Safety requirements | ATTCB106076 | EN62368-1: 2014 + A11:2017 |
| Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB Scheme) | | IEC62368-1:2014, 2nd Edition |
| Medical electrical equipment Part 1: General requirements for basic safety and essential performance | WD-SE-R-180541-A0 | EN60601-1:2006 + A12:2014 IEC60601-1:2005 + A1:2012, 3rd Edition |
| EAC | RU-AT.49.09571 | TP TC 004/2011 |
| RoHS2 | | RoHS-2011/65/EU + AM2015/863 |

| 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) |
|---------|------|-----|-------|-------------|
| R05P05S | 22µF | N/A | N/A | N/A |
| R05P12S | MLCC | | N/A | |
| R12P05S | 10µF | | 4.7µF | |
| R24P05S | MLCC | | MLCC | |

Component List Class B

| MODEL | C1 | L1 | C2 | C3 (safety) |
|---------|--------------|---|-----|-------------|
| R05P05S | 10µF MLCC | 22µH choke RLS-226 | N/A | 1nF |
| R05P12S | | | | |
| R12P05S | | | | |
| R24P05S | | | | |

Notes:

Note8: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

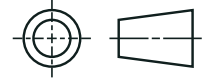
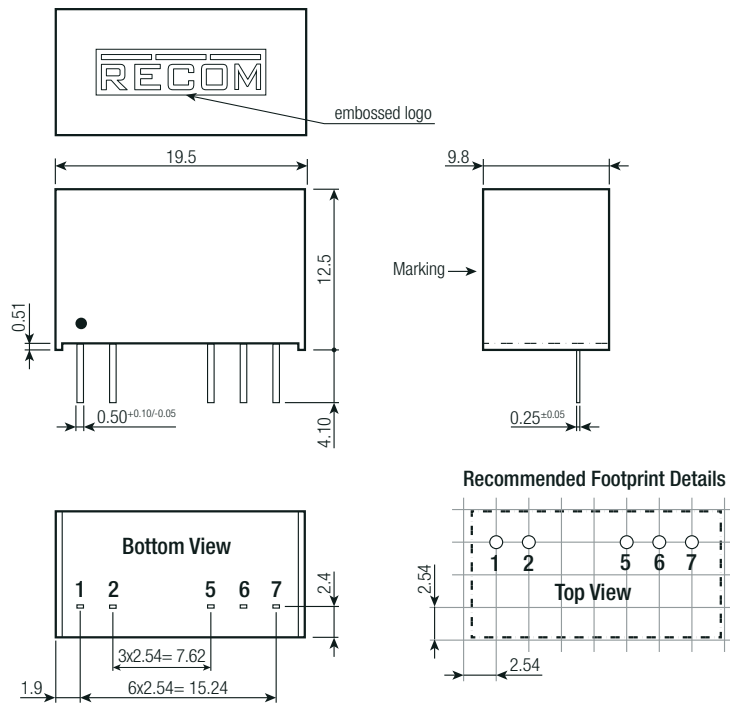
DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|-------------------|------------------------|--|
| Material | case potting PCB | non-conductive black plastic, (UL94 V-0) epoxy, (UL94 V-0) FR4, (UL94 V-0) |
| Dimension (LxWxH) | | 19.5 x 9.8 x 12.5mm |
| Weight | | 4.3g typ. |

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

Dimension Drawing (mm)



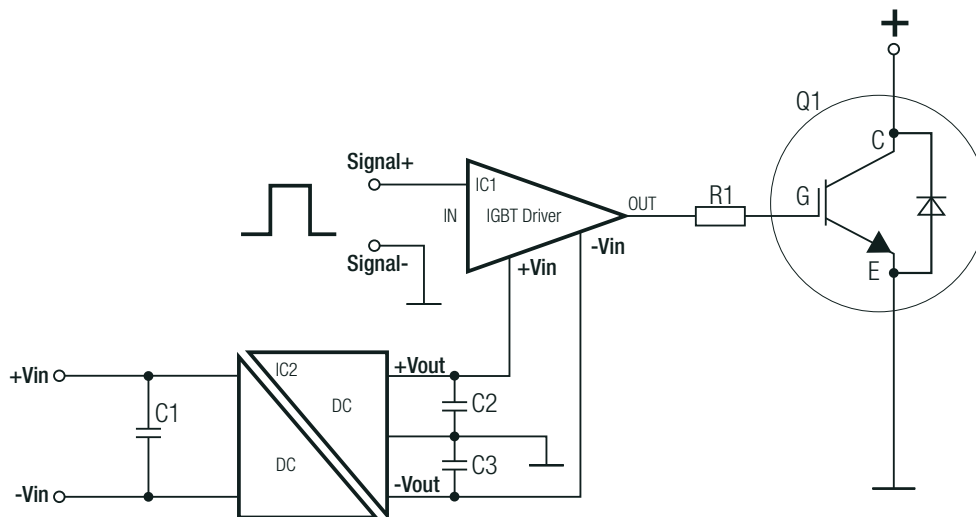
Pin Connection

| Pin # | Single | Dual | /X2 |
|-------|--------|-------|--------|
| 1 | +Vin | +Vin | +Vin |
| 2 | -Vin | -Vin | -Vin |
| 5 | -Vout | -Vout | No Pin |
| 6 | No Pin | Com | -Vout |
| 7 | +Vout | +Vout | +Vout |

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

INSTALLATION AND APPLICATION

IGBT Application Circuit



PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|------|-----------------------|
| Packaging Dimension (LxWxH) | tube | 520.0 x 22.3 x 12.0mm |
| Packaging Quantity | tube | 25pcs |
| Storage Temperature Range | | -55°C to +125°C |
| Storage Humidity | | 95% RH max. |

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.

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- ✓ Shortage Management
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