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[Diodes Incorporated](#)

[DZT651-13](#)

For any questions, you can email us directly:

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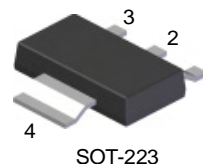


DZT651

LOW $V_{CE(SAT)}$ NPN SURFACE MOUNT TRANSISTOR

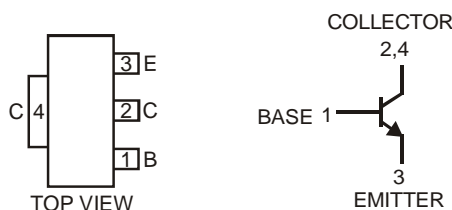
Features

- 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.
 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 1.8cm² copper area.

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Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Off Characteristics (Note 5)						
Collector-Base Breakdown Voltage	V _{(BR)CBO}	80	—	—	V	I _C = 100μA, I _E = 0
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	60	—	—	V	I _C = 10mA, I _B = 0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	5	—	—	V	I _E = 100μA, I _C = 0
Collector Cutoff Current	I _{CBO}	—	—	0.1 10	μA	V _{CB} = 60V, I _E = 0 V _{CB} = 60V, I _E = 0, T _A = 100°C
Emitter Cutoff Current	I _{EBO}	—	—	0.1	μA	V _{EB} = 4V, I _C = 0
On Characteristics (Note 5)						
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	0.08 0.23	0.3 0.6	V	I _C = 1A, I _B = 100mA I _C = 3A, I _B = 300mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	0.85	1.25	V	I _C = 1A, I _B = 100mA
Base-Emitter Turn-On Voltage	V _{BE(ON)}	—	0.8	1	V	V _{CE} = 2V, I _C = 1A
DC Current Gain	h _{FE}	70 100 80 40	200 200 185 120	— 300 — —	—	V _{CE} = 2V, I _C = 50mA V _{CE} = 2V, I _C = 500mA V _{CE} = 2V, I _C = 1A V _{CE} = 2V, I _C = 2A
AC Characteristics						
Transition Frequency	f _T	140	200	—	MHz	V _{CE} = 5V, I _C = 100mA, f = 100MHz
Output Capacitance	C _{obo}	—	—	30	pF	V _{CB} = 10V, f = 1MHz
Switching Times	t _{on} t _{off}	— —	35 230	— —	ns	V _{CC} = 10V, I _C = 500mA I _{B1} = I _{B2} = 50mA

Notes: 5. Pulse Test: Pulse width ≤300μs. Duty cycle ≤2.0%.

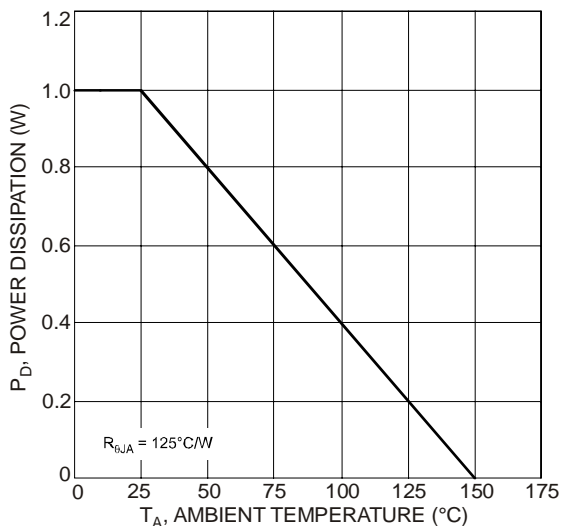


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

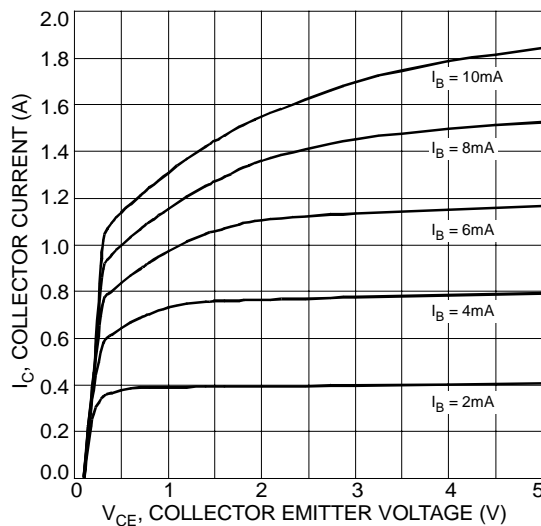


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage



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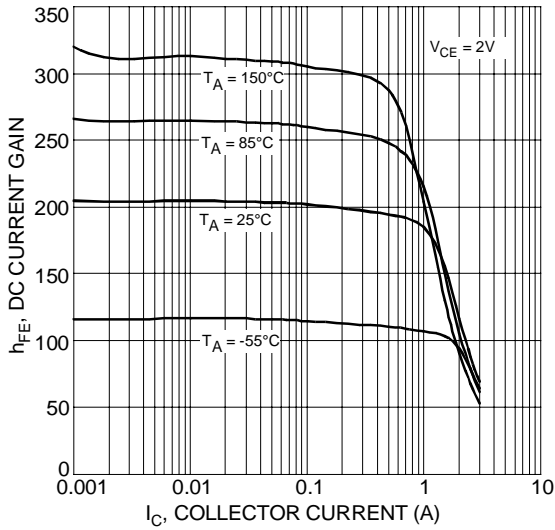


Fig. 3 Typical DC Current Gain vs. Collector Current

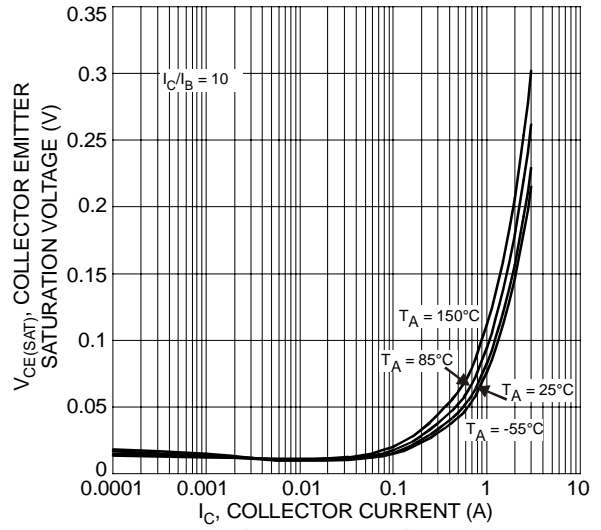


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

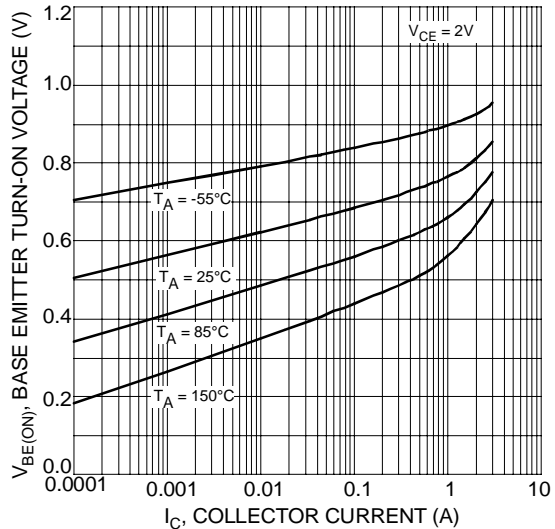


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

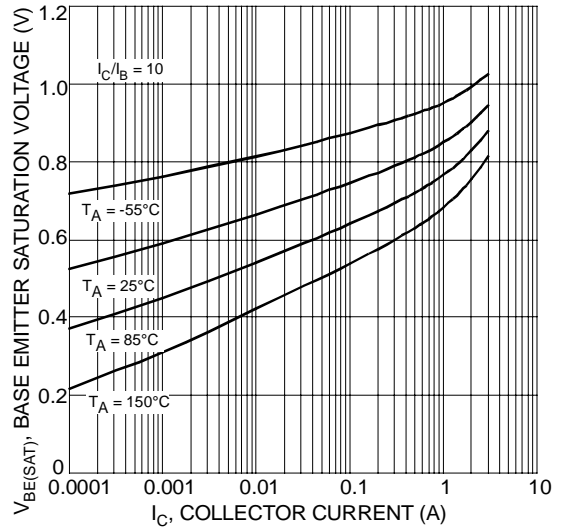


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

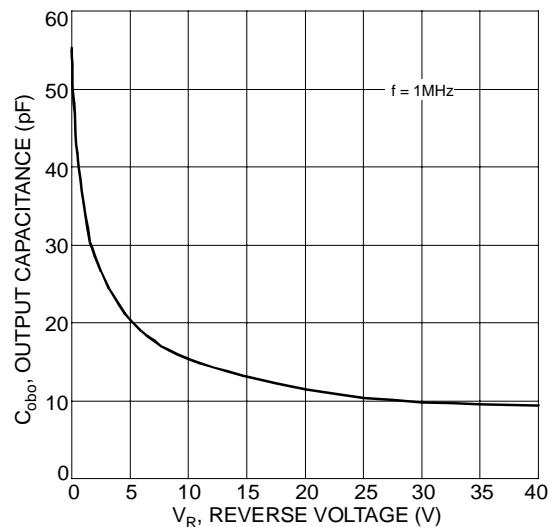


Fig. 7 Typical Output Capacitance Characteristics

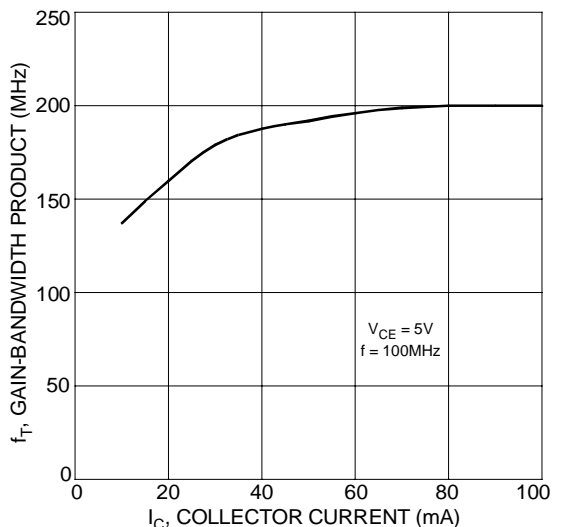


Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

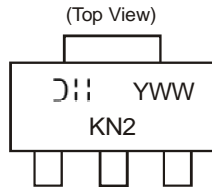


Ordering Information (Note 6)

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

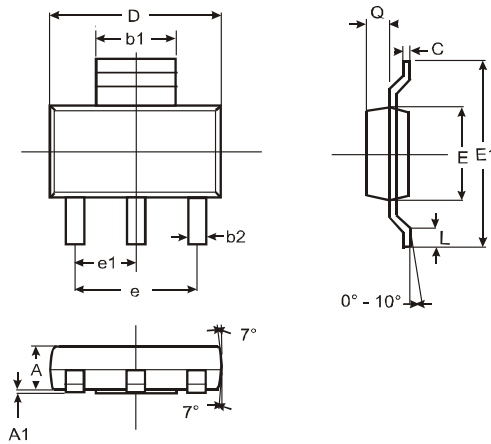
Notes: 6. For packaging details, go to our website at <http://www.diodes.com/ap2007.pdf>.

Marking Information



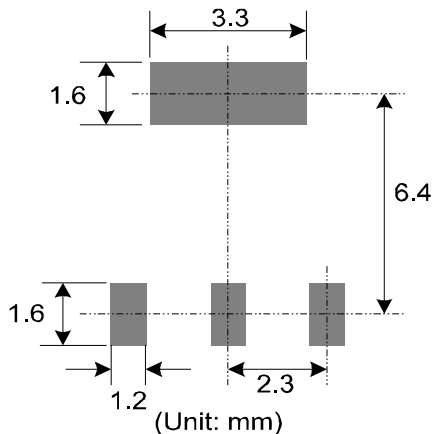
KN2 = Product Type Marking Code
 YWW = Date Code Marking
 Y = Last digit of year ex: 7 = 2007
 WW = Week code 01 - 52

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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