



# HD1750JL

Very high voltage NPN power transistor for high definition and slim CRT display

PRELIMINARY DATA

## Features

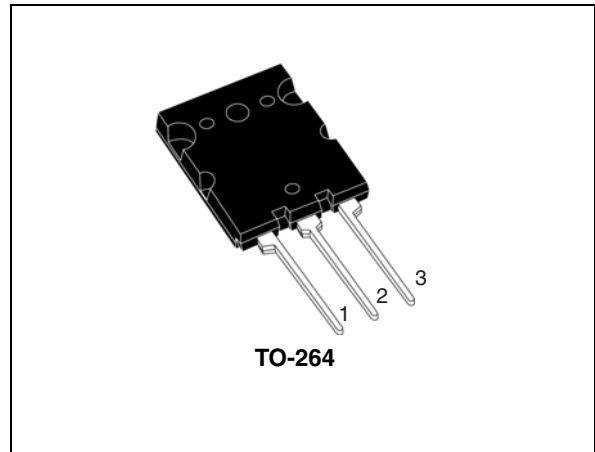
- State-of-the-art technology: diffused collector "enhanced generation" EHVS1
- Wider range of optimum drive conditions
- Less sensitive to operating temperature variation
- In compliance with the 2002/93/EC European directive

## Description

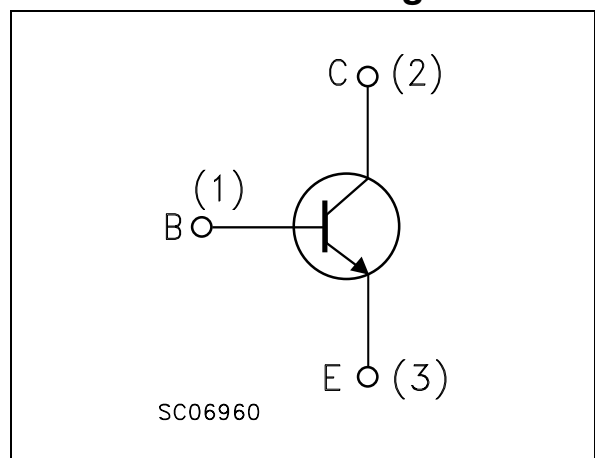
The HD1750JL is manufactured using Diffused Collector in Planar technology adopting new and Enhanced High Voltage Structure 1 (E.H.V.S.1) developed to fit High-Definition CRT display. The new HD product series show improved silicon efficiency bringing updated performance to the Horizontal Deflection stage.

## Applications

- High-definition and slim CRT TV and monitors



## Internal schematic diagram



## Order code

| Part number | Marking  | Package | Packaging |
|-------------|----------|---------|-----------|
| HD1750JL    | HD1750JL | TO-264  | Tube      |

# 1 Electrical ratings

**Table 1. Absolute maximum ratings**

| Symbol    | Parameter                                     | Value      | Unit             |
|-----------|-----------------------------------------------|------------|------------------|
| $V_{CES}$ | Collector-emitter voltage ( $V_{BE} = 0$ )    | 1700       | V                |
| $V_{CEO}$ | Collector-emitter voltage ( $I_B = 0$ )       | 800        | V                |
| $V_{EBO}$ | Emitter-base voltage ( $I_C = 0$ )            | 10         | V                |
| $I_C$     | Collector current                             | 24         | A                |
| $I_{CM}$  | Collector peak current ( $t_P < 5\text{ms}$ ) | 36         | A                |
| $I_B$     | Base current                                  | 12         | A                |
| $I_{BM}$  | Base peak current ( $t_P < 5\text{ms}$ )      | 18         | A                |
| $P_{TOT}$ | Total dissipation at $T_C = 25^\circ\text{C}$ | 200        | W                |
| $T_{STG}$ | Storage temperature                           | -65 to 150 | $^\circ\text{C}$ |
| $T_J$     | Max. operating junction temperature           | 150        | $^\circ\text{C}$ |

**Table 2. Thermal data**

| Symbol      | Parameter                            | Value | Unit               |
|-------------|--------------------------------------|-------|--------------------|
| $R_{thJ-C}$ | Thermal resistance junction-case max | 0.625 | $^\circ\text{C/W}$ |

## 2 Electrical characteristics

( $T_{CASE}=25^{\circ}\text{C}$  unless otherwise specified)

**Table 3. Electrical characteristics**

| Symbol               | Parameter                                             | Test conditions                                                                                                                                                                                             | Min. | Typ.       | Max.       | Unit                |
|----------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|------------|---------------------|
| $I_{CES}$            | Collector cut-off current<br>( $V_{BE} = 0$ )         | $V_{CE} = 1700\text{V}$<br>$V_{CE} = 1700\text{V}; T_C = 125^{\circ}\text{C}$                                                                                                                               |      |            | 0.2<br>2   | mA<br>mA            |
| $I_{EBO}$            | Emitter cut-off current<br>( $I_C = 0$ )              | $V_{EB} = 5\text{V}$                                                                                                                                                                                        |      |            | 10         | $\mu\text{A}$       |
| $V_{CEO(sus)}^{(1)}$ | Collector-emitter<br>sustaining voltage ( $I_B = 0$ ) | $I_C = 10\text{mA}$                                                                                                                                                                                         | 800  |            |            | V                   |
| $V_{EBO}^{(1)}$      | Emitter-base saturation<br>voltage ( $I_C = 0$ )      | $I_E = 10\text{mA}$                                                                                                                                                                                         | 10   |            |            | V                   |
| $V_{CE(sat)}^{(1)}$  | Collector-emitter saturation<br>voltage               | $I_C = 12\text{A}; I_B = 3\text{A}$                                                                                                                                                                         |      |            | 3          | V                   |
| $V_{BE(sat)}^{(1)}$  | Base-emitter saturation<br>voltage                    | $I_C = 12\text{A}; I_B = 3\text{A}$                                                                                                                                                                         |      | 0.95       | 1.5        | V                   |
| $h_{FE}$             | DC current gain                                       | $I_C = 1\text{A}; V_{CE} = 5\text{V}$<br>$I_C = 12\text{A}; V_{CE} = 5\text{V}$                                                                                                                             | 5.5  | 30         | 8.5        |                     |
| $t_s$<br>$t_f$       | Inductive load<br>Storage time<br>Fall time           | $I_C = 12\text{A}; I_{B(on)} = 1.8\text{A}$<br>$I_{B(off)} = -7.25\text{A};$<br>$V_{CE(fly)} = 1320\text{V};$<br>$V_{BE(off)} = -2.7\text{V};$<br>$L_{BB(on)} = 0.8\mu\text{H};$<br>$f_h = 31520\text{Hz}$  |      | 3<br>300   | 3.6<br>450 | $\mu\text{s}$<br>ns |
| $t_s$<br>$t_f$       | Inductive load<br>Storage time<br>Fall time           | $I_C = 6.5\text{A}; I_{B(on)} = 1.1\text{A}$<br>$I_{B(off)} = -5.25\text{A};$<br>$V_{CE(fly)} = 1220\text{V};$<br>$V_{BE(off)} = -2.7\text{V};$<br>$L_{BB(on)} = 0.25\mu\text{H};$<br>$f_h = 100\text{kHz}$ |      | 1.6<br>110 | 2<br>220   | $\mu\text{s}$<br>ns |

1. Pulsed: pulse duration = 300 $\mu\text{s}$ , duty cycle < 2%

2.1 Electrical characteristics (curve)

Figure 1. Safe operating area

Figure 2. Derating curve

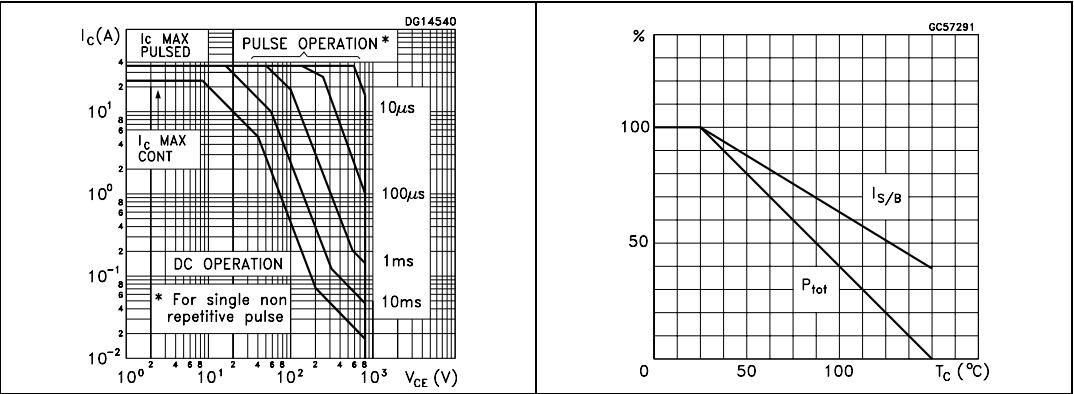


Figure 3. Output characteristics

Figure 4. Reverse biased SOA

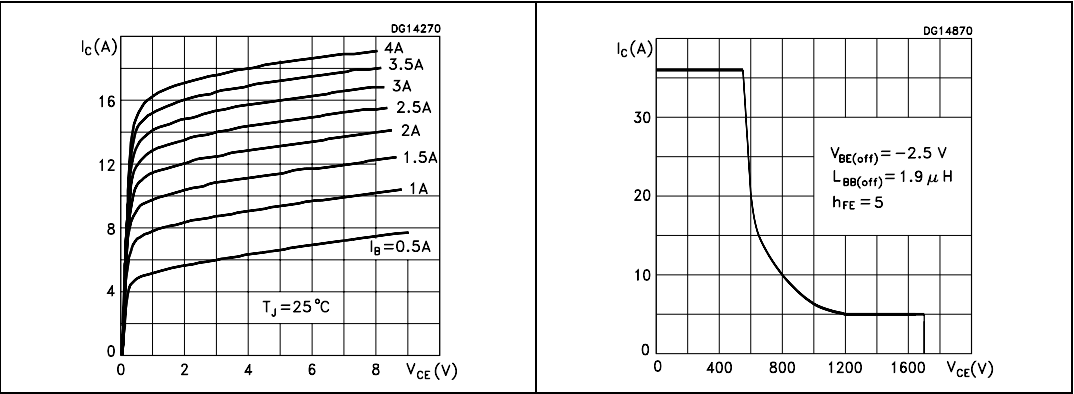


Figure 5. DC current gain

Figure 6. DC current gain

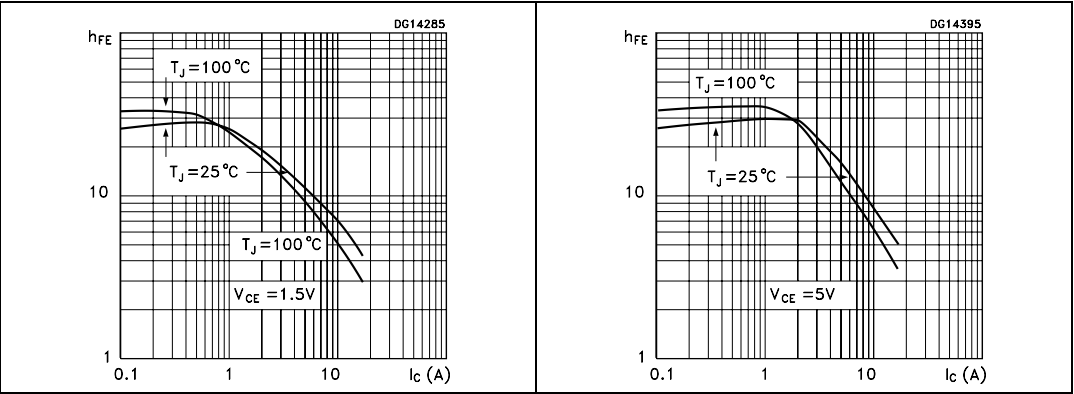


Figure 7. Collector-emitter saturation voltage

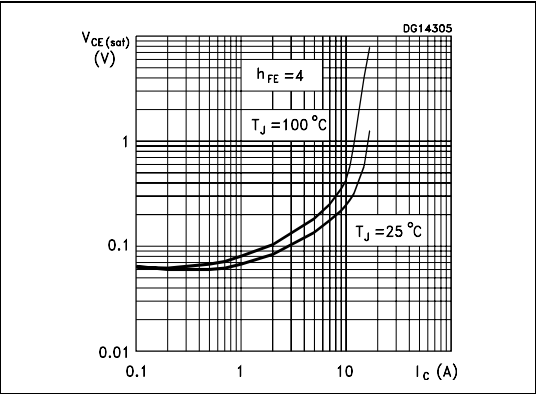


Figure 8. Base-emitter saturation voltage

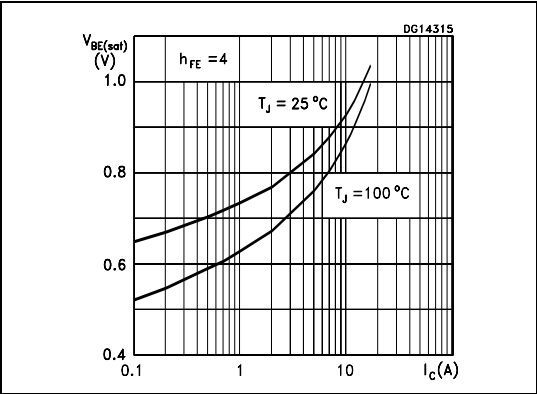


Figure 9. Power losses

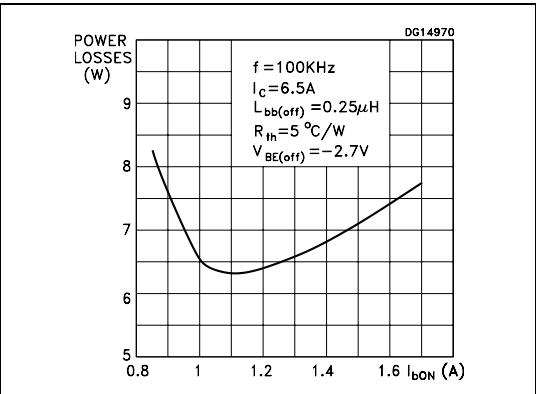


Figure 10. Power losses

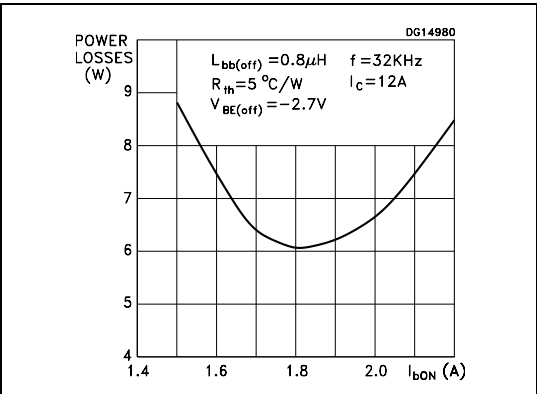


Figure 11. Inductive load switching time

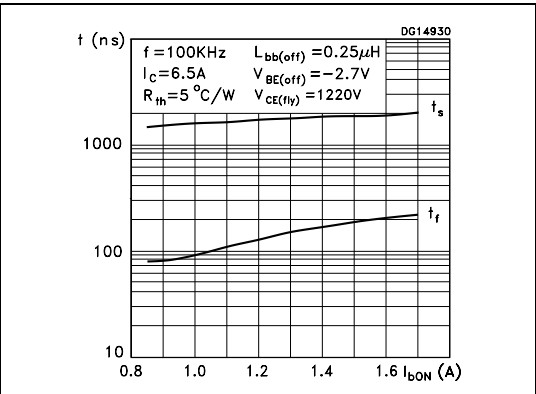
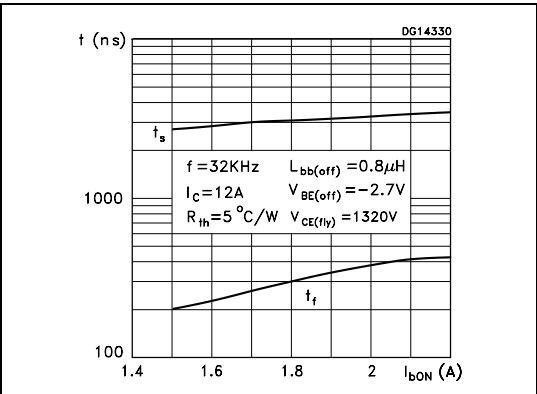
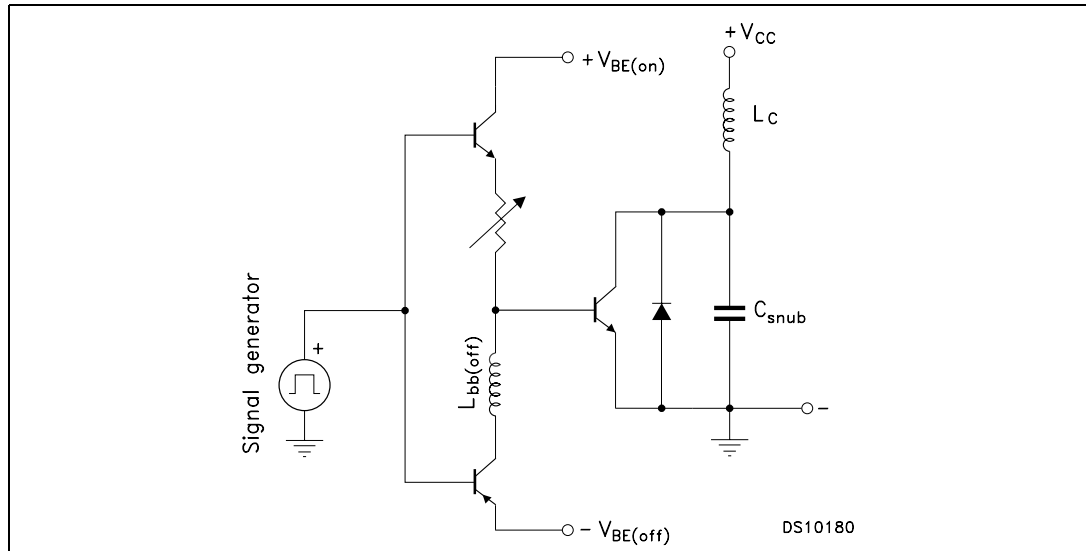


Figure 12. Inductive load switching time

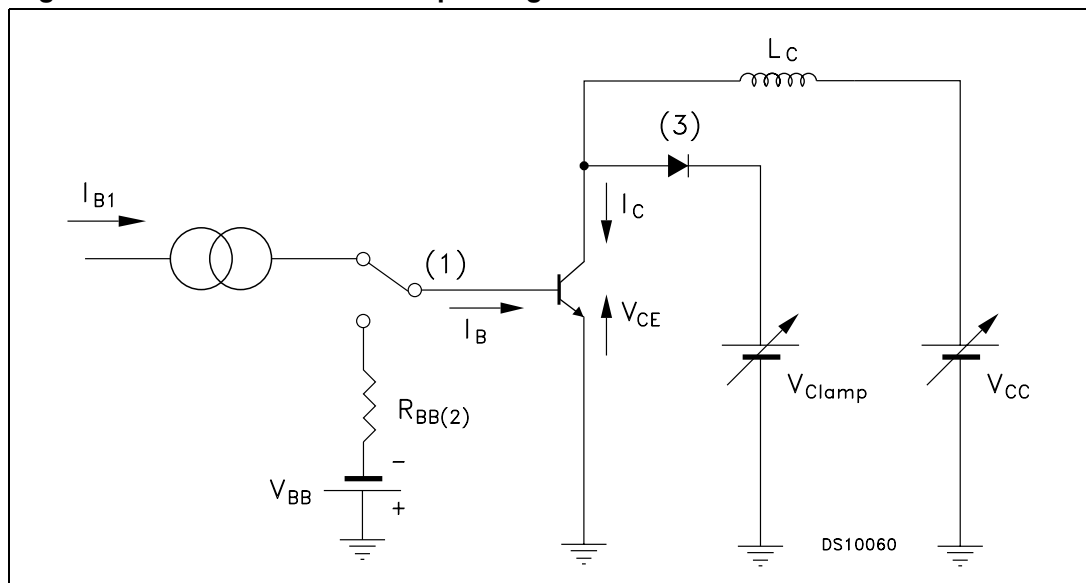


### 3 Test circuit

**Figure 13. Power losses and inductive load switching test circuit**



**Figure 14. Reverse biased safe operating area test circuit**



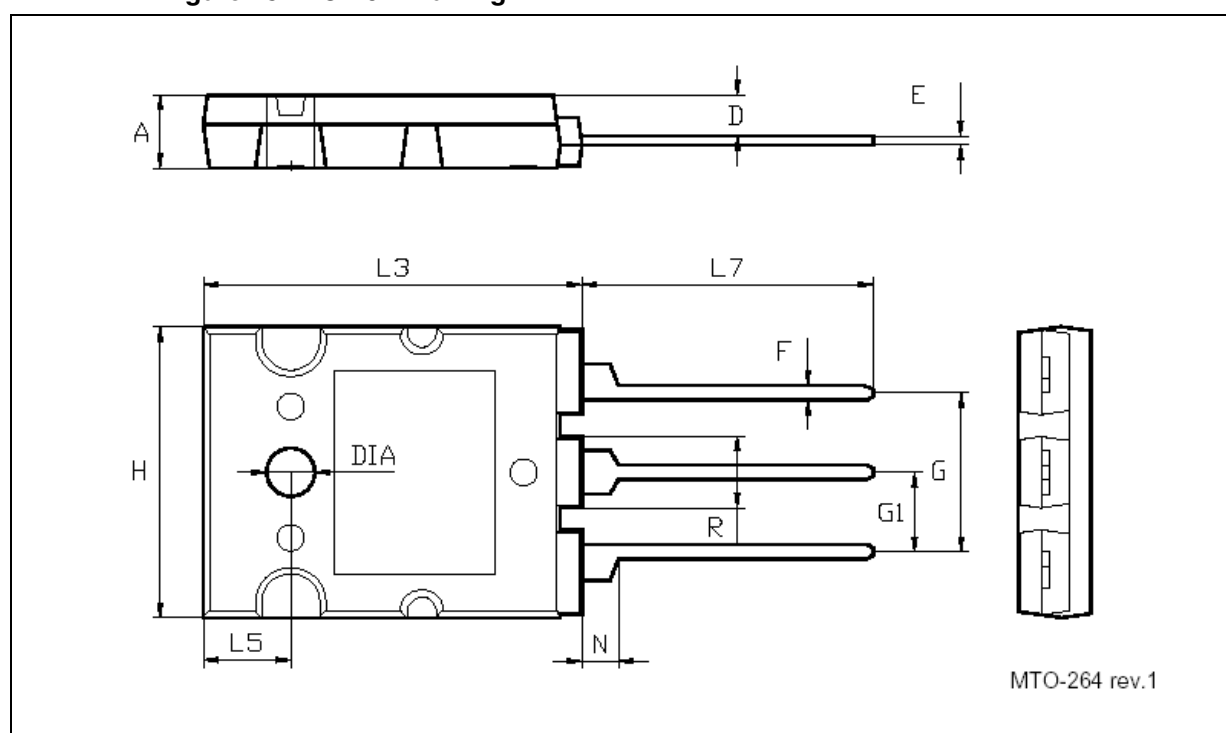
## 4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com)

Table 4. TO-264 Mechanical Data

| DIM. | mm.   |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.80  |      | 5.20  | 0.189 |       | 0.205 |
| D    | 2.50  |      | 3.10  | 0.098 |       | 0.122 |
| E    | 0.50  | 0.60 | 0.85  | 0.020 | 0.24  | 0.033 |
| F    | 0.90  | 1.00 | 1.25  | 0.036 | 0.039 | 0.049 |
| G    | 10.30 |      | 11.50 | 0.406 |       | 0.453 |
| G1   |       | 5.45 |       |       | 0.215 |       |
| H    | 19.80 |      | 20.20 | 0.780 |       | 0.795 |
| L3   | 25.80 |      | 26.20 | 1.016 |       | 1.031 |
| L5   | 5.80  |      | 6.20  | 0.228 |       | 0.244 |
| L7   | 19.50 |      | 20.50 | 0.768 |       | 0.807 |
| N    | 2.30  |      | 2.70  | 0.091 |       | 0.106 |
| R    | 4.7   |      | 5.10  | 0.185 |       | 0.201 |
| DIA  | 3.10  |      | 3.50  | 0.122 |       | 0.138 |

Figure 15. TO-264 Drawing



## 5 Revision history

**Table 5. Revision history**

| Date        | Revision | Changes                           |
|-------------|----------|-----------------------------------|
| 12-Oct-2006 | 1        | Initial release.                  |
| 17-Oct-2005 | 2        | Final document                    |
| 23-Feb-2007 | 3        | The document has been reformatted |

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