Semiconductors

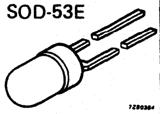
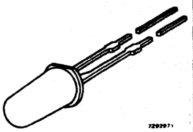
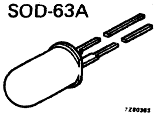
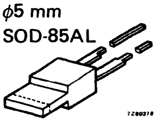
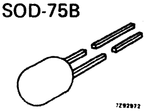
Book S8a 1988

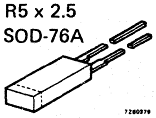
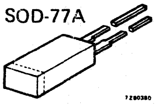
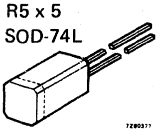
Light emitting diodes

LIGHT EMITTING DIODES

SELECTION GUIDE

LEDs (visible light) grouped according to shape and encapsulation.

shape /case	type	L	crystal	colour	λ nm	θ ½	V_F (V)	I_{Fmax} mA	plastic
ϕ3 mm	PLED-H313A		GaAlAs	HYPERRED	650	60	1.75	100	CLEAR/RED
SOD-53E	PLED-G313A		GaP:N	SUPERGREEN	565	60	2.10	60	CLEAR/GREEN
	PLED-Y313A		GaP:As	YELLOW	590	60	2.10	30	CLEAR/YELLOW
	PLED-H314A		GaAlAs	HYPERRED	650	100	1.75	100	DIFF/RED
	PLED-G314A		GaP:N	SUPERGREEN	565	70	2.10	60	DIFF/GREEN
	PLED-Y314A		GaP:As	YELLOW	590	70	2.10	30	DIFF/YELLOW
ϕ3 mm	PLED-O313N		GaAsP	ORANGE	630	40	2.20	30	CLEAR/RED
SOD-82C	PLED-G313N		GaP:N	SUPERGREEN	565	25	2.20	30	CLEAR/GREEN
	PLED-P313N		GaP:Zn	ULTRARED	700	60	2.20	30	CLEAR/RED
	PLED-Y313N		GaP:As	YELLOW	590	25	2.20	30	CLEAR/YELLOW
	PLED-O314N		GaAsP	ORANGE	630	70	2.20	30	DIFF/RED
	PLED-G314N	*	GaP:N	SUPERGREEN	565	60	2.20	30	DIFF/GREEN
	PLED-P314N	*	GaP:Zn	ULTRARED	700	70	2.20	30	DIFF/RED
	PLED-Y314N	*	GaP:As	YELLOW	590	60	2.20	30	DIFF/YELLOW
ϕ5 mm	PLED-T512B		GaAlAs	HYPERRED	650	70	1.75	100	DIFF/TRANSP.
SOD-63A			/GaP:N	SUPERGREEN	565	70	2.10	60	DIFF/TRANSP.
	PLED-H514B	*	GaAlAs	HYPERRED	650	100	1.75	100	DIFF/RED
	PLED-G514B	*	GaP:N	SUPERGREEN	565	70	2.10	60	DIFF/GREEN
	PLED-Y514B	*	GaP:As	YELLOW	590	70	2.10	30	DIFF/YELLOW
ϕ5 mm	PLED-H511C	*	GaAlAs	HYPERRED	650	20	2.10	60	CLEAR/TRANSP.
SOD-63D	PLED-G511C	*	GaP:N	SUPERGREEN	565	20	2.10	60	CLEAR/TRANSP.
	PLED-Y511C	*	GaP:As	YELLOW	590	20	2.10	30	CLEAR/TRANSP.
	PLED-G513C	*	GaP:N	SUPERGREEN	565	20	2.10	60	CLEAR/GREEN
	PLED-Y513C	*	GaP:As	YELLOW	590	20	2.10	30	CLEAR/YELLOW
ϕ5 mm	PLED-H544KL		GaAlAs	HYPERRED	650	70	1.75	100	DIFF/RED
SOD-85AL	PLED-G544KL		GaP:N	SUPERGREEN	565	70	2.10	60	DIFF/GREEN
	PLED-Y544KL		GaP:As	YELLOW	590	70	2.10	30	DIFF/YELLOW
SOD-85BL	PLED-H544LL		GaAlAs	HYPERRED	650	70	1.75	100	DIFF/RED
	PLED-G544LL		GaP:N	SUPERGREEN	565	70	2.10	60	DIFF/GREEN
	PLED-Y544LL		GaP:As	YELLOW	590	70	2.10	30	DIFF/YELLOW
ϕ5 mm	PLED-O513M	*	GaAsP	ORANGE	630	30	2.20	30	CLEAR/RED
SOD-90C	PLED-G513M	*	GaP:N	SUPERGREEN	565	35	2.20	30	CLEAR/GREEN
	PLED-P513M	*	GaP:Zn	ULTRARED	700	30	2.20	30	CLEAR/RED
	PLED-Y513M	*	GaP:As	YELLOW	590	35	2.20	30	CLEAR/YELLOW
	PLED-O514M	*	GaAsP	ORANGE	630	40	2.20	30	DIFF/RED
	PLED-G514M	*	GaP:N	SUPERGREEN	565	50	2.20	30	DIFF/GREEN
	PLED-P514M	*	GaP:Zn	ULTRARED	700	40	2.20	30	DIFF/RED
	PLED-Y514M	*	GaP:As	YELLOW	590	40	2.20	30	DIFF/YELLOW
R5 x 1	PLED-TR12E		GaAlAs	HYPERRED	650	100	1.75	100	DIFF/TRANSP.
SOD-75B			/GaP:N	SUPERGREEN	565	100	2.10	60	DIFF/TRANSP.
	PLED-HR14E	*	GaAlAs	HYPERRED	650	100	1.75	100	DIFF/RED
	PLED-GR14E	*	GaP:N	SUPERGREEN	565	100	2.10	60	DIFF/GREEN
	PLED-YR14E	*	GaP:As	YELLOW	590	100	2.10	30	DIFF/YELLOW

shape /case	type	L	crystal	colour	λ nm	θ ½	V_F (V)	I_{Fmax} mA	plastic
R5 x 2.5	PLED-TR12F		GaAIAS	HYPERED	650	100	1.75	100	DIFF/TRANSP.
SOD-76A			/GaP:N	SUPERGREEN	565	100	2.10	60	DIFF/TRANSP.
	PLED-HR14F	*	GaAlAs	HYPERRED	650	100	1.75	100	DIFF/RED
	PLED-GR14F	*	GaO:N	SUPERGREEN	565	100	2.10	60	DIFF/GREEN
	PLED-YR14F	*	GaP:As	YELLOW	590	100	2.10	30	DIFF/YELLOW
R5 x 3	PLED-TR12G		GaAlAs	HYPERRED	650	100	1.75	100	DIFF/TRANSP.
SOD-77A			/GaP:N	SUPERGREEN	565	100	2.10	60	DIFF/TRANSP.
	PLED-HR14G	*	GaAlAs	HYPERRED	650	100	1.75	100	DIFF/RED
	PLED-GR14G	*	GaP:N	SUPERGREEN	565	100	2.10	60	DIFF/GREEN
	PLED-YR14G	*	GaP:As	YELLOW	590	100	2.10	30	DIFF/YELLOW
R5 x 5	PLED-TR42DL		GaAlAs	HYPERRED	650	100	1.75	100	DIFF/TRANSP.
SOD-74L			/GaP:N	SUPERGREEN	565	100	2.10	60	DIFF/TRANSP.
	PLED-HR44DL		GaAlAs	HYPERRED	650	100	1.75	100	DIFF/RED
	PLED-GR44DL		GaP:N	SUPERGREEN	565	100	2.10	60	DIFF/GREEN
	PLED-YR44DL		GaP:As	YELLOW	590	100	2.10	30	DIFF/YELLOW

* Product available in long lead form.

Infrared LEDs and photo-sensitive devices.

package	type	λ_p typ. (nm)	I_F max. (mA)	I_{FRM} max. (mA)	V_R max. (V)	ϕ_e and typ. mW	I_e at (mW/sr)	I_F (mA)	$\phi½$ typ. (°)	t_r typ. (ns)	crystal
Round, 3 mm diameter											
SOD-53F	CQW58A-1 CQW58A-2	830	60	1000	5	1	1 to 5 >3	20	15	30	GaAlAs
SOD-53F	CQY58A CQY58A-1 CQY58A-2	930	50	200	5	1	>2 1 to 5 >3	20	20	3000	GaAs
Round, 5 mm diameter											
SOD-63D2	CQW89A CQW89A-1 CQW89A-2	830	130	2500	5	8	>9 >12 >15	100	24	30	GaAlAs
SOD-94	CQW89B	830	130	2500	5	8	>20	100	12	30	GaAlAs
SOD-63B2	CQY89A CQY89A-1 CQY89A-2	930	130	1000	5	10	>9 >12 >15	100	40	1000	GaAs
Rectangular with round end											
SOD-93	CQY89F CQY89F-1 CQF89F-2	930	120	1000	5	10	>9 >12 >15	100	30	1000	GaAs

(1) Pulse width = ⩽10 μs; δ = 0.01
(2) Pulse width = ⩽50 μs; δ = 0.05
(3) Beam width = 30° in the plane of the leads and 25° perpendicular to that plane.

package	type	λ_p* typ. (nm)	V_R max. (V)	I_L at: max. (μA)	V_R (V)	E_e and (mW/cm²)	λ (nm)	I_R at max. (nA)	V_R (V)	A (mm²)	crystal
SOD-67	BPW50	930	32	45	5	1	930	30	10	5	Si

package	type	λ_p* typ. (nm)	V_{CEO} max. (V)	I_C max. (mA)	I_L at: (mA)	V_{CE} (V)	E_e and (mW/cm²)	λ (nm)	I_{CEO} at max. (μA)	V_{CE} (V)	crystal
SOD-53F	BPW22A-1 BPW22A-2	800	50	25	1,5 to 8 5 to 25	5	1	930	0,1	30	Si

* Wavelength at which maximum sensitivity occurs.

TYPE NUMBER SURVEY

TYPE NUMBER SURVEY

In this alphanumeric list we present all light emitting diodes mentioned in this handbook.

type		page
BPW22A	Photosensitive transistor, SOD-53F	41
BPW50	Photosensitive PIN diode for remote control, SOD-67	47
CQW58A	LED, IR, for optical coupling and encoding, ϕ 5 mm, SOD-53F	53
CQW89A	LED, IR, for remote control, ϕ 5 mm, SOD-63D2	59
CQW89B	LED, IR, for remote control, ϕ 5 mm, SOD-94	65
CQY58A	LED, IR, for optical coupling and encoding, ϕ 3 mm, SOD-53F	71
CQY89A	LED, IR, for remote control, ϕ 5 mm, SOD-63B2	77
CQY89F	LED, IR, for remote control, FO-147A2	83
PLED-G313A	LED, supergreen, ϕ 3 mm, SOD-53E	89
PLED-G313N	LED, supergreen, ϕ 3 mm, SOD-82C	95
PLED-G314A	LED, supergreen, ϕ 3 mm, SOD-53E	101
PLED-G314N	LED, supergreen, ϕ 3 mm, SOD-82C	107
PLED-G511C	LED, supergreen, ϕ 5 mm, SOD-63C	113
PLED-G513C	LED, supergreen, ϕ 5 mm, SOD-63D	119
PLED-G513M	LED, supergreen, ϕ 5 mm, SOD-90C	125
PLED-G514B	LED, supergreen, ϕ 5 mm, SOD-63A	131
PLED-G514M	LED, supergreen, ϕ 5 mm, SOD-90C	137
PLED-G544KL	LED, supergreen, ϕ 5 mm, SOD-85AL	143
PLED-GR14E	LED, supergreen, 5 x 1 mm, SOD-75B	149
PLED-GR14F	LED, supergreen, 5 x 2,5 mm, SOD-76A	155
PLED-GR14G	LED, supergreen, 5 x 3 mm, SOD-77A	161
PLED-GR44DL	LED, supergreen, 5 x 5 mm, SOD-74L	167
PLED-H313A	LED, hyper-red, ϕ 3 mm, SOD-53E	173
PLED-H314A	LED, hyper-red, ϕ 3 mm, SOD-53E	177
PLED-H511C	LED, hyper-red, ϕ 5 mm, SOD-63D	183
PLED-H514B	LED, hyper-red, ϕ 5 mm, SOD-63A	189
PLED-H544KL	LED, hyper-red, ϕ 5 mm, SOD-85AL	195
PLED-H544LL	LED, hyper-red, ϕ 5 mm, SOD-85BL	201
PLED-HR14E	LED, hyper-red, 5 x 1 mm, SOD-75B	207
PLED-HR14F	LED, hyper-red, 5 x 2.5 mm, SOD-76A	213
PLED-HR14G	LED, hyper-red, 5 x 3 mm, SOD-77A	219
PLED-HR44DL	LED, hyper-red, 5 x 5 mm, SOD-74L	225
PLED-O313N	LED, orange, ϕ 3 mm, SOD-82C	231
PLED-O314N	LED, orange, ϕ 3 mm, SOD-82C	237
PLED-O513M	LED, orange, ϕ 5 mm, SOD-90C	243
PLED-O514M	LED, orange, ϕ 5 mm, SOD-90C	249
PLED-P313N	LED, ultra-red, ϕ 3 mm, SOD-82C	255
PLED-P314N	LED, ultra-red, ϕ 3 mm, SOD-82C	261
PLED-P513M	LED, ultra-red, ϕ 5 mm, SOD-90C	267
PLED-P514M	LED, ultra-red, ϕ 5 mm, SOD-90C	273
PLED-T512B	LED, bi-colour, hyper-red or supergreen, ϕ 5 mm, SOD-63A	279
PLED-TR12E	LED, bi-colour, hyper-red or supergreen, 5 x 1 mm, SOD-75B	285
PLED-TR12F	LED, bi-colour, hyper-red or supergreen, 5 x 2.5 mm, SOD-76A	291

GENERAL

Safety recommendations
Rating system
Letter symbols
Definitions
Dimensioning
Driving GaAlAs LEDs
Tape packaging of LEDs
Soldering and mounting recommendations

GENERAL SAFETY RECOMMENDATIONS
OPTOELECTRONIC DEVICES

1. GENERAL

When properly used and handled, optoelectronic devices do not constitute a risk to health or environment. Modern high technology materials have been used in the manufacture of these devices to ensure optimum performance. Some of these materials are toxic in certain circumstances. Mechanical or electrical damage is unlikely to give rise to any hazard, but toxic vapours may be generated if the devices are heated to destruction and it is important that the following recommendations are observed.

Care should be taken to ensure that all personnel who may handle, use or dispose of these products are aware of the necessary precautions.

Individual product data sheets will indicate whether any specific hazards are likely to be present.

2. DISPOSAL

These devices should be disposed of in accordance with the relevant legislation; in the United Kingdom disposal should therefore be carried out in accordance with the Deposit of Poisonous Waste Act 1972 and the Control of Pollution Act 1974, or with the latest legislation.

3. FIRE

Optoelectronic devices themselves, when used within the specified limits, do not present a fire hazard.

Devices can contain arsenic, beryllium, cadmium, lead, mercury, selenium, tellurium or similar hazardous materials or compounds, which, if exposed to high temperatures may emit toxic or noxious fumes.

Most packaging materials are flammable and care should be taken in the disposal of such materials, some of which will emit toxic fumes if burned.

4. HANDLING

Care must be exercised with those devices incorporating glass which may have sharp edges. In addition, if these devices are broken, precautions must be taken against the following hazards that may arise:—

Broken glass or ceramic. Protective clothing such as gloves should be worn.

Contamination from toxic materials and vapours. In particular, skin contact and inhalation must be avoided.

Access to live contacts which may be at high potential. Devices must be isolated from the mains supply prior to their removal.

5. BERYLLIUM COMPOUNDS

Beryllium oxide dust is toxic if inhaled or if particles enter a cut or abrasion. At all times avoid handling beryllium oxide ceramics; if they are touched, the hands must be washed thoroughly with soap and water. Do nothing to beryllium oxide ceramics that may produce dust or fumes.

5. BERYLLIUM COMPOUNDS (continued)

Care should be taken upon eventual disposal that they are not thrown out with general industrial waste. Users seeking disposal of devices incorporating beryllium oxide ceramics should first take advice from the manufacturer's service department.
This potential hazard is present at all times from receipt to disposal of devices.

6. CADMIUM COMPOUNDS

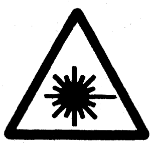
Cadmium compounds are toxic. In the event of accidental breakage, cadmium dust may be released. Gloves should be worn and the dust should be mopped up with a damp cloth. Upon disposal, the cloth should be sealed in a plastic bag and the hands washed thoroughly with soap and water.
Controlled disposal of devices containing cadmium compounds should be conducted in the open air or in a well ventilated area.
Inhalation of cadmium dust must be avoided.
This potential hazard is present, if breakage occurs, at all times from receipt to disposal of devices.

7. OTHER COMPOUNDS

Other compounds, such as those containing arsenic, indium, lead, lithium, selenium, tantalum, tellurium etc., may be toxic by ingestion or inhalation.

8. LASER HAZARDS

Laser devices emit radiation which is invisible to the human eye. When in use, do not look directly into the device. Direct viewing of laser emission at close range may cause eye damage, especially in conjunction with collimating lenses.
Safety in the use of laser devices is described in British Standard 4803: 1983, 'Radiation Safety of Laser Products and Systems'. Users of laser devices must observe the procedures and requirements defined in this standard.
The published data for each device, together with the primary packaging, carry the British Standard approved warning symbol, shown below.



> The above information and recommendations are given in good faith and are in accordance with the best knowledge and opinion available at the date of the compilation of the data sheets.

RATING SYSTEMS

The rating systems described are those recommended by the International Electrotechnical Commission (IEC) in its Publication 134.

DEFINITIONS OF TERMS USED

Electronic device. An electronic tube or valve, transistor or other semiconductor device.

Note
This definition excludes inductors, capacitors, resistors and similar components.

Characteristic. A characteristic is an inherent and measurable property of a device. Such a property may be electrical, mechanical, thermal, hydraulic, electro-magnetic, or nuclear, and can be expressed as a value for stated or recognized conditions. A characteristic may also be a set of related values, usually shown in graphical form.

Bogey electronic device. An electronic device whose characteristics have the published nominal values for the type. A bogey electronic device for any particular application can be obtained by considering only those characteristics which are directly related to the application.

Rating. A value which establishes either a limiting capability or a limiting condition for an electronic device. It is determined for specified values of environment and operation, and may be stated in any suitable terms.

Note
Limiting conditions may be either maxima or minima.

Rating system. The set of principles upon which ratings are established and which determine their interpretation.

Note
The rating system indicates the division of responsibility between the device manufacturer and the circuit designer, with the object of ensuring that the working conditions do not exceed the ratings.

ABSOLUTE MAXIMUM RATING SYSTEM

Absolute maximum ratings are limiting values of operating and environmental conditions applicable to any electronic device of a specified type as defined by its published data, which should not be exceeded under the worst probable conditions.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device, taking no responsibility for equipment variations, environmental variations, and the effects of changes in operating conditions due to variations in the characteristics of the device under consideration and of all other electronic devices in the equipment.

The equipment manufacturer should design so that, initially and throughout life, no absolute maximum value for the intended service is exceeded with any device under the worst probable operating conditions with respect to supply voltage variation, equipment component variation, equipment control adjustment, load variations, signal variation, environmental conditions, and variations in characteristics of the device under consideration and of all other electronic devices in the equipment.

DESIGN MAXIMUM RATING SYSTEM

Design maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electronic device of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device, taking responsibility for the effects of changes in operating conditions due to variations in the characteristics of the electronic device under consideration.

The equipment manufacturer should design so that, initially and throughout life, no design maximum value for the intended service is exceeded with a bogey device under the worst probable operating conditions with respect to supply voltage variation, equipment component variation, variation in characteristics of all other devices in the equipment, equipment control adjustment, load variation, signal variation and environmental conditions.

DESIGN CENTRE RATING SYSTEM

Design centre ratings are limiting values of operating and environmental conditions applicable to a bogey electronic device of a specified type as defined by its published data, and should not be exceeded under normal conditions.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device in average applications, taking responsibility for normal changes in operating conditions due to rated supply voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all electronic devices.

The equipment manufacturer should design so that, initially, no design centre value for the intended service is exceeded with a bogey electronic device in equipment operating at the stated normal supply voltage.

LETTER SYMBOLS FOR TRANSISTORS AND SIGNAL DIODES

based on IEC Publication 148

LETTER SYMBOLS FOR CURRENTS, VOLTAGES AND POWERS

Basic letters

The basic letters to be used are:

I, i = current
V, v = voltage
P, p = power.

Lower-case basic letters shall be used for the representation of instantaneous values which vary with time.
In all other instances upper-case basic letters shall be used.

Subscripts

A, a	Anode terminal
(AV), (av)	Average value
B, b	Base terminal, for MOS devices: Substrate
(BR)	Breakdown
C, c	Collector terminal
D, d	Drain terminal
E, e	Emitter terminal
F, f	Forward
G, g	Gate terminal
K, k	Cathode terminal
M, m	Peak value
O, o	As third subscript: The terminal not mentioned is open circuited
R, r	As first subscript: Reverse. As second subscript: Repetitive. As third subscript: With a specified resistance between the terminal not mentioned and the reference terminal.
(RMS), (rms)	R.M.S. value
S, s	As first or second subscript: Source terminal (for FETS only) As second subscript: Non-repetitive (not for FETS) As third subscript: Short circuit between the terminal not mentioned and the reference terminal
X, x	Specified circuit
Z, z	Replaces R to indicate the actual working voltage, current or power of voltage reference and voltage regulator diodes.

Note: No additional subscript is used for d.c. values.

Upper-case subscripts shall be used for the indication of:

a) continuous (d.c.) values (without signal)

Example I_B

b) instantaneous total values

Example i_B

c) average total values

Example $I_{B(AV)}$

d) peak total values

Example I_{BM}

e) root-mean-square total values

Example $I_{B(RMS)}$

Lower-case subscripts shall be used for the indication of values applying to the varying component alone:

a) instantaneous values

Example i_b

b) root-mean-square values

Example $I_{b(rms)}$

c) peak values

Example I_{bm}

d) average values

Example $I_{b(av)}$

Note: If more than one subscript is used, subscript for which both styles exist shall either be all upper-case or all lower-case.

Additional rules for subscripts

Subscripts for currents

Transistors: If it is necessary to indicate the terminal carrying the current, this should be done by the first subscript (conventional current flow from the external circuit into the terminal is positive).

Examples: I_B, i_B, i_b, I_{bm}

Diodes: To indicate a forward current (conventional current flow into the anode terminal) the subscript F or f should be used; for a reverse current (conventional current flow out of the anode terminal) the subscript R or r should be used.

Examples: I_F, I_R, i_F, $I_{f(rms)}$

Subscripts for voltages

Transistors: If it is necessary to indicate the points between which a voltage is measured, this should be done by the first two subscripts. The first subscript indicates the terminal at which the voltage is measured and the second the reference terminal or the circuit node. Where there is no possibility of confusion, the second subscript may be omitted.

Examples: V_{BE}, v_{BE}, v_{be}, V_{bem}

Diodes: To indicate a forward voltage (anode positive with respect to cathode), the subscript F or f should be used; for a reverse voltage (anode negative with respect to cathode) the subscript R or r should be used.

Examples: V_F, V_R, v_F, V_{rm}

Subscripts for supply voltages or supply currents

Supply voltages or supply currents shall be indicated by repeating the appropriate terminal subscript.

Examples: V_{CC}, I_{EE}

Note: If it is necessary to indicate a reference terminal, this should be done by a third subscript

Example : V_{CCE}

Subscripts for devices having more than one terminal of the same kind

If a device has more than one terminal of the same kind, the subscript is formed by the appropriate letter for the terminal followed by a number; in the case of multiple subscripts, hyphens may be necessary to avoid misunderstanding.

Examples: I_{B2} = continuous (d.c.) current flowing into the second base terminal

V_{B2-E} = continuous (d.c.) voltage between the terminals of second base and emitter

Subscripts for multiple devices

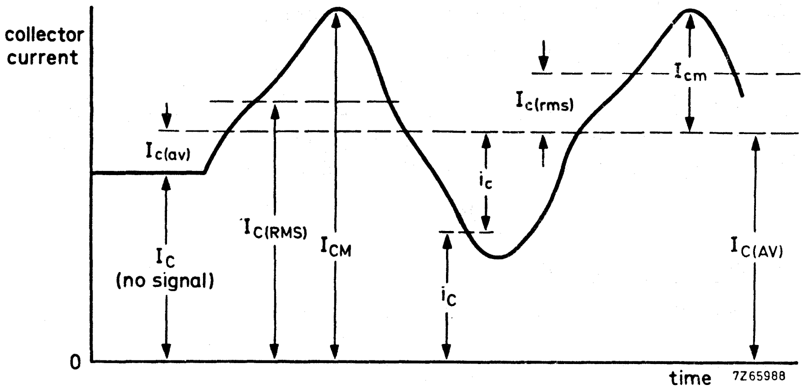
For multiple unit devices, the subscripts are modified by a number preceding the letter subscript; in the case of multiple subscripts, hyphens may be necessary to avoid misunderstanding.

Examples: I_{2C} = continuous (d.c.) current flowing into the collector terminal of the second unit

V_{1C-2C} = continuous (d.c.) voltage between the collector terminals of the first and the second unit.

Application of the rules

The figure below represents a transistor collector current as a function of time. It consists of a continuous (d.c.) current and a varying component.



LETTER SYMBOLS FOR ELECTRICAL PARAMETERE METERS

Defenition

For the purpose of this Publication, the term "electrical parameter" applies to four-pole matrix parameters, elements of electrical equivalent circuits, electrical impedances and admittances, inductances and capacitances.

Basic letters

The following is a list of the most important basic letters used for electrical parameters of semiconductor devices.

B, b = susceptance; imaginary part of an admittance

C = capacitance

G, g = conductance; real part of an admittance

H, h = hybrid parameter

L = inductance

R, r = resistance; real part of an impedance

X, x = reactance; imaginary part of an impedance

Y, y = admittance;

Z, z = impedance;

Upper-case letters shall be used for the representation of:

a) electrical parameters of external circuits and of circuits in which the device forms only a part;

b) all inductances and capacitances.

Lower-case letters shall be used for the representation of electrical parameters inherent in the device (with the exception of inductances and capacitances).

Subscripts

General subscripts

The following is a list of the most important general subscripts used for electrical parameters of semiconductor devices:

F, f = forward; forward transfer
I, i (or 1) = input
L, l = load
O, o (or 2) = output
R, r = reverse; reverse transfer
S, s = source

Examples: Z_S, h_f, h_F

The upper-case variant of a subscript shall be used for the designation of static (d.c.) values.

Examples : h_{FE} = static value of forward current transfer ratio in common-emitter configuration (d.c. current gain)

R_E = d.c. value of the external emitter resistance.

Note: The static value is the slope of the line from the origin to the operating point on the appropriate characteristic curve, i.e. the quotient of the appropriate electrical quantities at the operating point.

The lower-case variant of a subscript shall be used for the designation of small-signal values.

Examples: h_{fe} = small-signal value of the short-circuit forward current transfer ratio in common-emitter configuration

$Z_e = R_e + jX_e$ = small-signal value of the external impedance

Note: If more than one subscript is used, subscripts for which both styles exist shall either be all upper-case or all lower-case

Examples: h_{FE}, y_{RE}, h_{fe}

Subscripts for four-pole matrix parameters

The first letter subscript (or double numeric subscript) indicates input, output, forward transfer or reverse transfer

Examples: h_i (or h_{11})
h_o (or h_{22})
h_f (or h_{21})
h_r (or h_{12})

A further subscript is used for the identification of the circuit configuration. When no confusion is possible, this further subscript may be omitted.

Examples: h_{fe} (or h_{21e}), h_{FE} (or h_{21E})

Distinction between real and imaginary parts

If it is necessary to distinguish between real and imaginary parts of electrical parameters, no additional subscripts should be used. If basic symbols for the real and imaginary parts exist, these may be used.

Examples: $Z_i = R_i + jX_i$

$y_{fe} = g_{fe} + jb_{fe}$

If such symbols do not exist or if they are not suitable, the following notation shall be used:

Examples: Re (h_{ib}) etc. for the real part of h_{ib}
Im (h_{ib}) etc. for the imaginary part of h_{ib}

DEFINITIONS FOR OPTOELECTRONIC DEVICES ACCORDING TO IEC 306

DEFINITIONS AND UNITS VALID FOR INFRARED RADIATION

Radiant flux, radiant power ϕ, P, (ϕ_e)

This is the power emitted, transferred or received as radiation, i.e. the radiant energy (dQ_e) emitted per second.

$$\phi_e = \frac{dQ_e}{dt} \qquad \text{unit: watt, W}$$

Radiant intensity I_e, I

For a source of given direction, the radiant intensity is the radiant power leaving the source, or an element of the source, in an element of solid angle (Ω) containing the given direction, divided by that element of solid angle.

$$I_e = \frac{d\phi_e}{d\Omega} \qquad \text{unit: watt per steradian, W/sr}$$

Irradiance E, (E_e)

At a point on a surface, the irradiance is the radiant power incident on an element of the surface containing the point divided by the area (A) of that element.

$$E = \frac{d\phi_e}{dA} \qquad \text{unit: watt per square metre, W/m}^2$$

DEFINITIONS AND UNITS VALID FOR VISIBLE LIGHT

This is radiation capable of stimulating the eye. Exceptions to this definition are made where necessary in the data sheets, e.g. dark and light currents of a phototransistor and light rise time of a near-infrared light emitting diode.

Luminous flux ϕ, (ϕ_v)

The luminous flux $d\phi$ of a source of luminous intensity I_v in an element of solid angle of $d\Omega$, is given by:

$$d\phi = I_v.d\Omega \qquad \text{unit: lumen, lm}$$

Lumen

This is the luminous flux radiating from a point source of uniform luminous intensity of 1 candela, contained within a solid angle of 1 steradian.

$$1\ \text{lm} = 1\ \text{cd.sr}$$

Luminous intensity I_v, (I)

For a source of given direction, the luminous intensity is the luminous flux leaving the source, or an element of the source, in an element of solid angle (Ω) containing the given direction, divided by that element of solid angle.

$$I_v = \frac{d\phi_v}{d\Omega} \qquad \text{unit: candela, cd}$$

Candela

This is the luminous intensity in a given direction, of a source emitting monochromatic radiation at a frequency of 540×10^{12} Hz*, the radiant intensity of which, in that direction, being 1/683 W/sr.

* Approximately 555 nm.

Illuminance E_v, (E)

At a point on a surface, the illuminance is the luminous flux incident on an element of the surface containing the point, divided by the area (A) of that element.

$$E_v = \frac{d\phi_v}{dA} \qquad \text{unit: lux, lx}$$

Lux lx

This is the illumination produced when 1 lumen of flux falls on a surface of area 1 square metre. It will be seen that an illumination of 1 lx is produced on a area of 1 square metre at a distance of 1 metre from a point source of 1 candela.

Distribution temperature T_d

This is the temperature of a black body at which the spectral radiation distribution of the radiator under consideration, in a given wavelength range, is proportional or approximately proportional to the spectral radiation distribution of the black body. If the wavelength range given includes visible radiation, then the distribution temperature corresponds to the colour temperature.

Colour temperature T_c

The colour temperature of a radiator is the temperature of a black body which has the same, or approximately the same, spectral radiation distribution in the visible range as the radiator under consideration.

DEFINITIONS OF ELECTRICAL QUANTITIES

Photocurrent I_{ph}

This is the change in output current from the photocathode due to incident radiation.

Dark current I_d

This is the current flowing in a photoelectric device in the absence of illumination.

Dark current equivalent radiation E_d

This is the incident radiation required to give a d.c. signal output current equal to the dark current.

Quantum efficiency

This is the ratio of the number of emitted photoelectrons to the number of incident photons. Quantum efficiency (Q.E.) at a given wavelength of incident radiation may be calculated as follows:

$$\text{Q.E.} = \frac{\text{constant} \times S_k}{\lambda}$$

where S_k = spectral sensitivity (A/W) at wavelength λ
λ = wavelength of incident radiation (nm)

constant $= \frac{hc}{e} = 1{,}24 \times 10^3$ W.nm/A

h = Planck's constant ($6{,}6256 \times 10^{-34}$ js)
c = velocity of electromagnetic waves in vacuo = $2{,}997925 \times 10^8$ m/s
e = elementary charge = $1{,}60210 \times 10^{-19}$ coulomb or $4{,}80298 \times 10^{-19}$ e.s.u.

Saturation voltage V_{CEsat}

This is the lowest operating voltage which causes no change in photocurrent when this voltage is increased with constant radiation.

Saturation current I_{CEsat}

This is the output current of a photosensitive device which is not changed by an increase of either:

a. the irradiance under constant operating conditions, or,
b. the operating voltage under constant irradiance.

Thermal resistance

This is the ratio of temperature rise to power dissipation or

$$R_{th\ j\text{-}a} = \frac{T_j - T_{amb}}{P_{tot}}$$

The thermal resistance is also the reciprocal of the derating factor.

Pulsed operation

Under these conditions higher peak power dissipation is possible. In general, the shorter the pulse and lower the frequency, the lower is the temperature that the junction reaches.

By analogy with thermal resistance:

$$Z_{th\ j\text{-}a} = \frac{T_j - T_{amb}}{P_{tot}}$$

DEFINITIONS OF SENSITIVITY

These definitions apply more directly to photocathode sensitivity. For devices in which it is necessary to define the anode (overall) sensitivity, the signal output current should be considered instead of the photocurrent.

Actinity of radiation Z

This is the ratio of the sensitivity to a given radiation to the sensitivity to a reference radiation.

Radiant sensitivity S_R

This may be expressed as either:

a. the ratio of the photocurrent of the device to the incident radiant power, expressed in amperes per watt (A/W), or,
b. the ratio of the photocurrent of the device to the incident irradiance, expressed in amperes per watt per square metre ($A/W/m^2$).

Absolute spectral sensitivity $s(\lambda)$

This is the radiant sensitivity for monochromatic radiation of a stated wavelength.

Relative spectral sensitivity $s(\lambda)_{rel}$

This is the ratio of the radiant sensitivity at a particular wavelength to the radiant sensitivity at a reference wavelength, usually the wavelength of maximum reponse.

Note
For non-linear detectors, it is necessary to refer to constant photocurrent at all wavelengths.

Luminous sensitivity S_L

This may be expressed as either:

a. the ratio of the photocurrent of the device to the incident luminous flux, expressed in amperes per lumen (A/lm), or,
b. the ratio of the photocurrent of the device to the incident illuminance, expressed in amperes per lux (A/lx).

Dynamic sensitivity S_D

Under stated operating conditions, this is the ratio of the variation of the photocurrent of the device to the initiating small variation in the incident radiant or luminous power.

Note
Distinction is made between luminous dynamic sensitivity and radiant sensitivity.

Spectral sensitivity characteristics

This is the relationship, usually shown in graphical form, between the wavelength and the absolute or relative spectral sensitivity.

Absolute spectral sensitivity characteristics

This is the relationship, usually shown in graphical form, between the wavelength and the absolute spectral sensitivity.

Relative spectral sensitivity characteristics

This is the relationship between wavelength and the relative spectral sensitivity.

Quantum efficiency characteristic

This is the relationship, usually shown in graphical form, between the wavelength and the quantum efficiency.

DEFINITIONS OF TIME QUANTITIES

Rise time t_r

This is the time required for the photocurrent to rise from a stated low percentage to a stated higher percentage of the maximum value when a steady state of radiation is instantaneously applied. It is usual to consider the 10% and 90% levels (see Figs 1 and 2).

Fall time t_f

This is the time required for the photocurrent to fall from a stated high percentage to a stated lower percentage of the maximum value when the steady state of radiation is instantaneously removed.

It is usual to consider the 90% and 10% levels (see Figs 1 and 2).

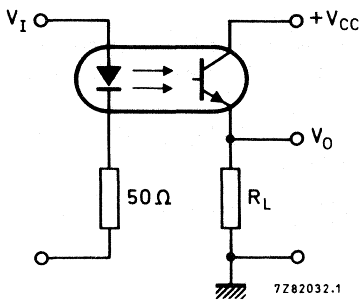


Fig. 1 Switching circuit.

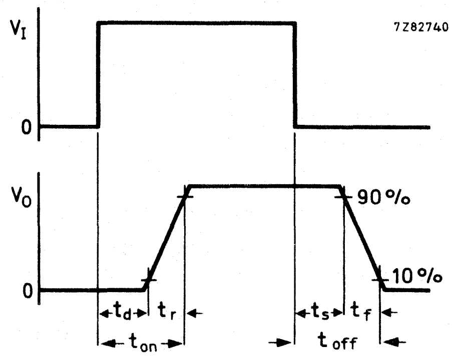


Fig. 2 Waveforms.

DEFINITIONS AND UNITS OF INFRARED SENSITIVE DEVICES

Emissivity

This is the ratio of the radiant exitance of a thermal radiator to that of a black body radiator at the same temperature.

Absolute refractive index n

This is the ratio of the velocity of light in vacuo to that in a particular medium. For most practical purposes the velocity of light in vacuo can be replaced by that in air.

Detectivity

This is the signal-to-noise ratio per unit radiant power. Thus it is the reciprocal of the N.E.P. Care must be exercised when considering detectivity as this term has also been used in the definitions of D*.

unit: 1/watts (1/W)

D*

This is an independent figure of merit which is defined as the r.m.s. signal-to-noise ratio in a 1 Hz bandwidth per unit r.m.s. incident radiant power per square root of detector area. Unless otherwise stated, it is assumed that the detector field of view is hemispherical (2 π steradian).

unit: $cm\sqrt{Hz}/W$

Wave number

This is the reciprocal of the wavelength in centimetres. $(\frac{1}{\lambda})$

N.E.P. (Noise Equivalent Power)

This is the r.m.s. value of the incident, chopped, radiant power necessary to produce an r.m.s. signal to r.m.s. noise ratio of unity. The r.m.s. noise refers to the value calculated for unit square root bandwidth $V/\sqrt{Hz}$.

unit: $W/\sqrt{Hz}$

Responsivity

This is the ratio of the r.m.s. signal in volts to the r.m.s. value of the incident, chopped, radiant power.

unit: V/W

Noise equivalent irradiation

This is the value of incident radiation which, when modulated in a stated manner, produces a signal output power equal to the noise power, both of which are in a stated bandwidth.

Radiance L_e

This is the radiant intensity (I_e) at a point on a surface and in a given direction, of an element of that surface, divided by the area of the orthogonal projection of the element on a plane perpendicular to the given direction.

unit: watt per steradian square metre, W/sr.m^2

Radiant exitance (radiant emittance) M_e

At a point on a surface, this is the radiant power leaving an element of that surface, divided by the area of the element.

$$M_e = \frac{d\phi_e}{dA}$$ unit: watt per square metre, W/m^2

Luminous exitance (luminous emittance) M_v

At a point on a surface, this is the luminous flux leaving an element of that surface, divided by the area of that element.

$$M_v = \frac{d\phi_v}{dA}$$ unit: lumen per square metre, lm/m^2

Luminance L_v

This is the luminous intensity (I_v) at a point on a surface and in a given direction, of an element of that surface divided by the area of the orthogonal projection of the element on a plane perpendicular to the given direction.

unit: candela per square metre, cd/m^2

Steradian sr (see Fig. 3)

This is the solid angle subtended at the centre of a sphere by an element of the surface area equal to the square of the radius of the sphere. There are, therefore, 4π steradians in a complete sphere.

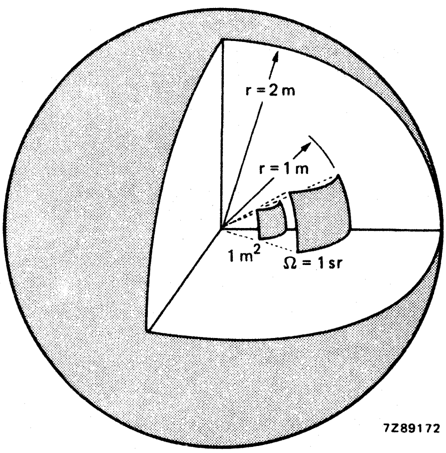


Fig. 3.

DIMENSIONING OF LED ENVELOPES

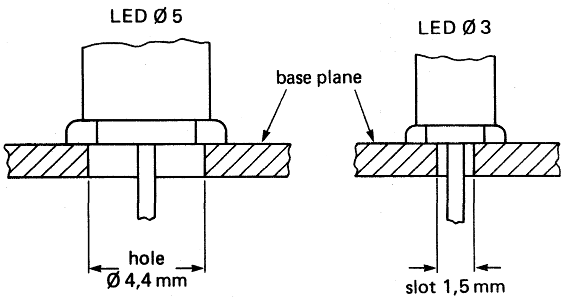
The dimensioning of the envelopes contained in this handbooks is in accordance with the I.E.C. publication 191: Mechanical Standardization of Semiconductor devices.

The following section defines the different characteristics of LED dimensions.

The Base Plane

As the base of the plastic body is irregular, due to the manufacturing process, the base plane is defined as:

for Ø5 mm LEDs (or equivalent) a 4,4 mm hole,
for Ø3 mm LEDs (or equivalent) a 1,5 mm slot.



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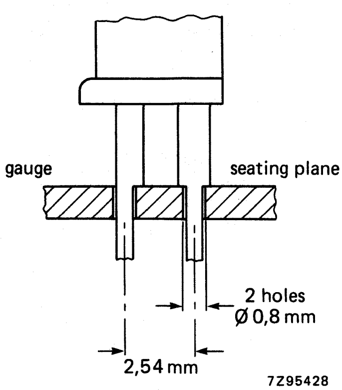
The Seating Plane

This is defined as when the flanges of the leads are seated on a gauge with 0,8 mm Ø holes which are 2,54 mm apart.



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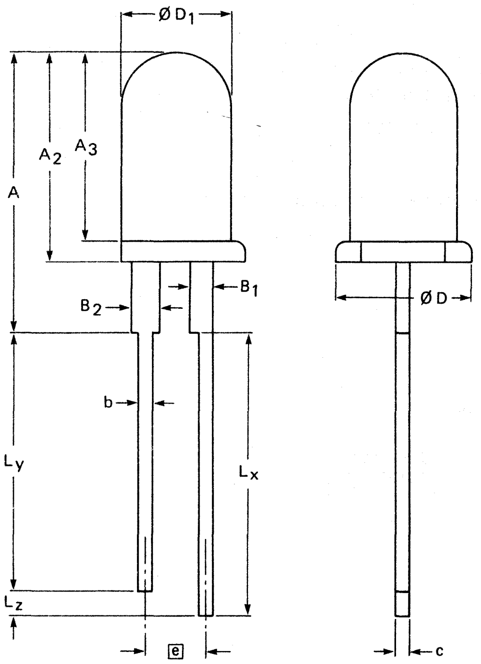
The Emission Area

The emission area is defined by top view dimensions such as ØD1, D1 and E1.



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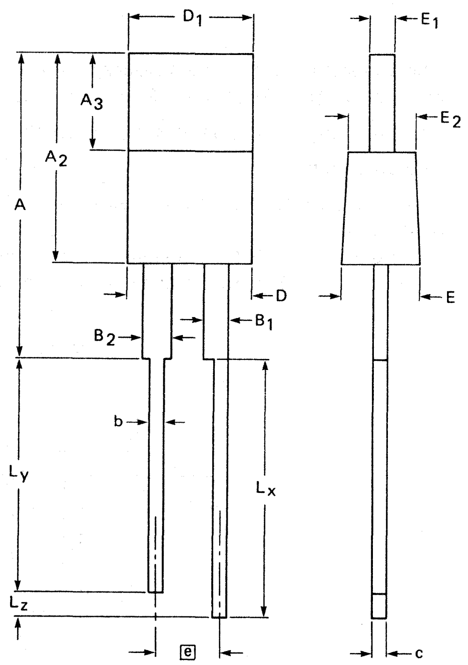

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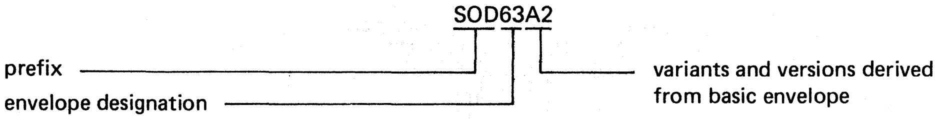
Pinning

The cathode, anode, emitter and collector are indicated on the drawings. Only the flat on the body or the shortest lead are used for pinning reference. The wider part of the lead must not be taken as a reference as different configurations may exist according to version and variant.

Envelope numbering

In the absence of international standards the following numbering system is used:



DRIVING GaAlAs LIGHT EMITTING DIODES

GaAlAs LEDs should be driven from a constant current supply to avoid small changes in forward voltage leading to large current changes. It is, however, possible to pulse the current to increase the efficiency of the LEDs by taking advantage of the non-linear relationship between luminous intensity and forward current (Fig. 1).

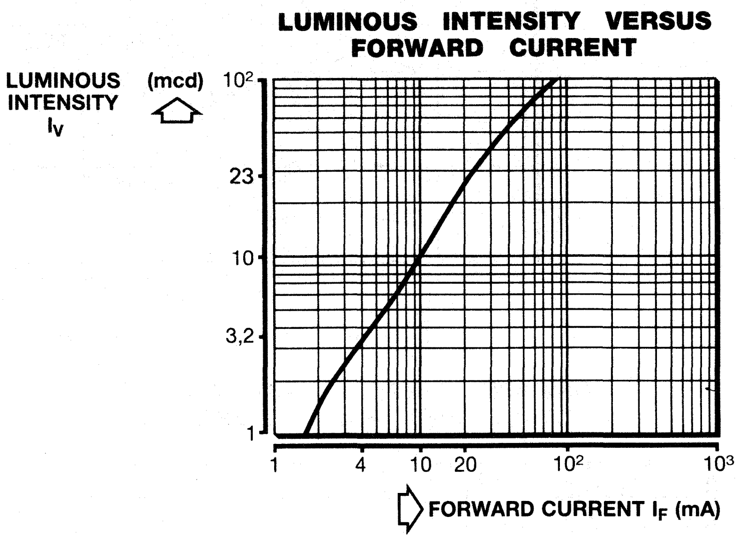


Fig. 1.

As the figure shows, a forward current of 4 mA results in a luminous intensity of 3,2 mcd, while a forward current of 20 mA results in a luminous intensity of 23 mcd. If the 20 mA current is pulsed with a dutyfactore d of 0,2, the average forward current is still 4 mA, and the average luminous intensity becomes 4,6 mcd. Thus the effective luminance intensity is 1,44 times as great with pulsed current as with d.c. of the same average value.

The effect is greatest at low average current; at higher currents the gain diminishes. This is because, at higher peak currents I_{FM}, the average power $P_{(AV)}$ increases as $V_{FM}I_{FM}d$, where V_{FM} is the peak voltage. The increase in $P_{(AV)}$ causes the diode junction temperature T_j to increase by $\Delta T_j = P_{(AV)}R_H$, where R_H is the thermal resistance of the diode junction. Since the luminous intensity is related to the junction temperature by $dI_V/dT_j = -0{,}7\%$ per ^oC, the advantage of pulsed operation is lost if the average current is too high.

Junction temperature is also affected by the pulse duration t_p, since average current increases with increasing duration.

Figure 2 shows the effect of the peak current (I_{FM}) and pulse duration (t_p) on the average luminous intensity, and Fig. 3 shows how the duty factor and pulse duration affect the absolute maximum ratings of I_F.

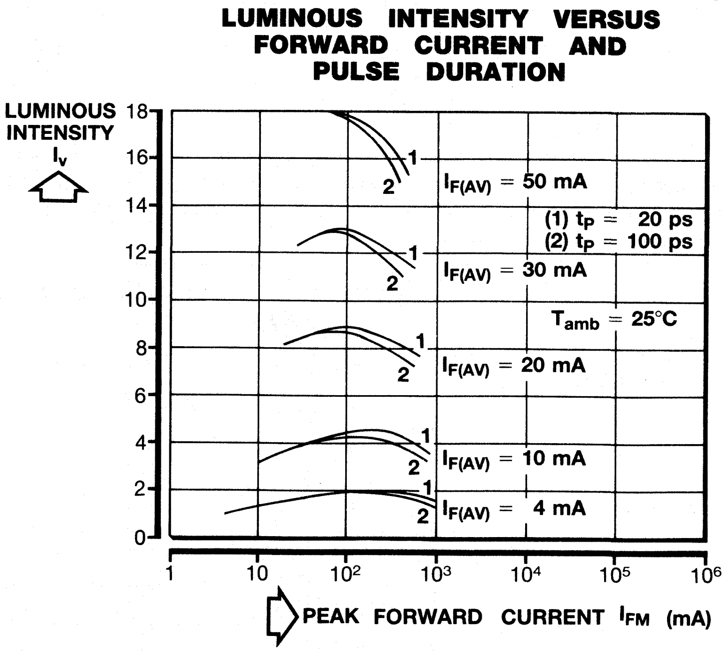


Fig. 2 T_{amb} = 25 °C;
(1) t_p = 20 ps
(2) t_p = 100 ps

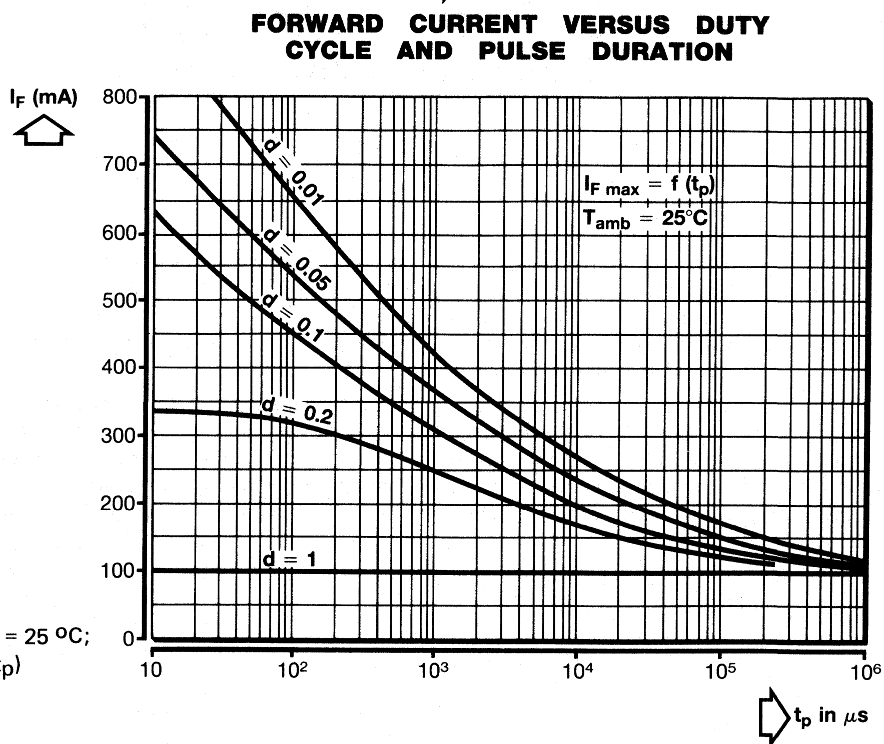


Fig. 3 T_{amb} = 25 °C;
I_F max = f (t_p)

The peak wavelength of the colour emitted by the LED also changes with junction temperature, according to the relation d λ_p/dT_j = +0,15 to 0,20 nm/K. Detection of a colour difference between two LEDs depends on the dominant wavelength. Figure 4 shows how the response of the eye varies with wavelength, and Fig. 5, the change in wavelength just detectable by eye as a function of wavelength.

SPECTRAL RESPONSE OF HUMAN EYE

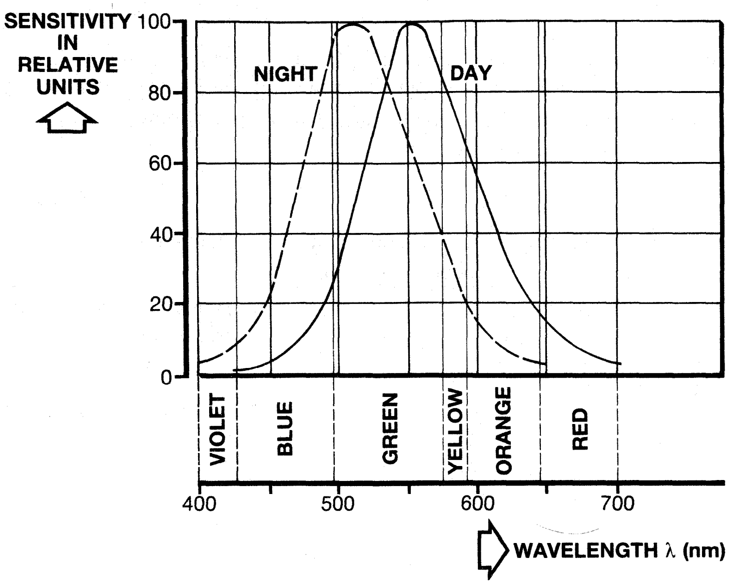


Fig. 4.

CHANGE IN WAVELENGTH JUST DETECTABLE BY HUMAN EYE VERSUS WAVELENGTH

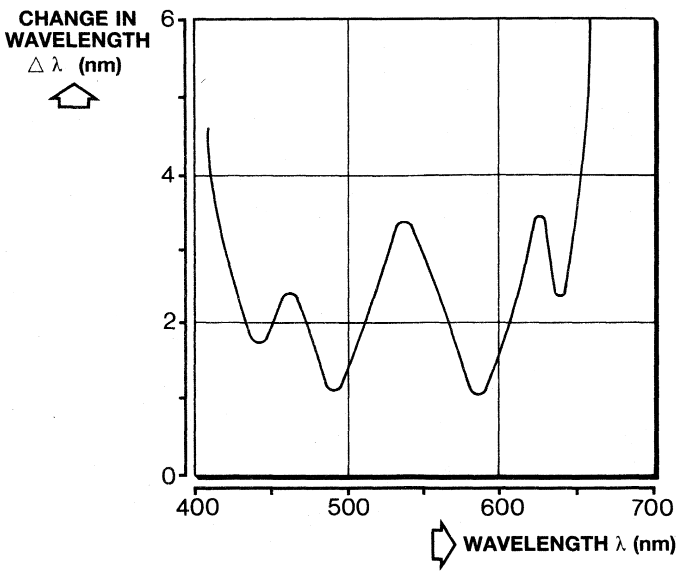


Fig. 5.

TAPE PACKAGING OF LEDs

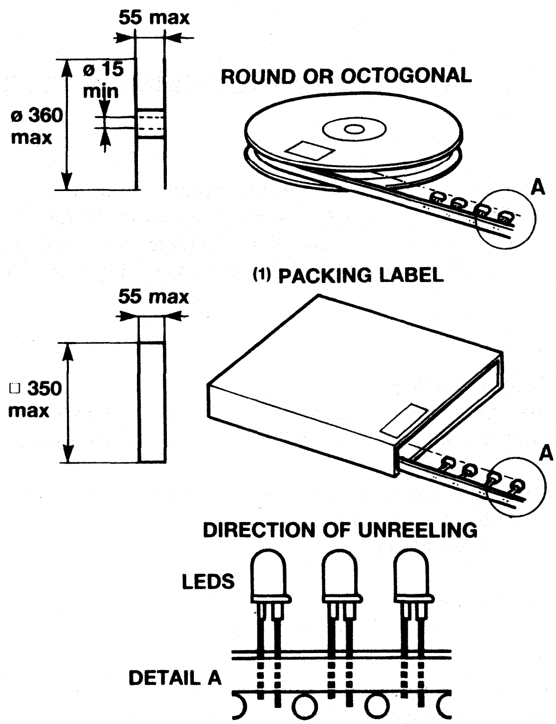
LEDs can be supplied on tape, with unindirectional leads for automatic insertion into PCBs. The tape packaging can be delivered on bandolier/rolls or meander/concertina packing as shown in Fig. 1.

The packaging consists of a carrier tape and a fixing tape as specified by IEC Publication 286. The relevant dimensions are given in Fig. 2 and the table.

MECHANICAL DATA

Dimensions in mm

Item	Symbol	Specification		Remarks
		value	tolerance	
Body width	A_1			Dimensions derived from relevant comp. spec.
Body height	A			
Body thickness	T			
Lead wire dimensions	b			
	c			See Philips envelope spec.
Pitch of component	P	12,7	±1	
Feed hole pitch	P_o	12,7	±0,2	Cumulative error 1mm/20 pitch
Feed hole centre to component centre	P_2	6,35	±0,4	To be measured at 10 mm from feed hole centre
Feed hole centre to lead	P_1			
Distance between outer leads	F	2,54	±0,2	
Lead to lead distance	F_1F_2			
Component alignment	Δh	±1		At top of body
Component alignment	Δh_1	±1		At top of body
Lead alignment after cutting	Δ_2			
Parallelism	Δ_3			
Tape width	W	18	±0,5	
Hold down tape width	W_o	6	±0,3	
Hole position	W_1	9	±0,5	
Hold down tape position	W_2	0,5	±0,2	
Feed hole diameter	D_0	4	±0,2	
Total tape thickness	t	0,9	max.	
Height of component from tape centre	H			
Lead wire clinch height	H_o			
Component height	H_1	H+A	+0–0,2	
Length of snipped leads	L_1	11	max.	
Lead wire taped portion	L			
Pull out force	(P)	6N	min.	
Pull out force from tape end/reel		2,5N	max.	



DIMENSIONS mm OF REEL AND BOX

MECHANICAL DATA

Dimensions in mm

UNREELING

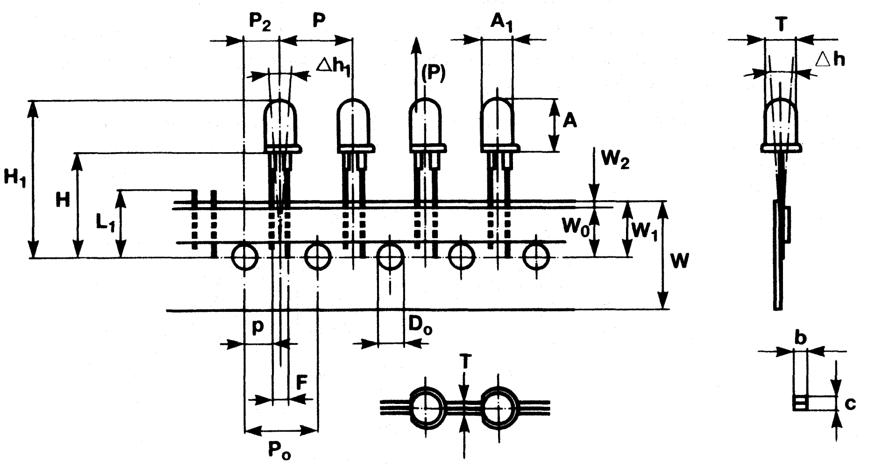


Fig. 2 See table.

SOLDERING AND MOUNTING RECOMMENDATIONS

Because LEDs are encapsulated in cast resin and not in transfer-moulded housings, they tend to soften when heated, as for instance during soldering. If there happens to be any mechanical stresses on the leads at this time, they tend to be displaced in a direction that minimizes the stress, with the result that the internal connections of the LED are fractured. This is one of the major reasons for LED failure.

To overcome the problem, it is essential:

a) to form and crop the leads before soldering;
b) to ensure that the holes in the printed circuit board (PCB) are of sufficient size (0,8 mm) to allow the LED to be inserted without stressing the leads while still allowing a good soldered joint to be made;
c) to ensure that the holes in the PCB are adequately spaced (2,54 mm) so as not to stress the leads;
d) that any spacers used do not impose stresses on the leads;
e) that any sockets are able to secure the LED without stress.

If it is necessary to crop the leads after soldering, the LED must first be allowed to cool to room temperature. This may take from 30 seconds to 3 minutes depending upon the circumstances.

Long sockets are particularly hazardous for the LED as they rarely have the same expansion characteristics as the PCB. The resulting distortion can easily be fatal for the LEDs unless great care is taken to ensure that the holes in the sockets and the PCB are not only in perfect alignment, but also that they are of adequate size and spacing. The longer the socket, the greater the care needed.

Soldering should be done with a solder-bath or temperature-controlled iron. In either case, the temperature should be accurately controlled (preferably at 245 °C) and, in the case of the solder-bath, it is useful to record the temperature. The maximum temperature must not exceed 260 °C and the maximum time is 7 seconds. Solder must not be less than 1,5 mm from the seating plane. When using a solder-bath, take care to avoid the pressure of the solder-wave bending the PCB.

The way in which the LED is cast means that the lower surface of the device is not suitable as a reference surface. The top of the device or the top of any flange should therefore be used. A slighty less accurate reference is the seating plane.

Figure 1 shows the effect on the lower surface of the LED of (a) under filling, and (b), over filling the mould. Other dimensions are within 0,1 mm and can be used as reference.

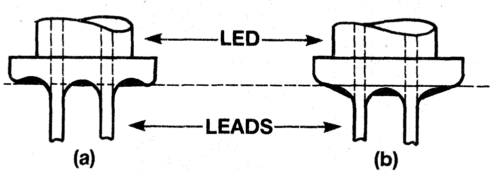


Fig. 1.

When mounting arrays of LEDs, it is preferable to use the top as the reference surface and if possible to use a screen in front of them. The screen not only makes any small differences of position less noticeable but also removes the need for the LEDs to withstand the mechanical tests required by some countries (see Fig. 2).

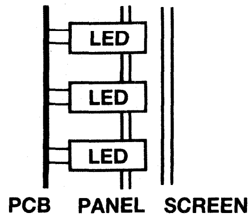


Fig. 2.

Finally, Fig. 3 shows a recommended mounting arrangement using sockets. The LED is held on the PCB by a double-sided adhesive tape and the socket presses the device against it. With the correct hole size and spacing, no stress is imposed on the leads and soldering can be done in complete safety.

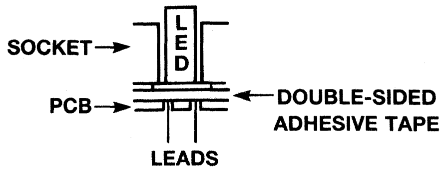


Fig. 3.

SILICON PHOTOTRANSISTOR

N-P-N silicon phototransistor in epoxy resin encapsulation intended for optical coupling and encoding. The base is inaccessible. Combination with IR emitter diode CQY58A is recommended.

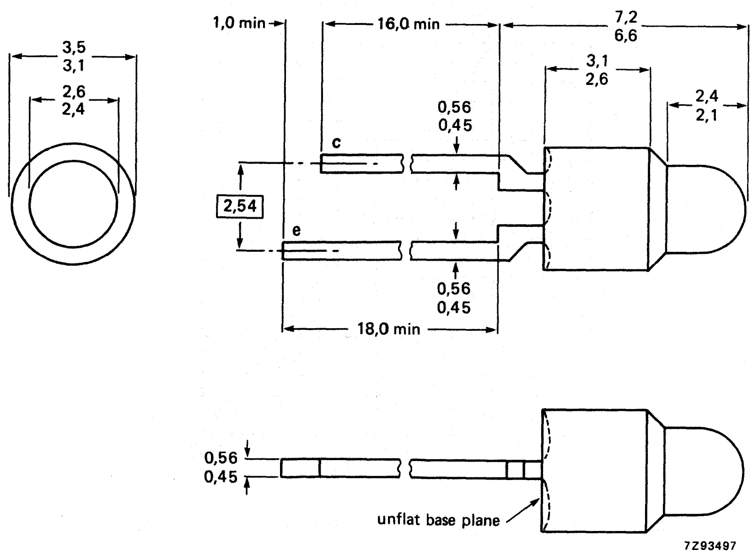
QUICK REFERENCE DATA

Collector-emitter voltage		V_{CEO}	max.	50	V
Collector current (d.c.)		I_C	max.	25	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	100	mW
Collector dark current V_{CE} = 30 V; E = 0		$I_{CEO(D)}$	<	100	nA
Collector light current V_{CE} = 5 V; E_e = 1 mW/cm^2; λ_p = 930 nm	**BPW22A-1**	$I_{CEO(L)}$	>	1,5 to 8	mA
	BPW22A-2	$I_{CEO(L)}$	>	5 to 25	mA
Wavelength at peak response		λ_p	typ.	800	nm

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53F.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Collector-emitter voltage	V_{CEO}	max.	50 V
Emitter-collector voltage	V_{ECO}	max.	7 V
Collector current			
d.c.	I_C	max.	25 mA
peak value	I_{CM}	max.	50 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	100 mW
Storage temperature	T_{stg}	−55 to + 100 °C	
Junction temperature	T_j	max.	100 °C
Lead soldering temperature			
$>$1,5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient, device mounted on printed-circuit board	$R_{th\ j\text{-}a}$	=	750 K/W

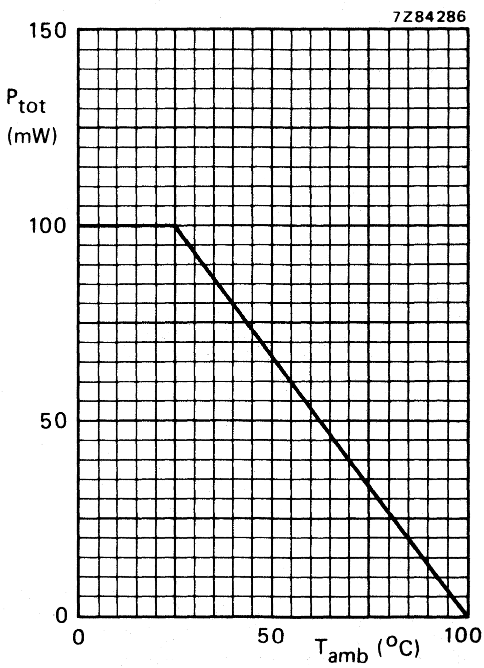


Fig. 2 Power derating curve versus ambient temperature.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector dark current				
V_{CE} = 30 V; E = 0		$I_{CEO(D)}$	<	100 nA
Collector light current				
V_{CE} = 5 V; E_e = 1 mW/cm²; λ_p = 930 nm	**BPW22A-1**	$I_{CEO(L)}$		1,5 to 8 mA
	BPW22A-2	$I_{CEO(L)}$		5 to 25 mA
Collector-emitter saturation voltage				
I_C = 1 mA; E_e = 1 mW/cm²; λ_p = 930 nm		V_{CEsat}	<	0,4 V
Wavelength at peak response		λ_p	typ.	800 nm
Bandwidth at half height		$\Delta\lambda$	typ.	400 nm
Half sensitivity angle		$\theta_{½}$	typ.	20°
Switching times (see Figs 3, 4, 9 and 10)				
I_{Con} = 2 mA; V_{CC} = 5 V; R_E = 100 Ω; T_{amb} = 25 °C				
turn-on time		t_{on}	typ.	3 μs
turn-off time		t_{off}	typ.	3 μs
I_{Con} = 2 mA; V_{CC} = 5 V; R_E = 1 kΩ; T_{amb} = 25 °C				
turn-on time		t_{on}	typ.	12,0 μs
turn-off time		t_{off}	typ.	12,0 μs

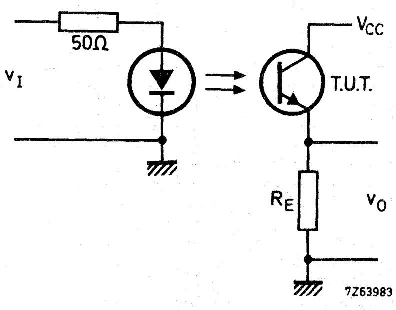


Fig. 3 Switching circuit with light emitting diode CQY58A. T.U.T. = BPW22A.

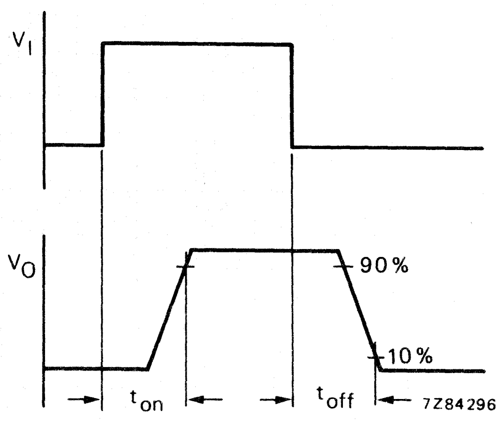


Fig. 4 Input and output switching waveforms.

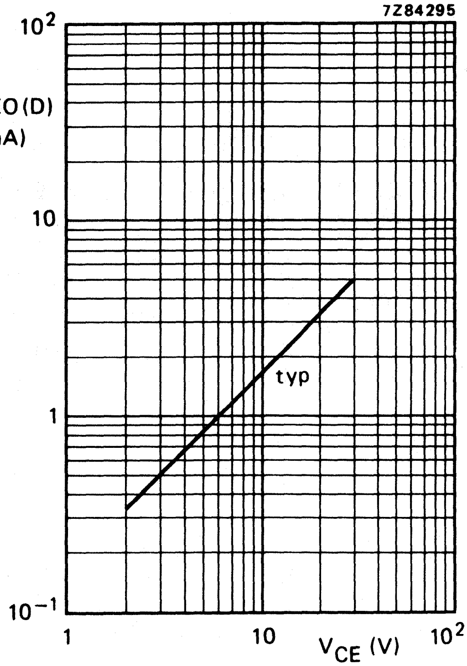


Fig. 5 $E = 0$; $T_j = 25\ ^oC$.

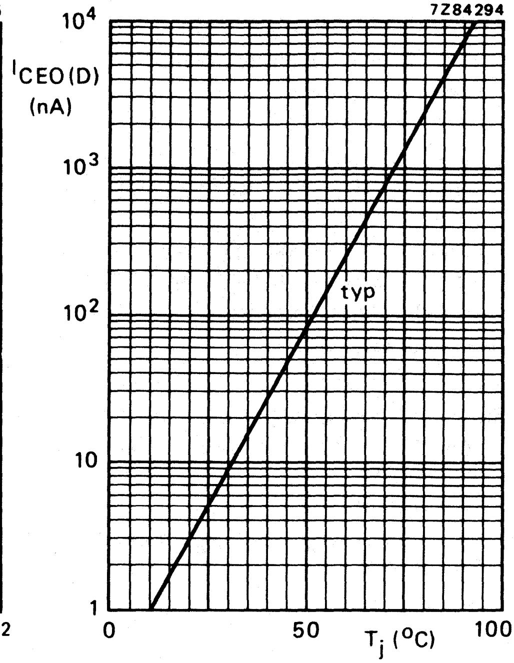


Fig. 6 $E = 0$; $V_{CE} = 30$ V.

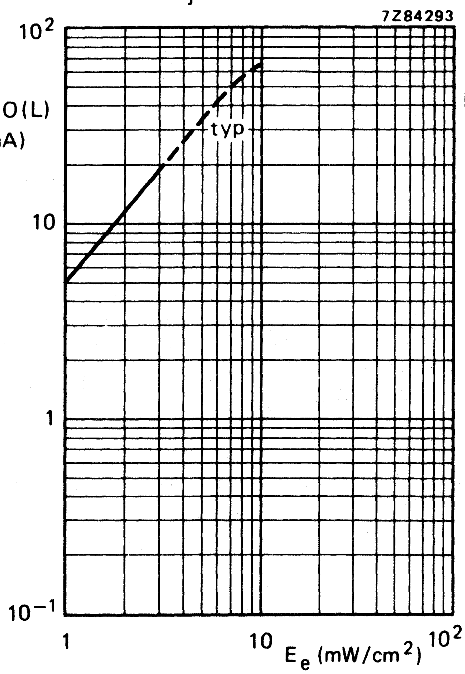


Fig. 7 GaAs source: $\lambda_{pk} = 930$ nm; $V_{CE} = 5$ V; $T_j = 25\ ^oC$.

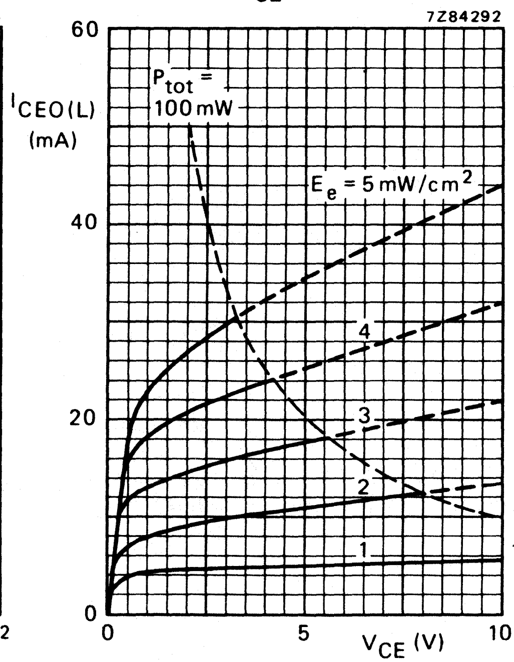


Fig. 8 $\lambda_{pk} = 930$ nm; $T_j = 25\ ^oC$; typical values.

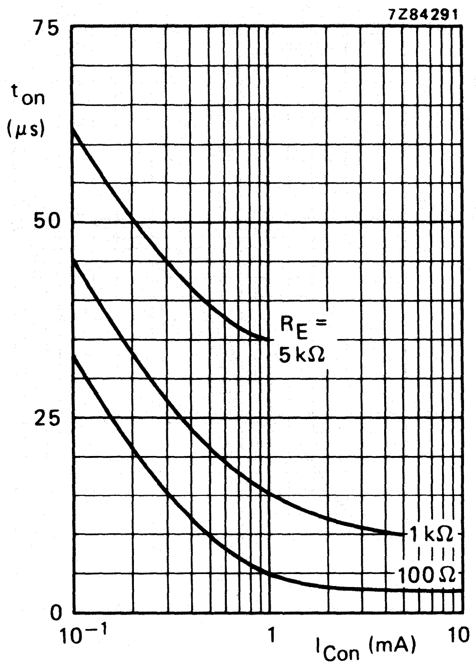


Fig. 9 V_{CC} = 5 V; T_{amb} = 25 °C; typical values; see also Figs 3 and 4.

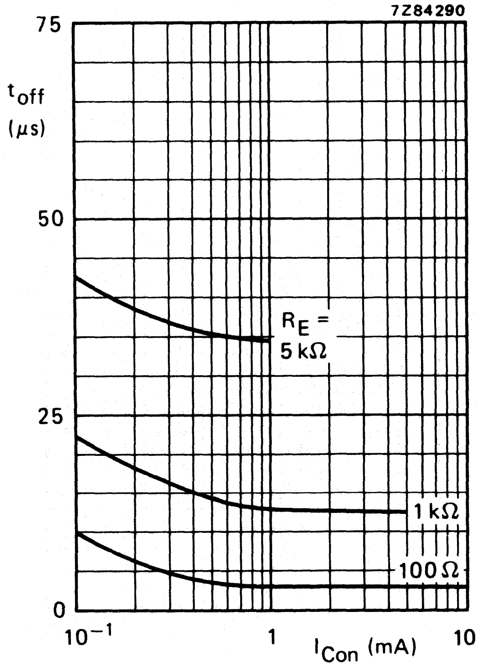


Fig. 10 V_{CC} = 5 V; T_{amb} = 25 °C; typical values; see also Figs 3 and 4.

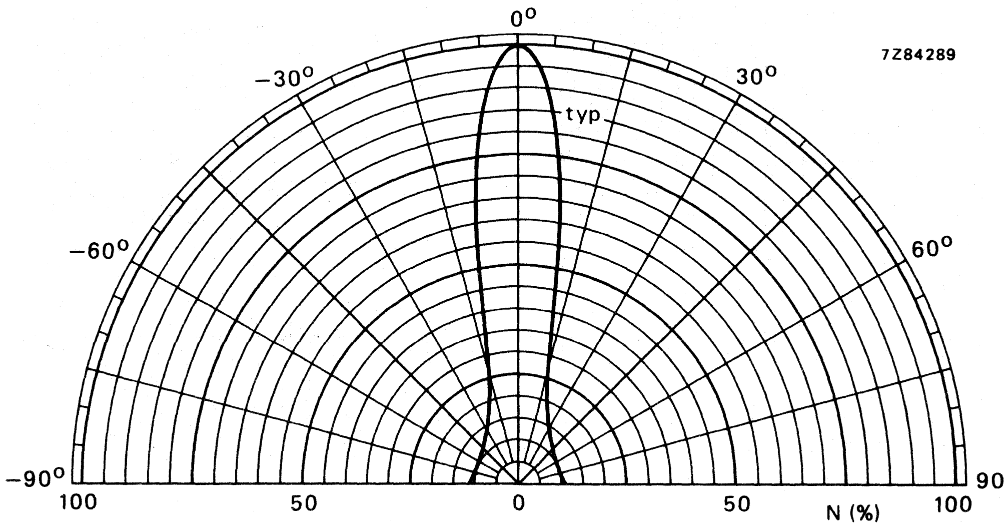


Fig. 11.

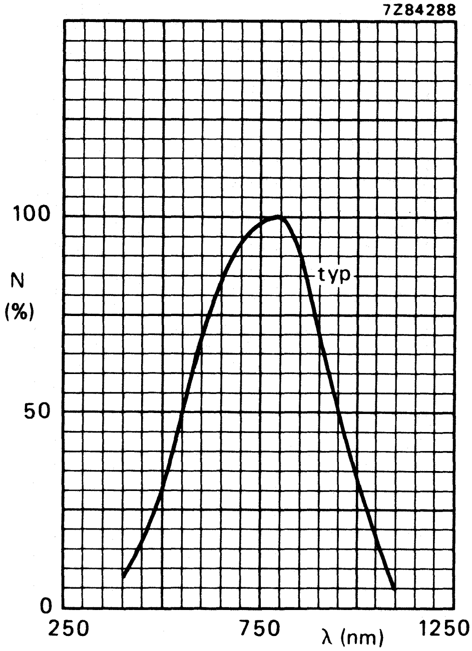


Fig. 12 Spectral response.

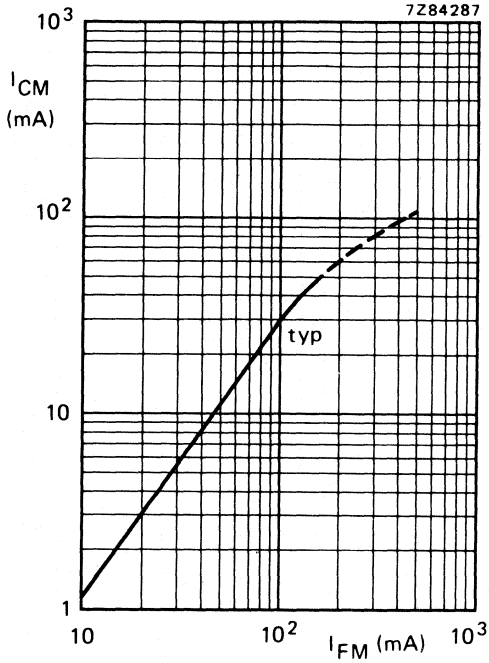


Fig. 13 V_{CE} = 5 V; t_p (I_{FM}) = 10 μs; T = 1 ms; d* = 10 mm; T_{amb} = 25 °C.

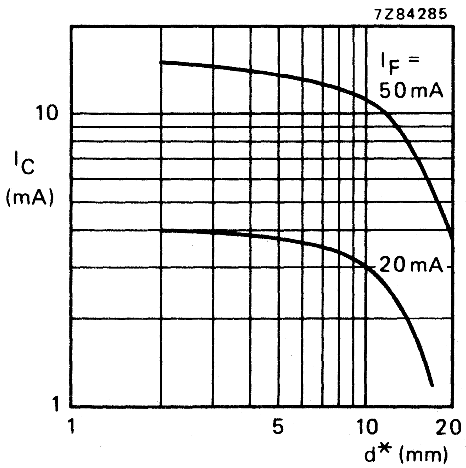


Fig. 14 V_{CE} = 5 V; T_{amb} = 25 °C; typical values.

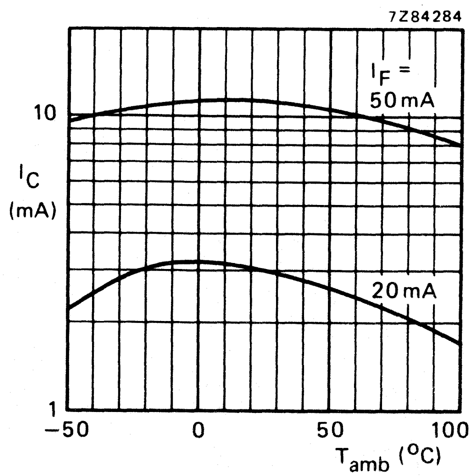


Fig. 15 V_{CE} = 5 V; d* = 10 mm; typical values.

* d = shortest free distance of mechanical on-axis when BPW22A is coupled with CQY58A.

HIGH-SPEED SILICON PHOTO P-I-N DIODE

The BPW50 is optimized for applications with remote control systems. Combination with IR emitter diode CQY89A-2 or CQW89A is recommended. If combined with high-speed IR emitting diode CQW89A, carrier frequencies of up to 1 MHz can be applied.

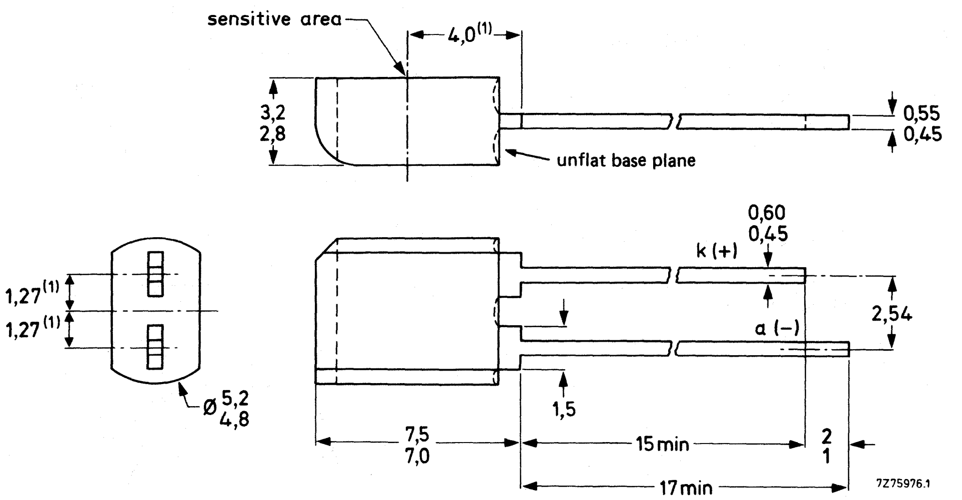
QUICK REFERENCE DATA

Continuous reverse voltage	V_R	max.	32	V
Total power dissipation up to T_{amb} = 47,5 °C	P_{tot}	max.	150	mW
Junction temperature	T_j	max.	100	°C
Dark reverse current V_R = 10 V; E_e = 0	$I_{R(D)}$	<	30	nA
Ligth reverse current V_R = 5 V; E_e = 1 mW/cm²; λ = 930 nm	$I_{R(L)}$	>	30	μA
Wavelength at peak response V_R = 5 V	λ_p	typ.	930	nm
Sensitive area	A	typ.	5	mm²

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-67.



(1) Reference for the positional tolerance of the sensitive area.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	32 V
Total power dissipation up to T_{amb} = 47,5 °C	P_{tot}	max.	150 mW
Storage temperature	T_{stg}	−30 to + 100 °C	
Junction temperature	T_j	max.	100 °C
Lead soldering temperature up to the seating plane; $t_{sld} < 10$ s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	350 K/W

CHARACTERISTICS

T_j = 25 °C

Dark reverse current V_R = 10 V; E_e = 0	$I_{R(D)}$	typ.	2 nA
		<	30 nA
Light reverse current V_R = 5 V; E_e = 1 mW/cm²; λ = 930 nm	$I_{R(L)}$	>	30 μA
		typ.	45 μA
Reverse voltage I_R = 0,1 mA; E_e = 0	V_R	>	32 V
Wavelength at peak response V_R = 5 V	λ_p	typ.	930 nm
Diode capacitance V_R = 3 V	C_d	typ.	17 pF
		<	30 pF
V_R = 0	C_d	typ.	50 pF
Light switching times (see Figs 2 and 3) Rise time and fall time V_{KK} = 10 V; R_A = 1 kΩ	t_r, t_f	typ.	50 ns

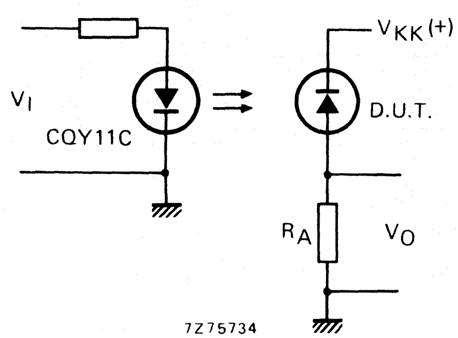


Fig. 2 Switching circuit.

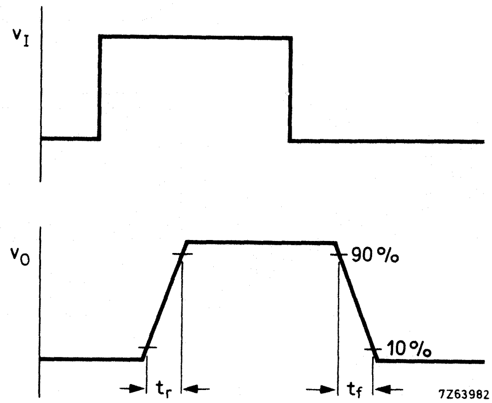


Fig. 3 Input and output switching waveforms.

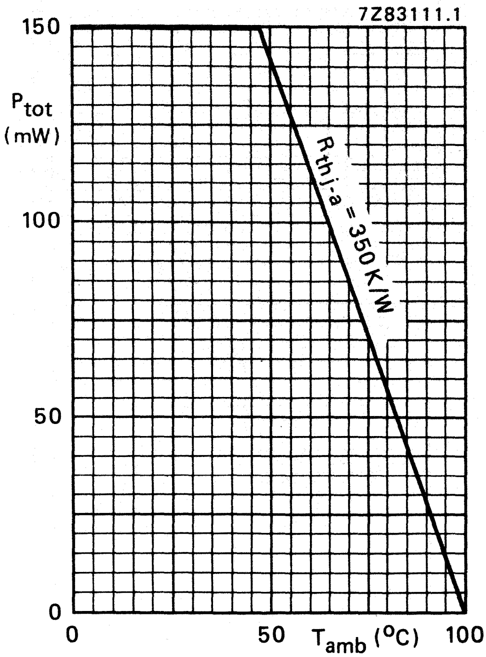


Fig. 4 Maximum permissible power dissipation as a function of temperature.

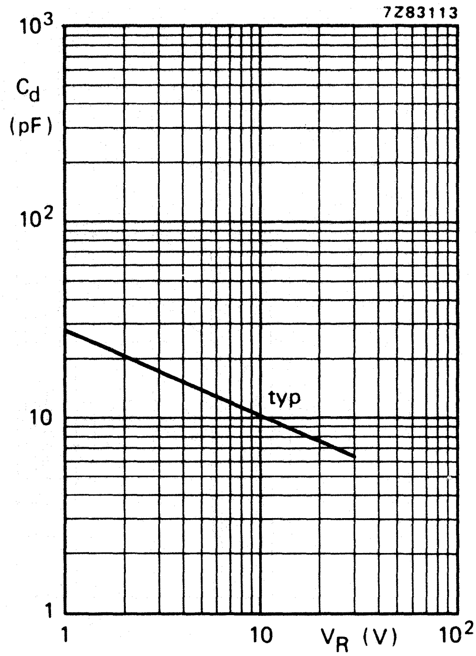


Fig. 5 T_{amb} = 25 °C.

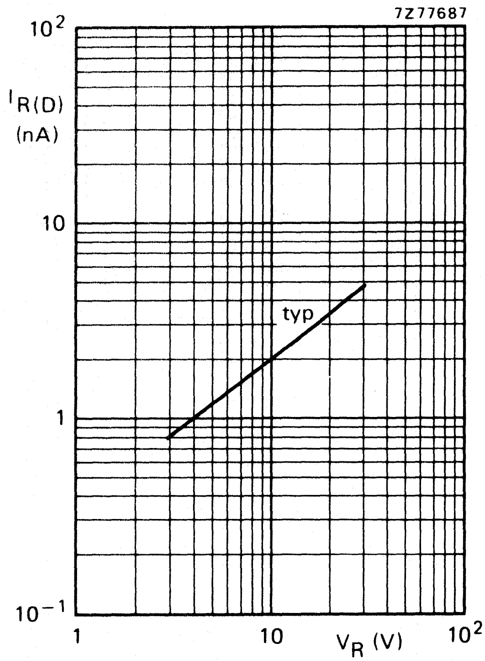


Fig. 6 E = 0; T_{amb} = 25 °C.

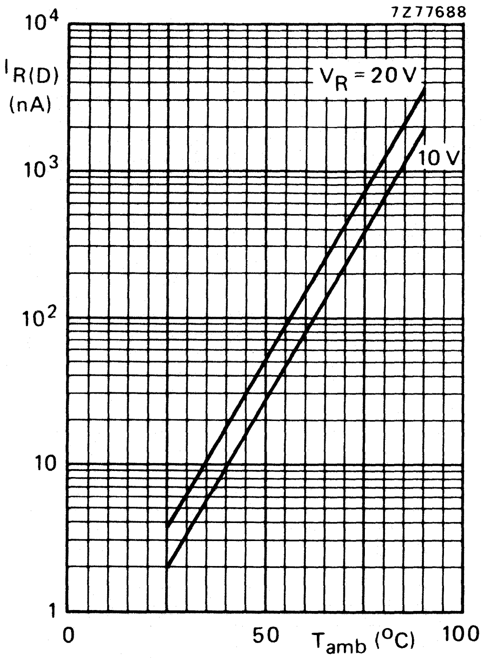


Fig. 7 E = 0; typical values.

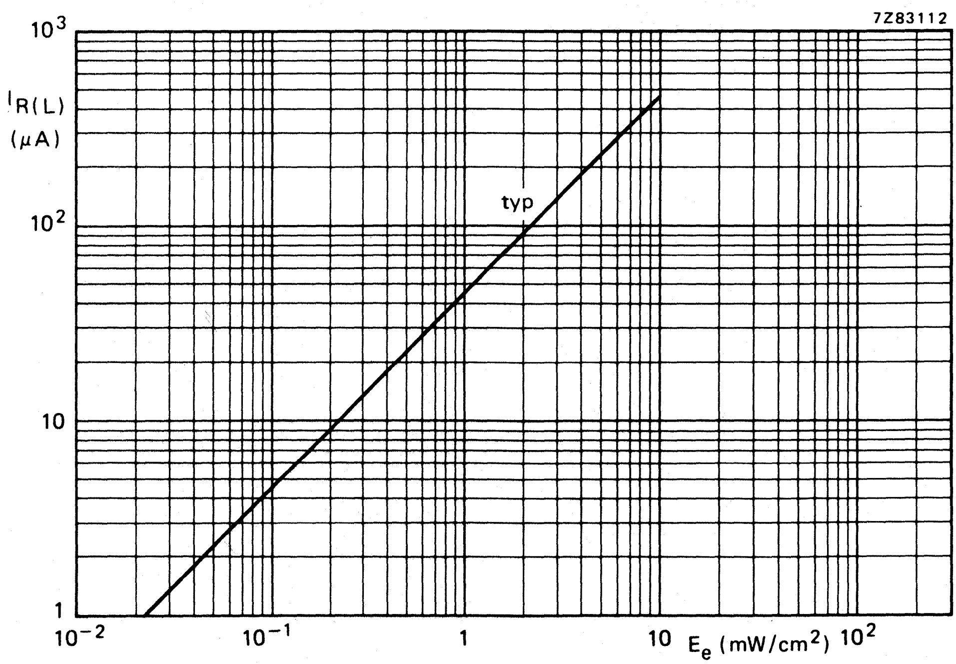


Fig. 8 V_R = 5 V; λ = 930 nm; T_{amb} = 25 °C.

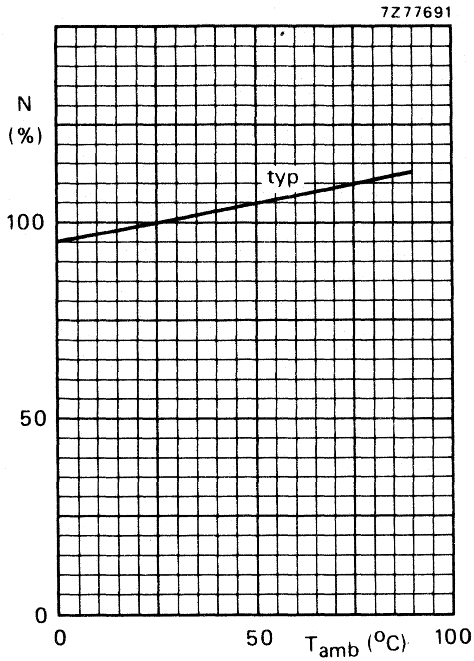


Fig. 9 $E_e = 1\ mW/cm^2$; $\lambda = 930$ nm.

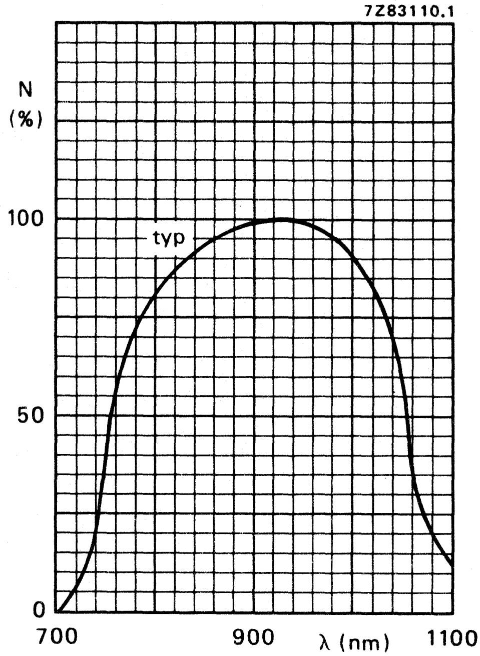


Fig. 10 $V_R = 5$ V; $T_{amb} = 25\ ^oC$.

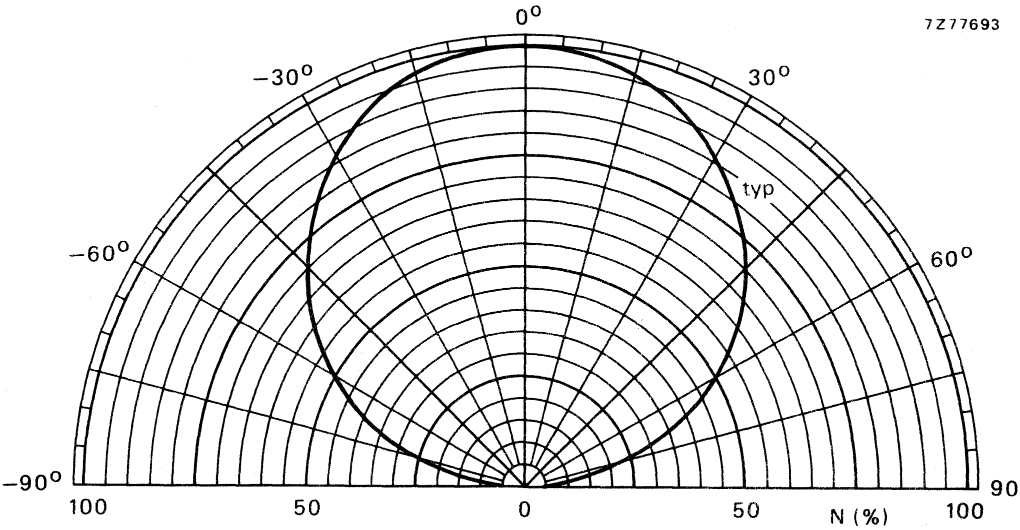


Fig. 11.

HIGH-SPEED INFRARED EMITTING DIODE

Diffused planar GaAlAs light emitting diode intended for optical coupling and encoding. It emits radiation in the near infrared when forward biased.

The application of special (intrinsic) GaAlAs technology results in perfect linearity at low currents, very high switching speed (30 ns) and low degradation during the devices operating life.

Combination with phototransistor BPW22A is recommended.

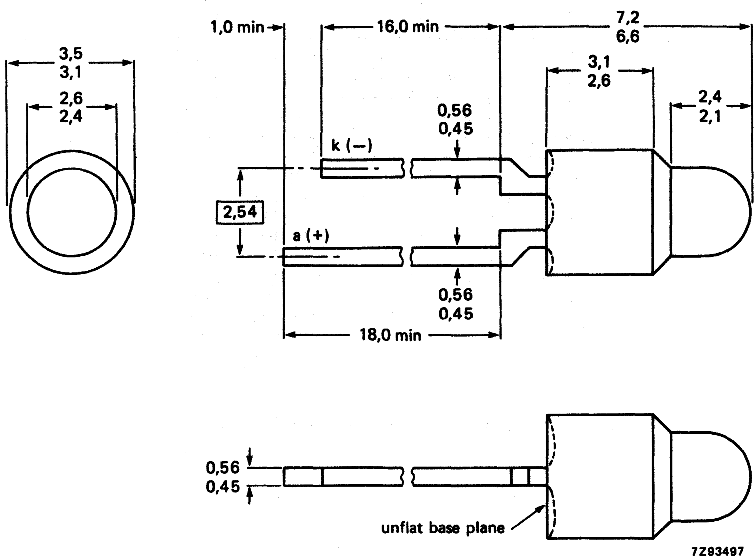
QUICK REFERENCE DATA

Continuous reverse voltage	V_R	max.	5	V
Forward current (d.c.)	I_F	max.	60	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	100	mW
Radiant intensity (on-axis) at I_F = 20 mA	I_e	min.	1	mW/sr
Wavelength at peak emission	λ_p	typ.	830	nm
Beamwidth between half-intensity directions	$\theta_{1/2}$	typ.	15	°
Switching times				
I_{Fon} = 20 mA Light rise time	t_r	typ.	30	ns
Light fall time	t_f	typ.	30	ns

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53F.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	60	mA
(peak value); t_p = 10 μs; δ = 0,01	I_{FRM}	max.	1	A
Total power dissipation up to T_{amb} = 25 °C (see Fig. 2)	P_{tot}	max.	100	mW
Storage temperature	T_{stg}	−55 to +100		°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature				
> 1,5 mm from the seating plane; t_{sld} < 7 s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient	$R_{th\ j\text{-}a}$	=	750	K/W
From junction to ambient, device mounted on a printed-circuit board	$R_{th\ j\text{-}a}$	=	500	K/W

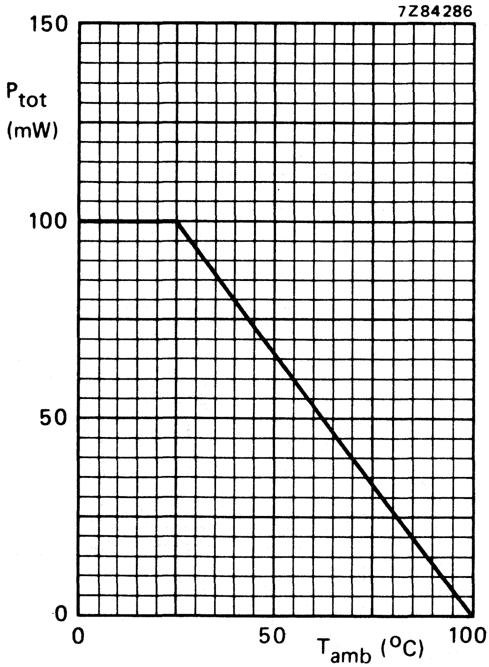


Fig. 2 Power derating curve versus ambient temperature.

CHARACTERISTICS

$T_j = 25\ ^oC$

Forward voltage					
$I_F = 20$ mA		V_F	typ. max.	1,5 1,8	V V
$I_F = 1$ A ($t_{on} = 50\ \mu s$; $\delta = 0{,}01$)		V_F	typ.	3,1	V
Reverse current					
$V_R = 5$ V		I_R	max.	10	μA
Diode capacitance					
$V_R = 0$; f = 1 MHz		C_d	typ.	200	pF
Total radiant power					
$I_F = 20$ mA		ϕ_e	typ.	1	mW
Radiant intensity (on-axis)					
$I_F = 20$ mA	**CQW58A**	I_e	min.	2	mW/sr
	CQW58A-1	I_e	min. max.	1 5	mW/sr mW/sr
	CQW58A-2	I_e	min.	3	mW/sr
Wavelength at peak emission		λ_p	typ.	830	nm
Bandwidth at half height		$\Delta\lambda$	typ.	35	nm
Beamwidth between half-intensity directions					
$I_F = 20$ mA		$\theta_{½}$	typ.	15	o
Switching times					
$I_{Fon} = 20$ mA					
Light rise time		t_r	typ.	30	ns
Light fall time		t_f	typ.	30	ns

DEVELOPMENT DATA

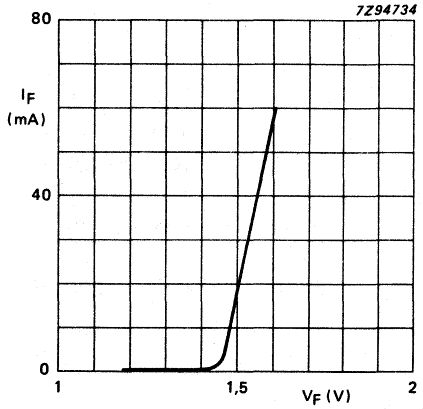


Fig. 3 T_{amb} = 25 °C; typical values.

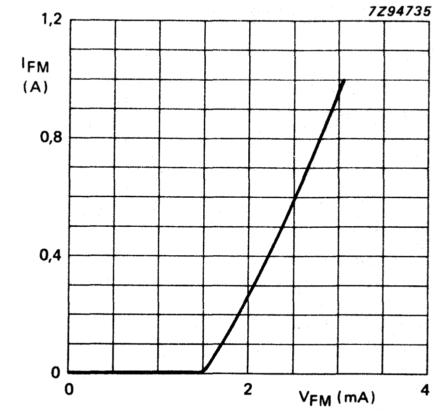


Fig. 4 t_{on} = 10 μs; T_{amb} = 25 °C; δ = 0,01; typical values.

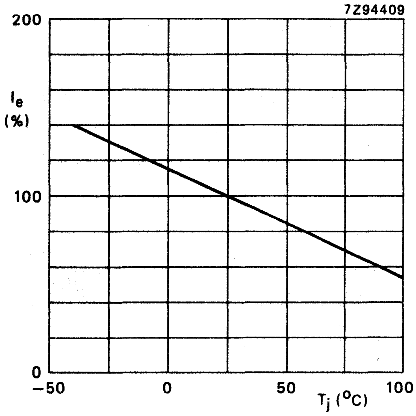


Fig. 5 I_F = 20 mA; typical values.

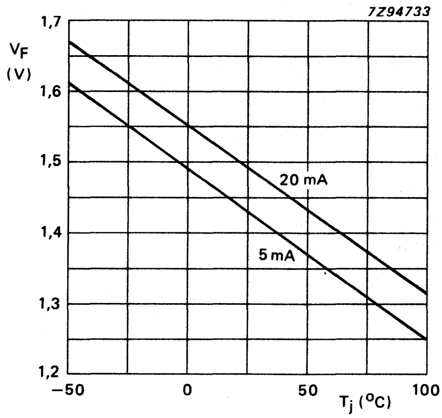


Fig. 6 Typical values.

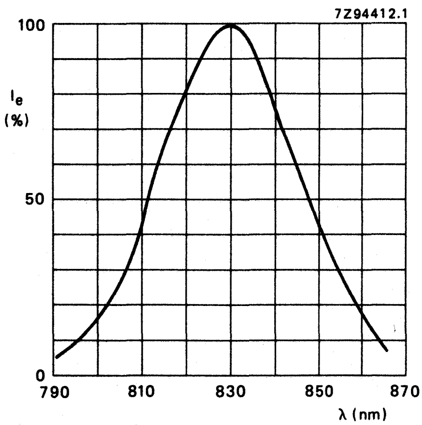


Fig. 7 Spectral response; typical values.

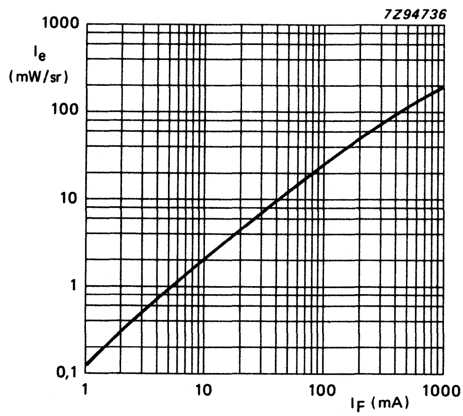


Fig. 8 t_{on} = 10 μs; δ = 0,01; typical values.

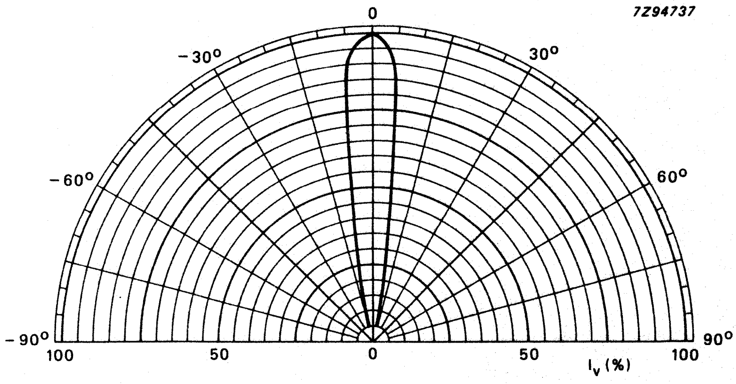


Fig. 9.

DEVELOPMENT DATA

HIGH-SPEED INFRARED EMITTING DIODE

Circular infrared emitting diode with diameter of 5 mm which emits infrared light at a typical peak wavelength of 830 nm (GaAlAs; infrared) when forward biased.

The CQW89A has a SOD-63 outline and is moulded in a light blue encapsulation with long leads.

The application of new GaAlAs (intrinsic) technology results in extremely short switching times and very low degradation during the devices operating life.

It is intended for remote control applications using carrier frequencies up to 1 MHz. Combination with the high-speed photo p-i-n diode BPW50 is recommended.

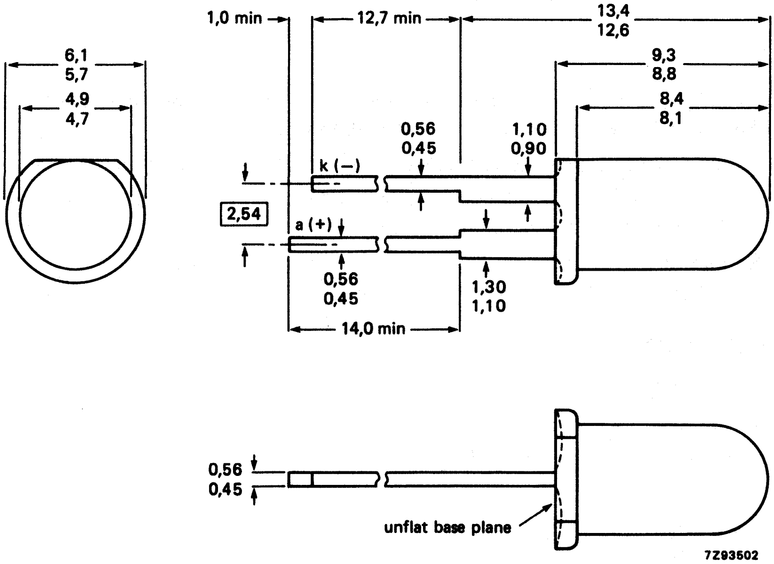
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	130	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	300	mW
Junction temperature		T_j	max.	100	°C
Radiant intensity (on axis)					
static (at d.c. condition)					
I_F = 100 mA	CQW89A	I_e	min.	9	mW/sr
	CQW89A-1	I_e	min.	12	mW/sr
	CQW89A-2	I_e	min.	15	mW/sr
dynamic (at pulse condition)					
I_{FM} = 100 mA; t_p = 0,5 μs; δ = 0,5		I_{eD}	typ.	0,8	I_e
Switching times (see Figs 2 and 3)					
I_F = 100 mA		t_r	typ.	30	ns
		t_f	typ.	30	ns
Wavelength at peak emission		λ_p	typ.	830	nm
Beamwidth at half-intensity directions		$\theta_{½}$	typ.	40	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-63D2.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	130	mA
peak value; t_p = 10 μs; δ = 0,01	I_{FM}	max.	2500	mA
peak value; t_p = 50 μs; δ = 0,01	I_{FM}	max.	1500	mA
Total power dissipation up to T_{amb} = 25 °C with heatsink	P_{tot}	max.	300	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature t_{sld} < 10 s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a printed circuit board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 1,5 A; t_{on} = 50 μs; δ = 0,01		V_F	typ.	3,7	V
Forward voltage I_F = 100 mA		V_F	typ.	1,7	V
			max.	2,2	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Diode capacitance at f = 1 MHz V_R = 0		C_d	typ.	200	pF
Total radiant power I_F = 100 mA		ϕ_e	typ.	8	mW
Radiant intensity (on axis) static (at d.c. condition) I_F = 100 mA	CQW89A	I_e	min.	9	mW/sr
	CQW89A-1	I_e	min.	12	mW/sr
	CQW89A-2	I_e	min.	15	mW/sr
dynamic (at pulse condition)* I_{FM} = 100 mA; t_p = 0,5 μs; δ = 0,5		I_{eD}	typ.	0,8	I_e

* I_{eD} = Dynamic radiant intensity (average radiant intensity level during pulse time).

Radiant power temperature coefficient	$k_{\phi e}$	typ.	−0,6 %/K
Wavelength at peak emission I_F = 100 mA	λ_p	typ.	830 nm
Bandwidth at half-height I_F = 100 mA	$\Delta\lambda$	typ.	35 nm
Beamwidth at half-intensity direction I_F = 100 mA	$\theta_{1/2}$	min. typ.	28 ° 40 °
Switching times (see Figs 2 and 3) I_F = 100 mA	t_r t_f	typ. typ.	30 ns 30 ns

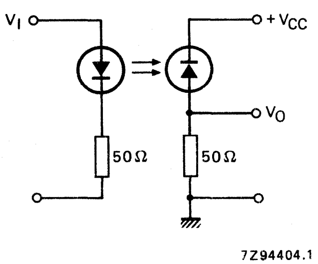


Fig. 2 Measuring circuit.

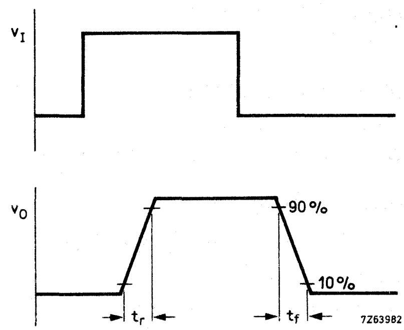


Fig. 3 Waveforms.

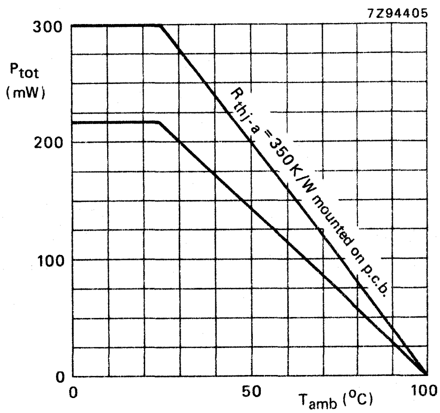


Fig. 4 Typical values.

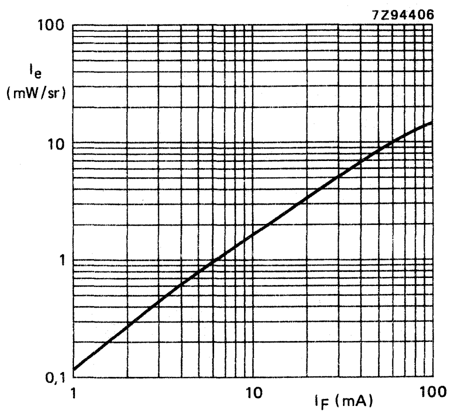


Fig. 5 t_{on} = 10 μs; δ = 0,01; T_{amb} = 25 °C; typical values.

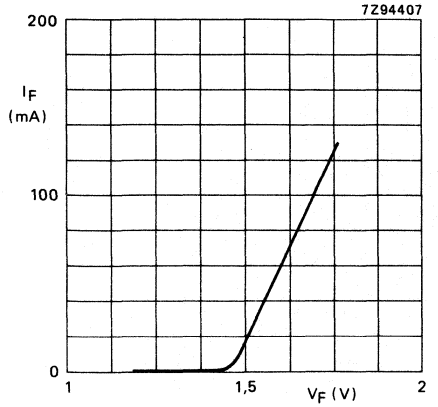


Fig. 6 T_{amb} = 25 °C; typical values.

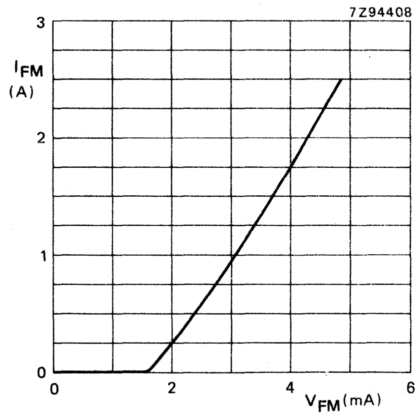


Fig. 7 t_{on} = 10 μs; T_{amb} = 25 °C; typical values.

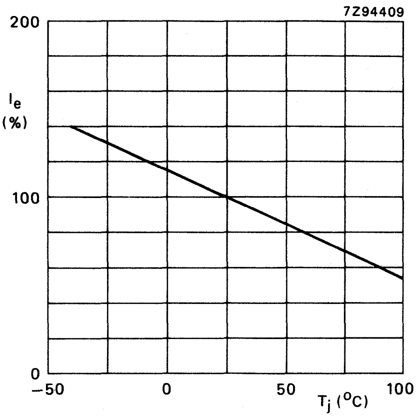


Fig. 8 I_F = 100 mA; typical values.

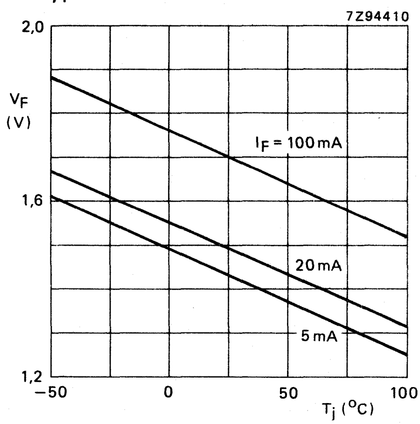


Fig. 9 Typical values.

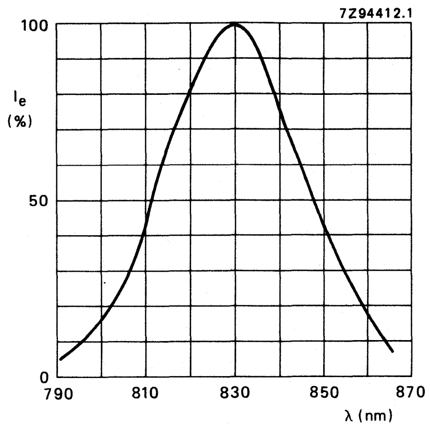


Fig. 10 Spectral response; typical values.

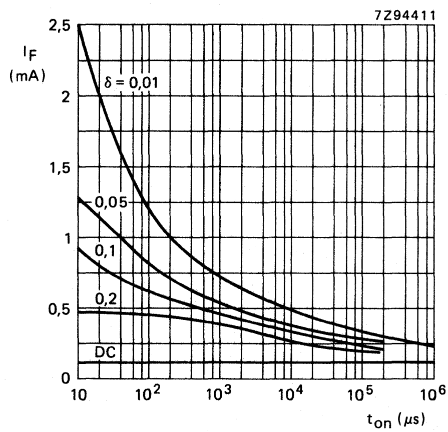


Fig. 11 Typical values.

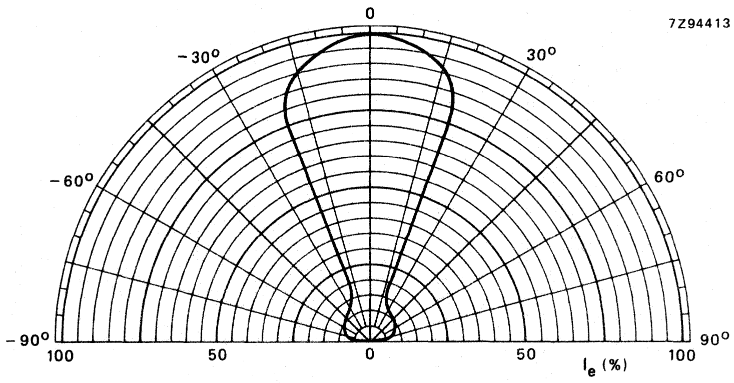


Fig. 12 Typical values.

LIGHT EMITTING DIODE

Circular infrared emitting diode with diameter of 5 mm which emits infrared light at a typical peak wavelength of 830 nm (GaAlAs; infrared) when forward biased.
The CQW89B has a SOD-94 outline and is moulded in a light blue encapsulation.
The application of new GaAlAs (intrinsic) technology results in extremely short switching times and very low degradation during the devices' operating life.
It is intended for remote control applications using carrier frequencies up to 1 MHz. Combination with the high-speed photo p-i-n diode BPW50 is recommended.

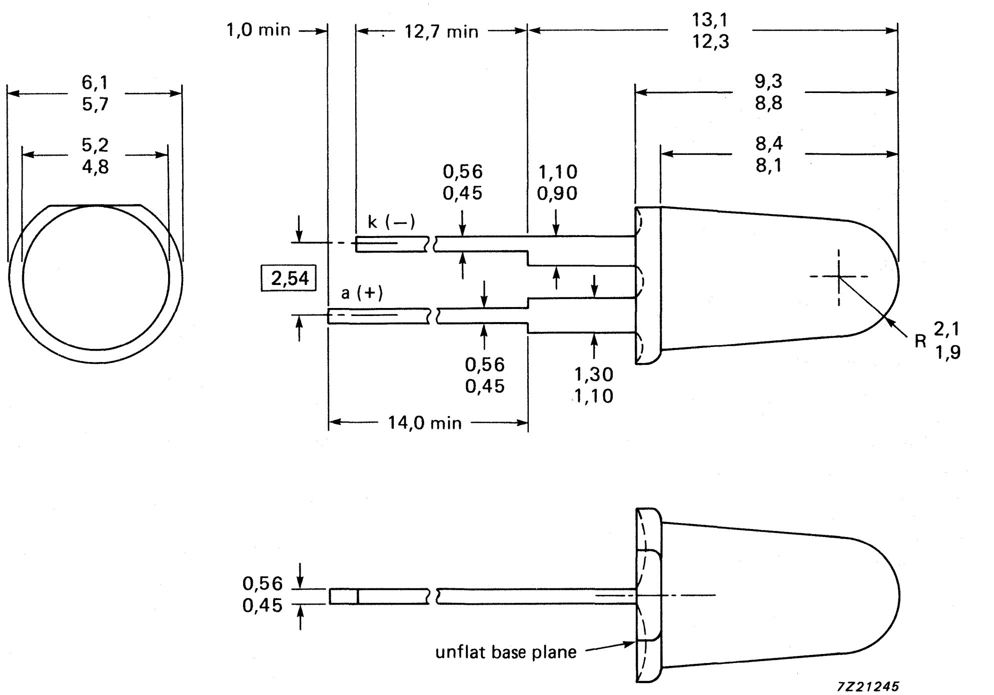
QUICK REFERENCE DATA

Continuous reverse voltage	V_R	max.	5	V
Forward current (d.c.)	I_F	max.	130	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	300	mW
Junction temperature	T_j	max.	100	°C
Radiant intensity (on axis) I_F = 100 mA	I_e	min.	20	mW/Sr
Emission angle at half intensity	$\theta½$	typ.	12	°
Peak wavelength	λp	typ.	830	nm

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-94.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	130	mA
peak value; t_{on} = 10 μs; δ = 0,01	I_{FRM}	max.	2500	mA
peak value; t_{on} = 50 μs; δ = 0,01	I_{FRM}	max.	1500	mA
Total power dissipation up to T_{amb} = 25 °C with heatsink	P_{tot}	max.	300	mW
Storage temperature	T_{stg}	−55 to	+100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature T_{sld} ⩽ 7 s. ⩾ 1,5 mm from the seating plane	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a printed circuit board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 1,5 A (t_{on} = 50 μs, δ = 0,01)	V_F	typ.	3,7	V
Forward voltage I_F = 100 mA	V_F	typ.	1,7	V
		max.	2,2	V
Reverse current V_R = 5 V	I_R	max.	10	μA
Capacitance V_R = 0 V; f = 1 MHz	C_d	typ.	200	pF
Total radiant power I_F = 100 mA	ϕe	typ.	8	mW
Bandwidth at half height I_F = 100 mA	$\Delta\lambda$	typ.	35	nm
Wavelength at peak emission I_F = 100 mA	λ_p	typ.	830	nm
Radiant intensity (on axis) I_F = 100 mA	I_e	min.	20	mW/sr
		typ.	35	mW/sr
Radiant power temperature coefficient	$K\phi e$	typ.	−0,6	%/K
Emission angle at half intensity and I_F = 100 mA	ϕ½	typ.	12	°
Switching time (see Figs 2 and 3) I_F = 100 mA	t_r	typ.	30	ns
	t_f	typ.	30	ns

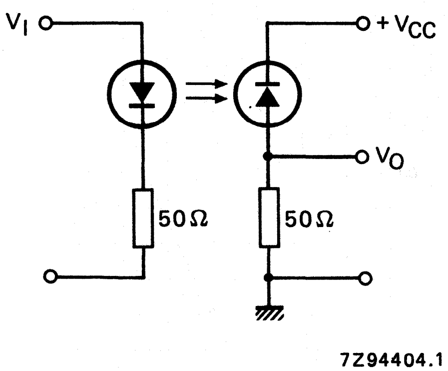


Fig. 2 Measuring circuit.

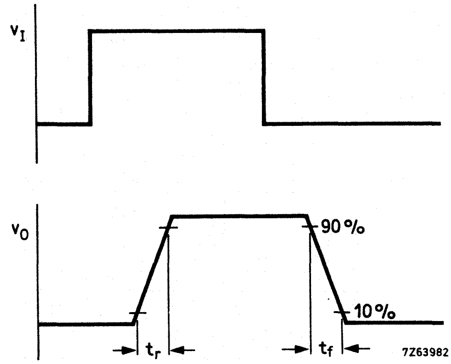


Fig. 3 Waveforms.

DEVELOPMENT DATA

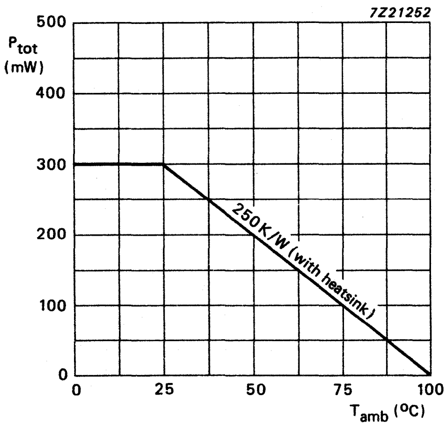


Fig. 4 Power derating curve.

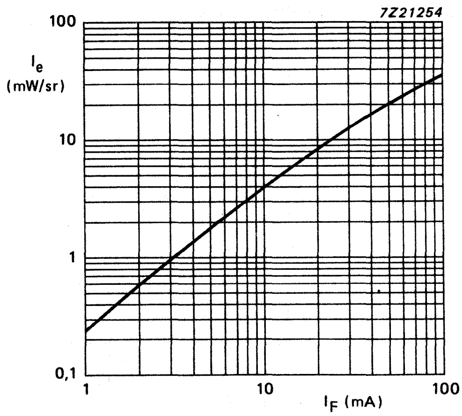


Fig. 5 Radiant intensity as a function of forward current; t_{on} = 10 ms; T_{amb} = 25 °C; typical values.

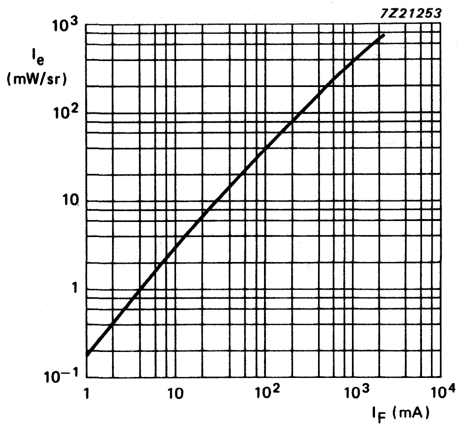


Fig. 6 Radiant intensity as a function of forward current; t_{on} = 10 μs; δ = 0,01; T_{amb} = 25 °C; typical values.

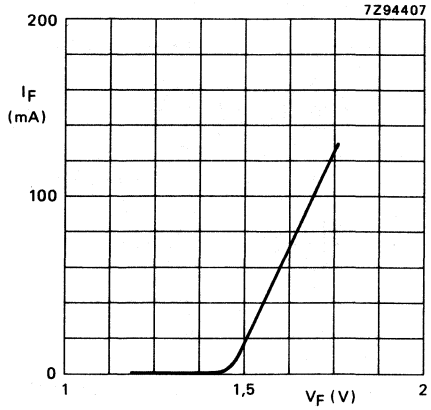


Fig. 7 Forward current as a function of forward voltage; T_{amb} = 25 °C; typical values.

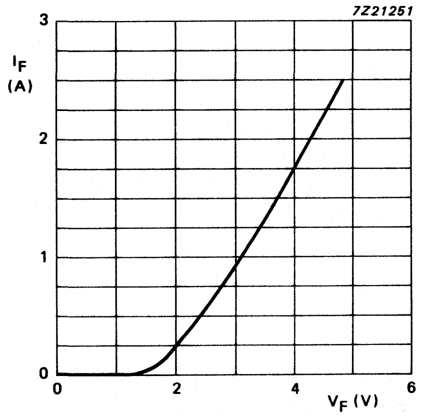


Fig. 8 Forward current as a function of forward voltage; t_{on} = 10 μs; δ = 0,01; T_{amb} = 25 °C; typical values.

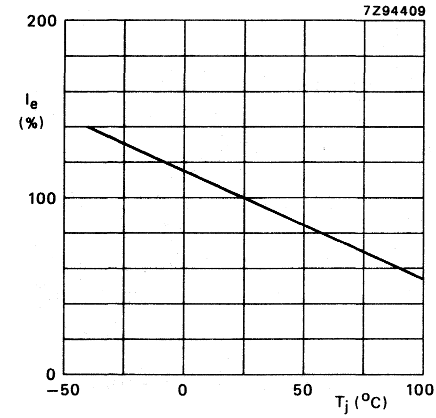


Fig. 9 Radiant intensity as a function of junction temperature; I_F = 100 mA; typical values.

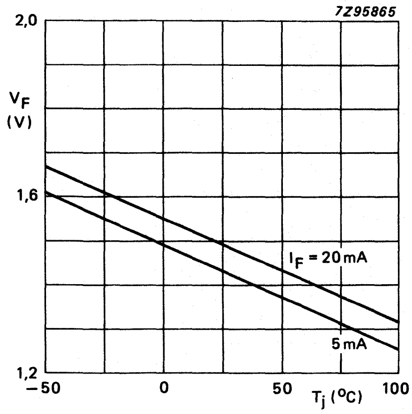


Fig. 10 Forward voltage as a function of junction temperature; typical values.

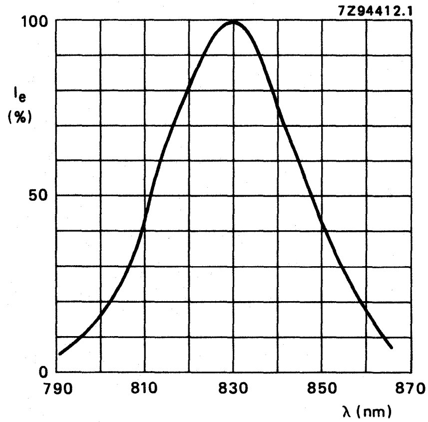


Fig. 11 Spectral response; typical values.

DEVELOPMENT DATA

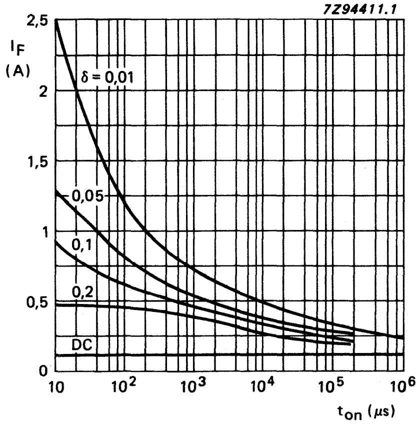


Fig. 12 Forward current as a function of time; typical values.

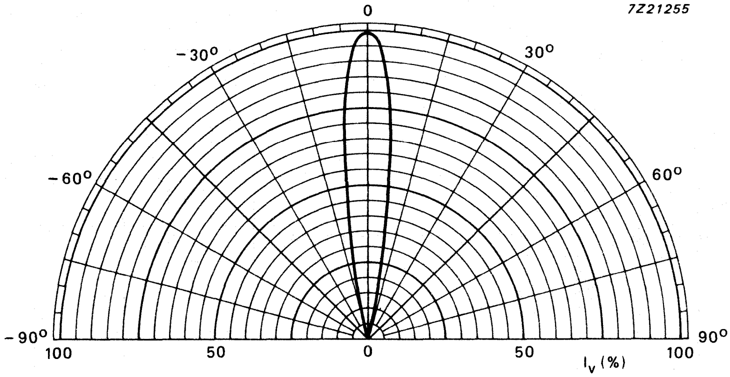


Fig. 13 Polar diagram; typical values.

INFRARED EMITTING DIODE

Diffused planar light emitting diode intended for optical coupling and encoding. It emits radiation in the near infrared when forward biased. Infrared translucent epoxy encapsulation (dark blue). Combination with phototransistor BPW22A is recommended.

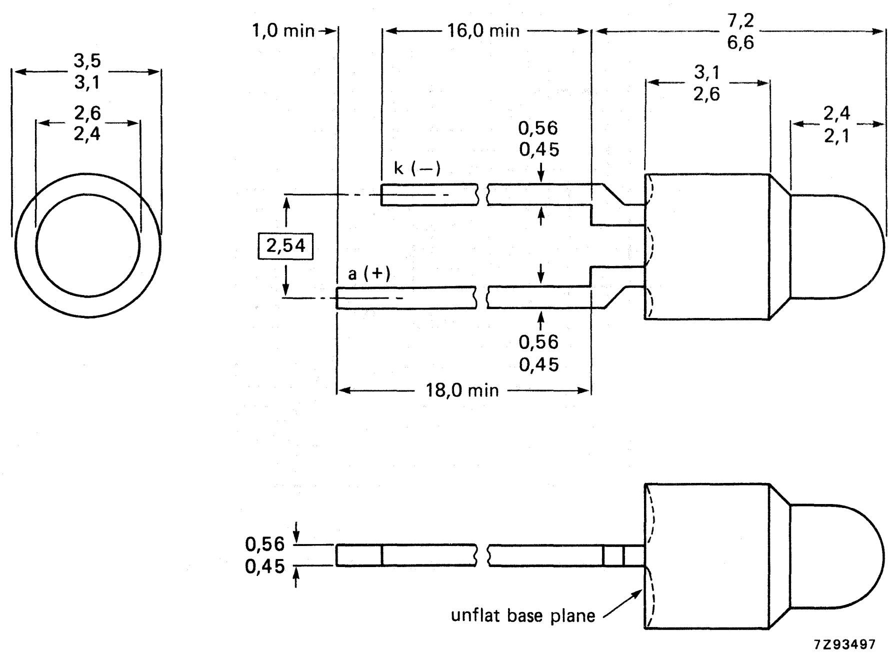
QUICK REFERENCE DATA

Continuous reverse voltage	V_R	max.	5	V
Forward current (d.c.)	I_F	max.	50	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	100	mW
Radiant intensity (on-axis) at I_F = 20 mA	I_e	typ.	2	mW/sr
Wavelength at peak emission	λ_p	typ.	930	nm
Beamwidth between half-intensity directions	$\theta_{1/2}$	typ.	20	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53F.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	50	mA
(peak value); t_p = 10 μs; δ = 0,01	I_{FRM}	max.	200	mA
Total power dissipation up to T_{amb} = 25 °C (see Fig. 2)	P_{tot}	max.	100	mW
Storage temperature	T_{stg}	−55 to +	100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature				
> 1,5 mm from the seating plane; t_{sld} < 7 s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient, device mounted on a printed-circuit board	$R_{th\ j\text{-}a}$	=	750	K/W

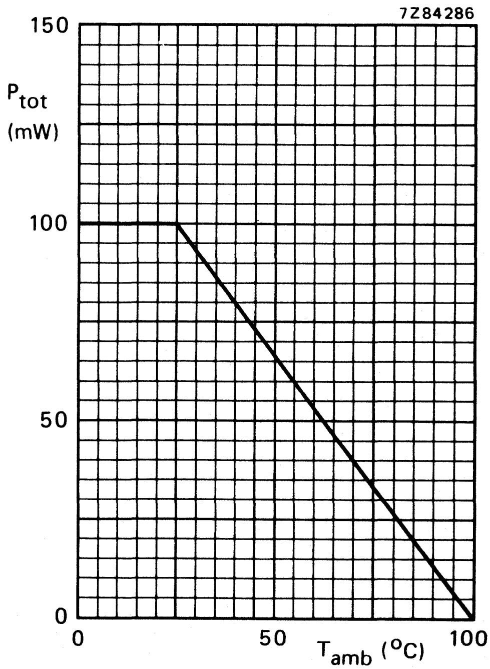


Fig. 2 Power derating curve versus ambient temperature.

CHARACTERISTICS

T_j = 25 °C

Forward voltage I_F = 20 mA		V_F	typ. max.	1,2 V 1,5 V
Reverse current V_R = 5 V		I_R	max.	100 μA
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	40 pF
Total radiant power I_F = 20 mA	**CQY58A**	ϕ_e I_e	typ. min.	1 mW 2 mW/sr
Radiant intensity (on-axis) I_F = 20 mA	**CQY58A-1**	I_e	min. max.	1 mW/sr 5 mW/sr
	CQY58A-2	I_e	min.	3 mW/sr
Wavelength at peak emission		λ_p	typ.	930 nm
Bandwidth at half height		$\Delta\lambda$	typ.	50 nm
Beamwidth between half-intensity directions I_F = 20 mA		$\theta_{½}$	typ.	20 °
Switching times I_{Fon} = 20 mA				
Light rise time		t_r	typ.	3 μs
Light fall time		t_f	typ.	3 μs

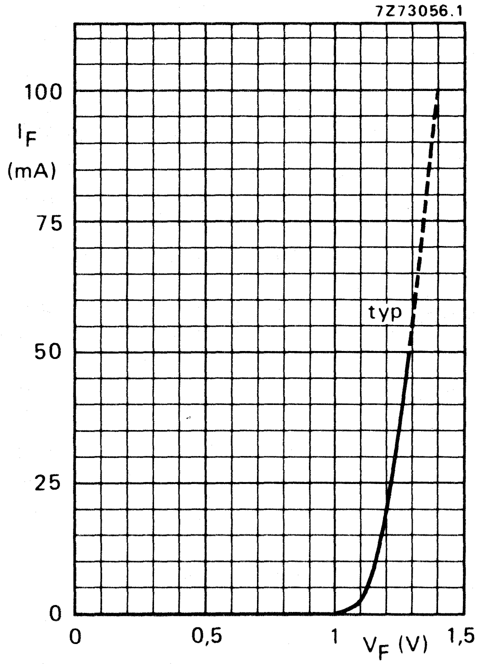


Fig. 3 T_{amb} = 25 ^oC.

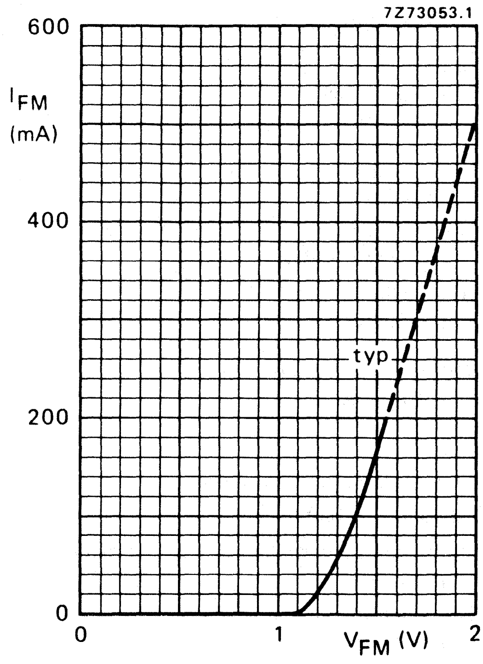


Fig. 4 t_p = 10 μs; T = 1 ms; T_{amb} = 25 ^oC.

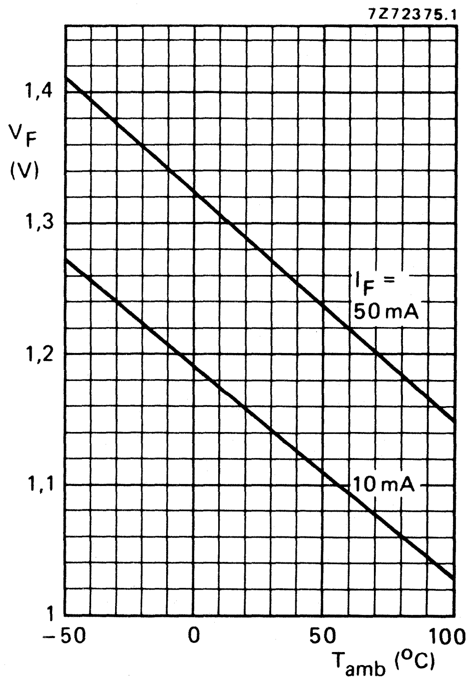


Fig. 5 Typical values.

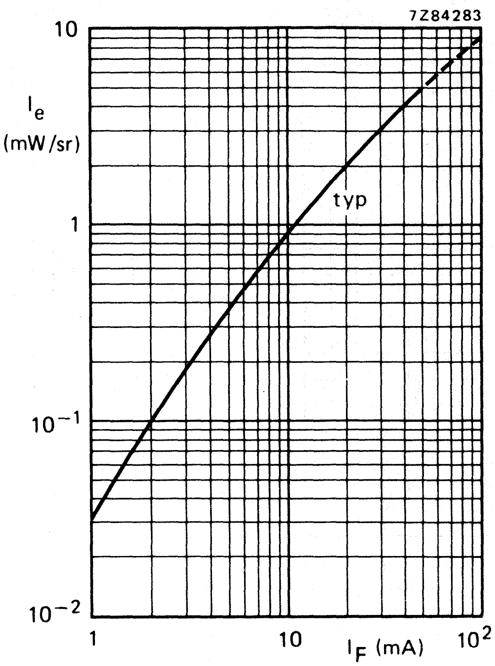


Fig. 6 T_{amb} = 25 °C.

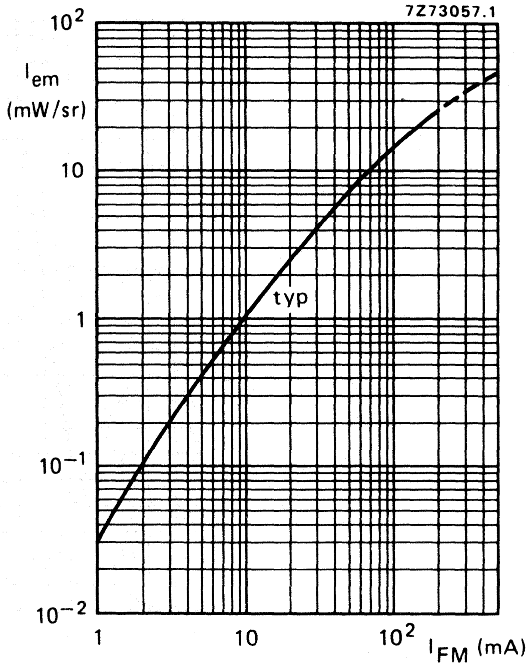


Fig. 7 t_p = 10 µs; T = 1 ms; T_{amb} = 25 °C.

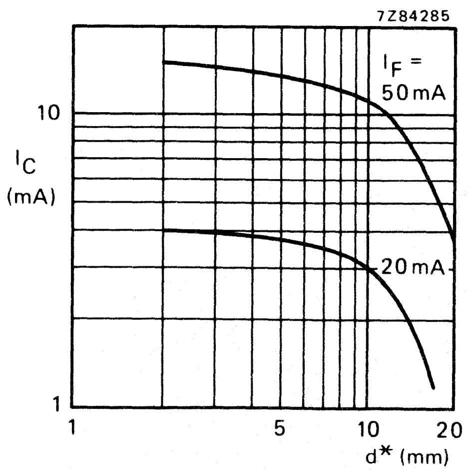


Fig. 8 V_{CE} = 5 V; T_{amb} = 25 °C; typical values.

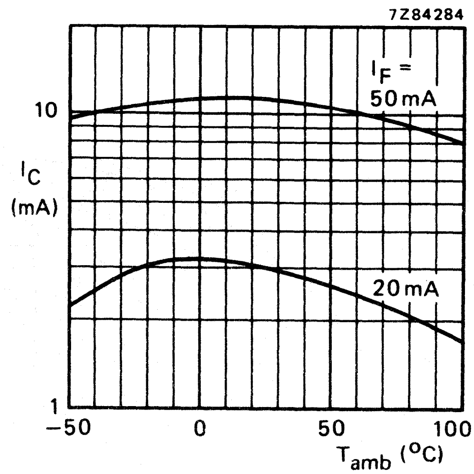


Fig. 9 V_{CE} = 5 V; d* = 10 mm; typical values.

* d = shortest free distance of mechanical on-axis when BPW22A is coupled with CQY58A.

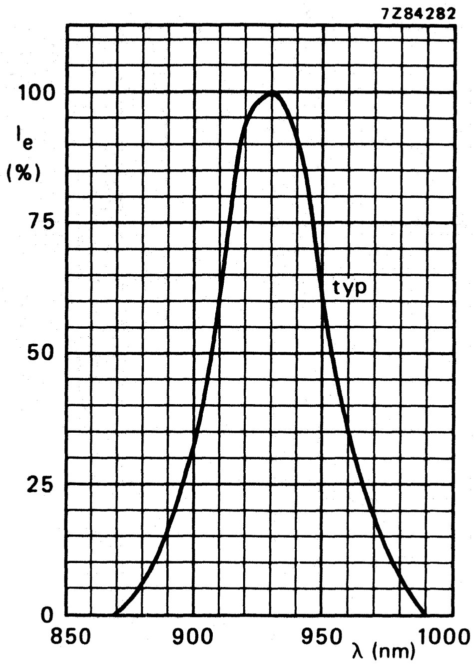


Fig. 10 Spectral response.

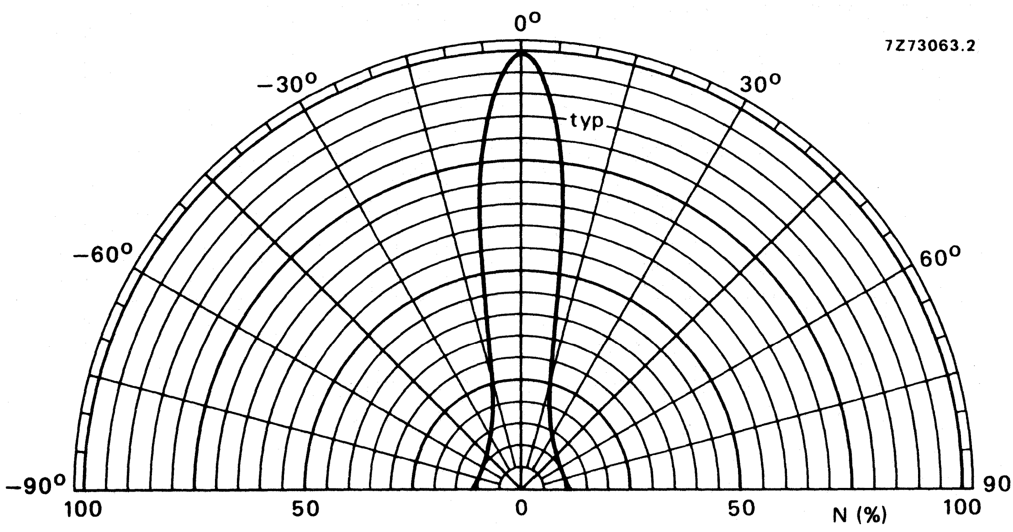


Fig. 11 Typical values.

GaAs LIGHT EMITTING DIODE

Epitaxial gallium arsenide light emitting diode intended for remote-control applications. It emits radiation in the near infrared when forward biased. Infrared translucent epoxy encapsulation (dark blue).

Combination with the photo p-i-n diode BPW50 is recommended.

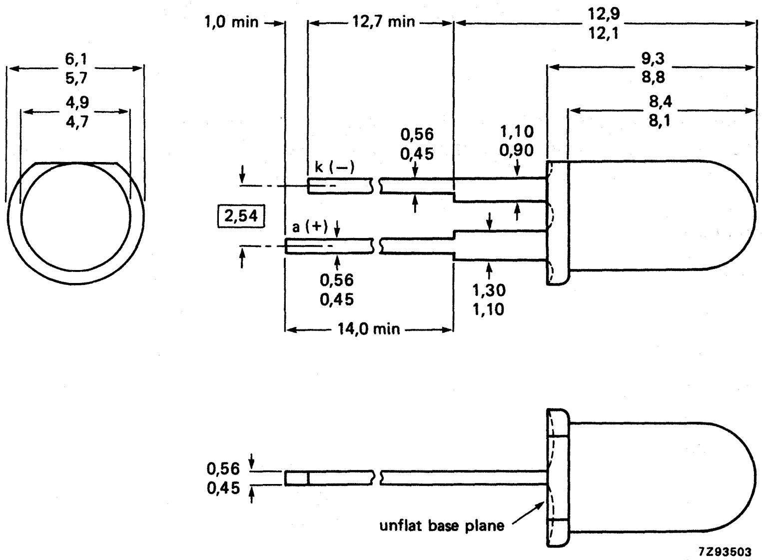
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	130	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Radiant intensity (on-axis)					
static (at d.c. condition)					
I_F = 100 mA	CQY89A	I_e	min.	9	mW/sr
	CQY89A-1	I_e	min.	12	mW/sr
	CQY89A-2	I_e	min.	15	mW/sr
dynamic (at pulse condition)					
I_{FM} = 100 mA; t_p = 0,5 μs; δ = 0,5		I_{eD}	typ.	0,3	I_e
Wavelength at peak emission		λ_p	typ.	930	nm

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-63B2.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current (d.c.)	I_F	max.	130	mA
Forward current (peak value) $t_p \leqslant 50\ \mu s$; $\delta = 0{,}05$	I_{FM}	max.	1000	mA
Non-repetitive peak forward current ($t_p \leqslant 10\ \mu s$)	I_{FSM}	max.	2500	mA
Total power dissipation up to $T_{amb} = 25\ ^oC$	P_{tot}	max.	215	mW
Storage temperature	T_{stg}	−55 to + 100		^oC
Junction temperature	T_j	max.	100	^oC
Lead soldering temperature up to the seating plane; $t_{sld} < 10$ s	T_{sld}	max.	260	^oC

THERMAL RESISTANCE

From junction to ambient mounted on a printed-circuit board	$R_{th\ j\text{-}a}$	=	350	K/W

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Forward voltage $I_F = 100$ mA		V_F	typ.	1,4	V
			<	1,6	V
$I_{FM} = 1500$ mA; $t_p = 20\ \mu s$; $\delta = 0{,}033$		V_{FM}	typ.	2,4	V
Reverse current $V_R = 5$ V		I_R	<	100	μA
Diode capacitance $V_R = 0$; f = 1 MHz		C_d	typ.	40	pF
Total radiant power $I_F = 100$ mA		ϕ_e	>	7	mW
			typ.	12	mW
Decrease of radiant power with temperature $I_F = 100$ mA		$\frac{\Delta\phi_e}{\Delta T_j}$	typ.	1	%/K
Radiant intensity (on-axis) static (at d.c. condition) $I_F = 100$ mA	CQY89A	I_e	min.	9	mW/sr
	CQY89A-1	I_e	min.	12	mW/sr
	CQY89A-2	I_e	min.	15	mW/sr
dynamic (at pulse condition)* $I_{FM} = 100$ mA; $t_p = 0{,}5\ \mu s$; $\delta = 0{,}5$		I_{eD}	typ.	0,3	I_e

* I_{eD} = Dynamic radiant intensity (average radiant intensity level during pulse time).

Wavelength at peak emission			
I_F = 100 mA	λ_p	typ.	930 nm
Bandwidth at half height			
I_F = 100 mA	$\Delta\lambda$	typ.	50 nm
Beamwidth between half-intensity directions			
I_F = 100 mA	$\theta_{1/2}$	typ.	40 °

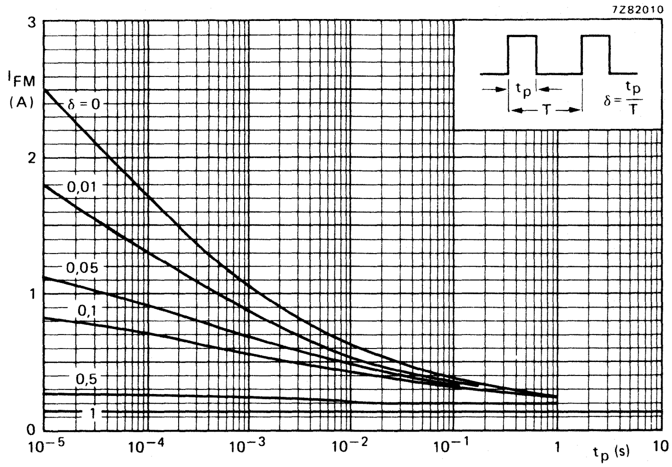


Fig. 2 T_{amb} = 25 °C; $T_{j\ peak}$ = 100 °C.

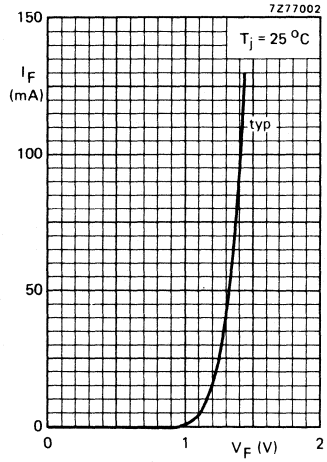


Fig. 3.

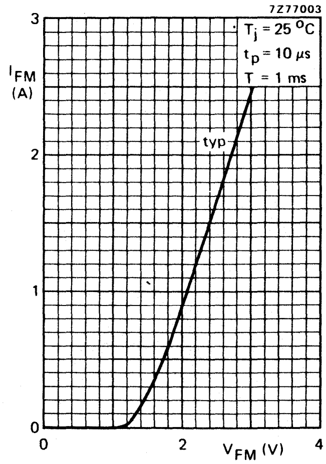


Fig. 4.

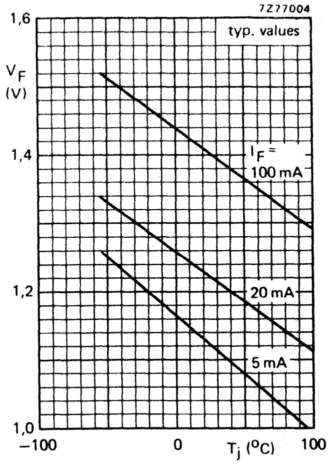


Fig. 5.

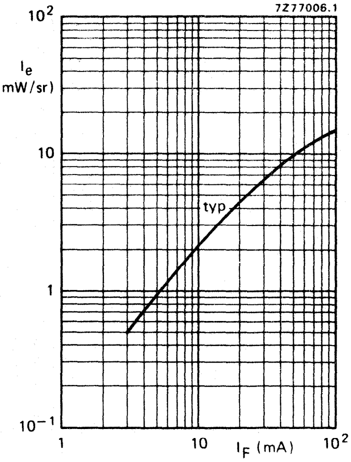


Fig. 6 T_j = 25 °C.

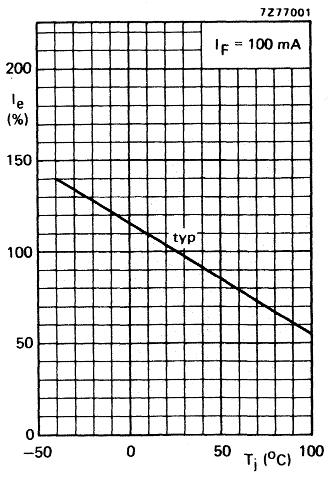


Fig. 7.

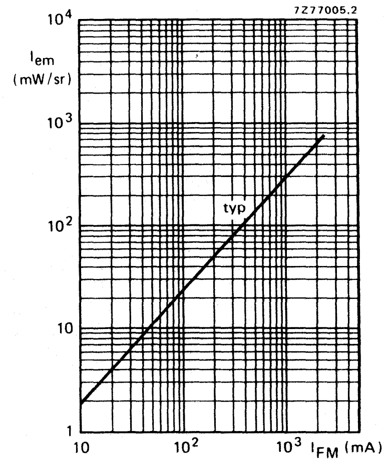


Fig. 8 T_{amb} = 25 °C; t_p = 10 μs; T = 1 ms.

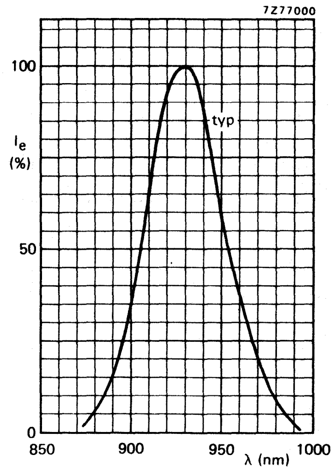

7Z77000
100
50
0
I_e
(%)
typ
850
900
950
1000
λ (nm)

Fig. 9.

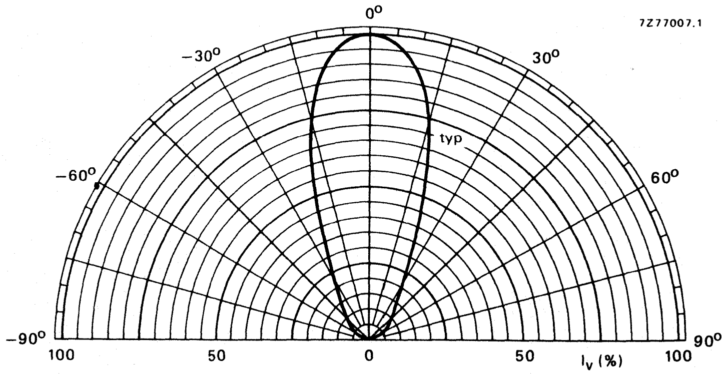

7Z77007.1
0°
−30°
30°
−60°
60°
−90°
90°
typ
100
50
0
50
100
I_v (%)

Fig. 10.

GaAs LIGHT EMITTING DIODE

Epitaxial gallium arsenide light emitting diode intended for remote-control applications. It emits radiation in the near infrared when forward biased.
The special, flat infrared translucent epoxy encapsulation (dark blue) is optimised for mounting in a thin remote control emitter unit.

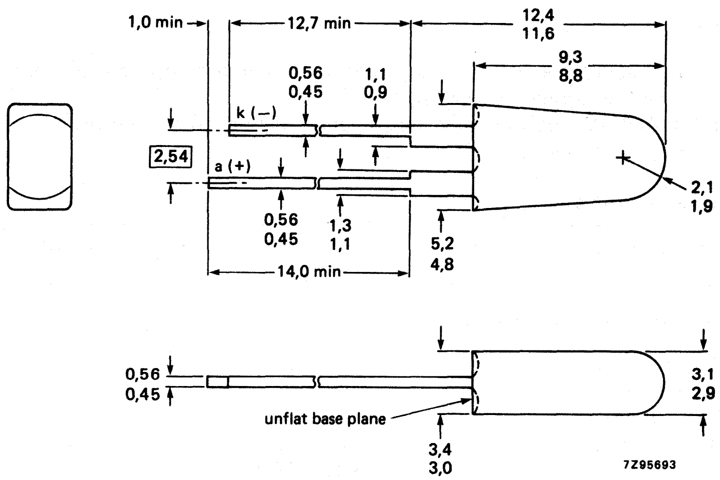
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	130	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Radiant intensity (on-axis)					
static (at d.c. condition)					
I_F = 100 mA	**CQY89F**	I_e	min.	9	mW/sr
	CQY89F-1	I_e	min.	12	mW/sr
	CQY89F-2	I_e	min.	15	mW/sr
dynamic (at pulse condition)					
I_{FM} = 100 mA; t_p = 0,5 μs; δ = 0,5		I_{eD}	typ.	0,3	I_e
Wavelength at peak emission		λ_p	typ.	930	nm

MECHANICAL DATA

Fig. 1 FO-147A2.

Dimensions in mm



DEVELOPMENT DATA

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current (d.c.)	I_F	max.	130 mA
Forward current (peak value) $t_p \leqslant 50\ \mu s$; $\delta = 0{,}05$	I_{FM}	max.	1000 mA
Non-repetitive peak forward current ($t_p \leqslant 10\ \mu s$)	I_{FSM}	max.	2500 mA
Total power dissipation up to $T_{amb} = 25\ ^oC$	P_{tot}	max.	215 mW
Storage temperature	T_{stg}	−55 to + 100	^oC
Junction temperature	T_j	max.	100 ^oC
Lead soldering temperature up to the seating plane; $t_{sld} < 10$ s	T_{sld}	max.	260 ^oC

THERMAL RESISTANCE

From junction to ambient with device mounted on a printed-circuit board	$R_{th\ j\text{-}a}$	=	350 K/W

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Forward voltage $I_F = 100$ mA		V_F	typ.	1,4 V
			<	1,6 V
$I_{FM} = 1500$ mA; $t_p = 20\ \mu s$; $\delta = 0{,}033$		V_{FM}	typ.	2,4 V
Reverse current $V_R = 5$ V		I_R	<	100 μA
Diode capacitance $V_R = 0$; f = 1 MHz		C_d	typ.	40 pF
Total radiant power $I_F = 100$ mA		ϕ_e	typ.	12 mW
Decrease of radiant power with temperature $I_F = 100$ mA		$\dfrac{\Delta\phi_e}{\Delta T_j}$	typ.	1 %/K
Radiant intensity (on-axis) static (at d.c. condition) $I_F = 100$ mA	**CQY89F**	I_e	min.	9 mW/sr
	CQY89F-1	I_e	min.	12 mW/sr
	CQY89F-2	I_e	min.	15 mW/sr
dynamic (at pulse condition)* $I_{FM} = 100$ mA; $t_p = 0{,}5\ \mu s$; $\delta = 0{,}5$		I_{eD}	typ.	0,3 I_e

* I_{eD} = Dynamic radiant intensity (average radiant intensity level during pulse time).

Wavelength at peak emission			
I_F = 100 mA	λ_p	typ.	930 nm
Bandwidth at half height			
I_F = 100 mA	$\Delta\lambda$	typ.	50 nm
Beamwidth between half-intensity directions			
I_F = 100 mA; in the plane of the leads	$\theta_{1/2}$	typ.	40 ^{o}
perpendicular to the plane of the leads	$\theta_{1/2}$	typ.	25 ^{o}

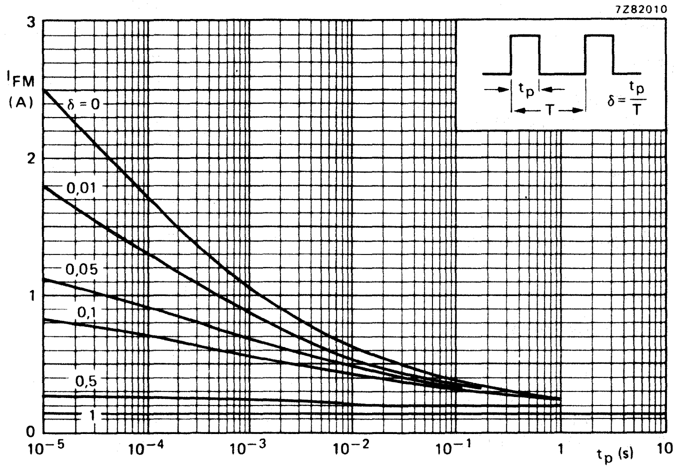


Fig. 2 T_{amb} = 25 ^oC; $T_{j\ peak}$ = 100 ^oC.

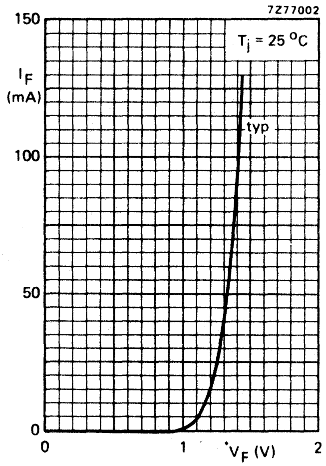


Fig. 3.

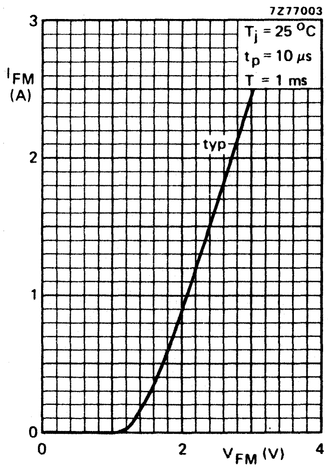


Fig. 4.

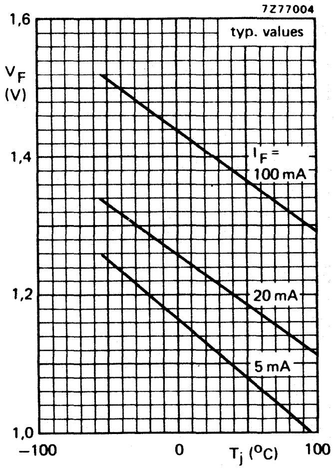


Fig. 5.

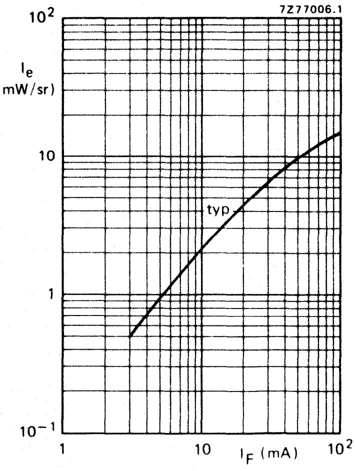


Fig. 6 T_j = 25 °C.

DEVELOPMENT DATA

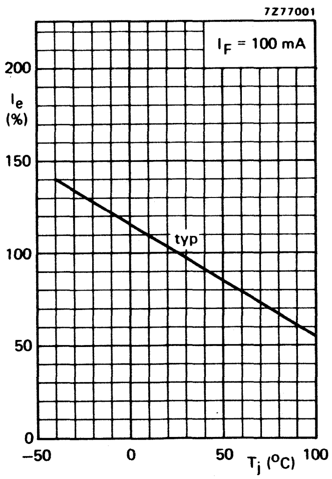


Fig. 7.

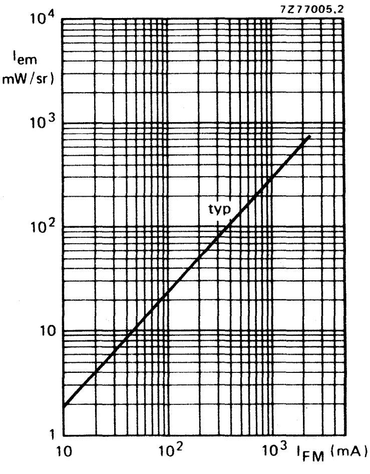


Fig. 8 T_{amb} = 25 °C; t_p = 10 μs; T = 1 ms.

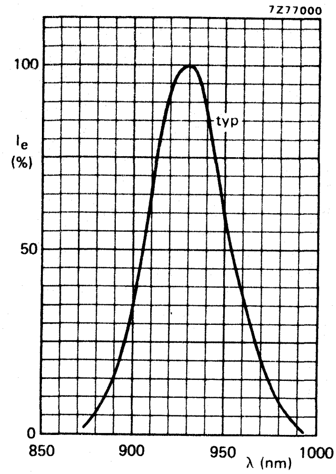


Fig. 9.

LIGHT EMITTING DIODE WITH HIGH LUMINOSITY

Circular light emitting diode with a diameter of 3 mm which emits green light at a typical peak wavelength of 565 nm (GaP; super-green) when forward biased.

The PLED-G313A has a SOD-53 outline and is encapsulated in a green non-diffusing resin.

The PLED-G313A can resist higher forward currents when high luminosity is required. An appropriate device, for example, for the backlighting of push buttons.

Note: This device has to be used behind a diffusing screen.

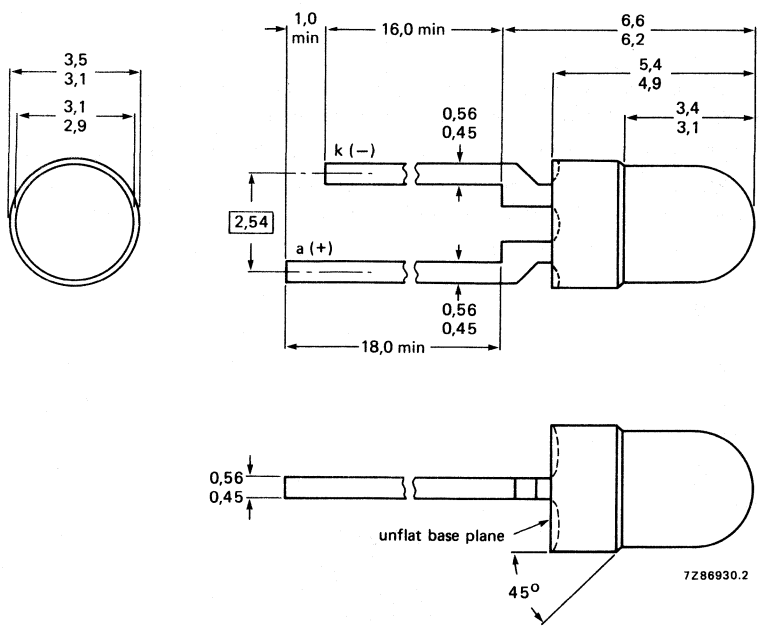
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	150	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-G313A	I_v	min.	3	mcd
	PLED-G313A-5	I_v		5 to 12	mcd
	PLED-G313A-6	I_v		10 to 22	mcd
	PLED-G313A-7	I_v	min.	16	mcd
Wavelength at peak emission		λ_p	typ.	565	nm
Beamwidth between half-intensity directions		$\theta_{½}$	typ.	60	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53E.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
DC	I_F	max.	60 mA
peak value; $t_p = 1\ \mu s$; f = 300 Hz	I_{FRM}	max.	1 A
peak value; $t_{on} = 1$ ms; $\delta = 0.33$	I_{FRM}	max.	150 mA
Total power dissipation up to $T_{amb} = 25\ ^oC$	P_{tot}	max.	150 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature > 1.5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	500 K/W

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Forward voltage $I_F = 10$ mA		V_F	typ.	2.1 V
			max.	3.0 V
Reverse current $V_R = 5$ V		I_R	max.	100 µA
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	60 °
Bandwidth at half height		$\Delta\lambda$	typ.	30 nm
Wavelength at peak emission		λ_p	typ.	565 nm
Luminous intensity $I_F = 10$ mA	PLED-G313A	I_v	min.	3 mcd
	PLED-G313A-5	I_v		5 to 12 mcd
	PLED-G313A-6	I_v		10 to 22 mcd
	PLED-G313A-7	I_v	min.	16 mcd
Diode capacitance $V_R = 0$; f = 1 MHz		C_d	typ.	20 pF

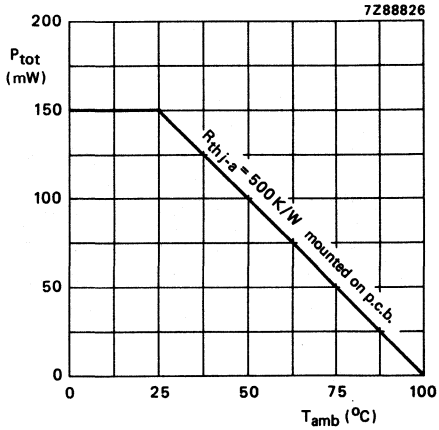


Fig. 2.

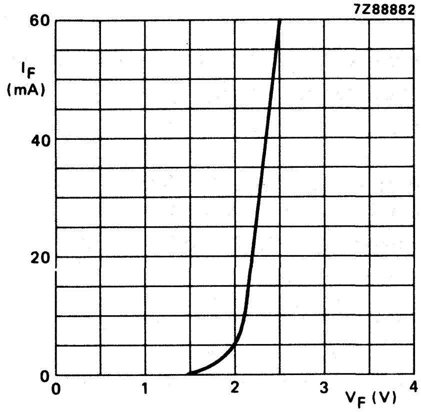


Fig. 3 T_{amb} = 25 °C; typ. values.

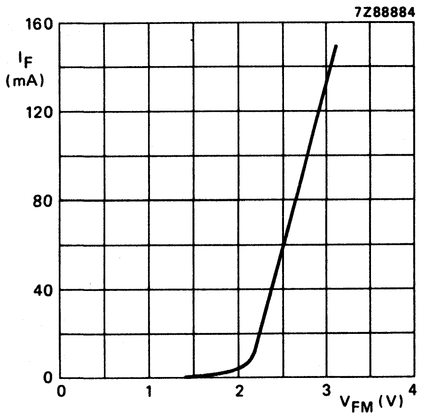


Fig. 4 t_{on} = 1 ms; δ = 0.33;
T_{amb} = 25 °C; typ. values.

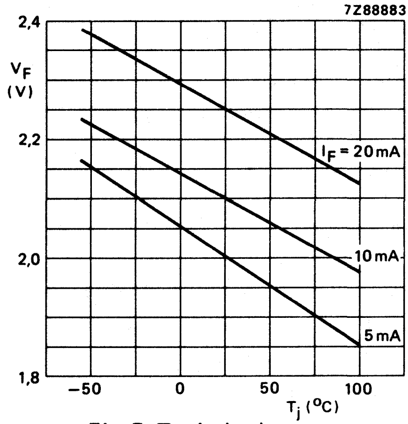


Fig. 5 Typical values.

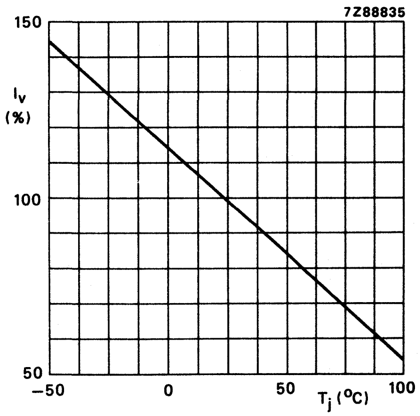


Fig. 6 Typical values.

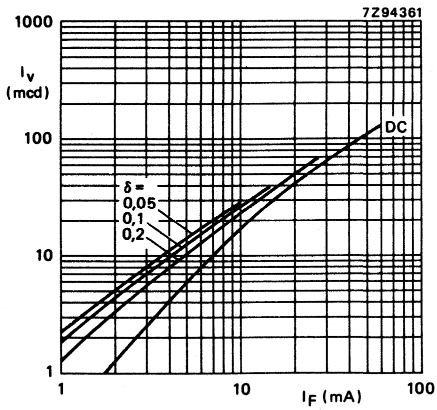


Fig. 7 t_p = 50 μs; typ. values.

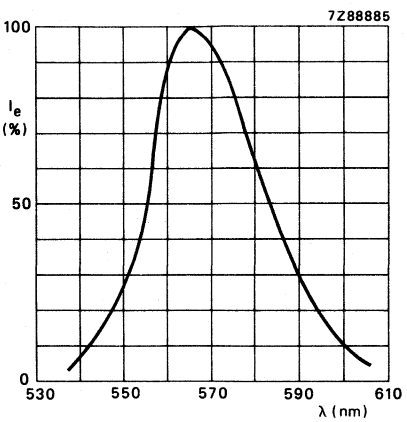


Fig. 8 I_F = 10 mA; typ. values.

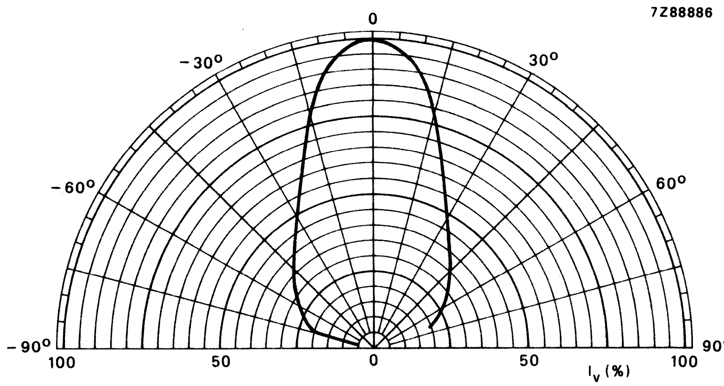


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits green light (GaP; green) at a typical peak wavelength of 565 nm when forward biased.
The PLED-G313N has a SOD-82C1 outline and is encapsulated in a green non-diffusing resin.

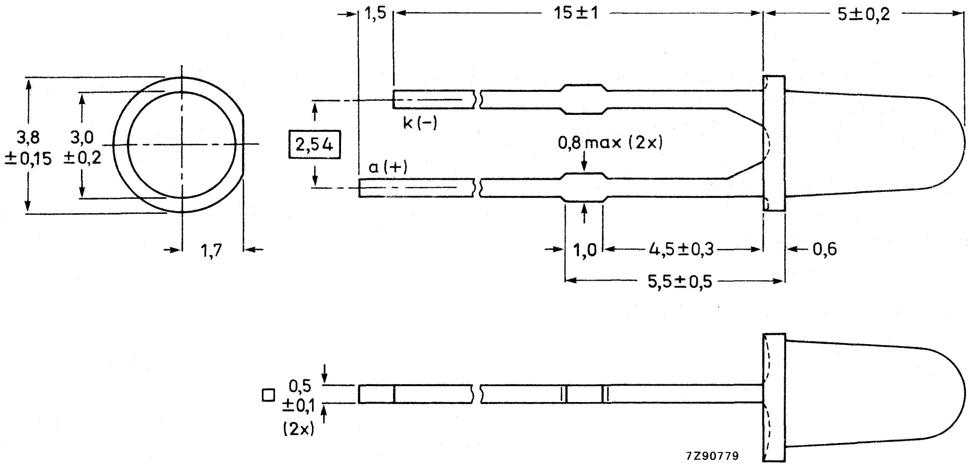
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	30	mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90	mW
Luminous intensity					
I_F = 10 mA	PLED-G313N	I_v	min.	1,0	mcd
			typ.	2,5	mcd
	PLED-G313N-3	I_v	1,6 to	3,5	mcd
	PLED-G313N-4	I_v	3,0 to	7,0	mcd
	PLED-G313N-5	I_v	5,0 to	12,0	mcd
	PLED-G313N-56	I_v	5,0 to	22,0	mcd
	PLED-G313N-6	I_v	10,0 to	22,0	mcd
Wavelength at peak emission					
I_F = 20 mA		λp	typ.	565	nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	25	deg

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-82C1.
PLED-G313N



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	30	mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150	mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}	−30 to + 100		°C
Operating ambient temperature	T_{opr}	−25 to + 85		°C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260	°C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2	V
			max.	2,8	V
Reverse current V_R = 5 V		I_R	max.	10	μA
Beamwidth at half-intensity directions		$\theta½$	typ.	25	deg
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	565	nm
Luminous intensity I_F = 10 mA	PLED-G313N	I_v	min.	1,0	mcd
			typ.	2,5	mcd
	PLED-G313N-3	I_v	1,6 to	3,5	mcd
	PLED-G313N-4	I_v	3,0 to	7,0	mcd
	PLED-G313N-5	I_v	5,0 to	12,0	mcd
	PLED-G313N-56	I_v	5,0 to	22,0	mcd
	PLED-G313N-6	I_v	10,0 to	22,0	mcd

DEVELOPMENT DATA

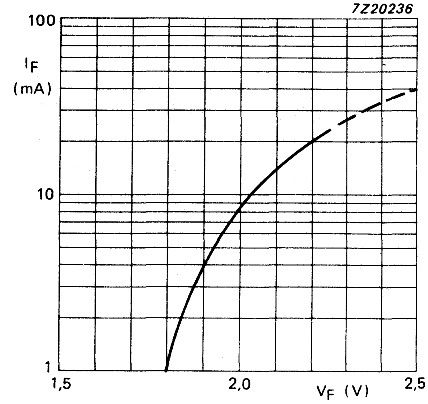


Fig. 2 $I_F = F(V_F)$; typical values.

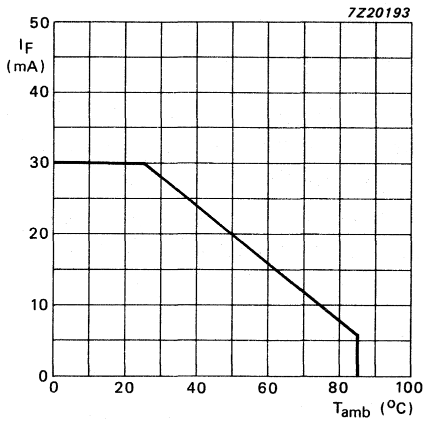


Fig. 3 $I_F = f(T_{amb})$; typical values.

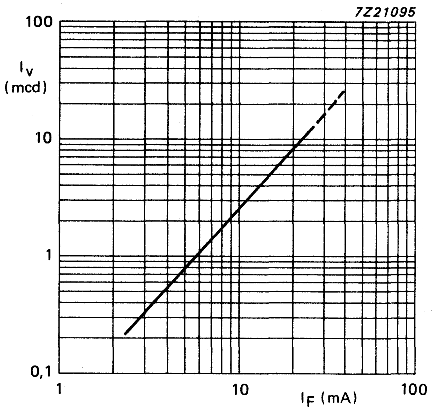


Fig. 4 $I_v = f(I_F)$; typical values.

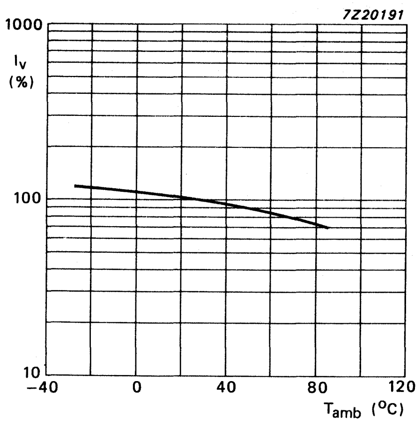


Fig. 5 $I_v(\%) = f(T_{amb})$; typical values.

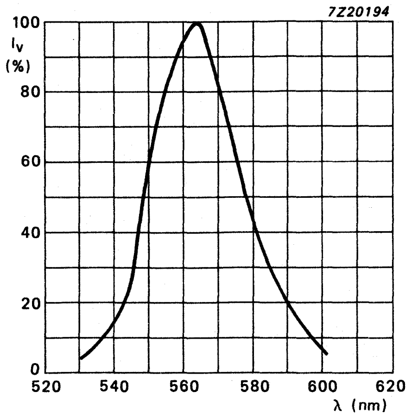


Fig. 6 Spectral response; typical values.

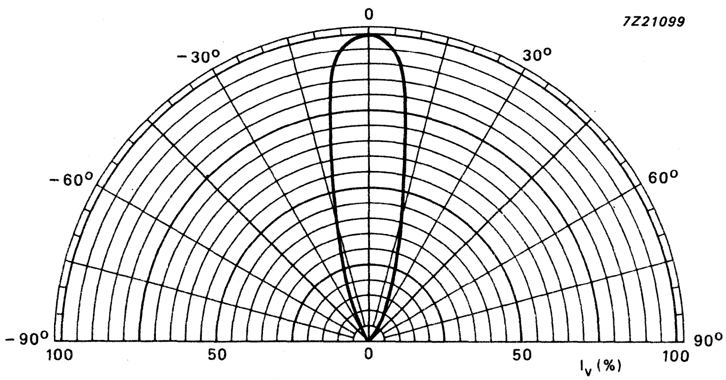


Fig. 7 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits green light at a typical peak wavelength of 565 nm (GaP; super-green) when forward biased.

The PLED-G314A has a SOD-53 outline and is encapsulated in a green diffusing resin.

This LED can resist higher forward currents when a higher lumiousity is required. Because the PLED-G314A is available in high I_V classes, it is suitable for those applications where only low currents are available.

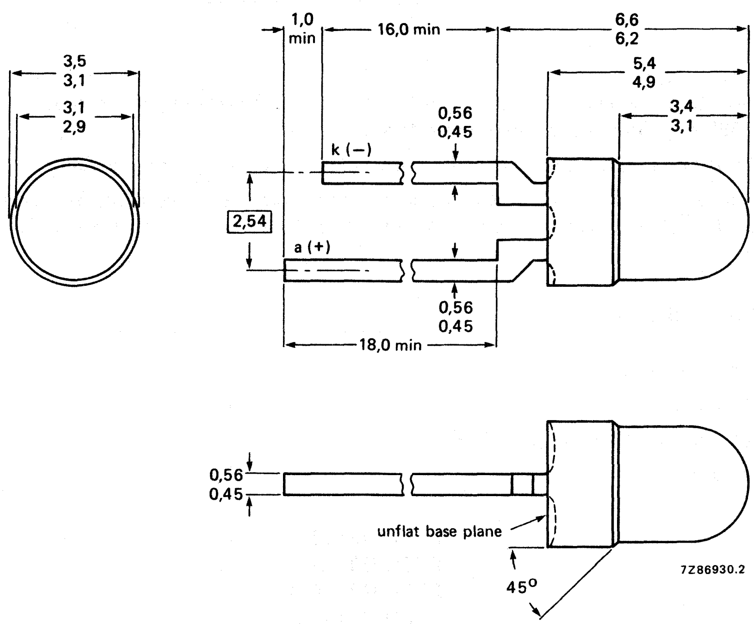
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 25 ^oC		P_{tot}	max.	150	mW
Junction temperature		T_j	max.	100	^oC
Luminous intensity					
I_F = 10 mA	PLED-G314A	I_V	min.	0.7	mcd
	PLED-G314A-3	I_V		1.6 to 3.5	mcd
	PLED-G314A-4	I_V		3.0 to 7.0	mcd
	PLED-G314A-5	I_V	min.	5.0	mcd
Wavelength at peak emission		λ_p	typ.	565	nm
Beamwidth between half-intensity directions		$\theta_{½}$	typ.	70	^{o}

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53E.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	60	mA
peak value; $t_p = 1\ \mu s$; $f = 300$ Hz	I_{FRM}	max.	1	A
peak value; $t_{on} = 1$ ms; $\delta = 0.33$	I_{FRM}	max.	150	mA
Total power dissipation up to $T_{amb} = 25\ ^oC$	P_{tot}	max.	150	mW
Storage temperature	T_{stg}		−55 to +100	^oC
Junction temperature	T_j	max.	100	^oC
Lead soldering temperature $>$ 1.5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260	^oC

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	500	K/W

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Forward voltage $I_F = 10$ mA		V_F	typ.	2.1	V
		V_F	max.	3.0	V
Reverse current $V_R = 5$ V		I_R	max.	100	μA
Beamwidth between half-intensity directions		$\theta_{½}$	typ.	70	^{o}
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission		λ_p	typ.	565	nm
Luminous intensity $I_F = 10$ mA	PLED-G314A	I_v	min.	0.7	mcd
	PLED-G314A-3	I_v		1.6 to 3.5	mcd
	PLED-G314A-4	I_v		3.0 to 7.0	mcd
	PLED-G314A-5	I_v	min.	5.0	mcd
Diode capacitance $V_R = 0$; $f = 1$ MHz		C_d	typ.	20	pF

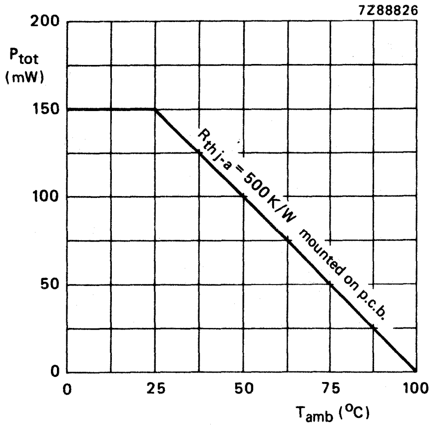


Fig. 2.

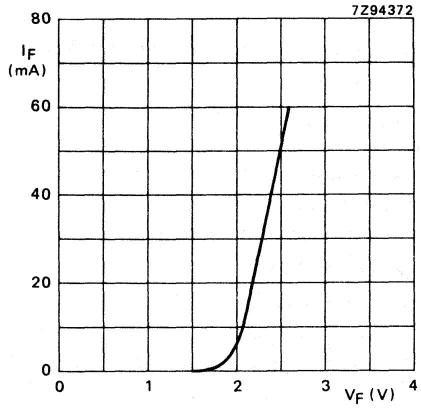


Fig. 3 T_{amb} = 25 °C; typ. values.

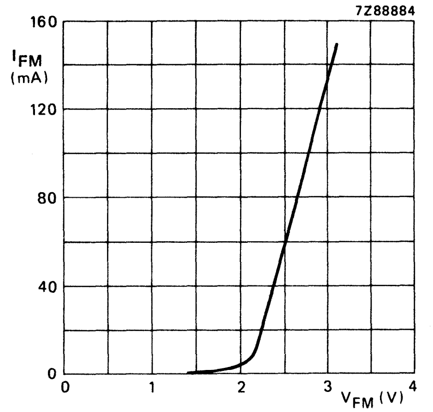


Fig. 4 t_{on} = 1 ms; δ = 0.33;
T_{amb} = 25 °C; typ. values.

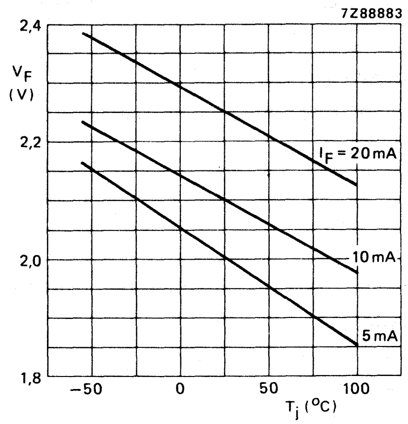


Fig. 5 Typical values.

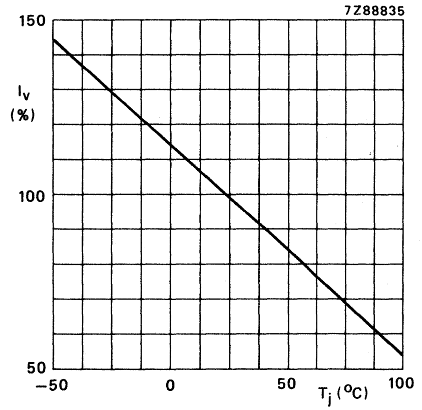


Fig. 6 Typical values.

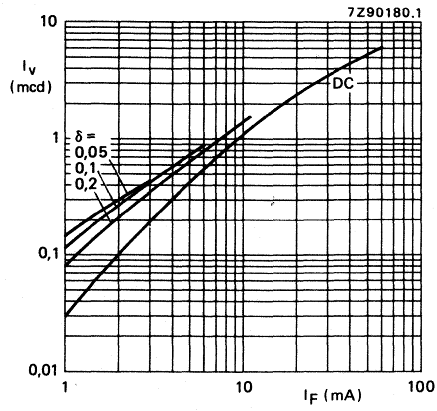


Fig. 7 t_p = 50 μs; typ. values.

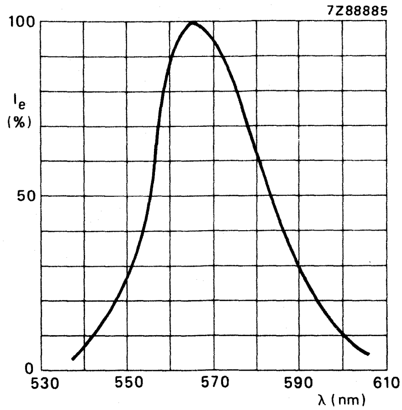


Fig. 8 I_F = 10 mA; typ. values.

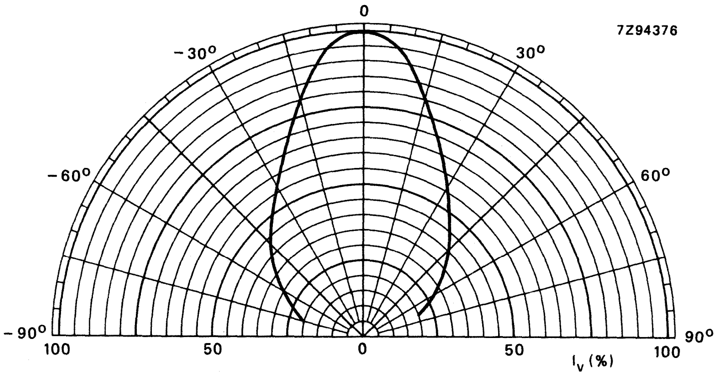


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 3 mm which emit green light (GaP; green) at a typical peak wavelength of 565 nm when forward biased.
The PLED-G314N has a SOD-82C1 outline and is encapsulated in a green diffusing resin.

The PLED-G334NL has a SOD-82A1 outline and is encapsulated in a green diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	30 mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90 mW
Luminous intensity I_F = 10 mA	PLED-G314N/G334NL	I_V	min. typ.	1,0 mcd 2,5 mcd
	PLED-G314N/G334NL-2	I_V		1,0 to 2,2 mcd
	PLED-G314N/G334NL-3	I_V		1,6 to 3,5 mcd
	PLED-G314N/G334NL-34	I_V		1,6 to 7,0 mcd
	PLED-G314N/G334NL-4	I_V		3,0 to 7,0 mcd
	PLED-G314N/G334NL-5	I_V		5,0 to 12,0 mcd
Wavelength at peak emission I_F = 20 mA		λp	typ.	565 nm
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	60 deg

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-82C1.
PLED-G314N

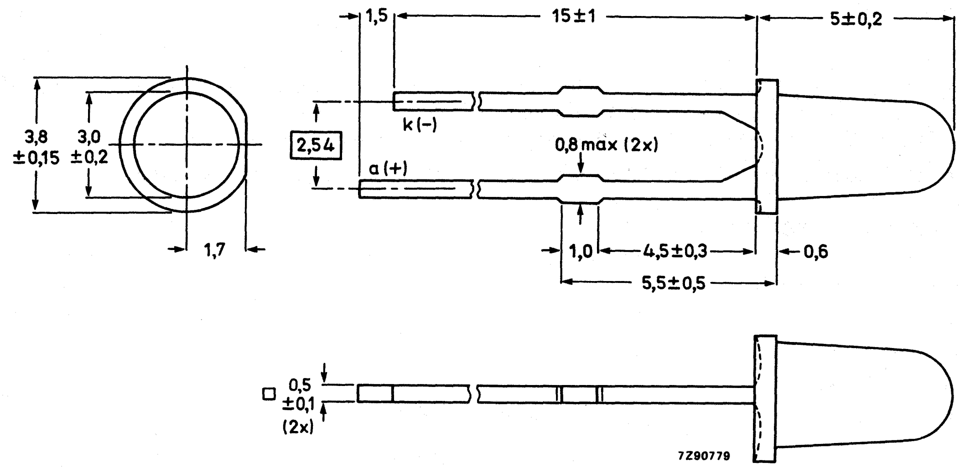
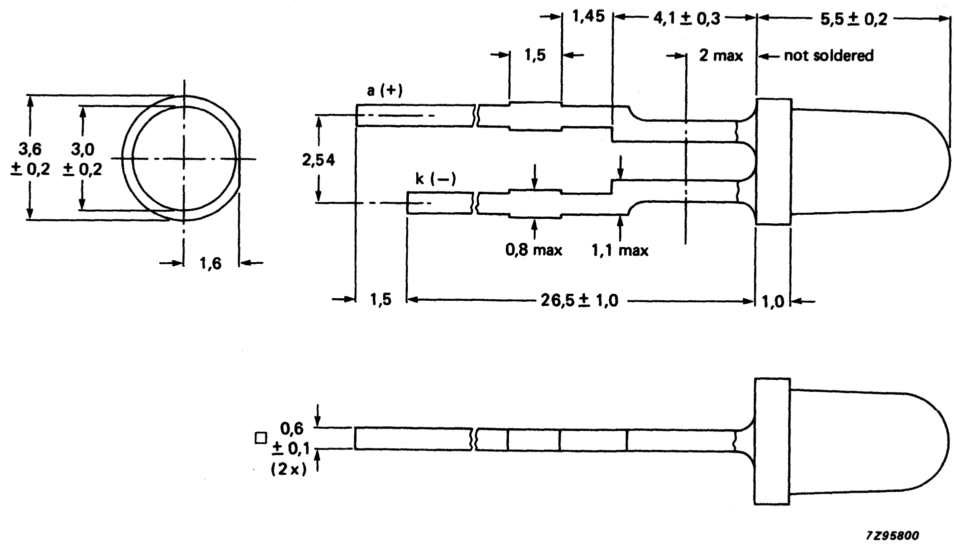


Fig. 1b SOD-82A1.
PLED-G334NL



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	30 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−30 to + 100 °C
Operating ambient temperature	T_{opr}		−25 to + 85 °C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current V_R = 5 V		I_R	max.	10 μA
Beamwidth at half-intensity directions		$\theta ½$	typ.	60 deg
Bandwidth at half height		$\Delta\lambda$	typ.	30 nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	565 nm
Luminous intensity I_F = 10 mA	PLED-G314N/G334NL	I_v	min.	1,0 mcd
			typ.	2,5 mcd
	PLED-G314N/G334NL-2	I_v		1,0 to 2,2 mcd
	PLED-G314N/G334NL-3	I_v		1,6 to 3,5 mcd
	PLED-G314N/G334NL-34	I_v		1,6 to 7,0 mcd
	PLED-G314N/G334NL-4	I_v		3,0 to 7,0 mcd
	PLED-G314N/G334NL-5	I_v		5,0 to 12,0 mcd

DEVELOPMENT DATA

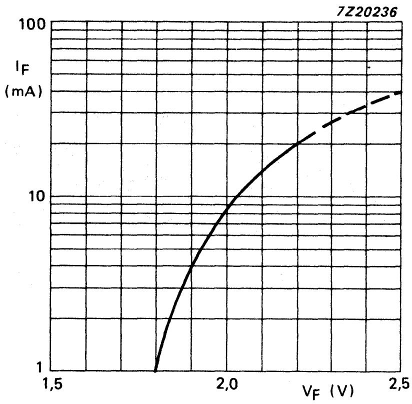


Fig. 2 $I_F = f(V_F)$; typical values.

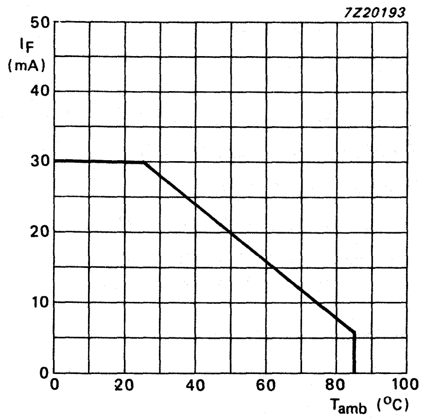


Fig. 3 $I_F = f(T_{amb})$; typical values.

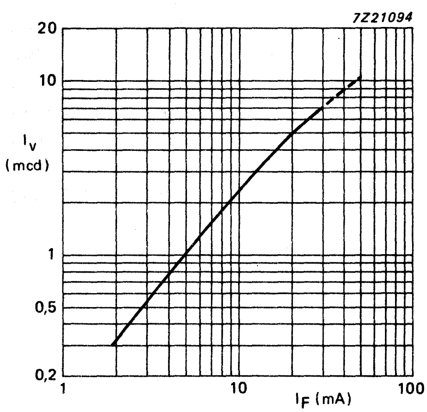


Fig. 4 $I_v = f(I_F)$; typical values.

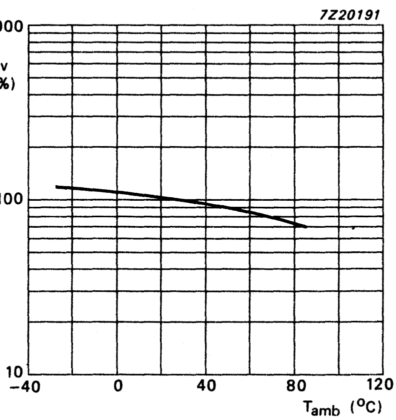


Fig. 5 $I_v(\%) = f(T_{amb})$; typical values.

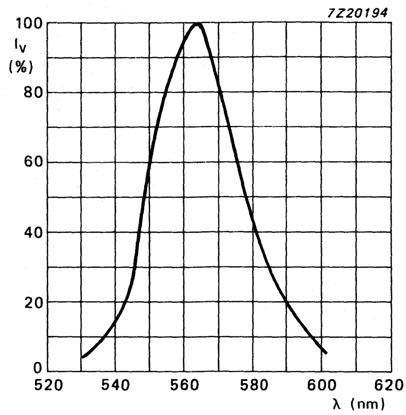


Fig. 6 Spectral response; typical values.

DEVELOPMENT DATA

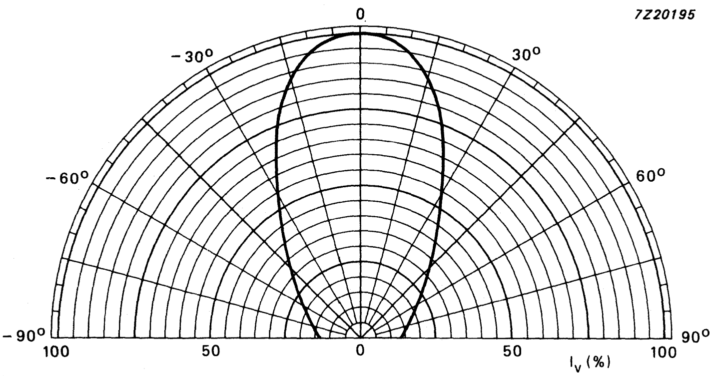


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit a narrow beam of green light at a typical peak wavelength of 565 nm (GaP, super-green) when forward biased.

The PLED-G511C and PLED-G541CL have a SOD-63 outline and are encapsulated in a clear resin. Because of their resistance to high forward currents, the PLED-G511C and PLED-G541CL are suitable for applications where high luminous intensity is required and applications where only low currents are available.

The PLED-G541CL is the long-lead version of the PLED-G511C and has no seating plane but is in all other respects equal to the PLED-G511C.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-G511C(G541CL)	I_V	min.	10	mcd
	PLED-G511C(G541CL)-7	I_V		16 to 35	mcd
	PLED-G511C(G541CL)-8	I_V		30 to 70	mcd
	PLED-G511C(G541CL)-9	I_V	min.	50	mcd
Wavelength at peak emission		λ_p	typ.	565	nm
Beamwidth between half-intensity directions		$\theta_{½}$	typ.	20	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-63D1
PLED-G511C

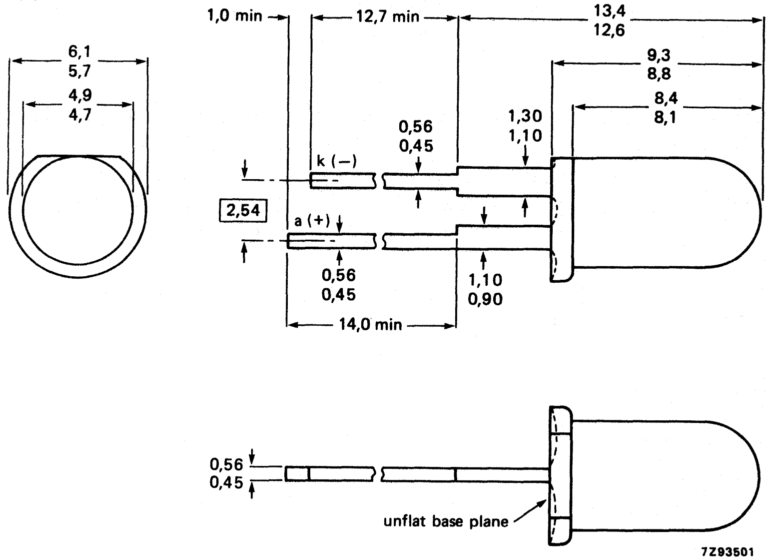
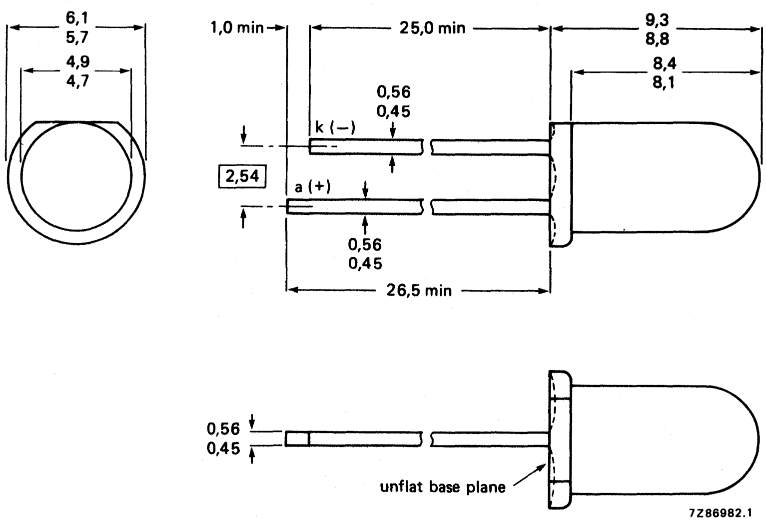


Fig. 1b SOD-63L.
PLED-G541CL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current DC	I_F	max.	60	mA
Forward current peak value, t_p = 1 μs; f = 300 Hz peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max. max.	1 150	A mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	180	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; t_{sld} < 7 s > 1.5 mm from the seating plane for PLED-G511C > 5 mm from the plastic body for PLED-G541CL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ. max.	2.1 3.0	V V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	20	°
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission		λ_p	typ.	565	nm
Luminous intensity I_F = 10 mA	PLED-G511C(G541CL)	I_v	min.	10	mcd
	PLED-G511C(G541CL)-7	I_v		16 to 35	mcd
	PLED-G511C(G541CL)-8	I_v		30 to 70	mcd
	PLED-G511C(G541CL)-9	I_v	min.	50	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	20	pF

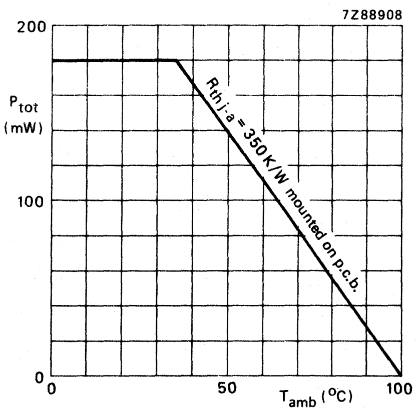


Fig. 2.

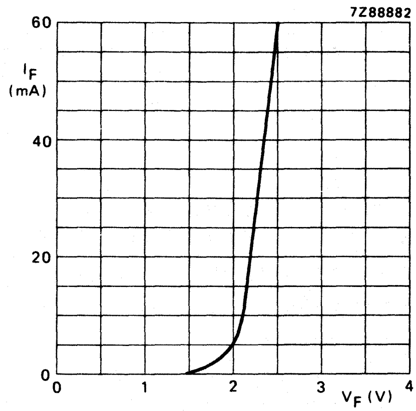


Fig. 3 T_{amb} = 25 °C; typ. values.

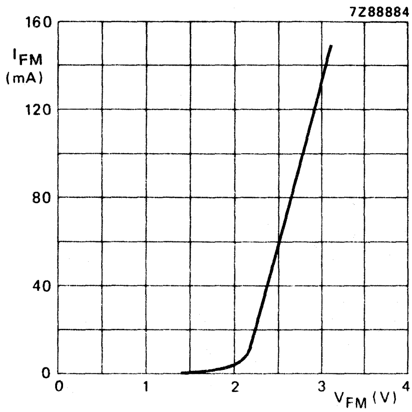


Fig. 4 t_{on} = 1 ms; δ = 0.33;
T_{amb} = 25 °C; typ. values.

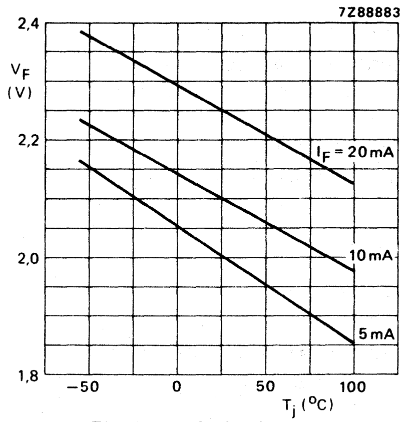


Fig. 5 Typical values.

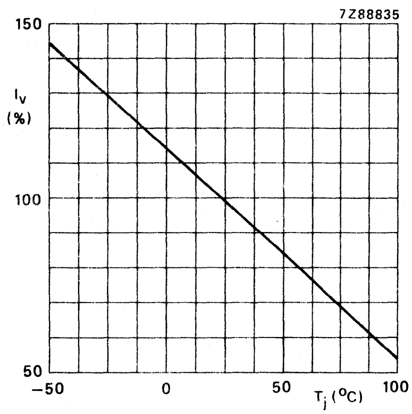


Fig. 6 Typical values.

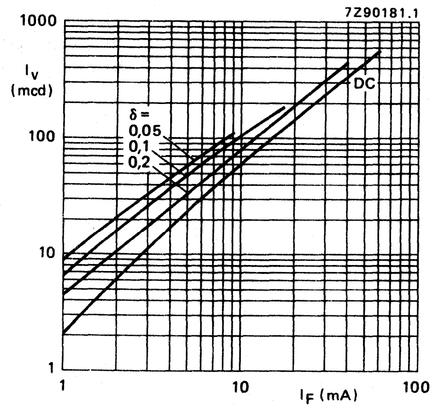


Fig. 7 t_p = 50 μs; typ. values.

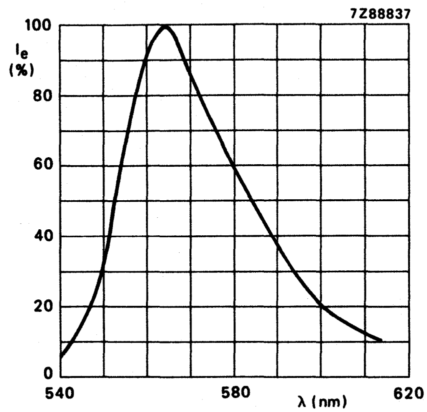


Fig. 8 I_F = 10 mA; typ. values.

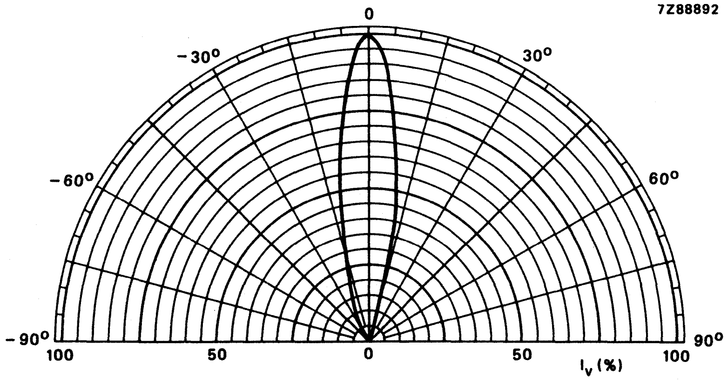


Fig. 9 I_F = 10 mA; typ. values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit a narrow beam of green light at a typical peak wavelength of 565 nm (GaP, super-green) when forward biased.

The PLED-G513C and PLED-G543CL have a SOD-63 outline and are encapsulated in a green diffusing resin.

The PLED-G543CL is the long-lead version of the PLED-G513C and has no seating plane but is in all other respects equal to the PLED-G513C.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-G513C(G543CL)	I_V	min.	10	mcd
	PLED-G513C(G543CL)-6	I_V		10 to 22	mcd
	PLED-G513C(G543CL)-7	I_V		16 to 35	mcd
	PLED-G513C(G543CL)-8	I_V	min.	30	mcd
Wavelength at peak emission		λ_p	typ.	565	nm
Beamwidth between half-intensity directions		$\theta_{½}$	typ.	20	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-63DI.
PLED-G513C

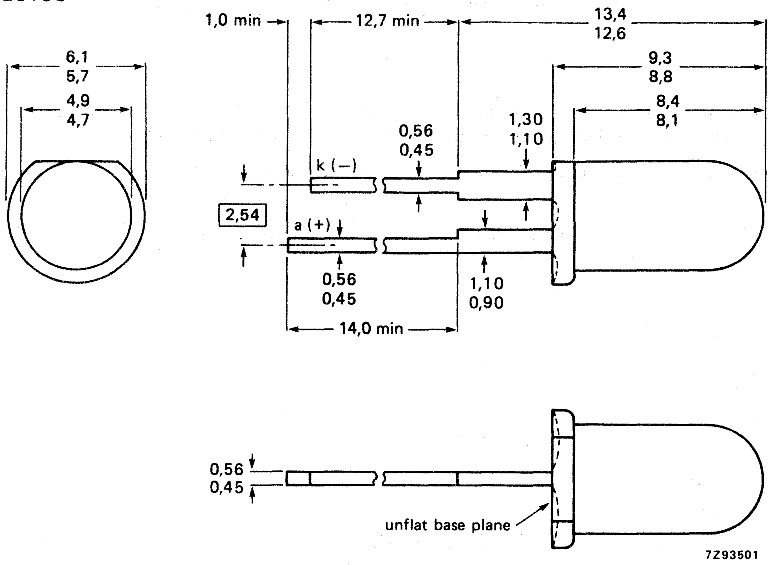
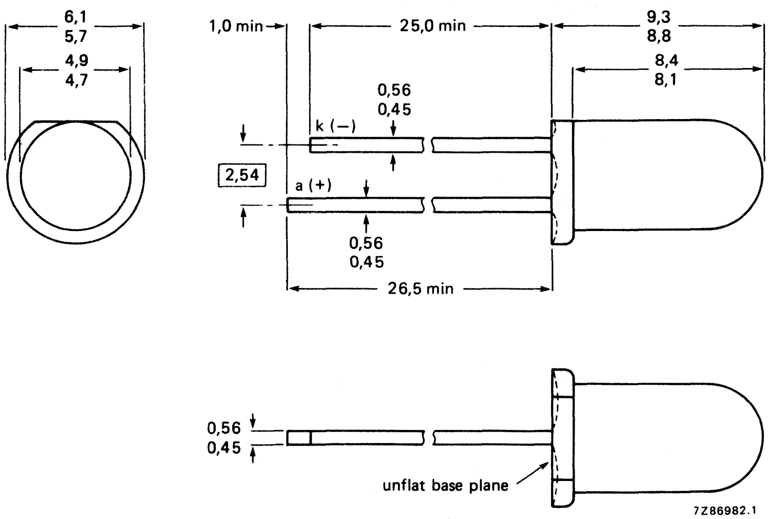


Fig. 1b SOD-63L.
PLED-G543CL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current DC	I_F	max.	60	mA
Forward current peak value, t_p = 1 μs; f = 300 Hz peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max. max.	1 150	A mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	180	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; t_{sld} < 7 s > 1,5 mm from the seating plane for PLED-G513C > 5 mm from the plastic body for PLED-G543CL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ. max.	2.1 3.0	V V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	20	°
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission		λ_p	typ.	565	nm
Luminous intensity I_F = 10 mA	PLED-G513C(G543CL)	I_v	min.	10	mcd
	PLED-G513C(G543CL)-6	I_v		10 to 22	mcd
	PLED-G513C(G543CL)-7	I_v		16 to 35	mcd
	PLED-G513C(G543CL)-8	I_v	min.	30	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	20	pF

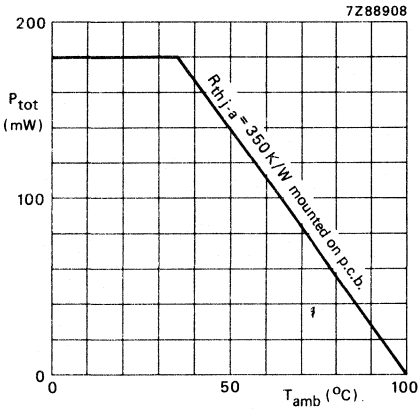


Fig. 2.

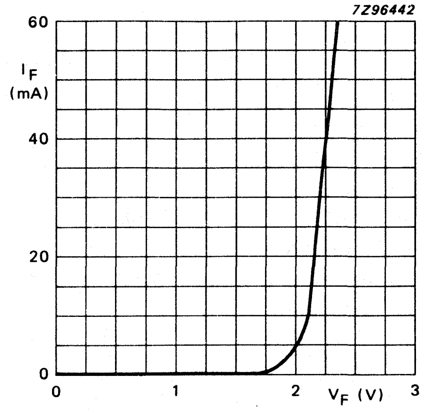


Fig. 3 T_j = 25 °C; typical values.

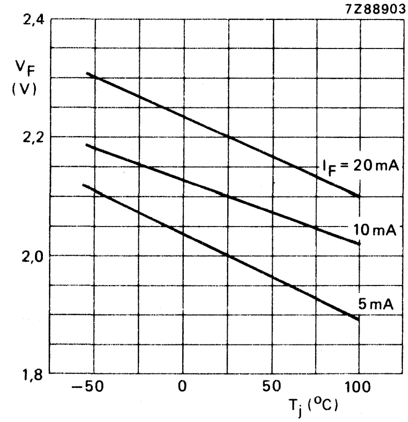


Fig. 4 Typical values.

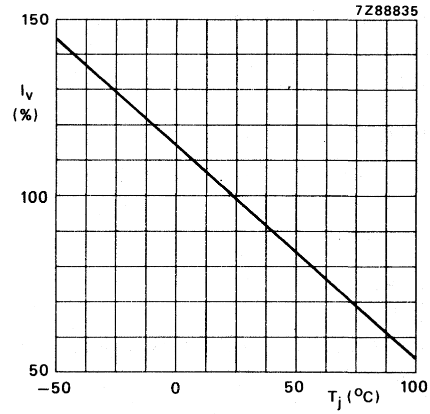


Fig. 5 Typical values.

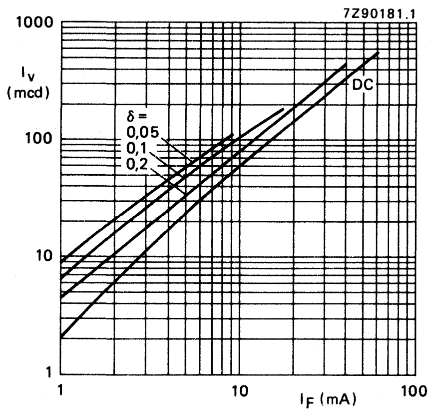


Fig. 6 t_p = 50 μs; typ. values.

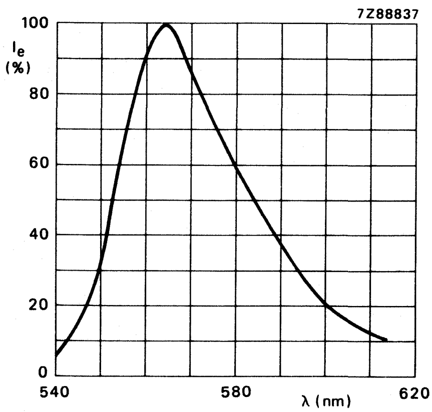


Fig. 7 I_F = 10 mA; typ. values.

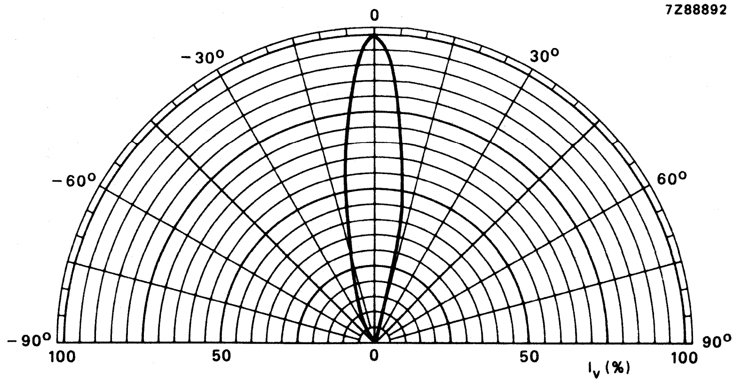


Fig. 8 I_F = 10 mA; typ. values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit green light (GaP; green) at a typical peak wavelength of 565 nm when forward biased.

The PLED-G513M has a SOD-90C1 outline and is encapsulated in a green non-diffusing resin.

The PLED-G533ML has a SOD-90A1 outline and is encapsulated in a green non-diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	30 mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90 mW
Luminous intensity I_F = 10 mA	PLED-G513M/G533ML	I_v	min. typ.	3,0 mcd 8,5 mcd
	PLED-G513M/G533ML-4	I_v		3,0 to 7,0 mcd
	PLED-G513M/G533ML-5	I_v		5,0 to 12 mcd
	PLED-G513M/G533ML-6	I_v		10 to 22 mcd
	PLED-G513M/G533ML-7	I_v		15 to 35 mcd
	PLED-G513M/G533ML-78	I_v		15 to 70 mcd
	PLED-G513M/G533ML-8	I_v		30 to 70 mcd
Wavelength at peak emission I_F = 20 mA		λp	typ.	565 nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	35 °

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-G513M

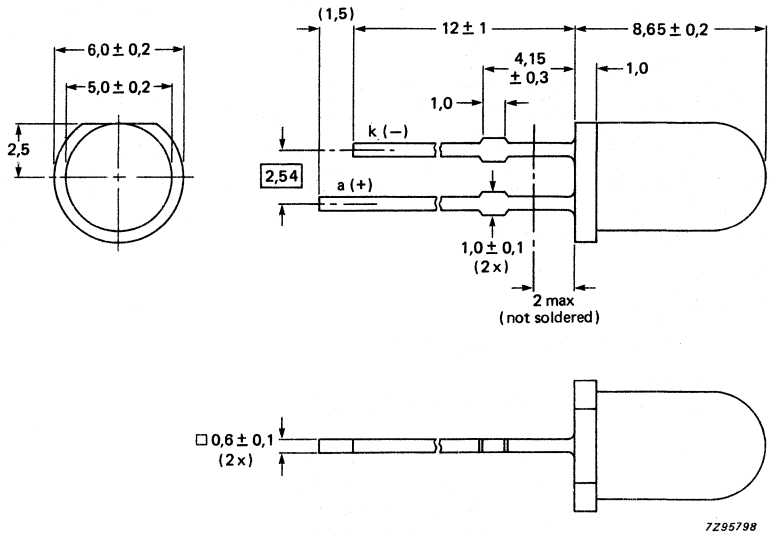
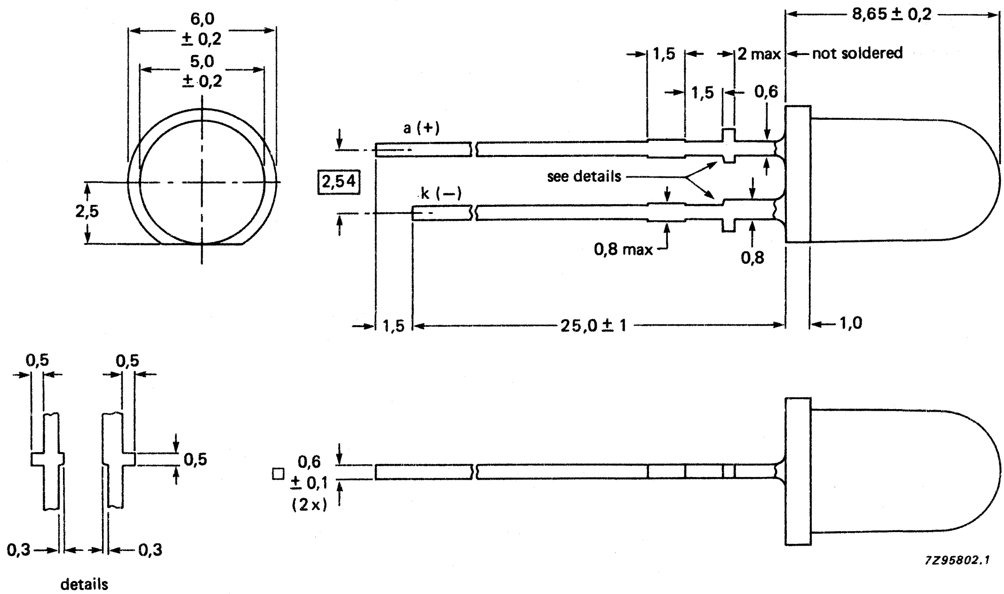


Fig. 1b SOD-90A1
PLED-G533ML



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	30	mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150	mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−30 to +100	°C
Operating ambient temperature	T_{opr}		−25 to +85	°C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260	°C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2	V
			max.	2,8	V
Reverse current V_R = 5 V		I_R	max.	10	µA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	35	°
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	565	nm
Luminous intensity I_F = 10 mA	PLED-G513M/G533ML	I_v	min.	3,0	mcd
			typ.	8,5	mcd
	PLED-G513M/G533ML-4	I_v		3,0 to 7,0	mcd
	PLED-G513M/G533ML-5	I_v		5,0 to 12	mcd
	PLED-G513M/G533ML-6	I_v		10 to 22	mcd
	PLED-G513M/G533ML-7	I_v		15 to 35	mcd
	PLED-G513M/G533ML-78	I_v		15 to 70	mcd
	PLED-G513M/G533ML-8	I_v		30 to 70	mcd

DEVELOPMENT DATA

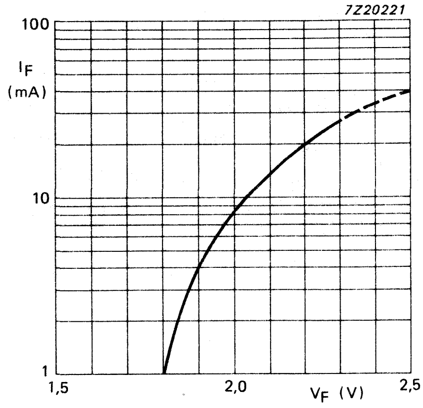


Fig. 2 $I_F = f(V_F)$ typical values.

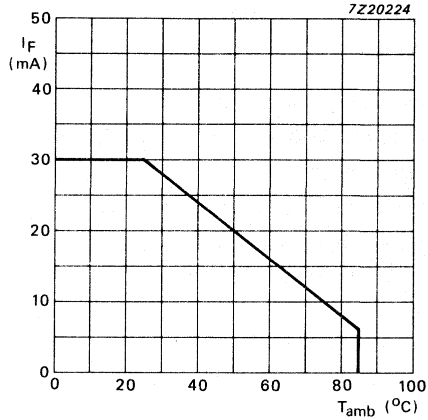


Fig. 3 $I_F = f(T_{amb})$ typical values.

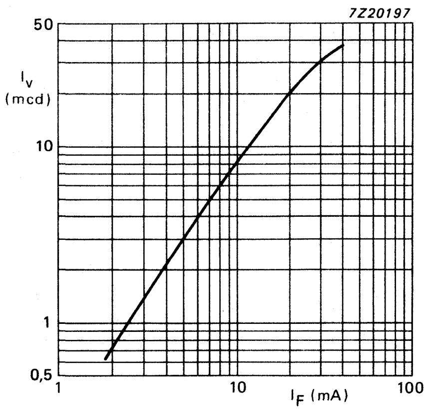


Fig. 4 $I_V = f(I_F)$ typical values.

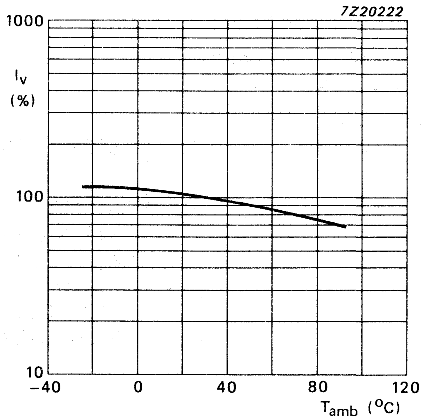


Fig. 5 $I_V(\%) = f(T_{amb})$ typical values.

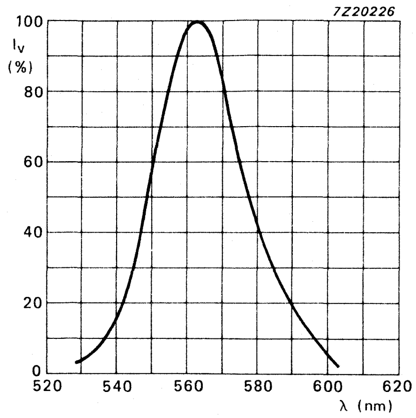


Fig. 6 Spectral response typical values.

DEVELOPMENT DATA

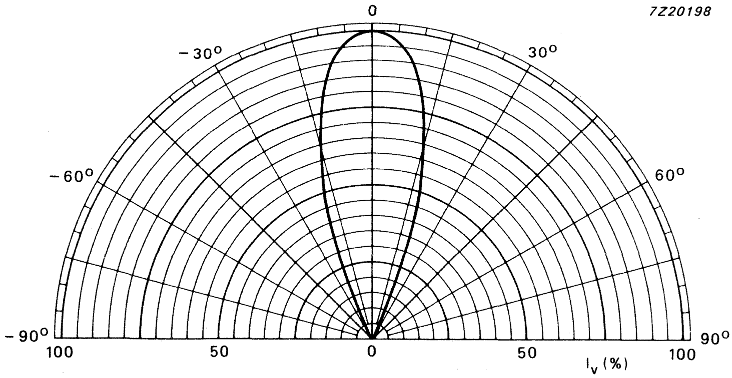


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit green light at a typical peak wavelength of 565 nm (GaP; super-green) when forward biased.

The PLED-G514B and PLED-G544CL have a SOD-63 outline and are encapsulated in a green diffusing resin. Because of their resistance to high forward currents, the PLED-G514B and PLED-G544CL are suitable for those applications where high lumiousity is required.

The PLED-G544CL is the long-lead version of the PLED-G514B and has no seating plane but is in all other respects equal to the PLED-G514B.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-G514B(G544CL)	I_v	min.	0.7	mcd
	PLED-G514B(G544CL)-3	I_v		1.6 to 3.5	mcd
	PLED-G514B(G544CL)-4	I_v		3.0 to 7.0	mcd
	PLED-G514B(G544CL)-5	I_v	min.	5.0	mcd
Wavelength at peak emission		λ_p	typ.	565	nm
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	70	°

MECHANICAL DATA

Dimensions in mm

Fig 1a SOD-63AI.
PLED-G514B

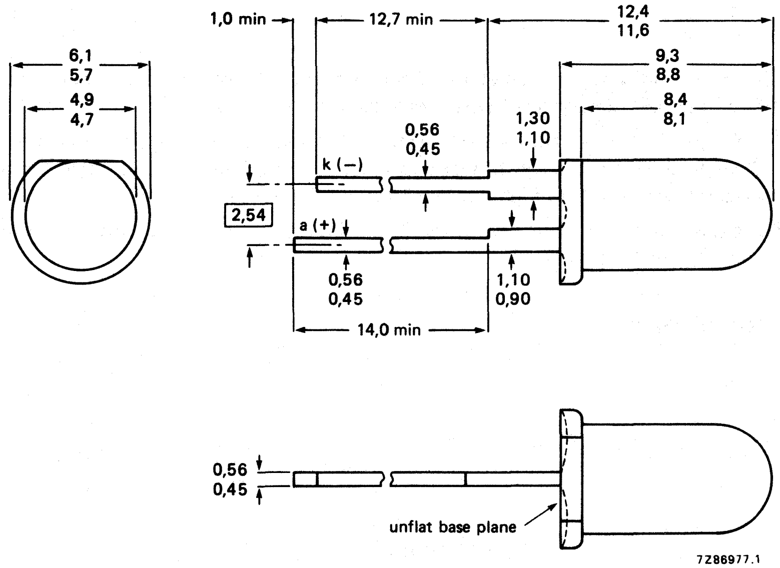
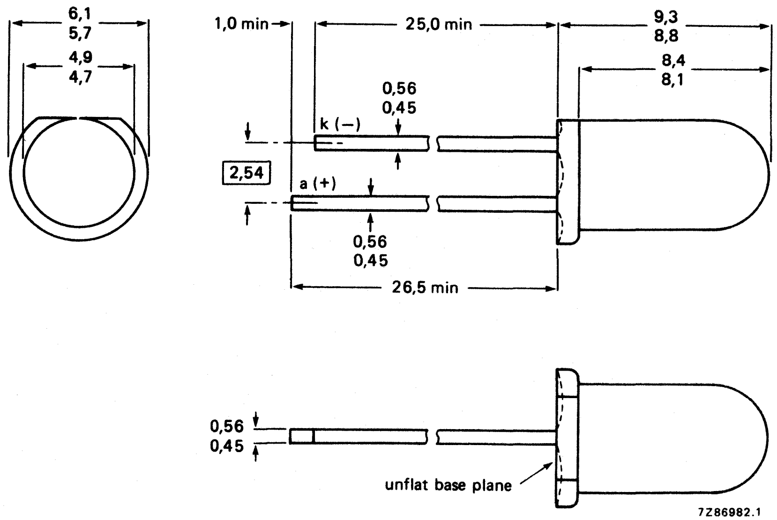


Fig. 1b SOD-63L.
PLED-G544CL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5 V
Forward current DC	I_F	max.	60 mA
Forward current peak value; t_p = 1 μs; f = 300 Hz peak value; t_p = 1 ms; δ = 0.33	I_{FRM}	max. max.	1 A 150 mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	180 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature at $t_{sld} < 7$ s $>$ 1.5 mm from the seating plane for PLED-G514B $>$ 5 mm from the plastic body for PLED-G544CL	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ. max.	2.1 V 3.0 V
Reverse current V_R = 5 V		I_R	max.	100 μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	70 °
Bandwidth at half height		$\Delta\lambda$	typ.	30 nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	565 nm
Luminous intensity I_F = 10 mA	PLED-G514B(G544CL)	I_v	min.	0.7 mcd
	PLED-G514B(G544CL)-3	I_v		1.6 to 3.5 mcd
	PLED-G514B(G544CL)-4	I_v		3.0 to 7.0 mcd
	PLED-G514B(G544CL)-5	I_v	min.	5.0 mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	20 pF

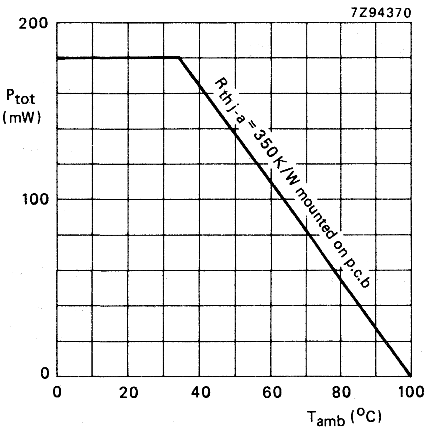


Fig. 2 Typical values.

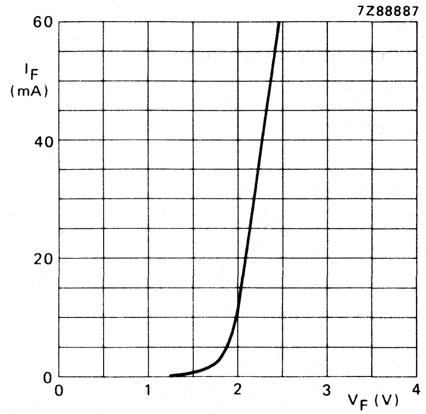


Fig. 3 T_{amb} = 25 °C; typ. values.

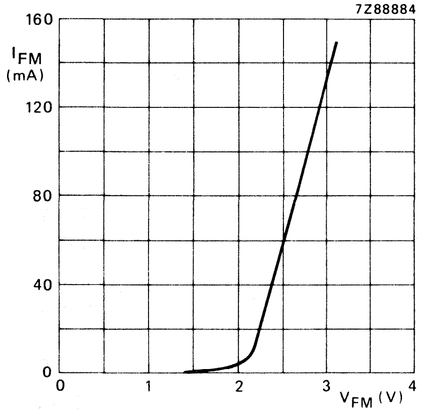


Fig. 4 t_{on} = 1 ms; δ = 0.33; T_{amb} = 25 °C; typ. values.

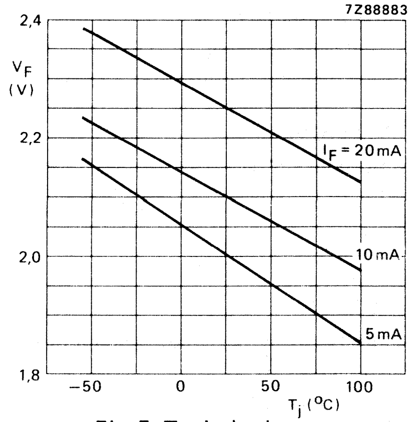


Fig. 5 Typical values.

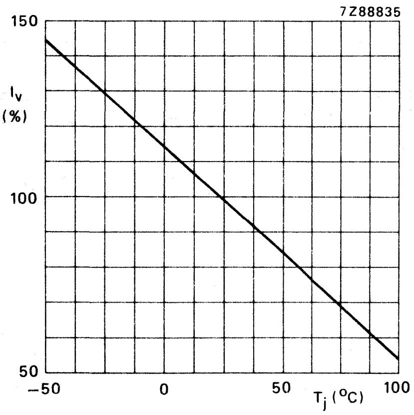


Fig. 6 Typical values.

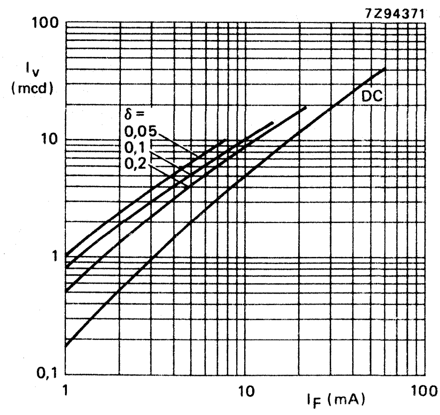


Fig. 7 t_p = 50 μs.

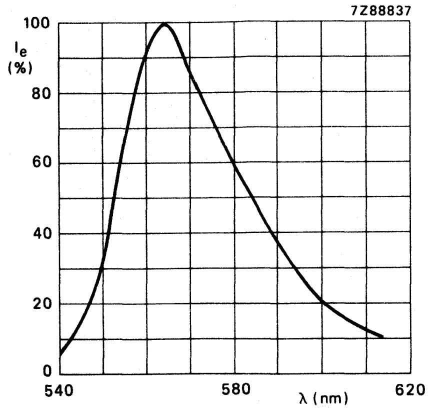


Fig. 8 I_F = 10 mA; typ. values.

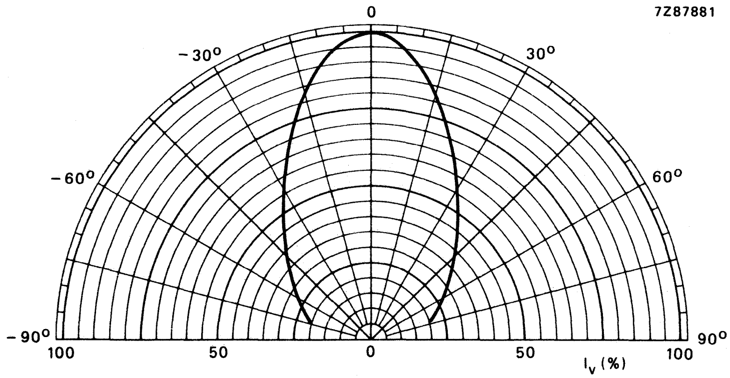


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit green light (GaP; green) at a typical peak wavelength of 565 nm when forward biased.

The PLED-G514M has a SOD-90C1 outline and is encapsulated in a green coloured diffusing resin.

The PLED-G534ML has a SOD-90A1 outline and is encapsulated in a green coloured diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	30 mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90 mW
Luminous intensity I_F = 10 mA	PLED-G514M/G534ML	I_V	min. typ.	1,6 mcd 5,0 mcd
	PLED-G514M/G534ML-4	I_V		3,0 to 7,0 mcd
	PLED-G514M/G534ML-5	I_V		5,0 to 12 mcd
	PLED-G514M/G534ML-6	I_V		10 to 22 mcd
	PLED-G514M/G534ML-67	I_V		10 to 35 mcd
	PLED-G514M/G534ML-7	I_V		15 to 35 mcd
Wavelength at peak emission I_F = 20 mA		λp	typ.	565 nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	50 °

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-G514M

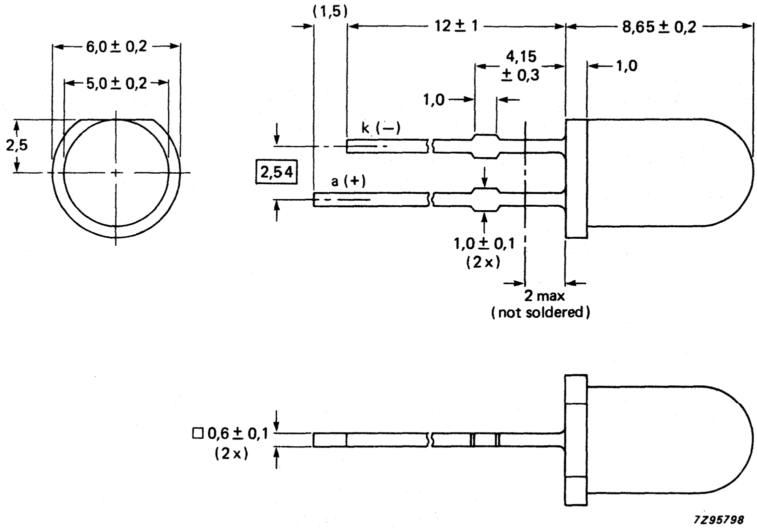
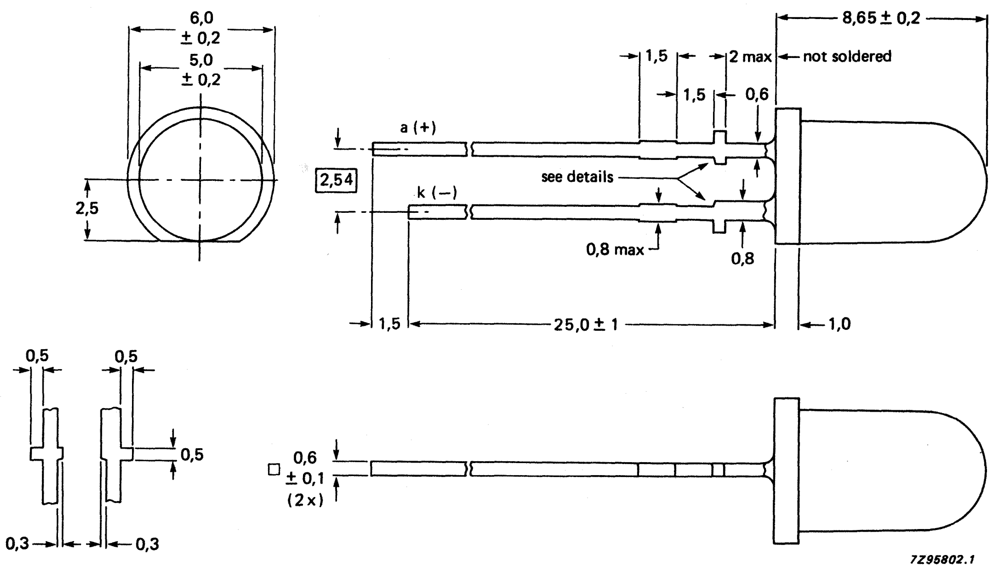


Fig. 1b SOD-90A1
PLED-G534ML



details

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	30 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−25 to +85 °C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage				
I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current				
V_R = 5 V		I_R	max.	10 μA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	50 °
Bandwidth at half height		$\Delta\lambda$	typ.	30 nm
Wavelength at peak emission				
I_F = 10 mA		λp	typ.	565 nm
Luminous intensity				
I_F = 10 mA	PLED-G514M/G534ML	I_v	min.	1,6 mcd
			typ.	5,0 mcd
	PLED-G514M/G534ML-4	I_v		3,0 to 7,0 mcd
	PLED-G514M/G534ML-5	I_v		5,0 to 12 mcd
	PLED-G514M/G534ML-6	I_v		10 to 22 mcd
	PLED-G514M/G534ML-67	I_v		10 to 35 mcd
	PLED-G514M/G534ML-7	I_v		15 to 35 mcd

DEVELOPMENT DATA

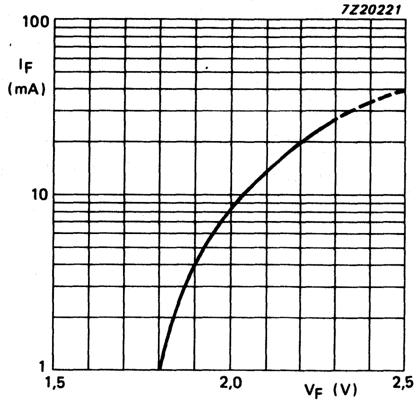


Fig. 2 $I_F = f(V_F)$ typical values.

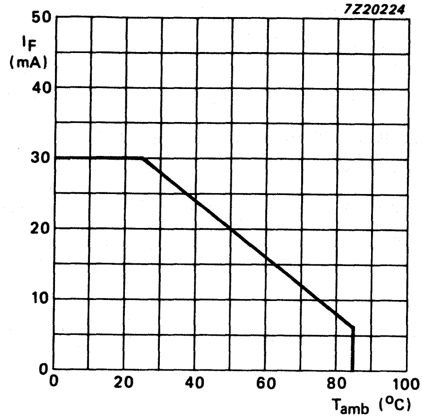


Fig. 3 $I_F = f(T_{amb})$ typical values.

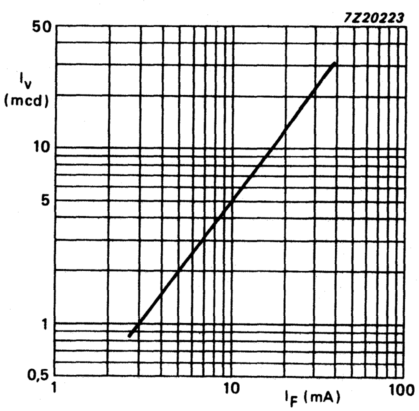


Fig. 4 $I_V = f(I_F)$ typical values.

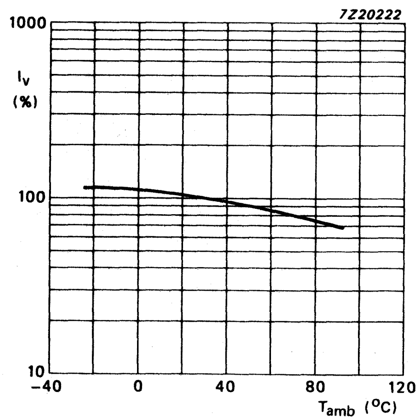


Fig. 5 $I_V(\%) = f(T_{amb})$ typical values.

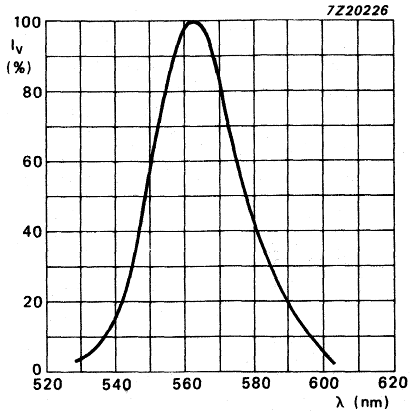


Fig. 6 Spectral response typical values.

DEVELOPMENT DATA

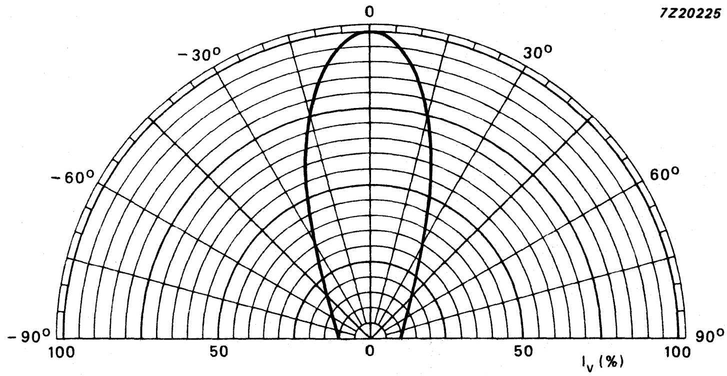


Fig. 7 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode which emits green light at a typical peak wavelength of 565 nm (GaP; super-green) when forward biased.

The PLED-G544KL has a flangeless SOD-85 outline and is encapsulated in a green diffusing resin.

Together with the PLED-H544KL and the PLED-Y544KL, the PLED-G544KL forms one family and is available only in the long lead (L) version.

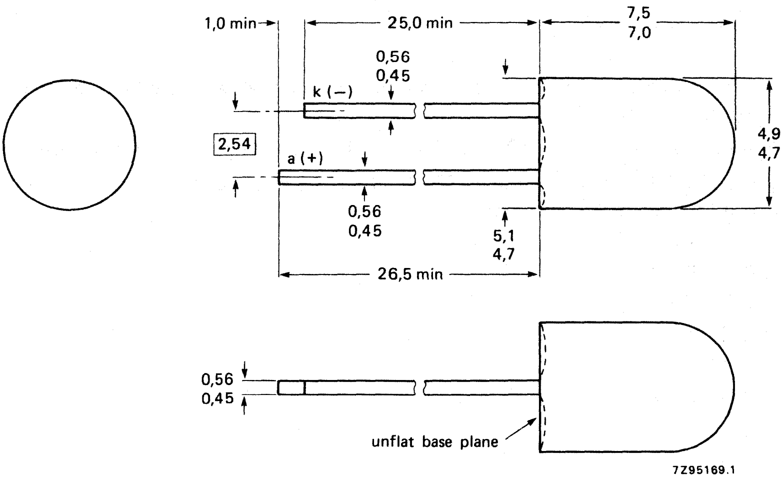
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-G544KL	I_v	min.	0.7	mcd
	PLED-G544KL-3	I_v		1.6 to 3.5	mcd
	PLED-G544KL-4	I_v		3.0 to 7.0	mcd
	PLED-G544KL-5	I_v	min.	5.0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	565	nm
Beamwidth at half-intensity directions		$\theta_{½}$	typ.	70	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-85AL.



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	60	mA
peak value; t = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; $t_p < 1$ ms; $\delta = 0.33$	I_{FRM}	max.	150	mA
Total power dissipation up to $T_{amb} = 35$ °C	P_{tot}	max.	180	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; $t_{sld} < 7$ s; > 5 mm from the plastic body	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

$T_{amb} = 25$ °C unless otherwise specified

Forward voltage					
$I_F = 10$ mA		V_F	typ.	2.1	V
			max.	2.6	V
Reverse current					
$V_R = 5$ V		I_R	max.	100	μA
Beamwidth at half-intensity directions					
$I_F = 10$ mA		$\theta_{1/2}$	typ.	70	°
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission					
$I_F = 10$ mA		λ_p	typ.	565	nm
Luminous intensity					
$I_F = 10$ mA	PLED-G544KL	I_v	min.	1.0	mcd
	PLED-G544KL-3	I_v		1.6 to 3.5	mcd
	PLED-G544KL-4	I_v		3.0 to 7.0	mcd
	PLED-G544KL-5	I_v	min.	5.0	mcd
Diode capacitance					
$V_R = 0$; f = 1 MHz		C_d	typ.	20	pF

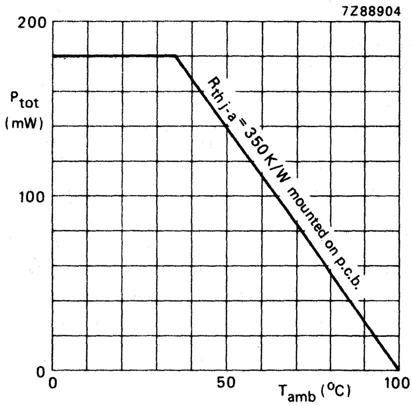


Fig. 2.

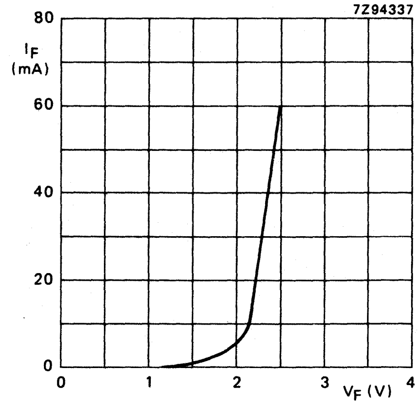


Fig. 3 T_{amb} = 25 °C; typ. values.

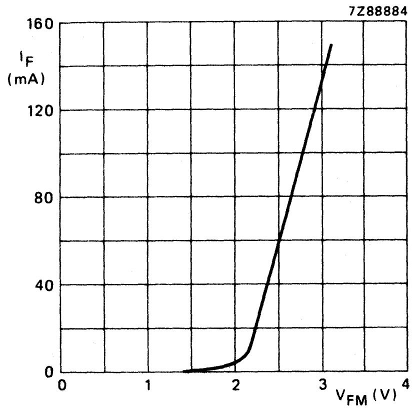


Fig. 4 t_{on} = 1 ms; δ = 0.33; T_{amb} = 25 °C; typ. values.

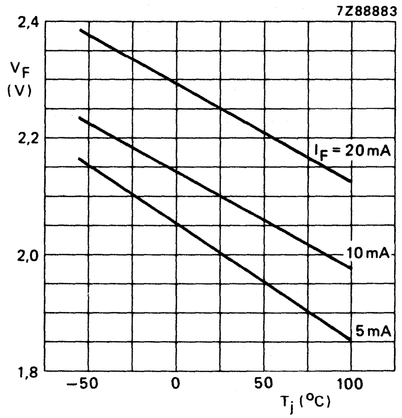


Fig. 5 Typical values.

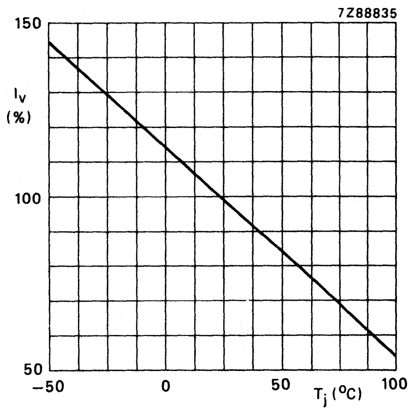


Fig. 6 Typical values.

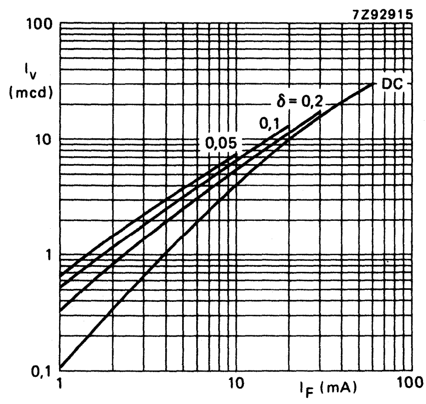


Fig. 7 t_p = 50 μs; typ. values.

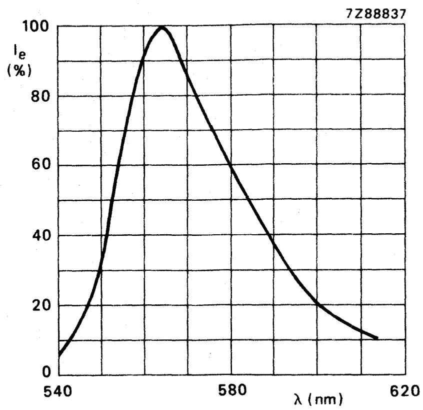


Fig. 8 I_F = 10 mA; typ. values.

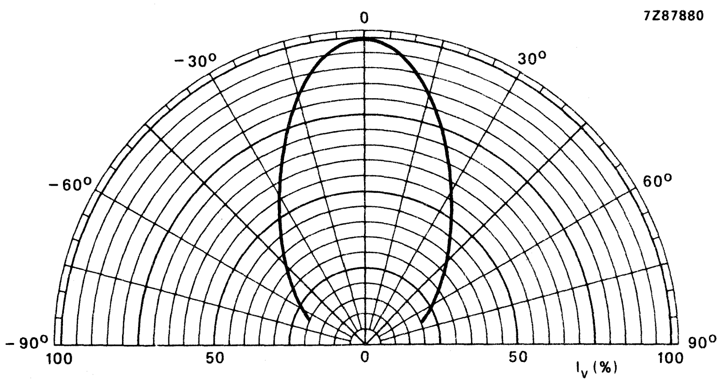


Fig. 9 I_F = 10 mA; typ. values.

LIGHT EMITTING DIODES

Rectangular light emitting diodes of 5 mm x 1 mm which emit green light at a typical peak wavelength of 565 nm (GaP; super-green) when forward biased.

The PLED-GR14E and PLED-GR44EL have a SOD-75 outline and are encapsulated in a green diffusing resin. These LEDs when stacked in an array (in combination with other SOD-75 LEDs) can be used, for example, as level indicators.

The PLED-GR44EL is equal to the PLED-GR14E but has long leads and no seating plane.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-GR14E(GR44EL)	I_v	min.	0.7	mcd
	PLED-GR14E(GR44EL)-2	I_v		1.0 to 2.2	mcd
	PLED-GR14E(GR44EL)-3	I_v	min.	1.6	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	565	nm
Beamwidth between half-intensity directions					
in the plane of the leads		$\theta_{½}$	typ.	110	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-75B1.
PLED-GR14E

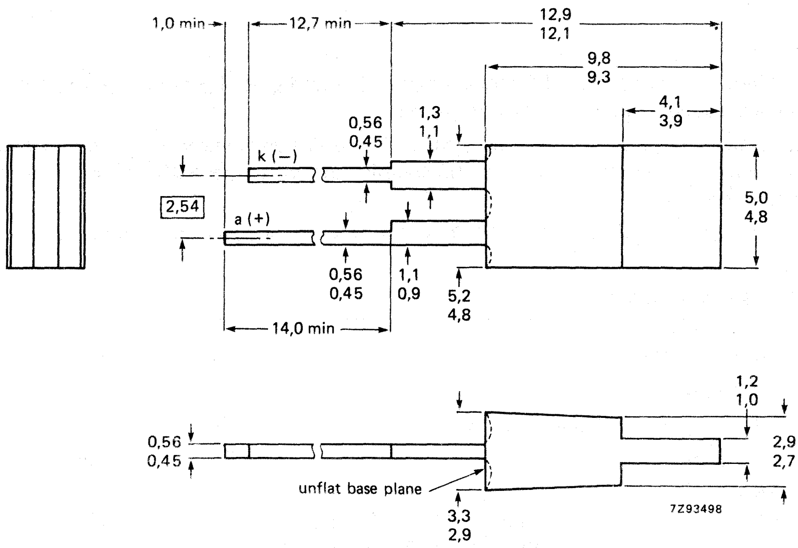
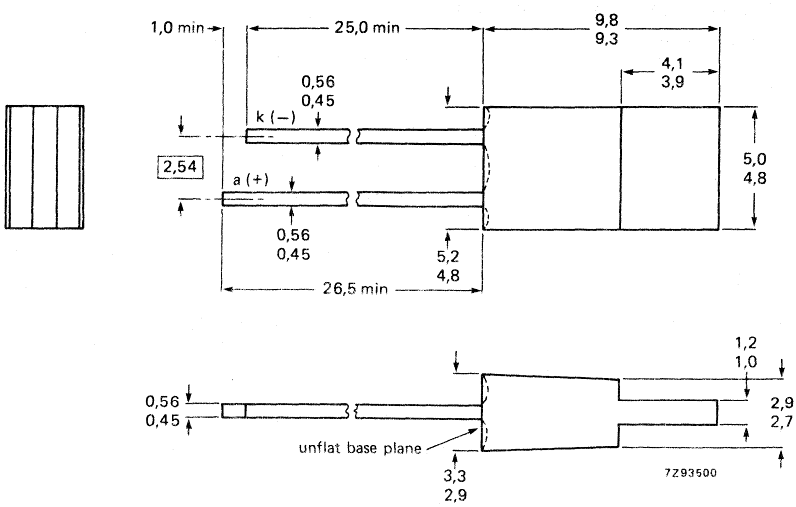


Fig. 1b SOD-75BL.
PLED-GR44EL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	60	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	150	mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	180	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature at t_{sld} < 7 s > 1.5 mm from the seating plane for PLED-GR14E > 5 mm from the plastic body for PLED-GR44EL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1	V
		V_F	max.	3.0	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions in the plane of the leads; I_F = 10 mA		$\theta_{1/2}$	typ.	110	°
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	565	nm
Luminous intensity I_F = 10 mA	PLED-GR14E(GR44EL)	I_v	min.	0.7	mcd
	PLED-GR14E(GR44EL)-2	I_v		1.0 to 2.2	mcd
	PLED-GR14E(GR44EL)-3	I_v	min.	1.6	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	20	pF

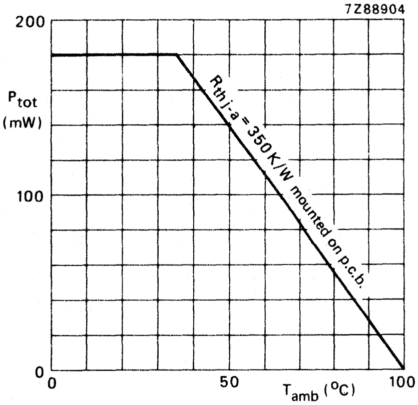


Fig. 2.

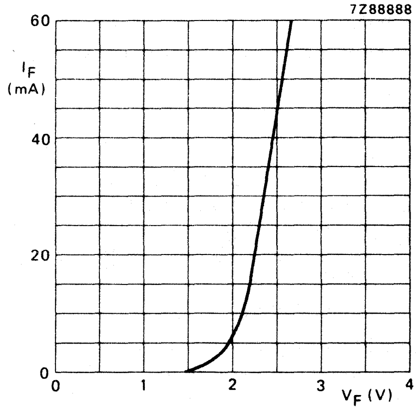


Fig. 3 T_{amb} = 25 °C; typ. values.

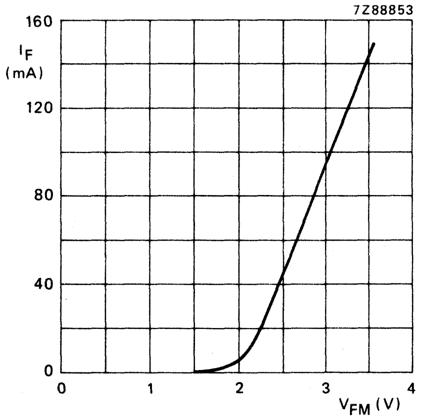


Fig. 4 t_{on} = 50 μs; δ = 0.01; T_{amb} = 25 °C; typ. values.

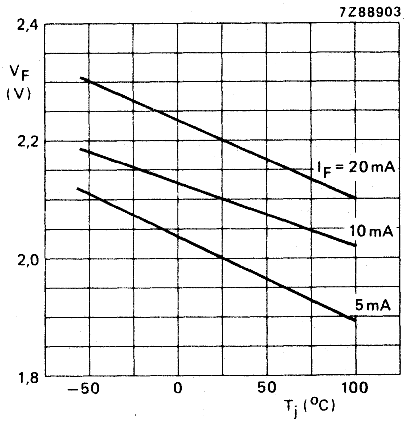


Fig. 5 Typical values.

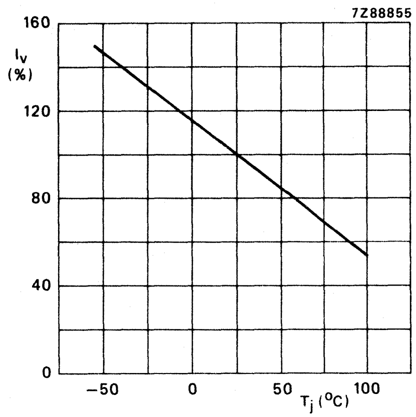


Fig. 6 Typical values.

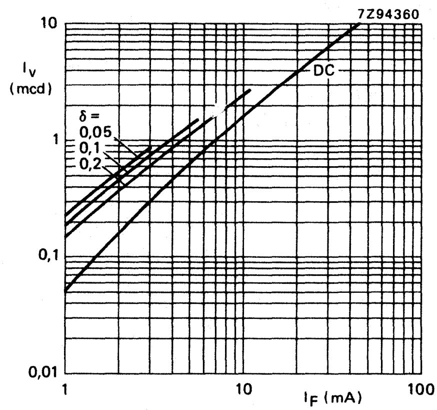


Fig. 7 t_p = 50 μs; typical values.

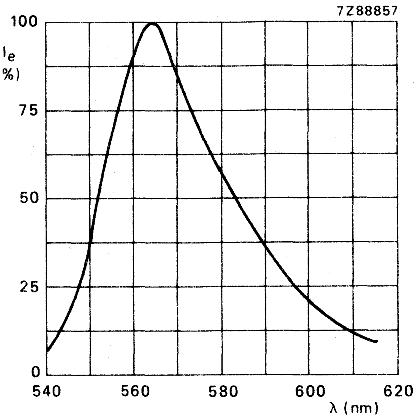


Fig. 8 I_F = 10 mA; typical values.

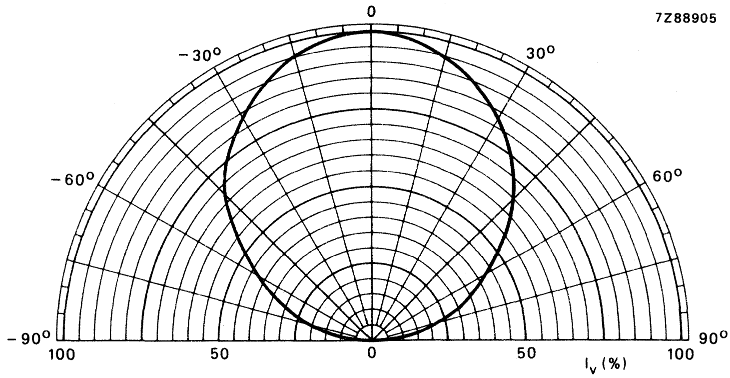


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diode of 5 mm x 2.5 mm which emits green light at a typical peak wavelength of 565 nm (GaP; super-green) when forward biased.

The PLED-GR14F has a SOD-76 envelope and is encapsulated in a green diffusing resin.

The PLED-GR44FL is the long lead version of the PLED-GR14F without a seating plane, but in all respects similar to the PLED-GR14F.

When stacked in an array these SOD-76 LEDs can be used, for example, as level indicators. Because of its high light intensity the PLED-GR14F is very suitable in applications where only low currents are available and because of its high I_{Fmax} it can be used for high I_V applications.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-GR14F(GR44FL)	I_V	min.	0.7	mcd
	PLED-GR14F(GR44FL)-2	I_V		1.0 to 2.2	mcd
	PLED-GR14F(GR44FL)-3	I_V		1.6 to 3.5	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	565	nm
Beamwidth between half-intensity directions					
I_F = 10 mA		$\theta_{½}$	typ.	100	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-76A1.
PLED-GR14F

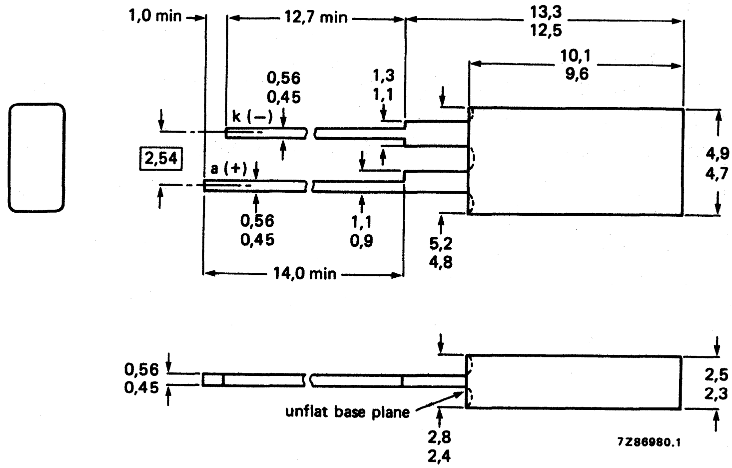
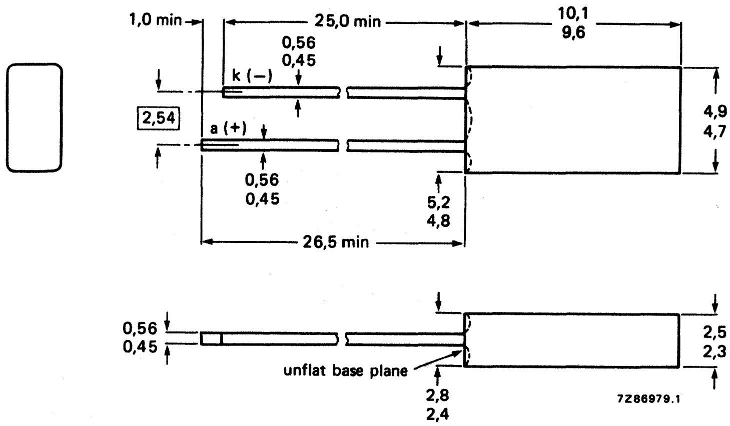


Fig. 1b SOD-76L.
PLED-GR44FL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
DC	I_F	max.	60 mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1 A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	150 mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	180 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature; t_{sld} < 7 s > 1.5 mm from the seating plane PLED-GR14F > 5 mm from the plastic body PLED-GR44FL	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ. max.	2.1 V 3.0 V
Reverse current V_R = 5 V		I_R	max.	100 μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	100 °
Bandwidth at half height		$\Delta\lambda$	typ.	30 nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	565 nm
Luminous intensity I_F = 10 mA	PLED-GR14F(GR44FL)	I_v	min.	0.7 mcd
	PLED-GR14F(GR44FL)-2	I_v		1.0 to 2.2 mcd
	PLED-GR14F(GR44FL)-3	I_v		1.6 to 3.5 mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	20 pF

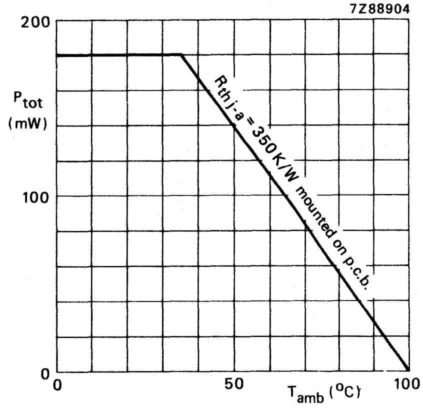


Fig. 2.

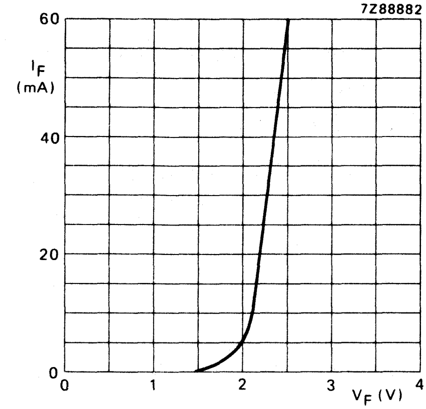


Fig. 3 T_j = 25 °C; typ. values.

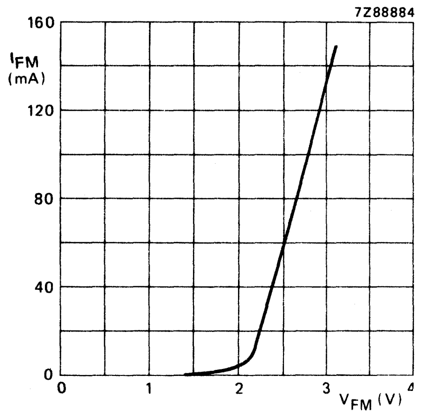


Fig. 4 t_{on} = 1 ms; δ = 0.33; T_{amb} = 25 °C; typ. values.

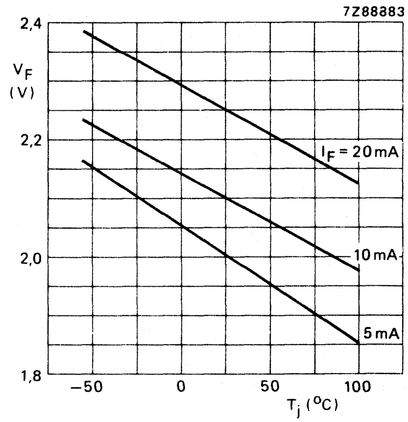


Fig. 5 Typical values.

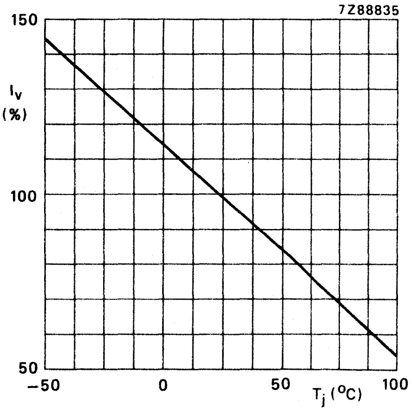


Fig. 6 I_F = 10 mA; typ. values.

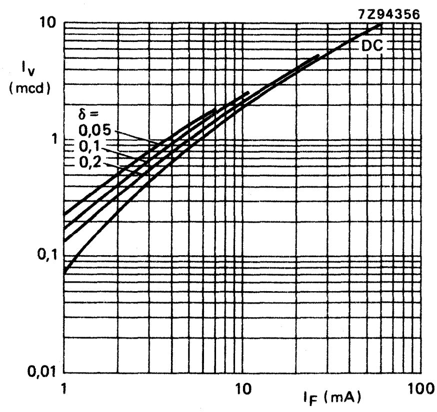


Fig. 7 t_p = 50 μs; typical values.

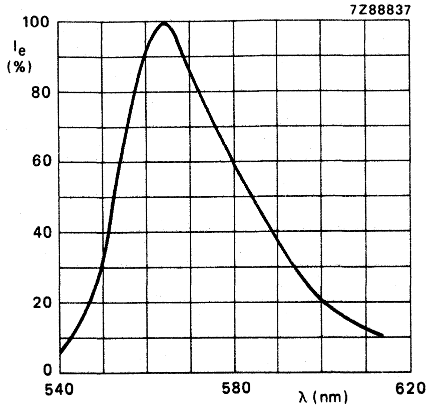


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

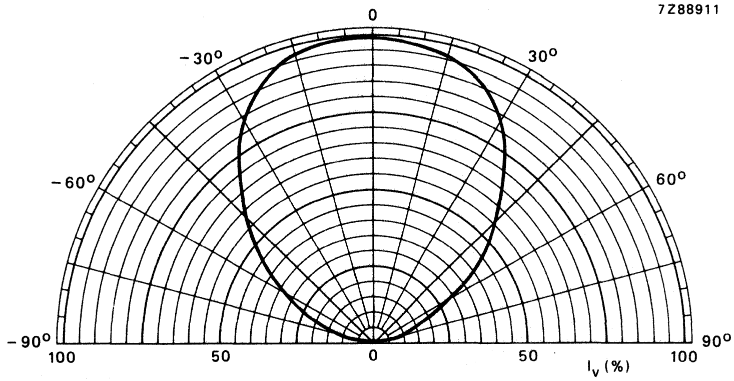


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diodes of 5 mm x 3 mm which emit green light at a typical peak wavelength of 565 nm (GaP, super-green) when forward biased. The PLED-GR14G and PLED-GR44GL have SOD-77 envelopes and are encapsulated in a green diffusing resin.

When stacked in an array these SOD-77 LEDs can be used as level indicators.

The PLED-GR44GL is similar to the PLED-GR14G but has long leads and has no seating plane.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-GR14G(GR44GL)	I_v	min.	0.7	mcd
	PLED-GR14G(GR44GL)-2	I_v		1.0 to 2.2	mcd
	PLED-GR14G(GR44GL)-3	I_v		1.6 to 3.5	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	565	nm
Beamwidth between half-intensity directions in the plane of the leads; I_F = 10 mA		$\theta_{1/2}$	typ.	100	°

MECHANICAL DATA Dimensions in mm

Fig. 1a SOD-77A1.
PLED-GR14G

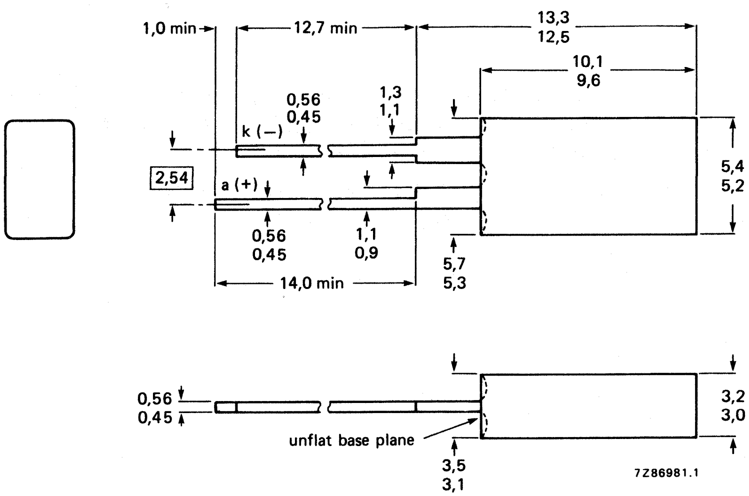
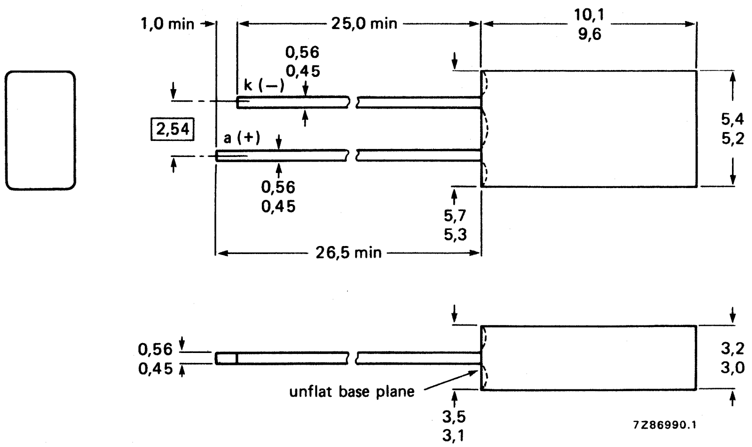


Fig. 1b SOD-77L.
PLED-GR44GL



Note: Solderabitity not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	60	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 1 ms; δ = 0.01	I_{FRM}	max.	150	mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	180	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature at $t_{sld} < 7$ s; $>$ 1.5 mm from the seating plane for PLED-GR14G; $>$ 5 mm from the plastic body for PLED-GR44GL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage					
I_F = 10 mA		V_F	typ.	2.1	V
			max.	3.0	V
Reverse current					
V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions in the plane of the leads; I_F = 10 mA		$\theta_{1/2}$	typ.	100	°
Bandwith at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	565	nm
Luminous intensity					
I_F = 10 mA	PLED-GR14G(GR44GL)	I_v	min.	0.7	mcd
	PLED-GR14G(GR44GL)-2	I_v		1.0 to 2.2	mcd
	PLED-GR14G(GR44GL)-3	I_v		1.6 to 3.5	mcd
Diode capacitance					
V_R = 0; f = 1 MHz		C_d	typ.	20	pF

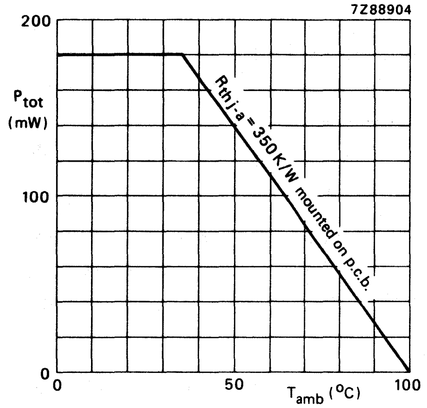


Fig. 2.

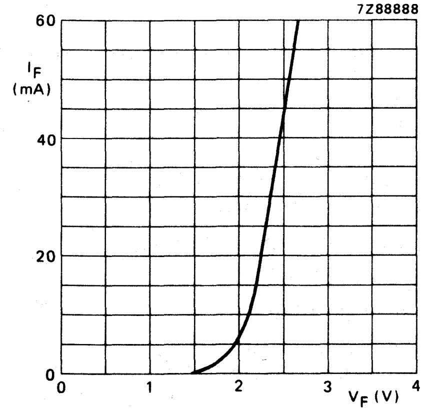


Fig. 3 T_{amb} = 25 °C; typical values.

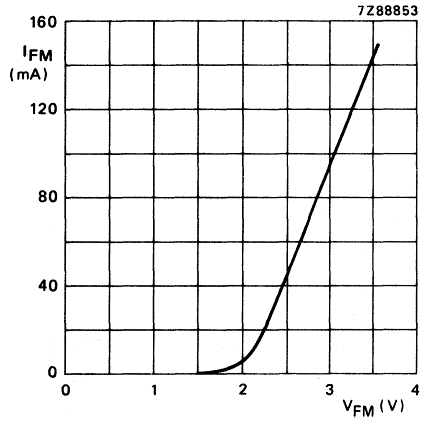


Fig. 4 t_{on} = 1 ms; δ = 0.01;
T_j = 25 °C; typical values.

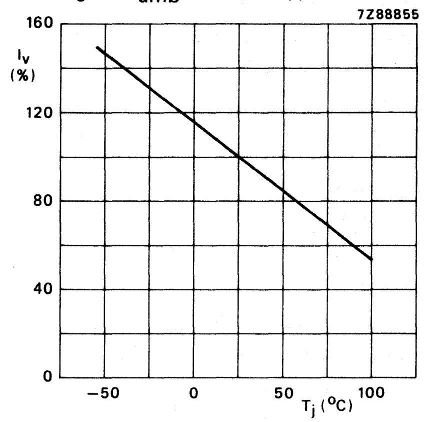


Fig. 5 Typical values.

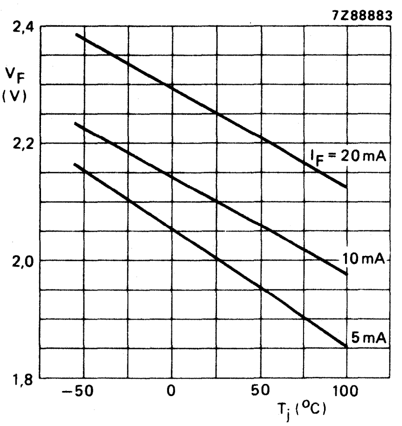


Fig. 6 I_F = 10 mA; typ. values.

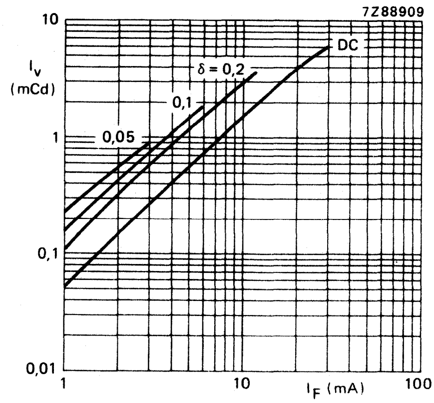


Fig. 7 t_p = 50 μs; typical values.

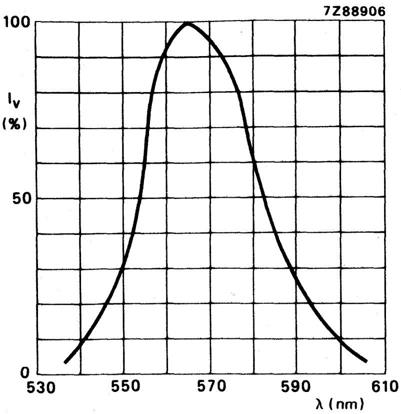


Fig. 8 Typical values.

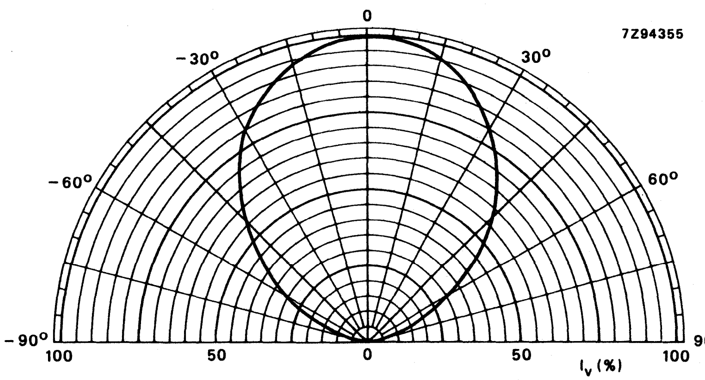


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Rectangular light emitting diode of 5 mm x 5 mm which emits green light at a typical peak wavelength of 565 nm (GaP; super-green) when forward biased. The PLED-GR44DL has SOD-74L envelope and is encapsulated in a green diffusing resin.

These SOD-74 LEDs are suitable for surface illumination, for example in information boards, score boards, moving advertisement and electronic game applications.

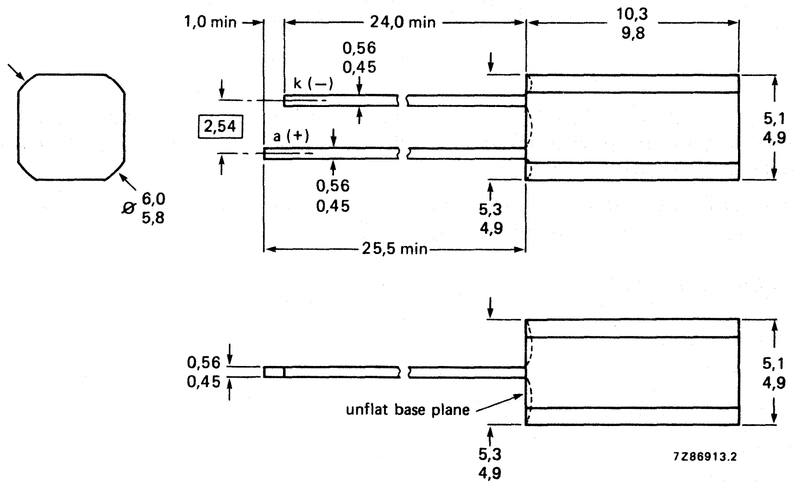
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 35 °C		P_{tot}	max.	180	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-GR44DL	I_v	min.	0.7	mcd
	PLED-GR44DL-2	I_v		1.0 to 2.2	mcd
	PLED-GR44DL-3	I_v		1.6 to 3.5	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	565	nm
Beamwidth between half-intensity directions					
I_F = 10 mA		$\theta_{½}$	typ.	100	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-74L.



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	60	mA
peak value, t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	150	mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	180	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature $>$ 5.0 mm from the plastic body; $t_{sld} < 7$ s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1	V
			max.	3.0	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	100	°
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	565	nm
Luminous intensity I_F = 10 mA	PLED-GR44DL	I_v	min.	0.7	mcd
	PLED-GR44DL-2	I_v		1.0 to 2.2	mcd
	PLED-GR44DL-3	I_v		1.6 to 3.5	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	20	pF

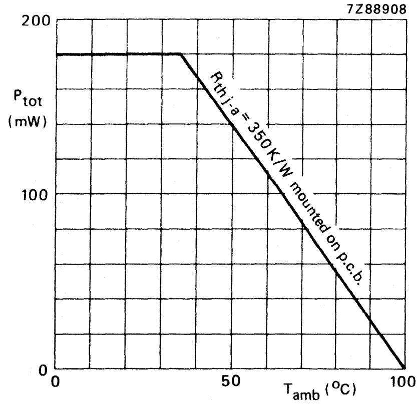


Fig. 2.

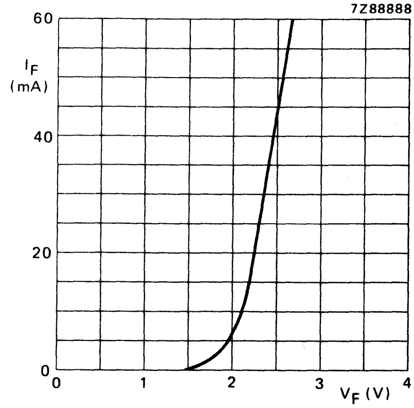


Fig. 3 T_{amb} = 25 °C; typical values.

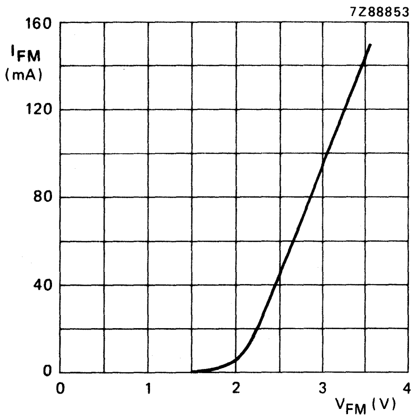


Fig. 4 t_{on} = 50 μs; δ = 0.01; T_{amb} = 25 °C; typical values.

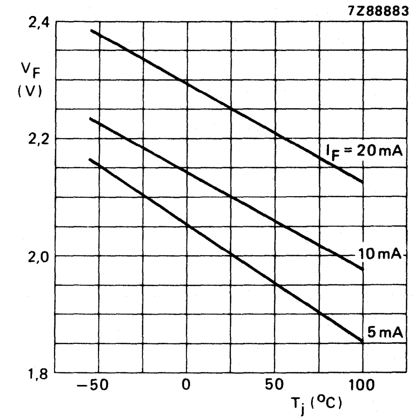


Fig. 5 Typical values.

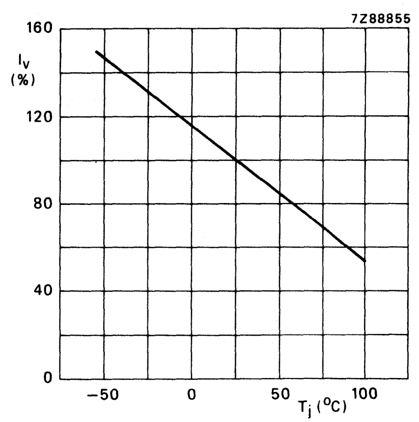


Fig. 6 I_F = 10 mA; typical values.

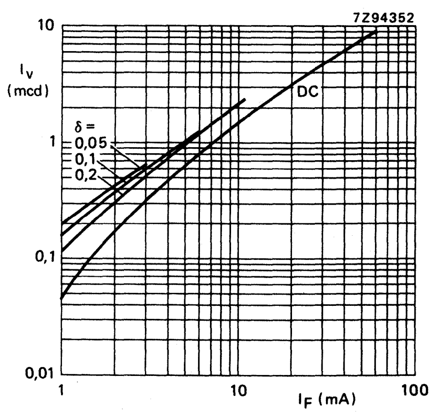


Fig. 7 t_p = 50 μs; typical values.

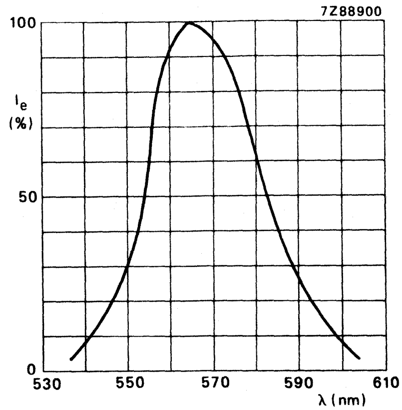


Fig. 8 Typical values.

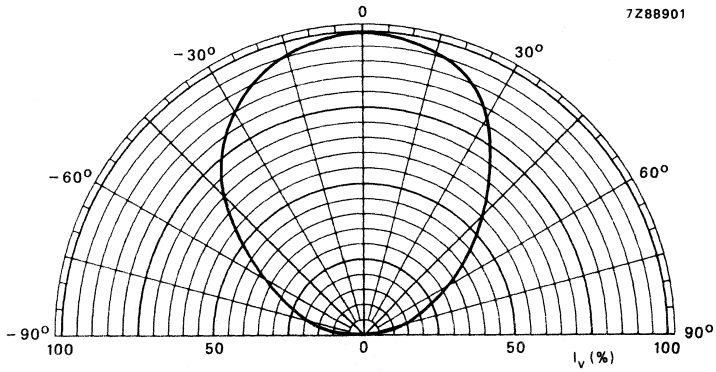


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased. The PLED-H313A has a SOD-53 outline and is encapsulated in a red non-diffusing resin.

Note: This device has to be used behind a diffusing screen.

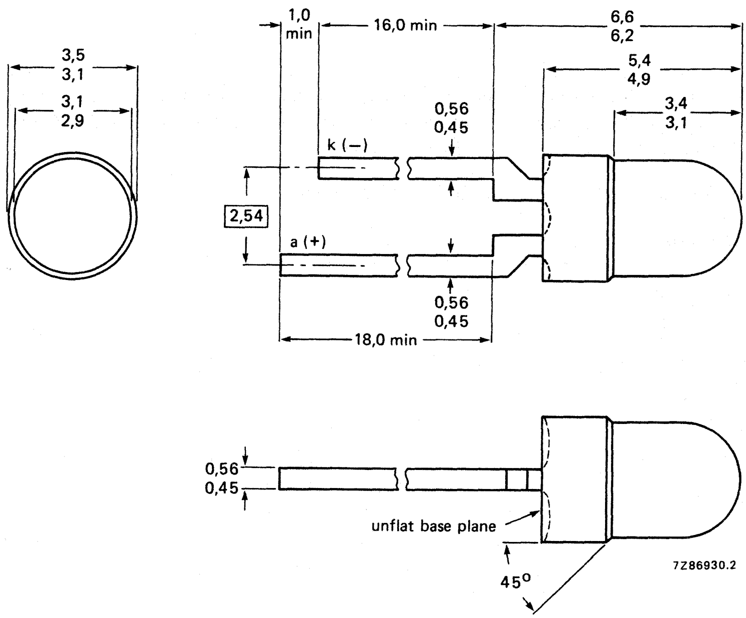
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	150	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-H313A	I_V	min.	5	mcd
	PLED-H313A-5	I_V		5 to 12	mcd
	PLED-H313A-6	I_V		10 to 12	mcd
	PLED-H313A-7	I_V		16 to 35	mcd
	PLED-H313A-8	I_V	min.	30	mcd
I_F = 2 mA	PLED-H313A-C	I_V		1,6 to 3,5	mcd
	PLED-H313A-D	I_V		3 to 7	mcd
	PLED-H313A-E	I_V	min.	5	mcd
Wavelength at peak emission		λ_p	typ.	650	nm
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	60	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53E.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	60	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	150	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature				
$>$ 1,5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	500	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage					
I_F = 2 mA		V_F	typ.	1,65	V
I_F = 10 mA		V_F	typ.	1,75	V
		V_F	max.	2,2	V
Reverse current					
V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	60	°
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm
Wavelength at peak emission		λ_p	typ.	650	nm
Luminous intensity					
I_F = 10 mA	PLED-H313A	I_v	min.	5	mcd
	PLED-H313A-5	I_v		5 to 12	mcd
	PLED-H313A-6	I_v	min.	10 to 12	mcd
	PLED-H313A-7	I_v		16 to 35	mcd
	PLED-H313A-8	I_v	min.	30	mcd
Luminous intensity					
I_F = 2 mA	PLED-H313A-C	I_v		1,6 to 3,5	mcd
	PLED-H313A-D	I_v		3 to 7	mcd
	PLED-H313A-E	I_v	min.	5	mcd
Diode capacitance					
V_R = 0; f = 1 MHz		C_d	typ.	80	pF

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased.

The PLED-H314A has a SOD-53 outline and is encapsulated in a red coloured diffusing resin.

The high light intensity of the PLED-H314A makes it suitable for applications where only low currents are available.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	60	mA
Total power dissipation up to $T_{amb} = 25\ ^oC$		P_{tot}	max.	150	mW
Junction temperature		T_j	max.	100	^oC
Luminous intensity					
$I_F = 10$ mA	PLED-H314A	I_v	min.	3	mcd
	PLED-H314A-5	I_v		5 to 12	mcd
	PLED-H314A-6	I_v		10 to 22	mcd
	PLED-H314A-7	I_v	min.	16	mcd
$I_F = 2$ mA	PLED-H314A-B	I_v		1 to 2,2	mcd
	PLED-H314A-C	I_v		1,6 to 3,5	mcd
	PLED-H314A-D	I_v		3 to	mcd
Wavelength at peak emission					
$I_F = 10$ mA		λ_p	typ.	650	nm
Beamwidth at half-intensity directions		$\theta_{1/2}$	typ.	100	^{o}

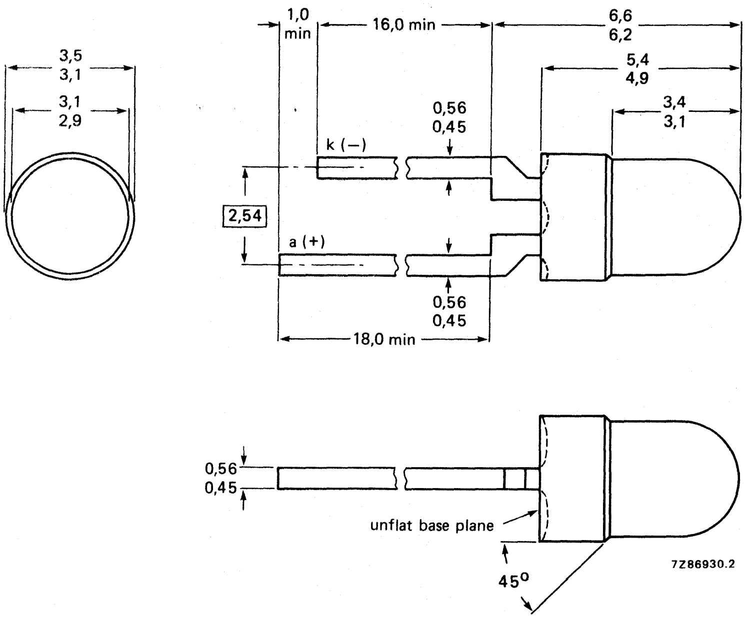
MECHANICAL DATA

SOD-53E (see Fig. 1).

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53E.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	60	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	150	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature $>$ 1,5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	500	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage						
I_F = 4 mA		V_F	typ.	1,65	V	
I_F = 10 mA		V_F	typ.	1,75	V	
			max.	2,2	V	
Reverse current						
V_R = 5 V		I_R	max.	100	μA	
Beamwidth between half-intensity directions						
I_F = 10 mA		$\theta_{1/2}$	typ.	100	°	
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm	
Wavelength at peak emission						
I_F = 10 mA		λ_p	typ.	650	nm	
Luminous intensity						
I_F = 2 mA	PLED-H314A-B	I_v	typ.	1,8	mcd	←
	PLED-H314A-C	I_v	typ.	3	mcd	←
	PLED-H314A-D	I_v	typ.	5	mcd	←
I_F = 10 mA	PLED-H314A	I_v	min.	3	mcd	
		I_v	typ.	5	mcd	
	PLED-H314A-5	I_v		5 to 12	mcd	
		I_v	typ.	8	mcd	
	PLED-H314A-6	I_v		10 to 22	mcd	
		I_v	typ.	15	mcd	
	PLED-H314A-7	I_v	min.	16	mcd	
		I_v	typ.	18	mcd	

Diode capacitance
$V_R = 0$; f = 1 MHz C_d typ. 80 pF

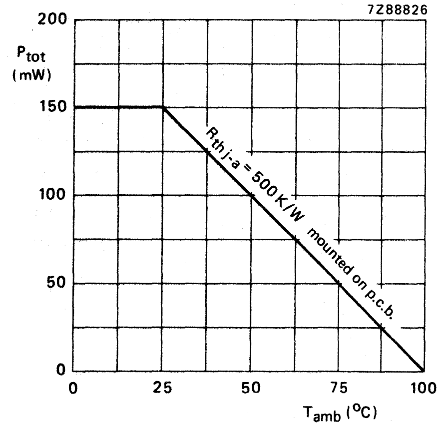


Fig. 2.

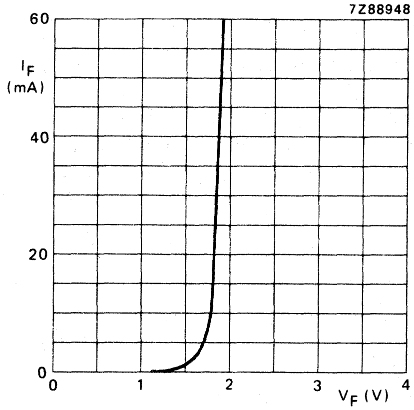


Fig. 3 T_{amb} = 25 °C; typ. values.

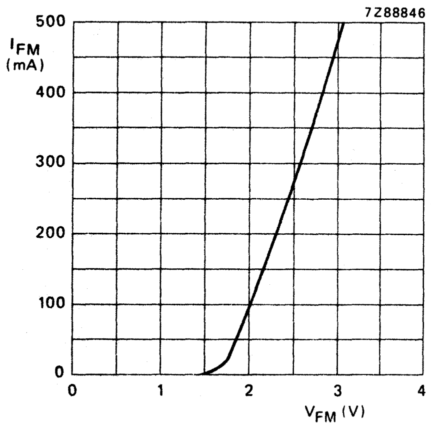


Fig. 4 t_{on} = 20 μs; δ = 0,01; T_{amb} = 25 °C; typ. values.

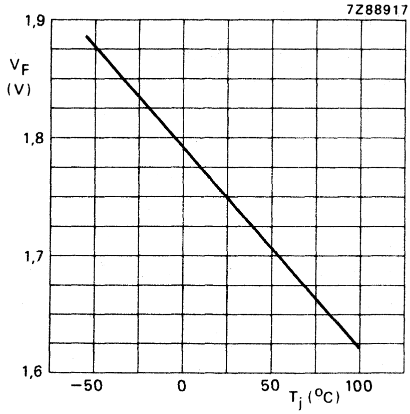


Fig. 5 I_F = 10 mA; typ. values.

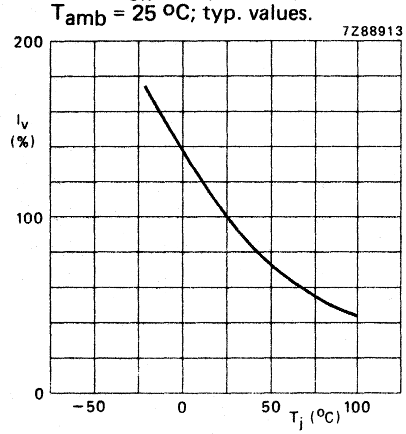


Fig. 6 Typical values.

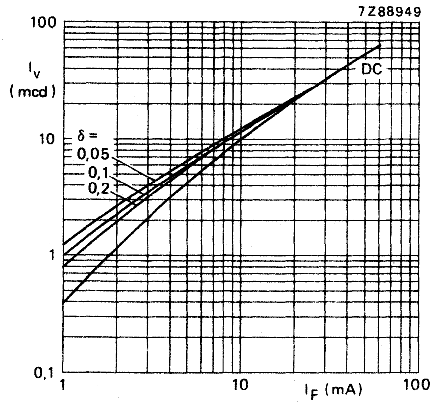


Fig. 7 t_p = 50 μs; typ. values.

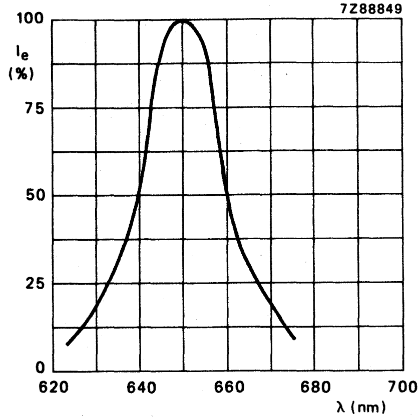


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

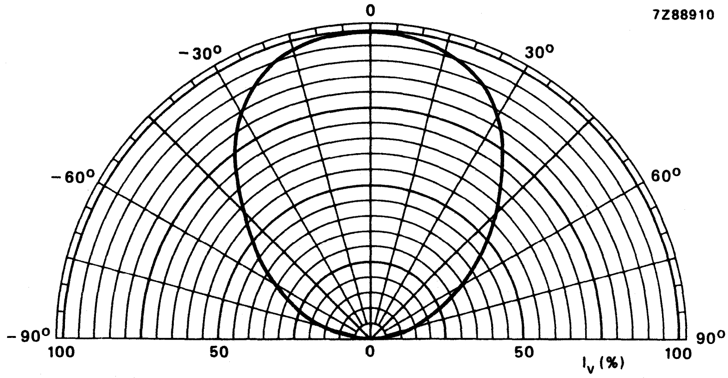


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 3 mm which emit a narrow beam of red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased.

The PLED-H511C and PLED-H541CL have a SOD-63 outline and are encapsulated in a clear colourless resin.

The very high light intensity of the PLED-H511C and PLED-H541CL make them suitable for applications where only low currents are available. They are also suited for very high luminous intensity applications because of their ability to withstand high forward currents.

The PLED-H541CL is the long-lead version of the PLED-H511C and has no seating plane but is in all other respects similar to the PLED-H511C.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	100	mA
Total power dissipation up to $T_{amb} = 25\ ^oC$		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	^oC
Luminous intensity					
$I_F = 10$ mA	PLED-H511C/H541CL	I_v	min.	16	mcd
	PLED-H511C/H541CL-8	I_v		30 to 70	mcd
	PLED-H511C/H541CL-9	I_v		50 to 120	mcd
	PLED-H511C/H541CL-10	I_v	min.	100	mcd
$I_F = 2$ mA	PLED-H511C/H541CL-F	I_v		10 to 22	mcd
	PLED-H511C/H541CL-G	I_v	min.	16	mcd
Wavelength at peak emission		λ_p	typ.	650	nm
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	20	^{o}

MECHANICAL DATA

SOD-63D2 (see Fig. 1a).

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-63D2.
PLED-H511C

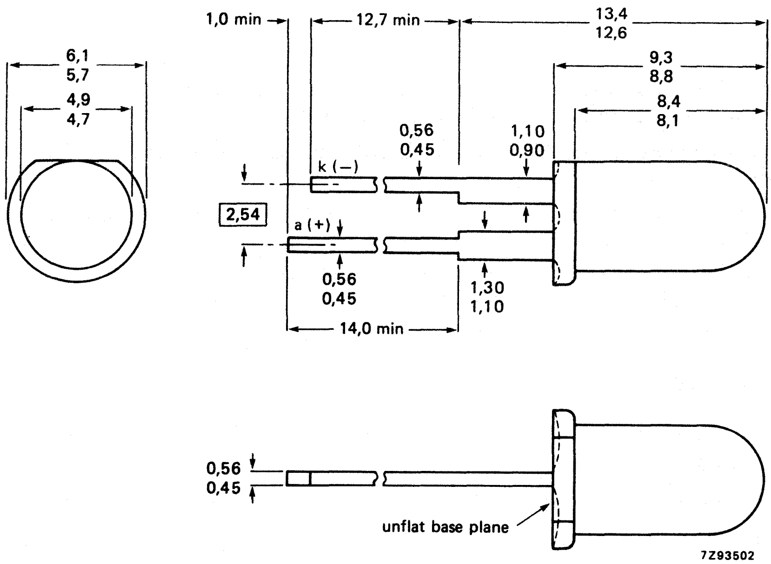
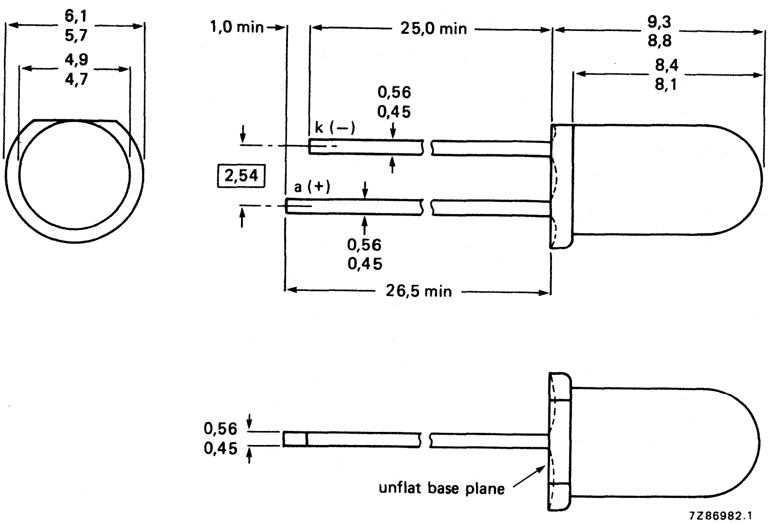


Fig. 1b SOD-63L.
PLED-H541CL



Note. Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5 V
Forward current d.c.	I_F	max.	100 mA
Forward current peak value, t_p = 1 μs; f = 300 Hz peak value, t_{on} = 20 μs; δ = 0,01	I_{FRM}	max. max.	1 A 500 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature; t_{sld} < 7 s > 1,5 mm from the seating plane for PLED-H511C > 5 mm from the plastic body for PLED-H541CL	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	max. typ.	2,2 V 1,75 V
I_F = 2 mA		V_F	typ.	1,65 V ←
Reverse current V_R = 5 V		I_R	max.	100 μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{½}$	typ.	20 °
Bandwidth at half height		$\Delta\lambda$	typ.	20 nm
Wavelength at peak emission I_F = 10 mA; T_{amb} = 25 °C		λ_p	typ.	650 nm
Luminous intensity I_F = 2 mA	PLED-H511C/H541CL-F	I_V	typ.	16 mcd ←
	PLED-H511C/H541CL-G	I_V	typ.	35 mcd ←
I_F = 10 mA	PLED-H511C/H541CL	I_V	min.	16 mcd
	PLED-H511C/H541CL-8	I_V	 typ.	30 to 70 mcd 50 mcd
	PLED-H511C/H541CL-9	I_V	 typ.	50 to 120 mcd 80 mcd
	PLED-H511C/H541CL-10	I_V	min. typ.	100 mcd 120 mcd
I_F = 50 mA	PLED-H511C/H541CL-8	I_V	typ.	200 mcd
	PLED-H511C/H541CL-9	I_V	typ.	400 mcd
	PLED-H511C/H541CL-10	I_V	typ.	600 mcd

Diode capacitance

$V_R = 0$; f = 1 MHz — C_d typ. 80 pF

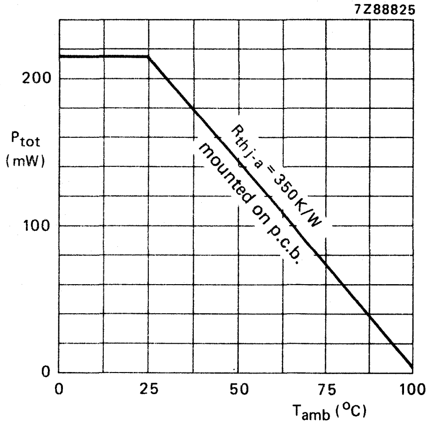


Fig. 2.

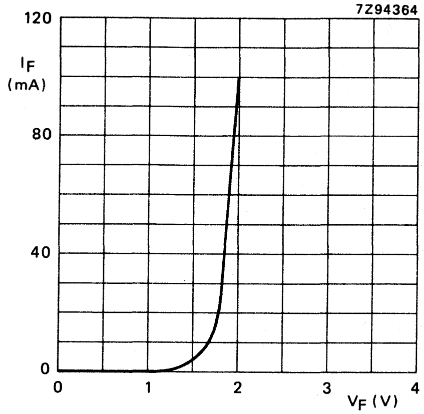


Fig. 3 Typical values; T_{amb} = 25 °C.

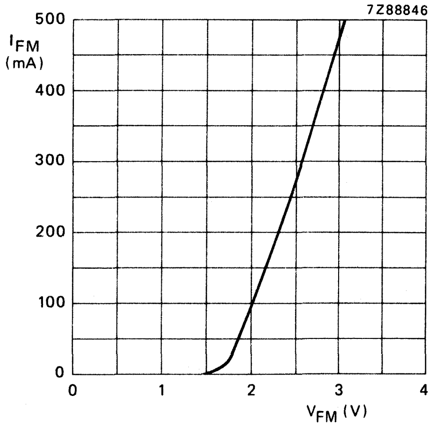


Fig. 4 t_{on} = 20 μs; δ = 0,01; T_{amb} = 25 °C; typ. values.

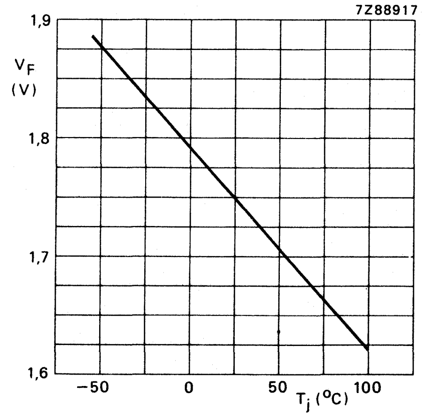


Fig. 5 I_F = 10 mA; typ. values.

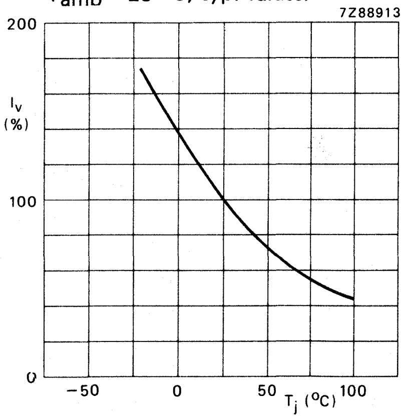


Fig. 6 Typical values.

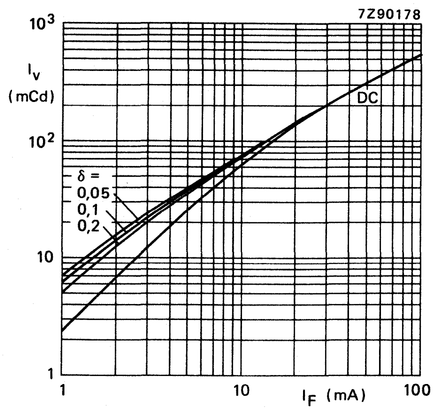


Fig. 7 t_p = 50 μs; typ. values.

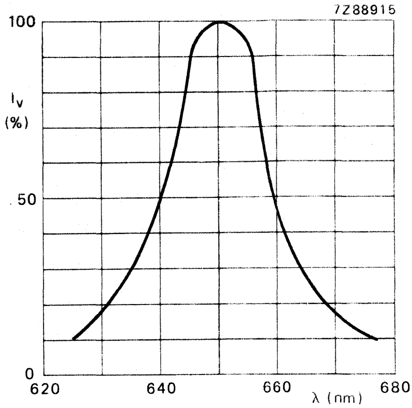


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

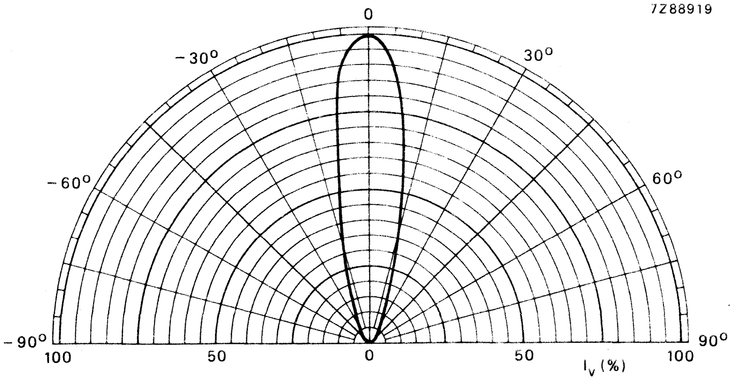


Fig. 9.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased.

The PLED-H514B and PLED-H544CL have a SOD-63 outline and are encapsulated in a red diffusing resin.

The PLED-H544CL is the long-lead version of the PLED-H514B and has no seating plane but is in all other respects similar to the PLED-H514B.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	100	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-H514B/H544CL	I_v	min.	3	mcd
	PLED-H514B/H544CL-4	I_v		3 to 7	mcd
	PLED-H514B/H544CL-5	I_v		5 to 12	mcd
	PLED-H514B/H544CL-6	I_v	min.	10	mcd
I_F = 2 mA	PLED-H514B/H544CL-B	I_v		1 to 2.2	mcd
	PLED-H514B/H544CL-C	I_v	min.	1.6	mcd
Wavelength at peak emission		λ_p	typ.	650	nm
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	100	°

MECHANICAL DATA

SOD-63A2 (see Fig. 1a).

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-63A2.
PLED-H514B

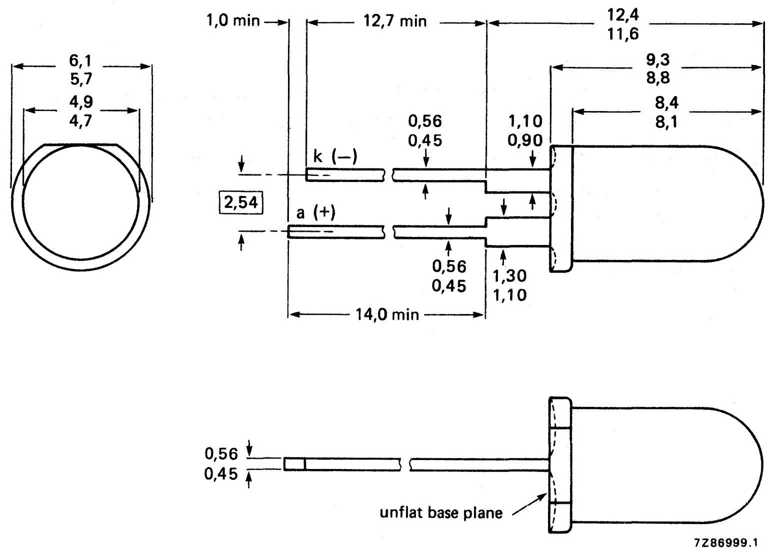
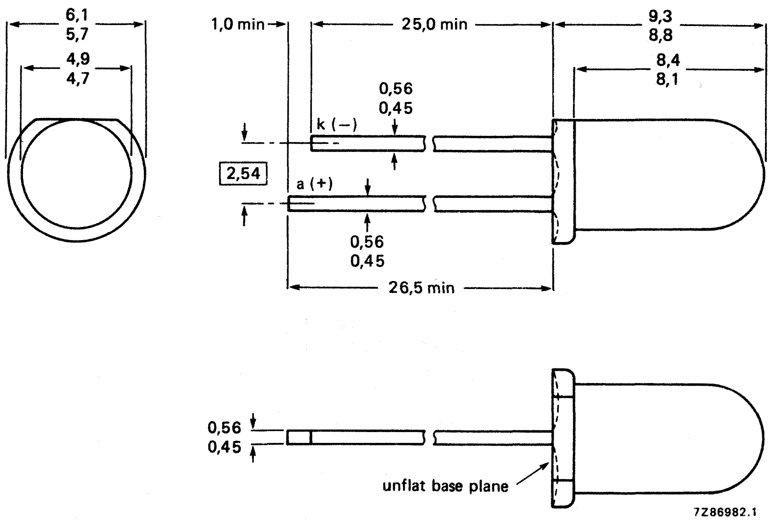


Fig. 1b SOD-63L
PLED-H544CL



Note.: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current d.c.	I_F	max.	100	mA
Forward current peak value, t_p = 1 μs; f = 300 Hz peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max. max.	1 500	A mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; t_{sld} < 7 s > 1,5 mm from the seating plane for PLED-H514B > 5 mm from the plastic body for PLED-H544CL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 2 mA		V_F	typ.	1,65	V ←
I_F = 10 mA		V_F	typ. max.	1,75 2,2	V V
I_F = 50 mA		V_F	typ.	1,9	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Bandwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	100	°
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm
Wavelength at peak emission I_F = 10 mA, T_{amb} = 25 °C		λ_p	typ.	650	nm
Luminous intensity I_F = 2 mA	PLED-H514B/H544CL-B	I_v	typ.	1,5	mcd ←
	PLED-H514B/H544CL-C	I_v	typ.	3	mcd ←
I_F = 10 mA	PLED-H514B/H544CL	I_v	min.	4	mcd
	PLED-H514B/H544CL-4	I_v	 typ.	3 to 7 5	mcd mcd
	PLED-H514B/H544CL-5	I_v	 typ.	5 to 12 8	mcd mcd
	PLED-H514B/H544CL-6	I_v	min. typ.	10 15	mcd mcd

Diode capacitance
$V_R = 0$; f = 1 MHz $\qquad C_d \qquad$ typ. $\qquad$ 80 pF

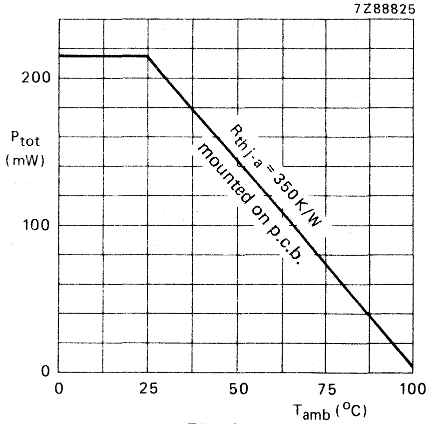


Fig. 2.

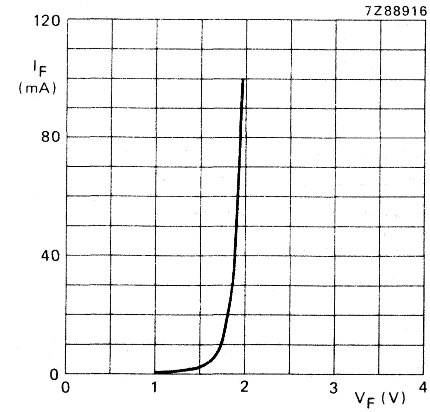


Fig. 3 T_{amb} = 25 °C; typ. values.

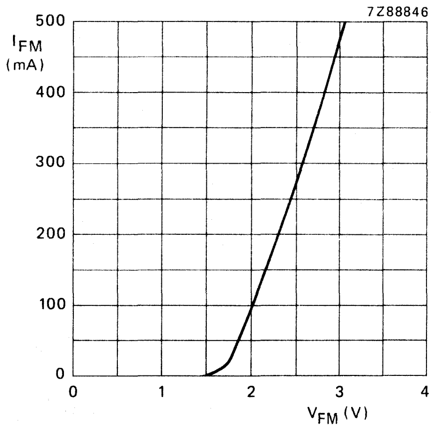


Fig. 4 t_{on} = 20 μs; δ = 0,01;
T_{amb} = 25 °C; typ. values.

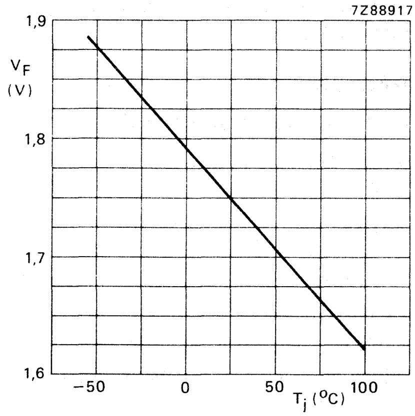


Fig. 5 I_F = 10 mA; typ. values.

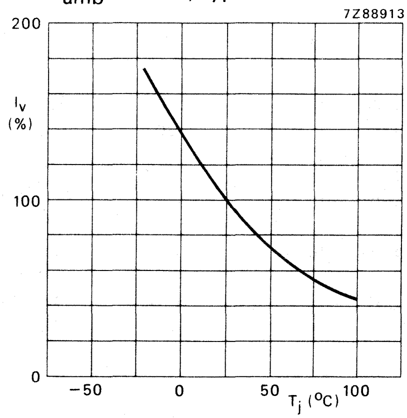


Fig. 6 Typical values.

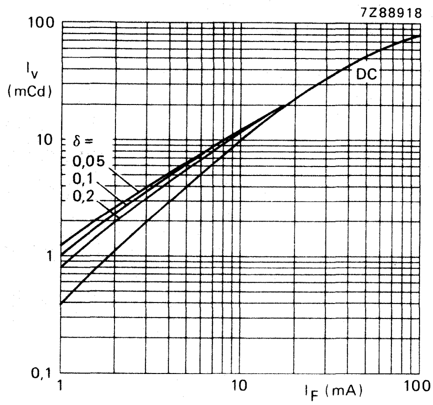


Fig. 7 t_p = 50 μs; typ. values.

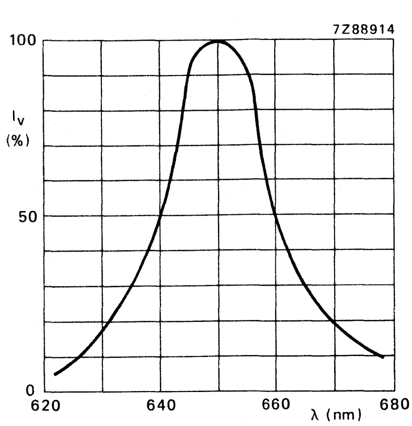


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

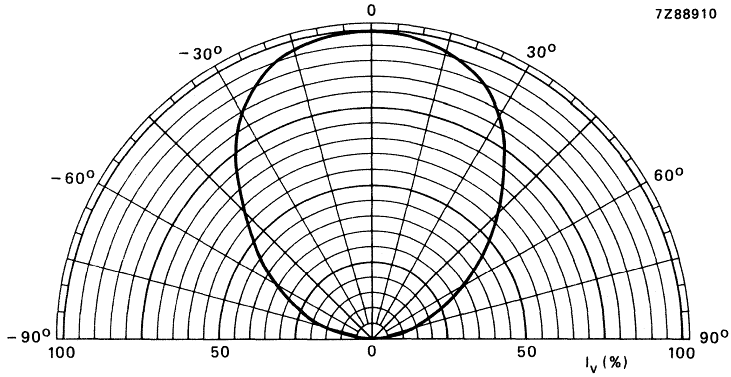


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased.

The PLED-H544KL has a flangeless SOD-85 outline and is encapsulated in a red diffusing resin.

Together with the CQS84L and the CQS86L, the PLED-H544KL forms one family and is available only in the long lead (L) version.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	100	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-H544KL	I_V	min.	1,6	mcd
	PLED-H544KL-4	I_V		3,0 to 7,0	mcd
	PLED-H544KL-5	I_V		5,0 to 12	mcd
	PLED-H544KL-6	I_V	min.	10	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	650	nm
Beamwidth at half-intensity directions		$\theta_{½}$	typ.	70	°

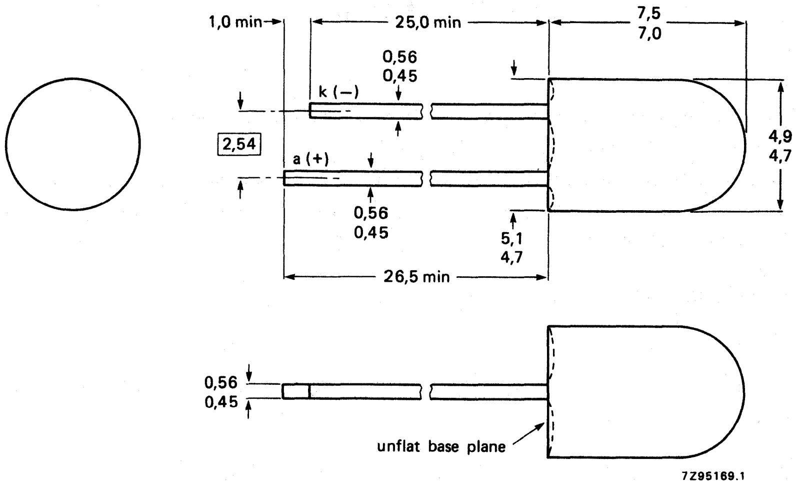
MECHANICAL DATA

SOD-85AL (see Fig. 1).

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-85AL.



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	100 mA
peak value; t = 1 μs; f = 300 Hz	I_{FRM}	max.	1 A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature; t_{sld} < 7 s; > 5 mm from the plastic body	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage				
I_F = 10 mA		V_F	typ.	1,75 V
			max.	2,2 V
I_F = 100 mA		V_F	typ.	2,0 V
			max.	2,5 V
Reverse current				
V_R = 5 V		I_R	max.	100 μA
Beamwidth at half-intensity directions				
I_F = 10 mA; in the plane of the leads		$\theta_{1/2}$	typ.	70 °
Bandwidth at half height		Δλ	typ.	20 nm
Wavelength at peak emission				
I_F = 10 mA		λ_p	typ.	650 nm
Luminous intensity				
I_F = 10 mA	PLED-H544KL	I_v	min.	1,6 mcd
	PLED-H544KL-4	I_v		3,0 to 7,0 mcd
	PLED-H544KL-5	I_v		5,0 to 12 mcd
	PLED-H544KL-6	I_v	min.	10 mcd
Diode capacitance				
V_R = 0; f = 1 MHz		C_d	typ.	80 pF

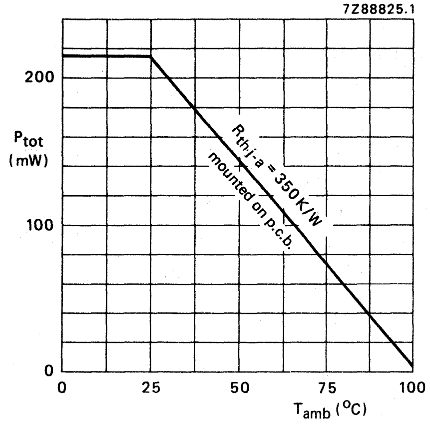


Fig. 2.

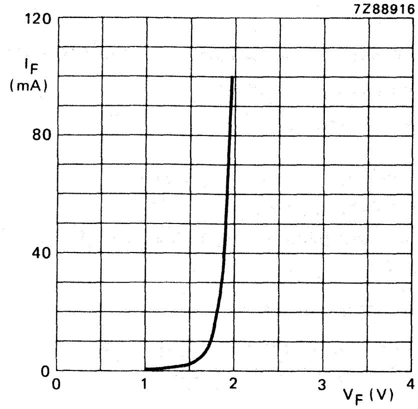


Fig. 3 T_{amb} = 25 °C; typ. values.

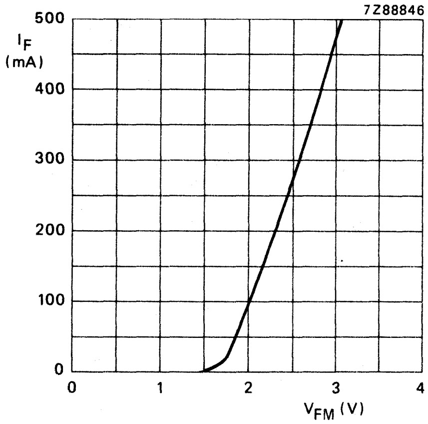


Fig. 4 t_{on} = 20 μs; δ = 0,01; T_{amb} = 25 °C; typ. values.

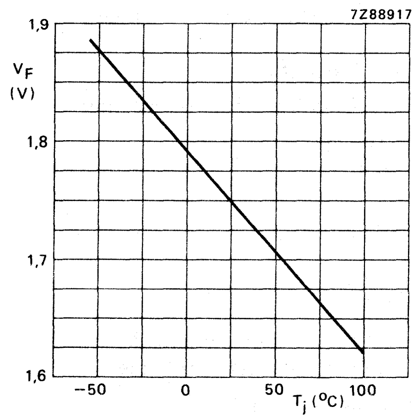


Fig. 5 I_F = 10 mA; typ. values.

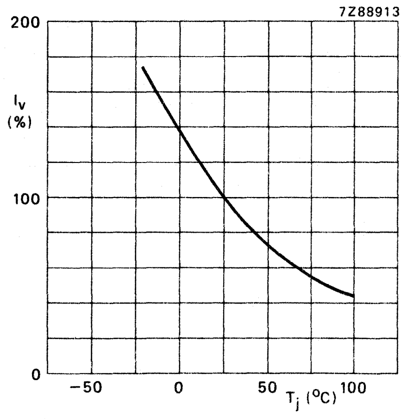


Fig. 6 Typical values.

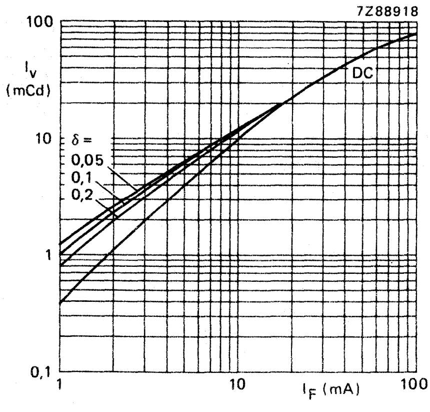


Fig. 7 t_p = 50 μs; typ. values.

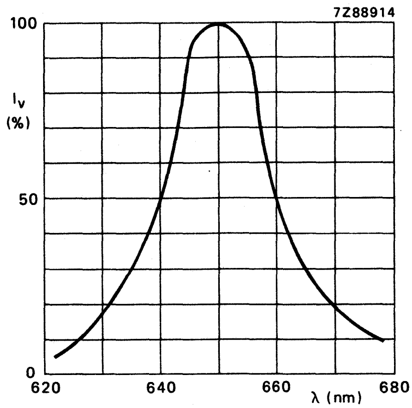


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

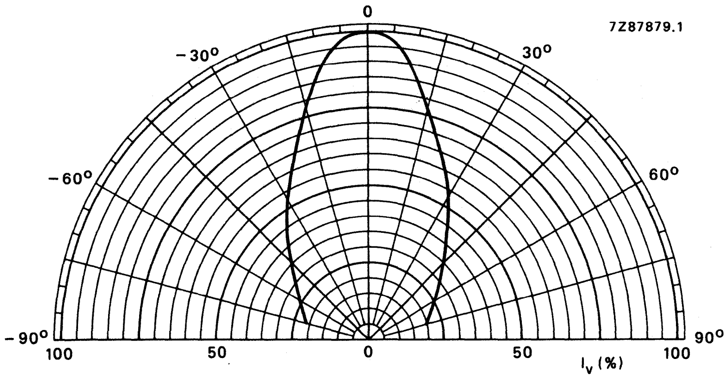


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased.

The PLED-H544LL has a flangeless SOD-85 outline and is encapsulated in a red diffusing resin.

Together with the CQS94L and the CQS96L, the PLED-H544LL forms one family and is available only in the long lead (L) version.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	100	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-H544LL	I_v	min.	3,0	mcd
	PLED-H544LL-4	I_v		3,0 to 7,0	mcd
	PLED-H544LL-5	I_v		5,0 to 12	mcd
	PLED-H544LL-6	I_v	min.	10	mcd
Wavelength at peak emission		λ_p	typ.	650	nm
Beamwidth at half-intensity directions		$\theta_{1/2}$	typ.	70	°

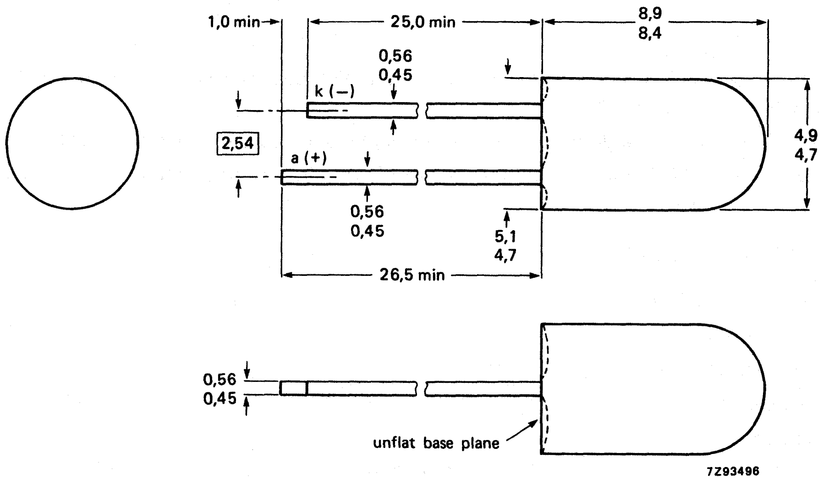
MECHANICAL DATA

SOD-85BL (see Fig. 1).

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-85BL.



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	100	mA
peak value; t = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; $t_{sld} < 7$ s; >5 mm from the plastic body	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage					
I_F = 10 mA		V_F	typ.	1,75	V
			max.	2,2	V
Reverse current					
V_R = 5 V		I_R	max.	100	μA
Beamwidth at half-intensity directions					
I_F = 10 mA; in the plane of the leads		$\theta_{1/2}$	typ.	70	°
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	650	nm
Luminous intensity					
I_F = 10 mA	PLED-H544LL	I_v	min.	3,0	mcd
	PLED-H544LL-4	I_v		3,0 to 7,0	mcd
	PLED-H544LL-5	I_v		5,0 to 12	mcd
	PLED-H544LL-6	I_v	min.	10	mcd
Diode capacitance					
V_R = 0; f = 1 MHz		C_d	typ.	80	pF

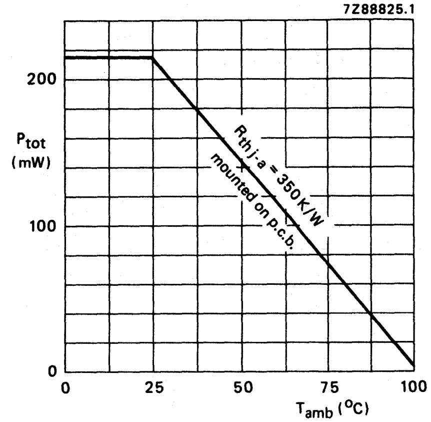


Fig. 2.

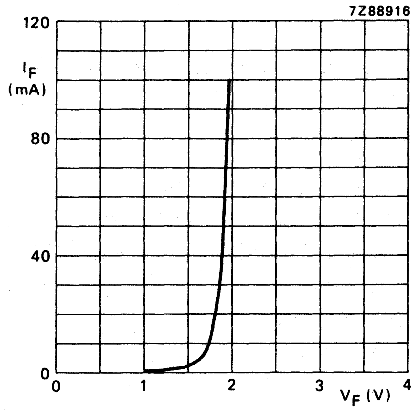


Fig. 3 T_{amb} = 25 °C; typ. values.

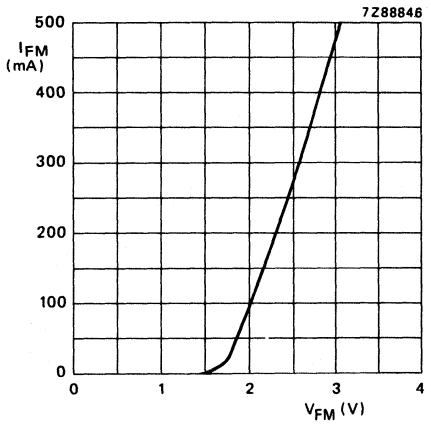


Fig. 4 t_{on} = 20 μs; δ = 0,01; T_{amb} = 25 °C; typ. values.

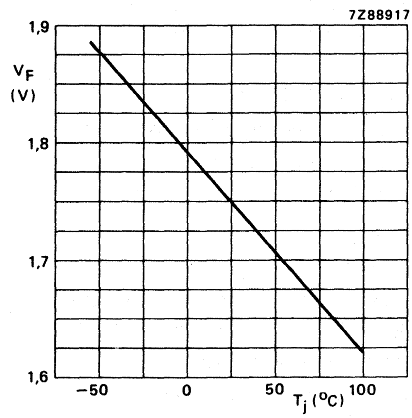


Fig. 5 I_F = 10 mA; typ. values.

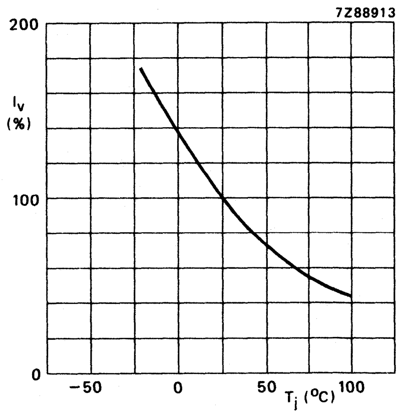


Fig. 6 Typical values.

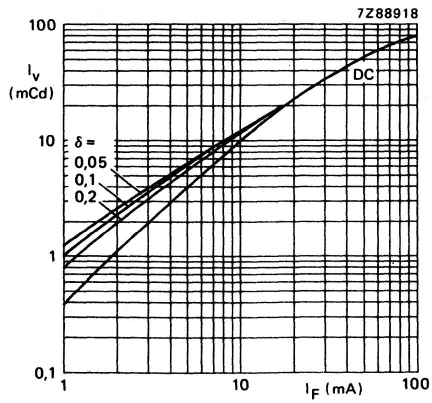


Fig. 7 t_p = 50 μs; typ. values; T_{amb} = 25 °C.

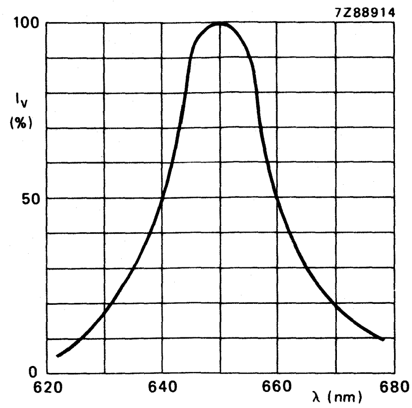


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

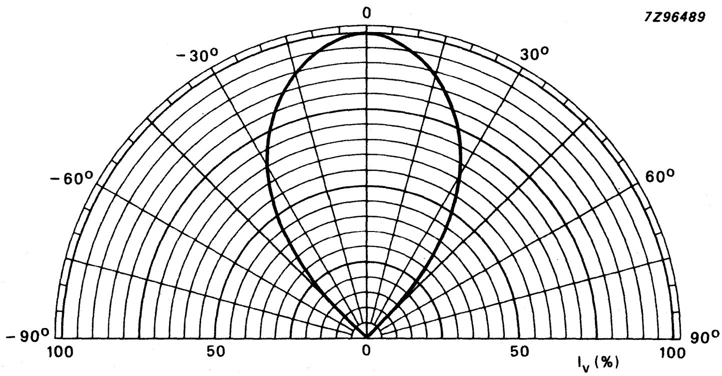


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diodes of 5 mm x 1 mm which emit red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased.

The PLED-HR14E and PLED-HR44EL have a SOD-75 outline and are encapsulated in a red diffusing resin. These LEDs when stacked in an array (in combination with other SOD-75 LEDs) can be used, for example, as level indicators.

The PLED-HR44EL is equal to the PLED-HR14E but has long leads and no seating plane.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	100	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-HR14E/HR44EL	I_V	min.	0,7	mcd
	PLED-HR14E/HR44EL-3	I_V		1,6 to 3,5	mcd
	PLED-HR14E/HR44EL-4	I_V	min.	3,0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	650	nm
Beamwidth between half-intensity directions in the plane of the leads		$\theta_{½}$	typ.	110	°

MECHANICAL DATA

SOD-75B2 (see Fig. 1a).

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-75B2.
PLED-HR14E

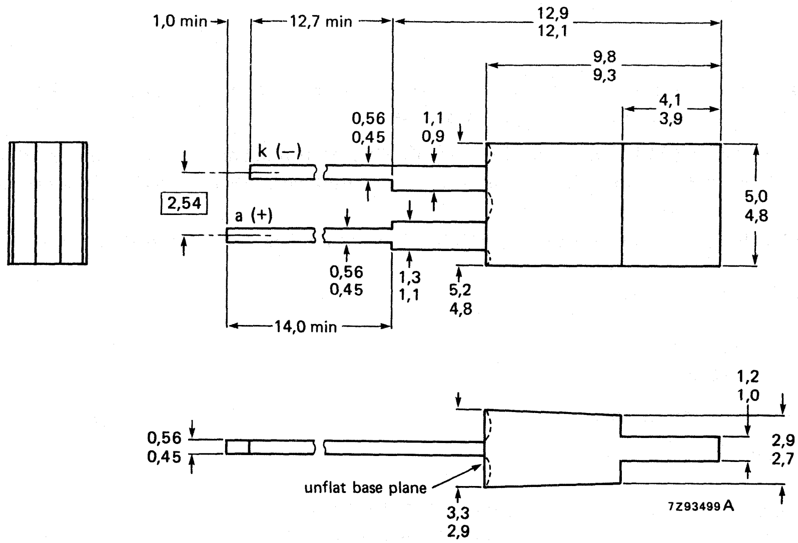
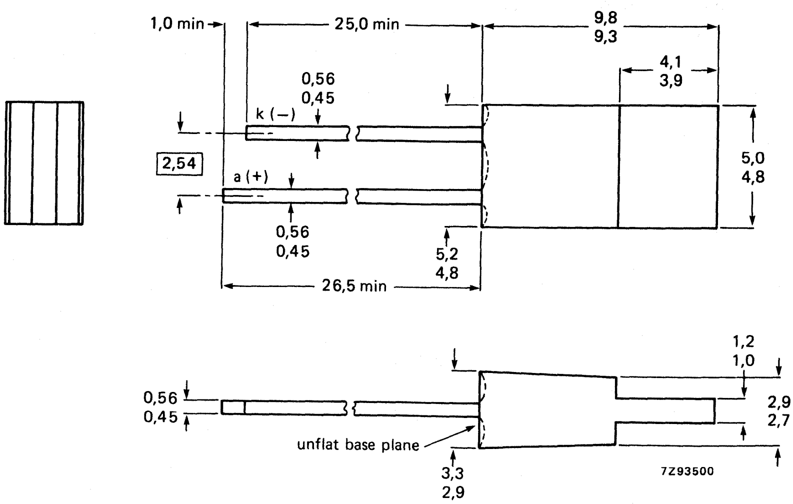


Fig. 1b SOD-75BL.
PLED-HR44EL



Note. Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	100	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500	mA
Total power dissipation up to T_{amb} = 25 ^oC	P_{tot}	max.	215	mW
Storage temperature	T_{stg}		−55 to +100	^oC
Junction temperature	T_j	max.	100	^oC
Lead soldering temperature at t_{sld} < 7 s > 1,5 mm from the seating plane for PLED-HR14E > 5 mm from the plastic body for PLED-HR44EL	T_{sld}	max.	260	^oC

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 ^oC unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	1,75	V
			max.	2,20	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions in the plane of the leads		$\theta_{½}$	typ.	110	^{o}
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	650	nm
Luminous intensity I_F = 10 mA	PLED-HR14E/HR44EL	I_v	min.	0,7	mcd
	PLED-HR14E/HR44EL-3	I_v		1,6 to 3,5	mcd
	PLED-HR14E/HR44EL-4	I_v	min.	3,0	mcd
Diode capacitance V_R = 0, f = 1 MHz		C_d	typ.	80	pF

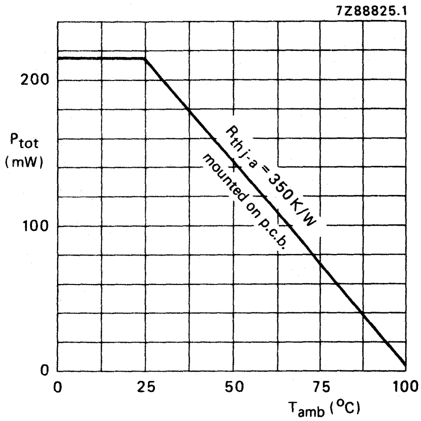


Fig. 2.

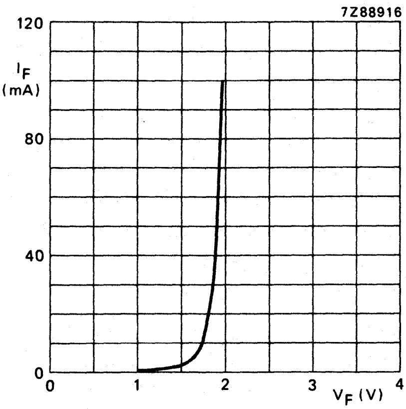


Fig. 3 T_{amb} = 25 °C; typ. values.

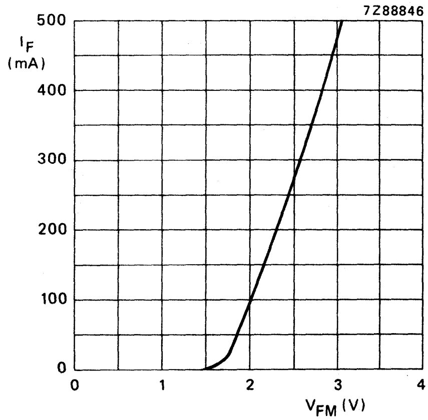


Fig. 4 t_{on} = 20 μs; δ = 0,01; T_{amb} = 25 °C; typ. values.

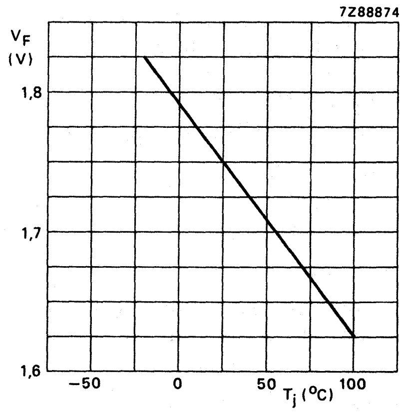


Fig. 5 I_F = 10 mA; typical values.

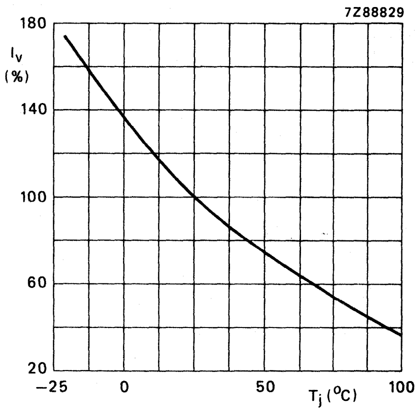


Fig. 6 Typical values.

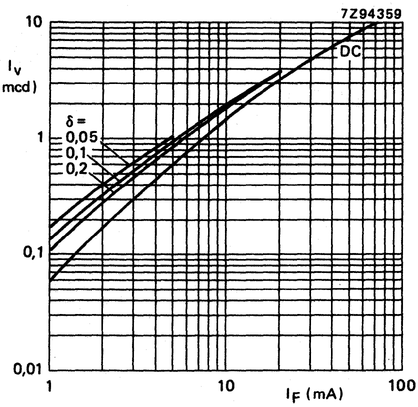


Fig. 7 t_p = 50 μs; typical values.

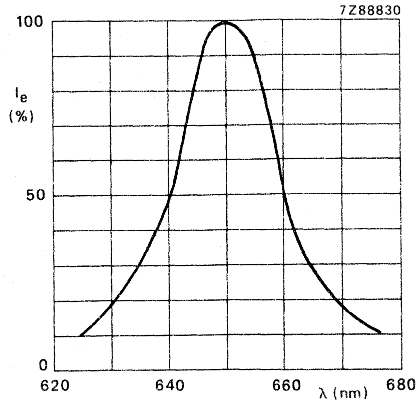


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

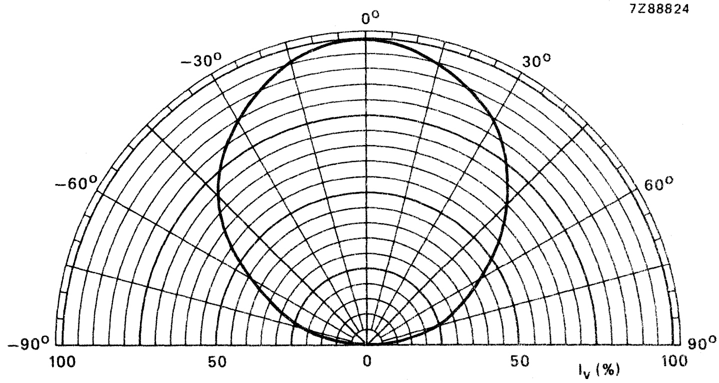


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diode of 5 mm x 2,5 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased.

The PLED-HR14F has a SOD-76 envelope and is encapsulated in a red diffusing resin.

The PLED-HR44FL is the long lead version of the PLED-HR14F without a seating plane but is in all other respects similar to the PLED-HR14F.

When stacked in an array these SOD-76 LEDs can be used, for example, as level indicators. Because of its high light intensity the PLED-HR14F (and PLED-HR44FL) is suitable in applications where only low currents are available and because of its high I_{Fmax} it can be used for high I_V applications.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	100	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-HR14F/HR44FL	I_v	min.	0,7	mcd
	PLED-HR14F/HR44FL-3	I_v		1,6 to 3,5	mcd
	PLED-HR14F/HR44FL-4	I_v		3,0 to 7,0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	650	nm
Beamwidth between half-intensity directions					
I_F = 10 mA		$\theta_{½}$	typ.	100	°

MECHANICAL DATA

SOD-76A2 (see Fig. 1).

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-76A2.
PLED-HR14F

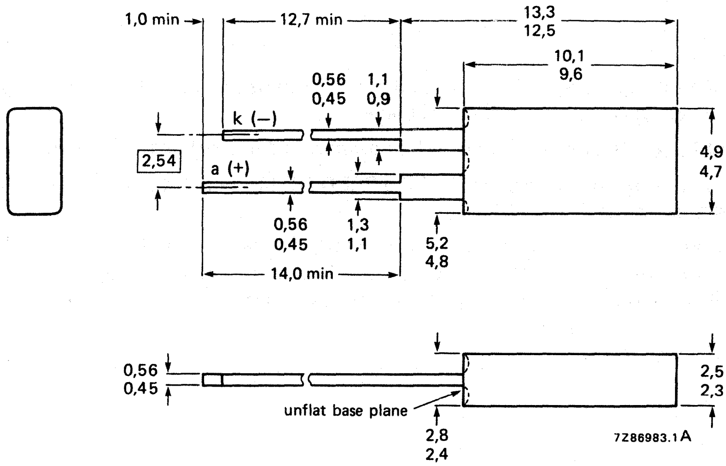
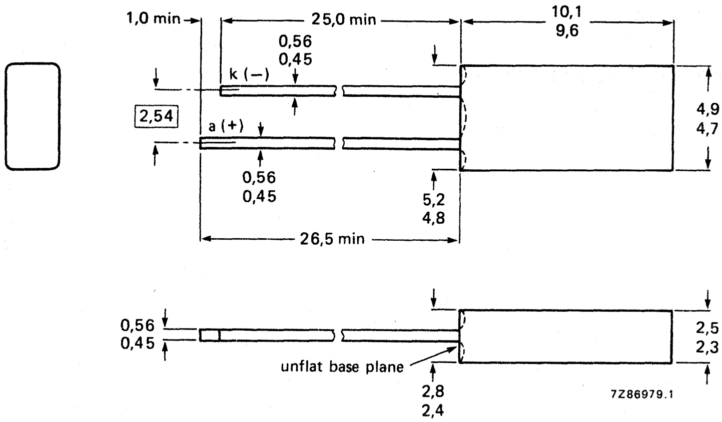


Fig. 1b SOD-76L.
PLED-HR44FL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
d.c.	I_F	max.	100	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500	mA
Total power dissipation up to T_{amb} = 25 ^oC	P_{tot}	max.	215	mW
Storage temperature	T_{stg}		−55 to +100	^oC
Junction temperature	T_j	max.	100	^oC
Lead soldering temperature; t_{sld} < 7 s > 1,5 mm from the seating plane for PLED-HR14F > 5 mm from the plastic body for PLED-HR44FL	T_{sld}	max.	260	^oC

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 ^oC unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ. max.	1,75 2,2	V V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	100	^{o}
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	650	nm
Luminous intensity I_F = 10 mA	PLED-HR14F/HR44FL	I_v	min.	0,7	mcd
	PLED-HR14F/HR44FL-3	I_v		1,6 to 3,5	mcd
	PLED-HR14F/HR44FL-4	I_v		3,0 to 7,0	mcd
Diode capacitance V_R = 0, f = 1 MHz		C_d	typ.	80	pF

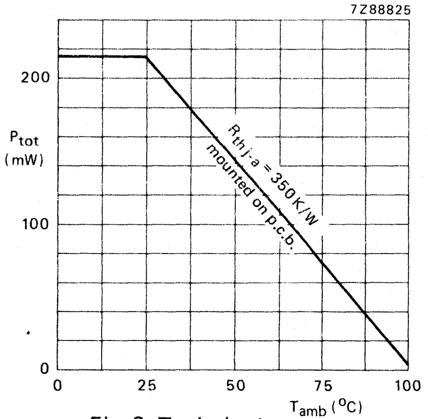


Fig. 2 Typical values.

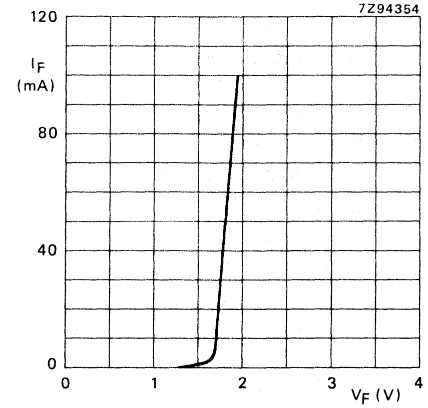


Fig. 3 T_{amb} = 25 ^oC; typ. values.

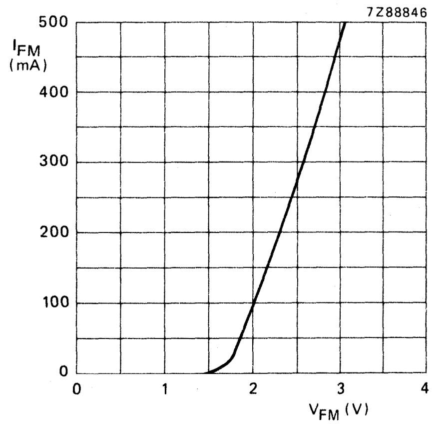


Fig. 4 t_{on} = 20 μs; δ = 0,01; typ. values.

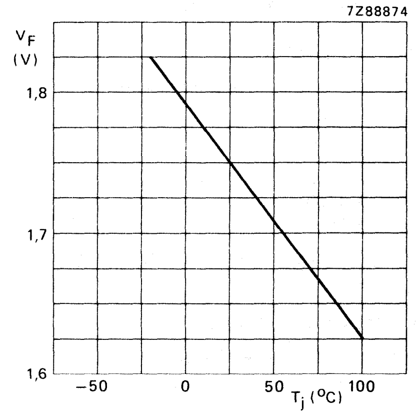


Fig. 5 I_F = 10 mA; typ. values.

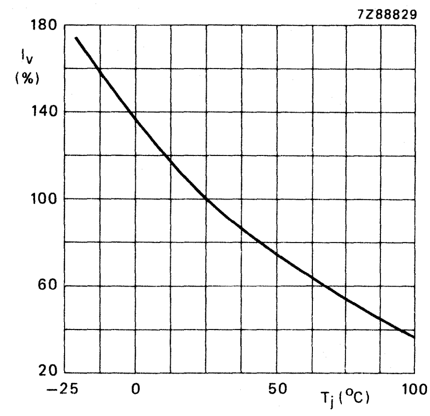


Fig. 6 Typical values.

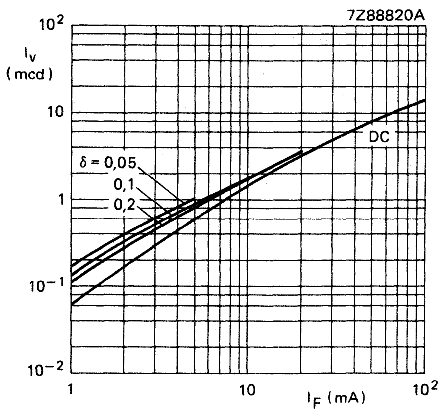


Fig. 7 t_p = 50 μs; typ. values.

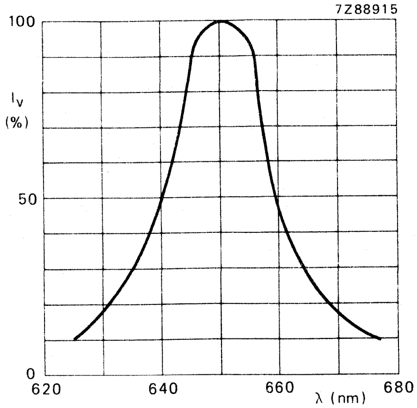


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

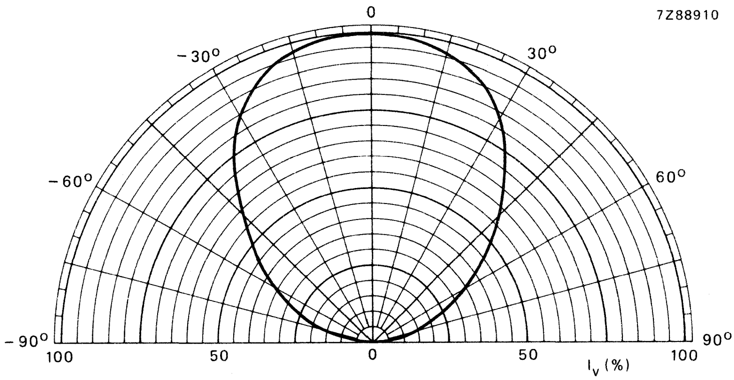


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diodes of 5 mm x 3 mm which emit red light at a typical peak wavelength of 650nm (GaAlAs, hyper-red) when forward biased. The PLED-HR14G and PLED-HR44GL have SOD-77 envelopes and are encapsulated in a red diffusing resin. Its high luminousity enables the PLED-HR14G to be used in applications where only low currents are available and because of its high I_{Fmax} it can be used in high I_v applications.

These SOD-77 LEDs, when stacked in an array, can be used as level indicators.

The PLED-HR44GL is similar to the PLED-HR14G but has long leads and has no seating plane.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	100	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-HR14G/HR44GL	I_v	min.	0,7	mcd
	PLED-HR14G/HR44GL-3	I_v		1,6 to 3,5	mcd
	PLED-HR14G/HR44GL-4	I_v		3,0 to 7,0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	650	nm
Beamwidth between half-intensity directions					
in the plane of the leads; I_F = 10 mA		$\theta_{1/2}$	typ.	100	°

MECHANICAL DATA

SOD-77A2 (see Fig. 1a).

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-77A2.
PLED-HR14G

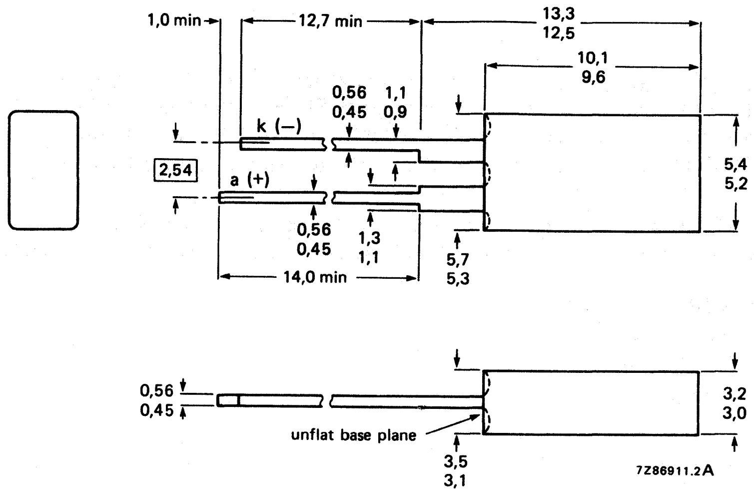
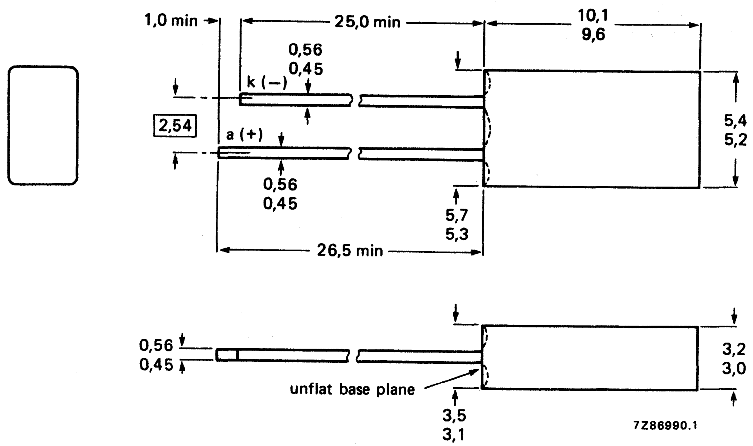


Fig. 1b SOD-77L.
PLED-HR44GL



Note. Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	100	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature at $t_{sld} < 7$ s > 1,5 mm from the seating plane for PLED-HR14G > 5 mm from the plastic body for PLED-HR44GL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_f	typ.	1,75	V
			max.	2,2	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	100	°
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	650	nm
Luminous intensity I_F = 10 mA	PLED-HR14G/HR44GL	I_v	min.	0,7	mcd
	PLED-HR14G/HR44GL-3	I_v		1,6 to 3,5	mcd
	PLED-HR14G/HR44GL-4	I_v		3,0 to 7,0	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	80	pF

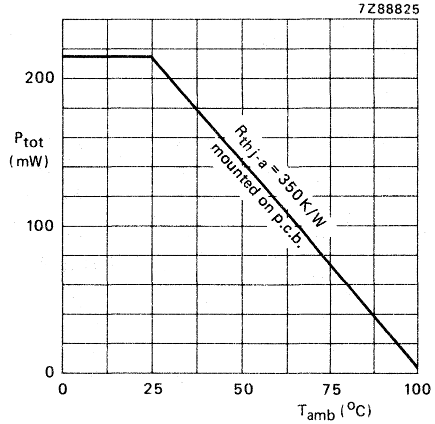


Fig. 2.

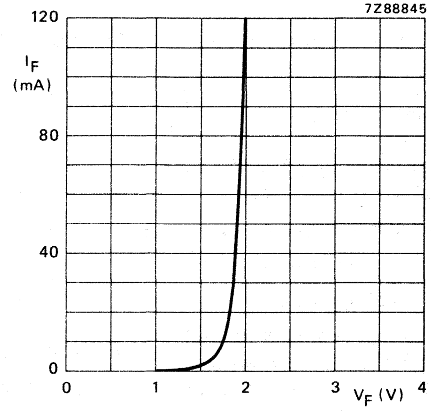


Fig. 3 T_{amb} = 25 °C; typ. values.

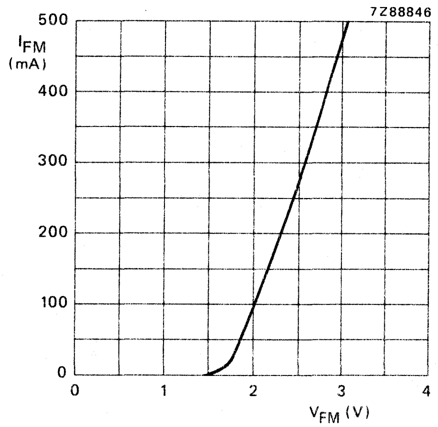


Fig. 4 t_{on} = 20 μs; δ = 0,01; typ. values.

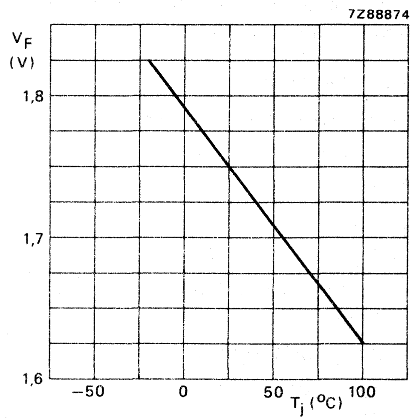


Fig. 5 I_F = 10 mA; typ. values.

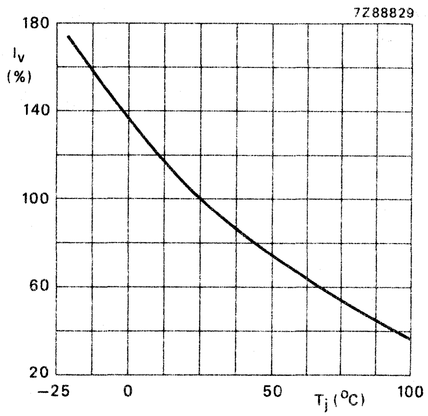


Fig. 6 Typical values.

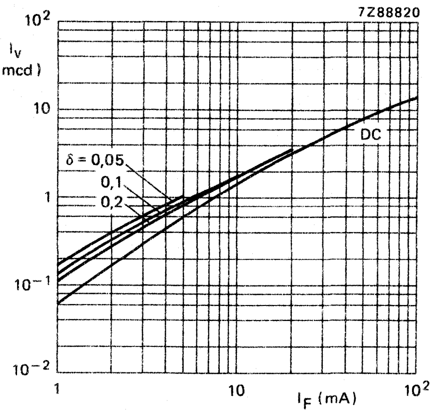


Fig. 7 t_p = 50 μs; typ. values.

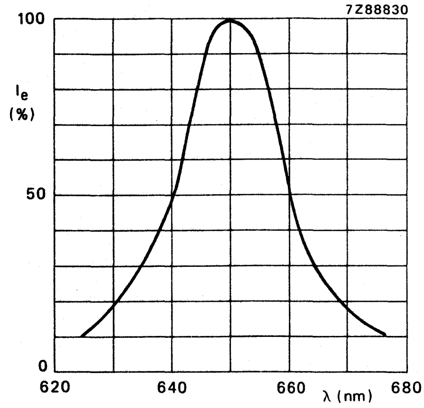


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

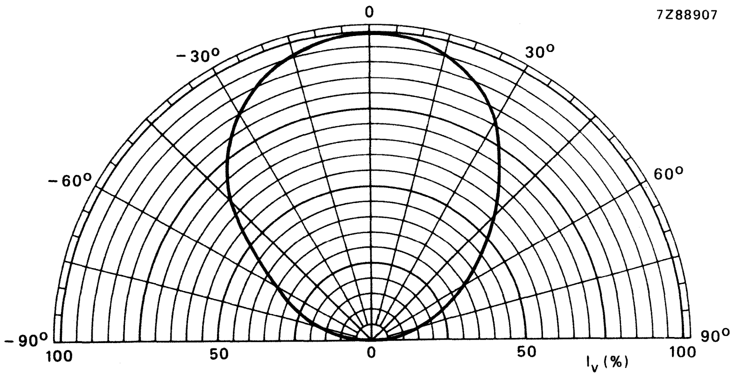


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Rectangular light emitting diode of 5 mm x 5 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) when forward biased. The PLED-HR44DL has a SOD-74L envelope and is encapsulated in a red diffusing resin. The PLED-HR44DL has long leads but no seating plane.

This LED is suitable for surface illumination, for example in information boards, score boards, moving advertisements and electronic games applications. Because of its high light intensity the PLED-HR44DL is also suitable in applications where only very low currents are available and because of its high I_{Fmax} it can be used in high I_v applications.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	100	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-HR44DL	I_v	min.	0,7	mcd
	PLED-HR44DL-3	I_v		1,6 to 3,5	mcd
	PLED-HR44DL-4	I_v		3,0 to 7,0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	650	nm
Beamwidth between half-intensity directions					
I_F = 10 mA		$\theta_{1/2}$	typ.	100	°

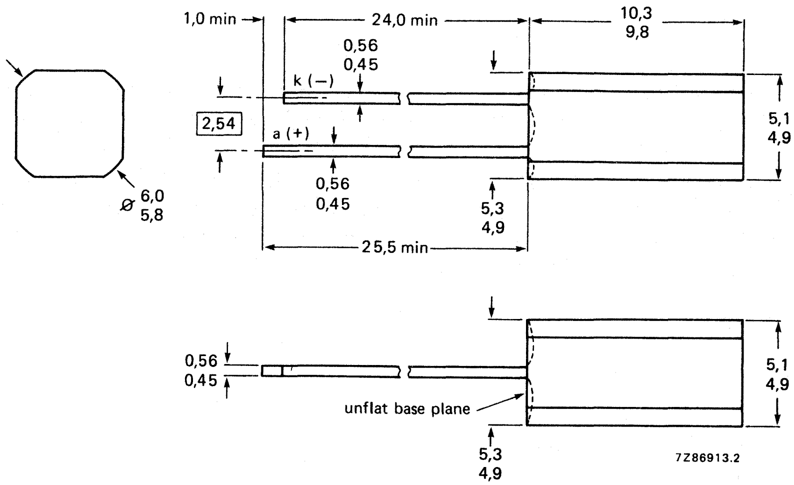
MECHANICAL DATA

SOD-74L (see Fig. 1).

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-74L.



Note. Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	100	mA
peak value, t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 20 μs; δ = 0,01	I_{FRM}	max.	500	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature				
> 5,0 mm from the plastic body; t_{sld} < 7 s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a p.c. board	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage					
I_F = 10 mA		V_F	typ.	1,75	V
		V_F	max.	2,2	V
Reverse current					
V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions					
I_F = 10 mA		$\theta_{½}$	typ.	100	°
Bandwidth at half height		$\Delta\lambda$	typ.	20	nm
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	650	nm
Luminous intensity					
I_F = 10 mA	PLED-HR44DL	I_v	min.	1,0	mcd
	PLED-HR44DL-3	I_v		1,6 to 3,5	mcd
	PLED-HR44DL-4	I_v		3,0 to 7,0	mcd
Diode capacitance					
V_R = 0; f = 1 MHz		C_d	typ.	80	pF

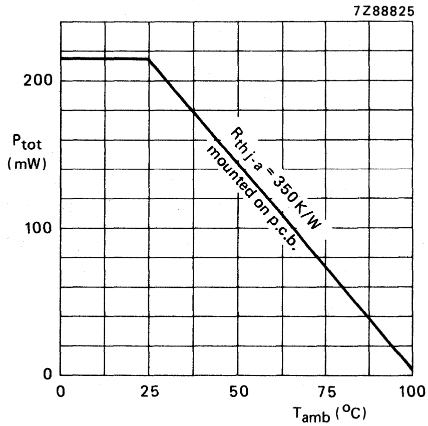


Fig. 2.

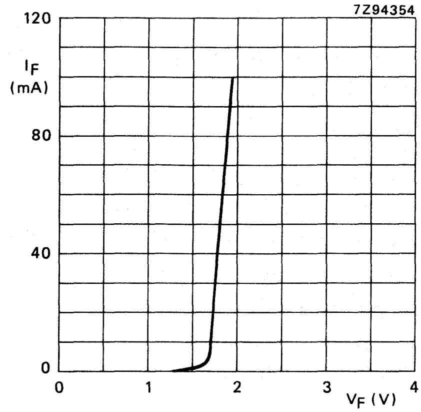


Fig. 3 T_{amb} = 25 °C; typ. values.

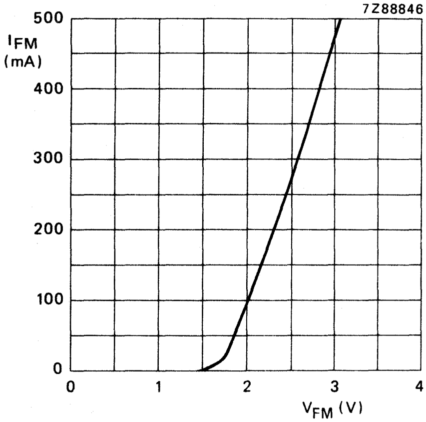


Fig. 4 t_{on} = 20 μs; δ = 0,01; T_{amb} = 25 °C; typ. values.

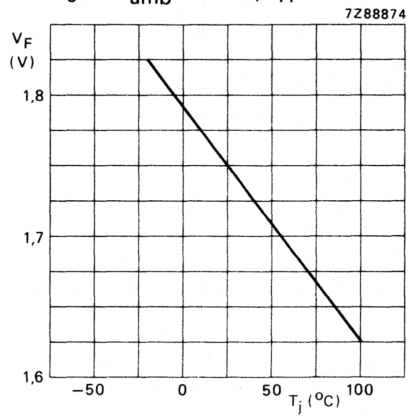


Fig. 5 I_F = 10 mA; typ. values.

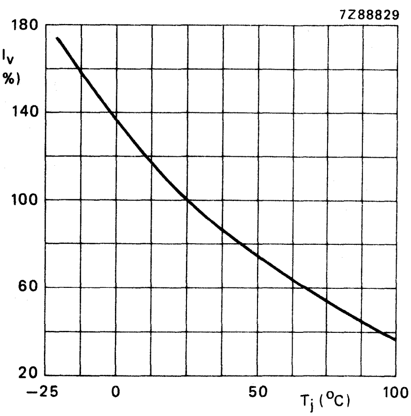


Fig. 6 Typical values.

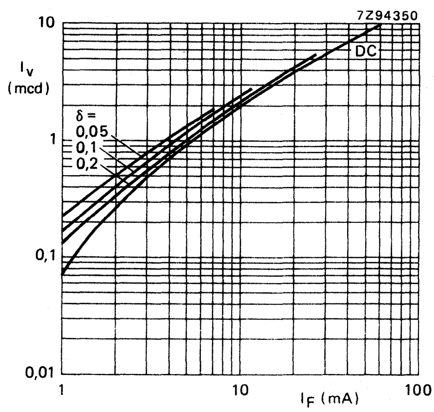


Fig. 7 t_p = 50 μs; typical values.

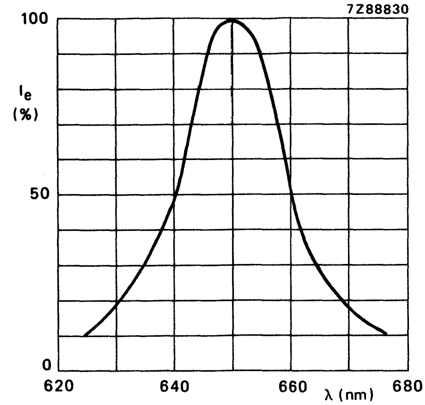


Fig. 8 I_F = 10 mA; T_{amb} = 25 °C; typ. values.

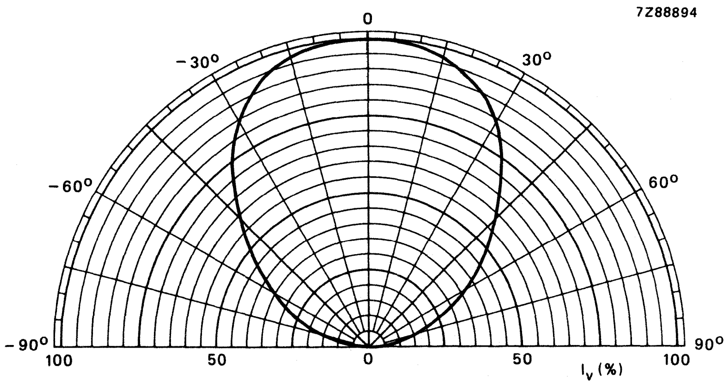


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits orange light (GaAsP; orange) at a typical peak wavelength of 630 nm when forward biased.
The PLED-O313N has a SOD-82C1 outline and is encapsulated in a red non-diffusing resin.

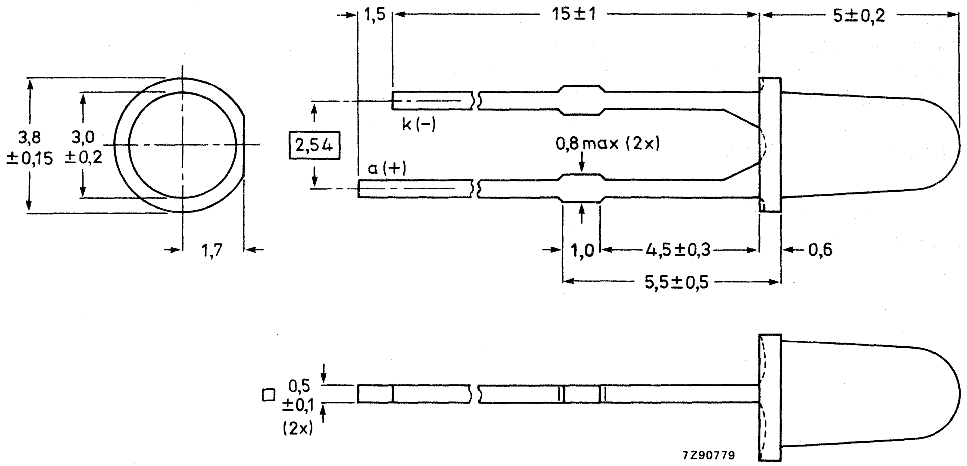
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	30	mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90	mW
Luminous intensity					
I_F = 10 mA	PLED-O313N	I_V	min.	3,0	mcd
			typ.	8,0	mcd
	PLED-O313N-4	I_V		3,0 to 7,0	mcd
	PLED-O313N-5	I_V		5,0 to 12,0	mcd
	PLED-O313N-56	I_V		5,0 to 22,0	mcd
	PLED-O313N-6	I_V		10,0 to 22,0	mcd
Wavelength at peak emission					
I_F = 20 mA		λp	typ.	630	nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	40	deg

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-82C1.
PLED-O313N



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	30	mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150	mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}	−30 to + 100		°C
Operating ambient temperature	T_{opr}	−25 to + 85		°C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260	°C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage					
I_F = 20 mA		V_F	typ.	2,2	V
			max.	2,8	V
Reverse current					
V_R = 5 V		I_R	max.	10	μA
Beamwidth at half-intensity directions		θ½	typ.	40	deg
Bandwidth at half height		Δλ	typ.	40	nm
Wavelength at peak emission					
I_F = 10 mA		λp	typ.	630	nm
Luminous intensity					
I_F = 10 mA	PLED-O313N	I_v	min.	3,0	mcd
			typ.	8,0	mcd
	PLED-O313N-4	I_v		3,0 to 7,0	mcd
	PLED-O313N-5	I_v		5,0 to 22,0	mcd
	PLED-O313N-56	I_v		5,0 to 22,0	mcd
	PLED-O313N-6	I_v		10,0 to 22,0	mcd

DEVELOPMENT DATA

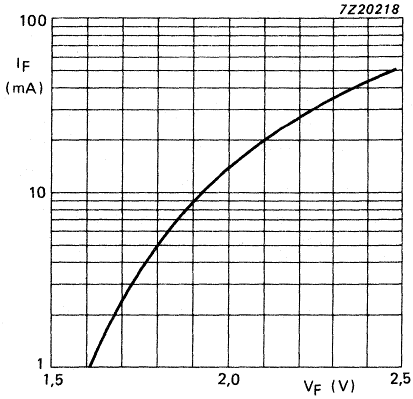


Fig. 2 $I_F = f(V_F)$; typical values.

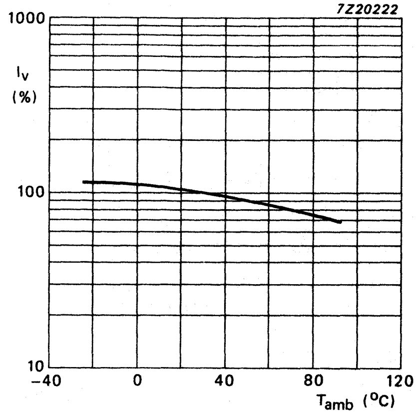


Fig. 3 $I_F = f(T_{amb})$; typical values.

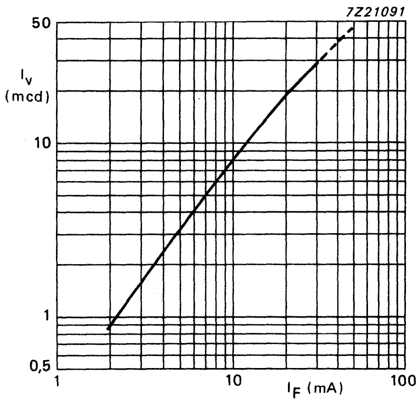


Fig. 4 $I_v = f(I_F)$; typical values.

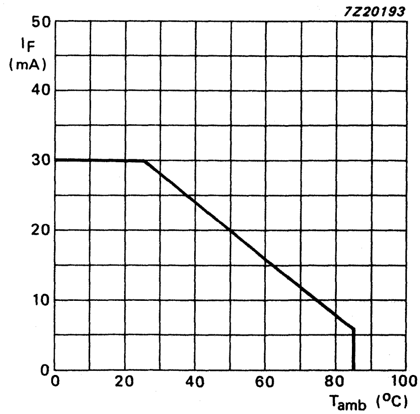


Fig. 5 $I_v(\%) = f(T_{amb})$; typical values.

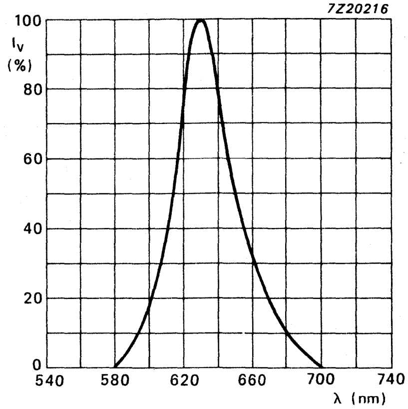


Fig. 6 Spectral response; typical values.

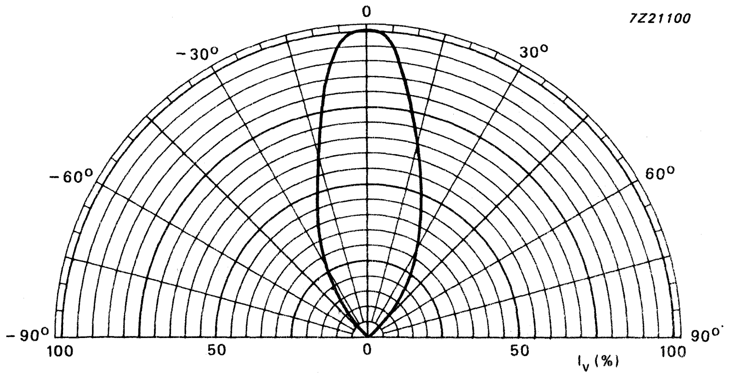


Fig. 7 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits orange light (GaAsP; orange) at a typical peak wavelength of 630 nm when forward biased.
The PLED-O314N has a SOD-82C1 outline and is encapsulated in a red diffusing resin.

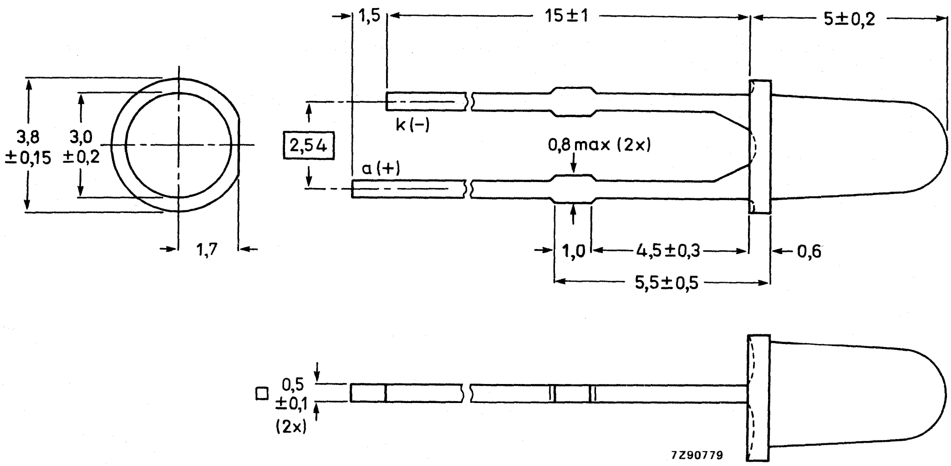
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	30	mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90	mW
Luminous intensity					
I_F = 10 mA	PLED-O314N	I_v	min.	1,0	mcd
			typ.	2,5	mcd
	PLED-O314N-3	I_v		1,6 to 3,5	mcd
	PLED-O314N-4	I_v		3,0 to 7,0	mcd
	PLED-O314N-45	I_v		3,0 to 12,0	mcd
	PLED-O314N-5	I_v		5,0 to 12,0	mcd
	PLED-O314N-6	I_v		10,0 to 22,0	mcd
Wavelength at peak emission					
I_F = 20 mA		λp	typ.	630	nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	70	deg

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-82C1.
PLED-O314N



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	30	mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150	mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}	−30 to + 100		°C
Operating ambient temperature	T_{opr}	−25 to + 85		°C
Lead soldering temperature; t_{sld} < 7 s; > 1,5 mm from the seating plane	T_{sld}	max.	260	°C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2	V
			max.	2,8	V
Reverse current V_R = 5 V		I_R	max.	10	µA
Beamwidth at half-intensity directions		θ½	typ.	70	deg
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	630	nm
Luminous intensity I_F = 10 mA	PLED-O314N	I_v	min.	1,0	mcd
			typ.	2,5	mcd
	PLED-O314N-3	I_v	1,6 to	3,5	mcd
	PLED-O314N-4	I_v	3,0 to	7,0	mcd
	PLED-O314N-45	I_v	3,0 to	12,0	mcd
	PLED-O314N-5	I_v	5,0 to	12,0	mcd
	PLED-O314N-6	I_v	10,0 to	22,0	mcd

DEVELOPMENT DATA

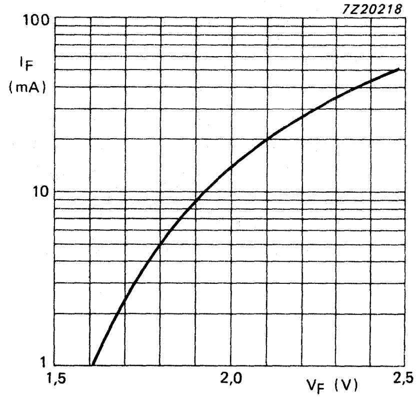


Fig. 2 $I_F = f(V_F)$; typical values.

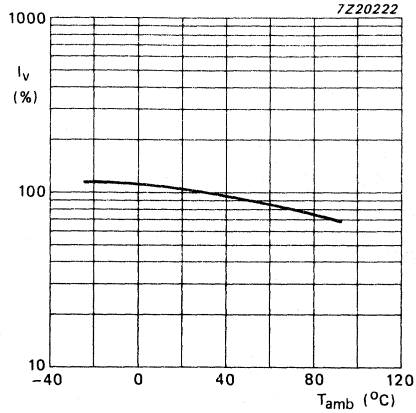


Fig. 3 $I_F = f(T_{amb})$; typical values.

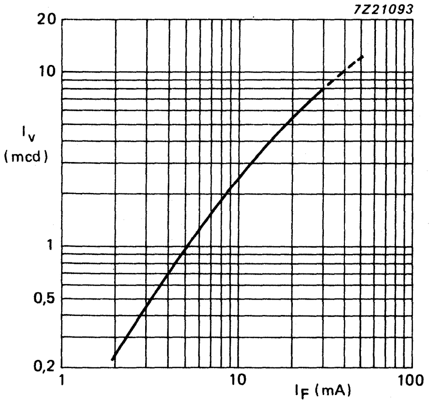


Fig. 4 $I_v = f(I_F)$; typical values.

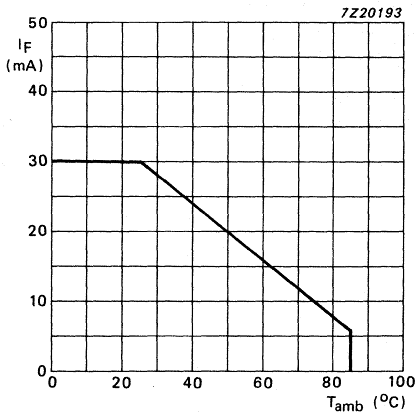


Fig. 5 $I_v(\%) = f(T_{amb})$; typical values.

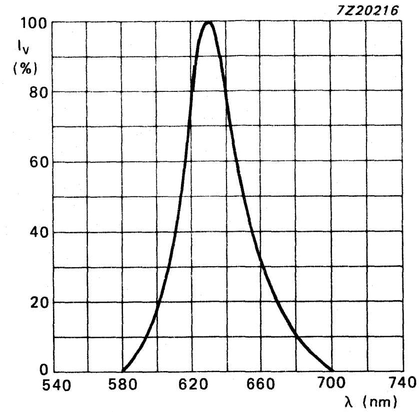


Fig. 6 Spectral response; typical values.

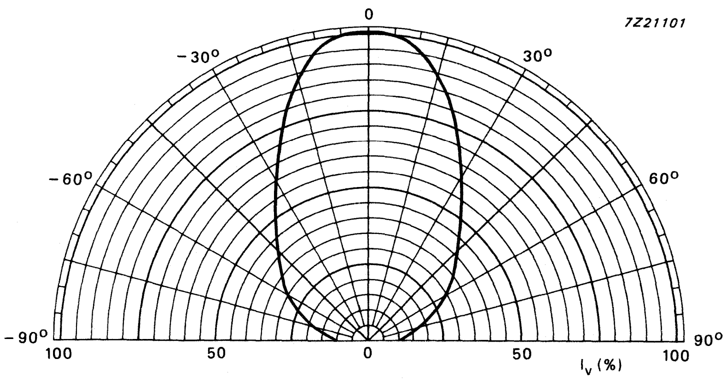


Fig. 7 Typical values.

DEVELOPMENT DATA

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit orange light (GaAsP; orange) at a typical peak wavelength of 630 nm when forward biased.

The PLED-O513M has a SOD-90C1 outline and is encapsulated in a red non-diffusing resin.

The PLED-O533ML has a SOD-90A1 outline and is encapsulated in a red non-diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	30 mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90 mW
Luminous intensity				
I_F = 10 mA	PLED-O513M/O533ML	I_V	min.	3,0 mcd
			typ.	8,5 mcd
	PLED-O513M/O533ML-5	I_V		5,0 to 12 mcd
	PLED-O513M/O533ML-6	I_V		10 to 22 mcd
	PLED-O513M/O533ML-7	I_V		15 to 35 mcd
	PLED-O513M/O533ML-78	I_V		15 to 70 mcd
	PLED-O513M/O533ML-8	I_V		30 to 70 mcd
Wavelength at peak emission				
I_F = 20 mA		λp	typ.	630 nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	30 °

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-O513M

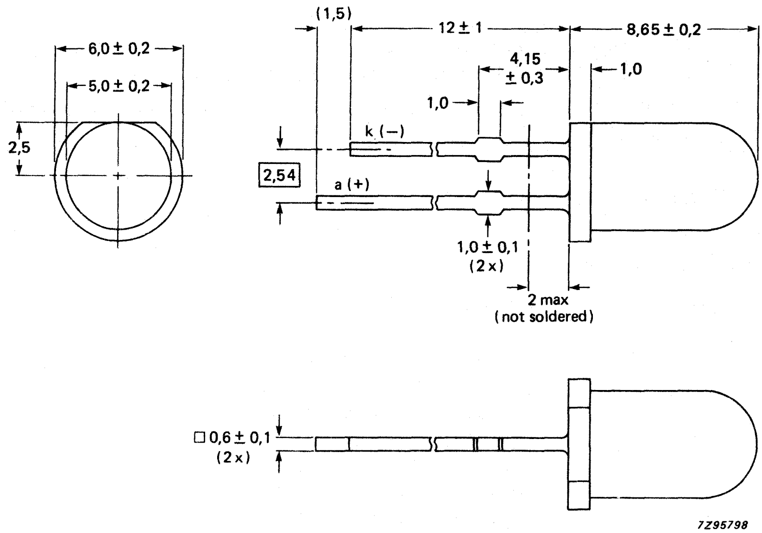
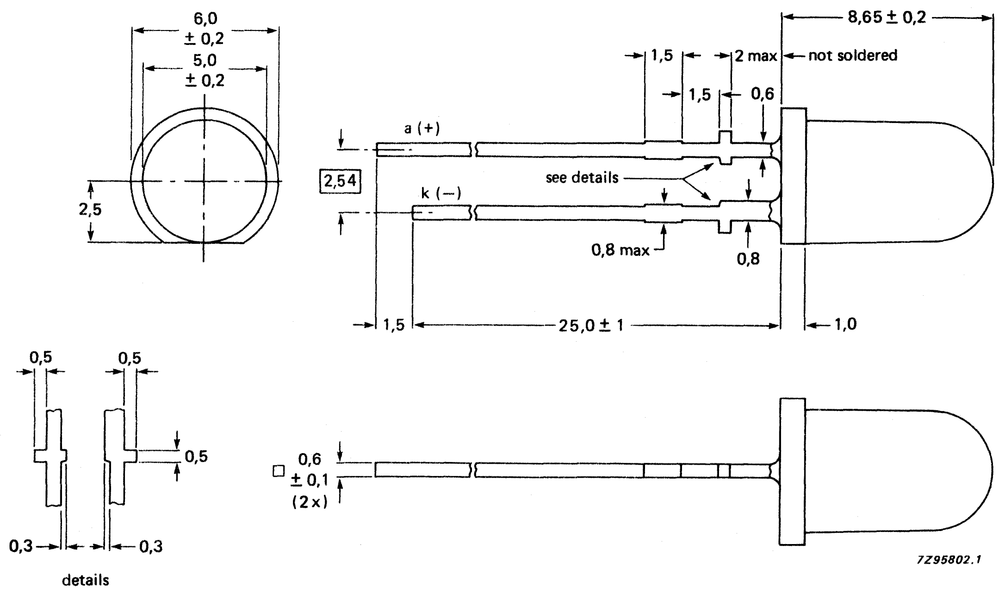


Fig. 1b SOD-90A1
PLED-O533ML



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	30 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−25 to +85 °C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage				
I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current				
V_R = 5 V		I_R	max.	10 μA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	30 °
Bandwidth at half height		$\Delta\lambda$	typ.	40 nm
Wavelength at peak emission				
I_F = 10 mA		λp	typ.	630 nm
Luminous intensity				
I_F = 10 mA	PLED-O513M/O533ML	I_V	min.	3,0 mcd
			typ.	8,5 mcd
	PLED-O513M/O533ML-5	I_V		5,0 to 12 mcd
	PLED-O513M/O533ML-6	I_V		10 to 22 mcd
	PLED-O513M/O533ML-7	I_V		15 to 35 mcd
	PLED-O513M/O533ML-78	I_V		15 to 70 mcd
	PLED-O513M/O533ML-8	I_V		30 to 70 mcd

DEVELOPMENT DATA

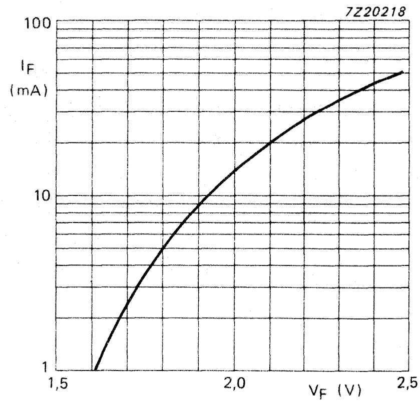


Fig. 2 $I_F = f(V_F)$ typical values.

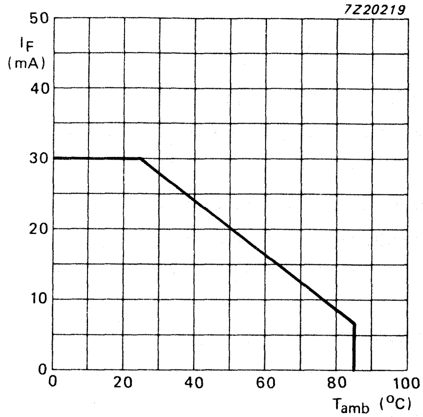


Fig. 3 $I_F = f(T_{amb})$ typical values.

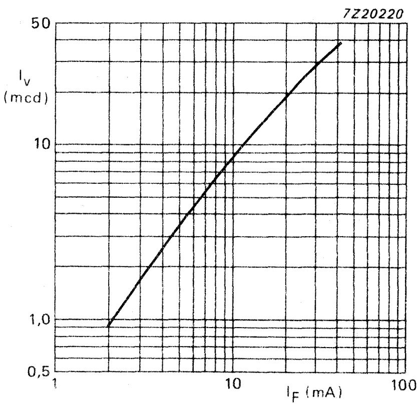


Fig. 4 $I_V = f(I_F)$ typical values.

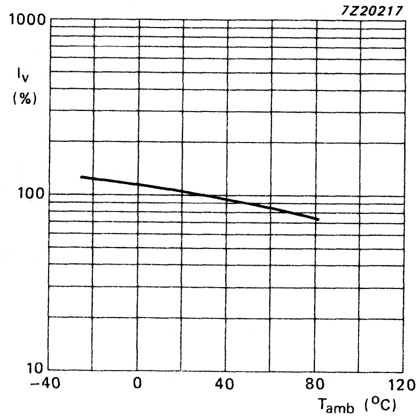


Fig. 5 $I_V(\%) = f(T_{amb})$ typical values.

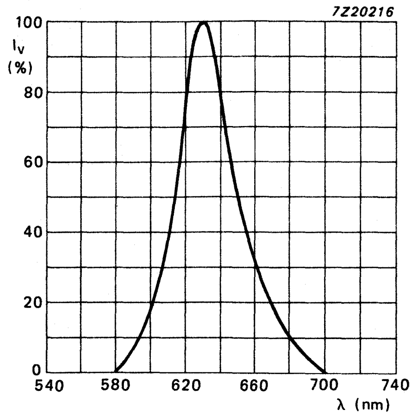


Fig. 6 Spectral response typical values.

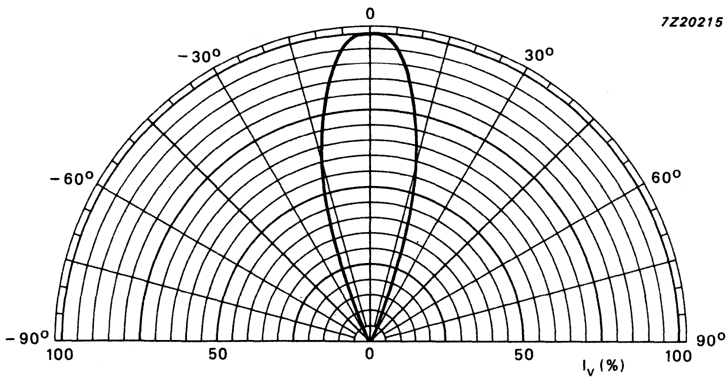


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit orange light (GaAsP; orange) at a typical peak wavelength of 630 nm when forward biased.

The PLED-O514M has a SOD-90C1 outline and is encapsulated in a red diffusing resin.

The PLED-O534ML has a SOD-90A1 outline and is encapsulated in a red diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	30 mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90 mW
Luminous intensity				
I_F = 10 mA	PLED-O514M/O534ML	I_V	min.	3,0 mcd
			typ.	8,5 mcd
	PLED-O514M/O534ML-5	I_V		5,0 to 12,0 mcd
	PLED-O514M/O534ML-6	I_V		10 to 22 mcd
	PLED-O514M/O534ML-67	I_V		10 to 35 mcd
	PLED-O514M/O534ML-7	I_V		15 to 35 mcd
Wavelength at peak emission				
I_F = 20 mA		λp	typ.	630 nm
Beamwidth at half-intensity directions		$\theta \frac{1}{2}$	typ.	40 °

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-O514M

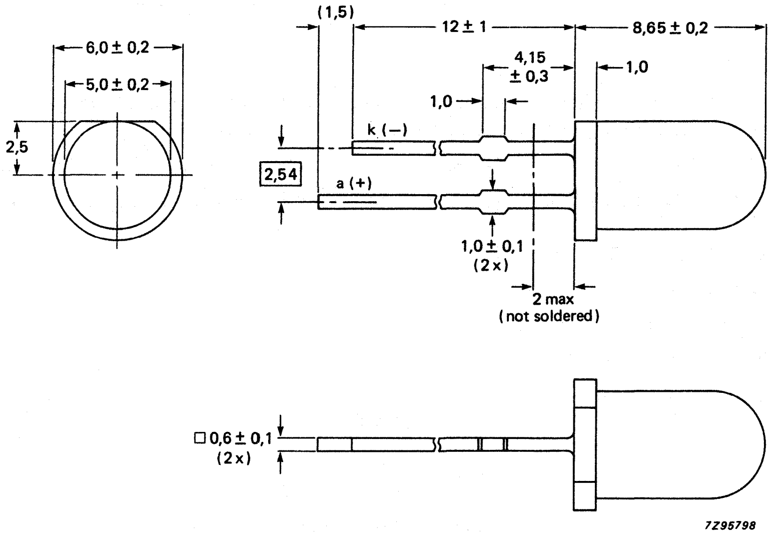
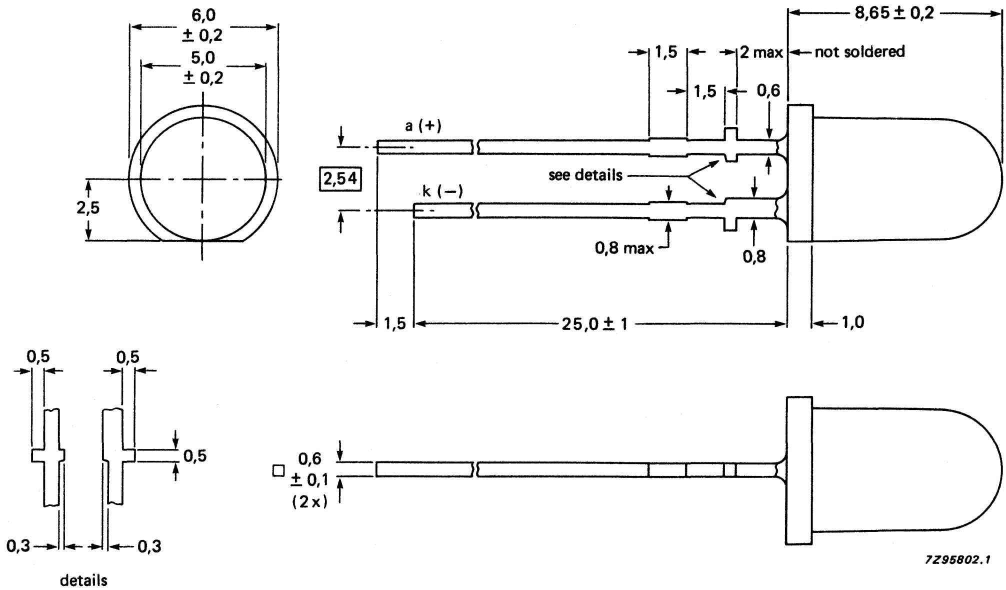


Fig. 1b SOD-90A1
PLED-O534ML



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	30 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−25 to +85 °C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current V_R = 5 V		I_R	max.	10 μA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	40 °
Bandwidth at half height		$\Delta\lambda$	typ.	40 nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	630 nm
Luminous intensity I_F = 10 mA	PLED-0514M/0534ML	I_v	min.	3,0 mcd
			typ.	8,5 mcd
	PLED-0514M/0534ML-5	I_v		5,0 to 12,0 mcd
	PLED-0514M/0534ML-6	I_v		10 to 22 mcd
	PLED-0514M/0534ML-67	I_v		10 to 35 mcd
	PLED-0514M/0534ML-7	I_v		15 to 35 mcd

DEVELOPMENT DATA

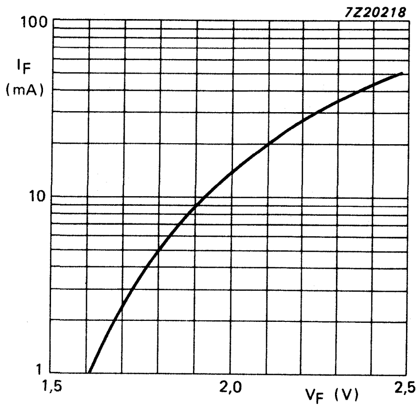


Fig. 2 $I_F = f(V_F)$ typical values.

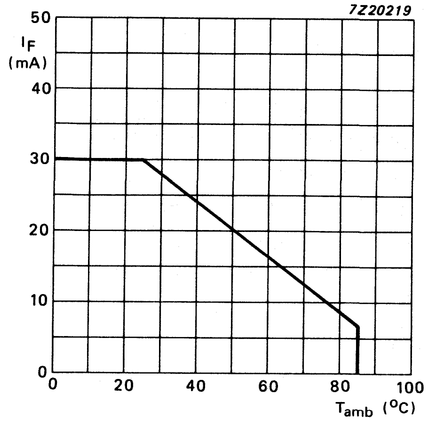


Fig. 3 $I_F = f(T_{amb})$ typical values.

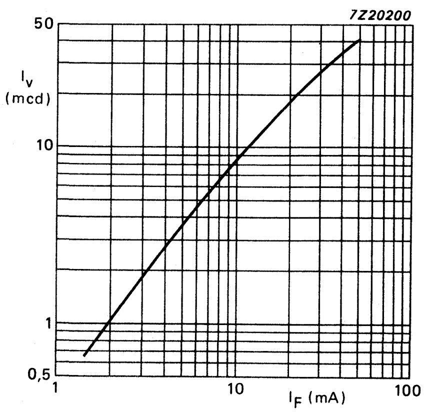


Fig. 4 $I_V = f(I_F)$ typical values.

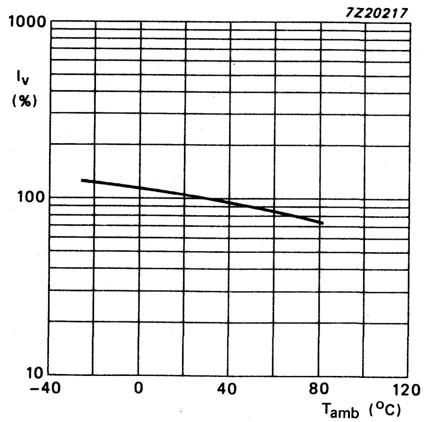


Fig. 5 $I_V(\%) = f(T_{amb})$ typical values.

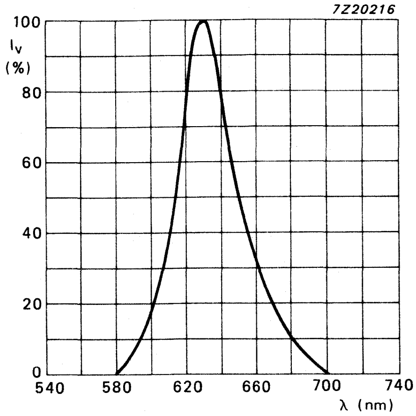


Fig. 6 Spectral response typical values.

DEVELOPMENT DATA

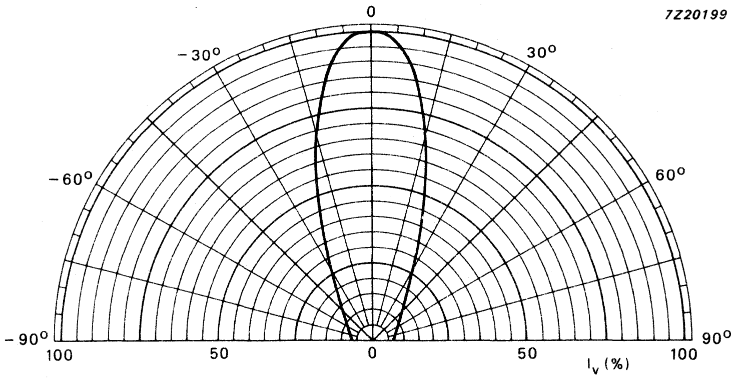


Fig. 7 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits red light (GaP:ZnO; ultra-red) at a typical peak wavelength of 700 nm when forward biased.
The PLED-P313N has a SOD-82C1 outline and is encapsulated in a red non-diffusing resin.

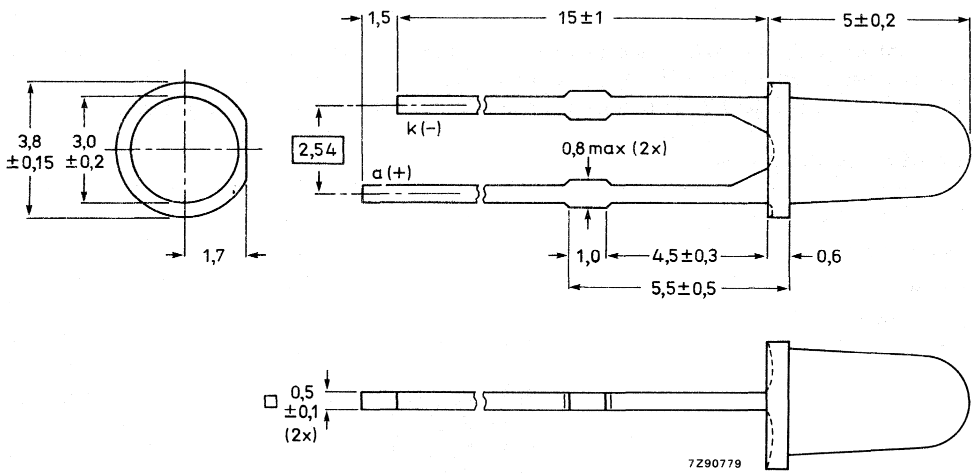
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	25	mA
Total power dissipation at $T_{amb} = 25\ ^oC$		P_{tot}	max.	70	mW
Luminous intensity $I_F = 10$ mA	PLED-P313N	I_v	min. typ.	1,6 5,0	mcd mcd
	PLED-P313N-3	I_v	1,6 to	3,5	mcd
	PLED-P313N-34	I_v	1,6 to	7,0	mcd
	PLED-P313N-4	I_v	3,0 to	7,0	mcd
	PLED-P313N-5	I_v	5,0 to	12,0	mcd
Wavelength at peak emission $I_F = 20$ mA		λp	typ.	700	nm
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	25	deg

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-82C1.
PLED-P313N



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	25 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	70 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−25 to +85 °C
Lead soldering temperature; t_{sld} < 7 s; > 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current V_R = 5 V		I_R	max.	5 µA
Beamwidth at half-intensity directions		$\theta_{½}$	typ.	25 deg
Bandwidth at half height		$\Delta\lambda$	typ.	100 nm
Wavelength at peak emission I_F = 20 mA		λ_p	typ.	700 nm
Luminous intensity I_F = 10 mA	PLED-P313N	I_v	min.	1,6 mcd
			typ.	5,0 mcd
	PLED-P313N-3	I_v		1,6 to 3,5 mcd
	PLED-P313N-34	I_v		1,6 to 7,0 mcd
	PLED-P313N-4	I_v		3,0 to 7,0 mcd
	PLED-P313N-5	I_v		5,0 to 12,0 mcd

DEVELOPMENT DATA

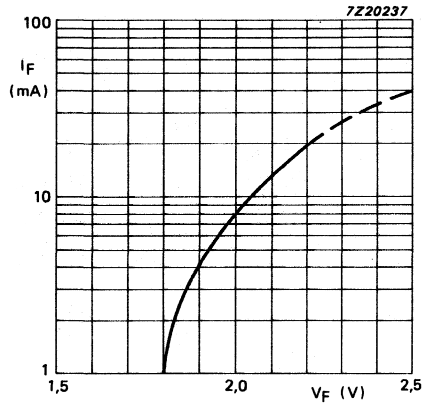


Fig. 2 $I_F = f(V_F)$; typical values.

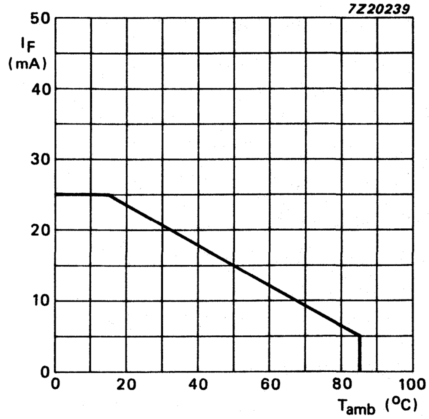


Fig. 3 $I_F = f(T_{amb})$; typical values.

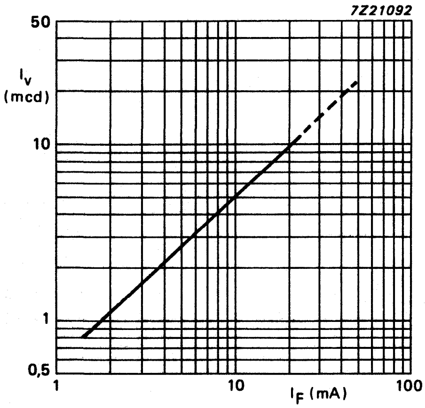


Fig. 4 $I_v = f(I_F)$; typical values.

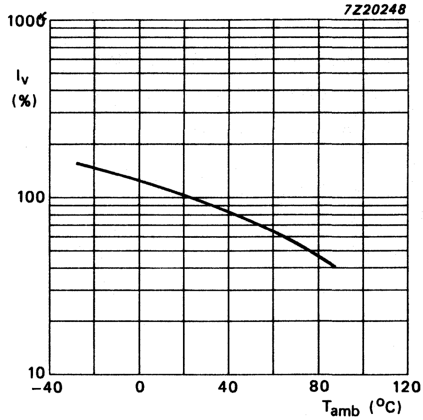


Fig. 5 $I_v(\%) = f(T_{amb})$; typical values.

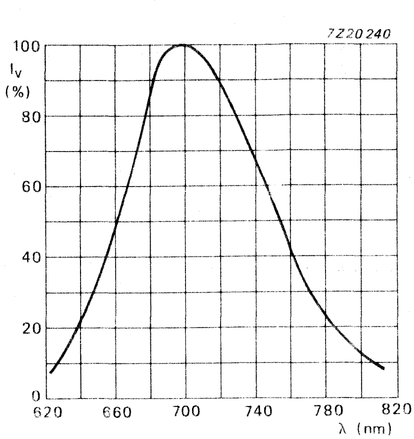


Fig. 6 Spectral response; typical values.

DEVELOPMENT DATA

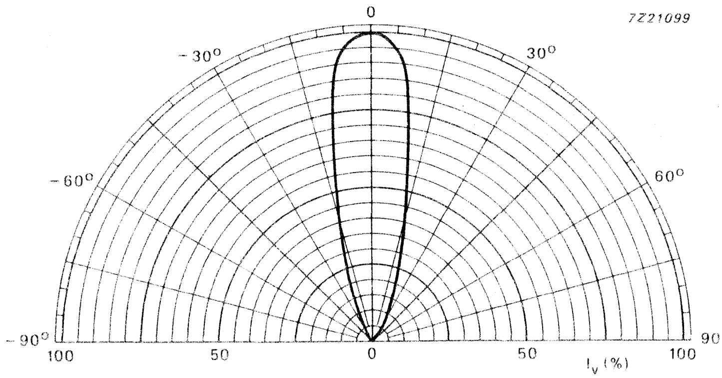


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 3 mm which emit red light (GaP:ZnO; ultra-red) at a typical peak wavelength of 700 nm when forward biased.
The PLED-P314N has a SOD-82C1 outline and is encapsulated in a red diffusing resin.

The PLED-P334NL has a SOD-82A1 outline and is encapsulated in a red diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	25	mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	70	mW
Luminous intensity I_F = 10 mA	PLED-P314N/P334NL	I_v	min.	0,7	mcd
			typ.	1,6	mcd
	PLED-P314N/P334NL-1	I_v		0,7 to 1,6	mcd
	PLED-P314N/P334NL-2	I_v		1,0 to 2,2	mcd
	PLED-P314N/P334NL-23	I_v		1,0 to 3,5	mcd
	PLED-P314N/P334NL-3	I_v		1,6 to 3,5	mcd
	PLED-P314N/P334NL-4	I_v		3,0 to 7,0	mcd
Wavelength at peak emission I_F = 20 mA		λp	typ.	700	nm
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	60	deg

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-82C1.
PLED-P314N

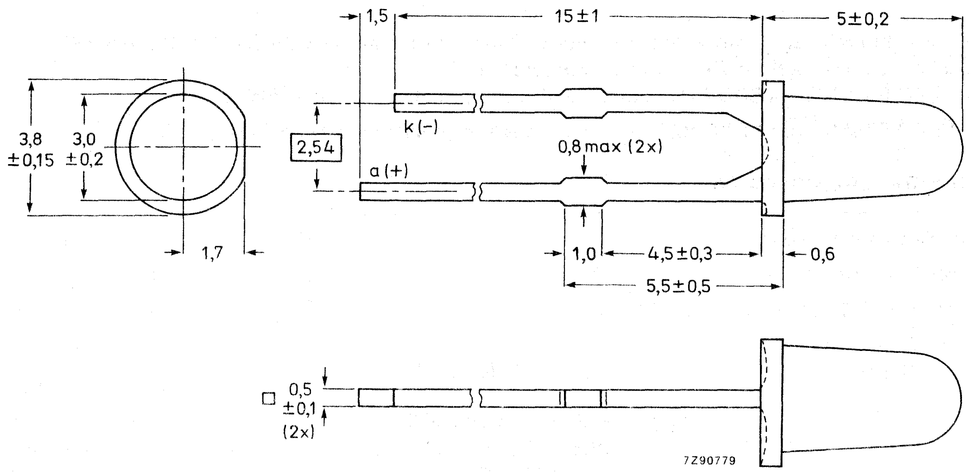
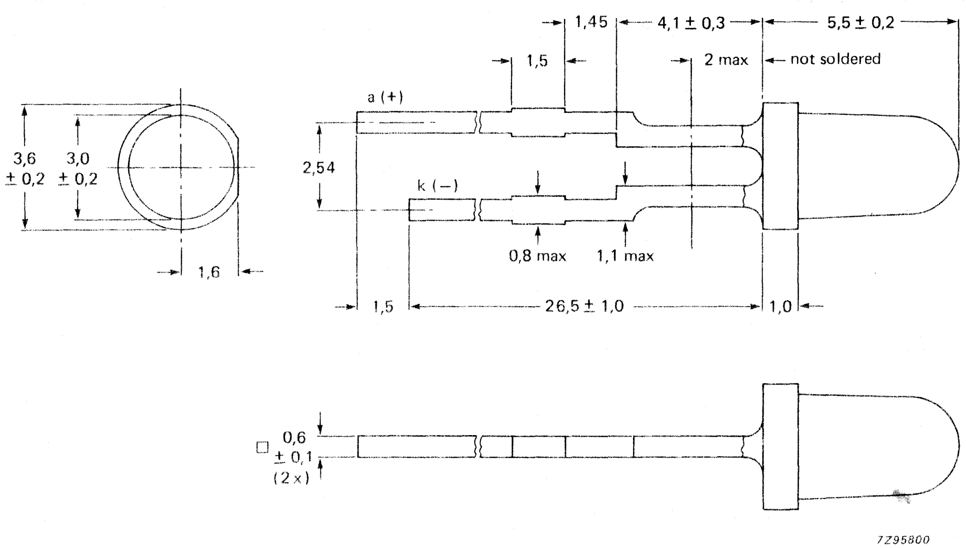


Fig. 1b SOD-82A1.
PLED-P334NL



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	25 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	70 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−24 to +85 °C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current V_R = 5 V		I_R	max.	5 μA
Beamwidth at half-intensity directions		$\theta_{½}$	typ.	60 deg
Bandwidth at half height		$\Delta\lambda$	typ.	100 nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	700 nm
Luminous intensity I_F = 10 mA	PLED-P314N/P334NL	I_v	min.	0,7 mcd
			typ.	1,6 mcd
	PLED-P314N/P334NL-1	I_v		0,7 to 1,6 mcd
	PLED-P314N/P334NL-2	I_v		1,0 to 2,2 mcd
	PLED-P314N/P334NL-23	I_v		1,0 to 3,5 mcd
	PLED-P314N/P334NL-3	I_v		1,6 to 3,5 mcd
	PLED-P314N/P334NL-4	I_v		3,0 to 7,0 mcd

DEVELOPMENT DATA

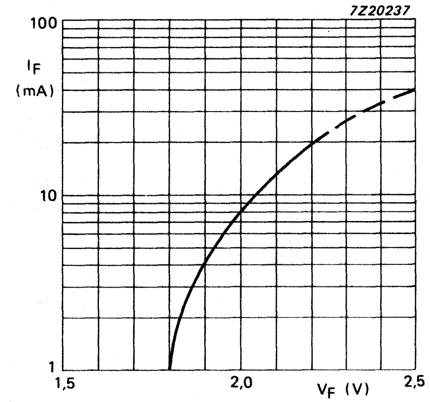


Fig. 2 $I_F = f(V_F)$; typical values.

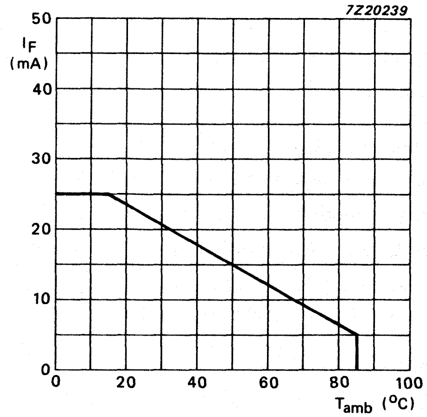


Fig. 3 $I_F = f(T_{amb})$; typical values.

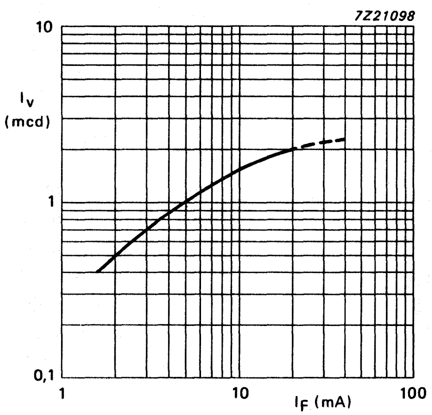


Fig. 4 $I_v = f(I_F)$; typical values.

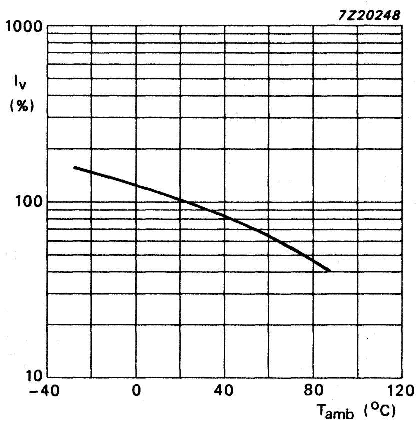


Fig. 5 $I_v(\%) = f(T_{amb})$; typical values.

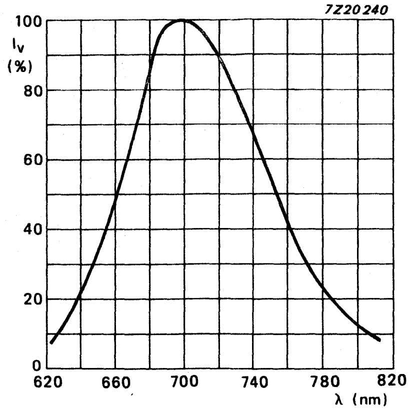


Fig. 6 Spectral response; typical values.

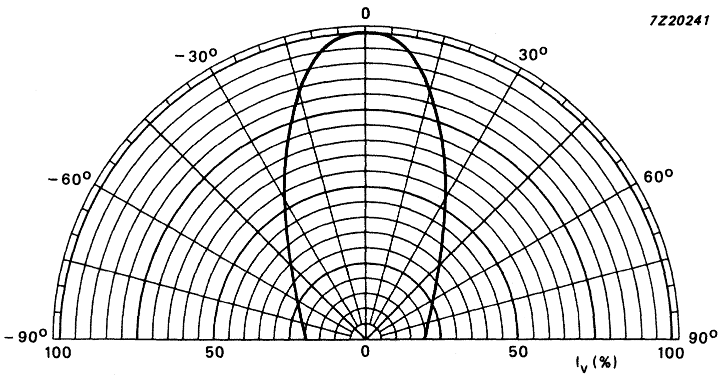


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit red light (GaP:ZnO; ultra-red) at a typical peak wavelength of 700 nm when forward biased.

The PLED-P513M has a SOD-90C1 outline and is encapsulated in a red non-diffusing resin.

The PLED-P533ML has a SOD-90A1 outline and is encapsulated in a red non-diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	25 mA
Total power dissipation at T_{amb} = 25 ^oC		P_{tot}	max.	70 mW
Luminous intensity I_F = 10 mA	PLED-P513M/P533ML	I_v	min. typ.	1,6 mcd 5,0 mcd
	PLED-P513M/P533ML-4	I_v		3,0 to 7,0 mcd
	PLED-P513M/P533ML-5	I_v		5,0 to 12 mcd
	PLED-P513M/P533ML-6	I_v		10 to 22 mcd
	PLED-P513M/P533ML-67	I_v		10 to 35 mcd
	PLED-P513M/P533ML-7	I_v		15 to 35 mcd
Wavelength at peak emission I_F = 20 mA		λp	typ.	700 nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	30 ^{o}

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-P513M

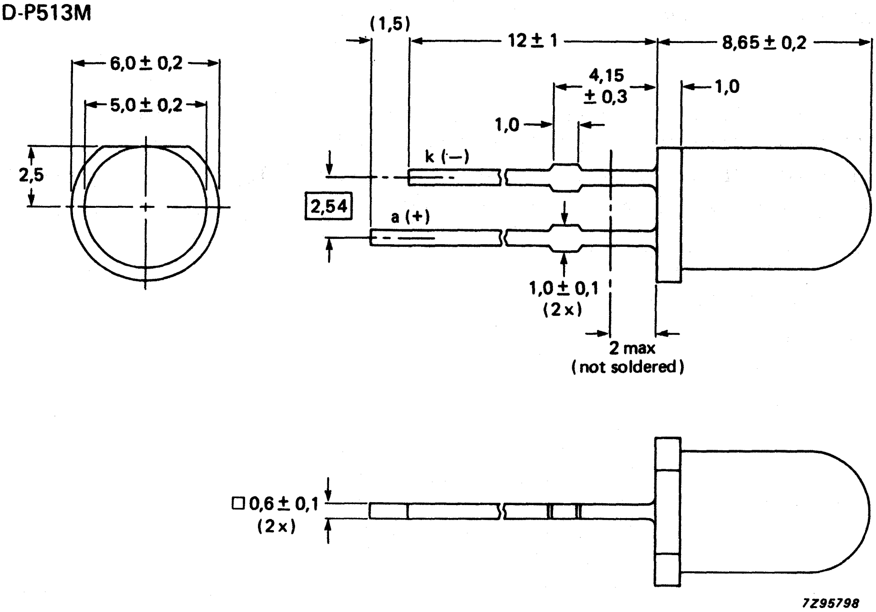
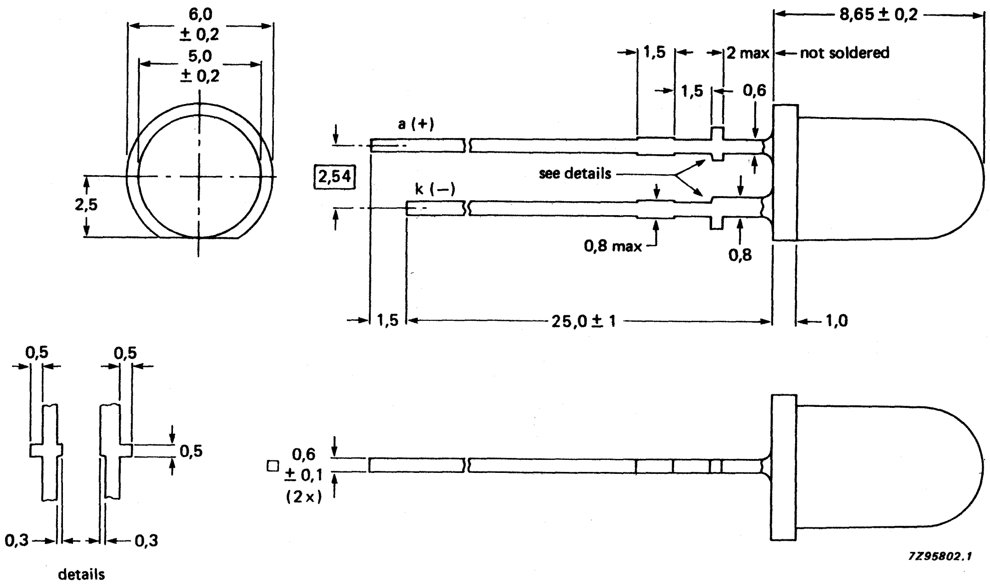


Fig. 1b SOD-90A1
PLED-P533ML



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	25 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	70 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−25 to +85 °C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current V_R = 5 V		I_R	max.	5 μA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	30 °
Bandwidth at half height		$\Delta\lambda$	typ.	100 nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	700 nm
Luminous intensity I_F = 10 mA	PLED-P513M/P533ML	I_v	min.	1,6 mcd
			typ.	5,0 mcd
	PLED-P513M/P533ML-4	I_v		3,0 to 7,0 mcd
	PLED-P513M/P533ML-5	I_v		5,0 to 12 mcd
	PLED-P513M/P533ML-6	I_v		10 to 22 mcd
	PLED-P513M/P533ML-67	I_v		10 to 35 mcd
	PLED-P513M/P533ML-7	I_v		15 to 35 mcd

DEVELOPMENT DATA

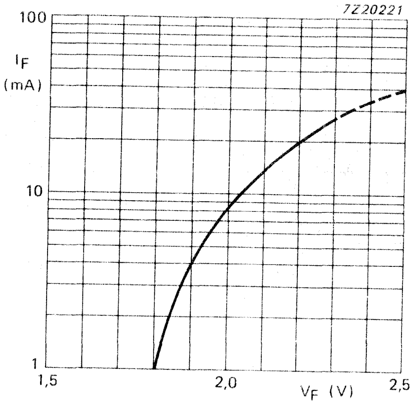


Fig. 2 $I_F = f(V_F)$ typical values.

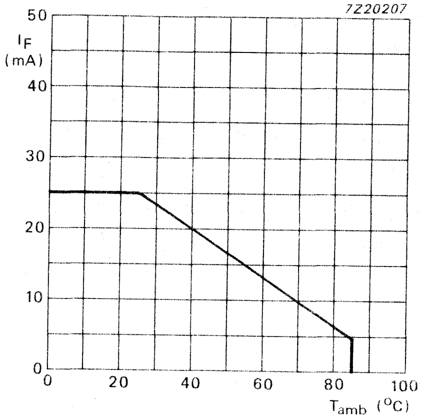


Fig. 3 $I_F = f(T_{amb})$ typical values.

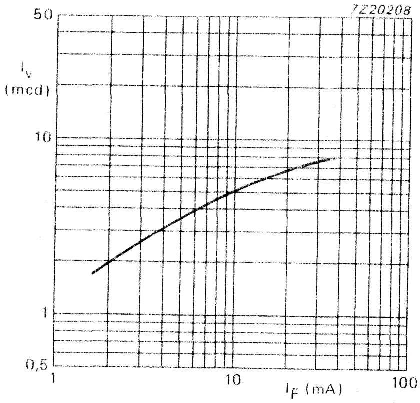


Fig. 4 $I_V = f(I_F)$ typical values.

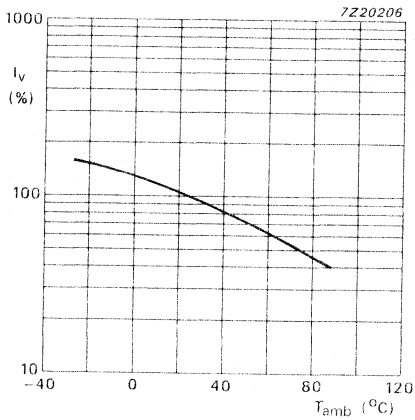


Fig. 5 $I_V(\%) = f(T_{amb})$ typical values.

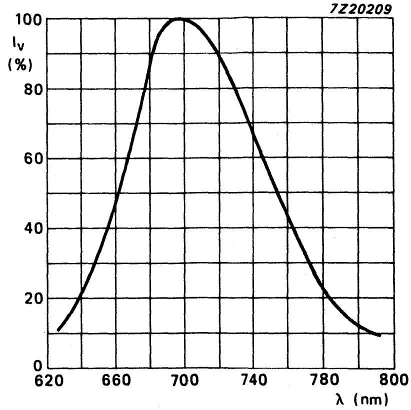


Fig. 6 Spectral response typical values.

DEVELOPMENT DATA

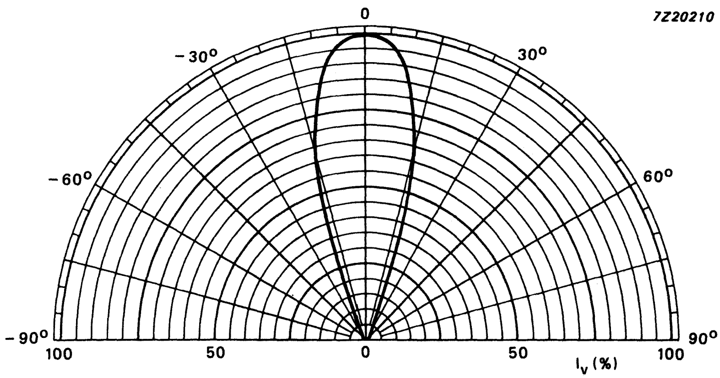


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit red light (GaP:ZnO; ultra-red) at a typical peak wavelength of 700 nm when forward biased.

The PLED-P514M has a SOD-90C1 outline and is encapsulated in a red coloured diffusing resin.

The PLED-P534ML has a SOD-90A1 outline and is encapsulated in a red coloured diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	25 mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	70 mW
Luminous intensity				
I_F = 10 mA	PLED-P514M/P534ML	I_V	min.	0,7 mcd
			typ.	1,6 mcd
	PLED-P514M/P534ML-3	I_V		1,6 to 3,5 mcd
	PLED-P514M/P534ML-4	I_V		3,0 to 7,0 mcd
	PLED-P514M/P534ML-45	I_V		3,0 to 12 mcd
	PLED-P514M/P534ML-5	I_V		5,0 to 12 mcd
Wavelength at peak emission				
I_F = 20 mA		λp	typ.	700 nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	40 °

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-P514M

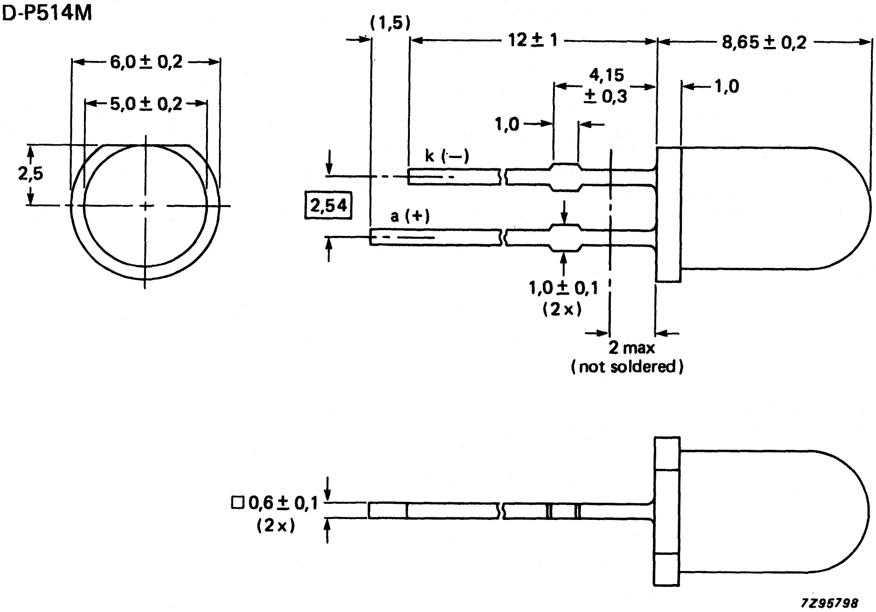
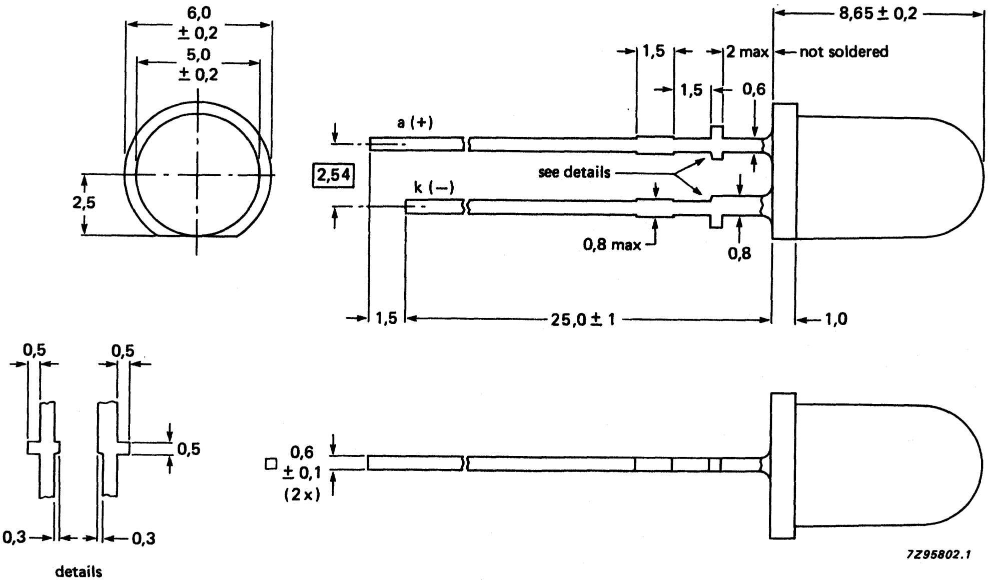


Fig. 1b SOD-90A1
PLED-P534ML



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	25 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	70 mW
Storage temperature	T_{stg}		–30 to +100 °C
Operating ambient temperature	T_{opr}		–25 to +85 °C
Lead soldering temperature; t_{sld} < 7 s; > 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage, I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current, V_R = 5 V		I_R	max.	5 μA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	40 °
Bandwidth at half height		$\Delta\lambda$	typ.	100 nm
Wavelength at peak emission, I_F = 10 mA		λp	typ.	700 nm
Luminous intensity, I_F = 10 mA	PLED-P514M/P534ML	I_V	min.	0,7 mcd
			typ.	1,6 mcd
	PLED-P514M/P534ML-3	I_V		1,6 to 3,5 mcd
	PLED-P514M/P534ML-4	I_V		3,0 to 7,0 mcd
	PLED-P514M/P534ML-45	I_V		3,0 to 12 mcd
	PLED-P514M/P534ML-5	I_V		5,0 to 12 mcd

DEVELOPMENT DATA

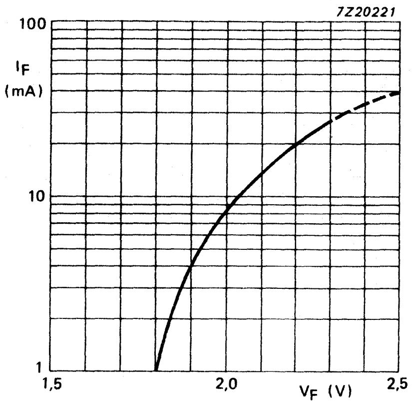


Fig. 2 $I_F = f(V_F)$ typical values.

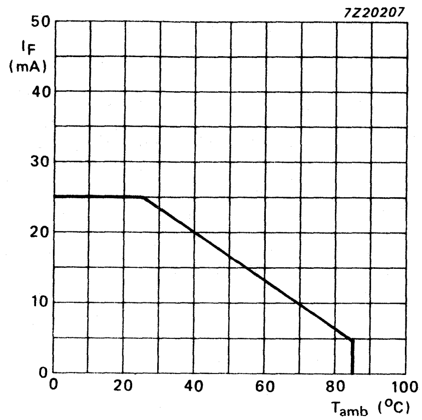


Fig. 3 $I_F = f(T_{amb})$ typical values.

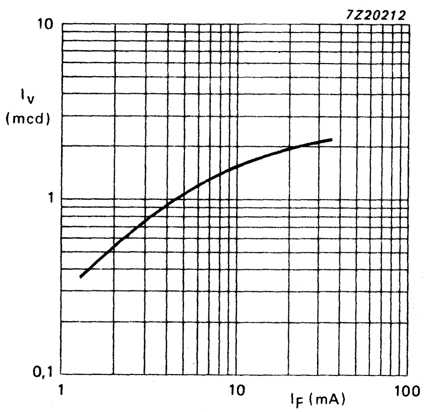


Fig. 4 $I_V = f(I_F)$ typical values.

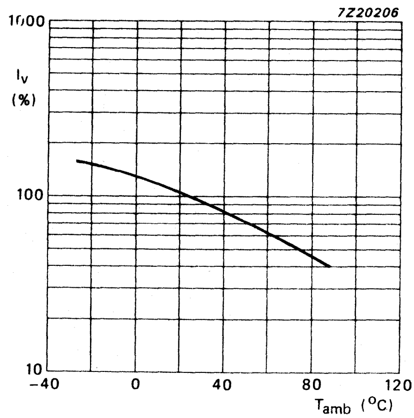


Fig. 5 $I_V(\%) = f(T_{amb})$ typical values.

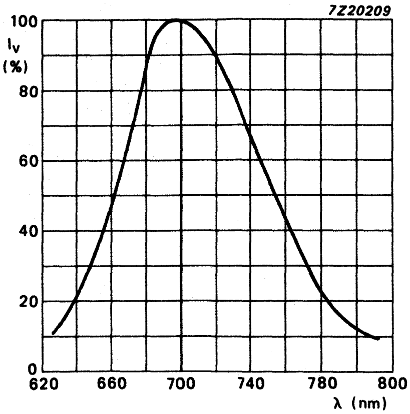


Fig. 6 Spectral response typical values.

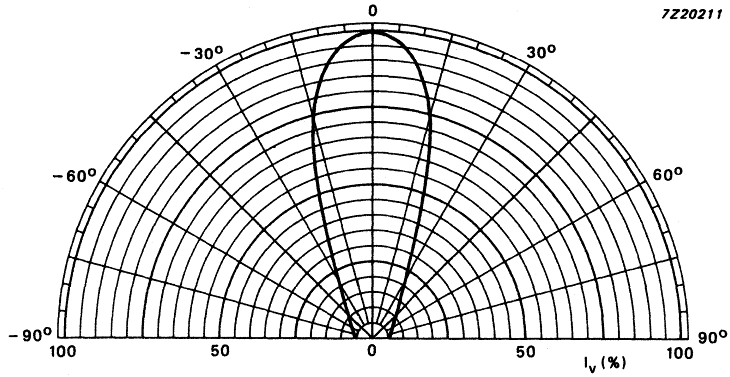


Fig. 7 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 5 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) or green light at a typical peak wavelength of 565 nm (GaP; super-green) depending on the polarity of the current.

The PLED-T512B has a SOD-63 outline and is encapsulated in a clear diffusing resin. Because of its resistance to high forward currents, the PLED-T512B is suitable for high I_V applications, for example, moving information display panels.

Other applications are:

- mains indicator
- temperature indicator
- motor control indicator

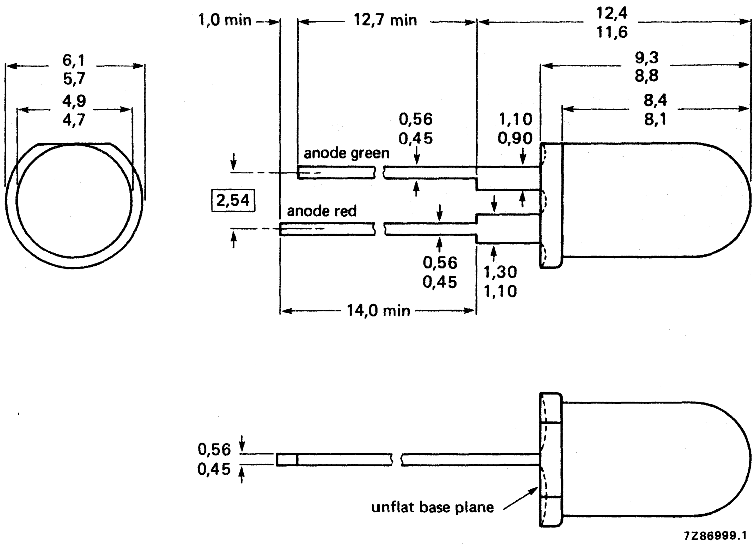
QUICK REFERENCE DATA

Continuous reverse current	V_R	max.	5 V
Forward current (DC)			
red	I_F	max.	100 mA
green			60 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Junction temperature	T_j	max.	100 °C
Luminous intensity			
red at I_F = 10 mA	I_v	min.	3 mcd
		typ.	10 mcd
green at I_F = 20 mA	I_v	min.	3 mcd
		typ.	10 mcd
Wavelength at peak emission			
red	λ_p	typ.	650 nm
green			565 nm
Beamwidth between half-intensity directions	$\theta_{1/2}$	typ.	70 °

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-63A2.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Forward current (DC)			
red	I_F	max.	100 mA
green			60 mA
Forward current			
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1 A
peak value; t_{on} = 1 ms; δ = 0.33		max.	150 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Junction temperature	T_j	max.	100 °C
Storage temperature	T_{stg}		−55 to +100 °C
Lead soldering temperature			
> 1.5 mm from the seating plane; t_{sld} < 7 s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage			
red at I_F = 10 mA	V_F	typ.	1.75 V
		max.	2.2 V
green at I_F = 20 mA	V_F	typ.	2.1 V
		max.	3.0 V
Beamwidth between half-intensity directions at I_F = 10 mA (in the plane of the leads)	$\theta_{½}$	typ.	70 °
Wavelength at peak emissions at I_F = 10 mA			
red	λ_p	typ.	650 nm
green			565 nm
Diode capacitance at V_R = 0; f = 1 MHz	C_d	typ.	160 pF
Luminous intensity			
red at I_F = 10 mA	I_v	min.	3 mcd
		typ.	10 mcd
green at I_F = 20 mA	I_v	min.	3 mcd
		typ.	10 mcd

DEVELOPMENT DATA

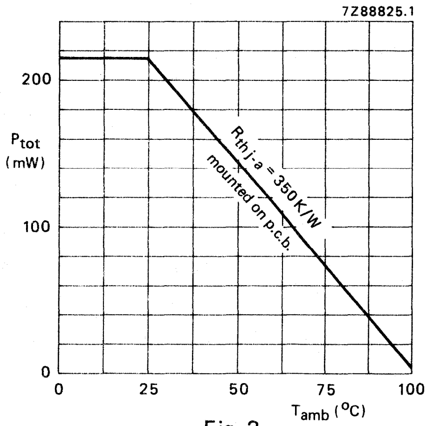


Fig. 2.

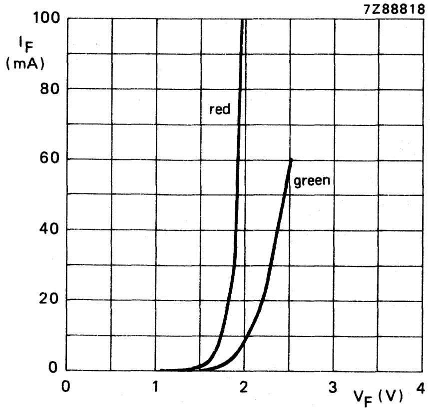


Fig. 3 T_{amb} = 25 °C; typical values.

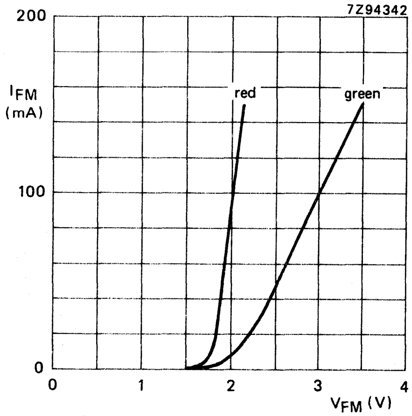


Fig. 4 t_{on} = 20 μs; δ = 0.01; T_{amb} = 25 °C; typical values.

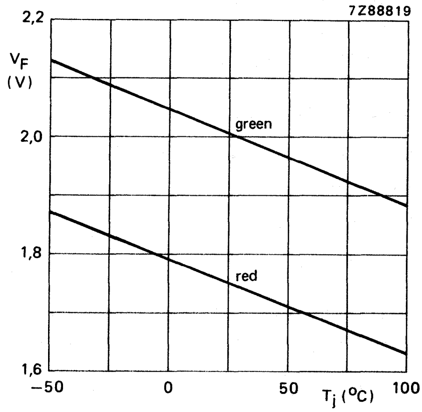


Fig. 5 I_F = 10 mA; typical values.

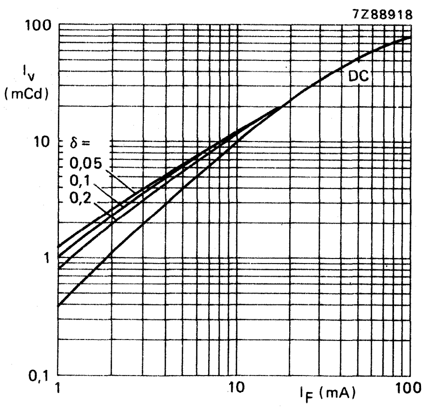


Fig. 6 t_p = 50 μs; typical values.

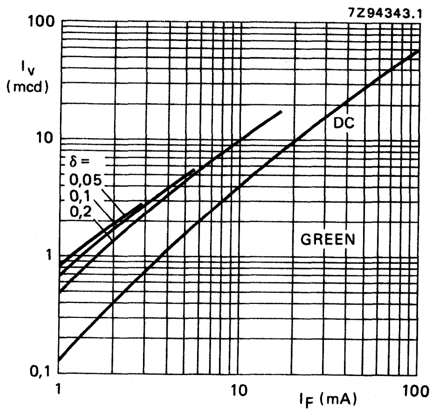


Fig. 7 t = 50 μs; typical values.

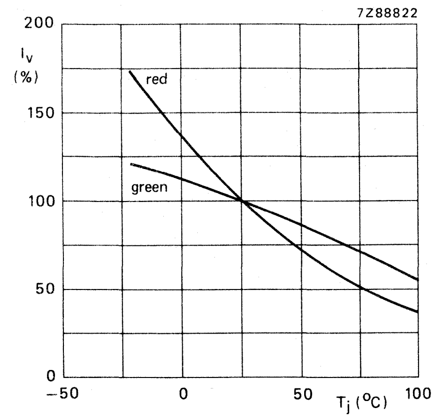


Fig. 8 Typical values.

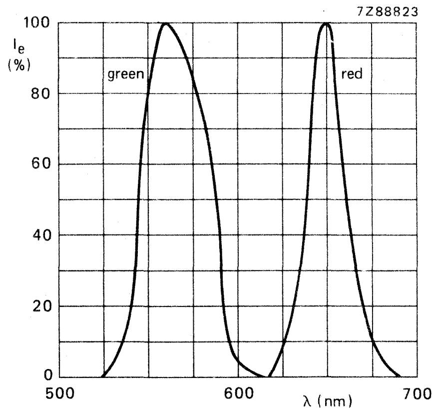


Fig. 9 I_F = 10 mA; typical values.

DEVELOPMENT DATA

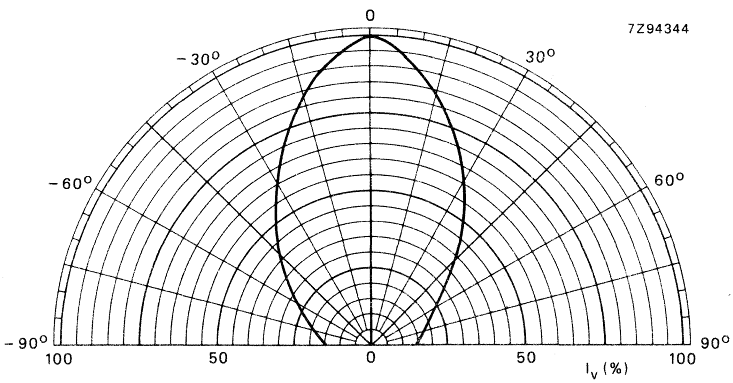


Fig 10 I_F = 10 mA; typical values.

LIGHT EMITTING DIODE

Rectangular light emitting diode of 5 mm x 1 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) or green light at a typical peak wavelength of 565 nm (GaP; super-green) depending on the polarity of the current.

The PLED-TR12E has a SOD-75 outline and is encapsulated in a colourless diffusing resin. Because of its SOD-75 envelope, the PLED-TR12E can be used in configurations together with the PLED-HR14 family.
The bicolour function gives this light emitting device special application possibilities, e.g.

- as level sensor overdrive indicator
- as zero point indicator
- as tuning indicator

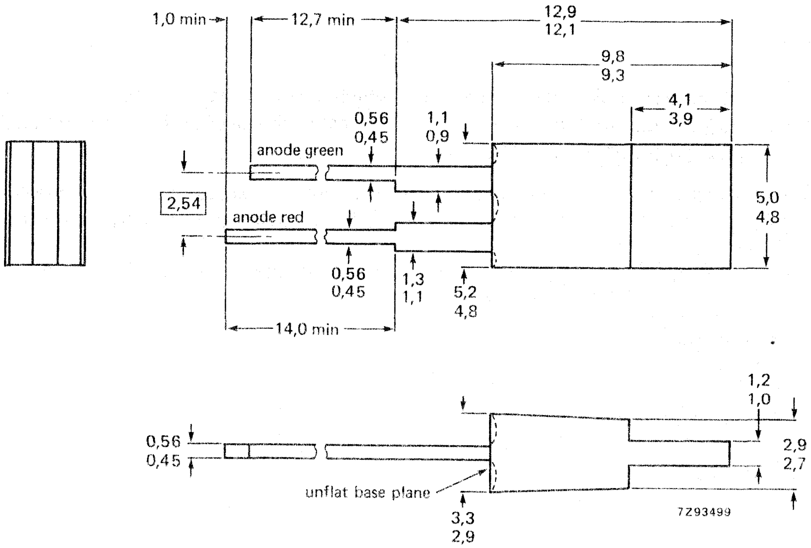
QUICK REFERENCE DATA

Forward current (DC)			
red	I_F	max.	100 mA
green		max.	60 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Junction temperature	T_j	max.	100 °C
Luminous intensity			
red at I_F = 10 mA	I_v	min.	1.0 mcd
green at I_F = 20 mA		typ.	1.5 mcd
Wavelength at peak emission			
red	λ_p	typ.	650 nm
green		typ.	565 nm
Beamwidth between half-intensity directions in the plane of the leads	$\theta_{½}$	typ.	110 °

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-75B2



DEVELOPMENT DATA

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Forward current red green	I_F	max.	100 mA 60 mA
Forward current peak value; t_p = 1 μs; f = 300 Hz peak value, t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	1 A 150 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Junction temperature	T_j	max.	100 °C
Storage temperature	T_{stg}		−55 to +100 °C
Lead soldering temperature $>$ 1.5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage red at I_F = 10 mA	V_F	typ. max.	1.75 V 2.2 V
green at I_F = 20 mA	V_F	typ. max.	2.1 V 3.0 V
Beamwidth between half-intensity directions at I_F = 10 mA	$\theta_{1/2}$	typ.	110 °
Wavelength at peak emission at I_F = 10 mA red green	λ_p	typ.	650 nm 565 nm
Luminous intensity red at I_F = 10 mA green at I_V = 20 mA	I_V	min. typ.	1.0 mcd 1.5 mcd
Diode capacitance at V_R = 0; f = 1 MHz	C_d	typ.	100 pF

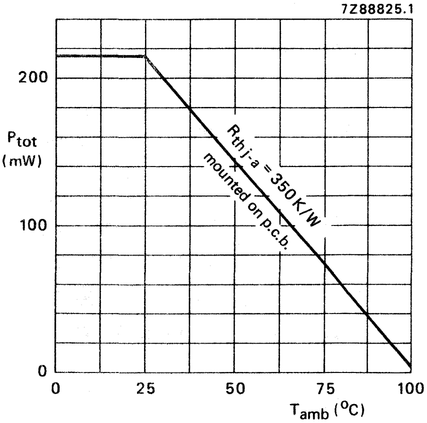


Fig. 2.

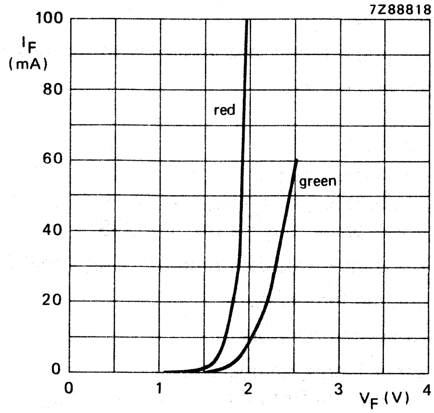


Fig. 3 T_{amb} = 25 °C; typical values.

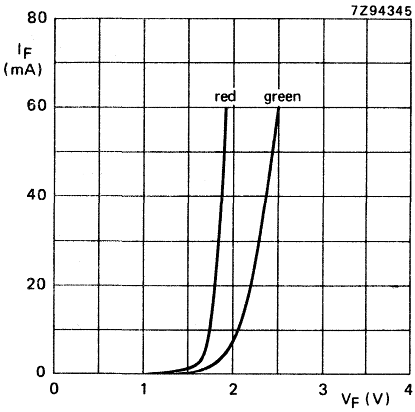


Fig. 4 t_{on} = 20 μs; δ = 0.01; T_{amb} = 25 °C; typical values.

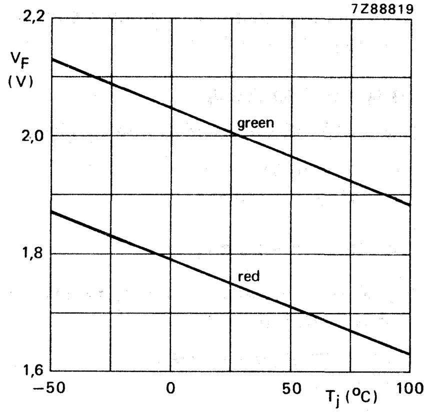


Fig. 5 I_F = 10 mA; typical values.

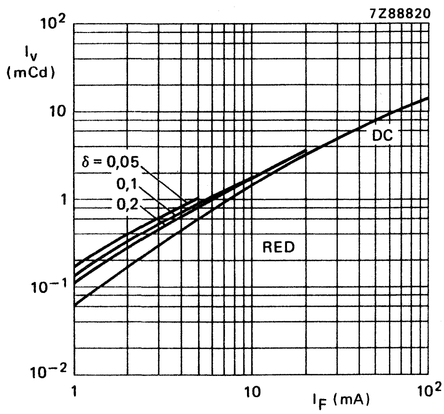


Fig. 6 t_p = 50 μs; typical values.

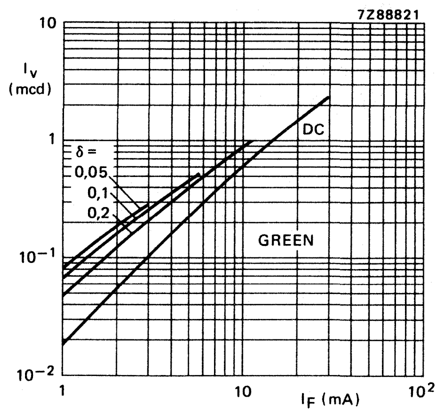


Fig. 7 t_p = 50 μs; typical values.

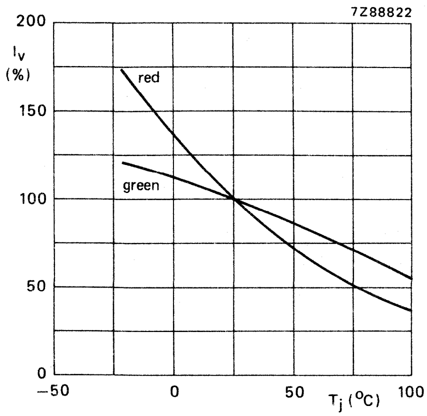


Fig. 8 Typical values.

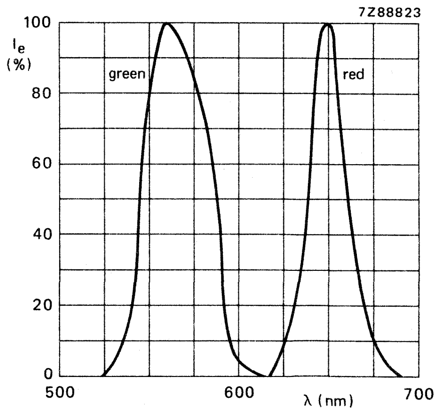


Fig. 9 I_F = 10 mA; typical values.

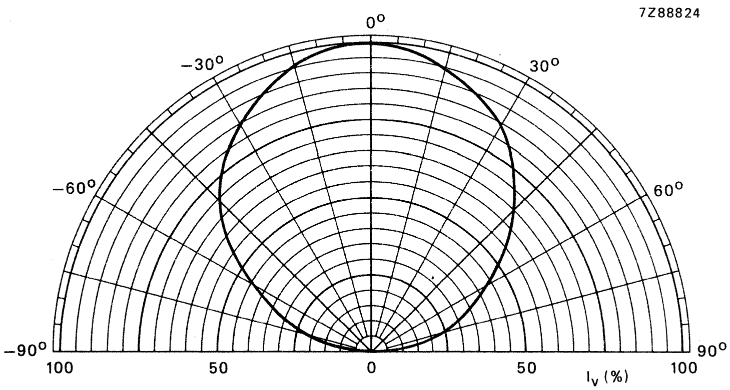


Fig. 10 I_F = 10 mA; typical values.

LIGHT EMITTING DIODE

Rectangular light emitting diode of 5 mm x 2,5 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) or green light at a typical peak wavelength of 565 nm (GaP; super-green) depending on the polarity of the current.

The PLED-TR12F has a SOD-76 outline and is encapsulated in a colourless diffusing resin. The SOD-76 envelope enables the PLED-TR12F to be used in configurations together with the PLED-HR14 family.
The bicolour function gives this light emitting block special possibilities e.g.
- as level sensor overdrive indicator or
- as zero point indicator or
- as tuning indicator

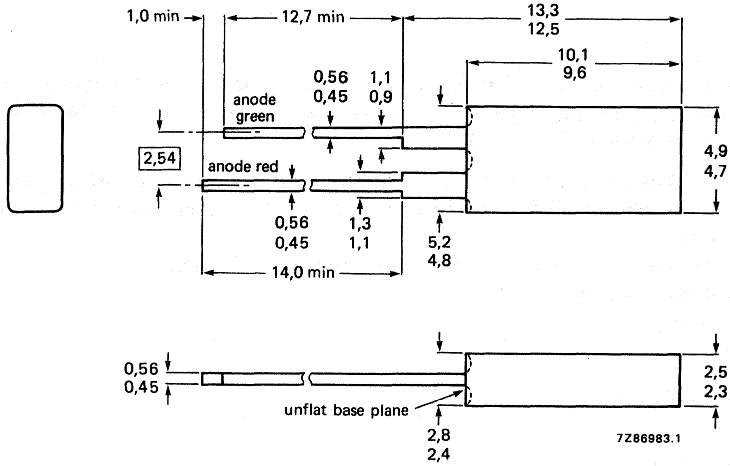
QUICK REFERENCE DATA

Forward current (DC)	red	I_F	max.	100 mA
	green			60 mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	215 mW
Junction temperature		T_j	max.	100 °C
Luminous intensity				
red at I_F = 10 mA		I_v	min.	1.0 mcd
green at I_F = 20 mA			typ.	1.5 mcd
Wave length at peak emission	red	λ_p	typ.	650 nm
	green			565 nm
Beamwidth between half-intensity directions in the plane of the leads		$\theta_{1/2}$	typ.	100 °

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-76A2



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Forward current					
DC	red	I_F	max.	100	mA
	green			60	mA
peak value; t_p = 1 μs; f = 300 Hz		I_{FRM}	max.	1	A
peak value, t_{on} = 1 ms; δ = 0.33			max.	150	mA
Total power dissipation up to T_{amb} = 25 ^oC		P_{tot}	max.	215	mW
Junction temperature		T_j	max.	100	^oC
Storage temperature		T_{stg}		−55 to +100	^oC
Lead soldering temperature $> 1,5$ mm from the seating plane; $t_{sld} < 7$ s		T_{sld}	max.	260	^oC

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB		$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_{amb} = 25 ^oC unless otherwise specified

Forward voltage					
red at I_F = 10 mA		V_F	typ.	1.75	V
			max.	2.2	V
green at I_F = 20 mA		V_F	typ.	2.1	V
			max.	3.0	V
Beamwidth between half-intensity directions at I_F = 10 mA		$\theta_{½}$	typ.	100	^{o}
Wavelength at peak emissions at I_F = 10 mA	red	λ_p	typ.	650	nm
	green		typ.	565	nm
Capacitance at V_R = 0; f = 1 MHz		C_d	typ.	100	pF
Luminous intensity					
red at I_F = 10 mA		I_v	min.	1.0	mcd
green at I_F = 20 mA			typ.	1.5	mcd

DEVELOPMENT DATA

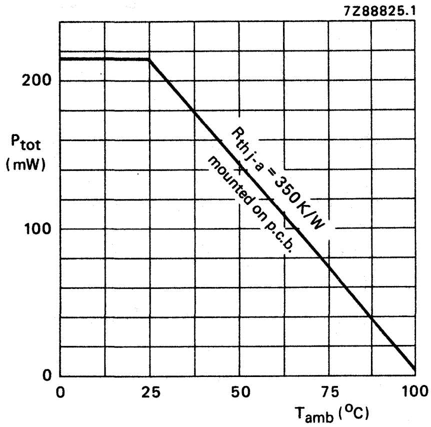


Fig. 2.

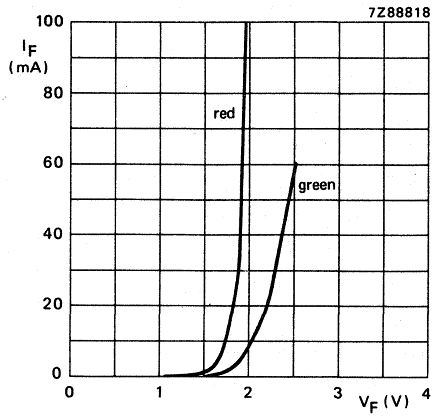


Fig. 3 T_{amb} = 25 °C; typical values.

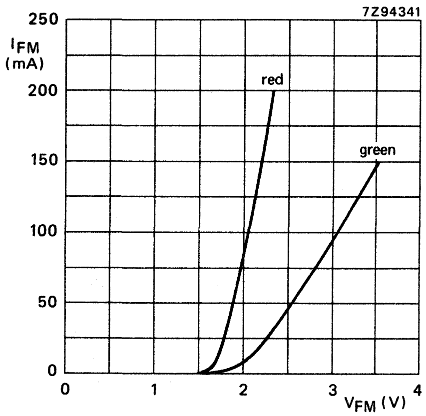


Fig. 4 t_{on} = 20 μs; δ = 0.01;
T_{amb} = 25 °C; typical values.

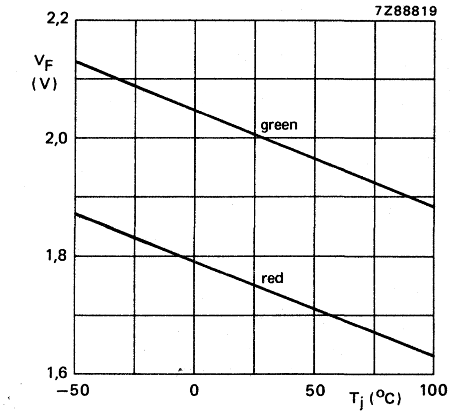


Fig. 5 I_F = 10 mA; typical values.

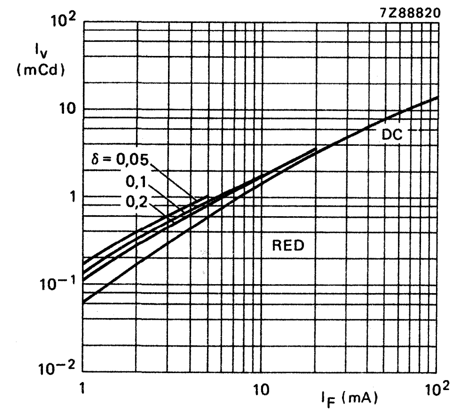


Fig. 6 t_p = 50 μs; typical values.

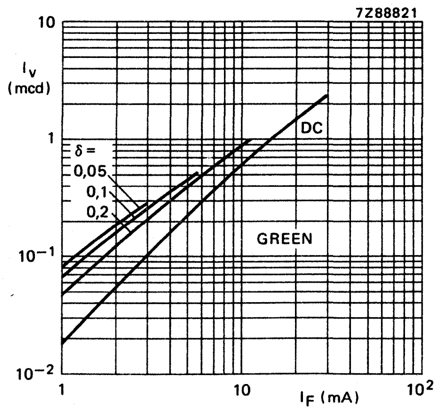


Fig. 7 t_p = 50 μs; typical values.

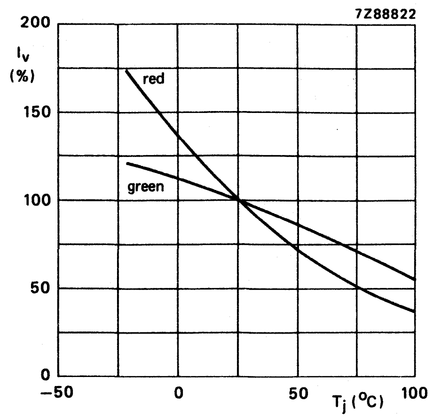


Fig. 8 Typical values.

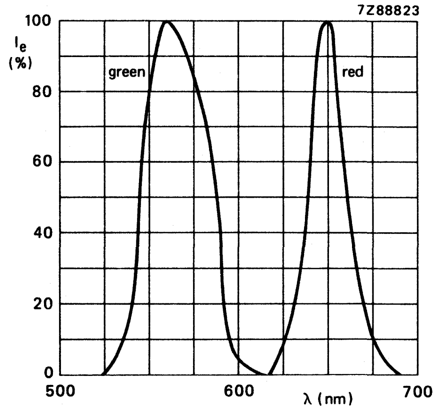


Fig. 9 I_F = 10 mA; typical values.

DEVELOPMENT DATA

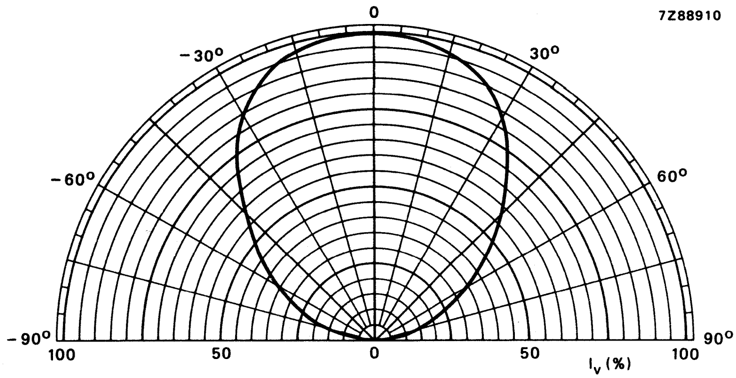


Fig. 10 Typical values.

LIGHT EMITTING DIODE

Rectangular light emitting diode of 5 mm x 3 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) or green light at a typical peak wavelength of 565 nm (GaP; super-green) depending on the polarity of the current.

The PLED-TR12G has a SOD-77 outline and is encapsulated in a colourless diffusing resin. Because of its SOD-77 envelope, the PLED-TR12G can be used in configurations together with the PLED-HR14 family.

The bicolour function gives this light emitting device special application possibilities, e.g.

- as level sensor overdrive indicator
- as zero point indicator
- as tuning indicator
- as temperature indicator
- for motor control
- in bicolour information panels

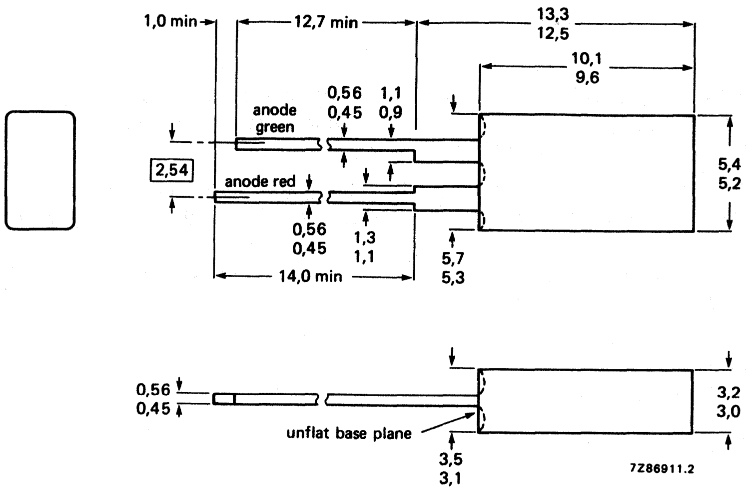
QUICK REFERENCE DATA

Forward current (DC)			
red	I_F	max.	100 mA
green			60 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Junction temperature	T_j	max.	100 °C
Luminous intensity			
red at I_F = 20 mA	I_V	min.	1.0 mcd
green at I_F = 20 mA		typ.	1.5 mcd
Wavelength at peak emission			
red	λ_p	typ.	650 nm
green			565 nm
Beamwidth between half-intensity directions in the plane of the leads	$\theta_{1/2}$	typ.	110 °

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-77A2.



DEVELOPMENT DATA

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Forward current (DC)			
red	I_F	max.	100 mA
green			60 mA
Forward current			
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1 A
peak value; t_{on} = 1 ms; δ = 0.33			150 mA
Total power dissipation up to T_{amb} = 35 °C	P_{tot}	max.	215 mW
Junction temperature	T_j	max.	100 °C
Storage temperature	T_{stg}		−55 to +100 °C
Lead soldering temperature $>$ 1.5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage			
red at I_F = 10 mA	V_F	typ.	1.75 V
		max.	2.2 V
green at I_F = 20 mA	V_F	typ.	2.1 V
		max.	3.0 V
Beamwidth between half-intensity directions at I_F = 10 mA	$\theta_{1/2}$	typ.	110 °
Wavelength at peak emission at I_F = 10 mA			
red	λ_p	typ.	650 nm
green			565 nm
Luminous intensity			
red at I_F = 10 mA	I_v	min.	1.0 mcd
green at I_v = 20 mA	I_v	typ.	1.5 mcd
Diode capacitance at V_R = 0; f = 1 MHz	C_d		100 pF

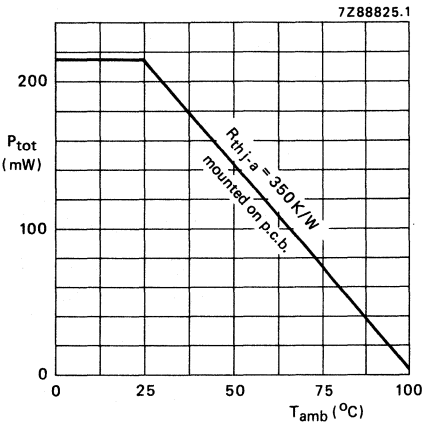


Fig. 2.

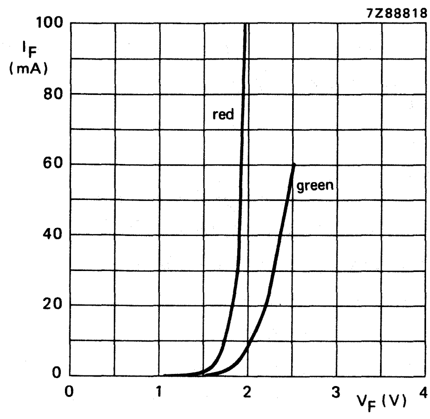


Fig. 3 T_{amb} = 25 °C; typical values.

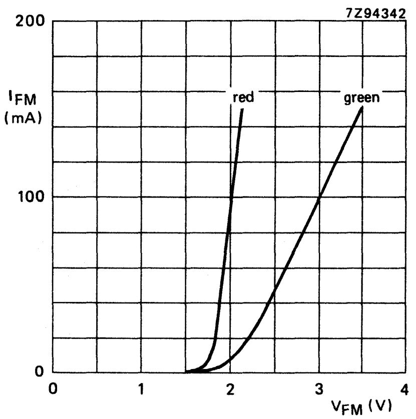


Fig. 4 t_{on} = 20 μs; δ = 0.01; T_{amb} = 25 °C, typical values.

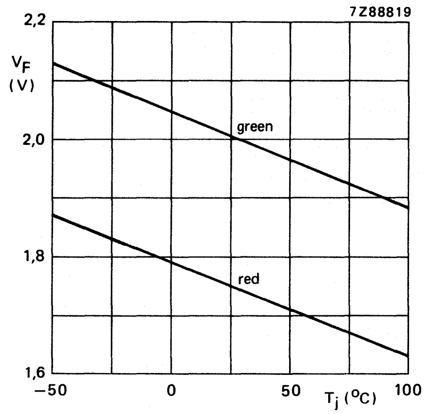


Fig. 5 I_F = 10 mA; typical values.

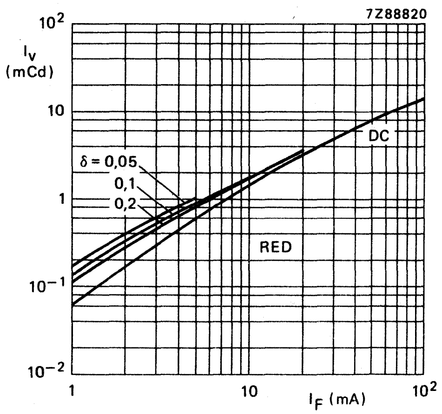


Fig. 6 t_p = 50 μs; typical values.

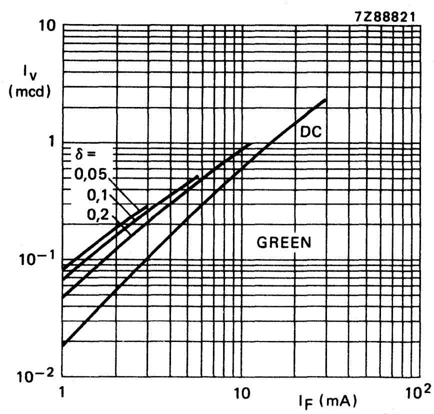


Fig. 7 t_p = 50 μs; typical values.

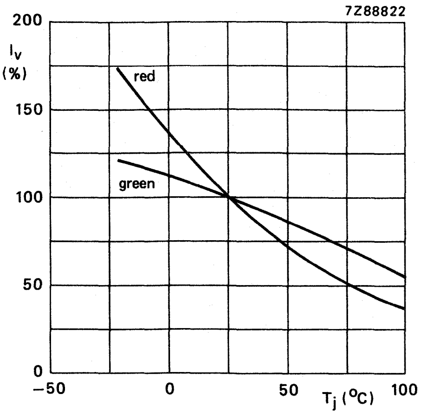


Fig. 8 Typical values.

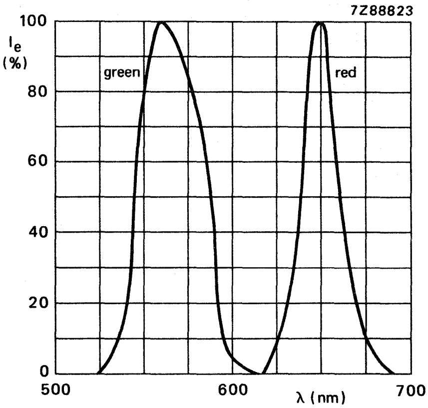


Fig. 9 I_F = 10 mA; typical values.

DEVELOPMENT DATA

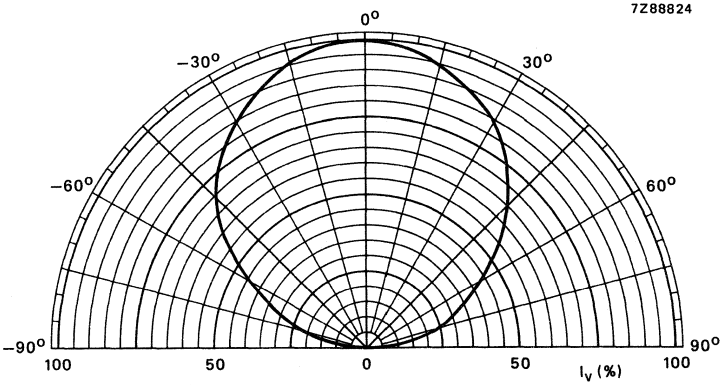


Fig. 10 I_F = 10 mA; typical values.

LIGHT EMITTING DIODE

Rectangular light emitting diode of 5 mm x 5 mm which emits red light at a typical peak wavelength of 650 nm (GaAlAs; hyper-red) or green light at a typical peak wavelength of 565 nm (GaP; super-green) depending on the polarity of the current. The PLED-TR42DL has a SOD-74L envelope and is encapsulated in a clear diffusing resin.

Because of its high I_V the PLED-TR42DL is suitable for applications where only low currents are available.

The PLED-TR42DL is suitable for surface illumination such as announcing boards, score boards, moving advertisements and electronic games applications. A third colour (orange) is available when an alternating current is applied.

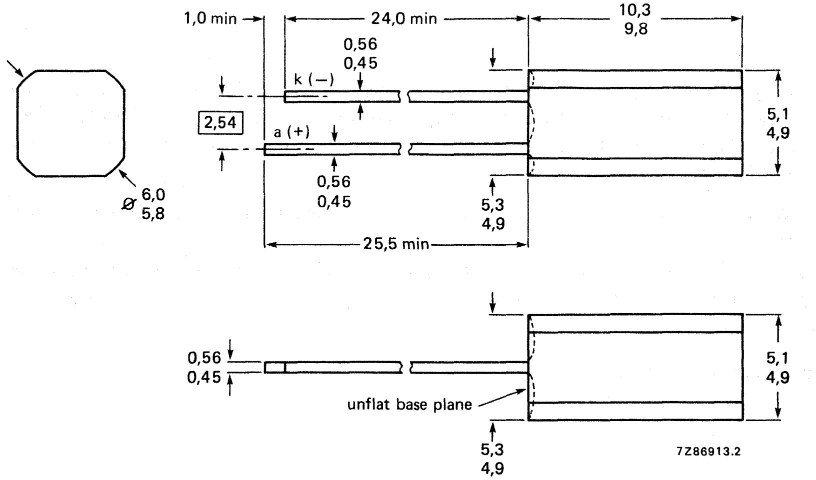
QUICK REFERENCE DATA

Forward current (DC)			
red	I_F	max.	100 mA
green			60 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	215 mW
Junction temperature	T_j	max.	100 °C
Luminous intensity			
red at I_F = 10 mA	I_V	min.	1.0 mcd
green at I_F = 20 mA		typ.	2.0 mcd
Wavelength at peak emission			
red	λ_p	typ.	650 nm
green			565 nm
Beamwidth between half-intensity directions	$\theta_{1/2}$	typ.	100 °

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-74L.



Note. Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Forward current (DC)			
red	I_F	max.	100 mA
green			60 mA
Forward current			
peak value; $t_p = 1\ \mu s$; f = 300 Hz	I_{FRM}	max.	1 A
peak value; $t_{on} = 1$ ms; $\delta = 0.33$		max.	150 mA
Total power dissipation up to $T_{amb} = 25\ ^oC$	P_{tot}	max.	215 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature			
$>$ 5.0 mm from the plastic body; $t_{sld} < 7$ s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

$T_{amb} = 25\ ^oC$ unless otherwise specified

Forward voltage			
red at $I_F = 10$ mA	V_F	typ.	1.75 V
		max.	2.2 V
green at $I_F = 20$ mA	V_F	typ.	2.1 V
		max.	3.0 V
Beamwidth between half-intensity directions			
$I_F = 10$ mA	$\theta_{1/2}$	typ.	100 °
Wavelength at peak emission at $I_F = 10$ mA			
red	λ_p	typ.	650 nm
green			565 nm
Luminous intensity			
red at $I_F = 10$ mA	I_v	min.	1.0 mcd
green at $I_F = 20$ mA		typ.	2.0 mcd
Diode capacitance			
$V_R = 0$; f = 1 MHz	C_d	typ.	100 pF

DEVELOPMENT DATA

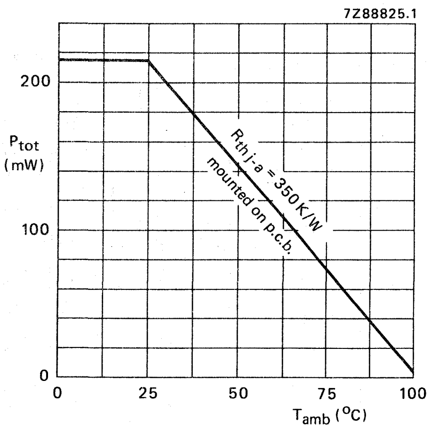


Fig. 2.

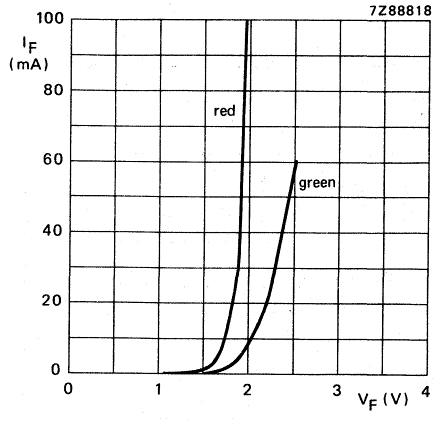


Fig. 3 T_{amb} = 25 °C; typical values.

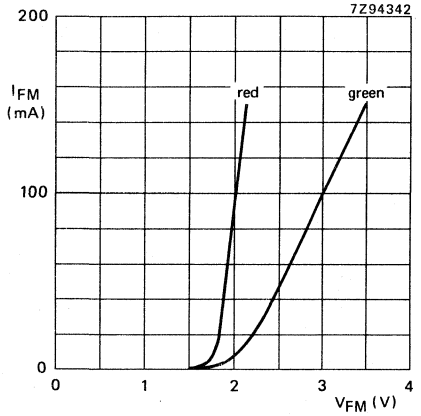


Fig. 4 t_{on} = 20 μs; δ = 0.01; T_{amb} = 25 °C; typical values.

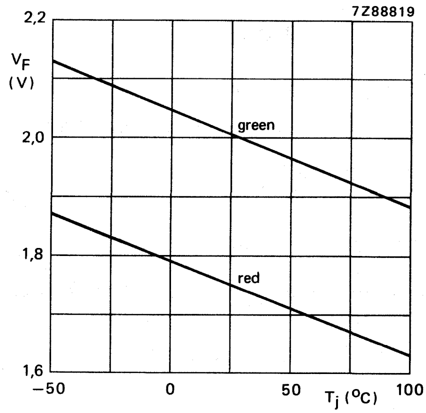


Fig. 5 I_F = 10 mA; typical values.

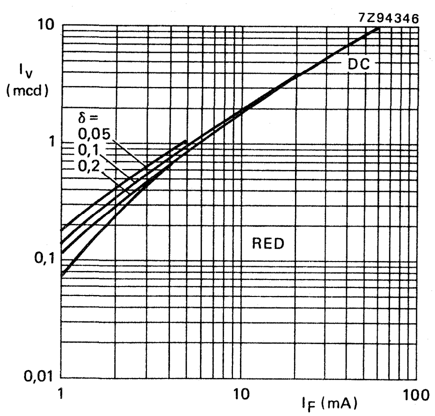


Fig. 6 t_p = 50 μs; typical values.

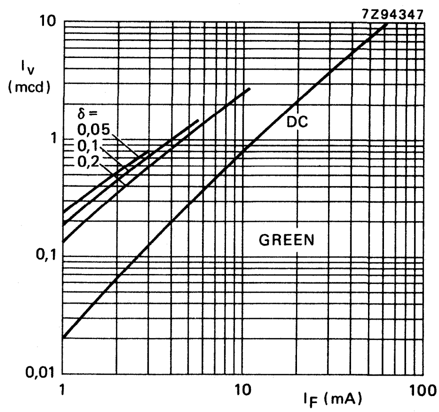


Fig. 7 t_p = 50 μs; typical values.

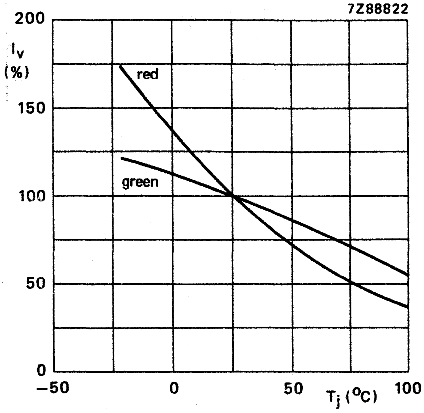


Fig. 8 Typical values.

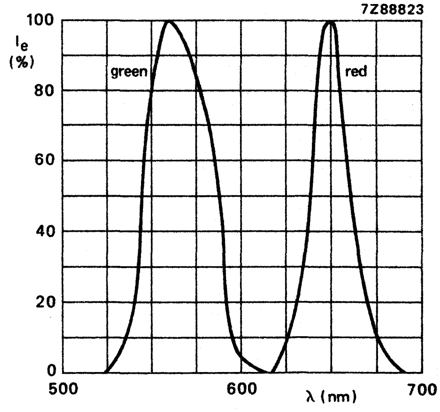


Fig. 9 I_F = 10 mA; typical values.

DEVELOPMENT DATA

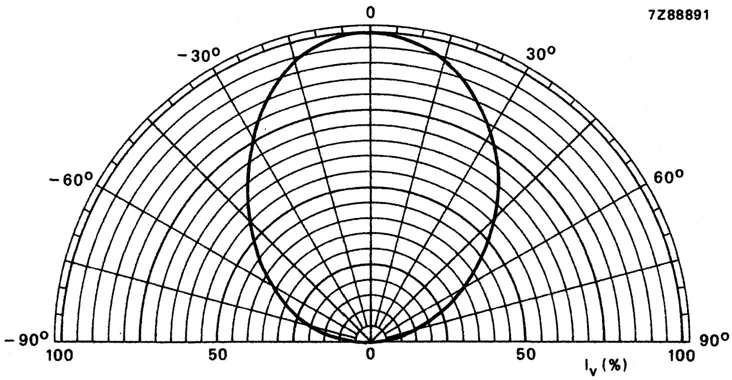


Fig. 10 Typical values.

LIGHT EMITTING DIODE WITH HIGH LUMINOSITY

Circular light emitting diode with a diameter of 3 mm which emits yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-Y313A has a SOD-53 outline and is mounted in a yellow non-diffusing resin. An appropriate device, for example, backlighting push button indicators.

Note: This device has to be used behind a diffusing screen.

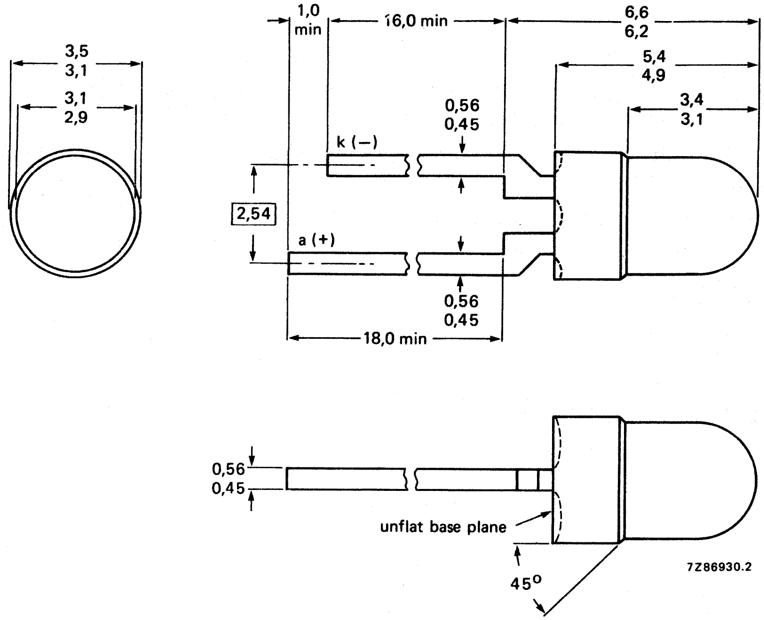
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 55 ^oC		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	^oC
Luminous intensity					
I_F = 10 mA	PLED-Y313A	I_V	min.	3	mcd
	PLED-Y313A-5	I_V		5 to 12	mcd
	PLED-Y313A-6	I_V		10 to 22	mcd
	PLED-Y313A-7	I_V	min.	16	mcd
Wavelength at peak emission		λ_p	typ.	590	nm
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	60	^{o}

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53E.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	30	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	60	mA
Total power dissipation up to T_{amb} = 55 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature > 1.5 mm from the seating plane; t_{sld} < 7 s	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	500	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1	V
			max.	3.0	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{½}$	typ.	60	°
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	590	nm
Luminous intensity I_F = 10 mA	PLED-Y313A	I_v	min.	3	mcd
	PLED-Y313A-5	I_v		5 to 12	mcd
	PLED-Y313A-6	I_v		10 to 22	mcd
	PLED-Y313A-7	I_v	min.	16	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	15	pF

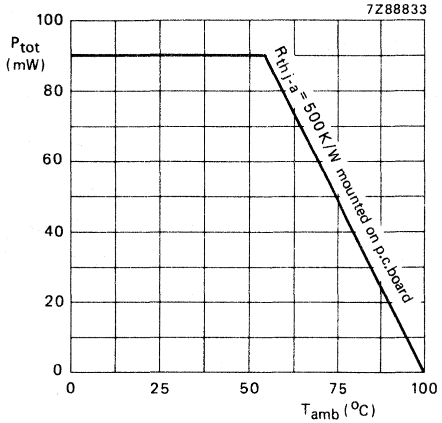


Fig. 2.

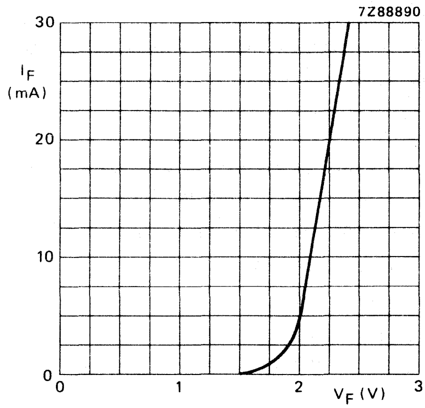


Fig. 3 T_j = 25 °C; typ. values.

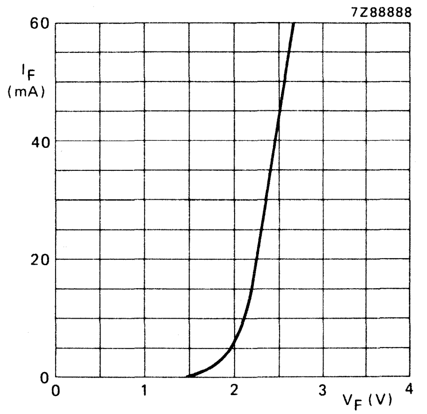


Fig. 4 t_p = 50 μs; δ = 0.01; T_{amb} = 25 °C; typ. values.

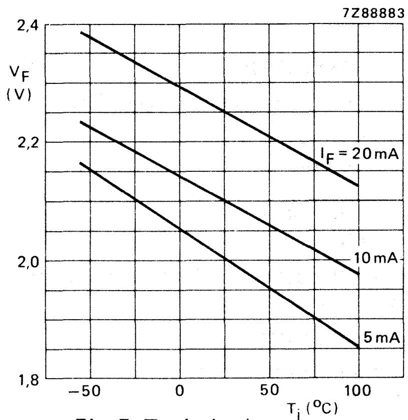


Fig. 5 Typical values.

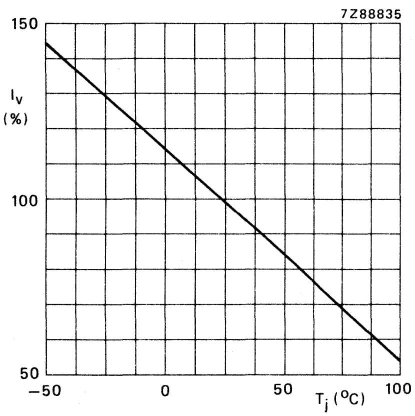


Fig. 6 Typical values.

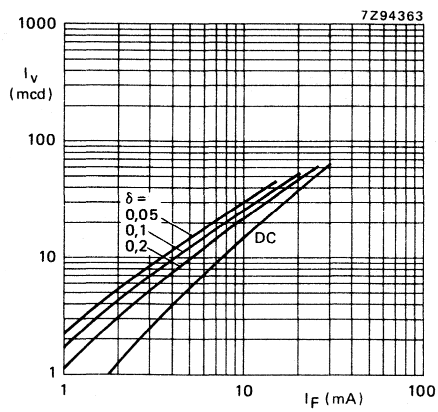


Fig. 7 T_j = 25 °C; typ. values.

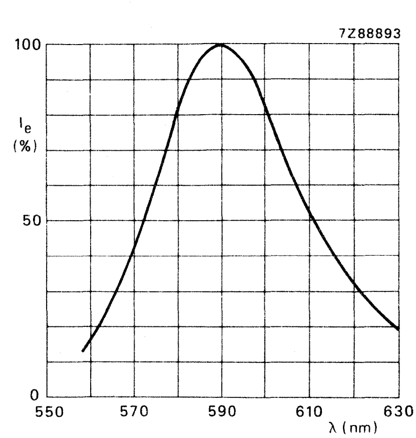


Fig. 8 Typical values.

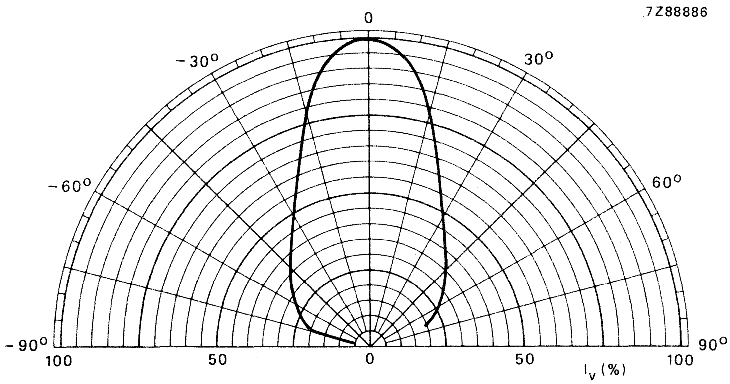


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits yellow light (GaAsP; yellow) at a typical peak wavelength of 590 nm when forward biased.
The PLED-Y313N has a SOD-82C1 outline and is encapsulated in a yellow non-diffusing resin.

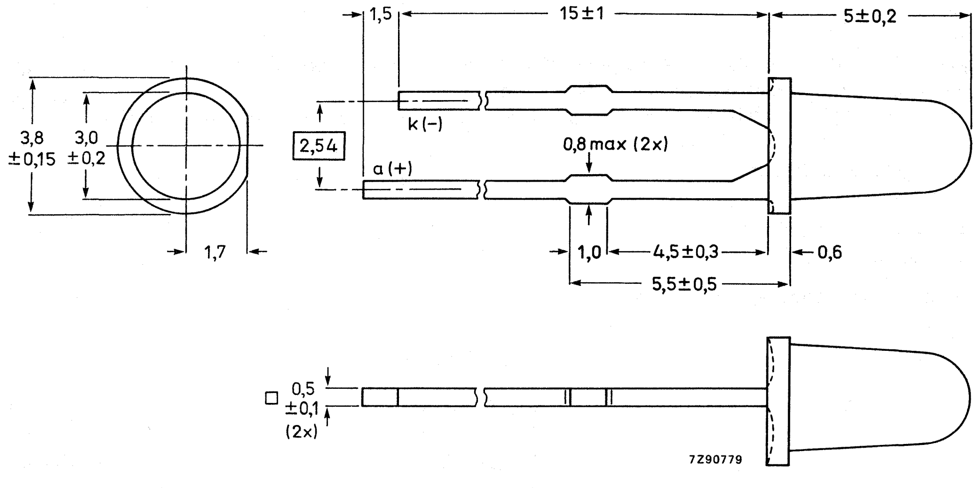
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	30	mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90	mW
Luminous intensity					
I_F = 10 mA	PLED-Y313N	I_v	min.	0,7	mcd
			typ.	1,6	mcd
	PLED-Y313N-3	I_v		1,6 to 3,5	mcd
	PLED-Y313N-4	I_v		3,0 to 7,0	mcd
	PLED-Y313N-45	I_v		3,0 to 12,0	mcd
	PLED-Y313N-5	I_v		5,0 to 12,0	mcd
Wavelength at peak emission					
I_F = 20 mA		λp	typ.	590	nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	25	deg

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-82C1.
PLED-Y313N



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	30	mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150	mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−30 to + 100	°C
Operating ambient temperature	T_{opr}		−25 to + 85	°C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260	°C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage					
I_F = 20 mA		V_F	typ.	2,2	V
			max.	2,8	V
Reverse current					
V_R = 5 V		I_R	max.	10	μA
Beamwidth at half-intensity directions		θ½	typ.	25	deg
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission					
I_F = 10 mA		λp	typ.	590	nm
Luminous intensity					
I_F = 10 mA	PLED-Y313N	I_v	min.	0,7	mcd
			typ.	1,6	mcd
	PLED-Y313N-3	I_v		1,6 to 3,5	mcd
	PLED-Y313N-4	I_v		3,0 to 7,0	mcd
	PLED-Y313N-45	I_v		3,0 to 12,0	mcd
	PLED-Y313N-5	I_v		5,0 to 12,0	mcd

DEVELOPMENT DATA

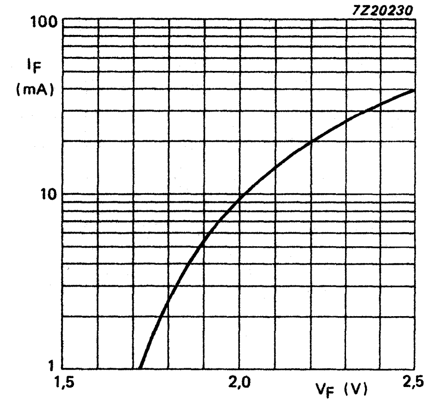


Fig. 2 $I_F = f(V_F)$; typical values.

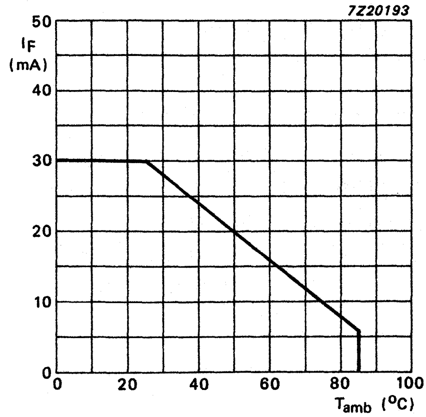


Fig. 3 $I_F = f(T_{amb})$; typical values.

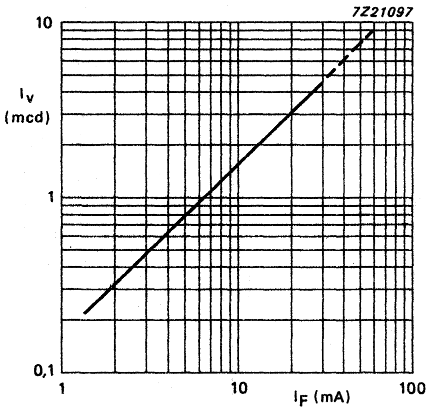


Fig. 4 $I_v = f(I_F)$; typical values.

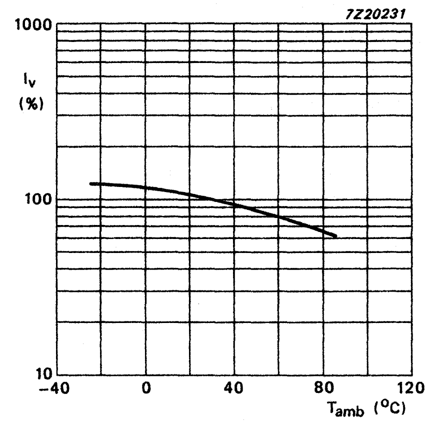


Fig. 5 $I_v(\%) = f(T_{amb})$; typical values.

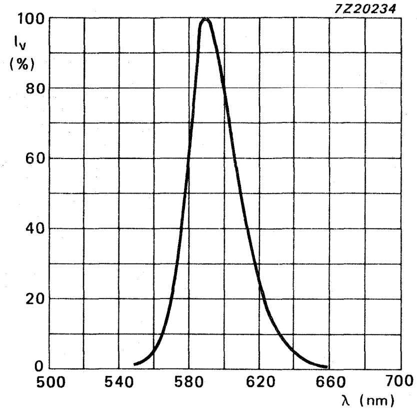


Fig. 6 Spectral response; typical values.

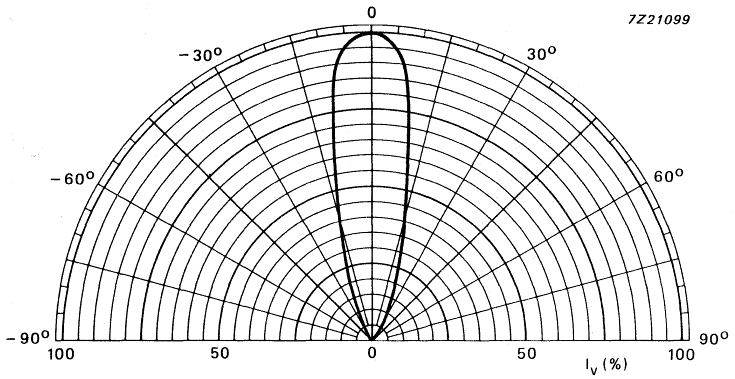


Fig. 7 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode with a diameter of 3 mm which emits yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-Y314A has a SOD-53 envelope and is encapsulated in a yellow coloured resin.

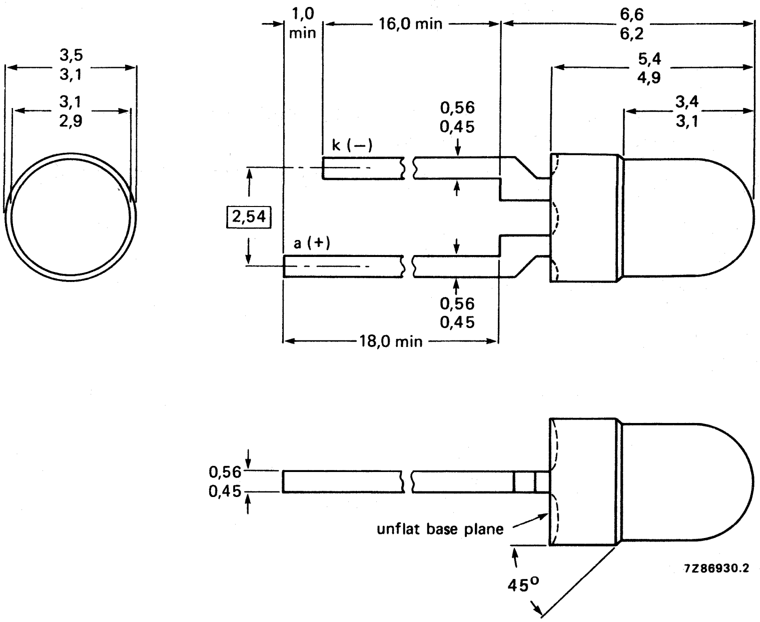
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 55 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-Y314A	I_v	min.	0.7	mcd
	PLED-Y314A-3	I_v		1.6 to 3.5	mcd
	PLED-Y314A-4	I_v		3.0 to 7.0	mcd
	PLED-Y314A-5	I_v	min.	5.0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Beamwidth at half-intensity directions		$\theta_{1/2}$	typ.	70	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-53E.



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5 V
Forward current			
DC	I_F	max.	30 mA
peak value, t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1 A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	60 mA
Total power dissipation up to T_{amb} = 55 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature $>$ 1.5 mm from the seating plane; $t_{sld} < 7$ s	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	500 K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1 V
			max.	3.0 V
Reverse current V_R = 5 V		I_R	max.	100 μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{½}$	typ.	70 °
Bandwidth at half height		$\Delta\lambda$	typ.	40 nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	590 nm
Luminous intensity (class division) I_F = 10 mA	PLED-Y314A	I_v	min.	0.7 mcd
	PLED-Y314A-3	I_v		1.6 to 3.5 mcd
	PLED-Y314A-4	I_v		3.0 to 7.0 mcd
	PLED-Y314A-5	I_v	min.	5.0 mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	15 pF

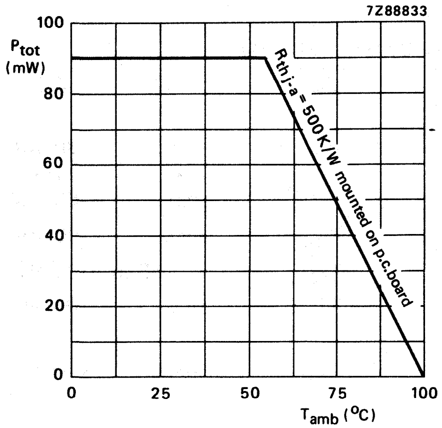


Fig. 2.

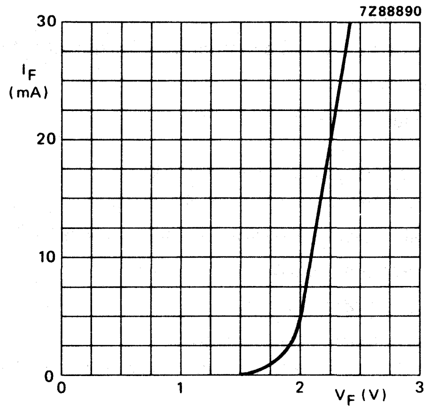


Fig. 3 T_j = 25 °C; typ. values.

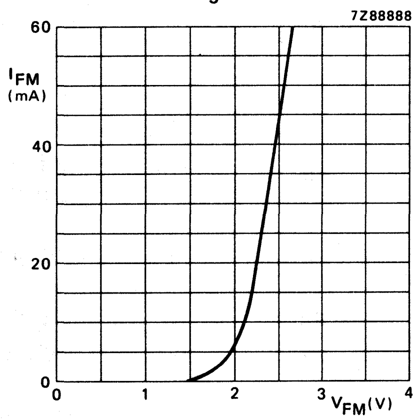


Fig. 4 t_p = 50 μs; δ = 0.01;
T_{amb} = 25 °C; typ. values.

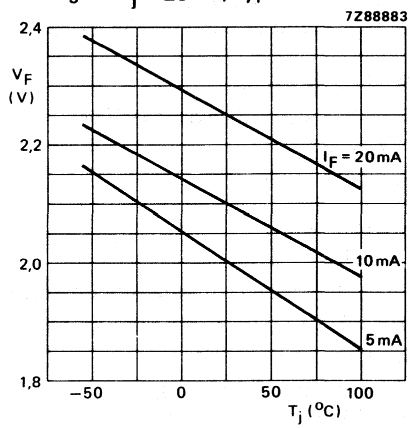


Fig. 5 Typical values.

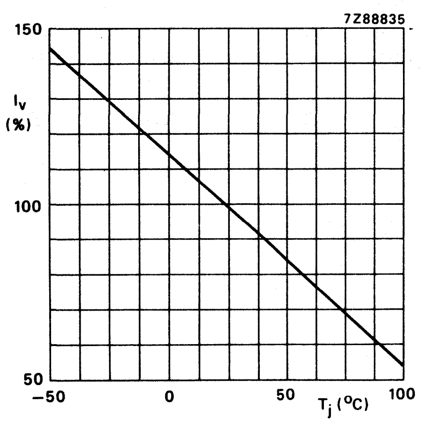


Fig. 6 Typical values.

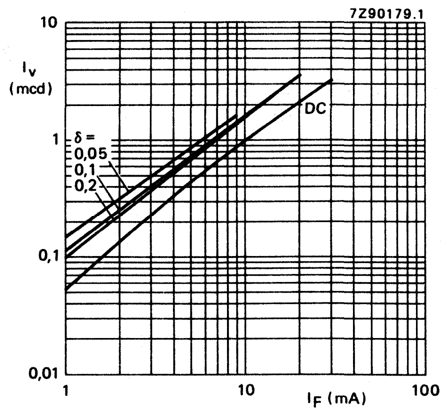


Fig. 7 T_j = 25 °C, typ. values.

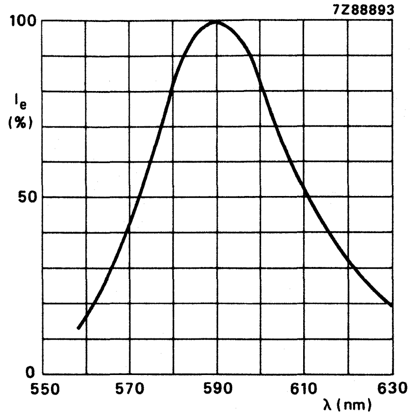


Fig. 8 Typical values.

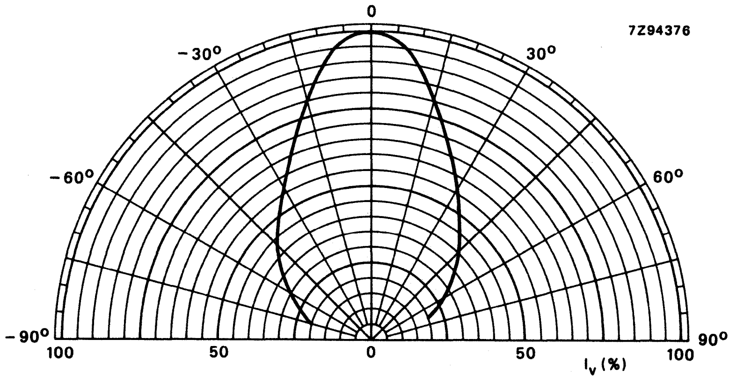


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 3 mm which emit yellow light (GaAsP; yellow) at a typical peak wavelength of 590 nm when forward biased.
The PLED-Y314N has a SOD-82C1 outline and is encapsulated in a yellow diffusing resin.
The PLED-Y334NL has a SOD-82A1 outline and is encapsulated in a yellow diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	30	mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90	mW
Luminous intensity					
I_F = 10 mA	PLED-Y314N/Y334NL	I_V	min.	0,7	mcd
			typ.	1,6	mcd
	PLED-Y314N/Y334NL-2	I_V		1,0 to 2,2	mcd
	PLED-Y314N/Y334NL-3	I_V		1,6 to 3,5	mcd
	PLED-Y314N/Y334NL-4	I_V		3,0 to 7,0	mcd
	PLED-Y314N/Y334NL-45	I_V		3,0 to 12,0	mcd
	PLED-Y314N/Y334NL-5	I_V		5,0 to 12,0	mcd
Wavelength at peak emission					
I_F = 20 mA		λp	typ.	590	nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	60	deg

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-82C1.
PLED-Y314N

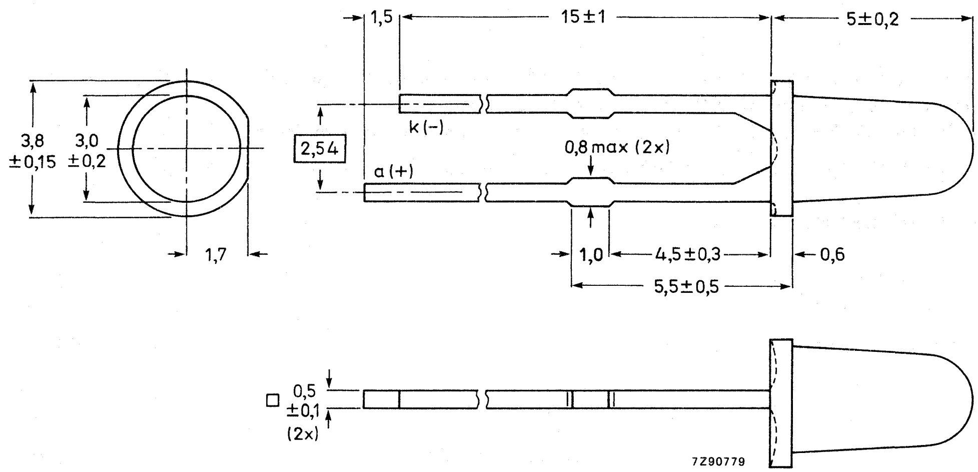
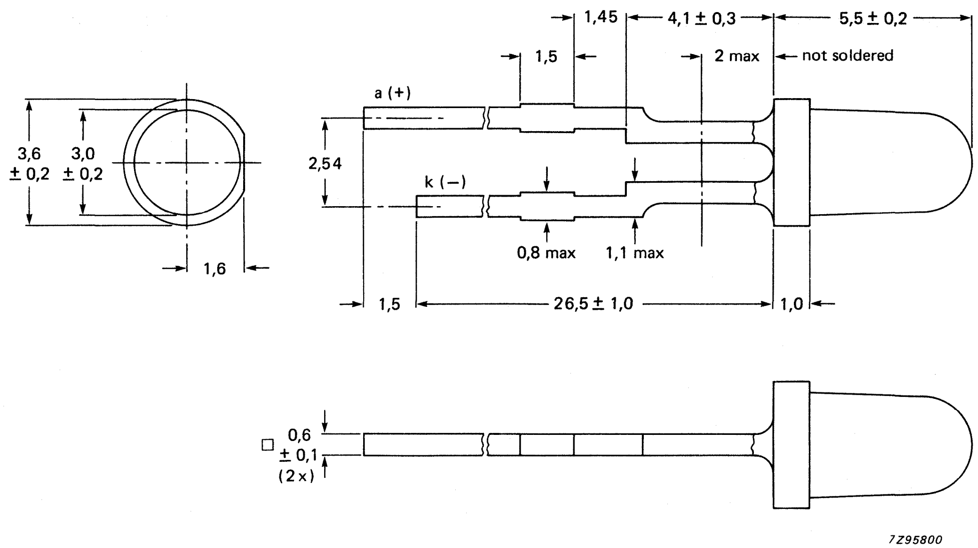


Fig. 1b SOD-82A1.
PLED-Y334NL



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
d.c.	I_F	max.	30	mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150	mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}	–30 to + 100		°C
Operating ambient temperature	T_{opr}	–25 to + 85		°C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260	°C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2	V
			max.	2,8	V
Reverse current V_R = 5 V		I_R	max.	10	μA
Beamwidth at half-intensity directions		θ½	typ.	60	deg
Bandwidth at half height		$\Delta\lambda$	typ.	30	nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	590	nm
Luminous intensity I_F = 10 mA	PLED-Y314N/Y334NL	I_v	min.	0,7	mcd
			typ.	1,6	mcd
	PLED-Y314N/Y334NL-2	I_v	1,0 to	2,2	mcd
	PLED-Y314N/Y334NL-3	I_v	1,6 to	3,5	mcd
	PLED-Y314N/Y334NL-4	I_v	3,0 to	7,0	mcd
	PLED-Y314N/Y334NL-45	I_v	3,0 to	12,0	mcd
	PLED-Y314N/Y334NL-5	I_v	5,0 to	12,0	mcd

DEVELOPMENT DATA

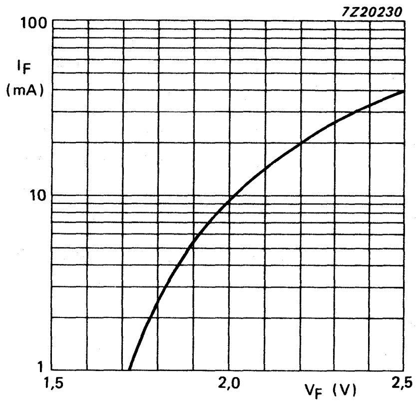


Fig. 2 $I_F = f(V_F)$; typical values.

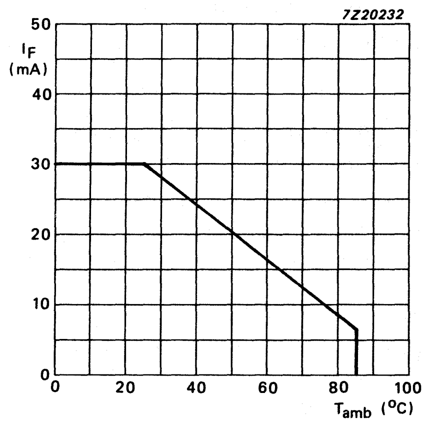


Fig. 3 $I_F = f(T_{amb})$; typical values.

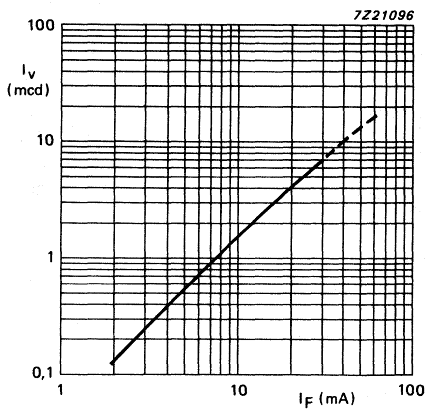


Fig. 4 $I_v = f(I_F)$; typical values.

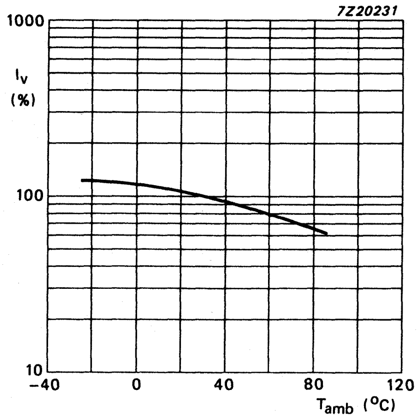


Fig. 5 $I_{v(\%)} = f(T_{amb})$; typical values.

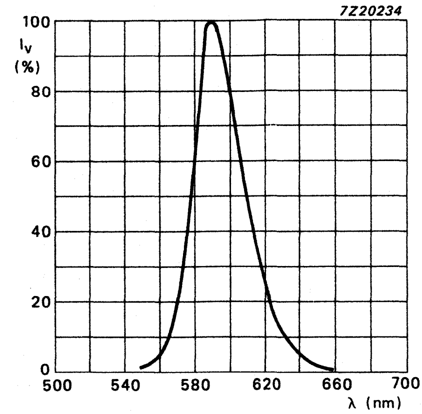


Fig. 6 Spectral response; typical values.

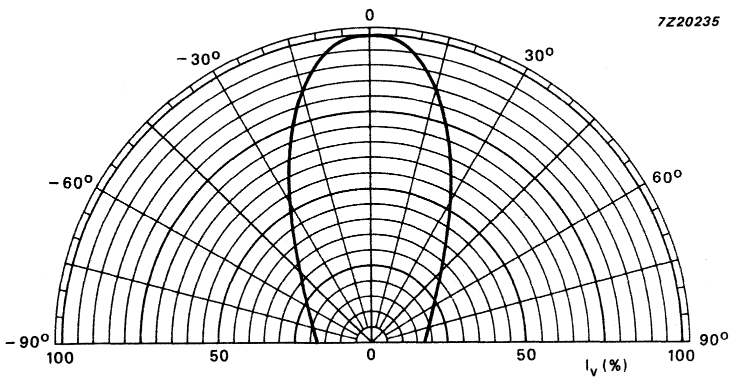


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit a narrow beam of yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-Y511C and PLED-Y541CL have a SOD-63 outline and are encapsulated in a clear resin.

The PLED-Y541CL is the long-lead version of the PLED-Y511C and has no seating plane but is in all other respects equal to the PLED-Y511C.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-Y511C(Y541CL)	I_v	min.	10	mcd
	PLED-Y511C(Y541CL)-7	I_v		16 to 35	mcd
	PLED-Y511C(Y541CL)-8	I_v		30 to 70	mcd
	PLED-Y511C(Y541CL)-9	I_v	min.	50	mcd
Wavelength at peak emission		λ_p	typ.	590	nm
Beamwidth between half-intensity directions		$\theta_{½}$	typ.	20	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-63DI.
PLED-Y511C

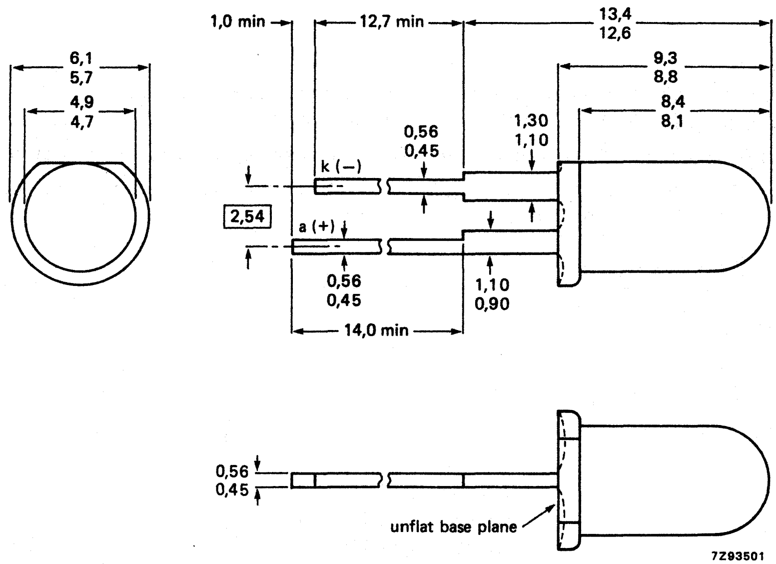
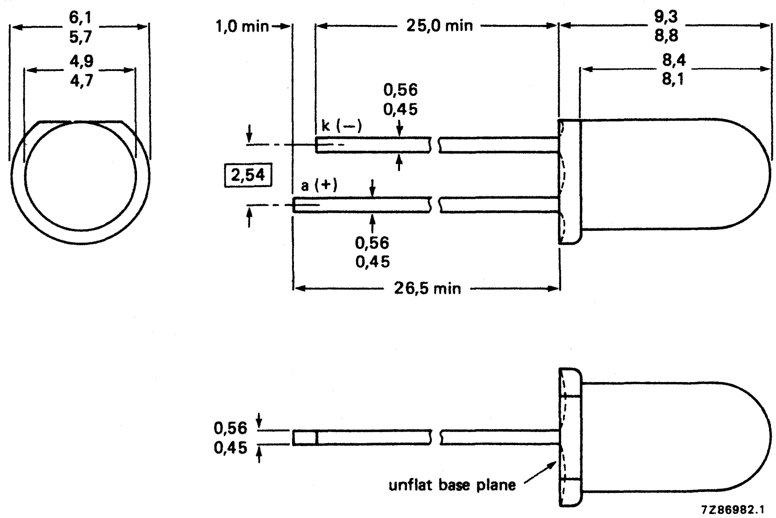


Fig. 1b SOD-63L.
PLED-Y541CL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current DC	I_F	max.	30	mA
Forward current peak value; t_p = 1 μs; f = 300 Hz peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max. max.	1 60	A mA
Total power dissipation up to T_{amb} = 65 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; $t_{sld} < 7$ s > 1.5 mm from the seating plane for PLED-Y511C > 5 mm from the plastic body for PLED-Y541CL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ. max.	2.1 3.0	V V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	20	°
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	590	nm
Luminous intensity I_F = 10 mA	PLED-Y511C(Y541CL)	I_v	min.	10	mcd
	PLED-Y511C(Y541CL)-7	I_v		16 to 35	mcd
	PLED-Y511C(Y541CL)-8	I_v		30 to 70	mcd
	PLED-Y511C(Y541CL)-9	I_v	min.	50	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	15	pF

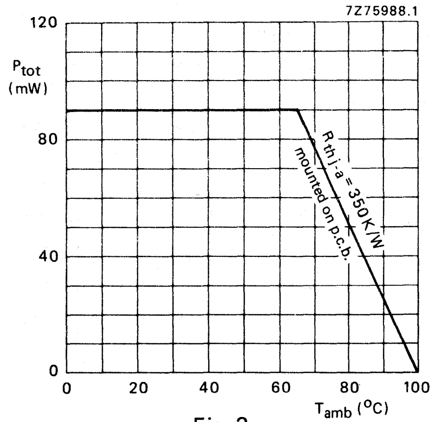


Fig. 2.

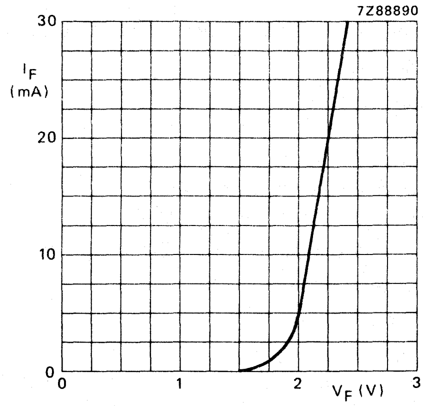


Fig. 3 T_j = 25 °C; typ. values.

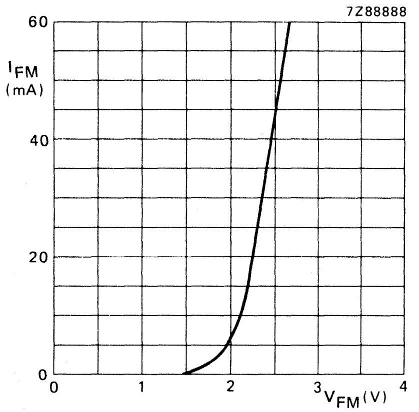


Fig. 4 t_{on} = 50 μs; δ = 0.01;
T_{amb} = 25 °C; typ. values.

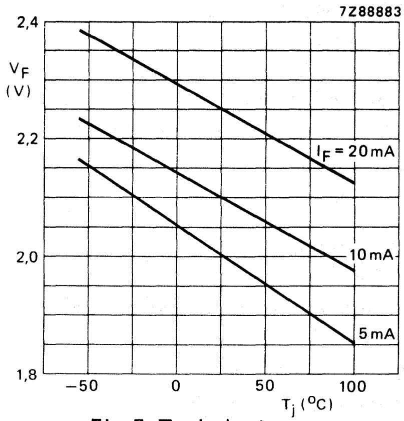


Fig. 5 Typical values.

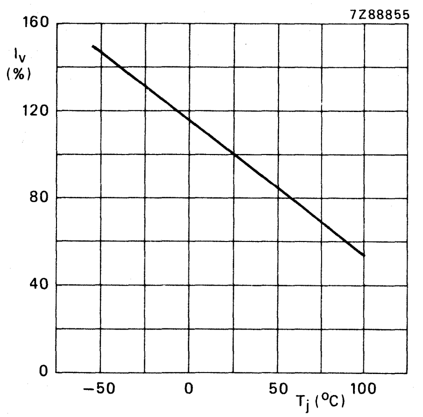


Fig. 6 I_F = 10 mA; typ. values.

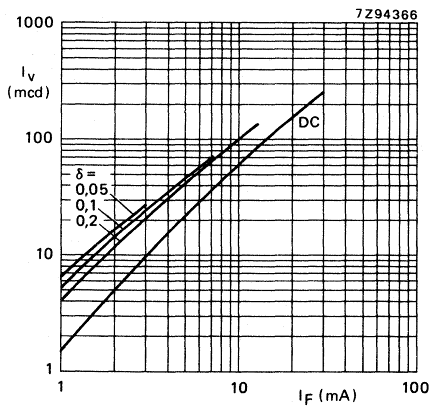


Fig. 7 t_p = 50 μs; typ. values.

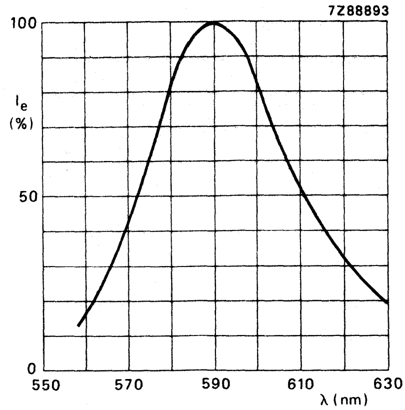


Fig. 8 Typical values.

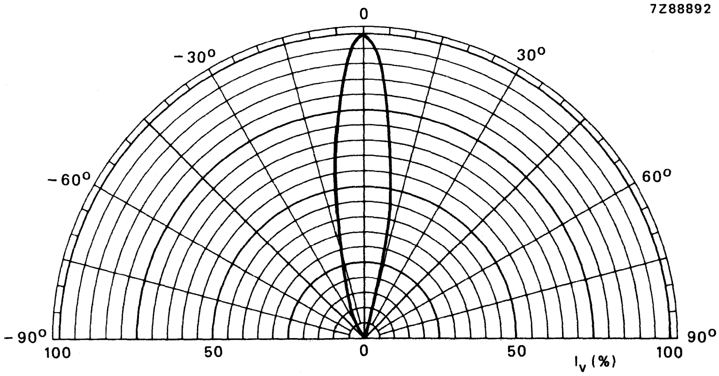


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit a narrow beam of yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-Y513C and PLED-Y543CL have a SOD-63 outline and are encapsulated in a yellow diffusing resin.

The PLED-Y543CL is the long-lead version of the PLED-Y513C and has no seating plane but is in all other respects equal to the PLED-Y513C.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-Y513C(Y543CL)	I_V	min.	10	mcd
	PLED-Y513C(Y543CL)-6	I_V		10 to 22	mcd
	PLED-Y513C(Y543CL)-7	I_V		16 to 35	mcd
	PLED-Y513C(Y543CL)-8	I_V	min.	30	mcd
Wavelength at peak emission		λ_p	typ.	590	nm
Beamwidth between half-intensity directions		$\theta_{½}$	typ.	20	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-63DI.
PLED-Y513C

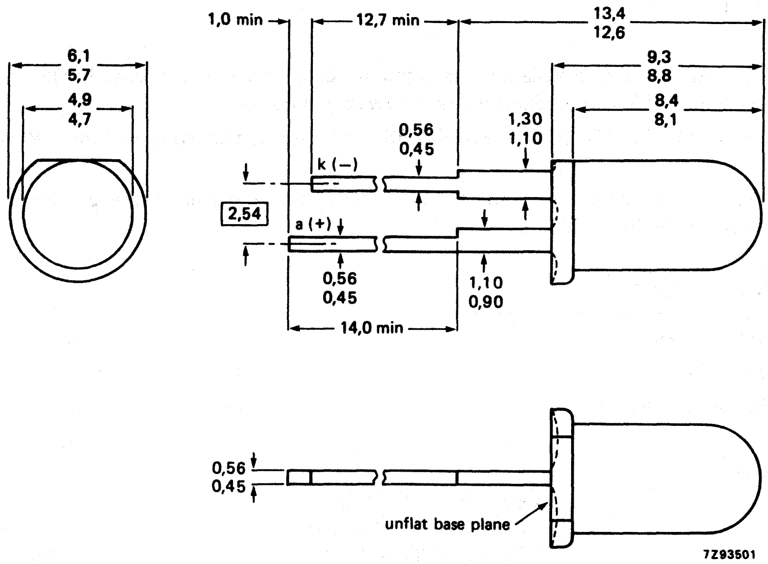
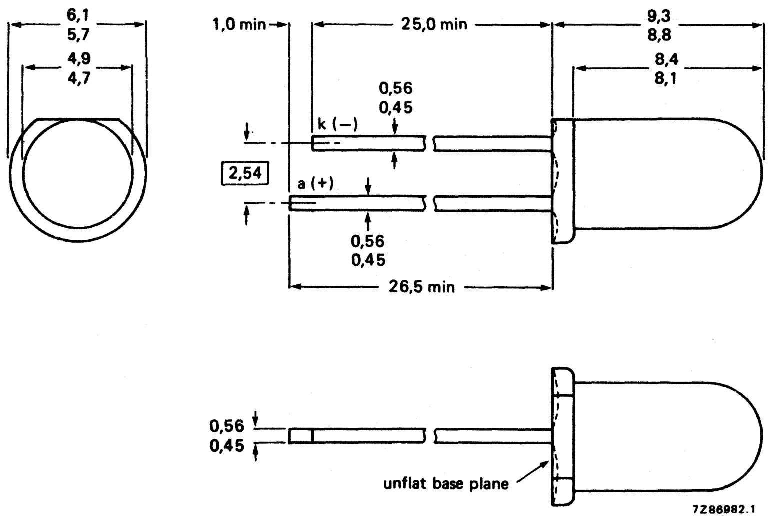


Fig. 1b SOD-63L.
PLED-Y543CL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current DC	I_F	max.	30	mA
Forward current				
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	60	mA
Total power dissipation up to T_{amb} = 65 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; t_{sld} < 7 s; > 1.5 mm from the seating plane for PLED-Y513C; > 5 mm from the plastic body for PLED-Y543CL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1	V
		V_F	max.	3.0	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{1/2}$	typ.	20	°
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	590	nm
Luminous intensity I_F = 10 mA	PLED-Y513C(Y543CL)	I_v	min.	10	mcd
	PLED-Y513C(Y543CL)-6	I_v		10 to 22	mcd
	PLED-Y513C(Y543CL)-7	I_v		16 to 35	mcd
	PLED-Y513C(Y543CL)-8	I_v	min.	30	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	15	pF

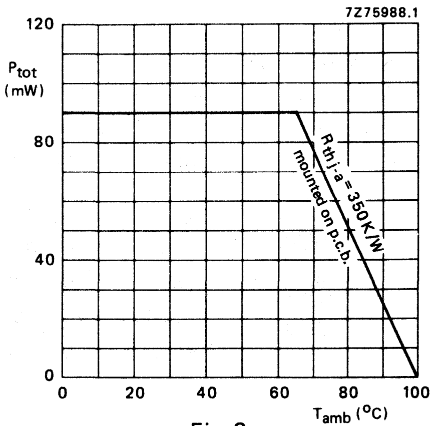


Fig. 2.

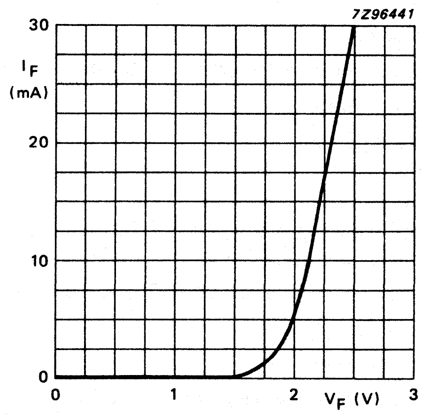


Fig. 3 T_j = 25 °C; typ. values.

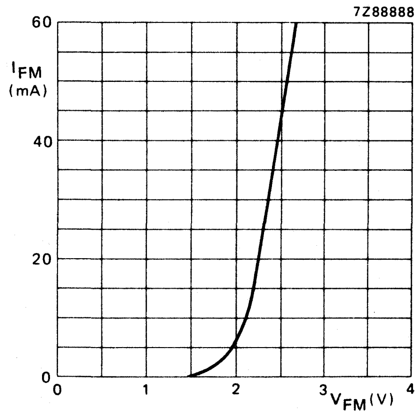


Fig. 4 t_{on} = 50 μs; δ = 0.01, T_{amb} = 25 °C; typ. values.

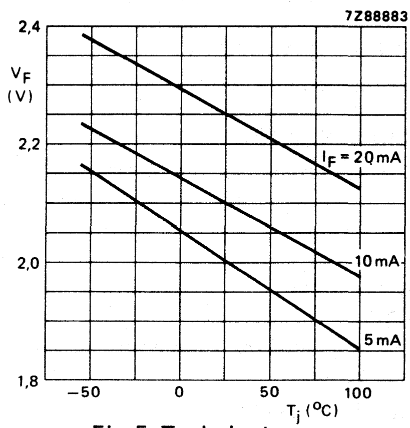


Fig. 5 Typical values.

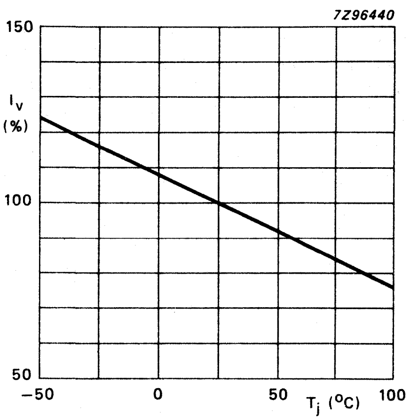


Fig. 6 Typical values; I_F = 10 mA.

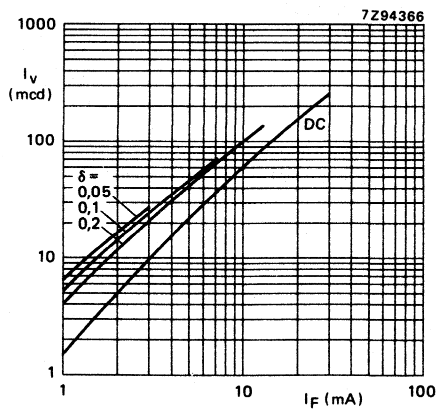


Fig. 7 t_p = 50 μs; typ. values.

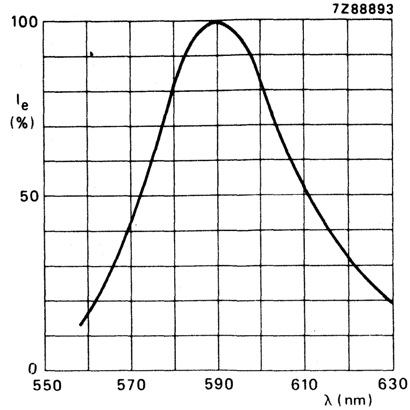


Fig. 8 Typical values.

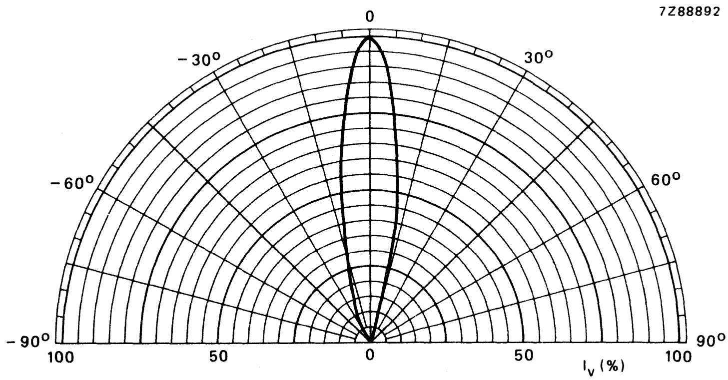


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit yellow light (GaAsP; yellow) at a typical peak wavelength of 590 nm when forward biased.

The PLED-Y513M has a SOD-90C1 outline and is encapsulated in an yellow non-diffusing resin.

The PLED-Y533ML has a SOD-90A1 outline and is encapsulated in an yellow non-diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5 V
Forward current (d.c.)		I_F	max.	30 mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90 mW
Luminous intensity I_F = 10 mA	PLED-Y513M/Y533ML	I_V	min. typ.	1,6 mcd 5,0 mcd
	PLED-Y513M/Y533ML-4	I_V		3,0 to 7,0 mcd
	PLED-Y513M/Y533ML-5	I_V		5,0 to 12 mcd
	PLED-Y513M/Y533ML-56	I_V		5,0 to 22 mcd
	PLED-Y513M/Y533ML-6	I_V		10 to 22 mcd
	PLED-Y513M/Y533ML-7	I_V		15 to 35 mcd
Wavelength at peak emission I_F = 20 mA		λp	typ.	590 nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	35 °

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-Y513M

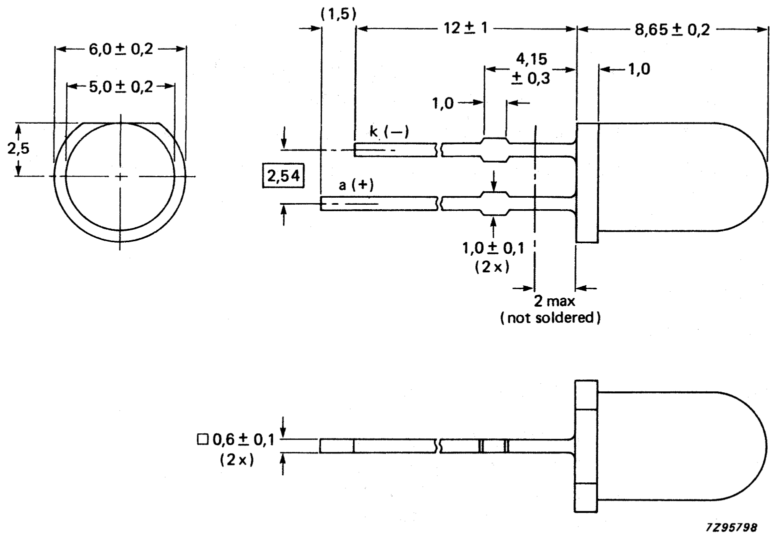
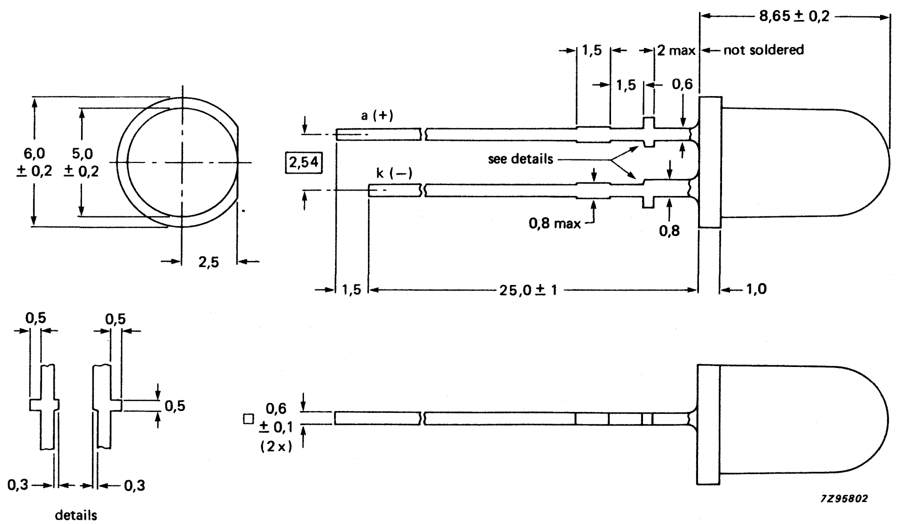


Fig. 1b SOD-90A1
PLED-Y533ML



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	30 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−25 to +85 °C
Lead soldering temperature; $t_{sld} < 7$ s; $>$ 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage				
I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current				
V_R = 5 V		I_R	max.	10 μA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	35 °
Bandwidth at half height		$\Delta\lambda$	typ.	30 nm
Wavelength at peak emission				
I_F = 10 mA		λp	typ.	590 nm
Luminous intensity				
I_F = 10 mA	PLED-Y513M/Y533ML	I_v	min.	1,6 mcd
			typ.	5,0 mcd
	PLED-Y513M/Y533ML-4	I_v		3,0 to 7,0 mcd
	PLED-Y513M/Y534ML-5	I_v		5,0 to 12 mcd
	PLED-Y513M/Y534ML-56	I_v		5,0 to 22 mcd
	PLED-Y513M/Y534ML-6	I_v		10 to 22 mcd
	PLED-Y513M/Y534ML-7	I_v		15 to 35 mcd

DEVELOPMENT DATA

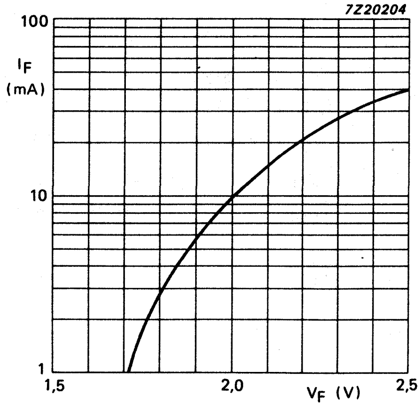


Fig. 2 $I_F = f(V_F)$ typical values.

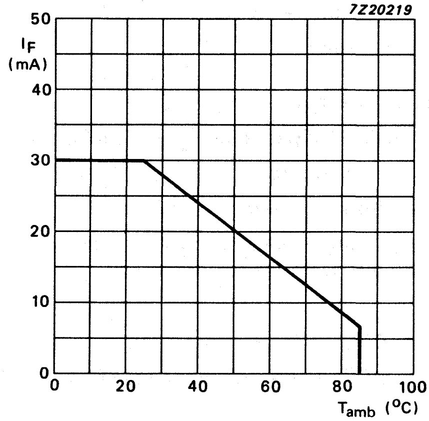


Fig. 3 $I_F = f(T_{amb})$ typical values.

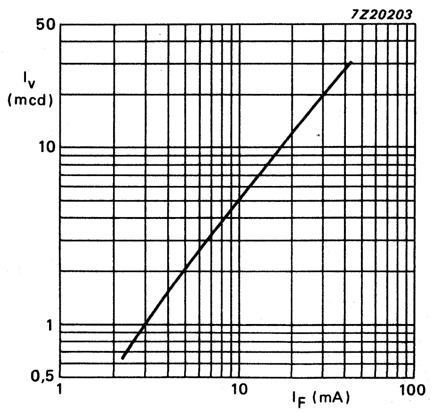


Fig. 4 $I_V = f(I_F)$ typical values.

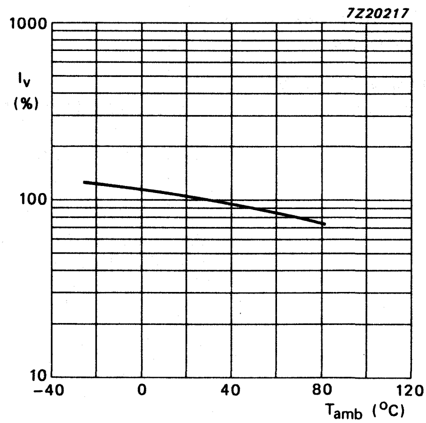


Fig. 5 $I_V(\%) = f(T_{amb})$ typical values.

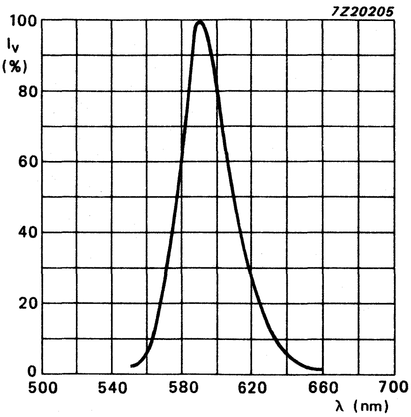


Fig. 6 Spectral response typical values.

DEVELOPMENT DATA

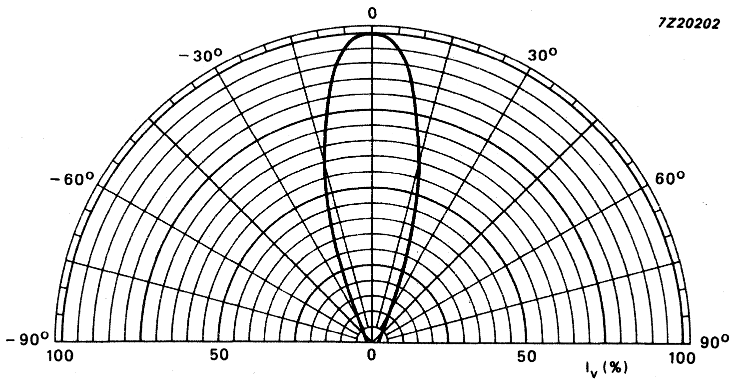


Fig. 7 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-Y514B and PLED-Y544CL have a SOD-63 outline and are encapsulated in a yellow diffusing resin.

The PLED-Y544CL is the long-lead version of the PLED-Y514B and has no seating plane but is in all other respects equal to the PLED-Y514B.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity (on-axis)					
I_F = 10 mA	PLED-Y514B(Y544CL)	I_V	min.	0.7	mcd
	PLED-Y514B(Y544CL)-3	I_V		1.6 to 3.5	mcd
	PLED-Y514B(Y544CL)-4	I_V		3.0 to 7.0	mcd
	PLED-Y514B(Y544CL)-5	I_V		5.0 to 12	mcd
Wavelength at peak emission		λ_p	typ.	590	nm
Beamwidth between half-intensity directions		$\theta_{1/2}$	typ.	70	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-63A1.
PLED-Y514B

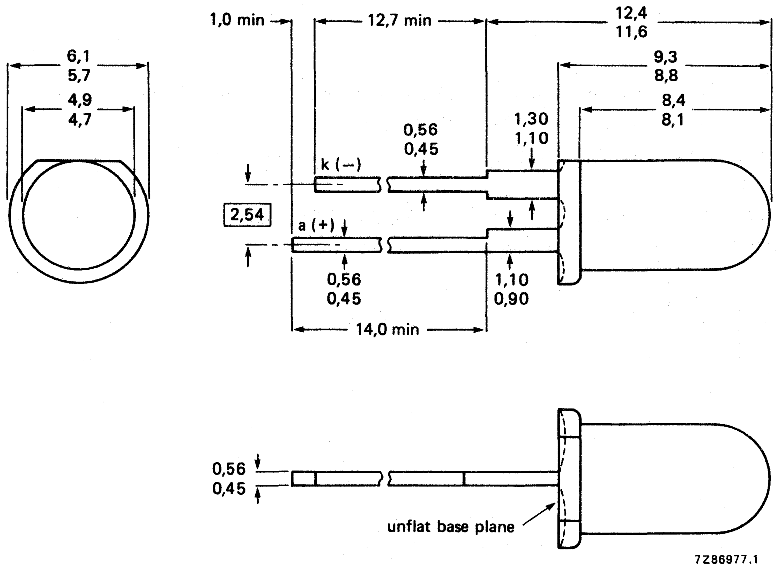
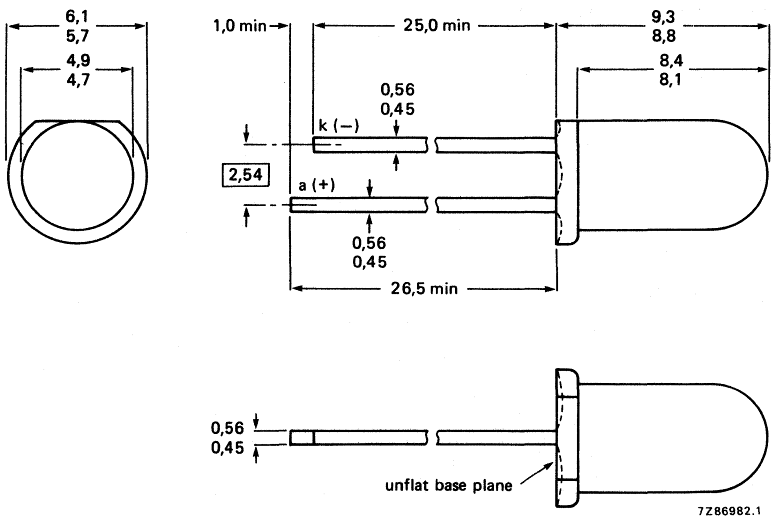


Fig. 1b SOD-63L.
PLED-Y544CL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	30	mA
Forward current				
peak value; $t_p = 1\ \mu s$; f = 300 Hz	I_{FRM}	max.	1	A
peak value; $t_{on} = 1$ ms; $\delta = 0.33$	I_{FRM}	max.	60	mA
Total power dissipation up to $T_{amb} = 65\ ^oC$	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		–55 to +100	^oC
Junction temperature	T_j	max.	100	^oC
Lead soldering temperature at $t_{sld} < 7$ s $>$ 1.5 mm from the seating plane for PLED-Y514B $>$ 5 mm from the plastic body for PLED-Y544CL	T_{sld}	max.	260	^oC

THERMAL RESISTANCE

From junction to ambient mounted on a printed board	$R_{th\ j\text{-}a}$	=	350	K/W

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Forward voltage					
$I_F = 10$ mA		V_F	typ.	2.1	V
			max.	3	V
Reverse current					
$V_R = 5$ V		I_R	max.	100	μA
Diode capacitance					
$V_R = 0$; f = 1 MHz		C_d	typ.	15	pF
Luminous intensity (on-axis)					
$I_F = 10$ mA	PLED-Y514B(Y544CL)	I_v	min.	0.7	mcd
	PLED-Y514B(Y544CL)-3	I_v		1.6 to 3.5	mcd
	PLED-Y514B(Y544CL)-4	I_v		3.0 to 7.0	mcd
	PLED-Y514B(Y544CL)-5	I_v		5.0 to 12	mcd
Wavelength at peak emission		λ_p	typ.	590	nm
Bandwidth at half height		$\theta_{1/2}$	typ.	40	nm
Beamwidth between half-intensity directions		$\Delta\lambda$	typ.	70	^{o}

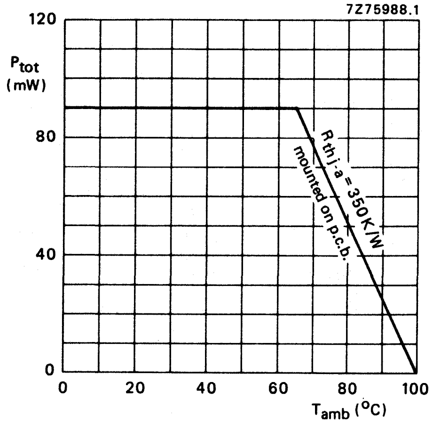


Fig. 2.

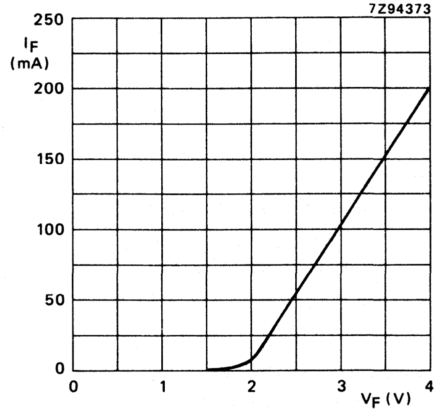


Fig. 3 T_{amb} = 25 °C; typ. values.

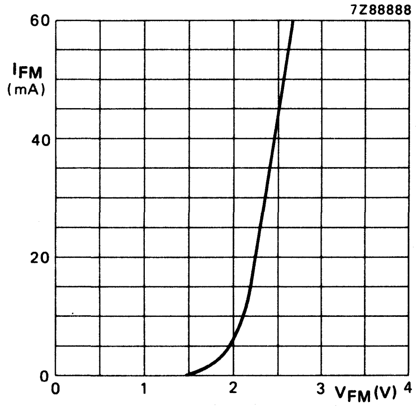


Fig. 4 t_{on} = 1 ms; δ = 0.33;
T_{amb} = 25 °C; typ. values.

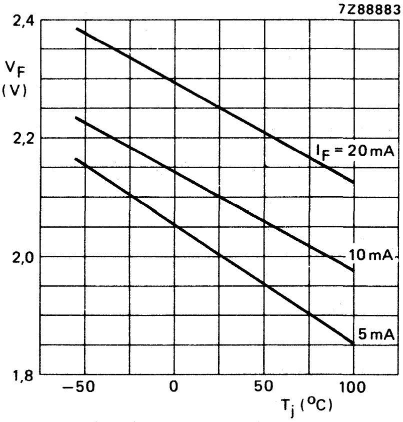


Fig. 5 Typical values.

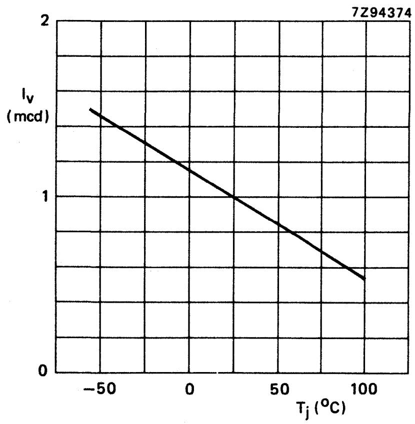


Fig. 6 Typical values.

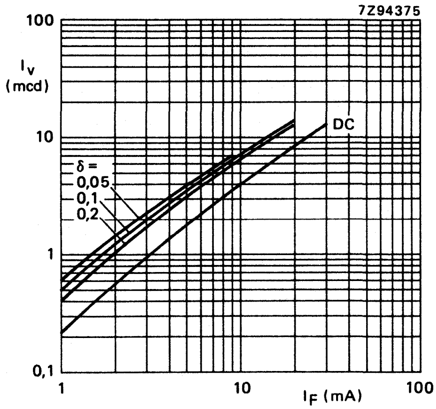


Fig. 7 t_p = 50 μs.

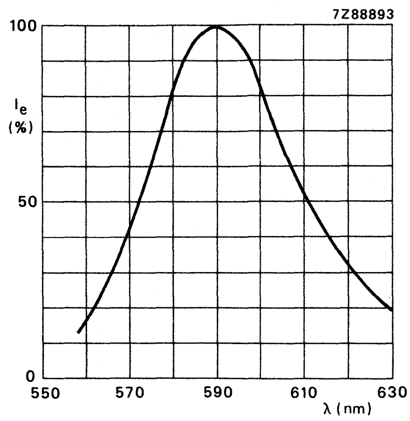


Fig. 8 Typical values.

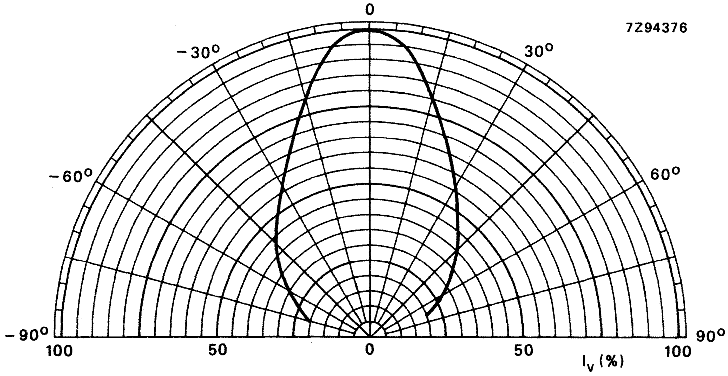


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Circular light emitting diodes with a diameter of 5 mm which emit yellow light (GaAsP; yellow) at a typical peak wavelength of 590 nm when forward biased.

The PLED-Y514M has a SOD-90C1 outline and is encapsulated in an yellow diffusing resin.

The PLED-Y534ML has a SOD-90A1 outline and is encapsulated in an yellow diffusing resin.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (d.c.)		I_F	max.	30	mA
Total power dissipation at T_{amb} = 25 °C		P_{tot}	max.	90	mW
Luminous intensity					
I_F = 10 mA	PLED-Y514M/Y534ML	I_v	min.	1,6	mcd
			typ.	5,0	mcd
	PLED-Y514M/Y534ML-4	I_v		3,0 to 7,0	mcd
	PLED-Y514M/Y534ML-5	I_v		5,0 to 12	mcd
	PLED-Y514M/Y534ML-56	I_v		5,0 to 22	mcd
	PLED-Y514M/Y534ML-6	I_v		10 to 22	mcd
Wavelength at peak emission					
I_F = 20 mA		λp	typ.	590	nm
Beamwidth at half-intensity directions		$\theta\frac{1}{2}$	typ.	40	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-90C1
PLED-Y514M

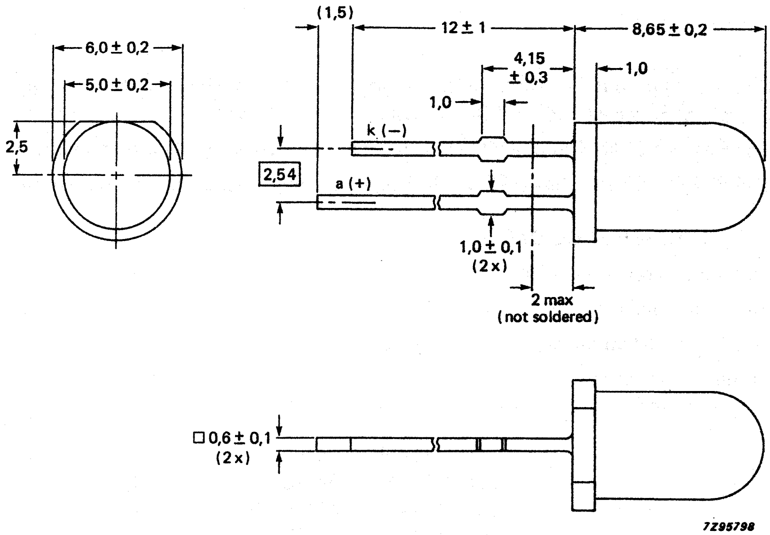
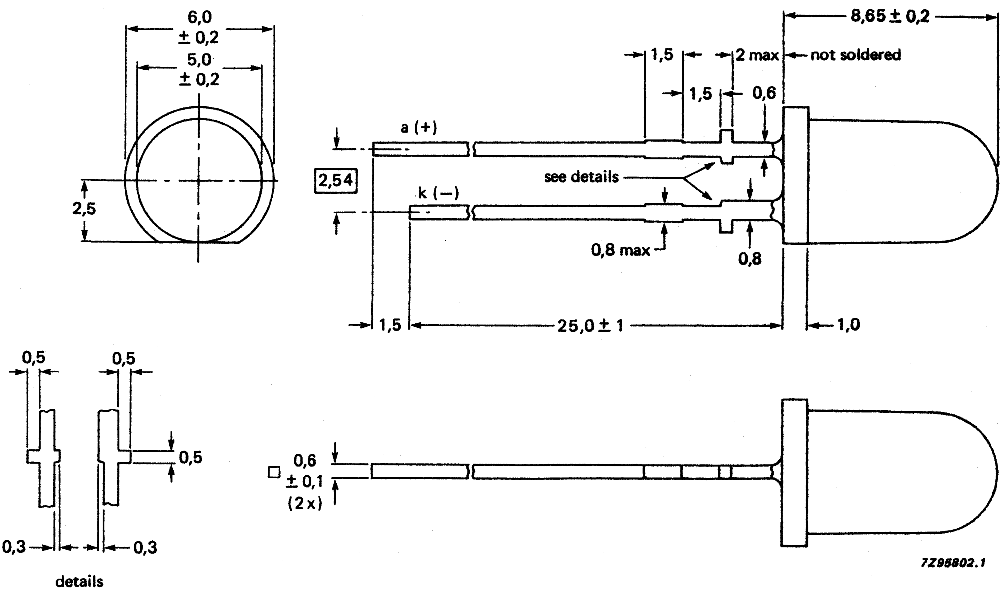


Fig. 1b SOD-90A1
PLED-Y534ML



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
d.c.	I_F	max.	30 mA
peak value; t_{on} = 1 ms; δ = 0,1	I_{FRM}	max.	150 mA
Total power dissipation at T_{amb} = 25 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−30 to +100 °C
Operating ambient temperature	T_{opr}		−25 to +85 °C
Lead soldering temperature; t_{sld} < 7 s; > 1,5 mm from the seating plane	T_{sld}	max.	260 °C

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

Forward voltage I_F = 20 mA		V_F	typ.	2,2 V
			max.	2,8 V
Reverse current V_R = 5 V		I_R	max.	10 µA
Beamwidth at half-intensity directions		$\theta_{\frac{1}{2}}$	typ.	40 °
Bandwidth at half height		$\Delta\lambda$	typ.	30 nm
Wavelength at peak emission I_F = 10 mA		λp	typ.	590 nm
Luminous intensity I_F = 10 mA	PLED-Y514M	I_v	min.	1,6 mcd
			typ.	5,0 mcd
	PLED-Y534ML	I_v	min.	mcd
			typ.	mcd
	PLED-Y514M/Y534ML-4	I_v		3,0 to 7,0 mcd
	PLED-Y514M/Y534ML-5	I_v		5,0 to 12 mcd
	PLED-Y514M/Y534ML-56	I_v		5,0 to 22 mcd
	PLED-Y514M/Y534ML-6	I_v		10 to 22 mcd

DEVELOPMENT DATA

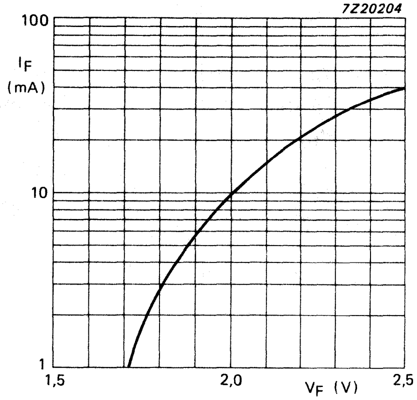


Fig. 2 $I_F = f(V_F)$.

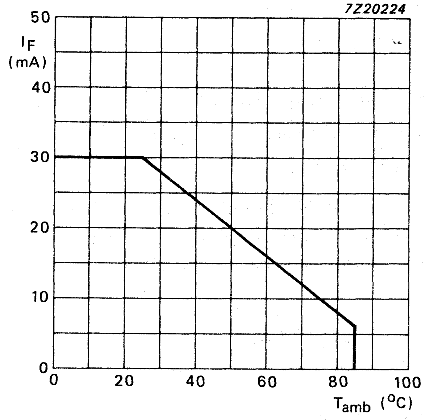


Fig. 3 $I_F = f(T_{amb})$.

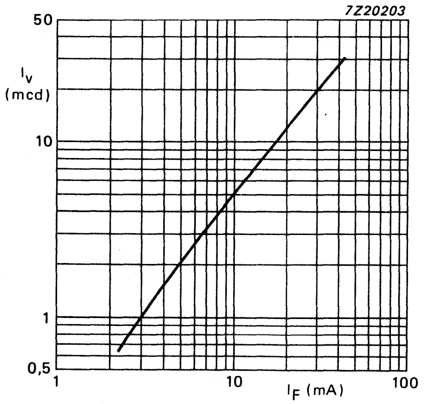


Fig. 4 $I_V = f(I_F)$.

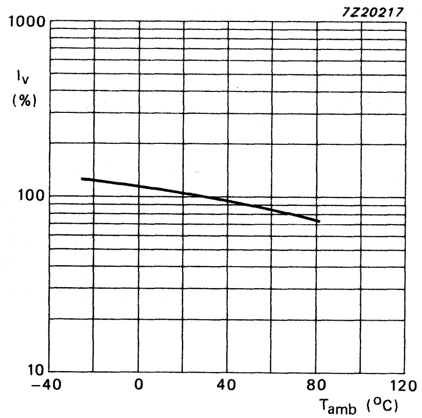


Fig. 5 $I_V(\%) = f(T_{amb})$.

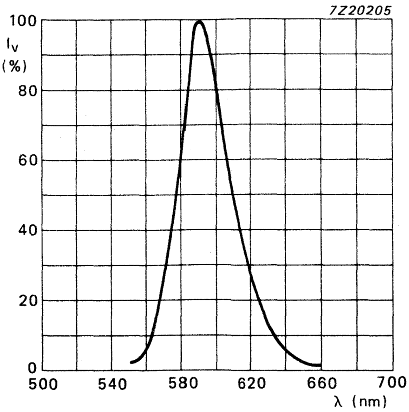


Fig. 6 Spectral response.

DEVELOPMENT DATA

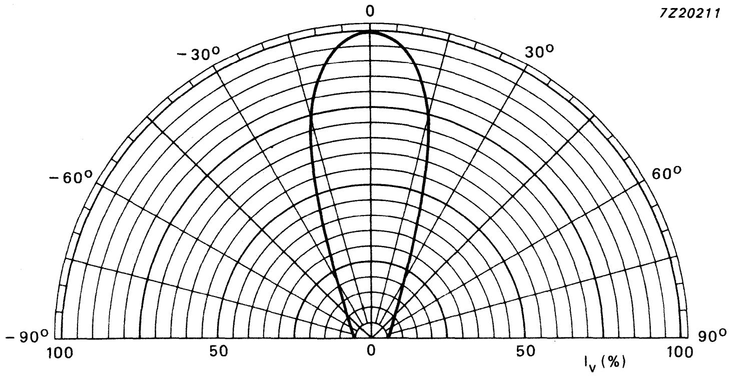


Fig. 7 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode which emits yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-Y544KL has a flangeless SOD-85 outline and is encapsulated in a yellow diffusing resin.

Together with the PLED-H544KL and the PLED-G544KL, the PLED-Y544KL forms one family and is available only in the long lead (L) version.

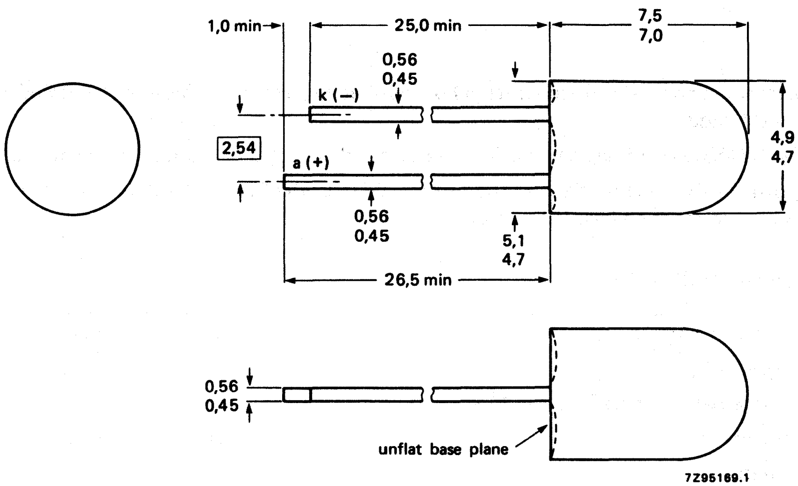
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-Y544KL	I_v	min.	0.7	mcd
	PLED-Y544KL-3	I_v		1.6 to 3.5	mcd
	PLED-Y544KL-4	I_v		3.0 to 7.0	mcd
	PLED-Y544KL-5	I_v	min.	5.0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Beamwidth at half-intensity directions		$\theta_{1/2}$	typ.	70	°

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-85AL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	30	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_p < 1 ms; δ = 0.33	I_{FRM}	max.	60	mA
Total power dissipation up to T_{amb} = 65 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; t_{sld} < 7 s; > 5 mm from the plastic body	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\,j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage					
I_F = 10 mA		V_F	typ.	2.1	V
			max.	2.6	V
Reverse current					
V_R = 5 V		I_R	max.	100	μA
Beamwidth at half-intensity directions					
I_F = 10 mA		$\theta_{½}$	typ.	70	°
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Luminous intensity					
I_F = 10 mA	PLED-Y544KL	I_v	min.	0.7	mcd
	PLED-Y544KL-3	I_v		1.6 to 3.5	mcd
	PLED-Y544KL-4	I_v		3.0 to 7.0	mcd
	PLED-Y544KL-5	I_v	min.	5.0	mcd
Diode capacitance					
V_R = 0; f = 1 MHz		C_d	typ.	15	pF

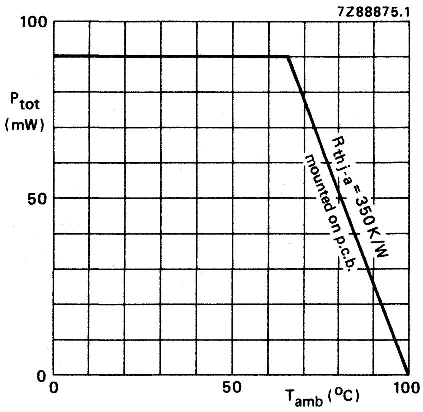


Fig. 2.

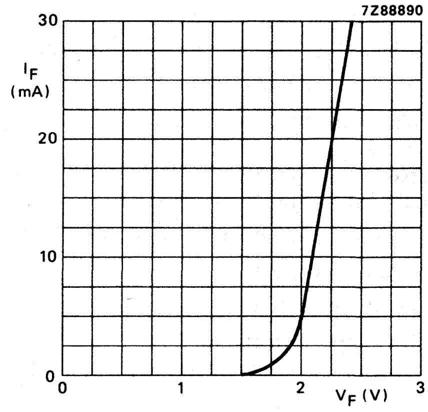


Fig. 3 T_{amb} = 25 °C; typ. values.

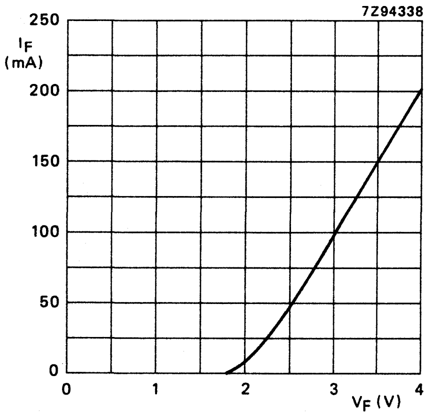


Fig. 4 t_{on} = 50 μs; δ = 0.33; T_{amb} = 25 °C; typ. values.

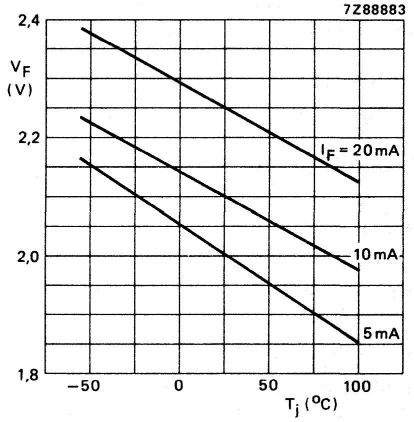


Fig. 5 Typical values.

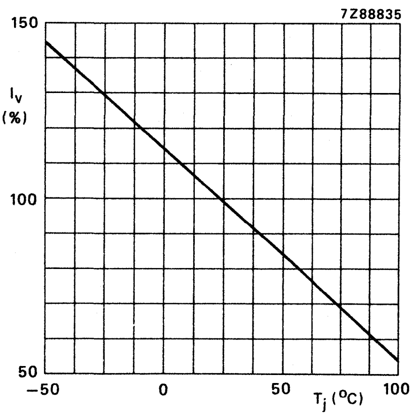


Fig. 6 Typical values.

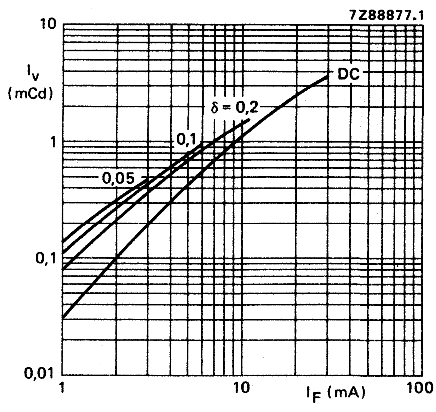


Fig. 7 t_p = 50 μs; typ. values.

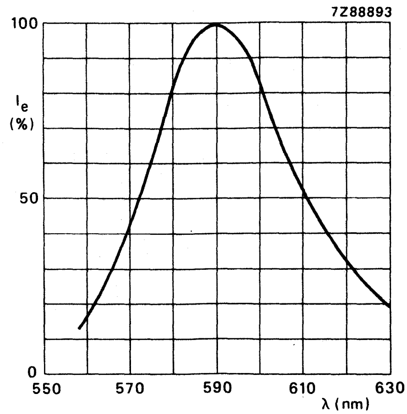


Fig. 8 Typical values.

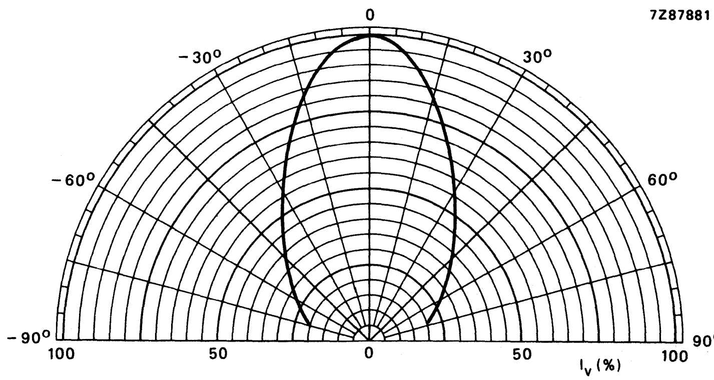


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Circular light emitting diode which emits yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-Y544LL has a flangeless SOD-85 outline and is encapsulated in a yellow diffusing resin.

Together with the PLED-H544LL and the PLED-G544LL, the PLED-Y544LL forms one family and is available only in the long lead (L) version.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-Y544LL	I_v	min.	1.0	mcd
	PLED-Y544LL-3	I_v		1.6 to 3.5	mcd
	PLED-Y544LL-4	I_v		3.0 to 7.0	mcd
	PLED-Y544LL-5	I_v	min.	5.0	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Beamwidth at half-intensity directions		$\theta_{½}$	typ.	70	°

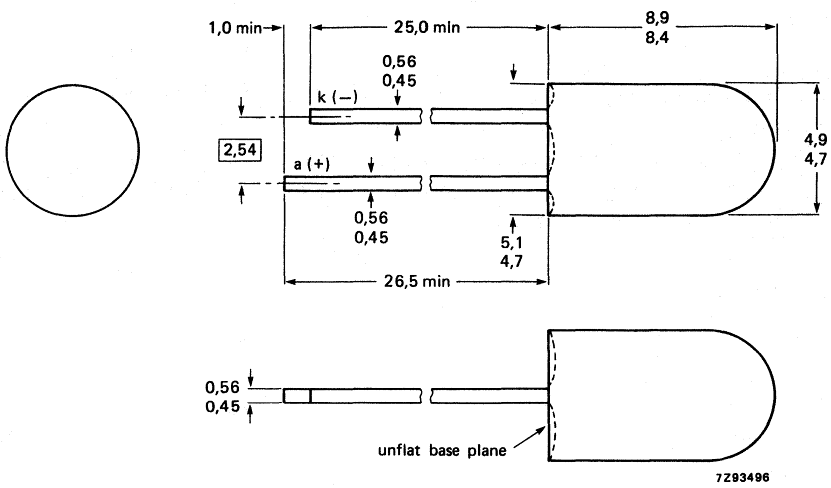
MECHANICAL DATA

SOD-85BL (see Fig. 1).

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-85BL.



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5 V
Forward current			
DC	I_F	max.	30 mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1 A
peak value; t_p = 1 ms; δ = 0.33	I_{FRM}	max.	60 mA
Total power dissipation up to T_{amb} = 65 °C	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−55 to +100 °C
Junction temperature	T_j	max.	100 °C
Lead soldering temperature; t_{sld} < 7 s; > 5 mm from the plastic body	T_{sld}	max.	260 °C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage				
I_F = 10 mA		V_F	typ.	2.1 V
			max.	3.0 V
Reverse current				
V_R = 5 V		I_R	max.	100 μA
Beamwidth at half-intensity directions				
I_F = 10 mA		$\theta_{1/2}$	typ.	70 °
Bandwidth at half height		$\Delta\lambda$	typ.	40 nm
Wavelength at peak emission				
I_F = 10 mA		λ_p	typ.	590 nm
Luminous intensity				
I_F = 10 mA	PLED-Y544LL	I_v	min.	0.7 mcd
	PLED-Y544LL-3	I_v		1.6 to 3.5 mcd
	PLED-Y544LL-4	I_v		3.0 to 7.0 mcd
	PLED-Y544LL-5	I_v	min.	5.0 mcd
Diode capacitance				
V_R = 0; f = 1 MHz		C_d	typ.	15 pF

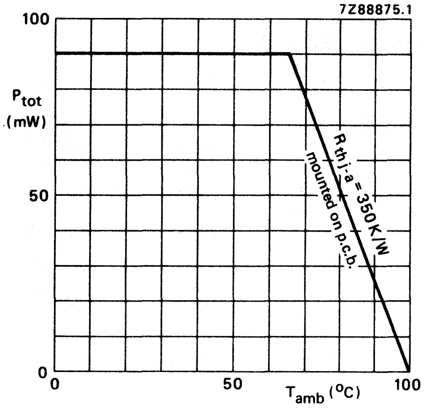


Fig. 2.

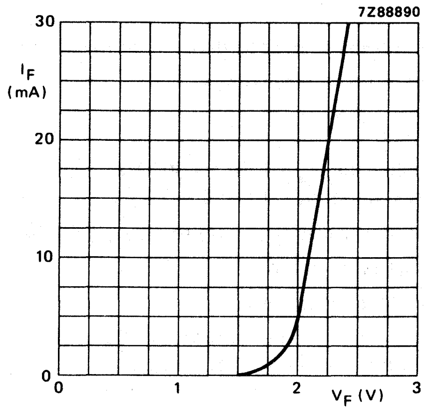


Fig. 3 T_{amb} = 25 °C; typ. values.

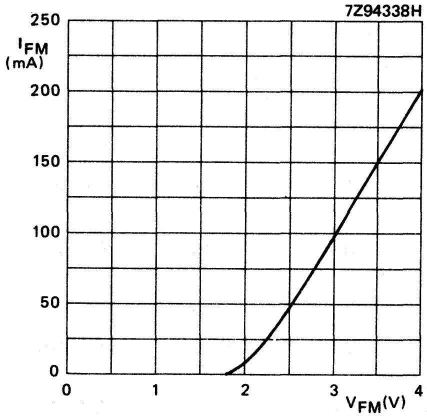


Fig. 4 t_{on} = 50 μs; δ = 0.01;
T_{amb} = 25 °C; typ. values.

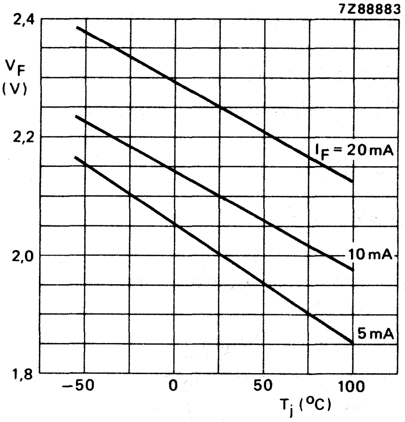


Fig. 5 Typical values.

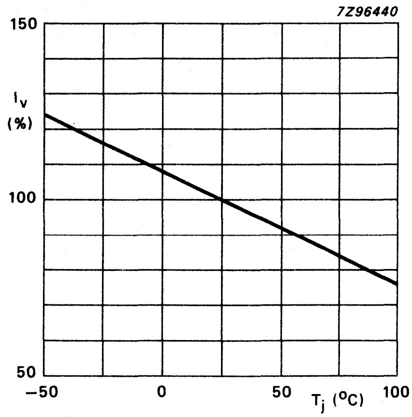


Fig. 6 Typical values; I_F = 10 mA.

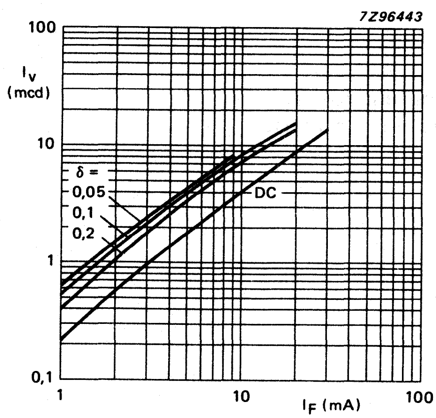


Fig. 7 t_p = 50 μs; typ. values.

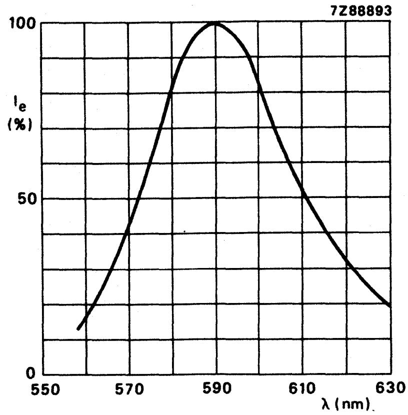


Fig. 8 Typical values.

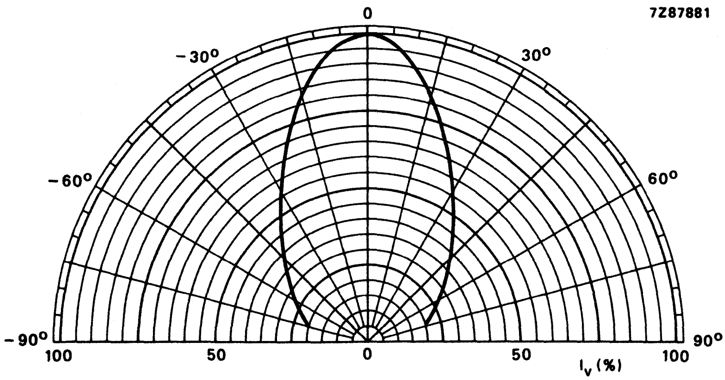


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diodes of 5 mm x 1 mm which emit yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-YR14E and PLED-YR44EL have a SOD-75 outline and are encapsulated in a yellow diffusing resin. These LEDs when stacked in an array (in combination with other SOD-75 LEDs) can be used, for example, as level indicators.

The PLED-YR14E is equal to the PLED-YR44EL but has long leads and no seating plane.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-YR14E(YR44EL)	I_V	min.	0.7	mcd
	PLED-YR14E(YR44EL)-2	I_V		1.0 to 2.2	mcd
	PLED-YR14E(YR44EL)-3	I_V	min.	1.6	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Beamwidth between half-intensity directions in the plane of the leads		$\theta_{½}$	typ.	110	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-75B1.
PLED-YR14E

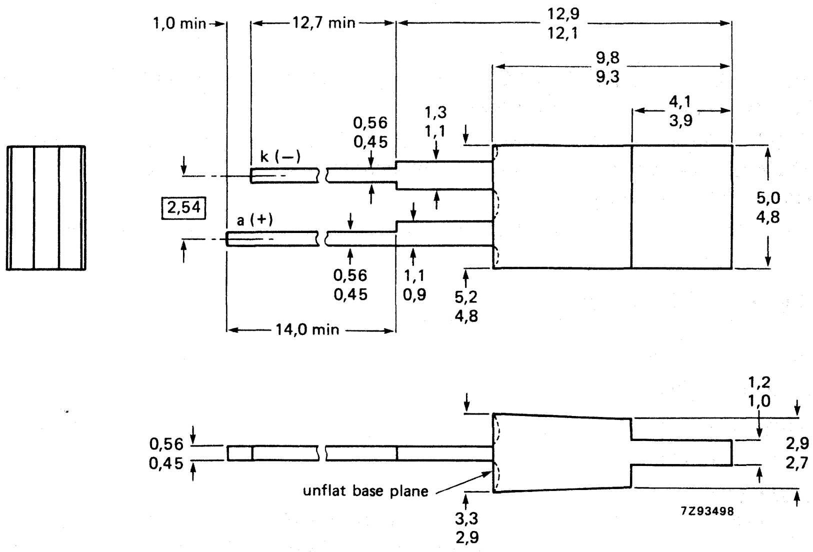
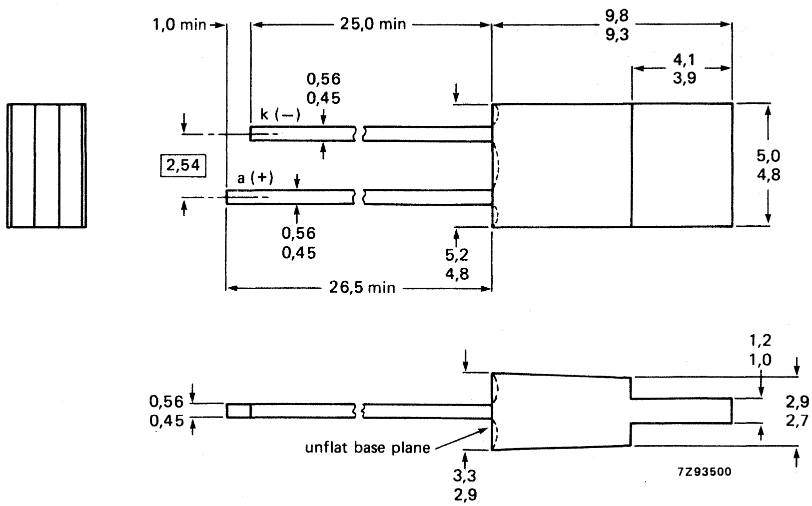


Fig. 1b SOD-75BL.
PLED-YR44EL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	30	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	60	mA
Total power dissipation up to T_{amb} = 65 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature at t_{sld} < 7 s > 1.5 mm from the seating plane for PLED-YR14E > 5 mm from the plastic body for PLED-YR44EL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1	V
			max.	3.0	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions in the plane of the leads; I_F = 10 mA		$\theta_{½}$	typ.	110	°
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	590	nm
Luminous intensity I_F = 10 mA	PLED-YR14E(YR44EL)	I_v	min.	0.7	mcd
	PLED-YR14E(YR44EL)-2	I_v		1.0 to 2.2	mcd
	PLED-YR14E(YR44EL)-3	I_v	min.	1.6	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	15	pF

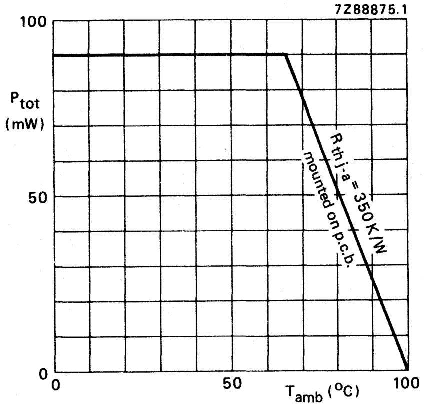


Fig. 2.

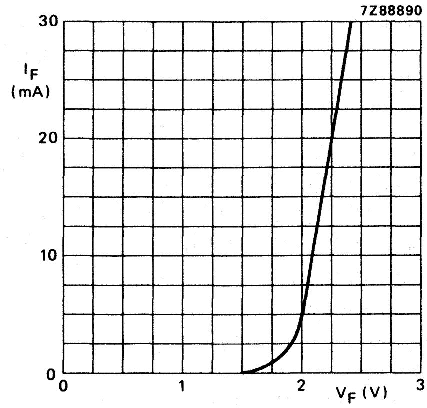


Fig. 3 T_{amb} = 25 °C; typ. values.

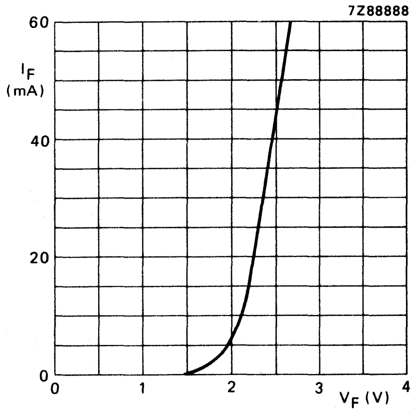


Fig. 4 t_{on} = 50 μs; δ = 0.01;
T_{amb} = 25 °C; typ. values.

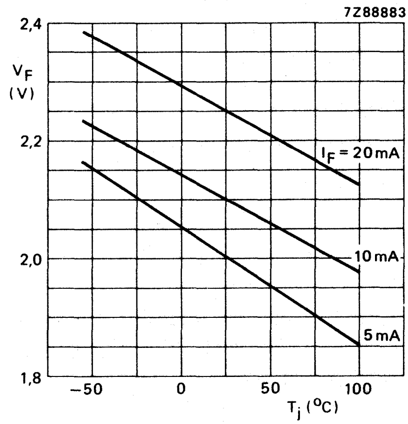


Fig. 5 Typical values.

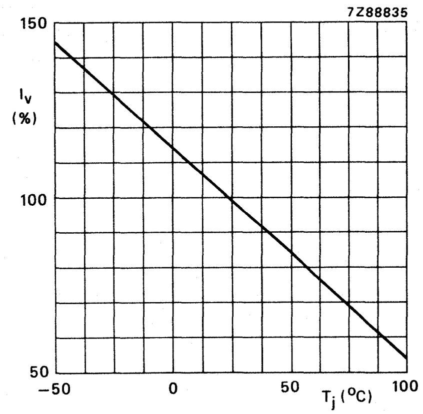


Fig. 6 I_F = 10 mA; typ. values.

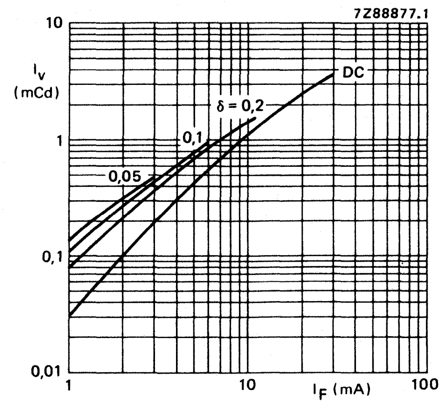


Fig. 7 t_p = 50 μs; typical values.

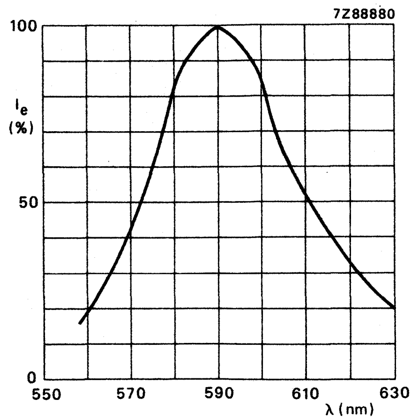


Fig. 8 Typical values.

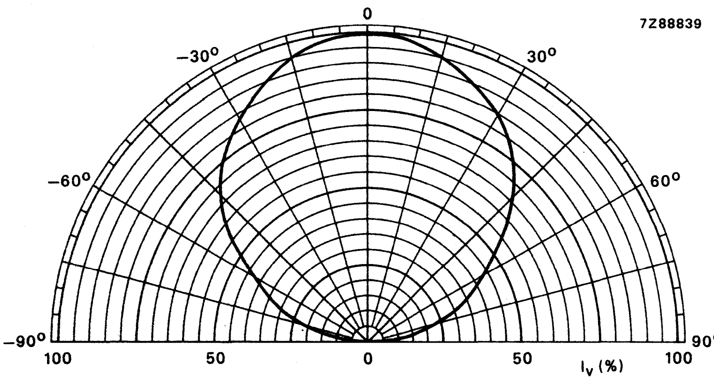


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diode of 5 mm x 2.5 mm which emits yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased.

The PLED-YR14F has a SOD-76 envelope and is encapsulated in a yellow diffusing resin.

The PLED-YR44FL is similar to the PLED-YR14F but has long leads and no seating plane.

When stacked as an array these SOD-76 LEDs can be used, for example, as level indicators.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-YR14F(YR44FL)	I_v	min.	0.7	mcd
	PLED-YR14F(YR44FL)-2	I_v		1.0 to 2.2	mcd
	PLED-YR14F(YR44FL)-3	I_v		1.6 to 3.5	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Beamwidth between half-intensity directions					
I_F = 10 mA; in the plane of the leads		$\theta_{½}$	typ.	100	°

MECHANICAL DATA

Dimensions in mm

Fig. 1a SOD-76A.1.
PLED-YR14F

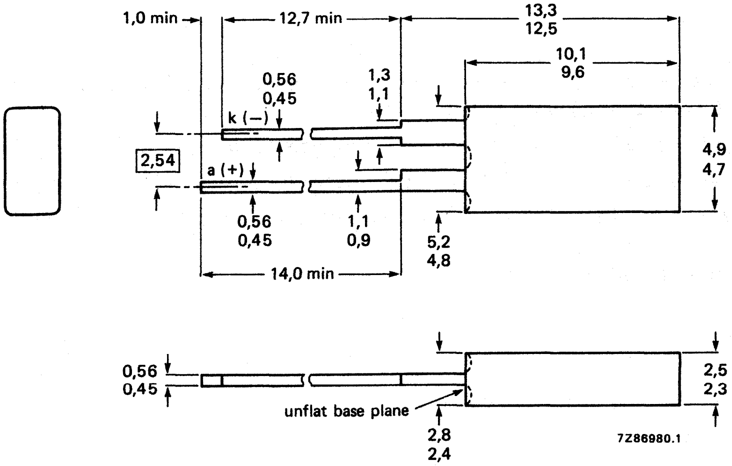
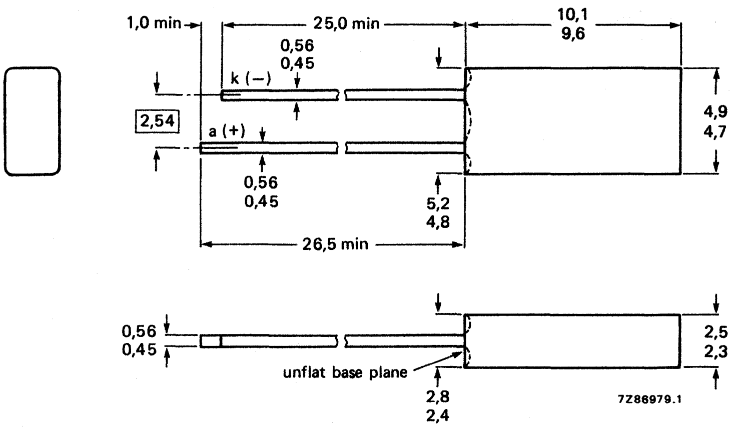


Fig. 1b SOD-76L.
PLED-YR44FL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Continuous reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	30	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value, t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	60	mA
Total power dissipation up to T_{amb} = 65 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature; $t_{sld} < 7$ s > 1.5 mm from the seating plane for PLED-YR14F > 5 mm from the plastic body for PLED-YR44FL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1	V
		V_F	max.	3.0	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions I_F = 10 mA		$\theta_{½}$	typ.	100	°
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	590	nm
Luminous intensity I_F = 10 mA	PLED-YR14F(YR44FL)	I_v	min.	0.7	mcd
	PLED-YR14F(YR44FL)-2	I_v		1.0 to 2.2	mcd
	PLED-YR14F(YR44FL)-3	I_v		1.6 to 3.5	mcd
Diode capacitance V_R = 0; f = 1 MHz		C_d	typ.	15	pF

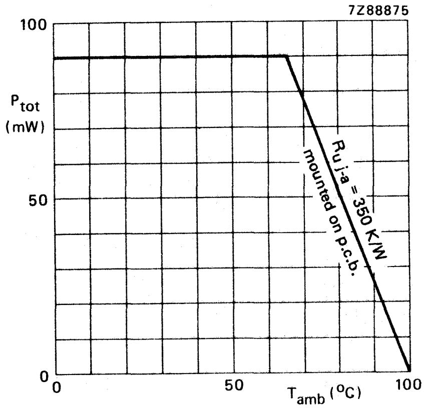


Fig. 2.

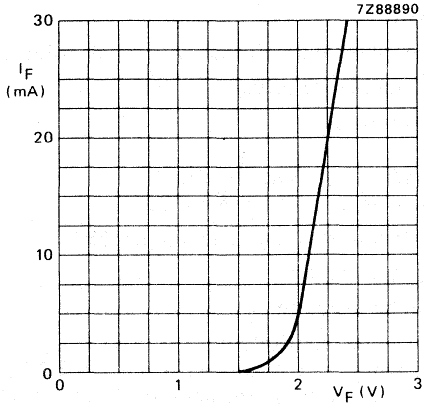


Fig. 3 T_j = 25 °C; typ. values.

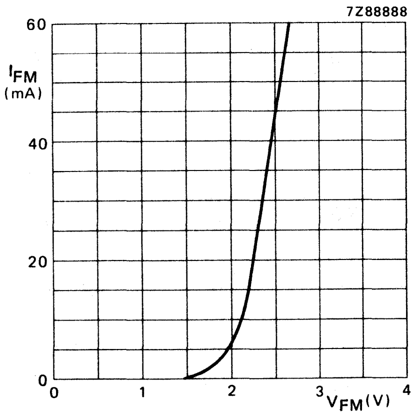


Fig. 4 t_{on} = 50 μs; δ = 0.01;
T_j = 25 °C; typ. values.

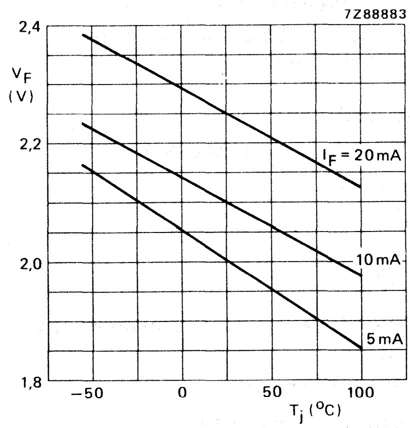


Fig. 5 Typical values.

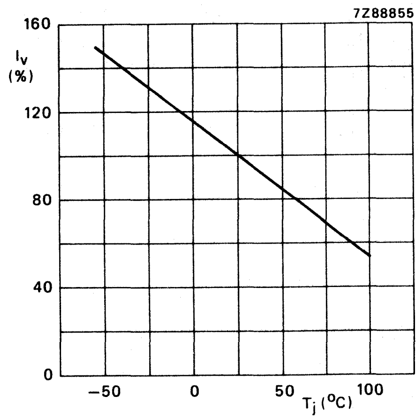


Fig. 6 I_F = 10 mA; typ. values.

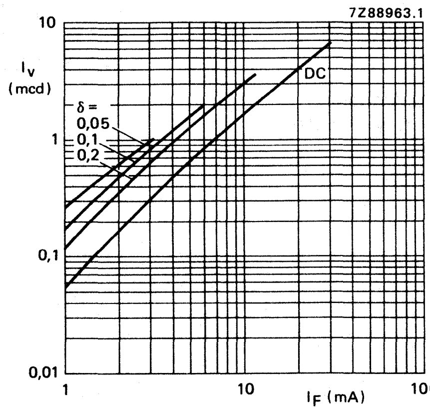


Fig. 7 t_p = 50 μs; typical values.

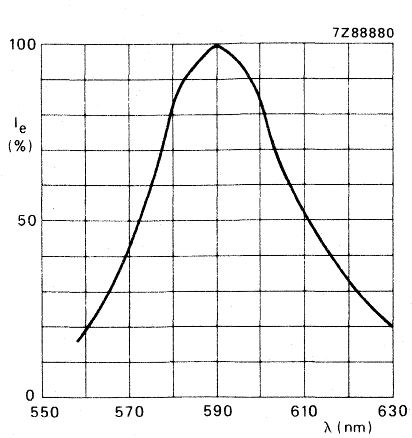


Fig. 8 Typical values.

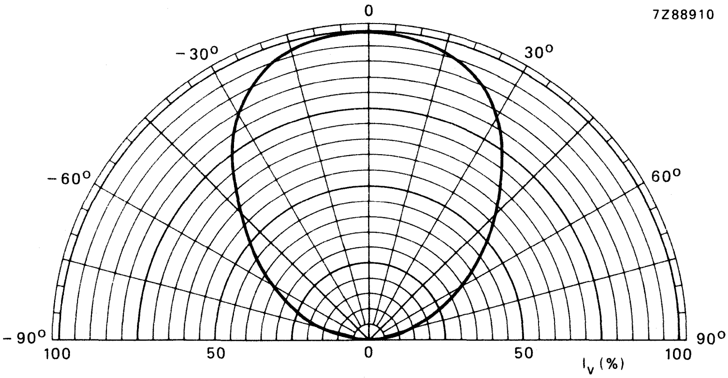


Fig. 9 Typical values.

LIGHT EMITTING DIODES

Rectangular light emitting diodes of 5 mm x 3 mm which emit yellow light at a typical wavelength of 590 nm (GaPAs) when forward biased. The PLED-YR14G and PLED-YR44GL have a SOD-77 envelope and are encapsulated in a yellow diffusing resin.

The PLED-YR44GL is the long lead version (26 mm) and has no seating plane but is in all other respects equal to the PLED-YR14G.

When stacked in an array these LEDs can be used as level indicators etc.

QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 °C		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	°C
Luminous intensity					
I_F = 10 mA	PLED-YR14G(YR44GL)	I_v	min.	0.7	mcd
	PLED-YR14G(YR44GL)-2	I_v		1.0 to 2.2	mcd
	PLED-YR14G(YR44GL)-3	I_v		1.6 to 3.5	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Beamwidth between half-intensity directions					
in the plane of the leads; I_F = 10 mA		$\theta_{½}$	typ.	100	°

MECHANICAL DATA

Dimensions in mm

Fig 1a SOD-77A1.
PLED-YR14G

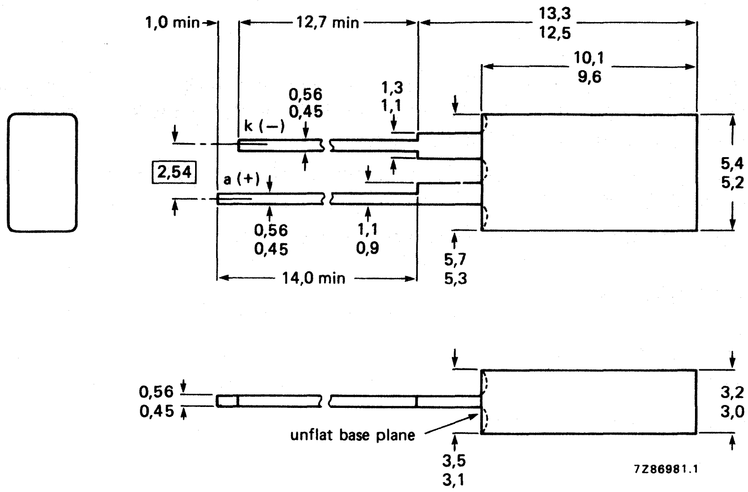
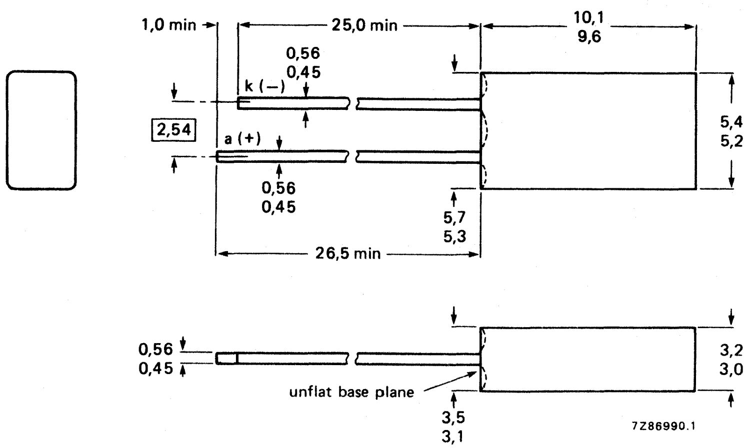


Fig. 1b SOD-77L.
PLED-YR44GL



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5	V
Forward current				
DC	I_F	max.	30	mA
peak value; t_p = 1 μs; f = 300 Hz	I_{FRM}	max.	1	A
peak value; t_{on} = 1 ms; δ = 0.33	I_{FRM}	max.	60	mA
Total power dissipation up to T_{amb} = 65 °C	P_{tot}	max.	90	mW
Storage temperature	T_{stg}		−55 to +100	°C
Junction temperature	T_j	max.	100	°C
Lead soldering temperature at t_{sld} < 7 s > 1.5 mm from the seating plane for PLED-YR14G > 5 mm from the plastic body for PLED-YR44GL	T_{sld}	max.	260	°C

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	typ.	2.1	V
			max.	3.0	V
Reverse current V_R = 5 V		I_R	max.	100	μA
Beamwidth between half-intensity directions in the plane of the leads; I_F = 10 mA		$\theta_{1/2}$	typ.	100	°
Bandwidth at half height		$\Delta\lambda$	typ.	40	nm
Wavelength at peak emission I_F = 10 mA		λ_p	typ.	590	nm
Luminous intensity I_F = 10 mA	PLED-YR14G(YR44GL)	I_v	min.	0.7	mcd
	PLED-YR14G(YR44GL)-2	I_v		1.0 to 2.2	mcd
	PLED-YR14G(YR44GL)-3	I_v		1.6 to 3.5	mcd
Diode capacitance V_R = 0, f = 1 MHz		C_d	typ.	15	pF

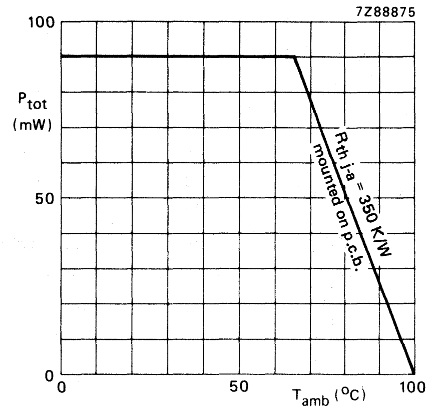


Fig. 2.

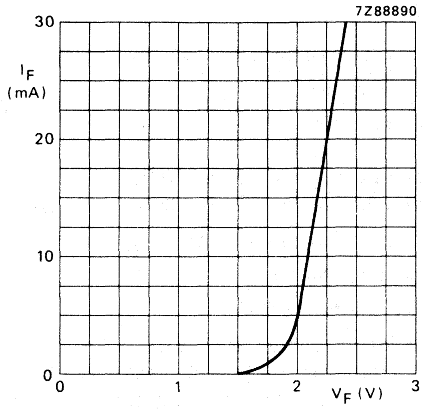


Fig. 3 T_{amb} = 25 °C; typ. values.

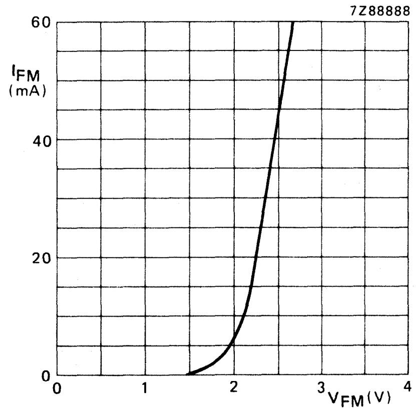


Fig. 4 t_{on} = 50 μs; δ = 0.01;
T_{amb} = 25 °C; typ. values.

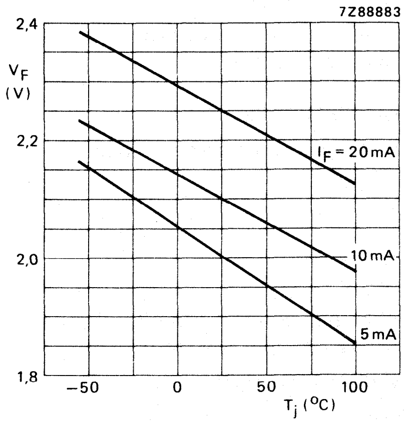


Fig. 5 Typical values.

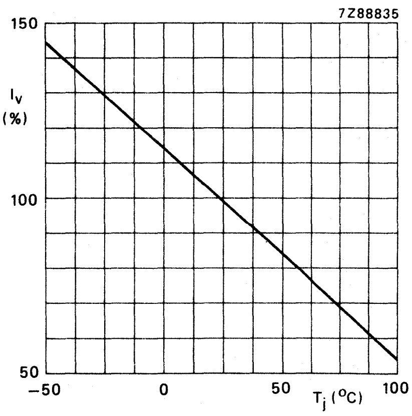


Fig. 6 I_F = 10 mA; typ. values.

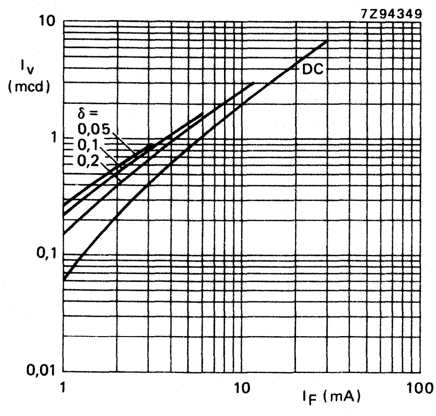


Fig. 7 t_p = 50 μs; typical values.

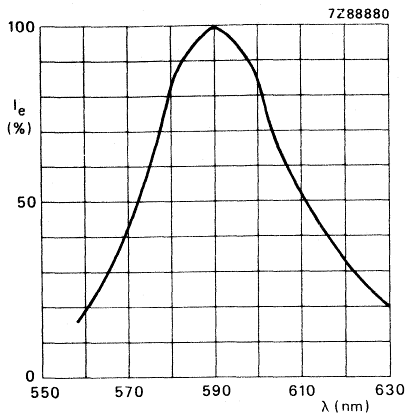


Fig. 8 Typical values.

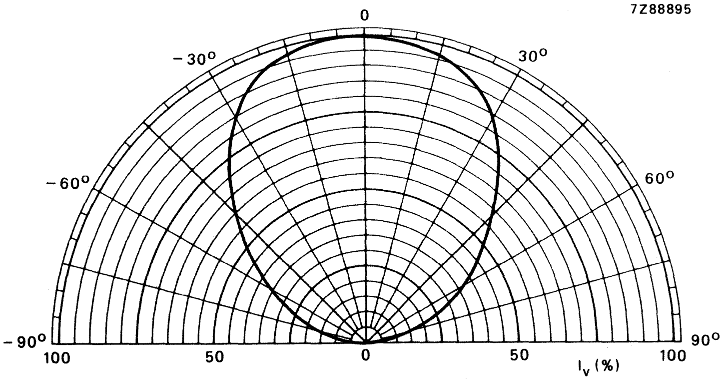


Fig. 9 Typical values.

LIGHT EMITTING DIODE

Rectangular light emitting diode of 5 mm x 5 mm which emits yellow light at a typical peak wavelength of 590 nm (GaPAs) when forward biased. The PLED-YR44DL has a SOD-74L envelope and is encapsulated in a yellow diffusing resin.

The PLED-YR44DL is suitable for surface illumination, for example, information boards, score boards, moving advertisements and electronic game applications.

The PLED-YR44DL has long leads and has no seating plane.

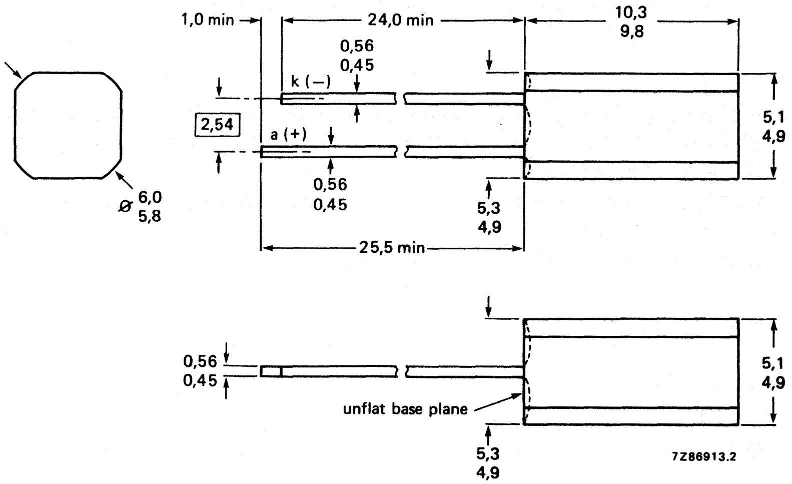
QUICK REFERENCE DATA

Continuous reverse voltage		V_R	max.	5	V
Forward current (DC)		I_F	max.	30	mA
Total power dissipation up to T_{amb} = 65 ^oC		P_{tot}	max.	90	mW
Junction temperature		T_j	max.	100	^oC
Luminous intensity					
I_F = 10 mA	PLED-YR44DL	I_v	min.	0.7	mcd
	PLED-YR44DL-2	I_v		1.0 to 2.2	mcd
	PLED-YR44DL-3	I_v		1.6 to 3.5	mcd
Wavelength at peak emission					
I_F = 10 mA		λ_p	typ.	590	nm
Beamwidth between half-intensity directions					
I_F = 10 mA		$\theta_{½}$	typ.	100	^{o}

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-74L.



Note: Solderability not guaranteed in tie-bar zone.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Reverse voltage	V_R	max.	5 V
Forward current			
DC	I_F	max.	30 mA
peak value; $t_p = 1\ \mu s$; f = 300 Hz	I_{FRM}	max.	1 A
peak value; $t_{on} = 1$ ms; $\delta = 0.33$	I_{FRM}	max.	60 mA
Total power dissipation up to $T_{amb} = 65\ ^oC$	P_{tot}	max.	90 mW
Storage temperature	T_{stg}		−55 to +100 ^oC
Junction temperature	T_j	max.	100 ^oC
Lead soldering temperature			
> 5.0 mm from the plastic body; $t_{sld} < 7$ s	T_{sld}	max.	260 ^oC

THERMAL RESISTANCE

From junction to ambient when the device is mounted on a PCB	$R_{th\ j\text{-}a}$	max.	350 K/W

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Forward voltage		V_F	typ.	2.1 V
			max.	3.0 V
Reverse current				
$V_R = 5$ V		I_R	max.	100 μA
Beamwidth between half-intensity directions				
$I_F = 10$ mA		$\theta_{½}$	typ.	100 ^{o}
Bandwidth at half height		$\Delta\lambda$	typ.	40 nm
Wavelength at peak emission				
$I_F = 10$ mA		λ_p	typ.	590 nm
Luminous intensity				
$I_F = 10$ mA	PLED-YR44DL	I_v	min.	0.7 mcd
	PLED-YR44DL-2	I_v		1.0 to 2.2 mcd
	PLED-YR44DL-3	I_v		1.6 to 3.5 mcd
Diode capacitance				
$V_R = 0$; f = 1 MHz		C_d	typ.	15 pF

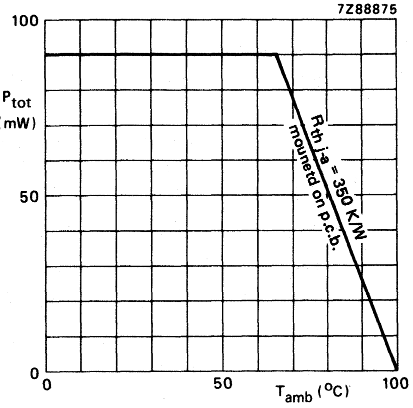


Fig. 2.

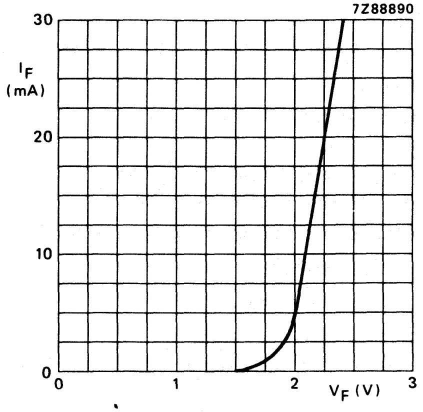


Fig. 3 Typical values.

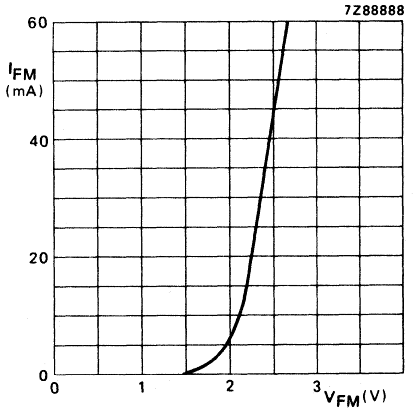


Fig. 4 t_{on} = 50 μs; δ = 0.01; T_{amb} = 25 °C; typ. values.

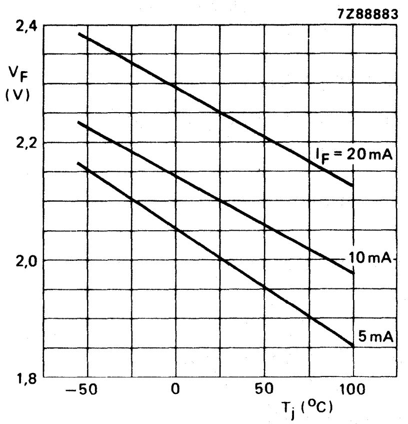


Fig. 5 Typical values.

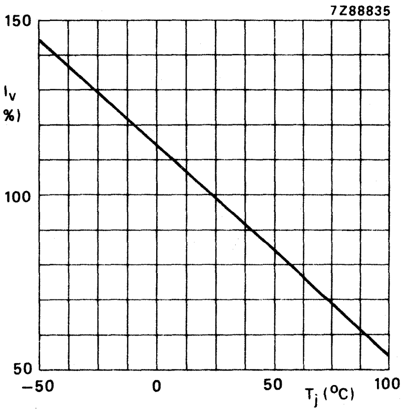


Fig. 6 I_F = 10 mA; typ. values.

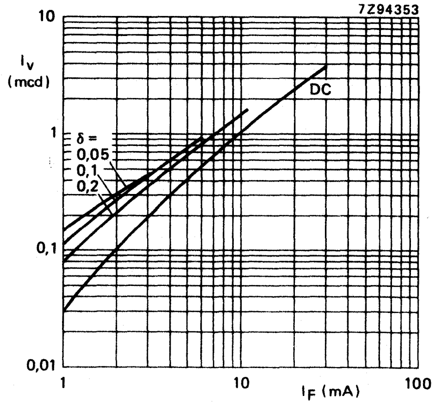


Fig. 7 t_p = 50 μs; typical values.

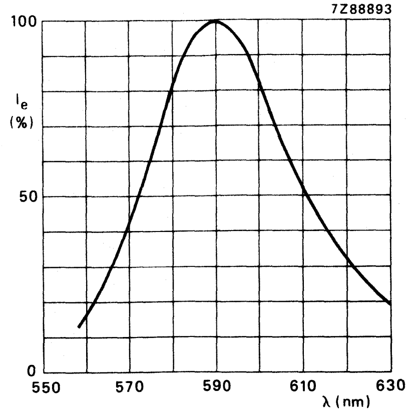


Fig. 8 Typical values.

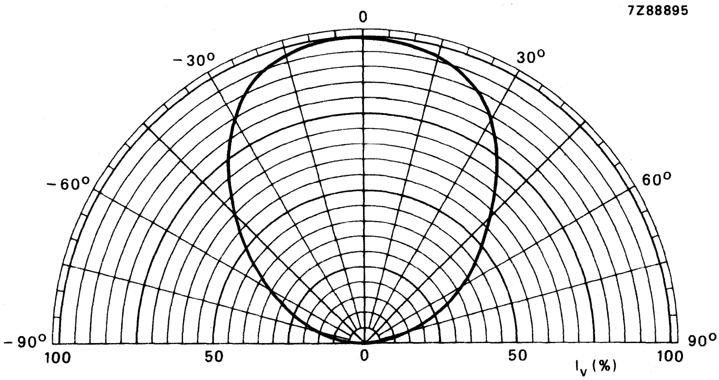


Fig. 9 Typical values.

INDEX OF TYPE NUMBERS

The inclusion of a type number in this publication does not necessarily imply its availability.

Mm = Microminiature semiconductors for hybrid circuits
SD = Small-signal diodes
Sp = Special diodes
T = Tuner diodes
Vrg = Voltage regulator diodes

* = series
FET = Field-effect transistors
Mm = Microminiature semiconductors for hybrid circuits
P = Low-frequency power transistors
Sm = Small-signal transistors
T = Tuner diodes

P = Low-frequency power transistors

P = Low-frequency power transistors

FET = Field-effect transistors
HVP = High-voltage power transistors
Mm = Microniature semiconductors for hybrid circuits
P = Low-frequency power transistors
Sm = Small-signal transistors
WBT = Wideband transistors

* = series
FET = Field-effect transistors
Mm = Microminiature semiconductors for hybrid circuits
RFP = R.F. power transistors and modules
RT = Tripler
Sm = Small-signal transistors
ThM = Thyristor modules
WBM = Wideband hybrid IC modules
WBT = Wideband transistors

* = series
FET = Field-effect transistors
RFP = R.F. power transistors and modules
ThM = Thyristor modules
WBM = Wideband hybrid IC modules

FET = Field-effect transistors
Mm = Microminiature semiconductors for hybrid circuits
PDT = Photodiodes or transistors
RFP = R.F. power transistors and modules
Sm = Small-signal transistors
Th = Thyristors

* = series
FET = Field-effect transistors
Mm = Microminiature semiconductors for hybrid circuits
Sm = Small-signal transistors
SP = Low-frequency switching power transistors
Th = Thyristors
Tri = Triacs

* = series
PM = Power MOS transistors
R = Rectifier diodes
SP = Low-frequency switching power transistors

* = series
LED = Light-emitting diodes
M = Microwave transistors
Mm = Microminiature semiconductors for hybrid circuits
Ph = Photoconductive devices
PhC = Photocouplers
R = Rectifier diodes
TS = Transient suppressor diodes
Vrf = Voltage reference diodes
Vrg = Voltage regulator diodes

* = series
A = Accessories
I = Infrared devices
LED = Light-emitting diodes
M = Microwave transistors
PhC = Photocouplers
SEN = Sensors

FET = Field-effect transistors
I = Infrared devices
M = Microwave transistors
Mm = Microminiature semiconductors for hybrid circuits
P = Low-frequency power transistors
PhC = Photocouplers
R = Rectifier diodes
SD = Small-signal diodes
SEN = Sensors
Sm = Small-signal transistors
SP = Low-frequency switching power transistors
St = Rectifier stacks
WBM = Wideband hybrid IC modules

* = series
I = Infrared devices
M = Microwave transistors
P = Low-frequency power transistors
PhC = Photocouplers
R = Rectifier diodes
SD = Small-signal diodes
Vrf = Voltage reference diodes

A = Accessories
FET = Field-effect transistors
Ph = Photoconductive devices
PhC = Photocouplers
R = Rectifier diodes
RFP = R.F. power transistors and modules
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Sm = Small-signal transistors
WBT = Wideband transistors

A = Accessories
FET = Field-effect transistors
Ph = Photoconductive devices
PhC = Photocouplers
Sm = Small-signal diodes

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DATA HANDBOOK SYSTEM

DATA HANDBOOK SYSTEM

Our Data Handbook System comprises more than 60 books with specifications on electronic components, subassemblies and materials. It is made up of four series of handbooks:

ELECTRON TUBES	BLUE
SEMICONDUCTORS	RED
INTEGRATED CIRCUITS	PURPLE
COMPONENTS AND MATERIALS	GREEN

The contents of each series are listed on pages iv to vii.

The data handbooks contain all pertinent data available at the time of publication, and each is revised and reissued periodically.

When ratings or specifications differ from those published in the preceding edition they are indicated with arrows in the page margin. Where application information is given it is advisory and does not form part of the product specification.

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T3	**Klystrons**
T4	**Magnetrons for microwave heating**
T5	**Cathode-ray tubes** Instrument tubes, monitor and display tubes, C.R. tubes for special applications
T6	**Geiger-Müller tubes**
T8	**Colour display systems** Colour TV picture tubes, colour data graphic display tube assemblies, deflection units
T9	**Photo and electron multipliers**
T10	**Plumbicon camera tubes and accessories**
T11	**Microwave semiconductors and components**
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T13	**Image intensifiers and infrared detectors**
T15	**Dry reed switches**
T16	**Monochrome tubes and deflection units** Black and white TV picture tubes, monochrome data graphic display tubes, deflection units

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S3	**Small-signal transistors**
S4a	**Low-frequency power transistors and hybrid modules**
S4b	**High-voltage and switching power transistors**
S5	**Field-effect transistors**
S6	**R.F. power transistors and modules**
S7	**Surface mounted semiconductors**
S8a	**Light-emitting diodes**
S8b	**Devices for optoelectronics** Optocouplers, photosensitive diodes and transistors, infrared light-emitting diodes and infrared sensitive devices, laser and fibre-optic components
S9	**PowerMos transistors**
S10	**Wideband transistors and wideband hybrid IC modules**
S11	**Microwave transistors**
S12	**Surface acoustic wave devices**
S13	**Semiconductor sensors**
S14	**Liquid Crystal Displays**

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IC05N	**HE4000B logic family — uncased ICs** CMOS	
IC06	**High-speed CMOS; PC74HC/HCT/HCU** Logic family	
IC08	**ECL 10K and 100K logic families**	
IC09N	**TTL logic series**	
IC10	**Memories** MOS, TTL, ECL	
IC11	**Linear Products**	
Supplement to IC11	**Linear Products**	
IC12	**I^2C-bus compatible ICs**	
IC13	**Semi-custom** Programmable Logic Devices (PLD)	
IC14	**Microcontrollers and peripherals** Bipolar, MOS	
IC15	**FAST TTL logic series**	
IC16	**CMOS integrated circuits for clocks and watches**	
IC17	**Integrated Services Digital Networks (ISDN)**	not yet issued
IC18	**Microprocessors and peripherals**	
IC19	**Data communication products**	

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C8	**Variable mains transformers**
C9	**Piezoelectric quartz devices**
C11	**Varistors, thermistors and sensors**
C12	**Potentiometers, encoders and switches**
C13	**Fixed resistors**
C14	**Electrolytic and solid capacitors**
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