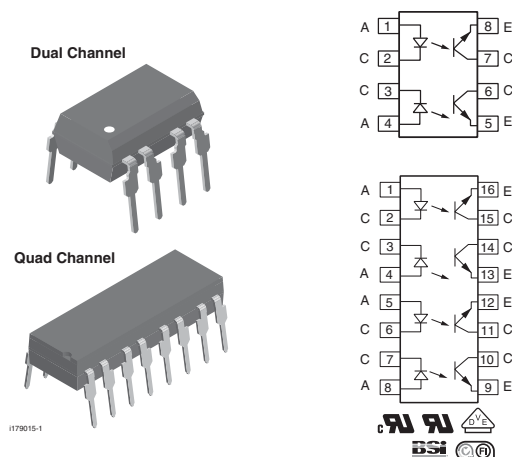


## Optocoupler, Phototransistor Output (Dual, Quad Channel)



### DESCRIPTION

The ILD74, ILQ74 is an optically coupled pair with a GaAlAs infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output.

The ILD74, ILQ74 is especially for driving medium-speed logic, where it may be used to eliminate troublesome ground loop and noise problems. Also it can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CTR modulation.

The ILD74 has two isolated channels in a single DIP package; the ILQ74 has four isolated channels per package.

### FEATURES

- ILD74, ILQ74 TTL compatible
- Transfer ratio, 35 % typical
- Coupling capacitance, 0.5 pF
- Single, dual, and quad channel
- Industry standard DIP packages
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

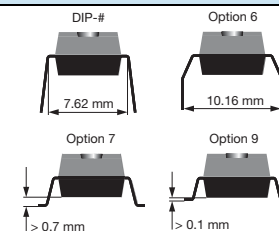
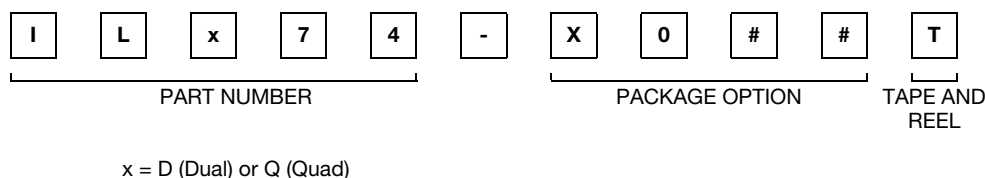


**RoHS**  
COMPLIANT

### AGENCY APPROVALS

- UL1577, file no. E52744 system code H or J, double protection
- CSA 93751
- BSI IEC 60950; IEC 60065
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 pending available with option 1
- FIMKO

### ORDERING INFORMATION



| AGENCY CERTIFIED/PACKAGE        | DUAL CHANNEL               | QUAD CHANNEL               |
|---------------------------------|----------------------------|----------------------------|
|                                 | CTR (%)                    |                            |
| <b>UL, CSA, BSI, FIMKO</b>      | <b>≥ 12.5</b>              | <b>≥ 12.5</b>              |
| DIP-8                           | ILD74                      | -                          |
| SMD-8, option 9                 | ILD74-X009T <sup>(1)</sup> | -                          |
| DIP-16                          | -                          | ILQ74                      |
| SMD-16, option 9                | -                          | ILQ74-X009T <sup>(1)</sup> |
| <b>VDE, UL, CSA, BSI, FIMKO</b> | <b>≥ 12.5</b>              | <b>≥ 12.5</b>              |
| DIP-8                           | ILD74-X001                 | -                          |
| DIP-8, 400 mil, option 6        | ILD74-X016                 | -                          |
| SMD-8, option 7                 | ILD74-X017T                | -                          |
| DIP-16                          | -                          | ILQ74-X001                 |

### Notes

- Additional options may be possible, please contact sales office.
- <sup>(1)</sup> Also available in tubes, do not put "T" on the end.

| ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                                   |       |            |                |                        |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------|------------|----------------|------------------------|
| PARAMETER                                                                                       | TEST CONDITION                                                    | PART  | SYMBOL     | VALUE          | UNIT                   |
| <b>INPUT</b>                                                                                    |                                                                   |       |            |                |                        |
| Peak reverse voltage                                                                            |                                                                   |       | $V_R$      | 3              | V                      |
| Forward continuous current                                                                      |                                                                   |       | $I_F$      | 60             | mA                     |
| Power dissipation                                                                               |                                                                   |       | $P_{diss}$ | 100            | mW                     |
| Derate linearly from 55 %                                                                       |                                                                   |       |            | 1.33           | mW/ $^{\circ}\text{C}$ |
| <b>OUTPUT</b>                                                                                   |                                                                   |       |            |                |                        |
| Collector emitter breakdown voltage                                                             |                                                                   |       | $BV_{CEO}$ | 20             | V                      |
| Emitter collector breakdown voltage                                                             |                                                                   |       | $BV_{ECO}$ | 5              | V                      |
| Collector base breakdown voltage                                                                |                                                                   |       | $BV_{CBO}$ | 70             | V                      |
| Power dissipation                                                                               |                                                                   |       | $P_{diss}$ | 150            | mW                     |
| Derate linearly from 25 $^{\circ}\text{C}$                                                      |                                                                   |       |            | 2              | mW/ $^{\circ}\text{C}$ |
| <b>COUPLER</b>                                                                                  |                                                                   |       |            |                |                        |
| Isolation test voltage                                                                          | $t = 1\text{ s}$                                                  |       | $V_{ISO}$  | 5300           | $V_{RMS}$              |
| Isolation resistance                                                                            | $V_{IO} = 500\text{ V}$ , $T_{amb} = 25\text{ }^{\circ}\text{C}$  |       | $R_{IO}$   | $\geq 10^{12}$ | $\Omega$               |
|                                                                                                 | $V_{IO} = 500\text{ V}$ , $T_{amb} = 100\text{ }^{\circ}\text{C}$ |       | $R_{IO}$   | $\geq 10^{11}$ | $\Omega$               |
| Total package dissipation                                                                       |                                                                   | ILD74 | $P_{tot}$  | 400            | mW                     |
|                                                                                                 |                                                                   | ILQ74 | $P_{tot}$  | 500            | mW                     |
| Derate linearly from 25 $^{\circ}\text{C}$                                                      |                                                                   | ILD74 |            | 5.33           | mW/ $^{\circ}\text{C}$ |
|                                                                                                 |                                                                   | ILQ74 |            | 6.67           | mW/ $^{\circ}\text{C}$ |
| Creepage distance                                                                               |                                                                   |       |            | $\geq 7$       | mm                     |
| Clearance distance                                                                              |                                                                   |       |            | $\geq 7$       | mm                     |
| Storage temperature                                                                             |                                                                   |       | $T_{stg}$  | - 55 to + 150  | $^{\circ}\text{C}$     |
| Operating temperature                                                                           |                                                                   |       | $T_{amb}$  | - 55 to + 100  | $^{\circ}\text{C}$     |
| Lead soldering time at 260 $^{\circ}\text{C}$                                                   |                                                                   |       |            | 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.

| ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                            |             |      |      |      |                  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------|-------------|------|------|------|------------------|
| PARAMETER                                                                                         | TEST CONDITION                             | SYMBOL      | MIN. | TYP. | MAX. | UNIT             |
| <b>INPUT</b>                                                                                      |                                            |             |      |      |      |                  |
| Forward voltage                                                                                   | $I_F = 20\text{ mA}$                       | $V_F$       |      | 1.3  | 1.5  | V                |
| Reverse current                                                                                   | $V_R = 3\text{ V}$                         | $I_R$       |      | 0.1  | 100  | $\mu\text{A}$    |
| Capacitance                                                                                       | $V_R = 0\text{ V}$                         | $C_O$       |      | 25   |      | pF               |
| <b>OUTPUT</b>                                                                                     |                                            |             |      |      |      |                  |
| Collector emitter breakdown voltage                                                               | $I_C = 1\text{ mA}$                        | $BV_{CEO}$  | 20   | 50   |      | V                |
| Collector emitter leakage current                                                                 | $V_{CE} = 5\text{ V}$ , $I_F = 0\text{ A}$ | $I_{CEO}$   |      | 5    | 500  | nA               |
| Capacitance collector emitter                                                                     | $V_{CE} = 0\text{ V}$ , $f = 1\text{ Hz}$  | $C_{CE}$    |      | 10   |      | pF               |
| <b>COUPLER</b>                                                                                    |                                            |             |      |      |      |                  |
| Saturation voltage, collector emitter                                                             | $I_C = 2\text{ mA}$ , $I_F = 16\text{ mA}$ | $V_{CEsat}$ |      | 0.3  | 0.5  | V                |
| Resistance (input to output)                                                                      |                                            | $R_{IO}$    |      | 100  |      | $\text{G}\Omega$ |
| Capacitance (input to output)                                                                     |                                            | $C_{IO}$    |      | 0.5  |      | pF               |

**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                               | SYMBOL     | MIN. | TYP. | MAX. | UNIT |
|---------------------------|----------------------------------------------|------------|------|------|------|------|
| DC current transfer ratio | $I_F = 16\text{ mA}$ , $V_{CE} = 5\text{ V}$ | $CTR_{DC}$ | 12.5 | 35   |      | %    |

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

| PARAMETER       | TEST CONDITION                                                           | SYMBOL               | MIN. | TYP. | MAX. | UNIT          |
|-----------------|--------------------------------------------------------------------------|----------------------|------|------|------|---------------|
| Switching times | $R_L = 100\text{ }\Omega$ , $V_{CE} = 10\text{ V}$ , $I_C = 2\text{ mA}$ | $t_{on}$ , $t_{off}$ |      | 3    |      | $\mu\text{s}$ |

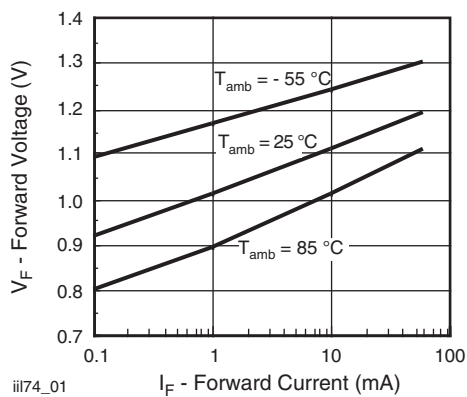
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Fig. 1 - Forward Voltage vs. Forward Current

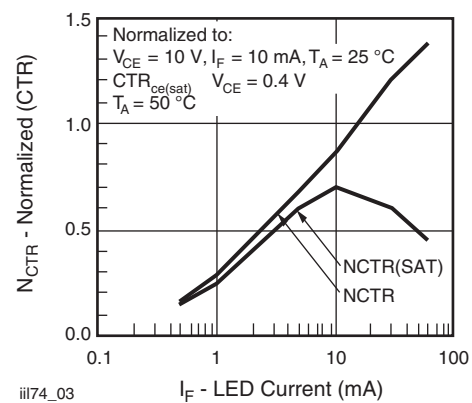


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

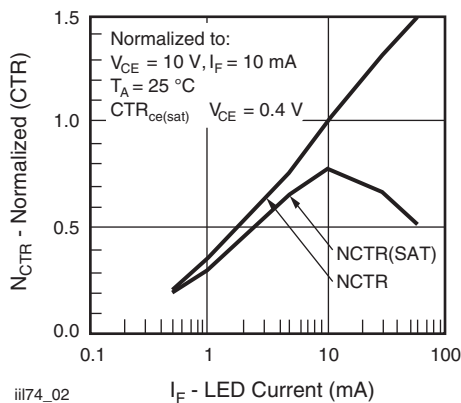


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

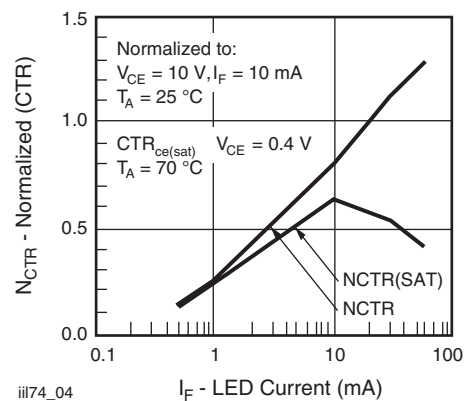


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

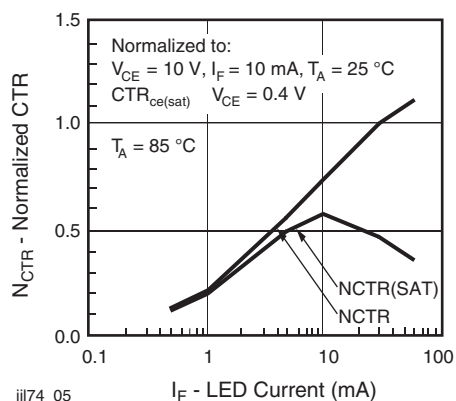


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

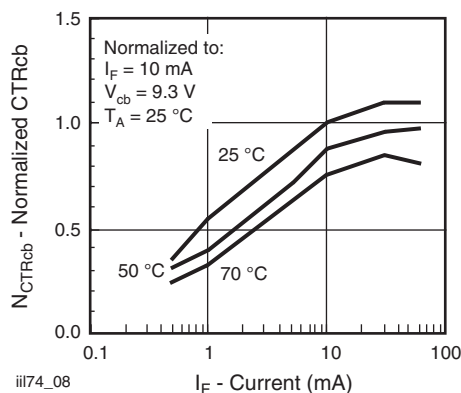


Fig. 8 - Normalized  $CTR_{cb}$  vs. LED Current and Temperature

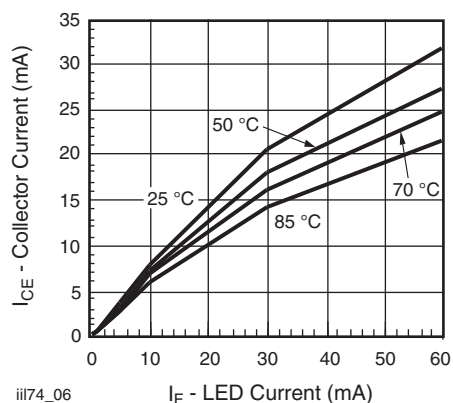


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

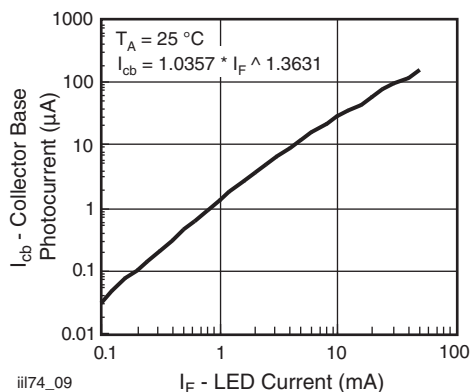


Fig. 9 - Collector Base Photocurrent vs. LED Current

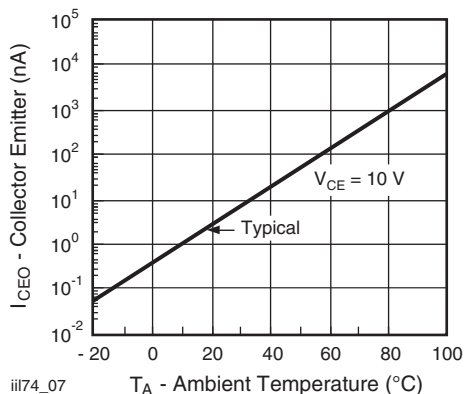


Fig. 7 - Collector Emitter Leakage Current vs. Temperature

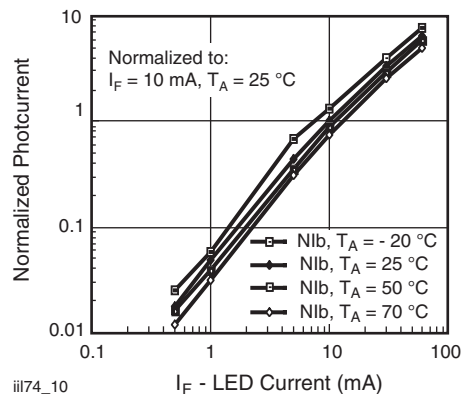


Fig. 10 - Normalized Photocurrent vs.  $I_F$  and Temperature

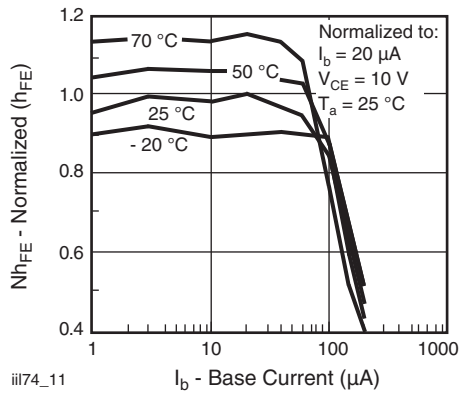
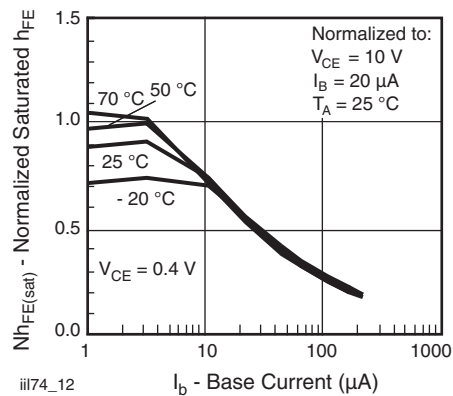
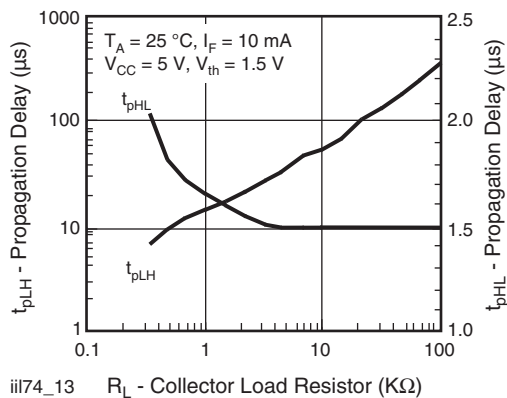
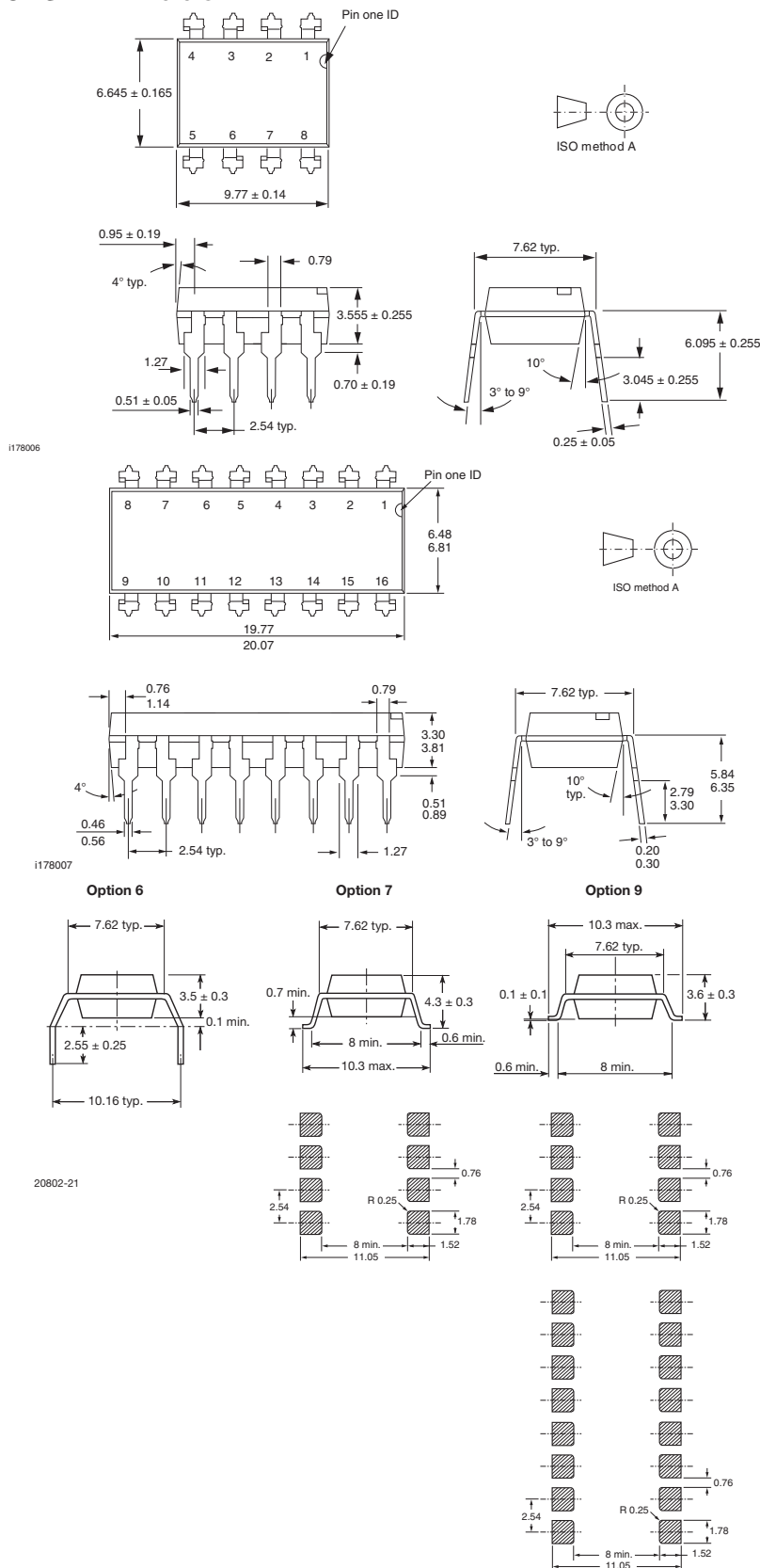

 Fig. 11 - Normalized Non-Saturated  $h_{FE}$  vs. Base Current and Temperature

 Fig. 12 - Normalized Saturated  $h_{FE}$  vs. Base Current and Temperature


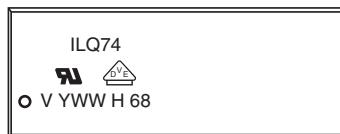
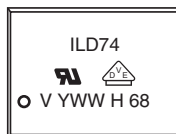
Fig. 13 - Propagation Delay vs. Collector Load Resistor

## PACKAGE DIMENSIONS in millimeters





### PACKAGE MARKING



#### Notes

- Only options 1 and 7 reflected in the package marking
- The VDE logo is only marked on option 1 parts
- Tape and reel suffix (T) is not part of the package marking



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