40V LOW $V_{CE(sat)}$ PNP SURFACE MOUNT TRANSISTOR

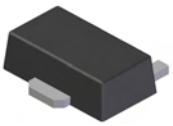
Features

- Ultra Low Collector-Emitter Saturation Voltage
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **"Lead Free", RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**

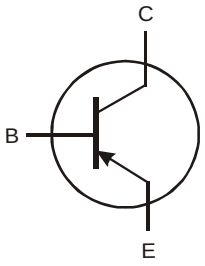
Mechanical Data

- Case: SOT89
- 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 (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Weight: 0.055 grams (approximate)

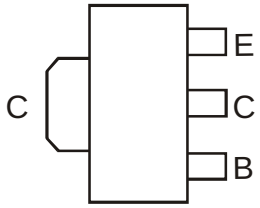
SOT89



Top View



Device Schematic



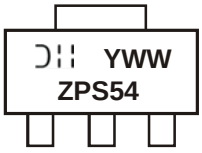
Pin-Out Top

Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DSS5540X-13	ZPS54	13	12mm	2,500

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, please go to our website at http://www.diodes.com

Marking Information



ZPS54 = Product Type Marking Code
= Manufacturer's Code Marking
YWW = Date Code Marking
Y = Last digit of year (ex: 8 = 2008)
WW = Week code (01 – 53)

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
Peak Pulse Collector Current	I_{CM}	-10	A
Repetitive Peak Pulse Collector Current (Note 4)	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 5) @ T_A = 25°C	P_D	0.9	W
Thermal Resistance, Junction to Ambient Air (Note 5) @ T_A = 25°C	$R_{\theta JA}$	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	$R_{\theta JA}$	62.5	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 4. Pulse width ≤ 10ms; Duty cycle ≤ 0.2
5. Device mounted on FR-4 PCB with minimum recommended pad layout.
6. Device mounted on FR-4 PCB with 1inch^2 copper pad layout.

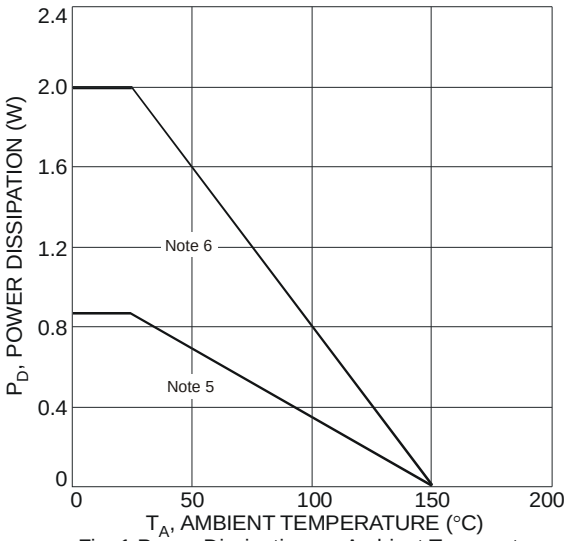


Fig. 1 Power Dissipation vs. Ambient Temperature

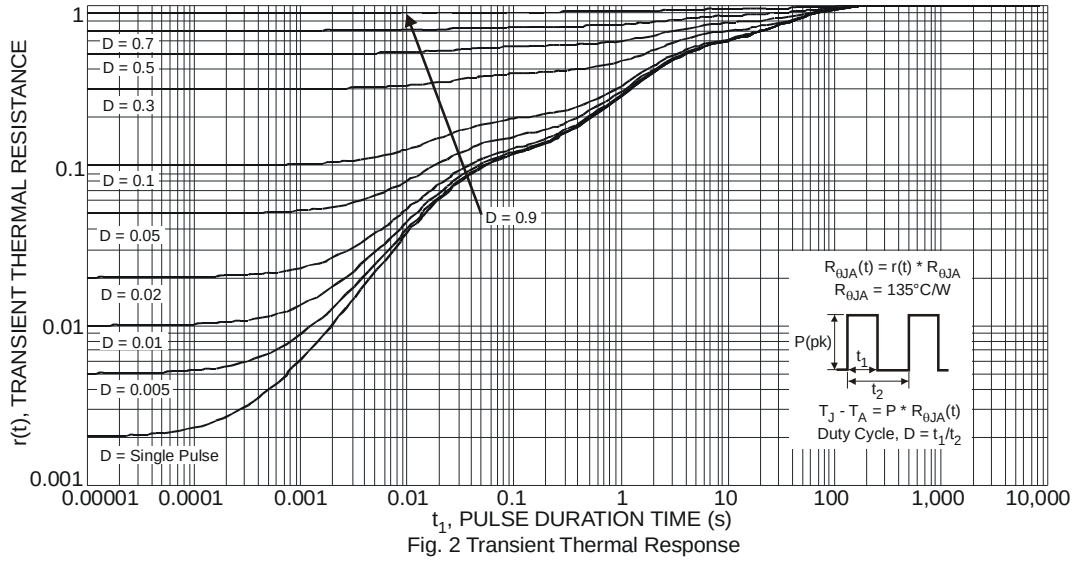


Fig. 2 Transient Thermal Response

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV_{CBO}	-40	—	—	V	I_C = -100μA
Collector-Emitter Breakdown Voltage (Note 7)	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
Emitter-Base Cutoff Current	I_{EBO}	—	—	-100	nA	V_{EB} = -5V, I_C = 0
DC Current Gain (Note 6)	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 7)	$V_{CE(sat)}$	—	—	-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: 7. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

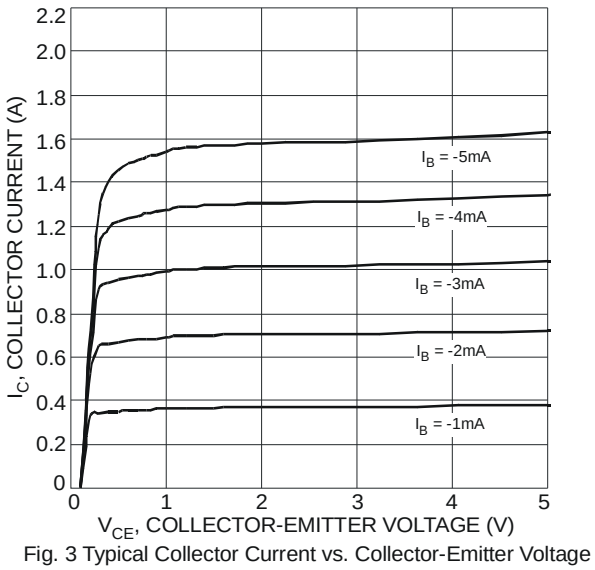


Fig. 3 Typical Collector Current vs. Collector-Emitter Voltage

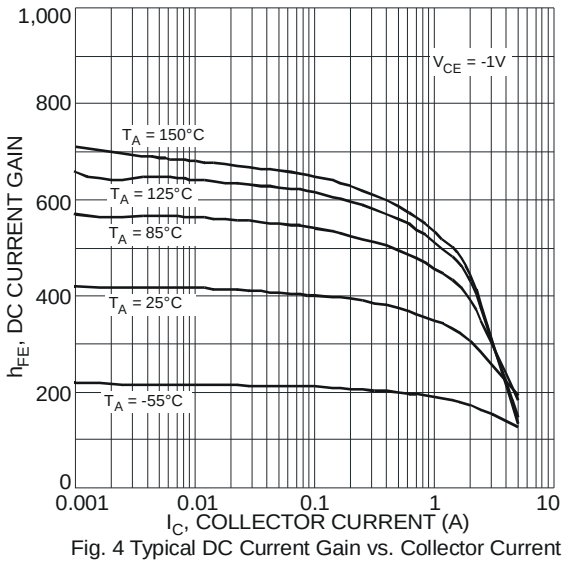


Fig. 4 Typical DC Current Gain vs. Collector Current

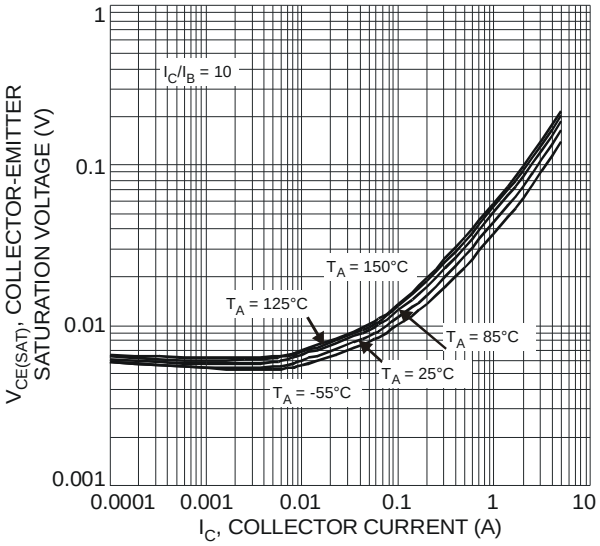


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

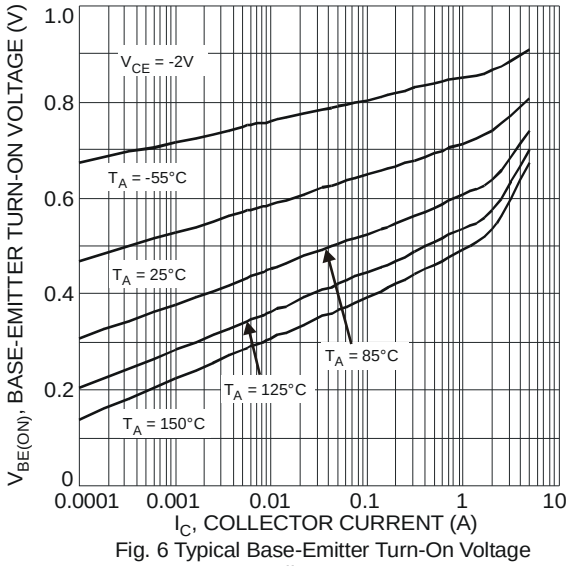


Fig. 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

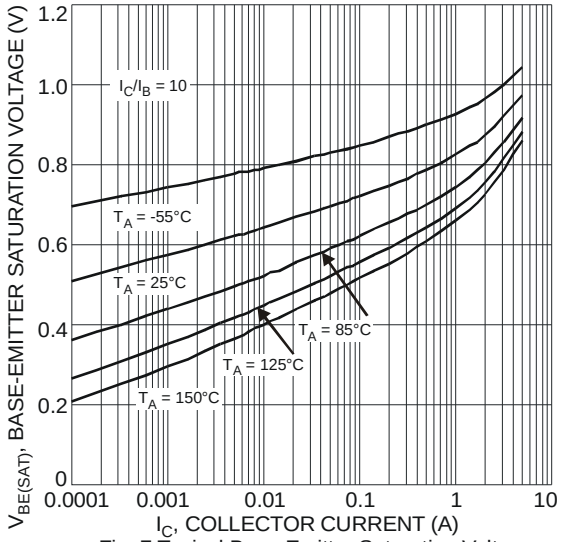


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

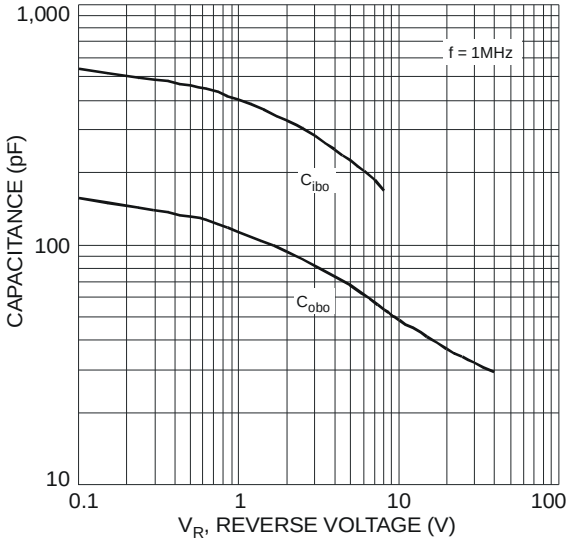
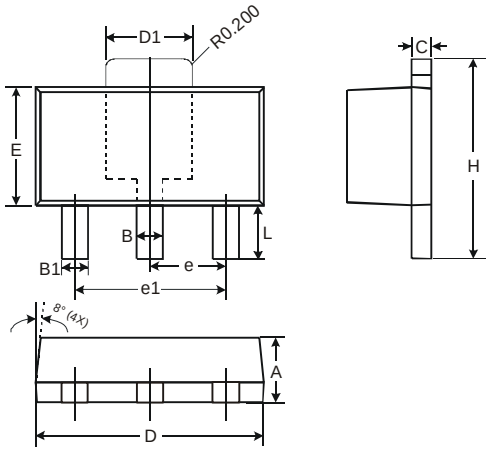


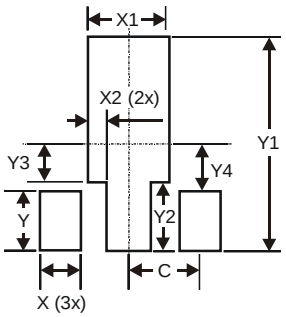
Fig. 8 Typical Capacitance Characteristics

Package Outline Dimensions



SOT89		
Dim	**Min**	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.43
D	4.40	4.60
D1	1.52	1.83
E	2.29	2.60
e	1.50 Typ	
e1	3.00 Typ	
H	3.94	4.25
L	0.89	1.20
All Dimensions in mm		

Suggested Pad Layout



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500