

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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

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 ④③
- Weight: 0.112 grams (Approximate)

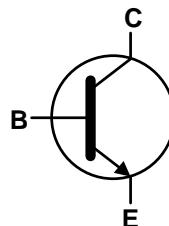
Applications

- Switch-Mode Power Supplies (SMPS)
- Video Output Stages
- Motor Driver

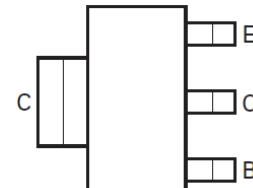
SOT223



Top View



Device Symbol



Top View
Pin-Out

Ordering Information (Notes 4 and 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DZTA42Q-13	Automotive	K3M	13	12	2,500

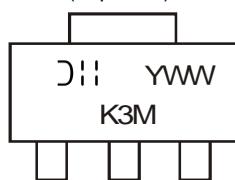
Notes:

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 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

SOT223

(Top View)



K3M = Product Type Marking Code
 DII = Manufacturer's Code Marking
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 6 = 2016)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	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	2	W
		1	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62	°C/W
		125	
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	19.4	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to +150	°C

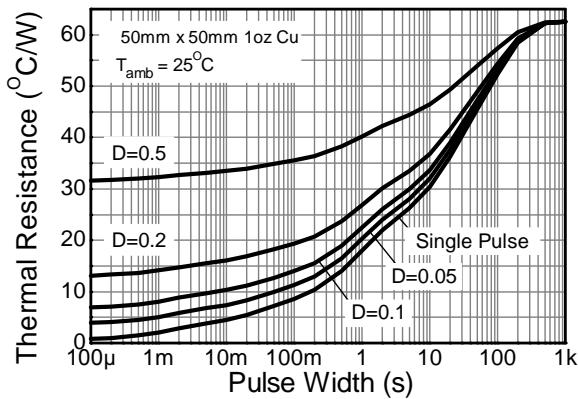
ESD Ratings (Note 9)

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

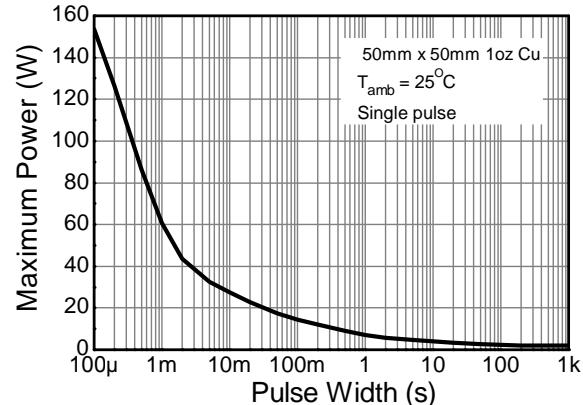
Notes:

- 6. For a device mounted with the collector lead on 50mm x 50mm 1oz 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.
- 7. Same as note (6), except mounted on minimum recommended pad (MRP) layout.
- 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.

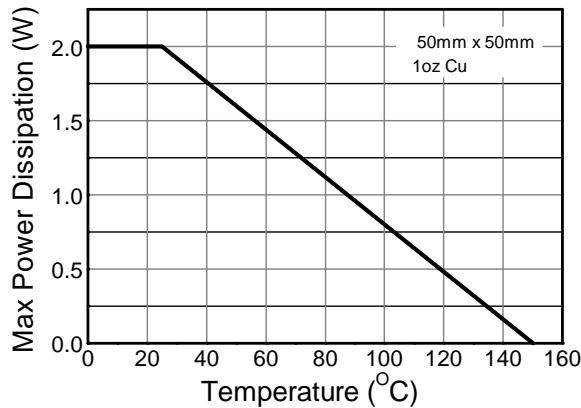
Thermal Characteristics and Derating Information



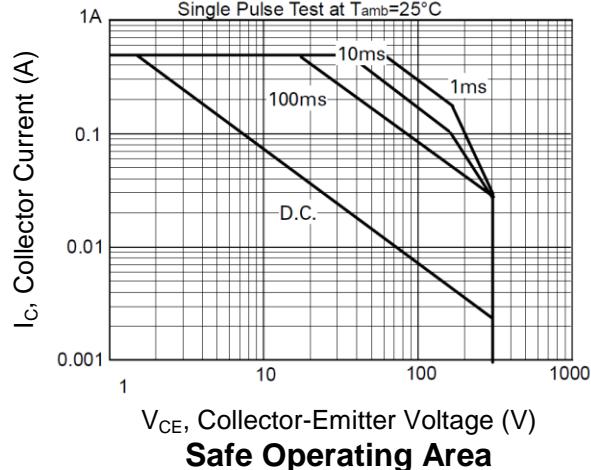
Transient Thermal Impedance



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
OFF CHARACTERISTICS						
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	μA	$V_{\text{CB}} = 200\text{V}$
Emitter-Base Cut-off Current	I_{EBO}	—	—	0.1	μA	$V_{\text{EB}} = 6\text{V}$
ON CHARACTERISTICS (Note 10)						
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{SAT})}$	—	—	0.5	V	$I_C = 20\text{mA}, I_B = 2\text{mA}$
Base-Emitter Saturation Voltage	$V_{\text{BE}(\text{SAT})}$	—	—	0.9	V	$I_C = 20\text{mA}, I_B = 2\text{mA}$
Static Forward Current Transfer Ratio	h_{FE}	25	—	—	—	$I_C = 1\text{mA}, V_{\text{CE}} = 10\text{V}$
		40	—	—		$I_C = 10\text{mA}, V_{\text{CE}} = 10\text{V}$
		40	—	—		$I_C = 30\text{mA}, V_{\text{CE}} = 10\text{V}$
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	50	—	—	MHz	$I_C = 10\text{mA}, V_{\text{CE}} = 20\text{V}$ $f = 100\text{MHz}$
Output Capacitance	C_{obo}	—	—	3	pF	$V_{\text{CB}} = 20\text{V}, f = 1\text{MHz}$

Note: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

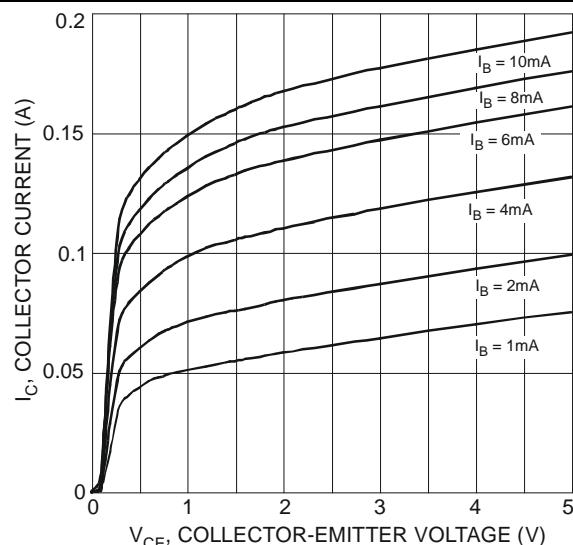
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)


Figure 1 Typical Collector Current
vs. Collector-Emitter Voltage

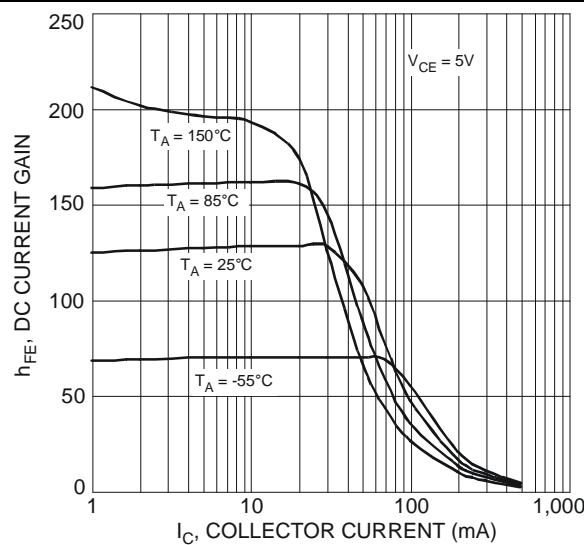


Figure 2 Typical DC Current Gain vs. Collector Current

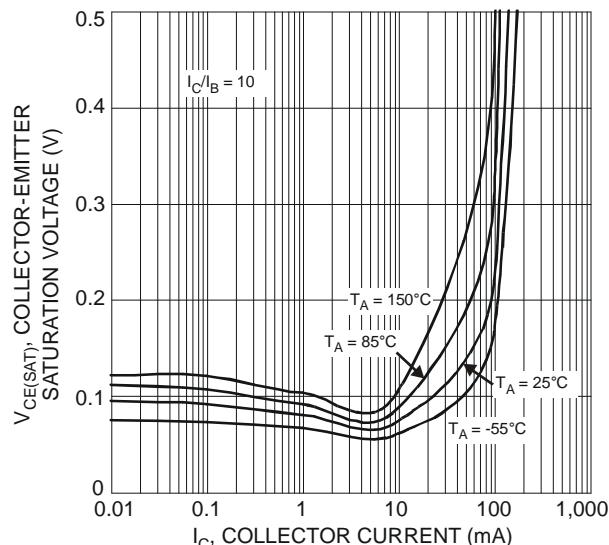


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

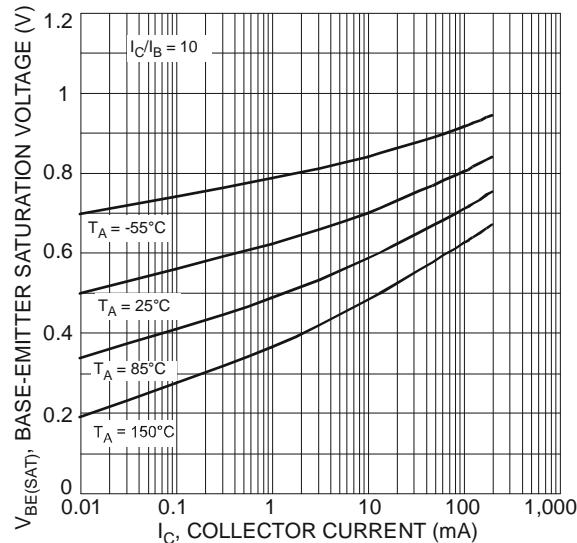


Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

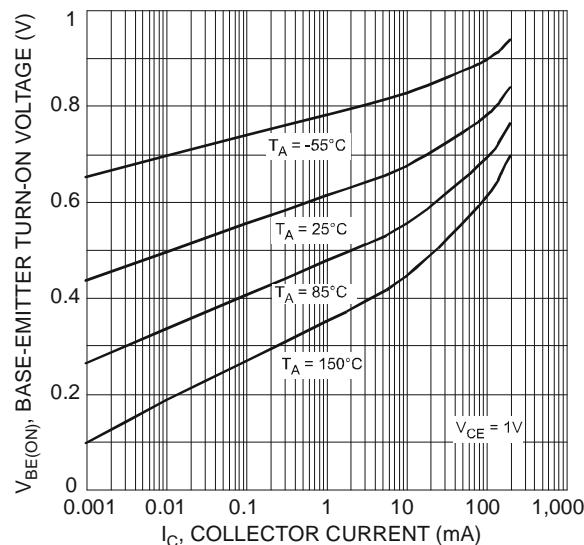


Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

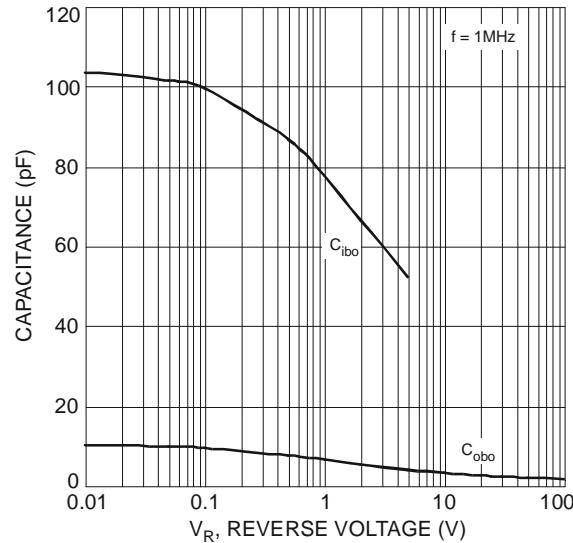


Figure 6 Typical Capacitance Characteristics

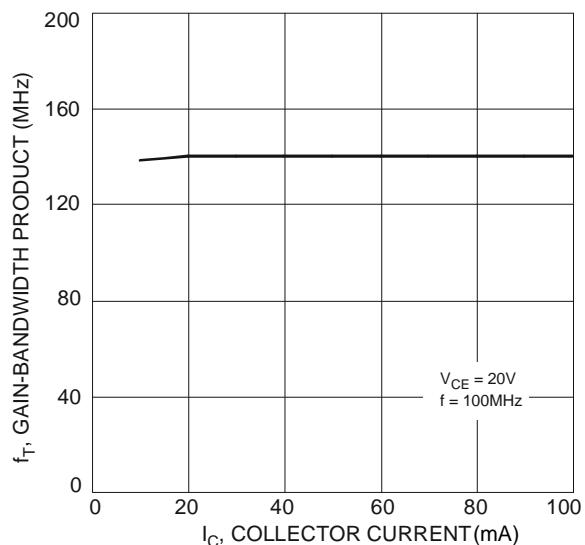
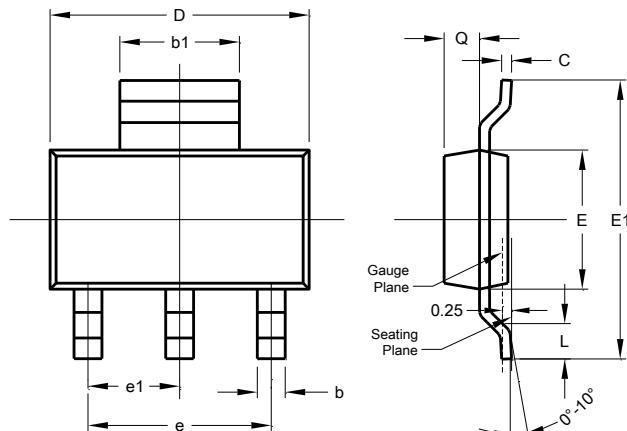


Figure 7 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

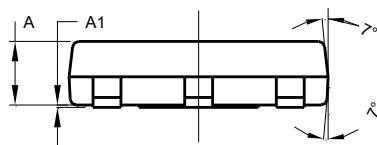
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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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

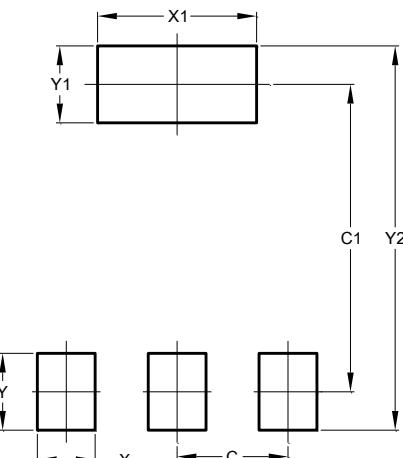
All Dimensions in mm



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

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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