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SPC-F005.DWG

## REVISIONS

DOC. NO. SPC-F005 \* Effective: 7/8/02 \* DCP No: 1398

| DCP # | REV | DESCRIPTION | DRAWN | DATE     | CHECKD | DATE   | APPRVD | DATE   |
|-------|-----|-------------|-------|----------|--------|--------|--------|--------|
| 1885  | A   | RELEASED    | BYF   | 02/03/06 | HO     | 2/6/06 | JWM    | 2/6/06 |
|       |     |             |       |          |        |        |        |        |

### Description:

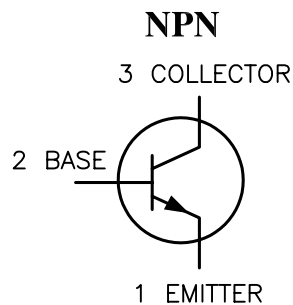
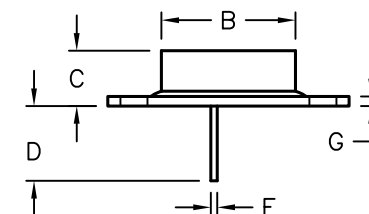
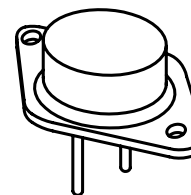
High Power TO-3, NPN, Silicon Transistor For use in power amplifier and switching circuits applications

### Features:

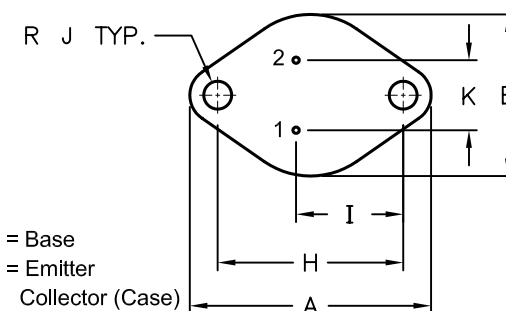
- High Collector Emitter Sustaining Voltage  $V_{CE0} = 80V @ I_C = 200MA$
- Low Collector Emitter Saturation Voltage  $V_{CE(sat)} = 0.75V @ I_C = 10A$

### Absolute Maximum Ratings:

- Collector-Base Voltage,  $V_{CBO} = 40V$
- Collector-Emitter Voltage,  $V_{CEO} = 40V$
- Continuous Collector Current,  $I_C = 30A$
- Base Current,  $I_B = 7.5A$
- Total Device Dissipation ( $T_C = +25^\circ C$ ),  $P_D = 200W$   
Derate above  $25^\circ C = 1.14mW/^\circ C$
- Operating Junction Temperature Range,  $T_J = -65^\circ C$  to  $+200^\circ C$
- Storage Temperature Range,  $T_{stg} = -65^\circ C$  to  $+200^\circ C$



| DIM | MIN   | MAX   |
|-----|-------|-------|
| A   | 38.75 | 39.96 |
| B   | 19.28 | 22.23 |
| C   | 7.96  | 9.23  |
| D   | 11.18 | 12.19 |
| E   | 25.20 | 26.67 |
| F   | 0.92  | 1.09  |
| G   | 1.38  | 1.62  |
| H   | 29.90 | 30.40 |
| I   | 16.64 | 17.30 |
| J   | 3.88  | 4.36  |
| K   | 10.67 | 11.18 |



DISCLAIMER:  
ALL STATEMENTS AND TECHNICAL INFORMATION CONTAINED HEREIN ARE BASED UPON INFORMATION AND/OR TESTS WE BELIEVE TO BE ACCURATE AND RELIABLE. SINCE CONDITIONS OF USE ARE BEYOND OUR CONTROL, THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR THE INTENDED USE AND ASSUME ALL RISK AND LIABILITY WHATSOEVER IN CONNECTION THEREWITH.

### TOLERANCES:

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE FOR REFERENCE PURPOSES ONLY.

|               |          |
|---------------|----------|
| DRAWN BY:     | DATE:    |
| BASAM YOUSIF  | 02/03/06 |
| CHECKED BY:   | DATE:    |
| HISHAM ODISH  | 2/6/06   |
| APPROVED BY:  | DATE:    |
| JEEF MCVICKER | 2/6/06   |

DRAWING TITLE:  
High Power Transistor, Silicon, TO-3, NPN

| SIZE   | DWG. NO. | ELECTRONIC FILE     | REV           |
|--------|----------|---------------------|---------------|
| A      | 2N5301   | 01H1381.DWG         | A             |
| SCALE: | NTS      | U.O.M.: MILLIMETERS | SHEET: 1 OF 2 |

**Electrical Characteristics: ( $T_C = +25^\circ\text{C}$  unless otherwise specified)**

| Parameter | Symbol | Test Conditions | Min | Max | Unit |
|-----------|--------|-----------------|-----|-----|------|
|-----------|--------|-----------------|-----|-----|------|

**OFF Characteristics**

|                                     |               |                                                  |    |   |    |
|-------------------------------------|---------------|--------------------------------------------------|----|---|----|
| Collector–Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 200\text{mA}, I_B = 0$ (Note 1)           | 40 | – | V  |
|                                     |               |                                                  | –  | – | V  |
| Collector Cut–Off Current           | $I_{CEO}$     | $V_{CB} = 40\text{V}, I_B = 0$                   | –  | 5 | mA |
| Collector Cut–Off Current           | $I_{CEX}$     | $V_{CE} = 40\text{V}, V_{EB(off)} = 1.5\text{V}$ | –  | 1 | mA |
|                                     | $I_{CBO}$     | $V_{CB} = 40\text{V}, I_E = 0$                   | –  | 1 | mA |
| Emitter Cut–Off Current             | $I_{EBO}$     | $V_{EB} = 5\text{V}, I_C = 0$                    | –  | 5 | mA |

**ON Characteristics**

|                                      |               |                                        |    |      |   |
|--------------------------------------|---------------|----------------------------------------|----|------|---|
| DC Current Gain (Note 1)             | $h_{FE}$      | $V_{CE} = 2\text{V}, I_C = 1\text{A}$  | 40 | –    | – |
|                                      |               | $V_{CE} = 2\text{V}, I_C = 15\text{A}$ | 15 | 60   | – |
|                                      |               | $V_{CE} = 4\text{V}, I_C = 30\text{A}$ | 5  | –    | – |
| Collector–Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 10\text{A}, I_B = 1\text{A}$    | –  | 0.75 | V |
|                                      |               | $I_C = 20\text{A}, I_B = 2\text{A}$    | –  | 2    | V |
| Collector–Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 30\text{A}, I_B = 6\text{A}$    | –  | 3    | V |
| Base–Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = 10\text{A}, I_B = 1\text{A}$    | –  | 1.7  | V |
|                                      | $V_{BE(sat)}$ | $I_C = 15\text{A}, I_B = 1.5\text{A}$  | –  | 1.8  | V |
|                                      |               | $I_C = 20\text{A}, I_B = 2\text{A}$    | –  | 2.5  | V |
| Base–Emitter Saturation Voltage      | $V_{BE(on)}$  | $I_C = 15\text{A}, V_{CE} = 2\text{V}$ |    | 1.7  | V |
|                                      |               | $I_C = 30\text{A}, V_{CE} = 4\text{V}$ | –  | 3    | V |

**Small-Signal Characteristics**

|                                         |          |                                                         |    |   |     |
|-----------------------------------------|----------|---------------------------------------------------------|----|---|-----|
| Current Gain–Bandwidth Product (Note 2) | $f_T$    | $V_{CE} = 10\text{V}, I_C = 1\text{A}, f = 1\text{MHz}$ | 2  | – | MHz |
| Small–Signal Current Gain               | $h_{fe}$ | $V_{CE} = 10\text{V}, I_C = 1\text{A}, f = 1\text{kHz}$ | 40 | – | –   |

**Switching Characteristics**

|              |       |                                                                      |   |   |    |
|--------------|-------|----------------------------------------------------------------------|---|---|----|
| Rise Time    | $t_r$ | $V_{CC} = 30\text{V}, I_C = 10\text{A}, I_{B1} = 1\text{A}$          | – | 1 | us |
| Storage Time | $t_s$ | $V_{CC} = 30\text{V}, I_C = 10\text{A}, I_{B1} = I_{B2} = 1\text{A}$ | – | 2 | us |
| Fall Time    | $t_f$ |                                                                      | – | 1 | us |

Note 1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

Note 2.  $f_T$  is defined as the frequency at which  $|h_{fe}|$  extrapolates to unity.