

## Description

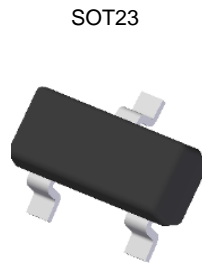
This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

## Features

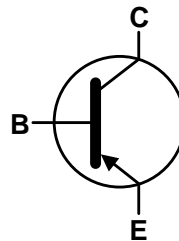
- $BV_{CEO} > -60V$
- $I_C = -1A$  Continuous Collector Current
- $I_{CM} = -2A$  Peak Pulse Current
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

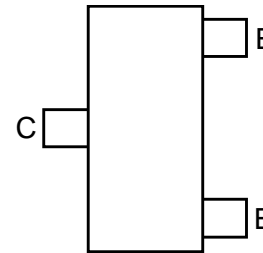
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight 0.008 grams (Approximate)



Top View



Device Symbol



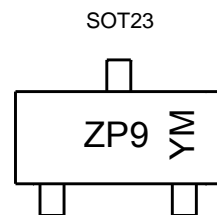
Top View  
Pin-Out

## Ordering Information (Notes 4 and 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DSS5160TQ-7	Automotive	ZP9	7	8mm	3,000

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



ZP9 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: E = 2017)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024
Code	E	F	G	H	I	J	K	L

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

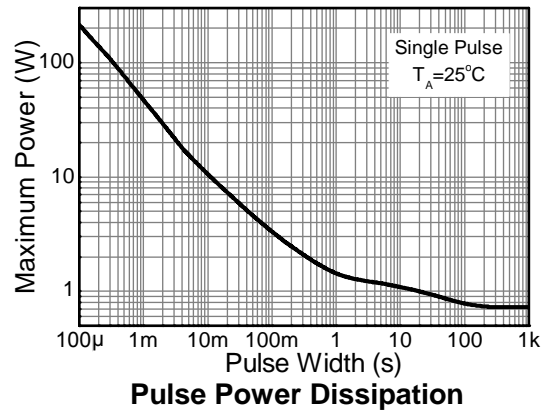
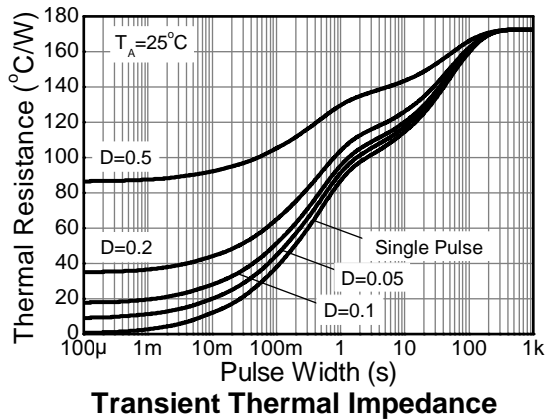
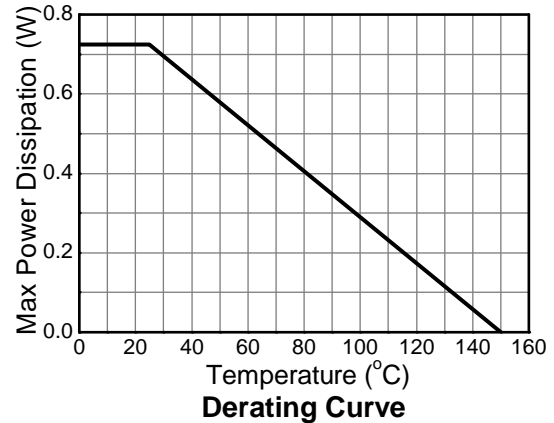
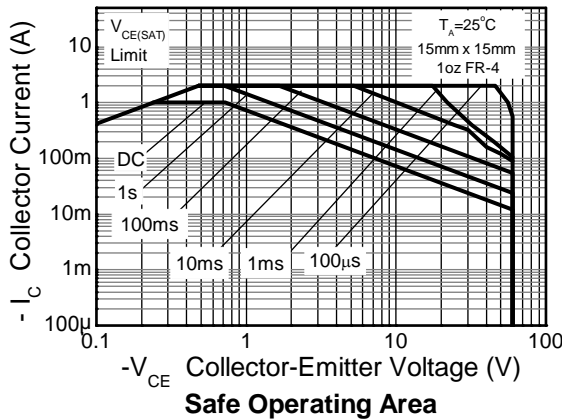
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-80	V
Collector-Emitter Voltage	$V_{CEO}$	-60	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-1	A
Peak Pulse Collector Current	$I_{CM}$	-2	A
Base Current (DC)	$I_B$	-300	mA
Peak Base Current	$I_{BM}$	-1	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	$P_D$	725	mW
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	172	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	79	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

Notes: 6. Operated under pulsed conditions: pulse width  $\leq 100\text{ms}$ , duty cycle  $\leq 0.25$ .  
 7. Device mounted on 15mm x 15mm x 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.

**Thermal Characteristics**



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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-80	—	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	-60	—	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	—	—	V	I <sub>E</sub> = -100μA
Collector-Base Cutoff Current	I <sub>CBO</sub>	—	—	-100	nA	V <sub>CB</sub> = -20V, I <sub>E</sub> = 0
		—	—	-50	μA	V <sub>CB</sub> = -20V, I <sub>E</sub> = 0, T <sub>A</sub> = +150°C
Emitter-Base Cutoff Current	I <sub>EBO</sub>	—	—	-100	nA	V <sub>EB</sub> = -5V, I <sub>C</sub> = 0
DC Current Gain (Note 6)	h <sub>FE</sub>	200	—	—	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -1mA
		150	—	—		V <sub>CE</sub> = -5V, I <sub>C</sub> = -500mA
		100	—	—		V <sub>CE</sub> = -5V, I <sub>C</sub> = -1A
Collector-Emitter Saturation Voltage (Note 8)	V <sub>CE(SAT)</sub>	—	—	-175	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -1mA
		—	—	-180		I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
		—	—	-340		I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
Equivalent On-Resistance	R <sub>CE(SAT)</sub>	—	—	340	mΩ	I <sub>E</sub> = -1A, I <sub>B</sub> = -100mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	—	-1.1	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA
Base-Emitter Turn-On Voltage	V <sub>BE(ON)</sub>	—	—	-0.9	V	V <sub>CE</sub> = -5V, I <sub>C</sub> = -1A
Transition Frequency	f <sub>T</sub>	150	—	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
Output Capacitance	C <sub>OB</sub>	—	—	15	pF	V <sub>CB</sub> = -10V, f = 1MHz
Turn-On Time	t <sub>ON</sub>	—	75	—	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -0.5A, I <sub>B1</sub> = I <sub>B2</sub> = -25mA
Delay Time	t <sub>D</sub>	—	35	—	ns	
Rise Time	t <sub>R</sub>	—	40	—	ns	
Turn-Off Time	t <sub>OFF</sub>	—	265	—	ns	
Storage Time	t <sub>S</sub>	—	230	—	ns	
Fall Time	t <sub>F</sub>	—	35	—	ns	

Note: 8. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

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

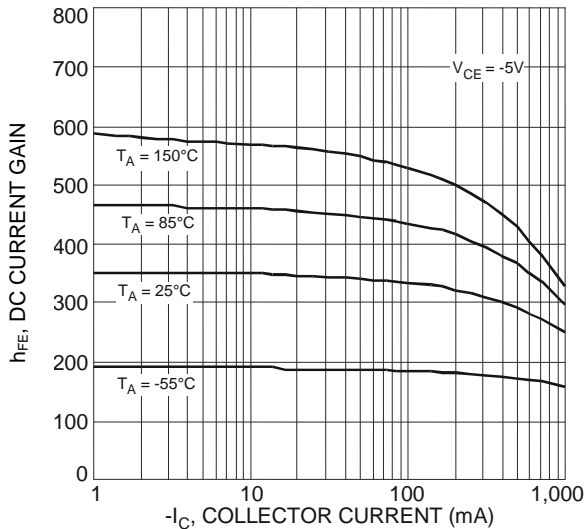


Fig. 1 Typical DC Current Gain vs. Collector Current

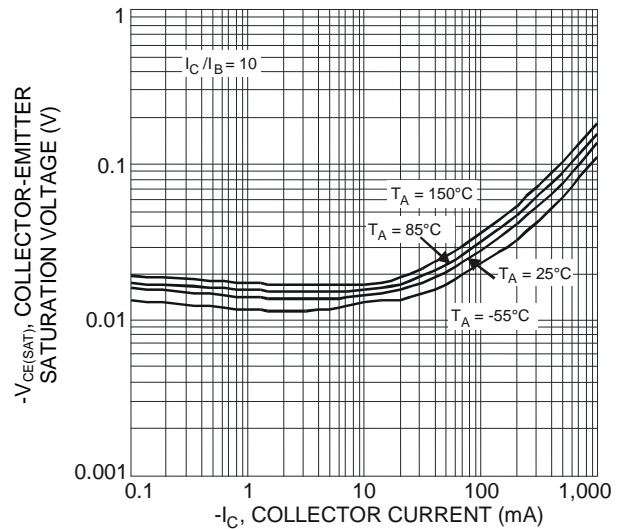


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

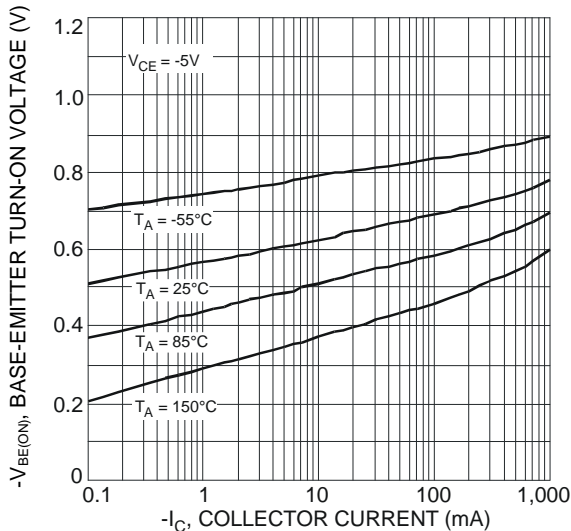


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

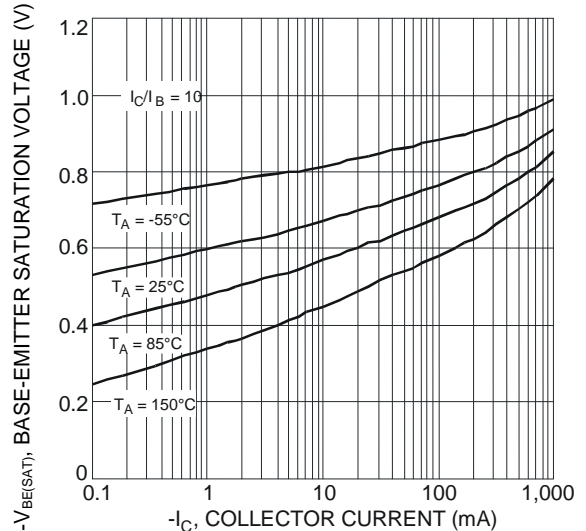


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

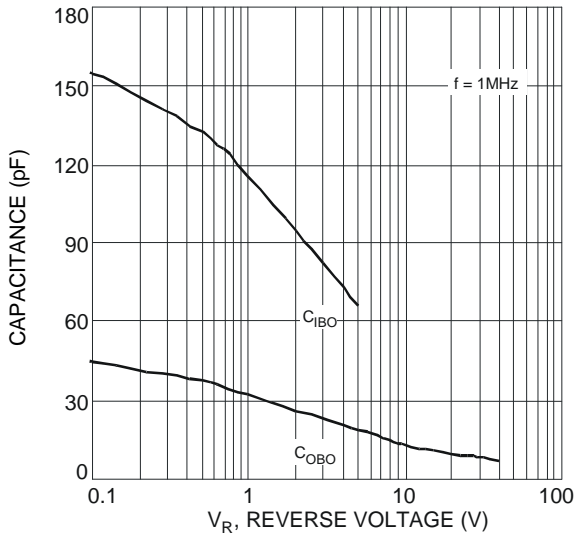
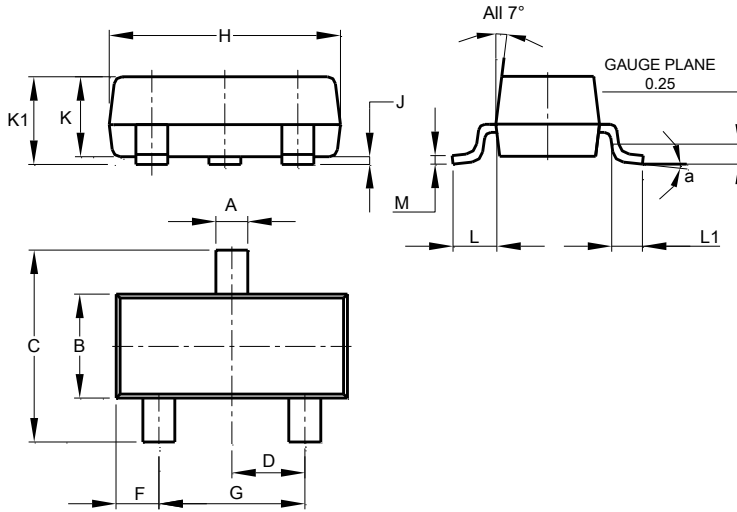


Fig. 5 Typical Capacitance Characteristics

**Package Outline Dimensions**

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

**SOT23**

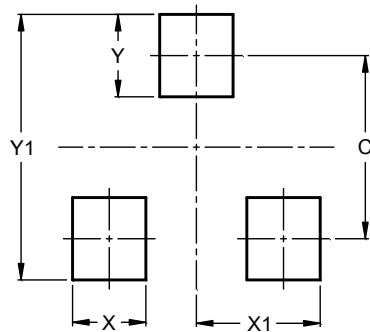


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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