

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

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

**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)**
- **The DZTA42Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

**Mechanical Data**

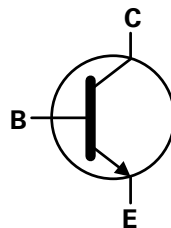
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.112 grams (Approximate)

**Applications**

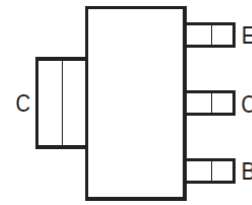
- Switch-mode power supplies (SMPS)
- Video output stages
- Motor drivers



Top View



Device Symbol

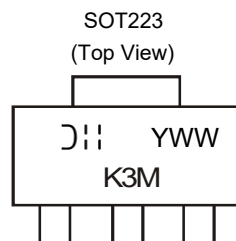


Top View Pin-Out

**Ordering Information** (Note 4)

Orderable Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
				Quantity	Carrier
DZTA42Q-13	K3M	13	12	2,500	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**


K3M = Product Type Marking Code  
 ⌋⌋⌋ = Manufacturer's Code Marking  
 YWW = Date Code Marking  
 Y = Last Digit of Year (ex: 1 = 2021)  
 WW = Week Code (01 to 52)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	300	V
Collector-Emitter Voltage	$V_{CEO}$	300	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	500	mA
Base Current	$I_B$	100	mA

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

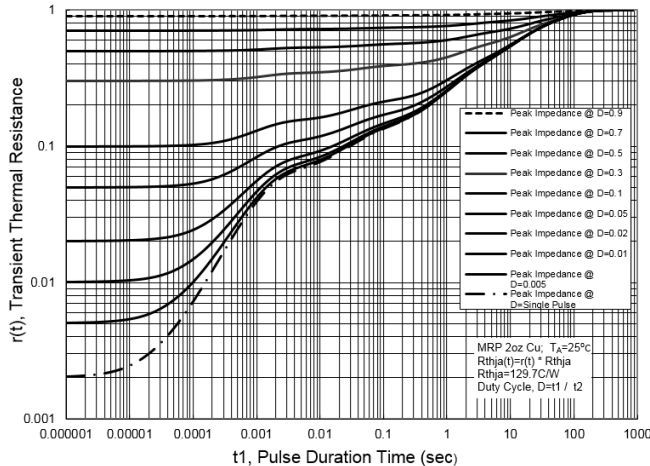
Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	(Note 5)	1.86
		(Note 6)	0.97
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	67.7
		(Note 6)	129.7
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	(Note 5)	13
		(Note 6)	17.9
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	(Note 5)	41
		(Note 6)	26.2
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 9)

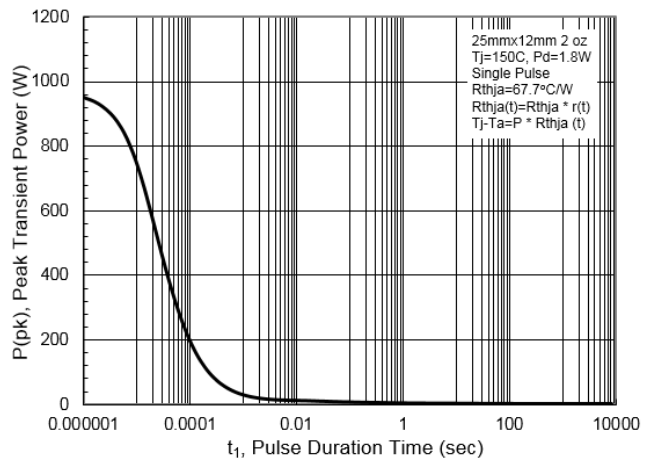
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 25mm x 12mm 2oz copper that is on a single-sided 1.6mm FR-4 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 top of the package.
  8. Thermal resistance from junction to solder-point (at the end of the collector lead).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

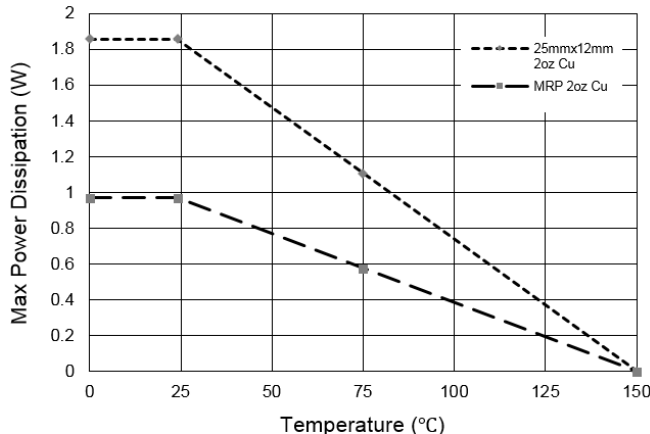
**Thermal Characteristics and Derating Information**



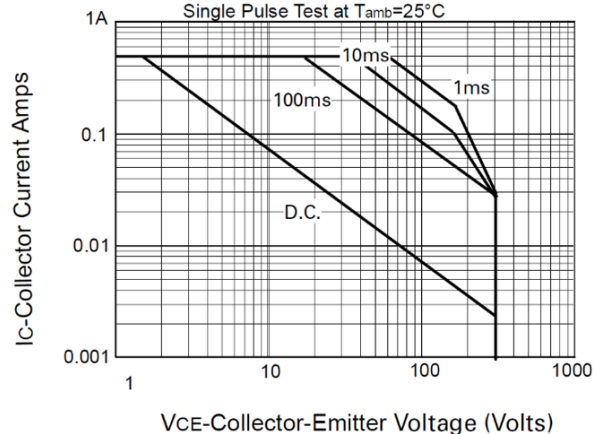
**Transient Thermal Resistance**



**Single Pulse Maximum 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	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 10)	$BV_{CEO}$	300	—	—	V	$I_C = 1\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	6	—	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cut-off Current	$I_{CBO}$	—	—	0.1	$\mu\text{A}$	$V_{CB} = 200\text{V}$
Emitter-Base Cut-off Current	$I_{EBO}$	—	—	0.1	$\mu\text{A}$	$V_{EB} = 6\text{V}$
<b>ON CHARACTERISTICS</b> (Note 10)						
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	$C_{OBO}$	—	—	3	pF	$V_{CB} = 20\text{V}$ , $f = 1\text{MHz}$

Note: 10. 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.)

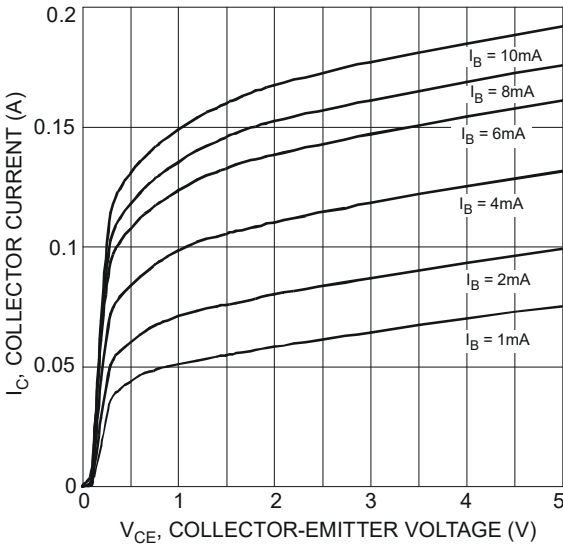


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

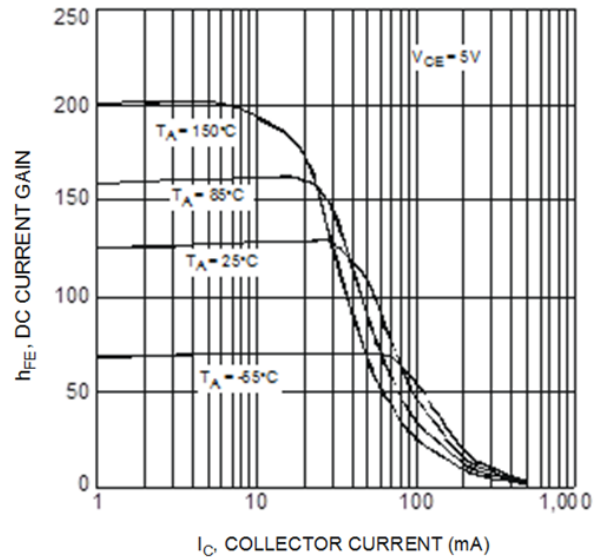


Figure 2 Typical DC Current Gain vs. Collector Current

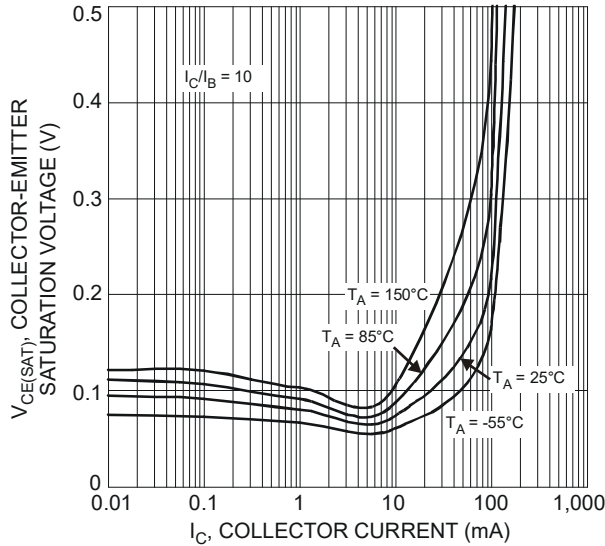


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

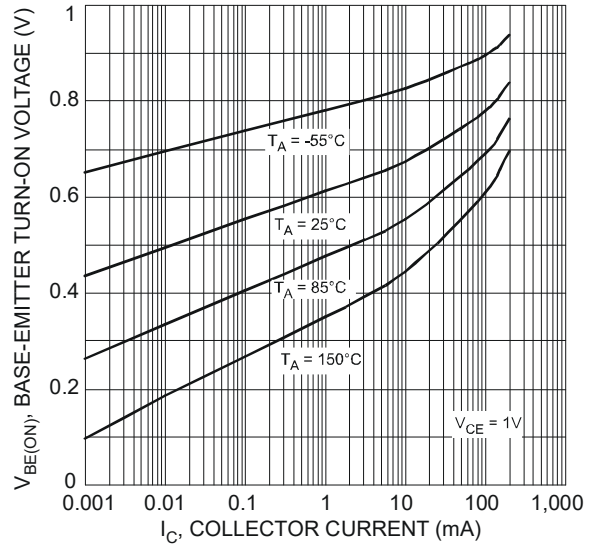


Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

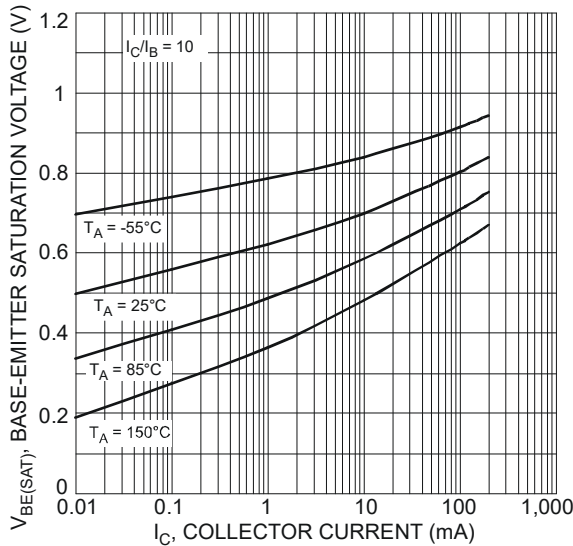


Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

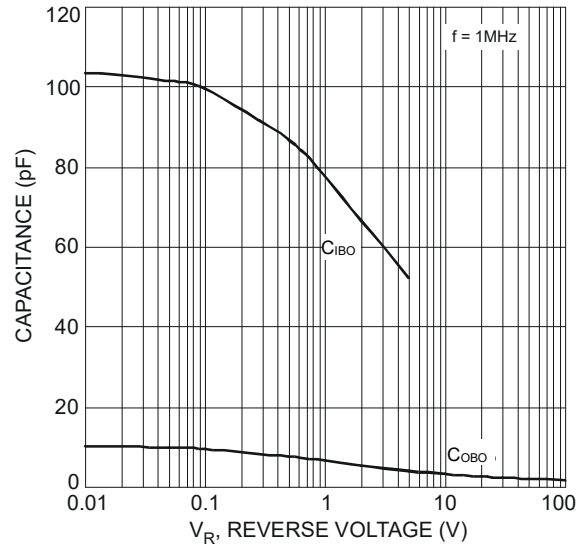


Figure 6 Typical Capacitance Characteristics

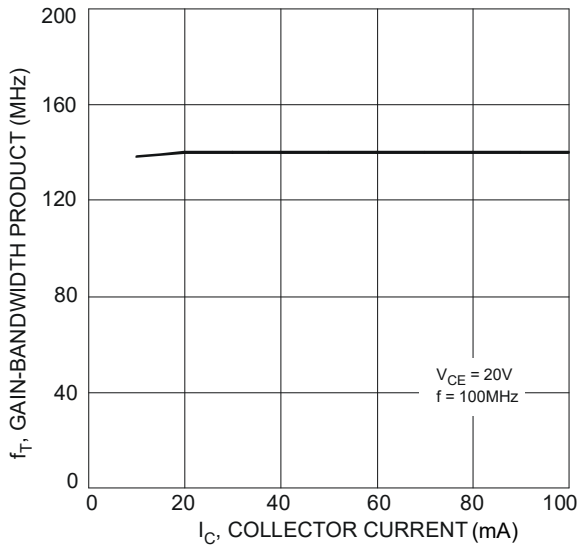
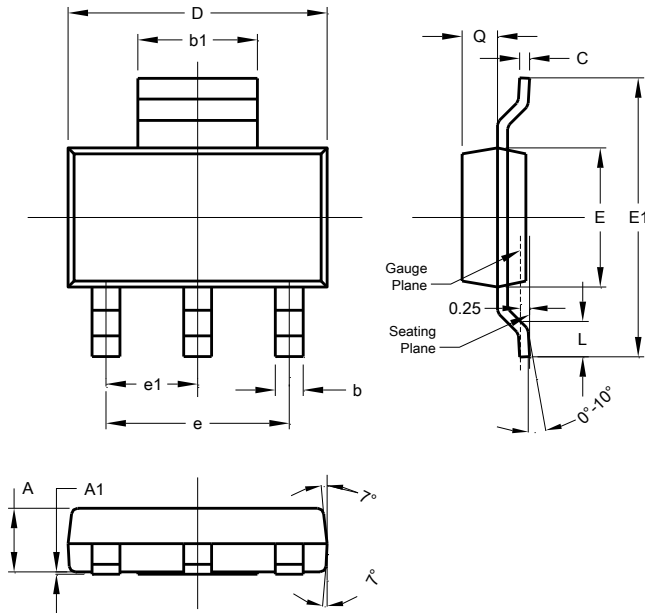


Figure 7 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

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

**SOT223**

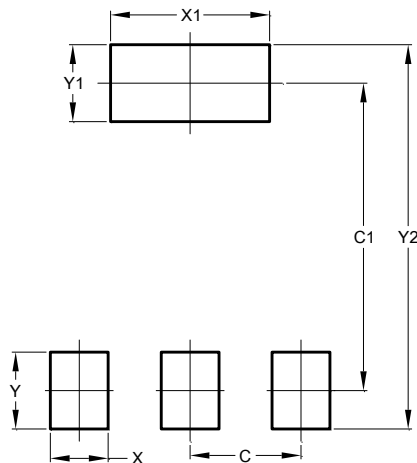


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

## Suggested Pad Layout

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

**SOT223**



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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