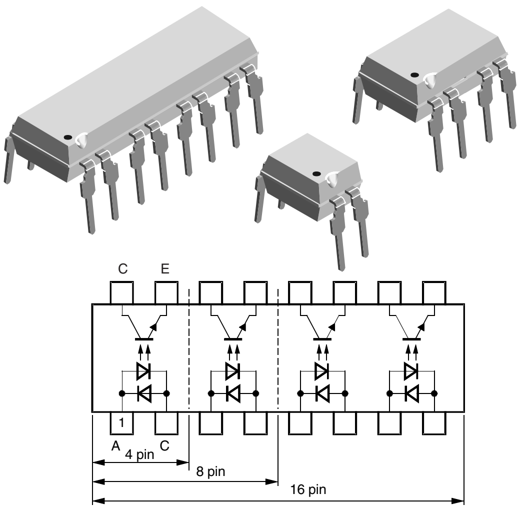
Optocoupler, Phototransistor Output, AC Input



17220_2

DESCRIPTION

The K814P, K824P, K844P consist of a phototransistor optically coupled to 2 gallium arsenide infrared emitting diodes (reverse polarity) in 4 pin (single); 8 pin (dual) or 16-pin (quad) plastic dual inline package.

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

FEATURES

- Endstackable to 2.54 mm (0.1") spacing
- DC isolation test voltage V_{ISO} = 5000 V_{RMS}
- Low coupling capacitance of typical 0.3 pF
- Current transfer ratio (CTR) of typical 100 %
- Low temperature coefficient of CTR
- Wide ambient temperature range
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free
e3
RoHS COMPLIANT

APPLICATIONS

- Feature phones
- Answering machines
- PBX
- Fax machines

AGENCY APPROVALS

- UL1577, file no. E76222 system code U, double protection
- C-UL CSA 22.2, bulletin 5A

ORDER INFORMATION	
PART	REMARKS
K814P	CTR > 20 %, single channel, DIP-4
K824P	CTR > 20 %, dual channel, DIP-8
K844P	CTR > 20 %, quad channel, DIP-16

ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Forward current		I_F	± 60	mA
Forward surge current	$t_p \leq 10$ µs	I_{FSM}	± 1.5	A
Power dissipation		P_{diss}	100	mW
Junction temperature		T_j	125	°C
OUTPUT				
Collector emitter voltage		V_{CEO}	70	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}	150	mW
Junction temperature		T_j	125	°C

ABSOLUTE MAXIMUM RATINGS [1]

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
AC isolation test voltage (RMS)	t = 1.0 min	V_{ISO}	5000	V_{RMS}
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 [3]	2 mm from case, t ≤ 10 s	T_{sld}	260	°C

Notes

(1) T_{amb} = 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 ratings for extended periods of the time can adversely affect reliability.

(2) Refer to wave profile for soldering conditions for through hole devices.

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I_F = ± 50 mA	V_F		1.25	1.6	V
Reverse current	V_R = ± 6 V	I_R			10	µA
OUTPUT						
Collector emitter voltage	I_C = 100 µA	V_{CEO}	70			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}			100	nA
COUPLER						
Collector emitter saturation voltage	I_F = ± 10 mA, I_C = 1 mA	V_{CEsat}			0.3	V
Cut-off frequency	I_F = ± 10 mA, V_{CE} = 5 V, R_L = 100 Ω	f_c		100		kHz
Coupling capacitance	f = 1 MHz	C_k		0.3		pF

Note

T_{amb} = 25 °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.

CURRENT TRANSFER RATIO

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	V_{CE} = 5 V, I_F = ± 5 mA	K814P	CTR	20		300	%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_d		3		µs
Rise time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_r		3		µs
Fall time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_f		4.7		µs
Storage time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_s		0.3		µs
Turn-on time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_{on}		6		µs
Turn-off time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_{off}		5		µs
Turn-on time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ (see figure 1)	t_{on}		9		µs
Turn-off time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ (see figure 1)	t_{off}		18		µs

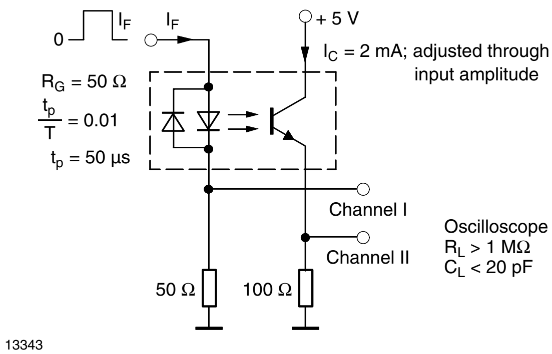


Fig. 1 - Test Circuit, Non-Saturated Operation

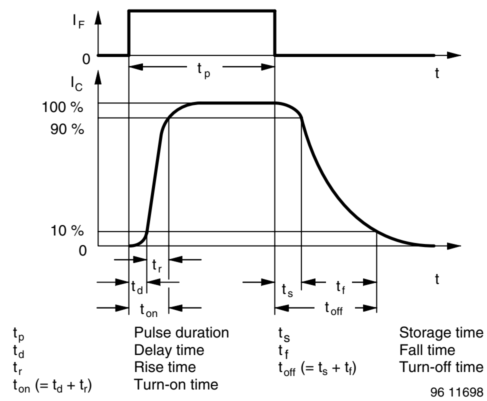


Fig. 3 - Switching Times

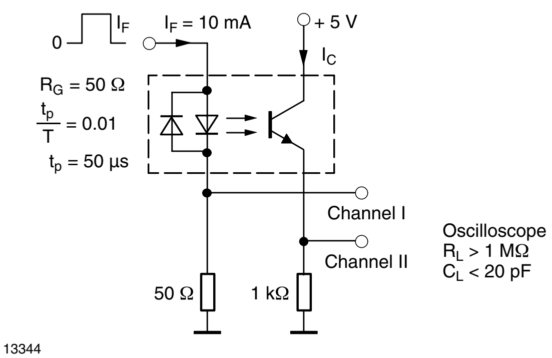


Fig. 2 - Test Circuit, Saturated Operation

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

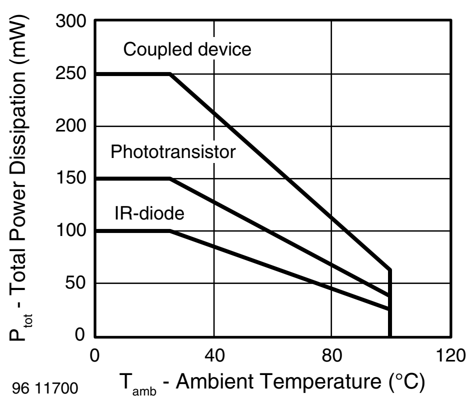


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

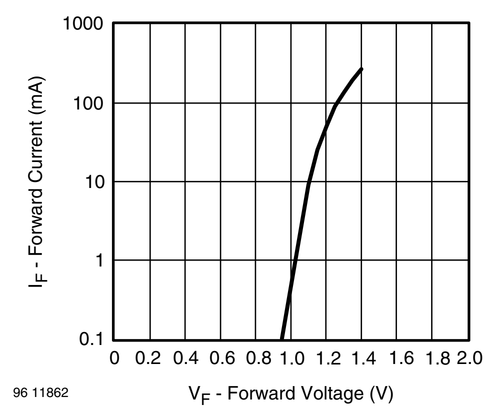


Fig. 5 - Forward Current vs. Forward Voltage

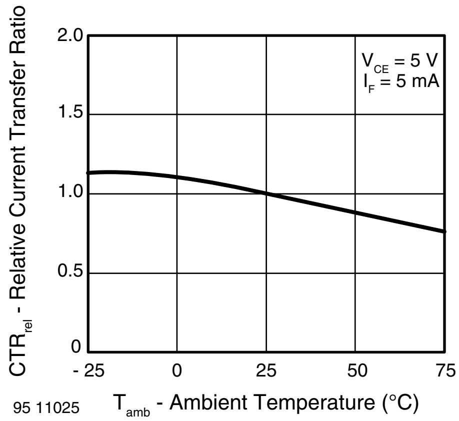


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

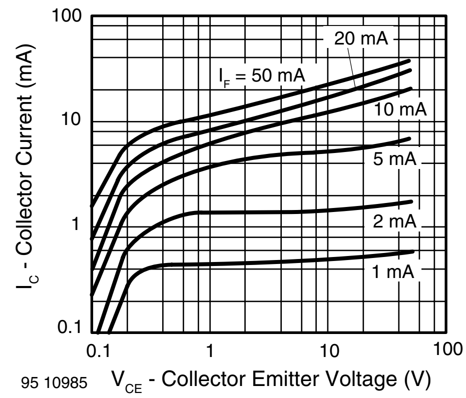


Fig. 9 - Collector Current vs. Collector Emitter Voltage

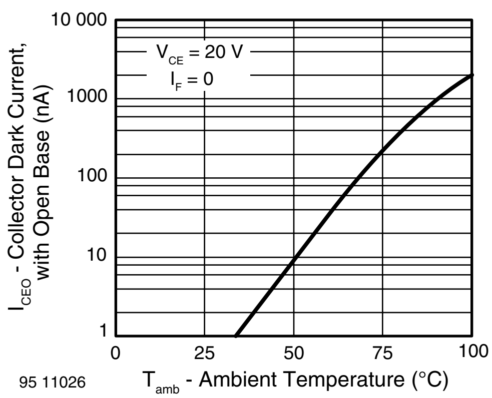


Fig. 7 - Collector Dark Current vs. Ambient Temperature

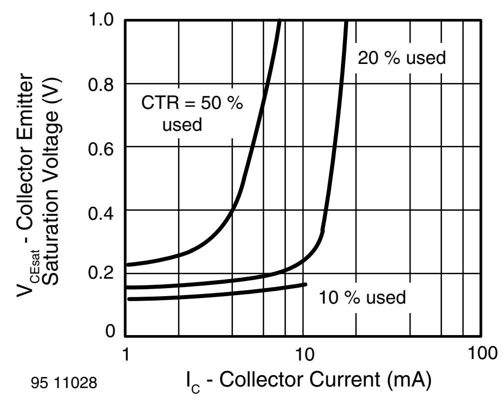


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

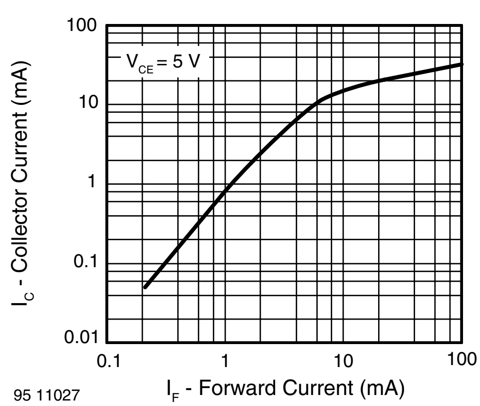


Fig. 8 - Collector Current vs. Forward Current

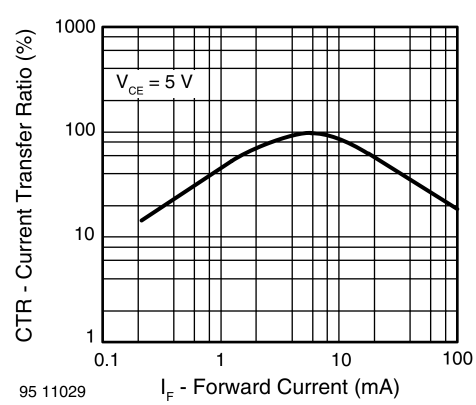


Fig. 11 - Current Transfer Ratio vs. Forward Current

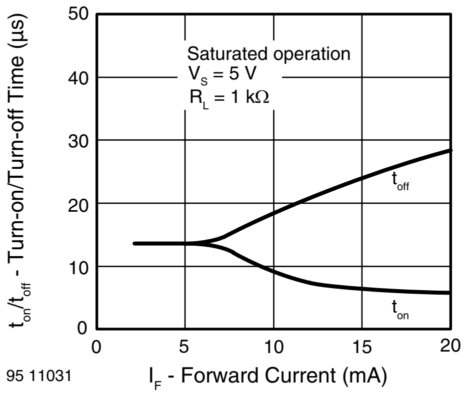


Fig. 12 - Turn-on/Turn-off Time vs. Forward Current

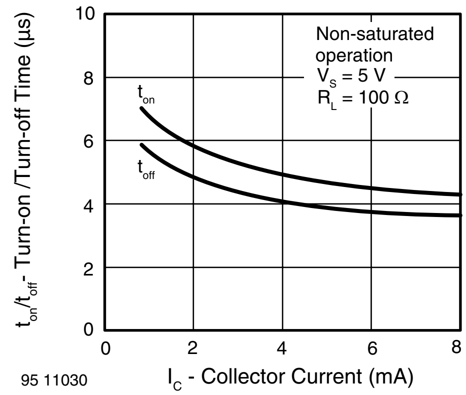
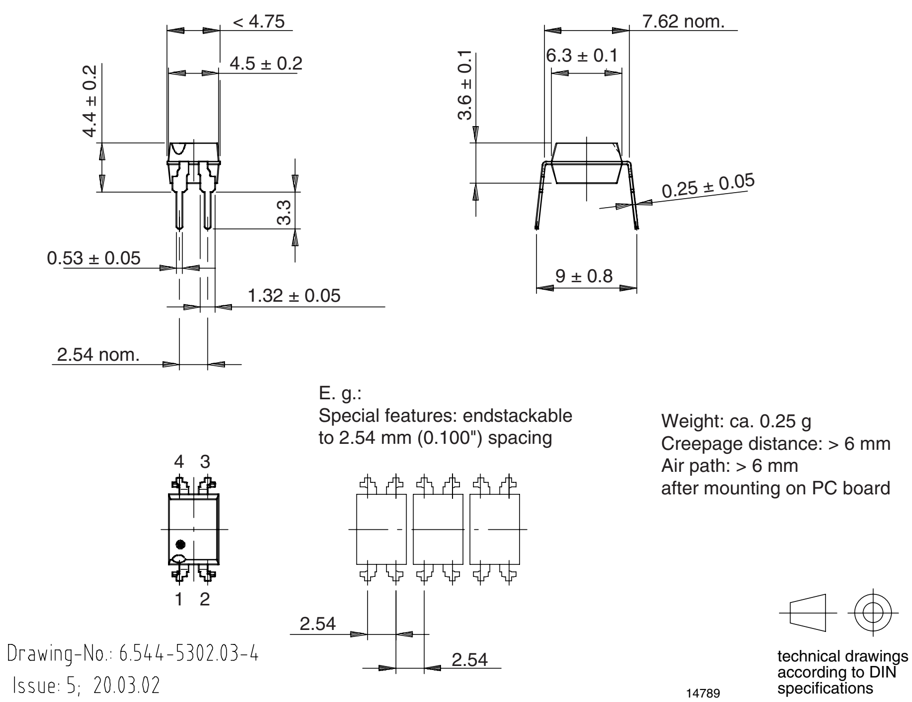
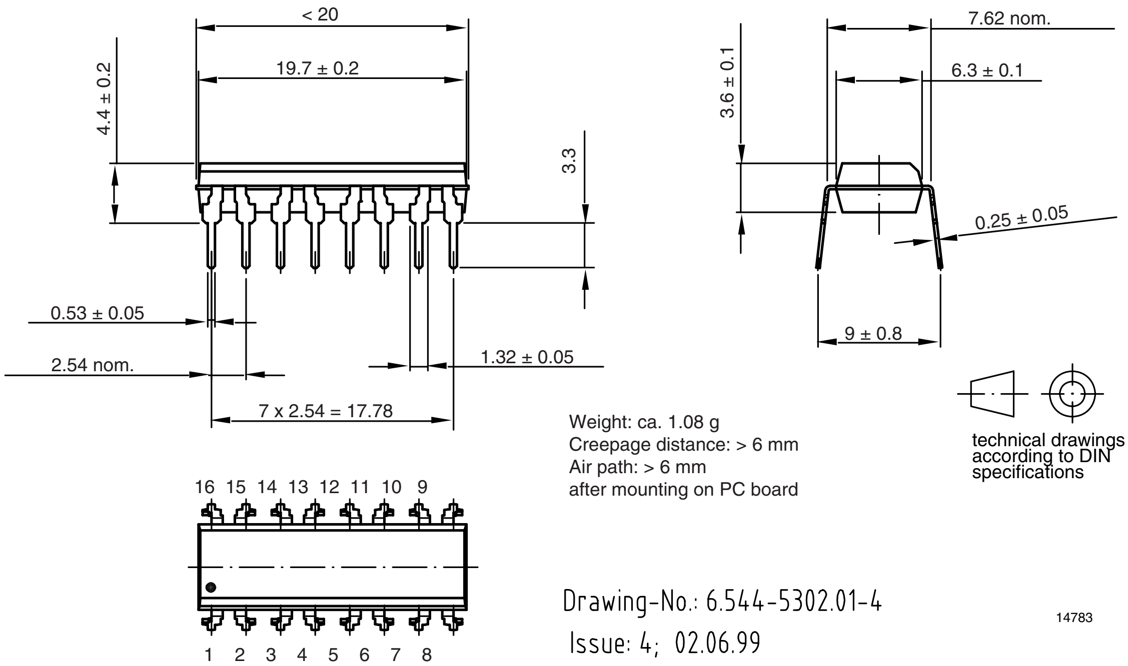


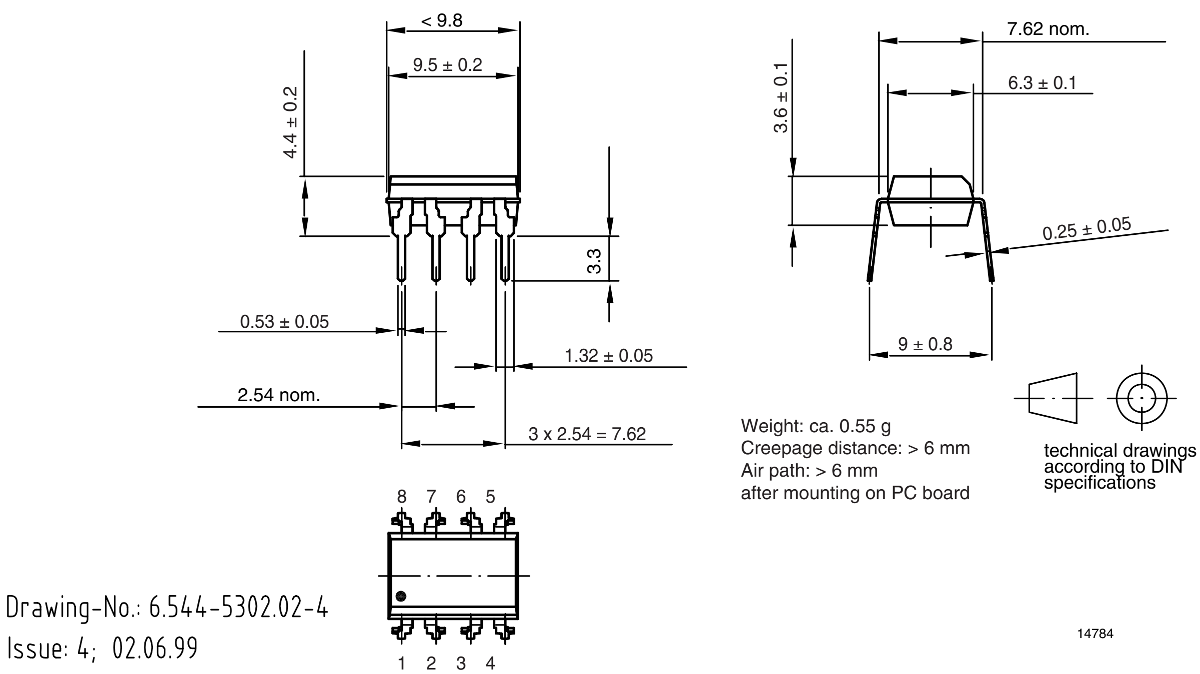
Fig. 13 - Turn-on/Turn-off Time vs. Collector Current

PACKAGE DIMENSIONS in millimeters





Weight: ca. 1.08 g
Creepage distance: > 6 mm
Air path: > 6 mm
after mounting on PC board



Weight: ca. 0.55 g
Creepage distance: > 6 mm
Air path: > 6 mm
after mounting on PC board

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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

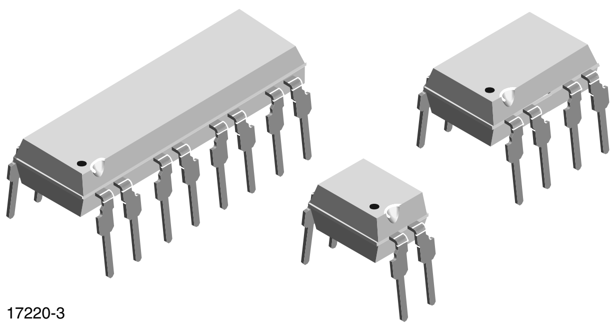
Footprint and Schematic Information for K814P, K824P, K844P

The footprint and schematic symbols for the following parts can be accessed using the associated links. They are available in Eagle, Altium, KiCad, OrCAD / Allegro, Pulsonix, and PADS.

Note that the 3D models for these parts can be found on the Vishay product page.

PART NUMBER	FOOTPRINT / SCHEMATIC
K814P	www.snapeda.com/parts/K814P/Vishay/view-part
K824P	www.snapeda.com/parts/K824P/Vishay/view-part
K844P	www.snapeda.com/parts/K844P/Vishay/view-part

For technical issues and product support, please contact optocoupleranswers@vishay.com.



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