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## User's Guide

# C-33-1305

# VFD

(Vacuum Fluorescent Character Display Module)

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October 31, 2006



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## Vacuum Fluorescent Display Specification

**PART NUMBER:** C-33-1305

**FEATURES:** 7 Digits, Alphanumeric, with Icons – AUDIO

**APPLICATION:** Character Display (*Alphanumeric*)

**RATINGS:** Below

| Outer Dimensions      | Panel Length     | P.L. | 135.2       | mm   |      |
|-----------------------|------------------|------|-------------|------|------|
|                       | Panel Height     | P.H. | 28.9        | mm   |      |
|                       | Panel Thickness  | P.T. | 8.5         | mm   |      |
|                       |                  |      |             |      |      |
| Leads                 | Lead Pitch       | L.P. | 2.5         | mm   |      |
|                       | Lead Out         | -    | SIL         |      |      |
|                       |                  |      |             |      |      |
| Character Size        | Character Height | C.H. | 8.8         | mm   |      |
|                       | Character Width  | C.W. | 5.5         | mm   |      |
|                       |                  |      |             |      |      |
| Item                  | Symbol           | Min. | Recommended | Max. | Unit |
| Filament Voltage      | Ef               | 4.5  | 5.0         | 5.5  | Vac  |
| Peak Grid Voltage     | ec               | -    | 29.0        | 34.0 | Vp-p |
| Peak Anode Voltage    | eb               | -    | 29.0        | 34.0 | Vp-p |
| Cut-off Bias          | Ek               | -    | -           | -    | -    |
| Duty Cycle            | Du               | -    | 1/ 14       | -    | -    |
| Pulse Width           | tp               | -    | 100         | -    | uS   |
| Operating Temperature | Topr             | -20  | -           | + 70 | C    |
| Storage Temperature   | Tstg             | -55  | -           | + 80 | C    |
| Color of Illumination | Green / Red      |      |             |      |      |

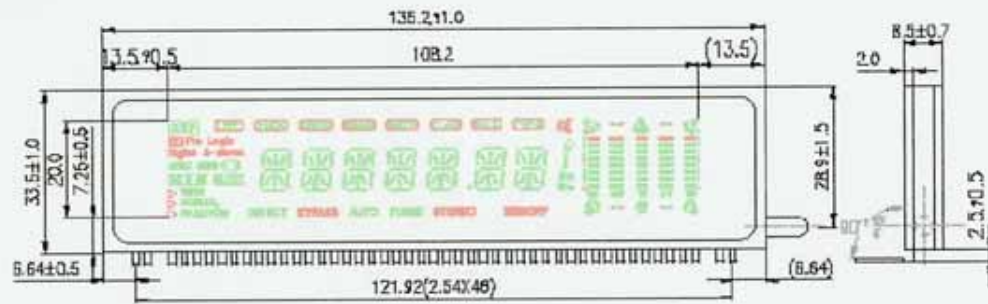
\* Life = 10,000hrs to half brightness

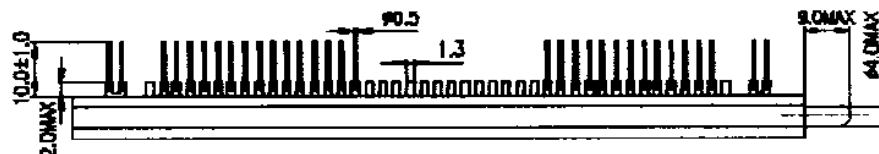
## C-33-1305

### Electrical Characteristics

| Item                         | Symbol                                              | Test Condition                                                               | Min.         | Typical      | Max.       | Unit                      |
|------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------|--------------|--------------|------------|---------------------------|
| <b>Filament Current</b>      | If<br>-                                             | Ef = 5.0 Vac<br>eb = ec = 0                                                  | 202.5<br>-   | 225.0<br>-   | 247.5<br>- | mAac<br>-                 |
| <b>Anode Current</b>         | ib/1,2,3,5,7G<br>ib/6,8~12G<br>ib/4G<br>ib/13G<br>- | Ef = 5.0 Vac<br>eb = 29.0 Vp-p<br>ec = 29.0 Vp-p<br>Du = 1/14<br>tp = 100 uS | -            | 7.0          | 14.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | 9.0          | 18.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | 12.0         | 24.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | 21.0         | 42.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | -            | -          | mA <sub>p-p</sub>         |
| <b>Grid Current</b>          | Ic/1,3,5G<br>ic/2,6~12G<br>ic/4G<br>ic/13G<br>-     |                                                                              | -            | 7.0          | 14.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | 12.0         | 24.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | 16.0         | 32.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | 23.0         | 46.0       | mA <sub>p-p</sub>         |
|                              |                                                     |                                                                              | -            | -            | -          | mA <sub>p-p</sub>         |
| <b>Luminance</b>             | L(G)<br><br>L(R)<br><br>-                           |                                                                              | 350<br>(102) | 700<br>(204) | -          | cd/m <sup>2</sup><br>(fL) |
|                              |                                                     |                                                                              | 35<br>(10)   | 70<br>(20)   |            | cd/m <sup>2</sup><br>(fL) |
|                              |                                                     |                                                                              | -            | -            |            | cd/m <sup>2</sup><br>(fL) |
| <b>Luminance Ratio</b>       | Lmin/Lmax                                           |                                                                              | 50           | -            | -          | %                         |
| <b>Grid Cut-off Voltage</b>  | Ecco                                                | Ef = 5.0 Vac<br>Eb = 29.0 Vdc                                                | -6.5         | -            | -          | Vdc                       |
| <b>Anode Cut-off Voltage</b> | Ebco                                                | Ef = 5.0 Vac<br>Ec = 29.0 Vp-p<br>Du = 1/14<br>tp = 100 uS                   | -6.5         | -            | -          | Vdc                       |

**Drive Mode: Dynamic state**

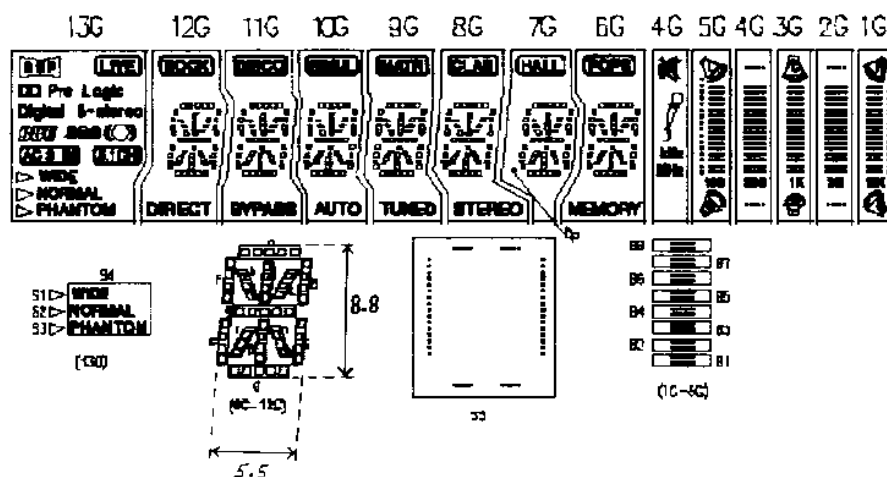




#### PINOUT CONNECTIONS

|         |       |     |     |     |     |    |    |    |    |    |    |    |    |     |     |     |     |     |     |
|---------|-------|-----|-----|-----|-----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| Pin No. | 1     | 2   | 3   | 4   | 5   | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14  | 15  | 16  | 17  | 18  | 19  |
| Conn.   | F     | F   | NP  | NC  | P1  | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | P12 | P13 | P14 | P15 |
| Pin No. | 20-32 | 33  | 34  | 35  | 36  | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45  | 46  | 47  | 48  | 49  |     |
| Conn.   | NC    | 13G | 12G | 11G | 10G | 9G | 8G | 7G | 6G | 5G | 4G | 3G | 2G | 1G  | NC  | NP  | F   | F   |     |

F: Filament  
 G: Grid  
 P: Anode  
 NC: No Connect  
 NP: No Pin



|     | 13G       | 12G    | 11G    | 10G  | 9G    | 8G     | 7G | 6G     | 5G  | 4G  | 3G  | 2G  | 1G  |
|-----|-----------|--------|--------|------|-------|--------|----|--------|-----|-----|-----|-----|-----|
| P1  |           | a      | a      | a    | a     | a      | a  | a      | B8  | B8  | B8  | B8  | B8  |
| P2  |           | h      | h      | h    | h     | h      | h  | h      | B7  | B7  | B7  | B7  | B7  |
| P3  | Pre Light | i      | i      | i    | i     | i      | i  | i      | B6  | B6  | B6  | B6  | B6  |
| P4  | Digital   | k      | k      | k    | k     | k      | k  | k      | B5  | B5  | B5  | B5  | B5  |
| P5  | 8-Alarm   | f      | f      | f    | f     | f      | f  | f      | B4  | B4  | B4  | B4  | B4  |
| P6  |           | b      | b      | b    | b     | b      | b  | b      | B3  | B3  | B3  | B3  | B3  |
| P7  |           | g      | g      | g    | g     | g      | g  | g      | B2  | B2  | B2  | B2  | B2  |
| P8  |           | e      | e      | e    | e     | e      | e  | e      | B1  | B1  | B1  | B1  | B1  |
| P9  |           | c      | c      | c    | c     | c      | c  | c      | 100 | 200 | 300 | 400 | 500 |
| P10 | S3        | r      | r      | r    | r     | r      | r  | r      | S5  | S5  | /   | S5  | S5  |
| P11 | S2        | p      | p      | p    | p     | p      | p  | p      |     | kHz |     | /   |     |
| P12 | S1        | n      | n      | n    | n     | n      | n  | n      |     | kHz |     | /   |     |
| P13 | S4        | d      | d      | d    | d     | d      | d  | d      | /   | /   | /   | /   | /   |
| P14 | /         | DIRECT | SYSTEM | AUTO | TUNED | STEREO | Dp | MEMORY | /   | /   | /   | /   | /   |
| P15 |           |        |        |      |       |        |    |        | /   | /   | /   | /   | /   |