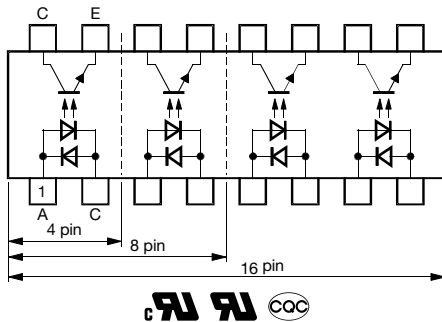
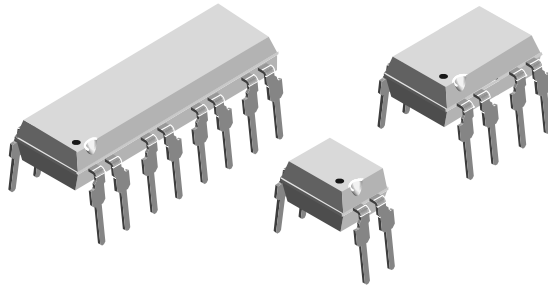






## Optocoupler, Phototransistor Output, AC Input



### 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

### APPLICATIONS

- Feature phones
- Answering machines
- PBX
- Fax machines

### AGENCY APPROVALS

- [UL](#)
- [cUL](#)
- [CQC](#)

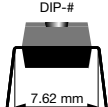
### LINKS TO ADDITIONAL RESOURCES



### 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.

| ORDERING INFORMATION  |   |
|---|---|
| <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">K</div> <div style="border: 1px solid black; padding: 2px 5px;">8</div> <div style="border: 1px solid black; padding: 2px 5px;">#</div> <div style="border: 1px solid black; padding: 2px 5px;">4</div> <div style="border: 1px solid black; padding: 2px 5px;">P</div> </div> <p style="text-align: center; margin-top: 5px;">PART NUMBER</p> |  |
| AGENCY CERTIFIED / PACKAGE  | CTR (%)   |
| <b>UL, cUL</b>  | <b>&gt; 20</b>  |
| DIP-4, single channel   | K814P   |
| DIP-8, dual channel   | K824P   |
| DIP-16, quad channel  | K844P   |



| ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                      |            |             |                    |
|---|--------------------------------------|------------|-------------|--------------------|
| PARAMETER   | CONDITION                            | SYMBOL     | VALUE       | UNIT               |
| <b>INPUT</b>  |                                      |            |             |                    |
| Forward current   |                                      | $I_F$      | 60          | mA                 |
| Forward surge current   | $t_p \leq 10\text{ }\mu\text{s}$     | $I_{FSM}$  | 1.5         | A                  |
| Power dissipation   |                                      | $P_{diss}$ | 100         | mW                 |
| Junction temperature  |                                      | $T_j$      | 125         | $^{\circ}\text{C}$ |
| <b>OUTPUT</b>   |                                      |            |             |                    |
| Collector emitter voltage   |                                      | $V_{CEO}$  | 70          | V                  |
| Emitter collector voltage   |                                      | $V_{ECO}$  | 7           | V                  |
| Collector current   |                                      | $I_C$      | 50          | mA                 |
| Collector peak current  | $t_p/T = 0.5, t_p \leq 10\text{ ms}$ | $I_{CM}$   | 100         | mA                 |
| Power dissipation   |                                      | $P_{diss}$ | 150         | mW                 |
| Junction temperature  |                                      | $T_j$      | 125         | $^{\circ}\text{C}$ |
| <b>COUPLER</b>  |                                      |            |             |                    |
| AC isolation test voltage (RMS)   | $t = 1.0\text{ min}$                 | $V_{ISO}$  | 5000        | $V_{RMS}$          |
| Total power dissipation   |                                      | $P_{tot}$  | 250         | mW                 |
| Operating ambient temperature range   |                                      | $T_{amb}$  | -40 to +100 | $^{\circ}\text{C}$ |
| Storage temperature range   |                                      | $T_{stg}$  | -55 to +125 | $^{\circ}\text{C}$ |
| Soldering temperature <sup>(1)</sup>  | 2 mm from case, $t \leq 10\text{ s}$ | $T_{sld}$  | 260         | $^{\circ}\text{C}$ |

**Notes**

- 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.
- <sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices

| ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |  |             |      |      |      |               |
|---|--|-------------|------|------|------|---------------|
| PARAMETER   | TEST CONDITION   | SYMBOL      | MIN. | TYP. | MAX. | UNIT          |
| <b>INPUT</b>  |  |             |      |      |      |               |
| Forward voltage   | $I_F = 50\text{ mA}$   | $V_F$       | -    | 1.25 | 1.6  | V             |
| Reverse current   | $V_R = \pm 6\text{ V}$   | $I_R$       | -    | -    | 10   | $\mu\text{A}$ |
| <b>OUTPUT</b>   |  |             |      |      |      |               |
| Collector emitter breakdown voltage   | $I_C = 100\text{ }\mu\text{A}$   | $BV_{CEO}$  | 70   | -    | -    | V             |
| Emitter collector breakdown voltage   | $I_E = 10\text{ }\mu\text{A}$  | $BV_{ECO}$  | 7    | -    | -    | V             |
| Collector dark current  | $V_{CE} = 20\text{ V}, I_F = 0, E = 0$                                 | $I_{CEO}$   | -    | -    | 100  | nA            |
| <b>COUPLER</b>  |  |             |      |      |      |               |
| Collector emitter saturation voltage  | $I_F = \pm 10\text{ mA}, I_C = 1\text{ mA}$                            | $V_{CEsat}$ | -    | -    | 0.3  | V             |
| Cut-off frequency   | $I_F = \pm 10\text{ mA}, V_{CE} = 5\text{ V}, R_L = 100\text{ }\Omega$ | $f_c$       | -    | 100  | -    | kHz           |
| Coupling capacitance  | $f = 1\text{ MHz}$   | $C_k$       | -    | 0.3  | -    | pF            |

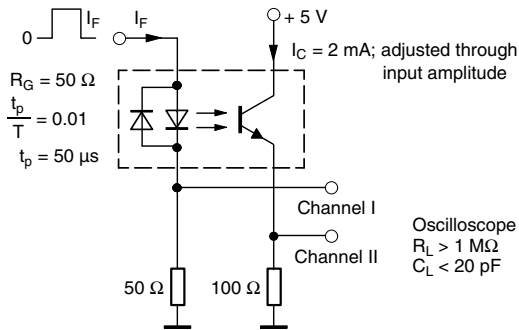
**Note**

- 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 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |  |       |        |      |      |      |      |
|---|--|-------|--------|------|------|------|------|
| PARAMETER   | TEST CONDITION                               | PART  | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| $I_C/I_F$   | $I_F = \pm 5\text{ mA}, V_{CE} = 5\text{ V}$ | K814P | CTR    | 20   | -    | 300  | %    |



| SWITCHING CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |           |      |      |      |               |
|--|---|-----------|------|------|------|---------------|
| PARAMETER  | TEST CONDITION  | SYMBOL    | MIN. | TYP. | MAX. | UNIT          |
| Delay time   | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1) | $t_d$     | -    | 3    | -    | $\mu\text{s}$ |
| Rise time  | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1) | $t_r$     | -    | 3    | -    | $\mu\text{s}$ |
| Fall time  | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1) | $t_f$     | -    | 4.7  | -    | $\mu\text{s}$ |
| Storage time   | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1) | $t_s$     | -    | 0.3  | -    | $\mu\text{s}$ |
| Turn-on time   | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1) | $t_{on}$  | -    | 6    | -    | $\mu\text{s}$ |
| Turn-off time  | $V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\text{ }\Omega$ (see Fig. 1) | $t_{off}$ | -    | 5    | -    | $\mu\text{s}$ |
| Turn-on time   | $V_S = 5\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 1\text{ k}\Omega$ (see Fig. 1) | $t_{on}$  | -    | 9    | -    | $\mu\text{s}$ |
| Turn-off time  | $V_S = 5\text{ V}$ , $I_C = 10\text{ mA}$ , $R_L = 1\text{ k}\Omega$ (see Fig. 1) | $t_{off}$ | -    | 18   | -    | $\mu\text{s}$ |



13343

Fig. 1 - Test Circuit, Non-Saturated Operation

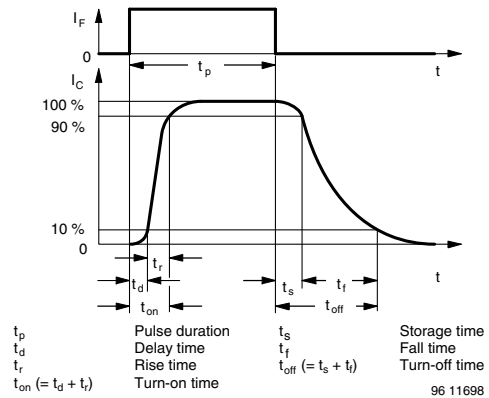
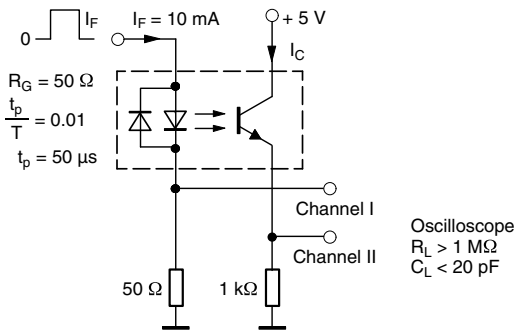


Fig. 3 - Switching Times



13344

Fig. 2 - Test Circuit, Saturated Operation



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

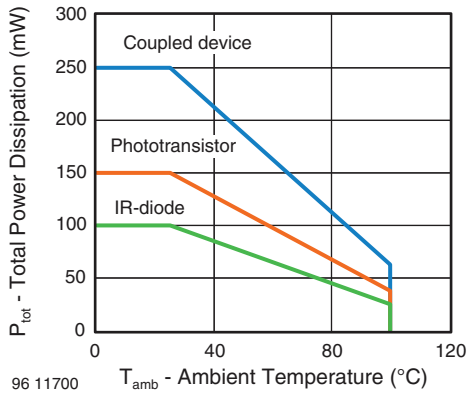


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

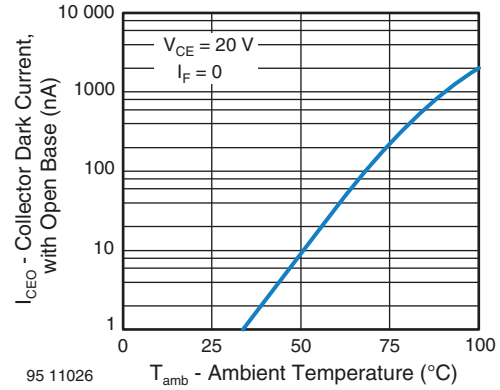


Fig. 7 - Collector Dark Current vs. Ambient Temperature

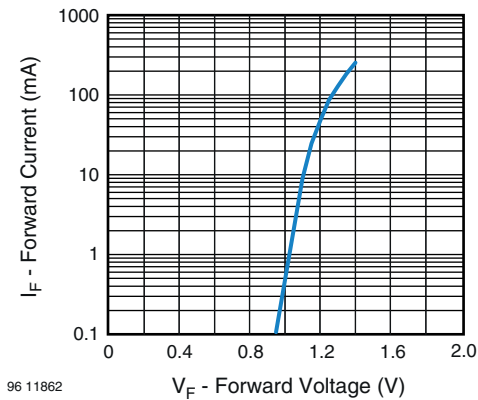


Fig. 5 - Forward Current vs. Forward Voltage

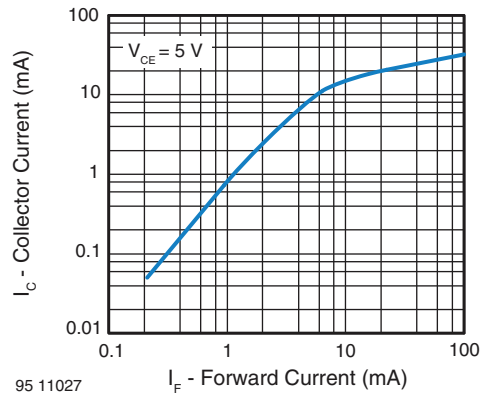


Fig. 8 - Collector Current vs. Forward Current

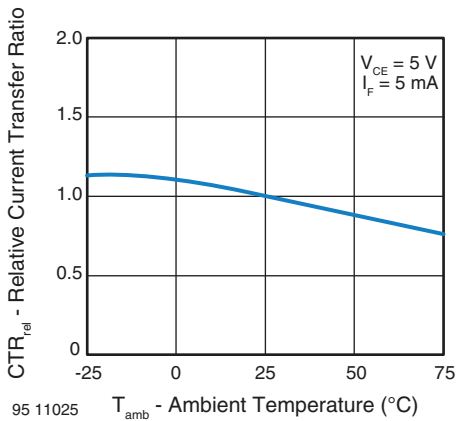


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

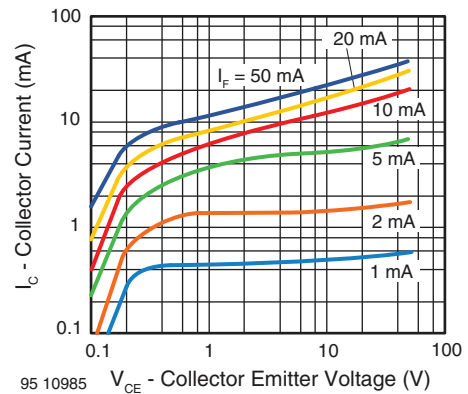


Fig. 9 - Collector Current vs. Collector Emitter Voltage

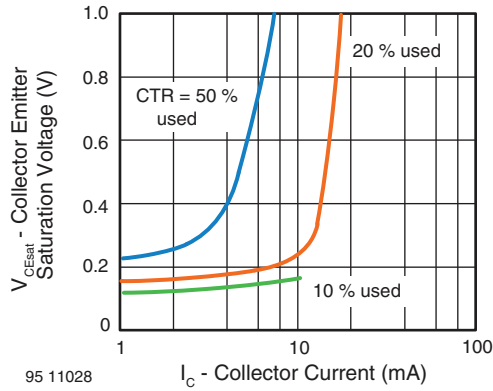


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

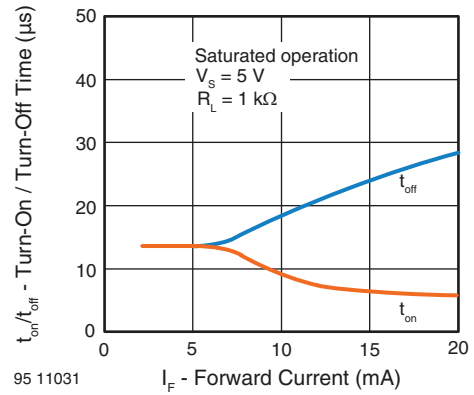


Fig. 12 - Turn-on / Turn-off Time vs. Forward Current

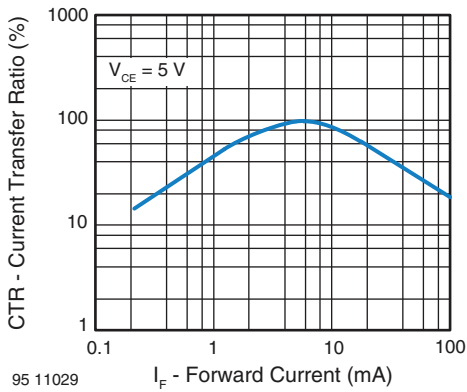


Fig. 11 - Current Transfer Ratio vs. Forward Current

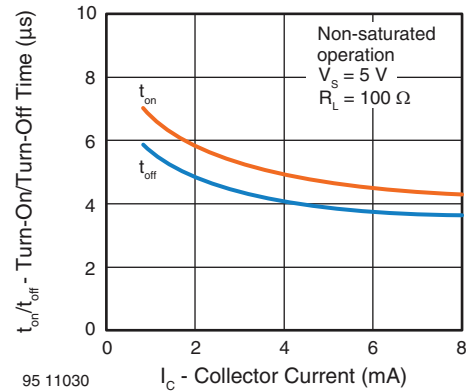
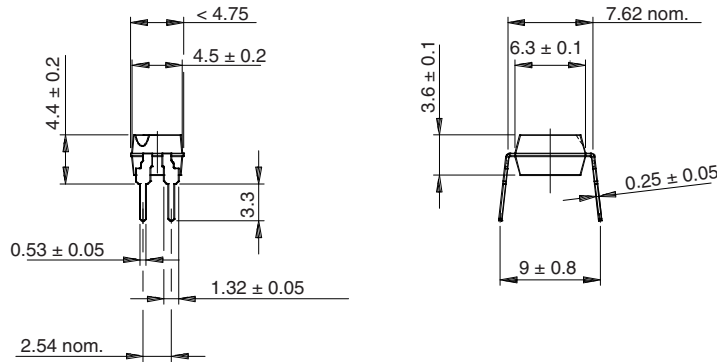


Fig. 13 - Turn-on / Turn-off Time vs. Collector Current

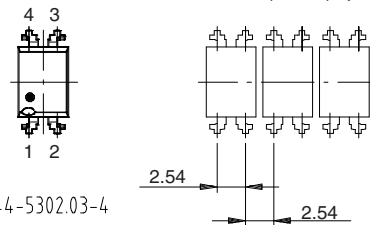


**PACKAGE DIMENSIONS** in millimeters



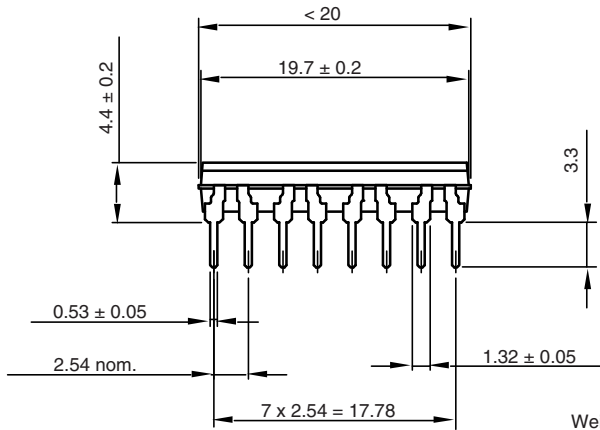
E. g.:  
Special features: endstackable  
to 2.54 mm (0.100") spacing

Weight: ca. 0.25 g  
Creepage distance: > 6 mm  
Air path: > 6 mm  
after mounting on PC board



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

technical drawings  
according to DIN  
specifications  
14789

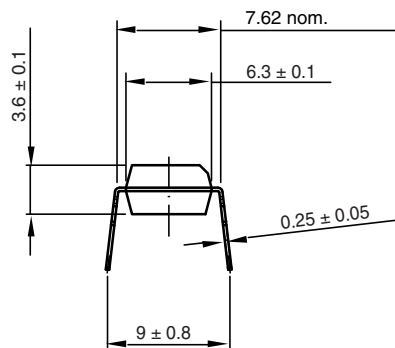
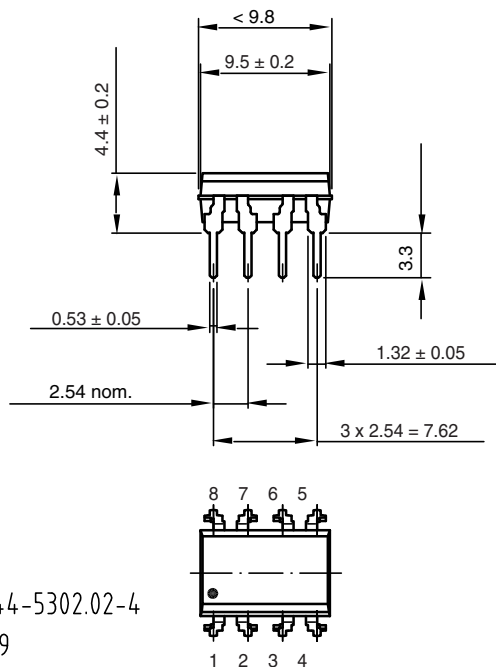


Weight: ca. 1.08 g  
Creepage distance: > 6 mm  
Air path: > 6 mm  
after mounting on PC board

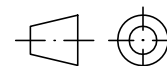


Drawing-No.: 6.544-5302.01-4  
Issue: 4; 02.06.99

technical drawings  
according to DIN  
specifications  
14783



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

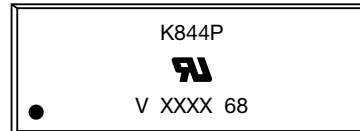
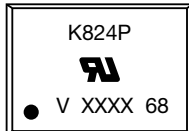
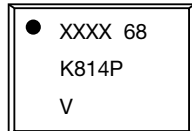


technical drawings  
 according to DIN  
 specifications

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

14784

**PACKAGE MARKING (example)**



**Note**

- XXXX = LMC (lot marking code)



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