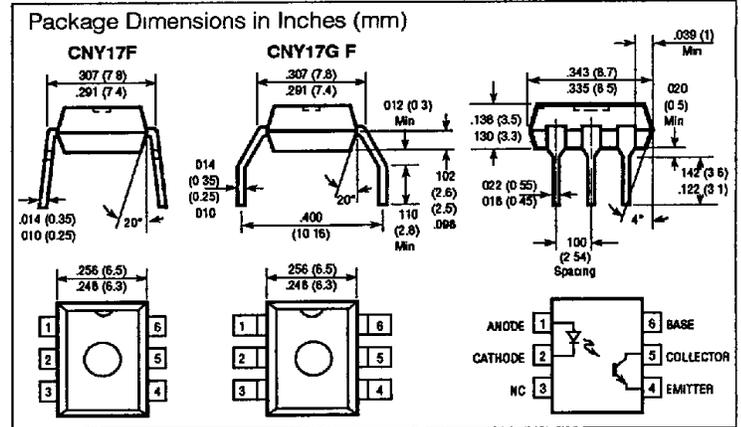
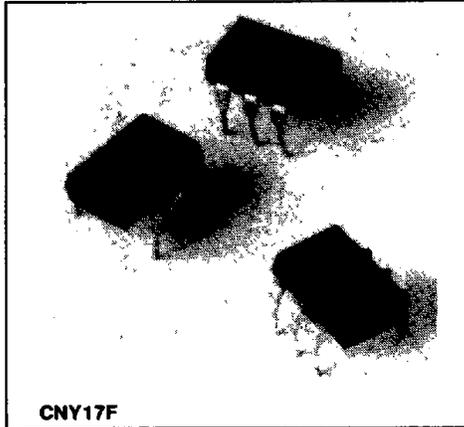


# SIEMENS

T-41-83

## CNY17F SERIES VDE LEAD BEND CNY17G F SERIES SINGLE CHANNEL PHOTOTRANSISTOR OPTOCOUPLER NO BASE CONNECTION



### FEATURES

- CNY17F G Lead Bend in Accordance with VDE 0805/0806
- 5300 Volt Breakdown Voltage
- Base Terminal not connected for improved Common Mode Interface Immunity
- High Current Transfer Ratio, 4 Groups  
CNY17F/G F-1, 40 to 80%  
CNY17F/G F-2, 63 to 125%  
CNY17F/G F-3, 100 to 200%  
CNY17F/G F-4, 160 to 320%
- Low CTR Degradation
- High Collector-emitter Voltage  $V_{CE0} = 70V$
- 100% Burn-in
- VDE Approval #0883
- VDE Approval #0884 (Optional with Option 1, add -X001 suffix)
- Conforms to VDE #0805/0806

### DESCRIPTION

The CNY17F/G F is an optocoupler that employs a GaAs infrared emitting diode optically coupled to a silicon planar phototransistor detector. The component is incorporated 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/G F type is not connected. This results in a substantially improved common-mode interference immunity.

### Maximum Ratings:

#### Emitter (GaAs infrared emitter)

|   |           |     |    |
|---|-----------|-----|----|
| Reverse voltage                             | $V_R$     | 6   | V  |
| DC forward current                          | $I_F$     | 60  | mA |
| Surge forward current ( $t \leq 10 \mu s$ ) | $I_{FSM}$ | 2.5 | A  |
| Total power dissipation                     | $P_{tot}$ | 100 | mW |

#### Detector (silicon phototransistor)

|                                     |           |     |    |
|-------------------------------------|-----------|-----|----|
| Collector-emitter reverse voltage   | $V_{CE0}$ | 70  | V  |
| Collector current                   | $I_C$     | 50  | mA |
| Collector current ( $t \leq 1 ms$ ) | $I_{CSM}$ | 100 | mA |
| Total power dissipation             | $P_{tot}$ | 150 | mW |

#### Optocoupler

|   |           |     |      |    |
|---|-----------|-----|------|----|
| Storage temperature range                     | $T_{stg}$ | -40 | +150 | °C |
| Ambient temperature range                     | $T_{amb}$ | -40 | +100 | °C |
| Junction temperature                          | $T_j$     | 100 | °C   |    |
| Soldering temperature (max 10s) <sup>1)</sup> | $T_s$     | 260 | °C   |    |

#### Isolation test voltage<sup>2)</sup>

between emitter and detector referred to standard climate 23/50 DIN 50 014

|              |          |      |     |
|--------------|----------|------|-----|
| Leakage path | $V_{IO}$ | 5300 | Vdc |
| Air Path     |          | >8.0 | mm  |
| CNY17F       |          | >7.3 | mm  |
| CNY17G F     |          | >8.0 | mm  |

#### Tracking resistance

in acc with VDE 0110 § 6, table 3 and DIN 53 480/VDE 0303, part 1

|   |          |            |           |          |
|---|----------|------------|-----------|----------|
| Isolation resistance ( $V_{IO} = 500 V$ ) | KB       | $\geq 100$ | (group 3) | $\Omega$ |
|   | $R_{IO}$ | $10^{11}$  |           |          |

### Characteristics ( $T_{amb} = 25^\circ C$ )

#### Emitter (GaAs infrared emitter)

|  |            |                      |         |
|--|------------|----------------------|---------|
| Forward voltage ( $I_F = 60 mA$ )      | $V_F$      | 1.25 ( $\leq 1.65$ ) | V       |
| Breakdown voltage ( $I_R = 10 \mu A$ ) | $BV$       | 30 ( $\geq 6$ )      | V       |
| Reverse current ( $V_R = 6 V$ )        | $I_R$      | 0.01 ( $\leq 10$ )   | $\mu A$ |
| Capacitance ( $V_R = 0 V, f = 1 MHz$ ) | $C_0$      | 40                   | pF      |
| Thermal resistance <sup>1)</sup>       | $R_{thJA}$ | 750                  | K/W     |

#### Detector (silicon phototransistor)

|   |            |     |     |
|---|------------|-----|-----|
| Capacitance ( $V_{CE} = 5 V, f = 1 MHz$ ) | $C_{ct}$   | 6.8 | pF  |
| Thermal resistance <sup>1)</sup>          | $R_{thJA}$ | 500 | K/W |

#### Optocoupler

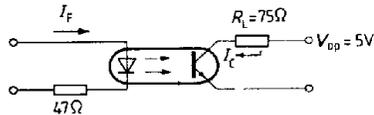
|  |             |                     |    |
|--|-------------|---------------------|----|
| Collector-emitter saturation voltage ( $I_F = 10 mA, I_C = 2.5 mA$ ) | $V_{CEsat}$ | 0.25 ( $\leq 0.4$ ) | V  |
| Coupling capacitance   | $C_k$       | 0.5                 | pF |

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The optocouplers are grouped according to their current transfer ratio  $I_C/I_F$  at  $V_{CE}=5$  V, marked by dash numbers

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

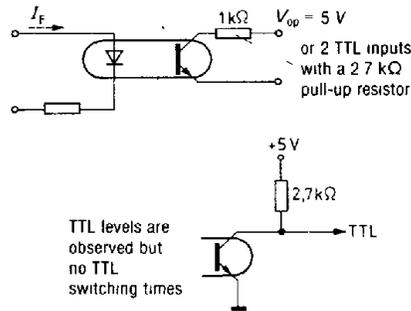
**Linear Operation (without saturation)**



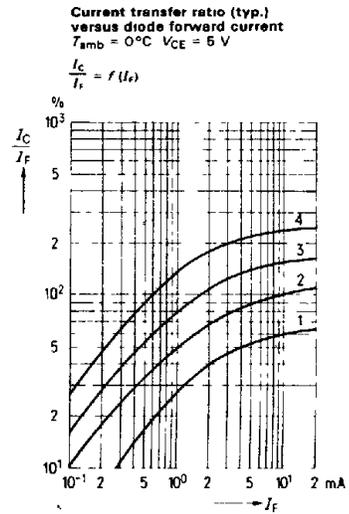
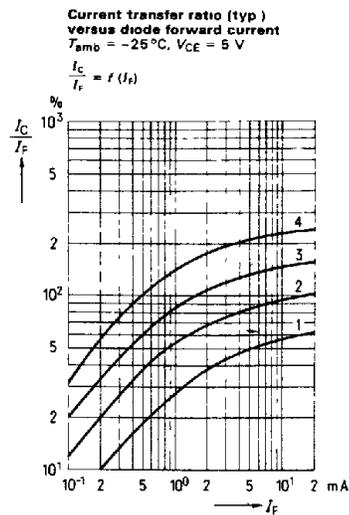
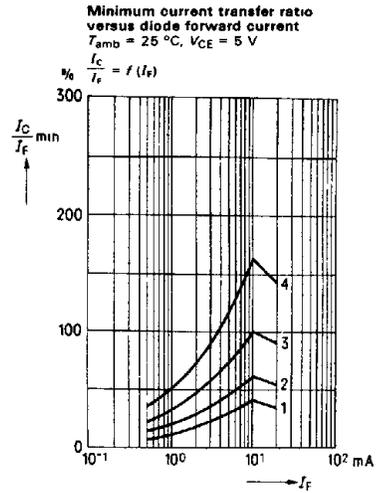
$I_F=10$  mA,  $V_{OP}=5$  V,  $T_{amb}=25^\circ\text{C}$

| Load Resistance   | $R_L$     | 75                 | $\Omega$      |
|-------------------|-----------|--------------------|---------------|
| Turn-On Time      | $t_{ON}$  | 3.0 ( $\leq 5.6$ ) | $\mu\text{s}$ |
| Rise Time         | $t_r$     | 2.0 ( $\leq 4.0$ ) | $\mu\text{s}$ |
| Turn-Off Time     | $t_{OFF}$ | 2.3 ( $\leq 4.1$ ) | $\mu\text{s}$ |
| Fall Time         | $t_f$     | 2.0 ( $\leq 3.5$ ) | $\mu\text{s}$ |
| Cut-Off Frequency | $F_{CO}$  | 250                | kHz           |

**Switching Operation (with saturation)**

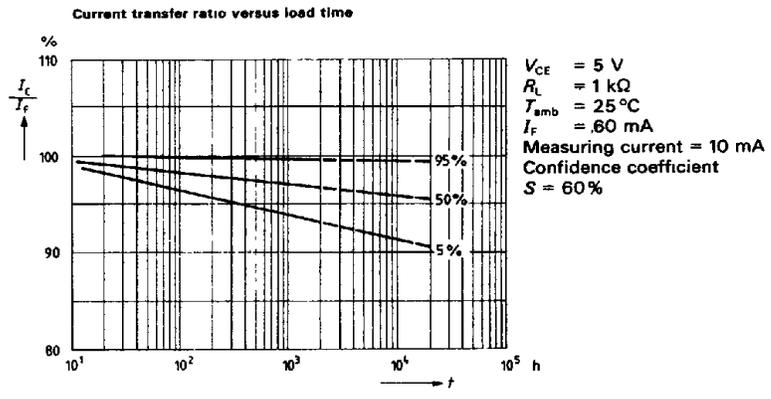
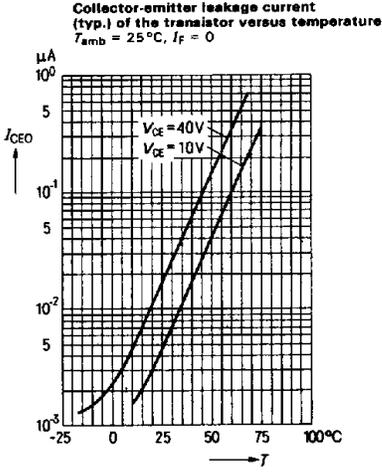
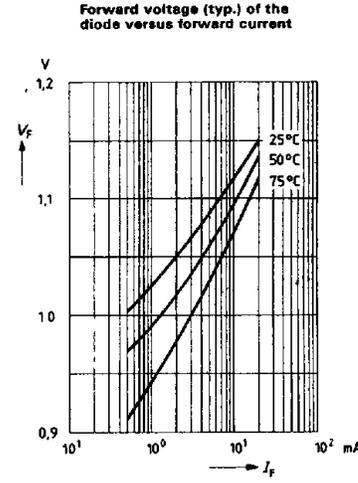
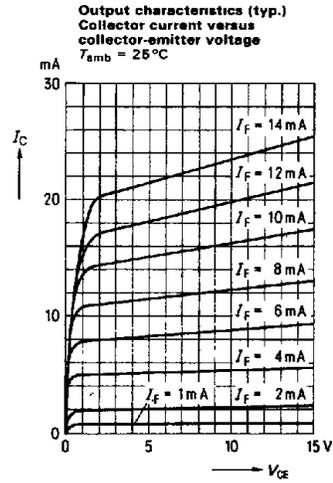
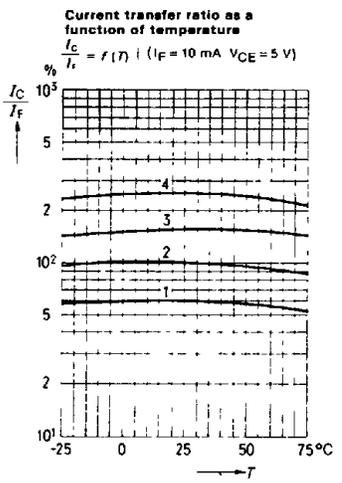
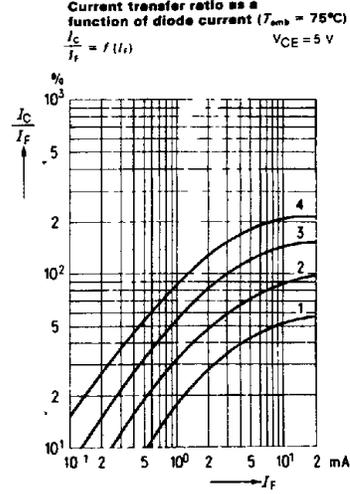
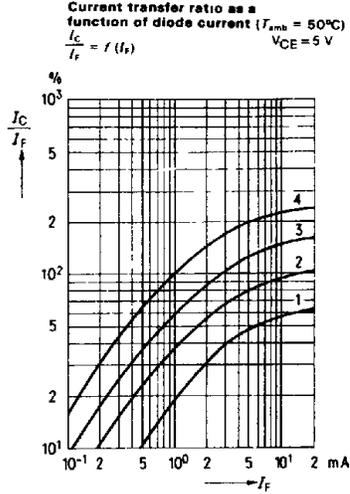
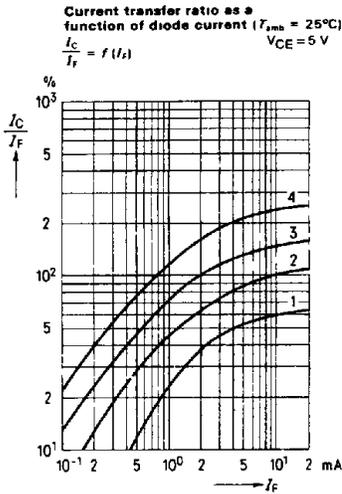


| Group         | -1<br>( $I_F=20$ mA) | -2 and -3<br>( $I_F=10$ mA) | -4<br>( $I_F=5$ mA) |                     |
|---------------|----------------------|-----------------------------|---------------------|---------------------|
| Turn-On Time  | $t_{ON}$             | 3.0 ( $\leq 5.5$ )          | 4.2 ( $\leq 8.0$ )  | 6.0 ( $\leq 10.5$ ) |
| Rise Time     | $t_r$                | 2.0 ( $\leq 4.0$ )          | 3.0 ( $\leq 6.0$ )  | 4.6 ( $\leq 8.0$ )  |
| Turn-Off Time | $t_{OFF}$            | 18 ( $\leq 34$ )            | 23 ( $\leq 39$ )    | 25 ( $\leq 43$ )    |
| Fall Time     | $t_f$                | 11 ( $\leq 20$ )            | 14 ( $\leq 24$ )    | 15 ( $\leq 26$ )    |
| $V_{CESAT}$   |                      | 0.25 ( $\leq 0.4$ )         |                     | V                   |



Optocouplers (Optoisolators)

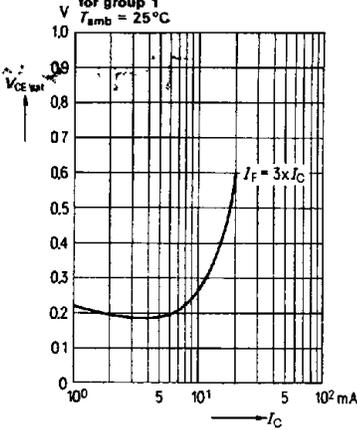
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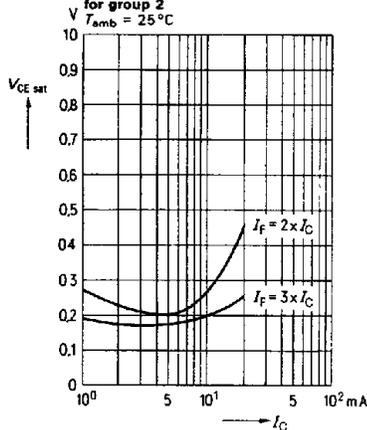
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Optocouplers (Optoisolators)

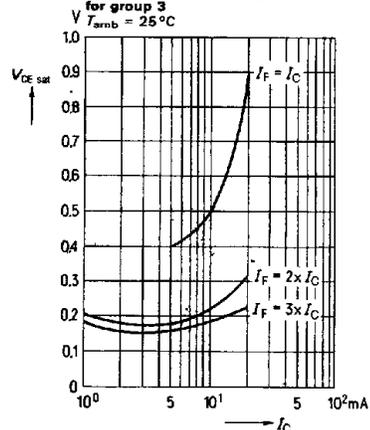
Collector-emitter saturation voltage (typ.) versus collector current and control range for group 1  
 $T_{amb} = 25^\circ\text{C}$



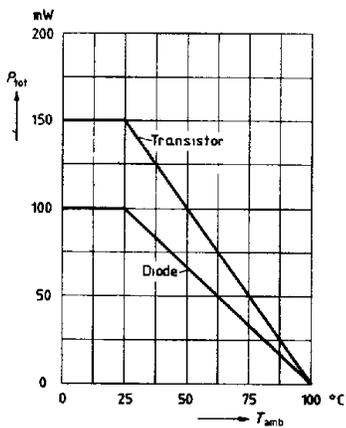
Collector-emitter saturation voltage (typ.) versus collector current and control range for group 2  
 $T_{amb} = 25^\circ\text{C}$



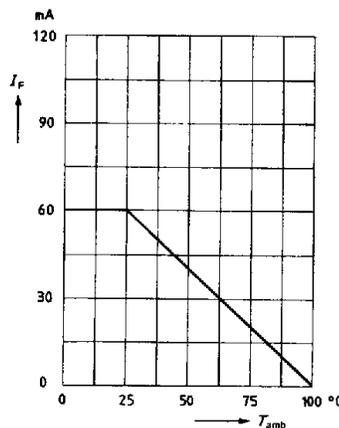
Collector-emitter saturation voltage (typ.) versus collector current and control range for group 3  
 $T_{amb} = 25^\circ\text{C}$



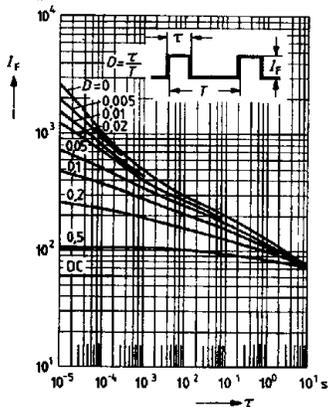
Permissible power dissipation for transistor and diode versus ambient temperature



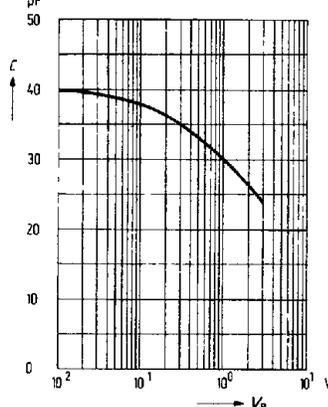
Permissible forward current of the diode versus ambient temperature



Permissible pulse handling capability Forward current versus pulse width  
 $D =$  parameter,  $T_{amb} = 25^\circ\text{C}$



Diode capacitance (typ.) versus reverse voltage  
 $T_{amb} = 25^\circ\text{C}, f = 1\text{ MHz}$



Transistor capacitances (typ.) versus emitter voltage  
 $T_{amb} = 25^\circ\text{C}, f = 1\text{ MHz}$

