

Features

- Epitaxial Planar Die Construction
- Low Collector-Emitter Saturation Resistance $R_{CE(SAT)} = 80m\Omega$ at 3A
- High DC Current Gain $h_{FE} > 400$ at $I_C = 2A$
- Complementary PNP Type Available (DPLS325E)
- 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 3
- Ordering Information: See Page 3
- Weight: 0.112 grams (approximate)

Maximum Ratings

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

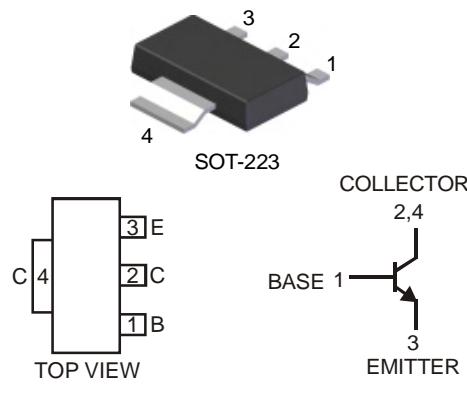
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	20	V
Collector-Emitter Voltage	V_{CEO}	20	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	3	A
Peak Pulse Current	I_{CM}	8	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 3)	P_D	1	W
Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	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>.



Schematic and Pin Configuration

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Off Characteristics						
Collector-Base Breakdown Voltage	$V_{(\text{BR})\text{CBO}}$	20	—	—	V	$I_C = 100\mu\text{A}$, $I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(\text{BR})\text{CEO}}$	20	—	—	V	$I_C = 10\text{mA}$, $I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(\text{BR})\text{EBO}}$	5	—	—	V	$I_E = 100\mu\text{A}$, $I_C = 0$
Collector Cutoff Current	I_{CBO}	—	—	100	nA	$V_{\text{CB}} = 16\text{V}$, $I_E = 0$
Emitter Cutoff Current	I_{EBO}	—	—	100	nA	$V_{\text{EB}} = 4\text{V}$, $I_C = 0$
On Characteristics (Note 4)						
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{SAT})}$	— — —	0.04 0.18 0.24	0.10 0.50 0.45	V	$I_C = 0.1\text{A}$, $I_B = 0.5\text{mA}$ $I_C = 2\text{A}$, $I_B = 10\text{mA}$ $I_C = 3\text{A}$, $I_B = 20\text{mA}$
Base-Emitter Saturation Voltage	$V_{\text{BE}(\text{SAT})}$	—	—	0.9	V	$I_C = 1\text{A}$, $I_B = 10\text{mA}$
Base-Emitter Turn-On Voltage	$V_{\text{BE}(\text{ON})}$	—	—	0.9	V	$V_{\text{CE}} = 2\text{V}$, $I_C = 1\text{A}$
DC Current Gain	h_{FE}	500 400 150	— — —	— — —	V _{CE}	$V_{\text{CE}} = 2\text{V}$, $I_C = 0.1\text{A}$ $V_{\text{CE}} = 2\text{V}$, $I_C = 2\text{A}$ $V_{\text{CE}} = 2\text{V}$, $I_C = 6\text{A}$
AC Characteristics						
Transition Frequency	f_T	150	—	—	MHz	$V_{\text{CE}} = 5\text{V}$, $I_C = 50\text{mA}$, $f = 50\text{MHz}$
Input Capacitance	C_{ibo}	—	230	—	pF	$V_{\text{EB}} = 0.5\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{obo}	—	23	—	pF	$V_{\text{CB}} = 10\text{V}$, $f = 1\text{MHz}$
Switching Times	t_{on} t_{off}	— —	26 220	— —	ns ns	$V_{\text{CC}} = 10\text{V}$, $I_C = 500\text{mA}$ $I_{B1} = -I_{B2} = 50\text{mA}$

Notes: 4. Pulse Test: Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2.0\%$.

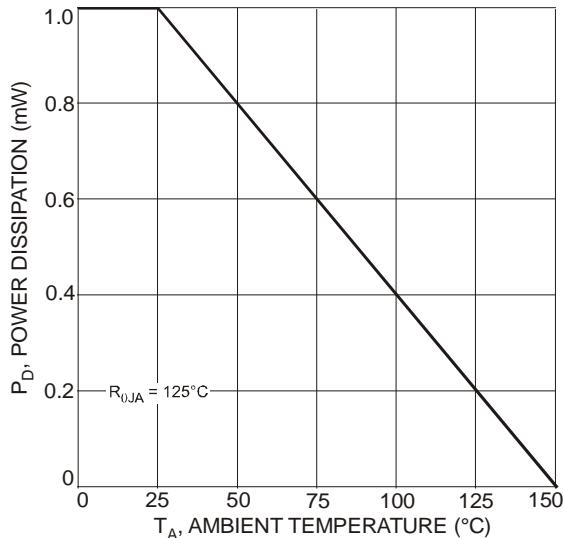


Fig. 1 Max Power Dissipation vs. Ambient Temperature

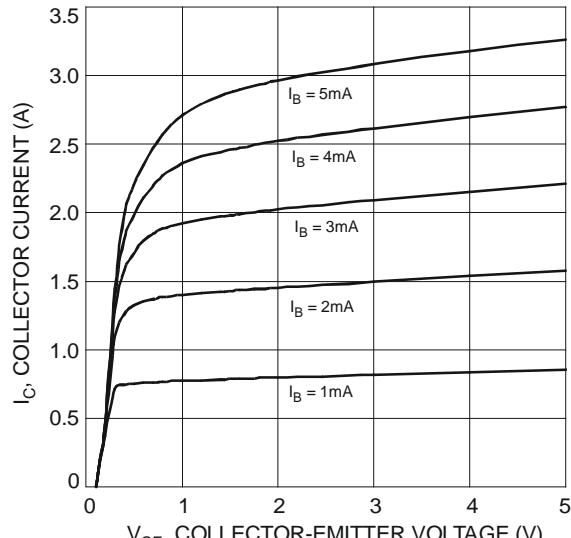


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

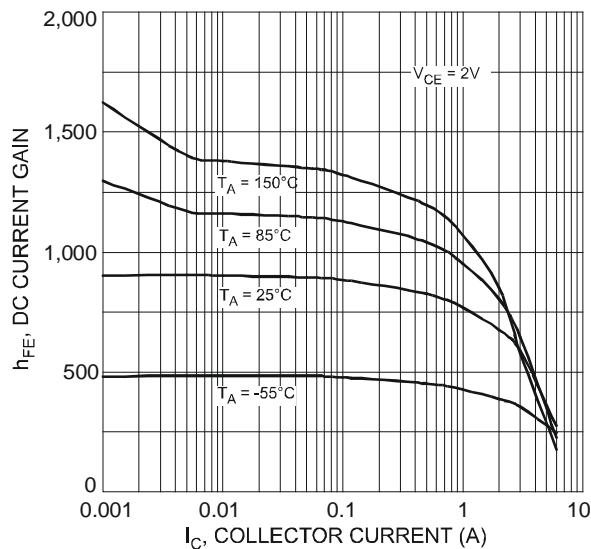


Fig. 3 Typical DC Current Gain vs. Collector Current

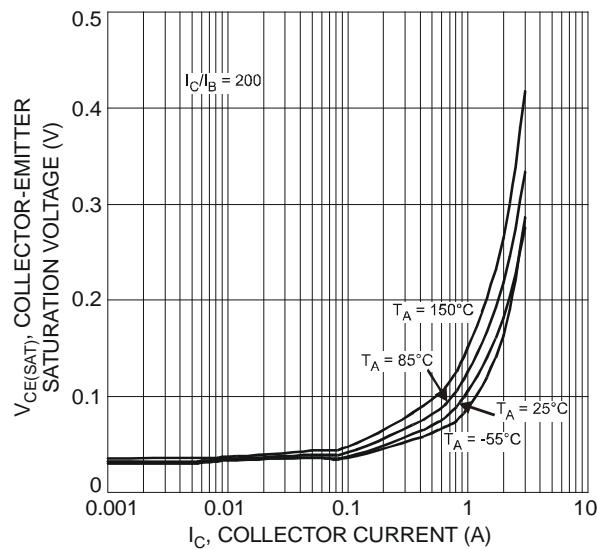


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

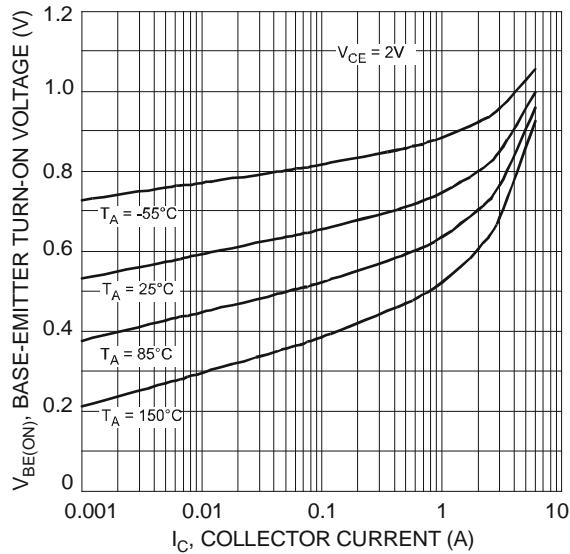


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

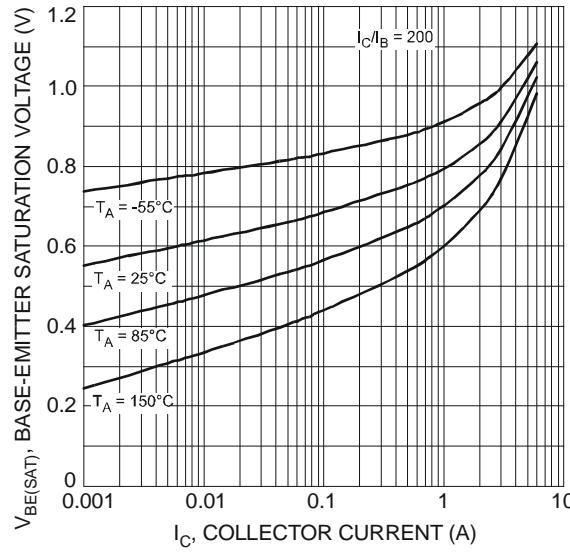


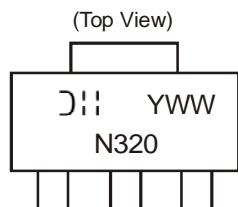
Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

Ordering Information (Note 5)

Device	Packaging	Shipping
DNLS320E-13	SOT-223	2500/Tape & Reel

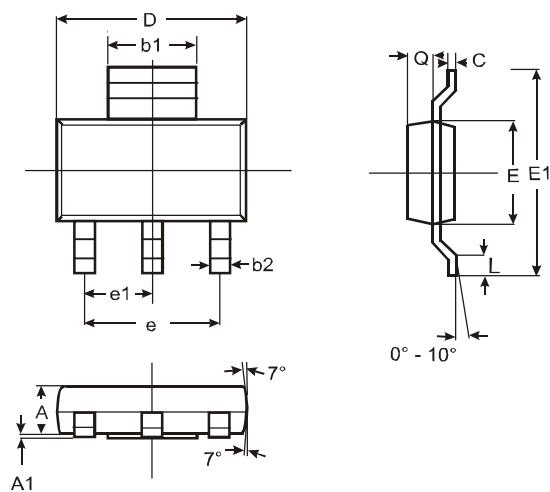
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap2007.pdf>.

Marking Information



N320 = Product Type Marking Code
YWW = Date Code Marking
Y = Last digit of year ex: 7 = 2007
WW = Week code 01 - 52

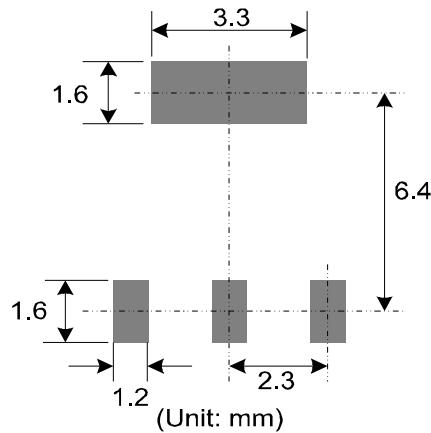
Package Outline Dimensions



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:



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