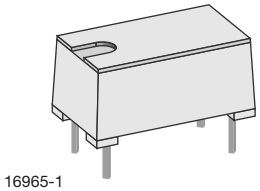
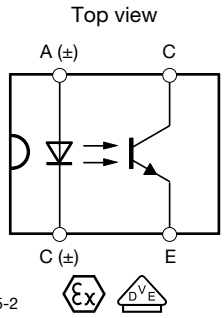
Optocoupler, Phototransistor Output, ATEX Certified



16965-1



16965-2

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 European Guide line 94/9/EG.

AGENCY APPROVALS

- ATEX Ⓔx: PTB 03 ATEX 2033 U
  EN 60079-0:2009
  EN 60079-11:2007
  EN 60079-26:2007
  EN 61241-11:2006
- DIN EN 60747-5-2 (VDE 0884)
  DIN EN 60747-5-5

FEATURES

- ATEX certificate: PTB 03 ATEX 2033 U www.vishay.com/doc?85361
- Suitable for intrinsic safe circuits for gas
- Gas safety provision: II (1) G (EX ia) IIC
- Dust safety provision: II (1) D (EX ia) IIIC
- Conforms to EN60079-11:2007 and IEC 60079-11:1999 edition 4
- Qualified for continuously, longterm, or frequently dangerous explosive environments, zone 0
- Isolation voltage (V_{ISO}) of 11 600 V_{RMS}
- Distance from emitter to detector through insulation ≥ 3 mm
- Comparitive tracking index (CTI) greater than 475 according to VDE 0303/DIN 53480
- 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

Pb-free

e4

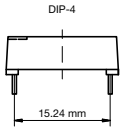
RoHS COMPLIANT

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 (%)	
VDE	50 to 300	100 to 200
DIP-4, HV, high isolation distance	CNY65Exi	CNY65BExi

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Reverse voltage		V_R	5	V
Forward current		I_F	75	mA
Forward surge current	$t_p \leq 10$ µs	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
COUPLER				
DC isolation test voltage	t = 1 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 ≤ 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						
Forward voltage	I_F = 50 mA	V_F		1.25	1.6	V
OUTPUT						
Collector emitter voltage	I_C = 1 mA	V_{CEO}	32			V
Emitter collector voltage	I_E = 100 µA	V_{ECO}	7			V
Collector dark current	V_{CE} = 20 V, I_f = 0, E = 0	I_{CEO}			200	nA
COUPLER						
DC isolation test voltage	t = 1 min	V_{ISO} (1)	11.6			kV
Isolation resistance	V_{IO} = 1 kV, 40 % relative humidity	R_{IO} (1)		10^{12}		Ω
Collector saturation voltage	I_F = 10 mA, I_C = 1 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

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 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	V_{CE} = 5 V, I_F = 10 mA	CNY65Exi	CTR	50	100	300	%
		CNY65BExi	CTR	100		200	%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Delay time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see figure 1)	t_d		2.6		µs
Rise time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see figure 1)	t_r		2.4		µs
Fall time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see figure 1)	t_f		2.4		µs
Storage time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see figure 1)	t_s		0.3		µs
Turn-on time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see figure 1)	t_{on}		5		µs
Turn-off time	V_S = 5 V, I_C = 5 mA, R_L = 100 Ω, (see figure 1)	t_{off}		3		µs
Turn-on time	V_S = 5 V, I_F = 10 mA, R_L = 1 kΩ, (see figure 2)	t_{on}		25		µs
Turn-off time	V_S = 5 V, I_F = 10 mA, R_L = 1 kΩ, (see figure 2)	t_{off}		42.5		µs

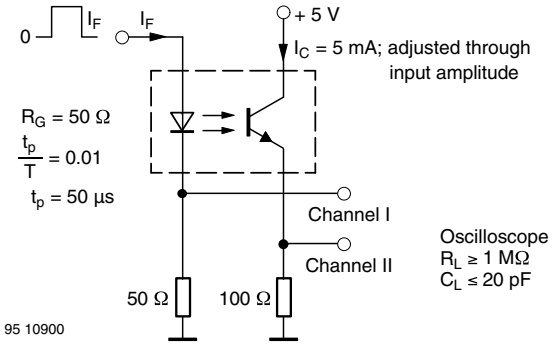


Fig. 1 - Test Circuit, Non-Saturated Operation

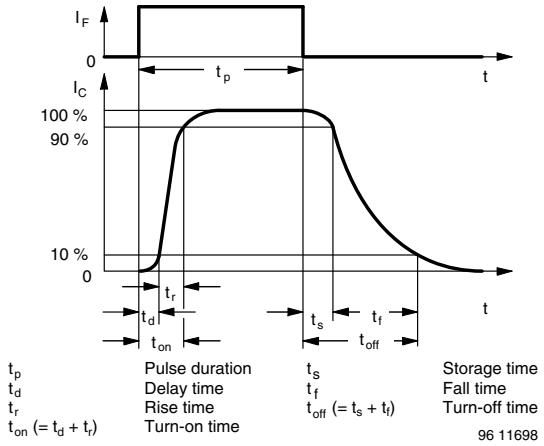


Fig. 3 - Switching Times

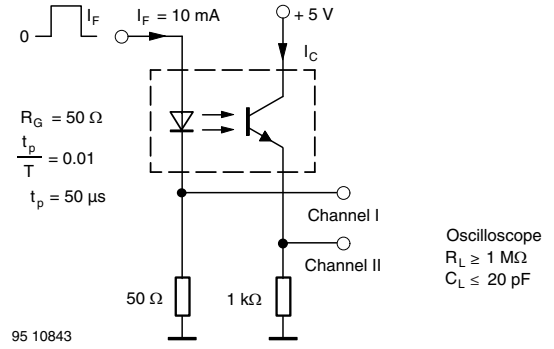


Fig. 2 - Test Circuit, Saturated Operation

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

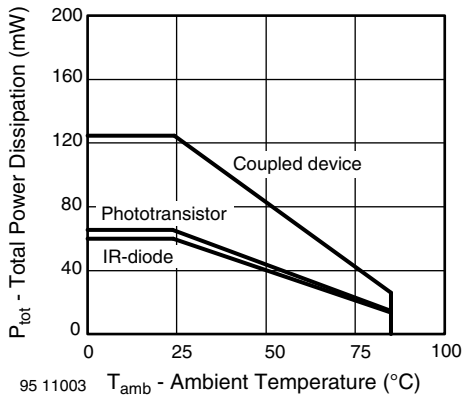


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

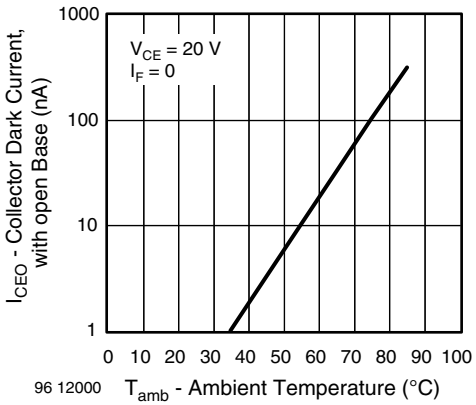


Fig. 7 - Collector Dark Current vs. Ambient Temperature

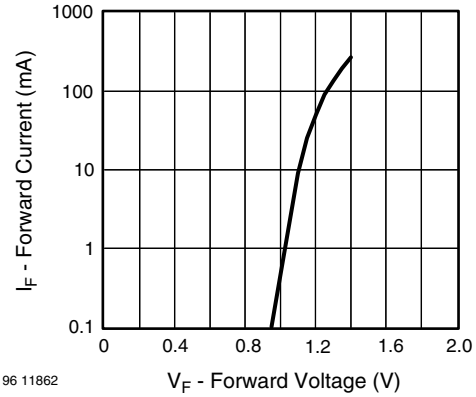


Fig. 5 - Forward Current vs. Forward Voltage

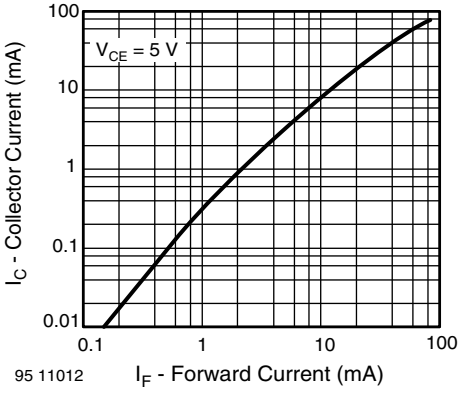


Fig. 8 - Collector Current vs. Forward Current

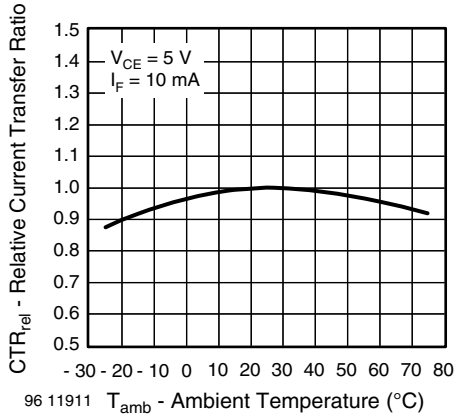


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

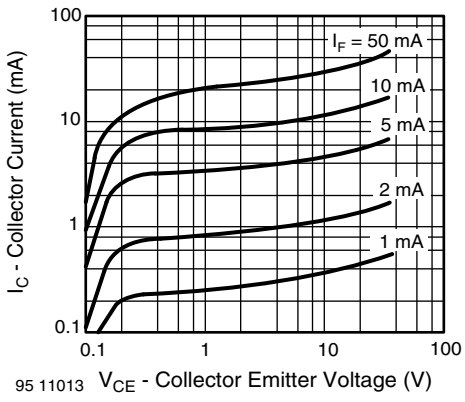


Fig. 9 - Collector Current vs. Collector Emitter Voltage

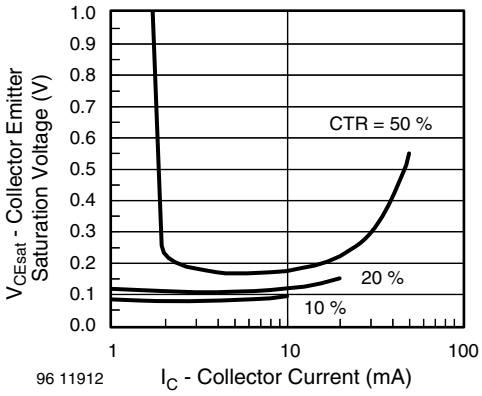


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

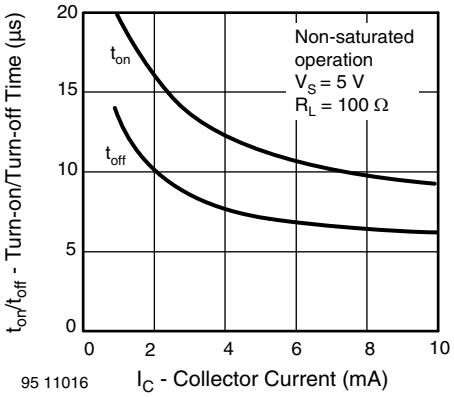


Fig. 13 - Turn-on/Turn-off Time vs. Collector Current

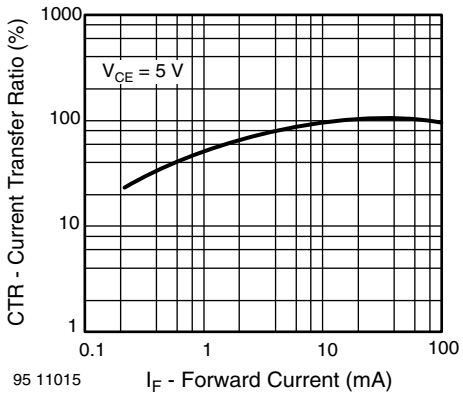


Fig. 11 - Current Transfer Ratio vs. Forward Current

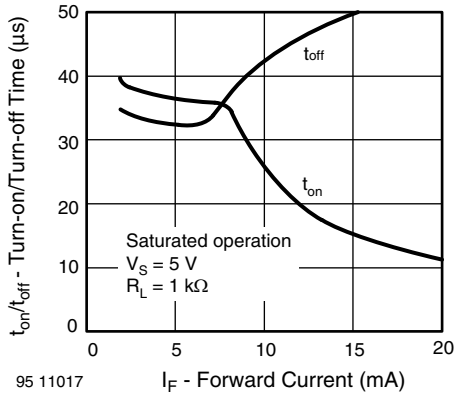
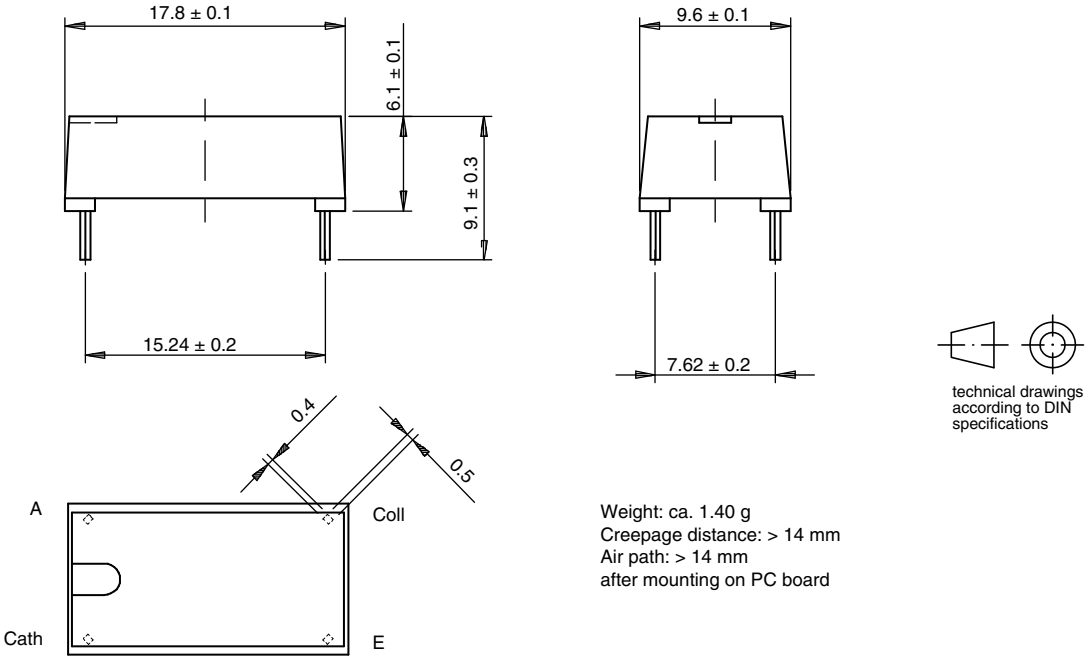


Fig. 12 - Turn-on/Turn-off Time vs. Forward Current

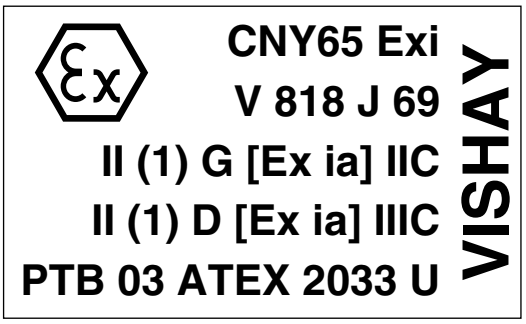
PACKAGE DIMENSIONS in millimeters



Weight: ca. 1.40 g
Creepage distance: > 14 mm
Air path: > 14 mm
after mounting on PC board

Drawing-No.: 6.544-5036.01-1
Issue: 2; 10.11.98
14763

PACKAGE MARKING (example)



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