



# SUPER BRIGHT LED NUMERIC DISPLAYS

10mm (0.4inch)

## ■ FEATURES

- SUPER BRIGHT AND CLEAR DISPLAY
- AVAILABLE IN 5 COLORS: RED, PURE GREEN, GREEN, YELLOW AND ORANGE
- LOW CURRENT DRIVE
- IDEAL FOR DYNAMIC DRIVE
- EASY MOUNTING ON PC BOARDS AND IC SOCKETS
- AVAILABLE IN 2 FACE COLORS: BLACK AND GRAY
- 1 DIGIT AND 2 DIGIT DISPLAY

## ■ APPLICATION





- MEASURING INSTRUMENTS
- OFFICE EQUIPMENT
- GAME MACHINE
- AUTOMATIC VENDING MACHINE

## ■ Absolute Maximum Ratings

(Ta=25°C)

| Items                         | Symbol          | Test Condition  | Red           | Pure green    | Green          | Yellow        | Orange        | Units  |
|-------------------------------|-----------------|-----------------|---------------|---------------|----------------|---------------|---------------|--------|
|                               |                 |                 | NSR, NAR, NKR | NSG, NAG, NKG | NSG-NAG-P-NKGP | NSY, NAY, NKY | NSA, NAA, NKA |        |
| Power Dissipation             | Pd              | —               | 60            |               | 63             |               |               | mW/seg |
| Forward Current               | If              | —               | 30            |               | 25             |               |               | mA/seg |
| Forward Current Derating      | $\Delta I_f$    | Ta=25°C         | 0.41          |               | 0.34           |               |               | mA/°C  |
| Peak Forward Current          | IFM             | Duty 1/5, 1 kHz | 120           |               | 100            |               |               | mA/seg |
| Peak Forward Current Derating | $\Delta I_{FM}$ | Ta=25°C         | 1.64          |               | 1.35           |               |               | mA/°C  |
| Reverse Voltage               | Vr              |                 | 4             |               |                |               |               | V/seg  |
| Operating Temperature         | Topr            |                 | -40 ~ +85     |               |                |               |               | °C     |
| Storage Temperature           | Tstg            |                 | -40 ~ +85     |               |                |               |               | °C     |

## ■ SELECTION GUIDE

| Emitted Color | Package Color | Type No.  |   |   |   |         |
|---------------|---------------|---|---|---|---|---------|
|               |               |  |  |  |  |         |
|               |               | Common Anode  | Common Cathode  | Common Anode  | Common Cathode  |         |
| Red           | Black         | NSR141  | NAR141  | NKR141  | NAR241  | NKR241  |
|               | Gray          | NSR143  | NAR143  | NKR143  | NAR243  | NKR243  |
| Pure green    | Black         | NSG141  | NAG141  | NKG141  | NAG241  | NKG241  |
|               | Gray          | NSG143  | NAG143  | NKG143  | NAG243  | NKG243  |
| Green         | Black         | NSG141P   | NAG141P   | NKG141P   | NAG241P   | NKY241P |
|               | Gray          | NSG143P   | NAG143P   | NKG143P   | NAG243P   | NKG243P |
| Yellow        | Black         | NSY141  | NAY141  | NKY141  | NAY241  | NKY241  |
|               | Gray          | NSY143  | NAY143  | NKY143  | NAY243  | NKY243  |
| Orange        | Black         | NSA141  | NAA141  | NKA141  | NAA241  | NKA241  |
|               | Gray          | NSA143  | NAA143  | NKA143  | NAA243  | NKA243  |
| Package Key   |               | Fig. 1  | Fig. 2  | Fig. 3  |   |         |

## ELECTRO-OPTICAL CHARACTERISTICS

## ■ RED (NSR, NAR, NKR SERIES)

(Ta=25°C)

| Description              |                      | Symbol         | Test Conditions       | Min.        | Typ.        | Max. | Units   |
|--------------------------|----------------------|----------------|-----------------------|-------------|-------------|------|---------|
| Luminous Intensity       | Rank A/Rank B/Rank C | Iv             | I <sub>f</sub> = 20mA | 2/4/8       | 4/8/11      | —    | mcd/seg |
|                          |                      |                | 100mA Peak, Duty 1/5  | 1.6/3.2/6.4 | 3.2/6.4/8.8 | —    |         |
| Forward Voltage          |                      | V <sub>f</sub> | I <sub>f</sub> = 20mA | —           | 1.7         | 2.0  | V/seg   |
| Reverse Current          |                      | I <sub>r</sub> | V <sub>r</sub> = 4V   | —           | —           | 100  | μA/seg  |
| Peak Wave Length         |                      | λ <sub>p</sub> | I <sub>f</sub> = 20mA | —           | 660         | —    | nm      |
| Spectral Line Half Width |                      | Δλ             | I <sub>f</sub> = 20mA | —           | 30          | —    | nm      |
| Capacitance              |                      | C <sub>o</sub> | V = 0, f = 1MHz       | —           | 35          | —    | pF/seg  |

\* Recommended operating current I<sub>f</sub> = 5mA ~ 10mA

## ■ PURE GREEN (NSG, NAG, NKG SERIES)

(Ta=25°C)

| Description              |        | Symbol         | Test Conditions       | Min. | Typ. | Max. | Units   |
|--------------------------|--------|----------------|-----------------------|------|------|------|---------|
| Luminous Intensity       | Rank A | Iv             | I <sub>f</sub> = 20mA | 0.5  | 1    | —    | mcd/seg |
|                          | Rank B |                |                       | 1    | 2    | —    |         |
| Forward Voltage          |        | V <sub>f</sub> | I <sub>f</sub> = 20mA | —    | 2.2  | 2.5  | V/seg   |
| Reverse Current          |        | I <sub>r</sub> | V <sub>r</sub> = 4V   | —    | —    | 100  | μA/seg  |
| Peak Wave Length         |        | λ <sub>p</sub> | I <sub>f</sub> = 20mA | —    | 555  | —    | nm      |
| Spectral Line Half Width |        | Δλ             | I <sub>f</sub> = 20mA | —    | 30   | —    | nm      |
| Capacitance              |        | C <sub>o</sub> | V = 0, f = 1MHz       | —    | 55   | —    | pF/seg  |

\* Recommended operating current I<sub>f</sub> = 10mA ~ 20mA

## ■ GREEN (NSG-P, NAG-P, NKG-P SERIES)

(Ta=25°C)

| Description              |        | Symbol         | Test Conditions       | Min. | Typ. | Max. | Units   |
|--------------------------|--------|----------------|-----------------------|------|------|------|---------|
| Luminous Intensity       | Rank A | Iv             | I <sub>f</sub> = 20mA | 0.5  | 1    | —    | mcd/seg |
|                          | Rank B |                |                       | 1    | 2    | —    |         |
| Forward Voltage          |        | V <sub>f</sub> | I <sub>f</sub> = 20mA | —    | 2.2  | 2.5  | V/seg   |
| Reverse Current          |        | I <sub>r</sub> | V <sub>r</sub> = 4V   | —    | —    | 100  | μA/seg  |
| Peak Wave Length         |        | λ <sub>p</sub> | I <sub>f</sub> = 20mA | —    | 565  | —    | nm      |
| Spectral Line Half Width |        | Δλ             | I <sub>f</sub> = 20mA | —    | 30   | —    | nm      |
| Capacitance              |        | C <sub>o</sub> | V = 0, f = 1MHz       | —    | 40   | —    | pF/seg  |

\* Recommended operating current I<sub>f</sub> = 8mA ~ 15mA

## ■ YELLOW (NSY, NAY, NKY SERIES)

(Ta=25°C)

| Description              |        | Symbol         | Test Conditions       | Min. | Typ. | Max. | Units   |
|--------------------------|--------|----------------|-----------------------|------|------|------|---------|
| Luminous Intensity       | Rank A | Iv             | I <sub>f</sub> = 20mA | 1.5  | 3    | —    | mcd/seg |
|                          | Rank B |                |                       | 3    | 6    | —    |         |
| Forward Voltage          |        | V <sub>f</sub> | I <sub>f</sub> = 20mA | —    | 2.2  | 2.5  | V/seg   |
| Reverse Current          |        | I <sub>r</sub> | V <sub>r</sub> = 4V   | —    | —    | 100  | μA/seg  |
| Peak Wave Length         |        | λ <sub>p</sub> | I <sub>f</sub> = 20mA | —    | 580  | —    | nm      |
| Spectral Line Half Width |        | Δλ             | I <sub>f</sub> = 20mA | —    | 30   | —    | nm      |
| Capacitance              |        | C <sub>o</sub> | V = 0, f = 1MHz       | —    | 40   | —    | pF/seg  |

\* Recommended operating current I<sub>f</sub> = 8mA ~ 15mA

**■ ORANGE (NSA, NAA, NKA SERIES)**

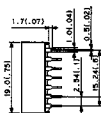
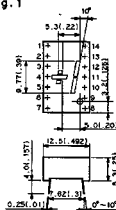
(Ta = 25°C)

| Description              | Symbol          | Test Conditions          | Min. | Typ. | Max. | Units                    |
|--------------------------|-----------------|--------------------------|------|------|------|--------------------------|
| Luminous Intensity       | Rank A          | $I_f = 20\text{mA}$      | 1.5  | 3    | —    | mcd/seg                  |
|                          | Rank B          |                          | 3    | 6    | —    |                          |
| Forward Voltage          | $V_f$           | $I_f = 20\text{mA}$      | —    | 2.2  | 2.5  | V/seg                    |
| Reverse Current          | $I_R$           | $V_R = 4\text{V}$        | —    | —    | 100  | $\mu\text{A}/\text{seg}$ |
| Peak Wave Length         | $\lambda_p$     | $I_f = 20\text{mA}$      | —    | 605  | —    | nm                       |
| Spectral Line Half Width | $\Delta\lambda$ | $I_f = 20\text{mA}$      | —    | 30   | —    | nm                       |
| Capacitance              | $C_o$           | $V = 0, f = 1\text{MHz}$ | —    | 25   | —    | pF/seg                   |

 \* Recommended operating current  $I_f = 8\text{mA} \sim 15\text{mA}$

# ■ Package Dimensions

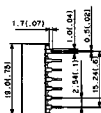
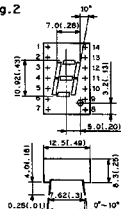
Fig. 1

Tolerance:  $\pm 0.25(0.01)$ 

Unit: mm(inch)

1. Anode d
2. Cathode d
3. No Pin
4. Anode c
5. Anode e
6. Cathode e
7. Cathode c
8. Cathode DP
9. Anode DP
10. Anode b
11. Anode a
12. No Pin
13. Cathode a
14. Cathode b

Fig. 2



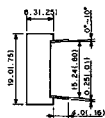
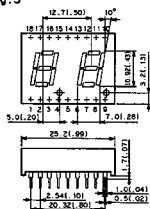
Common Anode Type

Tolerance:  $\pm 0.25(0.01)$ 

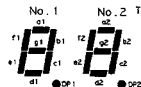
1. Cathode a
2. Cathode f
3. Common Anode
4. No Pin
5. No Pin
6. No Pin
7. Cathode e
8. Cathode d
9. Cathode DP
10. Cathode c
11. Cathode g
12. No Pin
13. Cathode b
14. Common Anode

For common cathode types, polarities are reversed

Fig. 3



Common Anode Type

Tolerance:  $\pm 0.25(0.01)$ 

1. Cathode e1
2. Cathode d1
3. Cathode c1
4. Cathode DP1
5. Cathode e2
6. Cathode d2
7. Cathode g2
8. Cathode c2
9. Cathode DP2
10. Cathode b2
11. Cathode a2
12. Cathode f2
13. Common Anode (No. 2)
14. Common Anode (No. 1)
15. Cathode b1
16. Cathode a1
17. Cathode g1
18. Cathode f1

For common cathode types, polarities are reversed

Fig. 4 FORWARD CURRENT vs. FORWARD VOLTAGE

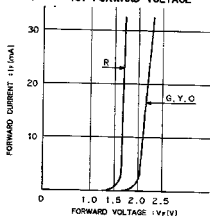


Fig. 5 MAXIMUM DC FORWARD CURRENT vs. AMBIENT TEMPERATURE

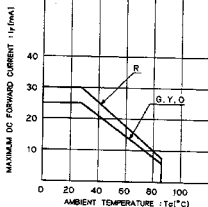


Fig. 6 RELATIVE LUMINOUS INTENSITY vs. FORWARD CURRENT (I<sub>F</sub>=20mA)

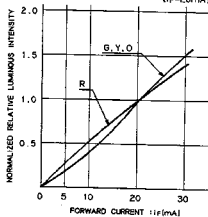


Fig. 7 RELATIVE LUMINOUS INTENSITY vs. DUTY CYCLE (I<sub>AVG</sub>=20mA)

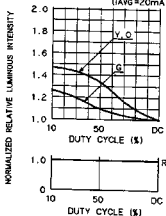


Fig. 8 MAXIMUM PEAK FORWARD CURRENT vs. DUTY FACTOR (T<sub>a</sub>=25 °C)

