

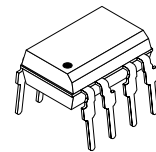
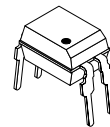
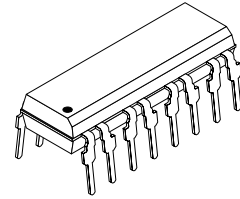


Optocoupler with Phototransistor Output

Description

The K817P/ K827PH/ K847PH consist of a phototransistor 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.

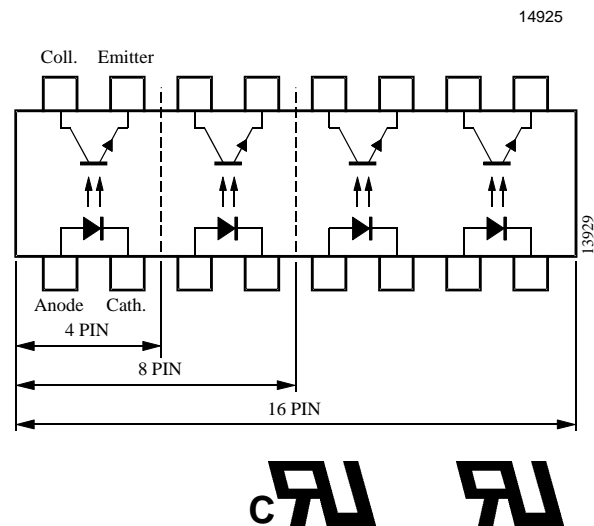


Applications

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

K817P/ K827PH/ K847PH**Vishay Telefunken****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	$^\circ C$

¹⁾ 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	

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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	μS
Rise time		t_r	3.0	μS
Fall time		t_f	4.7	μS
Storage time		t_s	0.3	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}	6.0	μS
Turn-off time		t_{off}	5.0	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}	9.0	μS
Turn-off time		t_{off}	18.0	μS

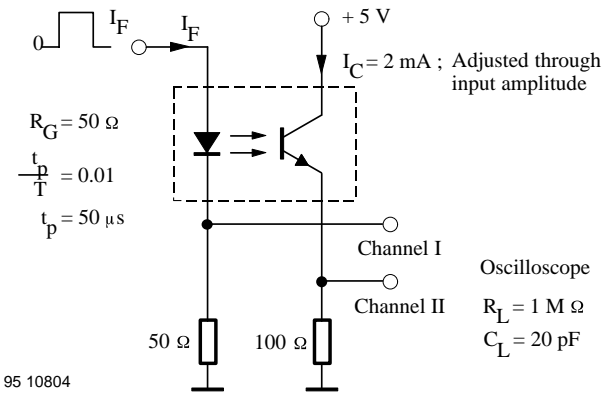


Figure 1. Test circuit, non-saturated operation

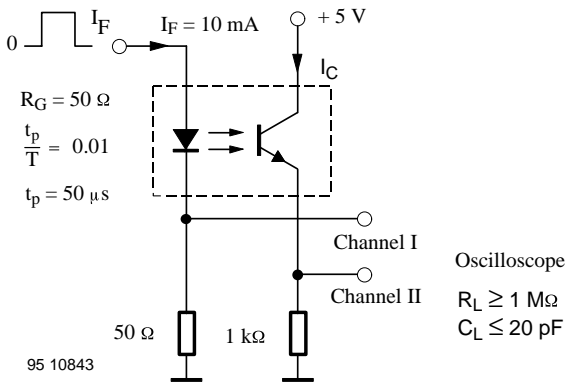


Figure 2. Test circuit, saturated operation

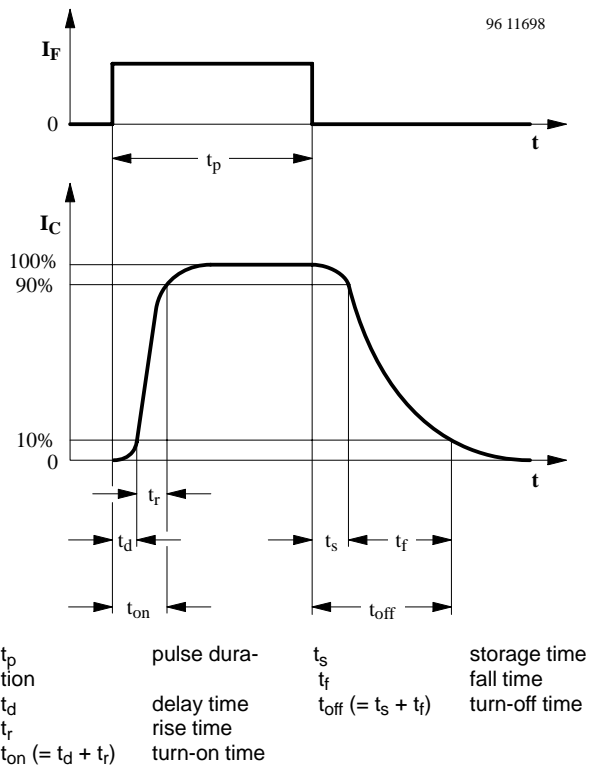
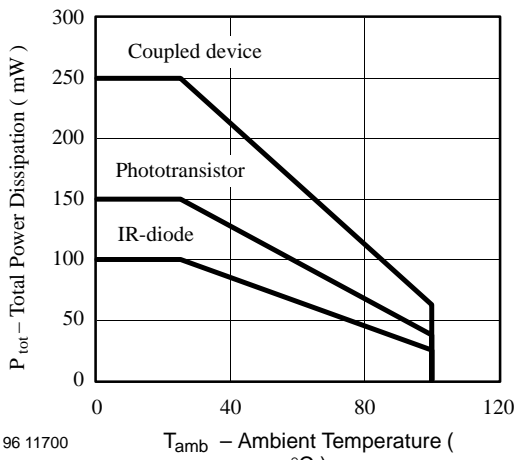


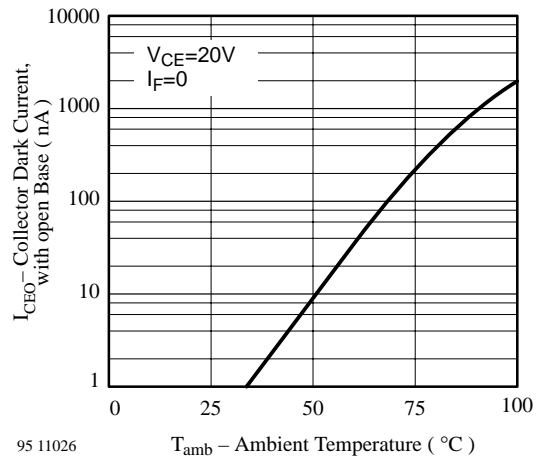
Figure 3. Switching times



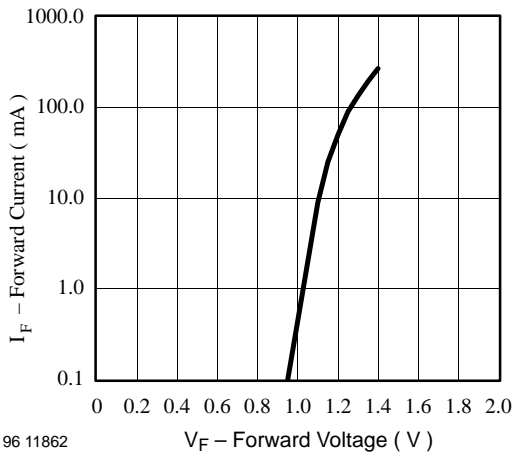
Typical Characteristics ($T_{amb} = 25^{\circ}C$, unless otherwise specified)



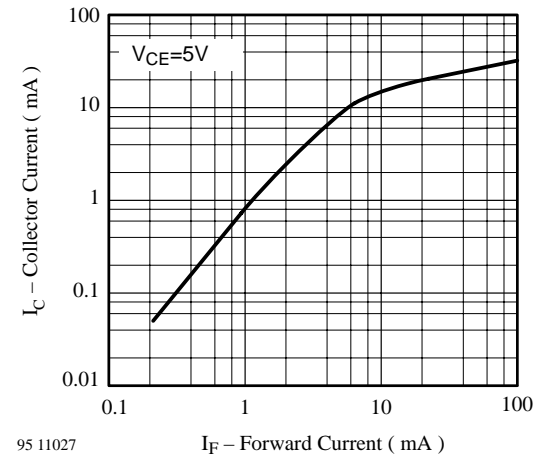
96 11700
Figure 4. Total Power Dissipation vs. Ambient Temperature



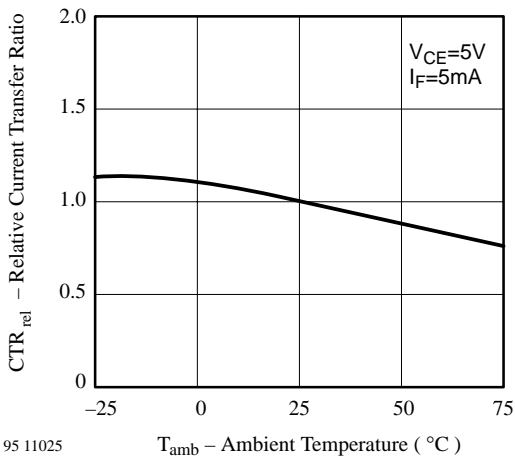
95 11026
Figure 7. Collector Dark Current vs. Ambient Temperature



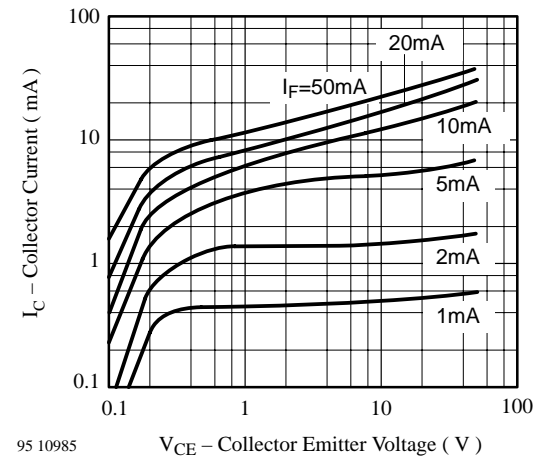
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Figure 5. Forward Current vs. Forward Voltage



95 11027
Figure 8. Collector Current vs. Forward Current



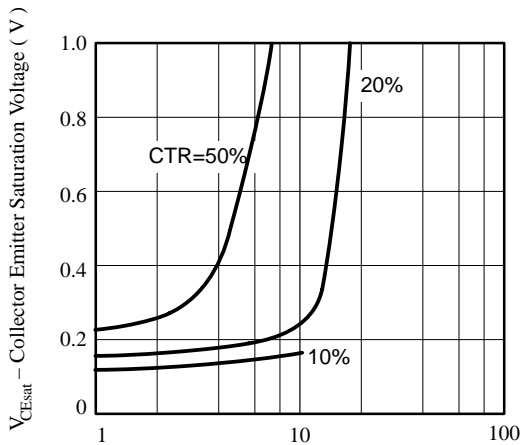
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Figure 6. Relative Current Transfer Ratio vs. Ambient Temperature



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Figure 9. Collector Current vs. Collector Emitter Voltage

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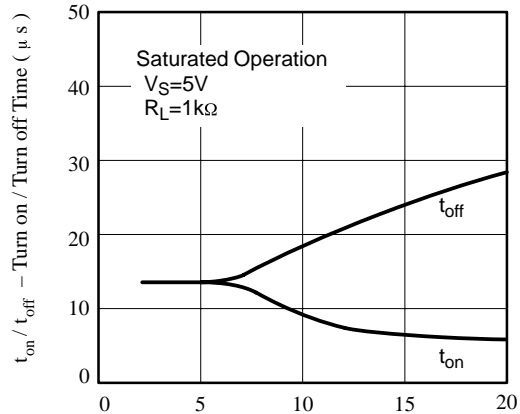
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95 11028

I_C – Collector Current (mA)

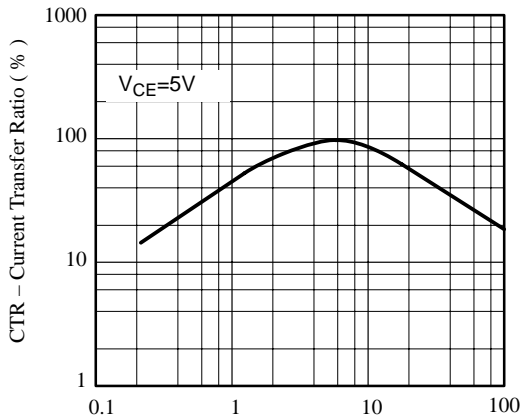
Figure 10. Collector Emitter Saturation Voltage vs. Collector Current



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I_F – Forward Current (mA)

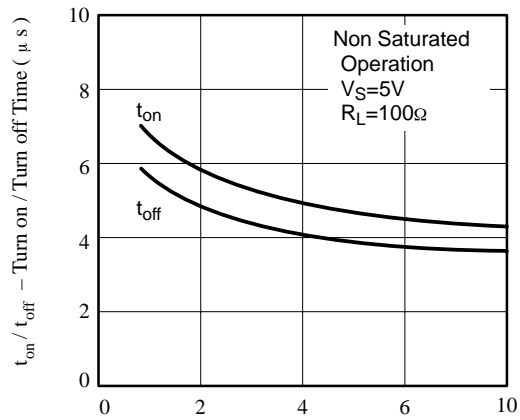
Figure 12. Turn on / off Time vs. Forward Current



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I_F – Forward Current (mA)

Figure 11. Current Transfer Ratio vs. Forward Current



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I_C – Collector Current (mA)

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

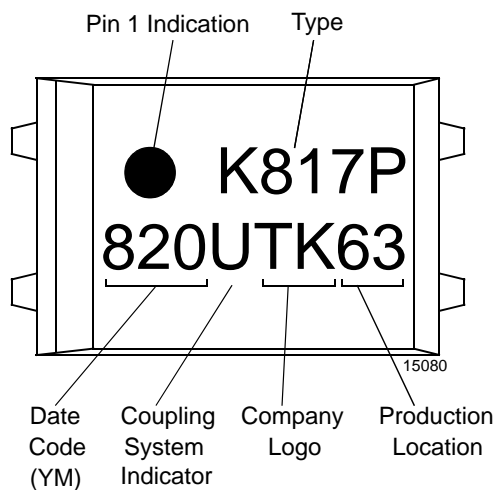


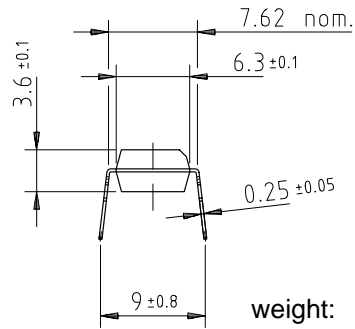
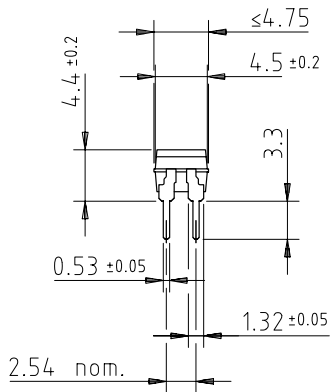
Figure 14. Marking example



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Dimensions of K817P. in mm

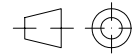
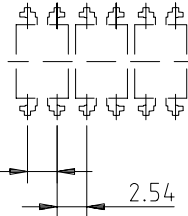
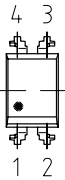


weight: ca. 0.25 g
 creepage distance: ≥ 6 mm
 air path: ≥ 6 mm

after mounting on PC board

E.g.:

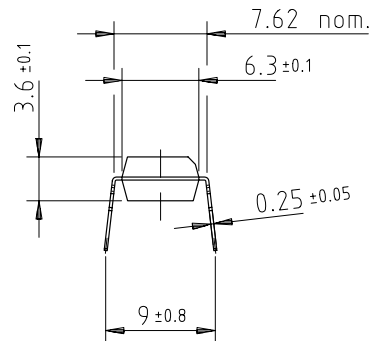
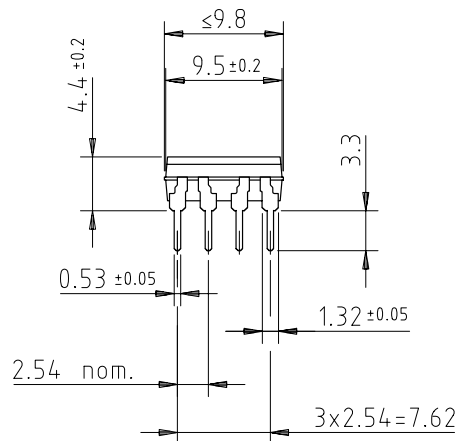
special Features: endstackable to 2.54mm (.100") spacing



technical drawings according to DIN specifications

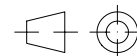
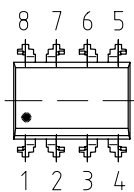
14789

Dimensions of K827PH in mm



weight: ca. 0.55 g
 creepage distance: ≥ 6 mm
 air path: ≥ 6 mm

after mounting on PC board



technical drawings according to DIN specifications

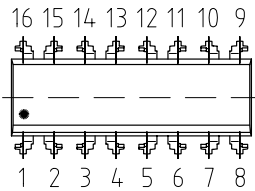
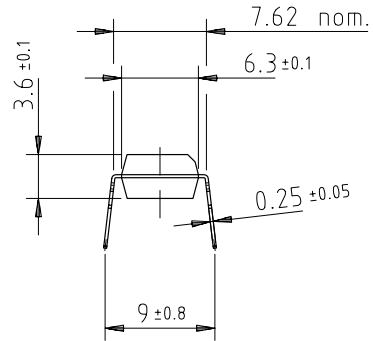
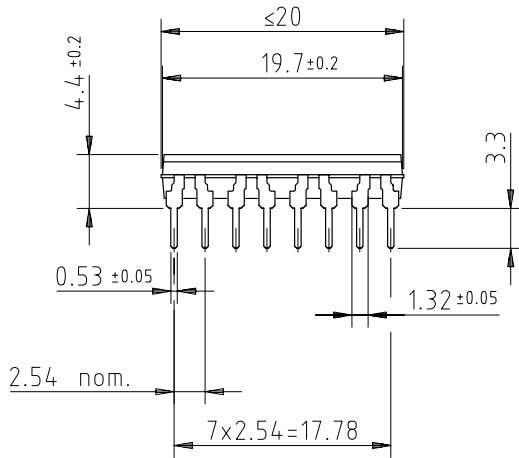
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K817P/ K827PH/ K847PH

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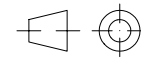


Dimensions of K847PH in mm



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

after mounting on PC board



technical drawings
 according to DIN
 specifications

14783