T-41-69

TELEFUNKEN electronic
Creative Technologies

BPW 80 · BPW 81

Monolithic Integrated Circuit

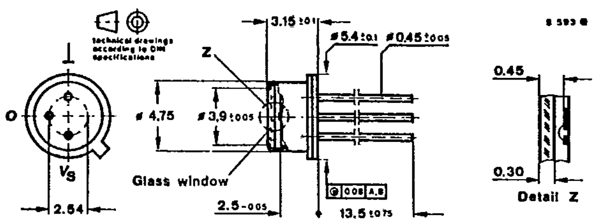
Construction: **Photo-Schmitt-Detector**

Applications: Microprocessor interface, threshold switch, digital control of switching mode power supply, pulse former

Features:

- TTL-compatible
- CMOS compatible
- BPW 80 output signal inverted, active "LOW"
- BPW 81 output signal not inverted, active "HIGH"
- Open collector output
- High transmission frequency $f \geqq 250$ kHz, and transmission rate $\geqq 500$ kbit/s
- Suitable to couple with glass fiber
- Square wave output pulse is independent of input signal form

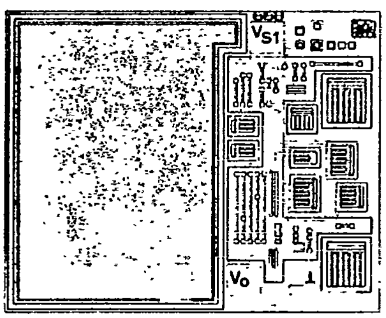
Dimensions in mm



Radiant sensitive area
$A = 0.7$ mm²
Angle of half sensitivity
$\pm\varphi = 40°$

Case
18 A3 DIN 41876
Weight max. 0.05 g

Chip configuration



1.2 mm x 1.4 mm
$A = 0.7$ mm²

When the glass fiber is placed in mechanical contact with the window and optically adjusted the detector collects radiation from a typical numerical aperture of 0.6

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Absolute maximum ratings

Supply voltage	V_S	7	V
Output current	I_O	20	mA
Power dissipation $T_{amb} = 25$ °C	P_V	250	mW
Junction temperature	T_j	100	°C
Operating temperature range	T_{amb}	−40...+85	°C
Storage temperature range	T_{stg}	−40...+100	°C
Soldering temperature $t \leq 10$ s	T_{sd}	260	°C

Electrical characteristics			Min.	Typ.	Max.	
Supply voltage		V_S	4.75	5	5.25	V
Supply current						
V_{OL}, E_{eON}	BPW 80	I_S		16		mA
$10 \times E_{eON}$	BPW 80	I_S		35		mA
E_{eOFF}	BPW 80	I_S		16		mA
V_{OH}, E_{eON}	BPW 81	I_S		8		mA
$10 \times E_{eON}$	BPW 81	I_S		26		mA
E_{eOFF}	BPW 81	I_S		12		mA
Irradiance for threshold "ON"						
$\lambda = 950$ nm		E_{eON}		1.0	1.4	mW/cm^2
$\lambda = 900$ nm		E_{eON}		0.8		mW/cm^2
Hysteresis $R_L = 360\ \Omega$		ΔE_e	20	30		%
Output voltage E_{eON}, $I_O = 12$ mA		V_{OL}		0.3	0.4	V
Switching frequency $V_{S1} = 5$ V, $R_L = 360\ \Omega$, $2 \times E_{eON}$,						
$\lambda = 950$ nm		f_{SW}	250	400		kHz
$\lambda = 900$ nm		f_{SW}		700		kHz
High level output current $V_{S2} = 16$ V		I_{OH}			1	µA

Switching characteristics
$V_{S1} = 5$ V, $R_L = 360\ \Omega$, $2 \times E_{eON}$

Rise time	t_r	30	ns
Fall time	t_f	10	ns
Turn-on time			
$\lambda = 950$ nm	t_{on}	0.5	µs
$\lambda = 900$ nm	t_{on}	0.16	µs
Turn-off time			
$\lambda = 950$ nm	t_{off}	1.6	µs
$\lambda = 900$ nm	t_{off}	1.2	µs

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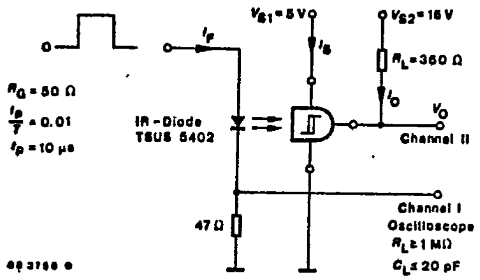

Fig. 1 Test circuit for: f_s, t_r, t_f, t_{on}, t_{off}

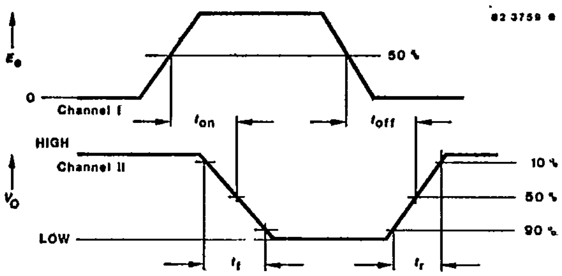

Fig. 2 Pulse diagram

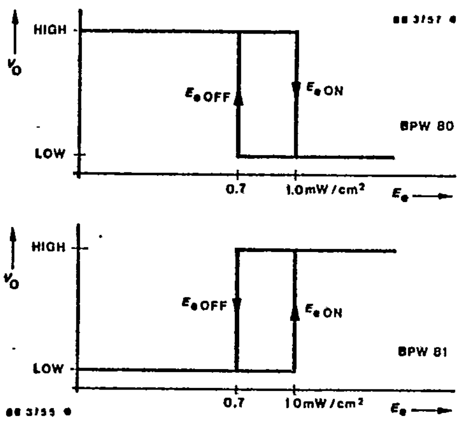

Fig. 3 Principal electro-optical functions

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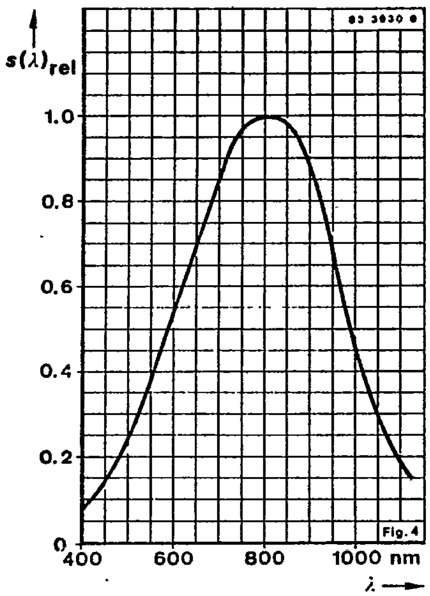
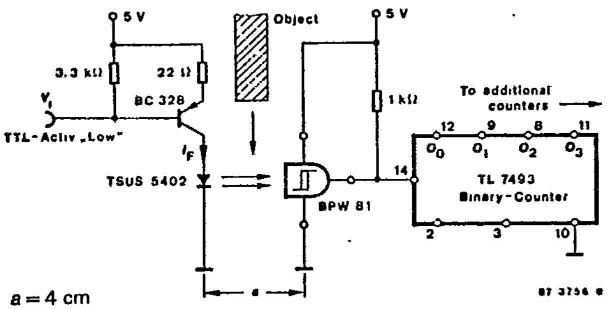


Application note



Light barrier width can be expanded by increasing radition level especially at pulse operation

Fig. 5 Light barrier with BPW 81 and a binary counter