

## FEATURES

- **High Current Transfer Ratio**  
CNY17F-1, 40-80%  
CNY17F-2, 63-125%  
CNY17F-3, 100-200%  
CNY17F-4, 160-320%
- **Breakdown Voltage, 5300 VAC<sub>RMS</sub>**
- **High Collector-Emitter Voltage**
- **V<sub>CEO</sub>=70 V**
- **No Base Terminal Connection for Improved Common Mode Interface Immunity**
- **Field-Effect Stable by TRIOS\***
- **Long Term Stability**
- **Industry Standard Dual-in-Line Package**
- **Underwriters Lab File #E52744**
- **VDE #0884, Available with Option 1**

## Maximum Ratings (T<sub>A</sub>=25°C)

### Emitter

|   |        |
|---|--------|
| Reverse Voltage .....                   | 6 V    |
| DC Forward Current .....                | 60 mA  |
| Surge Forward Current (t ≤ 10 μs) ..... | 2.5 A  |
| Total Power Dissipation .....           | 100 mW |

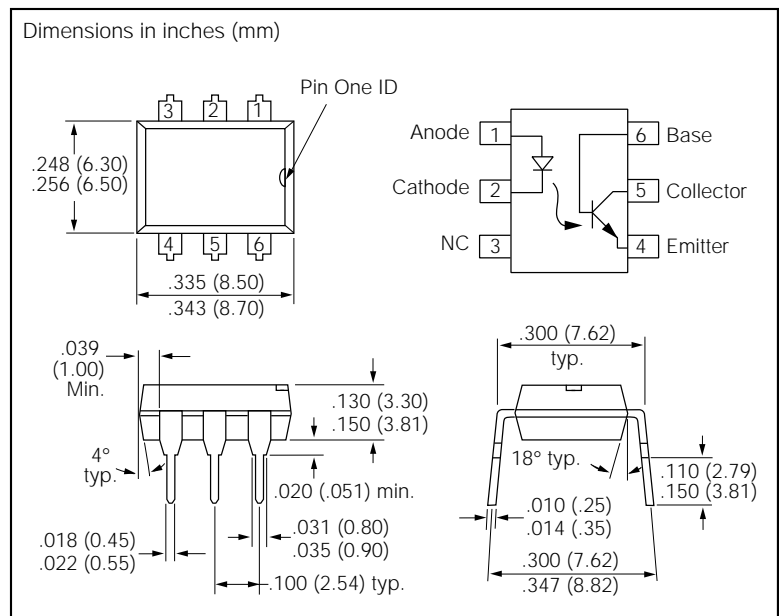
### Detector

|   |        |
|---|--------|
| Collector-Emitter Breakdown Voltage ..... | 70 V   |
| Collector Current .....                   | 50 mA  |
| Collector Current (t ≤ 1 ms) .....        | 100 mA |
| Total Power Dissipation .....             | 150 mW |

### Package

|  |                         |
|--|-------------------------|
| Isolation Test Voltage (between emitter and detector referred to standard climate 23/50 DIN 50014) ..... | 5300 VAC <sub>RMS</sub> |
| Creepage .....   | >7 mm                   |
| Clearance .....  | >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 <sub>10</sub> =500 V) .....  | ≥10 <sup>11</sup> Ω     |
| Storage Temperature Range .....  | -55 to +150°C           |
| Ambient Temperature Range .....  | -55 to +100°C           |
| Junction Temperature .....   | 100°C                   |
| Soldering Temperature (max. 10 s, dip soldering; distance to seating plane ≥1.5 mm) .....                | 260°C                   |

\***TRIOS**—**TR**ansparent **IO**n **S**hield



## 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 connected, resulting in a substantially improved common-mode interference immunity.

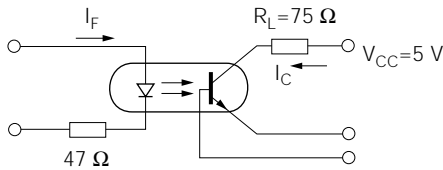
## Characteristics (T<sub>A</sub>=25°C)

|                                       | Symbol             | Unit         | Condition                                      |
|---------------------------------------|--------------------|--------------|--|
| <b>Emitter</b>                        |                    |              |  |
| Forward Voltage                       | V <sub>F</sub>     | 1.25 (≤1.65) | V I <sub>F</sub> =60mA                         |
| Breakdown Voltage                     | V <sub>BR</sub>    | ≥≥≥6         | V I <sub>R</sub> =10μA                         |
| Reverse Current                       | I <sub>R</sub>     | 0.01 (≤10)   | μA V <sub>R</sub> =6 V                         |
| Capacitance                           | C <sub>O</sub>     | 25           | pF V <sub>R</sub> =0 V, f=1 MHz                |
| Thermal Resistance                    | R <sub>thJA</sub>  | 750          | K/W  |
| <b>Detector</b>                       |                    |              |  |
| Capacitance                           | C <sub>CE</sub>    | 5.2          | pF V <sub>CE</sub> =5 V, f=1 MHz               |
| Thermal Resistance                    | R <sub>thJA</sub>  | 500          | K/W  |
| <b>Package</b>                        |                    |              |  |
| Saturation Voltage, Collector-Emitter | V <sub>CEsat</sub> | 0.25 (≤0.4)  | V I <sub>F</sub> =10 mA I <sub>C</sub> =2.5 mA |
| Coupling Capacitance                  | C <sub>C</sub>     | 0.6          | pF   |

**Current Transfer Ratio ( $I_C/I_F$  at  $V_{CE}=5\text{ V}$ ,  $25^\circ\text{C}$ ) and Collector-Emitter Leakage Current by dash number**

|  | -1              | -2              | -3               | -4               | Unit |
|--|-----------------|-----------------|------------------|------------------|------|
| $I_C/I_F$ at $V_{CE}=5\text{ V}$ ( $I_F=10\text{ mA}$ )                  | 40-80           | 63-125          | 100-200          | 160-320          | %    |
| $I_C/I_F$ at $V_{CE}=5\text{ V}$ ( $I_F=1\text{ mA}$ )                   | 30 (>13)        | 45 (>22)        | 70 (>34)         | 90 (>56)         | %    |
| Collector-Emitter Leakage Current ( $V_{CE}=10\text{ V}$ ) ( $I_{CEO}$ ) | 2 ( $\leq 50$ ) | 2 ( $\leq 50$ ) | 5 ( $\leq 100$ ) | 5 ( $\leq 100$ ) | nA   |

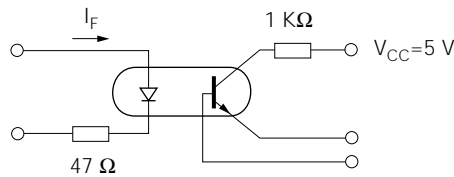
**Figure 1. Linear operation (without saturation)**



$I_F=10\text{ mA}$ ,  $V_{CC}=5\text{ V}$ ,  $T_A=25^\circ\text{C}$

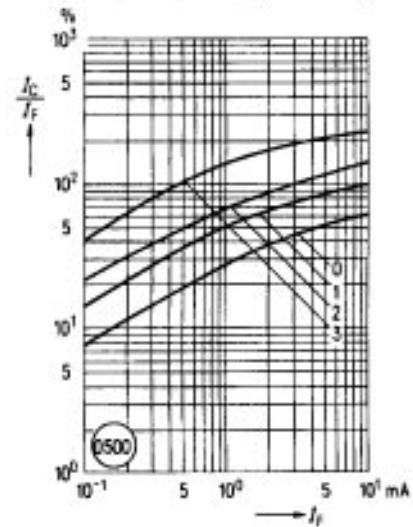
|                   |           |     |               |
|-------------------|-----------|-----|---------------|
| Load Resistance   | $R_L$     | 75  | $\Omega$      |
| Turn-On Time      | $t_{ON}$  | 3.0 | $\mu\text{s}$ |
| Rise Time         | $t_R$     | 2.0 | $\mu\text{s}$ |
| Turn-Off Time     | $t_{OFF}$ | 2.3 | $\mu\text{s}$ |
| Fall Time         | $t_f$     | 2.0 | $\mu\text{s}$ |
| Cut-Off Frequency | $f_{CO}$  | 250 | kHz           |

**Figure 2. Switching operation (with saturation)**

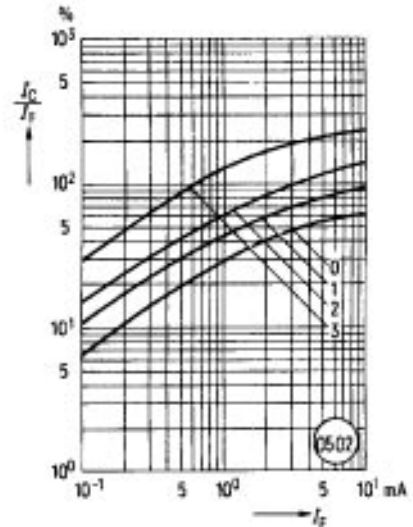


|               |           | -1<br>( $I_F=20\text{ mA}$ ) | -2 and -3<br>( $I_F=10\text{ mA}$ ) | -4<br>( $I_F=5\text{ mA}$ ) |               |
|---------------|-----------|------------------------------|-------------------------------------|-----------------------------|---------------|
| Turn-On Time  | $t_{ON}$  | 3.0                          | 4.2                                 | 6.0                         | $\mu\text{s}$ |
| Rise Time     | $t_R$     | 2.0                          | 3.0                                 | 4.6                         | $\mu\text{s}$ |
| Turn-Off Time | $t_{OFF}$ | 18                           | 23                                  | 25                          | $\mu\text{s}$ |
| Fall Time     | $t_f$     | 11                           | 14                                  | 15                          | $\mu\text{s}$ |

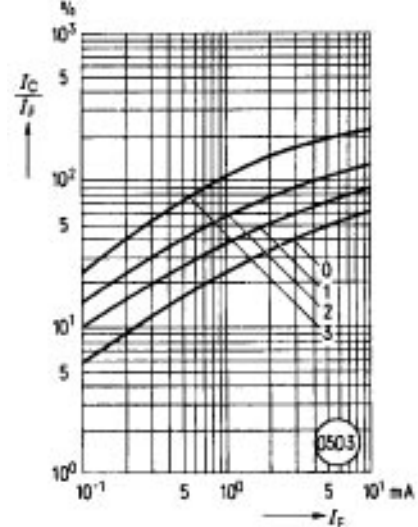
**Figure 3. Current transfer ratio versus diode current ( $T_A=-25^\circ\text{C}$ ,  $V_{CE}=5\text{ V}$ )  $I_C/I_F=f(I_F)$**



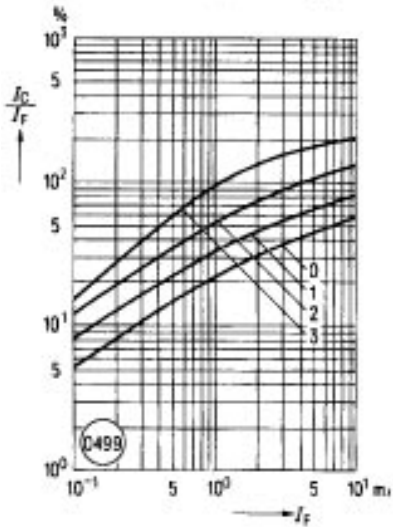
**Figure 4. Current transfer ratio versus diode current ( $T_A=0^\circ\text{C}$ ,  $V_{CE}=5\text{ V}$ )  $I_C/I_F=f(I_F)$**



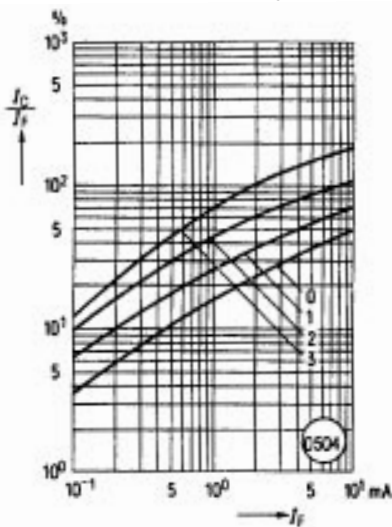
**Figure 5. Current transfer ratio versus diode current ( $T_A=25^\circ\text{C}$ ,  $V_{CE}=5\text{ V}$ )  $I_C/I_F=f(I_F)$**



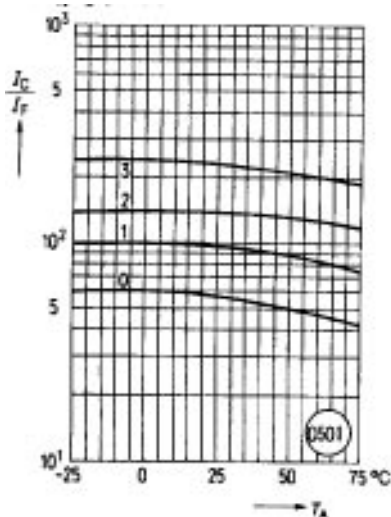
**Figure 6. Current transfer ratio versus diode current ( $T_A=50^\circ\text{C}$ )  $V_{CE}=5\text{ V}$**



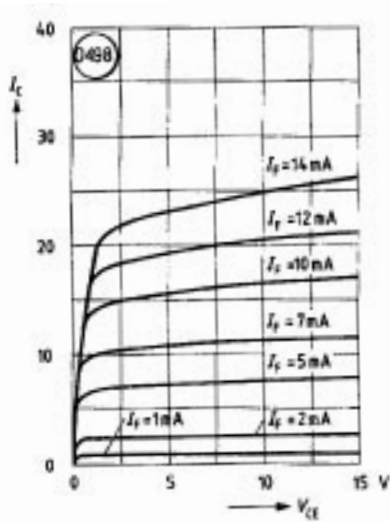
**Figure 7. Current transfer ratio versus diode current ( $T_A=75^\circ\text{C}$ )  $V_{CE}=5\text{ V}$**



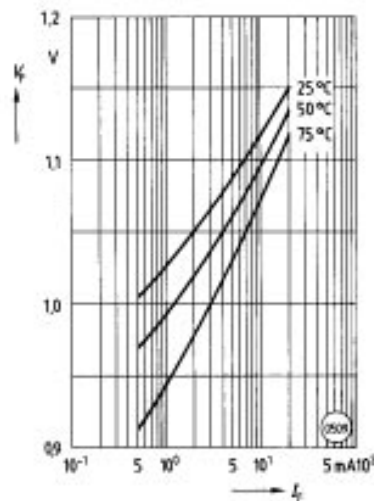
**Figure 8. Current transfer ratio versus temperature ( $I_F=10\text{ mA}$ ,  $V_{CE}=5\text{ V}$ )  $I_C/I_F=f(T)$**



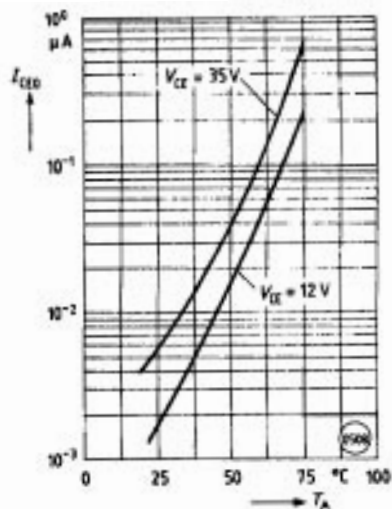
**Figure 9. Output characteristics CNY17F-2, -3 ( $T_A=25^\circ\text{C}$ )  $I_C=f(V_{CE})$**



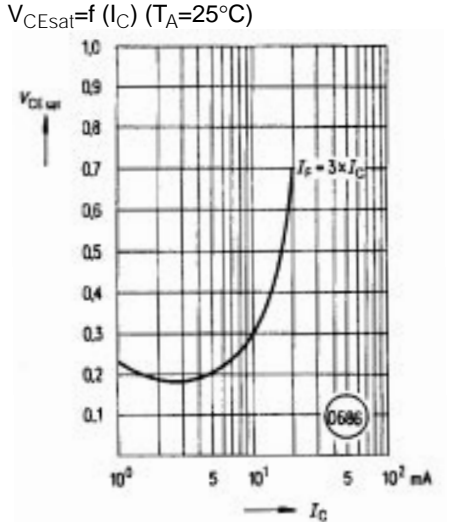
**Figure 10. Forward voltage  $V_F=f(I_F)$**



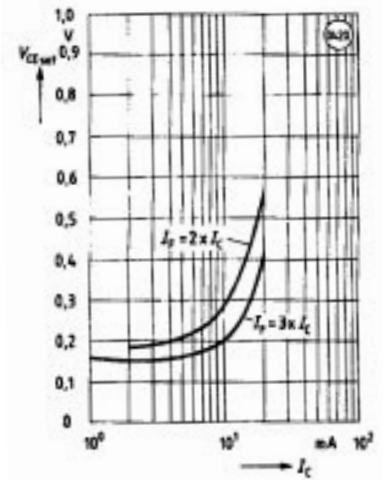
**Figure 11. Collector emitter off-state current  $I_{CEO}=f(V,T)$  ( $T_A=75^\circ\text{C}$ ,  $I_F=0$ )**



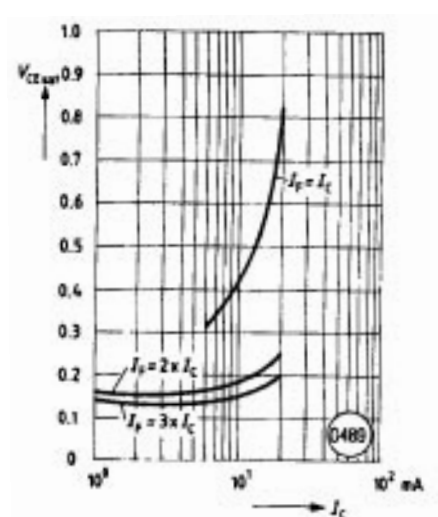
**Figure 12. Saturation voltage current and modulation CNY17F-1  $V_{CEsat}=f(I_C)$  ( $T_A=25^\circ\text{C}$ )**



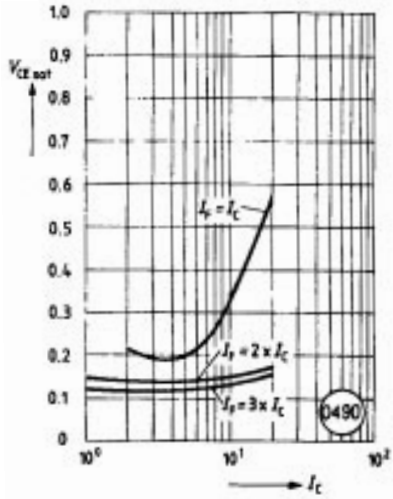
**Figure 13. Saturation voltage versus collector current and modulation depth CNY17F-2  $V_{CEsat}=f(I_C)$  ( $T_A=25^\circ\text{C}$ )**



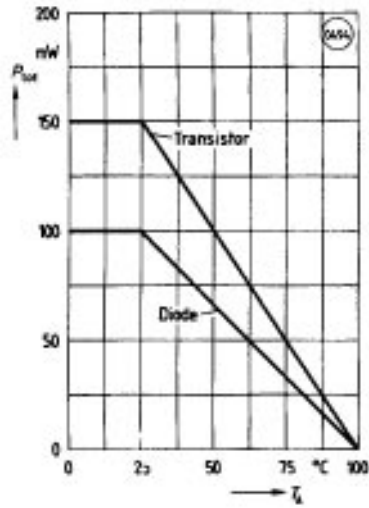
**Figure 14. Saturation voltage versus collector current and modulation depth CNY17F-3  $V_{CEsat}=f(I_C)$  ( $T_A=25^\circ\text{C}$ )**



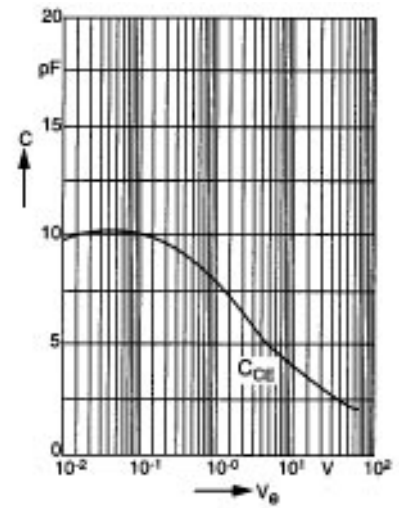
**Figure 15. Saturation voltage versus collector current and modulation depth CNY17F-4**  
 $V_{CEsat}=f(I_C)$  ( $T_A=25^\circ\text{C}$ )



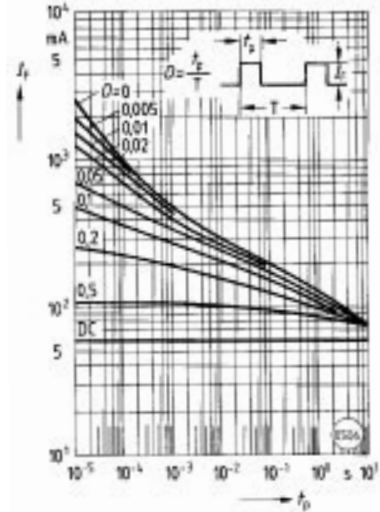
**Figure 17. Permissible power dissipation transistor and diode**  
 $P_{tot}=f(T_A)$



**Figure 19. Transistor capacitance**  
 $C=f(V_O)$  ( $T_A=25^\circ\text{C}$ ,  $f=1\text{ MHz}$ )



**Figure 16. Permissible pulse load**  
 $D=\text{parameter}$ ,  $T_A=25^\circ\text{C}$ ,  $I_F=f(t_D)$



**Figure 18. Permissible forward current diode**  
 $I_F=f(T_A)$

