# 40V PNP MEDIUM POWER HIGH GAIN TRANSISTOR

## Features

- $BV_{CEO}$ > -40V
- $I_C$ = -3A High Continuous Collector Current
- $I_{CM}$ = -6A Peak Pulse Current
- High Gain Device >200 @-1A
- $R_{CE(SAT)}$ = 83mΩ Typical
- Low Saturation Voltage
- **Lead-Free Finish; RoHS compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

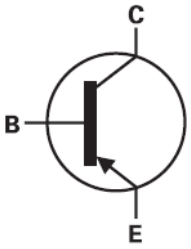
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.34 grams (Approximate)

## Application

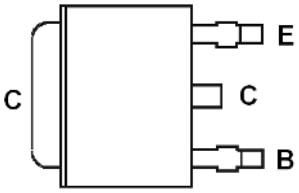
- DC-DC Converters
- MOSFET Gate Drivers
- Charging Circuits
- Power Switches
- Siren Drivers

**TO252 (DPAK)**

Top View




Device Schematic



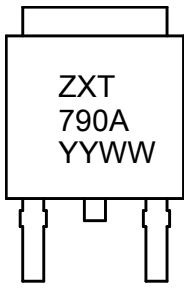

Pin Out Configuration
Top view

## Ordering Information (Note 4)

| Product | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---|---|---|---|---|
| ZXT790AKTC | ZXT790A | 13 | 16 | 2,500 |

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information




ZXT790A = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 16 = 2016)
WW = Week Code (01 to 53)

## Absolute Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $BV_{CBO}$ | -50 | V |
| Collector-Emitter Voltage | $BV_{CEO}$ | -40 | V |
| Emitter-Base Voltage | $BV_{EBO}$ | -7 | V |
| Continuous Collector Current | $I_C$ | -3 | A |
| Base Current | $I_B$ | -0.5 | A |
| Peak Pulse Collector Current | $I_{CM}$ | -6 | A |

## Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

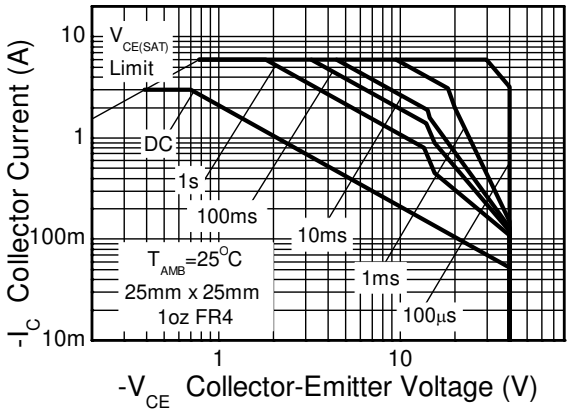
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 5) | $P_D$ | 2.1 | W |
| | (Note 6) | | 3.0 | |
| | (Note 7) | | 3.9 | |
| Thermal Resistance, Junction to Ambient Air | (Note 5) | $R_{\theta JA}$ | 59 | °C/W |
| | (Note 6) | | 41 | |
| | (Note 7) | | 32 | |
| Operating and Storage Temperature Range | | $T_J, T_{STG}$ | -55 to +150 | °C |

## ESD Ratings (Note 8)

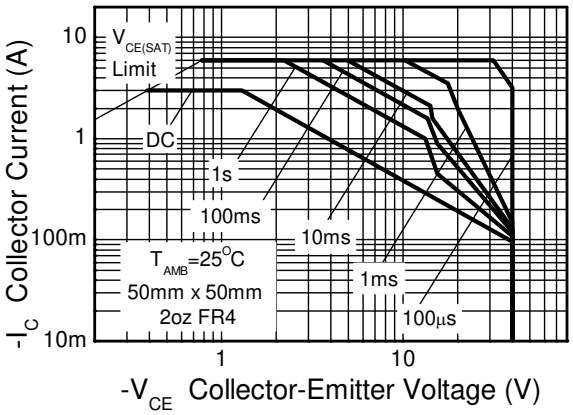
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V | 3B |
| Electrostatic Discharge – Machine Model | ESD MM | 400 | V | C |

Notes:
5. For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as note (5), except mounted on 50mm x 50mm 1oz copper.
7. Same as note (5), except mounted on 50mm x 50mm 2oz copper.
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

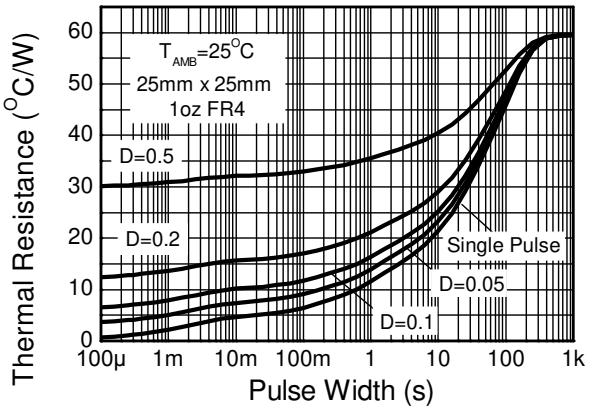
## Thermal Characteristics and Derating Information



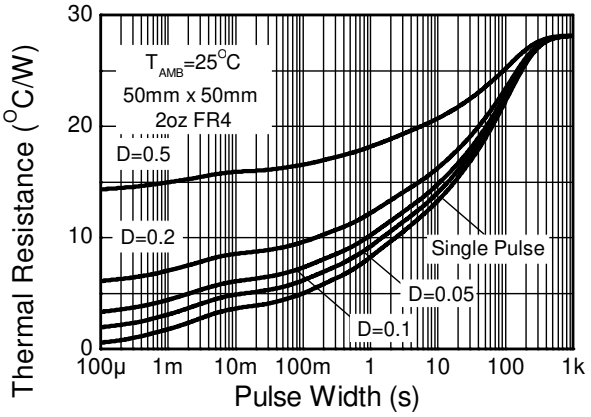

**Safe Operating Area**



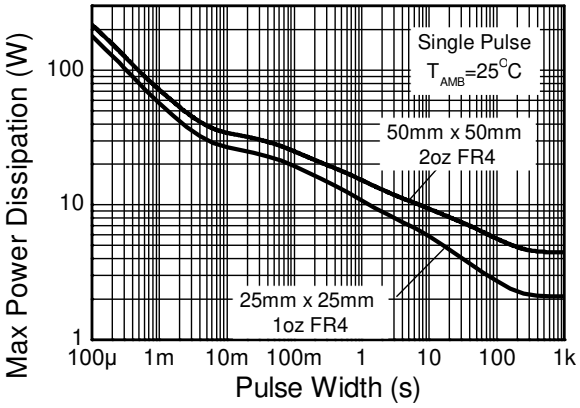

**Safe Operating Area**



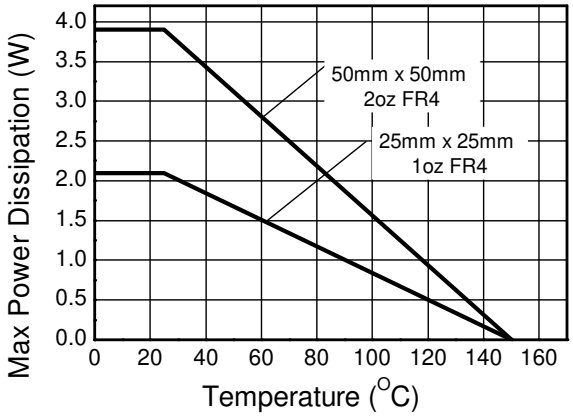

**Transient Thermal Impedance**




**Transient Thermal Impedance**




**Pulse Power Dissipation**



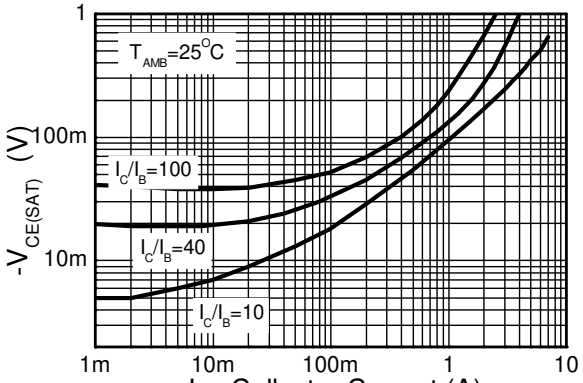

**Derating Curve**

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

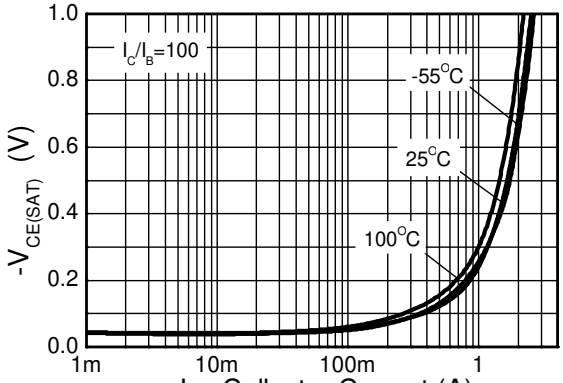
| Characteristic | Symbol | Min | Typ. | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -50 | -70 | — | V | $I_C$ = -100µA |
| Collector-Emitter Breakdown Voltage (Note 9) | $BV_{CEO}$ | -40 | -60 | — | V | $I_C$ = -10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -7 | -8.3 | — | V | $I_E$ = -100µA |
| Collector Cutoff Current | $I_{CBO}$ | — | <1 | -20 | nA | $V_{CB}$ = -30V |
| Emitter Cutoff Current | $I_{EBO}$ | — | <1 | -20 | nA | $V_{EB}$ = -6V |
| Emitter Cutoff Current | $I_{CES}$ | — | <1 | -20 | nA | $V_{CB}$ = -30V |
| DC Current Transfer Static Ratio (Note 9) | $h_{FE}$ | 300<br>250<br>200<br>150<br>80 | 450<br>390<br>350<br>280<br>170 | 800<br>—<br>—<br>—<br>— | — | $I_C$ = -10mA, $V_{CE}$ = -2V<br>$I_C$ = -500mA, $V_{CE}$ = -2V<br>$I_C$ = -1A, $V_{CE}$ = -2V<br>$I_C$ = -2A, $V_{CE}$ = -2V<br>$I_C$ = -3A, $V_{CE}$ = -2V |
| Collector-Emitter Saturation Voltage (Note 9) | $V_{CE(SAT)}$ | — | -110<br>-220<br>-260<br>-250 | -170<br>-350<br>-450<br>-450 | mV | $I_C$ = -0.5A, $I_B$ = -5mA<br>$I_C$ = -1A, $I_B$ = -10mA<br>$I_C$ = -2A, $I_B$ = -50mA<br>$I_C$ = -3A, $I_B$ = -300mA |
| Base-Emitter Saturation Voltage (Note 9) | $V_{BE(SAT)}$ | — | -1.05 | -1.15 | V | $I_C$ = -3A, $I_B$ = -300mA |
| Base-Emitter Turn-On Voltage (Note 9) | $V_{BE(ON)}$ | — | -0.90 | -1.0 | V | $I_C$ = -3A, $V_{CE}$ = -2V |
| Transitional Frequency | $f_T$ | 100 | — | — | MHz | $I_C$ = -50mA, $V_{CE}$ = -5V<br>f = 50MHz |
| Output Capacitance | $C_{OBO}$ | — | 24 | — | pF | $V_{CB}$ = -10V, f = 1MHz, |
| Switching Times | $t_{ON}$<br>$t_{OFF}$ | — | 35<br>600 | — | ns | $I_C$ = -500mA, $V_{CC}$ = -10V,<br>$I_{B1}$ = -50mA<br>$I_{B2}$ = 50mA |

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤2%.

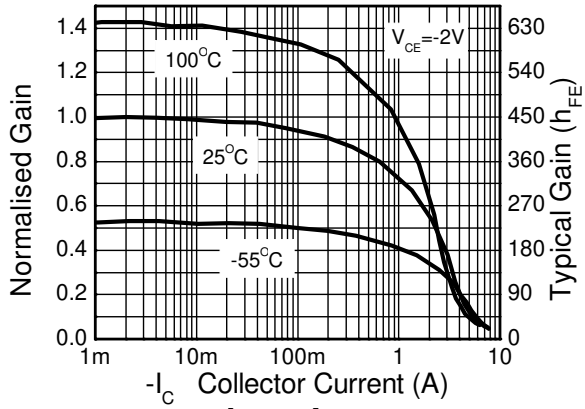
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



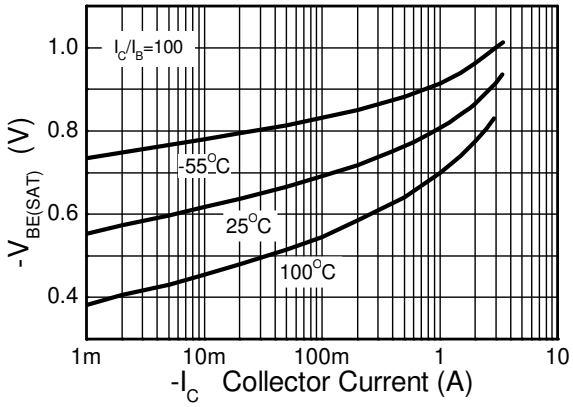

**$V_{CE(SAT)}$ v $I_C$**



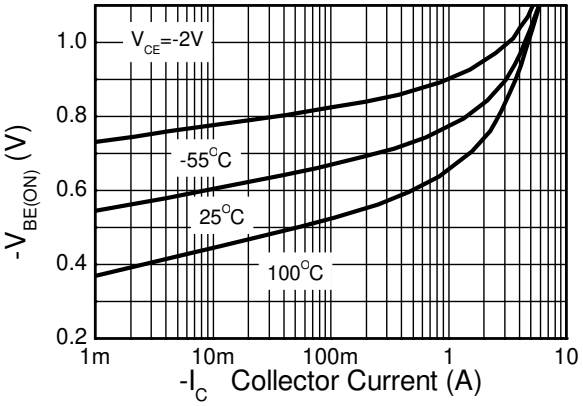

**$V_{CE(SAT)}$ v $I_C$**




**$h_{FE}$ v $I_C$**




**$V_{BE(SAT)}$ v $I_C$**

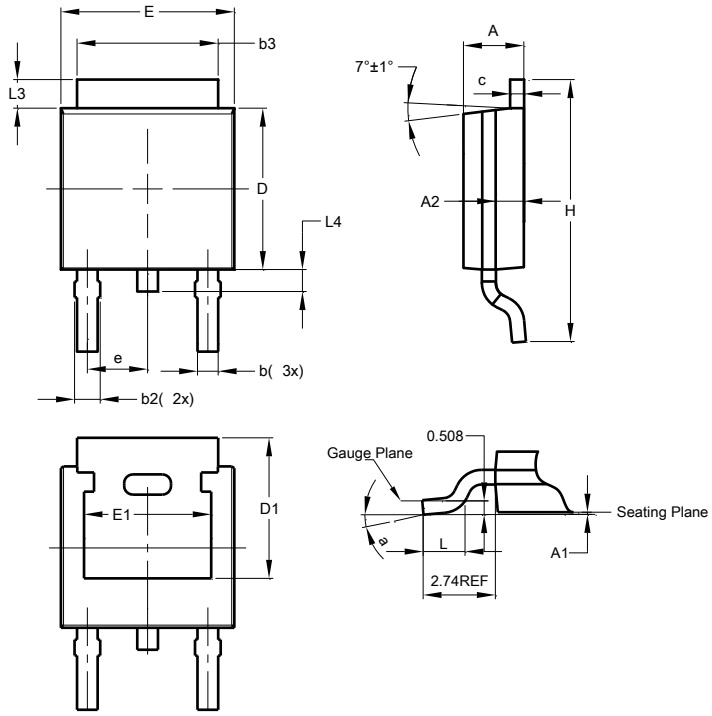



**$V_{BE(ON)}$ v $I_C$**

## Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

**TO252 (DPAK)**

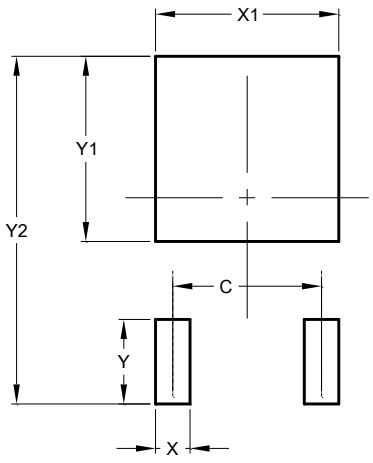



| TO252 (DPAK) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 2.19 | 2.39 | 2.29 |
| **A1** | 0.00 | 0.13 | 0.08 |
| **A2** | 0.97 | 1.17 | 1.07 |
| **b** | 0.64 | 0.88 | 0.783 |
| **b2** | 0.76 | 1.14 | 0.95 |
| **b3** | 5.21 | 5.46 | 5.33 |
| **c** | 0.45 | 0.58 | 0.531 |
| **D** | 6.00 | 6.20 | 6.10 |
| **D1** | 5.21 | – | – |
| **e** | – | – | 2.286 |
| **E** | 6.45 | 6.70 | 6.58 |
| **E1** | 4.32 | – | – |
| **H** | 9.40 | 10.41 | 9.91 |
| **L** | 1.40 | 1.78 | 1.59 |
| **L3** | 0.88 | 1.27 | 1.08 |
| **L4** | 0.64 | 1.02 | 0.83 |
| **a** | 0° | 10° | – |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

**TO252 (DPAK)**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 4.572 |
| **X** | 1.060 |
| **X1** | 5.632 |
| **Y** | 2.600 |
| **Y1** | 5.700 |
| **Y2** | 10.700 |

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