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

Features

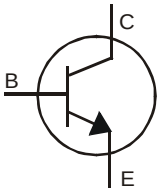
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- **"Lead Free", RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

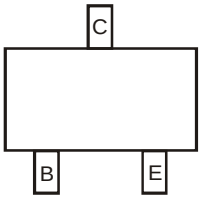
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

SOT23

Top View



Device Symbol



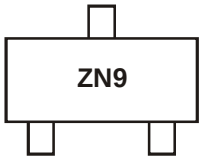
Pin-Out Top

Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DSS4160T-7	ZN9	7	8	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



ZN9 = Product Type Marking Code

Maximum Ratings @T_A = 25°C unless otherwise specified

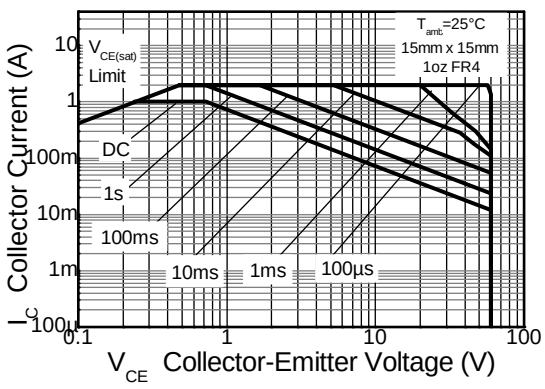
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	1	A
Peak Pulse Collector Current	I_{CM}	2	A
Base Current (DC)	I_B	300	mA
Peak Base Current	I_{BM}	1	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

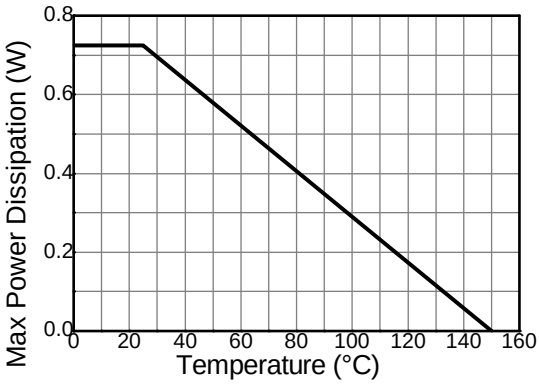
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	725	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	172	°C/W
Thermal Resistance, Junction to Ambient Air (Note 4)	$R_{\theta JA}$	79	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 4. Operated under pulsed conditions: pulse width ≤100ms, duty cycle ≤ 0.25.
5. Device mounted on 15mm x 15mm x1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

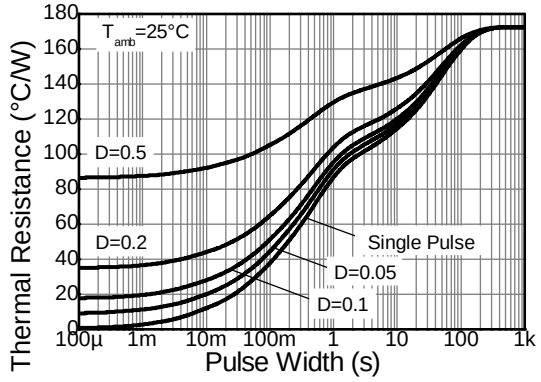
Thermal Characteristics



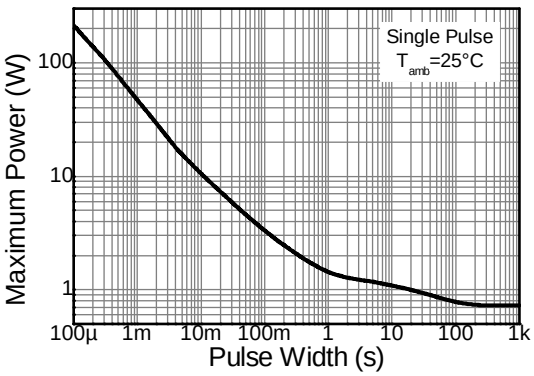
Safe operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 6)	BV_{CEO}	60	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	I_E = 100μA
Collector-Base Cutoff Current	I_{CBO}	—	—	100	nA	V_{CB} = 60V, I_E = 0
		—	—	50	μA	V_{CB} = 60V, I_E = 0, T_A = 150°C
Collector Cutoff Current	I_{CES}	—	—	100	nA	V_{EB} = 60V, I_{BE} = 0
Emitter-Base Cutoff Current	I_{EBO}	—	—	100	nA	V_{EB} = 5V, I_C = 0
DC Current Gain (Note 6)	h_{FE}	250	—	—	—	V_{CE} = 5V, I_C = 1mA
		200	—	—		V_{CE} = 5V, I_C = 500mA
		100	—	—		V_{CE} = 5V, I_C = 1A
Collector-Emitter Saturation Voltage (Note 6)	$V_{CE(sat)}$	—	—	115	mV	I_C = 100mA, I_B = 1mA
		—	—	150		I_C = 500mA, I_B = 50mA
		—	—	280		I_C = 1A, I_B = 100mA
Equivalent On-Resistance	$R_{CE(sat)}$	—	—	280	mΩ	I_E = 1A, I_B = 100mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	1.1	V	I_C = 1A, I_B = 50mA
Base-Emitter Turn-on Voltage	$V_{BE(on)}$	—	—	0.9	V	V_{CE} = 5V, I_C = 1A
Transition Frequency	f_T	150	—	—	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Output Capacitance	C_{obo}	—	—	10	pF	V_{CB} = 10V, f = 1MHz
Turn-On Time	t_{on}	—	63	—	ns	V_{CC} = 10V, I_C = 0.5A, I_{B1} = I_{B2} = 25mA
Delay Time	t_d	—	33	—	ns	
Rise Time	t_r	—	30	—	ns	
Turn-Off Time	t_{off}	—	420	—	ns	
Storage Time	t_s	—	380	—	ns	
Fall Time	t_f	—	40	—	ns	

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

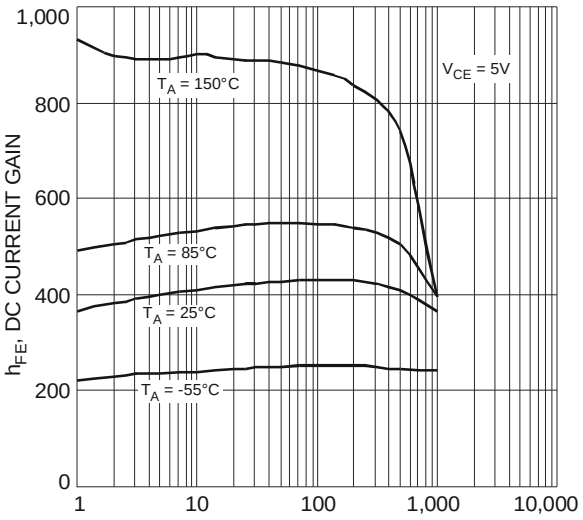


Fig. 5 Typical DC Current Gain vs. Collector Current

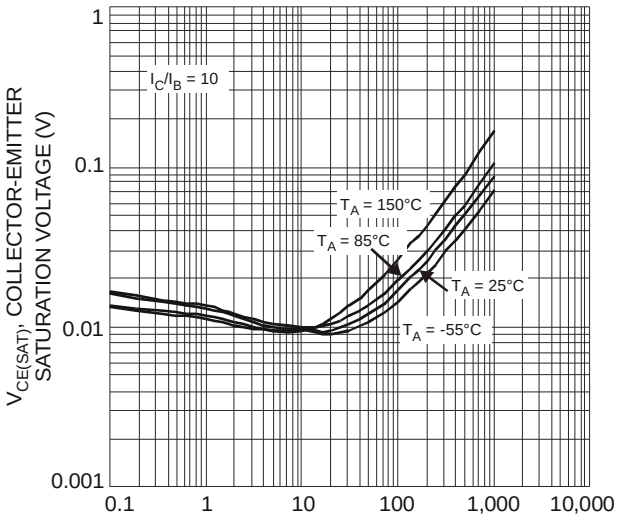


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

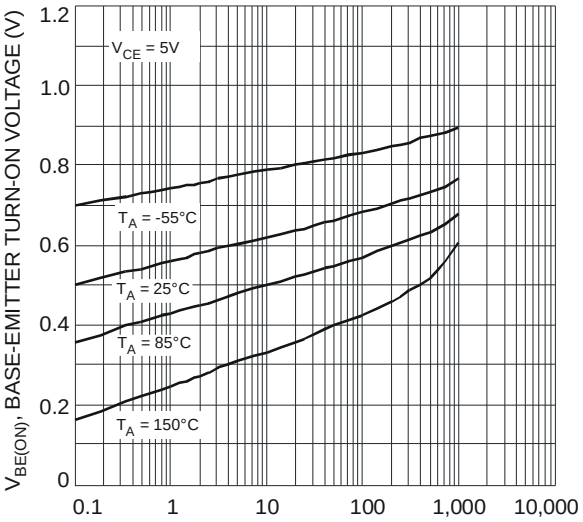


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

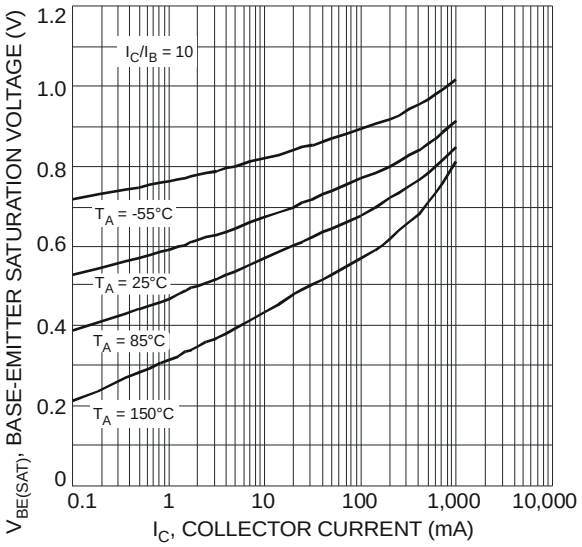


Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current

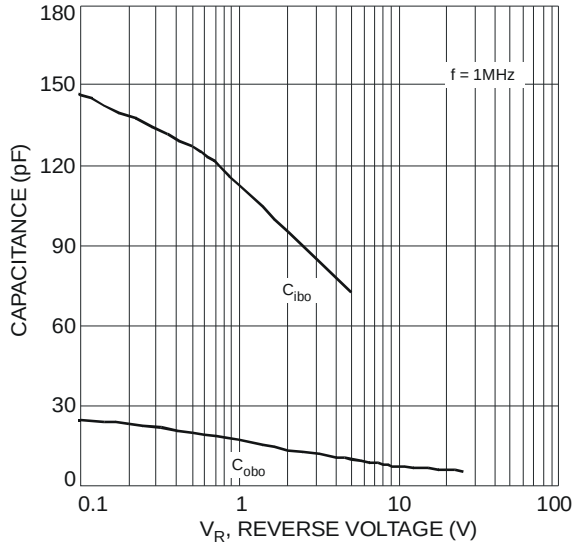
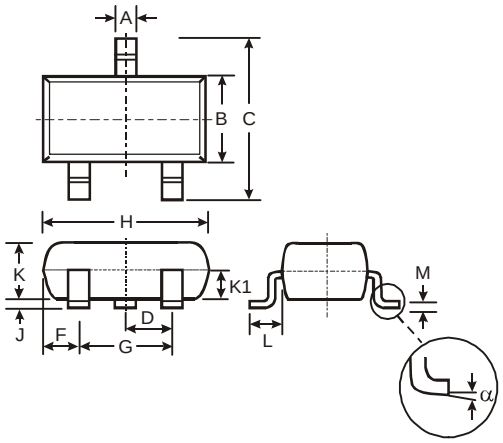


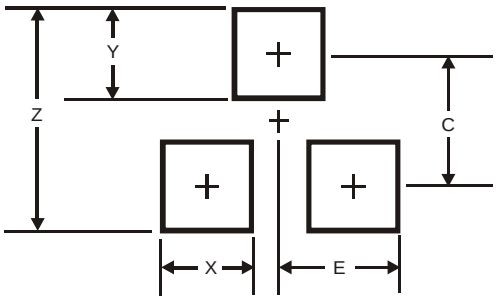
Fig. 9 Typical Capacitance Characteristics

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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