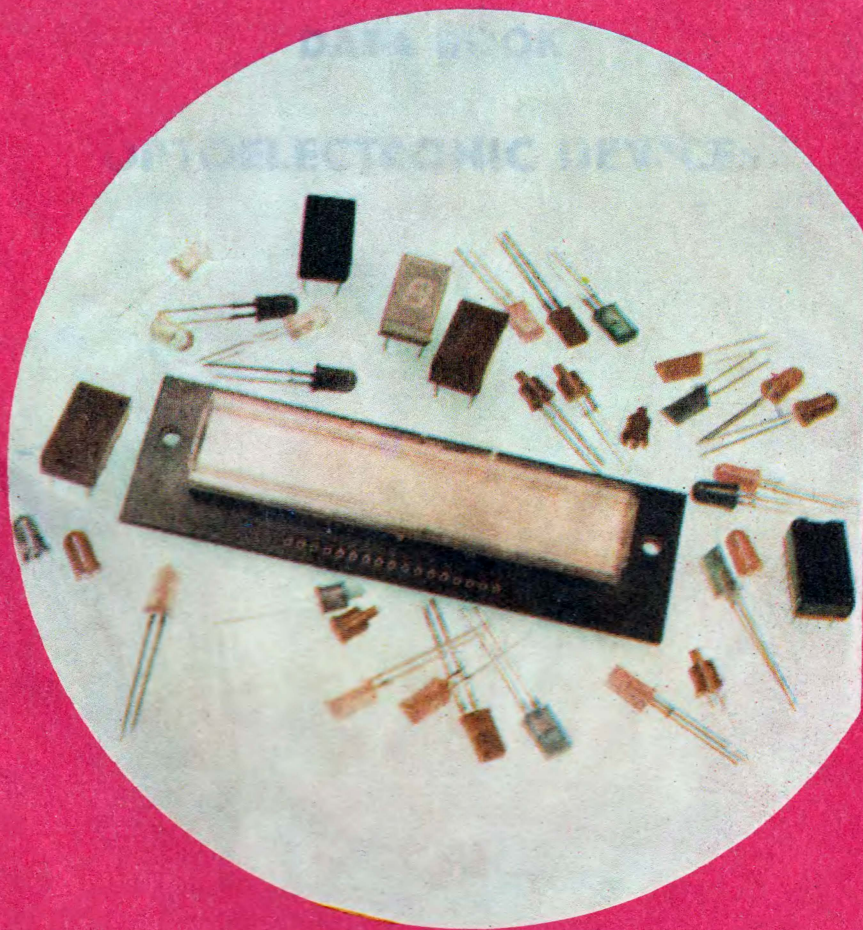


DATA BOOK



MICROELECTRONICA SA

DATA BOOK

OPTOELECTRONIC DEVICES

EDITION 1991

MICROELECTRONICA

**34B Erou Iancu Nicolae 72996 Bucharest
ROMANIA Phone: 334050 / 356, 404.**

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MDE 1601 V

STANDARD LIGHT EMITTING DIODES (Ø 5 ROUND TYPE)

GENERAL DESCRIPTION

The Standard Light Emitting Diodes are solid state lamps which include a light emitting diode (LED) mounted on a lead-frame and encapsulated in a Ø 5 mm standard case of a standard epoxy composition. The short lead is the cathode. The shape and the composition of the case provide a wide viewing angle, uniform aesthetic appearance and an excellent off / on contrast. The MDE Standard Light Emitting Diodes have two red series. The difference between them consists in the semiconductor LED chip type.

The 1101...3 R series has a GaAsP / GaAs or GaAsP / GaP red LED and the 1111...3 R has a GaP / GaP red LED.

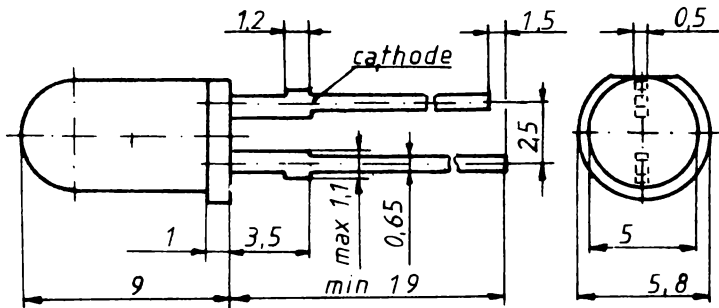
These lamps are intended for High Volume / Low cost application such as indicators for appliances, automobil instrument panels and many commercial uses.

FEATURES

- * Low power consumption
- * Long life
- * Low cost
- * Broad application
- * Diffused lens

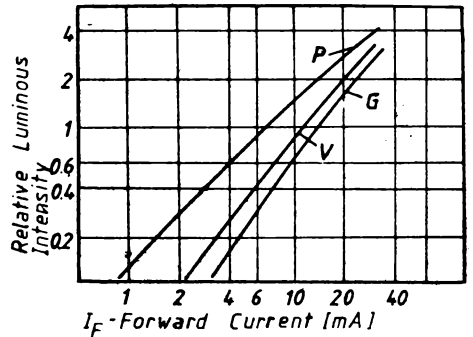
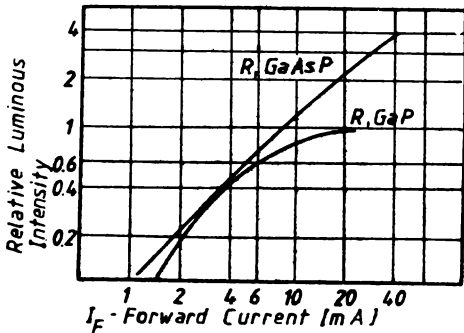
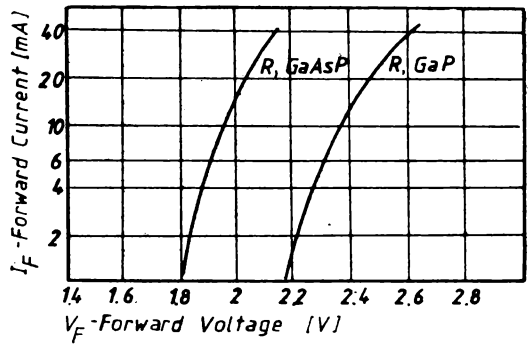
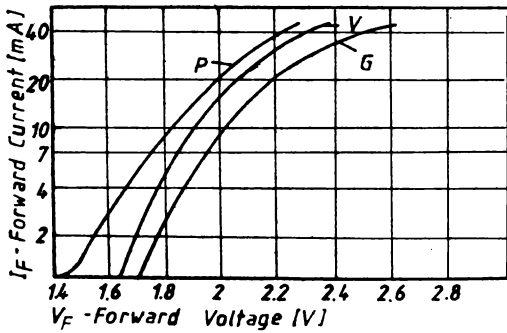
ABSOLUTE MAXIMUM RATINGS $T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Value |
|--|-----------|-------------|-----------|
| Power Dissipation | P_{tot} | mW | 150 |
| Forward Current | I_F | mA | 50 |
| Peak Forward Current (1 μs pulse width, 300 pps) | I_{FP} | A | 1 |
| Operating Temperature | T_{OP} | $^{\circ}C$ | -25...+70 |
| Storage Temperature | T_{stg} | $^{\circ}C$ | -40...+70 |
| Lead Soldering Temperature ($t_{sld} = 3s$) | T_{sld} | $^{\circ}C$ | +260 |



OPTOELECTRIC CHARACTERISTICS AT $T_{amb} = 25^{\circ}C$

| Type | $I_F = 20mA$ | | | | $I_V = 100\mu A$ | | |
|-------------------------------------|--------------|-------------------|-----------------|------|---------------------------|------|----------------------|
| | $V_F(V)$ | $I_V(mcd)$ | $\lambda_r(nm)$ | | $\Delta\theta_{0,5}(deg)$ | | $V_{BK}(V)$ |
| | max. | min. | min. | max. | min. | Case | |
| MDE 1101R MDE 1102R MDE 1103R | 3 | 0,3 1 2 | 635 | 680 | 40 | 5 | red, diffused |
| MDE 1101P MDE 1102P MDE 1103P | 3 | 0,3 1,5 2,5 | 590 | 635 | 40 | 5 | orange, diffused, |
| MDE 1101G MDE 1102G MDE 1103G | 3 | 0,3 1,5 2,5 | 573 | 590 | 40 | 5 | yellow, diffused |
| MDE 1101V MDE 1102V MDE 1103V | 3 | 0,3 1 2 | 554 | 573 | 40 | 5 | green, diffused |
| MDE 1111R MDE 1112R MDE 1113R | 3 | 0,3 1 2 | 680 | 710 | 40 | 5 | red, diffused |



HIGH EFFICIENCY LIGHT EMITTING DIODES

GENERAL DESCRIPTION

These solid state lamps include a red (R), orange (P), yellow (G) or green (V) light emitting diode packed in a $\varnothing 5$ mm epoxy case.

The luminous intensity of these lamps is high and the viewing angle narrow.

The coloured undiffused and the white lens high efficiency light emitting diodes are designed for applications where a point source is desired. They are particularly useful where the light must be focused or diffused with external optics.

The white lens is useful in masking the colour of the lamp in the off condition.

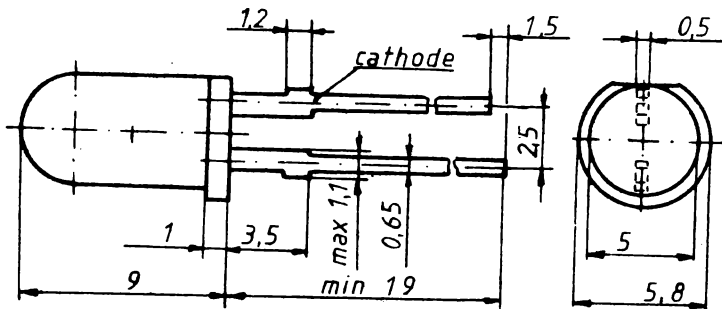
FEATURES

- * High intensity
- * Narrow viewing angle
- * Low power consumption
- * Long life

ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}\text{C}$

| | Symbol | Unit. | Value |
|--|------------|--------------------|-----------|
| Power Dissipation | P_{tot} | mW | 150 |
| Forward Current | I_F | mA | 50 |
| Peak Forward Current (1 μs pulse width, 300 pps) | I_{FP} | A | 1 |
| Operating Temperature | T_{OP} | $^{\circ}\text{C}$ | -25...+70 |
| Storage Temperature | T_{stg} | $^{\circ}\text{C}$ | -40...+70 |
| Lead Soldering Temperature ($t_{slid} = 3\text{s}$) | T_{slid} | $^{\circ}\text{C}$ | +260 |

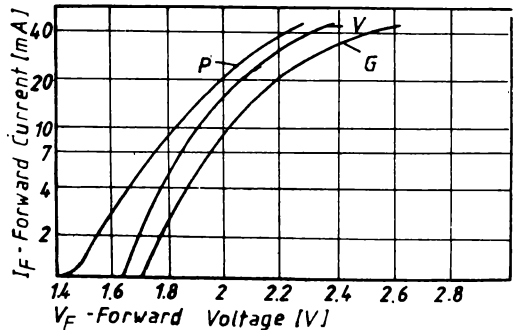
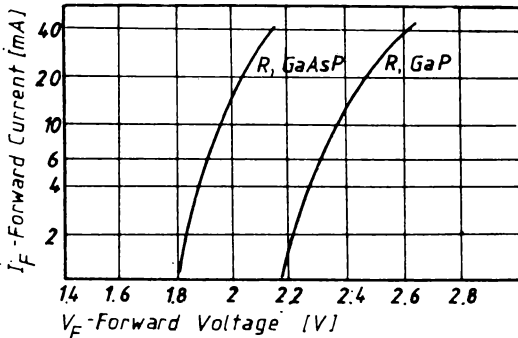
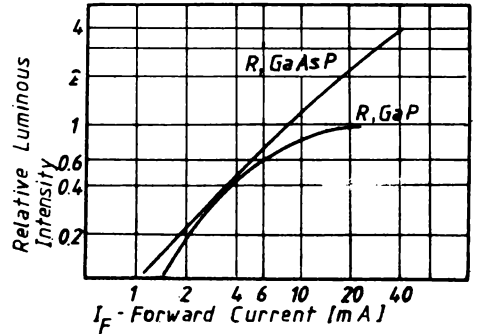
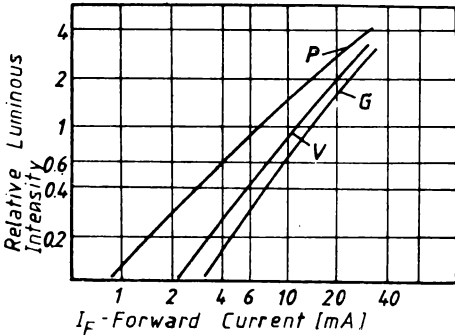


OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}C$

| Type | $I_F=20mA$ | | | | $I_R=100\mu A$ | | Case |
|-----------|------------|------------|------------------|------|----------------------------|-------------|---------------------------|
| | $V_F(V)$ | $I_V(mcd)$ | $\lambda_p (nm)$ | | $\angle\theta_{0,5} (deg)$ | $V_{BR}(V)$ | |
| | max. | min. | min. | max. | min. | min. | |
| MDE 1106R | 3 | 3 | 635 | 680 | 20 | 5 | red, undiffused |
| MDE 1107R | 3 | 6 | 635 | 680 | 20 | 5 | |
| MDE 1108R | 3 | 8 | 635 | 680 | 20 | 5 | |
| MDE 1106P | 3 | 3 | 590 | 635 | 20 | 5 | orange, undiffused |
| MDE 1107P | 3 | 6 | 590 | 635 | 20 | 5 | |
| MDE 1108P | 3 | 8 | 590 | 635 | 20 | 5 | |
| MDE 1106G | 3 | 3 | 573 | 590 | 20 | 5 | yellow, undiffused |
| MDE 1107G | 3 | 6 | 573 | 590 | 20 | 5 | |
| MDE 1108G | 3 | 8 | 573 | 590 | 20 | 5 | |
| MDE 1106V | 3 | 3 | 554 | 573 | 20 | 5 | green, undiffused |
| MDE 1107V | 3 | 6 | 554 | 573 | 20 | 5 | |
| MDE 1108V | 3 | 8 | 554 | 573 | 20 | 5 | |
| MDE 1116R | 3 | 3 | 680 | 710 | 25 | 5 | red, slow, diffused |
| MDE 1117R | 3 | 6 | 680 | 710 | 25 | 5 | |
| MDE 1118R | 3 | 8 | 680 | 710 | 25 | 5 | |
| MDE 1126R | 3 | 3 | 635 | 680 | 25 | 5 | red, slow, diffused |
| MDE 1127R | 3 | 6 | 635 | 680 | 25 | 5 | |
| MDE 1128R | 3 | 8 | 635 | 680 | 25 | 5 | |
| MDE 1126P | 3 | 3 | 590 | 635 | 25 | 5 | orange, slow, diffused |
| MDE 1127P | 3 | 6 | 590 | 635 | 25 | 5 | |
| MDE 1128P | 3 | 8 | 590 | 635 | 25 | 5 | |
| MDE 1126G | 3 | 3 | 573 | 590 | 25 | 5 | yellow, slow, diffused |
| MDE 1127G | 3 | 6 | 573 | 590 | 25 | 5 | |
| MDE 1128G | 3 | 8 | 573 | 590 | 25 | 5 | |
| MDE 1126V | 3 | 3 | 554 | 573 | 25 | 5 | green, slow, diffused |
| MDE 1127V | 3 | 6 | 554 | 573 | 25 | 5 | |
| MDE 1128V | 3 | 8 | 554 | 573 | 25 | 5 | |
| MDE 1136R | 3 | 3 | 680 | 710 | 20 | 5 | red, undiffused |
| MDE 1137R | 3 | 6 | 680 | 710 | 20 | 5 | |
| MDE 1138R | 3 | 8 | 680 | 710 | 20 | 5 | |
| MDE 1146R | 3 | 3 | 635 | 680 | 20 | 5 | white, clear |
| MDE 1146R | 3 | 6 | 635 | 680 | 20 | 5 | |
| MDE 1146R | 3 | 8 | 635 | 680 | 20 | 5 | |
| MDE 1146P | 3 | 3 | 590 | 635 | 20 | 5 | white clear |
| MDE 1146P | 3 | 6 | 590 | 635 | 20 | 5 | |
| MDE 1146P | 3 | 8 | 590 | 635 | 20 | 5 | |
| MDE 1146G | 3 | 3 | 573 | 590 | 20 | 5 | white clear |
| MDE 1146G | 3 | 6 | 573 | 590 | 20 | 5 | |
| MDE 1146G | 3 | 8 | 573 | 590 | 20 | 5 | |
| MDE 1156V | 3 | 3 | 554 | 590 | 20 | 5 | white clear |
| MDE 1146V | 3 | 6 | 554 | 590 | 20 | 5 | |
| MDE 1146V | 3 | 8 | 554 | 590 | 20 | 5 | |

OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}C$

| Type | $I_F=20mA$ | | | | $I_R=100\mu A$ | | Case |
|-----------|------------|------------|------------------|------|--------------------|-------------|-------------------------|
| | $V_F(V)$ | $I_V(mcd)$ | $\lambda_P (nm)$ | | $\angle 0,5 (deg)$ | $V_{BR}(V)$ | |
| | max. | min. | min. | max. | min. | min. | |
| MDE 1156R | 3 | 3 | 635 | 680 | 25 | 5 | white, slow diffused |
| MDE 1157R | 3 | 6 | 635 | 680 | 25 | 5 | |
| MDE 1158R | 3 | 8 | 635 | 680 | 25 | 5 | |
| MDE 1156P | 3 | 3 | 590 | 635 | 25 | 5 | white, slow diffused |
| MDE 1157P | 3 | 6 | 590 | 635 | 25 | 5 | |
| MDE 1158P | 3 | 8 | 590 | 635 | 25 | 5 | |
| MDE 1156G | 3 | 3 | 573 | 590 | 25 | 5 | white, slow diffused |
| MDE 1157G | 3 | 6 | 573 | 590 | 25 | 5 | |
| MDE 1158G | 3 | 8 | 573 | 590 | 25 | 5 | |
| MDE 1156V | 3 | 3 | 554 | 573 | 25 | 5 | white, slow diffused |
| MDE 1157V | 3 | 6 | 554 | 573 | 25 | 5 | |
| MDE 1158V | 3 | 8 | 554 | 573 | 25 | 5 | |
| MDE 1166R | 3 | 3 | 680 | 710 | 25 | 5 | white, slow diffused |
| MDE 1167R | 3 | 6 | 680 | 710 | 25 | 5 | |
| MDE 1168R | 3 | 8 | 680 | 710 | 25 | 5 | |
| MDE 1176R | 3 | 3 | 680 | 710 | 20 | 5 | white, clear |
| MDE 1177R | 3 | 6 | 680 | 710 | 20 | 5 | |
| MDE 1178R | 3 | 8 | 680 | 710 | 20 | 5 | |



MINIATURE LIGHT EMITTING DIODES

GENERAL DESCRIPTION

The Miniature Light Emitting Diodes are GaAsP or GaP LED chips mounted in a \varnothing 3 mm, diffused coloured epoxy package. Their small size, wide viewing angle and good luminous intensity contribute to their versatility as all purpose indicators.

FEATURES

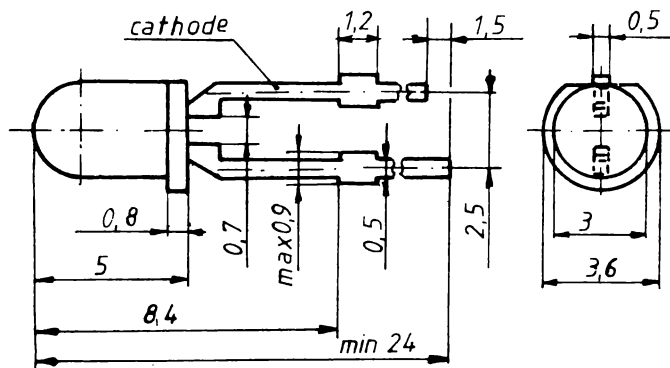
- * Small size
- * Bright
- * Wide viewing angle
- * Long life
- * Low cost

ABSOLUTE MAXIMUM RATINGS

$T_{amb}=25^{\circ}\text{C}$

| | Symbol | Unit. | Value |
|--|-------------|--------------------|-----------|
| Power Dissipation | $P_{tot.}$ | mW | 150 |
| Forward Current | $I_f.$ | mA | 50 |
| Peak Forward Current (1 μ s pulse width, 300pps) | $I_{FP.}$ | A | 1 |
| Operating Temperature | $T_{op.}$ | $^{\circ}\text{C}$ | -25...+70 |
| Storage temperature | $T_{stg.}$ | $^{\circ}\text{C}$ | -40...+70 |
| Lead Soldering Temperature ($t_{slid}=3s$) | $T_{slid.}$ | $^{\circ}\text{C}$ | +260 |

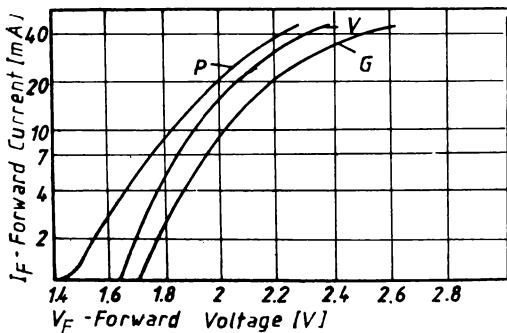
PACKAGE DIMENSIONS



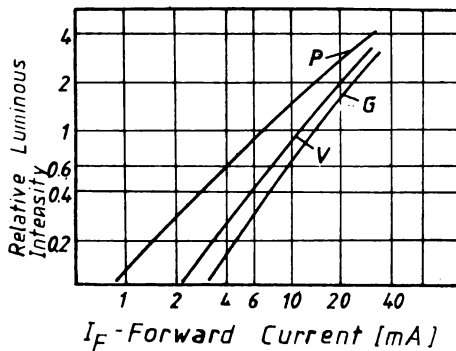
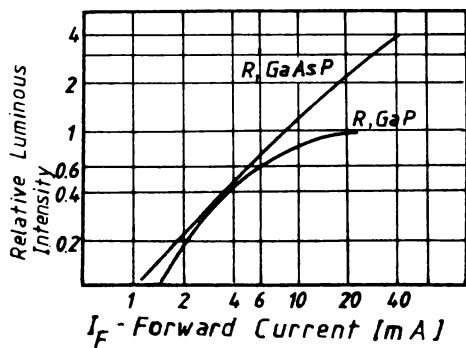
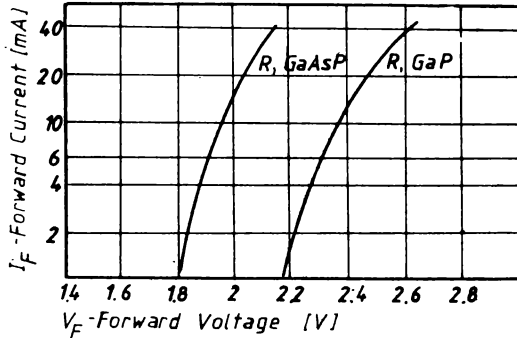
OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}C$

| Type | $I_F=20mA$ | | | | $I_R=100\mu A$ | | Case |
|-------------------------------------|------------|-------------------|----------------------|------|---------------------------|-------------|---------------------|
| | $V_F(V)$ | $I_V(mcd)$ | $\lambda(\text{nm})$ | | $\theta(0,5 \text{ deg})$ | $V_{BR}(V)$ | |
| | max. | min. | min. | max. | | min. | |
| MDE 1301R MDE 1302R MDE 1303R | 3 | 0,3 1 2 | 680 | 710 | 40 | 5 | red, diffused |
| MDE 1301P MDE 1302P MDE 1303P | 3 | 0,3 1,5 2,5 | 590 | 635 | 40 | 5 | orange, diffused |
| MDE 1301G MDE 1302G MDE 1303G | 3 | 0,3 1,5 2,5 | 573 | 590 | 40 | 5 | yellow, diffused |
| MDE 1301V MDE 1302V MDE 1303V | 3 | 0,3 1 2 | 554 | 570 | 40 | 5 | green, diffused |
| MDE 1311R MDE 1312R MDE 1313R | 3 | 0,3 1 2 | 635 | 680 | 40 | 5 | red, diffused |

I_F -Forward Current [mA]



I_F -Forward Current [mA]



RECTANGULAR LIGHT EMITTING DIODES

GENERAL DESCRIPTION

The MDE 1531...1536 series consists in a red (R) orange (P), yellow (G) or green (V) LED chip mounted on a lead-frame and encapsulated in a top tinted rectangular epoxy package.

FEATURES

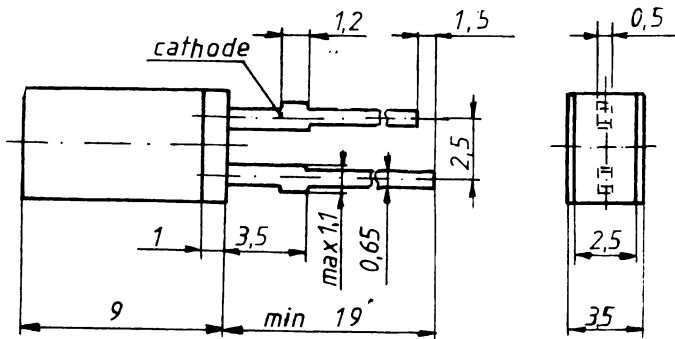
- * Rectangular Light Emitting Surface
- * Low current requirements
- * Long life

ABSOLUTE MAXIMUM RATINGS

$T_{amb}=25^{\circ}\text{C}$

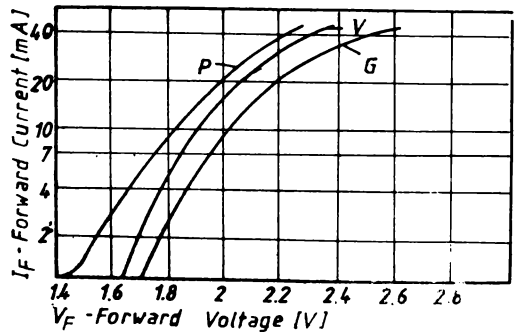
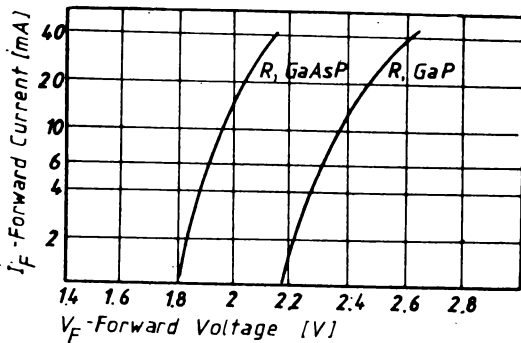
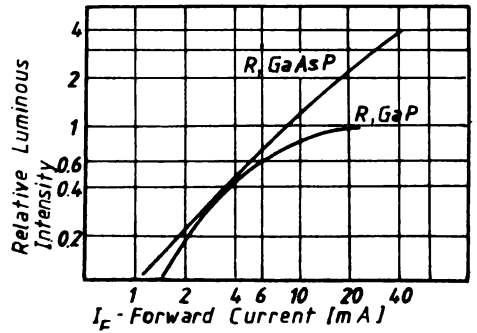
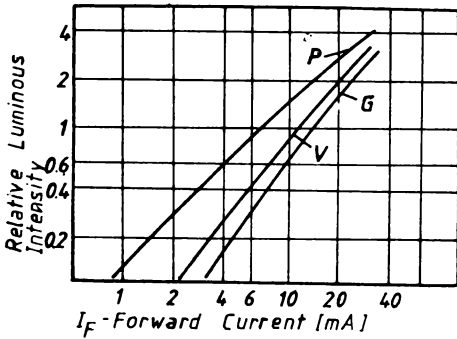
| | Symbol | Unit. | Value |
|--|-----------|--------------------|-----------|
| Power Dissipation | P_{tot} | mW | 150 |
| Forward Current | I_F | mA | 50 |
| Peak Forward Current (1 μs pulse width, 300pps) | I_{FP} | A | 1 |
| Operating Temperature | T_{op} | $^{\circ}\text{C}$ | -25...+70 |
| Storage temperature | T_{stg} | $^{\circ}\text{C}$ | -40...+70 |
| Lead Soldering Temperature ($t_{sld}=3\text{s}$) | T_{sld} | $^{\circ}\text{C}$ | +260 |

PACKAGE DIMENSIONS



OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}C$

| Type | $I_F=20mA$ | | | | $I_R=100\mu A$ | | Case |
|-----------|------------|------------|------------------|------|----------------------------|-------------|------------------|
| | $V_F(V)$ | $I_V(mcd)$ | $\lambda_p (nm)$ | | $\Delta\theta_{0,5} (deg)$ | $V_{BR}(V)$ | |
| | max. | min. | min. | max. | min. | min. | |
| MDE 1531R | 3 | 0,3 | 680 | 710 | 50 | 5 | red, diffused |
| MDE 1532R | | 1 | | | | | |
| MDE 1533R | | 2 | | | | | |
| MDE 1531P | 3 | 0,3 | 590 | 635 | 50 | 5 | orange, diffused |
| MDE 1532P | | 1,5 | | | | | |
| MDE 1533P | | 2,5 | | | | | |
| MDE 1531G | 3 | 0,3 | 573 | 590 | 50 | 5 | yellow, diffused |
| MDE 1532G | | 1,5 | | | | | |
| MDE 1533G | | 2,5 | | | | | |
| MDE 1531V | 3 | 0,3 | 554 | 570 | 50 | 5 | green, diffused |
| MDE 1532V | | 1 | | | | | |
| MDE 1533V | | 2 | | | | | |
| MDE 1534R | 3 | 0,3 | 635 | 680 | 50 | 5 | red, diffused |
| MDE 1535R | | 1 | | | | | |
| MDE 1536R | | 2 | | | | | |



TRIANGULAR LIGHT EMITTING DIODES

GENERAL DESCRIPTION

The MDE 1541...3 series consists in red (R), orange (P), yellow (G) or green (V) LED chips mounted on a lead frame and encapsulated in a top tinted triangular epoxy case.

FEATURES

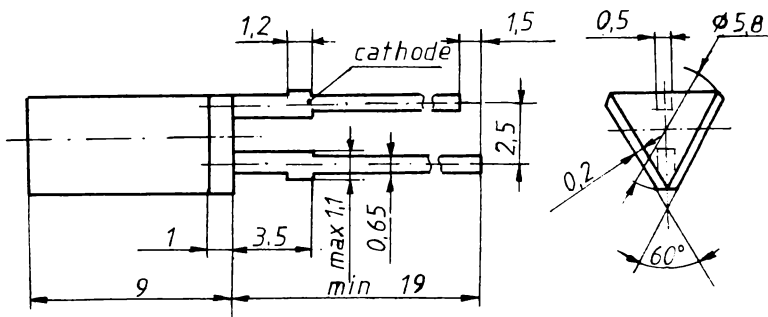
- * High intensity
- * Triangular Light Emitting Surface
- * Long Life
- * IC Compatible
- * Low Current Requirements

ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}\text{C}$

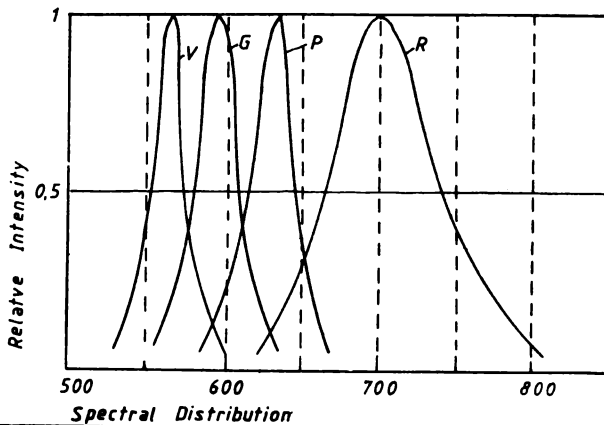
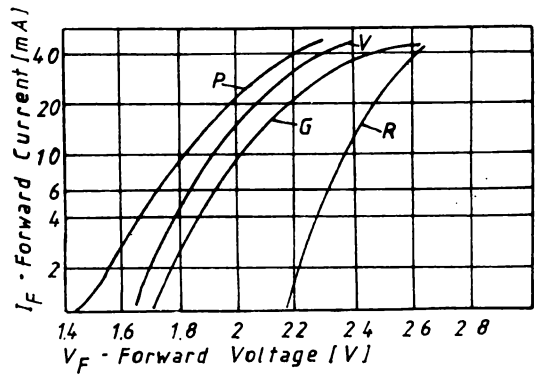
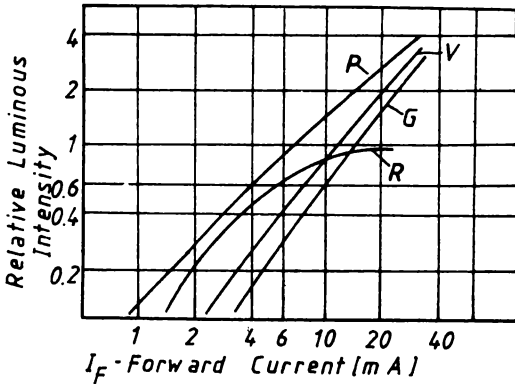
| | Symbol | Unit. | Value |
|--|------------|--------------------|-----------|
| Power Dissipation | $P_{tot.}$ | mW | 150 |
| Forward Current | $I_F.$ | mA | 50 |
| Peak Forward Current (1 μs pulse width, 300pps) | $I_{FP.}$ | A | 1 |
| Operating Temperature | $T_{op.}$ | $^{\circ}\text{C}$ | -25...+70 |
| Storage temperature | $T_{stg.}$ | $^{\circ}\text{C}$ | -40...+70 |
| Lead Soldering Temperature ($t_{sld}=3\text{s}$) | $T_{sld.}$ | $^{\circ}\text{C}$ | +260 |

PACKAGE DIMENSIONS



OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25\text{ C}$

| Type | $I_F=20\text{mA}$ | | | | $I_R=100\mu\text{A}$ | | Case |
|-------------------------------------|-------------------|-------------------|------------------------|------|----------------------------------|--------------------|---------------------|
| | $V_F(\text{V})$ | $I_V(\text{mcd})$ | $\lambda_p(\text{nm})$ | | $\Delta\theta_{0,5}(\text{deg})$ | $V_{BR}(\text{V})$ | |
| | max. | min. | min. | max. | min. | min. | |
| MDE 1541R MDE 1542R MDE 1543R | 3 | 0,3 1 2 | 635 | 710 | 50 | 5 | red, diffused |
| MDE 1541P MDE 1542P MDE 1543P | 3 | 0,3 1,5 2,5 | 590 | 635 | 50 | 5 | orange, diffused |
| MDE 1541G MDE 1542G MDE 1543G | 3 | 0,3 1,5 2,5 | 573 | 590 | 50 | 5 | yellow, diffused |
| MDE 1541V MDE 1542V MDE 1543V | 3 | 0,3 1 2 | 554 | 573 | 50 | 5 | green, diffused |



FLAT TOP LEDs ($\varnothing 2$ mm)

GENERAL DESCRIPTION

The MDE Flat Top LED series has a $\varnothing 2$ mm, red, yellow, orange or green bright surface. The convex shape of the case permits a good montage on front panels. The length of the pin allows a good penetration through the panel thickness.

FEATURES

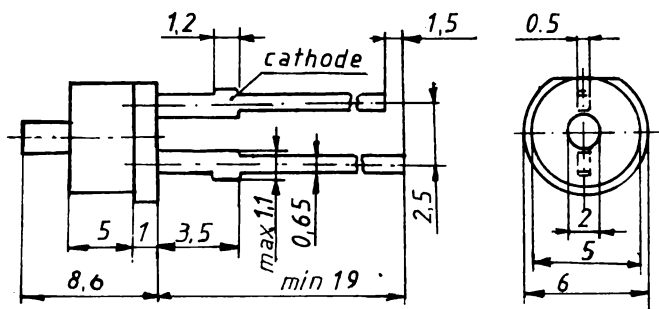
- $\varnothing 2$ mm uniform illuminated surface
- Mounts flush with panel
- Long Life
- IC Compatible

ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}\text{C}$

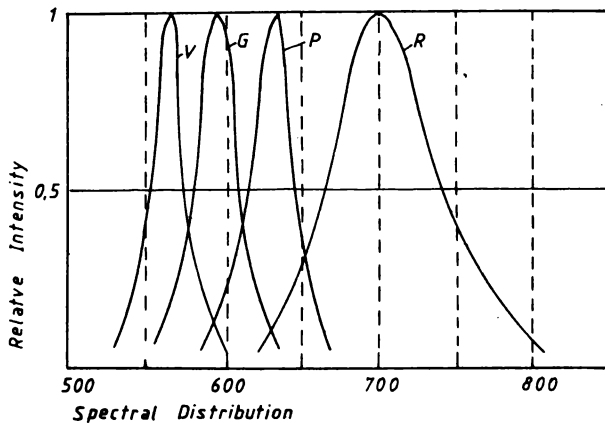
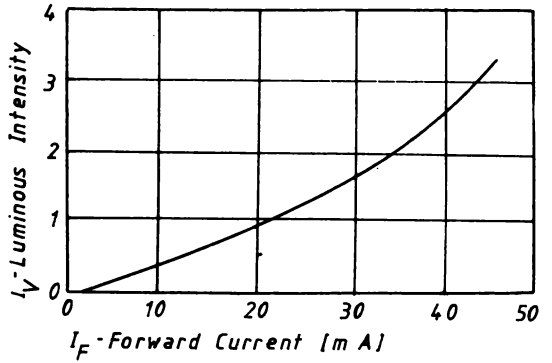
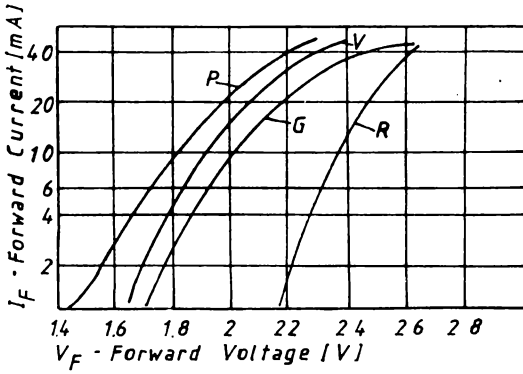
| | Symbol | Unit. | Value |
|--|-------------|--------------------|-----------|
| Power Dissipation | $P_{tot.}$ | mW | 150 |
| Forward Current | I_F | mA | 50 |
| Peak Forward Current (1 μs pulse width, 300pps) | $I_{FP.}$ | A | 4 |
| Operating Temperature | $T_{op.}$ | $^{\circ}\text{C}$ | -25...+70 |
| Storage temperature | $T_{stg.}$ | $^{\circ}\text{C}$ | -40...+70 |
| Lead Soldering Temperature ($t_{slid}=3\text{s}$) | $T_{slid.}$ | $^{\circ}\text{C}$ | +260 |

PACKAGE DIMENSIONS



OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}C$

| Type | $I_F=20\text{ mA}$ | | | | $I_R=100\mu\text{A}$ | |
|-------------------------------------|--------------------|-------------------|-------------------------|------|----------------------|---------------------|
| | $V_F\text{ (V)}$ | | $\lambda_p\text{ (nm)}$ | | $V_{BR}\text{ (V)}$ | Case |
| | max. | min. | min. | max. | | |
| MDE 1511R MDE 1512R MDE 1513R | 3 | 0,4 0,6 0,8 | 635 | 710 | 5 | red, diffused |
| MDE 1511P MDE 1512P MDE 1513P | 3 | 0,4 0,8 0,5 | 590 | 635 | 5 | orange, diffused |
| MDE 1511G MDE 1512G MDE 1513G | 3 | 0,4 0,8 1,5 | 573 | 590 | 5 | yellow, diffused |
| MDE 1511V MDE 1512V MDE 1513V | 3 | 0,4 0,6 0,8 | 554 | 573 | 5 | green, diffused |



POLARYTY INDICATOR LED

GENERAL DESCRIPTION

The MDE Polarity Indicator contains two parallel mounted GaP LED chips: one red and the other green. The Polarity Indicator offers a changing colour dependent on the direction the lamp is biased. This MDE series is white diffused epoxy encapsulated in a standard \varnothing 5 mm case.

FEATURES

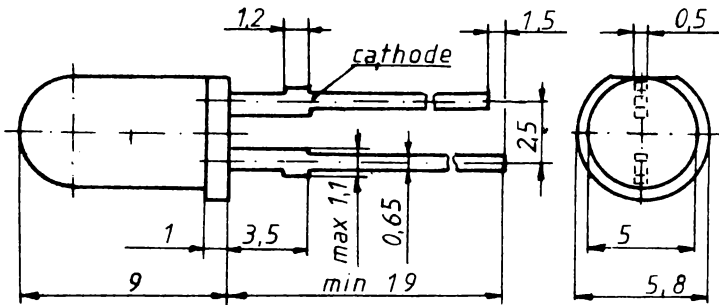
- * White epoxy case
- * Wide Viewing Angle
- * High intensity
- * Long life
- * 3 states: red, green, off.

ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}\text{C}$

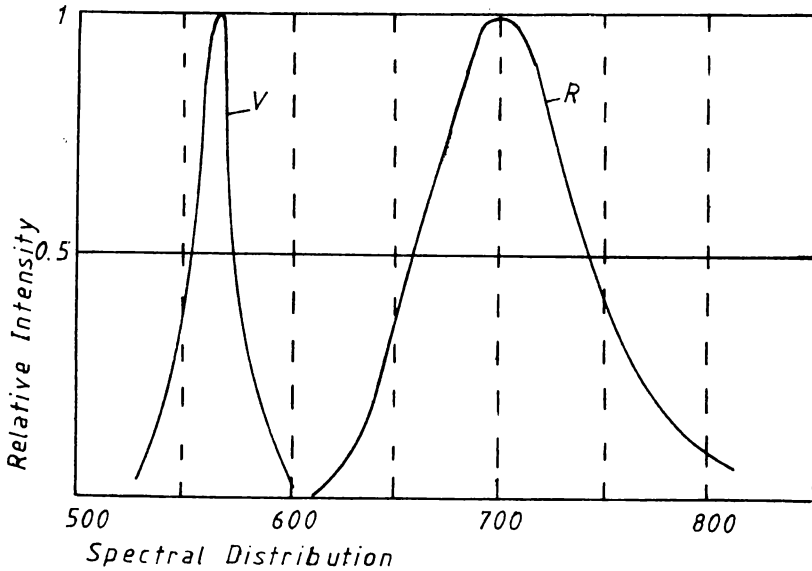
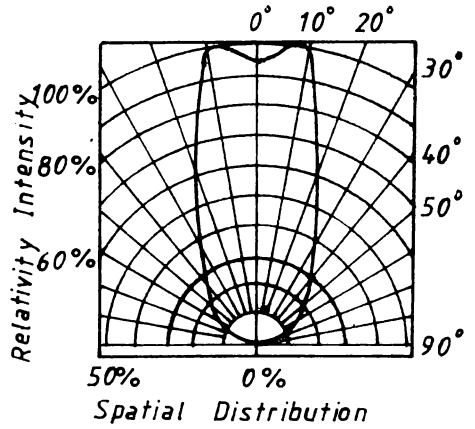
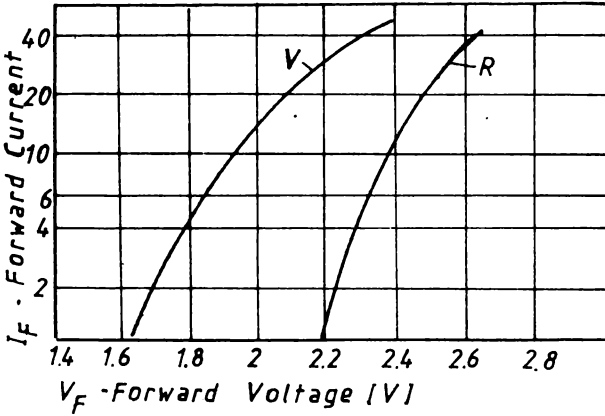
| | Symbol | Unit. | Value |
|--|-----------|--------------------|-----------|
| Power Dissipation | P_{tot} | mW | 150 |
| Forward Current | I_F | mA | 50 |
| Peak Forward Current (1 μs pulse width, 300pps) | I_{FP} | A | 1 |
| Operating Temperature | T_{op} | $^{\circ}\text{C}$ | -25...+70 |
| Storage temperature | T_{stg} | $^{\circ}\text{C}$ | -40...+70 |
| Lead Soldering Temperature ($t_{sld}=3\text{s}$) | T_{sld} | $^{\circ}\text{C}$ | +260 |

PACKAGE DIMENSIONS



OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}C$

| Type | V (V) max. | I=20mA | |
|------------|---------------|---------------------|-------------------------|
| | | I_v (mcd) min. | λ_p (nm) R V |
| MDE 1141RV | 3 | 0,3 | 700 560 |
| MDE 1142RV | 3 | 1 | 700 560 |
| MDE 1143RV | 3 | 2 | 700 560 |



RESISTOR LEDs

GENERAL DESCRIPTION

This solid state resistor lamp contains an integral current limiting resistor in series with the LED. This allows the lamp to be driven from a 5 volts source without the need for an external current limiter.

FEATURES

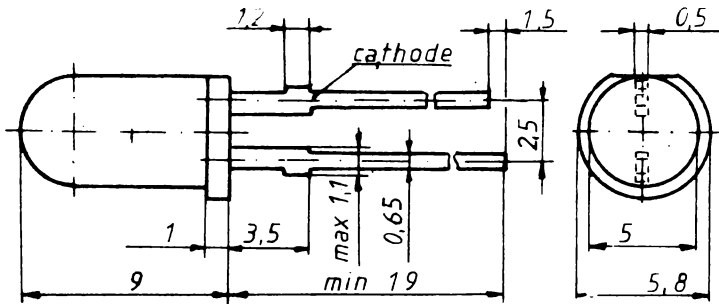
- * Integral Current Limiting Resistor
- * TTL Compatible
- * Wide viewing angle

ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}\text{C}$

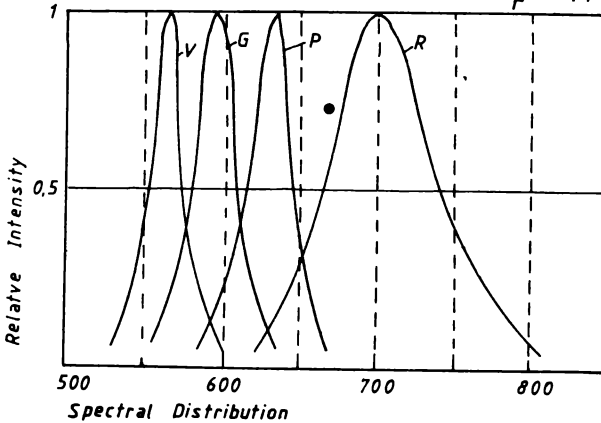
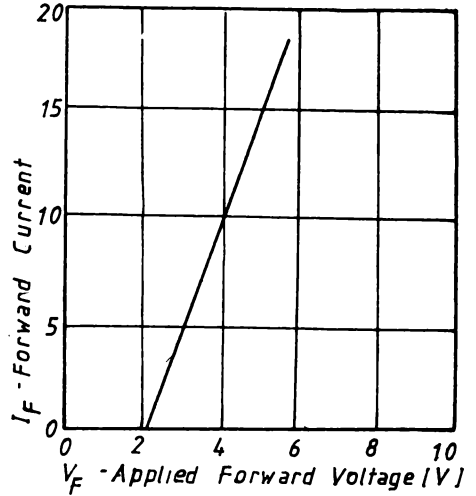
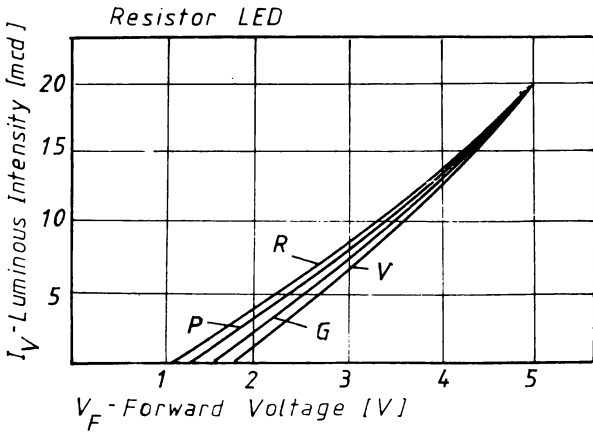
| | Symbol | Unit. | Value |
|---|-----------|--------------------|-----------|
| Power Dissipation | P_{tot} | mW | 150 |
| Forward Voltage | V_F | V | 7 |
| Operating Temperature | T_{op} | $^{\circ}\text{C}$ | -25...+70 |
| Storage Temperature | T_{stg} | $^{\circ}\text{C}$ | -40...+70 |
| Lead Soldering Temperature ($t_{sld}=3s$) | T_{sld} | $^{\circ}\text{C}$ | +260 |

PACKAGE DIMENSIONS



OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}\text{C}$

| Type | $I_F=20\text{ mA}$ | | | | $I_R=100\mu\text{A}$ | | Case |
|-------------------------------------|--------------------|-------------------|-------------------------|------|-----------------------------------|---------------------|---------------------|
| | $V_F\text{ (V)}$ | | $\lambda_P\text{ (nm)}$ | | $\Delta\theta_{0,5}\text{ (deg)}$ | $V_{BR}\text{ (V)}$ | |
| | max. | min. | min. | max. | min. | min. | |
| MDE 1601R MDE 1602R MDE 1603R | 20 | 0,3 1 2 | 615 | 710 | 40 | 5 | red, diffused |
| MDE 1601P MDE 1602P MDE 1603P | 20 | 0,3 1,5 2,5 | 590 | 615 | 40 | 5 | orange, diffused |
| MDE 1601G MDE 1602G MDE 1603G | 20 | 0,3 1,5 2,5 | 573 | 590 | 40 | 5 | yellow, diffused |
| MDE 1601V MDE 1602V MDE 1603V | 20 | 0,3 1 2 | 554 | 573 | 40 | 5 | green, diffused |



INFRARED LIGHT EMITTING DIODES

MINIATURE IRED

MDE 3323—12
MDE 3323—15
MDE 3323—16

STANDARD IRED

MDE 3123—12
MDE 3123—15
MDE 3123—16
MDE 3123—02
MDE 3123—05
MDE 3123—06

RECTANGULAR IRED

MDE 3523—11
MDE 3523—12
MDE 3523—13

TO—18 HERMETICALLY SEALED IRED

MDE 3643—12
MDE 3643—13
MDE 3643—15

TO—18 PLASTIC LENS IRED

MDE 3683—11
MDE 3683—13
MDE 3683—14

INFRARED LIGHT EMITTING DIODES

The MDE Infrared Light Emitting Diodes are made of efficient liquid epitaxial GaAs LED chips. The MDE 3323 series has a \varnothing 3 mm epoxy case (fig.1), the MDE 3123 has a \varnothing 5 mm epoxy case (fig. 2) and the MDE 3523 series has a rectangular epoxy case (fig. 3). The MDE 3683 series is mounted on a TO-18 header with epoxy clear lens (fig. 5). The MDE 3643 series with the GaAs infrared LED chip mounted on a TO-18 header had a flat epoxy window cap (fig. 4)

FEATURES

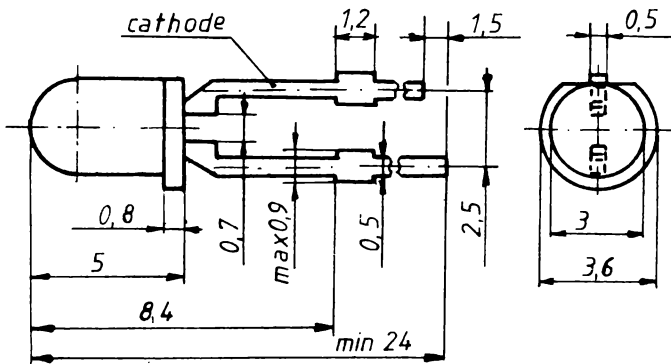
- * Good spectral matching with silicon photodetectors
- * High loading capability in pulse operation
- * High radiant power
- * Vibration resistant
- * Long life

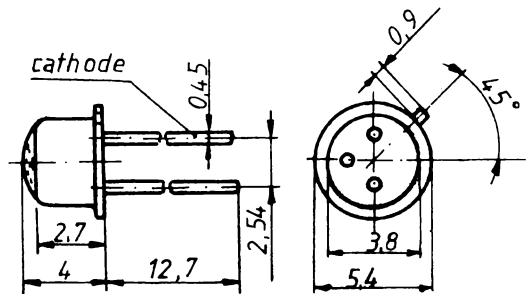
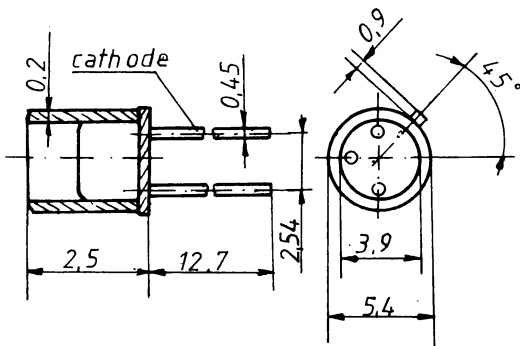
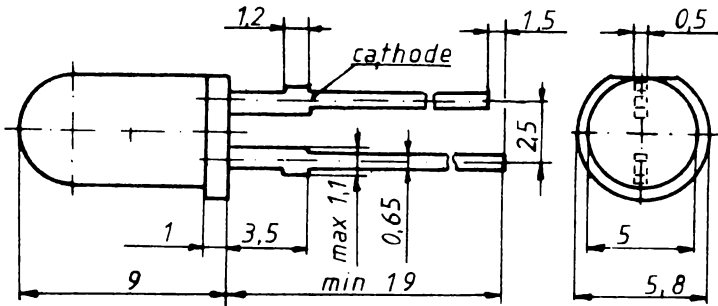
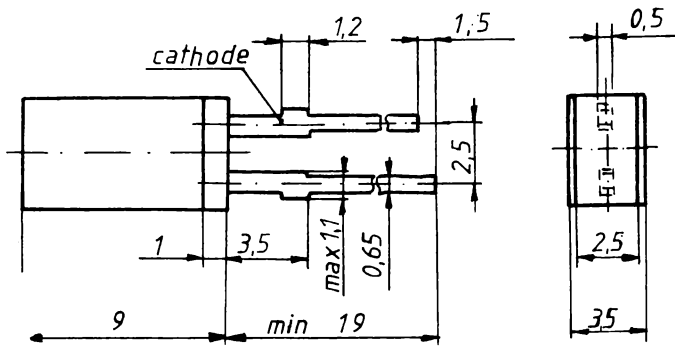
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Value |
|--|-----------------------|-------------|-----------|
| Power Dissipation | P_{tot} | mW | 150 |
| Forward Current | I_F | mA | 50 |
| Peak Forward Current (1 μ s pulse width, 300pps) | $\Delta I_{AZ\omega}$ | A | 1 |
| Operating Temperature | T_{op} | $^{\circ}C$ | -25...+70 |
| Storage temperature | T_{stg} | $^{\circ}C$ | -40...+70 |
| Lead Soldering Temperature ($t_{sld}=3s$) | T_{sld} | $^{\circ}C$ | +260 |

PACKAGE DIMENSIONS





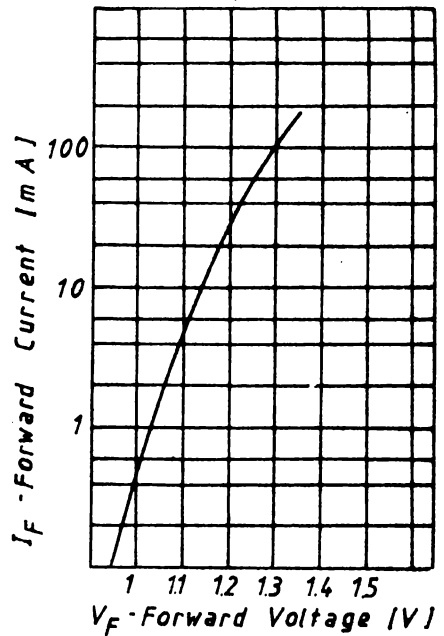
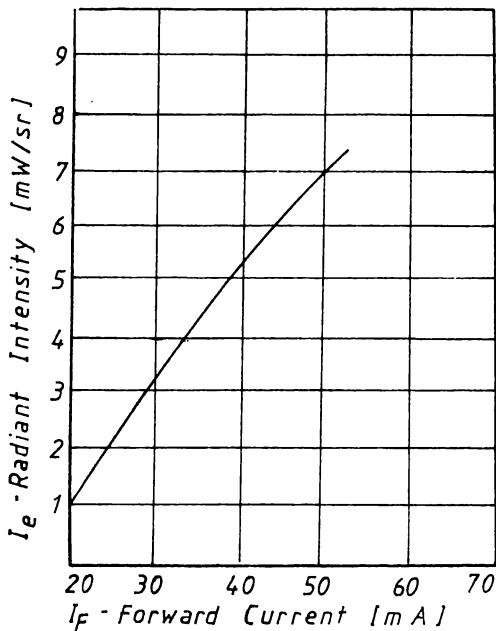
OPTOELECTRIC CHARACTERISTICS AT $T_{amb}=25^{\circ}C$

| Type | $I_F=50mA$ | | | $I_R=100\mu A$ | | | Case |
|---------------|------------|-----------------|------|----------------------------|--------------|-------------|---|
| | $V_F(V)$ | $\lambda_P(nm)$ | | $\Delta\theta_{0,5} (deg)$ | $I_o(mW/sr)$ | $V_{BR}(V)$ | |
| | | max. | min. | | | | |
| MDE 3323-12 | 2 | 900 | 980 | 20 | 0,5 | 5 | miniature $\varnothing=3mm$ fig.1 |
| MDE 3323-15 | 2 | 900 | 980 | 20 | 1 | 5 | |
| MDE 3323-16 | 2 | 900 | 980 | 20 | 2 | 5 | |
| MDE 3123-12 | 2 | 900 | 980 | 20 | 0,5 | 5 | standard $\varnothing=5mm$ fig. 3 |
| MDE 3123-15 | 2 | 900 | 980 | 20 | 3 | 5 | |
| MDE 3123-16 | 2 | 900 | 980 | 20 | 5 | 5 | |
| *MDE 3123-02 | 2 | 900 | 980 | 20 | 0,5 | 5 | standard $\varnothing=5mm$ fig. 3 |
| *MDE 3123-05 | 2 | 900 | 980 | 20 | 3 | 5 | |
| *MDE 3123-06 | 2 | 900 | 980 | 20 | 5 | 5 | |
| MDE 3523-11 | 2 | 900 | 980 | 40 | 0,1 | 5 | rectangular fig. 2 |
| MDE 3523-12 | 2 | 900 | 980 | 40 | 0,5 | 5 | |
| MDE 3523-13 | 2 | 900 | 980 | 40 | 1 | 5 | |
| **MDE 3643-12 | 2 | 900 | 980 | 20 | 0,5 | 5 | TO-18 hermetically sealed fig. 4 |
| **MDE 3643-13 | 2 | 900 | 980 | 20 | 1 | 5 | |
| **MDE 3643-15 | 2 | 900 | 980 | 20 | 3 | 5 | |
| **MDE 3683-11 | 2 | 900 | 980 | 80 | 0,2 | 5 | TO-18 plastic lens fig. 5 |
| **MDE 3683-13 | 2 | 900 | 980 | 80 | 1 | 5 | |
| **MDE 3683-14 | 2 | 900 | 980 | 80 | 2 | 5 | |

NOTES:

- * $I_F=100mA$
- ** Product in development

PACKAGE DIMENSIONS



PHOTOTRANSISTORS

STANDARD

MDR 4213—11A
MDR 4213—11B
MDR 4213—11C

RECTANGULAR

MDR 4213—51A
MDR 4213—51B

MINIATURE

MDR 4213—31A
MDR 4213—31B

PHOTOTRANSISTOR

GENERAL DESCRIPTION

The MDR 4213 series are silicon npn phototransistors encapsulated in an epoxy case. The MDR 4213-11 has a standard $\varnothing 5$ mm epoxy case (fig. 1), the MDR 4213-51 has a rectangular case (fig. 2) and the MDR 4213-31 a miniature ($\varnothing 3$ mm) case (fig. 3).

FEATURES

- * White clear epoxy case
- * Suitable for visible and near infrared radiation
- * High sensitivity
- * Axial terminals

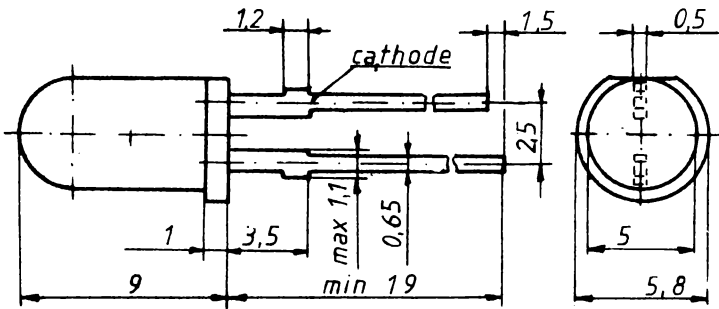
APPLICATIONS

- * Detector in electronic control and drive circuits
- * Detector in optocouplers

ABSOLUTE MAXIMUM RATINGS

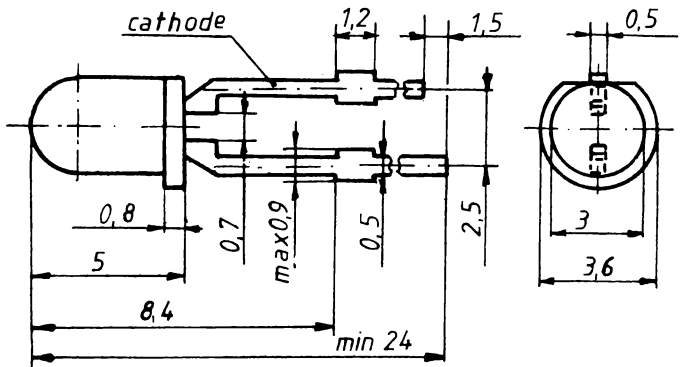
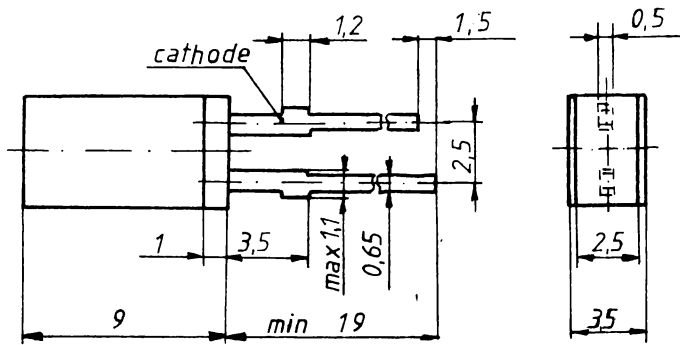
$T_{amb} = 25^{\circ}\text{C}$

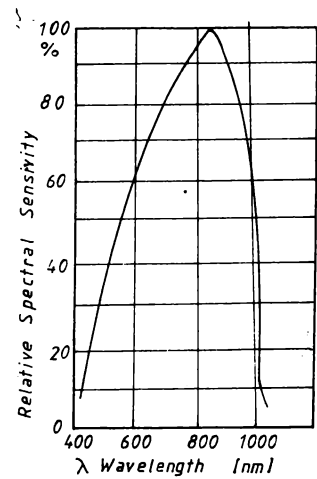
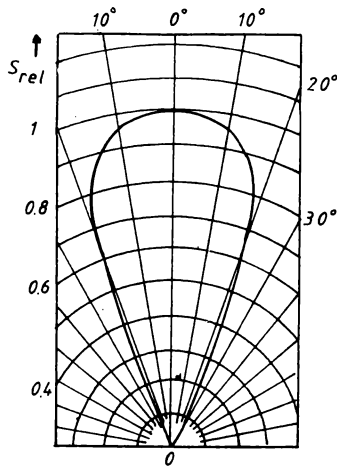
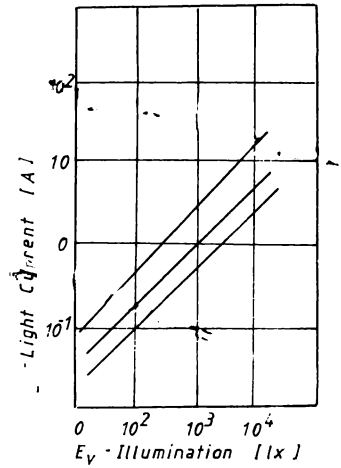
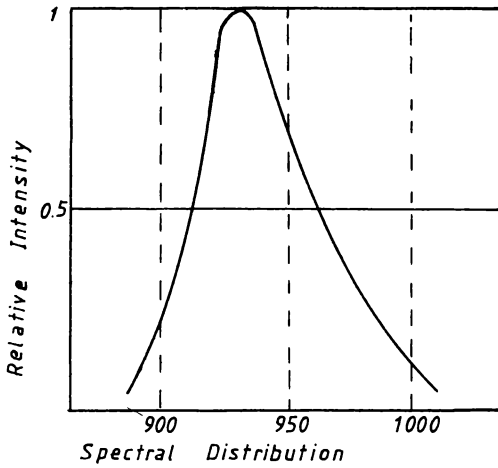
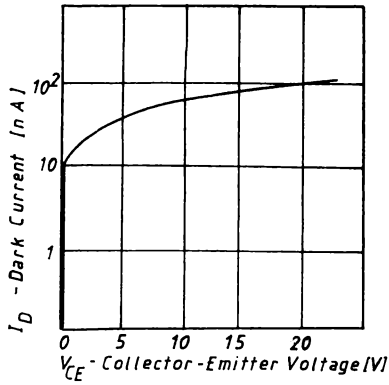
| | | STANDARD | MINIATURE | RECTANGULAR |
|---|--------------------|-----------|-----------|-------------|
| Collector-Emitter Voltage | V | 32 | 32 | 32 |
| Maximum Collector Current | mA | 50 | 50 | 50 |
| Power Dissipation | Mw | 200 | 100 | 200 |
| Storage and Operating Temperature | $^{\circ}\text{C}$ | -25...+70 | -25...+70 | -25...+70 |
| Lead Soldering Temperature (soldering 3 sec.) | $^{\circ}\text{C}$ | 260 | 260 C | 260 |



OPTOELECTRIC CHARACTERISTICS
 $T_{amb} = 25^{\circ}\text{C}$

| Type | $V_{(BR)CEO}$ (V) | $I_C = 1\text{mA}$ | | | λ_p | I_L (mA) $E_V = 1\text{klx}$ | I_D (nA) $E_V = 0$ | Case |
|--|----------------------|---------------------|----------------------------|----------------------------|-------------|--------------------------------------|----------------------------|--|
| | | $V_{CEsat.}$ (V) | t_r (μs) | t_f (μs) | | | | |
| | min. | max. | max. | max. | tip. | min. | max. | |
| MDR 4213-11A MDR 4213-11B MDR 4213-11C | 32 | 0,3 | 10 | 10 | 830 | 0,2 1 2 | 100 | standard $\varnothing = 5\text{mm}$ fig. 1 |
| MDR 4213-51A MDR 4213-51B | 32 | 0,3 | 10 | 10 | 830 | 0,5 1,5 | 100 | rectangular type, fig. 2 |
| MDR 4213-31A MDR 4213-31B | 32 | 0,3 | 10 | 10 | 830 | 0,5 1,5 | 100 | miniature $\varnothing = 3\text{mm}$, fig.3 |





OPTOCOUPERS

REFLECTIVE OPTO-SWITCH

MDC 2211—01

GALVANIC ISOLATOR OPTO-COUPLER

MDC 1111—03

MDC 1111—05

REFLECTIVE OPTO-SWITCH

GENERAL DESCRIPTION

This MDC series is an optocoupler at which the optical coupling radiation is necessary to be reflected by an external reflective surface. The distance between the optocoupler and this surface has to be max. 5,6 mm. This MDC optocoupler has in its composition a rectangular MDE Infrared Light Emitting Diode and a rectangular MDR Phototransistor. These two compounds are mounted in an opaque ABS case so that their mechanical axes (which practically coincide with the optical axes) form a 34 degree angle.

FEATURES

- * Plastic case
- * Compact construction
- * Low coupling capacity

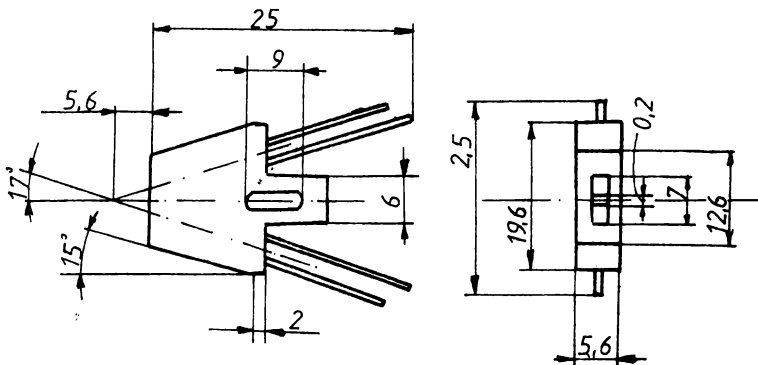
APPLICATIONS

- * Proximity photodetectors
- * Movement detectors
- * End of tape sensing

ABSOLUTE MAXIMUM RATINGS

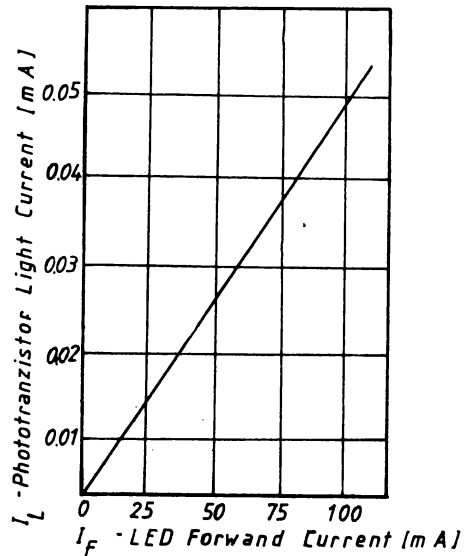
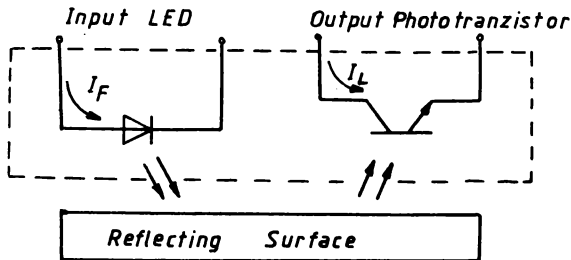
$T_{amb} = 25^{\circ}\text{C}$

| | Symbol | Unit. | Value |
|--|-------------|--------------------|-----------|
| Storage and Operating temperature | $T_{op.}$ | $^{\circ}\text{C}$ | -25...+70 |
| Lead soldering Temperature (soldering 3 sec) | $T_{slid.}$ | $^{\circ}\text{C}$ | +260 |
| 1. Emitter | | | |
| Forward DC Current | $I_F.$ | mA | 150 |
| Reverse Voltage | $V_R.$ | V | 5 |
| Peak Forward Current (1 μs pulse, 300pps) | $I_{FP.}$ | A | 1 |
| Power Dissipation | $P_{tot.}$ | mW | 100 |
| 2. Receiver | | | |
| Power Dissipation | $P_{tot.}$ | mW | 100 |
| 3. Optocoupler | | | |
| Input-output Continuous Voltage | $V_{IO.}$ | V | 1000 |
| Relative Moisture (t = 96 hours) | | % | 95 |



OPTOELECTRIC CHARACTERISTICS
 $T_{amb} = 25^{\circ}\text{C}$

| CHARACTERISTIC | Symbol | Test condition. | Value | | Unit. |
|---|-----------------|--|-------|------|---------------|
| | | | min. | max. | |
| 1. Emitter Forward Voltage | V_F . | $I_F = 100\text{mA}$ | | 1,7 | V |
| 2. Receiver Collector-Emitter Breakdown Voltage | $V_{BR}(CEO)$. | $I_C = 100\mu\text{A}$. | 30 | | V |
| Emitter-Collector Breakdown Voltage | $V_{BR}(ECO)$. | $I_E = 100\mu\text{A}$. | | | M |
| Collector-Emitter Leakage Current | I_{CEO} . | $V_{CEO} = 10\text{V}$ | | 0,5 | μA |
| 3. Optocoupler Collector Current | I_C . | $I_F = 100\text{mA}$ $V_{CEO} = 10\text{V}$ $R = 0,5$ (reflection coef.) | | 0,05 | mA |
| Rise Time | t_r . | $R_L = 1\text{k}\Omega$ | | 8 | μs |
| Fall Time | t_f . | $R_L = 1\text{k}\Omega$ | | 8 | μs |



GALVANIC ISOLATOR OPTOCOUPLER

GENERAL DESCRIPTION

The MDE Galvanic Isolator Optocoupler consists of a MDE \varnothing 5 mm or \varnothing 3 mm Infrared LED and a MDE \varnothing 5 or \varnothing 3 mm Phototransistor. These two components are sealed in a \varnothing 5 or \varnothing 3 mm opaque plastic tube.

FEATURES

- * Hermetically plastic case
- * Low coupling capacity
- * DC isolation voltage
- * Compact construction

APPLICATIONS

- * Galvanically separated circuits

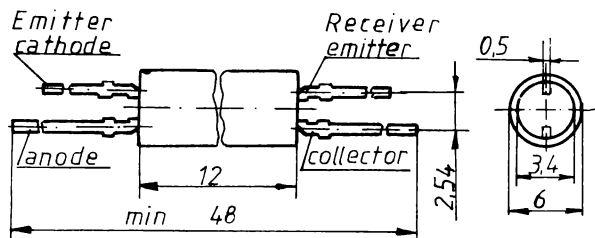
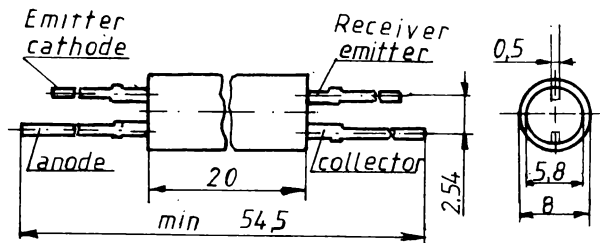
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}\text{C}$

OPTOELECTRIC CHARACTERISTICS

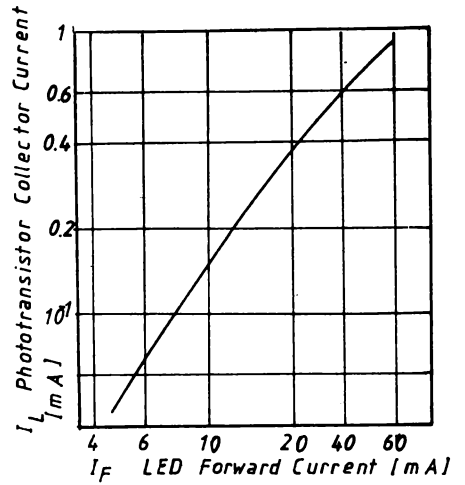
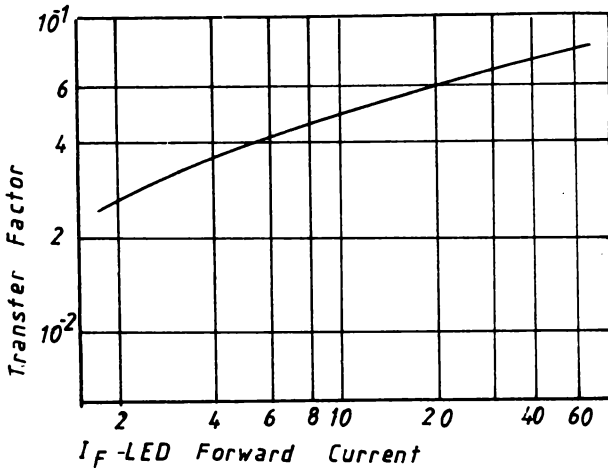
| | Symbol | UM | Value |
|---|------------|--------------------|-----------|
| Storage and operating Temperature | $T_{op.}$ | $^{\circ}\text{C}$ | -25...+70 |
| Lead Soldering Temperature (soldering 3 sec.) | $T_{sld.}$ | $^{\circ}\text{C}$ | +260 |
| 1. Emitter | | | |
| Forward DC current | $I_F.$ | mA | 50 |
| Reverse Voltage | $V_R.$ | V | 5 |
| Power Dissipation | $P_{tot.}$ | mW | 150 |
| 2. Receiver | | | |
| Power Dissipation | $P_{tot.}$ | mW | 100 |
| Collector Current | $I_C.$ | mA | 50 |
| 3. Optocoupler | | | |
| Input-output Continuous Voltage | $V_{IO.}$ | V | 5000 |
| Coupling Capacitance | $C_o.$ | pF | 0,3 |

PACKAGE DIMENSIONS



OPTOELECTRIC CHARACTERISTICS
 $T_{amb} = 25^{\circ}\text{C}$

| Characteristic | Symbol | Test condition | Value | | Unit. |
|---|--------------------|------------------------------------|-------|------|---------|
| | | | min. | max. | |
| 1. Emitter Reverse Current | $I_{R\cdot}$ | $V_R = 5V$ | | 10 | μA |
| Forward Voltage | V_F | $I_F = 50mA$ | | 2 | V |
| Breakdown Voltage | $V_{BR\cdot}$ | $I_R = 100\mu A$ | 5 | | V |
| 3. Receiver Collector-Emitter Breakdown Voltage | $V_{BR(CEO)\cdot}$ | $I_C = 1mA$ | 32 | | V |
| Dark Current | I_D | $I_F = 0; E = 0$ $V_{CE} = 20V$ | | 100 | nA |
| Saturation Voltage | $V_{CEsat\cdot}$ | $I_C = 1mA$ $E_V = 1klx$ | | 0,3 | V |
| 3. Optocoupler Collector Current | I_C | $I_F = 50mA$ $V_{CEO} = 10V$ | 7 | 10 | mA |
| Rise Time | t_r | $R_L = 1k\Omega$ | 10 | | μs |
| Fall Time | t_f | $R_L = 1k\Omega$ | 10 | | μs |
| Transfere factor | I_C / I_F | | 20 | | % |
| Max. frequency | f_M | | | 100 | kHz |



DISPLAYS

1 DIGIT

MDE 2101,2 R
MDE 2101,2 V
MDE 2111,2 R
MDE 2111,2 V

OVERFLOW

MDE 2502-13,4 V
MDE 2201,2 R
MDE 2201,2 V
MDE 2221,2 R
MDE 2221,2 V

9 DIGITS

MDE 2309-02 V
MDE 2309-12 V

2 DIGITS

MDE 2502-01,2 R
MDE 2502-01,2 V
MDE 2502-03,4 R
MDE 2502-03,4 V
MDE 2502-11,2 R
MDE 2502-11,2 V
MDE 2502-13,4 R
MDE 2583,4 R

1 1/2 DIGIT & SIGN

MDE 2541-01,2 R
MDE 2541-01,2 V
MDE 2541-03,4 R
MDE 2541-03,4 V
MDE 2551-11,2 R
MDE 2551-11,2 V
MDE 2551-13,4 R
MDE 2551-13,4 V

BARGRAPH

MDE 2954 RV

3 1/2 DIGITS

MDE 2571,2 R
MDE 2581,2 V

4 DIGITS

MDE 2573,4 R
MDE 2573,4 V
MDE 2583,4 V

5x7 DOT MATRIX

MDE 2701,2 R
MDE 2701,2 V

| | | | | | |
|--------------|----|---|-----------|-----|---|
| MDE 2101,2 R | AC | 3 | 180 / 300 | 700 | 5 |
| MDE 2111,2 R | CC | 3 | 180 / 300 | 700 | 5 |
| MDE 2101,2 V | AC | 3 | 180 / 300 | 567 | 5 |
| MDE 2111,2 V | CC | 3 | 180 / 300 | 567 | 5 |

1 DIGIT DISPLAY

GENERAL DESCRIPTION

The 7,62 mm seven segment display with right hand, left hand or less decimal point and common anode or cathode are plastic encapsulated.
The emissive GaP chips (LED) are mounted on a dual-in-line pin PCB.

FEATURES

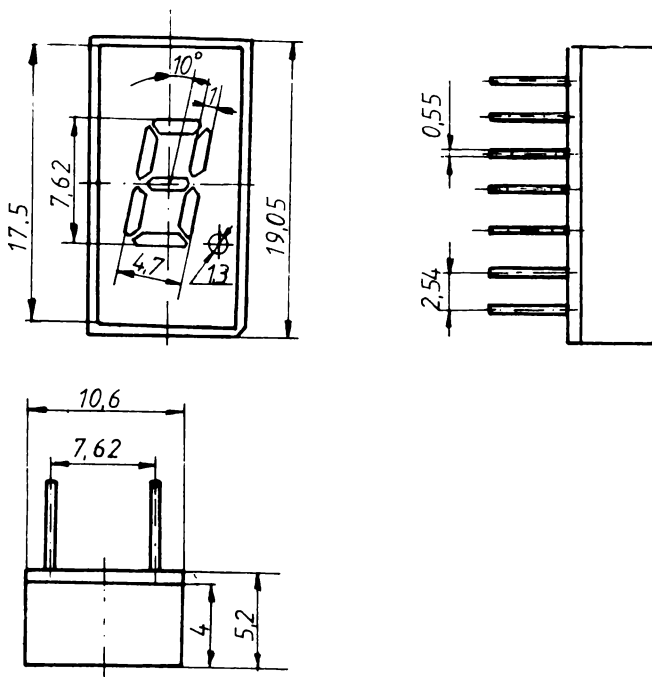
- * High luminous intensity
- * Low power requirements
- * Wide viewing angle
- * High reliability and long life
- * Usable in vibrating environment

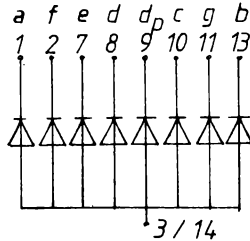
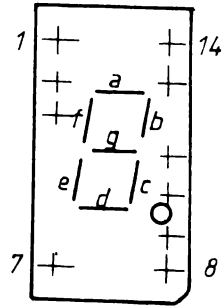
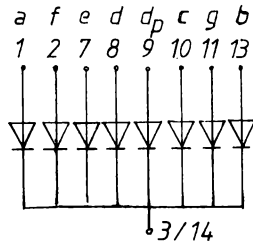
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Red | Green |
|---|------------|-------------|-----------|-----------|
| Power, Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 50 | 80 |
| Forward Current (for segment or d.p.) | $I_F.$ | mA | 20 | 20 |
| Peak Forward current, (for segment or d.p.) (1 μ s pulse width, 300pps) | $I_{FP.}$ | mA | 60 | 60 |
| Operating Temperature | $T_{op.}$ | $^{\circ}C$ | -25...+70 | -25...+70 |
| Storage Temperature | $T_{stg.}$ | $^{\circ}C$ | -40...+70 | -25...+70 |
| Lead Soldering Temperature ($t_{sid} = 3s$) | $T_{sid.}$ | $^{\circ}C$ | 260 | 260 |

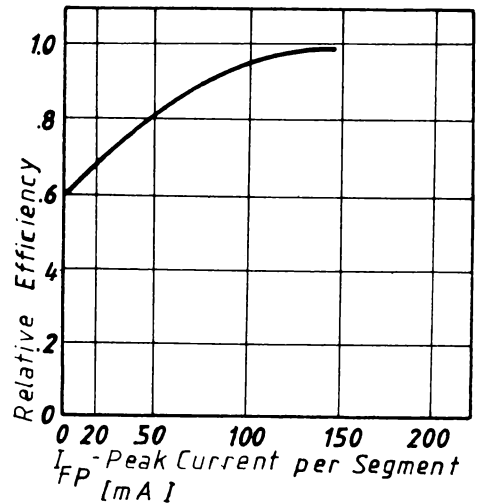
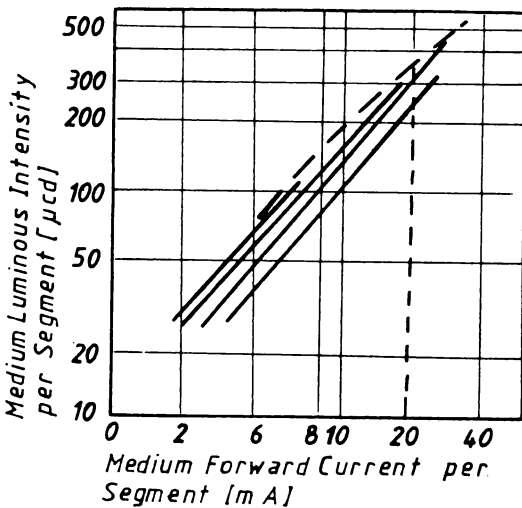
PACKAGE DIMENSIONS





OPTOELECTRIC CHARACTERISTICS % SEGMENT OR DECIMAL POINT

| Type | $T_{amb} = 25^{\circ}C, I_F = 10mA$ | | $I_R = 100\mu A$ | |
|-----------------|-------------------------------------|-----------------------|------------------------|---------------------|
| | $V_F(V)$ max. | $I_V(\mu cd)$ min. | $\lambda_P(nm)$ tip | $V_{BR}(V)$ min. |
| MDE 2101,2 R AC | 3 | 180 / 300 | 700 | 5 |
| MDE 2111,2 R CC | 3 | 180 / 300 | 700 | 5 |
| MDE 2101,2 V AC | 3 | 180 / 300 | 567 | 5 |
| MDE 2111,2 V CC | 3 | 180 / 300 | 567 | 5 |



OVERFLOW DISPLAY

GENERAL DESCRIPTION

The MDE overflow display has four segments and a right decimal point. It consists of GaP red or green LEDs mounted on a dual-in-line 14 pin substrate. It provides polarity and overflow display capability. It is matched with the 7,62 mm 1 Digit MDE display.

FEATURES

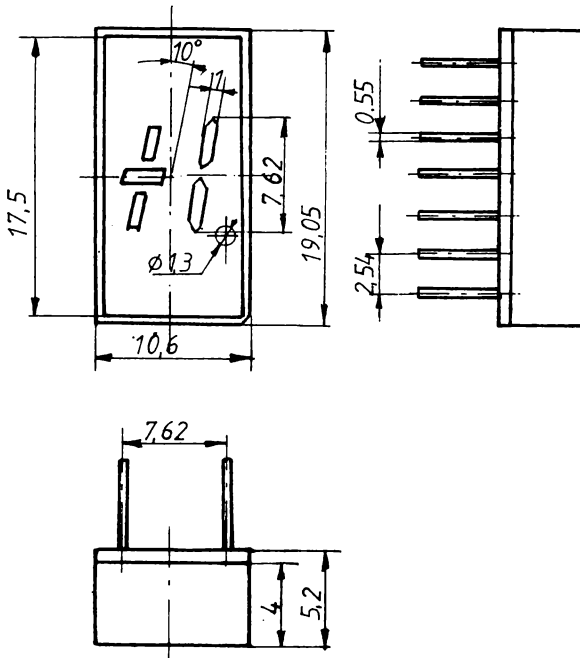
- * High luminous intensity
- * Low power requirements
- * Wide viewing angle
- * High reliability and long life
- * Usable in vibrating environment.

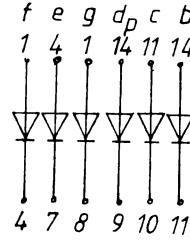
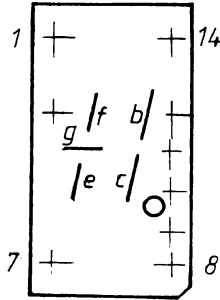
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Red | Green |
|--|------------|-------------|-----------|-----------|
| Power Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 50 | 80 |
| Forward Current (for segmnt or d.p.) | $I_F.$ | mA | 20 | 20 |
| Peak Forward Current (for segmnt or d.p.) (1 μ s pulse width, 300 pps) | $I_{FP.}$ | mA | 60 | 60 |
| Storage Temperature | $T_{stg.}$ | $^{\circ}C$ | -40...+70 | -40...+70 |
| Lead Soldering Temperature ($t_{sl.} = 3s$) | $T_{sl.}$ | $^{\circ}C$ | 260 | ± 260 |

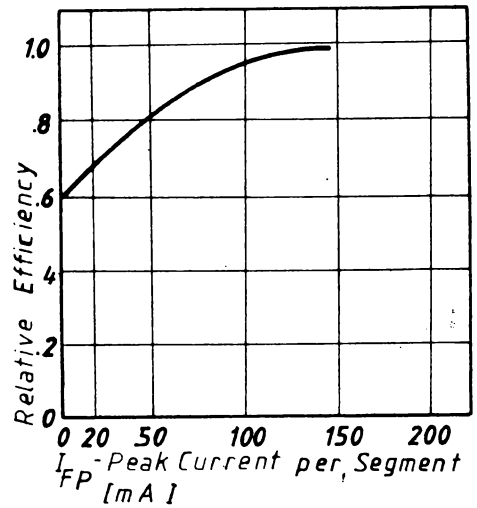
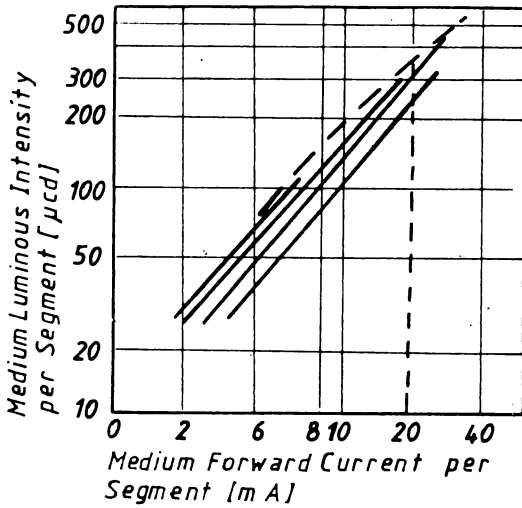
PACKAGE DIMENSIONS





OPTOELECTRIC CHARACTERISTICS / SEGMENT OR DECIMAL POINT
 $T_{amb} = 25^{\circ}\text{C}$

| TYPE | $I_F = 10\text{mA}$ | | | $I_R = 100\mu\text{A}$ |
|--------------|---------------------|---------------------|------------------------|------------------------|
| | $V_F(\text{V})$ | $I_V(\mu\text{cd})$ | $\lambda_P(\text{nm})$ | $V_{BR}(\text{V})$ |
| | max. | min. | tip | min. |
| MDE 2201,2 R | AC 3 | 180 / 300 | 700 | 5 |
| MDE 2211,2 R | CC 3 | 180 / 300 | 700 | 5 |
| MDE 2201,2 V | AC 3 | 180 / 300 | 567 | 5 |
| MDE 2211,2 V | CC 3 | 180 / 300 | 567 | 5 |



2 DIGITS

GENERAL DESCRIPTION

The emissive chips (LED) are made on GaP. These chips are mounted on a dual-in-line pin implanted PCB.

FEATURES

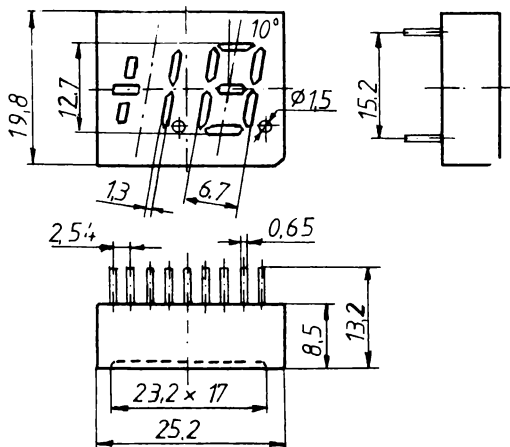
- * Back sealed package for MDE 2502-03, 04, 13, 14
- * or back unsealed package for MDE 25-01, 02, 11, 12.
- * High brightness
- * Wide viewing angle
- * Shock resistant

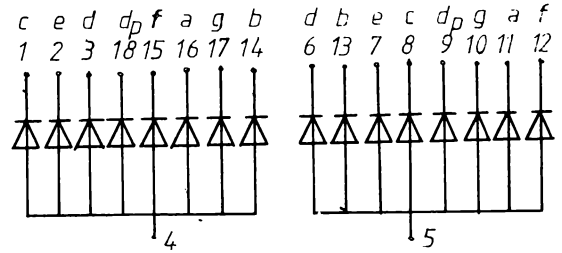
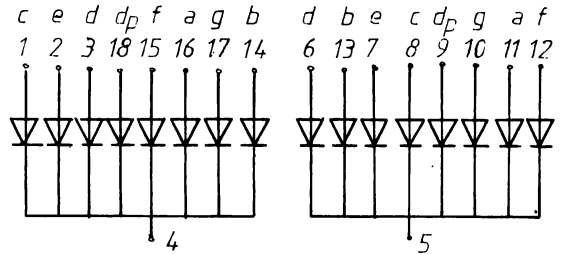
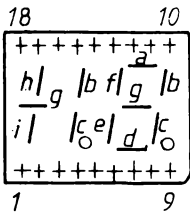
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Red | Green |
|--|-------------|-------------|-----------|-----------|
| Power Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 50 | 80 |
| Forward Current (for segment or d.p.) | I_F | mA | 20 | 20 |
| Peak Forward Current (for segment or d.p.) (1 μs pulse width, 300pps) | I_{FP} | mA | 60 | 60 |
| Operating Temperature | $T_{op.}$ | $^{\circ}C$ | -40...+70 | -25...+70 |
| Storage Temperature | $T_{stg.}$ | $^{\circ}C$ | -40...+70 | -40...+70 |
| Lead Soldering Temperature ($t_{slid}=3s$) | $T_{slid.}$ | $^{\circ}C$ | 260 | 260 |

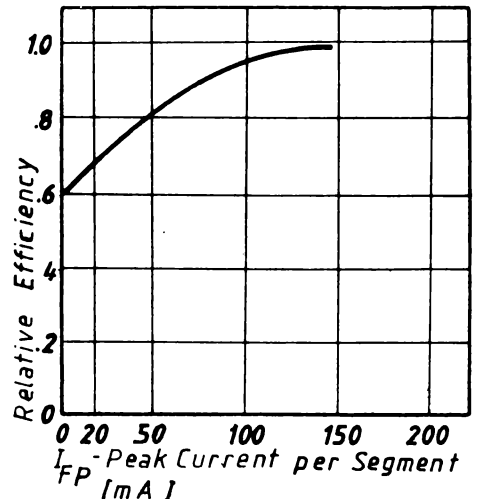
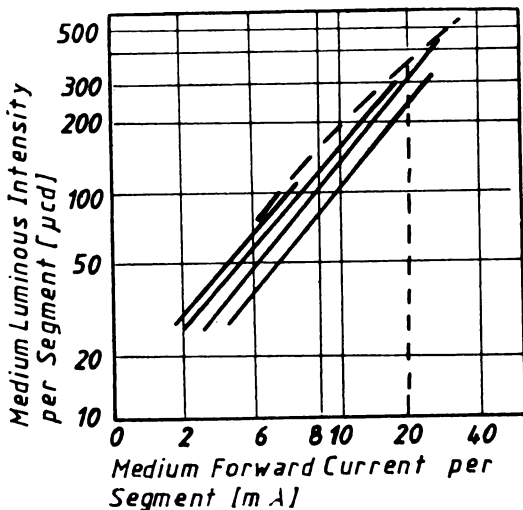
PACKAGE DIMENSIONS





OPTOELECTRIC CHARACTERISTICS / SEGMENT OR DECIMAL POINT
 $T_{amb} = 25^{\circ}\text{C}$

| TYPE | $I_f = 10\text{mA}$ | | | $I_r = 100\mu\text{A}$ |
|---------------------|---------------------|---------------------|------------------------|------------------------|
| | $V_F(\text{V})$ | $I_V(\mu\text{cd})$ | $\lambda_p(\text{nm})$ | $V_{BR}(\text{V})$ |
| | max. | min. | tip. | min. |
| MDE 2502-01,02 R AC | 3 | 230 / 350 | 700 | 5 |
| MDE 2502-01,02 V AC | 3 | 230 / 350 | 567 | 5 |
| MDE 2502-11,12 R CC | 3 | 230 / 350 | 700 | 5 |
| MDE 2502-11,12 V CC | 3 | 230 / 350 | 567 | 5 |
| MDE 2502-03,04 R AC | 3 | 230 / 350 | 700 | 5 |
| MDE 2502-03,04 V AC | 3 | 230 / 350 | 567 | 5 |
| MDE 2502-13,14 R CC | 3 | 230 / 350 | 700 | 5 |
| MDE 2502-13,14 V CC | 3 | 230 / 350 | 700 | 5 |



1 1/2 DIGITS — SIGN

FEATURES

GENERAL DESCRIPTION

This MDE series consists of GaP red (R) or green (V) LED chips mounted on a dual-in-line pin implanted PCBs.

The height of the digits is 12,7 mm, so that this display is matched with the '2 Digits' MDE series.

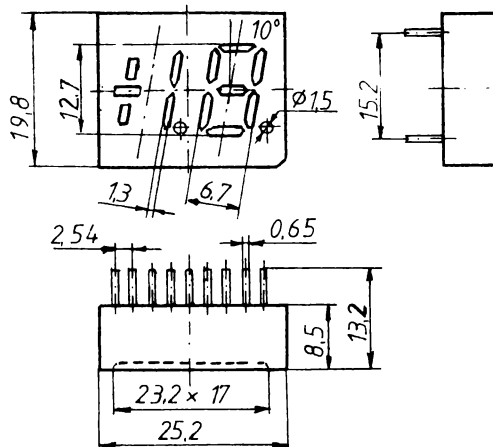
- * High luminous intensity
- * Low power requirements
- * Wide viewing angle
- * High reliability and long life
- * IC compatible
- * Back sealed package for MDE 2541-03, 2541-04, 2551-13, 2551-14 or back unsealed package for MDE 2541-01, 2541-02, 2551-11, 2551-12.

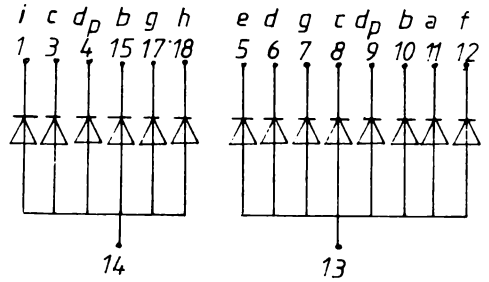
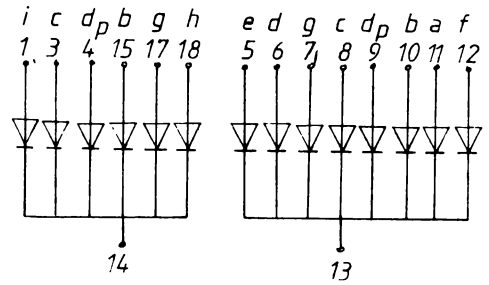
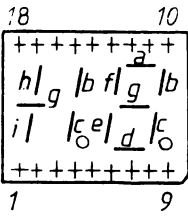
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Red | Green |
|--|-------------|-------------|-----------|-----------|
| Power Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 50 | 80 |
| Forward Current (for segment or d.p.) | $I_F.$ | mA | 20 | 20 |
| Peak Forward Current (for segment or d.p.) (1 μ s pulse width, 300pps) | $I_{FP.}$ | mA | 60 | 60 |
| Operating Temperature | $T_{op.}$ | $^{\circ}C$ | -25...+70 | -25...+70 |
| Storage temperature | $T_{slg.}$ | $^{\circ}C$ | -40...+70 | -40...+70 |
| Lead Soldering Temperature ($t_{slid} = 3s$) | $T_{slid.}$ | $^{\circ}C$ | 260 | +260 |

PACKAGE DIMENSIONS



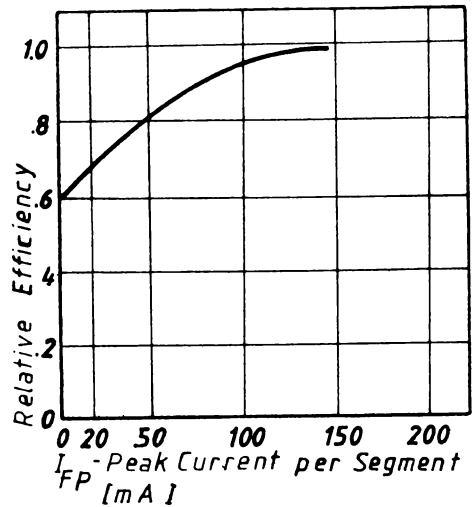
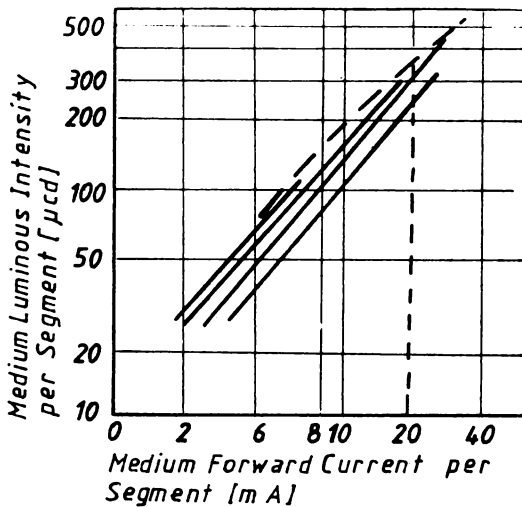


OPTOELECTRIC CHARACTERISTICS AT $T_{amb} = 25\text{ C}$

| TYPE | $I_F = 20\text{mA}$ | | $I_R = 100\mu\text{A}$ | |
|-----------------------|-------------------------|-----------------------------|--------------------------------|---------------------------|
| | $V_F(\text{V})$ max. | $I_V(\mu\text{cd})$ min. | $\lambda_P(\text{nm})$ tip. | $V_{BR}(\text{V})$ min |
| * MDE 2512-01,02 R AC | 3 | 230 / 350 | 700 | 5 |
| * MDE 2512-01,02 V AC | 3 | 230 / 350 | 567 | 5 |
| * MDE 2512-11,12 R CC | 3 | 230 / 350 | 700 | 5 |
| * MDE 2512-11,12 V CC | 3 | 230 / 350 | 567 | 5 |

NOTES:

* - Product in development



3 1/2 DIGITS DISPLAY

GENERAL DESCRIPTION

The emissive chips (LED) are made on GaP. The large 7,62 mm high character size generates a bright, continuously uniform seven segment display. They are made on printed circuit boards and plastic encapsulated.

FEATURES

- * High brightness
- * Low power requirements
- * Multiplexed addressable
- * Wide viewing angle
- * Shock resistant

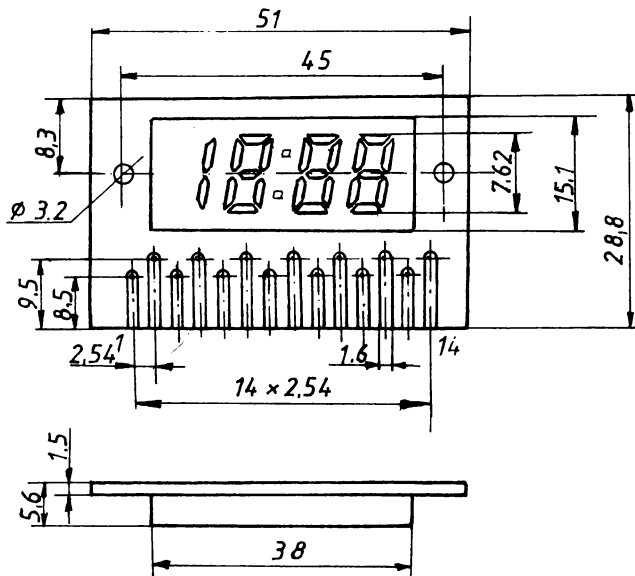
APPLICATIONS

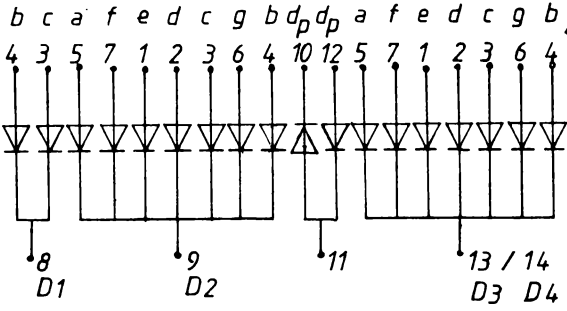
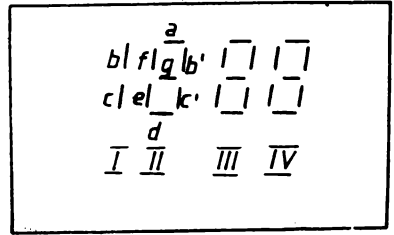
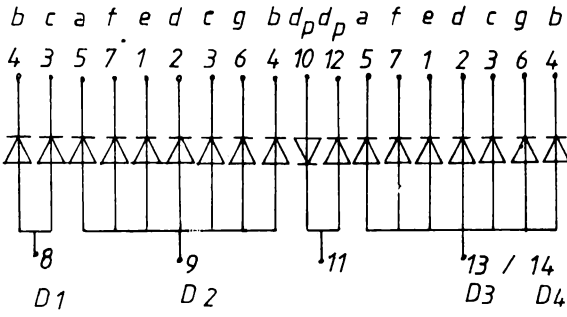
- * General indicating purposes
- * Time indication (clock, etc.)

ABSOLUTE MAXIMUM RATINGS $T_{amb} = 25^{\circ}\text{C}$

| | Symbol | Unit. | Red | Green |
|--|------------|--------------------|-----------|-----------|
| Power Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 50 | 80 |
| Forward Current (for segment or d.p.) | $I_F.$ | mA | 20 | 20 |
| Peak Forward Current (for segment or d.p.) (1 μs pulse width, 300pps) | $I_{FP.}$ | mA | 60 | 60 |
| Operating Temperature | $T_{op.}$ | $^{\circ}\text{C}$ | -25...+70 | -25...+70 |
| Storage Temperature | $T_{stg.}$ | $^{\circ}\text{C}$ | -40...+70 | -40...+70 |
| Lead Soldering Temperature ($t_{sid.} = 3\text{s}$) | $T_{sid.}$ | $^{\circ}\text{C}$ | +260 | +260 |

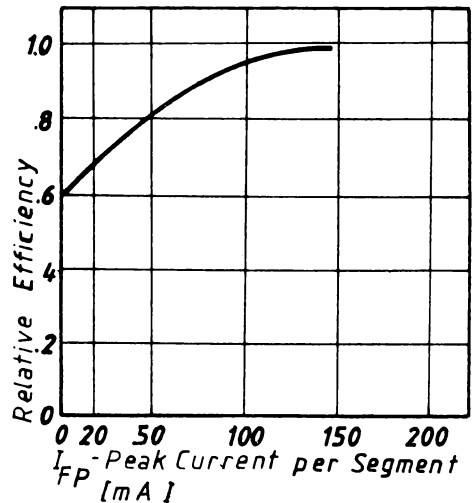
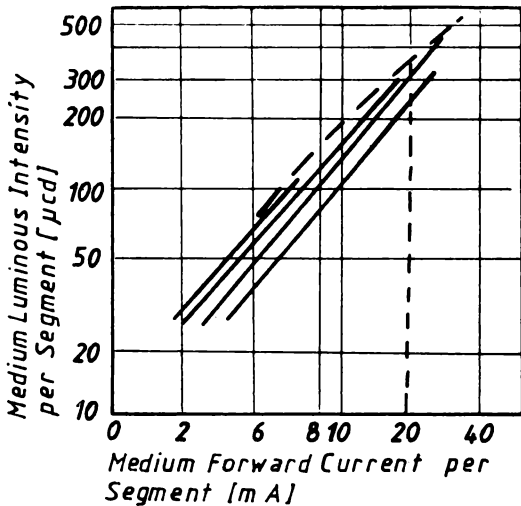
PACKAGE DIMENSIONS





OPTOELECTRIC CHARACTERISTICS / SEGMENT OR DECIMAL POINT
T_{amb} = 25°C

| TYPE | I _F = 10mA | | | I _R = 100μA |
|-----------------|----------------------------|------------------------------|----------------------------|-----------------------------|
| | V _F (V) max. | I _V (μcd) min. | λ _p (nm) tip | V _{BR} (V) min. |
| MDE 2571,2 R AC | 3 | 180 / 300 | 700 | 5 |
| MDE 2571,2 V AC | 3 | 180 / 300 | 567 | 5 |
| MDE 2581,2 R CC | 3 | 180 / 300 | 700 | 5 |
| MDE 2581,2 V CC | 3 | 180 / 300 | 567 | 5 |



4 DIGITS

GENERAL DESCRIPTION

The MDE 2573,4 R, V and MDE 2583, 4 R, V are common, cathode respectively common anod four digit seven segment displays. The height of the digits is 7,62 mm. These MDE series are made of GaP red or green LED chips mounted on a printed circuit board and plastic encapsulated.

FEATURES

- * High luminous intensity
- * Wide viewing angle
- * IC compatible
- * Multiplexed adressable
- * Shock resistant

APPLICATIONS

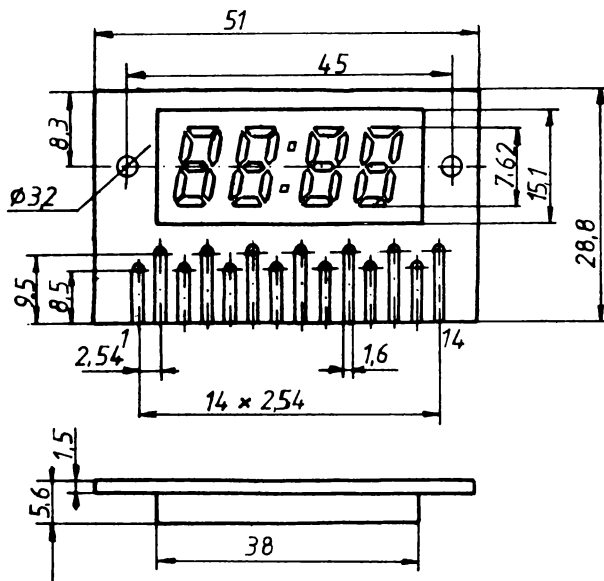
- * Time indication (clock, etc.)
- * To display digital information in electrical equipments

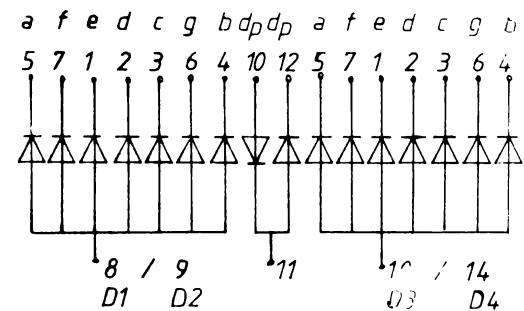
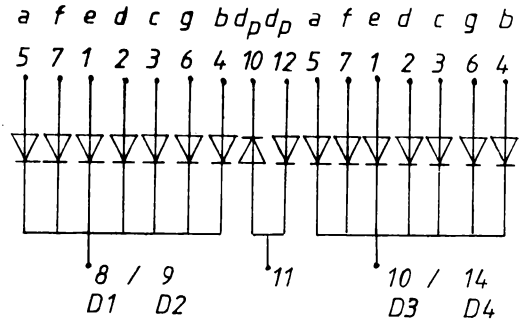
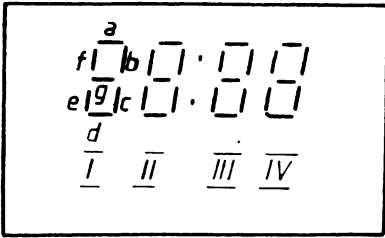
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Red | Green |
|--|-------------|-------------|-----------|-----------|
| Power Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 50 | 80 |
| Forward Current (for segment or d.p.) | $I_F.$ | mA | 20 | 20 |
| Peak forward Current (for segment or d.p.) (1 μ s pulse width, 300pps) | $I_{FP.}$ | mA | 60 | 60 |
| Operating Temperature | $T_{op.}$ | $^{\circ}C$ | -25...+70 | -25...+70 |
| Storage Temperature | $T_{slg.}$ | $^{\circ}C$ | -40...+70 | -40...+70 |
| Lead Soldering Temperature ($t_{slid.} = 3s$) | $T_{slid.}$ | $^{\circ}C$ | +260 | +260 |

PACKAGE DIMENSIONS

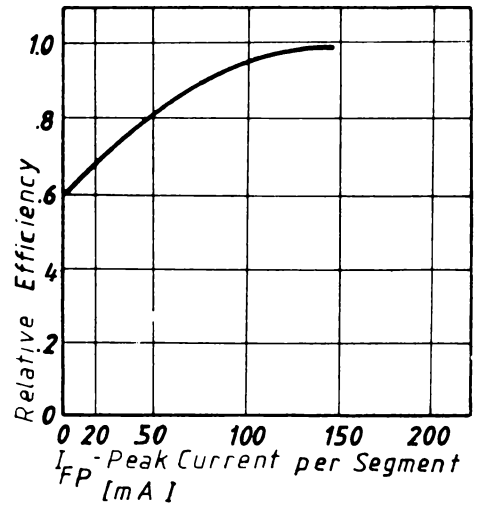
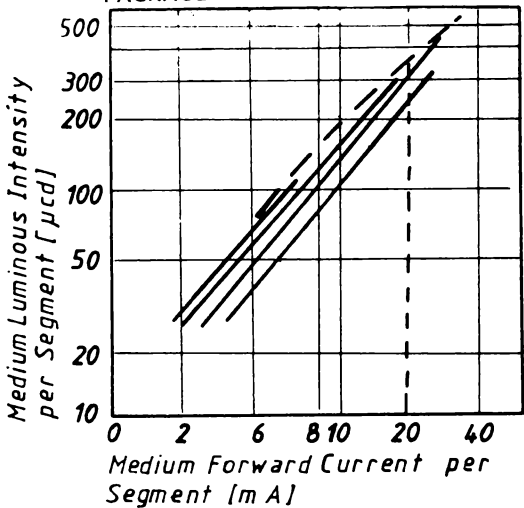




OPTOELECTRIC CHARACTERISTICS / SEGMENT OR DECIMAL POINT
 $T_{amb} = 25^{\circ}C$

| TYPE | $I_F = 10mA$ | | $I_R = 100\mu A$ | |
|-----------------|------------------|-----------------------|-------------------------|---------------------|
| | $V_F(V)$ max. | $I_V(\mu CD)$ min. | $\lambda_p(nm)$ tip. | $V_{BR}(V)$ min. |
| MDE 2573,4 R AC | 3 | 180 / 300 | 700 | 5 |
| MDE 2573,4 V AC | 3 | 180 / 300 | 567 | 5 |
| MDE 2583,4 R CC | 3 | 180 / 300 | 700 | 5 |
| MDE 2583,4 V CC | 3 | 180 / 300 | 567 | 5 |

PACKAGE DIMENSIONS



9 DIGITS

GENERAL DESCRIPTION

The emissive chips (LED) are made on GaP. The large 7,62 mm high character size generates a bright, continuously uniform seven segment display. They are made on printed circuit boards and plastic encapsulated.

FEATURES

- * High brightness
- * High contrast
- * Multiplexed addressable
- * Wide viewing angle
- * Low power consumption

APPLICATIONS

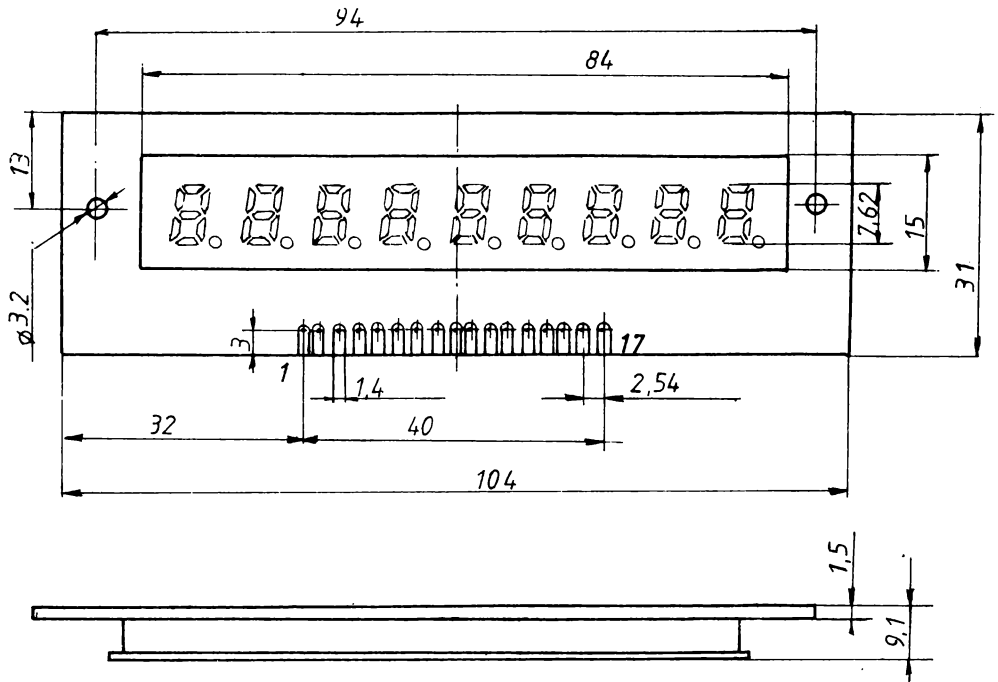
- * Pay-desks
- * Calculators
- * Digital readout displays

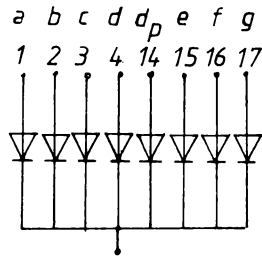
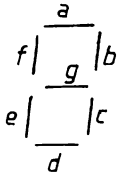
ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

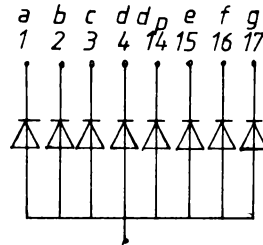
| | Symbol | Unit. | Value |
|---|------------|-------------|-----------|
| Power Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 80 |
| Forward Current (for segment or d.p.) | $I_F.$ | mA | 20 |
| Peak Forward Current (for segment or d.p.) (1 μ s pulse width, 300 pps) | $I_{FP.}$ | mA | 60 |
| Operating temperature | $T_{op.}$ | $^{\circ}C$ | -25...+70 |
| Storage Temperature | $T_{stg.}$ | $^{\circ}C$ | -40...+70 |
| Lead Soldering Temperature ($t_{sid.} = 3s$). | $T_{sid.}$ | $^{\circ}C$ | +260 |

PACKAGE DIMENSIONS





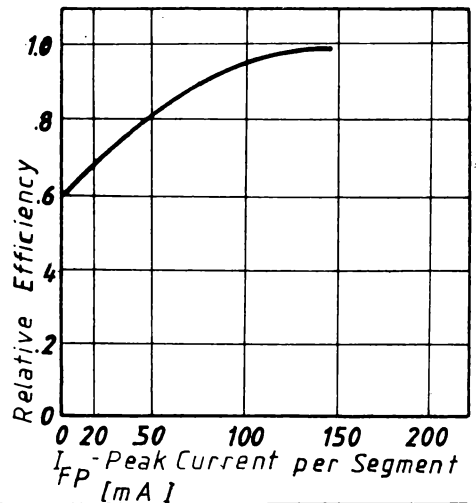
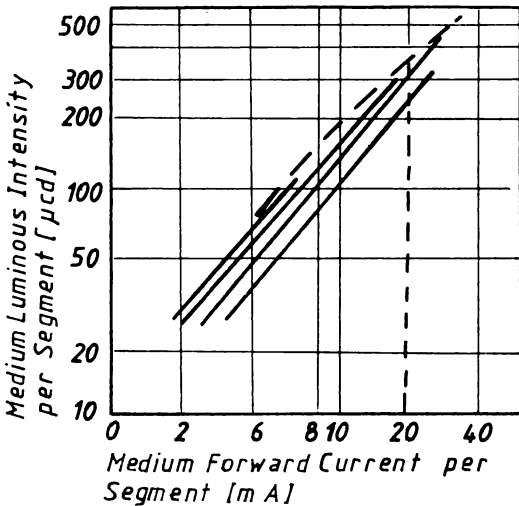
5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13
D1 D2 D3 D4 D5 D6 D7 D8 D9



5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13
D1 D2 D3 D4 D5 D6 D7 D8 D9

OPTOELECTRIC CHARACTERISTICS / SEGMENT OR DECIMAL POINT
T_{amb} = 25°C

| TYPE | V _F (V) max. | I _F = 10mA | | I _R = 100μa |
|------------------|----------------------------|------------------------------|----------------------------|-----------------------------|
| | | I _V (μcd) min. | λ _P (nm) tip | V _{BR} (V) min. |
| MDE 2309-02 V AC | 3 | 180 | 567 | 5 |
| MDE 2309-12 V CC | 3 | 180 | 567 | 5 |



5X7 DOT MATRIX DISPLAY

GENERAL DESCRIPTION

The MDE 2701, 2 R, V series consists in GaP red (R) or green (V) LED chips mounted on a dual-in-line pin PCB.

FEATURES

- * 5x7 and decimal point dot matrix
- * Ideal for graphics panels
- * Excellent character appearance
- * Mechanically rugged

APPLICATIONS

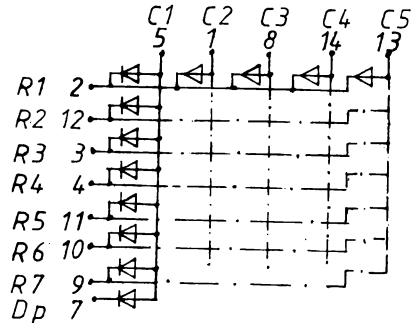
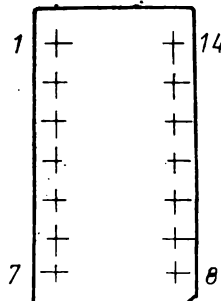
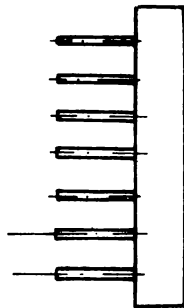
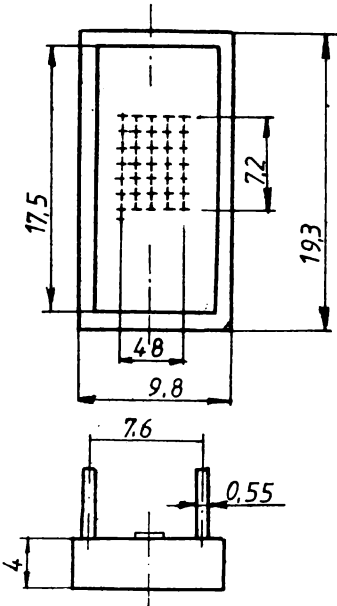
- * Applications include electronic instrumentation, computer peripherals, point of sale terminals.

ABSOLUTE MAXIMUM RATINGS

$T_{amb} = 25^{\circ}C$

| | Symbol | Unit. | Red | Green |
|--|-------------|-------------|-----------|-----------|
| Power Dissipation (for segment or d.p.) | $P_{tot.}$ | mW | 50 | 80 |
| Forward Current (for segment or d.p.) | $I_F.$ | mA | 20 | 20 |
| Peak Forward Current (for segment or d.p.) (1 μ s pulse width, 300pps) | $I_{FP.}$ | mA | 60 | 60 |
| Operating Temperature | $T_{op.}$ | $^{\circ}C$ | -25...+70 | -25...+70 |
| Storage Temperature | $T_{stg.}$ | $^{\circ}C$ | -40...+70 | -40...+70 |
| Lead Soldering Temperature $T_{slid.} = 3s$ | $T_{slid.}$ | $^{\circ}C$ | +260 | +260 |

PACKAGE DIMENSIONS

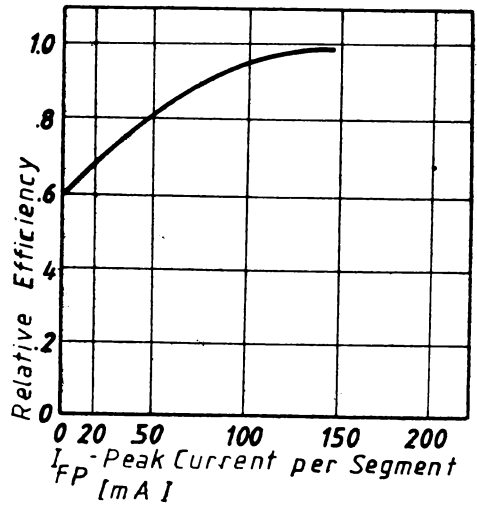
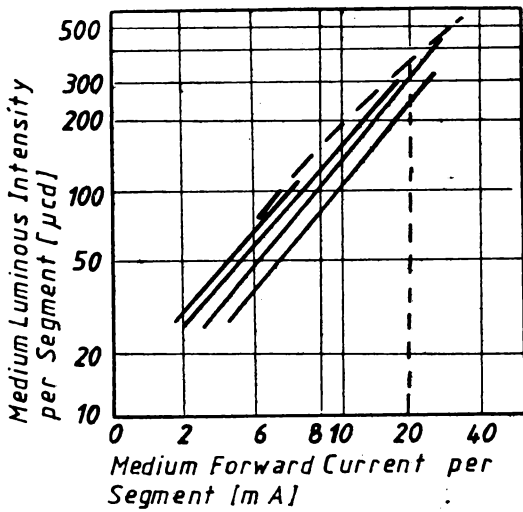


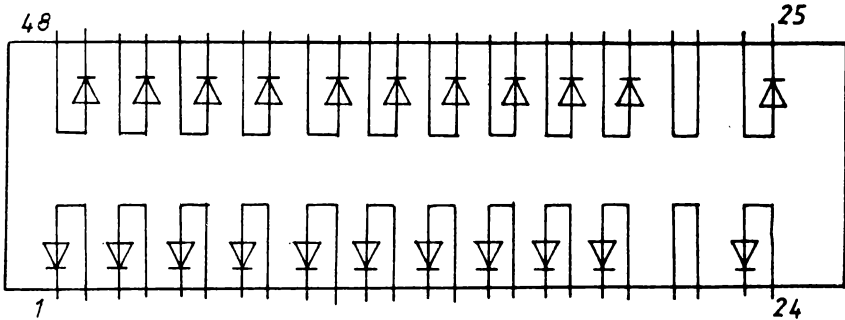
OPTOELECTRIC CHARACTERISTICS AT $T_{amb} = 25^{\circ}C$

| TYPE | $V_F(V)$ max. | $I_F = 10mA$ | | $I_R = 100\mu A$ |
|---------|------------------|---------------------|-------------------------|---------------------|
| | | $I_V(I/cd)$ min. | $\lambda_P(nm)$ tip. | $V_{BR}(V)$ min. |
| * Red | 3 | 150 / 250 | 700 | 5 |
| * Green | 3 | 150 / 350 | 567 | 5 |

NOTES :

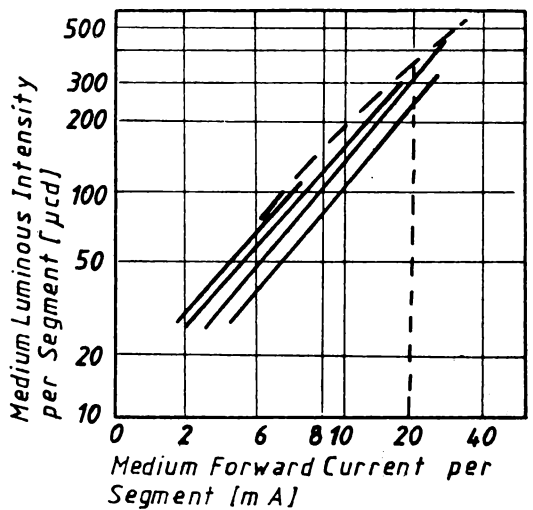
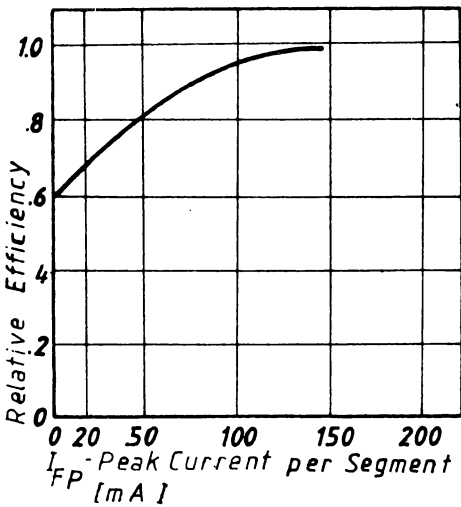
- * Product in development





OPTOELECTRIC CHARACTERISTICS / SEGMENT
 $T_{amb} = 25^{\circ}\text{C}$

| TYPE | $V_F(V)$ max. | $I_F = 10\text{mA}$ | | $I_R = 100\mu\text{A}$ |
|-------------|------------------|-----------------------------|-------------------------------|------------------------|
| | | $I_V(\mu\text{cd})$ min. | $\lambda_P(\text{nm})$ tip | $V_{BR}(V)$ min. |
| MDE 2954 RV | 3 | 100 | 700 567 | 5 |



CROSS REFERENCE GUIDE

| TYPE | EQUIVALENT DEVICES |
|---------------------------|--|
| MICROELECTRONICA | |
| MDE 1101,2,3 R, P, G, V | - TELEFUNKEN : CQY 40; CQX 38; CQY 72; CQY 74; - Hp : HLMP-3105; HLMP-D400; HLMP-3650 HLMP-3680; HLMP-4700; HLMP-4719 HLMP-4740 |
| MDE 1301,2,3 R, P, G, V | - TELEFUNKEN : CQY 85; CQX 41; CQY 86; CQY87; |
| MDE 1106,7,8 R, P, G, V | - TELEFUNKEN : CQX 35A; CQX 36A; CQX 37A; CQX 39A; |
| MDE 1601,2,3 R, P, G, V | - Hp : HLMP 3105; HLMP 3650; HLMP 3680 |
| MDE 1531,2,3 R, P, G, V | - Hp : HLMP 0300; HLMP 0400; HLMP 0503 |
| MDE 1511,2,3 R, P, G, V | - Hp : HLMP 1800; HLMP 1819; HLMP 1840; |
| MDE 3123-02,05,06 | - TELEFUNKEN : CQY 99 |
| MDE 3323-16 | - TELEFUNKEN : CQX 46 |
| MDE 2101,2 R, V | - MBLÉ : CQY 81A, B; |
| MDE 2111,2 R, V | |
| MDE 2201,2 R, V | - SANYO : SL 1171 T; SL 1173 T; |
| MDE 2502-01,02,03,04 R, V | - RFT : VQE 21...24 |
| MDE 2502-11,12,13,14 R, V | - SANYO : SL 2214 T |
| MDR 4213-11 A, B, C | - TELEFUNKEN : BPW 40; |
| MDR 4213-31 A,B | - TELEFUNKEN : BPW 42; |
| | - MBLÉ : BPW 22; |
| MDC 1111-03,05 | - TELEFUNKEN : CNY-21; |
| | - MBLÉ : CNY-42; |
| MDC 2211-01 | - HONEYWELL : HOA-1405 |

