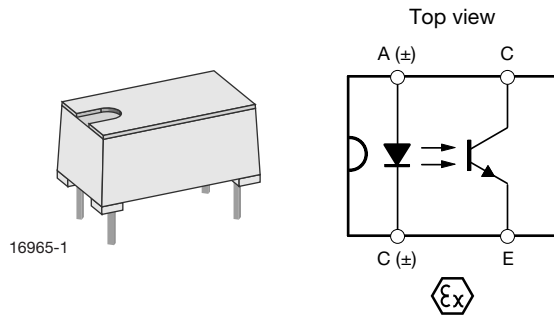


Optocoupler, Phototransistor Output, ATEX Certified



DESCRIPTION

The CNY65Exi consists of a phototransistor optically coupled to an infrared-emitting diode in a 4 pin plastic package. The components are mounted opposite one another, with a distance between input and output of > 3.0 mm; meeting the highest of safety requirements.

The CNY65Exi is ATEX certified for explosive atmospheres according to the Directive 2014/34/EU

AGENCY APPROVALS

- ATEX Ex : PTB 03 ATEX 2033 U
EN 60079-0 : 2012 + A11 : 2013
EN 60079-11 : 2012
EN 60079-26 : 2015

FEATURES

- ATEX certificate: PTB 03 ATEX 2033 U
www.vishay.com/doc?85361
- Suitable for intrinsic safe circuits for gas and dust
- Gas safety provision: II (1) G [Ex ia] IIC
- Dust safety provision: II (1) D [Ex ia] IIIC
- Conforms to EN 60079-0: 2012 + A11: 2013
- Qualified for continuously, longterm, or frequently dangerous explosive environments, zone 0
- Isolation voltage (V_{ISO}) of 11 600 V_{peak} for 1 minute
- Distance from emitter to detector through insulation ≥ 3 mm
- CTR from 50 % to 300 %
- Very low coupling capacity (C_K)
 - 0.3 pF superior noise immunity between input and output pins
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

- Electronics used in potentially explosive gas and dust environments
 - Safety related process automation and instrumentation
 - Natural gas metering and flow measurement
 - Power and motor switching
 - Power supplies, metering, and data acquisition
 - Lighting and signaling
 - Petrol and grain transport and storage

| ORDERING INFORMATION | | |
|--|------------------|-------------------|
| <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">C</div> <div style="border: 1px solid black; padding: 2px 5px;">N</div> <div style="border: 1px solid black; padding: 2px 5px;">Y</div> <div style="border: 1px solid black; padding: 2px 5px;">6</div> <div style="border: 1px solid black; padding: 2px 5px;">5</div> <div style="border: 1px solid black; padding: 2px 5px;">X</div> <div style="border: 1px solid black; padding: 2px 5px;">E</div> <div style="border: 1px solid black; padding: 2px 5px;">x</div> <div style="border: 1px solid black; padding: 2px 5px;">i</div> </div> <p style="text-align: center; margin-top: 5px;"> PART NUMBER CTR BIN PACKAGE OPTION </p> | | |
| AGENCY CERTIFIED/PACKAGE | CTR (%) | |
| ATEX | 50 to 300 | 100 to 200 |
| DIP-4, HV, high isolation distance | CNY65Exi | CNY65BExi |



| ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified) | | | | |
|---|---|-------------------|-------------|------|
| PARAMETER | CONDITION | SYMBOL | VALUE | UNIT |
| INPUT | | | | |
| Reverse voltage | | V _R | 5 | V |
| Forward current | | I _F | 75 | mA |
| Forward surge current | t _p ≤ 10 μs | I _{FSM} | 1.5 | A |
| Power dissipation | | P _{diss} | 120 | mW |
| Junction temperature | | T _j | 100 | °C |
| OUTPUT | | | | |
| Collector emitter voltage | | V _{CEO} | 32 | V |
| Emitter collector voltage | | V _{ECO} | 7 | V |
| Collector current | | I _C | 50 | mA |
| Collector peak current | t _p /T = 0.5, t _p ≤ 10 ms | I _{CM} | 100 | mA |
| Power dissipation | | P _{diss} | 130 | mW |
| Junction temperature | | T _j | 100 | °C |
| COUPLER | | | | |
| Total power dissipation | | P _{tot} | 250 | mW |
| Ambient temperature range | | T _{amb} | -55 to +85 | °C |
| Storage temperature range | | T _{stg} | -55 to +100 | °C |
| Soldering temperature | 2 mm from case, t ≤ 10 s | T _{slid} | 260 | °C |

Note

- Stresses in excess of the absolute Maximum Ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute Maximum Rating for extended periods of the time can adversely affect reliability

| ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified) | | | | | | |
|---|--|--------------------------------|------|------------------|------|------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| INPUT | | | | | | |
| Forward voltage | I _F = 50 mA | V _F | - | 1.25 | 1.6 | V |
| OUTPUT | | | | | | |
| Collector emitter voltage | I _C = 1 mA | V _{CEO} | 32 | - | - | V |
| Emitter collector voltage | I _E = 100 μA | V _{ECO} | 7 | - | - | V |
| Collector dark current | V _{CE} = 20 V, I _F = 0, E = 0 | I _{CEO} | - | - | 200 | nA |
| COUPLER | | | | | | |
| Isolation resistance | V _{IO} = 1 kV, 40 % relative humidity | R _{IO} ⁽¹⁾ | - | 10 ¹² | - | Ω |
| Collector saturation voltage | I _F = 10 mA, I _C = 1 mA | V _{CEsat} | - | - | 0.3 | V |
| Cut-off frequency | V _{CE} = 5 V, I _F = 10 mA, R _L = 100 Ω | f _c | 110 | - | - | kHz |
| Coupling capacitance | f = 1 MHz | C _k | - | 0.3 | - | pF |

Notes

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements
- ⁽¹⁾ Related to standard climate 23/50 DIN 50014

| CURRENT TRANSFER RATIO (T _{amb} = 25 °C, unless otherwise specified) | | | | | | | |
|---|---|-----------|--------|------|------|------|------|
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| I _C /I _F | V _{CE} = 5 V, I _F = 10 mA | CNY65Exi | CTR | 50 | 100 | 300 | % |
| | | CNY65BExi | CTR | 100 | - | 200 | % |

| SAFETY AND INSULATION RATINGS | | | | |
|--|---|-------------------|--------------------|-------------------|
| PARAMETER | | SYMBOL | VALUE | UNIT |
| Climatic classification | According to IEC 68 part 1 | | 40 / 85 / 21 | |
| Pollution degree | According to DIN VDE 0109 | | 2 | |
| Comparative tracking index | Insulation group IIIa | CTI | 475 | |
| Maximum rated withstanding isolation voltage | t = 1 min | V _{ISO} | 8200 | V _{RMS} |
| Maximum transient isolation voltage | | V _{IOTM} | 12 000 | V _{peak} |
| Maximum repetitive peak isolation voltage | | V _{IORM} | 1450 | V _{peak} |
| Isolation resistance | T _{amb} = 25 °C, V _{IO} = 500 V | R _{IO} | ≥ 10 ¹² | Ω |
| | T _{amb} = 100 °C, V _{IO} = 500 V | R _{IO} | ≥ 10 ¹¹ | Ω |
| | T _{amb} = T _S , V _{IO} = 500 V | R _{IO} | ≥ 10 ⁹ | Ω |
| Output safety power | | P _{SO} | 250 | mW |
| Input safety current | | I _{si} | 120 | mA |
| Input safety temperature | | T _S | 150 | °C |
| Creepage distance | | | ≥ 14 | mm |
| Clearance distance | | | ≥ 14 | mm |
| Insulation thickness | | DTI | ≥ 3 | mm |

Note

- According to DIN EN 60747-5-5 (see Fig. 2). This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits

| SWITCHING CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified) | | | | | | |
|--|---|------------------|------|------|------|------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Delay time | V _S = 5 V, I _C = 5 mA, R _L = 100 Ω, (see Fig. 1) | t _d | - | 2.6 | - | μs |
| Rise time | V _S = 5 V, I _C = 5 mA, R _L = 100 Ω, (see Fig. 1) | t _r | - | 2.4 | - | μs |
| Fall time | V _S = 5 V, I _C = 5 mA, R _L = 100 Ω, (see Fig. 1) | t _f | - | 2.4 | - | μs |
| Storage time | V _S = 5 V, I _C = 5 mA, R _L = 100 Ω, (see Fig. 1) | t _s | - | 0.3 | - | μs |
| Turn-on time | V _S = 5 V, I _C = 5 mA, R _L = 100 Ω, (see Fig. 1) | t _{on} | - | 5 | - | μs |
| Turn-off time | V _S = 5 V, I _C = 5 mA, R _L = 100 Ω, (see Fig. 1) | t _{off} | - | 3 | - | μs |
| Turn-on time | V _S = 5 V, I _F = 10 mA, R _L = 1 kΩ, (see Fig. 2) | t _{on} | - | 25 | - | μs |
| Turn-off time | V _S = 5 V, I _F = 10 mA, R _L = 1 kΩ, (see Fig. 2) | t _{off} | - | 42.5 | - | μs |

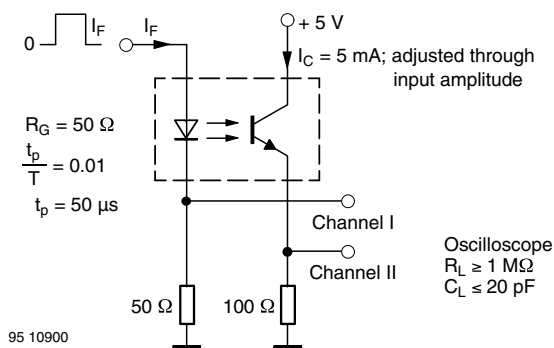


Fig. 1 - Test Circuit, Non-Saturated Operation

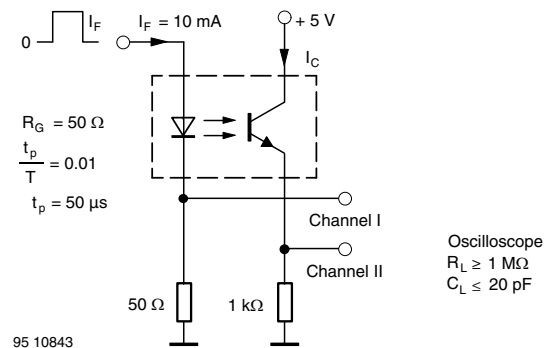


Fig. 2 - Test Circuit, Saturated Operation

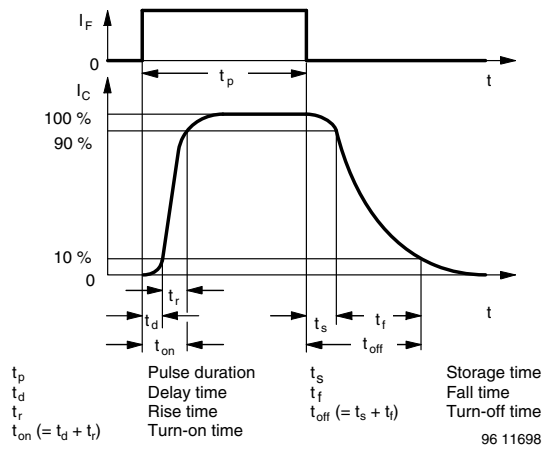


Fig. 3 - Switching Times

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified)

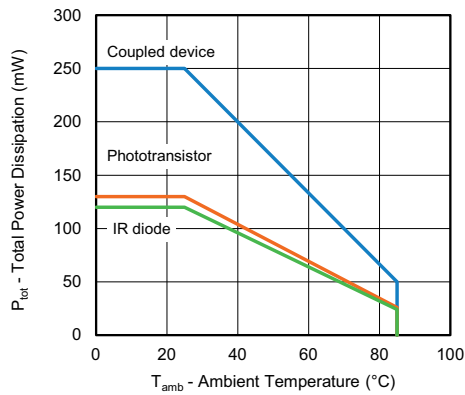


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

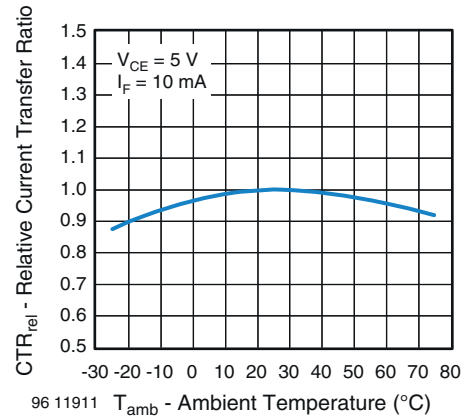


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

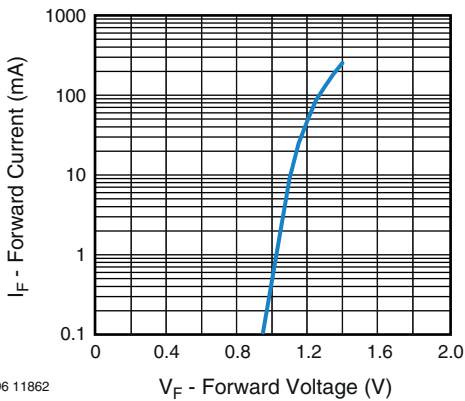


Fig. 5 - Forward Current vs. Forward Voltage

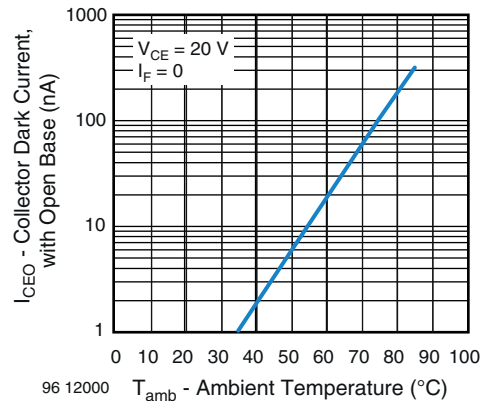


Fig. 7 - Collector Dark Current vs. Ambient Temperature

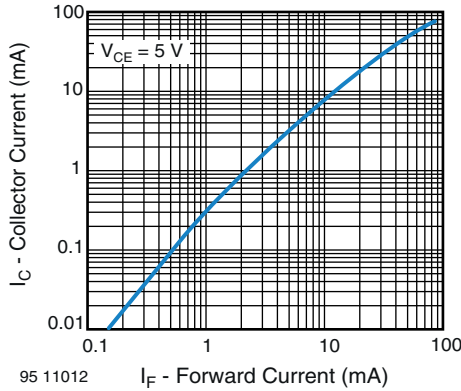


Fig. 8 - Collector Current vs. Forward Current

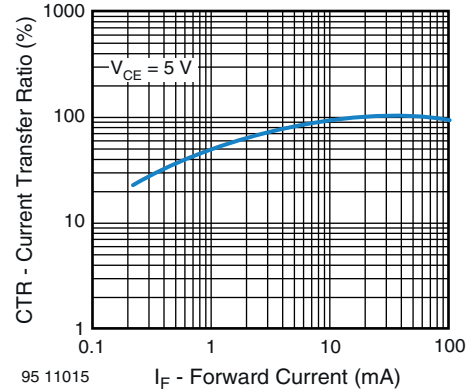


Fig. 11 - Current Transfer Ratio vs. Forward Current

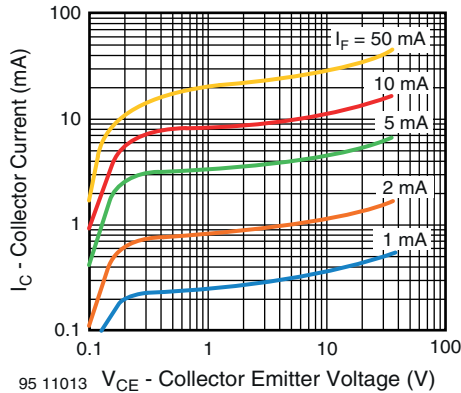


Fig. 9 - Collector Current vs. Collector Emitter Voltage

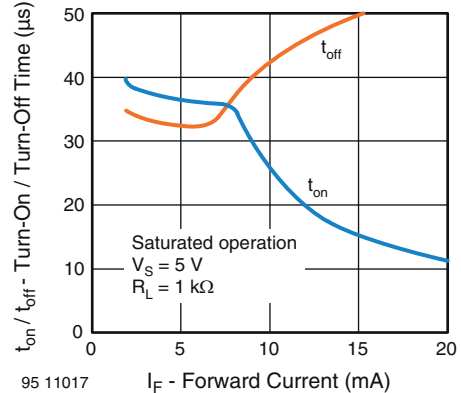


Fig. 12 - Turn-On / Turn-Off Time vs. Forward Current

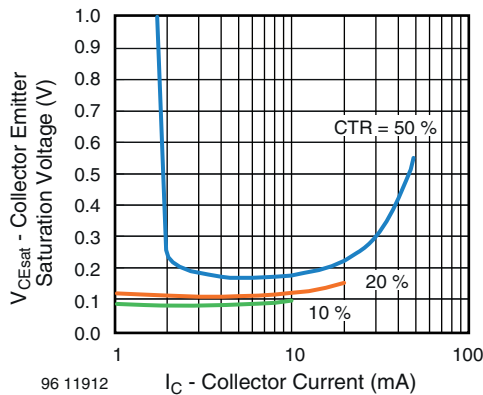


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

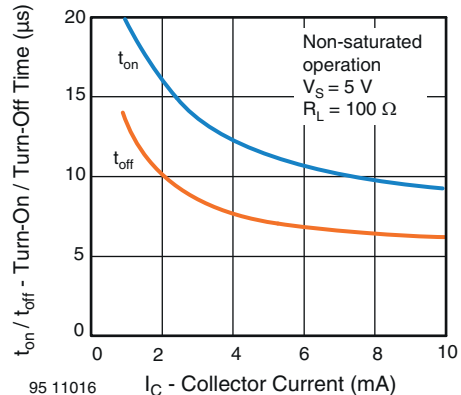
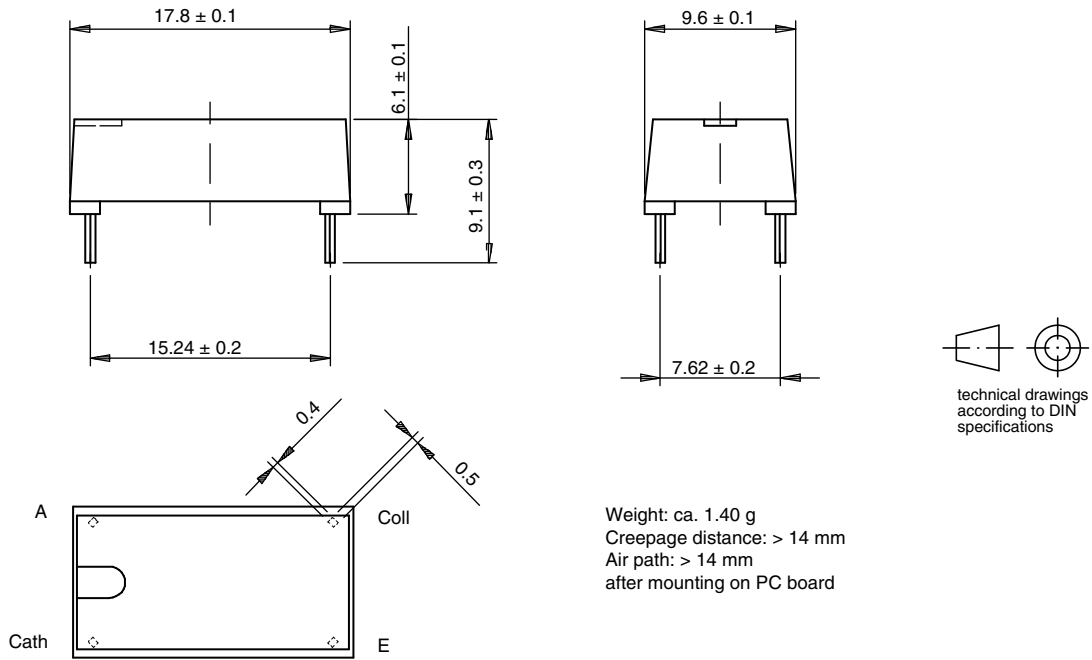


Fig. 13 - Turn-On / Turn-Off Time vs. Collector Current

PACKAGE DIMENSIONS (in millimeters)



Weight: ca. 1.40 g
 Creepage distance: > 14 mm
 Air path: > 14 mm
 after mounting on PC board

Drawing-No.: 6.544-5036.01-1
 Issue: 2; 10.11.98
 14763

PACKAGE MARKING (example of CNY65BExi)

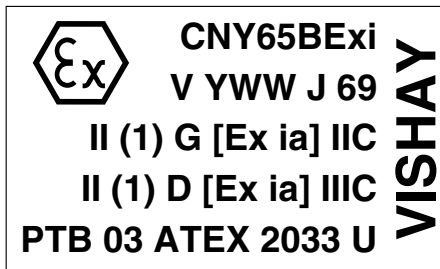


Fig. 14 - Top Marking

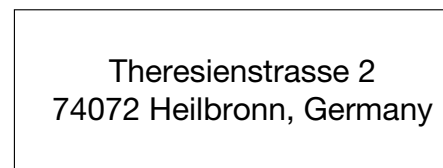


Fig. 15 - Side Marking

| TUBE INFORMATION | | | |
|------------------|------------|-----------|-----------|
| TYPE | UNITS/TUBE | TUBES/BOX | UNITS/BOX |
| CNY65Exi | 30 | 35 | 1050 |

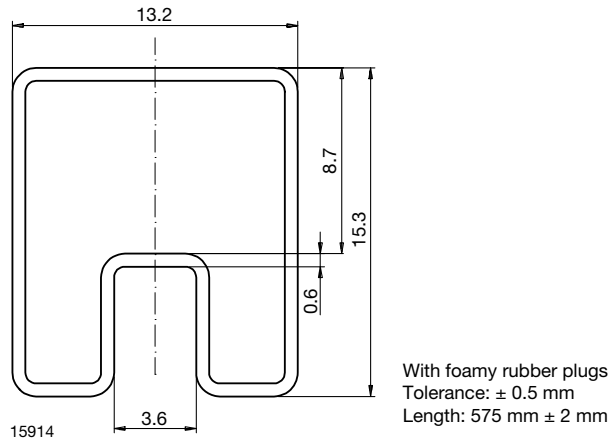
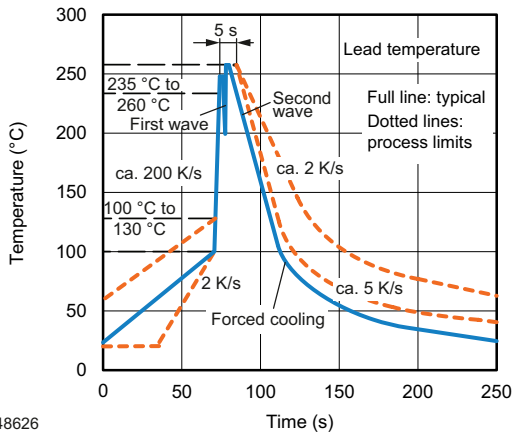


Fig. 16 - CNY65Exi

SOLDER PROFILES



948626

Fig. 17 - Wave Soldering Double Wave Profile According to J-STD-020 for Through-Hole Devices

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: $T_{amb} < 30\text{ °C}$, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020



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