NEW PRODUCT

DNLS320A

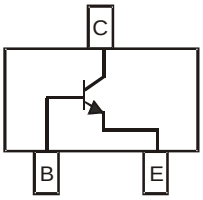
LOW $V_{CE(SAT)}$ NPN SURFACE MOUNT TRANSISTOR

Please click here to visit our online spice models database.

Features

- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Complimentary PNP Type Available (DPLS320A)
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

SOT-23



Schematic and Pin Configuration

Mechanical Data

- Case: SOT-23
- 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. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)

Maximum Ratings @T_A = 25°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
Peak Pulse Current	I_{CM}	5	A
Repetitive Peak Pulse Current (Note 3)	I_{CRP}	3	A
Continuous Collector Current	I_C	2	A
Base Current	I_B	0.5	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4) @ T_A = 25°C	P_D	600	mW
Thermal Resistance, Junction to Ambient Air (Note 3) @ T_A = 25°C	$R_{\theta JA}$	209	°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. Operated under pulse conditions: Pulse width ≤ 100ms, duty cycle ≤ 0.25.
4. 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.

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Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS (Note 5)						
Collector-Base Cutoff Current	I_{CBO}	—	—	100	nA	V_{CB} = 20V, I_E = 0
		—	—	50	μA	V_{CB} = 20V, 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	$V_{(BR)CBO}$	20	—	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	20	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	—	—	V	I_E = 100μA
ON CHARACTERISTICS (Note 5)						
DC Current Gain	h_{FE}	220	—	—	—	V_{CE} = 2V, I_C = 0.1A
		220	—	—		V_{CE} = 2V, I_C = 0.5A
		220	—	—		V_{CE} = 2V, I_C = 1A
		200	—	—		V_{CE} = 2V, I_C = 2A
		150	—	—		V_{CE} = 2V, I_C = 3A
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	70	mV	I_C = 0.5A, I_B = 50mA
		—	—	120		I_C = 1A, I_B = 50mA
		—	—	230		I_C = 2A, I_B = 40mA
		—	—	210		I_C = 2A, I_B = 200mA
		—	—	310		I_C = 3A, I_B = 300mA
Equivalent On-Resistance	$R_{CE(SAT)}$	—	85	105	mΩ	I_E = 2A, I_B = 200mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	—	1.1	V	I_C = 2A, I_B = 40mA
		—	—	1.2	V	I_C = 3A, I_B = 300mA
Base-Emitter Turn-on Voltage	$V_{BE(ON)}$	—	—	1.2	V	V_{CE} = 2V, I_C = 1A
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	100	220	—	MHz	V_{CE} = 5V, I_C = 100mA, f = 100MHz
Output Capacitance	C_{ob}	—	—	35	pF	V_{CB} = 10V, f = 1MHz

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

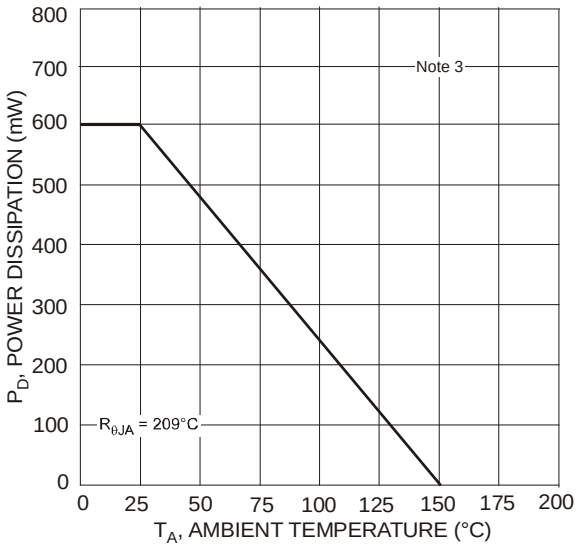

Fig. 1 Max Power Dissipation vs. Ambient Temperature

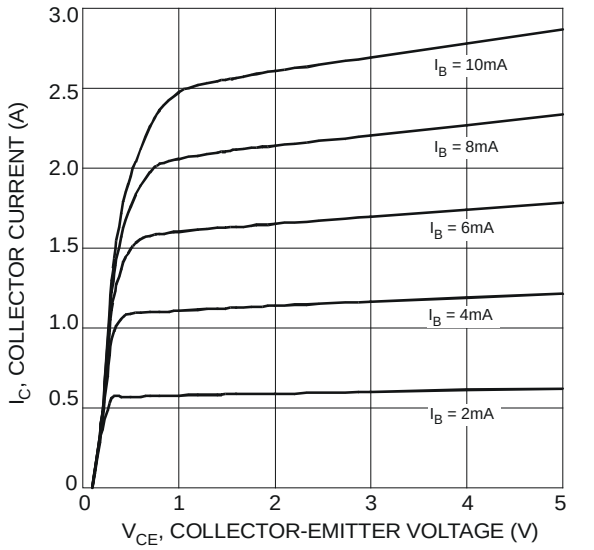

Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

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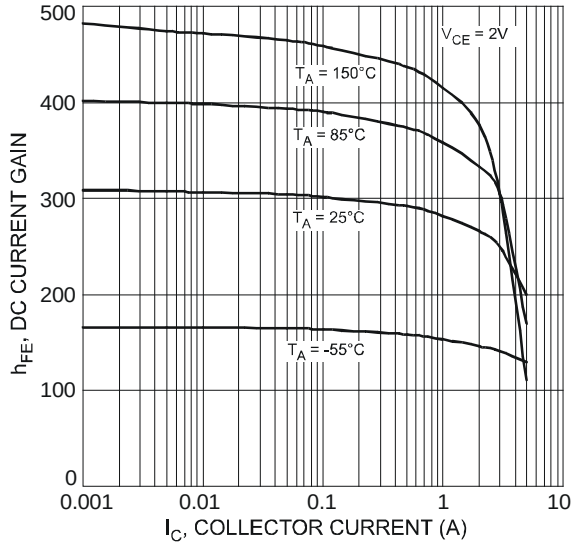

Fig. 3 Typical DC Current Gain vs. Collector Current

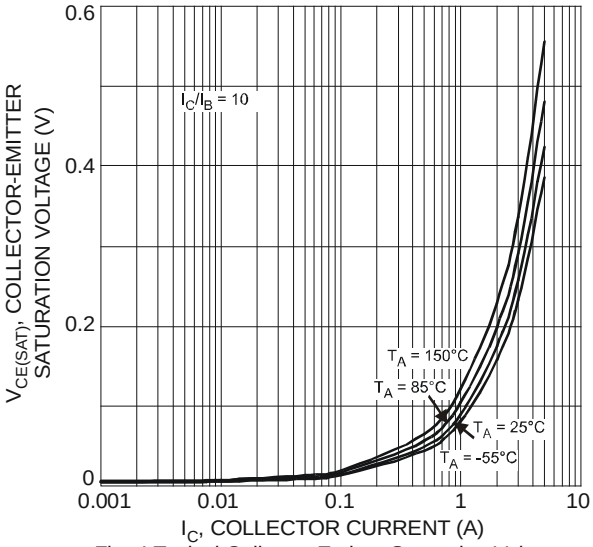

Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

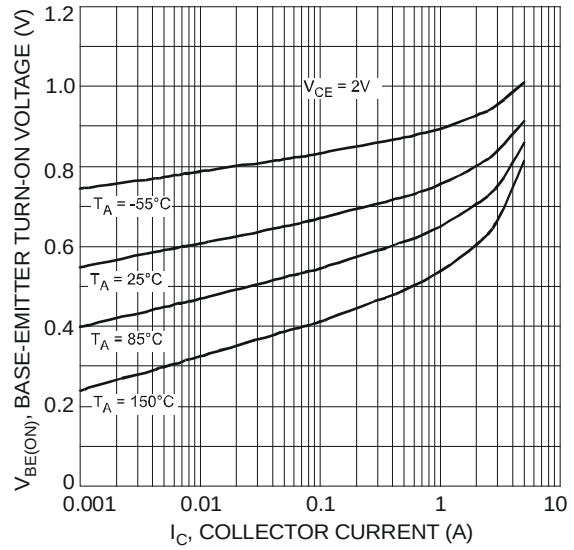

Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

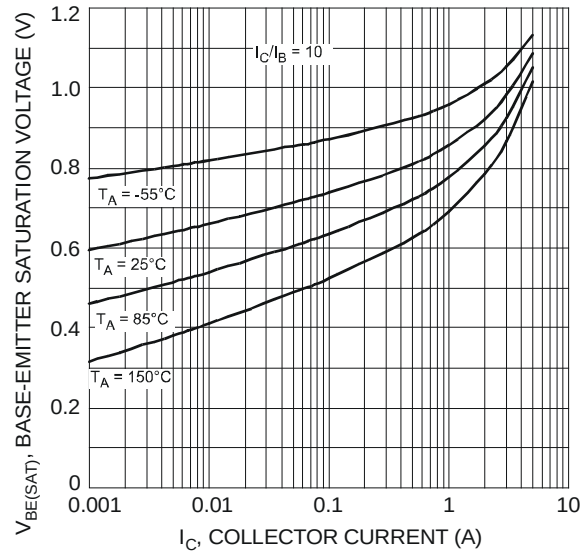

Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

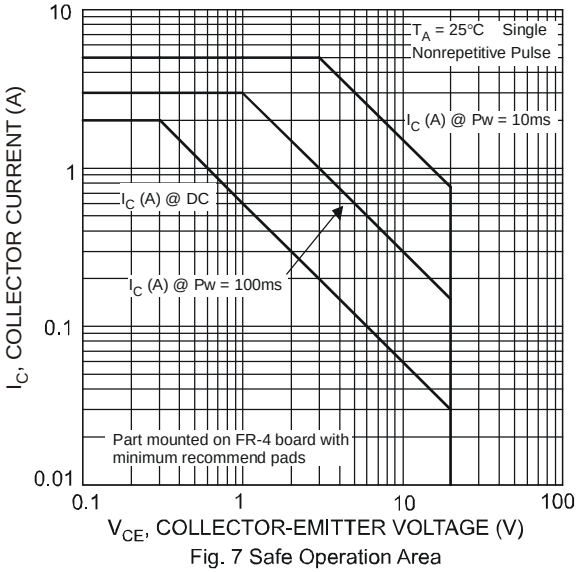

Fig. 7 Safe Operation Area

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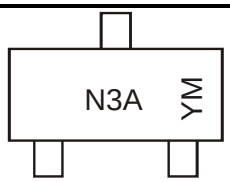
Ordering Information (Note 6)

Device	Packaging	Shipping
DNLS320A-7	SOT-23	3000/Tape & Reel

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

Marking Information



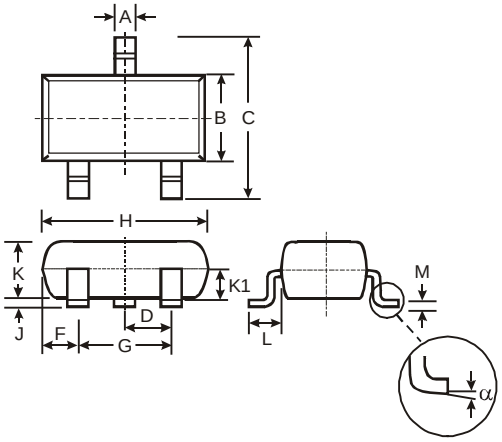
N3A = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: V = 2008)
M = Month (ex: 9 = September)

Date Code Key

Year	2008	2009	2010	2011	2012	2013	2014	2015
Code	V	W	X	Y	Z	A	B	C

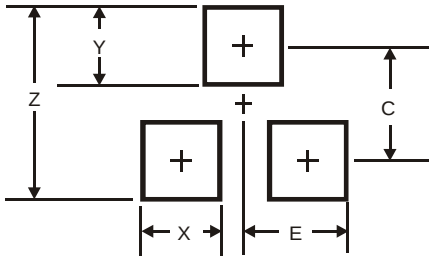
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Package Outline Dimensions



SOT-23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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