

CNY 17F-1X, CNY 17F-2X, CNY 17F-3X, CNY 17F-4X

OPTICALLY COUPLED ISOLATOR NON-BASE LEAD TRANSISTOR OUTPUT



DESCRIPTION

The CNY 17 is an optically coupled isolator consisting of a Gallium Arsenide infrared emitting diode and a NPN silicon phototransistor mounted in a standard 6-pin dual-in-line package.

NOTES

- 1 a. The product type number consists of the basic product type followed by the letter "X" which indicates VDE 0884 approval of the basic part.
b. Letter "X" supercedes letter "V" which denoted the now obsolete VDE 0883 approval.
2. For 10mm lead spread requirements add suffix G.
3. For surface mount requirements add suffix SM.

APPROVALS

DIN VDE 0884. Marks Licence No. 70910
UL 1577 File No. E91231
BSI 415 Certificate No. 7209



FEATURES

Rated Impulse Voltage (Transient Overvoltage)
 $V_{IOTM} = 6kV$ peak

Insulation Test Voltage (Partial Discharge Test)
 $V_{pd} = 1.4kV$ peak

Rated Insulation Voltage (RMS includes d.c.)
 $V_{IOWM} = 600 V_{RMS}$ (848V peak)

Rated Recurring Peak Voltage (repetitive)
 $V_{IORM} = 600 V_{RMS}$

Isolation Materials according to UL 94

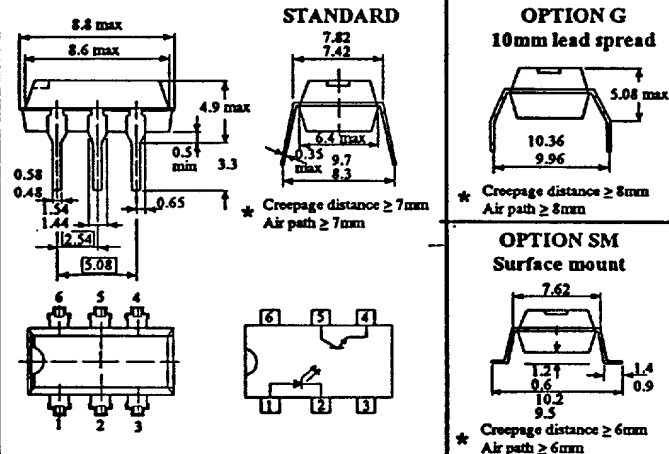
Creeping Current Resistance according to VDE 0303 / IEC 112

Comparative Tracking Index CTI 275 (VDE 0109)

Climatic Classification 55/100/21 (IEC 68 Part 1)

Pollution Degree 2 (VDE 0109)

PACKAGE DIMENSIONS IN MM



* After mounting on PC board

APPLICATIONS

These couplers meet the requirements of the following Equipment Standards

- | | |
|----------------------|---|
| VDE 0109
0110 | Circuits for safe protective separation against electrical shock according to safety class II (reinforced isolation).
Application class I-IV at mains voltages $\leq 300V$.
Application class I-III at mains voltage $\leq 600V$. |
| VDE 0804 | Telecommunication Apparatus and Data Processing |
| VDE 0805/
IEC 435 | Data Processing Equipment (Option G only) |
| VDE 0806/
IEC 950 | Office Machines (Option G only) |
| VDE 0860/
IEC 65 | Safety for Mains Operated Electronic and Related Apparatus for Household. |
| UL 1577 | Standard for Safety . Optical isolated switch systems. Package type K. |
| BS 415/
IEC 65 | Safety requirements for mains operated electronic and related apparatus for household and similar general use. Class II applications. |
| BS 7002/
IEC 950 | Specification for safety of information technology equipment including electrical business equipment (Option G only) |

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ABSOLUTE MAXIMUM RATINGS (25°C UNLESS OTHERWISE NOTED)

Storage Temperature _____ -55°C to +125°C
 Operating Temperature _____ -55°C to +100°C
 Lead Soldering Temperature
 (2mm from case for 10 seconds) _____ 260°C
 Input-to-Output Isolation Voltage _____ ± 5300 Vdc

ISOCOM COMPONENTS LTD

INPUT DIODE

Forward D.C. Current _____ 60mA
 Reverse D.C. Voltage _____ 6V
 Peak Forward Current ($t_p \leq 10 \mu s$) _____ 2.5A
 Power Dissipation
 (derate linearly 1.33mW/°C above 25°C) _____ 100mW
 Junction Temperature _____ 100°C

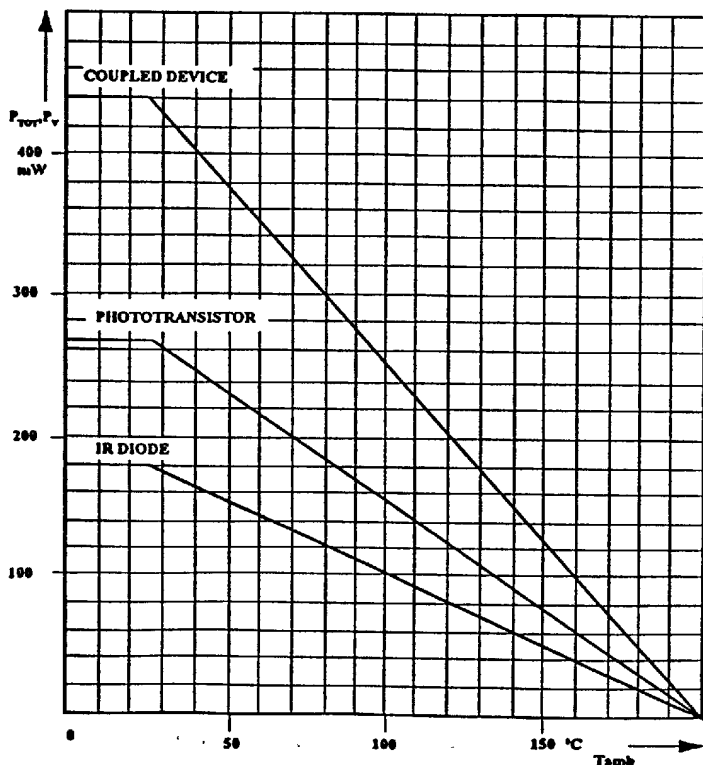
OUTPUT TRANSISTOR

Collector-emitter Voltage BV_{CEO} _____ 70V
 Emitter-collector Voltage BV_{ECO} _____ 7V
 Collector Current _____ 50mA
 Collector Current ($t \leq 1ms$) _____ 100mA
 Power Dissipation
 (derate linearly 2.00mW/°C above 25°C) _____ 150mW
 Junction Temperature _____ 100°C

PACKAGE

Total Power Dissipation
 (derate linearly 3.3mW/°C above 25°C) _____ 250mW

MAXIMUM SAFETY DERATING CURVE



MAXIMUM SAFETY RATINGS

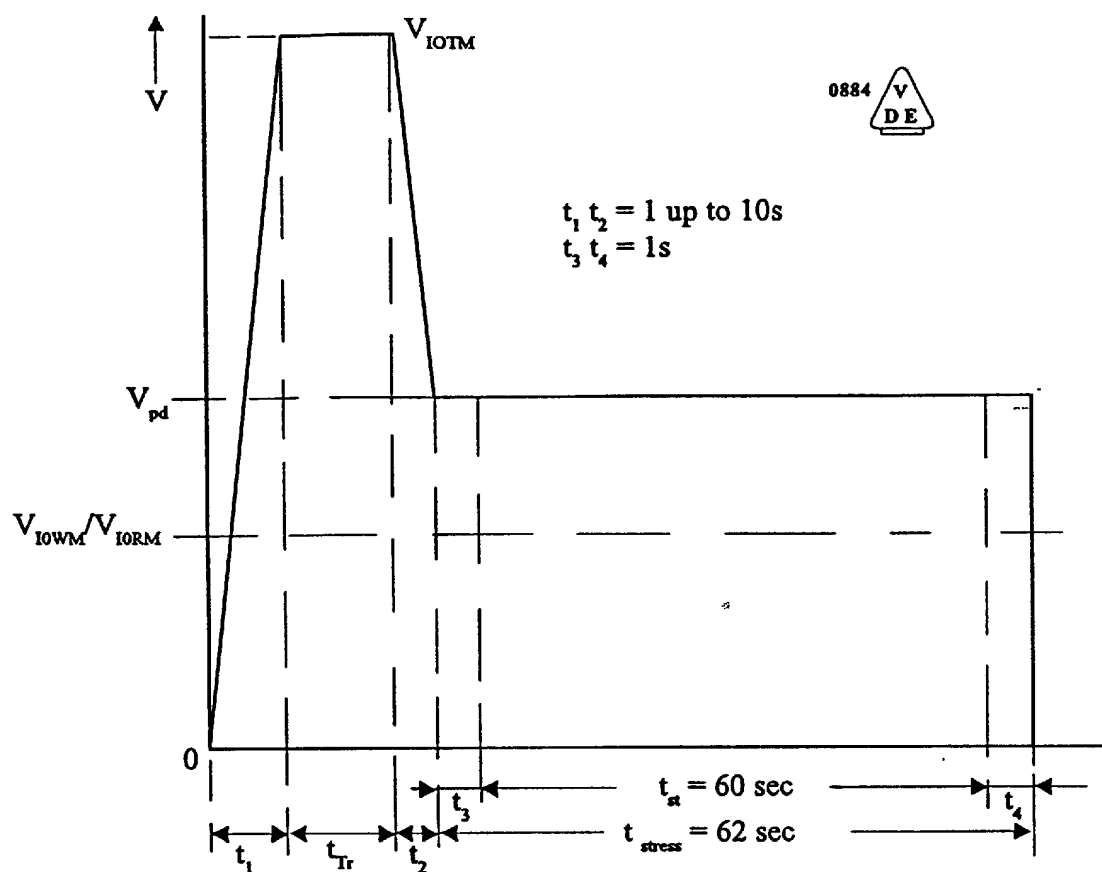
Input Diode I_{si} _____ 130 mA max
 Output Transistor P_{si} _____ 265 mW max

Coupled Device
 Impulse Voltage V_{IOTM} _____ 6 KV max
 Safety Temperature T_{si} _____ 200°C max

Note

This device is suitable for safe electrical isolation **only** within the maximum safety ratings. This must be ensured by protective circuits in the applications.

TEST PULSE DIAGRAM FOR SAMPLE TESTS acc. DIN VDE 0884



INSULATION RATED PARAMETERS

PARAMETER		TEST CONDITIONS	SYMBOL	MIN	MAX	UNIT
Partial Discharge Test Voltage	routine test	100% $t_m = 1s$	V_{pd}	1.4		kV
	lot test (sample test)	$t_{Tr} = 10 s$ $t_m = 60 s$ see Test Pulse Diagram	V_{IOTM}	6		kV
			V_{pd}	1.05		kV
Insulation Resistance		$V_{10} = 500V, T_{amb} = 25^{\circ}C$	R_{15}	10^{12}		OHM
		$V_{10} = 500V, T_{amb} = 100^{\circ}C$	R_{15}	10^{11}		OHM
		$V_{10} = 500V, T_m = 200^{\circ}C$ (only construction test)	R_{15}	10^9		OHM

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

T-41-83

Parameter		Min.	Typ	Max.	Units	Test Condition
Input	Forward Voltage (V_F)		1.2	1.65	Volt	$I_F = 60 \text{ mA}$
	Capacitance		45		pF	$V_R = 0, f = 1 \text{ MHz}$
	Reverse Current (I_R)			10	μA	$V_R = 6 \text{ V}$
	Reverse Breakdown Voltage (V_R)	6.0			Volt	$I_R = 100 \mu\text{A}$
Output	Collector-emitter Voltage (BV_{CE0})	70			Volt	$I_C = 1 \text{ mA}, I_B = 0$
	Emitter-collector Voltage (BV_{ECO})	7			Volt	$I_E = 100 \mu\text{A}, I_C = 0$
	Capacitance (C_{CE})		6.8		pF	$V_{CE} = 5 \text{ V}, f = 1 \text{ MHz}$
	Leakage Current (I_{CBO}) CNY17F-1X, CNY17F-2X, CNY17F-3X, CNY17F-4X		5 15	50 100	nA nA	$V_{CE} = 10 \text{ V}, I_F = 0$
Coupled	DC Current Transfer Ratio I_C / I_F CNY17F-1X CNY17F-2X CNY17F-3X CNY17F-4X	40		80	%	$I_F = 10 \text{ mA}, V_{CE} = 5 \text{ V}$ Note 2
		63		125	%	
		100		200	%	
		160		320	%	
	CNY17F-1X CNY17F-2X CNY17F-3X CNY17F-4X	13			%	$I_F = 1 \text{ mA}, V_{CE} = 5 \text{ V}$
		22			%	
		34			%	
		56			%	
	Input-to-Output Isolation Resistance (R_{IO})	10^{11}			ohm	$V_{IO} = 500 \text{ V}, (\text{note 1})$ $I_F = 10 \text{ mA}, I_C = 2.5 \text{ mA}$ $f = 1 \text{ MHz} (\text{note 1})$
	Collector-emitter Saturation Voltage $V_{CE}(\text{SAT})$		0.2	0.4	Volt	
	Capacitance Input to Output (C_{IO})		0.6		pF	

Note 1. Measured with input leads shorted together and output leads shorted together.

2. We are also willing to offer other CTR parameter selections if required. Please contact our factory to discuss requirements in detail.

SWITCHING CHARACTERISTICS

1. Linear Operation (without saturation) Fig 1
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- $I_F = 10 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 75 \Omega$

	TYP	MAX	UNITS
Turn-On Time t_{on}	3.8	5.6	μs
Rise Time t_r	2.8	4.0	μs
Turn-Off Time t_{off}	3.5	4.1	μs
Fall Time t_f	3.0	3.5	μs
Cut-Off Frequency F_{CO}		250	kHz

2. Switching Operation (with saturation) Fig 2
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- $V_{CC} = 5 \text{ V}, R_L = 1 \text{ k}\Omega$

GROUP	-1X ($I_F = 20 \text{ mA}$)		-2X and -3X ($I_F = 10 \text{ mA}$)		-4X ($I_F = 5 \text{ mA}$)		UNITS
	TYP	MAX	TYP	MAX	TYP	MAX	
Turn-On Time t_{on}	4.0	5.5	5.0	8.0	6.0	10.5	μs
Rise Time t_r	3.0	4.0	3.5	6.0	5.2	8.0	μs
Turn-Off Time t_{off}	26	34	28	39	30	43	μs
Fall Time t_f	15	20	17	24	19	26	μs
V_{CESAT}	≤ 0.4						V

