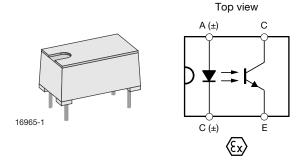


Optocoupler, Phototransistor Output, ATEX Certified



LINKS TO ADDITIONAL RESOURCES









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 certificated for explosive atmospheres according to the Directive 2014/34/EU

AGENCY APPROVALS

• ATEX (Ex):PTB 03 ATEX 2033 U

EN 60079-0 : 2018 EN 60079-11 : 2012 EN 60079-26 : 2015

FEATURES

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 latest EN 60079-0 : 2018



- 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 $\geq 3 \text{ mm}$
- 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 <u>www.vishay.com/doc?99912</u>

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 PART NUMBER	6 5 X CTR BIN	PACKAGE OPTION	DIP-4				
AGENCY CERTIFIED / PACKAGE	CTR (%)						
ATEX	50 to 300 100 to 20		100 to 200				
DIP-4, HV, high isolation distance	CNY65Exi CNY65BExi		CNY65BExi				



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °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 ≤ 10 μs	I _{FSM}	1.5	А				
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	$t_p/T = 0.5, t_p \le 10 \text{ ms}$	I _{CM}	100	mA				
Power dissipation		P _{diss}	130	mW				
Junction temperature		T _j	100	°C				
COUPLER								
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 ≤ 10 s	T _{sld}	260	°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 °C, unless otherwise specified)									
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT			
INPUT	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 μA	V _{ECO}	7	-	-	V			
Collector dark current	$V_{CE} = 20 \text{ V}, I_f = 0, E = 0$	I _{CEO}	-	-	200	nA			
COUPLER	COUPLER								
Collector saturation voltage	$I_F = 10 \text{ mA}, I_C = 1 \text{ mA}$	V _{CEsat}	-	-	0.3	V			
Cut-off frequency	V_{CE} = 5 V, I_F = 10 mA, R_L = 100 Ω	f _c	110	-	-	kHz			
Coupling capacitance	f = 1 MHz	C _k	-	0.3	-	pF			

Note

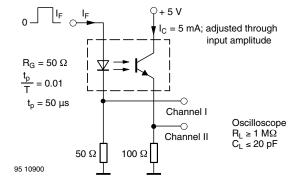
 Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements

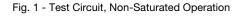
CURRENT TRANSFER RATIO (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER TEST CONDITION PART SYMBOL MIN. TYP. MAX. UNIT							UNIT
1 //	V - 5 V I - 10 mA	CNY65Exi	CTR	50	100	300	%
I _C /I _F	$V_{CE} = 5 \text{ V}, I_{F} = 10 \text{ mA}$		CTR	100	-	200	%



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 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}			
	$T_{amb} = 25 ^{\circ}C, V_{IO} = 500 V$	R _{IO}	≥ 10 ¹²	Ω			
Isolation resistance	$T_{amb} = 100 ^{\circ}C, V_{IO} = 500 V$	R _{IO}	≥ 10 ¹¹	Ω			
	$T_{amb} = T_S$, $V_{IO} = 500 V$	R _{IO}	≥ 10 ⁹	Ω			
Output safety power		P _{SO}	250	mW			
Input safety current		I _{si}	120	mA			
Input safety temperature		T _S	150	°C			
Creepage distance			≥ 14	mm			
Clearance distance			≥ 14	mm			
Insulation thickness		DTI	≥3	mm			

SWITCHING CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega, (\text{see Fig. 1})$	t _d	-	2.6	-	μs
Rise time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega, (\text{see Fig. 1})$	t _r	=	2.4	-	μs
Fall time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega, (\text{see Fig. 1})$	t _f	-	2.4	-	μs
Storage time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega, (\text{see Fig. 1})$	t _s	=	0.3	-	μs
Turn-on time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega, (\text{see Fig. 1})$	t _{on}	=	5	-	μs
Turn-off time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega, (\text{see Fig. 1})$	t _{off}	-	3	-	μs
Turn-on time	$V_S = 5 \text{ V}, I_F = 10 \text{ mA}, R_L = 1 \text{ k}\Omega, \text{ (see Fig. 2)}$	t _{on}	-	25	-	μs
Turn-off time	$V_S = 5 \text{ V}, I_F = 10 \text{ mA}, R_L = 1 \text{ k}\Omega, \text{ (see Fig. 2)}$	t _{off}	_	42.5	-	μs





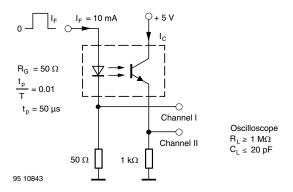


Fig. 2 - Test Circuit, Saturated Operation



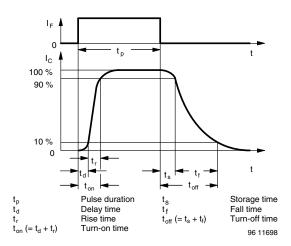


Fig. 3 - Switching Times

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

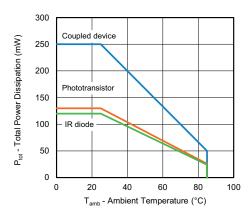


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

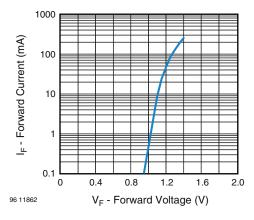


Fig. 5 - Forward Current vs. Forward Voltage

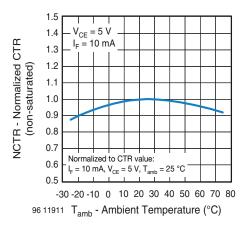


Fig. 6 - Relative Current Transfer Ratio vs.
Ambient Temperature

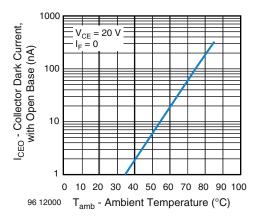


Fig. 7 - Collector Dark Current vs. Ambient Temperature

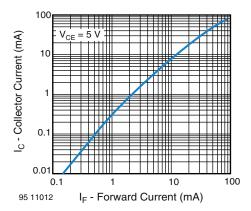


Fig. 8 - Collector Current vs. Forward Current

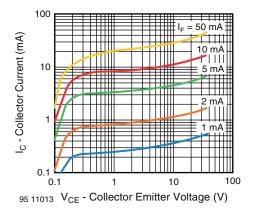


Fig. 9 - Collector Current vs. Collector Emitter Voltage

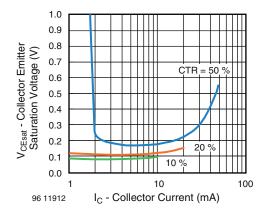


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

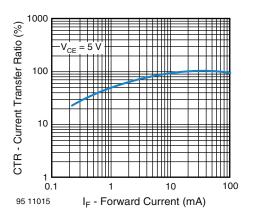


Fig. 11 - Current Transfer Ratio vs. Forward Current

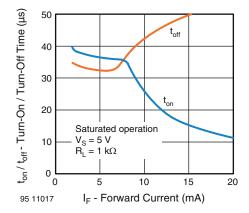


Fig. 12 - Turn-On / Turn-Off Time vs. Forward Current

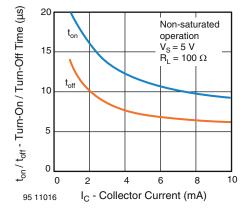
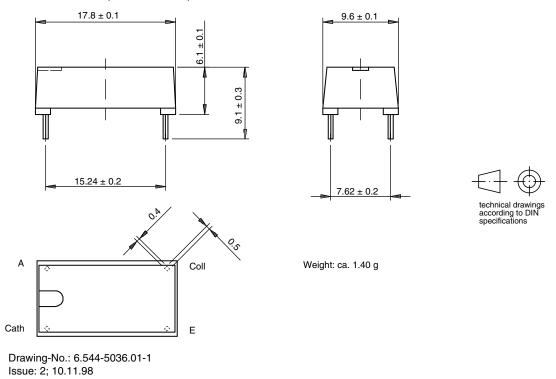


Fig. 13 - Turn-On / Turn-Off Time vs. Collector Current

PACKAGE DIMENSIONS (in millimeters)



PACKAGE MARKING (example of CNY65BExi)

14763



Fig. 14 - Top Marking

Theresienstrasse 2 74072 Heilbronn, Germany

Fig. 15 - Side Marking

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

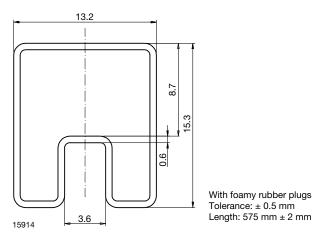


Fig. 16 - CNY65Exi

SOLDER PROFILES

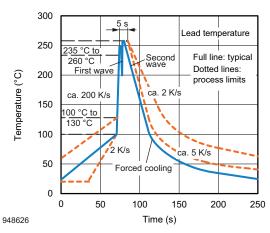


Fig. 17 - Wave Soldering Double Wave Profile According to J-STD-020 for Through-Hole Devices

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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