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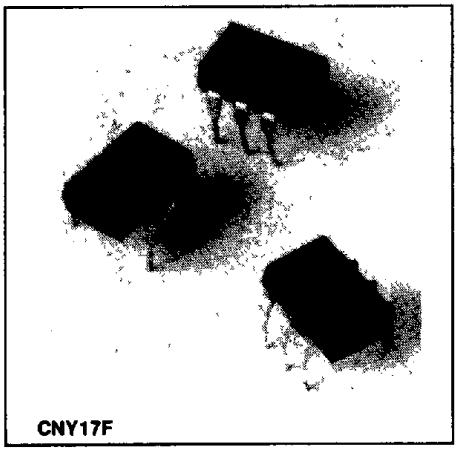
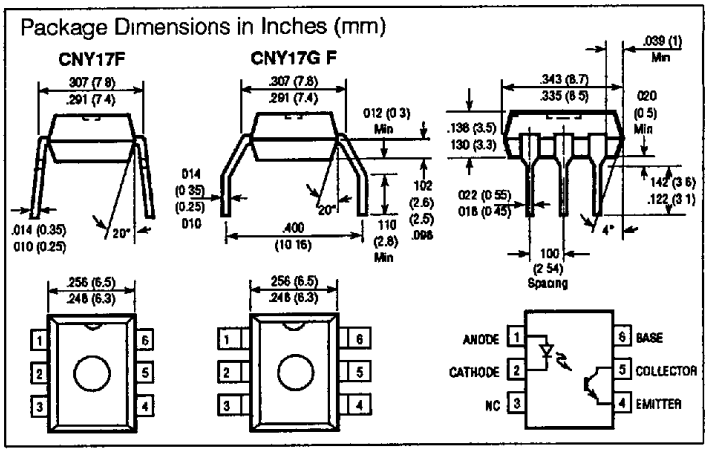
SIEMENS

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


CNY17F



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_{CEO} = 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 ($t \leq 10$ µs)	I_{FSM}	2.5	A
Total power dissipation	P_{tot}	100	mW
Detector (silicon phototransistor)			
Collector-emitter reverse voltage	V_{CEO}	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)[1]	T_s	260	°C
Isolation test voltage[2] between emitter and detector referred to standard climate 23/50 DIN 50014	V_{IO}	5300	Vdc
Leakage path		>8.0	mm
Air Path			
CNY17F		>7.3	mm
CNY17G F		>8.0	mm
Tracking resistance			
In acc. with VDE 0110 § 6, table 3 and DIN 53480/VDE 0303, part 1	KB	≥ 100 (group 3)	
Isolation resistance (V_{IO} = 500 V)	R_{IO}	10^{11}	Ω

Characteristics (T_{amb} = 25°C)

Emitter (GaAs infrared emitter)			
Forward voltage (I_F = 60 mA)	V_F	1.25 (≤ 1.65)	V
Breakdown voltage (I_R = 10 µA)	BV	30 (≥ 6)	V
Reverse current (V_R = 6 V)	I_R	0.01 (≤ 10)	µA
Capacitance (V_R = 0 V, f = 1 MHz)	C_O	40	pF
Thermal resistance[1]	R_{thJA}	750	K/W
Detector (silicon phototransistor)			
Capacitance (V_{CE} = 5 V, f = 1 MHz)	C_{Ct}	6.8	pF
Thermal resistance[1]	R_{thJA}	500	K/W
Optocoupler			
Collector-emitter saturation voltage (I_F = 10 mA, I_C = 2.5 mA)	V_{CEsat}	0.25 (≤ 0.4)	V
Coupling capacitance	C_K	0.5	pF

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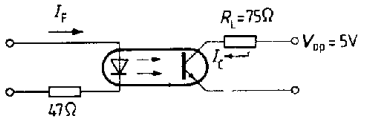
The optocouplers are grouped according to their current transfer ratio I_C/I_F at V_{CE}=5 V, marked by dash numbers

	-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 (≤50)	2 (≤50)	5 (≤100)	5 (≤100)	nA

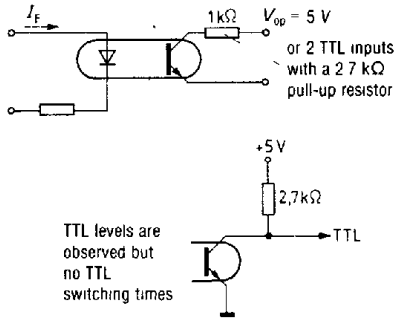
Linear Operation (without saturation)



I_F=10 mA, V_{OP}=5 V, T_{amb}=25°C

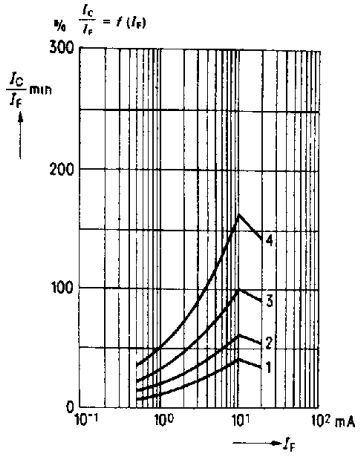
Load Resistance	R_L	75	Ω
Turn-On Time	t_{ON}	3 0 (≤5.6)	µs
Rise Time	t_R	2.0 (≤4 0)	µs
Turn-Off Time	t_{OFF}	2.3 (≤4.1)	µs
Fall Time	t_F	2.0 (≤3.5)	µs
Cut-Off Frequency	F_{CO}	250	kHz

Switching Operation (with saturation)

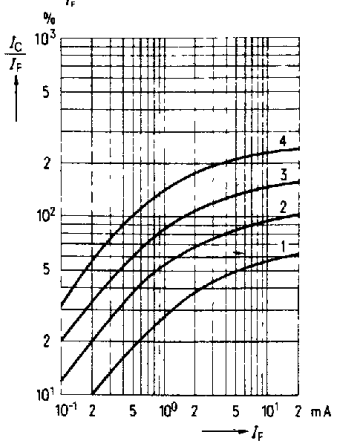


Group	-1 (I_F=20 mA)	-2 and -3 (I_F=10 mA)	-4 (I_F=5 mA)	
Turn-On Time t_{ON}	3.0 (≤5 5)	4 2 (≤8 0)	6.0 (≤10 5)	µs
Rise Time t_R	2.0 (≤4 0)	3 0 (≤6 0)	4 6 (≤8 0)	µs
Turn-Off Time t_{OFF}	18 (≤34)	23 (≤39)	25 (≤43)	µs
Fall Time t_F	11 (≤20)	14 (≤24)	15 (≤26)	µs
V_{CESAT}	0 25 (≤0 4)			V

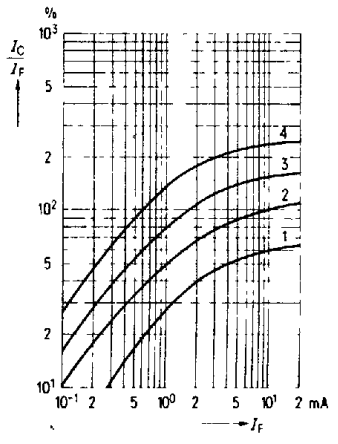
Minimum current transfer ratio versus diode forward current
T_{amb} = 25 °C, V_{CE} = 5 V



Current transfer ratio (typ.) versus diode forward current
T_{amb} = -25 °C, V_{CE} = 5 V



Current transfer ratio (typ.) versus diode forward current
T_{amb} = 0°C V_{CE} = 5 V



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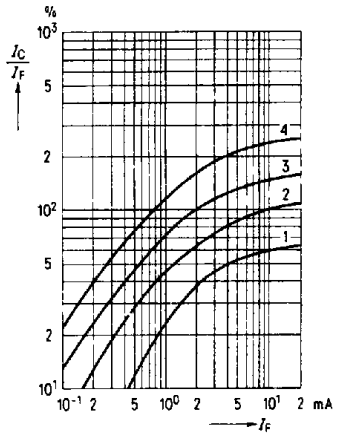
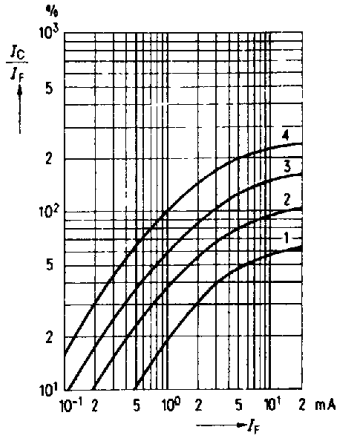
Current transfer ratio as a function of diode current (T_{amb} = 25°C)

$\frac{I_C}{I_F} = f(I_F)$ V_{CE} = 5 V



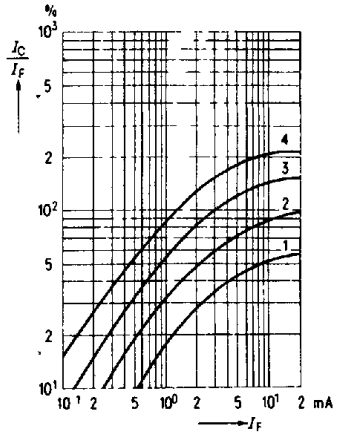
Current transfer ratio as a function of diode current (T_{amb} = 50°C)

$\frac{I_C}{I_F} = f(I_F)$ V_{CE} = 5 V



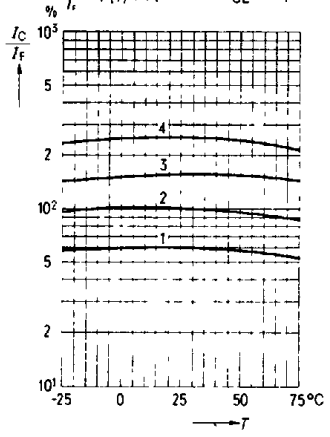
Current transfer ratio as a function of diode current (T_{amb} = 75°C)

$\frac{I_C}{I_F} = f(I_F)$ V_{CE} = 5 V



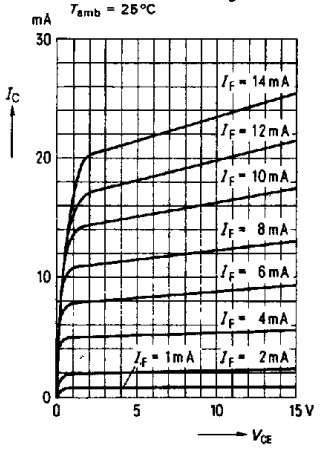
Current transfer ratio as a function of temperature

$\frac{I_C}{I_F} = f(T)$; (I_F = 10 mA V_{CE} = 5 V)

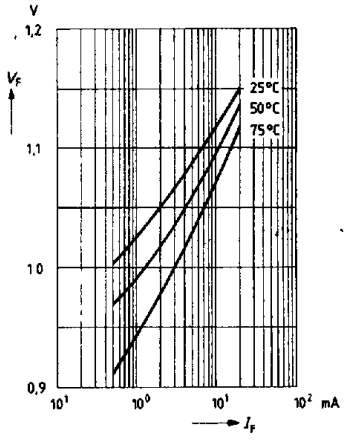


Output characteristics (typ.) Collector current versus collector-emitter voltage

T_{amb} = 25°C

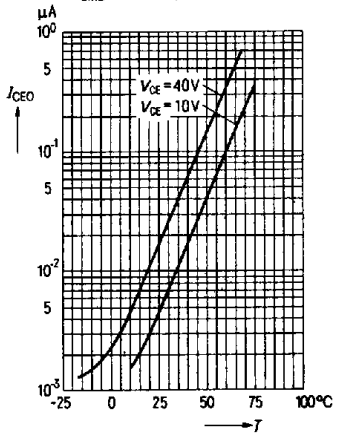


Forward voltage (typ.) of the diode versus forward current

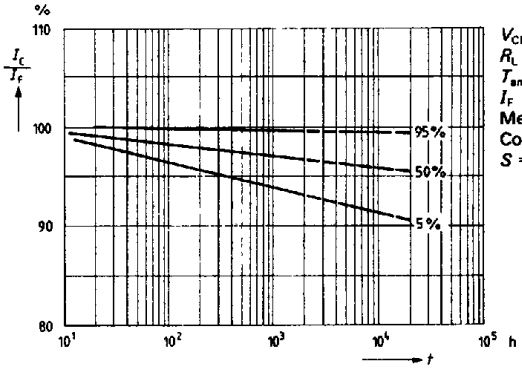


Collector-emitter leakage current (typ.) of the transistor versus temperature

T_{amb} = 25°C, I_F = 0



Current transfer ratio versus load time



V_{CE} = 5 V
R_L = 1 kΩ
T_{amb} = 25 °C
I_F = 60 mA
Measuring current = 10 mA
Confidence coefficient
S = 60 %

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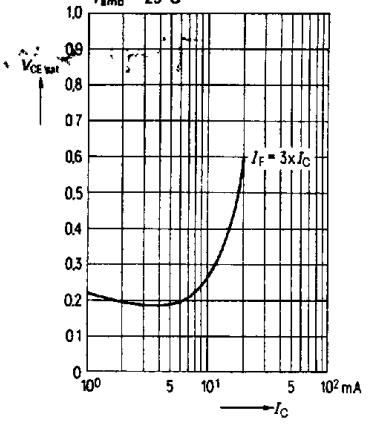
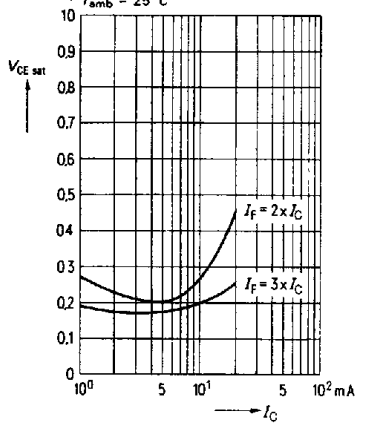
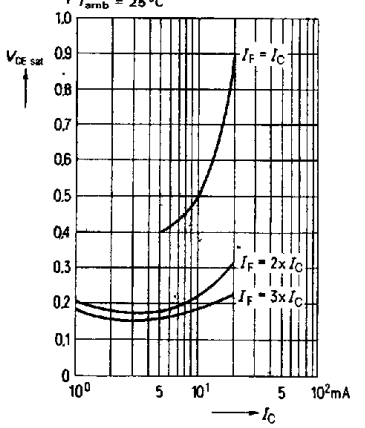
Collector-emitter saturation voltage (typ.) versus collector current and control range[1]) for group 1
T_{amb} = 25 °C



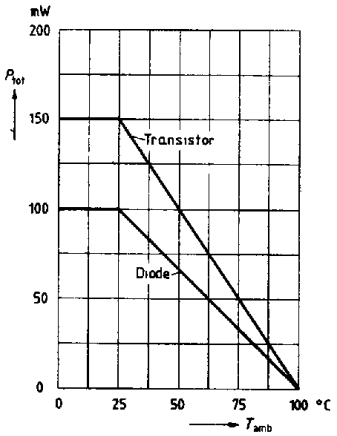
Collector-emitter saturation voltage (typ.) versus collector current and control range[1]) for group 2
T_{amb} = 25 °C



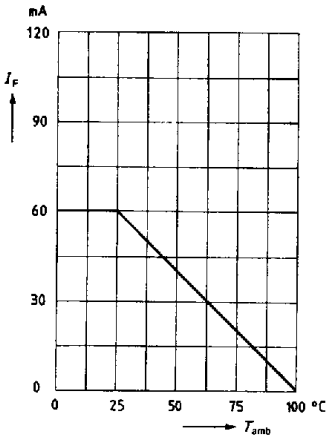
Collector-emitter saturation voltage (typ.) versus collector current and control range[1]) for group 3
T_{amb} = 25 °C



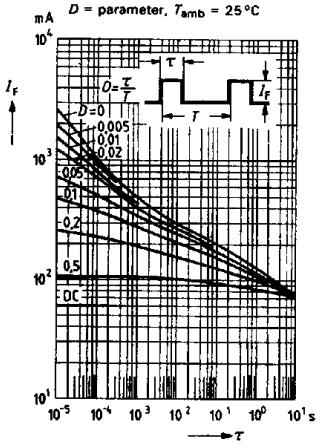
Permissible power dissipation for transistor and diode versus ambient temperature



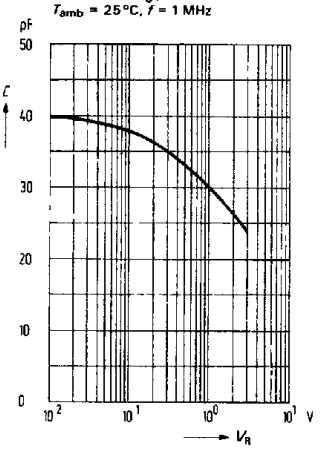
Permissible forward current of the diode versus ambient temperature



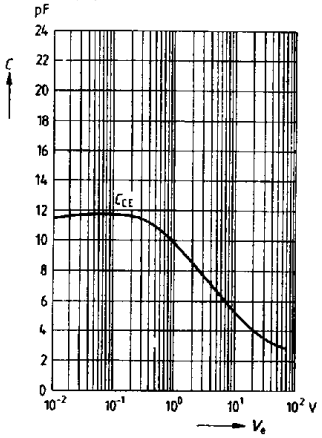
Permissible pulse handling capability
Forward current versus pulse width
D = parameter, T_{amb} = 25 °C



Diode capacitance (typ.) versus reverse voltage
T_{amb} = 25 °C, f = 1 MHz



Transistor capacitances (typ.) versus emitter voltage
T_{amb} = 25 °C, f = 1 MHz



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