



## STX790A

### MEDIUM CURRENT, HIGH PERFORMANCE, LOW VOLTAGE PNP TRANSISTOR

| Type    | Marking |
|---------|---------|
| STX790A | X790A   |

- VERY LOW COLLECTOR TO EMITTER SATURATION VOLTAGE
- DC CURRENT GAIN,  $h_{FE} > 100$
- 3 A CONTINUOUS COLLECTOR CURRENT
- 60 V BREAKDOWN VOLTAGE ( $V_{(BR)CER}$ )
- TO-92 PACKAGE SUITABLE FOR THROUGH-HOLE PCB ASSEMBLY

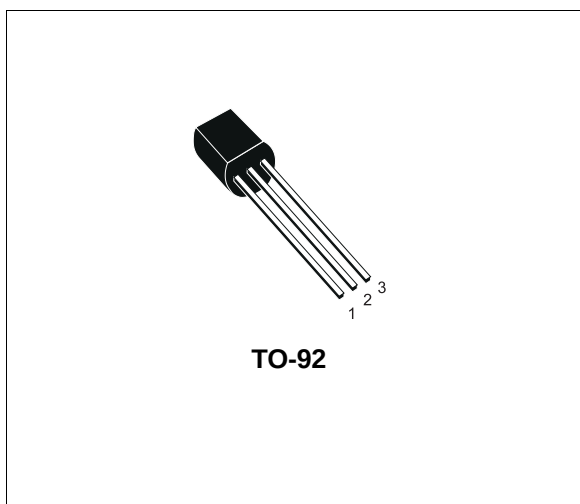
#### APPLICATIONS

- SWITCHING REGULATOR IN BATTERY CHARGER APPLICATIONS
- SUITABLE FOR AUTOMOTIVE APPLICATIONS ( $V_{(BR)CER} > 60V$ )
- VOLTAGE REGULATION IN BIAS SUPPLY CIRCUITS
- HEAVY LOAD DRIVER

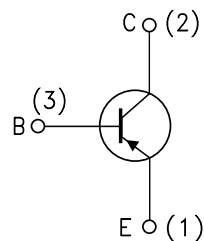
#### DESCRIPTION

The device is manufactured in low voltage PNP Planar Technology by using a "Base Island" layout.

The resulting Transistor shows exceptional high gain performance coupled with very low saturation voltage.



#### INTERNAL SCHEMATIC DIAGRAM



SC12765

#### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                         | Value      | Unit |
|-----------|---------------------------------------------------|------------|------|
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )              | -60        | V    |
| $V_{CER}$ | Collector-Emitter Voltage ( $R_{BE} = 47\Omega$ ) | -60        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )                | -5         | V    |
| $I_C$     | Collector Current                                 | -3         | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)            | -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   |

## STX790A

### THERMAL DATA

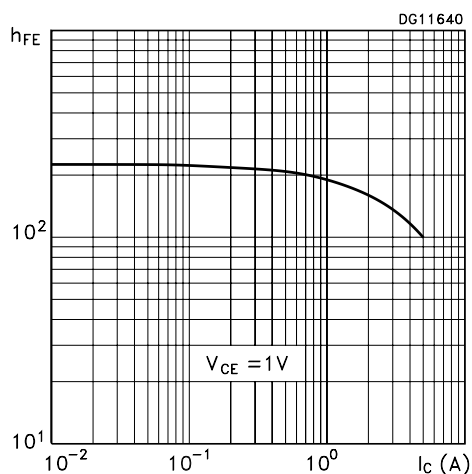
|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-Case    | Max | 44.6 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-Ambient | Max | 139  | °C/W |

### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

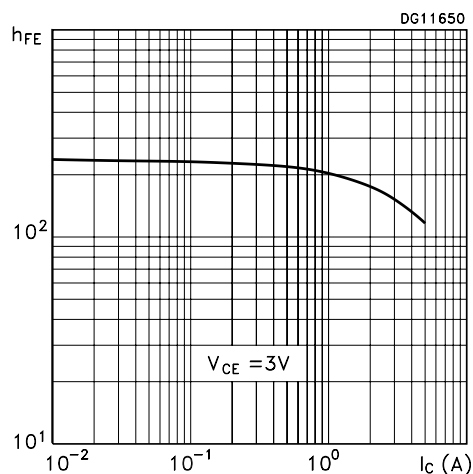
| Symbol                                                               | Parameter                                                            | Test Conditions                                                                                                                                                                                                                                                  | Min.                           | Typ.                     | Max.                                  | Unit                  |
|----------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------|---------------------------------------|-----------------------|
| I <sub>CBO</sub>                                                     | Collector Cut-off Current (I <sub>E</sub> = 0)                       | V <sub>CB</sub> = -30 V<br>V <sub>CB</sub> = -30 V T <sub>j</sub> = 100 °C                                                                                                                                                                                       |                                |                          | -0.1<br>-10                           | μA<br>μA              |
| I <sub>EBO</sub>                                                     | Emitter Cut-off Current (I <sub>C</sub> = 0)                         | V <sub>EB</sub> = -4 V                                                                                                                                                                                                                                           |                                |                          | -1                                    | μA                    |
| V <sub>(BR)CER</sub> *                                               | Collector-Emitter Breakdown Voltage (R <sub>BE</sub> = 47Ω)          | I <sub>C</sub> = -10 mA                                                                                                                                                                                                                                          | -60                            |                          |                                       | V                     |
| V <sub>(BR)CBO</sub>                                                 | Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)                | I <sub>C</sub> = -100 μA                                                                                                                                                                                                                                         | -60                            |                          |                                       | V                     |
| V <sub>(BR)EBO</sub>                                                 | Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)                  | I <sub>E</sub> = -100 μA                                                                                                                                                                                                                                         | -5                             |                          |                                       | V                     |
| V <sub>CE(sat)</sub> *                                               | Collector-Emitter Saturation Voltage                                 | I <sub>C</sub> = -0.5A I <sub>B</sub> = -5mA<br>I <sub>C</sub> = -1A I <sub>B</sub> = -10mA<br>I <sub>C</sub> = -2A I <sub>B</sub> = -20mA<br>I <sub>C</sub> = -3A I <sub>B</sub> = -30mA<br>I <sub>C</sub> = -3A I <sub>B</sub> = -30mA T <sub>j</sub> = 100 °C |                                |                          | -0.15<br>-0.3<br>-0.5<br>-0.7<br>-0.9 | V<br>V<br>V<br>V<br>V |
| V <sub>BE(sat)</sub> *                                               | Base-Emitter Saturation Voltage                                      | I <sub>C</sub> = -1 A I <sub>B</sub> = -10 mA                                                                                                                                                                                                                    |                                | -0.8                     | -1.0                                  | V                     |
| V <sub>BE(on)</sub>                                                  | Base-Emitter Turn-On Voltage                                         | I <sub>C</sub> = -1 A V <sub>CE</sub> = -2 V                                                                                                                                                                                                                     |                                | -0.8                     | -1                                    | V                     |
| h <sub>FE</sub> *                                                    | DC Current Gain                                                      | I <sub>C</sub> = -10 mA V <sub>CE</sub> = -2 V<br>I <sub>C</sub> = -500 mA V <sub>CE</sub> = -2 V<br>I <sub>C</sub> = -1 A V <sub>CE</sub> = -2 V<br>I <sub>C</sub> = -2 A V <sub>CE</sub> = -1 V<br>I <sub>C</sub> = -3 A V <sub>CE</sub> = -1V                 | 100<br>100<br>100<br>100<br>90 | 200<br>200<br>160<br>130 | 300<br>300                            |                       |
| f <sub>T</sub>                                                       | Transition Frequency                                                 | I <sub>C</sub> = -50 mA V <sub>CE</sub> = -5V f = 50MHz                                                                                                                                                                                                          | 100                            |                          |                                       | MHz                   |
| t <sub>d</sub><br>t <sub>r</sub><br>t <sub>s</sub><br>t <sub>f</sub> | RESISTIVE LOAD<br>Delay Time<br>RiseTime<br>StorageTime<br>Fall Time | I <sub>C</sub> = -3 A I <sub>B1</sub> = - I <sub>B2</sub> = -60 mA<br>V <sub>CC</sub> = -20 V (see figure 1)                                                                                                                                                     |                                | 180<br>160<br>250<br>80  | 220<br>210<br>300<br>100              | ns<br>ns<br>ns<br>ns  |

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1.5 %

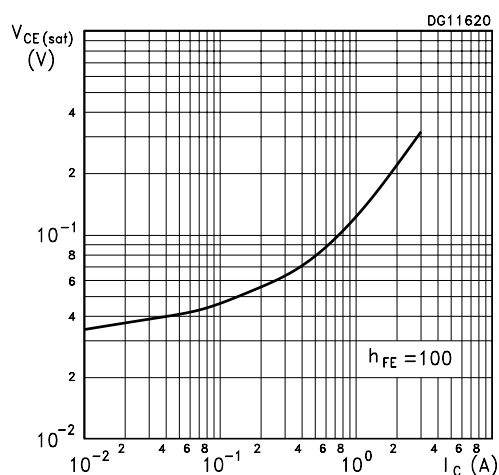
DC Current Gain



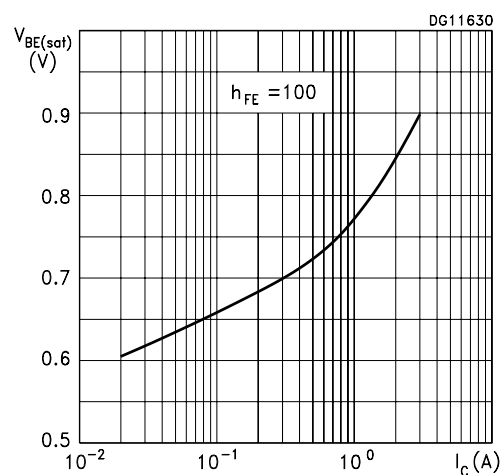
DC Current Gain



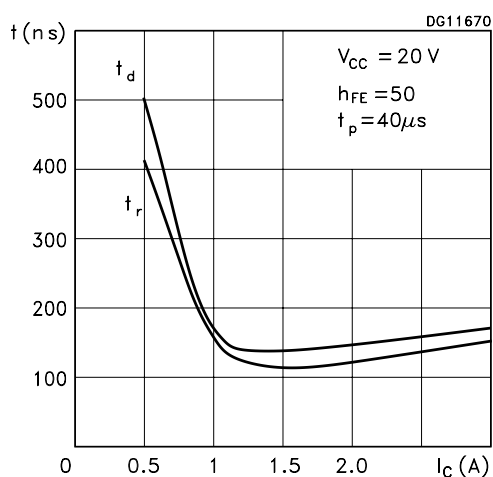
Collector-Emitter Saturation Voltage



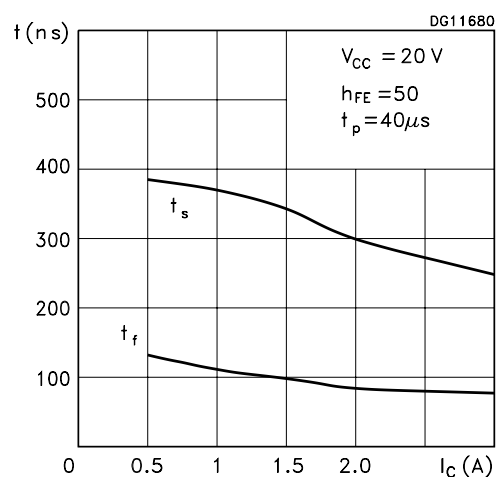
Base-Emitter Saturation Voltage

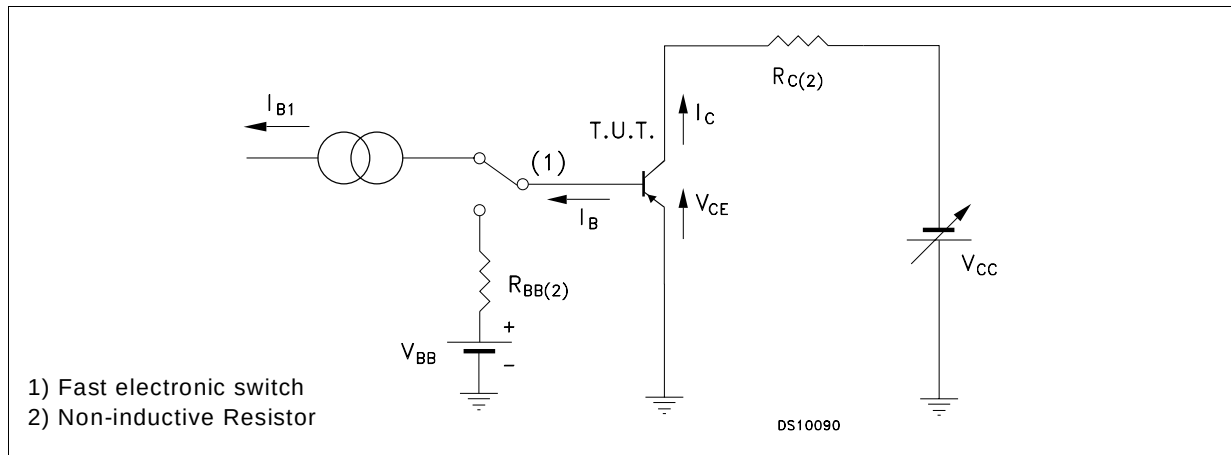


Switching Times Resistive Load



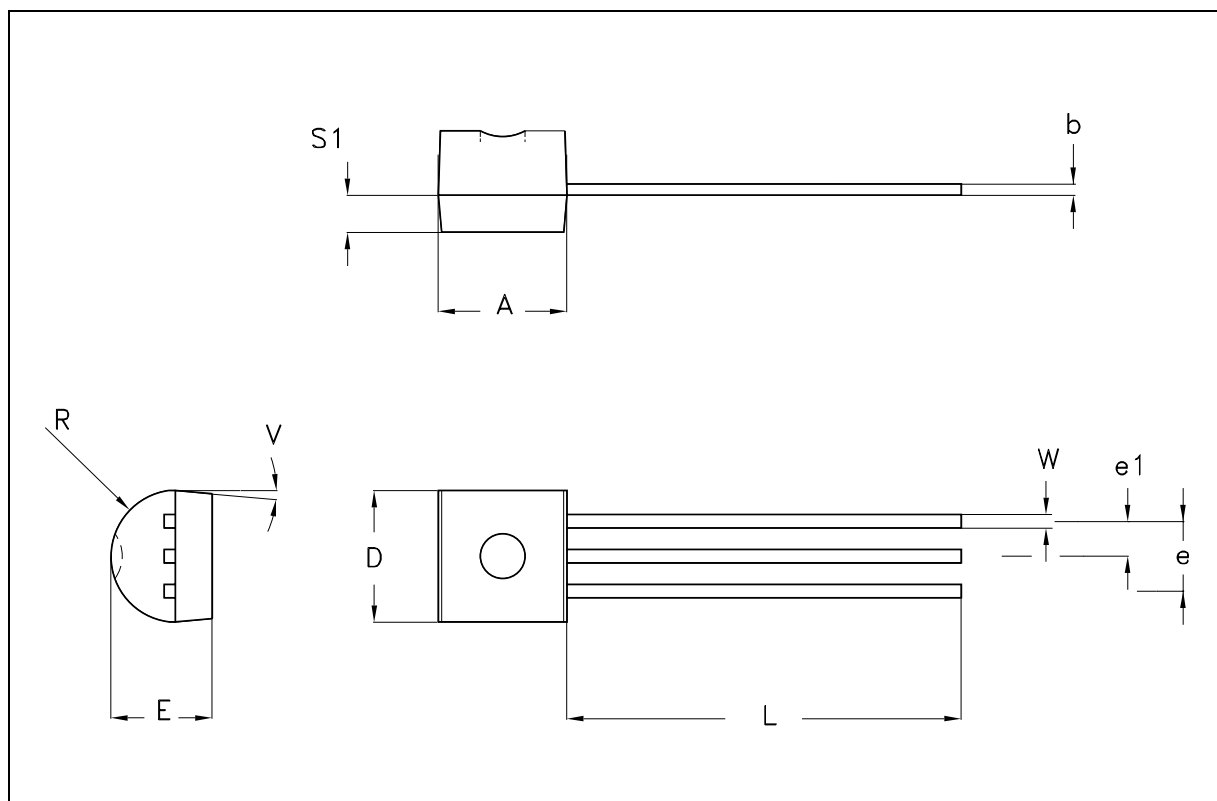
Switching Times Resistive Load



**Figure 1:** Resistive Load Switching Test Circuit.

## TO-92 MECHANICAL DATA

| DIM. | mm       |      |          | inch     |      |          |
|------|----------|------|----------|----------|------|----------|
|      | MIN.     | TYP. | MAX.     | MIN.     | TYP. | MAX.     |
| A    | 4.32     |      | 4.95     | 0.170    |      | 0.195    |
| b    | 0.36     |      | 0.51     | 0.014    |      | 0.020    |
| D    | 4.45     |      | 4.95     | 0.175    |      | 0.194    |
| E    | 3.30     |      | 3.94     | 0.130    |      | 0.155    |
| e    | 2.41     |      | 2.67     | 0.095    |      | 0.105    |
| e1   | 1.14     |      | 1.40     | 0.045    |      | 0.055    |
| L    | 12.70    |      | 15.49    | 0.500    |      | 0.609    |
| R    | 2.16     |      | 2.41     | 0.085    |      | 0.094    |
| S1   | 1.14     |      | 1.52     | 0.045    |      | 0.059    |
| W    | 0.41     |      | 0.56     | 0.016    |      | 0.022    |
| V    | 4 degree |      | 6 degree | 4 degree |      | 6 degree |



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