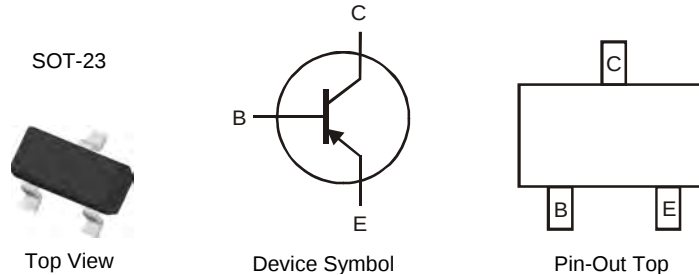


Features

- 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: SOT-23
- 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)

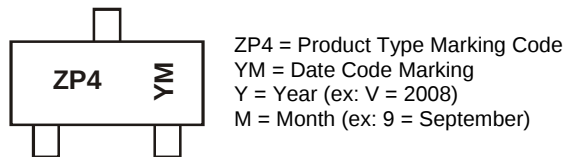


Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DSS5320T-7	ZP4	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



ZP4 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: V = 2008)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015	2016
Code	W	X	Y	Z	A	B	C	D

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

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-20	V
Collector-Emitter Voltage	V_{CEO}	-20	V
Emitter-Base Voltage	V_{EBO}	-5	V
Peak Pulse Current	I_{CM}	-5	A
Repetitive Peak Pulse Current (Note 4)	I_{CRP}	-3	A
Continuous Collector Current	I_C	-2	A
Base Current	I_B	-0.5	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) @ $T_A = 25^\circ\text{C}$	P_D	600	mW
Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	209	$^\circ\text{C/W}$
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 ≤ 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.

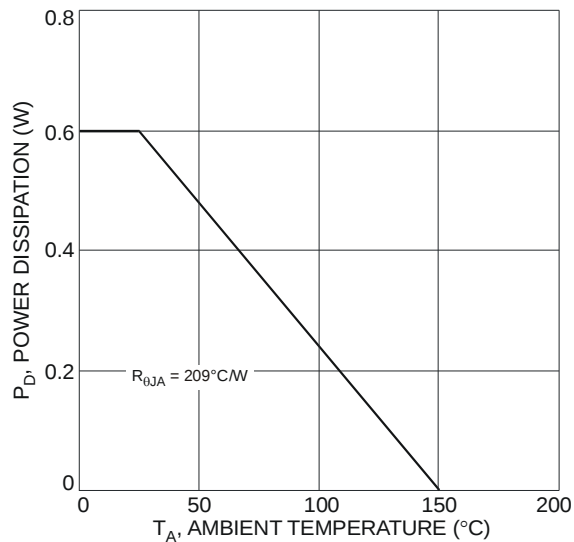


Fig. 1 Power Dissipation vs. Ambient Temperature

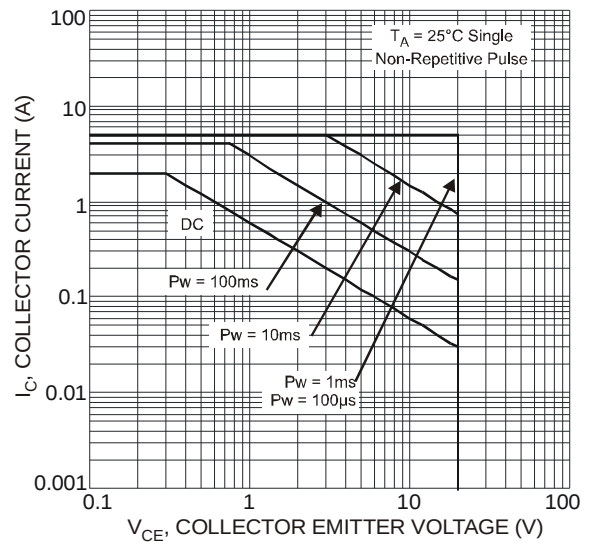


Fig. 2 Safe Operating Area

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Cutoff Current	I_{CBO}	—	—	-100	nA	$V_{CB} = -20V, I_E = 0$
		—	—	-50	μA	$V_{CB} = -20V, I_E = 0, T_A = 150^{\circ}C$
Emitter-Base Cutoff Current	I_{EBO}	—	—	-100	nA	$V_{EB} = -5V, I_C = 0$
Collector-Base Breakdown Voltage	BV_{CBO}	-20	—	—	V	$I_C = -100\mu A$
Collector-Emitter Breakdown Voltage (Note 6)	BV_{CEO}	-20	—	—	V	$I_C = -10mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	$I_E = -100\mu A$
DC Current Gain (Note 5)	h_{FE}	220	—	—	—	$V_{CE} = -2V, I_C = -0.1A$
		220	—	—		$V_{CE} = -2V, I_C = -0.5A$
		200	—	—		$V_{CE} = -2V, I_C = -1A$
		150	—	—		$V_{CE} = -2V, I_C = -2A$
		100	—	—		$V_{CE} = -2V, I_C = -3A$
Collector-Emitter Saturation Voltage (Note 6)	$V_{CE(sat)}$	—	—	-70	—	$I_C = -0.5A, I_B = -50mA$
		—	—	-130	—	$I_C = -1A, I_B = -50mA$
		—	—	-230	mV	$I_C = -2A, I_B = -100mA$
		—	—	-210		$I_C = -2A, I_B = -200mA$
		—	—	-300		$I_C = -3A, I_B = -300mA$
Equivalent On-Resistance	$R_{CE(sat)}$	—	—	105	m Ω	$I_E = -2A, I_B = -200mA$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	-1.1	V	$I_C = -2A, I_B = -100mA$
		—	—	-1.2	V	$I_C = -3A, I_B = -300mA$
Base-Emitter Turn-on Voltage	$V_{BE(on)}$	—	—	-1.2	V	$V_{CE} = -2V, I_C = -1A$
Transition Frequency	f_T	100	180	—	MHz	$V_{CE} = -5V, I_C = -100mA, f = 100MHz$
Output Capacitance	C_{ob}	—	25	50	pF	$V_{CB} = -10V, f = 1MHz$
Turn-On Time	t_{on}	—	67	—	ns	$V_{CC} = -10V, I_C = -1A, I_{B1} = -I_{B2} = -50mA$
Delay Time	t_d	—	23	—	ns	
Rise Time	t_r	—	44	—	ns	
Turn-Off Time	t_{off}	—	224	—	ns	
Storage Time	t_s	—	184	—	ns	
Fall Time	t_f	—	40	—	ns	

A graph showing the collector current I_C (in Amperes) on the y-axis versus the collector-emitter voltage V_{CE} (in Volts) on the x-axis. The y-axis ranges from 0 to 2.0 A with major grid lines every 0.2 A. The x-axis ranges from 0 to 5 V with major grid lines every 1 V. Five curves are plotted for different base currents I_B :

- $I_B = 5\text{ mA}$: The highest curve, starting at (0,0), rising steeply to about 1.3 A at $V_{CE} = 1\text{ V}$, and then gradually increasing to about 1.7 A at $V_{CE} = 5\text{ V}$.
- $I_B = 4\text{ mA}$: Starting at (0,0), rising to about 1.1 A at $V_{CE} = 1\text{ V}$, and then gradually increasing to about 1.45 A at $V_{CE} = 5\text{ V}$.
- $I_B = 3\text{ mA}$: Starting at (0,0), rising to about 0.9 A at $V_{CE} = 1\text{ V}$, and then gradually increasing to about 1.15 A at $V_{CE} = 5\text{ V}$.
- $I_B = 2\text{ mA}$: Starting at (0,0), rising to about 0.65 A at $V_{CE} = 1\text{ V}$, and then gradually increasing to about 0.85 A at $V_{CE} = 5\text{ V}$.
- $I_B = 1\text{ mA}$: The lowest curve, starting at (0,0), rising to about 0.35 A at $V_{CE} = 1\text{ V}$, and then gradually increasing to about 0.45 A at $V_{CE} = 5\text{ V}$.

The curves show that for a given V_{CE} , I_C is approximately equal to I_B in the active region, and that I_C increases with V_{CE} for a fixed I_B .

A semi-logarithmic plot showing the DC current gain h_{FE} on the y-axis (linear scale from 0 to 1,000) versus the collector current I_C on the x-axis (logarithmic scale from 0.001 to 10 A). The graph is for a common-emitter configuration with $V_{CE} = -2V$. Five curves are shown for different ambient temperatures T_A :

- $T_A = 150^\circ C$: Highest gain curve, starting at $h_{FE} \approx 900$ at $I_C = 0.001 A$.
- $T_A = 125^\circ C$: Starting at $h_{FE} \approx 800$ at $I_C = 0.001 A$.
- $T_A = 85^\circ C$: Starting at $h_{FE} \approx 700$ at $I_C = 0.001 A$.
- $T_A = 25^\circ C$: Starting at $h_{FE} \approx 500$ at $I_C = 0.001 A$.
- $T_A = -55^\circ C$: Lowest gain curve, starting at $h_{FE} \approx 250$ at $I_C = 0.001 A$.

All curves show a peak in gain at low I_C (around 0.01 A) followed by a decline at higher currents. The gain decreases significantly as temperature increases.

Fig. 4 Typical DC Current Gain vs. Collector Current

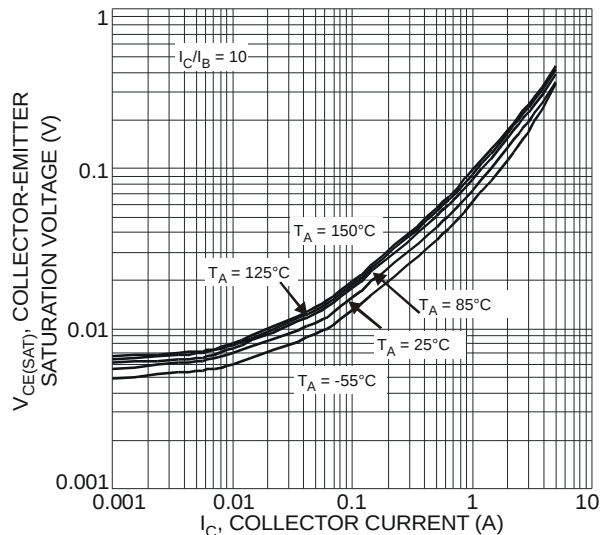


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

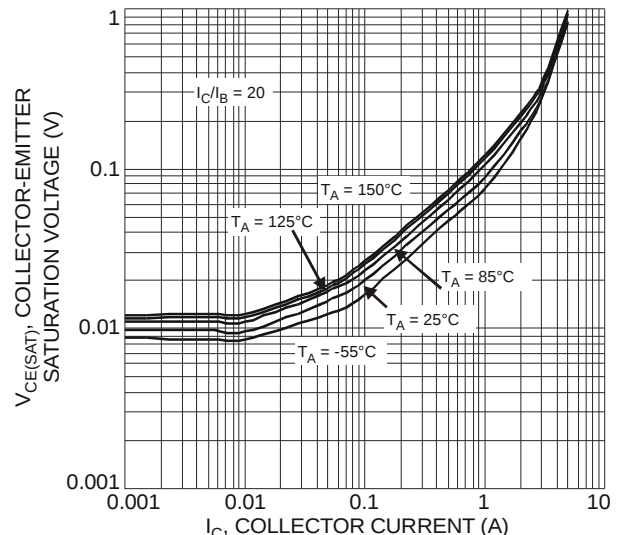


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

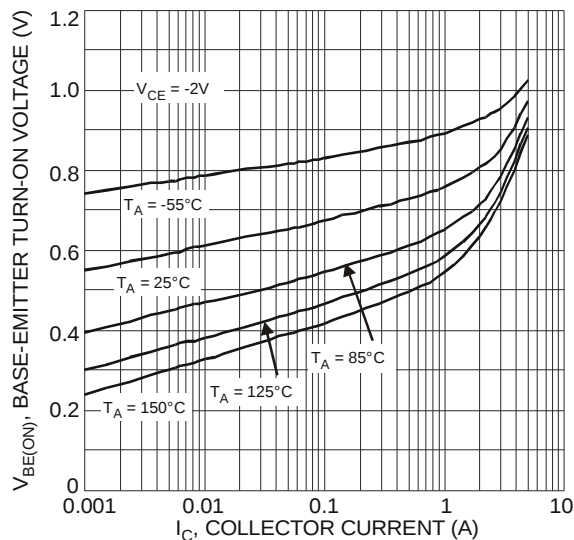


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

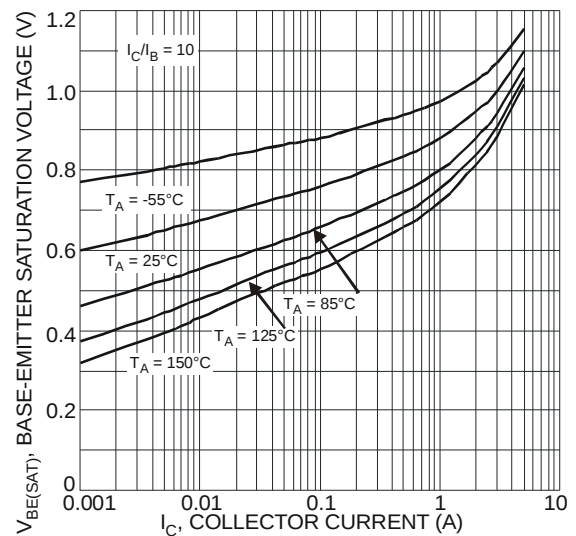
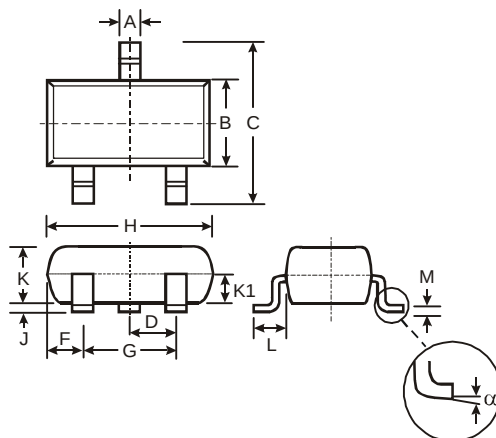


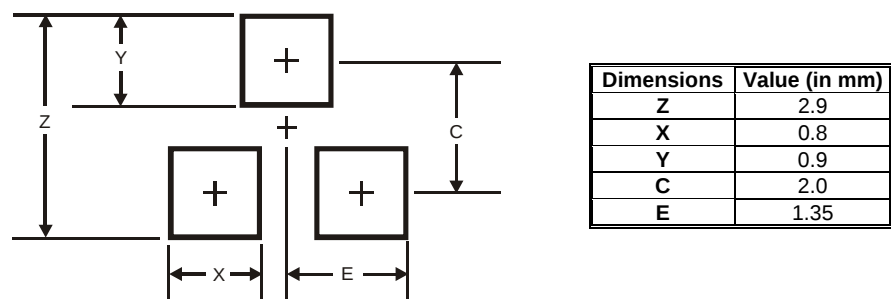
Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions



SOT-23			
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



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