



## HD1760JL

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

### Features

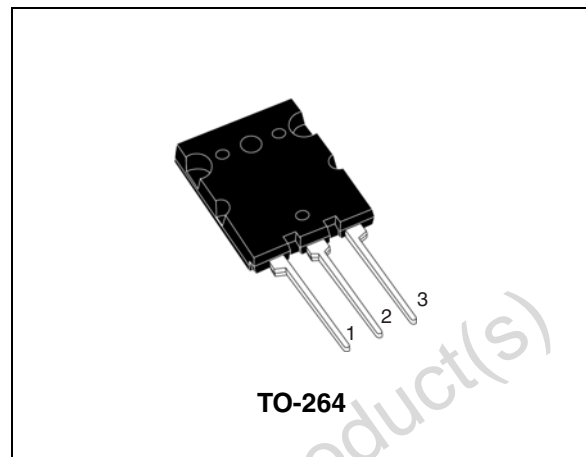
- State-of-the-art technology: diffused collector “enhanced generation” EHVS1
- Wide range of optimum drive conditions
- Stable performance versus operating temperature variation

### Applications

- High-definition and slim CRT TV and monitors

### Description

The HD1760JL 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.



### Internal schematic diagram

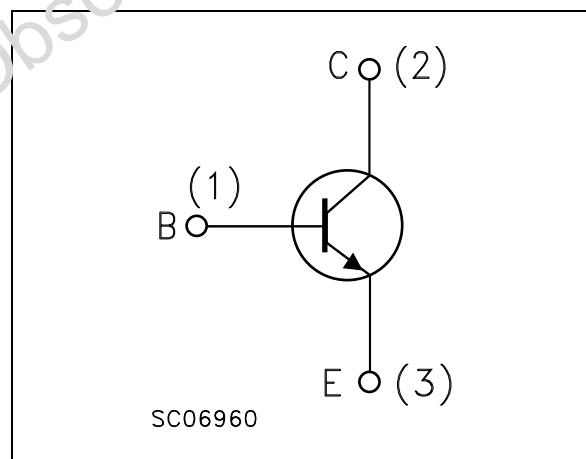


Table 1. Device summary

| Part number | Marking  | Package | Packaging |
|-------------|----------|---------|-----------|
| HD1760JL    | HD1760JL | TO-264  | Tube      |

# 1 Electrical ratings

**Table 2. Absolute maximum rating**

| 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                             | 36         | A                |
| $I_{CM}$  | Collector peak current ( $t_p < 5\text{ms}$ ) | 54         | A                |
| $I_B$     | Base current                                  | 18         | A                |
| $I_{BM}$  | Base peak current ( $t_p < 5\text{ms}$ )      | 27         | A                |
| $P_{TOT}$ | Total dissipation at $T_c = 25^\circ\text{C}$ | 200        | W                |
| $T_{STG}$ | Storage temperature                           | -55 to 150 | $^\circ\text{C}$ |
| $T_J$     | Max. operating junction temperature           | 150        | $^\circ\text{C}$ |

**Table 3. Thermal data**

| Symbol     | Parameter                                   | Value | Unit                      |
|------------|---|-------|---------------------------|
| $R_{thJC}$ | Thermal resistance junction case <b>Max</b> | 0.625 | $^\circ\text{C}/\text{W}$ |

## 2 Electrical characteristics

(T<sub>CASE</sub> = 25°C; unless otherwise specified)

**Table 4. Electrical characteristics**

| Symbol                               | Parameter  | Test conditions  | Min. | Typ.       | Max.     | Unit     |
|--------------------------------------|--|--|------|------------|----------|----------|
| I <sub>CES</sub>                     | Collector cut-off current<br>(V <sub>BE</sub> = 0)           | V <sub>CE</sub> = 1700V<br>V <sub>CE</sub> = 1700V T <sub>C</sub> = 125°C  |      |            | 0.2<br>2 | mA<br>mA |
| I <sub>EBO</sub>                     | Emitter cut-off current<br>(I <sub>C</sub> = 0)              | V <sub>EB</sub> = 5V   |      |            | 10       | μA       |
| V <sub>CEO(sus)</sub> <sup>(1)</sup> | Collector-emitter<br>sustaining voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 10mA  | 800  |            |          | V        |
| V <sub>EBO</sub>                     | Emitter-base voltage (I <sub>C</sub> = 0)                    | I <sub>E</sub> = 10mA  | 10   |            |          | V        |
| V <sub>CE(sat)</sub><br>(1)          | Collector-emitter saturation<br>voltage                      | I <sub>C</sub> = 18A I <sub>B</sub> = 4.5A   |      |            | 2        | V        |
| V <sub>BE(sat)</sub><br>(1)          | Base-emitter saturation<br>voltage                           | I <sub>C</sub> = 18A I <sub>B</sub> = 4.5A   |      |            | 1.5      | V        |
| h <sub>FE</sub>                      | DC current gain  | I <sub>C</sub> = 2A V <sub>CE</sub> = 5V<br>I <sub>C</sub> = 18A V <sub>CE</sub> = 5V  | 5    | 30         | 8.5      |          |
| t <sub>s</sub><br>t <sub>f</sub>     | Inductive load<br>Storage time<br>Fall time                  | I <sub>C</sub> = 12A f <sub>h</sub> = 32 KHz<br>I <sub>B(on)</sub> = 1A I <sub>B(off)</sub> = -6.9A<br>V <sub>CE(fly)</sub> = 1340V<br>V <sub>BE(off)</sub> = -2.7V<br>L <sub>BB(on)</sub> = 0.8μH   |      | 2.6<br>300 |          | μs<br>ns |
| t <sub>s</sub><br>t <sub>f</sub>     | Inductive load<br>Storage time<br>Fall time                  | I <sub>C</sub> = 8A f <sub>h</sub> = 100kHz<br>I <sub>B(on)</sub> = 1.3A I <sub>B(off)</sub> = -5.8A<br>V <sub>CE(fly)</sub> = 1300V<br>V <sub>BE(off)</sub> = -2.7V<br>L <sub>BB(on)</sub> = 0.25μH |      | 2<br>110   |          | μs<br>ns |

1. Pulsed duration = 300 ms, duty cycle £1.5%.

## 2.1 Electrical characteristics (curve)

Figure 1. Safe operating area

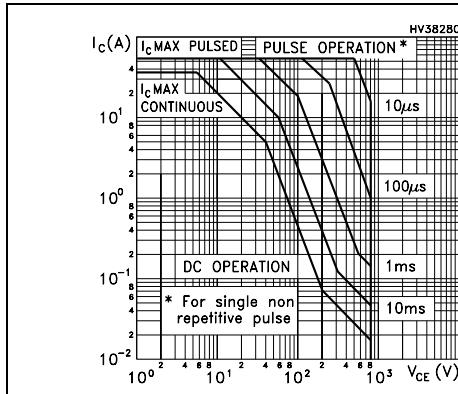


Figure 2. Derating curve

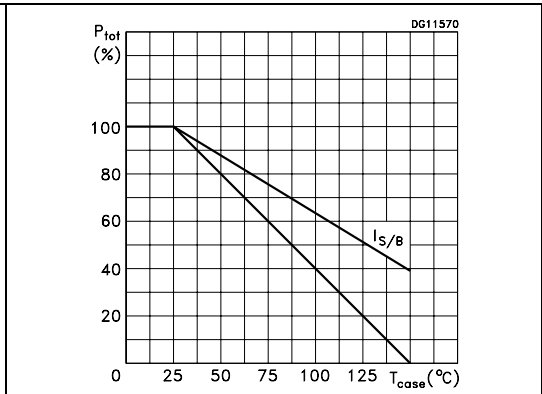


Figure 3. Output characteristics

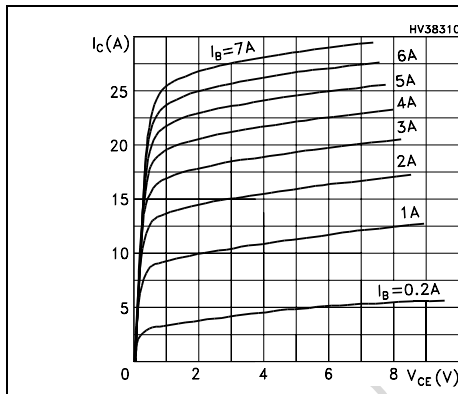


Figure 4. Reverse biased SOA

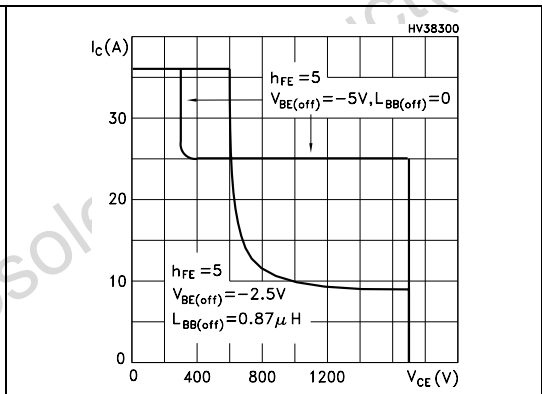


Figure 5. DC current gain

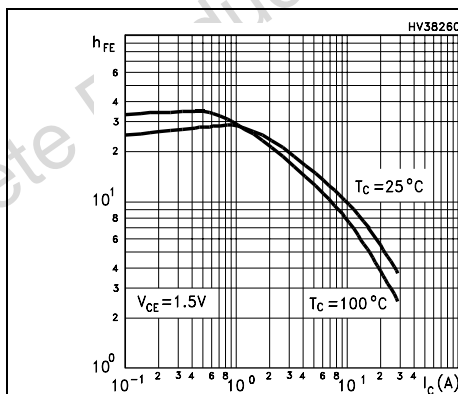


Figure 6. DC current gain

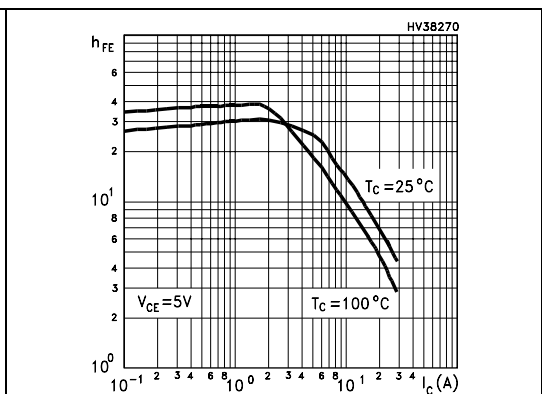


Figure 7. Collector-emitter saturation voltage

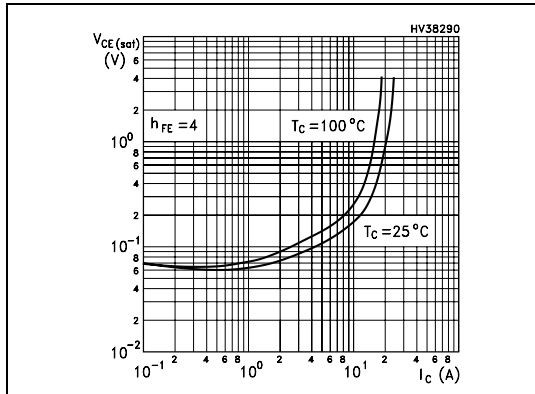


Figure 8. Base-emitter saturation voltage

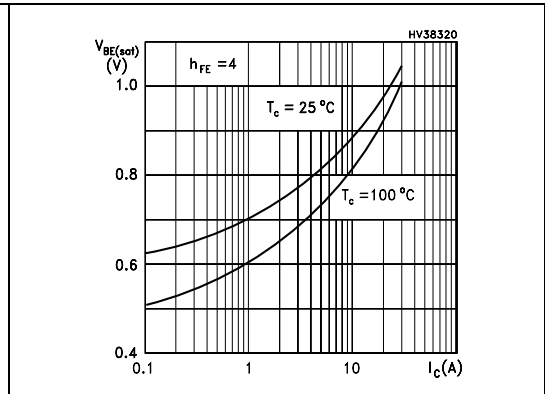


Figure 9. Power losses

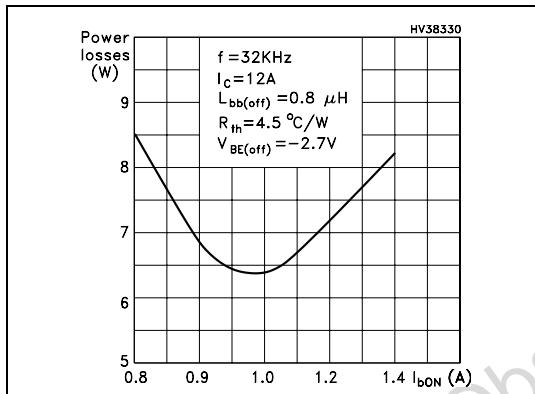


Figure 10. Power losses

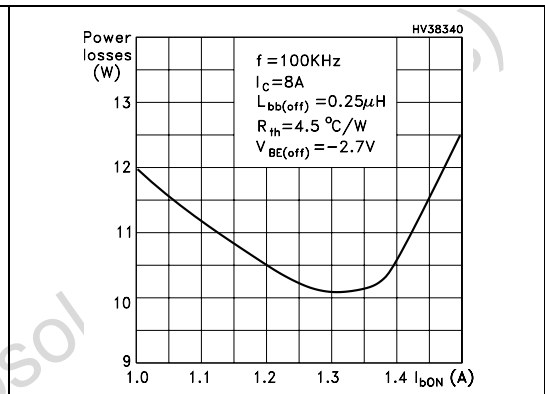


Figure 11. Inductive load switching time

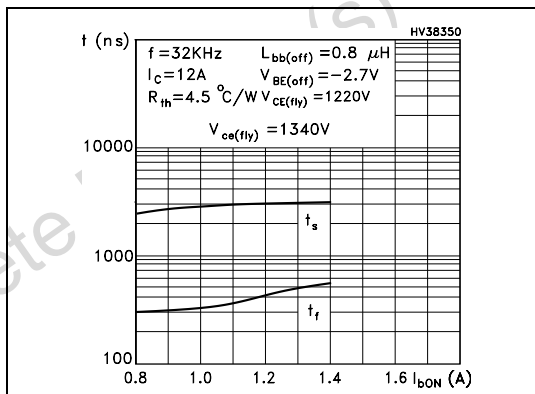
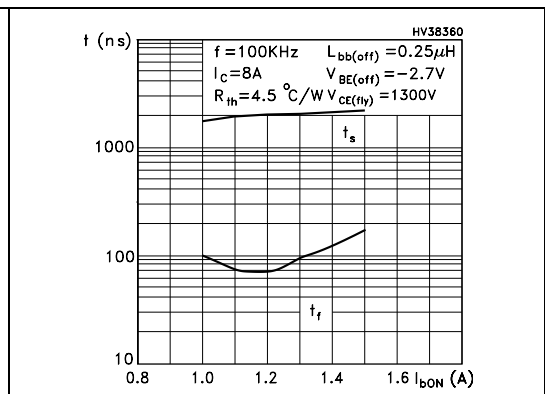


Figure 12. Inductive load switching time



### 3 Test circuit

Figure 13. Power losses and inductive load switching test circuit

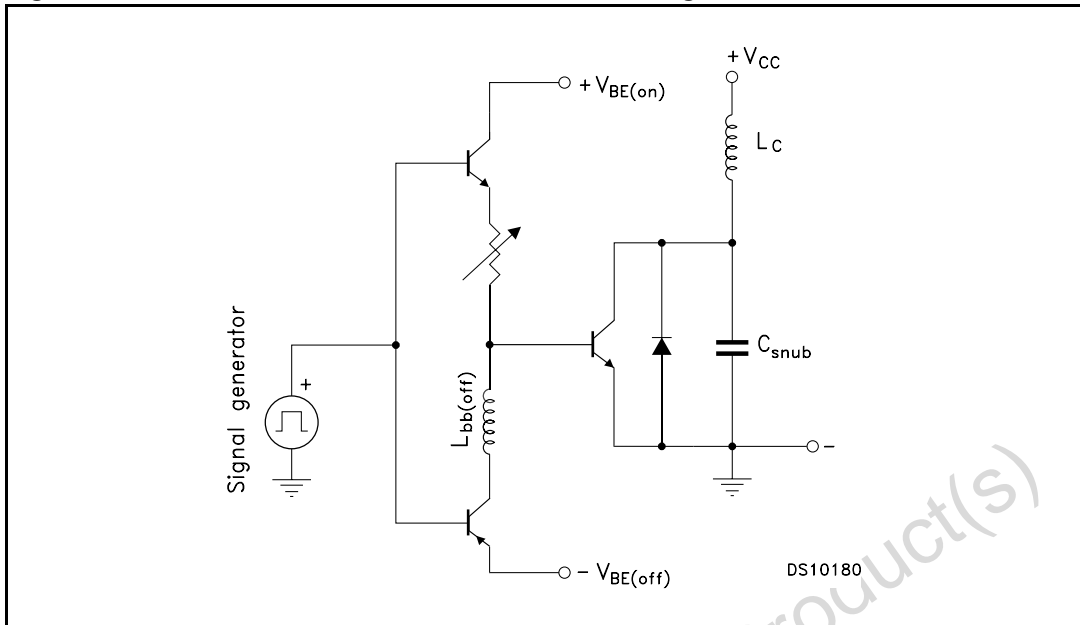
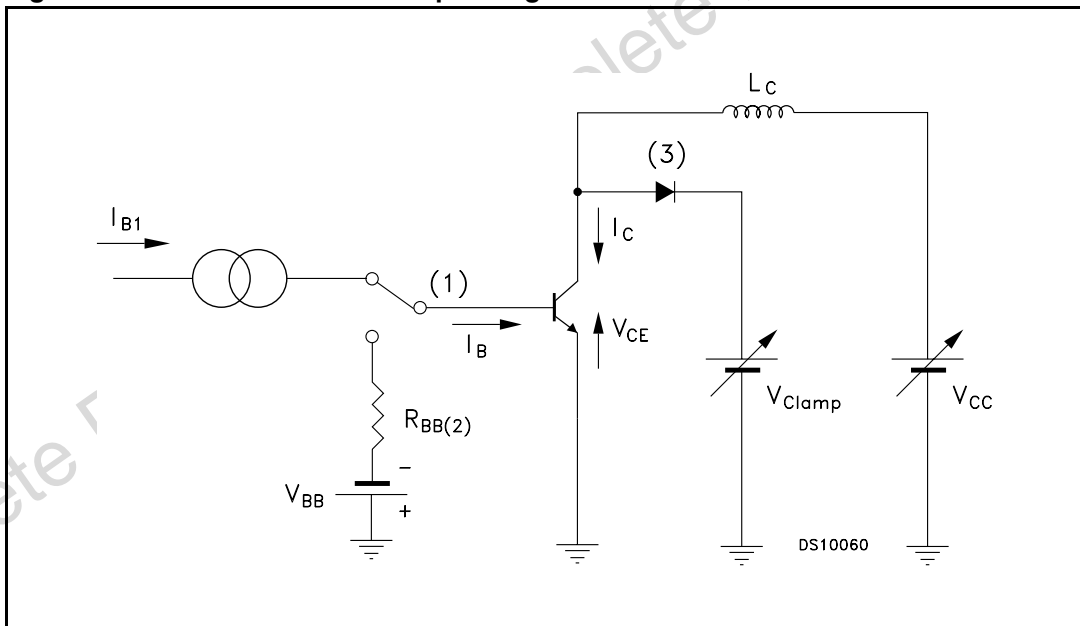


Figure 14. Reverse biased safe operating area test circuit



## 4 Package mechanical data

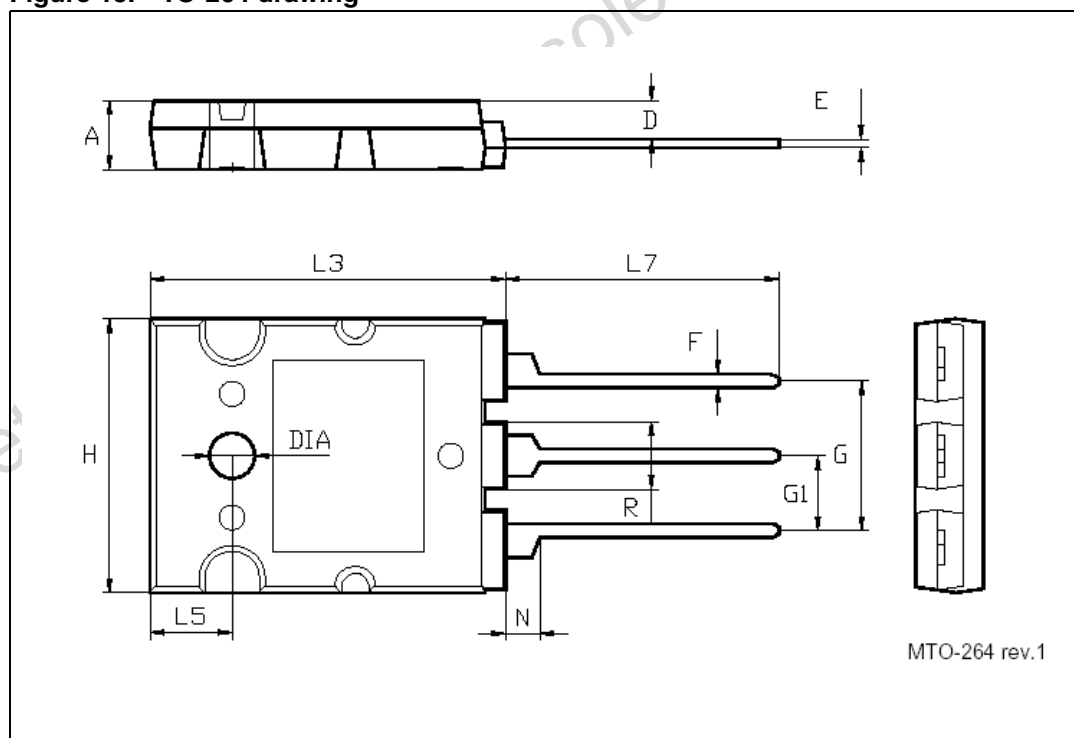
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Table 5. TO-264 mechanical data

| 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 6. Revision history**

| Date        | Revision | Changes  |
|-------------|----------|--|
| 17-Oct-2005 | 1        | Initial release.   |
| 03-Nov-2005 | 2        | $h_{FE}$ value has been changed on <a href="#">Table 4</a> |
| 14-Jun-2007 | 3        | Complete version: new <a href="#">Section 2.1</a> inserted |

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