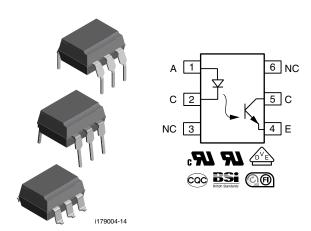


Optocoupler, Phototransistor Output, no Base Connection



DESCRIPTION

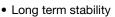
The CNY17F is an optocoupler consisting of a gallium arsenide infrared emitting diode optically coupled to a silicon planar phototransistor detector in a plastic plug-in DIP-6 package.

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

FEATURES

- Isolation test voltage, 5000 V_{RMS}
- · No base terminal connection for improved common mode interface immunity



- · Industry standard dual-in-line package
- · Material categorization: For definitions of compliance please see www.vishay.com/doc?99912





CNY17F-4X017 (1)

AGENCY APPROVALS

Safety application model number covering all products in this datasheet is CNY17F. This model number should be used when consulting safety agency documents.

- UL file no. E52744
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1

CNY17F-3X017 (1)

CNY17F-3X019 (1)

- BSI: EN 60065, EN 60950-1
- FIMKO EN60950
- CQC GB8898-2011

ORDERING INFORMATION	N						
C N Y 1 7 F - # X 0 # # T PART NUMBER CTR PACKAGE OPTION TAPE AND REEL Option 7 Option 9							
AGENCY CERTIFIED/PACKAGE		CTF	R (%)				
UL, cUL, BSI, FIMKO	40 to 80	63 to 125	100 to 200	160 to 320			
DIP-6	CNY17F-1	CNY17F-2	CNY17F-3	CNY17F-4			
DIP-6, 400 mil, option 6	CNY17F-1X006	CNY17F-2X006	CNY17F-3X006	CNY17F-4X006			
SMD-6, option 7	CNY17F-1X007 (1)	CNY17F-2X007T (1)	CNY17F-3X007T (1)	CNY17F-4X007T (1)			
SMD-6, option 9	CNY17F-1X009T (1)	CNY17F-2X009T (1)	CNY17F-3X009T (1)	CNY17F-4X009T (1)			
VDE, UL, cUL, BSI, FIMKO	40 to 80	63 to 125	100 to 200	160 to 320			
DIP-6	CNY17F-1X001	CNY17F-2X001	CNY17F-3X001	CNY17F-4X001			
DIP-6, 400 mil, option 6	CNY17F-1X016	CNY17F-2X016	CNY17F-3X016	CNY17F-4X016			

SMD-6, option 7

SMD-6, option 9

Additional options may be possible, please contact sales office.

CNY17F-1X017 (1)

CNY17F-1X019

(1) Also available in tubes; do not put T on end.

CNY17F-2X017 (1)

CNY17F-2X019 (1)



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT			
INPUT							
Reverse voltage		V_R	6	V			
DC forward current		I _F	60	mA			
Surge forward current	t ≤ 10 µs	I _{FSM}	2.5	А			
Power dissipation		P _{diss}	100	mW			
OUTPUT							
Collector emitter breakdown voltage		BV _{CEO}	70	V			
Collector current		I _C	50	mA			
Collector peak current	$t_p/T = 0.5, t_p \le 10 \text{ ms}$	I _{CM}	100	mA			
Output power dissipation		P _{diss}	150	mW			
COUPLER							
Isolation test voltage between emitter and detector	t = 1 min	V _{ISO}	5000	V _{RMS}			
Storage temperature range		T _{stg}	-55 to +150	°C			
Ambient temperature range		T _{amb}	-55 to +110	°C			
Junction temperature		Tj	100	°C			
Soldering temperature (1)	2 mm from case, ≤ 10 s	T _{sld}	260	°C			
Total power dissipation		P _{diss}	250	mW			

Notes

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not
 implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute
 maximum ratings for extended periods of the time can adversely affect reliability.
- (1) Refer to reflow profile for soldering conditions for surface mounted parts (SMD). Refer to wave profile for soldering conditions for through hole parts (DIP).

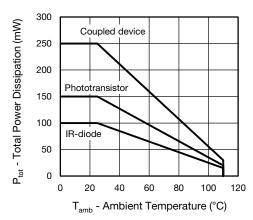


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	$I_F = 60 \text{ mA}$		V_{F}		1.39	1.65	V
Breakdown voltage	I _R = 10 μA		V_{BR}	6			V
Reverse current	V _R = 6 V		I _R		0.01	10	μΑ
Capacitance	$V_R = 0 V, f = 1 MHz$		Co		25		pF
OUTPUT							
Collector emitter capacitance	V _{CE} = 5 V, f = 1 MHz		C _{CE}		5.2		pF
Base collector capacitance	V _{CE} = 5 V, f = 1 MHz		C _{BC}		6.5		pF
Emitter base capacitance	V _{CE} = 5 V, f = 1 MHz		C _{EB}		7.5		pF



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ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER							
Collector emitter, saturation voltage	$I_F = 10 \text{ mA}, I_C = 2.5 \text{ mA}$		V _{CEsat}		0.25	0.4	V
Coupling capacitance			C _C		0.6		pF
		CNY17F-1	I _{CEO}		2	50	nA
Collector emitter, leakage current	V _{CE} = 10 V	CNY17F-2	I _{CEO}		2	50	nA
		CNY17F-3	I _{CEO}		5	100	nA
		CNY17F-4	I _{CEO}		5	100	nA

Note

 Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO (T _{amb} = 25 °C, unless otherwise specified)								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
	I _F = 10 mA	CNY17F-1	CTR	40		80	%	
		CNY17F-2	CTR	63		125	%	
		CNY17F-3	CTR	100		200	%	
1.7		CNY17F-4	CTR	160		320	%	
l _O /l _F	I _F = 1 mA	CNY17F-1	CTR	13	30		%	
		CNY17F-2	CTR	22	45		%	
		CNY17F-3	CTR	34	70		%	
		CNY17F-4	CTR	56	90		%	

Note

• Current transfer ratio I_C/I_F at V_{CE} = 5 V, 25 °C and collector emitter leakage current by dash number.

SWITCHING CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
LINEAR OPERATION (with	out saturation)				•		
Turn-on time	I_F = 10 mA, V_{CC} = 5 V, R_L = 75 Ω		t _{on}		3		μs
Rise time	I_F = 10 mA, V_{CC} = 5 V, R_L = 75 Ω		t _r		2		μs
Turn-off time	I_F = 10 mA, V_{CC} = 5 V, R_L = 75 Ω		t _{off}		2.3		μs
Fall time	I_F = 10 mA, V_{CC} = 5 V, R_L = 75 Ω		t _f		2		μs
Cut-off frequency	I_F = 10 mA, V_{CC} = 5 V, R_L = 75 Ω		f _{CO}		110		kHz
SWITCHING OPERATION (with saturation)						
	I _F = 20 mA	CNY17F-1	t _{on}		3		μs
Turn-on time	I _F = 10 mA	CNY17F-2	t _{on}		4.2		μs
rum-on ume	IF = TO THA	CNY17F-3	t _{on}		4.2		μs
	$I_F = 5 \text{ mA}$	CNY17F-4	t _{on}		6		μs
	I _F = 20 mA	CNY17F-1	t _r		2		μs
Rise time	I _F = 10 mA	CNY17F-2	t _r		3		μs
nise time	IF = TO THA	CNY17F-3	t _r		3		μs
	$I_F = 5 \text{ mA}$	CNY17F-4	t _r		4.6		μs
	I _F = 20 mA	CNY17F-1	t _{off}		18		μs
Turn-off time	I _F = 10 mA	CNY17F-2	t _{off}		23		μs
Turn-on time	IF = TO THA	CNY17F-3	t _{off}		23		μs
	$I_F = 5 \text{ mA}$	CNY17F-4	t _{off}		25		μs
	I _F = 20 mA	CNY17F-1	t _f		11		μs
Fall time	I _F = 10 mA	CNY17F-2	t _f		14		μs
i all tille	IF = TO ITIA	CNY17F-3	t _f		14		μs
	$I_F = 5 \text{ mA}$	CNY17F-4	t _f		15		μs



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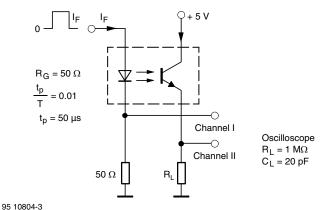


Fig. 2 - Test Circuit, Non-Saturated Operation

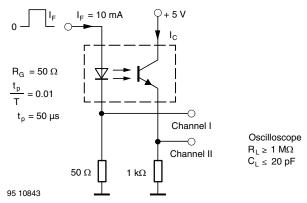


Fig. 3 - Test Circuit, Saturated Operation

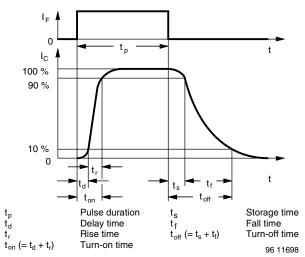


Fig. 4 - Switching Times

SAFETY AND INSULATIO	N RATINGS			
PARAMETER	SYMBOL	VALUE	UNIT	
MAXIMUM SAFETY RATINGS		<u> </u>		
Output safety power		P _{SO}	700	mW
Input safety current		I _{SI}	400	mA
Safety temperature		T _{SI}	175	°C
Comparative tracking index		CTI	175	
INSULATION RATED PARAMETE	RS			
Maximum withstanding isolation vo	Itage	V _{ISO}	5000	V _{RMS}
Maximum transient isolation voltage		V _{IOTM}	8000	V _{peak}
Maximum repetitive peak isolation	voltage	V _{IORM}	890	V _{peak}
Insulation resistance	T _{amb} = 25 °C, V _{DC} = 500 V	R _{IO}	≥ 10 ¹²	Ω
Isolation resistance	T _{amb} = 100 °C, V _{DC} = 500 V	R _{IO}	≥ 10 ¹¹	Ω
Climatic classification (according to	IEC 68 part 1)		55/115/21	
Environment (pollution degree in ac	cordance to DIN VDE 0109)		2	
Cronness diatance	Standard DIP-4		≥ 7	mm
Creepage distance	SMD		≥7	mm
Clearance distance	Standard DIP-4		≥8	mm
Clearance distance	SMD		≥8	mm
Insulation thickness	·	DTI	≥ 0.4	mm

Note

As per DIN EN 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance
with the safety ratings shall be ensured by means of protective circuits.





TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

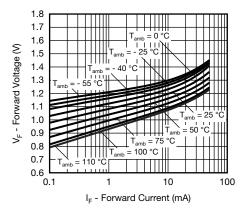


Fig. 5 - Forward Voltage vs. Forward Current

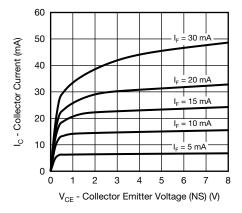


Fig. 6 - Collector Current vs. Collector Emitter Voltage (NS)

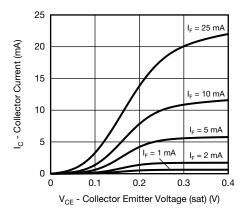


Fig. 7 - Collector Current vs. Collector Emitter Voltage (sat)

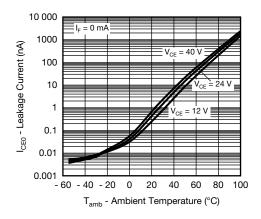


Fig. 8 - Leakage Current vs. Ambient Temperature

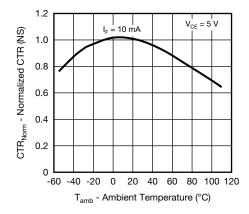


Fig. 9 - Normalized CTR (NS) vs. Ambient Temperature

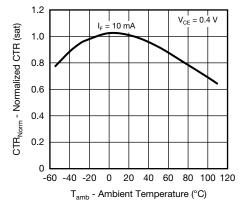


Fig. 10 - Normalized CTR (sat) vs. Ambient Temperature



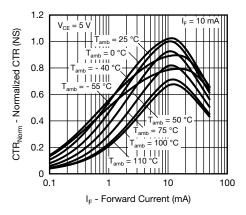


Fig. 11 - Normalized CTR (NS) vs. Forward Current

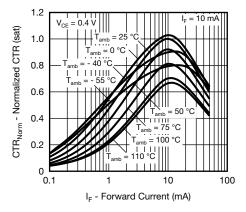


Fig. 12 - Normalized CTR (sat) vs. Forward Current

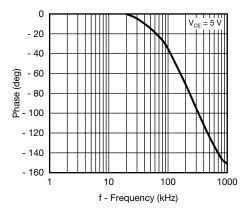


Fig. 13 - CTR Frequency vs. Phase Angle

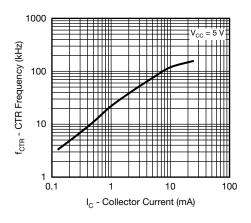


Fig. 14 - CTR -3 dB Frequency vs. Collector Current

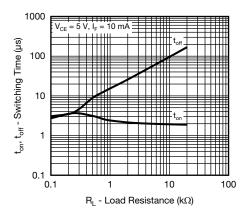
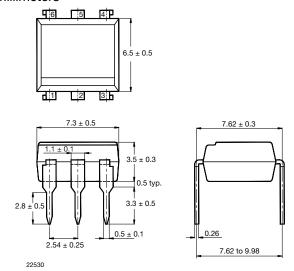


Fig. 15 - Switching Time vs. Load Resistance

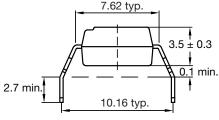


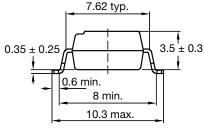
PACKAGE DIMENSIONS in millimeters

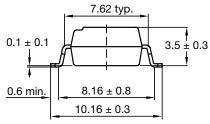


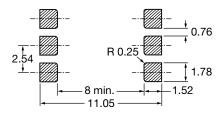
 Option 6
 Option 7
 Option 9

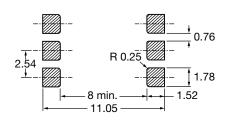
 7.62 typ.
 7.62 typ.
 7.62 typ.











20802-34

PACKAGE MARKING (Example of CNY17F-2x017T)



Notes

- VDE logo is only marked on option 1 parts. Option information is not marked on the part.
- Tape and reel suffix (T) is not part of the package marking.



TUBE AND TAPE INFORMATION

DEVICES PER TUBE			
TYPE	UNITS/TUBE	TUBES/BOX	UNITS/BOX
DIP-6	50	40	2000

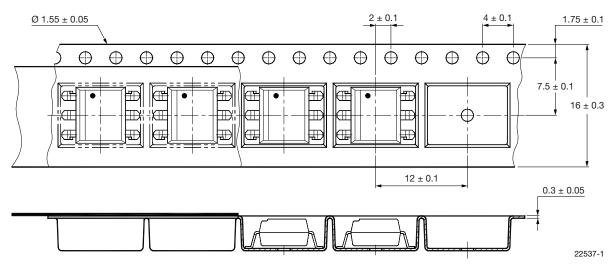


Fig. 16 - Tape and Reel Drawing, 1000 Units per Reel



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