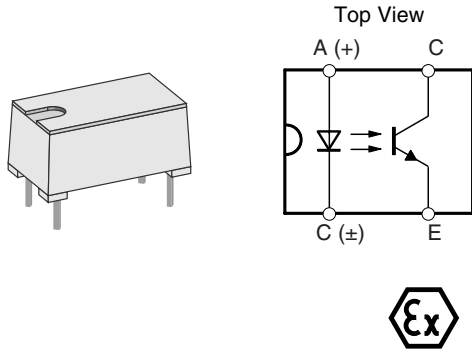


Optocoupler, Phototransistor Output, Very High Isolation Voltage



16965

DESCRIPTION

The CNY65Exi consists of a phototransistor optically coupled to a gallium arsenide infrared-emitting diode in a 4 pin plastic package.

The single components are mounted opposite one another, providing a distance between input and output for highest safety requirements of > 3 mm.

The CNY65Exi has an ATEX certification for explosive atmospheres according European Guide Line 94/9/EG.

FEATURES

- Suitable for intrinsic safety circuits according to test certificate no. PTB 03 ATEX 2033 U
- Isolation material according to UL94 - VO - flammability class
- Low temperature coefficient of CTR
- Creepage current resistance of isolation material according to VDE 0303/DIN 53480: CTI ≥ 475
- Isolation test voltage 11.6 kV
- Test class 25/100/21 DIN 40045
- Very low coupling capacity of typical 0.3 pF therefore high noise voltage resistant
- Coupling system J
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC


RoHS
COMPLIANT

APPLICATIONS

- Galvanically separated circuits, suitable for intrinsic safety circuits
- Electrical apparatus used in a potentially explosive atmosphere:
 - EN 50014: 2002-2
 - General instructions
 - EN 60079-0: 2006
 - Intrinsic safety "i" section

ORDER INFORMATION

PART	REMARKS
CNY65Exi	CTR 50 to 300 %, high isolation distance, 4-pin

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	5	V
Forward current		I_F	75	mA
Forward surge current	$t_p \leq 10 \mu s$	I_{FSM}	1.5	A
Power dissipation		P_{diss}	120	mW
Junction temperature		T_j	100	°C
OUTPUT				
Collector emitter voltage		V_{CEO}	32	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Collector peak current	$t_p/T = 0.5, t_p \leq 10 ms$	I_{CM}	100	mA
Power dissipation		P_{diss}	130	mW
Junction temperature		T_j	100	°C

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
DC isolation test voltage	$t = 1 \text{ min}$	V_{ISO}	11.6	kV
Total power dissipation		P_{tot}	250	mW
Ambient temperature range		T_{amb}	- 55 to + 85	°C
Storage temperature range		T_{stg}	- 55 to + 100	°C
Soldering temperature	2 mm from case, $t \leq 10 \text{ s}$	T_{sld}	260	°C

Note

$T_{\text{amb}} = 25 \text{ °C}$, unless otherwise specified.

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 Rating for extended periods of the time can adversely affect reliability.

ELECTRICAL CHARACTERISTICS (1)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	$I_F = 50 \text{ mA}$	V_F		1.25	1.6	V
OUTPUT						
Collector emitter voltage	$I_C = 1 \text{ mA}$	V_{CEO}	32			V
Emitter collector voltage	$I_E = 100 \text{ }\mu\text{A}$	V_{ECO}	7			V
Collector dark current	$V_{\text{CE}} = 20 \text{ V}$, $I_F = 0$, $E = 0$	I_{CEO}			200	nA
COUPLER						
DC isolation test voltage	$t = 1 \text{ min}$	$V_{\text{ISO}}^{(2)}$	11.6			kV
Isolation resistance	$V_{\text{IO}} = 1 \text{ kV}$, 40 % relative humidity	$R_{\text{IO}}^{(2)}$		10^{12}		Ω
Collector saturation voltage	$I_F = 10 \text{ mA}$, $I_C = 1 \text{ mA}$	V_{CEsat}			0.3	V
Cut-off frequency	$V_{\text{CE}} = 5 \text{ V}$, $I_F = 10 \text{ mA}$, $R_L = 100 \text{ }\Omega$	f_c	110			kHz
Coupling capacitance	$f = 1 \text{ MHz}$	C_k		0.3		pF

Notes

(1) $T_{\text{amb}} = 25 \text{ °C}$, unless otherwise specified.

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

(2) Related to standard climate 23/50 DIN 50014.

CURRENT TRANSFER RATIO

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	$V_{\text{CE}} = 5 \text{ V}$, $I_F = 10 \text{ mA}$	CNY65Exi	CTR	50	100	300	%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	$V_S = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $R_L = 100 \text{ }\Omega$, (see figure 1)	t_d		2.6		μs
Rise time	$V_S = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $R_L = 100 \text{ }\Omega$, (see figure 1)	t_r		2.4		μs
Fall time	$V_S = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $R_L = 100 \text{ }\Omega$, (see figure 1)	t_f		2.4		μs
Storage time	$V_S = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $R_L = 100 \text{ }\Omega$, (see figure 1)	t_s		0.3		μs
Turn-on time	$V_S = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $R_L = 100 \text{ }\Omega$, (see figure 1)	t_{on}		5.0		μs
Turn-off time	$V_S = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $R_L = 100 \text{ }\Omega$, (see figure 1)	t_{off}		3.0		μs
Turn-on time	$V_S = 5 \text{ V}$, $I_F = 10 \text{ mA}$, $R_L = 1 \text{ k}\Omega$, (see figure 2)	t_{on}		25.0		μs
Turn-off time	$V_S = 5 \text{ V}$, $I_F = 10 \text{ mA}$, $R_L = 1 \text{ k}\Omega$, (see figure 2)	t_{off}		42.5		μs

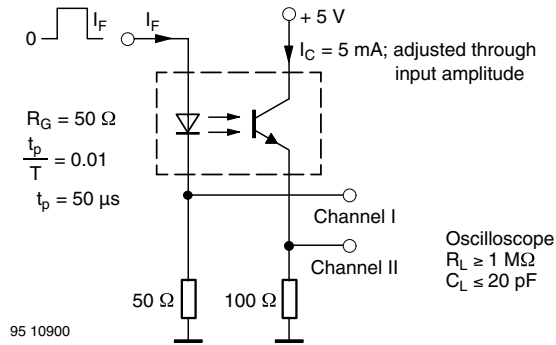


Fig. 1 - Test Circuit, Non-Saturated Operation

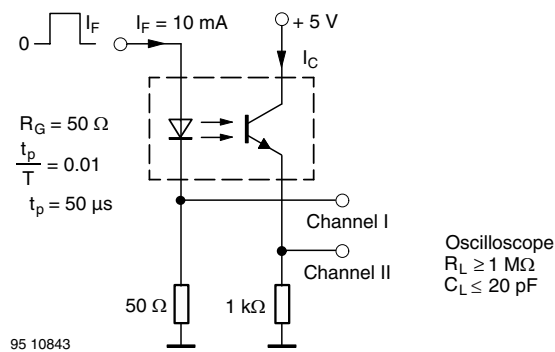


Fig. 2 - Test Circuit, Saturated Operation

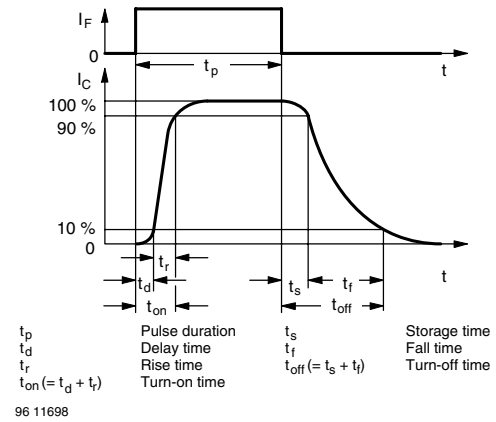


Fig. 3 - Switching Times

TYPICAL CHARACTERISTICS

$T_{amb} = 25^\circ\text{C}$, unless otherwise specified

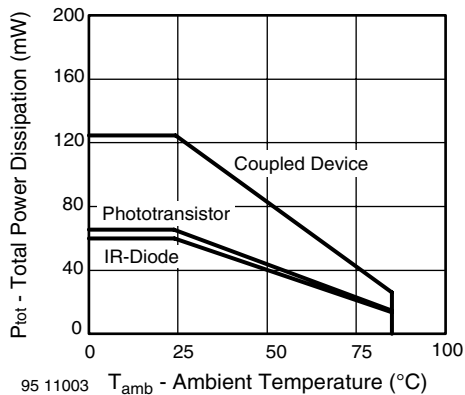


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

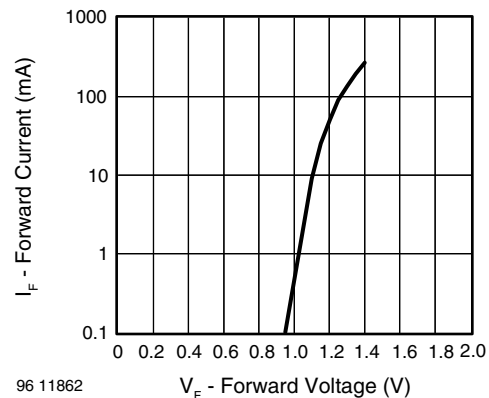


Fig. 5 - Forward Current vs. Forward Voltage

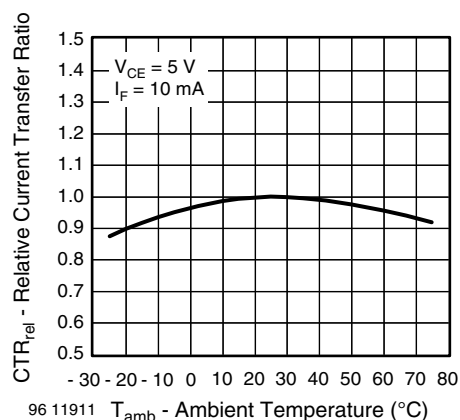


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

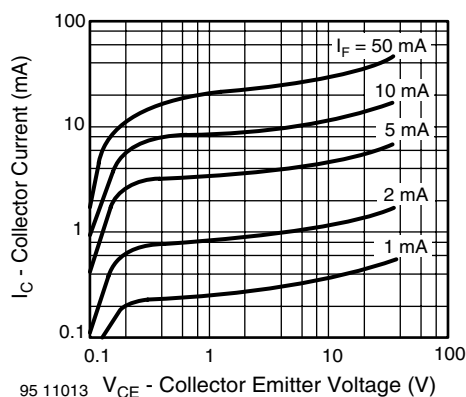


Fig. 9 - Collector Current vs. Collector Emitter Voltage

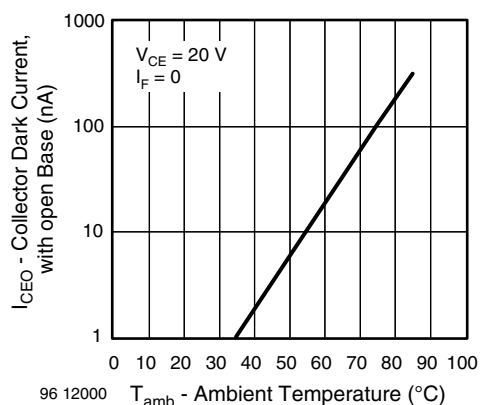


Fig. 7 - Collector Dark Current vs. Ambient Temperature

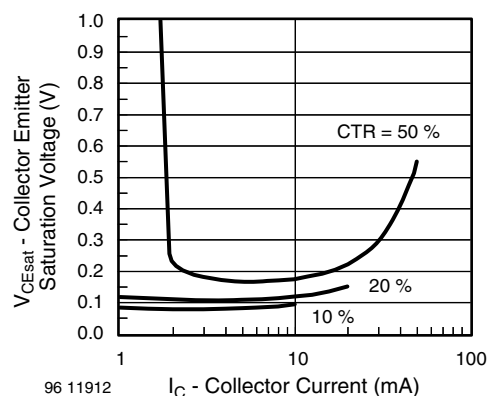


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

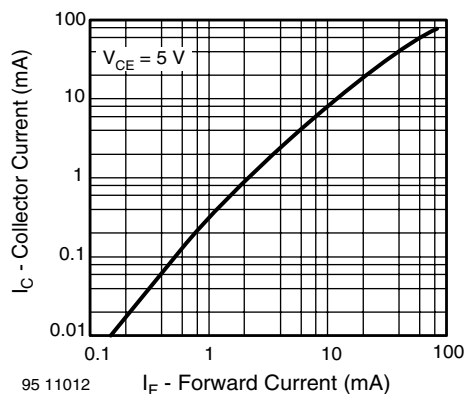


Fig. 8 - Collector Current vs. Forward Current

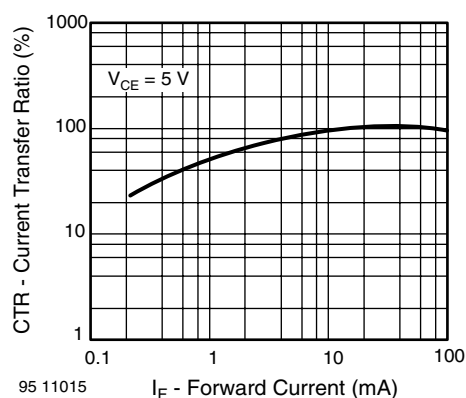


Fig. 11 - Current Transfer Ratio vs. Forward Current

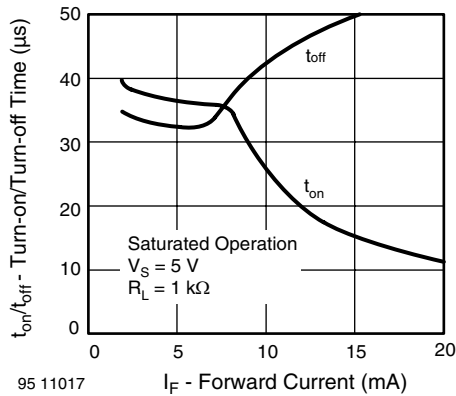


Fig. 12 - Turn-on/Turn-off Time vs. Forward Current

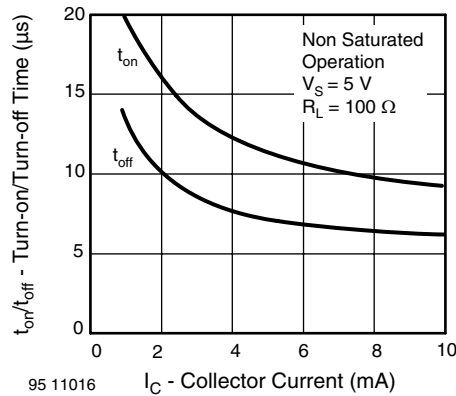


Fig. 13 - Turn-on/Turn-off Time vs. Collector Current

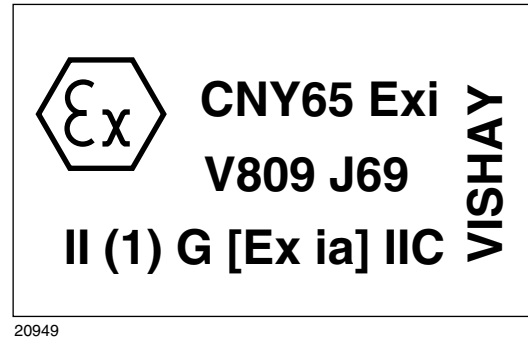
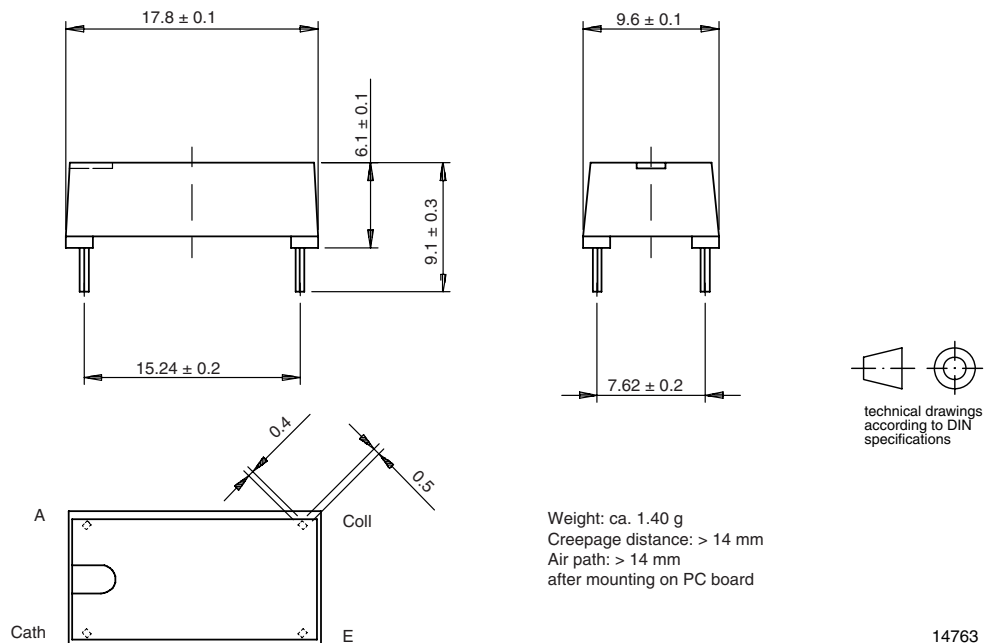


Fig. 14 - Marking Example

PACKAGE DIMENSIONS in millimeters



**OZONE DEPLETING SUBSTANCES POLICY STATEMENT**

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design
and may do so without further notice.

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Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



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