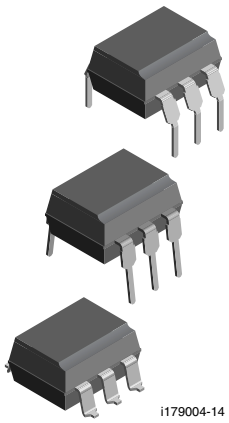
# Optocoupler, Phototransistor Output, no Base Connection



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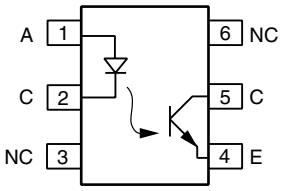



## FEATURES

- Isolation test voltage, 5000 $V_{RMS}$
- No base terminal connection for improved common mode interface immunity
- Long term stability
- Industry standard dual-in-line package
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

## AGENCY APPROVALS

- UL file no. E52744
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- BSI: EN 60065, EN 60950-1
- FIMKO
- CQC

## DESCRIPTION

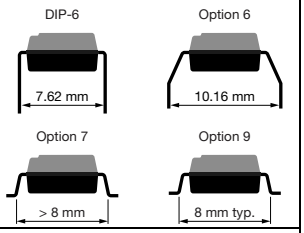
The CNY17F is an optocoupler consisting of a gallium arsenide infrared emitting diode optically coupled to a silicon planar phototransistor detector in a plastic plug-in DIP-6 package.

The coupling device is suitable for signal transmission between two electrically separated circuits. The potential difference between the circuits to be coupled is not allowed to exceed the maximum permissible reference voltages.

In contrast to the CNY17 series, the base terminal of the F type is not conected, resulting in a substantially improved common-mode interference immunity.

## ORDERING INFORMATION

| C | N | Y | 1 | 7 | F | - | # | X | 0 | # | # | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PART NUMBER | | | | | | | CTR BIN | PACKAGE OPTION | | | | TAPE AND REEL |




| AGENCY CERTIFIED/PACKAGE | CTR (%) | | | |
|---|---|---|---|---|
| **UL, cUL, BSI, FIMKO** | **40 to 80** | **63 to 125** | **100 to 200** | **160 to 320** |
| DIP-6 | CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |
| DIP-6, 400 mil, option 6 | CNY17F-1X006 | CNY17F-2X006 | CNY17F-3X006 | CNY17F-4X006 |
| SMD-6, option 7 | CNY17F-1X007 (1) | CNY17F-2X007T (1) | CNY17F-3X007T (1) | CNY17F-4X007T (1) |
| SMD-6, option 9 | CNY17F-1X009T (1) | CNY17F-2X009T (1) | CNY17F-3X009T (1) | CNY17F-4X009T (1) |
| **VDE, UL, cUL, BSI, FIMKO** | **40 to 80** | **63 to 125** | **100 to 200** | **160 to 320** |
| DIP-6 | CNY17F-1X001 | CNY17F-2X001 | CNY17F-3X001 | CNY17F-4X001 |
| DIP-6, 400 mil, option 6 | CNY17F-1X016 | CNY17F-2X016 | CNY17F-3X016 | CNY17F-4X016 |
| SMD-6, option 7 | CNY17F-1X017 (1) | CNY17F-2X017 (1) | CNY17F-3X017 (1) | CNY17F-4X017 (1) |
| SMD-6, option 9 | CNY17F-1X019 | CNY17F-2X019 (1) | CNY17F-3X019 (1) | - |

**Notes**

- Additional options may be possible, please contact sales office.

(1) Also available in tubes; do not put T on end.

| **ABSOLUTE MAXIMUM RATINGS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | |
|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **VALUE** | **UNIT** |
| **INPUT** | | | | |
| Reverse voltage | | $V_R$ | 6 | V |
| DC forward current | | $I_F$ | 60 | mA |
| Surge forward current | t ≤ 10 µs | $I_{FSM}$ | 2.5 | A |
| Power dissipation | | $P_{diss}$ | 70 | mW |
| **OUTPUT** | | | | |
| Collector emitter breakdown voltage | | $BV_{CEO}$ | 70 | V |
| Collector current | | $I_C$ | 50 | mA |
| Collector peak current | $t_p/T$ = 0.5, $t_p$ ≤ 10 ms | $I_{CM}$ | 100 | mA |
| Output power dissipation | | $P_{diss}$ | 150 | mW |
| **COUPLER** | | | | |
| Isolation test voltage between emitter and detector | t = 1 min | $V_{ISO}$ | 5000 | $V_{RMS}$ |
| Creepage distance | | | ≥ 7 | mm |
| Clearance distance | | | ≥ 7 | mm |
| Isolation thickness between emitter and detector | | | ≥ 0.4 | mm |
| Comparative tracking index per DIN IEC 112/VDE 0303, part 1 | | | ≥ 175 | |
| Isolation resistance | $V_{IO}$ = 500 V | $R_{IO}$ | ≥ $10^{11}$ | Ω |
| Storage temperature range | | $T_{stg}$ | - 55 to + 150 | °C |
| Ambient temperature range | | $T_{amb}$ | - 55 to + 110 | °C |
| Junction temperature | | $T_j$ | 100 | °C |
| Soldering temperature (1) | 2 mm from case, ≤ 10 s | $T_{sld}$ | 260 | °C |
| Total power dissipation | | $P_{diss}$ | 220 | mW |

**Notes**

- 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.

(1) Refer to reflow profile for soldering conditions for surface mounted parts (SMD). Refer to wave profile for soldering conditions for through hole parts (DIP).

| **ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **INPUT** | | | | | | | |
| Forward voltage | $I_F$ = 60 mA | | $V_F$ | | 1.39 | 1.65 | V |
| Breakdown voltage | $I_R$ = 10 µA | | $V_{BR}$ | 6 | | | V |
| Reverse current | $V_R$ = 6 V | | $I_R$ | | 0.01 | 10 | µA |
| Capacitance | $V_R$ = 0 V, f = 1 MHz | | $C_O$ | | 25 | | pF |
| **OUTPUT** | | | | | | | |
| Collector emitter capacitance | $V_{CE}$ = 5 V, f = 1 MHz | | $C_{CE}$ | | 5.2 | | pF |
| Base collector capacitance | $V_{CE}$ = 5 V, f = 1 MHz | | $C_{BC}$ | | 6.5 | | pF |
| Emitter base capacitance | $V_{CE}$ = 5 V, f = 1 MHz | | $C_{EB}$ | | 7.5 | | pF |
| **COUPLER** | | | | | | | |
| Collector emitter, saturation voltage | $I_F$ = 10 mA, $I_C$ = 2.5 mA | | $V_{CEsat}$ | | 0.25 | 0.4 | V |
| Coupling capacitance | | | $C_C$ | | 0.6 | | pF |
| Collector emitter, leakage current | $V_{CE}$ = 10 V | CNY17F-1 | $I_{CEO}$ | | 2 | 50 | nA |
| | | CNY17F-2 | $I_{CEO}$ | | 2 | 50 | nA |
| | | CNY17F-3 | $I_{CEO}$ | | 5 | 100 | nA |
| | | CNY17F-4 | $I_{CEO}$ | | 5 | 100 | nA |

**Note**

- Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

| **CURRENT TRANSFER RATIO** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| $I_C/I_F$ | $I_F$ = 10 mA | CNY17F-1 | CTR | 40 | | 80 | % |
| | | CNY17F-2 | CTR | 63 | | 125 | % |
| | | CNY17F-3 | CTR | 100 | | 200 | % |
| | | CNY17F-4 | CTR | 160 | | 320 | % |
| | $I_F$ = 1 mA | CNY17F-1 | CTR | 13 | 30 | | % |
| | | CNY17F-2 | CTR | 22 | 45 | | % |
| | | CNY17F-3 | CTR | 34 | 70 | | % |
| | | CNY17F-4 | CTR | 56 | 90 | | % |

**Note**

- Current transfer ratio $I_C/I_F$ at $V_{CE}$ = 5 V, 25 °C and collector emitter leakage current by dash number.

| **SWITCHING CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **LINEAR OPERATION** (without saturation) | | | | | | | |
| Turn-on time | $I_F$ = 10 mA, $V_{CC}$ = 5 V, $R_L$ = 75 Ω | | $t_{on}$ | | 3 | | µs |
| Rise time | $I_F$ = 10 mA, $V_{CC}$ = 5 V, $R_L$ = 75 Ω | | $t_r$ | | 2 | | µs |
| Turn-off time | $I_F$ = 10 mA, $V_{CC}$ = 5 V, $R_L$ = 75 Ω | | $t_{off}$ | | 2.3 | | µs |
| Fall time | $I_F$ = 10 mA, $V_{CC}$ = 5 V, $R_L$ = 75 Ω | | $t_f$ | | 2 | | µs |
| Cut-off frequency | $I_F$ = 10 mA, $V_{CC}$ = 5 V, $R_L$ = 75 Ω | | $f_{CO}$ | | 110 | | kHz |
| **SWITCHING OPERATION** (with saturation) | | | | | | | |
| Turn-on time | $I_F$ = 20 mA | CNY17F-1 | $t_{on}$ | | 3 | | µs |
| | $I_F$ = 10 mA | CNY17F-2 | $t_{on}$ | | 4.2 | | µs |
| | | CNY17F-3 | $t_{on}$ | | 4.2 | | µs |
| | $I_F$ = 5 mA | CNY17F-4 | $t_{on}$ | | 6 | | µs |
| Rise time | $I_F$ = 20 mA | CNY17F-1 | $t_r$ | | 2 | | µs |
| | $I_F$ = 10 mA | CNY17F-2 | $t_r$ | | 3 | | µs |
| | | CNY17F-3 | $t_r$ | | 3 | | µs |
| | $I_F$ = 5 mA | CNY17F-4 | $t_r$ | | 4.6 | | µs |
| Turn-off time | $I_F$ = 20 mA | CNY17F-1 | $t_{off}$ | | 18 | | µs |
| | $I_F$ = 10 mA | CNY17F-2 | $t_{off}$ | | 23 | | µs |
| | | CNY17F-3 | $t_{off}$ | | 23 | | µs |
| | $I_F$ = 5 mA | CNY17F-4 | $t_{off}$ | | 25 | | µs |
| Fall time | $I_F$ = 20 mA | CNY17F-1 | $t_f$ | | 11 | | µs |
| | $I_F$ = 10 mA | CNY17F-2 | $t_f$ | | 14 | | µs |
| | | CNY17F-3 | $t_f$ | | 14 | | µs |
| | $I_F$ = 5 mA | CNY17F-4 | $t_f$ | | 15 | | µs |

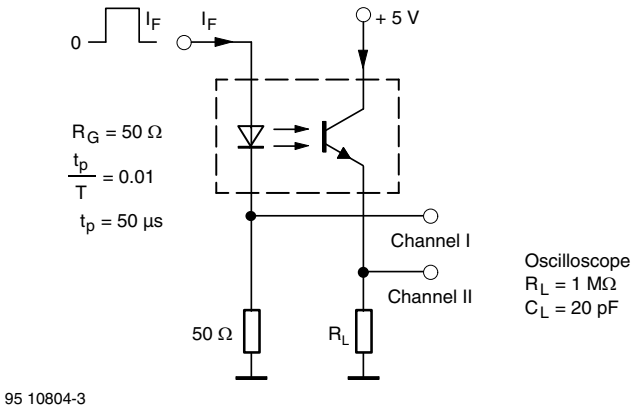



Fig. 1 - Test Circuit, Non-Saturated Operation

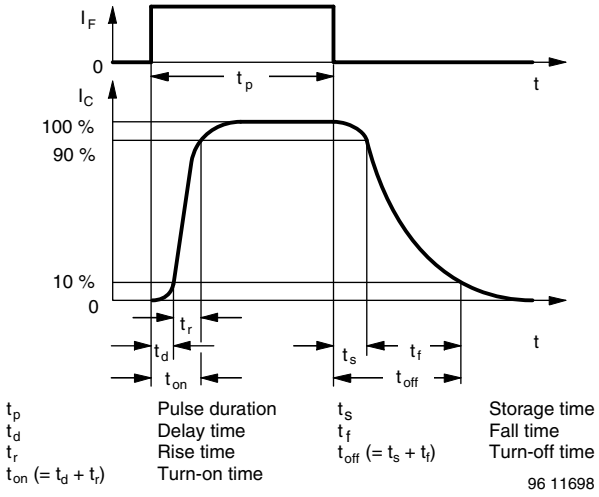



Fig. 3 - Switching Times

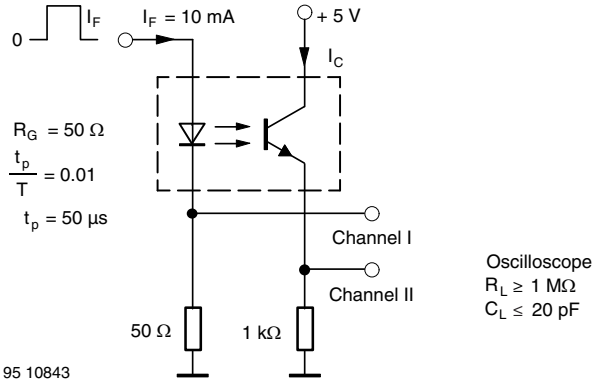



Fig. 2 - Test Circuit, Saturated Operation

## TYPICAL CHARACTERISTICS ($T_{amb}$ = 25 °C, unless otherwise specified)

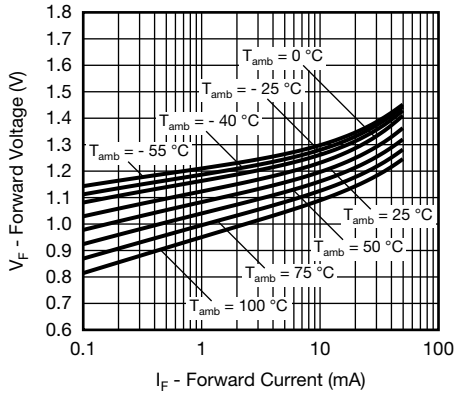



Fig. 4 - Forward Voltage vs. Forward Current

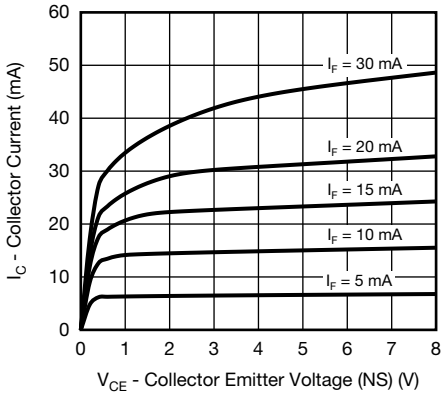



Fig. 5 - Collector Current vs. Collector Emitter Voltage (NS)

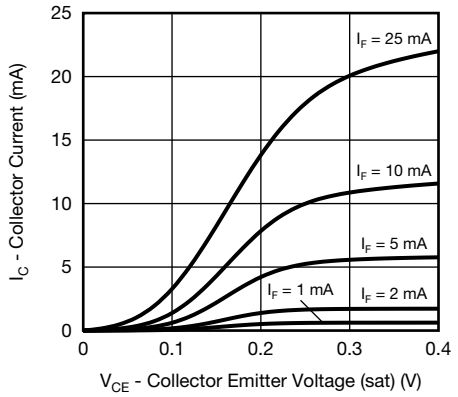



Fig. 6 - Collector Current vs. Collector Emitter Voltage (sat)

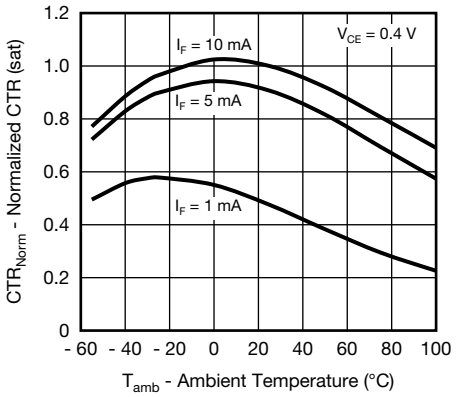



Fig. 9 - Normalized CTR (sat) vs. Ambient Temperature

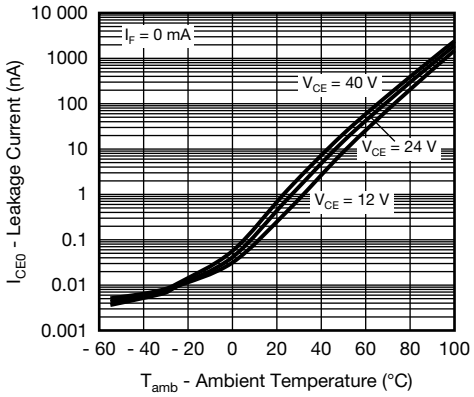



Fig. 7 - Leakage Current vs. Ambient Temperature

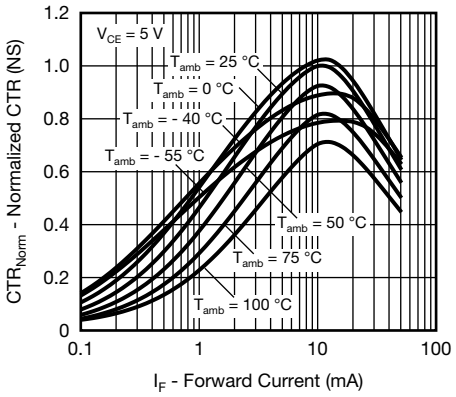



Fig. 10 - Normalized CTR (NS) vs. Forward Current

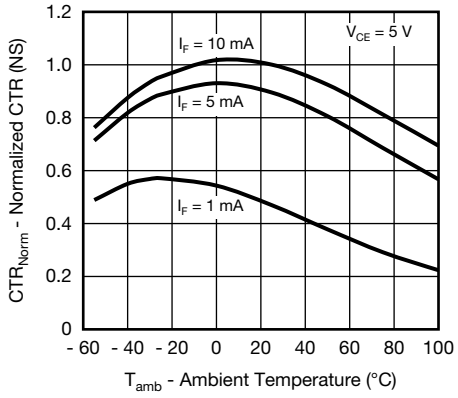



Fig. 8 - Normalized CTR (NS) vs. Ambient Temperature

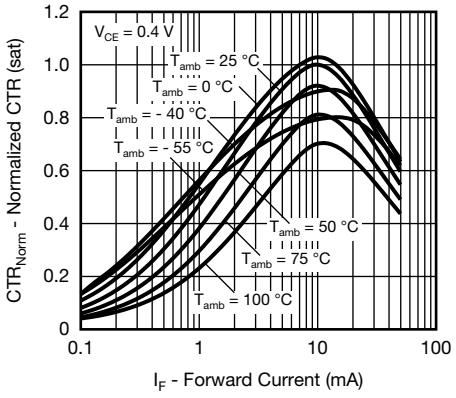



Fig. 11 - Normalized CTR (sat) vs. Forward Current

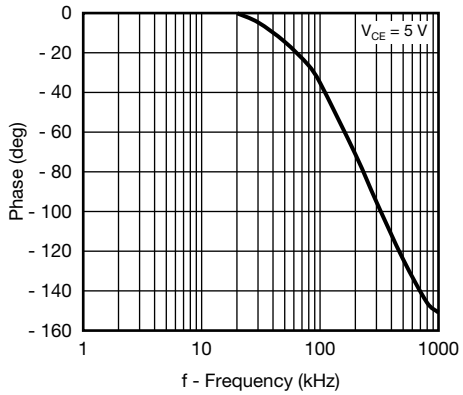



Fig. 12 - CTR Frequency vs. Phase Angle

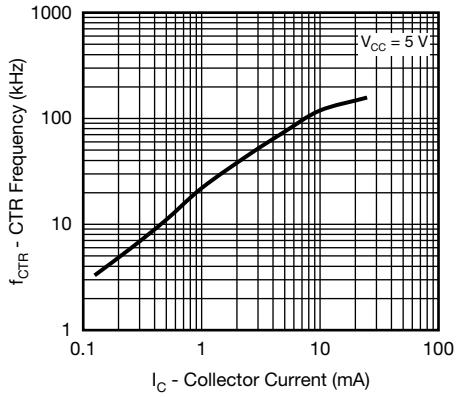



Fig. 13 - CTR Frequency vs. Collector Current

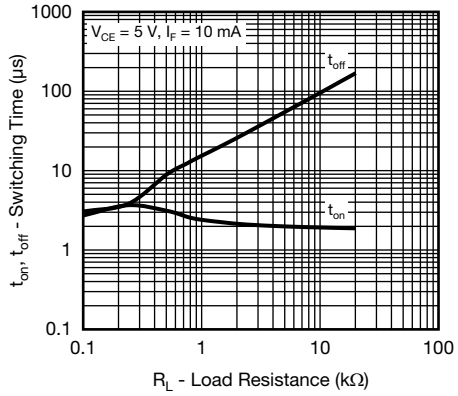
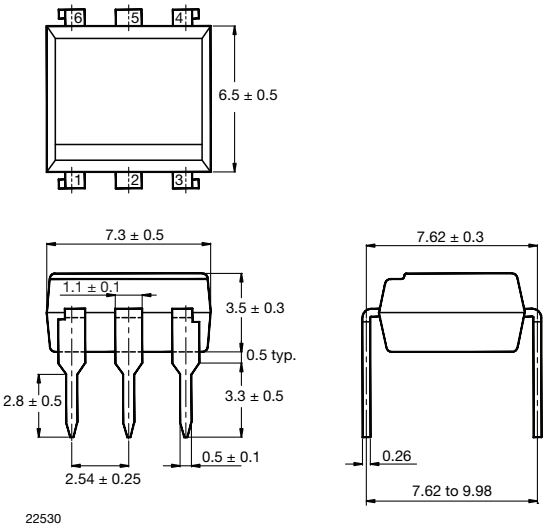
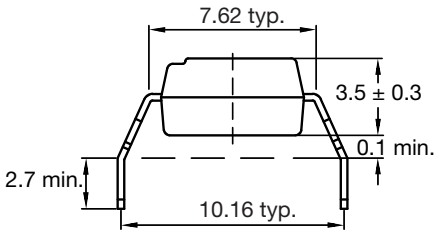



Fig. 14 - Switching Time vs. Load Resistance

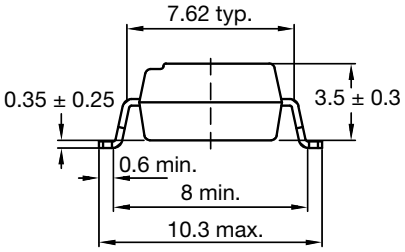
## PACKAGE DIMENSIONS in millimeters



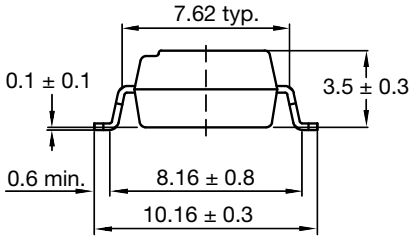

**Option 6**

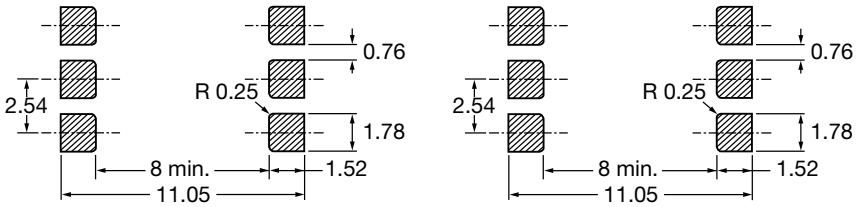



**Option 7**



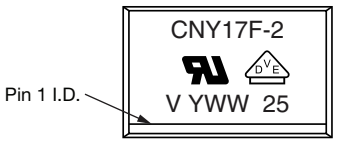

**Option 9**




20802-34

## PACKAGE MARKING




**Notes**

- VDE logo is only marked on option 1 parts. Option information is not marked on the part.
- Tape and reel suffix (T) is not part of the package marking.

## TUBE AND TAPE INFORMATION

| DEVICES PER TUBE | | | |
|---|---|---|---|
| **TYPE** | **UNITS/TUBE** | **TUBES/BOX** | **UNITS/BOX** |
| DIP-6 | 50 | 40 | 2000 |

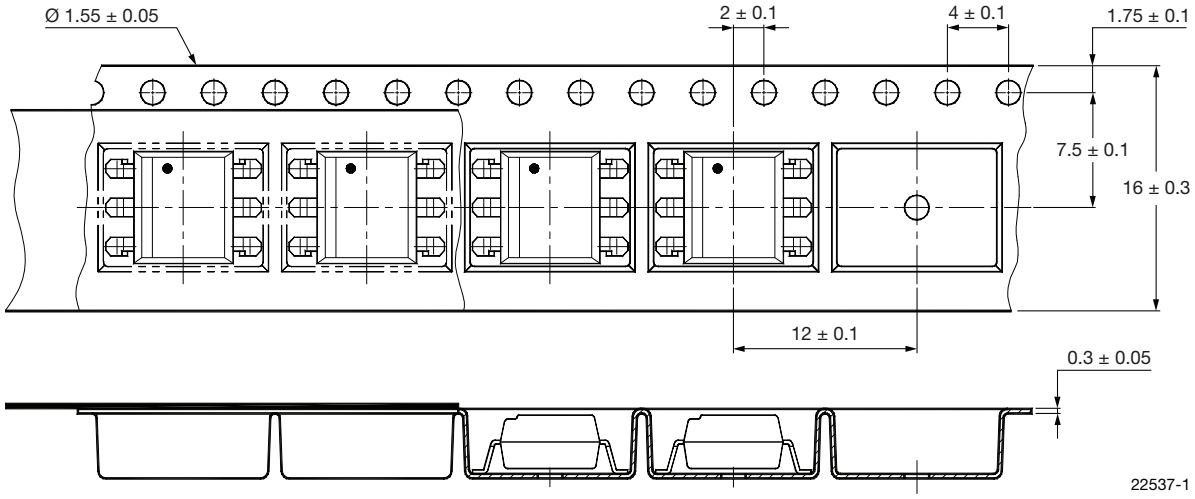



Fig. 15 - Tape and Reel Drawing, 1000 Units per Reel

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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**

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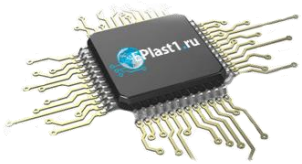
Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

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