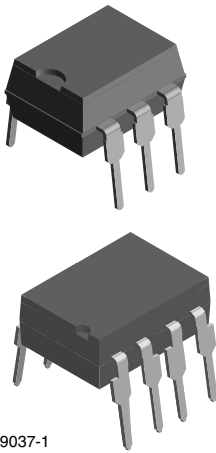
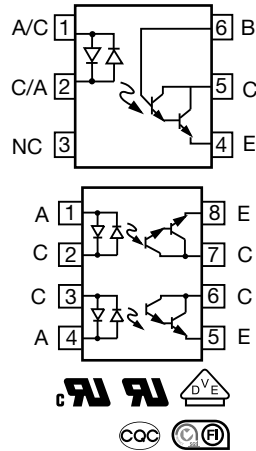




## Optocoupler, Photodarlington Output, AC Input, High Gain (Single, Dual Channel)



i179037-1



### FEATURES

- AC or polarity insensitive inputs
- Built-in reverse polarity input protection
- Industry standard DIP package
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

RoHS  
COMPLIANT

### APPLICATIONS

- Designed for applications requiring detection or monitoring of AC signals

### AGENCY APPROVALS

- [UL 1577](#)
- [cUL](#)
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1 for:
- - [IL755](#)
- - [ILD755](#)
- [CQC GB8898](#)
- [CQC GB4943.1](#)
- [BSI](#)

### LINKS TO ADDITIONAL RESOURCES

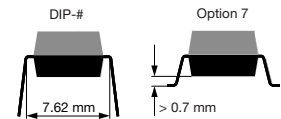
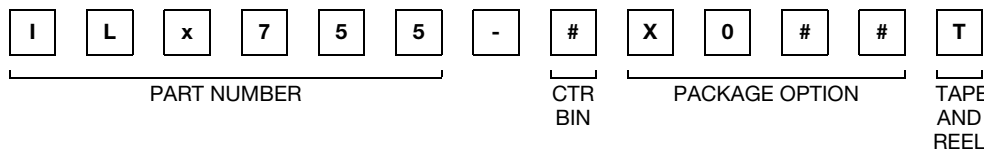


### DESCRIPTION

The IL755, ILD755 are bidirectional input optically coupled isolators. They consist of two gallium arsenide infrared emitting diodes coupled to a silicon NPN photodarlington per channel.

The IL755 is single channel Darlington optocoupler. The ILD755 has two isolated channels in a single DIP package.

### ORDERING INFORMATION



| AGENCY CERTIFIED / PACKAGE        | CTR (%)               |              |                     |               |
|-----------------------------------|-----------------------|--------------|---------------------|---------------|
|                                   | SINGLE CHANNEL, 6 PIN |              | DUAL CHANNEL, 8 PIN |               |
|                                   | ± 2 mA                | ± 1 mA       | ± 2 mA              | ± 1 mA        |
| UL, cUL, BSI, CQC                 | ≥ 750                 | ≥ 1000       | ≥ 750               | ≥ 1000        |
| DIP-#                             | IL755-1               | IL755-2      | ILD755-1            | ILD755-2      |
| SMD-#, option 7                   | IL755-1X007           | IL755-2X007T | -                   | ILD755-2X007T |
| UL, cUL, BSI, CQC, VDE (option 1) | ≥ 750                 | ≥ 1000       | ≥ 750               | ≥ 1000        |
| DIP-#                             | IL755-1X001           | -            | -                   | -             |
| SMD-#, option 7                   | -                     | -            | ILD755-1X017        | -             |

#### Note

- Additional options may be possible, please contact sales office



| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                |          |                   |             |       |
|---------------------------------------------------------------------------------|----------------|----------|-------------------|-------------|-------|
| PARAMETER                                                                       | TEST CONDITION | PART     | SYMBOL            | VALUE       | UNIT  |
| INPUT                                                                           |                |          |                   |             |       |
| Forward continuous current                                                      |                |          | I <sub>F</sub>    | 60          | mA    |
| Power dissipation                                                               |                |          | P <sub>diss</sub> | 100         | mW    |
| Derate linearly from 25°C                                                       |                |          |                   | 1.33        | mW/°C |
| OUTPUT                                                                          |                |          |                   |             |       |
| Collector emitter breakdown voltage                                             |                |          | BV <sub>CEO</sub> | 60          | V     |
| Collector base breakdown voltage                                                |                |          | BV <sub>CBO</sub> | 60          | V     |
| Power dissipation                                                               |                | IL755-1  | P <sub>diss</sub> | 200         | mW    |
|                                                                                 |                | IL755-2  |                   | 200         | mW    |
|                                                                                 |                | ILD755-1 |                   | 150         | mW    |
|                                                                                 |                | ILD755-2 |                   | 150         | mW    |
| Derate linearly from 25°C                                                       |                | IL755-1  |                   | 2.6         | mW/°C |
|                                                                                 |                | IL755-2  |                   | 2.6         | mW/°C |
|                                                                                 |                | ILD755-1 |                   | 2.0         | mW/°C |
|                                                                                 |                | ILD755-2 |                   | 2.0         | mW/°C |
| COUPLER                                                                         |                |          |                   |             |       |
| Total power dissipation                                                         |                | IL755-1  | P <sub>tot</sub>  | 250         | mW    |
|                                                                                 |                | IL755-2  |                   | 250         | mW    |
|                                                                                 |                | ILD755-1 |                   | 400         | mW    |
|                                                                                 |                | ILD755-2 |                   | 400         | mW    |
| Derate linearly from 25 °C                                                      |                | IL755-1  |                   | 3.0         | mW/°C |
|                                                                                 |                | IL755-2  |                   | 3.0         | mW/°C |
|                                                                                 |                | ILD755-1 |                   | 3.0         | mW/°C |
|                                                                                 |                | ILD755-2 |                   | 3.0         | mW/°C |
| Storage temperature                                                             |                |          | T <sub>stg</sub>  | -55 to +150 | °C    |
| Operating temperature                                                           |                |          | T <sub>amb</sub>  | -55 to +100 | °C    |
| Lead soldering time at 260 °C                                                   |                |          |                   | 10          | s     |

**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 ratings for extended periods of the time can adversely affect reliability.

| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                 |             |      |      |      |      |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------|------|------|------|------|
| PARAMETER                                                                                                | TEST CONDITION                                  | SYMBOL      | MIN. | TYP. | MAX. | UNIT |
| <b>INPUT</b>                                                                                             |                                                 |             |      |      |      |      |
| Forward voltage                                                                                          | $I_F = \pm 10\text{ mA}$                        | $V_F$       |      | 1.2  | 1.5  | V    |
| <b>OUTPUT</b>                                                                                            |                                                 |             |      |      |      |      |
| Collector emitter breakdown voltage                                                                      | $I_C = 1.0\text{ mA}$                           | $BV_{CEO}$  | 60   | 75   |      | V    |
| Collector base breakdown voltage                                                                         | $I_C = 10\text{ }\mu\text{A}$                   | $BV_{CBO}$  | 60   | 90   |      | V    |
| Collector emitter leakage current                                                                        | $V_{CE} = 10\text{ V}$ , $I_F = 0\text{ A}$     | $I_{CEO}$   |      | 10   | 100  | nA   |
| <b>COUPLER</b>                                                                                           |                                                 |             |      |      |      |      |
| Collector emitter saturation voltage                                                                     | $I_C = 10\text{ mA}$ , $I_F = \pm 10\text{ mA}$ | $V_{CEsat}$ |      |      | 1    | V    |

**Note**

- 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.

**CURRENT TRANSFER RATIO** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER              | TEST CONDITION                                    | PART     | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|------------------------|---------------------------------------------------|----------|--------|------|------|------|------|
| Current transfer ratio | $I_F = \pm 2\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ | IL755-1  | CTR    | 750  | -    | -    | %    |
|                        | $I_F = \pm 2\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ | ILD755-1 | CTR    | 750  | -    | -    | %    |
|                        | $I_F = \pm 1\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ | IL755-2  | CTR    | 1000 | -    | -    | %    |
|                        | $I_F = \pm 1\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ | ILD755-2 | CTR    | 1000 | -    | -    | %    |

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

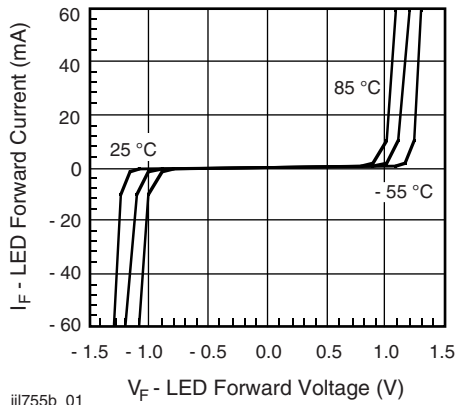
| PARAMETER | TEST CONDITION                                                               | PART     | SYMBOL | MIN. | TYP. | MAX. | UNIT          |
|-----------|------------------------------------------------------------------------------|----------|--------|------|------|------|---------------|
| Rise time | $V_{CC} = 10\text{ V}$ , $I_F = \pm 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ | IL755-1  | $t_r$  | -    | 50   | -    | $\mu\text{s}$ |
|           |                                                                              | ILD755-1 | $t_r$  | -    | 50   | -    | $\mu\text{s}$ |
| Fall time | $V_{CC} = 10\text{ V}$ , $I_F = \pm 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ | IL755-1  | $t_f$  | -    | 50   | -    | $\mu\text{s}$ |
|           |                                                                              | ILD755-1 | $t_f$  | -    | 50   | -    | $\mu\text{s}$ |
| Rise time | $V_{CC} = 10\text{ V}$ , $I_F = \pm 1\text{ mA}$ , $R_L = 100\text{ }\Omega$ | IL755-2  | $t_r$  | -    | 70   | -    | $\mu\text{s}$ |
|           |                                                                              | ILD755-2 | $t_r$  | -    | 70   | -    | $\mu\text{s}$ |
| Fall time | $V_{CC} = 10\text{ V}$ , $I_F = \pm 1\text{ mA}$ , $R_L = 100\text{ }\Omega$ | IL755-2  | $t_f$  | -    | 70   | -    | $\mu\text{s}$ |
|           |                                                                              | ILD755-2 | $t_f$  | -    | 70   | -    | $\mu\text{s}$ |

**SAFETY AND INSULATION RATINGS**

| PARAMETER                                    | TEST CONDITION                                                    | SYMBOL     | VALUE          | UNIT               |
|----------------------------------------------|-------------------------------------------------------------------|------------|----------------|--------------------|
| Climatic classification                      | According to IEC 68 part 1                                        |            | 55 / 100 / 21  |                    |
| Comparative tracking index                   |                                                                   | CTI        | 175            |                    |
| Maximum rated withstanding isolation voltage | $t = 1\text{ min}$                                                | $V_{ISO}$  | 4420           | $V_{RMS}$          |
| Maximum transient isolation voltage          |                                                                   | $V_{IOTM}$ | 10 000         | $V_{peak}$         |
| Maximum repetitive peak isolation voltage    |                                                                   | $V_{IORM}$ | 890            | $V_{peak}$         |
| Isolation resistance                         | $V_{IO} = 500\text{ V}$ , $T_{amb} = 25\text{ }^{\circ}\text{C}$  | $R_{IO}$   | $\geq 10^{12}$ | $\Omega$           |
|                                              | $V_{IO} = 500\text{ V}$ , $T_{amb} = 100\text{ }^{\circ}\text{C}$ | $R_{IO}$   | $\geq 10^{11}$ | $\Omega$           |
| Output safety power                          |                                                                   | $P_{SO}$   | 400            | mW                 |
| Input safety current                         |                                                                   | $I_{SI}$   | 275            | mA                 |
| Safety temperature                           |                                                                   | $T_S$      | 175            | $^{\circ}\text{C}$ |
| Creepage distance                            |                                                                   |            | $\geq 7$       | mm                 |
| Clearance distance                           |                                                                   |            | $\geq 7$       | mm                 |
| Insulation thickness                         |                                                                   | DTI        | $\geq 0.4$     | mm                 |

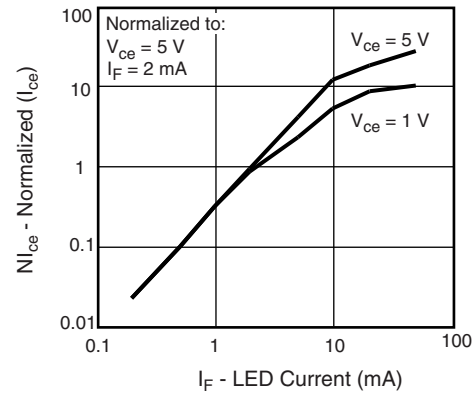
**Note**

- As per IEC 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

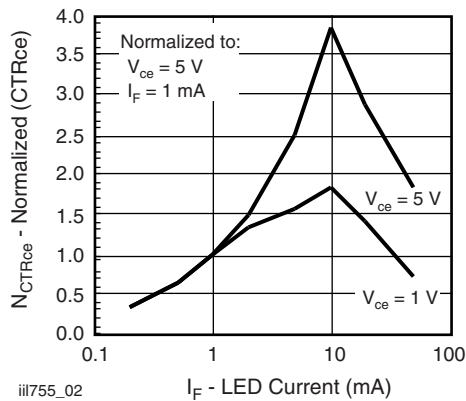
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

iii755b\_01

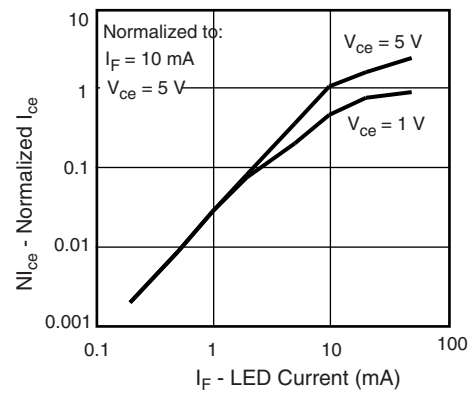
Fig. 1 - LED Forward Current vs. Forward Voltage



iii755\_04

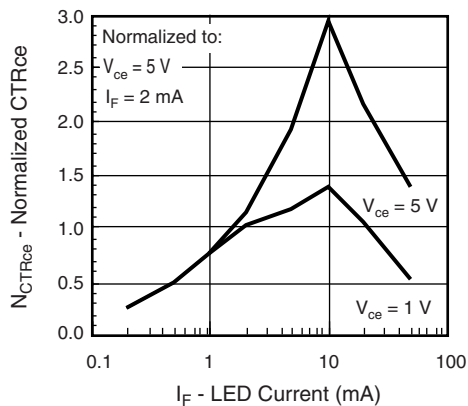
Fig. 4 - Normalized Non-Saturated and Saturated  $I_{CE}$  vs. LED Current

iii755\_02

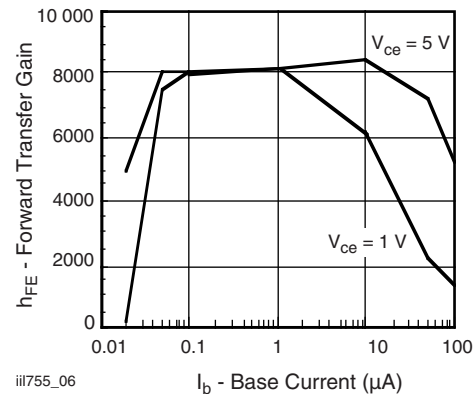
Fig. 2 - Normalized Non-Saturated and Saturated  $CTR_{CE}$  vs. LED Current

iii755\_05

Fig. 5 - Normalized Non-Saturated and Saturated Collector-Emitter Current vs. LED Current



iii755\_03

Fig. 3 - Normalized Non-Saturated and Saturated  $CTR_{CE}$  vs. LED Current

iii755\_06

Fig. 6 - Non-Saturated and Saturated  $h_{FE}$  vs. Base Current

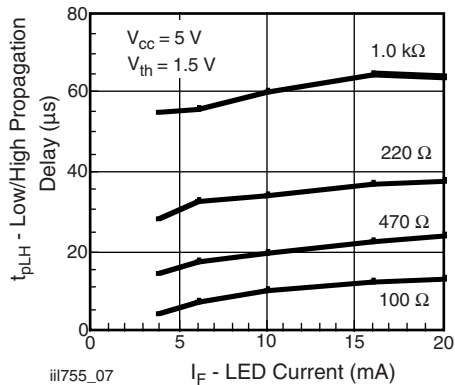


Fig. 7 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current

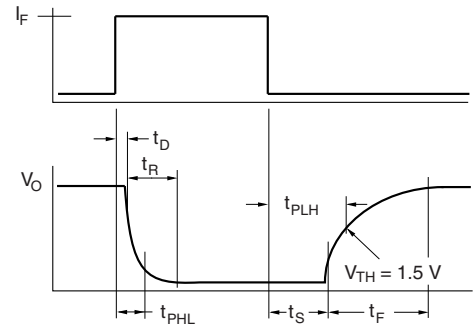


Fig. 9 - Switching Waveform

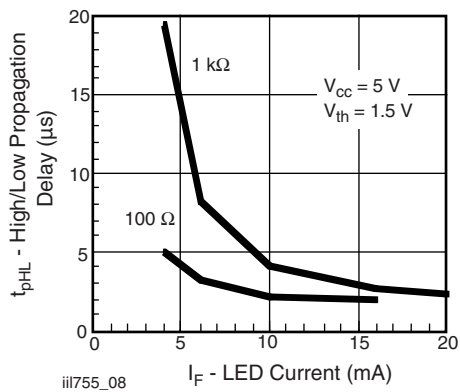


Fig. 8 - High to Low Propagation Delay vs. Collector Load Resistance and LED Current

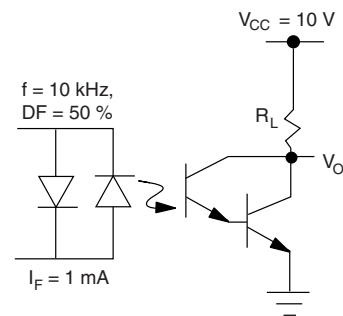
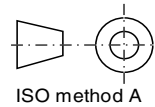
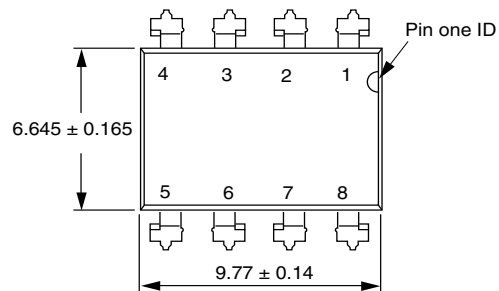
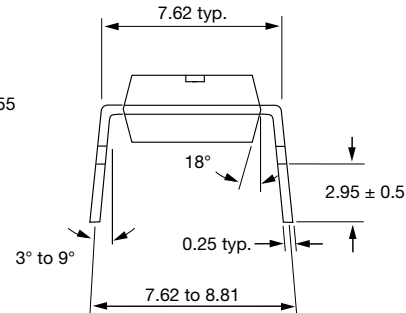
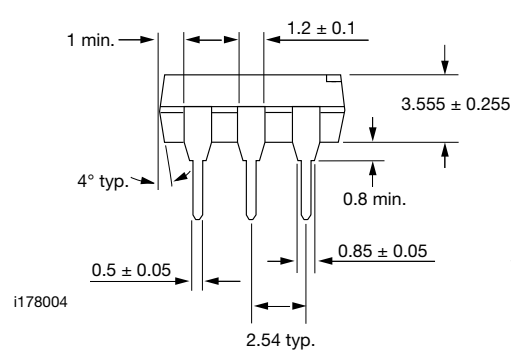
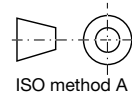
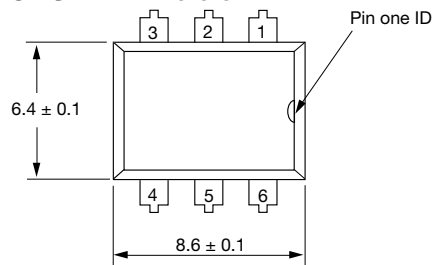
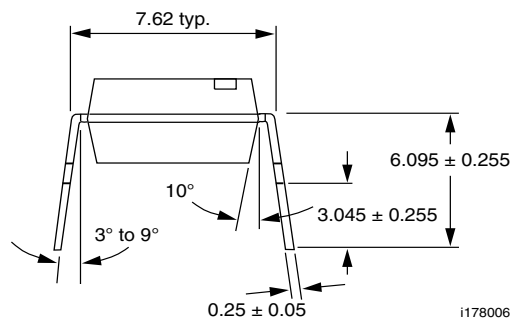
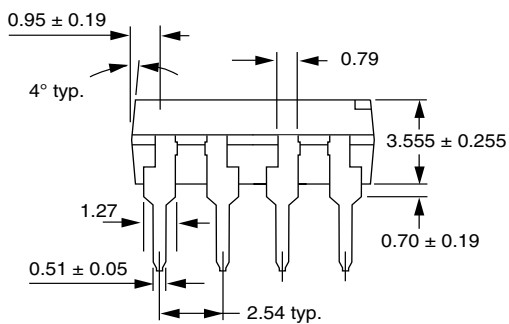
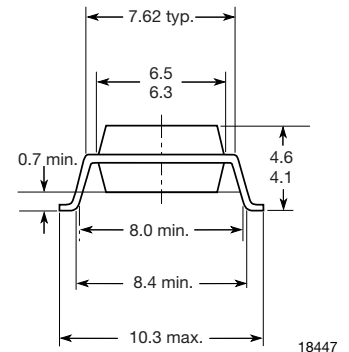
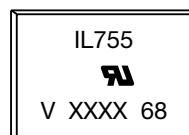


Fig. 10 - Test Circuit, Saturated and Non-Saturated Operation

**PACKAGE DIMENSIONS** in millimeters**Option 7****PACKAGE MARKING** (example)**Notes**

- XXXX = LMC (lot marking code)
- The VDE logo is only marked on option 1 parts
- Tape and reel suffix (T) is not part of the package marking



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.