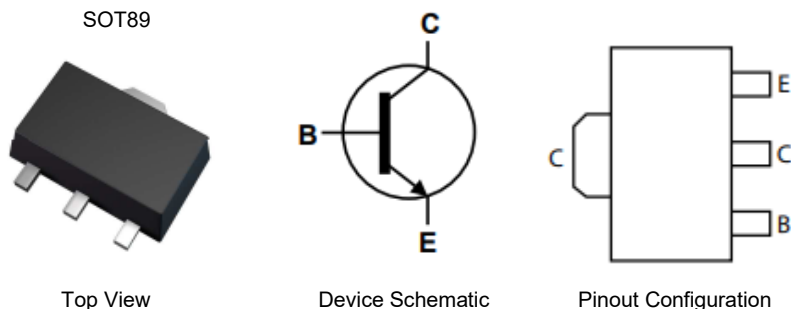


Features

- $BV_{CEO} > 40V$
- $I_C = 4A$ High Continuous Collector Current
- $I_{CM} = 10A$ Peak Pulse Current
- Low Saturation Voltage 120mV max @ $I_C = 1A$
- $R_{CE(sat)} = 37m\Omega$ at 5A for a Low Equivalent On-Resistance
- 900mW Power Dissipation
- 2W Power Rating
- Complementary PNP Type Available ([DSS5540X](#))
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Package: SOT89
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 [\(E3\)](#)
- Weight: 0.052 grams (Approximate)



Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DSS4540X-13	SOT89	ZNS54	13	12	2,500	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



ZNS54 = Product Type Marking Code
 YWW = Manufacturer's Code Marking
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 6 = 2026)
 WW = Week Code 01 to 52

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	6	V
Continuous Collector Current	I _C	4	A
Repetitive Collector Current (Note 5)	I _{CRM}	5	A
Peak Pulse Collector Current	I _{CM}	10	A
Continuous Base Current	I _B	1	A
Peak Pulse Base Current	I _{BM}	2	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7) @ T _A = +25°C	P _D	0.9	W
Thermal Resistance, Junction to Ambient Air (Note 7) @ T _A = +25°C	R _{θJA}	139	°C/W
Power Dissipation (Note 6) @ T _A = +25°C	P _D	2	W
Thermal Resistance, Junction to Ambient Air (Note 6) @ T _A = +25°C	R _{θJA}	62.5	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

- Notes:
5. Operated under pulsed conditions: pulse width ≤ 10ms; duty cycle ≤ 0.2.
 6. For a device mounted with the collector lead on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady state.
 7. Same as Note 6, except the device is mounted on minimum recommended pad layout.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	40	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV _{CEO}	40	—	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	6	—	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	—	100	nA	V _{CB} = 30V, I _E = 0
		—	—	50	μA	V _{CB} = 30V, I _E = 0, T _A = +150°C
Collector-Emitter Cutoff Current	I _{CES}	—	—	100	nA	V _{CE} = 30V, V _{BE} = 0
Emitter-Base Cutoff Current	I _{EBO}	—	—	100	nA	V _{EB} = 5V, I _C = 0
ON CHARACTERISTICS (Note 8)						
DC Current Gain	h _{FE}	300	—	—	—	V _{CE} = 2V, I _C = 0.5A
		300	—	—		V _{CE} = 2V, I _C = 1A
		250	—	—		V _{CE} = 2V, I _C = 2A
		100	—	—		V _{CE} = 2V, I _C = 5A
Collector-Emitter Saturation Voltage	V _{CE(sat)}	—	—	90	mV	I _C = 0.5A, I _B = 5mA
		—	—	120		I _C = 1A, I _B = 10mA
		—	80	150		I _C = 2A, I _B = 200mA
		—	160	290		I _C = 4A, I _B = 200mA
		—	185	355		I _C = 5A, I _B = 500mA
Equivalent On-Resistance	R _{CE(sat)}	—	37	71	mΩ	I _C = 5A, I _B = 500mA
Base-Emitter Saturation Voltage	V _{BE(sat)}	—	—	1.1	V	I _C = 4A, I _B = 200mA
		—	—	1.2		I _C = 5A, I _B = 500mA
Base-Emitter Turn-On Voltage	V _{BE(on)}	—	—	1.1	V	V _{CE} = 2V, I _C = 2A
SMALL-SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	70	—	—	MHz	V _{CE} = 10V, I _C = 0.1A, f = 100MHz
Collector Capacitance	C _c	—	—	75	pF	V _{CB} = 10V, I _E = 0, f = 1MHz
SWITCHING CHARACTERISTICS						
Turn-On Time	t _{on}	—	135	—	ns	V _{CC} = 10V, I _C = 2A, I _{B1} = 40mA
Delay Time	t _d	—	60	—	ns	
Rise Time	t _r	—	75	—	ns	
Turn-Off Time	t _{off}	—	670	—	ns	V _{CC} = 10V, I _C = 2A, I _{B1} = -I _{B2} = 40mA
Storage Time	t _s	—	570	—	ns	
Fall Time	t _f	—	100	—	ns	

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

Thermal Characteristics and Derating Information (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

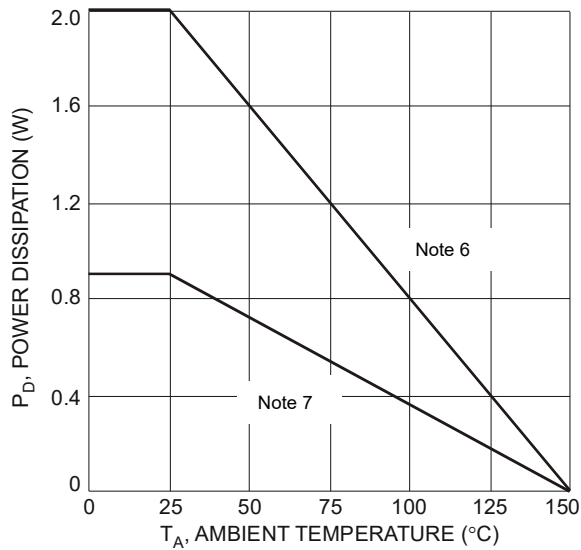


Fig. 1 Power Dissipation vs. Ambient Temperature

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

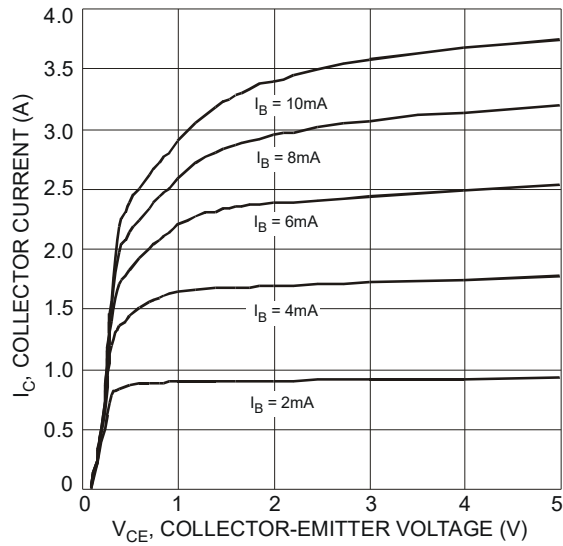


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

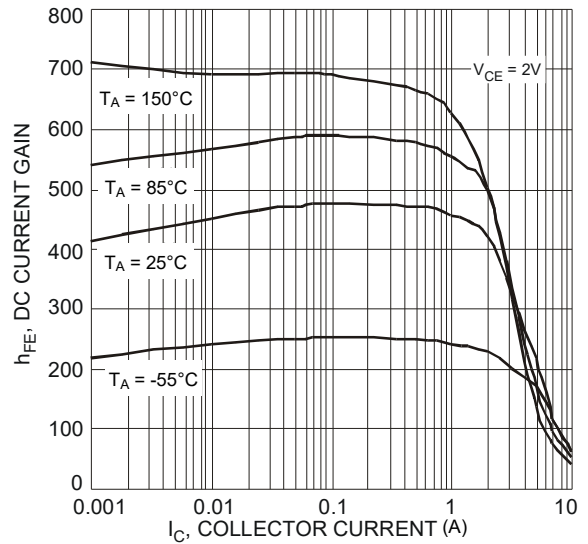


Fig. 3 Typical DC Current Gain vs. Collector Current

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

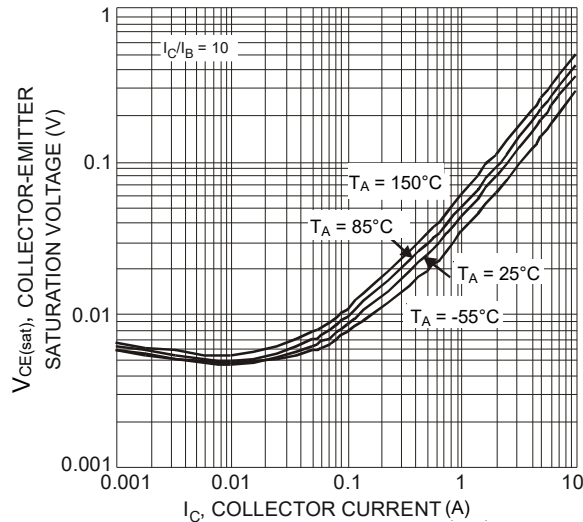


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

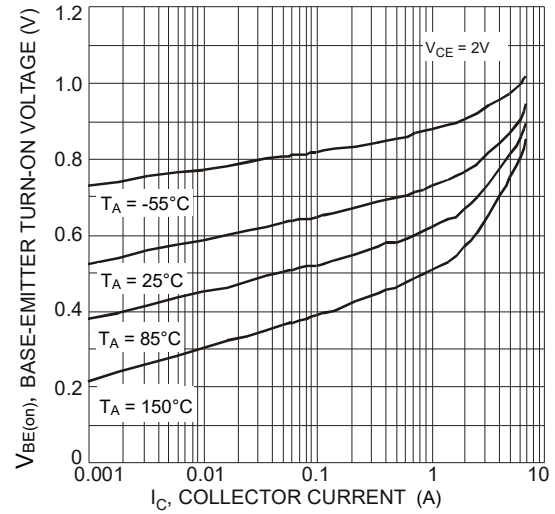


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

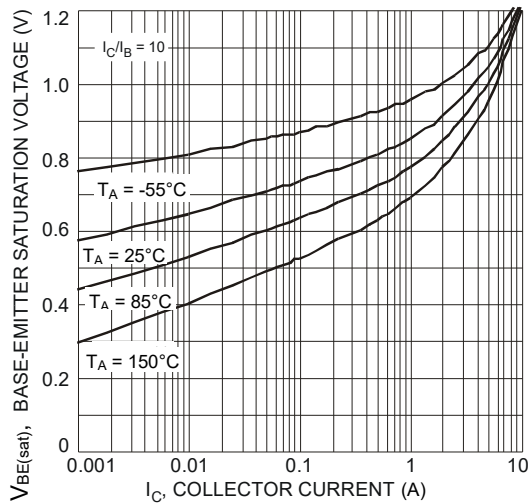


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

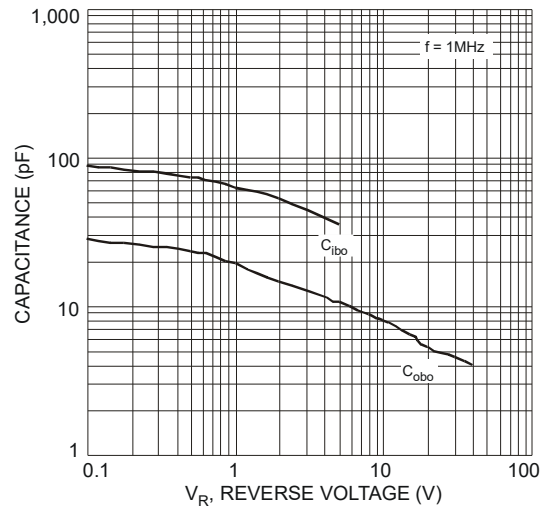


Fig. 7 Typical Capacitance Characteristics

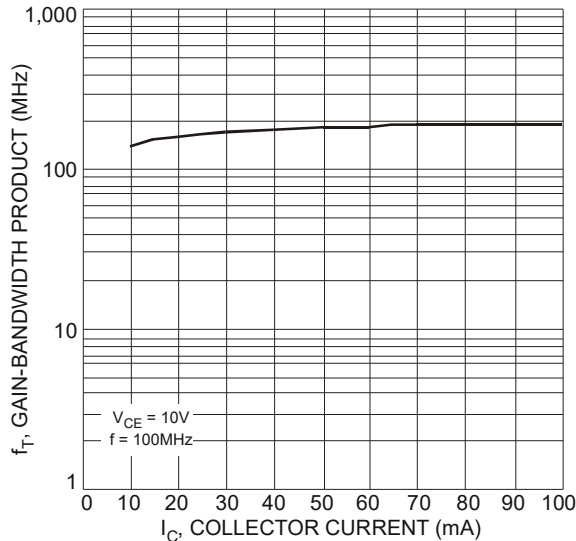
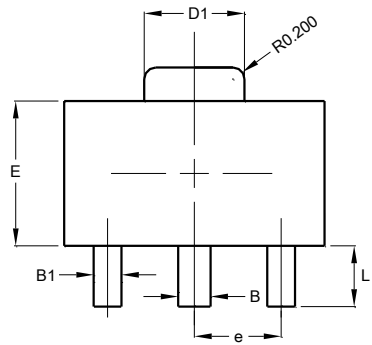


Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

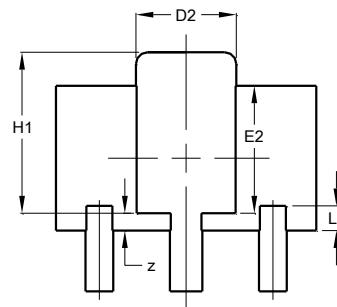
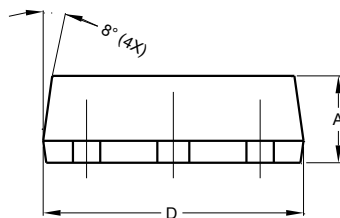
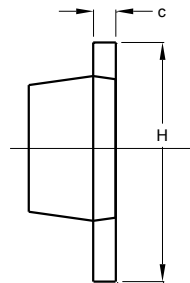
Package Outline Dimensions

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

SOT89



TOP VIEW



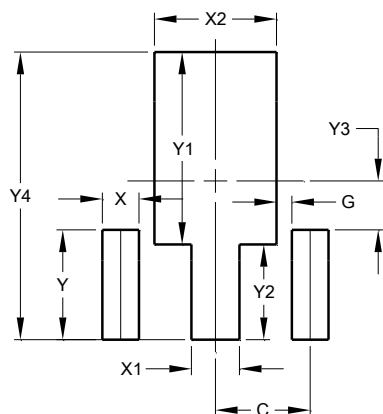
BOTTOM VIEW

SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

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

SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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