Lead-free Green

DNLS540E

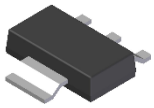
LOW $V_{CE(SAT)}$ NPN SURFACE MOUNT TRANSISTOR

Features

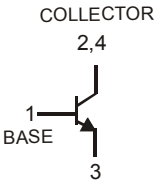
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (DPLS540E)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

Mechanical Data

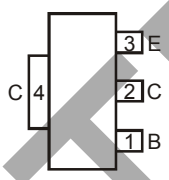
- Case: SOT-223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: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



Top View



Device Schematic



TOP VIEW

Pin Out Configuration

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
Continuous Collector Current	I_C	5	A
Peak Pulse Base Current	I_{BM}	2	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @ T_A = 25°C	P_D	1	W
Thermal Resistance, Junction to Ambient Air (Note 3) @ T_A = 25°C	$R_{\theta JA}$	125	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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; pad layout as shown on page 4 or in Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS (Note 4)						
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
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	40	—	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	—	—	V	I_E = 100μA
ON CHARACTERISTICS (Note 4)						
DC Current Gain	h_{FE}	300	375	—	—	V_{CE} = 2V, I_C = 0.5A
		300	370	—		V_{CE} = 2V, I_C = 1A
		250	360	—		V_{CE} = 2V, I_C = 2A
		100	315	—		V_{CE} = 2V, I_C = 5A
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	45	90	mV	I_C = 0.5A, I_B = 5mA
		—	60	120		I_C = 1A, I_B = 10mA
		—	60	150		I_C = 2A, I_B = 200mA
		—	140	355		I_C = 5A, I_B = 500mA
Equivalent On-Resistance	$R_{CE(SAT)}$	—	28	71	mΩ	I_C = 5A, I_B = 500mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	1.0	1.3	V	I_C = 5A, I_B = 500mA
Base-Emitter Turn-on Voltage	$V_{BE(ON)}$	—	0.75	1.1	V	V_{CE} = 2V, I_C = 2A
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	70	150	—	MHz	V_{CE} = 10V, I_C = 100mA, f = 100MHz
Output Capacitance	C_{obo}	—	50	75	pF	V_{CB} = 10V, f = 1MHz

Notes: 4. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

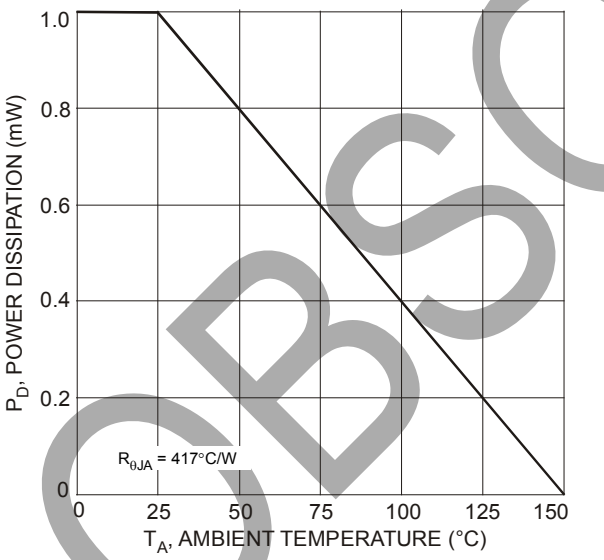


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

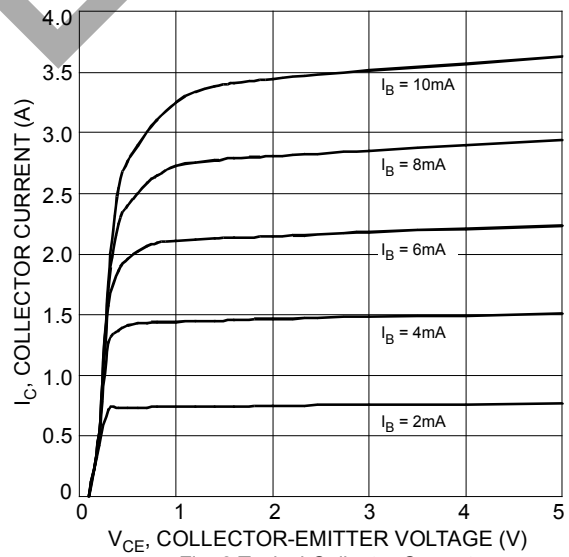


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

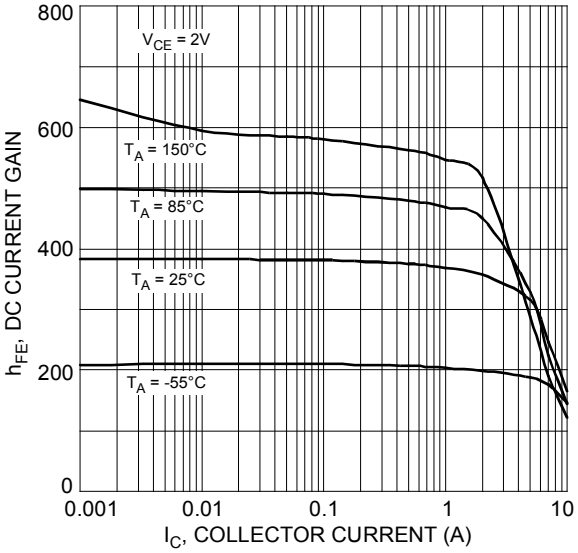


Fig. 3 Typical DC Current Gain vs. Collector Current

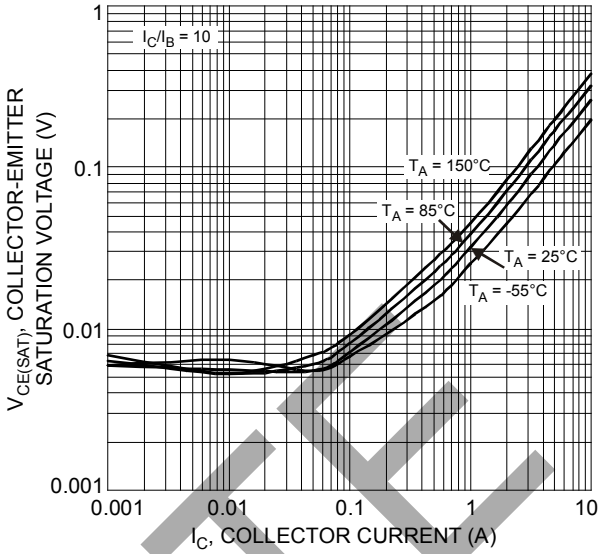


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

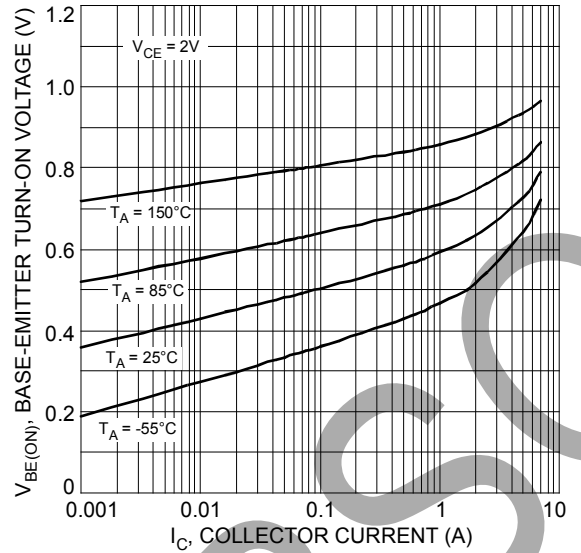


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

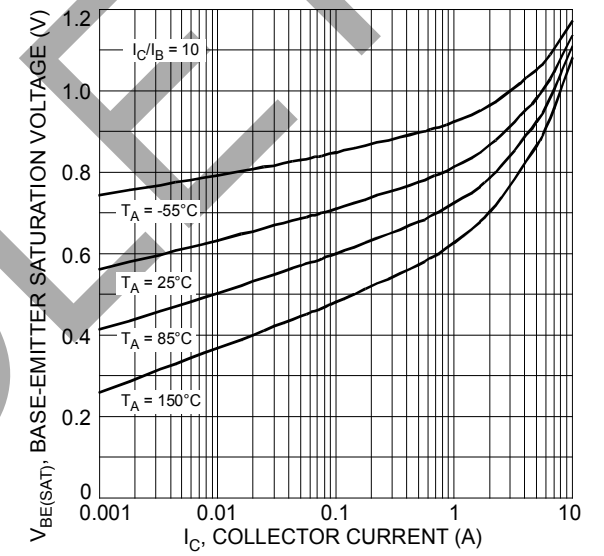


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

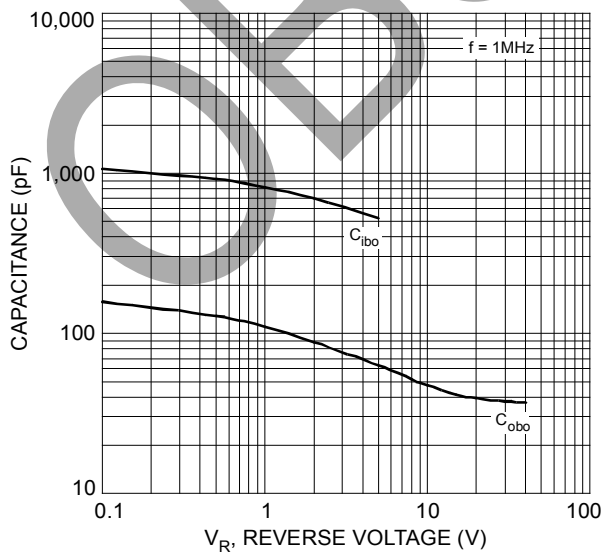


Fig. 7 Typical Capacitance Characteristics

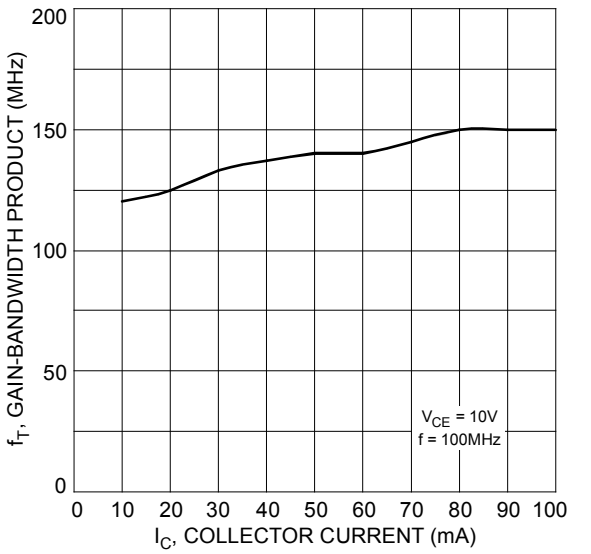


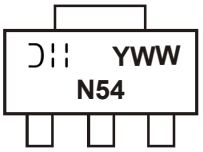
Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

Ordering Information (Note 5)

Part Number	Case	Packaging
DNLS540E-13	SOT-223	2500/Tape & Reel

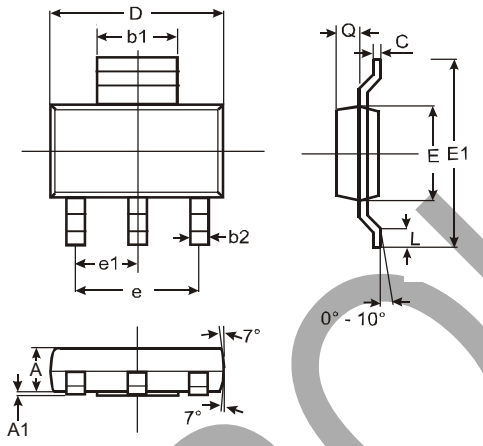
Notes: 5. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



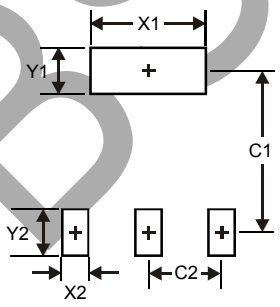
N54 = Product Type Marking Code
YWW = Date Code Marking
Y = Last digit of year (ex: 7 = 2007)
WW = Week code 01 - 52

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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