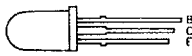
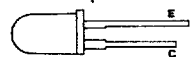
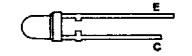
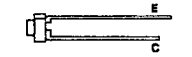
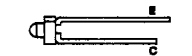


Photo Detectors




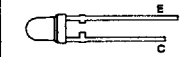
T-41-61

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Phototransistors in Clear Plastic Package

Package Dimensions see page 49-51	Type	Photo sensitive area mm ²	Characteristics										
			ϕ	I_{ca} $V_{CE}=5V$ mA	E_o $\lambda=950\text{ nm}$ mW/cm ²	$V_{(BR)CEO}$ $I_C=1\text{ mA}$ V	I_{CEO} at V_{CE} nA	V_{CE} V	$\lambda_p/\lambda_{0.5}$ nm	t_r and f_g at I_C and R_L $V_{CE}=5V,$ $\lambda=820\text{ nm}$ μs kHz mA $\text{k}\Omega$			
T-1 $\frac{1}{2}$, ϕ 5 mm, Fig. 22 	BPV 11	0.36	$\pm 15^\circ$	10(>3)	1	>70	3(<50)	10	800/ 600...1050	3.3	-	5	0.1
T-1 $\frac{1}{4}$, ϕ 5 mm, Fig. 17 	BPW 96A	0.18	$\pm 20^\circ$	1.5...4.5	1	>70	10(<200)	20	830/ 560...980	1.5	180	5	0.1
	BPW 96B			2.5...7.5									
	BPW 96C			4.5...15									
T-1, ϕ 3 mm, Fig. 8 	BPW 85A	0.18	$\pm 25^\circ$	0.8...2.5	1	>70	10(<200)	20	830/ 560...980	1.5	180	5	0.1
	BPW 85B			1.5...4.0									
	BPW 85C			3.0...8.0									
T- $\frac{3}{4}$, ϕ 1.8 mm, Fig. 3 	BPW 16N	0.36	$\pm 40^\circ$	0.14(>0.07)	1	>32	10(<200)	20	780/ 520...950	3.7	120	5	0.1
T- $\frac{3}{4}$, ϕ 1.8 mm, Fig. 5 	BPW 17N	0.36	$\pm 12.5^\circ$	1.0(>0.5)	1	>32	10(<200)	20	780/ 520...950	3.7	120	5	0.1

Phototransistors with Filter Matched for GaAs IREDs in Plastic Package

Package Dimensions see page 49-52	Type	Photo sensitive area mm ²	Characteristics										
			ϕ	I_{ca} $V_{CE}=5V$ mA	E_o $\lambda=950\text{ nm}$ mW/cm ²	$V_{(BR)CEO}$ $I_C=1\text{ mA}$ V	I_{CEO} at V_{CE} nA	V_{CE} V	$\lambda_p/\lambda_{0.5}$ nm	t_r and f_g at I_C and R_L $V_{CE}=5V,$ $\lambda=820\text{ nm}$ μs kHz mA $\text{k}\Omega$			
T-1 $\frac{1}{2}$, ϕ 5 mm, Fig. 22 	BPV 11F	0.36	$\pm 15^\circ$	9(>3)	1	>70	3(<50)	10	900/ 730...1050	3.3	-	5	0.1
T- $\frac{3}{4}$, ϕ 1.8 mm, Fig. 3 	S 350 P	0.36	$\pm 40^\circ$	1.0(>0.2)	1	>32	10(<200)	20	900/ 730...1050	3.7	170	5	0.1
Side view, Fig. 33 	BPW 78 A	0.36	$\pm 25^\circ$	1...3.0	1	>32	10(<100)	20	880/ 790...1000	3.8	110	5	0.1
	BPW 78 B			4(>2.0)									
T1, ϕ 3 mm, Fig. 8 	S 289 P	0.21	$\pm 25^\circ$	15(>4)	0.3	>32	10(<200)	20	900/ 820...1000	80	5	5	0.1

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Phototransistors in Hermetically Sealed Package



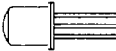



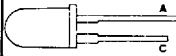
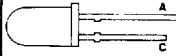
Package	Type	Photo sensitive area mm ²	Characteristics																			
			ϕ	I_{ca} $V_{CE}=5V$ mA	E_a $\lambda = 950\text{ nm}$ mW/cm ²	$V_{(BR)CEO}$ $I_C=1\text{ mA}$ V	I_{CEO} $V_{CE}=20\text{ V}$ nA	$\lambda_p/\lambda_{0.5}$ nm	t_r and f_g at I_C and R_L $V_{CE}=5V,$ $\lambda=820\text{ nm}$ μs kHz mA kΩ													
TO 18, Fig. 56 	BPW 47 A	0.28 ($\phi 0.6$) ⁴⁾	$\pm 40^\circ$	0.32...0.63	1	>70	10(<100)	800/ 600...1050	1.3	150	5	0.1										
	BPW 47 B			0.5...1.0																		
	BPW 47 C			0.8...1.6																		
	BPW 76 A BPW 76 B	0.36	$\pm 40^\circ$	0.4...0.6	1	>70	10(<100)	800/ 600...1050	3.8	110	5	0.1										
				1.2(>0.6)																		
		BPX 38 BPX 38-2 BPX 38-3 BPX 38-4 BPX 38-5 BPX 38-6		0.76									$\pm 40^\circ$	>0.2	0.5	>70	10(<200)	950/ 630...1040	-	-	1	1
														0.2...0.4								
														0.32...0.63								
														0.5...1.0								
0.8...1.6																						
>1.25																						
TO 18, Fig 58 	BPW 77 NA BPW 77 NB	0.36	$\pm 10^\circ$	7.5...15 20(>10)	1	>70	10(<100)	800/ 600...1050	3.8	110	5	0.1										
	S252 P (L14 G1) S253 P (L14 G2) S254 P (L14 G3)	0.18	$\pm 10^\circ$	>1.5 >0.75 >3.0	1	>45	10(<100)	780/ 520...950	1.7	170	5	0.1										
	TO 18, Fig 57 	BPX 43 BPX 43-2 BPX 43-3 BPX 43-4 BPX 43-5 BPX 43-6	0.76	$\pm 15^\circ$	>0.8	0.5	>70	10(<200)	950/ 630...1040	-	-	1	1									
		0.8...1.6																				
1.25...2.5																						
2.0...4.0																						
3.2...6.3																						
>5																						
TO 52, Fig 55 	BPX 99R-2 BPX 99R-3	0.21	$\pm 12.5^\circ$	10(>4) 20(>10)	0.3	>32	10(<200)	800/ 600...900	80	5	5	0.1										

Photo PIN Diodes in Clear Plastic Package

Package	Type	Photo sensitive area mm ²	Characteristics										
			ϕ	I_{ra} and V_o at λ $E_a = 1\text{ mW/cm}^2$ $V_R = 5\text{ V}$ μA mV nm			$V_{(BR)}$ $I_R = 100\text{ μA}$ V	I_{ro} $V_R = 10\text{ V}$ nA	$S_{(\lambda)}$ $V_R = 5\text{ V}$ $\lambda = 870\text{ nm}$ A/W	$\lambda_p/\lambda_{0.5}$ nm	$t_{on/}$ at V_R and R_L t_{off} $\lambda = 820\text{ nm}$ ns V Ω		
Top view, Fig 42 	BPW 34	7.5	$\pm 65^\circ$	50(>40)	350	950	>60	2(<30)	0.6	900/ 530...1050	100	10	1000
Side view, Fig 36 	BPW 46	7.5	$\pm 65^\circ$	50(>40)	350	950	>60	2(<30)	0.6	900/ 530...1050	100	10	1000
T-1 ³⁾ , $\varnothing 5\text{ mm}$, Fig 14 	BPW 43	0.25	$\pm 25^\circ$	8(>4)	300	950	>60	1(<10)	0.6	900/ 500...1000	4 ¹⁾	10	50
T-1 ³⁾ , $\varnothing 5\text{ mm}$, Fig 15 	BPV 10	0.78 ($\phi 1\text{ mm}$)	$\pm 17.5^\circ$	65(>38)	450	950	>60	1(<5) ²⁾	0.55 ³⁾	950/ 630...1050	2.5 ¹⁾	50	50

¹⁾ t_r, t_f ; ²⁾ $V_R = 20\text{ V}$; ³⁾ $\lambda = 950\text{ nm}$; ⁴⁾ No bond in photo sensitive area

Photo PIN Diodes with Filter matched for GaAlAs IREDs in Plastic Package

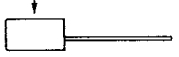

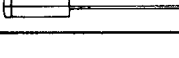
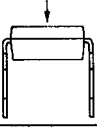
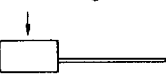
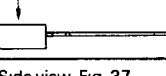
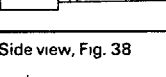
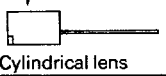
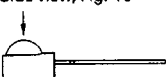
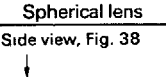
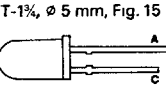
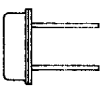
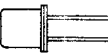
Package Dimensions see page 53	Type	Photo sensitive area mm ²	Characteristics										
			ϕ	I_{ra} and V_o $E_a=1 \text{ mW/cm}^2, \lambda=870 \text{ nm}$ $V_R=5 \text{ V}$ μA mV	$V_{(BR)}$ $I_R=$ $100 \mu\text{A}$ V	I_{ro} at V_R		$S(\lambda)$ $V_R=5 \text{ V}$ $\lambda=870 \text{ nm}$ A/W	$\lambda_p/\lambda_{0.5}$ nm	t_{on}/t_{off} at V_R and R_L $\lambda=820 \text{ nm}$ ns V Ω			
Top view, Fig. 35 	BPW 82	7.5	$\pm 65^\circ$	48 (>41)	350	>60	2 (<30)	10	0.6	920/ 750...1040	100	10	1000
Side view, Fig. 36 	BPW 83	7.5	$\pm 65^\circ$	50 (>41)	350	>60	2 (<30)	10	0.6	920/ 750...1040	100	10	1000
Side view, Fig. 37 	BPW 84	7.5	$\pm 65^\circ$	48 (>41)	350	>60	2 (<30)	10	0.6	920/ 750...1040	100	10	1000

Photo PIN Diodes with Filter matched for GaAs IREDs in Plastic Package

Package Dimensions see page 50-53	Type	Photo sensitive area mm ²	Characteristics										
			ϕ	I_{ra} and V_o $E_a=1 \text{ mW/cm}^2, \lambda=950 \text{ nm}$ $V_R=5 \text{ V}$ μA mV	$V_{(BR)}$ $I_R=$ $100 \mu\text{A}$ V	I_{ro} at V_R		$S(\lambda)$ $V_R=5 \text{ V}$ $\lambda=950 \text{ nm}$ A/W	$\lambda_p/\lambda_{0.5}$ nm	t_{on}/t_{off} at V_R and R_L $\lambda=820 \text{ nm}$ ns V Ω			
Top view, Fig. 42 	BP 104	7.5	$\pm 65^\circ$	45 (>40)	350	>60	2 (<30)	10	0.6	925/ 800...1000	100	10	1000
Side view, Fig. 35 	BPW 41 N	7.5	$\pm 65^\circ$	45 (>41)	350	>60	2 (<30)	10	0.6	950/ 820...1040	100	10	1000
Side view, Fig. 36 	S 186 P	7.5	$\pm 65^\circ$	45 (>41)	350	>60	2 (<30)	10	0.6	920/ 820...1040	100	10	1000
Side view, Fig. 37 	BPW 75	7.5	$\pm 65^\circ$	48 (>41)	350	>60	2 (<30)	10	0.6	950/ 820...1040	100	10	1000
Side view, Fig. 38 	BPV 20 F	7.5	$\pm 65^\circ$	60 (>40)	350	>60	2 (<30)	10	0.6	950/ 830...1050	100	10	1000
	BPV 21 F Cylindrical lens	5.7	$\pm 65^\circ$	38 (>27)	350	>60	2 (<30)	10	0.6	950/ 830...1050	70	10	1000
Side view, Fig. 40 	BPV 22 F	7.5	$\pm 60^\circ$	80 (>55)	350	>60	2 (<30)	10	0.6	950/ 830...1050	100	10	1000
	BPV 23 F Spherical lens	5.7	$\pm 60^\circ$	63 (>45)	350	>60	2 (<30)	10	0.6	950/ 830...1050	70	10	1000
Side view, Fig. 38 	S 288 P	0.78	$\pm 15^\circ$	50 (>30)	450	>60	2 (<30)	5	0.6	930/ 820...1040	2.5 ¹⁾	50	50
T-1%, $\varnothing 5 \text{ mm}$, Fig. 15 	BPV 10 F	0.78	$\pm 17.5^\circ$	60 (>30)	450	>60	1 (<5)	20	0.6	950/ 820...1040	2.5 ¹⁾	50	50

¹⁾ t_r, t_f

Photo PIN Diodes in Hermetically Sealed Package for Standard Applications

Package	Type	Photo sensitive area mm ²	φ	Characteristics										
				I_{ra} at V_R $E_0=1\text{ mW/cm}^2$ $\lambda=950\text{ nm}$		V_o $E_A=1\text{ klx}$	$V_{(BR)}$ $I_R=100\text{ }\mu\text{A}$	I_{ro} at V_R		$S(\lambda)$ $V_R=5\text{ V}$ $\lambda=870\text{ nm}$ A/W	$\lambda_p/\lambda_{0.5}$	t_{on}/t_{off} at V_R and R_L		
Dimensions see page 54				μA	V	mV	V	nA	V		nm	ns	V	Ω
≈ TO 56, Fig 52 	S 153 P	7.5	±50°	50 (>40)	5	350	>50	2 (<30)	10	0.6	900/ 530...1050	100	10	1000
TO 18, Fig 48 	BPW 24R	0.78	±12°	65 (>45)	20	350	>60	1 (<5)	50	0.6	900/ 550...1100	7 ¹⁾	20	50

¹⁾ t_r, t_f

Photo PIN Diodes in Hermetically Sealed Package for High Speed Applications


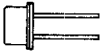
Package	Type	NA	Photo sensitive area mm ²	φ	Characteristics								
					I_{ra} $V_R=50\text{ V}$ $E_0=1\text{ mW/cm}^2$ $\lambda=870\text{ nm}$ μA	$V_{(BR)}$ $I_R=100\text{ }\mu\text{A}$ V	I_{ro} $V_R=50\text{ V}$ nA	$S(\lambda)$ $V_R=5\text{ V}$ $\lambda=870\text{ nm}$ A/W	λ_p nm	C_D $V_R=50\text{ V}$ $f=1\text{ MHz}$ pF	t_r, t_f at λ and f_g at $V_R=50\text{ V}, R_L=50\text{ }\Omega$ $\lambda=820\text{ nm}$ ns nm GHz		
TO 18, Fig 43  High precision flat window	BPW 48	0.45	0.78 ($\phi 1.0$)	±55°	4.5 (>4)	>60	1 (< 5)	0.6	930	3	2.5	850	0.2
	BPW 86	0.24	0.25 (0.5x0.5)	±55°	2.5 (>2)	>60	1 (< 5)	0.6	930	1.2	2.5	850	0.2
	BPW 87	0.24	0.25 (0.5x0.5)	±55°	1.3 (>1)	>60	1 (< 5)	0.5	810	2	0.6	850	1
	BPW 88	0.45	0.78 ($\phi 1.0$)	±55°	6.5 (>4)	>60	1 (< 5)	0.6	930	1.6	2.5	850	0.2
	BPW 89	0.45	0.78 ($\phi 1.0$)	±55°	4.5 (>3)	>60	1 (< 5)	0.5	810	4.5	0.6	850	1
	S 191 P	0.37	0.64 (0.8x0.8)	±55°	8.0 (>6)	>60	2 (<10)	0.6	900	2.5	2.5	820	1
TO 18, Fig. 44  High precision flat window	S 203 P	0.1	0.03 ($\phi 0.2$)	±55°	0.25 (>0.15)	>110	1 (< 5)	0.29	750	1.8	0.4	810	1
	S 213 P	0.15	0.07 ($\phi 0.3$)	±55°	0.4 (>0.3)	>110	1 (< 5)	0.3	750	1.8	0.4	810	1

Photo PIN Diodes in Hermetically Sealed Package for High Speed Applications
(Anode and Cathode Insulated from Case)


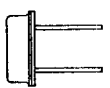
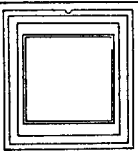
Package	Type	NA	Photo sensitive area mm ²	φ	Characteristics									
					I_{ra} $V_R=50\text{ V}$ $E_0=1\text{ mW/cm}^2$ $\lambda=870\text{ nm}$ μA	$V_{(BR)}$ $I_R=100\text{ }\mu\text{A}$ V	I_{ro} $V_R=50\text{ V}$ nA	$S(\lambda)$ $V_R=5\text{ V}$ $\lambda=870\text{ nm}$ A/W	λ_p nm	C_D at V_R $f=1\text{ MHz}$ pF	V	t_r, t_f at λ and f_g at $V_R=50\text{ V}, R_L=50\text{ }\Omega$ 820 nm ns nm GHz		
TO 18, Fig. 54  High precision flat window	BPW 97	0.24	0.25 (0.5x0.5)	±55°	1.3 (>1)	>60	1 (< 5)	0.5	810	2	50	0.6	850	1
	BPW 98	0.45	0.78 ($\phi 1\text{ mm}$)	±55°	4.5 (>4)	>60	1 (< 5)	0.6	930	4.5	12	2.5	850	0.2

Photo Diodes for Special Applications

Package	Type	Photo sensitive area mm ²	Characteristics									
			ϕ	V_o and I_k and I_{ra} at $E_A=1 \text{ klx}$ mV $R_L < 100 \Omega$ μA $V_R=5 \text{ V}$ μA	V_{BR} $I_R=100 \mu\text{A}$ V	I_{ro} at V_R nA	V	C_1 at V_R $f=1 \text{ MHz}$ pF	V	t_r/t_f $I_{ph}=100 \mu\text{A}$ $R_L=1 \text{ k}\Omega$ μs		
Dimensions see page 54/55 ≈ TO 39, Fig 52 	BPW 20 R	7.5	$\pm 50^\circ$	500 (>330)	61 (>20)	61 (>20)	>10	2 (<30)	5	400	5	3.5
	BPW 21 R with $V(\lambda)$ -filter	7.5	$\pm 50^\circ$	450 (>280)	9 (>4.5)	9 (>4.5)	>10	2 (<30)	5	400	5	3.5
 Ceramic package, Fig 65	S 284 P	100	$\pm 60^\circ$	390	800	800	30	3 (<100)	10	280	5	2.3

Avalanche Photo Diodes

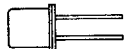
Package	Type	Photo sensitive area mm ²	Characteristics						
			ϕ	P_V mW	$V_{(BR)}$ V	η $\lambda=910 \text{ nm}$ %	G_B GHz	I_{ro} $M=100$ nA	C_D $V_R=100 \text{ V}, f=1 \text{ MHz}$ pF
Dimensions see page 54 TO 18, Fig 47 	BPW 28	$\phi 0.2$	$\pm 35^\circ$	100	140...200	>20	>200	1 (<5)	1 (<1.2)

Photo Quadrant Detector

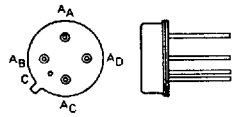
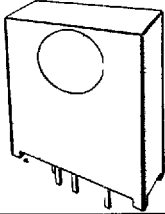
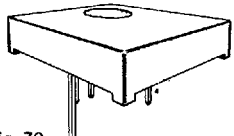
Package	Type	Photo sensitive area mm ²	Gap size μm	Characteristics					
				I_{ra} per quadrant $V_R=12 \text{ V}, E_o=1 \text{ mW/cm}^2$ $\lambda=870 \text{ nm}$ μA	I_{ro} nA	$s(\lambda)$ $V_R=12 \text{ V}$ $\lambda=850 \text{ nm}$ A/W	λ_p nm	C_1 $V_R=12 \text{ V}$ 1 MHz pF	t_r/t_f $V_R=12 \text{ V}$ $R_L=1 \text{ k}\Omega$ $\lambda=830 \text{ nm}$ ns
Dimensions see page 55 Fig. 59 	S 239 P	4x2.25	10	15 (>10)	1 (<25)	0.50	880	16	150

Photo Modules for Remote Control Systems

Package	Type	Photo sensitive area mm ²	Characteristics				Features:
			ϕ	λ nm	V_S V	E_{smin} mW/m ²	
Dimensions see page 57 Fig. 78 	TFMS 4...0	7.5	$\pm 70^\circ$	950	5	0.5	<ul style="list-style-type: none"> ● Photo detector and preamplifier in one package ● Package designed as IR filter and shield ● Internal filter for carrier frequency ● Available for following carrier frequencies: 30, 36, 38, 40 and 56 kHz (see "Designation Systems") ● Integrating output
Fig. 79 	TFMT 4...0						