

## High Brightness LED Power Module



22454



22159

### DESCRIPTION

The VLSL3112A2, VLSL3124A2 are metal core based high brightness LED power modules, assembled with 12 or 24 HB white LEDs. The color temperature is natural white. The typical color temperature is 4000 K. The modules are designed for flexible use due to the option for using special reflectors to adjust the emission characteristics.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: LED module
- Product series: power
- Angle of half intensity:  $\pm 80^\circ$

### FEATURES

- Metal core PCB: Al > 0.75 thickness
- Single side/single layer PCB
- Shiny white surface
- 12 or 24 LEDs minimum 71 lm at 350 mA per LED. Max. current per LED 1 A
- Conductive top layer: Cu (min. 18  $\mu\text{m}$ )
- Isolation layer prepreg > 63  $\mu\text{m}$
- Standard solder mask material
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B
- LM80 certified LEDs
- Compliant to RoHS Directive 2002/95/EC



### APPLICATIONS

- Streetlight
- Internal lighting in buildings
- Tunnel lights
- General lighting application

### PARTS TABLE

| PART       | COLOR         | LUMINOUS FLUX<br>(at $I_F = 700 \text{ mA typ.}$ ) | COLOR TEMPERATURE<br>K | TECHNOLOGY |
|------------|---------------|--|------------------------|------------|
| VLSL3112A2 | Natural white | $\Phi_V = 1600 \text{ lm}$                         | typ. 4000              | InGaN      |
| VLSL3124A2 | Natural white | $\Phi_V = 3200 \text{ lm}$                         | typ. 4000              | InGaN      |

### ABSOLUTE MAXIMUM RATINGS ( $T_{\text{amb}} = 25^\circ\text{C}$ , unless otherwise specified) VLSL3112A2, VLSL3124A2

| PARAMETER                    | TEST CONDITION | SYMBOL           | VALUE        | UNIT             |
|------------------------------|----------------|------------------|--------------|------------------|
| Forward current              | Per row        | $I_F$            | 750          | mA               |
| Power dissipation VLSL3112A2 | Total (max.)   | $P_{\text{tot}}$ | 34.5         | W                |
| Power dissipation VLSL3124A2 |                | $P_{\text{tot}}$ | 69           | W                |
| Junction temperature         |                | $T_j$            | 120          | $^\circ\text{C}$ |
| Operating temperature range  |                | $T_{\text{amb}}$ | - 40 to + 85 | $^\circ\text{C}$ |
| Storage temperature range    |                | $T_{\text{stg}}$ | - 40 to + 85 | $^\circ\text{C}$ |

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>(1)</sup> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) VL3112A2, NATURAL WHITE

| PARAMETER   | TEST CONDITION                       | SYMBOL        | MIN. | TYP.  | MAX. | UNIT |
|---|--------------------------------------|---------------|------|-------|------|------|
| Luminous flux per row <sup>(2)</sup>                        | $I_F = 700\text{ mA}$                | $\Phi_V$      | 650  | 800   | -    | lm   |
| Luminous flux total <sup>(2)</sup>                          | $I_{board} = 2 \times 700\text{ mA}$ | $\Phi_V$      | 1300 | 1600  | -    | lm   |
| Color temperature   | $I_F = 700\text{ mA}$                | TK            | -    | 4000  | -    | K    |
| Forward voltage per row                                     | $I_F = 700\text{ mA}$                | $V_F$         | 19   | 21    | 23   | V    |
| Class A ( $V_{Fmax.} - V_{Fmin.}$ ) all rows <sup>(3)</sup> | $I_F = 700\text{ mA}$                | $\Delta V_F$  | -    | -     | 0.9  | V    |
| Temperature coefficient of $V_F$ per row                    | $I_F = 350\text{ mA}$                | $TC_{V_F}$    | -    | - 20  | -    | mV/K |
| Temperature coefficient of $\Phi_V$                         | $I_F = 350\text{ mA}$ (per row)      | $TC_{\Phi_V}$ | -    | - 0.4 | -    | %/K  |

#### Notes

- (1) Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.1\text{ V}$ . Luminous flux is measured at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ .
- (2) Calculated based on single LED unit.
- (3)  $V_F$  classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.

### OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>(1)</sup> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) VL3124A2, NATURAL WHITE

| PARAMETER   | TEST CONDITION                       | SYMBOL        | MIN. | TYP.  | MAX. | UNIT |
|---|--------------------------------------|---------------|------|-------|------|------|
| Luminous flux per row <sup>(2)</sup>                        | $I_F = 700\text{ mA}$                | $\Phi_V$      | 650  | 800   | -    | lm   |
| Luminous flux total <sup>(2)</sup>                          | $I_{board} = 4 \times 700\text{ mA}$ | $\Phi_V$      | 2600 | 3200  | -    | lm   |
| Color temperature   | $I_F = 700\text{ mA}$                | TK            | -    | 4000  | -    | K    |
| Forward voltage per row                                     | $I_F = 700\text{ mA}$                | $V_F$         | 19   | 21    | 23   | V    |
| Class A ( $V_{Fmax.} - V_{Fmin.}$ ) all rows <sup>(3)</sup> | $I_F = 700\text{ mA}$                | $\Delta V_F$  | -    | -     | 0.9  | V    |
| Temperature coefficient of $V_F$ per row                    | $I_F = 350\text{ mA}$                | $TC_{V_F}$    | -    | - 20  | -    | mV/K |
| Temperature coefficient of $\Phi_V$                         | $I_F = 350\text{ mA}$ (per row)      | $TC_{\Phi_V}$ | -    | - 0.4 | -    | %/K  |

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### LUMINOUS FLUX CLASSIFICATION FOR THE SINGLE LED AT 350 mA

| GROUP    | LUMINOUS FLUX $\Phi_V$ (mIm) CORRELATION TABLE |         |
|----------|--|---------|
|          | MIN.   | MAX.    |
| STANDARD |  |         |
| KX       | 71 000   | 82 000  |
| KY       | 82 000   | 97 000  |
| KZ       | 97 000   | 112 000 |



**COLOR RANGE AND COLOR BINNING**

VLSL3112A2, VLSL3124A2; typ. 4000 K; group 4L to 8N

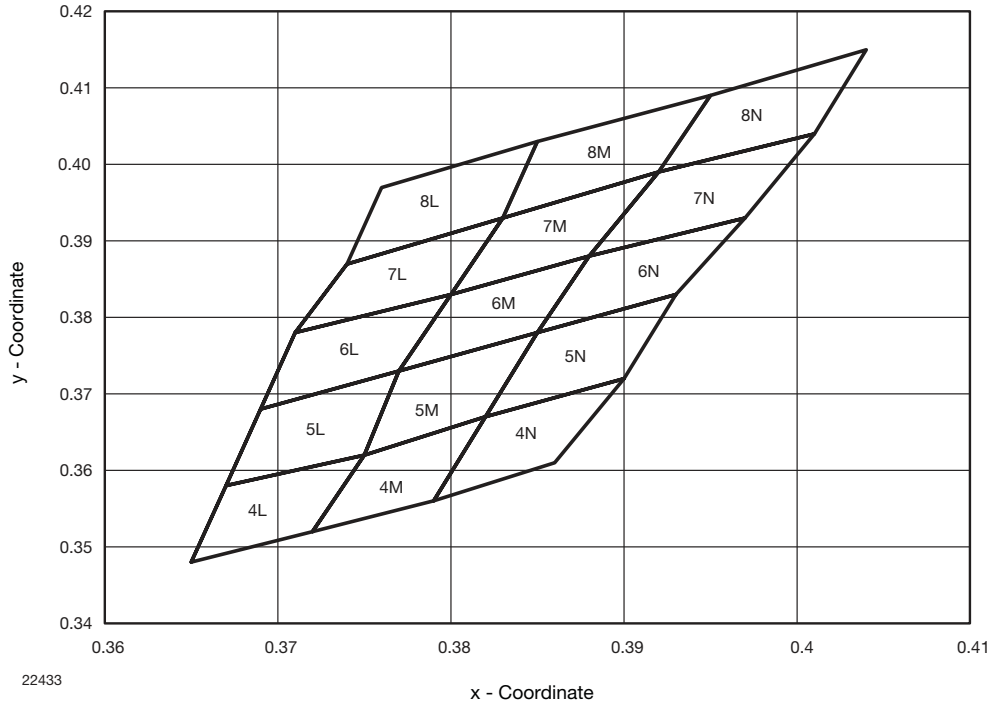


Fig. 1 - Chromaticity Coordinates of Colorgroups

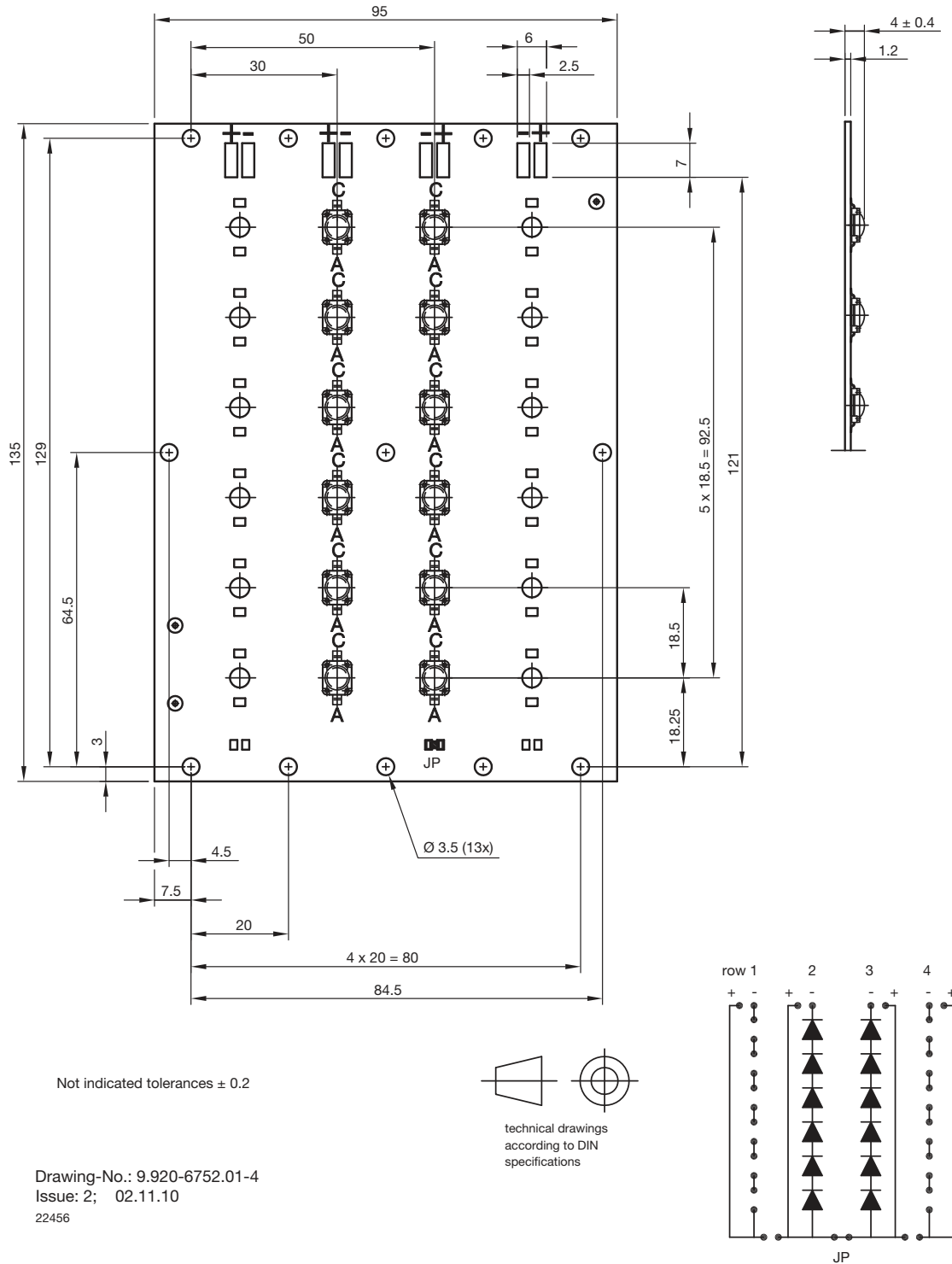
| CHROMATICITY COORDINATED GROUPS FOR WHITE SMD LED |       |       |       |       |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GROUP   | X     | Y     | GROUP | X     | Y     | GROUP | X     | Y     |       |
| 4L  | 0.365 | 0.348 | 4M    | 0.372 | 0.352 | 4N    | 0.379 | 0.356 |       |
|   | 0.367 | 0.358 |       | 0.375 | 0.362 |       | 0.382 | 0.367 |       |
|   | 0.375 | 0.362 |       | 0.382 | 0.367 |       | 0.390 | 0.372 |       |
|   | 0.372 | 0.352 |       | 0.379 | 0.356 |       | 0.386 | 0.361 |       |
| 5L  | 0.367 | 0.358 |       | 0.375 | 0.362 |       | 5N    | 0.382 | 0.367 |
|   | 0.369 | 0.368 | 0.377 | 0.373 | 0.385 | 0.378 |       |       |       |
|   | 0.377 | 0.373 | 0.385 | 0.378 | 0.393 | 0.383 |       |       |       |
|   | 0.375 | 0.362 | 0.382 | 0.367 | 0.390 | 0.372 |       |       |       |
| 6L  | 0.369 | 0.368 | 0.377 | 0.373 | 6N    | 0.385 | 0.378 |       |       |
|   | 0.371 | 0.378 | 0.380 | 0.383 |       | 0.388 | 0.388 |       |       |
|   | 0.380 | 0.383 | 0.388 | 0.388 |       | 0.397 | 0.393 |       |       |
|   | 0.377 | 0.373 | 0.385 | 0.378 |       | 0.393 | 0.383 |       |       |
| 7L  | 0.371 | 0.378 | 0.380 | 0.383 | 7N    | 0.388 | 0.388 |       |       |
|   | 0.374 | 0.387 | 0.383 | 0.393 |       | 0.392 | 0.399 |       |       |
|   | 0.383 | 0.393 | 0.392 | 0.399 |       | 0.401 | 0.404 |       |       |
|   | 0.380 | 0.383 | 0.388 | 0.388 |       | 0.397 | 0.393 |       |       |
| 8L  | 0.374 | 0.387 | 0.383 | 0.393 | 8N    | 0.392 | 0.399 |       |       |
|   | 0.376 | 0.397 | 0.385 | 0.403 |       | 0.395 | 0.409 |       |       |
|   | 0.385 | 0.403 | 0.395 | 0.409 |       | 0.404 | 0.415 |       |       |
|   | 0.383 | 0.393 | 0.392 | 0.399 |       | 0.401 | 0.404 |       |       |

# VLSL3112A2, VLSL3124A2

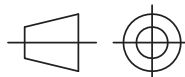
Vishay Semiconductors High Brightness LED Power Module



## PCB BASIC DESIGN VLSL3112A2 DIMENSIONS in millimeters



Not indicated tolerances ± 0.2



technical drawings according to DIN specifications

Drawing-No.: 9.920-6752.01-4  
Issue: 2; 02.11.10  
22456

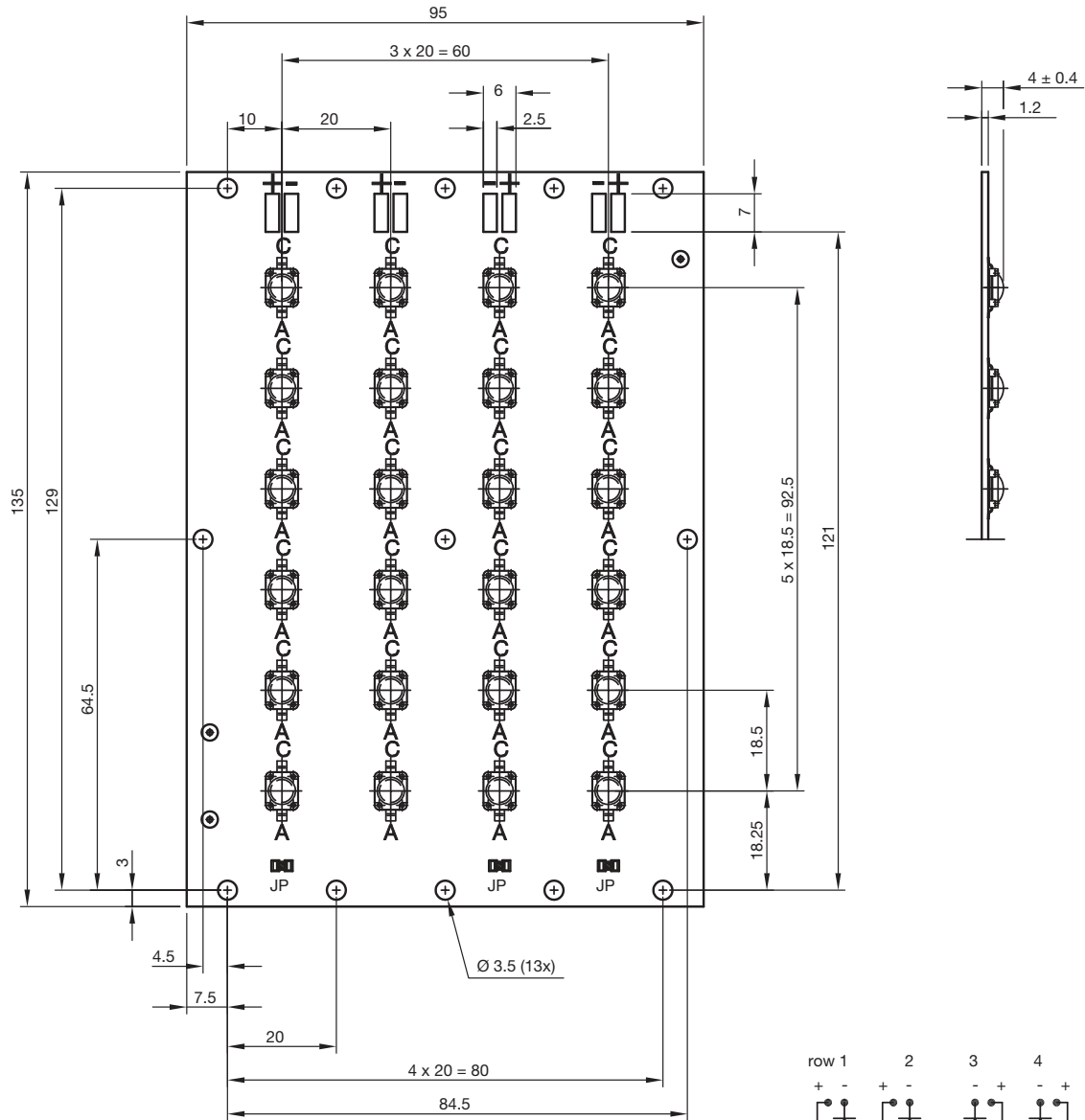
Assembled with all jumpers. Jumpers can be removed according driver design



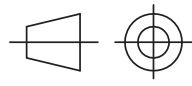
# VLSL3112A2, VLSL3124A2

High Brightness LED Power Module Vishay Semiconductors

## PCB BASIC DESIGN VLSL3124A2 DIMENSIONS in millimeters

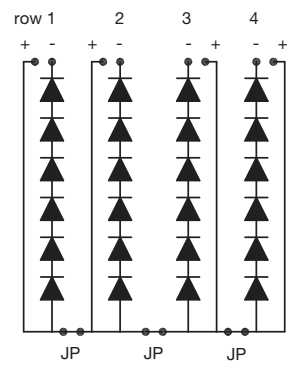


Not indicated tolerances ± 0.2



technical drawings according to DIN specifications

Drawing-No.: 9.920-6751.01-4  
Issue: 2; 02.11.10  
22455



Assembled with all jumpers. Jumpers can be removed according driver design

### PCB CHARACTERISTICS

- Metal core PCB with typical Al thickness of 800  $\mu\text{m}$
- Prepreg thickness typical 127  $\mu\text{m}$
- Conductive pattern Cu typical 25  $\mu\text{m}$
- Total board thickness: 1 mm  $\pm$  15 %
- Warpage max. 0.75 % of board dimension
- Solder resist on top side
- Shiny white surface
- Galvanic of solder pads pure matte Sn ( $\geq$  0.8  $\mu\text{m}$ ), immersion plated
- Assembled with 12 or 24 VLMW91xxx LEDs. LED position accuracy  $\pm$  0.125 mm from middle axis, horizontal tilt max. 2°

### EMISSION CHARACTERISTIC

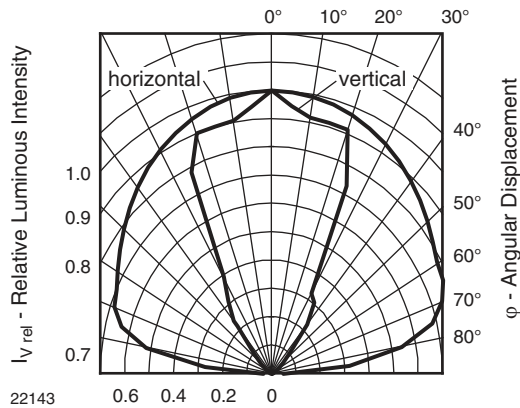


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

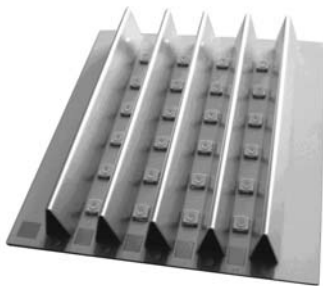
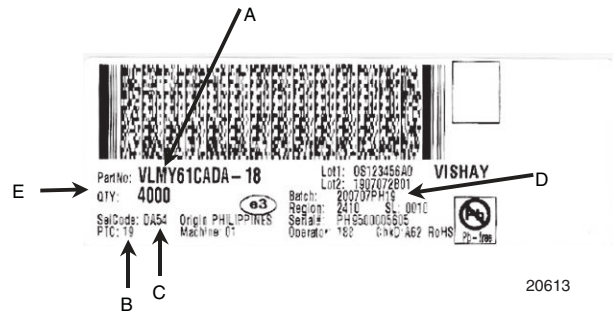


Fig. 3 - Sample Board with Reflectors (for Info only)

### BAR CODE PRODUCT LABEL (example)



- A. Type of component
- B. Manufacturing plant
- C. SEL - selection code (bin):  
e.g.: code for  $V_F$  class (A, B, C)
- D. Batch:  
200707 = year 2007, week 07  
PH19 = plant code
- E. Total quantity



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