

SIEMENS

T-41-83

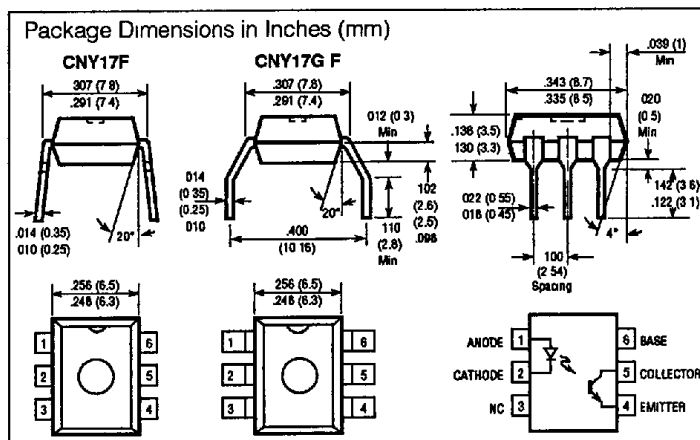
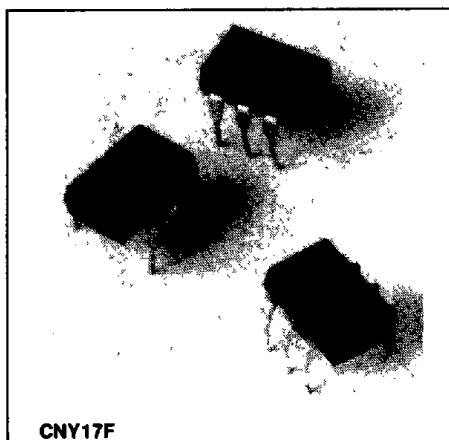
CNY17F SERIES

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) ¹⁾	T_s	260		°C

Isolation test voltage²⁾

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 ($V_{IO} = 500 V$)	R_{IO}	≥ 100 (group 3)	Ω
		10^{11}	

Characteristics ($T_{amb} = 25^\circ C$)**Emitter** (GaAs infrared emitter)

Forward voltage ($I_F = 60 mA$)	V_F	1.25 (≤ 1.65)	V
Breakdown voltage ($I_R = 10 \mu A$)	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_0	40	pF
Thermal resistance ¹⁾	R_{thJA}	750	K/W

Detector (silicon phototransistor)

Capacitance ($V_{CE} = 5 V, f = 1 MHz$)	C_{ck}	6.8	pF
Thermal resistance ¹⁾	R_{thJA}	500	K/W

Optocoupler

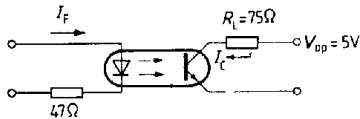
Collector-emitter saturation voltage

($I_F = 10 mA, I_C = 2.5 mA$)	V_{CEsat}	0.25 (≤ 0.4)	V
Coupling capacitance	C_k	0.5	pF

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

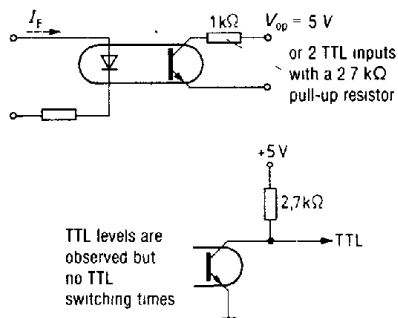
Linear Operation (without saturation)



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

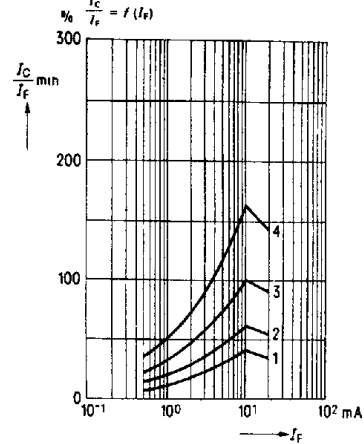
Load Resistance	R_L	75	Ω
Turn-On Time	t_{on}	3.0 (≤ 5.6)	μs
Rise Time	t_r	2.0 (≤ 4.0)	μs
Turn-Off Time	t_{off}	2.3 (≤ 4.1)	μs
Fall Time	t_f	2.0 (≤ 3.5)	μs
Cut-Off Frequency	F_{∞}	250	kHz

Switching Operation (with saturation)

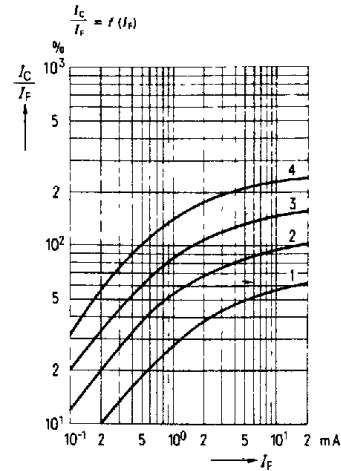


Group	-1 ($I_F=20$ mA)	-2 and -3 ($I_F=10$ mA)	-4 ($I_F=5$ mA)	
Turn-On Time t_{on}	3.0 (≤ 5.5)	4.2 (≤ 8.0)	6.0 (≤ 10.5)	μs
Rise Time t_r	2.0 (≤ 4.0)	3.0 (≤ 6.0)	4.6 (≤ 8.0)	μs
Turn-Off Time t_{off}	18 (≤ 34)	23 (≤ 39)	25 (≤ 43)	μs
Fall Time t_f	11 (≤ 20)	14 (≤ 24)	15 (≤ 26)	μs
$V_{CE(sat)}$	0.25 (≤ 0.4)			V

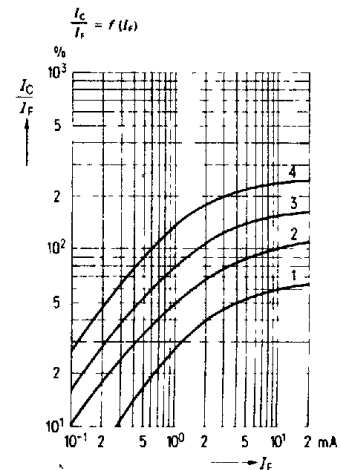
Minimum current transfer ratio versus diode forward current
 $T_{amb} = 25^\circ\text{C}$, $V_{CE} = 5$ V



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



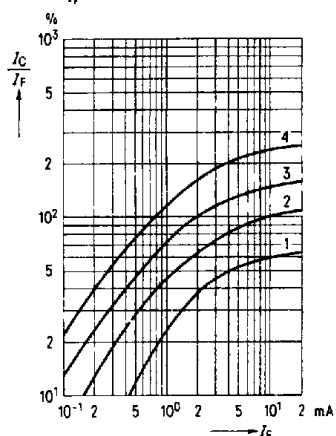
Current transfer ratio (typ.) versus diode forward current
 $T_{amb} = 0^\circ\text{C}$, $V_{CE} = 5$ V



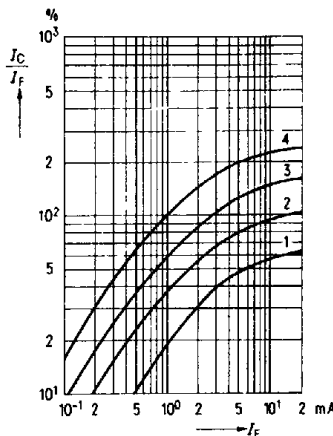
Optocouplers
(Optoisolators)

T-4183

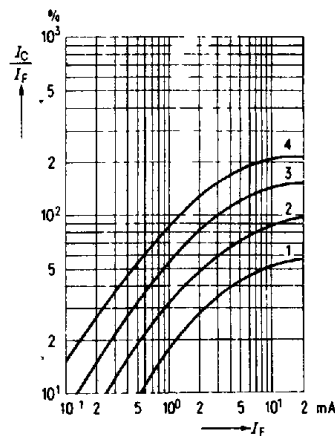
Current transfer ratio as a function of diode current ($T_{amb} = 25^\circ\text{C}$)
 $\frac{I_C}{I_F} = f(I_F)$ $V_{CE} = 5\text{ V}$



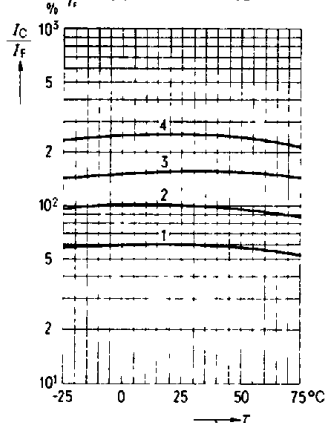
Current transfer ratio as a function of diode current ($T_{amb} = 50^\circ\text{C}$)
 $\frac{I_C}{I_F} = f(I_F)$ $V_{CE} = 5\text{ V}$



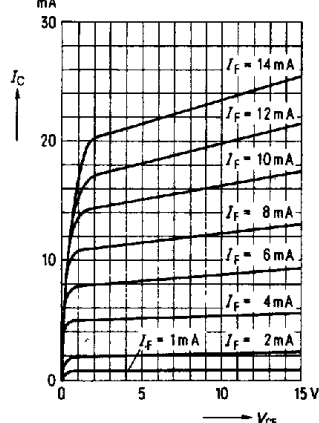
Current transfer ratio as a function of diode current ($T_{amb} = 75^\circ\text{C}$)
 $\frac{I_C}{I_F} = f(I_F)$ $V_{CE} = 5\text{ V}$



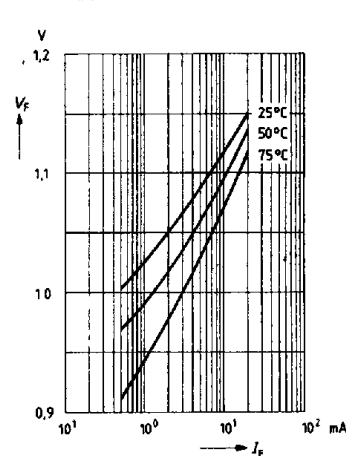
Current transfer ratio as a function of temperature
 $\frac{I_C}{I_F} = f(T)$ ($I_F = 10\text{ mA}$, $V_{CE} = 5\text{ V}$)



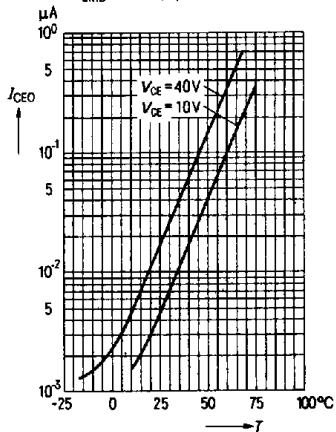
Output characteristics (typ.)
Collector current versus collector-emitter voltage
 $T_{amb} = 25^\circ\text{C}$



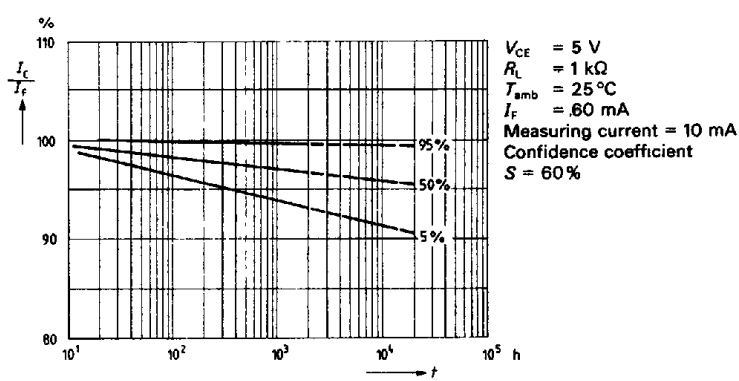
Forward voltage (typ.) of the diode versus forward current



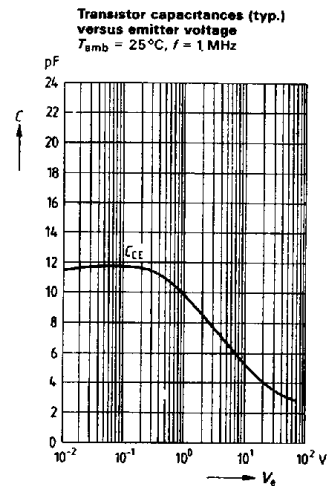
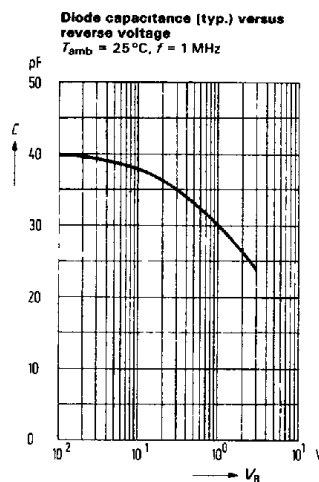
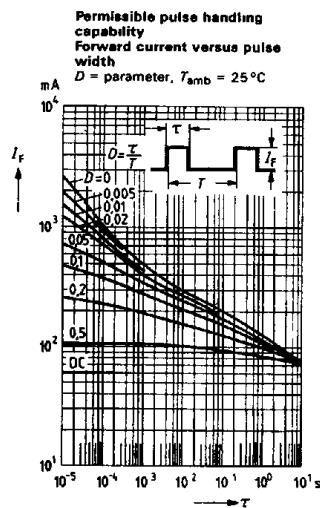
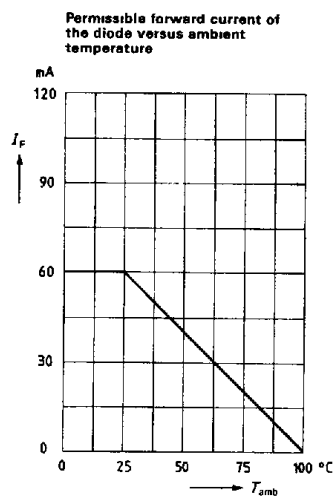
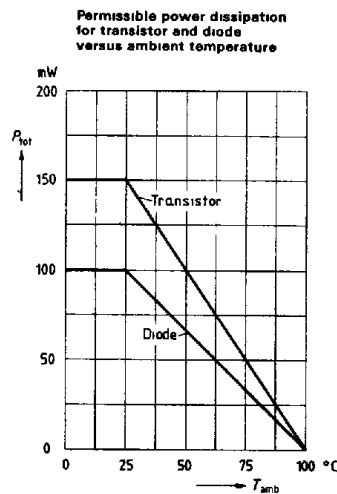
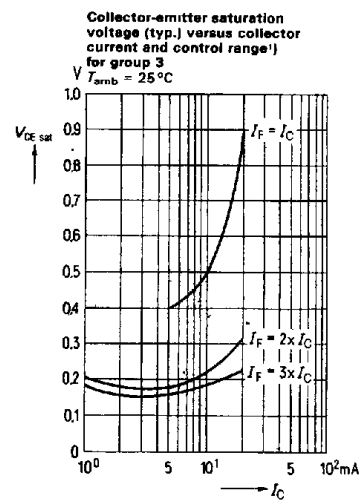
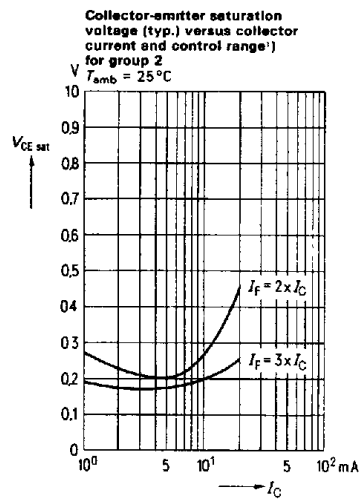
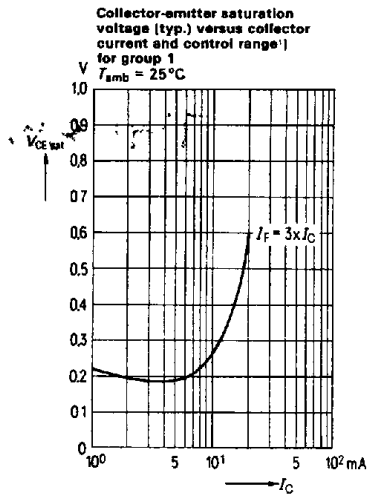
Collector-emitter leakage current (typ.) of the transistor versus temperature
 $T_{amb} = 25^\circ\text{C}$, $I_F = 0$



Current transfer ratio versus load time



T-4183



Optocouplers
 (Optoisolators)