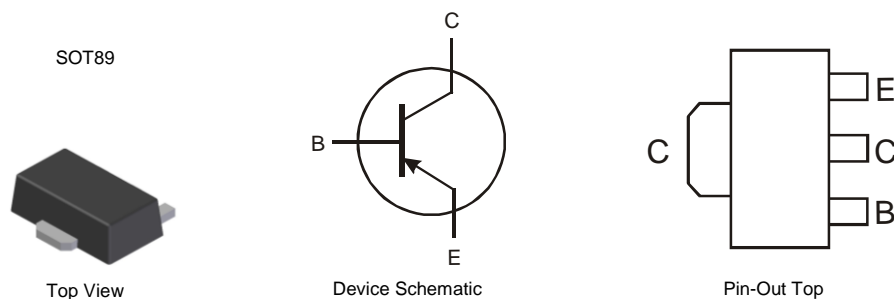


Features

- $BV_{CEO} > -40V$
- $I_C = -4A$ Continuous Collector Current
- Ultra-Low Collector-Emitter Saturation Voltage
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **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-Q101, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) 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 Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Plates Leads. Solderable per MIL-STD-202, Method 208 Ⓔ③
- Weight: 0.055 grams (Approximate)



Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DSS5540X-13	ZPS54	13	12mm	2500
DSS5540XTC	ZPS54	13	12mm	4000

- 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 <100ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



- ZPS54 = Product Type Marking Code
- J|| = Manufacturer's Code Marking
- YWW = Date Code Marking
- Y = Last digit of year (ex: 2 = 2022)
- WW = Week code (01 – 53)

Absolute Maximum Ratings @ $T_A = 25^\circ\text{C}$ 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
Peak Pulse Collector Current	I_{CM}	-10	A
Repetitive Peak Pulse Collector Current (Note 5)	I_{CRP}	-5	A
Continuous Collector Current	I_C	-4	A
Peak Pulse Base Current	I_{BM}	-2	A
Continuous Base Current	I_B	-1	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6) @ $T_A = 25^\circ\text{C}$	P_D	0.9	W
Thermal Resistance, Junction to Ambient Air (Note 6) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	139	$^\circ\text{C/W}$
Power Dissipation (Note 7) @ $T_A = 25^\circ\text{C}$	P_D	2	W
Thermal Resistance, Junction to Ambient Air (Note 7) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 6) @ $T_A = 25^\circ\text{C}$	$R_{\theta JC}$	17	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
5. Pulse width $\leq 10\text{ms}$; Duty cycle ≤ 0.2
 6. For a device mounted on FR-4 PCB with minimum recommended pad layout.
 7. For a device mounted on FR-4 PCB with 1inch^2 copper pad layout.

Thermal Characteristics and Derating Information

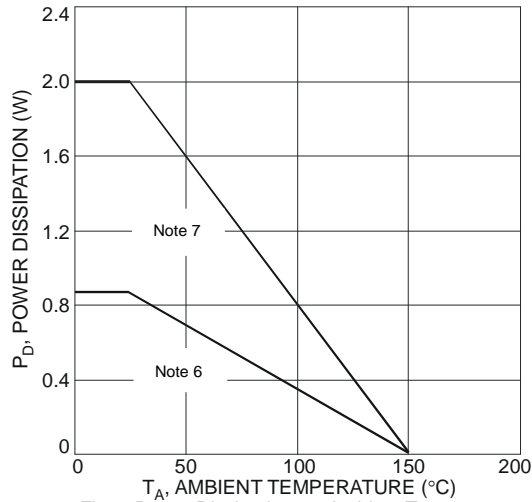


Fig. 1 Power Dissipation vs. Ambient Temperature

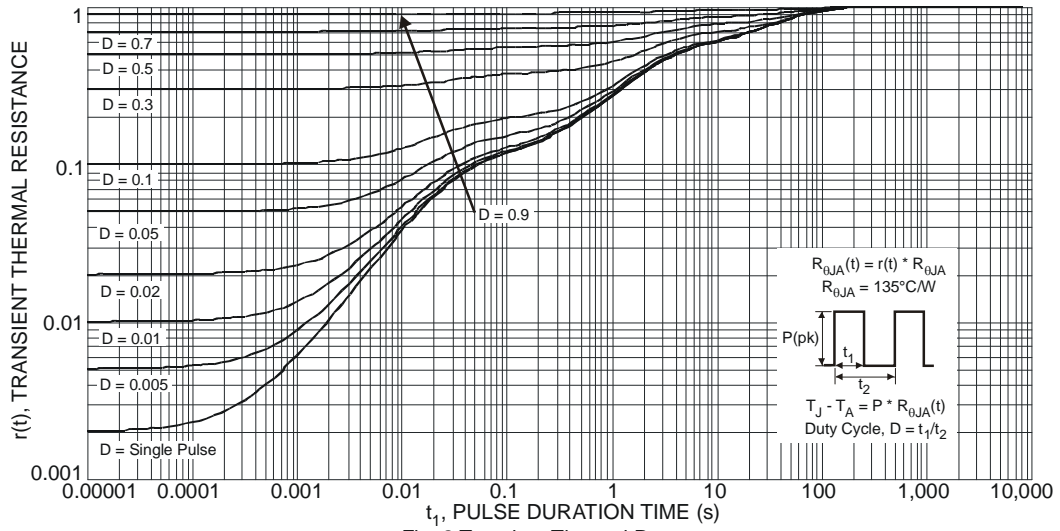


Fig. 2 Transient Thermal Response

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV _{CB0}	-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 _{CB0}	—	—	-100	nA	V _{CB} = -30V, I _E = 0
		—	—	-50	μA	V _{CB} = -30V, I _E = 0, T _A = 150°C
Emitter-Base Cutoff Current	I _{EBO}	—	—	-100	nA	V _{EB} = -5V, I _C = 0
DC Current Gain (Note 8)	h _{FE}	250	—	—	—	V _{CE} = -2V, I _C = -0.5A
		200	350	—		V _{CE} = -2V, I _C = -1A
		150	—	—		V _{CE} = -2V, I _C = -2A
		50	—	—		V _{CE} = -2V, I _C = -5A
Collector-Emitter Saturation Voltage (Note 8)	V _{CE(sat)}	—	—	-120	mV	I _C = -0.5A, I _B = -5mA
		—	—	-170		I _C = -1A, I _B = -10mA
		—	-70	-160		I _C = -2A, I _B = -200mA
		—	-165	-340		I _C = -4A, I _B = -200mA
		—	-150	-375		I _C = -5A, I _B = -500mA
Equivalent On-Resistance	R _{CE(sat)}	—	-30	-75	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)}	—	—	-1.0	V	V _{CE} = -2V, I _C = -2A
Transition Frequency	f _T	60	—	—	MHz	V _{CE} = -10V, I _C = -0.1A, f = 100MHz
Collector Capacitance	C _C	—	—	105	pF	V _{CB} = -10V, I _E = 0A, f = 1MHz
Turn-On Time	t _{on}	—	63	—	ns	V _{CC} = -10V, I _C = -2A, I _{B1} = -I _{B2} = -200mA
Delay Time	t _d	—	15	—	ns	
Rise Time	t _r	—	48	—	ns	
Turn-Off Time	t _{off}	—	280	—	ns	
Storage Time	t _s	—	232	—	ns	
Fall Time	t _f	—	48	—	ns	

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

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

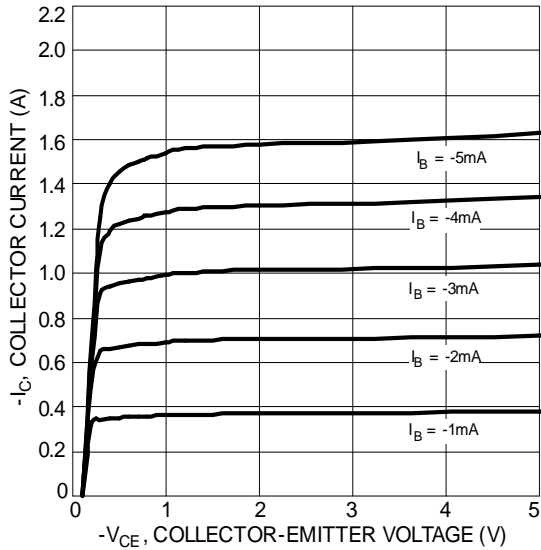


Fig. 3 Typical Collector Current vs. Collector-Emitter Voltage

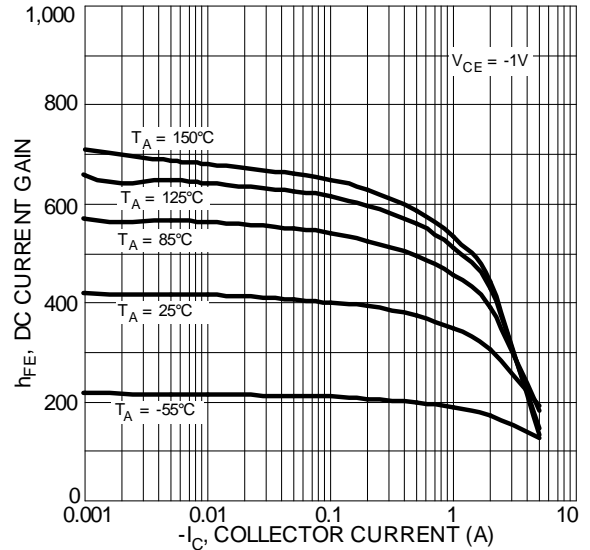


Fig. 4 Typical DC Current Gain vs. Collector Current

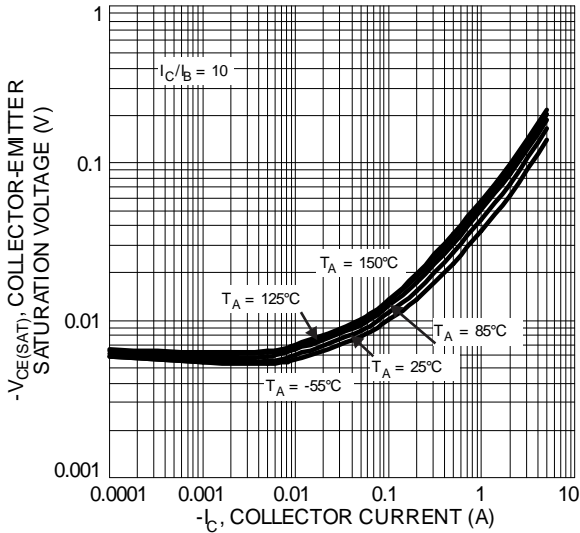


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

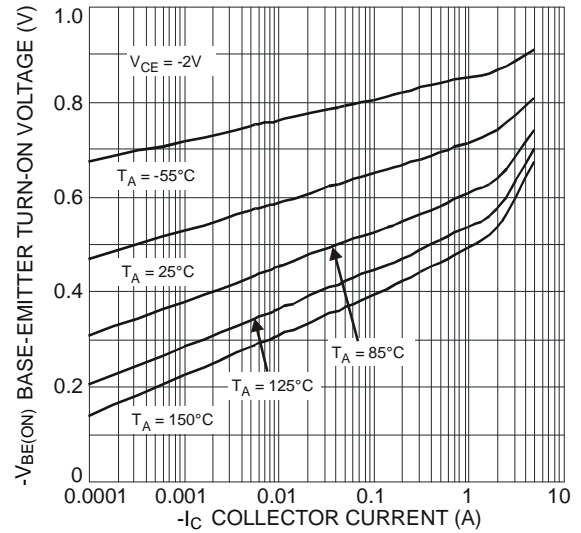


Fig. 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

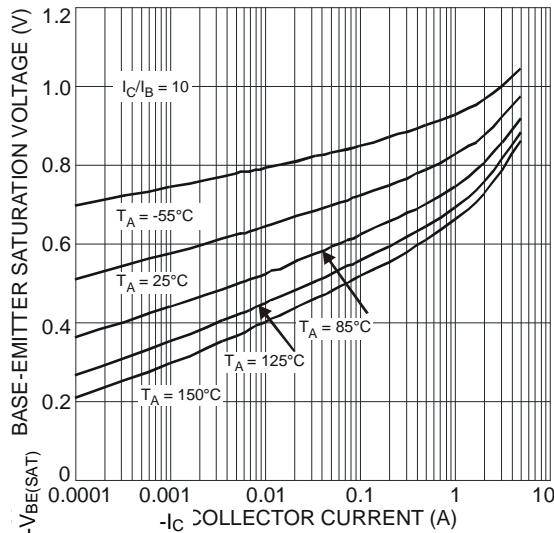


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

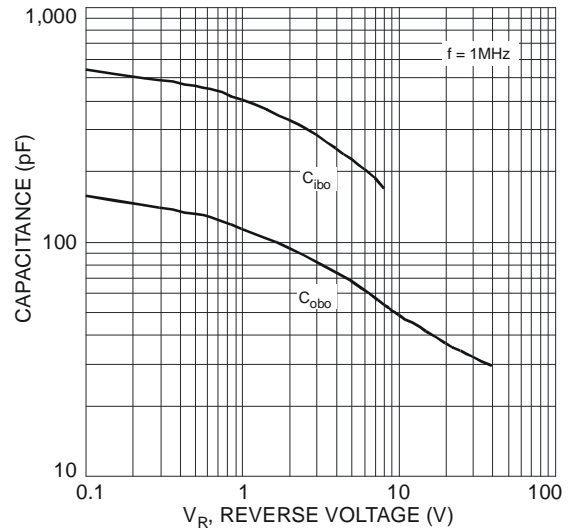
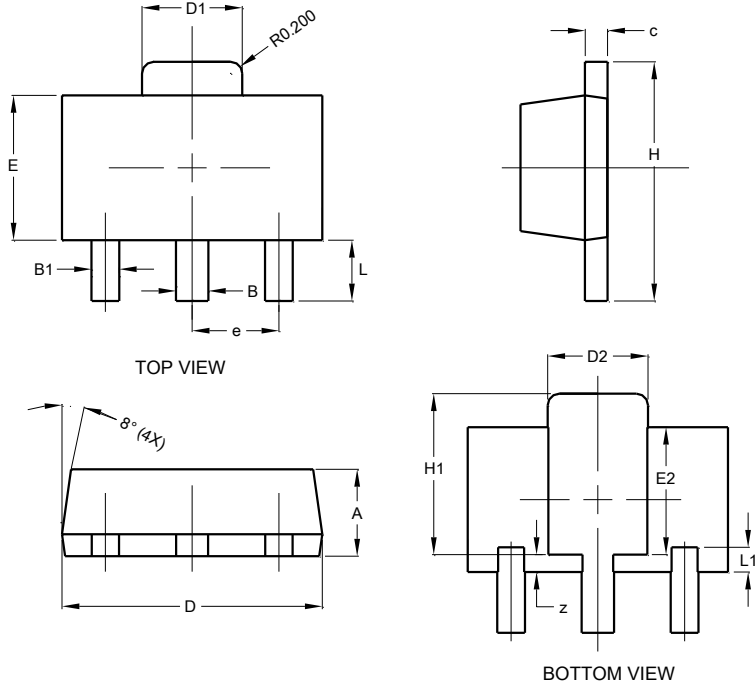


Fig. 8 Typical Capacitance Characteristics

Package Outline Dimensions

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

SOT89

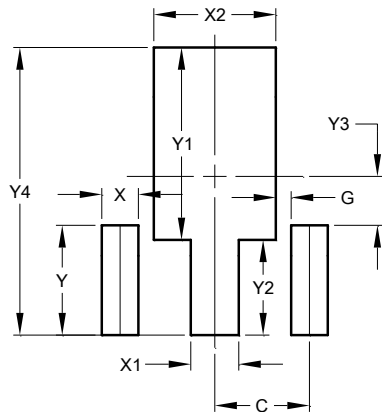


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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