TELEFUNKEN electronic
Creative Technologies

BPW 40

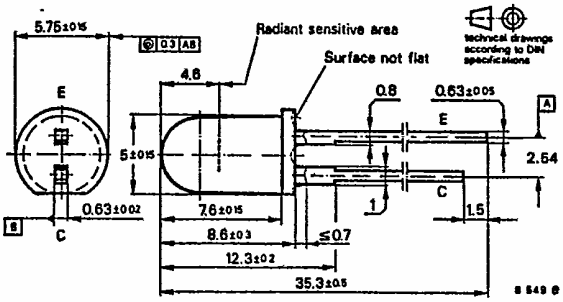
Silicon NPN Epitaxial Planar Phototransistor

Applications: Detector in electronic control and drive circuits

Features:

- Plastic case ø 5 mm (T-1¾)
- Suitable for visible and near infrared radiation
- High sensitivity
- Wide angle of half sensitivity
- Axial terminals

Dimensions in mm



Angle of half sensitivity
$\pm\varphi = 20°$
Special case
Clear plastic
Weight max. 0.4 g

Accessories

Mounting clip Order No. 562136
Retainer ring Order No. 562135

Absolute maximum ratings

Collector-emitter voltage	V_{CEO}	32	V
Emitter-collector voltage	V_{ECO}	5	V
Collector current	I_C	100	mA
Peak collector current $\frac{t_p}{T} = 0.5,\ t_p \leq 10ms$	I_{CM}	200	mA
Total power dissipation $T_{amb} \leq 47$ °C	P_{tot}	150	mW
Junction temperature	T_j	100	°C
Storage temperature range	T_{stg}	−25...+100	°C
Soldering temperature $t \leq 3$ s	T_{sd} [1]	245	°C

[1] Distance from the touching border ≧ 1.5 mm with intermediate PC-board

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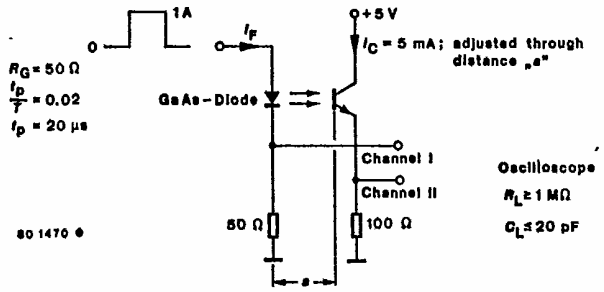
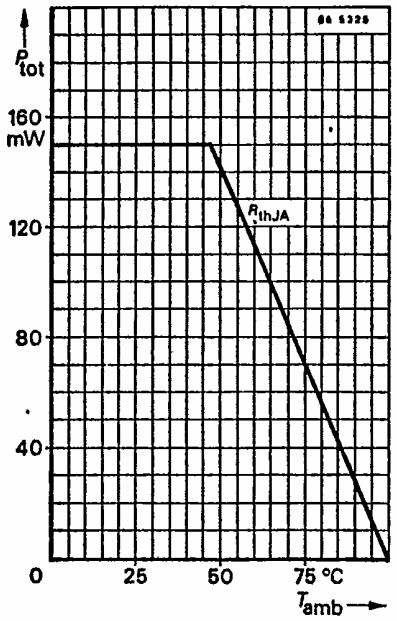
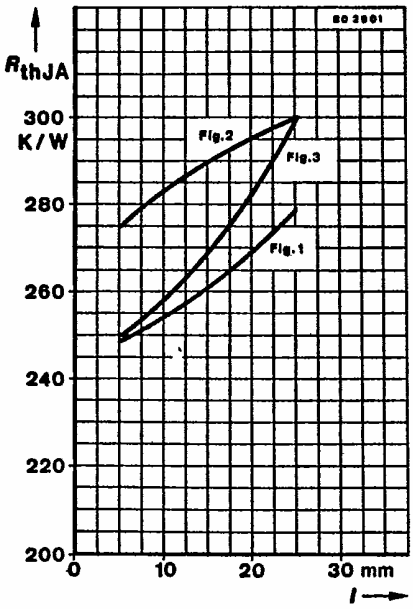
		Min.	Typ.	Max.	
Thermal resistance					
Junction ambient	R_{thJA}			350	K/W
Optical and electrical characteristics					
$T_{amb} = 25$ °C					
Collector dark current					
$V_{CE} = 20$ V, $E = 0$	I_{CEO} *)		10	200	nA
Collector light current					
$V_{CE} = 5$ V, $E_A = 1$ klx	I_{ca}		6		mA
$V_{CE} = 5$ V, $E_e = 1$ mW/cm², $\lambda_p = 950$ nm	I_{ca} *)	1	2		mA
Peak wavelength sensitivity	λ_p		780		nm
Range of spectral bandwidth (50%)	$\lambda_{0.5}$		520...950		nm
Collector-emitter breakdown voltage					
$I_C = 1$ mA	$V_{(BR)CEO}$ *)	32			V
Collector-Emitter saturation voltage					
$I_C = 1$ mA, $E_e = 1$ mW/cm², $\lambda_p = 950$ nm	V_{CEsat} *)			0.3	V
Cut-off frequency					
$V_S = 5$ V, $I_C = 5$ mA, $R_L = 100\ \Omega$	f_c		170		kHz
Switching characteristics					
$V_S = 5$ V, $I_C = 5$ mA, $R_L = 100\ \Omega$, see test circuit					
Delay time	t_d		1.8		µs
Rise time	t_r		1.6		µs
Turn-on time	t_{on}		3.4		µs
Storage time	t_s		0.3		µs
Fall time	t_f		1.7		µs
Turn-off time	t_{off}		2.0		µs

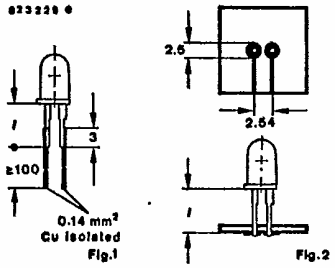


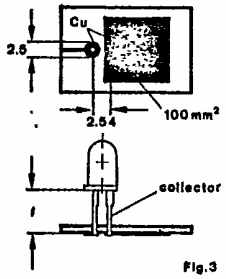
Test circuit

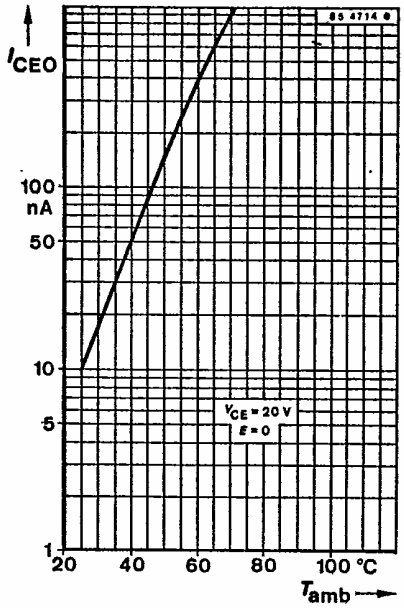
*) AQL = 0.65 % ¹) Standard illuminant A (DIN 5033/IEC 306-1)


P_{tot}
160 mW
120
80
40
0
25
50
75 °C
T_{amb}
R_{thJA}


R_{thJA}
300 K/W
280
260
240
220
200
0
10
20
30 mm
l
Fig.2
Fig.3
Fig.1


2.5
2.54
3
≥100
0.14 mm²
Cu isolated
Fig.1
Fig.2


Cu
2.5
2.54
100 mm²
collector
Fig.3


I_{CEO}
100 nA
50
10
5
1
20
40
60
80
100 °C
T_{amb}
V_{CE} = 20 V
E = 0

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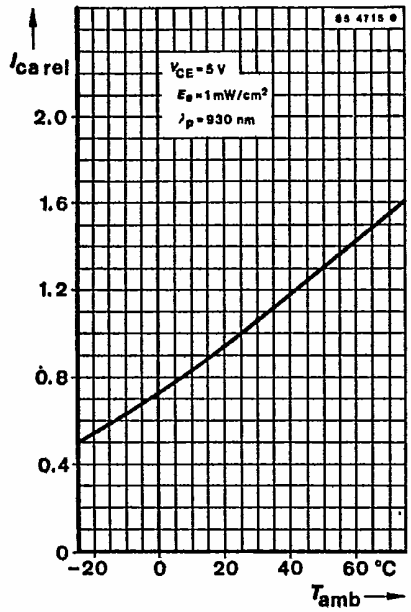
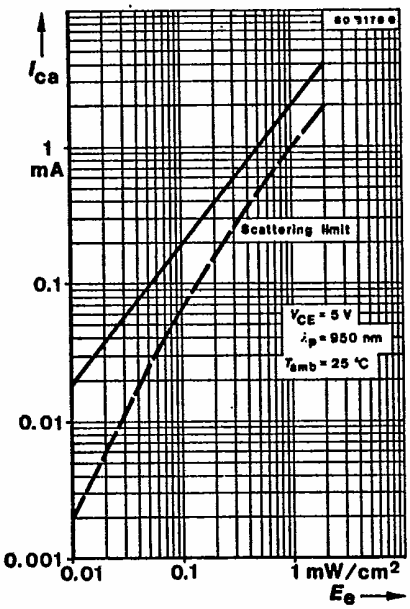
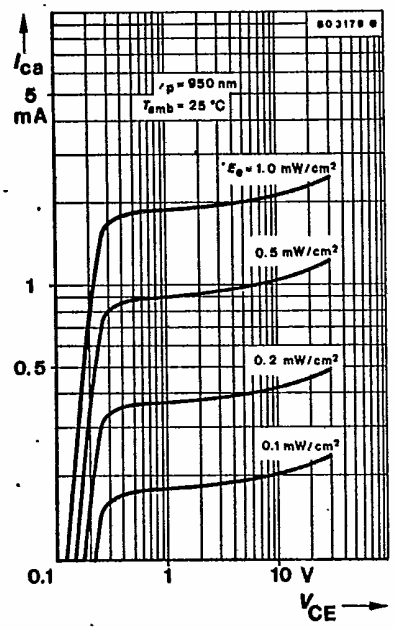
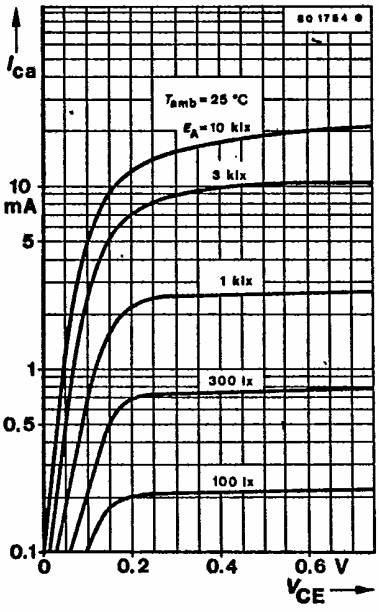
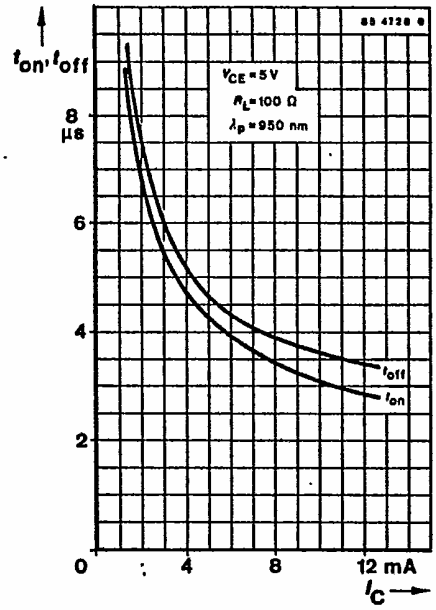
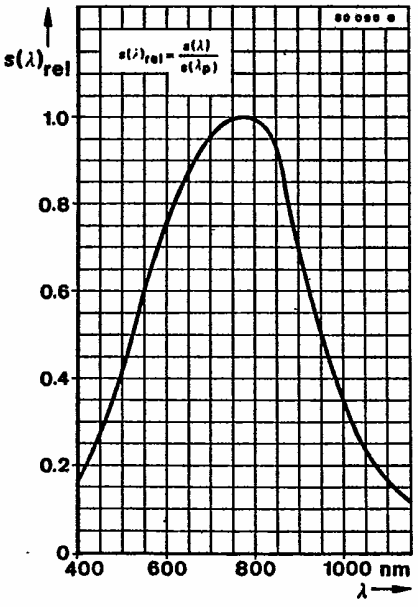

$I_{ca\,rel}$
V_{CE} = 5 V
E_e = 1 mW/cm²
λ_p = 930 nm
2.0
1.6
1.2
0.8
0.4
0
−20
0
20
40
60 °C
T_{amb}

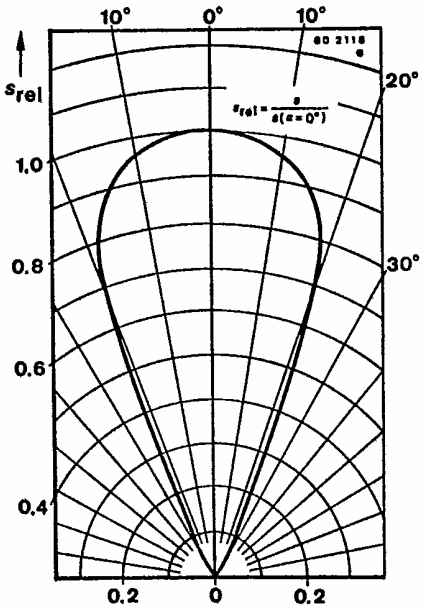

I_{ca}
1 mA
0.1
0.01
0.001
Scattering limit
V_{CE} = 5 V
λ_p = 950 nm
T_{amb} = 25 °C
0.01
0.1
1 mW/cm²
E_e


I_{ca}
5 mA
λ_p = 950 nm
T_{amb} = 25 °C
E_e = 1.0 mW/cm²
0.5 mW/cm²
0.2 mW/cm²
0.1 mW/cm²
1
0.5
0.1
1
10 V
V_{CE}


I_{ca}
T_{amb} = 25 °C
E_A = 10 klx
3 klx
1 klx
300 lx
100 lx
10 mA
5
1
0.5
0.1
0
0.2
0.4
0.6 V
V_{CE}


t_{on}, t_{off}
8 µs
6
4
2
0
4
8
12 mA
I_C
V_{CE} = 5 V
R_L = 100 Ω
λ_p = 950 nm
t_{off}
t_{on}


$s(\lambda)_{rel}$
1.0
0.8
0.6
0.4
0.2
0
400
600
800
1000 nm
λ


S_{rel}
10°
0°
10°
20°
30°
1.0
0.8
0.6
0.4
0.2
0
0.2