

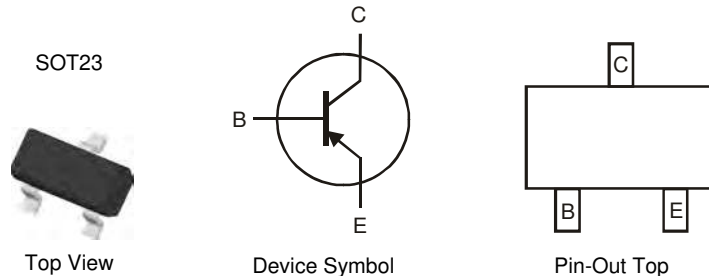
## 60V LOW $V_{CE(sat)}$ PNP SURFACE MOUNT TRANSISTOR

### Features

- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

### 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 annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

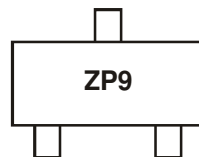


### Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DSS5160T-7	ZP9	7	8mm	3,000

- Notes:
1. No purposefully added lead.
  2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
  3. For packaging details, go to our website at <http://www.diodes.com>

### Marking Information



ZP9 = Product Type Marking Code

### Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

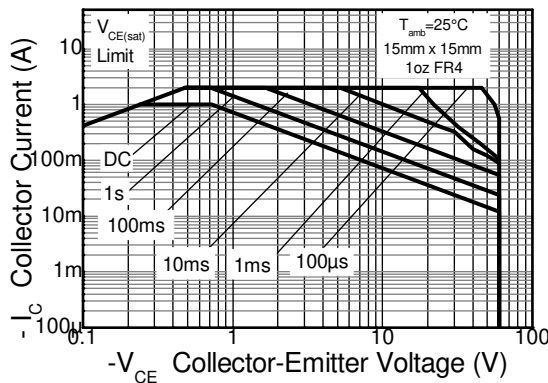
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-80	V
Collector-Emitter Voltage	$V_{CEO}$	-60	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-1	A
Peak Pulse Collector Current	$I_{CM}$	-2	A
Base Current (DC)	$I_B$	-300	mA
Peak Base Current	$I_{BM}$	-1	A

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

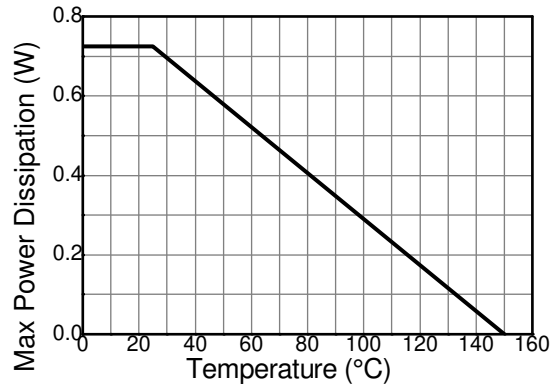
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	725	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	172	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient Air (Note 4)	$R_{\theta JA}$	79	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes: 4. Operated under pulsed conditions: pulse width  $\leq 100\text{ms}$ , duty cycle  $\leq 0.25$ .  
 5. Device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

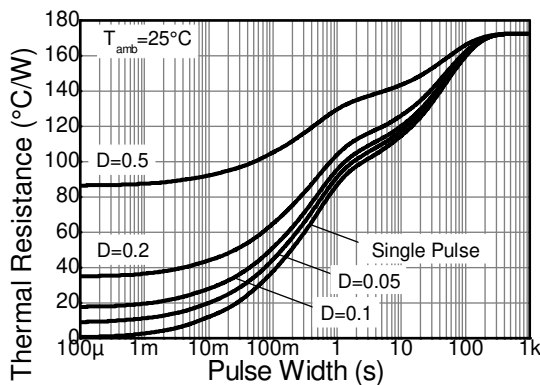
### Thermal Characteristics



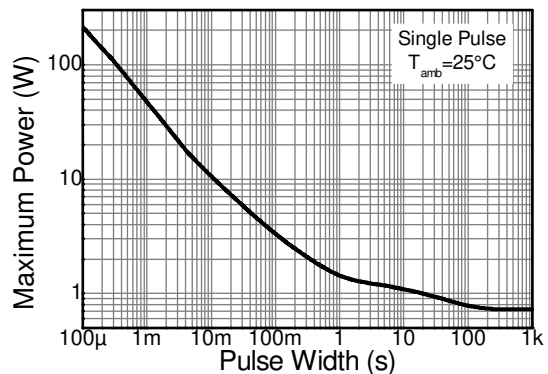
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**

**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 6)	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 6)	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	

Notes: 6. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

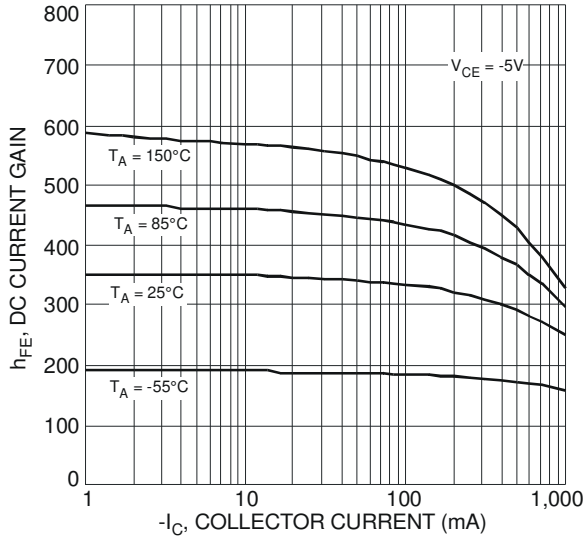


Fig. 5 Typical DC Current Gain vs. Collector Current

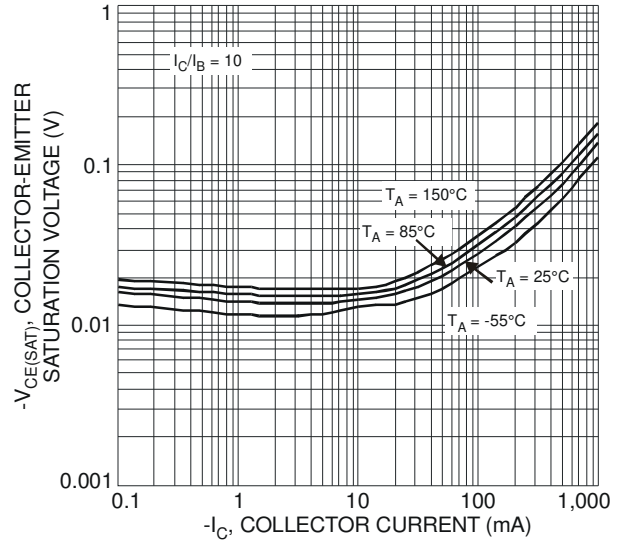


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

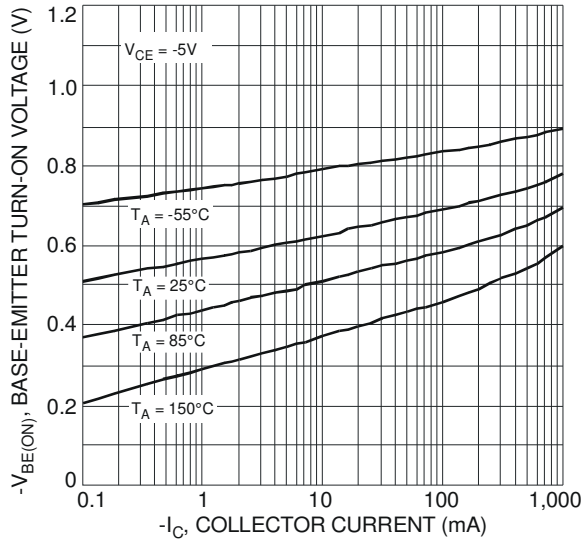


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

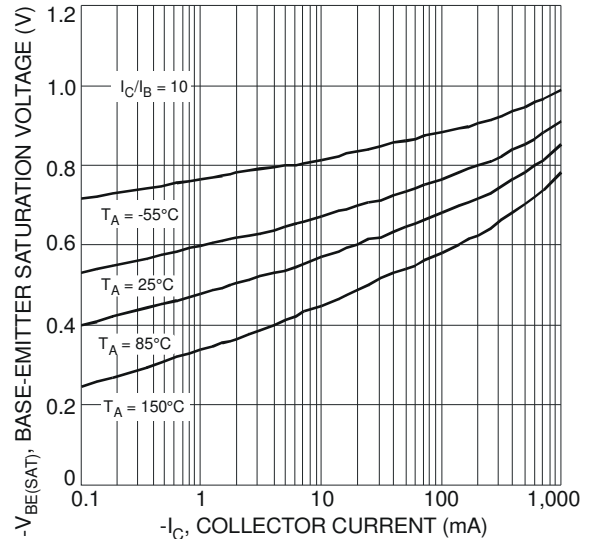


Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current

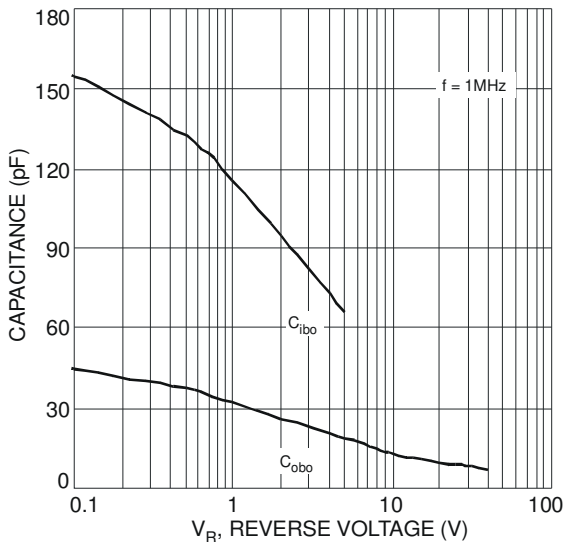
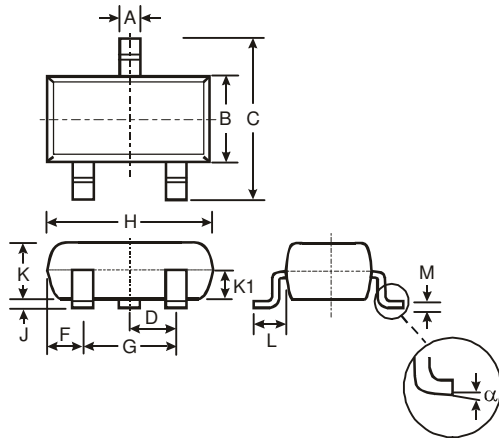


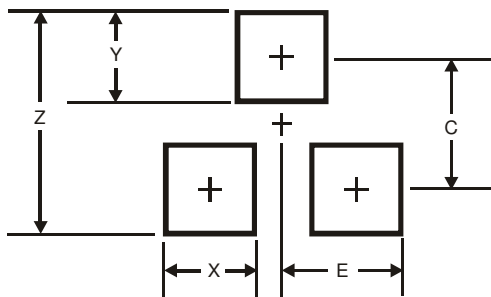
Fig. 9 Typical Capacitance Characteristics

**Package Outline Dimensions**



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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