

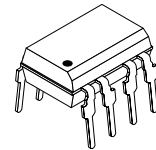
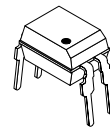
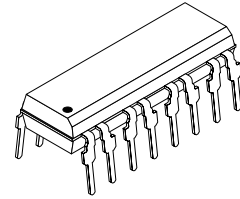


## Optocoupler with Phototransistor Output

### Description

The K817P/ K827PH/ K847PH consist of a photo-transistor optically coupled to a gallium arsenide infrared-emitting diode in an 4-lead up to 16-lead plastic dual in line package.

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

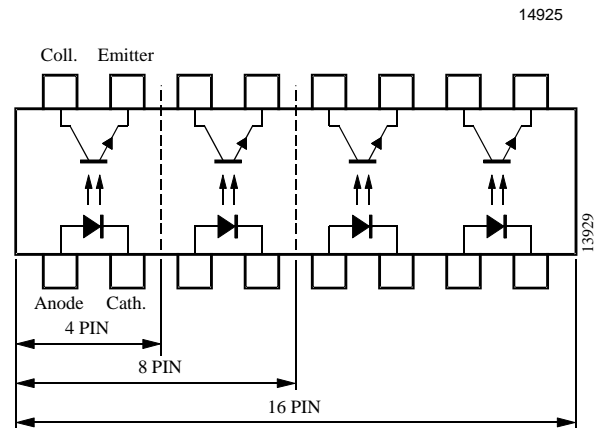


### Applications

Programmable logic controllers, modems, answering machines, general applications

### Features

- Endstackable to 2.54 mm (0.1") spacing
- DC isolation test voltage  $V_{IO} = 5 \text{ kV}$
- Low coupling capacitance of typical 0.3 pF
- **Current Transfer Ratio (CTR)** selected into groups
- Low temperature coefficient of CTR
- Wide ambient temperature range
- Underwriters Laboratory (UL) 1577 recognized, file number E-76222
- **CSA (C-UL) 1577** recognized, file number E-76222 – Double Protection
- Coupling System U



### Order Instruction

Ordering Code	CTR Ranking	Remarks
K817P	50 to 600%	4 Pin = Single channel
K827PH	50 to 600%	8 Pin = Dual channel
K847PH	50 to 600%	16 Pin = Quad channel
K817P1	40 to 80%	4 Pin = Single channel
K817P2	63 to 125%	4 Pin = Single channel
K817P3	100 to 200%	4 Pin = Single channel
K817P4	160 to 320%	4 Pin = Single channel
K817P5	50 to 150%	4 Pin = Single channel
K817P6	100 to 300%	4 Pin = Single channel
K817P7	80 to 160%	4 Pin = Single channel
K827P8	130 to 260%	4 Pin = Single channel
K817P9	200 to 400%	4 Pin = Single channel

**Absolute Maximum Ratings****Input (Emitter)**

Parameter	Test Conditions	Symbol	Value	Unit
Reverse voltage		$V_R$	6	V
Forward current		$I_F$	60	mA
Forward surge current	$t_p \leq 10 \mu s$	$I_{FSM}$	1.5	A
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_V$	100	mW
Junction temperature		$T_j$	125	$^\circ C$

**Output (Detector)**

Parameter	Test Conditions	Symbol	Value	Unit
Collector emitter voltage		$V_{CEO}$	70	V
Emitter collector voltage		$V_{ECO}$	7	V
Collector current		$I_C$	50	mA
Peak collector current	$t_p/T = 0.5, t_p \leq 10 ms$	$I_{CM}$	100	mA
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_V$	150	mW
Junction temperature		$T_j$	125	$^\circ C$

**Coupler**

Parameter	Test Conditions	Symbol	Value	Unit
AC isolation test voltage (RMS)	$t = 1 min$	$V_{IO}^{1)}$	5	kV
Total power dissipation	$T_{amb} \leq 25^\circ C$	$P_{tot}$	250	mW
Operating ambient temperature range		$T_{amb}$	-40 to +100	$^\circ C$
Storage temperature range		$T_{stg}$	-55 to +125	$^\circ C$
Soldering temperature	2 mm from case, $t \leq 10 s$	$T_{sd}$	260	$^\circ C$

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



## Electrical Characteristics ( $T_{amb} = 25^{\circ}\text{C}$ )

### Input (Emitter)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 50 \text{ mA}$	$V_F$		1.25	1.6	V
Junction capacitance	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$	$C_j$		50		pF

### Output (Detector)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector emitter voltage	$I_C = 100 \text{ }\mu\text{A}$	$V_{CEO}$	70			V
Emitter collector voltage	$I_E = 100 \text{ }\mu\text{A}$	$V_{ECO}$	7			V
Collector dark current	$V_{CE} = 20 \text{ V}, I_F = 0, E = 0$	$I_{CEO}$			100	nA

### Coupler

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

### Current Transfer Ratio (CTR)

Parameter	Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
$I_C/I_F$	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K817P	CTR	0.5		6.0	
	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K827PH	CTR	0.5		6.0	
	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K847PH	CTR	0.5		6.0	
	$V_{CE} = 5 \text{ V}, I_F = 10 \text{ mA}$	K817P1	CTR	0.4		0.8	
	$V_{CE} = 5 \text{ V}, I_F = 10 \text{ mA}$	K817P2	CTR	0.63		1.25	
	$V_{CE} = 5 \text{ V}, I_F = 10 \text{ mA}$	K817P3	CTR	1.0		2.0	
	$V_{CE} = 5 \text{ V}, I_F = 10 \text{ mA}$	K817P4	CTR	1.6		3.2	
	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K817P5	CTR	0.5		1.5	
	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K817P6	CTR	1.0		3.0	
	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K817P7	CTR	0.8		1.6	
	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K817P8	CTR	1.3		2.6	
	$V_{CE} = 5 \text{ V}, I_F = 5 \text{ mA}$	K817P9	CTR	2.0		4.0	



### Switching Characteristics

Parameter	Test Conditions	Symbol	Typ.	Unit
Delay time	$V_S = 5\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$ (see figure 1)	$t_d$	3.0	$\mu\text{s}$
Rise time		$t_r$	3.0	$\mu\text{s}$
Fall time		$t_f$	4.7	$\mu\text{s}$
Storage time		$t_s$	0.3	$\mu\text{s}$
Turn-on time		$t_{on}$	6.0	$\mu\text{s}$
Turn-off time		$t_{off}$	5.0	$\mu\text{s}$
Turn-on time	$V_S = 5\text{ V}$ , $I_F = 10\text{ mA}$ , $R_L = 1\text{ k}\Omega$ (see figure 2)	$t_{on}$	9.0	$\mu\text{s}$
Turn-off time		$t_{off}$	18.0	$\mu\text{s}$

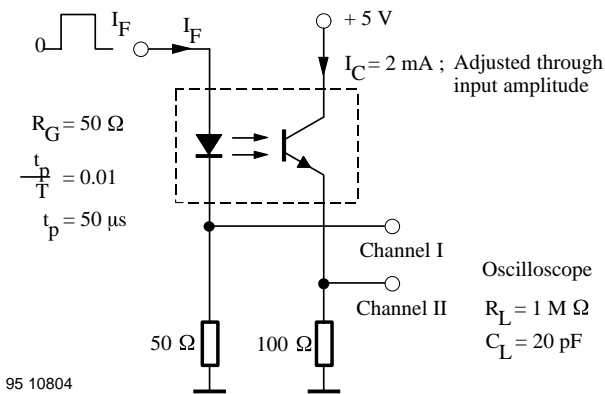


Figure 1. Test circuit, non-saturated operation

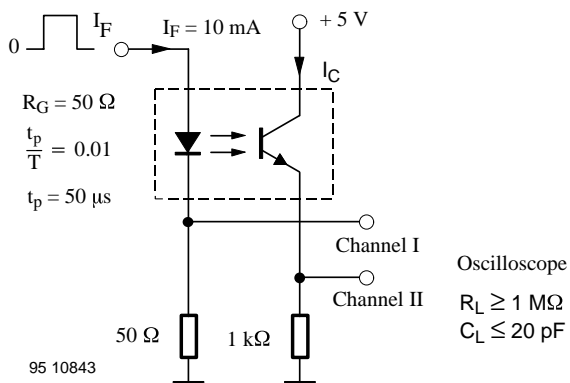


Figure 2. Test circuit, saturated operation

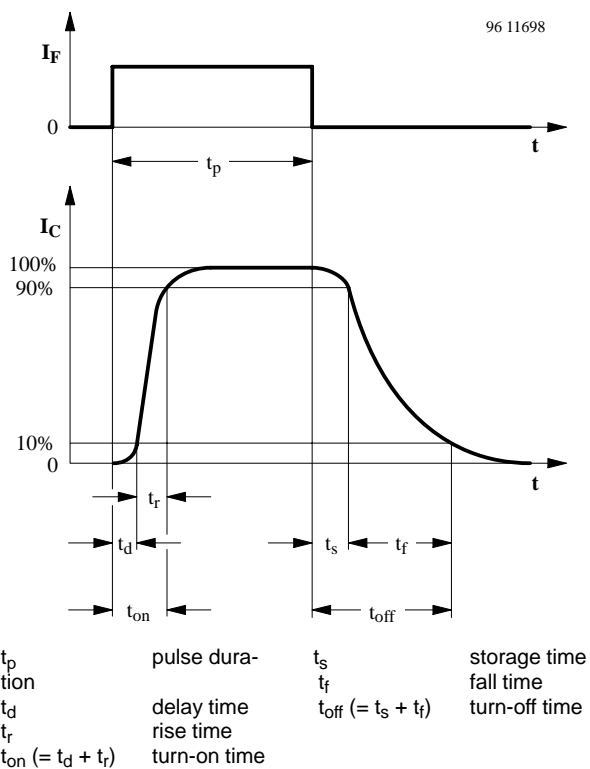
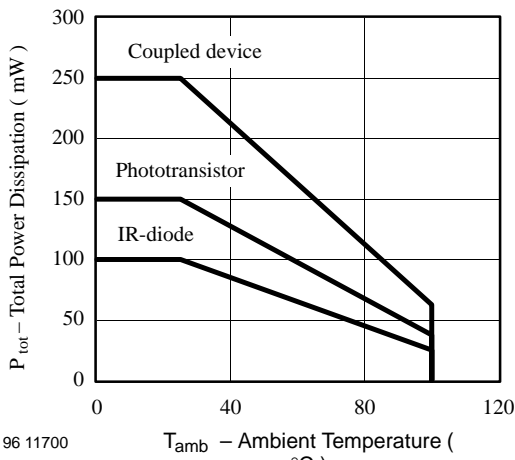
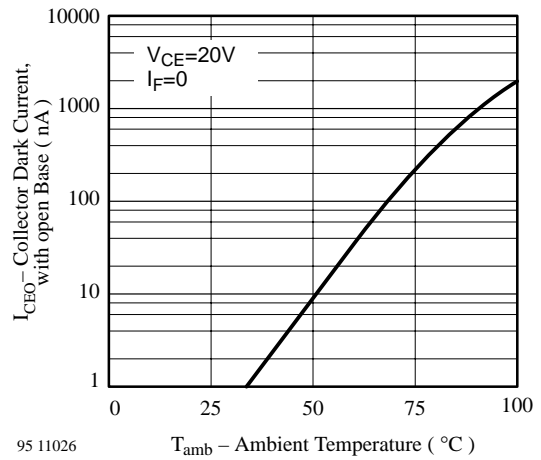


Figure 3. Switching times

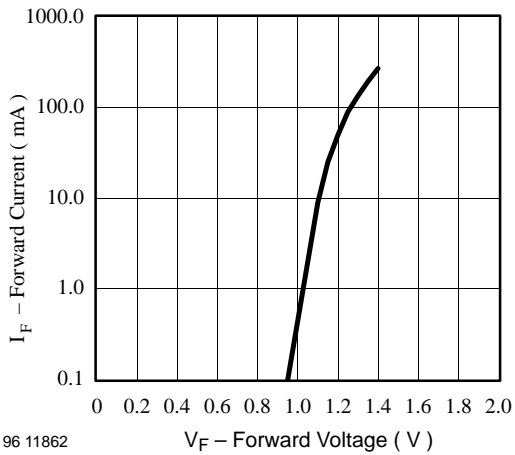
## Typical Characteristics ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified)



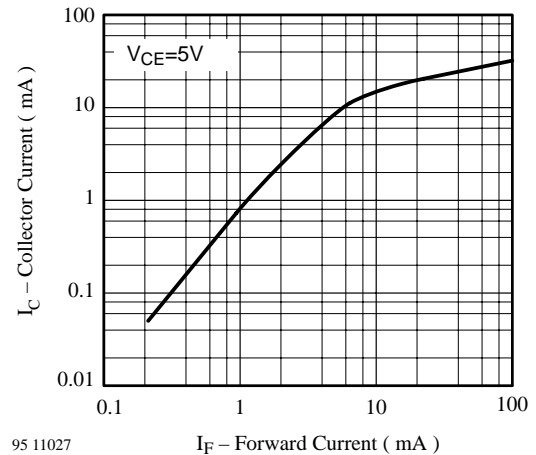
96 11700  
Figure 4. Total Power Dissipation vs. Ambient Temperature



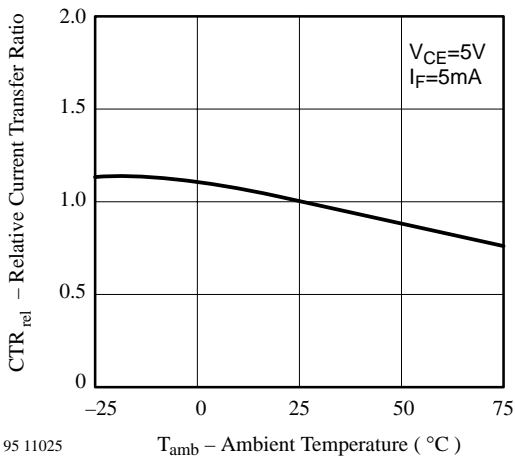
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Figure 7. Collector Dark Current vs. Ambient Temperature



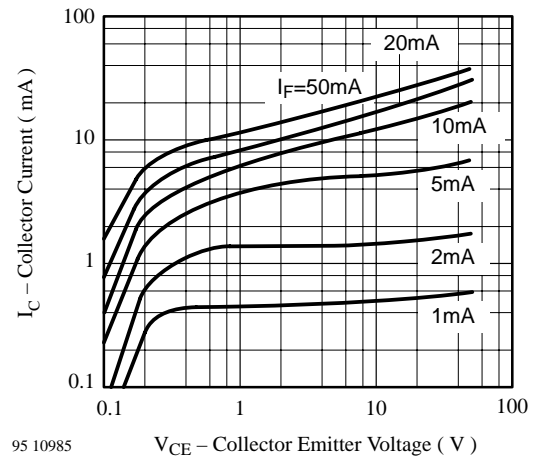
96 11862  
Figure 5. Forward Current vs. Forward Voltage



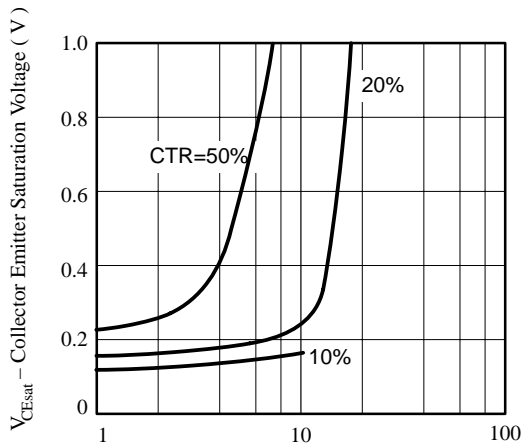
95 11027  
Figure 8. Collector Current vs. Forward Current



95 11025  
Figure 6. Relative Current Transfer Ratio vs. Ambient Temperature



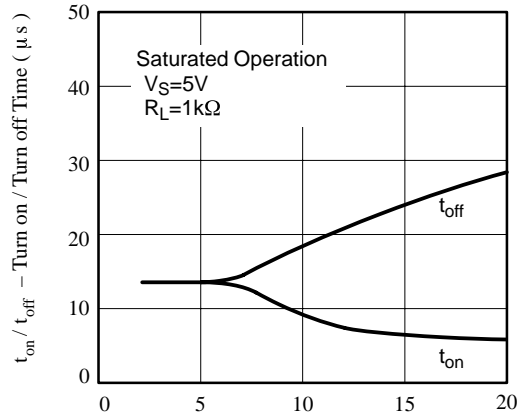
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Figure 9. Collector Current vs. Collector Emitter Voltage



95 11028

$I_C$  – Collector Current (mA)

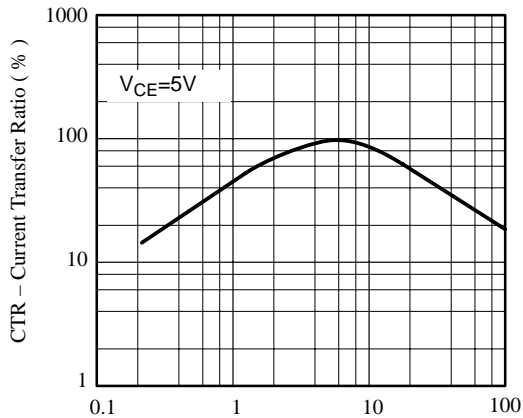
Figure 10. Collector Emitter Saturation Voltage vs. Collector Current



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$I_F$  – Forward Current (mA)

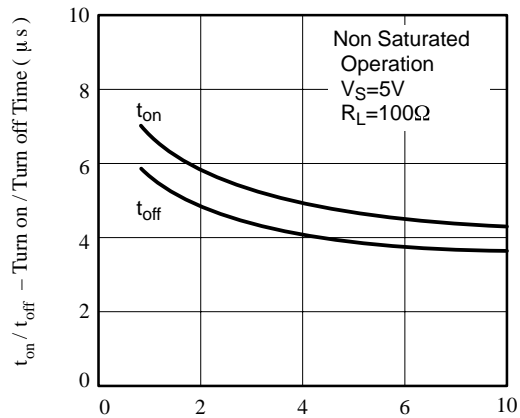
Figure 12. Turn on / off Time vs. Forward Current



95 11029

$I_F$  – Forward Current (mA)

Figure 11. Current Transfer Ratio vs. Forward Current



95 11030

$I_C$  – Collector Current (mA)

Figure 13. Turn on / off Time vs. Collector Current

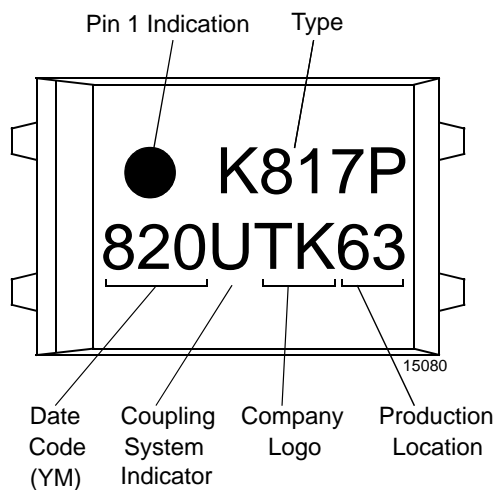
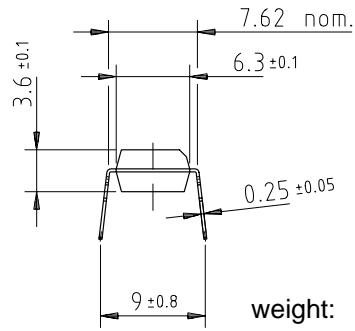
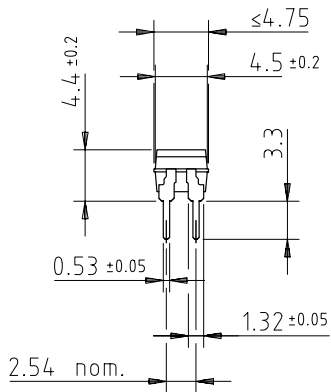


Figure 14. Marking example

## Dimensions of K817P. in mm

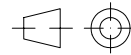
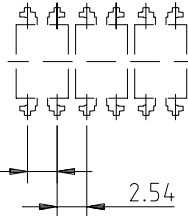
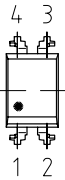


weight: ca. 0.25 g  
 creepage distance:  $\geq 6$  mm  
 air path:  $\geq 6$  mm

after mounting on PC board

E.g.:

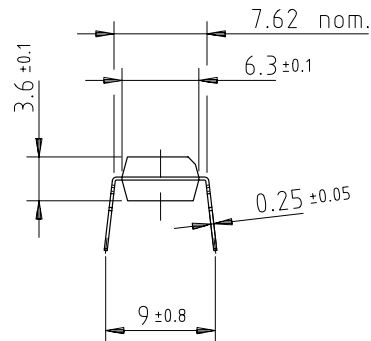
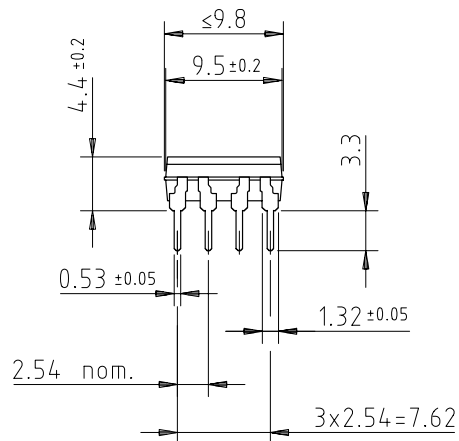
special Features: endstackable to 2.54mm ( .100" ) spacing



technical drawings according to DIN specifications

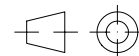
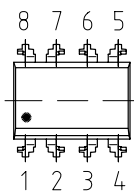
14789

## Dimensions of K827PH in mm



weight: ca. 0.55 g  
 creepage distance:  $\geq 6$  mm  
 air path:  $\geq 6$  mm

after mounting on PC board



technical drawings according to DIN specifications

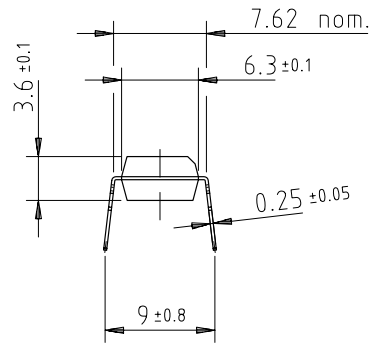
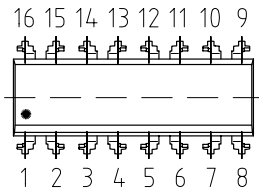
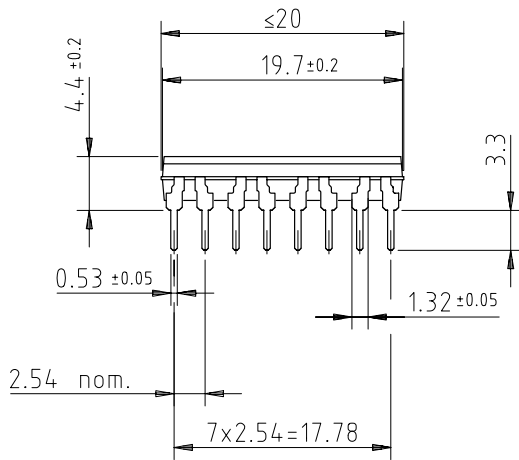
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# K817P/ K827PH/ K847PH

Vishay Telefunken

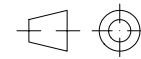


## Dimensions of K847PH in mm



weight: ca. 1.0 g  
creepage distance:  $\geq 6$  mm  
air path:  $\geq 6$  mm

after mounting on PC board



technical drawings  
according to DIN  
specifications

14783