

**300V NPN HIGH VOLTAGE TRANSISTOR IN SOT223**

**Features**

- $BV_{CEO} > 300V$
- $I_C = 500mA$  high Collector Current
- 2W Power Dissipation
- Low Saturation Voltage  $V_{CE(sat)} < 500mV @ 20mA$
- Complementary PNP Type: DZTA92
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

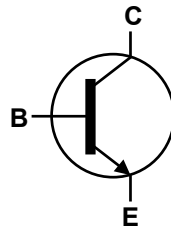
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208③
- Weight: 0.112 grams (approximate)

**Applications**

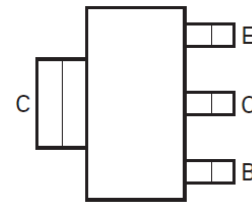
- Switch-Mode Power Supplies (SMPS)
- Video output stages
- Motor driver



Top View



Device Symbol



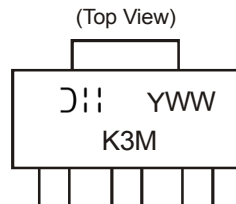
Top View Pin-Out

**Ordering Information** (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DZTA42-13	AEC-Q101	K3M	13	12	2,500

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](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**



K3M = Product Type Marking Code  
 YWW = Date Code Marking  
 Y = Last digit of year ex: 4 = 2014  
 WW = Week code 01 - 52

### Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	300	V
Collector-Emitter Voltage	V <sub>CEO</sub>	300	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Collector Current	I <sub>C</sub>	500	mA
Base Current	I <sub>B</sub>	100	mA

### Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

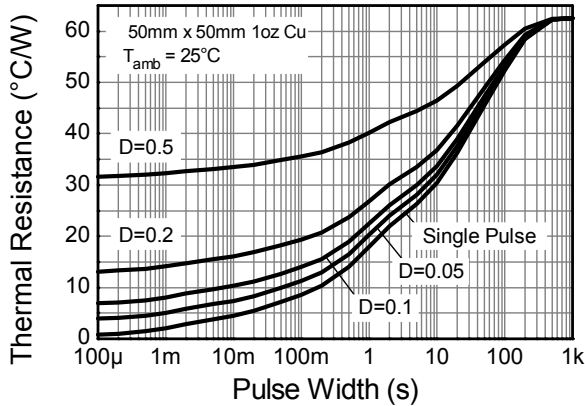
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5) 2	W
		(Note 6) 1	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 62	°C/W
		(Note 6) 125	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	19.4	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

### ESD Ratings (Note 8)

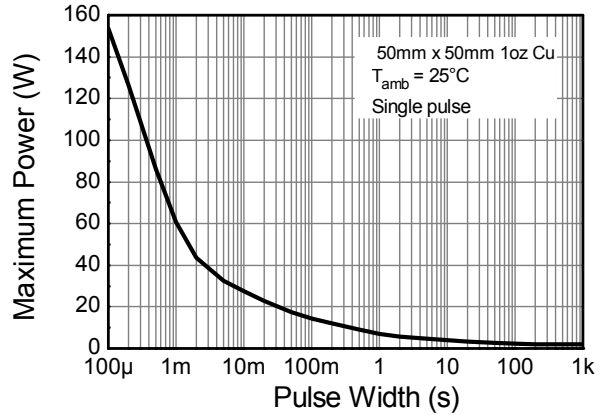
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 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 minimum recommended pad (MRP) layout.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

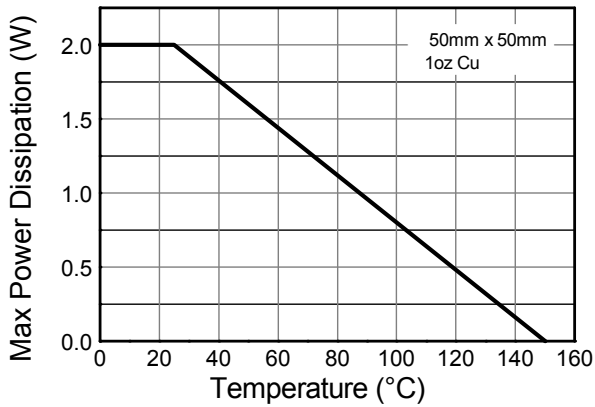
**Thermal Characteristics and Derating Information**



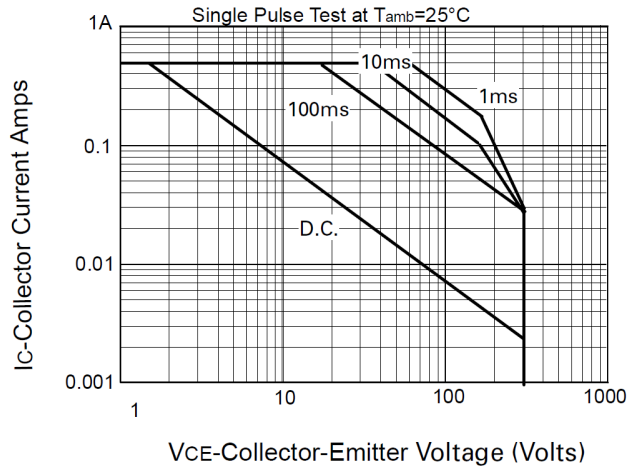
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Derating Curve**



**Safe operating area**

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	300	—	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	300	—	—	V	$I_C = 1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	6	—	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Collector-Base Cut-off Current	$I_{CBO}$	—	—	0.1	$\mu\text{A}$	$V_{CB} = 200\text{V}, I_E = 0$
Emitter-Base Cut-off Current	$I_{EBO}$	—	—	0.1	$\mu\text{A}$	$V_{EB} = 6\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 9)</b>						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.5	V	$I_C = 20\text{mA}, I_B = 2\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	0.9	V	$I_C = 20\text{mA}, I_B = 2\text{mA}$
Static Forward Current Transfer Ratio	$h_{FE}$	25	—	—		$I_C = 1\text{mA}, V_{CE} = 10\text{V}$
		40	—	—		$I_C = 10\text{mA}, V_{CE} = 10\text{V}$
		40	—	—		$I_C = 30\text{mA}, V_{CE} = 10\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	$f_T$	50	—	—	MHz	$I_C = 10\text{mA}, V_{CE} = 20\text{V}$ $f = 100\text{MHz}$
Output Capacitance	Cobo	—	—	3	pF	$V_{CB} = 20\text{V}, f = 1\text{MHz}$

Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

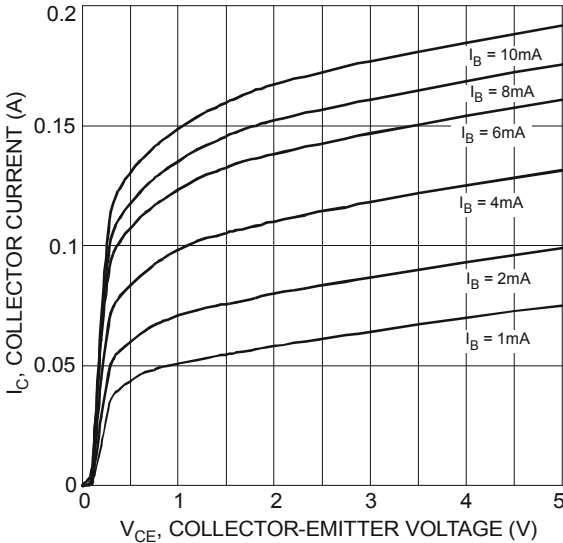


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

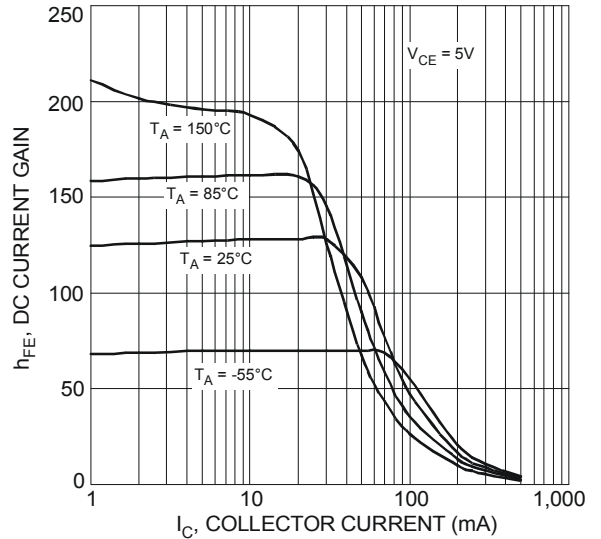


Figure 2 Typical DC Current Gain vs. Collector Current

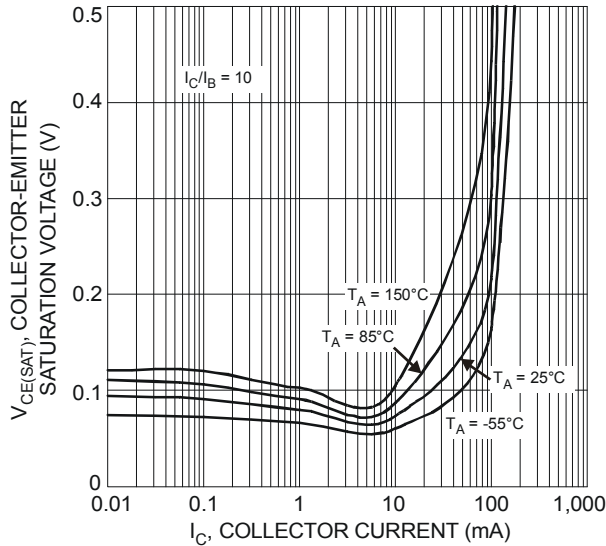


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

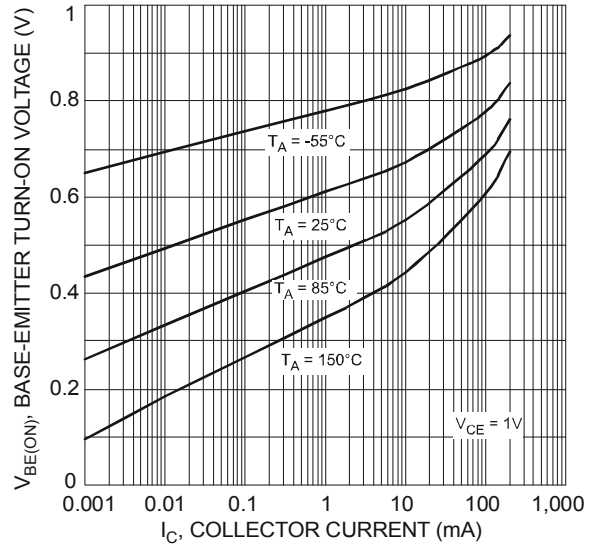


Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

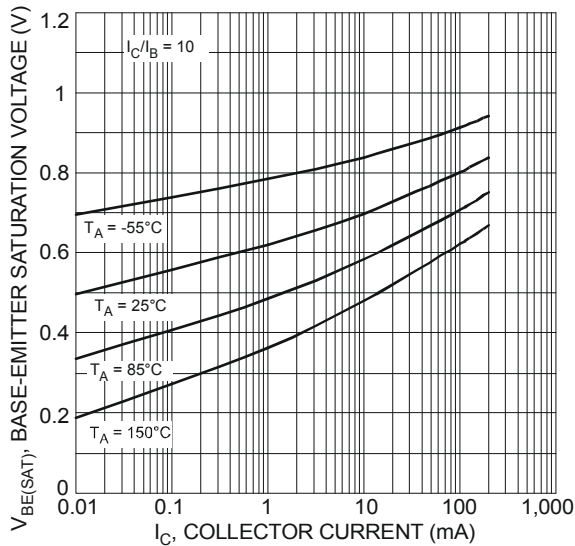


Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

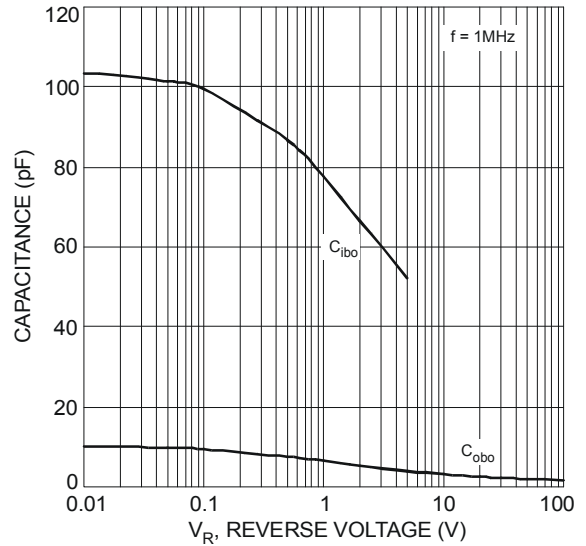


Figure 6 Typical Capacitance Characteristics

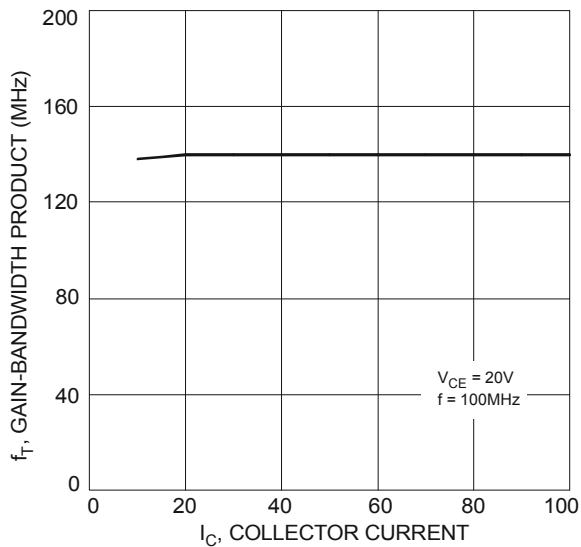
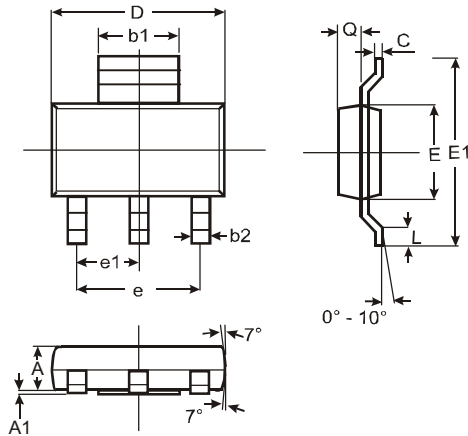


Figure 7 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

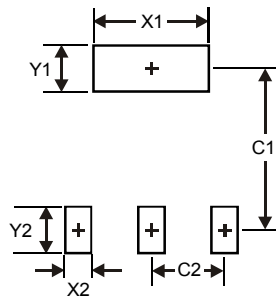
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT223			
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

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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