## LED NUMERIC DISPLAY, 1 DIGIT

BL-S28X-12

**Features:**

- 7.0mm (0.28") Single digit numeric display series.
- Low current operation.
- Excellent character appearance.
- Easy mounting on P.C. Boards or sockets.
- I.C. Compatible.
- ROHS Compliance.







**Super Bright**

**Electrical-optical characteristics: (Ta=25°C)** (Test Condition: IF=20mA)

| Part No | | Chip | | | VF Unit:V | | Iv |
|---|---|---|---|---|---|---|---|
| Common Cathode | Common Anode | Emitted Color | Material | $\lambda_P$ (nm) | Typ | Max | TYP.(mcd) |
| BL-S28A-12S-XX | BL-S28B-12S-XX | Hi Red | GaAlAs/GaAs,SH | 660 | 1.85 | 2.20 | 6 |
| BL-S28A-12D-XX | BL-S28B-12D-XX | Super Red | GaAlAs/GaAs,DH | 660 | 1.85 | 2.20 | 12 |
| BL-S28A-12UR-XX | BL-S28B-12UR-XX | Ultra Red | GaAlAs/GaAs,DDH | 660 | 1.85 | 2.20 | 14 |
| BL-S28A-12E-XX | BL-S28B-12E-XX | Red | GaAsP/GaP | 635 | 2.10 | 2.50 | 10 |
| BL-S28A-12Y-XX | BL-S28B-12Y-XX | Yellow | GaAsP/GaP | 585 | 2.10 | 2.50 | 10 |
| BL-S28A-12G-XX | BL-S28B-12G-XX | Green | GaP/GaP | 570 | 2.20 | 2.50 | 10 |

**Ultra Bright**

**Electrical-optical characteristics: (Ta=25°C)** (Test Condition: IF=20mA)

| Part No | | Chip | | | VF Unit:V | | Iv |
|---|---|---|---|---|---|---|---|
| Common Cathode | Common Anode | Emitted Color | Material | $\lambda P$ (nm) | Typ | Max | TYP.(mcd) |
| BL-S28A-12UHR-XX | BL-S28B-12UHR-XX | Ultra Red | AlGaInP | 645 | 2.10 | 2.50 | 14 |
| BL-S28A-12UE-XX | BL-S28B-12UE-XX | Ultra Red | AlGaInP | 630 | 2.10 | 2.50 | 12 |
| BL-S28A-12YO-XX | BL-S28B-12YO-XX | Ultra Amber | AlGaInP | 619 | 2.10 | 2.50 | 12 |
| BL-S28A-12UY-XX | BL-S28B-12UY-XX | Ultra Yellow | AlGaInP | 590 | 2.10 | 2.50 | 12 |
| BL-S28A-12UG-XX | BL-S28B-12UG-XX | Ultra Green | AlGaInP | 574 | 2.20 | 2.50 | 18 |
| BL-S28A-12PG-XX | BL-S28B-12PG-XX | Ultra Pure Green | InGaN | 525 | 3.80 | 4.50 | 22 |
| BL-S28A-12B-XX | BL-S28B-12B-XX | Ultra Blue | InGaN | 470 | 2.70 | 4.20 | 25 |
| BL-S28A-12W-XX | BL-S28B-12W-XX | Ultra White | InGaN | / | 2.70 | 4.20 | 30 |

■ -XX: Surface / Lens color：

| **Number** | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **Ref Surface Color** | White | Black | Gray | Red | Green | |
| **Epoxy Color** | Water clear | White diffused | Red Diffused | Green Diffused | Yellow Diffused | |

**Absolute maximum ratings (Ta=25°C)**

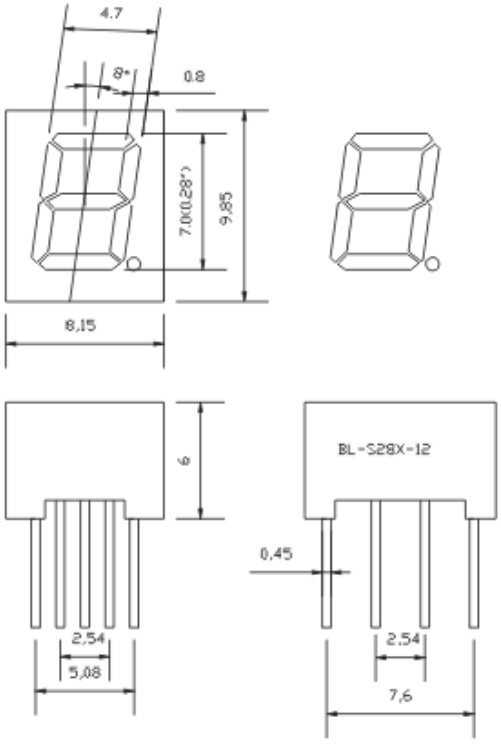
| Parameter | | S | D | UR | E | Y | G | Unit |
|---|---|---|---|---|---|---|---|---|
| Forward Current $I_F$ | | 25 | 25 | 25 | 25 | 25 | 30 | mA |
| Power Dissipation $P_d$ | | 60 | 60 | 60 | 60 | 60 | 65 | mW |
| Reverse Voltage $V_R$ | | 5 | 5 | 5 | 5 | 5 | 5 | V |
| Peak Forward Current $I_{PF}$ (Duty 1/10 @1KHZ) | | 150 | 150 | 150 | 150 | 150 | 150 | mA |
| Operation Temperature $T_{OPR}$ | -40 to +80 | | | | | | | °C |
| Storage Temperature $T_{STG}$ | -40 to +85 | | | | | | | °C |
| Lead Soldering Temperature $T_{SOL}$ | Max.260±5°C for 3 sec Max. (1.6mm from the base of the epoxy bulb) | | | | | | | °C |

■ **Absolute maximum ratings (Ta=25°C)**

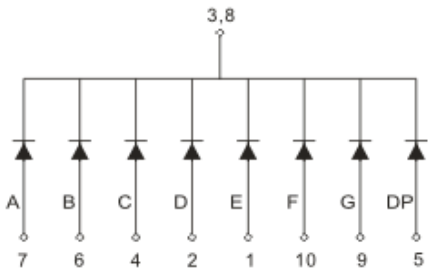
| Parameter | UHR | UE | YO | UY | UG | PG | UB | UW | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Forward Current $I_F$ | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | mA |
| Power Dissipation $P_d$ | 75 | 65 | 65 | 65 | 75 | 110 | 120 | 120 | mW |
| Reverse Voltage $V_R$ | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | V |
| Peak Forward Current $I_{PF}$ (Duty 1/10 @1KHZ) | 150 | 150 | 150 | 150 | 150 | 150 | 100 | 100 | mA |
| Operation Temperature $T_{OPR}$ | -40 to +80 | | | | | | | | °C |
| Storage Temperature $T_{STG}$ | -40 to +85 | | | | | | | | °C |
| Lead Soldering Temperature $T_{SOL}$ | Max.260±5°C for 3 sec Max. (1.6mm from the base of the epoxy bulb) | | | | | | | | °C |

■ **Package configuration & Internal circuit diagram**

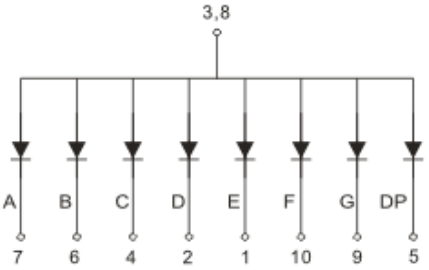
BL-S28X-12 Series




BL-S28A-12

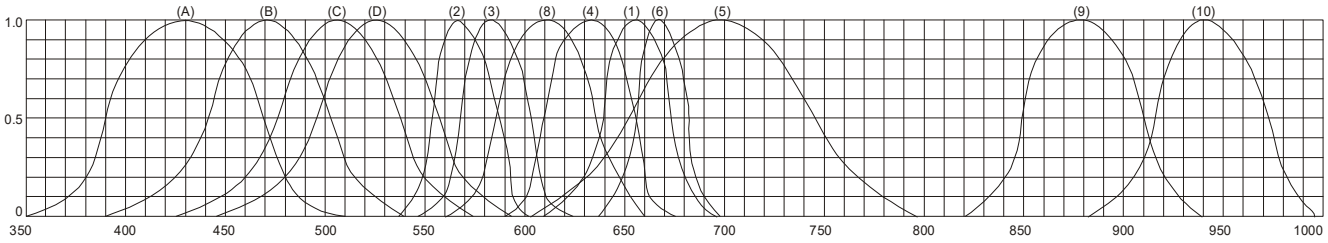



BL-S28B-12



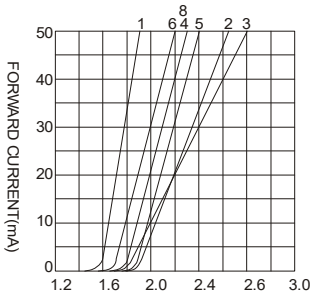

Notes:
1. All dimensions are in millimeters (inches)
2. Tolerance is ±0.25(0.01")unless otherwise noted.
3. Specifications are subject to change without notice.

## ■ Typical electrical-optical characteristics curves:

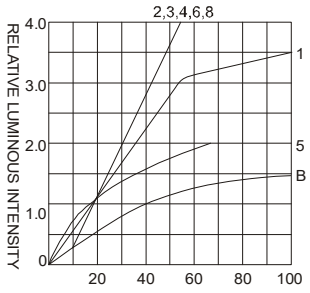



RELATIVE INTENSITY Vs WAVELENGTH(λ p)

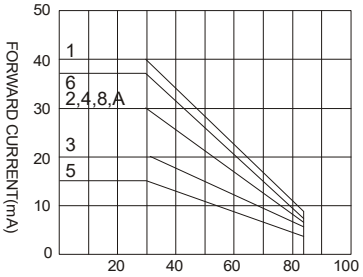
(1) - GaAsP/GaAs 655nm/Red
(2) - GaP 570nm/Yellow Green
(3) - GaAsP/GaP 585nm/Yellow
(4) - GaAsp/GaP 635nm/Orange & Hi-Eff Red
(5) - GaP 700nm/Bright Red
(6) - GaAlAs/GaAs 660nm/Super Red
(8) - GaAsP/GaP 610nm/Super Red
(9) - GaAlAs 880nm
(10) - GaAs/GaAs & GaAlAs/GaAs 940nm
(A) - GaN/SiC 430nm/Blue
(B) - InGaN/SiC 470nm/Blue
(C) - InGaN/SiC 505nm/Ultra Green
(D) - InGaAl/SiC 525nm/Ultra Green



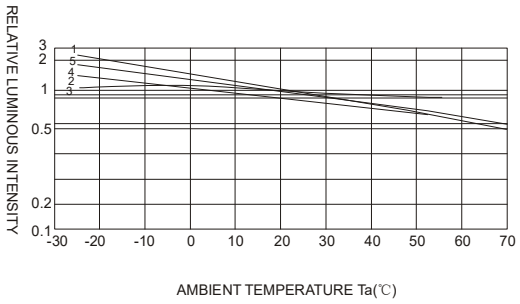

FORWARD VOLTAGE (Vf)
FORWARD CURRENT VS.
FORWARD VOLTAGE

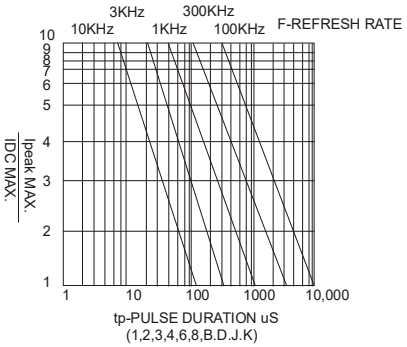


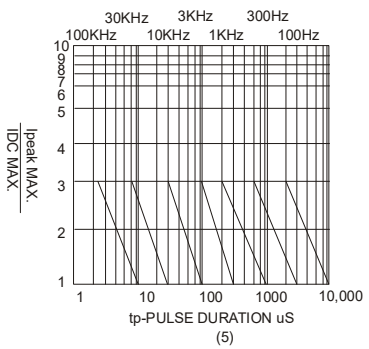

FORWARD CURRENT (mA)
RELATIVE LUMINOUS
INTENSITY VS. FORWARD
CURRENT




AMBIENT TEMPERATURE Ta(℃)
FORWARD CURRENT VS. AMBIENT
TEMPERATURE




NOTE:25℃ free air temperature unless otherwise specified

■ Packing and weighting

