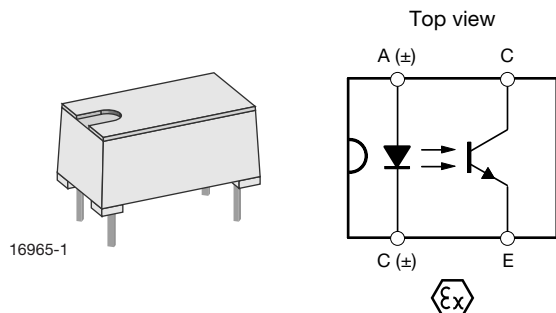


Optocoupler, Phototransistor Output, ATEX Certified



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 European Guide line 94/9/EG.

AGENCY APPROVALS

- ATEX Ex : PTB 03 ATEX 2033 U
EN 60079-0:2012
EN 60079-11:2012
EN 60079-26:2007

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 EN60079-0:2012
- 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



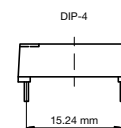
RoHS
COMPLIANT

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	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	5	V
Forward current		I_F	75	mA
Forward surge current	$t_p \leq 10\text{ }\mu\text{s}$	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				
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	$^{\circ}\text{C}$
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						
DC isolation test voltage	$t = 1\text{ min}$	$V_{ISO}^{(1)}$	11.6			kV
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	%

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	$V_S = 5\text{ V}$, $I_C = 5\text{ mA}$, $R_L = 100\text{ }\Omega$, (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		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		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		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

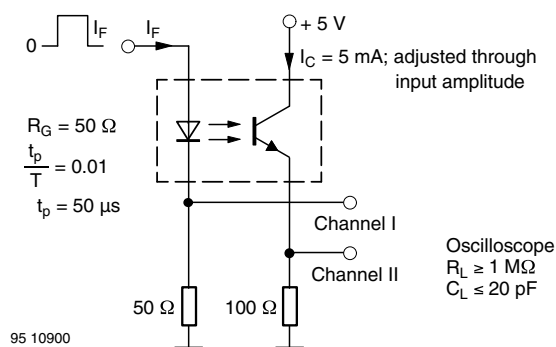


Fig. 1 - Test Circuit, Non-Saturated Operation

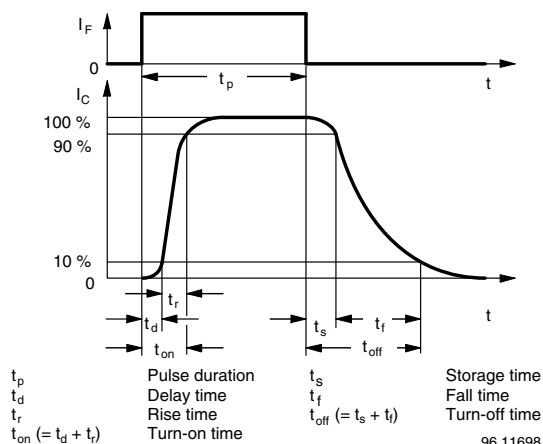


Fig. 3 - Switching Times

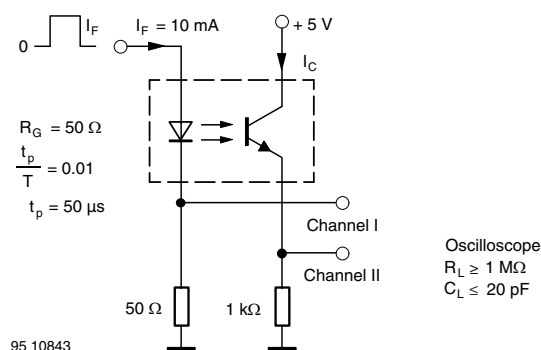


Fig. 2 - Test Circuit, Saturated Operation

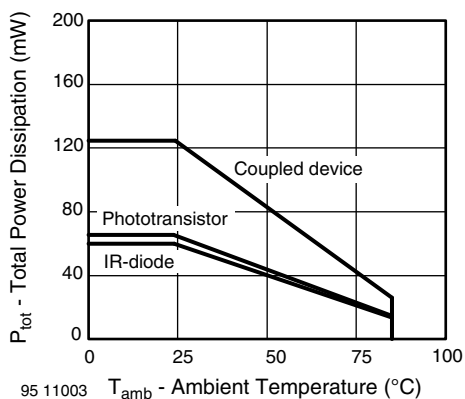
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

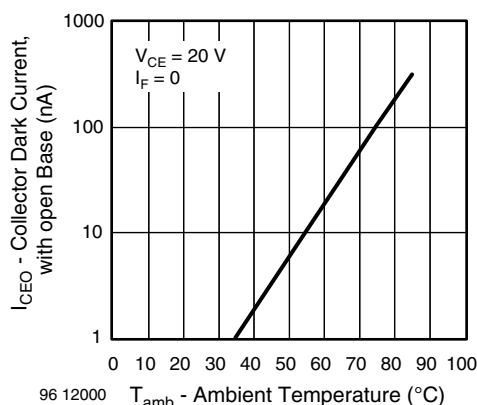


Fig. 7 - Collector Dark Current vs. Ambient Temperature

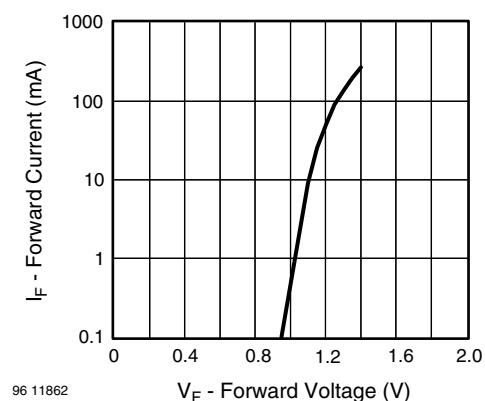


Fig. 5 - Forward Current vs. Forward Voltage

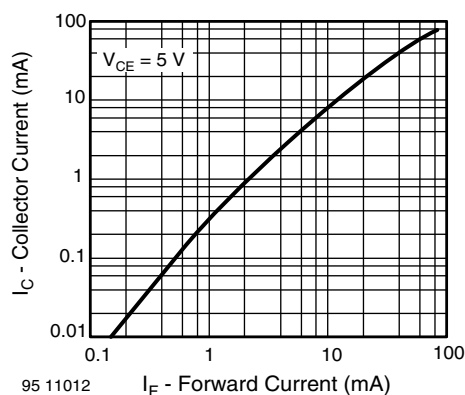


Fig. 8 - Collector Current vs. Forward Current

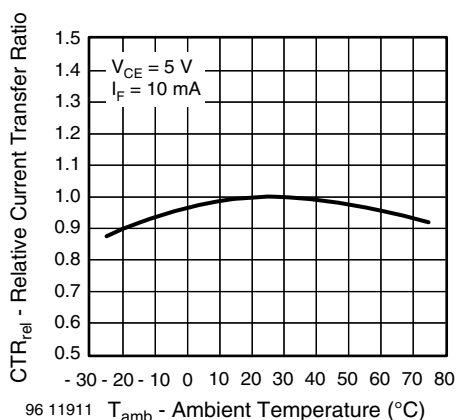


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

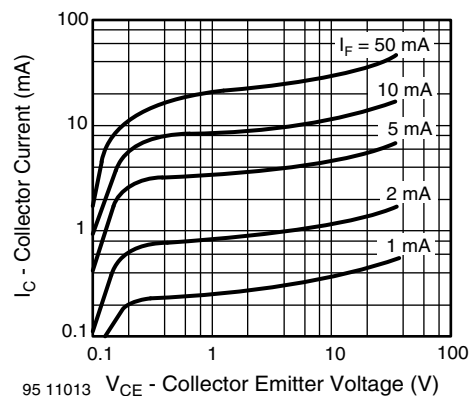


Fig. 9 - Collector Current vs. Collector Emitter Voltage

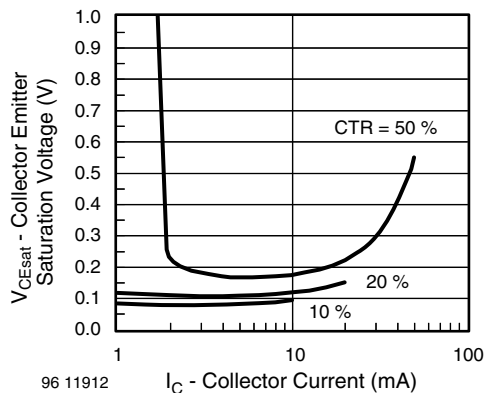


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

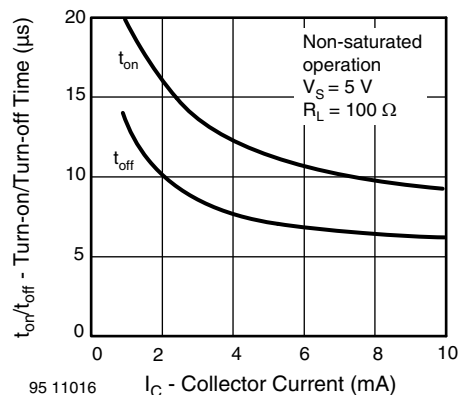


Fig. 13 - Turn-on/Turn-off Time vs. Collector Current

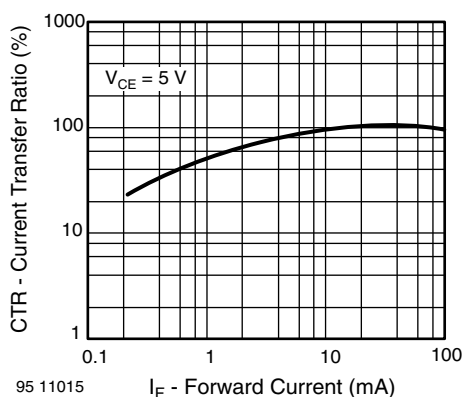


Fig. 11 - Current Transfer Ratio vs. Forward Current

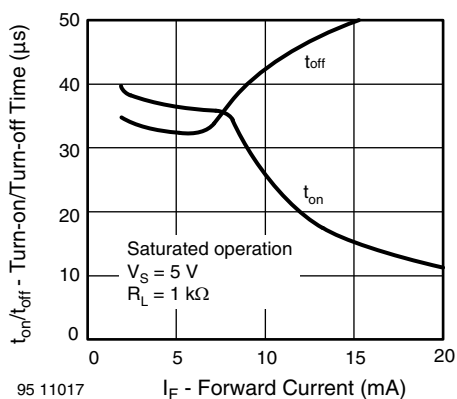
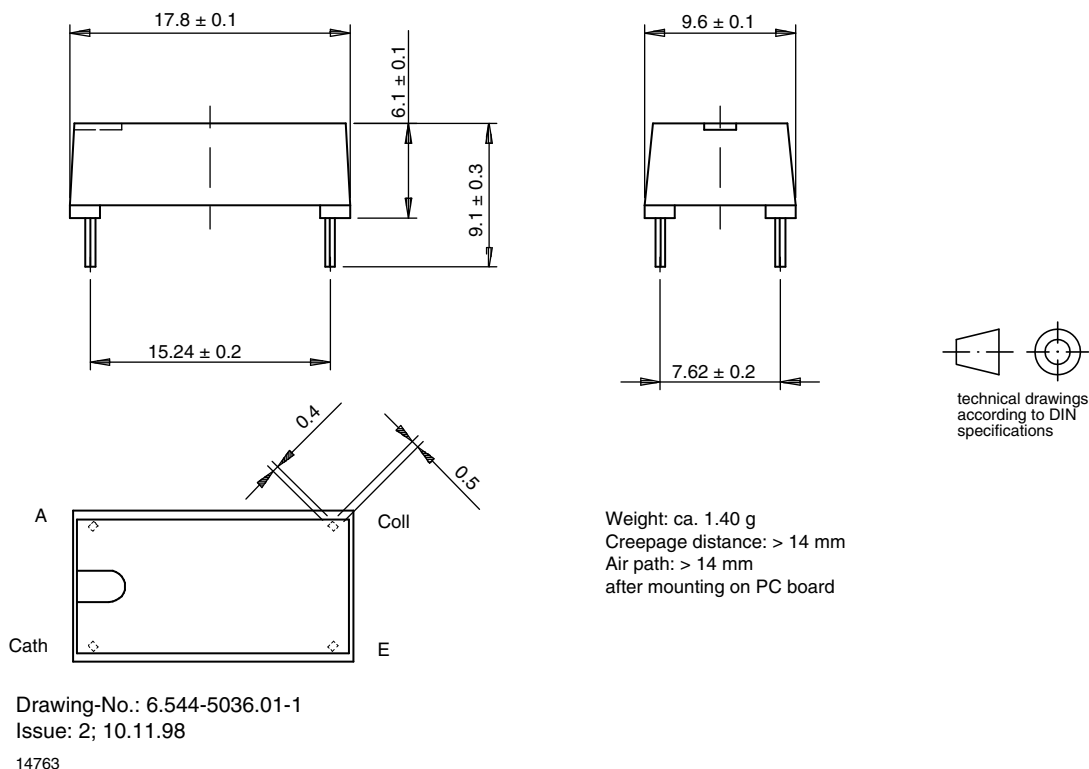


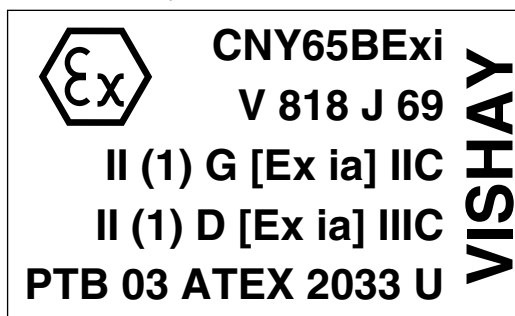
Fig. 12 - Turn-on/Turn-off Time vs. Forward Current



PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example of CNY65BExi)



HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2



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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9