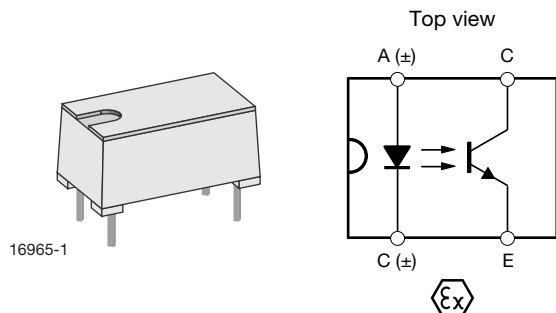


Optocoupler, Phototransistor Output, ATEX Certified



DESCRIPTION

The CNY65Exi consists of a phototransistor optically coupled to an infrared-emitting diode in a 4 pin plastic package. The components are mounted opposite one another, with a distance between input and output of > 3.0 mm; meeting the highest of safety requirements.

The CNY65Exi is ATEX certified for explosive atmospheres according to the Directive 2014/34/EU

AGENCY APPROVALS

- ATEX :PTB 03 ATEX 2033 U
EN 60079-0 : 2012 + A11 : 2013
EN 60079-11 : 2012
EN 60079-26 : 2015

FEATURES

- ATEX certificate: PTB 03 ATEX 2033 U
www.vishay.com/doc?85361
- Suitable for intrinsic safe circuits for gas and dust
- Gas safety provision: II (1) G [Ex ia] IIC
- Dust safety provision: II (1) D [Ex ia] IIIC
- Conforms to EN 60079-0: 2012 + A11: 2013
- Qualified for continuously, longterm, or frequently dangerous explosive environments, zone 0
- Isolation voltage (V_{ISO}) of 11 600 V_{peak} for 1 minute
- Distance from emitter to detector through insulation ≥ 3 mm
- CTR from 50 % to 300 %
- Very low coupling capacity (C_K)
 - 0.3 pF superior noise immunity between input and output pins
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



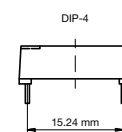
RoHS
COMPLIANT

APPLICATIONS

- Electronics used in potentially explosive gas and dust environments
 - Safety related process automation and instrumentation
 - Natural gas metering and flow measurement
 - Power and motor switching
 - Power supplies, metering, and data acquisition
 - Lighting and signaling
 - Petrol and grain transport and storage

ORDERING INFORMATION

C	N	Y	6	5	X	E	x	i
PART NUMBER					CTR BIN	PACKAGE OPTION		



AGENCY CERTIFIED/PACKAGE	CTR (%)	
ATEX	50 to 300	100 to 200
DIP-4, HV, high isolation distance	CNY65Exi	CNY65BExi



ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	5	V
Forward current		I_F	75	mA
Forward surge current	$t_p \leq 10\text{ }\mu\text{s}$	I_{FSM}	1.5	A
Power dissipation		P_{diss}	120	mW
Junction temperature		T_j	100	$^{\circ}\text{C}$
OUTPUT				
Collector emitter voltage		V_{CEO}	32	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Collector peak current	$t_p/T = 0.5, t_p \leq 10\text{ ms}$	I_{CM}	100	mA
Power dissipation		P_{diss}	130	mW
Junction temperature		T_j	100	$^{\circ}\text{C}$
COUPLER				
Total power dissipation		P_{tot}	250	mW
Ambient temperature range		T_{amb}	-55 to +85	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	-55 to +100	$^{\circ}\text{C}$
Soldering temperature	2 mm from case, $t \leq 10\text{ s}$	T_{sld}	260	$^{\circ}\text{C}$

Note

- 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
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	$V_{CE} = 20\text{ V}, I_F = 0, E = 0$	I_{CEO}	-	-	200	nA
COUPLER						
Isolation resistance	$V_{IO} = 1\text{ kV}$, 40 % relative humidity	$R_{IO}^{(1)}$	-	10^{12}	-	Ω
Collector saturation voltage	$I_F = 10\text{ mA}, I_C = 1\text{ mA}$	V_{CEsat}	-	-	0.3	V
Cut-off frequency	$V_{CE} = 5\text{ V}, I_F = 10\text{ mA}$, $R_L = 100\text{ }\Omega$	f_c	110	-	-	kHz
Coupling capacitance	$f = 1\text{ MHz}$	C_k	-	0.3	-	pF

Notes

- 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

⁽¹⁾ Related to standard climate 23/50 DIN 50014

CURRENT TRANSFER RATIO ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	$V_{CE} = 5\text{ V}, I_F = 10\text{ mA}$	CNY65Exi	CTR	50	100	300	%
		CNY65BExi	CTR	100	-	200	%

SAFETY AND INSULATION RATINGS

PARAMETER		SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		40 / 85 / 21	
Pollution degree	According to DIN VDE 0109		2	
Comparative tracking index	Insulation group IIIa	CTI	475	
Maximum rated withstanding isolation voltage	$t = 1 \text{ min}$	V_{ISO}	8200	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	12 000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	1450	V_{peak}
Isolation resistance	$T_{amb} = 25^\circ\text{C}, V_{IO} = 500 \text{ V}$	R_{IO}	$\geq 10^{12}$	Ω
	$T_{amb} = 100^\circ\text{C}, V_{IO} = 500 \text{ V}$	R_{IO}	$\geq 10^{11}$	Ω
	$T_{amb} = T_S, V_{IO} = 500 \text{ V}$	R_{IO}	$\geq 10^9$	Ω
Output safety power		P_{SO}	250	mW
Input safety current		I_{SI}	120	mA
Input safety temperature		T_S	150	$^\circ\text{C}$
Creepage distance			≥ 14	mm
Clearance distance			≥ 14	mm
Insulation thickness		DTI	≥ 3	mm

Note

- According to DIN EN 60747-5-5 (see Fig. 2). This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$, (see Fig. 1)	t_d	-	2.6	-	μs
Rise time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$, (see Fig. 1)	t_r	-	2.4	-	μs
Fall time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$, (see Fig. 1)	t_f	-	2.4	-	μs
Storage time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$, (see Fig. 1)	t_s	-	0.3	-	μs
Turn-on time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$, (see Fig. 1)	t_{on}	-	5	-	μs
Turn-off time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$, (see Fig. 1)	t_{off}	-	3	-	μs
Turn-on time	$V_S = 5 \text{ V}, I_F = 10 \text{ mA}, R_L = 1 \text{ k}\Omega$, (see Fig. 2)	t_{on}	-	25	-	μs
Turn-off time	$V_S = 5 \text{ V}, I_F = 10 \text{ mA}, R_L = 1 \text{ k}\Omega$, (see Fig. 2)	t_{off}	-	42.5	-	μs

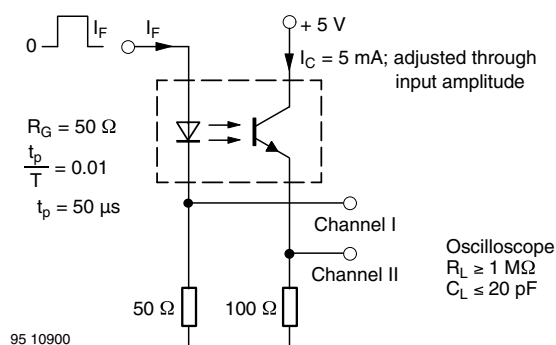


Fig. 1 - Test Circuit, Non-Saturated Operation

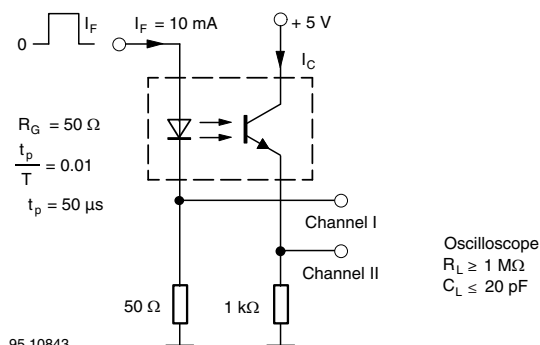


Fig. 2 - Test Circuit, Saturated Operation

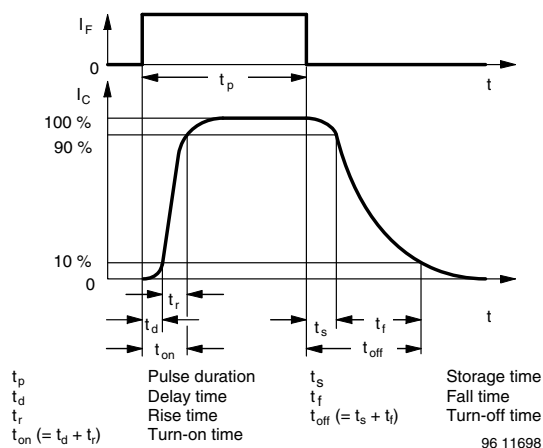


Fig. 3 - Switching Times

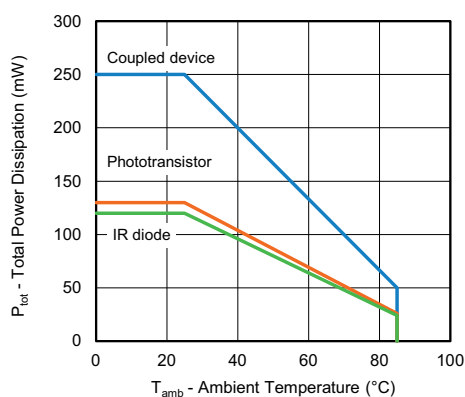
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

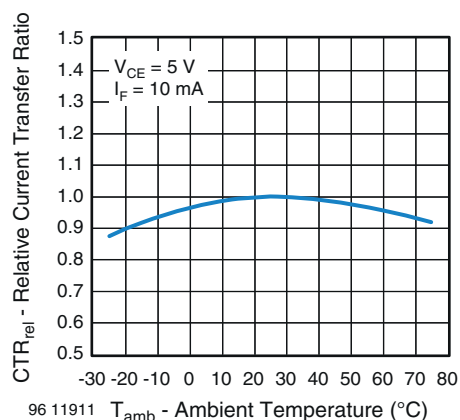


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

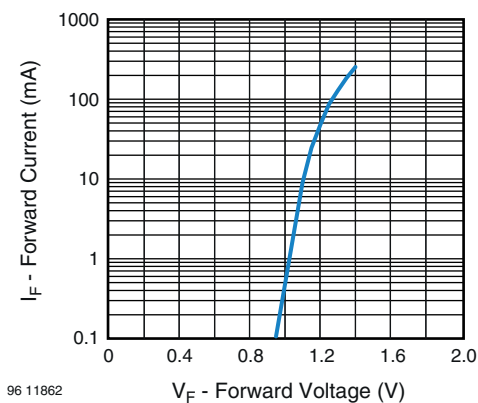


Fig. 5 - Forward Current vs. Forward Voltage

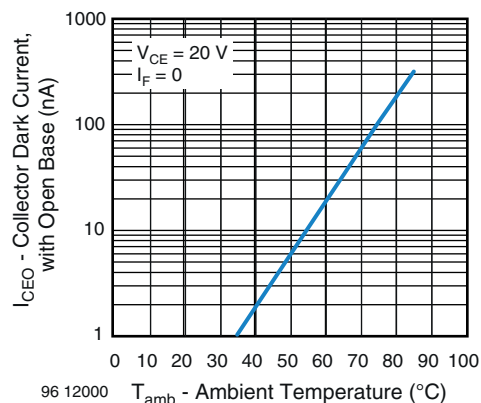


Fig. 7 - Collector Dark Current vs. Ambient Temperature

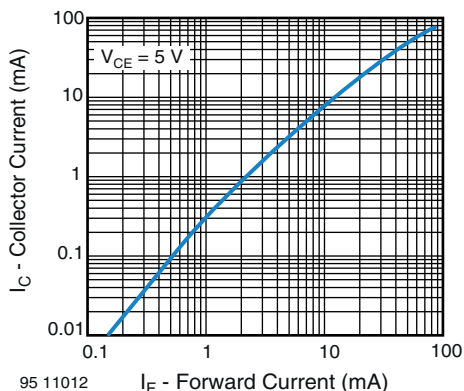


Fig. 8 - Collector Current vs. Forward Current

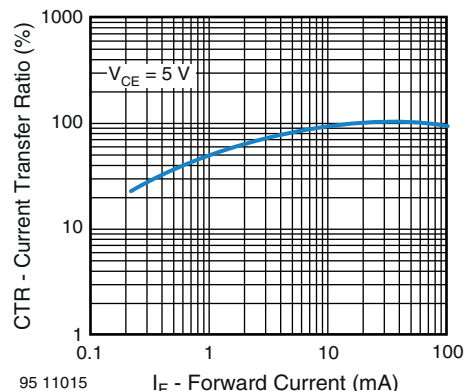


Fig. 11 - Current Transfer Ratio vs. Forward Current

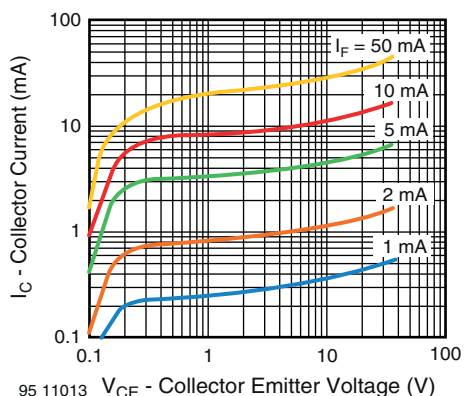


Fig. 9 - Collector Current vs. Collector Emitter Voltage

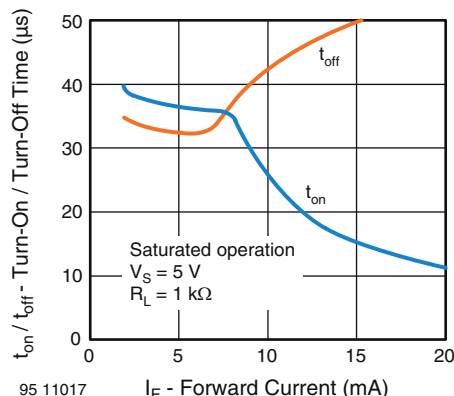


Fig. 12 - Turn-On / Turn-Off Time vs. Forward Current

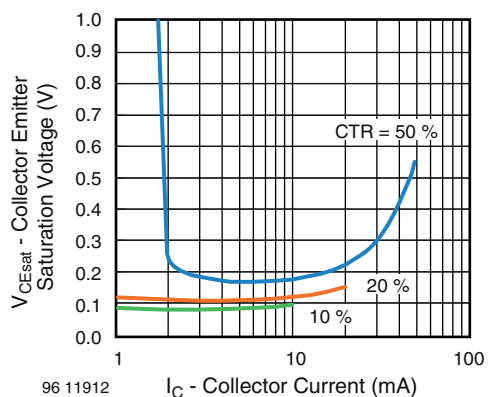


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

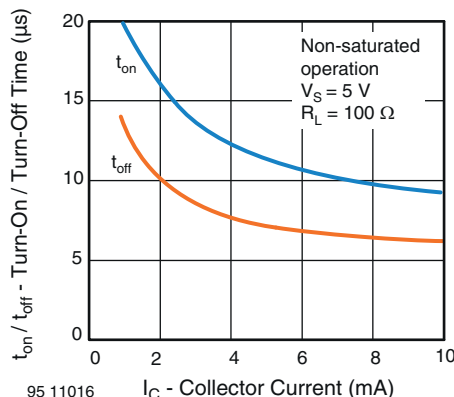


Fig. 13 - Turn-On / Turn-Off Time vs. Collector Current

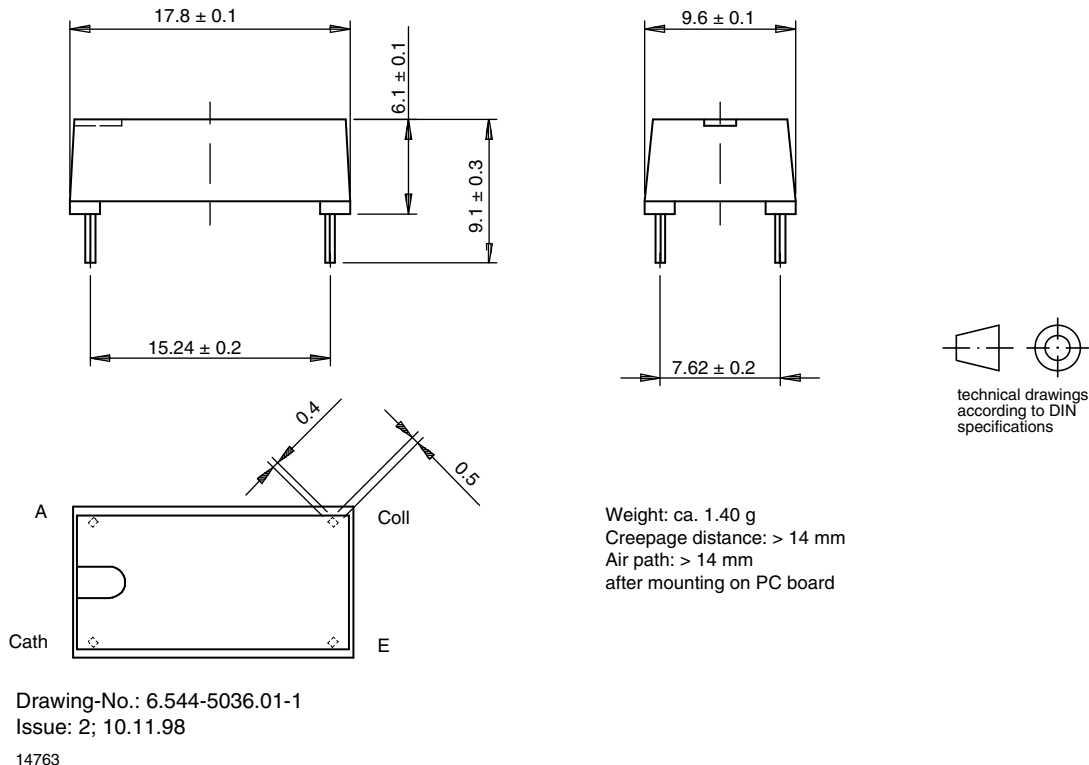
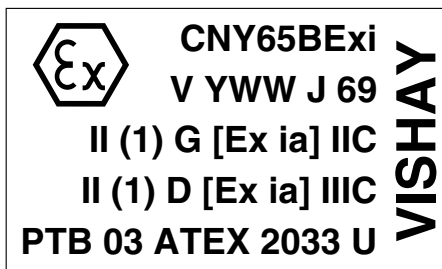
PACKAGE DIMENSIONS (in millimeters)

PACKAGE MARKING (example of CNY65BExi)


Fig. 14 - Top Marking

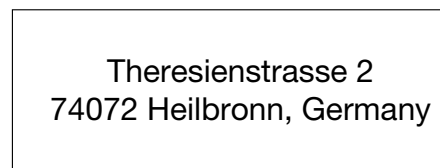


Fig. 15 - Side Marking

TUBE INFORMATION			
TYPE	UNITS/TUBE	TUBES/BOX	UNITS/BOX
CNY65Exi	30	35	1050

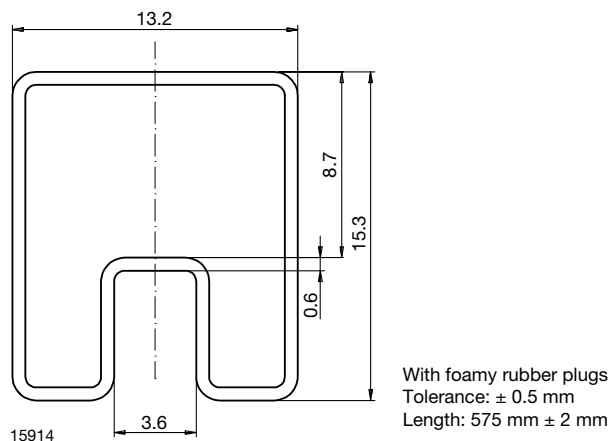
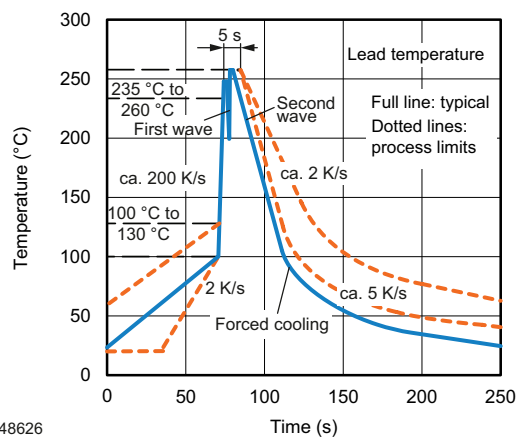


Fig. 16 - CNY65Exi

SOLDER PROFILES



948626

Fig. 17 - Wave Soldering Double Wave Profile According to J-STD-020 for Through-Hole Devices

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: $T_{amb} < 30$ °C, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020



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