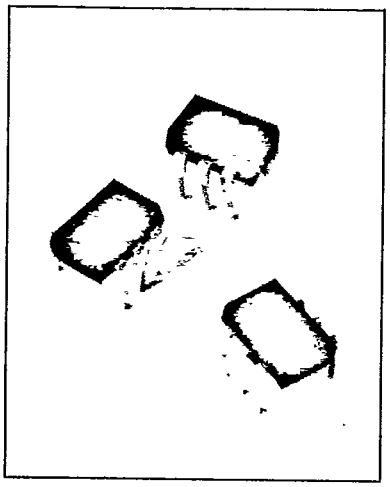
SIEMENS

CNY17 SERIES

SINGLE CHANNEL PHOTOTRANSISTOR OPTOCOUPLER

T-41-83



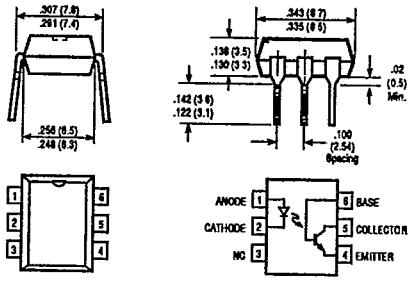
FEATURES

- **5300 Volt Breakdown Voltage**
- **High Current Transfer Ratio, 4 Groups**
  CNY 17-1, 40 to 80%
  CNY 17-2, 63 to 125%
  CNY 17-3, 100 to 200%
  CNY 17-4, 160 to 320%
- **Long Term Stability**
- **Industry Standard Dual-in-Line**
- **Underwriters Lab Approval #E52744**
- **VDE Approval #0883**
- **VDE Approval #0884 (Optional with Option 1, add -X001 suffix)**

DESCRIPTION

The CNY 17 is an optically coupled pair employing a gallium arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. The CNY 17 can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

Package Dimensions in Inches (mm)



Maximum Ratings

Emitter (GaAs infrared emitting diode)			
Reverse voltage	V_R	6	V
Forward current	I_F	60	mA
Surge current ($t \leq 10\ \mu s$)	i_{FS}	2.5	A
Power dissipation	P_{tot}	100	mW
Detector (Si phototransistor)			
Collector-emitter reverse voltage	V_{CEO}	70	V
Emitter-base reverse voltage	V_{EBO}	7	V
Collector current	I_C	50	mA
Collector current ($t < 1$ ms)	I_{CSM}	100	mA
Power dissipation	P_{tot}	150	mW
Coupler			
Storage temperature	T_{stor}	-40 to +150	°C
Operating temperature	T_{amb}	-40 to +100	°C
Junction temperature	T_j	100	°C
Soldering temperature in a 2 mm distance from the case bottom ($t \leq 3$ s)	T_s	260	°C
Isolation voltage	V_{is}	5300	V
(between emitter and detector referred to standard climate 23/50 DIN 50014,			
leakage path, DIN 57883, 6 80		8 2 MIN.	mm
air path, VDE 0883, 6 80		7.3 MIN.	mm
Tracking resistance. Group III (KC > 600 in accordance with VDE 110 § 6, table 3 and DIN 53 480/VDE 0330, part 1			
Isolation voltage @ V_{is} = 500 V	R_{is}	10^{11}	Ω

Characteristics (T_{amb} = 25°C)

Emitter (GaAs infrared emitting diode)			
Forward voltage (I_F = 60 mA)	V_F	1.25 (≤ 1 65)	V
Breakdown voltage (I_R = 10 μA)	V_{BR}	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	R_{thJamb}	750	K/W
Detector (Si phototransistor)			
Capacitance (V_{CE} = 5 V; f = 1 MHz)	C_{CE}	6.8	pF
(V_{CB} = 5 V; f = 1 μHz)	C_{CB}	8.5	pF
(V_{CB} = 5 V; f = 1 μHz)	C_{EB}	11	pF
Thermal Resistance	R_{thJamb}	500	K/W
Coupler			
Collector-emitter saturation voltage (I_F = 10 mA, I_C = 2 5 mA)	V_{CEsat}	.25 (≤ .4)	V
Coupling capacitance	C_K	.55	pF

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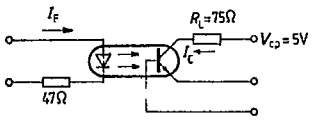
The optocouplers are grouped according to their current transfer ratio I_C/I_F at V_{CE}=5 V, marked by dash numbers.

	–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

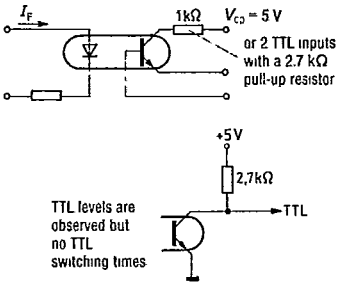
Linear Operation (without saturation)



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)

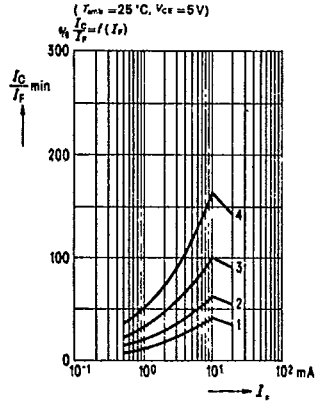


Group	–1 (I_F=20 mA)	–2 and –3 (I_F=10 mA)	–4 (I_F=5 mA)	
Turn-On Time t_{ON}	3.0 (≤5.5)	4.2 (≤8.0)	6.0 (≤10.5)	µs
Rise Time t_R	2.0 (≤4.0)	3.0 (≤6.0)	4.6 (≤8.0)	µs
Turn-Off Time t_{OFF}	18 (≤34)	23 (≤39)	25 (≤43)	µs
Fall Time t_F	11 (≤20)	14 (≤24)	15 (≤26)	µs
V_{CESAT}	0.25 (≤0.4)			V

Optocouplers (Optoisolators)

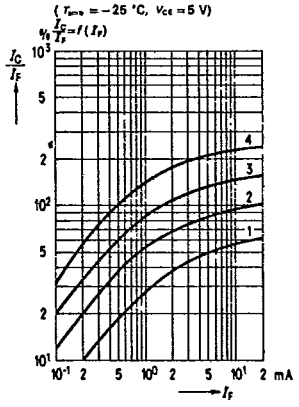
Minimum current transfer ratio as a function of diode current

(T_{amb} =25 °C, V_{CE} =5 V)



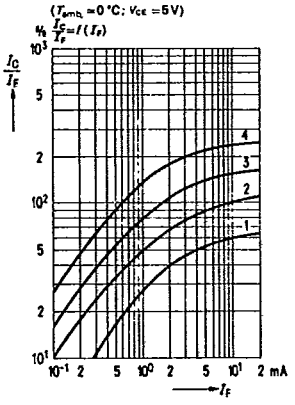
Current transfer ratio as a function of diode current

(T_{amb} = –25 °C, V_{CE} =5 V)



Current transfer ratio as a function of diode current

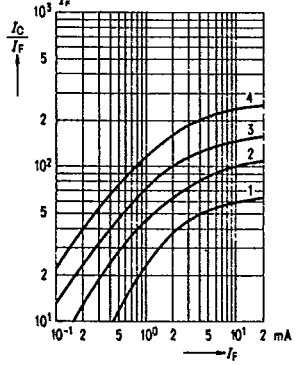
(T_{amb} =0 °C; V_{CE} =5 V)



Current transfer ratio as a function of diode current

(T_{amb} = 25 °C, V_{CE} = 5 V)

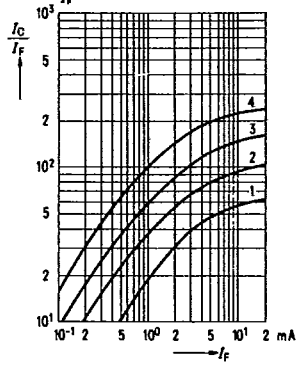
$\frac{I_C}{I_F} = f(I_F)$



Current transfer ratio as a function of diode current

(T_{amb} = 50 °C; V_{CE} = 5 V)

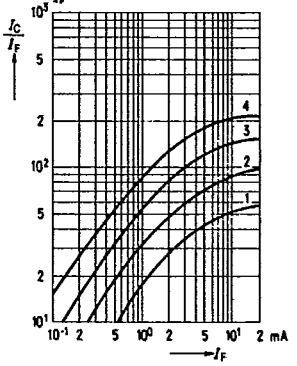
$\frac{I_C}{I_F} = f(I_F)$



Current transfer ratio as a function of diode current

(T_{amb} = 75 °C; V_{CE} = 5 V)

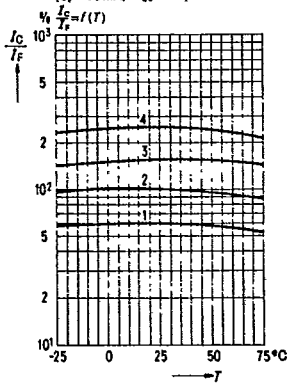
$\frac{I_C}{I_F} = f(I_F)$



Current transfer ratio as a function of temperature

(I_F = 10 mA, V_{CE} = 5 V)

$\frac{I_C}{I_F} = f(T)$

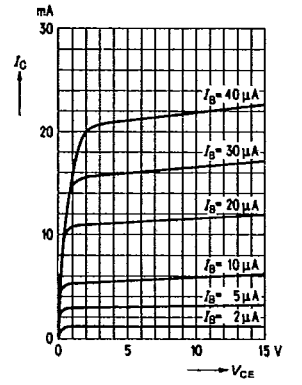


Transistor characteristics

(Current gain B=550)

(T_{amb} = 25 °C, I_F = 0)

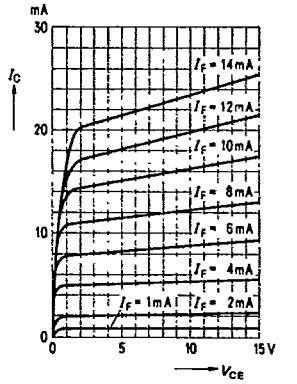
$I_C = f(V_{CE})$



Output characteristics

(T_{amb} = 25 °C)

$I_C = f(V_{CE})$



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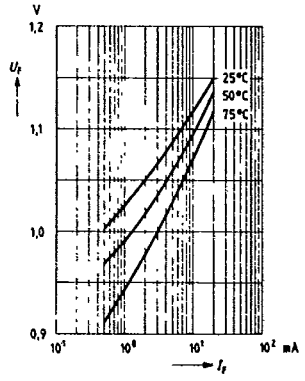
Forward voltage

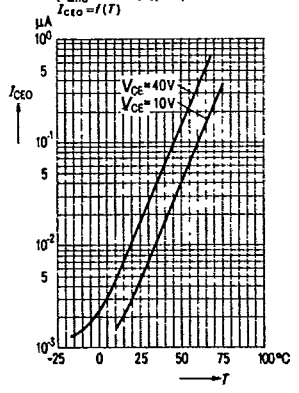
$V_F = f(I_F)$



Collector-emitter off-state current

(T_{amb} = 25 °C; I_F = 0)

$I_{CEO} = f(T)$



CNY 17

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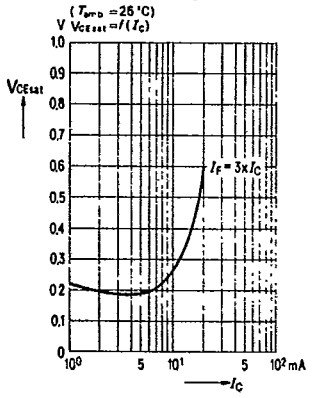
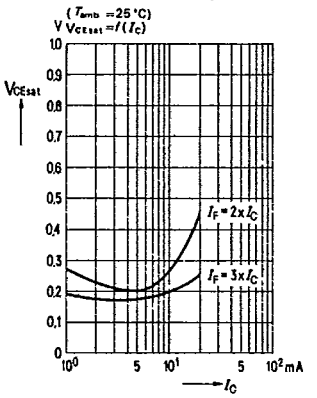
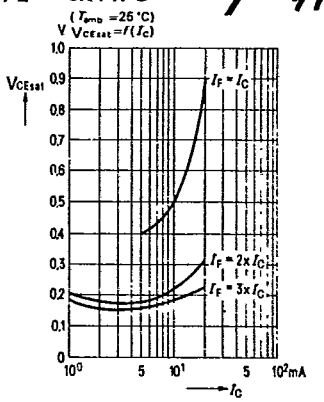
Saturation voltage as a function of collector current and modulation depth for CNY17-1



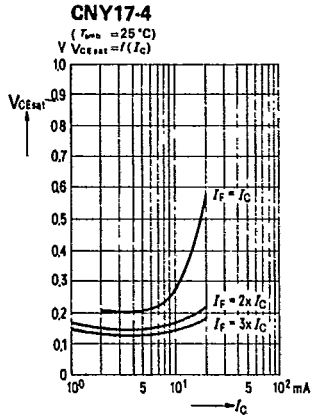
Handling same except for CNY17-2



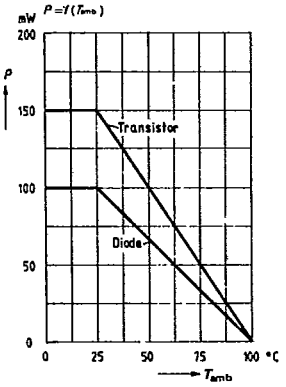
CNY17-3



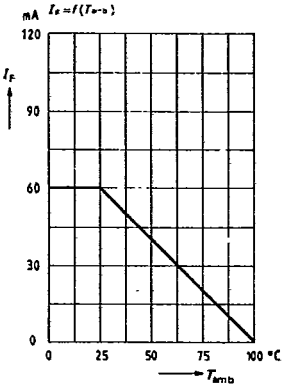
CNY17-4



Permissible loss transistor and diode

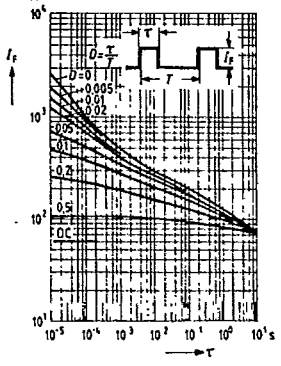


Permissible loss diode



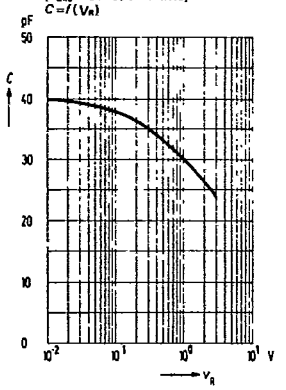
Permissible pulse load

(D = Parameter, T_{amb} = 25 °C)
$I_F = f(\tau)$



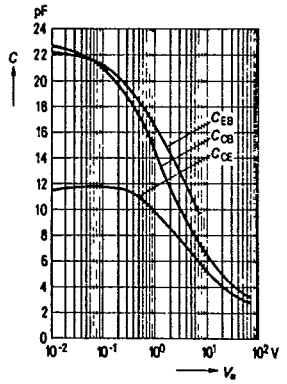
Diode capacitance

(T_{amb} = 25 °C, f = 1 MHz)
$C = f(V_R)$



Transistor capacitances

(T_{amb} = 25 °C; f = 1 MHz)
$C = f(V_e)$



Optocouplers (Optoisolators)