2012

Product Catalog

ROHM SEMICONDUCTOR

Opto Electronics

LED Numeric Displays

Pb Free ROHM Electronic Components

RoHS Directive Compliance

ROHM Co.,Ltd.

LED Numeric Displays

LED numeric displays are to be used for digital display modules to convey numeric information exclusively, and are featured with LEDs for segments forming digits providing wide viewing angle and high contrast visibility.

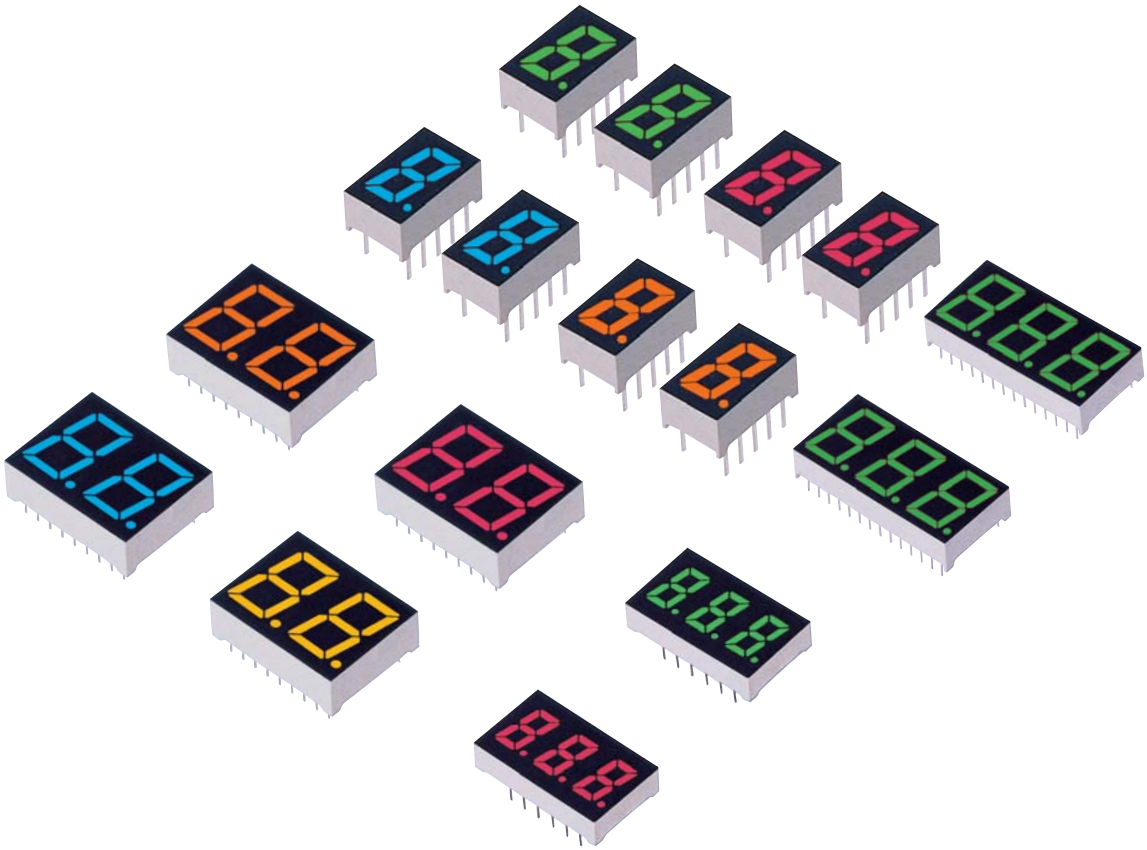
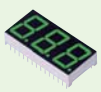


Table of Contents

Selection Guide

Frame Injection Mold Structure

Type	Number of Digit	Character Height	Series Name	Emitting Color (Light wavelength)	Luminosity for High Brightness				Luminosity Standard	
					Blue (470nm)	Yellow (589nm)	Orange (610nm)	Red (626nm)	Green (563nm)	Red (650nm)
				Material	GaN	AlGaInP	AlGaInP	AlGaInP	GaP	GaAsP on GaP
Surface Mount	One	8mm	**LF-301**	Package	—	—	—	—		
				Anode	—	—	—	—	**LF-301MA**	**LF-301VA**
				Cathode	—	—	—	—	**LF-301MK**	**LF-301VK**
Dip	One	8mm	**LA-301**	Package						
				Anode	**LA-301BB**	**LA-301XB**	**LA-301EB**	**LA-301AB**	**LA-301MB**	**LA-301VB**
				Cathode	**LA-301BL**	**LA-301XL**	**LA-301EL**	**LA-301AL**	**LA-301ML**	**LA-301VL**
	One	10.16mm	**LA-401**	Package						
				Anode	**LA-401BD**	**LA-401XD**	**LA-401ED**	**LA-401AD**	**LA-401MD**	**LA-401VD**
				Cathode	**LA-401BN**	**LA-401XN**	**LA-401EN**	**LA-401AN**	**LA-401MN**	**LA-401VN**
	One	13mm	**LA-501**	Package	—	—	—	—		
				Anode	—	—	—	—	**LA-501MD**	**LA-501VD**
				Cathode	—	—	—	—	**LA-501MN**	**LA-501VN**
	One	14.6mm	**LA-601**	Package						
				Anode	**LA-601BB**	**LA-601XB**	**LA-601EB**	**LA-601AB**	**LA-601MB**	**LA-601VB**
				Cathode	**LA-601BL**	**LA-601XL**	**LA-601EL**	**LA-601AL**	**LA-601ML**	**LA-601VL**
	Two	10.16mm	**LB-402**	Package	—	—	—	—		
				Anode	—	—	—	—	**LB-402MD**	**LB-402VD**
				Cathode	—	—	—	—	**LB-402MN**	**LB-402VN**
	Two	13mm	**LB-502**	Package	—	—	—	—		
				Anode	—	—	—	—	**LB-502MD**	**LB-502VD**
				Cathode	—	—	—	—	**LB-502MN**	**LB-502VN**
	Two	14.3mm	**LB-602**	Package						
				Anode	**LB-602BA2**	**LB-602XA2**	**LB-602EA2**	**LB-602AA2**	**LB-602MA2**	**LB-602VA2**
				Cathode	**LB-602BK2**	**LB-602XK2**	**LB-602EK2**	**LB-602AK2**	**LB-602MK2**	**LB-602VK2**
	Three	14.3mm	**LB-603**	Package	—	—	—	—		
				Anode	—	—	—	—	**LB-603MF**	**LB-603VF**
				Cathode	—	—	—	—	**LB-603MP**	**LB-603VP**

Frame Injection Mold Structure (High Brightness Type)

Type	Number of Digit	Character Height	Series Name	Emitting Color (Light wavelength)	Luminosity for High Brightness				
					Blue (470nm)	Yellow (590nm)	Orange (605nm)	Green (572nm)	Red (650nm)
				Material	GaN	AlGaInP	AlGaInP	AlGaInP	AlGaInP
Dip	One	8mm	**LAP-301**	Package	—				
				Anode	—	**LAP-301YB**	**LAP-301DB**	**LAP-301MB**	**LAP-301VB**
				Cathode	—	**LAP-301YL**	**LAP-301DL**	**LAP-301ML**	**LAP-301VL**
		10.16mm	**LAP-401**	Package	—				
				Anode	—	**LAP-401YD**	**LAP-401DD**	**LAP-401MD**	**LAP-401VD**
				Cathode	—	**LAP-401YN**	**LAP-401DN**	**LAP-401MN**	**LAP-401VN**
		14.6mm	**LAP-601**	Package	—				
				Anode	—	**LAP-601YB**	**LAP-601DB**	**LAP-601MB**	**LAP-601VB**
				Cathode	—	**LAP-601YL**	**LAP-601DL**	**LAP-601ML**	**LAP-601VL**
	Two	14.3mm	**LBP-602**	Package	—				
				Anode	—	**LBP-602YA2**	**LBP-602DA2**	**LBP-602MA2**	**LBP-602VA2**
				Cathode	—	**LBP-602YK2**	**LBP-602DK2**	**LBP-602MK2**	**LBP-602VK2**

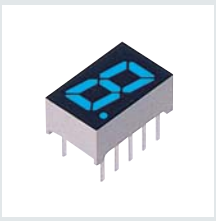
Substrate Injection Mold Structure

Type	Number of Digit	Character Height	Series Name	Emitting Color (Light wavelength)	Luminosity for High Brightness				Luminosity Standard	
					Blue (470nm)	Yellow (589nm)	Orange (610nm)	Red (626nm)	Green (563nm)	Red (650nm)
				Material	GaN	AlGaInP	AlGaInP	AlGaInP	GaP	GaAsP on GaP
Dip	One	25.4mm	**LA-101**	Package	—	—	—	—		
				Anode	—	—	—	—	**LA-101MA**	**LA-101VA**
				Cathode	—	—	—	—	**LA-101MK**	**LA-101VK**
	Two	7.62mm	**LB-302**	Package	—	—	—	—		
				Anode	—	—	—	—	**LB-302MF**	**LB-302VF**
				Cathode	—	—	—	—	**LB-302MP**	**LB-302VP**
	Three	8mm	**LB-303**	Package	—	—	—	—		
				Anode	—	—	—	—	**LB-303MA**	**LB-303VA**
				Cathode	—	—	—	—	**LB-303MK**	**LB-303VK**

Construction

LED Numeric Display Structure

ROHM LED numeric displays are classified into two types, Frame Injection and Substrate Injection, based on structural differences.



Frame Injection Mold Structure

LF-301 Series
LA-301 Series
LA-401 Series
LA-501 Series
LA-601 Series

LAP-301 Series
LAP-401 Series
LAP-601 Series
LAP-602 Series

LB-402 Series
LB-502 Series
LB-602 Series
LB-603 Series

With the Frame Injection Mold Structure, the LED element is mounted on the lead frame, assembled with the case, then sealed with resin. (See Fig.1)

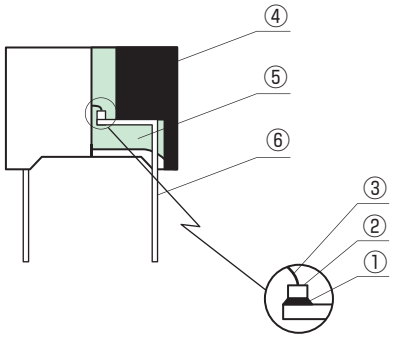
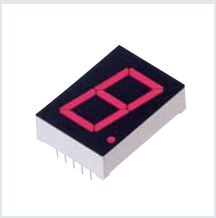


Fig.1 Frame Injection Mold Structure

Frame Injection Mold Structure	①	②	③	④	⑤	⑥
Item	Die bond	LED chip	Bonding wire	Reflector	Sealing resin	Lead frame
Material	Ag+Epoxy resin	(GaAsP on GaP) or (GaP) or (GaN) or (AlGaInP)	Au	Polymer resin	Epoxy resin	Fe (Plating : Sn-Ag-Cu)



Substrate Injection Mold Structure

LA-801 Series
LA-101 Series

LB-302 Series
LB-303 Series

With the Substrate Injection Mold Structure, the LED element is mounted on the substrate, assembled with the case, then sealed with resin. (See Fig.2)

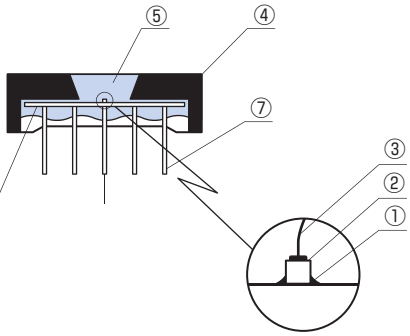


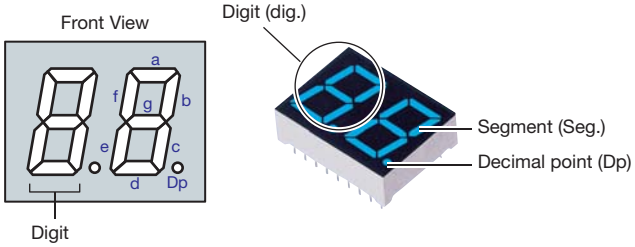
Fig.2 Substrate Injection Mold Structure

Substrate Injection Mold Structure	①	②	③	④	⑤	⑥	⑦
Item	Die bond	LED chip	Bonding wire	Reflector	Sealing resin	Sealing resin	Lead frame
Material	Ag+Epoxy resin	(GaAsP on GaP) or (GaP) or (GaN) or (AlGaInP)	Au	Polymer resin	Epoxy resin	Glass + Epoxy resin	CP wire (Plating : Sn-Ag-Cu)

Part Names

The names of the parts that make up an LED numeric display are as follows:

LED sections (a through g) : Segment (Seg.)
LED dot part : Decimal point (Dp)
Collective name of segments a through g : Digit (dig.)



“Anode Common” and “Cathode Common”

LED displays come in two types - Anode Common and Cathode Common.

Anode Common : The Common pin is positive ⊕.

Cathode Common : The Common pin is negative ⊖.

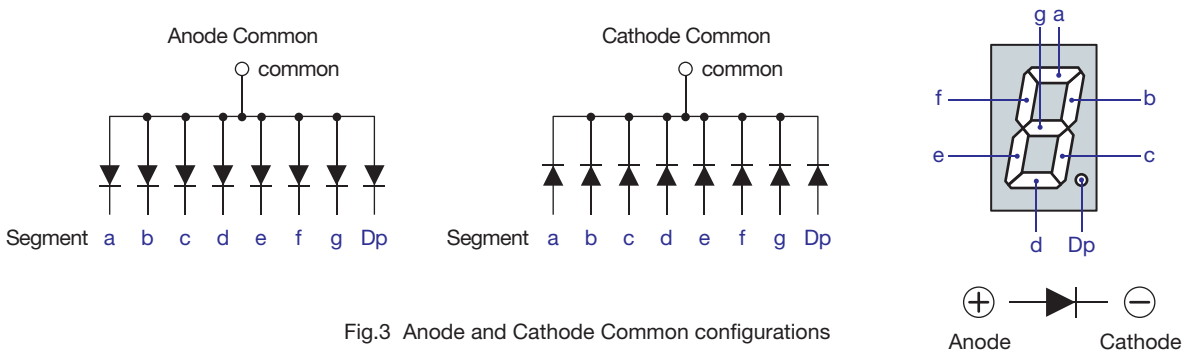


Fig.3 Anode and Cathode Common configurations

Part No. Explanation

L A - 3 0 1 V B

Series Name

LF	Surface Mount
LA	Single digit
LB	2 to 3 digits

Character Height

3	8mm, 7.62mm
4	10.16mm
5	13mm
6	14.3mm, 14.6mm
1	25.4mm

Number of Digits

01	1 digits
02	2 digits
03	3 digits

Emitting Color <Light wavelength>

B	Blue <470nm>
X	High Brightness Yellow <589nm>
E	High Brightness Orange <610nm>
A	High Brightness Red <626nm>
M	Green <563nm>
V	Red <650nm>

Common

A to J	Anode common
K to U	Cathode common

L A P - 3 0 1 V B

Series Name

LAP	Single digit
LBP	2 to 3 digits

Character Height

3	8mm
4	10.16mm
6	14.3mm, 14.6mm

Number of Digits

01	1 digits
02	2 digits
03	3 digits

Emitting Color <Light wavelength>

Y	High Brightness Yellow <590nm>
D	High Brightness Orange <605nm>
M	High Brightness Green <572nm>
V	High Brightness Red <650nm>

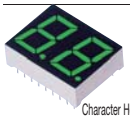
Common

A to J	Anode common
K to U	Cathode common

Lineup

High Brightness LED Numeric Displays

High brightness · Low power consumption · High reliability

Shape	Part No.	Emitting color	Absolute Maximum Ratings (Ta=25°C)				Absolute Maximum Ratings		Electrical and Optical Characteristics (Ta=25°C)									RoHS
			Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} * (mA)	Reverse Voltage V_R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Forward Voltage V_F Typ. (V)	V_F I_F (mA)	Reverse Current I_R Max. (μA)	I_R V_R (V)	Light Wavelength Peak λp Typ. (nm)	Half-wave Δλ Typ. (nm)	I_F (mA)	Brightness / Digit Iv Min. (mcd)	Typ. (mcd)	I_F (mA)	
 Character Height:8mm External Dimensions:(7×11)	**LAP-301VB/VL**	Red	448	20	60	5	–25 to +75	–30 to +85	1.9	10	100	3	650	20	10	14	36	10	Yes
	LAP-301MB/ML	Green											572			36	100		Yes
	LAP-301DB/DL	Orange											605			56	250		Yes
	LAP-301YB/YL	Yellow											590			90	450		Yes
 Character Height:10.16mm External Dimensions:(9.6×13)	**LAP-401VD/VN**	Red	448	20	60	5	–25 to +75	–30 to +85	1.9	10	100	3	650	20	10	14	36	10	Yes
	LAP-401MD/MN	Green											572			36	100		Yes
	LAP-401DD/DN	Orange											605			56	250		Yes
	LAP-401YD/YN	Yellow											590			90	450		Yes
 Character Height:14.6mm External Dimensions:(12.5×19)	**LAP-601VB/VL**	Red	448	20	60	5	–25 to +75	–30 to +85	1.9	10	100	3	650	20	10	14	36	10	Yes
	LAP-601MB/ML	Green											572			36	100		Yes
	LAP-601DB/DL	Orange											605			56	250		Yes
	LAP-601YB/YL	Yellow											590			90	450		Yes
 Character Height:14.3mm External Dimensions:(25×19)	**LBP-602VA2/VK2**	Red	896	20	60	5	–25 to +75	–30 to +85	1.9	10	100	3	650	20	10	14	36	10	Yes
	LBP-602MA2/MK2	Green											572			36	100		Yes
	LBP-602DA2/DK2	Orange											605			56	250		Yes
	LBP-602YA2/YK2	Yellow											590			90	450		Yes

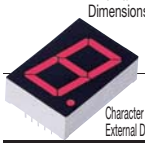
LED Numeric Displays

Single Digit LED Numeric Displays (Surface Mount Type)

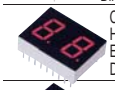
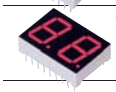
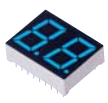
ROHM's LED numeric displays are compatible with automatic reflow processes

Shape	Part No.	Emitting color	Absolute Maximum Ratings (Ta=25°C)				Absolute Maximum Ratings		Electrical and Optical Characteristics (Ta=25°C)										RoHS
			Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} * (mA)	Reverse Voltage V_R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Forward Voltage V_F Typ. (V)	V_F I_F (mA)	Reverse Current I_R Max. (μA)	I_R V_R (V)	Light Wavelength Peak λp Typ. (nm)	Half-wave Δλ Typ. (nm)	I_F (mA)	Brightness / Digit Iv Min. (mcd)	Typ. (mcd)	I_F (mA)	
 Character Height:8mm External Dimensions:(6.8×11)	**LF-301VA/VK**	Red	320	15	60	5	–25 to +75	–30 to +85	2.0	10	100	3	650	40	10	3.6	10	10	Yes
	LF-301MA/MK	Green	480	20					2.1				563						Yes

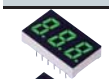
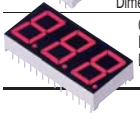
Single Digit LED Numeric Displays

Shape	Part No.	Emitting color	Absolute Maximum Ratings (Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} * (mA)	Reverse Voltage V_R (V)	Absolute Maximum Ratings Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics (Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Light Wavelength Peak λ_D Typ. (nm)	Half-wave $\Delta\lambda$ Typ. (nm)	I_F (mA)	Brightness / Digit I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	RoHS
 Character Height:8mm External Dimensions:(7×11)	LA-301VB/VL	Red	320	15	60				2.0				650	40		3.6	10		Yes
	LA-301MB/ML	Green	480	20					2.1	10			563		10				Yes
	LA-301BB/BL	Blue	336	10					3.6				470	26		14	56		Yes
	LA-301AB/AL	High Brightness Red	520	25	50				2.05	20			626	18	20	36	90		Yes
	LA-301EB/EL	High Brightness Orange											610	17					Yes
	LA-301XB/XL	High Brightness Yellow											589	15					Yes
 Character Height:10.16mm External Dimensions:(9.6×13)	LA-401VD/VN	Red	320	15	60	5	–25 to +75	–30 to +85	2.0	20	100	3	650	40	10	5.6	16	10	Yes
	LA-401MD/MN	Green	480	20					2.1				563						Yes
	LA-401BD/BN	Blue	336	10					3.6				470	26		14	56		Yes
	LA-401AD/AN	High Brightness Red	520	25	50				2.05				626	18	20	36	90		Yes
	LA-401ED/EN	High Brightness Orange											610	17					Yes
	LA-401XD/XN	High Brightness Yellow											589	15					Yes
 Character Height:13mm External Dimensions:(12.5×17.5)	LA-501VD/VN	Red	480	20	60				2.0	10			650	40	10	5.6	16		Yes
	LA-501MD/MN	Green							2.1				563						Yes
 Character Height:14.6mm External Dimensions:(12.5×19)	LA-601VB/VL	Red	336	10	50				2.0				650				14		Yes
	LA-601MB/ML	Green							2.1				563			9.0	22		Yes
	LA-601BB/BL	Blue							3.6				470	26		14	56		Yes
	LA-601AB/AL	High Brightness Red	520	25					2.05	20			626	18	20	36	90		Yes
	LA-601EB/EL	High Brightness Orange											610	17					Yes
	LA-601XB/XL	High Brightness Yellow											589	15					Yes
 Character Height:25.4mm External Dimensions:(24×34)	LA-101VA/VK	Red	640	15	60				4.0	10			650	40	10	3.6	10		Yes
	LA-101MA/MK	Green		20					4.2				563			5.6	16		Yes

Two Digit LED Numeric Displays

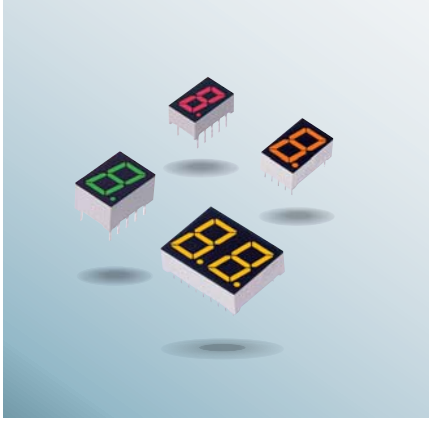
Shape	Part No.	Emitting color	Absolute Maximum Ratings (Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} * (mA)	Reverse Voltage V_R (V)	Absolute Maximum Ratings Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics (Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Light Wavelength Peak λ_D Typ. (nm)	Half-wave $\Delta\lambda$ Typ. (nm)	I_F (mA)	Brightness / Digit I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	RoHS
 Character Height:7.62mm External Dimensions:(15.5×15)	LB-302VF/VP	Red	800	15	60	5	–25 to +75	–30 to +85	2.0	10	100	3	650	40	10	2.2	6.3	10	Yes
	LB-302MF/MP	Green	960	20					2.1				563			3.6	9.0		Yes
 Character Height:10.16mm External Dimensions:(24×18)	LB-402VD/VN	Red	640	15					2.0				650			5.6	16		Yes
	LB-402MD/MN	Green							2.1				563			9.0	25		Yes
 Character Height:13mm External Dimensions:(25×17.5)	LB-502VD/VN	Red	960	20					2.0				650			5.6	16		Yes
	LB-502MD/MN	Green							2.1				563			9.0	25		Yes
 Character Height:14.3mm External Dimensions:(25×19)	LB-602VA2/VK2	Red	960	20	60				2.0				650	40		5.6	16		Yes
	LB-602MA2/MK2	Green							2.1	10			563		10	9.0	25		Yes
	LB-602BA2/BK2	Blue	672	10		5	–25 to +75	–30 to +85	3.6				470	26		14	56		Yes
	LB-602AA2/AK2	High Brightness Red	1040	25	50				2.05	20			626	18	20	36	90		Yes
	LB-602EA2/EK2	High Brightness Orange											610	17					Yes
	LB-602XA2/XK2	High Brightness Yellow											589	15					Yes

Three Digit LED Numeric Displays

Shape	Part No.	Emitting color	Absolute Maximum Ratings (Ta=25°C) Power Dissipation P_D (mW)	Forward Current I_F (mA)	Peak Forward Current I_{FP} * (mA)	Reverse Voltage V_R (V)	Absolute Maximum Ratings Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Electrical and Optical Characteristics (Ta=25°C) Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Light Wavelength Peak λ_D Typ. (nm)	Half-wave $\Delta\lambda$ Typ. (nm)	I_F (mA)	Brightness / Digit I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	RoHS
 Character Height:8mm External Dimensions:(22×13)	LB-303VA/VK	Red	960	15	60	5	–25 to +75	–30 to +85	2.0	10	100	3	650	40	10	1.4	4.0	10	Yes
	LB-303MA/MK	Green	1440	20					2.1				563			2.2	6.3		Yes
 Character Height:14.3mm External Dimensions:(37.5×18)	LB-603VF/VP	Red	960	15					2.0				650			5.6	16		Yes
	LB-603MF/MP	Green	1440	20					2.1				563			9.0	25		Yes

High Brightness LED Numeric Displays

LAP·LBP Series



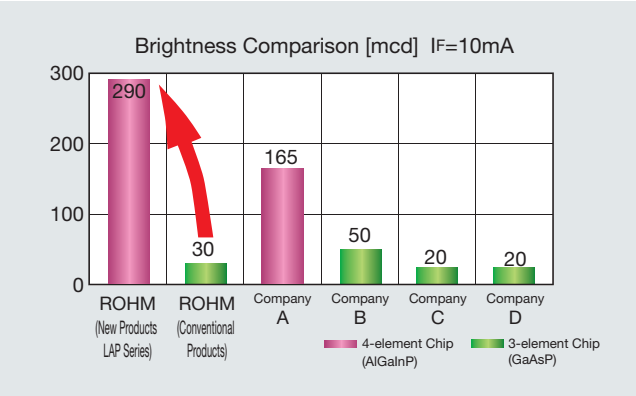
10x the brightness of conventional products

Product Outline

ROHM LED numerical displays utilize original 4-element high brightness LEDs, resulting in unparalleled brightness with virtually no degradation, even after continuous, long-term use.

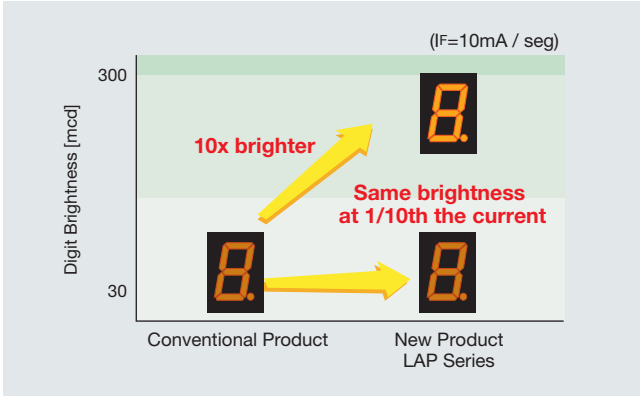
High Brightness

The proprietary 4-element configuration results in 10x the brightness of competitor products. (Orange emission ratio)



Low Power Consumption

Only 1/10th the current is required for the same level of brightness as conventional products.



Applications

FA/measurement equipment, gaming devices, home appliances

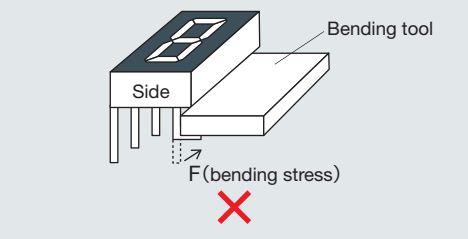
Installation Precautions

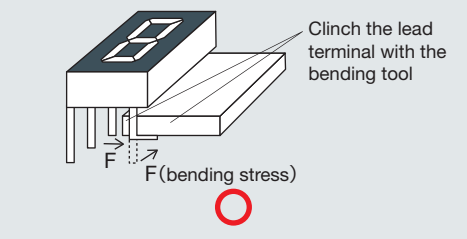
Lead Forming

(1) Avoid bending the leads at the base and ensure that the leads are fixed in place.

(2) Bend the leads at a point at least 2mm away from the base.

(3) From the leads before soldering.





Installation

TIP Refrain from installing such that stress is applied to the lead terminals.

Case (1)

When inserting into substrate, ensure that the terminal pitch matches the substrate hole pitch and avoid spreading or pitching the lead terminals at all costs.

Case (2)

When positioning with a holder or similar implement , take into consideration the tolerance of the holder, substrate and product dimensions so that pressure is not applied to the terminals.

Note : Consider the terminal expansion coefficients of the materials used. Heat from preheating and soldering can cause the holder to expand and contract, which can put pressure on the leads, resulting in short-circuits.

Case (3)

When using a holder or the other implement, the product and holder should be fixed in place at the terminal. Avoid methods that use pressure fitting or adhesive.

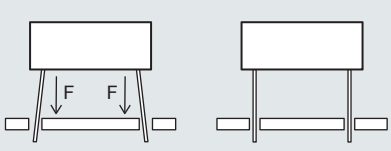
① More specifically, be careful of the soldering heat, which can cause the product or substrate to expand and contract, applying stress to the terminal.

② Please note that the resin used in the frame injection mold structure has a low melting temperature of 100 to 130°C, making it susceptible to heat. Therefore, caution is required.

③ Failures caused by overheating often occur due to aggressive preheating, high substrate temperature during preheating, or lengthy soldering process.

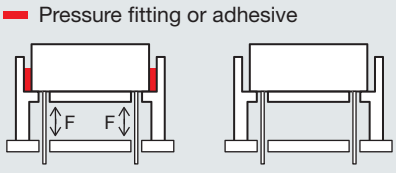
Case (4)

When performing automated mounting, bending of the substrate, cutting of the leads and/or clinching stress can conceivably damage the resin. In particular, caution should be observed when clinching or cutting the leads, since the amount of force applied during this time is significant. Therefore, test samples should be processed during the soldering phase and then evaluated for abnormalities/damage.



Not Recommended Recommended

Bending force applied after soldering.
Case (1)



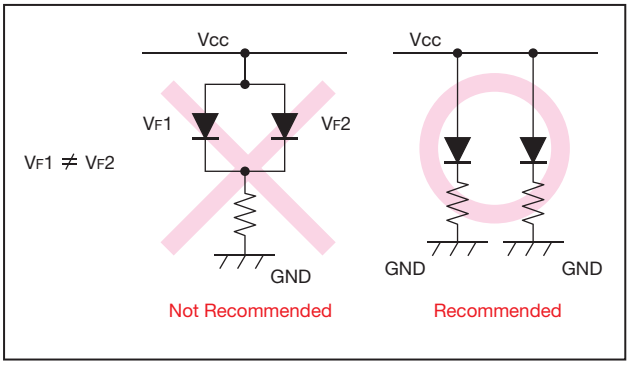
Not Recommended Recommended

Vertical stress applied after soldering.
Case (2), (3)

Recommended Circuits

Circuit A

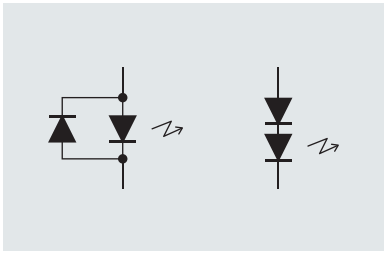
Please connect the limiting resistors in series with the LEDs to ensure stable operation, since current will flow in the direction of least resistance based on slight differences intrinsic to the semiconductors themselves. Parallel connection can lead to luminosity variations (uneven brightness) or even destruction.



Circuit B

When the power supply voltage being used is higher than the reverse voltage, it is recommended that a diode be inserted as shown right for protection, since step-up operation could cause unexpected reverse voltage to be applied.

In addition, the customer is requested to consult with ROHM in advance regarding matrix applications wherein the power supply voltage is higher than the reverse voltage.



Load Resistance Calculation Example

The load resistance will be calculated using LA-301VB as an example.

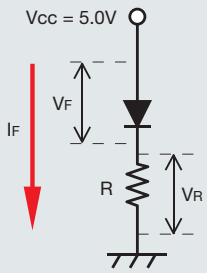
Calculation of resistance R with forward current IF=10mA at 25°C

Since VF=2V when IF=10mA, Ohm's law states that

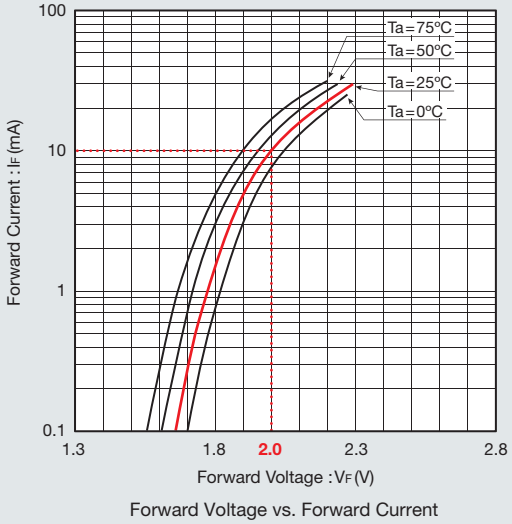
VR=IF · R

VR=Vcc — VF, so

$$R = \frac{V_R}{I_F} = \frac{Vcc - V_F}{I_F} = \frac{5V - 2V}{10mA} = 300\Omega$$



Example : **LA-301VB**(1/8 circuit)



Forward Voltage vs. Forward Current

Peak Current Calculation Example (With Pulse Light ON)

The peak current value will be calculated using LA-301VB as an example.

Example 1

Lighting conditions : Duty ratio=1/5, pulse width=1ms, Ta=60°C

Frequency f = duty ratio×1/pulse width

$$= \frac{1}{5} \times \frac{1}{1\text{ms}} = 200\text{Hz} \cdots\cdots\cdots\cdots\cdots\cdots \text{①}$$

The intersection of 200Hz (①) and 1ms (1000μs) (②) is determined from the graph. (③)

$$\frac{I_{FPEAK}\ \text{Max.}}{I_F\ \text{Max.}} = 4, \text{ therefore}$$

I_{FPEAK} Max. = I_F Max.×4

= 15mA×4=60mA ····· Ⓐ

Based on the graph in Figure 2, I_{FPEAK} Max. when Ta=60°C is 55%(④) of its value at

I_{FPEAK} Max. = 60mA×55% or

= **33mA.**

Example 2

Lighting conditions : Duty ratio=2/5, pulse width=2ms, Ta=60°C

Frequency f = $\frac{2}{5} \times \frac{1}{2\text{ms}} = 200\text{Hz}$ ····· ①

The intersection of 200Hz (①) and 2ms (2000μs) (⑤) is determined from the graph. (⑥)

$$\frac{I_{FPEAK}\ \text{Max.}}{I_F\ \text{Max.}} = 3.5, \text{ therefore}$$

I_{FPEAK} Max. = I_F Max.×3.5

= 15mA×3.5=52.5mA

I_{FPEAK} Max. when Ta=60°C is 55% (④) of 52.5mA, or

= **28.875mA.**

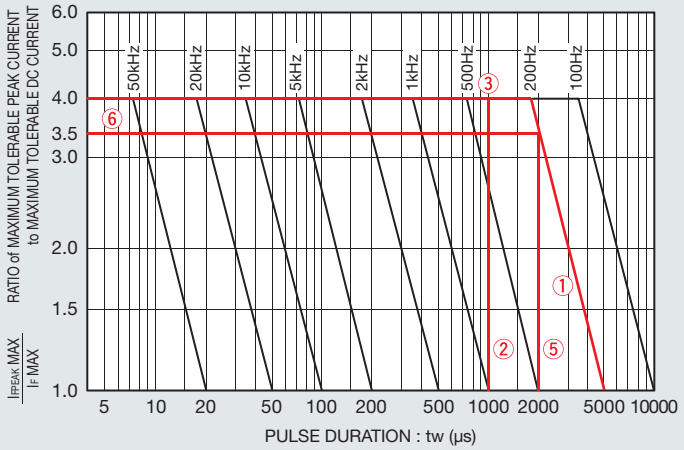


Figure 1. Frequency/Peak Current Characteristics

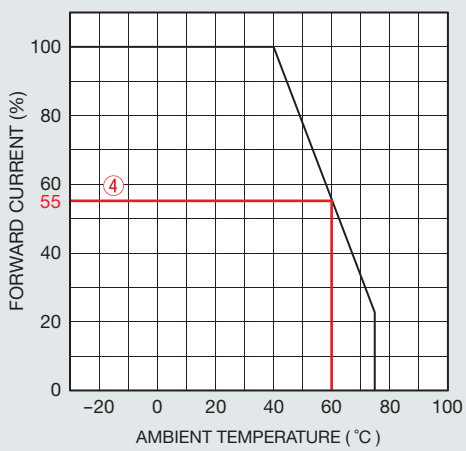
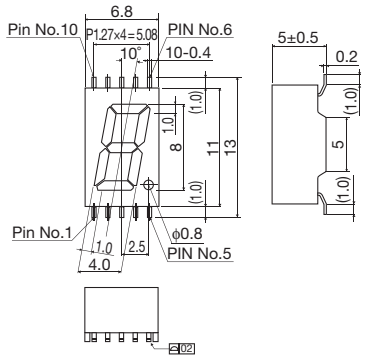


Figure 2. Derating Curve

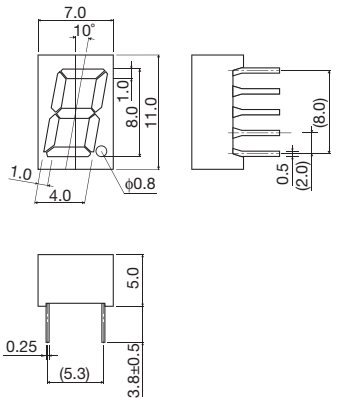
Dimensions

Frame Injection Mold Structure

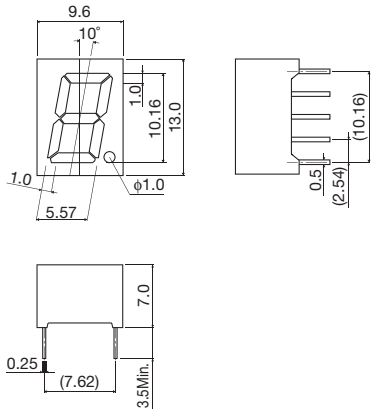
<LF-301 Series>



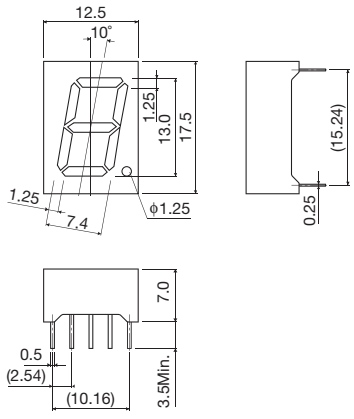
<LA-301/LAP-301 Series>



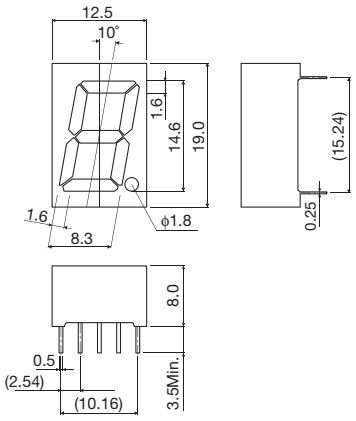
<LA-401/LAP-401 Series>



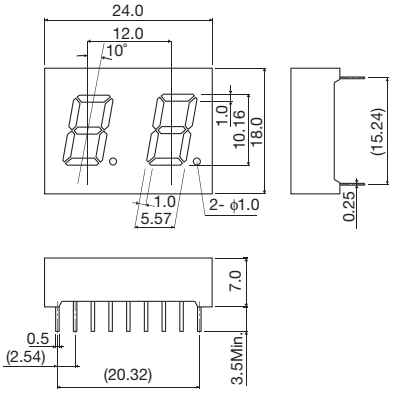
<LA-501 Series>



<LA-601/LAP-601 Series>



<LB-402 Series>



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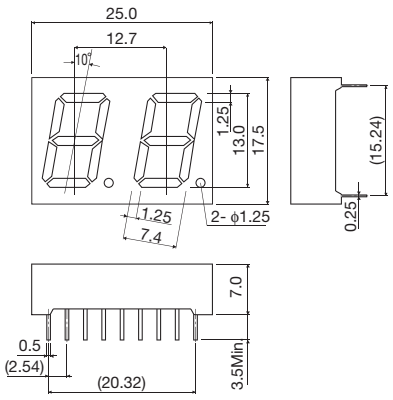

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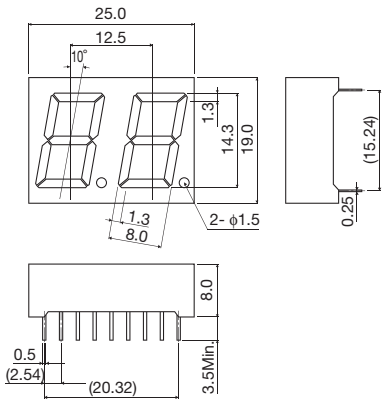
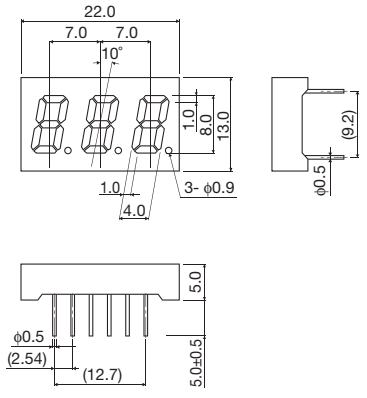


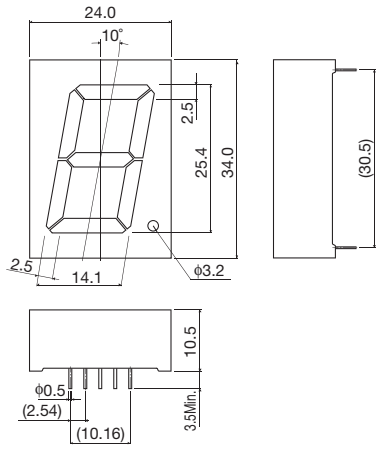
<LB-603 Series>



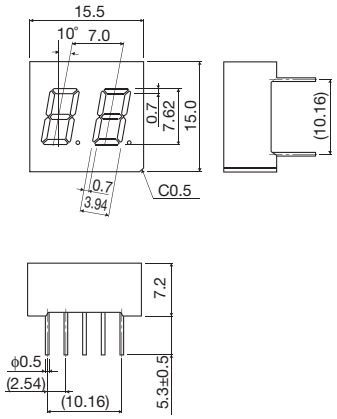
Notes : 1. Tolerance = ±0.3 unless otherwise specified.
2. Dimensions in parenthesis are shown for reference purposes.

Substrate Injection Mold Structure

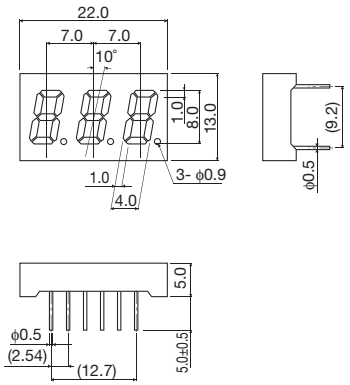
<LA-101 Series>



<LB-302 Series>



<LB-303 Series>



Notes : 1. Tolerance = ±0.3 unless otherwise specified.
2. Dimensions in parenthesis are shown for reference purposes.

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