

LOW $V_{CE(SAT)}$ PNP SURFACE MOUNT TRANSISTOR

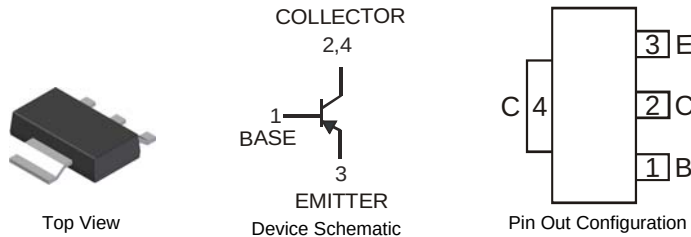
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Features

- Ideally Suited for Automated Assembly Processes
- Low Collector-Emitter Saturation Voltage
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

Mechanical Data

- Case: SOT-223
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe
(Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.115 grams (approximate)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-45	V
Collector-Emitter Voltage	V_{CEO}	-30	V
Emitter-Base Voltage	V_{EBO}	-6	V
Peak Pulse Current	I_{CM}	-5	A
Continuous Collector Current	I_C	-3	A
Continuous Base Current	I_B	-1	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$	P_D	1.2	W
Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	104	$^\circ\text{C/W}$
Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$	P_D	2	W
Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Power Dissipation @ $T_C = 25^\circ\text{C}$	P_D	3	W
Thermal Resistance, Junction to Case @ $T_C = 25^\circ\text{C}$	$R_{\theta JA}$	42	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Device mounted on FR-4 PCB with minimum recommended pad layout.
 4. Device mounted on FR-4 PCB with 1 inch² copper pad layout.

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (Note 5)	V _{(BR)CEO}	-30	—	—	V	I _C = -10mA
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	-6	—	—	V	I _E = -50μA
Collector-Base Cutoff Current	I _{CER}	—	—	-20	μA	V _{CB} = -25V, R _{BE} = 200Ω
		—	—	-200	μA	V _{CB} = -25V, R _{BE} = 200Ω, T _A = 125°C
Emitter-Base Cutoff Current	I _{EBO}	—	—	-10	μA	V _{EB} = -5V, I _C = 0
ON CHARACTERISTICS (Note 5)						
DC Current Gain	h _{FE}	125	—	—	—	V _{CE} = -1V, I _C = -0.8A
		110	—	—		V _{CE} = -1V, I _C = -1.2A
		90	—	—		V _{CE} = -1V, I _C = -3A
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	-100	-210	mV	I _C = -0.8A, I _B = -20mA
		—	—	-275		I _C = -1.2A, I _B = -20mA
		—	-250	-550		I _C = -3A, I _B = -300mA
Equivalent On-Resistance	R _{CE(SAT)}	—	83	183	mΩ	I _C = -3.0A, I _B = -300mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	—	-1.25	V	I _C = -3A, I _B = -300mA
Base-Emitter Turn-on Voltage	V _{BE(ON)}	—	—	-1.1	V	V _{CE} = -4V, I _C = -1.2A
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	—	160	—	MHz	V _{CE} = -10V, I _C = -100mA, f = 100MHz
Output Capacitance	C _{obo}	—	45	150	pF	V _{CB} = -10V, f = 1MHz
Input Capacitance	C _{ibo}	—	140	—	pF	V _{EB} = -8V, f = 1MHz
SWITCHING CHARACTERISTICS						
Turn-On Time	t _{on}	—	200	—	ns	V _{CC} = -15V, I _C = -1.2A, I _{B1} = -20mA
Delay Time	t _d	—	90	—	ns	
Rise Time	t _r	—	110	—	ns	
Turn-Off Time	t _{off}	—	155	—	ns	V _{CC} = -15V, I _C = -1.2A, I _{B1} = I _{B2} = -20mA
Storage Time	t _s	—	100	—	ns	
Fall Time	t _f	—	55	—	ns	

Notes: 5. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

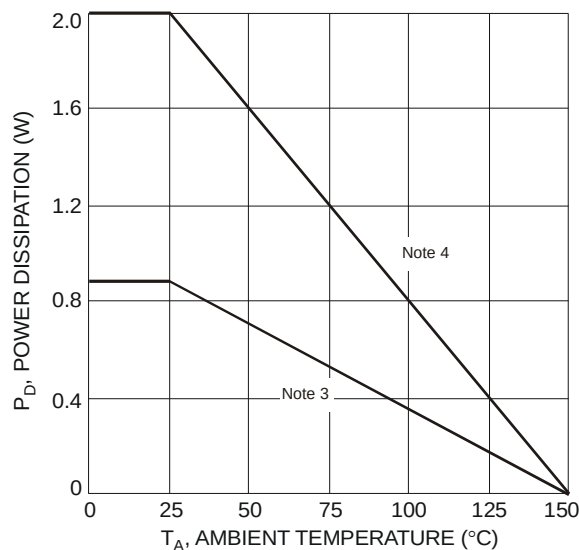


Fig. 1 Power Dissipation vs. Ambient Temperature

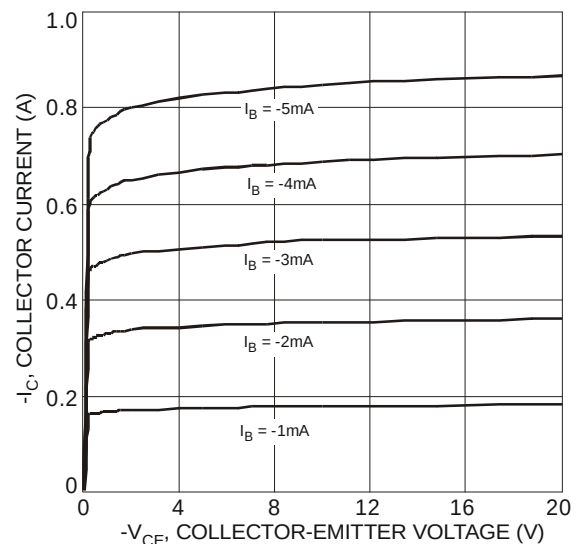


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

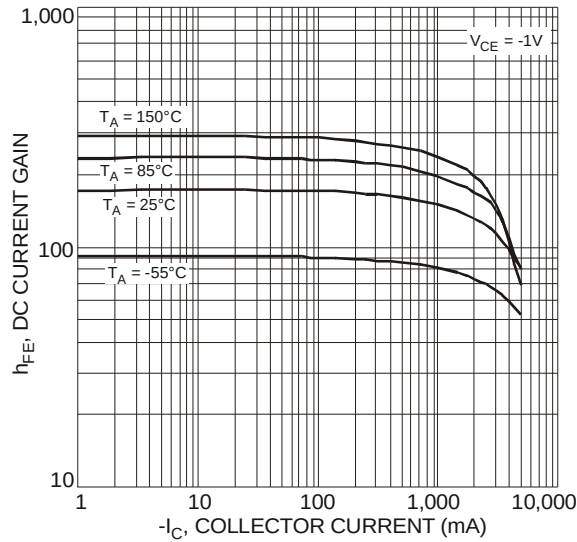


Fig. 3 Typical DC Current Gain vs. Collector Current

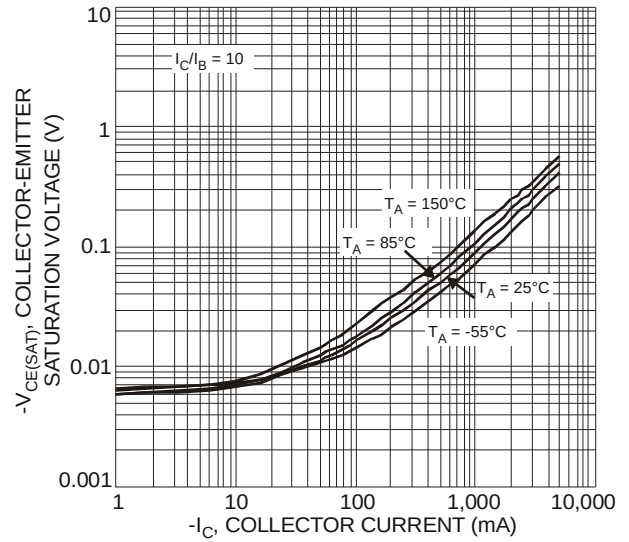


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

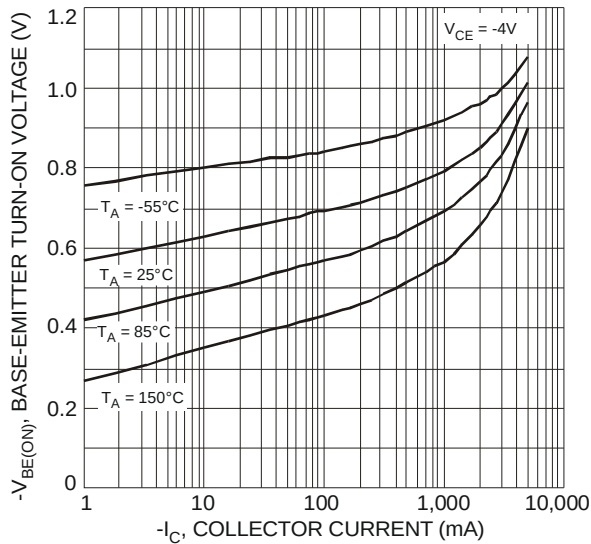


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

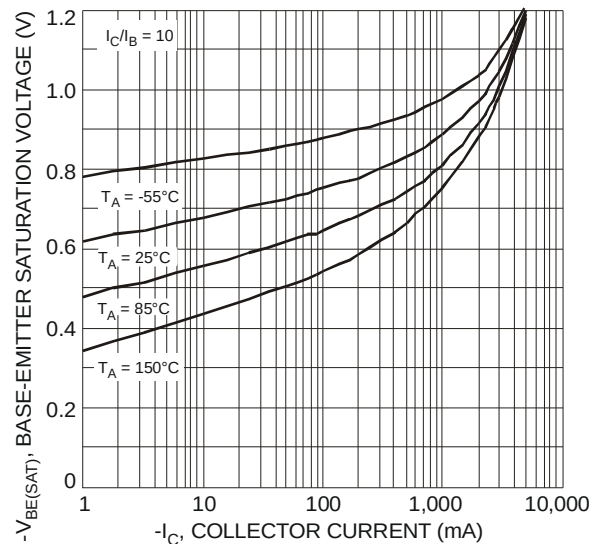


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

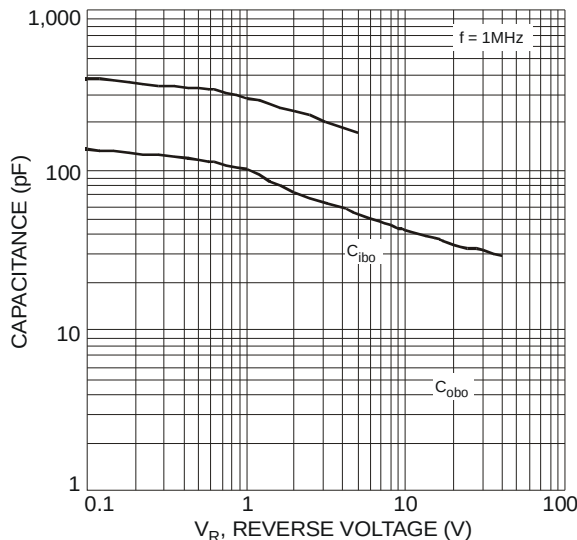


Fig. 7 Typical Capacitance Characteristics

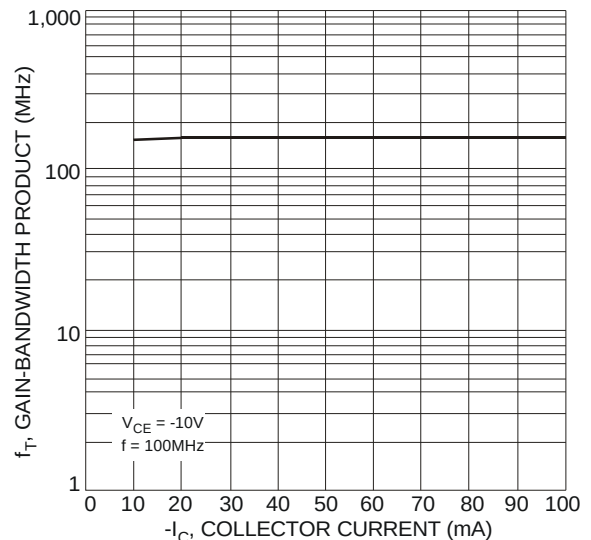
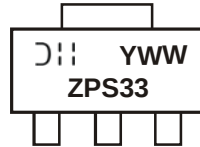


Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

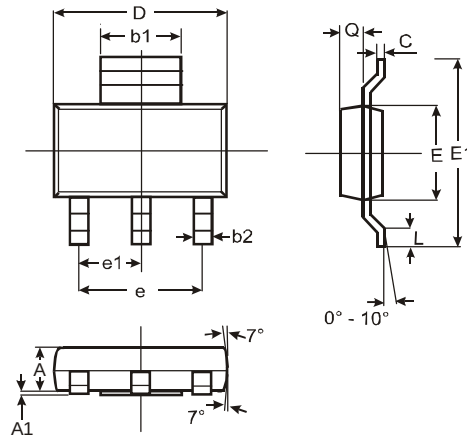
Ordering Information (Note 6)

Part Number	Case	Packaging
DMJT9435-13	SOT-223	2500/Tape & Reel

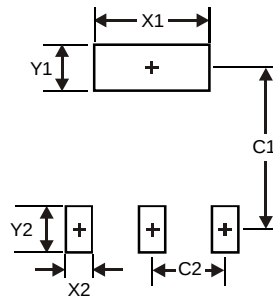
Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information


ZPS33 = Product Type Marking Code
 YWW = Date Code Marking
 Y = Last digit of year (ex: 8 = 2008)
 WW = Week code 01 - 52

Package Outline Dimensions


SOT-223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	—	—	4.60
e1	—	—	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout


Dimensions	Value (in mm)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

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