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NPN low voltage transistor

Features

- Low voltage small device for through-hole assembly
- High ruggedness

Applications

- Voltage regulation
- Relay driver
- Generic switch

Description

The STX715 is a NPN transistor manufactured using planar technology and it is housed in TO-92 small plastic package.

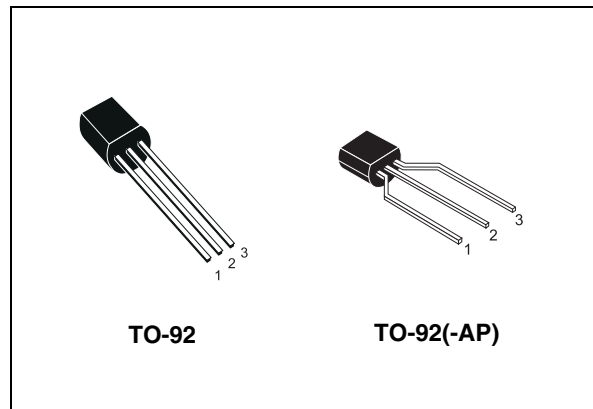


Figure 1. Internal schematic diagram

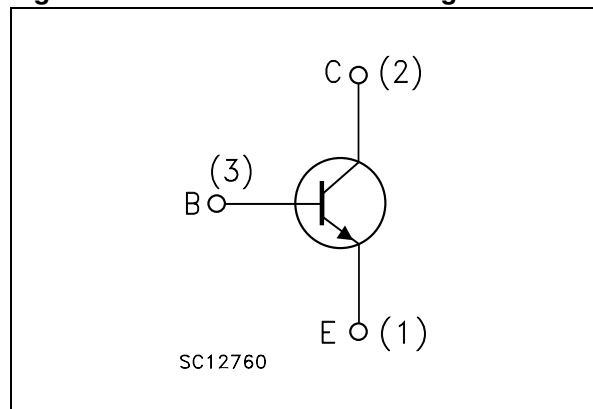


Table 1. Device summary

| Order codes | Marking | Package | Packaging |
|-------------|---------|---------|-----------|
| STX715 | X715 | TO-92 | Bag |
| STX715-AP | X715 | TO-92 | Ammopack |

1 Electrical ratings

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|-----------|---|------------|------|
| V_{CBO} | Collector-base voltage ($I_E = 0$) | 140 | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | 80 | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | 5 | V |
| I_C | Collector current | 1.5 | A |
| I_{CM} | Collector peak current ($t_P < 5$ ms) | 2 | A |
| I_B | Base current | 0.3 | A |
| I_{BM} | Base peak current ($t_P < 5$ ms) | 0.6 | A |
| P_{TOT} | Total dissipation at $T_{amb} = 25$ °C | 0.9 | W |
| T_{STG} | Storage temperature | -65 to 150 | °C |
| T_J | Max. operating junction temperature | 150 | °C |

Table 3. Thermal data

| Symbol | Parameter | Value | Unit |
|------------|---|-------|------|
| R_{thJA} | Thermal resistance junction-ambient max | 140 | °C/W |

2 Electrical characteristics

$T_{\text{case}} = 25\text{ °C}$ unless otherwise specified.

Table 4. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|----------------------------|---|---|-----------------|------|-------------|---------------|
| I_{CES} | Collector cut-off current ($V_{\text{BE}} = 0$) | $V_{\text{CE}} = 140\text{ V}$ | | | 500 | μA |
| I_{CEO} | Collector cut-off current ($I_{\text{B}} = 0$) | $V_{\text{CE}} = 80\text{ V}$ | | | 1 | mA |
| I_{EBO} | Emitter cut-off current ($I_{\text{C}} = 0$) | $V_{\text{EB}} = 5\text{ V}$ | | | 100 | μA |
| $V_{\text{CEO(sus)}}$ | Collector-emitter sustaining voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = 10\text{ mA}$ | 80 | | | V |
| $V_{\text{CE(sat)}}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = 100\text{ mA}$ $I_{\text{B}} = 10\text{ mA}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 100\text{ mA}$ | | | 0.25 0.5 | V V |
| $V_{\text{BE(sat)}}^{(1)}$ | Base-emitter saturation voltage | $I_{\text{C}} = 100\text{ mA}$ $I_{\text{B}} = 10\text{ mA}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 100\text{ mA}$ | | | 1 1.1 | V V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = 100\text{ }\mu\text{A}$ $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 500\text{ mA}$ $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 2\text{ V}$ | 140 80 40 | | | |
| f_{T} | Transition frequency | $I_{\text{C}} = 100\text{ mA}$ $V_{\text{CE}} = 10\text{ V}$ | | 50 | | MHz |

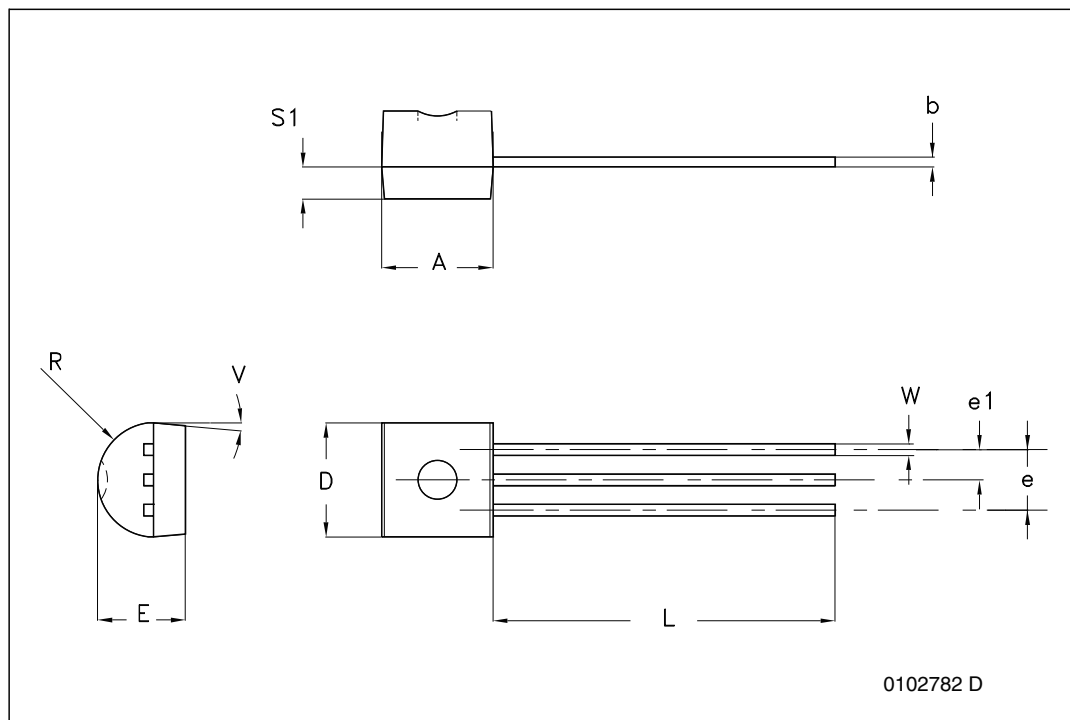
1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com. ECOPACK[®] is an ST trademark.

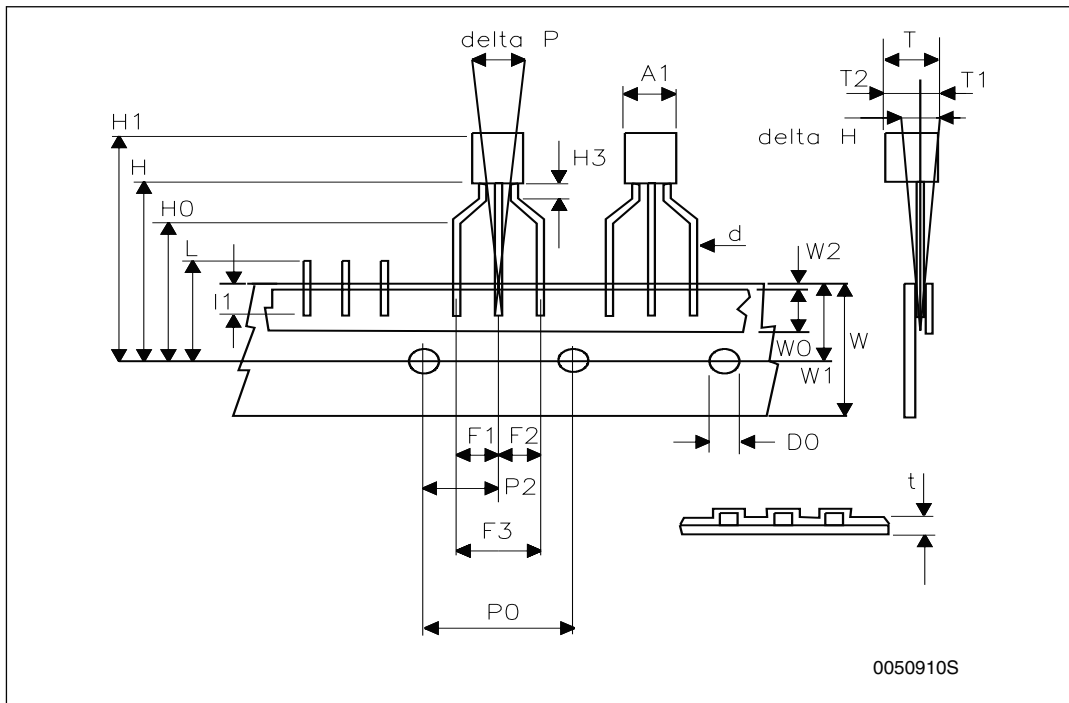
TO-92 bulk shipment mechanical data

| Dim. | mm. | | |
|------|-------|------|-------|
| | Min. | Typ. | Max. |
| A | 4.32 | | 4.95 |
| b | 0.36 | | 0.51 |
| D | 4.45 | | 4.95 |
| E | 3.30 | | 3.94 |
| e | 2.41 | | 2.67 |
| e1 | 1.14 | | 1.40 |
| L | 12.70 | | 15.49 |
| R | 2.16 | | 2.41 |
| S1 | 0.92 | | 1.52 |
| W | 0.41 | | 0.56 |
| V | | 5° | |



TO-92 ammpack shipment (suffix"-AP") mechanical data

| Dim. | mm. | | |
|---------|-------|-------|-------|
| | Min. | Typ. | Max. |
| A1 | | | 4.80 |
| T | | | 3.80 |
| T1 | | | 1.60 |
| T2 | | | 2.30 |
| d | | | 0.48 |
| P0 | 12.50 | 12.70 | 12.90 |
| P2 | 5.65 | 6.35 | 7.05 |
| F1,F2 | 2.44 | 2.54 | 2.94 |
| F3 | 4.98 | 5.08 | 5.48 |
| delta H | -2.00 | | 2.00 |
| W | 17.50 | 18.00 | 19.00 |
| W0 | 5.70 | 6.00 | 6.30 |
| W1 | 8.50 | 9.00 | 9.25 |
| W2 | | | 0.50 |
| H | 18.50 | | 20.50 |
| H3 | 0.5 | 1 | 1.5 |
| H0 | 15.50 | 16.00 | 16.50 |
| H1 | | | 25.00 |
| D0 | 3.80 | 4.00 | 4.20 |
| t | | | 0.90 |
| L | | | 11.00 |
| l1 | 3.00 | | |
| delta P | -1.00 | | 1.00 |



4 Document revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|---------------------------------------|
| 21-Jun-2004 | 2 | Document migration, no content change |
| 01-Feb-2010 | 3 | Updated package mechanical data |

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