AMERICAN BRIGHT OPTOELECTRONICS CORP.

Specification for 2016E2 Series

AB-2016E2-kkF80

High efficacy 2016 EMC white LED

Features:

- Top view white LED
- Thermally enhanced package design
- High luminous flux output
- High current capability
- Compact Package Size
- Wide viewing angle
- Pb-free Reflow Soldering Application
- RoHS and REACH compliant

Applications:

- Retrofits (replacement)
- Interior Lighting
- General lighting
- Indoor & Outdoor sign board back light
- Architectural / Decorative lighting

Electro Optical Characteristics (I_F= 65mA, T_j=25℃)

CCT	CRI	Luminous Flux (lm)	
	min.	min.	Typ.
2700K	70	24	26.0
	80	22	24.5
	90	18	22.0
3000K	70	24	27.0
	80	24	25.5
	90	20	23.0
4000K	70	26	28.5
	80	24	27.0
	90	22	24.5
5000K	70	26	28.5
	80	24	27.0
	90	22	24.5
5700K	70	26	28.5
	80	24	27.0
	90	22	24.5
6500K	70	26	28.5
	80	24	27.0
	90	22	24.5

* Tolerance of measurements of the Luminous Flux is ±7%
* Ra measurement tolerance is ±2

Absolute Maximum Ratings (T_j=25℃)

Item	Symbol	Absolute Max. Rating	Unit
Forward Current	I_F	150	mA
Pulse Forward Current	I_{FP}	225	mA
Power Dissipation	PD	480	mW
Reverse Voltage	V_R	5	V
Operating Temperature	T_{opr}	-40~ +105	˚C
Storage Temperature	T_{stg}	-40~ +85	˚C
Junction Temperature	T_j	120	˚C
Soldering Temperature	T_{sld}	Reflow soldering: 230˚C or 260˚C for 10 sec	

* IFP condition with Pulse: Width≤100μs, Duty cycle≤1/10
* LED's properties might be different from suggested values like above and below tables if operation condition will be exceeded our parameter range. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product
* All measurements were made under the standardized environment of American Bright LED

Electrical/Optical Characteristics (T_j=25℃)

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	-	2.9	3.2	V	I_f = 60mA
Reverse Current	I_R	-	-	10	μA	V_R = 5V
Viewing Angle	$2\theta_{1/2}$	-	120	-	°	I_f = 65mA
Thermal Resistance	R_{th} j-sp	-	8	-	℃/W	I_f = 65mA
Electrostatic Discharge	ESD	1000	-	-	V	HBM

* Tolerance of measurements of the Forward Voltage is ±0.1V
* $2\theta_{1/2}$ is the off-axis where the luminous intensity is 1/2 of the peak intensity
* R_{th} j-sp is the thermal resistance from LED junction to solder point on MCPCB with electrical power

Naming System:

AB-2016E2-kkFxx-yy

kk: Color temperature

xx: CRI

yy: bin code

BIN Structure

Luminous Flux Ranks (I_F =65mA, T_j =25˚C)

CCT	CRI		Luminous Flux		
	Min.	Typ.	Code	Min.	Max
2700K	70	72	D5	24	26
			D6	26	28
			D7	28	30
	80	82	D4	22	24
			D5	24	26
			D6	26	28
	90	92	D2	18	20
			D3	20	22
			D4	22	24
3000K	70	72	D5	24	26
			D6	26	28
			D7	28	30
	80	82	D5	24	26
			D6	26	28
			D7	28	30
	90	92	D3	20	22
			D4	22	24
			D5	24	26
4000K	70	71	D6	26	28
			D7	28	30
			D8	30	32
5000K 5700K	80	81	D5	24	22
			D6	26	24
			D7	28	26
6500K	90	91	D4	22	24
			D5	24	26
			D6	26	28

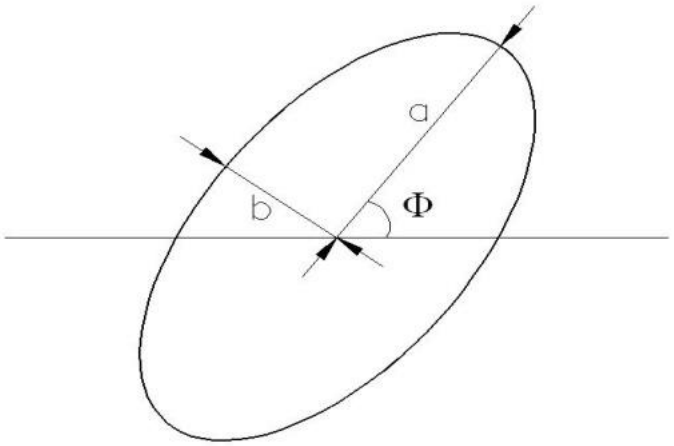
* Tolerance of measurements of the Luminous Flux is ±7%
* Ra measurement has a tolerance of ±2%

Forward Voltage Ranks (I_F = 65mA, T_j =25˚C)

Code	Min.	Max.	Unit
B1	2.8	2.9	V
C1	2.9	3.0	V
D1	3.0	3.1	V
E1	3.1	3.2	V

* Tolerance of measurements of the Forward Voltage is ±0.1V

CIE Chromaticity Diagram (I_F = 60mA, T_j = 25℃)



The color ranks have chromaticity ranges within 5-step MacAdam ellipse

Color Code	Center		Radius		Angle
	x	y	a	b	Φ
27M5	0.4582	0.4099	0.013500	0.00700	53.42
30M5	0.4342	0.4028	0.013900	0.00680	53.13
40M5	0.3825	0.3798	0.015650	0.00670	53.43
50M5	0.3451	0.3554	0.013700	0.00590	59.37
57M5	0.3290	0.3417	0.011175	0.00550	58.35
65M5	0.3130	0.3290	0.011150	0.00475	58.34

* Tolerance of measurements of the chromaticity Coordinate is±0.005

* Energy Star binning applied to all 2600~7000K.

Fig 1. Color Spectrum, Tj = 25℃ Ra≥70

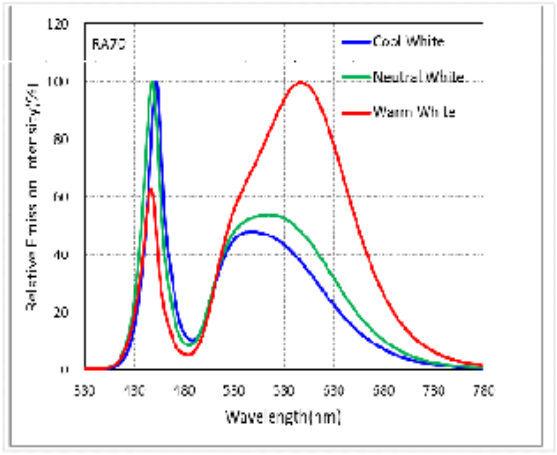


Fig 2. Color Spectrum, Tj = 25℃ Ra≥80

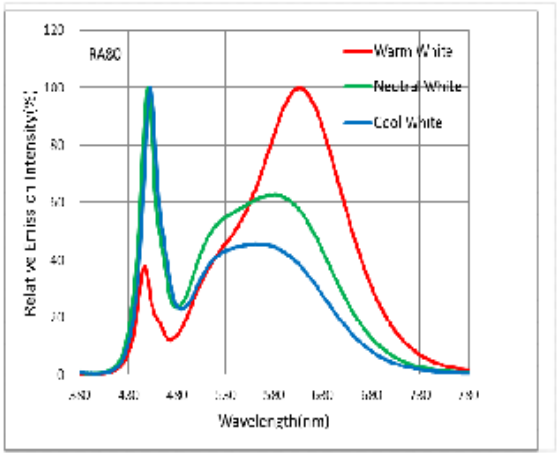


Fig 3. Color Spectrum, Tj = 25℃ Ra≥90

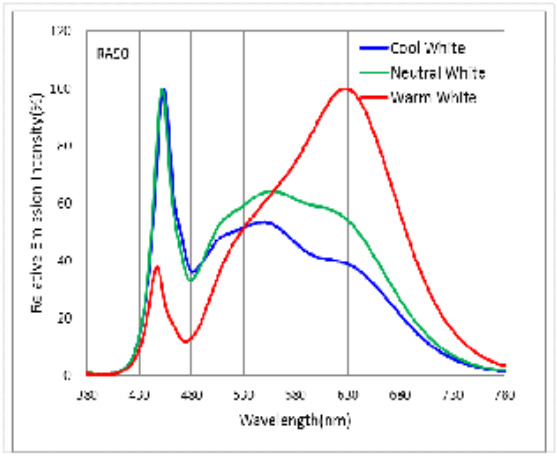


Fig 4. Viewing Angle Distribution, Tj = 25℃

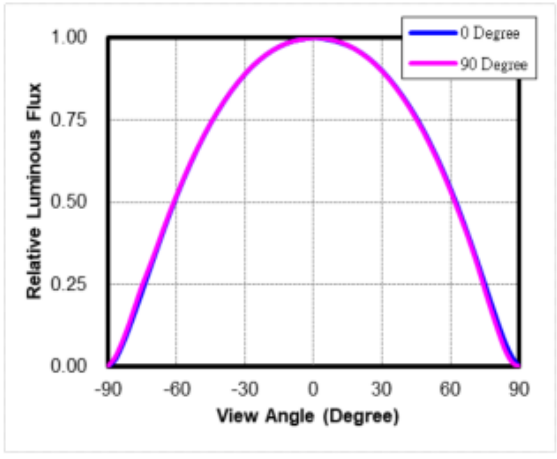


Fig 5. Forward Current vs. Relative Intensity, Tj = 25℃

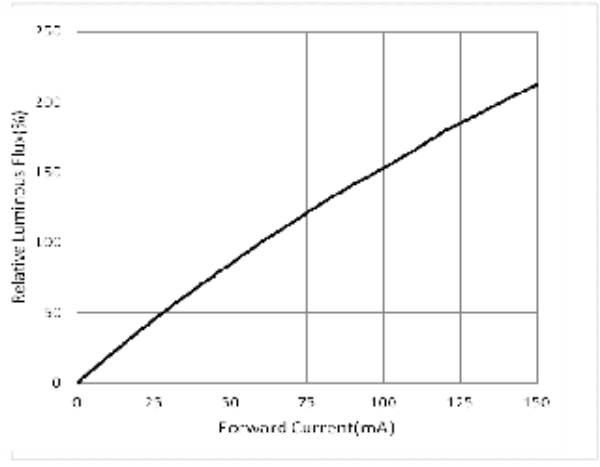


Fig 6. Forward Current vs. Forward Voltage, Tj = 25℃

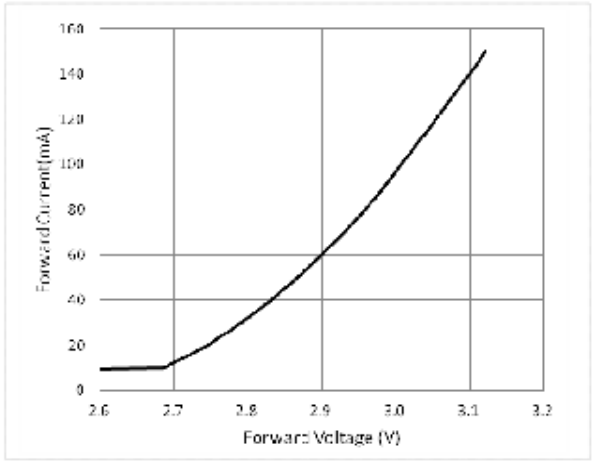


Fig 7. Ambient Temperature vs. Relative Luminous flux (IF=60mA)

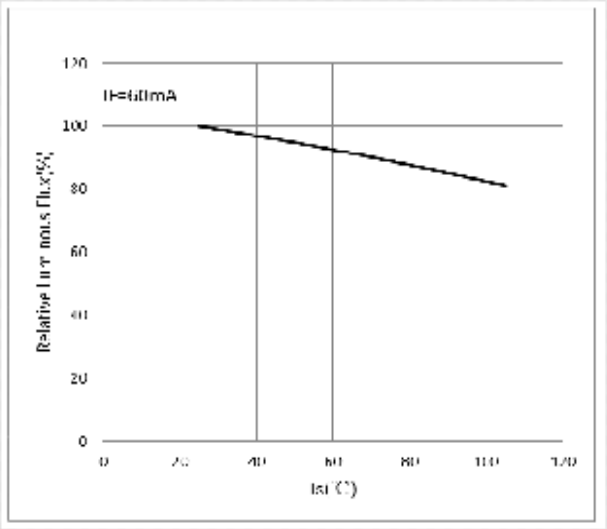


Fig 8. Ambient Temperature vs. Relative Forward Voltage (IF=60mA)

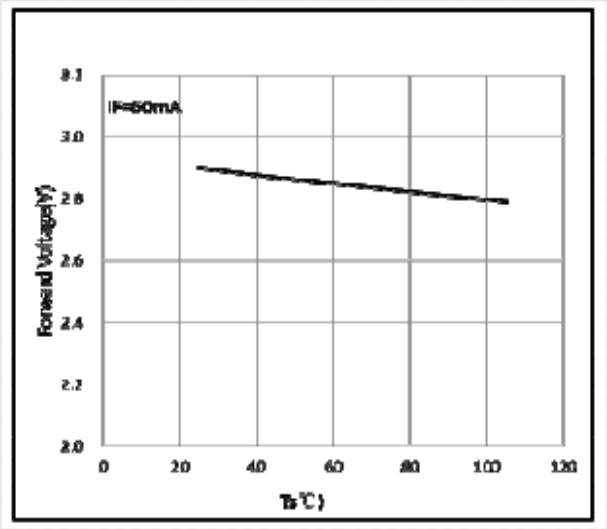


Fig 9. Ts vs. CIE x, y Shift

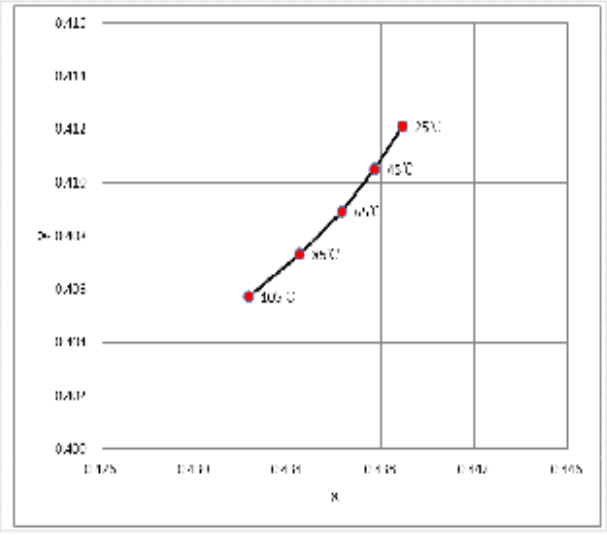
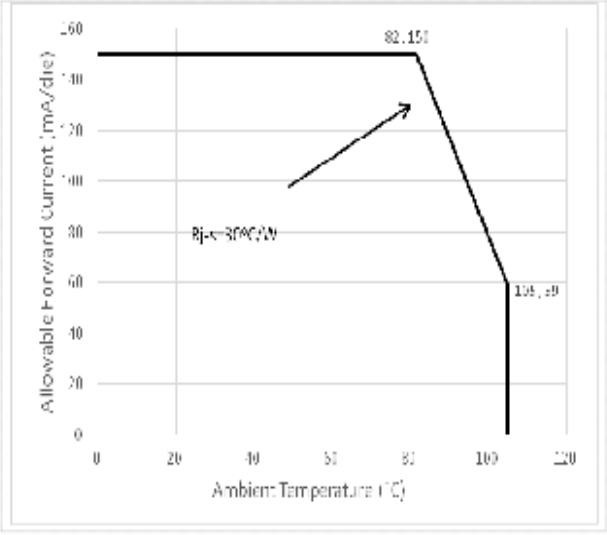
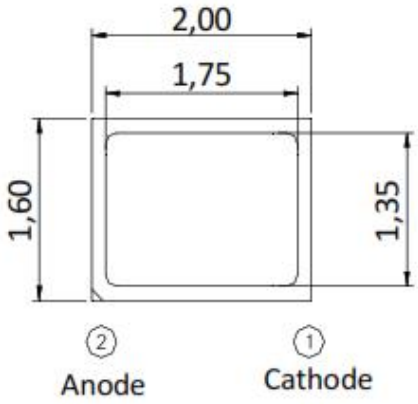


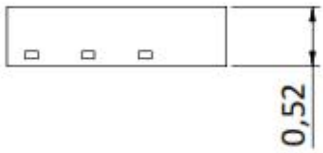
Fig10.Maximum Forward Current vs. Ambient Temperature

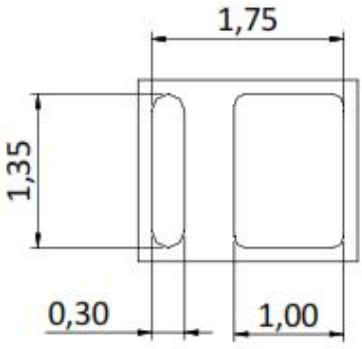


Package Dimensions

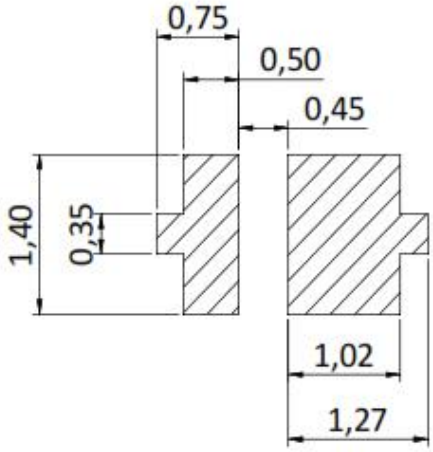


Polarity





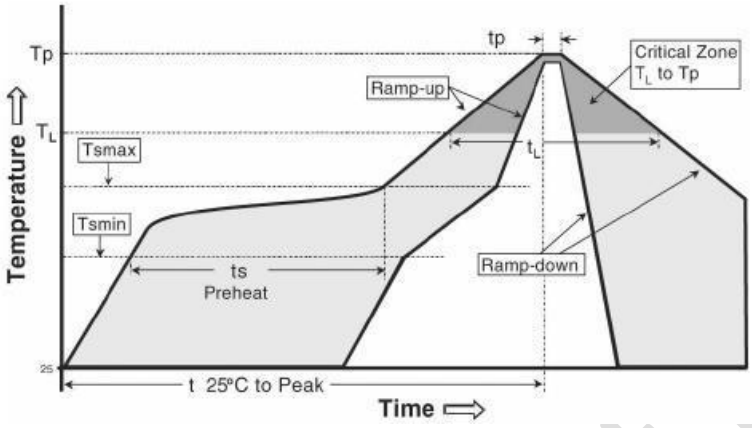
Bot. view



Soldering patterns

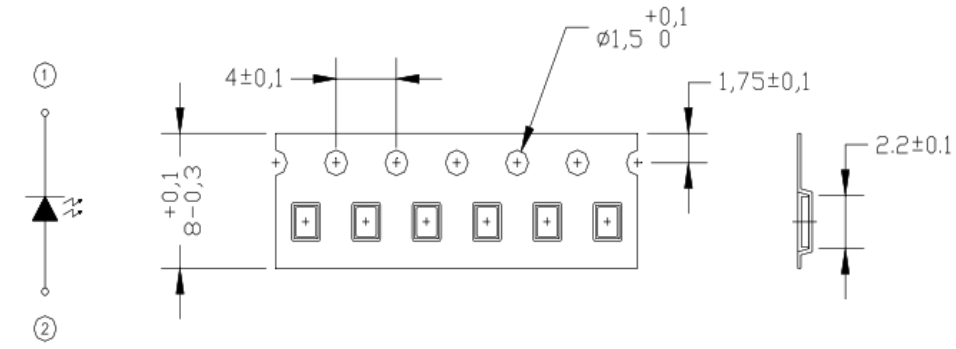
* The tolerance unless mentioned is ±0.1mm, unit = mm
* The soldering pad pattern is only for reference and can be modified according to actual requirements

Reflow Soldering Characteristics



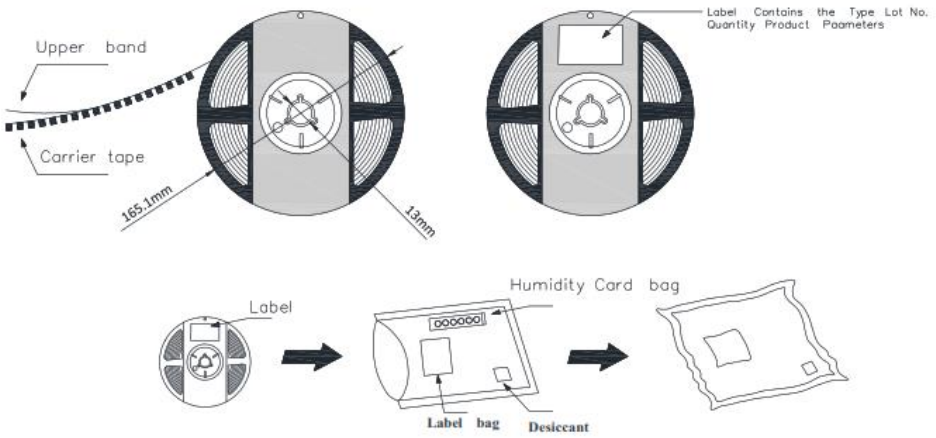
Reflow Soldering	
Temperature min ($T_{s,\ min}$)	150˚C
Temperature Max ($T_{s,\ Max}$)	200˚C
Time (t_s) from ($T_{s,\ min}$ to $T_{s,\ Max}$)	60-120 s
Ramp-up rate (T_L to T_p)	3˚C/s Max
Liquidous temperature (T_L)	217˚C
Time (T_L) maintained above T_L	60-150 s
Peak package body temperature	260˚C Max
Time (T_p) within 5˚C of the specified classification temperature (T_c)	30 s Max
Ramp-down rate (T_p to T_L)	6˚C/s Max
Time 25˚C to peak temperature	8 min. Max

Package Dimensions of Tape

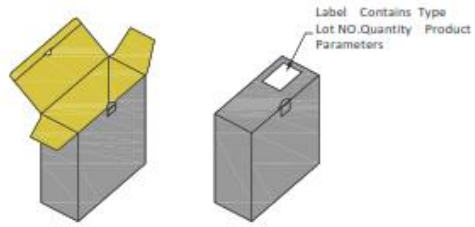


* Quantity : Max 5000pcs/Reel
* Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ±0.2mm
* Package : P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof Package.
* unit = mm

Package Dimensions of Reel

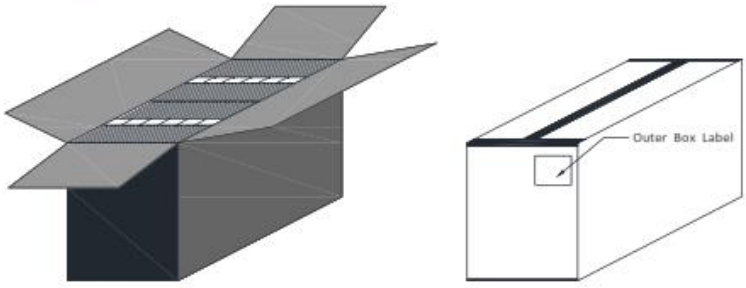


Packaging



* Capacity 10 reels per box.

Outer Box



* Capacity 30 or 60 reels per box.

Caution

1. Reflow soldering is recommended not to be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
2. Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.

Notes on American Bright EMC Series soldering:

1. Recommend to use reflow machine.
2. Recommend to use heating plate soldering.
3. Manual soldering is not recommended.

Notes on reflow process:

1. To confirm whether the actual temperature curve in the reflow soldering conditions comply with recommended
conditions. LEDs are guaranteed for one time reflow.
2. During reflow process do not apply force on LED active area.
3. After reflow process, PCB board should be cooled down before packing or storage.

Precaution for use

Storage

1. Before opening the package: The LED should be kept at 5˚C~30˚C and 60%RH or less.
2. After opening the package: The LED's lifetime is 168Hrs @30˚C or 60%RH. If unused LED remain, it should be stored in moisture proof packages JEDEC (**MSL 3**).
3.If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions: baking treatment: 60±5˚C for 24 hours.

Mouser Electronics

Authorized Distributor

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American Bright LED:

AB-2016E2-27F80 AB-2016E2-30F80 AB-2016E2-40F80