TABLE OF CONTENTS

DESCRIPTION OF TERMINOLOGY

	ITEMS	SYMBOLS	DEFINITION	UNIT
Absolute Max. Ratings	Power dissipation	(Pd)	Power dissipated by forward current and forward voltage	(mW)
	Forward current	(I_F)	Current from anode to cathode	(mA)
	Peak forward current	(I_{FM})	Forward peak current driven during pulse lighting	(mA)
	Current derating	(ΔI_F)	Derating over 25°C ambient temperature	(mA/°C)
	Forward voltage	(V_F)	Voltage drop when forward current goes from anode to cathode	(V)
Electro-optical characteristics	Reverse current	(I_R)	Leakage current when bias voltage is applied from cathode to anode	(μA)
	Luminous intensity	(I_V)	Flux in lumens per unit of solid angle on optical axis	(mcd)
	Peak wavelength	(λp)	Wavelength at which radiant intensity becomes greatest	(nm)
	Spectral line half width	($\Delta\lambda$)	Wavelength range in which radiant intensity becomes more than 50% of its peak value	(nm)

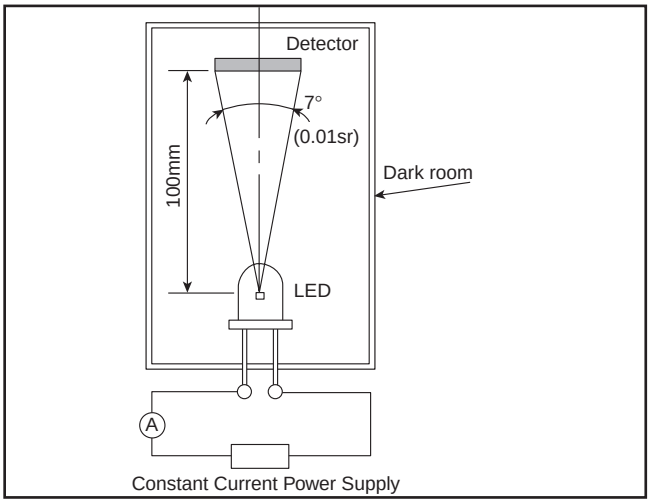
RELIABILITY TEST AND MEASURING METHOD

Items to be Guaranteed for LEDs

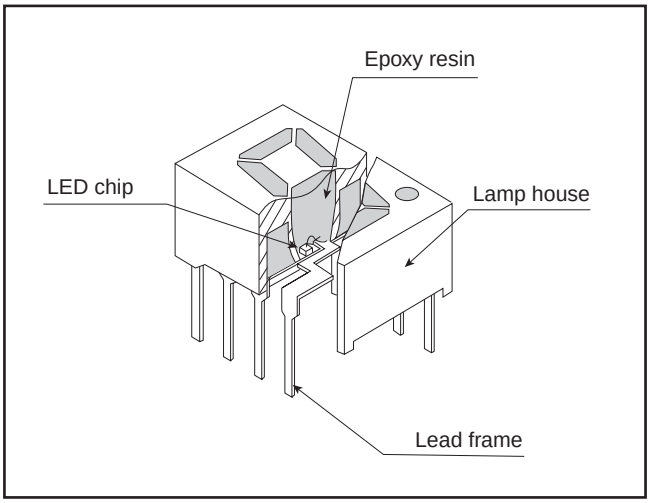
TEST ITEM	STANDARDS	TEST CONDITION	SAMPLE SIZE
Operating Endurance Test	JIS C 7035 Added documents	Ta=25°C, I_F=Maximum Rated Current, t=1000 Hrs.	25
Resistance to Soldering Heat	JIS C 7021 A-1	260±5°C, 10±1sec., 3mm from package base	25
Temperature Cycling	JIS C 7021 A-4	-30°C (30 min) to normal temperature (15 min) to +100°C (30 min) To normal temperature (15 min) 5 cycles	25
Humidity (Steady State)	JIS C 7021 B-11	Ta=60±2°C, RH=90±5%, t=1000Hr	25
High Temperature (Storage)	JIS C 7021 B-10	Ta=100±2°C, t=1000Hr	25
Low Temperature (Storage)	JIS C 7021 A-12	Ta=30±2°C, t=1000Hr	25
Lead Tension	JIS C 7021 A-11	*1kg/10 sec. one time (thin lead: 0.5kg)	10
Vibration Fatigue	JIS C 7021 A-10	10G, 100 to 2000Hz sweep for 20 min., 2 hours for directions X, Y and Z	10

Measuring Method

Luminous Intensity (Iv)



Structural Drawing for Numeric Display



Soldering Conditions

Please refer to each product to see if it's compatible with lead-free soldering.

Conventional Soldering Conditions

SOLDERING IRON	DIP SOLDERING	REFLOW SOLDERING
Iron Tip Temperature: 300°C Max. (30W Max.) Soldering Time: 3 Seconds Max. Location: At least 3.0mm away from resin	Pre-heat: 80°C Max. / 60 sec. Max. (Resin surface temperature) Bath Temperature: 260°C Max. Dipping Time: 5 sec. Max. Position: At least 3.0mm away from resin body	Not recommended

Lead-Free Soldering Conditions

SOLDERING IRON	DIP SOLDERING	REFLOW SOLDERING
Iron Tip Temperature: 400°C Max. Soldering Iron: 30W Max. Soldering Time: 3 Seconds Max. Position: At least 2.0mm away from resin	Pre-heat: 100°C Max. / 60 seconds Max. (Resin surface temperature) Bath Temperature: 265°C Max. Dipping time: 5 sec. Max. Position: At least 2.0mm away from resin body	Not recommended

Cleaning

Residual solder of flux left on the LED housing could reduce intensity and could affect the optical characteristics. Excess flux can be removed by the following chemical method:

1. Cleaning solvents (dipping time: 3 minutes maximum at normal temperature)
   - Ethyl alcohol
   - Isopropyl alcohol
   - Pure water (after cleaning, the water must be removed by drying)
   - Drying condition: 90°C max., 30 sec. max. and 4 times max.
2. The effect of ultrasonic cleaning on the LED resin body depends on such factors as the oscillator output, size of PCB and LED mounting method. Ultrasonic cleaning is strongly recommended after confirming that there are no problems.
   1. Ultrasonic wave frequency: 28 kHz or 40 kHz
   2. Output: 20 W/l
3. The solvent for freon equivalent (recommended after confirming that there are no problems).
   - AK-225AES
   - Clean through
   - Pine alpha ST-100S

Chemicals	Freon substitute detergent
Ethyl alcohol	AK225AES
Isopropyl alcohol	Clean through 705H
Pure water	Pine alpha ST-100S

* DIP Soldering and cleaning is not recommended for Alpha-Numeric (AAR121and AAA121) LED displays.

SUPER BRIGHT LED LIGHT BAR MODULE

Stanley's MU series of super-bright LED light bar modules can be selected from a wide variety of configurations and colors to suit a broad range of requirements. By using front mask patterns, including letters, numbers and even graphics, this series is usable for a myriad of display applications.

Description of Part Number

MU 0 2 - 2 2 0 1

- 0 2 — Shape Code
- 2 2 — Emitted color (2.Red 3.Orange 4.Yellow 5.Green / Pure Green)
- 0 1 — Suffix

Characteristics by Color

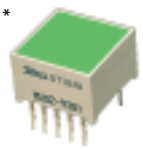
Ta=25°C

Part No.	Material Emitted Color		Absolute Maximum Ratings: Forward Current IF ❖ 1	Peak Forward Current IFM ❖ 2	Reverse Voltage VR	Operating Temperature Topr ❖ 3	Storage Temperature Tstg ❖ 4	Derating ΔIF	Electro-Optical Characteristics: Forward Voltage VF TYP.	VF MAX.	VF IF	Reverse Current IR MAX.	IR VR	Wavelength Peak λp TYP.	Spectral Line Half Width Δλ TYP	IF
2□□□	GaAlAs	(Red)	30	60	4	–40~+85	–40~+85	0.40	1.7	2.0	20	100	4	660	30	20
3□□□	GaAsP	(Orange)	25	60	4	–40~+85	–40~+85	0.33	2.2	2.5	20	100	4	605	30	20
4□□□	GaP	(Yellow)	30	60	4	–40~+85	–40~+85	0.40	2.1	2.5	20	100	4	570	30	20
5□□1	GaP	(Pure Green)	25	60	4	–40~+85	–40~+85	0.33	2.2	2.5	20	100	4	555	30	20
5□□2	GaP	(Green)	30	60	4	–40~+85	–40~+85	0.40	2.1	2.5	20	100	4	560	30	20
5□□5	GaP	(Pure Green)	25	60	4	–40~+85	–40~+85	0.33	2.2	2.5	20	100	4	555	30	20
9□□1	GaAlAs	(Red)	30	60	4	–40~+85	–40~+85	0.40	1.7	2.0	20	100	4	660	30	20
	GaP	(Pure Green)	25	60	4	–40~+85	–40~+85	0.33	2.2	2.5	20	100	4	555	30	20
9□□2	GaAlAs	(Red)	30	60	4	–40~+85	–40~+85	0.40	1.7	2.0	20	100	4	660	30	20
	GaP	(Yellow)	30	60	4	–40~+85	–40~+85	0.40	2.1	2.5	20	100	4	570	30	20
9□□3	GaAlAs	(Red)	30	60	4	–40~+85	–40~+85	0.40	1.7	2.0	20	100	4	660	30	20
	GaAsP	(Orange)	25	60	4	–40~+85	–40~+85	0.33	2.2	2.5	20	100	4	605	30	20
Units			mA	mA	V	°C		mA/°C	V		mA	μA	V	nm		mA

❖ 1 : MU91, MU92 and MU93 series are all 30 mA.
❖ 2 : tw≦2 msec, duty ≦1/5 However, for the MU91, MU92 and MU93 series, 300 mA for red and 100 mA for yellow, orange and pure green (tw ≦1 msec, duty ≦1/20)
❖ 3 ❖ 4 : For MU91, MU92 and MU93 series, the temperature range is -30°C to +85°C.

Characteristics by Shape

Ta=25°C

Shape	Part No.	Emitted Color	Resin Color	Light Emitting Surface (Outer Size)	No. of Chips	Absolute Max. Rating Power Dissipation Pd	Electro-Optical Characteristics: Luminous Intensity Iv MIN.	Iv TYP.	Iv IF	fig.
 *	**MU02-2201**	Red	Red	14 x 14 (15 x 15)	4	240	20	42	20	1
	MU02-2205		Milky White		4	240	20	42	20	
	MU02-3201	Orange	Orange		4	250	10	20	20	
	MU02-3205		Milky White		4	250	10	20	20	
	MU02-4201	Yellow	Yellow		4	300	20	42	20	
	MU02-4205		Milky White		4	300	20	42	20	
	MU02-5201	Pure Green	Green		4	250	10	20	20	
	MU02-5202	Green	Green		4	300	15	32	20	
	MU02-5205	Pure Green	Milky White		4	250	10	20	20	
	MU02-9301	Red	Green		4	240	8	12	20	2
		Pure Green			4	250	8	12	20	
 *	**MU03-2201**	Red	Red	6 x 9 (7 x 10)	2	120	10	20	20	3
	MU03-2205		Milky White		2	120	10	20	20	
	MU03-3201	Orange	Orange		2	125	5	10	20	
	MU03-3205		Milky White		2	125	5	10	20	
	MU03-4201	Yellow	Yellow		2	150	10	20	20	
	MU03-4205		Milky White		2	150	10	20	20	
	MU03-5201	Pure Green	Green		2	125	3	7	20	
	MU03-5202	Green	Green		2	150	8	16	20	
	MU03-5205	Pure Green	Milky White		2	125	5	10	20	
	MU03-9201	Red	Milky White		1	60	5	7	20	
		Pure Green			1	62.5	3	4	20	
Units				mm	pcs	mW	mcd		mA	

* Lead-free soldering compatible product

Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.1

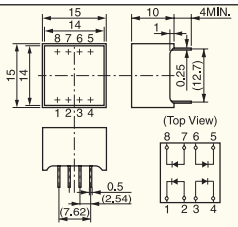
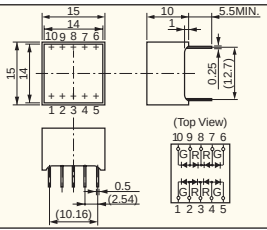
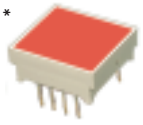


fig.2



Characteristics by Shape

Ta=25°C

Shape	Part No.	Emitted Color	Resin Color	Light Emitting Surface (Outer Size)	No. of Chips	Absolute Max. Rating	Electro-Optical Characteristics			fig.
						Power Dissipation Pd	Luminous Intensity Iv			
							MIN.	TYP.	IF	
* 	**MU04-2101**	Red	Red	6X19 (7X20)	3	180	15	32	20	4
	MU04-2105		Milky White		3	180	15	32	20	
	MU04-3101	Orange	Orange		3	190	8	16	20	
	MU04-3105		Milky White		3	190	8	16	20	
	MU04-4101	Yellow	Yellow		3	225	15	32	20	
	MU04-4105		Milky White		3	225	15	32	20	
	MU04-5101	Pure Green	Green		3	190	8	16	20	
	MU04-5102	Green	Green		3	225	10	20	20	
	MU04-5105	Pure Green	Milky White		3	190	8	16	20	
* 	**MU07-2101**	Red	Red	6X29 (7X30)	5	300	20	40	20	5
	MU07-3101	Orange	Orange		5	320	10	20	20	
	MU07-4101	Yellow	Yellow		5	375	20	40	20	
	MU07-5101	Pure Green	Green		5	320	10	20	20	
* 	**MU08-2201**	Red	Red	14X16 (15X17)	4	240	20	40	20	6
	MU08-3201	Orange	Orange		4	250	10	20	20	
	MU08-4201	Yellow	Yellow		4	300	20	40	20	
	MU08-5201	Pure Green	Green		4	250	10	20	20	
	MU08-9301	Red	Green		4	240	8	12	20	7
		Pure Green			4	250	8	12	20	
Units				mm	pcs	mW	mcd		mA	

* Lead-free soldering compatible product

Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.3

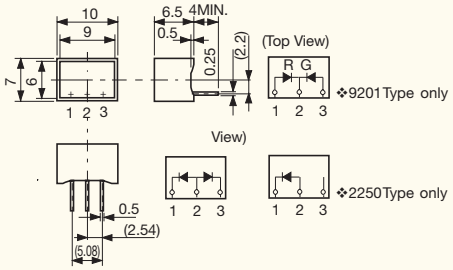


fig.4

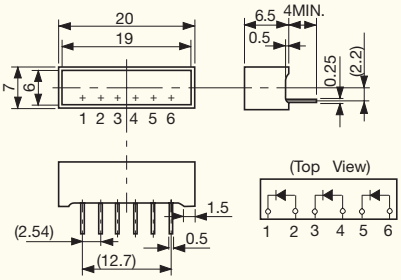


fig.5

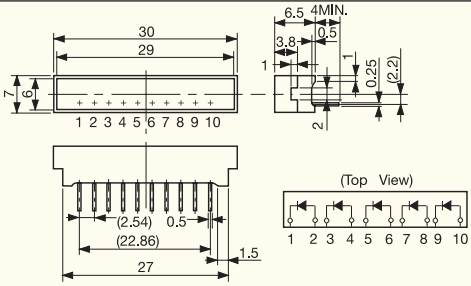


fig.6

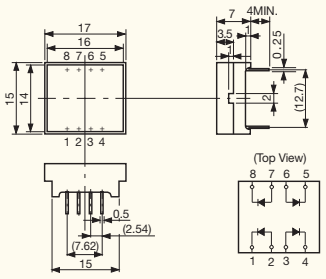
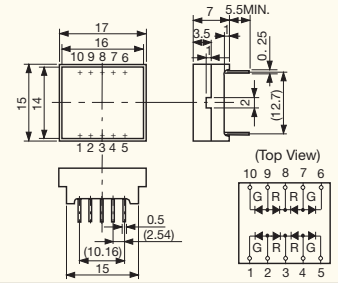


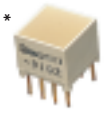
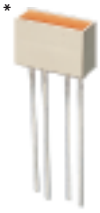
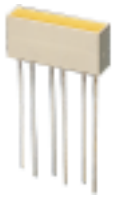
fig.7



SUPER BRIGHT LED LIGHT BAR MODULE

Characteristics by Shape

Ta=25°C

Shape	Part No.	Emitted Color	Resin Color	Light Emitting Surface (Outer Size)	No. of Chips	Absolute Max. Rating	Electro-Optical Characteristics			fig.
						Power Dissipation Pd	Luminous Intensity Iv			
							MIN.	TYP.	IF	
* 	MU09-9101	Red	Milky White	ϕ6.4 (ϕ7)	1	60	4	8	20	8
		Pure Green			2	125	4	6	20	
	MU09-9102	Red	Milky White		1	60	4	8	20	
		Yellow			2	150	6	12	20	
	MU09-9103	Red	Milky White		1	60	4	8	20	
		Orange			2	125	4	8	20	
* 	MU11-2201	Red	Red	4.6X9.5 (5.6X10.5)	2	120	10	20	20	9
	MU11-3201	Orange	Orange		2	125	5	10	20	
	MU11-4201	Yellow	Yellow		2	150	10	20	20	
	MU11-5201	Pure Green	Green		2	125	5	10	20	
* 	MU13-9101	Red	Milky White	9X9 (10.1X10.1)	1	60	6	12	20	10
		Pure Green			5	310	7	14	20	
	MU13-9102	Red	Milky White		1	60	6	12	20	
		Yellow			5	375	20	40	20	
* 	MU16-2101	Red	Red	4X12 (5X13)	2	120	8	16	20	11
	MU16-2105		Milky White		2	120	8	16	20	
	MU16-3101	Orange	Orange		2	125	6	12	20	
	MU16-3105		Milky White		2	125	6	12	20	
	MU16-4101	Yellow	Yellow		2	150	8	16	20	
	MU16-4105		Milky White		2	150	8	16	20	
	MU16-5101	Pure Green	Green		2	125	4	8	20	
	MU16-5105		Milky White		2	125	4	8	20	
* 	MU17-2101	Red	Red	4X19 (5X20)	3	180	12	24	20	12
	MU17-2105		Milky White		3	180	12	24	20	
	MU17-3101	Orange	Orange		3	190	9	18	20	
	MU17-3105		Milky White		3	190	9	18	20	
	MU17-4101	Yellow	Yellow		3	225	12	24	20	
	MU17-4105		Milky White		3	225	12	24	20	
	MU17-5101	Pure Green	Green		3	190	5	10	20	
	MU17-5105		Milky White		3	190	5	10	20	
Units				mm	pcs	mW	mcd		mA	

* Lead-free soldering compatible product

Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.8

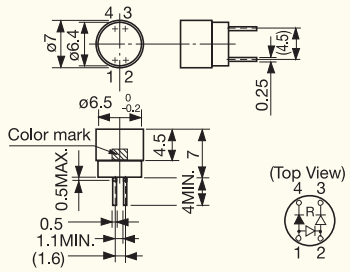


fig.9

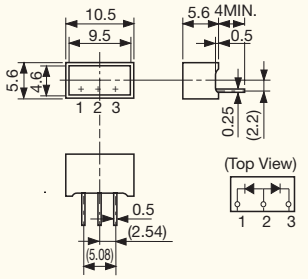


fig.10

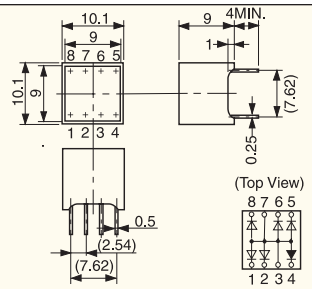
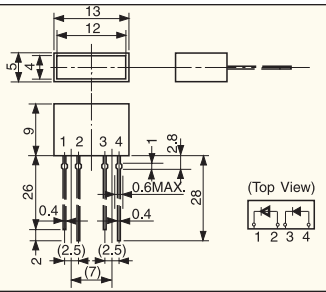


fig.11



Characteristics by Shape

Ta=25°C

Shape	Part No.	Emitted Color	Resin Color	Light Emitting Surface (Outer Size)	No. of Chips	Absolute Max. Rating Power Dissipation Pd	Electro-Optical Characteristics Luminous Intensity Iv MIN.	TYP.	IF	fig.
* 	**MU20-2101**	Red	Red	5X9 (6X10)	1	60	4	8	20	13
	MU20-2105		Milky White		1	60	4	8	20	
	MU20-3101	Orange	Orange		1	62.50	3	6	20	
	MU20-3105		Milky White		1	62.50	3	6	20	
	MU20-4101	Yellow	Yellow		1	75	4	8	20	
	MU20-4105		Milky White		1	75	4	8	20	
	MU20-5101	Pure Green	Green		1	62.50	2	4	20	
	MU20-5105		Milky White		1	62.50	2	4	20	
* 	**MU91-2001**	Red	Red	6X6 (6X6)	1	60	3	6	20	14
	MU91-3001	Orange	Orange		1	75	3	6	20	
	MU91-4001	Yellow	Yellow		1	75	3	6	20	
	MU91-5001	Pure Green	Green		1	75	1.2	2.4	20	
* 	**MU92-2001**	Red	Red	9X5 (9X5)	1	60	3	6	20	15
	MU92-3001	Orange	Orange		1	75	3	6	20	
	MU92-4001	Yellow	Yellow		1	75	3	6	20	
	MU92-5001	Pure Green	Green		1	75	1.2	2.4	20	
* 	**MU93-2001**	Red	Red	10X10 (10X10)	1	60	4	8	20	16
	MU93-3001	Orange	Orange		1	75	4	8	20	
	MU93-4001	Yellow	Yellow		1	75	4	8	20	
	MU93-5001	Pure Green	Green		1	75	1.5	3	20	
Units				mm	pcs	mW	mcd		mA	

* Lead-free soldering compatible product

Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.12

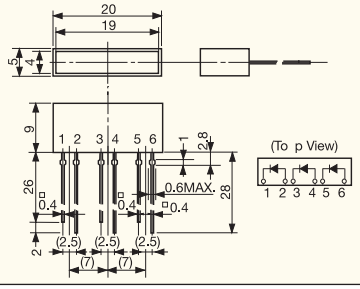


fig.13

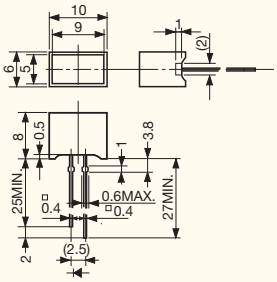


fig.14

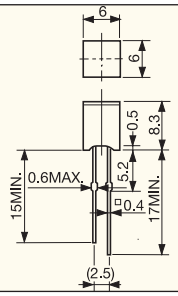


fig.15

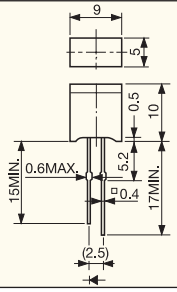
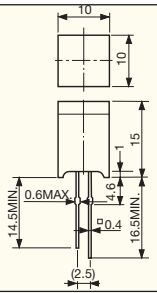


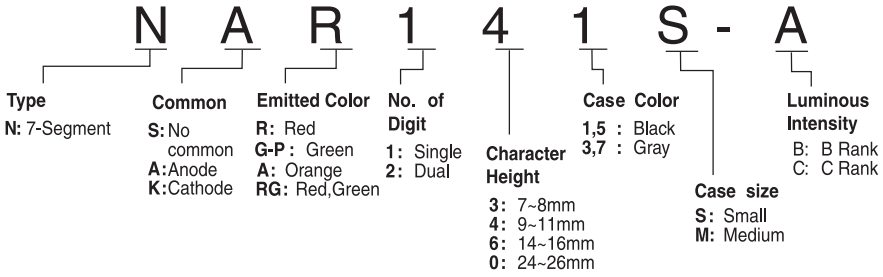
fig.16



SUPER BRIGHT LED NUMERIC DISPLAY (SEVEN SEGMENT DISPLAY)

Stanley's Numeric Displays which incorporate super-bright LEDs produce vivid, brilliant displays. Available colors are red, pure green, green, yellow and orange. Display types include segment type (character heights 7.5mm to 25mm) and the alpha-numeric type (character heights 25mm and 51mm). These are suitable for dynamic drive due to the low-current drive characteristics.

Description of Part Number



Characteristics by Color

Ta=25°C

Size	Part No.	Material Emitted Color	Chip/ Segment	Absolute Maximum Rating						Electro-Optical Characteristics							Derating
				Power Dissipation Pd	Forward Current IF	Peak Forward Current IFM	Reverse Voltage TR	Operating Temp Topr	Storage Temp Tstg	Forward Voltage VF TYP.	Forward Voltage VF MAX.	Forward Voltage IF	Reverse Current IR MAX.	Reverse Current VR	Wavelength λP TYP	Wavelength IF	ΔIF
7.5	N□R13□	GaP(Red)	1	37.5	15	60	4	–30~+85	–30~+85	2.0	2.5	10	100	4	700	10	0.25
	N□R13□S,ME	GaAlAs(Red)	1	40	20	80	4	–30~+85	–30~+85	1.7	2.0	10	100	4	660	10	0.33
	N□G13□P,SP,MP	GaP(Green)	1	48	20	80	4	–30~+85	–30~+85	2.0	2.4	10	100	4	565	10	0.33
	N□A13□,S,M	GaAsP(Orange)	1	48	20	80	4	–30~+85	–30~+85	2.0	2.4	10	100	4	605	10	0.33
10	N□R14□,N□R24	GaAlAs(Red)	1	60	30	120	4	–40~+85	–40~+85	1.7	2.0	20	100	4	660	20	0.41
	N□R14□S	GaAlAs(Red)	1	40	20	80	4	–30~+85	–30~+85	1.7	2.0	10	100	4	660	10	0.33
	N□G14□P,N□G24P	GaP(Green)	1	63	25	100	4	–40~+85	–40~+85	2.2	2.5	20	100	4	565	20	0.34
	N□G14□SP	GaP(Green)	1	48	20	80	4	–40~+85	–30~+85	2.0	2.4	10	100	4	565	10	0.33
	N□A14□,N□A24□	GaAsP(Orange)	1	63	25	100	4	–40~+85	–40~+85	2.2	2.5	20	100	4	605	20	0.34
	N□A14□S	GaAsP(Orange)	1	48	20	80	4	–30~+85	–30~+85	2.0	2.4	10	100	4	605	10	0.33
	NARG14□	GaAlAs(Red)	1	36	15	70	4	–30~+70	–30~+80	1.7	2.0	10	20	4	660	10	0.22
		GaP(Green)								2.0	2.4	10			570	10	
15	N□R16□,N□R26□	GaAlAs(Red)	1	60	30	120	4	–40~+85	–40~+85	1.7	2.0	20	100	4	660	20	0.41
	N□G16□P,N□G26□P	GaP(Green)	1	63	25	100	4	–40~+85	–40~+85	2.2	2.5	20	100	4	565	20	0.34
	N□A16□,N□A26□	GaAsP(Orange)	1	63	25	100	4	–40~+85	–40~+85	2.2	2.5	20	100	4	605	20	0.34
	NARG16□	GaAlAs(Red)	1	36	15	70	4	–30~+70	–30~+80	1.7	2.0	10	20	4	660	10	0.22
		GaP(Green)					4			2.0	2.4	10			570	10	
25	N□R10□	GaAlAs(Red)	2	120	30	120	4	–20~+85	–20~+85	3.4	4.0	20	100	8	660	20	0.41
	N□G10□P	GaP(Green)	2	126	25	100	4	–20~+85	–20~+85	4.4	5.0	20	100	8	565	20	0.34
	N□A10□	GaAsP(Orange)	2	126	25	100	4	–20~+85	–20~+85	4.4	5.0	20	100	8	605	20	0.34
	NARG10□	GaAlAs(Red)	2	80	20	❖1 40	4	–30~+70	–30~+80	3.4	4.0	10	100	4	660	10	0.33
		GaP(Green)	2	96			4			4.0	4.8	10			570	10	
mm	Units			mW	mA	mA	V	°C		V		mA	μA	V	nm	mA	mA/°C

- Number of chips per segment
- Ratings and specifications are for one segment
- When both colors of a bi-color LED are driven simultaneously, the rating of NARG types are the total of the Pd, I_F and I_{FM} values.

❖1 : NARG 10□ type in dynamic drive has a duty cycle of 1/2 and f=500Hz and the others have a duty cycle of 1/5 and f =1 kHz.

7.5mm Type

Ta=25°C

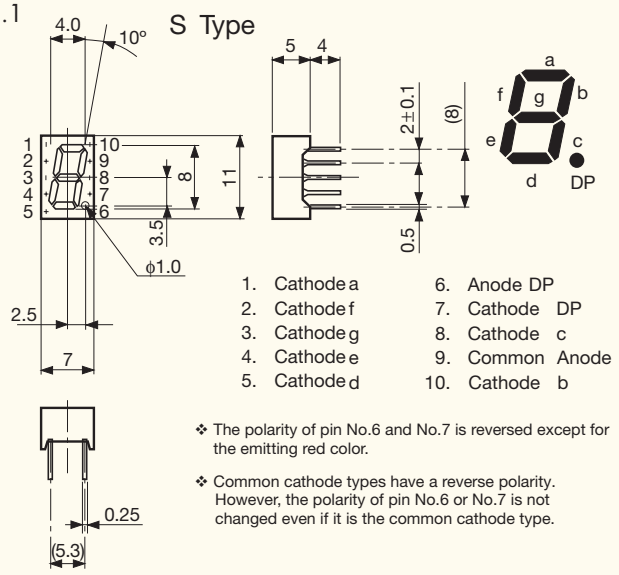
Case Size (WXH)	Shape	Part No.		Emitted Color	Luminous Intensity Iv					fig.
		Anode Common	Cathode Common		Rank B MIN.	Rank B TYP.	Rank C MIN.	Rank C TYP.	IF	
7.0 X 11.0	Arrow feather type	NAR131S/133S	NKR131S/133S	Red	1.4	2.8	2.8	5.6	10	1
		NAG131SP/133SP	NKG131SP/133SP	Green	1	2	—	—	10	
		NAA131S/133S	NKA131S/133S	Orange	0.6	1.2	—	—	10	
10.0 X 15.0	Arrow feather type	NAG131ME/133ME	NKR131ME/133ME	Red	1.2	2.4	—	—	10	2
		NAG131MP/133MP	NKG131MP/133MP	Green	0.6	1.2	—	—	10	
		NAA131M/133M	NKA131M/133M	Orange	0.8	1.6	—	—	10	
10.0 X 19.0	Arrow feather type	NAR131/133	NKR131/133	Red	0.3	0.6	—	—	10	3
		NAG131P/133P	NKG131P/133P	Green	0.6	1.2	—	—	10	
		NAA131/133	NKA131/133	Orange	0.8	1.6	—	—	10	
mm	Units				mcd				mA	

Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.1 S Type

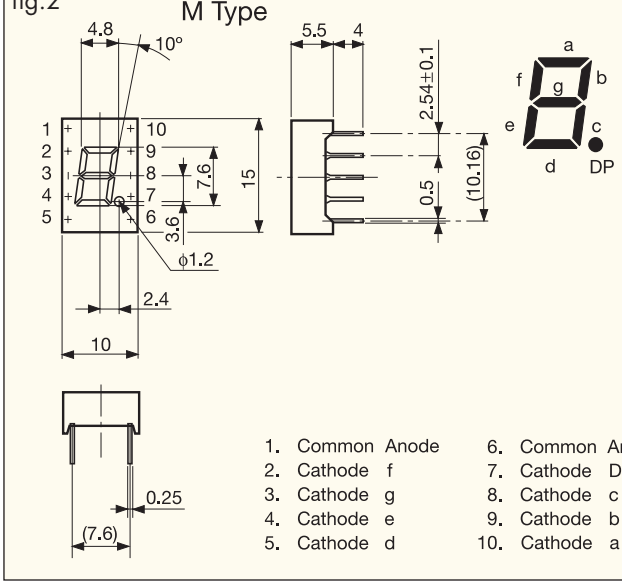


1. Cathode a
2. Cathode f
3. Cathode g
4. Cathode e
5. Cathode d
6. Anode DP
7. Cathode DP
8. Cathode c
9. Common Anode
10. Cathode b

❖ The polarity of pin No.6 and No.7 is reversed except for the emitting red color.

❖ Common cathode types have a reverse polarity. However, the polarity of pin No.6 or No.7 is not changed even if it is the common cathode type.

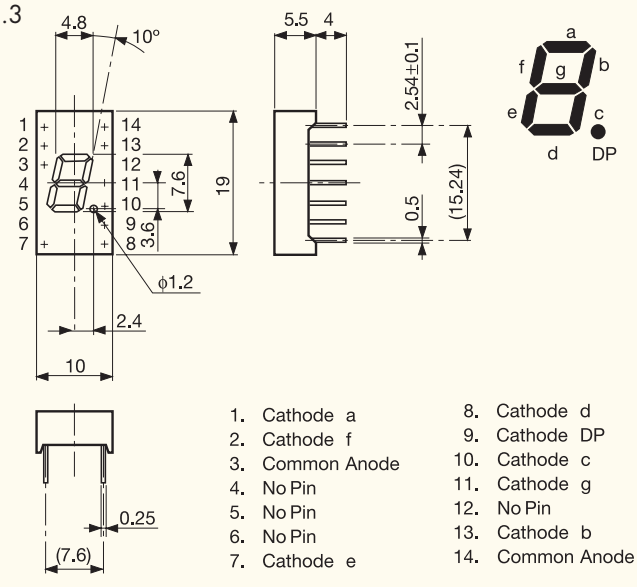
fig.2 M Type



1. Common Anode
2. Cathode f
3. Cathode g
4. Cathode e
5. Cathode d
6. Common Anode
7. Cathode DP
8. Cathode c
9. Cathode b
10. Cathode a

● Common cathode types shown in fig. 2 and 3 have a reverse polarity.

fig.3



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

10mm Type

Ta=25°C

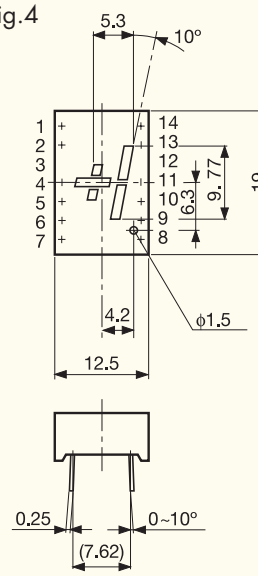
Case Size (WXH)	Shape	Part No.	Emitted Color	Luminous Intensity Iv					fig.
				Rank B MIN.	Rank B TYP.	Rank C MIN.	Rank C TYP.	I_F	
12.5 X 19.0	Square shape type 	**NSR141/143**	Red	4	8	8	11	20	4
		NSG141P/143P	Green	1	2	—	—	20	
		NSA141/143	Orange	3	6	—	—	20	
12.5 X 19.0	Arrow feather type 	**NSR145/147**	Red	3.2	6.4	6.4	8.8	20	5
		NSG145P/147P	Green	0.8	1.6	—	—	20	
		NSA145/147	Orange	2.4	4.8	—	—	20	
mm	Units			mcd				mA	

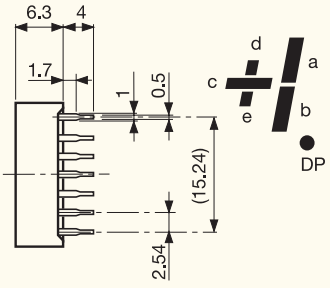
Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.4

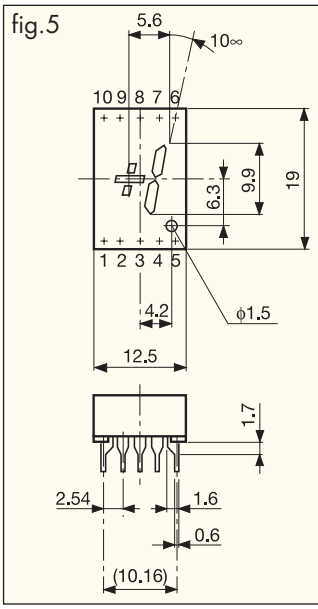


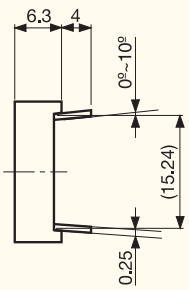


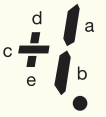
1. Anode d
2. Anode d
3. No Pin
4. Anode c
5. Anode e
6. Cathode e
7. Cathode c
8. Cathode d DF
9. Anode DP
10. Anode b
11. Anode a
12. No Pin
13. Cathode a
14. Cathode b

❖ Leave a minimum clearance of 1.7 mm from body resin to solder.

fig.5







1. Cathode d, e
2. Anode e
3. Anode b
4. Anode DP
5. Cathode DP
6. Anode a
7. Cathode a, b
8. Anode d
9. Cathode c
10. Anode c

❖ Leave a minimum clearance of 1.7 mm from body resin to solder.

10mm Type

Ta=25°C

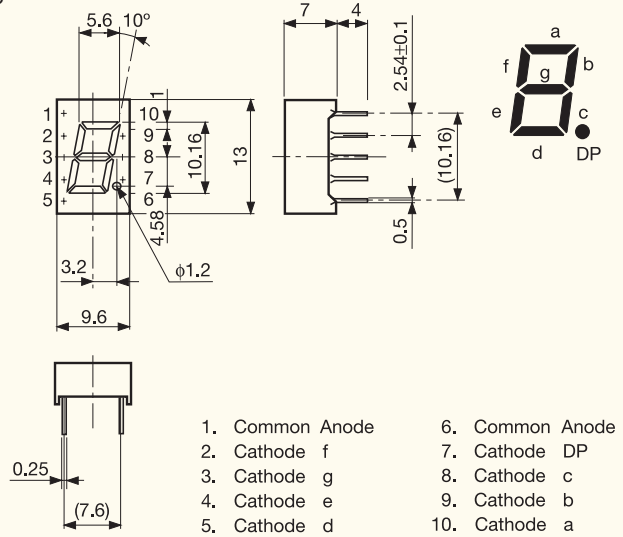
Case Size (WXH)	Shape	Part No.		Emitted Color	Luminous Intensity Iv					fig.
		Anode Common	Cathode Common		Rank B MIN.	Rank B TYP.	Rank C MIN.	Rank C TYP.	I_F	
9.6 X 13.0	Arrow feather type 	**NAR141S/143S**	**NKR141S/143S**	Red	1.6	3.2	3.2	6.4	10	6
		NAG141SP/143SP	**NKG141SP/143SP**	Green	0.6	1.2	—	—	10	
		NAA141S/143S	**NKA141S/143S**	Orange	0.8	1.6	—	—	10	
12.5 X 19.0	Square shape type 	**NAR141/143**	**NKR141/143**	Red	4	8	8	11	20	7
		NAG141P/143P	**NKG141P/143P**	Green	1	2	—	—	20	
		NAA141/143	**NKA141/143**	Orange	3	6	—	—	20	
12.5 X 19.0	Arrow feather type 	**NAR145/147**	**NKR145/147**	Red	3.2	6.4	6.4	8.8	20	8
		NAG145P/147P	**NKG145P/147P**	Green	0.8	1.6	—	—	20	
		NAA145/147	**NKA145/147**	Orange	2.4	4.8	—	—	20	
mm	Units				mcd				mA	

Package Dimensions

unit : mm

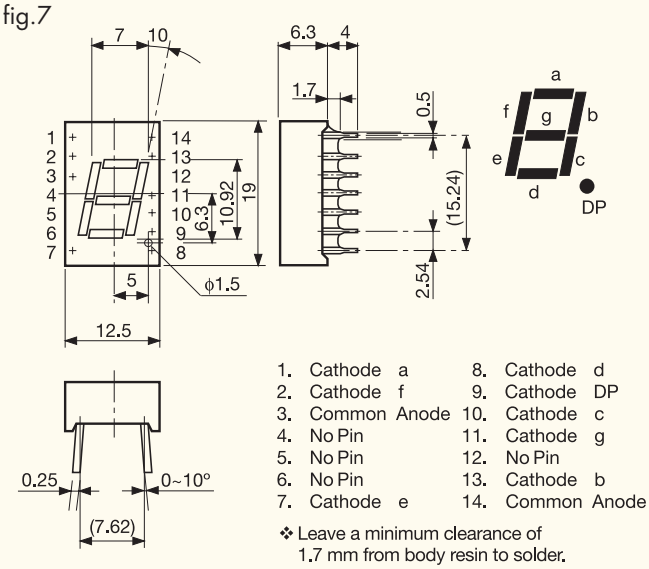
Tolerance : ±0.25mm

fig.6



1. Common Anode
2. Cathode f
3. Cathode g
4. Cathode e
5. Cathode d
6. Common Anode
7. Cathode DP
8. Cathode c
9. Cathode b
10. Cathode a

fig.7

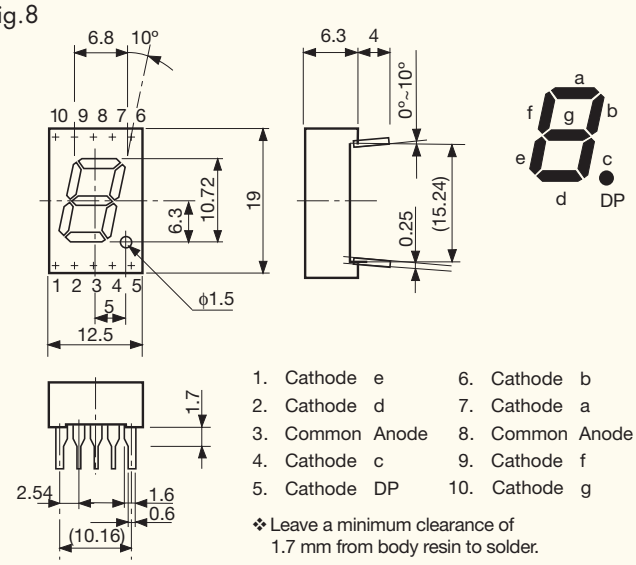


1. Cathode a
2. Cathode f
3. Common Anode
4. No Pin
5. No Pin
6. No Pin
7. Cathode e
8. Cathode d
9. Cathode DP
10. Cathode c
11. Cathode g
12. No Pin
13. Cathode b
14. Common Anode

❖ Leave a minimum clearance of 1.7 mm from body resin to solder.

● Common cathode types shown in fig. 6, 7, and 8 have a reverse polarity.

fig.8



1. Cathode e
2. Cathode d
3. Common Anode
4. Cathode c
5. Cathode DP
6. Cathode b
7. Cathode a
8. Common Anode
9. Cathode f
10. Cathode g

❖ Leave a minimum clearance of 1.7 mm from body resin to solder.

10mm Type

Ta=25°C

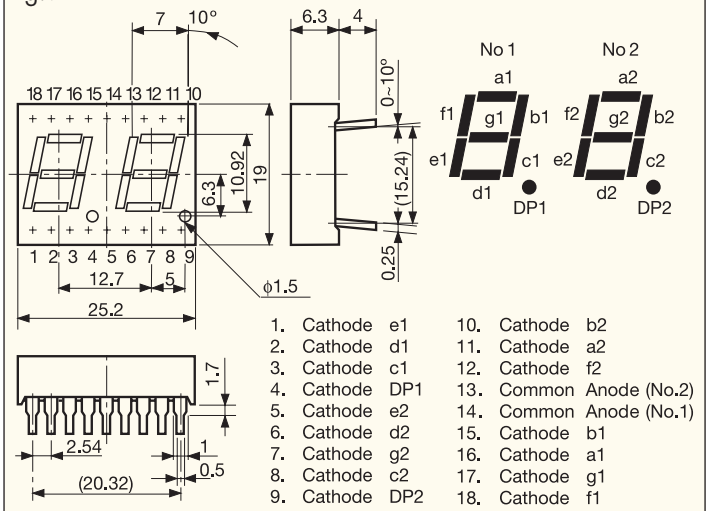
Case Size (WXH)	Shape	Part No.		Emitted Color	Luminous Intensity Iv					fig.
		Anode Common	Cathode Common		Rank B MIN.	Rank B TYP.	Rank C MIN.	Rank C TYP.	I_F	
25.2 X 19.0	Square shape type 	**NAR241/243**	**NKR241/243**	Red	4	8	8	11	20	9
		NAG241P/243P	**NKG241P/243P**	Green	1	2	—	—	20	
		NAA241/243	**NKA241/243**	Orange	3	6	—	—	20	
25.2 X 19.0	Arrow feather type 	**NAR245/247**	**NKR245/247**	Red	3.2	6.4	6.4	8.8	20	10
		NAG245P/247P	**NKG245P/247P**	Green	0.8	1.6	—	—	20	
		NAA245/247	**NKA245/247**	Orange	2.4	4.8	—	—	20	
mm	Units				mcd				mA	

Package Dimensions

unit : mm

Tolerance : ±0.25mm

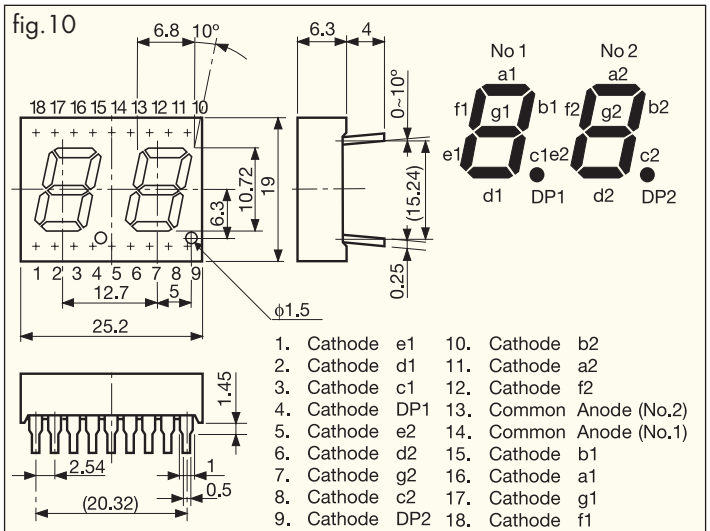
fig.9



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

❖ Leave a minimum clearance of 1.45 mm from body resin to solder.

fig.10



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

❖ Leave a minimum clearance of 1.45 mm from body resin to solder.

● Common cathode types shown in fig. 9 and 10 have a reverse polarity.

15mm Type

Ta=25°C

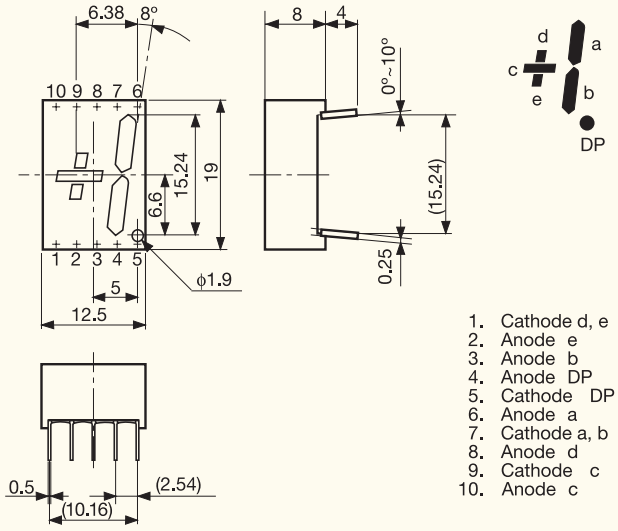
Case Size (WXH)	Shape	Part No.		Emitted Color	Luminous Intensity Iv					fig.
					Rank B		Rank C			
		Anode Common	Cathode Common		MIN.	TYP.	MIN.	TYP.	I_F	
12.5 X 19.0	Arrow feather type	**NSR161/163**		Red	6	12	12	15	20	11
		NSG161P/163P		Green	2	4	—	—	20	
		NSA161/163		Orange	4	8	—	—	20	
12.5 X 19.0	Arrow feather type	**NAR161/163**	**NKR161/163**	Red	6	12	12	15	20	12
		NAG161P/163P	**NKG161P/163P**	Green	2	4	—	—	20	
		NAA161/163	**NKA161/163**	Orange	4	8	—	—	20	
25.2 X 19.0	Arrow feather type	**NAR261/263**	**NKR261/263**	Red	6	12	12	15	20	13
		NAG261P/263P	**NKG261P/263P**	Green	2	4	—	—	20	
		NAA261/263	**NKA261/263**	Orange	4	8	—	—	20	
mm	Units				mcd				mA	

Package Dimensions

unit : mm

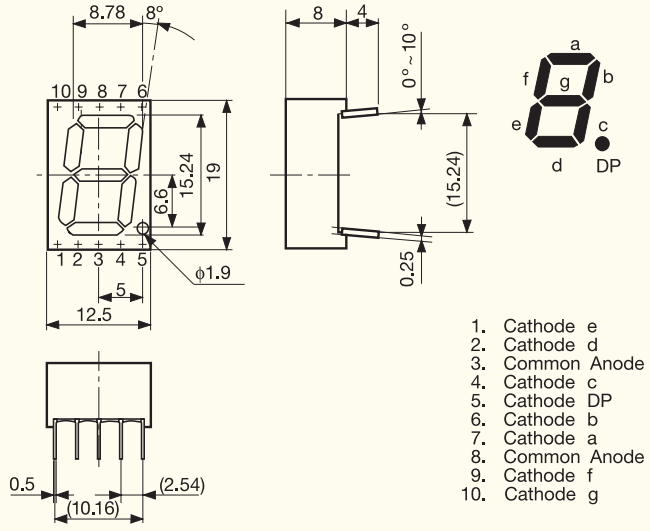
Tolerance : ±0.25mm

fig.11



1. Cathode d, e
2. Anode e
3. Anode b
4. Anode DP
5. Cathode DP
6. Anode a
7. Cathode a, b
8. Anode d
9. Cathode c
10. Anode c

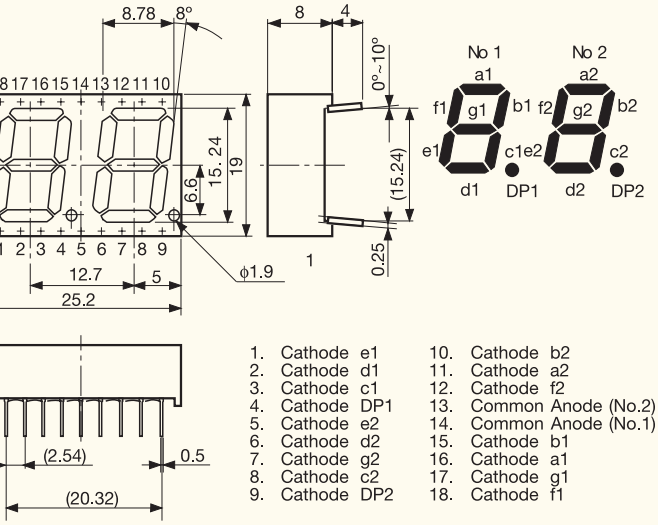
fig.12



1. Cathode e
2. Cathode d
3. Common Anode
4. Cathode c
5. Cathode DP
6. Cathode b
7. Cathode a
8. Common Anode
9. Cathode f
10. Cathode g

● Common cathode types shown in fig. 12 and 13 have a reverse polarity.

fig.13



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

25mm Type

Ta=25°C

Case Size (WXH)	Shape	Part No.		Emitted Color	Luminous Intensity Iv					fig.
					Rank B		Rank C			
		Anode Common	Cathode Common		MIN.	TYP.	MIN.	TYP.	I_F	
22.8 X 33.0	*Square shape type	NSR101/103		Red	10	20	20	25	20	14
		NSG101P/103P		Green	4	8	—	—	20	
		NSA101/103		Orange	8	16	—	—	20	
22.8 X 33.0	*Square shape type	NAR101/103	NKR101/103	Red	10	20	20	25	20	15
		NAG101P/103P	NKG101P/103P	Green	4	8	—	—	20	
		NAA101/103	NKA101/103	Orange	8	16	—	—	20	
22.8 X 33.0	*Arrow feather type	NAR105/107	NKR105/107	Red	10	20	20	25	20	16
		NAG105P/107P	NKG105P/107P	Green	4	8	—	—	20	
		NAA105/107	NKA105/107	Orange	8	16	—	—	20	
mm	Units				mcd				mA	

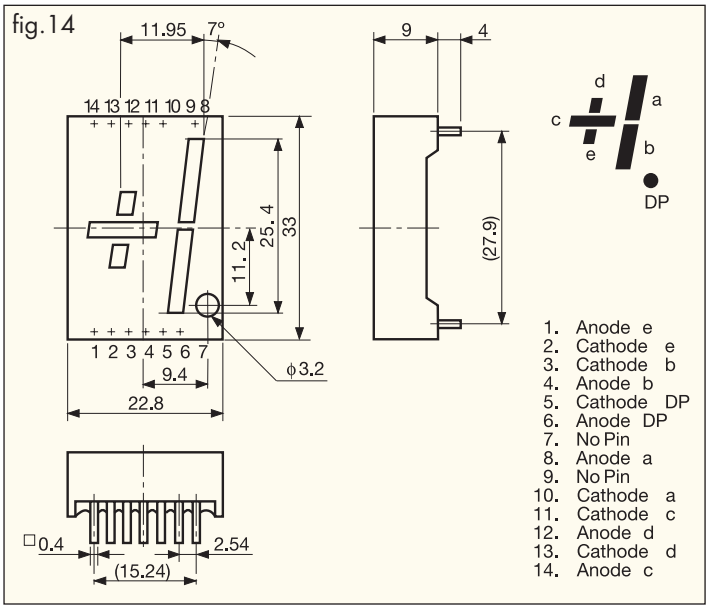
* Lead-free soldering compatible product

Package Dimensions

unit : mm

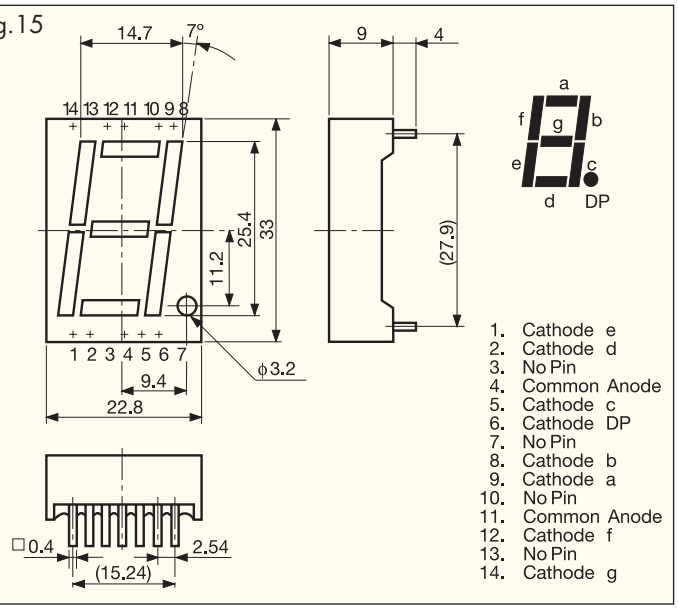
Tolerance : ±0.25mm

fig.14



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

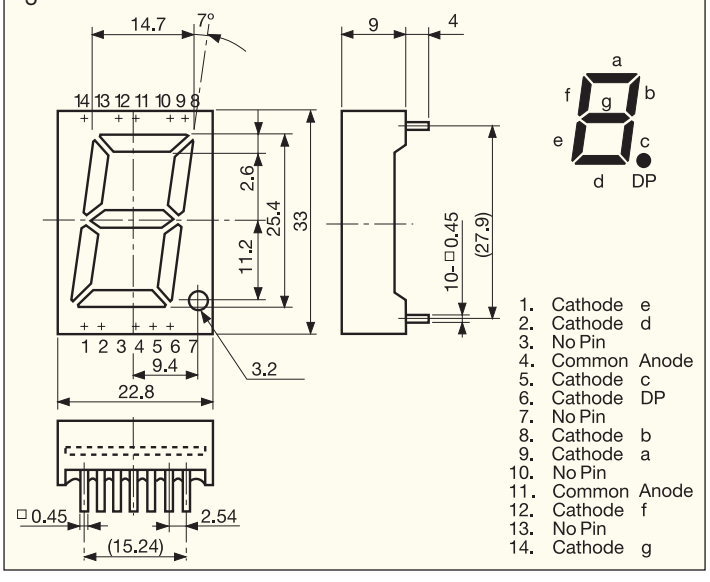
fig.15



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

● Common cathode types shown in fig. 15 and 16 have a reverse polarity.

fig.16



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

Bi-color LED Numeric Displays 10/15/25mm TYPE

Ta=25°C

Case Size (WXH)	Shape	Part No.		Emitted Color	Luminous Intensity Iv			fig.
		Anode Common	Cathode Common		MIN.	TYP.	I_F	
10.0 X 19.0	*Arrow feather type 	NARG141/143	NKRG141/143	Red	1.2	2.4	10	17
				Green	1.2	2.4	10	
12.5 X 19.0	*Arrow feather type 	NARG161/163	NKRG161/163	Red	1.2	2.4	10	18
				Green	1.2	2.4	10	
22.8 X 33.0	*Arrow feather type 	NARG105/107		Red	2	4	10	19
				Green	2	4	10	
mm	Units				mcd		mA	

* Lead-free soldering compatible product

Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.17

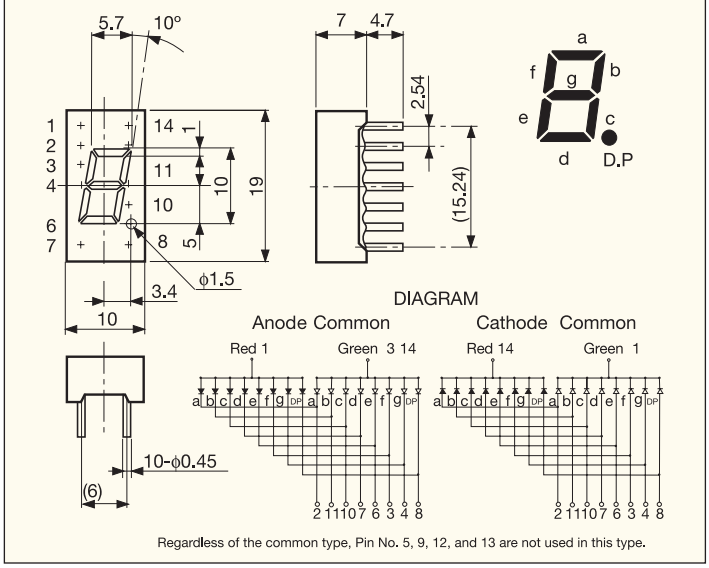


fig.18

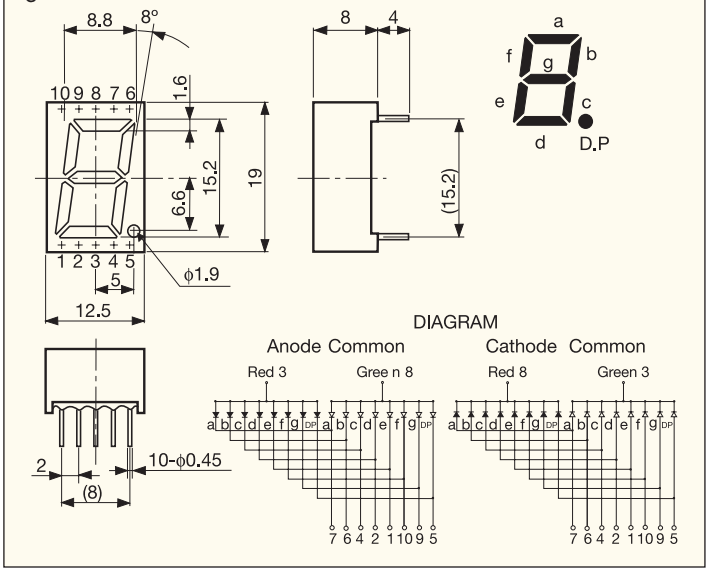
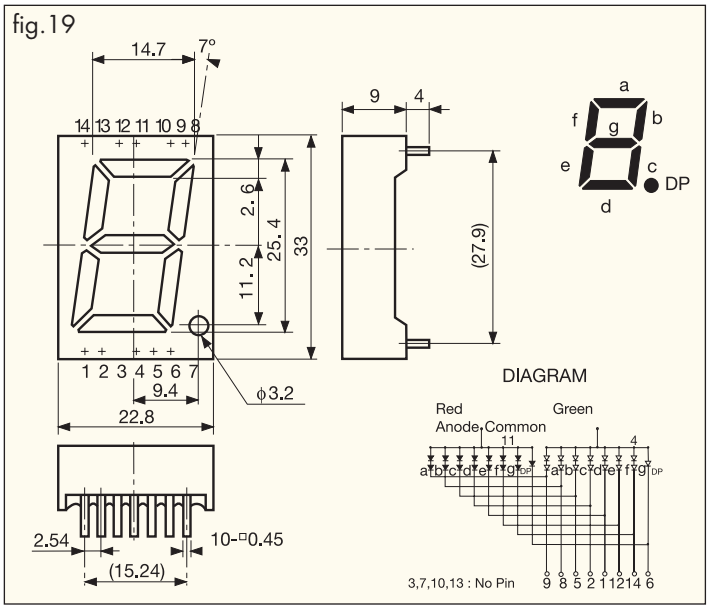


fig.19



ALPHA-NUMERIC LED DISPLAY

Description of Part Number

A	A	R	1	0	1
Alpha Numeric	Common A: Anode	Emitted Color R: Red A: Orange	No. of Digit	Character Height 0: 24~26mm 2: 50~52mm	Face Color 1: Black

Characteristics by Color

Ta=25°C

Size	Part No.	Material (Emitted color)	❖	Absolute Maximum Ratings: Power Dissipation Pd	Forward current IF	Peak Forward current IFM	Reverse Voltage VR	Operating Temp. Topr	Storage Temp. Tstg	Electro-Optical Characteristics: Forward Voltage VF TYP.	Forward Voltage VF MAX.	IF	Reverse Current IR MAX.	VR	Wavelength λp TYP.	VR	Derating Δ IF
25	AAR	GaAlAs (Red)	1	50	25	100	4	-20~+85	-20~+100	1.7	2.0	20	100	4	660	20	0.33
			2	100			8			3.4	4.0			8			
	AAA	GaAsP (Orange)	1	60	25	100	4	-20~+85	-20~+100	2.2	2.5	20	100	4	605	20	0.33
			2	120			8			4.4	5.0			8			
50	AAR	GaAlAs (Red)	4	200	40	200	8	-30~+70	-30~+80	1.7	2.0	40	20	8	660	40	0.66
			2	100	20	100						20	10			20	0.33
	AAA	GaAsP (Orange)	4	200	40	200	8	-30~+70	-30~+80	2.1	2.5	40	20	8	605	40	0.66
			2	100	20	100						20	10			20	0.33
mm	Units			mW	mA	mA	V	°C		V		mA	μA	V	nm	mA	mA/°C

Characteristics by Shape (25/50 mm TYPE)

Ta=25°C

Case Size (WXH)	Shape	Part No. Anode Common	Emitted Color	❖	Luminous Intensity Iv Rank B MIN.	Rank B TYP.	Rank C MIN.	Rank C TYP.	IF	fig.
22.8 X 33	* 	AAR101	Red	1	6	12	12	15	20	20
				2	12	24	24	30		
		AAA101	Orange	1	2	4	—	—	20	
				2	4	8	—	—		
40 X 74	* 	AAR121	Red		4	6	—	—	40❖	21
		AAA121	Orange		2	3	—	—	40❖	
mm	Units				mcd				mA	

* Lead-free soldering compatible product

❖ 20 mA/segment is for segments A,B,E,F,U and P.

Package Dimensions

unit : mm

Tolerance : ±0.25mm

fig.20

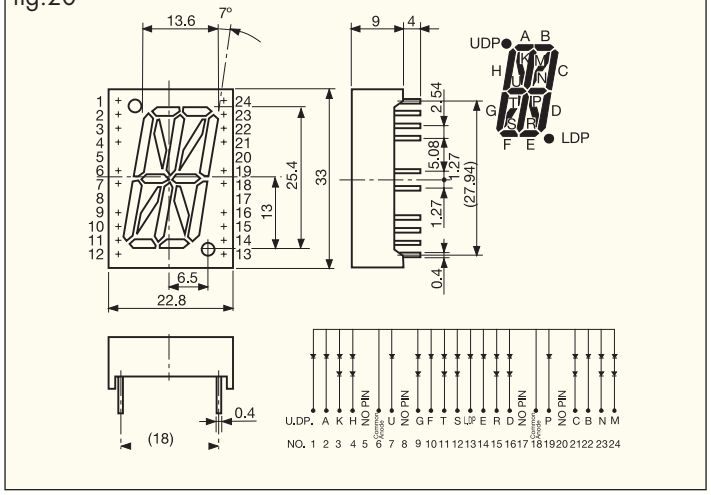
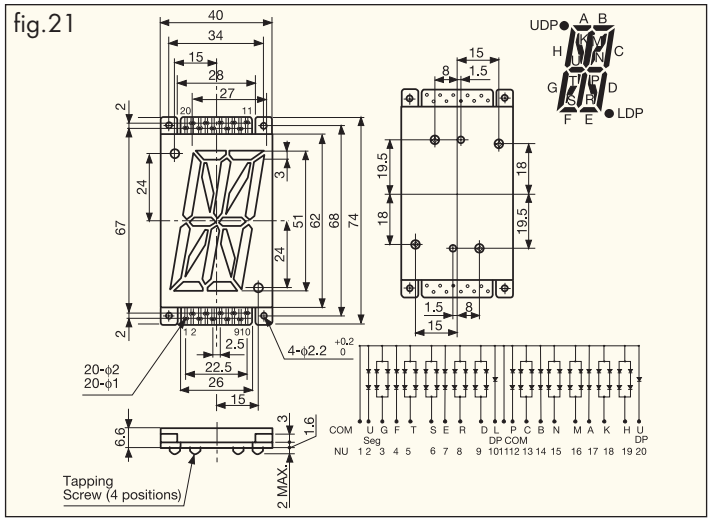


fig.21



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