

## Optocoupler, Photodarlington Output

### Features

- Endstackable to 2.54 mm (0.1") spacing
- Isolation test voltage 5000 V<sub>RMS</sub>
- Low coupling capacitance of typical 0.3 pF
- Low temperature coefficient of CTR
- Wide ambient temperature range
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

### Agency Approvals

- UL1577, File No. E76222 System Code U, Double Protection
- CSA 22.2 bulletin 5A, Double Protection

### Applications

Programmable logic controllers

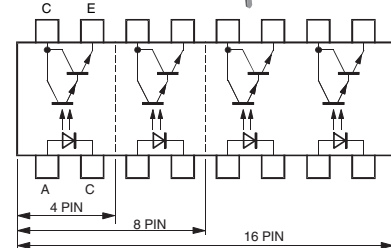
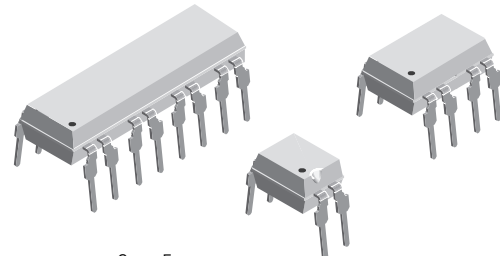
Modems

Answering machines

General applications

### Description

In the K815P/ K825P/ K845P parts, each channel consist of a photodarlington optically coupled to a gallium arsenide infrared-emitting diode in an 4-pin, 8-pin and 16-pin plastic dual inline package.



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The elements are mounted on one leadframe providing a fixed distance between input and output for highest safety requirements.

### Order Information

Part	Remarks
K815P	CTR > 600 %, Single Channel, DIP-4
K825P	CTR > 600 %, Dual Channel, DIP-8
K845P	CTR > 600 %, Quad Channel, DIP-16

For additional information on the available options refer to Option Information.

### Absolute Maximum Ratings

T<sub>amb</sub> = 25 °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.

### Input

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V <sub>R</sub>	6	V
Forward current		I <sub>F</sub>	60	mA
Forward surge current	t <sub>p</sub> ≤ 10 μs	I <sub>FSM</sub>	1.5	A
Power dissipation		P <sub>diss</sub>	100	mW
Junction temperature		T <sub>j</sub>	125	°C

## Output

Parameter	Test condition	Symbol	Value	Unit
Collector emitter voltage		$V_{CEO}$	35	V
Emitter collector voltage		$V_{ECO}$	7	V
Collector current		$I_C$	80	mA
Collector peak current	$t_p/T = 0.5, t_p \leq 10 \text{ ms}$	$I_{CM}$	100	mA
Power dissipation		$P_{diss}$	150	mW
Junction temperature		$T_j$	125	°C

## Coupler

Parameter	Test condition	Symbol	Value	Unit
AC Isolation test voltage (RMS)	$t = 1 \text{ min}, f = 50 \text{ Hz}$	$V_{ISO}^{1)}$	5	kV
Total power dissipation		$P_{tot}$	250	mW
Operating ambient temperature range		$T_{amb}$	- 40 to + 100	°C
Storage temperature range		$T_{stg}$	- 55 to + 125	°C
Soldering temperature	2 mm from case, $t \leq 10 \text{ s}$	$T_{sld}$	260	°C

<sup>1)</sup> Related to standard climate 23/50 DIN 50014

## Electrical Characteristics

$T_{amb} = 25 \text{ °C}$ , 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.

## Input

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	$I_F = 20 \text{ mA}$	$V_F$		1.2	1.4	V
Reverse current	$V_R = 6 \text{ V}$	$I_R$			10	$\mu\text{A}$

## Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector emitter voltage	$I_C = 100 \text{ }\mu\text{A}$	$V_{CEO}$	35			V
Emitter collector voltage	$I_E = 100 \text{ }\mu\text{A}$	$V_{ECO}$	7			V
Collector dark current	$V_{CE} = 10 \text{ V}, I_F = 0, E = 0$	$I_{CEO}$			100	nA

## Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector emitter saturation voltage	$I_F = 20 \text{ mA}, I_C = 5 \text{ mA}$	$V_{CEsat}$			0.1	V
Cut-off frequency	$I_F = 10 \text{ mA}, V_{CE} = 5 \text{ V}, R_L = 100 \text{ }\Omega$	$f_c$		10		kHz
Coupling capacitance	$f = 1 \text{ MHz}$	$C_k$		0.3		pF

## Current Transfer Ratio

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
$I_C/I_F$	$V_{CE} = 2\text{ V}$ , $I_F = 1\text{ mA}$	CTR	600	800		%

## Switching Characteristics

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Rise time	$V_{CE} = 2\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)	$t_r$		300		$\mu\text{s}$
Turn-off time	$V_{CE} = 2\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)	$t_{off}$		250		$\mu\text{s}$

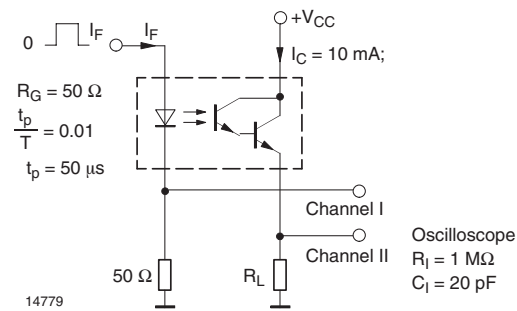


Figure 1. Test circuit, non-saturated operation

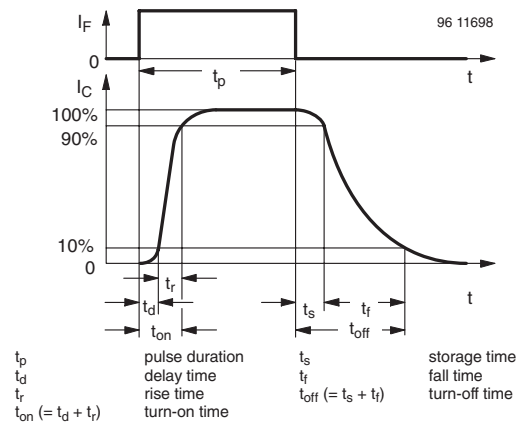


Figure 2. Switching Times

## Typical Characteristics ( $T_{amb} = 25\text{ }^\circ\text{C}$ unless otherwise specified)

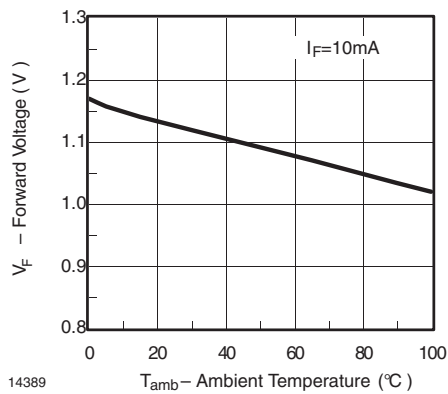


Figure 3. Forward Voltage vs. Ambient Temperature

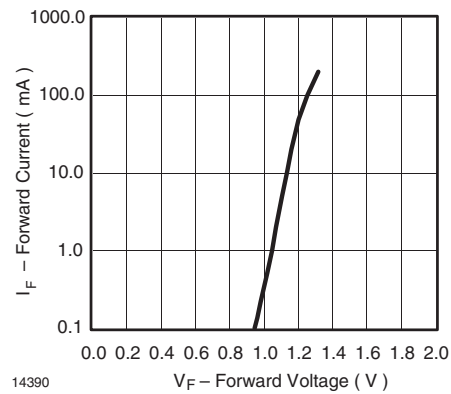


Figure 4. Forward Current vs. Forward Voltage

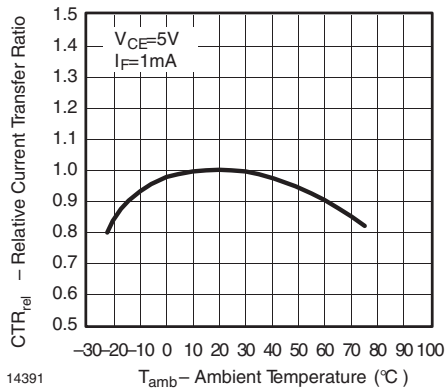


Figure 5. Relative Current Transfer Ratio vs. Ambient Temperature

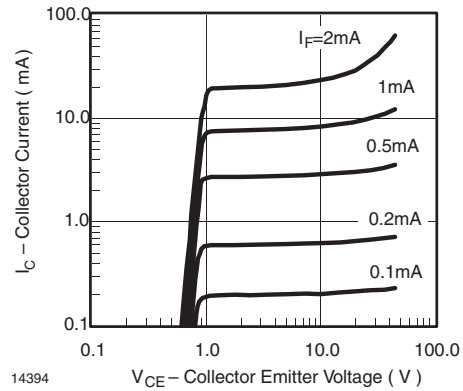


Figure 8. Collector Current vs. Collector Emitter Voltage

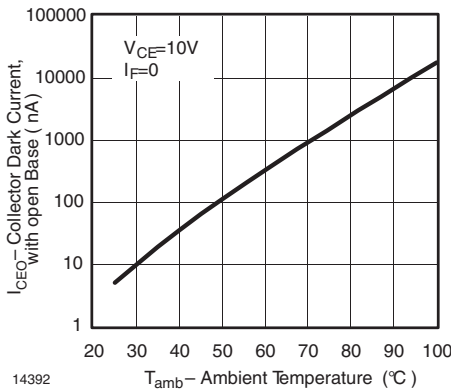


Figure 6. Collector Dark Current vs. Ambient Temperature

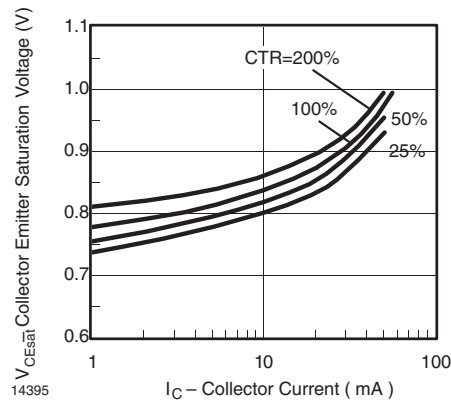


Figure 9. Collector Emitter Saturation Voltage vs. Collector Current

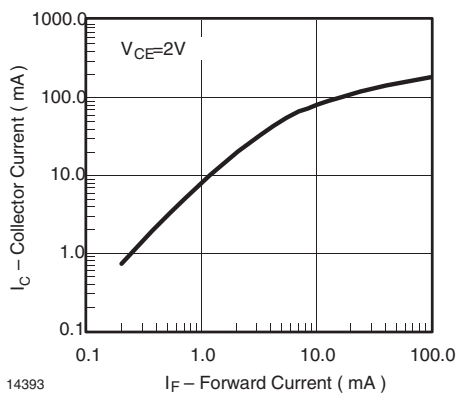


Figure 7. Collector Current vs. Forward Current

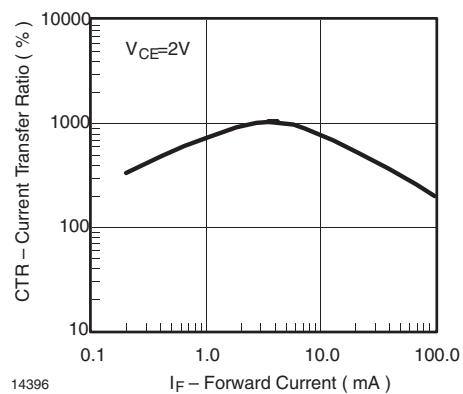
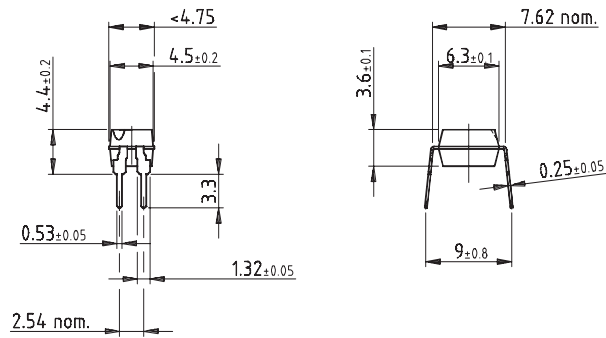
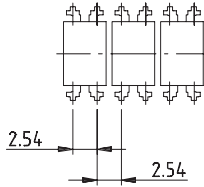


Figure 10. Current Transfer Ratio vs. Forward Current

## Package Dimensions in mm



E.g:  
special Features: endstackable  
to 2.54mm (.100") spacing



weight : ca 0.25g  
creepage distance : > 6mm  
air path : > 6mm  
after mounting on PC board

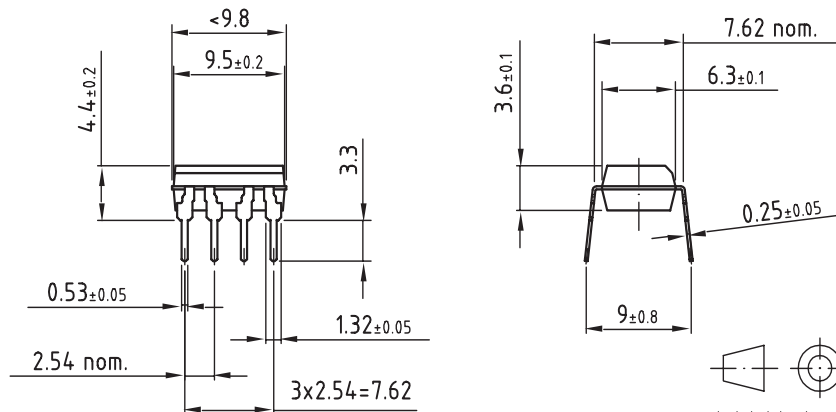


technical drawings  
according to DIN  
specifications

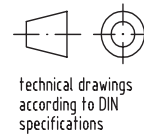
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Drawing-No.: 6.544-5302.03-4  
Issue: 5; 20.03.02

## Package Dimensions in mm



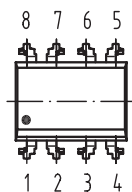
weight : ca 0.55g  
creepage distance : > 6mm  
air path : > 6mm  
after mounting on PC board



technical drawings  
according to DIN  
specifications

14784

Drawing-No.: 6.544-5302.02-4  
Issue: 4; 02.06.99

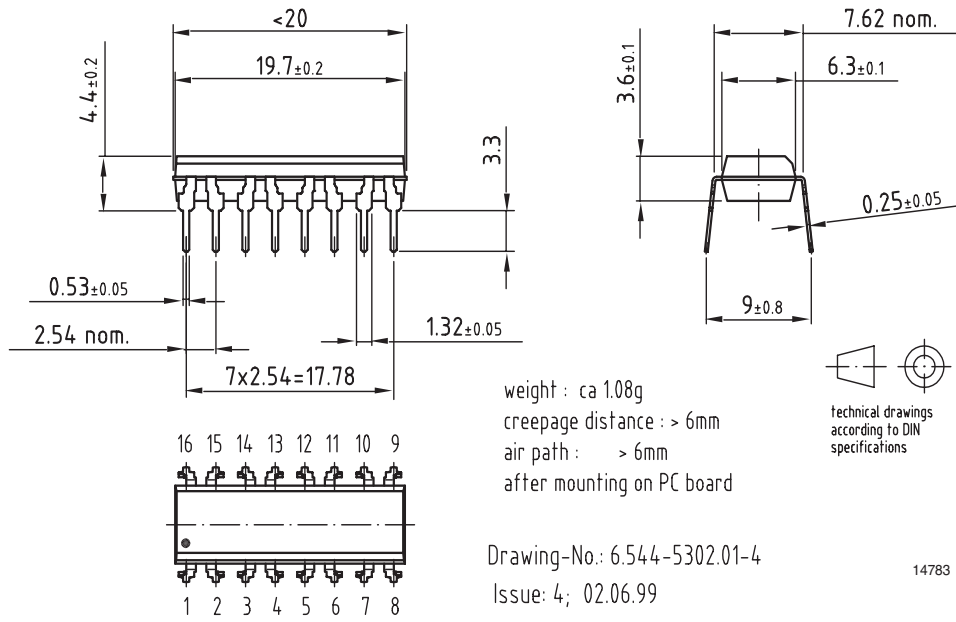


# K815P/ K825P/ K845P



Vishay Semiconductors

## Package Dimensions in mm





## 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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