

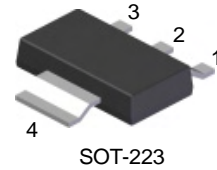


**THE DATASHEET OF  
DZT651-13**



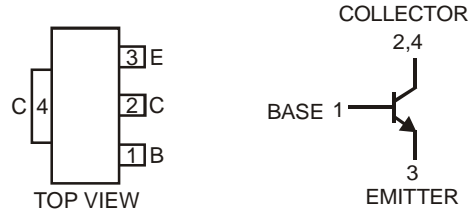
**Features**

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (DZT751)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



**Mechanical Data**

- Case: SOT-223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish — Matte Tin annealed over Copper Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.115 grams



Schematic and Pin Configuration

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	80	V
Collector-Emitter Voltage	$V_{CEO}$	60	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Continuous Collector Current	$I_C$	3	A
Peak Pulse Collector Current	$I_{CM}$	6	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	1 (Note 3) 2 (Note 4)	W
Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB, pad layout as shown on page 4 or in Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  4. Device mounted on Polyimide PCB with 1.8cm<sup>2</sup> copper area.

## Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>Off Characteristics (Note 5)</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	80	—	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	60	—	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	—	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CBO}$	—	—	0.1 10	$\mu\text{A}$ $\mu\text{A}$	$V_{CB} = 60\text{V}, I_E = 0$ $V_{CB} = 60\text{V}, I_E = 0, T_A = 100^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	—	—	0.1	$\mu\text{A}$	$V_{EB} = 4\text{V}, I_C = 0$
<b>On Characteristics (Note 5)</b>						
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.08 0.23	0.3 0.6	V V	$I_C = 1\text{A}, I_B = 100\text{mA}$ $I_C = 3\text{A}, I_B = 300\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	0.85	1.25	V	$I_C = 1\text{A}, I_B = 100\text{mA}$
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	—	0.8	1	V	$V_{CE} = 2\text{V}, I_C = 1\text{A}$
DC Current Gain	$h_{FE}$	70 100 80 40	200 200 185 120	— 300 — —	—	$V_{CE} = 2\text{V}, I_C = 50\text{mA}$ $V_{CE} = 2\text{V}, I_C = 500\text{mA}$ $V_{CE} = 2\text{V}, I_C = 1\text{A}$ $V_{CE} = 2\text{V}, I_C = 2\text{A}$
<b>AC Characteristics</b>						
Transition Frequency	$f_T$	140	200	—	MHz	$V_{CE} = 5\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	—	—	30	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Switching Times	$t_{on}$ $t_{off}$	— —	35 230	— —	ns ns	$V_{CC} = 10\text{V}, I_C = 500\text{mA}$ $I_{B1} = I_{B2} = 50\text{mA}$

Notes: 5. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2.0\%$ .

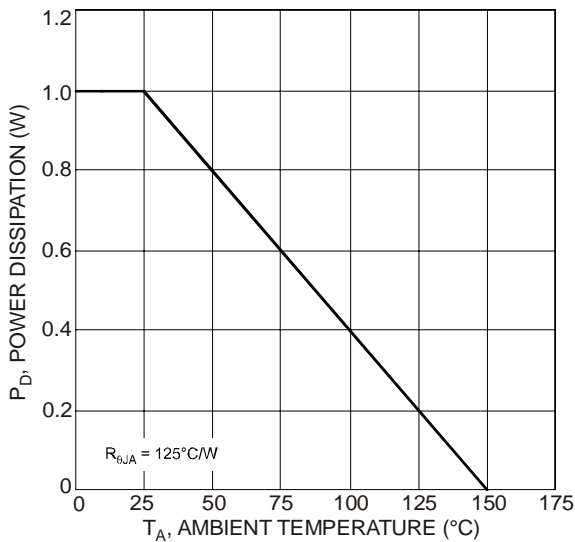


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

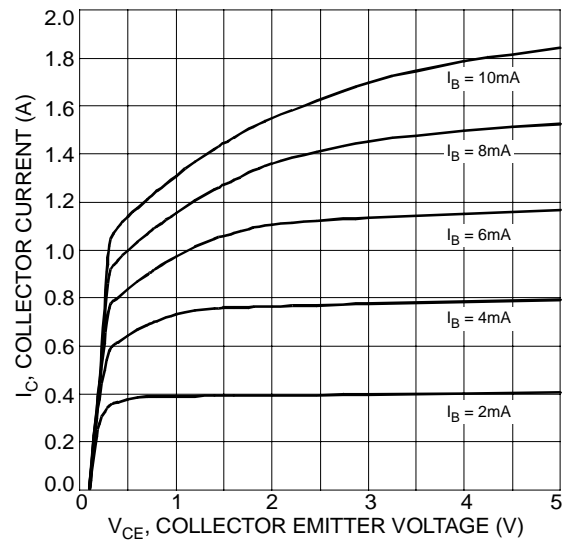


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

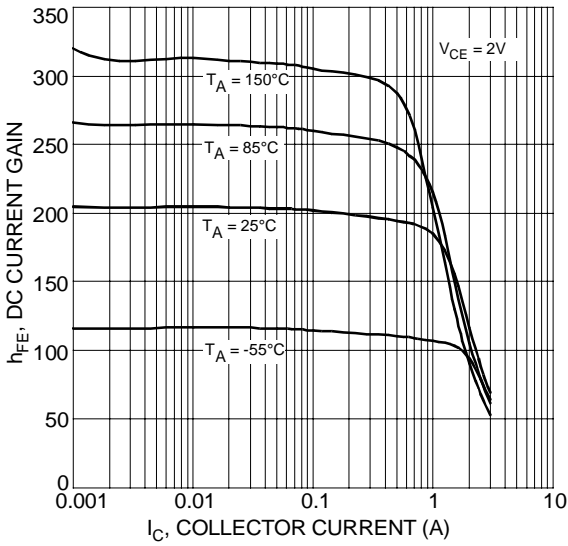


Fig. 3 Typical DC Current Gain vs. Collector Current

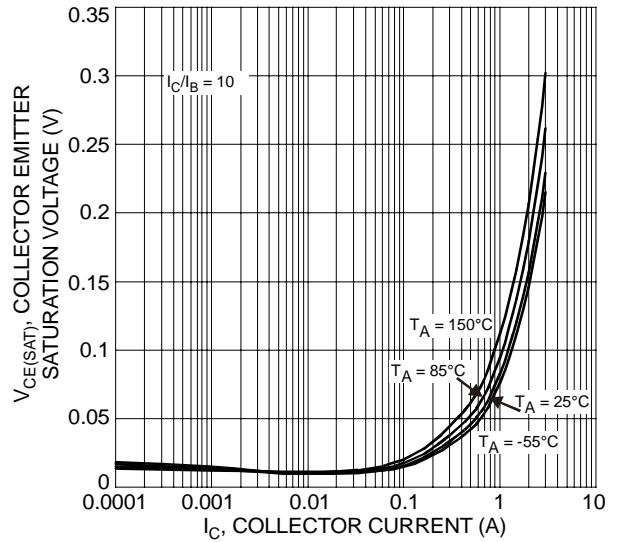


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

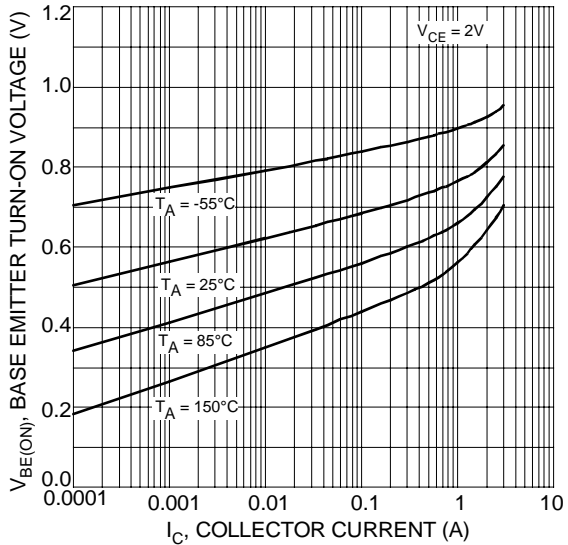


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

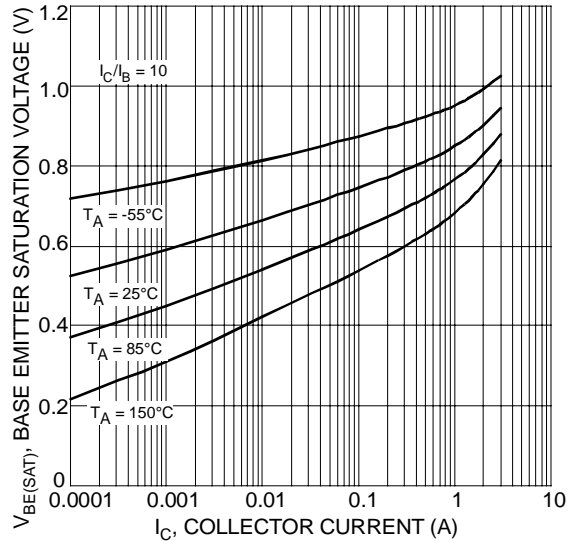


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

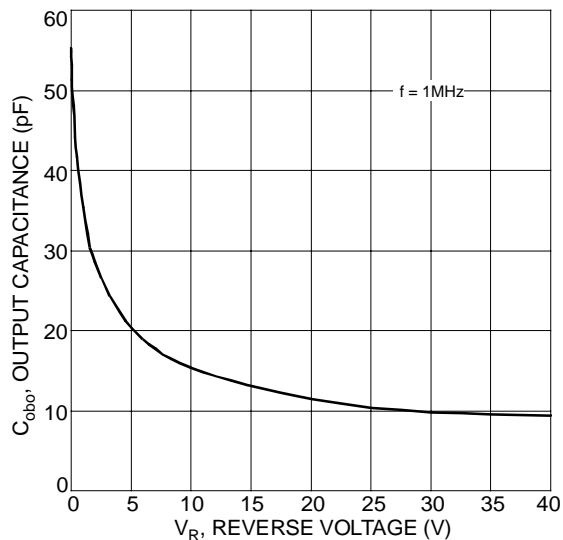


Fig. 7 Typical Output Capacitance Characteristics

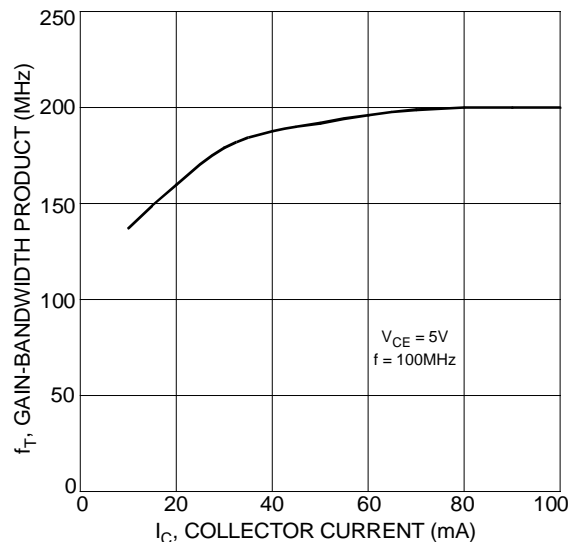


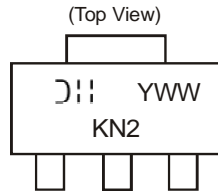
Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

## Ordering Information (Note 6)

Device	Packaging	Shipping
DZT651-13	SOT-223	2500/Tape & Reel

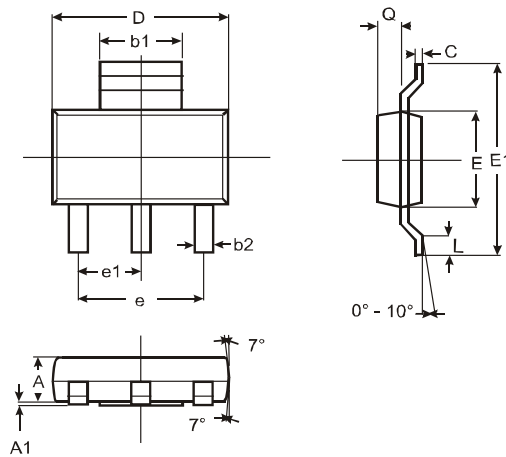
Notes: 6. For packaging details, go to our website at <http://www.diodes.com/ap2007.pdf>.

## Marking Information



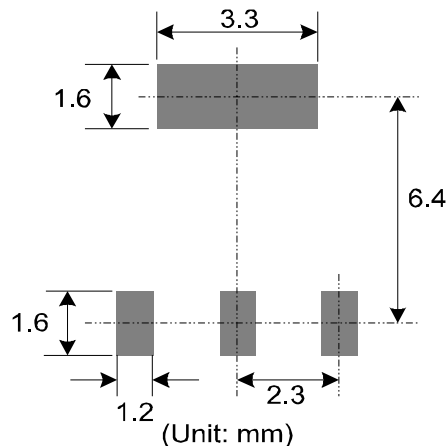
KN2 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

## Package Outline Dimensions



SOT-223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	—	—	4.60
e1	—	—	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

## Suggested Pad Layout



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