

DNLS320E-13 Datasheet

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DiGi Electronics Part Number	DNLS320E-13-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DNLS320E-13
Description	TRANS NPN 20V 3A SOT223-3
Detailed Description	Bipolar (BJT) Transistor NPN 20 V 3 A 150MHz 1 W Surface Mount SOT-223-3



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DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

DNLS320E-13

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

20 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

1 W

Operating Temperature:

-55°C ~ 150°C (TJ)

Package / Case:

TO-261-4, TO-261AA

Base Product Number:

DNLS320

Manufacturer:

Diodes Incorporated

Product Status:

Active

Current - Collector (Ic) (Max):

3 A

Vce Saturation (Max) @ Ib, Ic:

450mV @ 20mA, 3A

DC Current Gain (hFE) (Min) @ Ic, Vce:

400 @ 2A, 2V

Frequency - Transition:

150MHz

Mounting Type:

Surface Mount

Supplier Device Package:

SOT-223-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0075

Moisture Sensitivity Level (MSL):

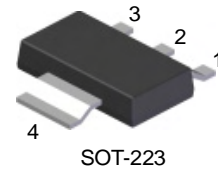
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ECCN:

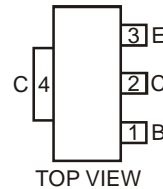
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Features

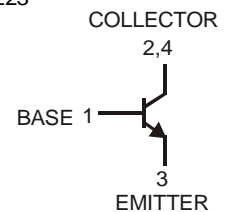
- Epitaxial Planar Die Construction
- Low Collector-Emitter Saturation Resistance $R_{CE(SAT)} = 80m\Omega$ at 3A
- High DC Current Gain $h_{FE} > 400$ at $I_C = 2A$
- Complementary PNP Type Available (DPLS325E)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



SOT-223



TOP VIEW



Schematic and Pin Configuration

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	$^\circ\text{C/W}$
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, 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 Condition
Off Characteristics						
Collector-Base Breakdown Voltage	V _{(BR)CBO}	20	—	—	V	I _C = 100μA, I _E = 0
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	20	—	—	V	I _C = 10mA, I _B = 0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	5	—	—	V	I _E = 100μA, I _C = 0
Collector Cutoff Current	I _{CBO}	—	—	100	nA	V _{CB} = 16V, I _E = 0
Emitter Cutoff Current	I _{EBO}	—	—	100	nA	V _{EB} = 4V, I _C = 0
On Characteristics (Note 4)						
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	0.04 0.18 0.24	0.10 0.50 0.45	V	I _C = 0.1A, I _B = 0.5mA I _C = 2A, I _B = 10mA I _C = 3A, I _B = 20mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	—	0.9	V	I _C = 1A, I _B = 10mA
Base-Emitter Turn-On Voltage	V _{BE(ON)}	—	—	0.9	V	V _{CE} = 2V, I _C = 1A
DC Current Gain	h _{FE}	500 400 150	— — —	— — —	—	V _{CE} = 2V, I _C = 0.1A V _{CE} = 2V, I _C = 2A V _{CE} = 2V, I _C = 6A
AC Characteristics						
Transition Frequency	f _T	150	—	—	MHz	V _{CE} = 5V, I _C = 50mA, f = 50MHz
Input Capacitance	C _{ibo}	—	230	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance	C _{obo}	—	23	—	pF	V _{CB} = 10V, f = 1MHz
Switching Times	t _{on} t _{off}	— —	26 220	— —	ns ns	V _{CC} = 10V, I _C = 500mA I _{B1} = -I _{B2} = 50mA

Notes: 4. Pulse Test: Pulse width ≤300μs. Duty cycle ≤2.0%.

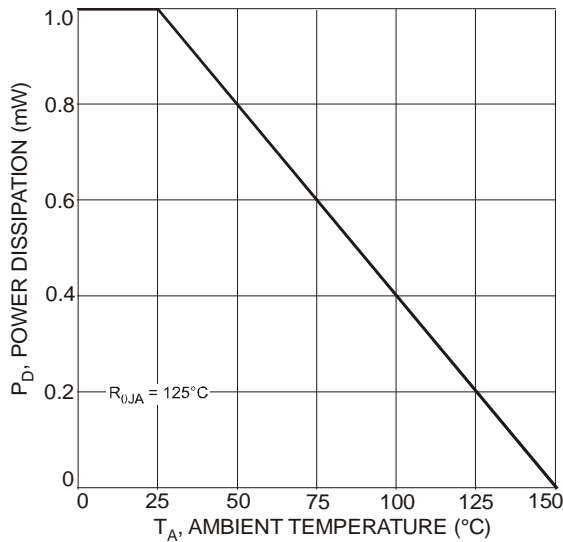


Fig. 1 Max Power Dissipation vs. Ambient Temperature

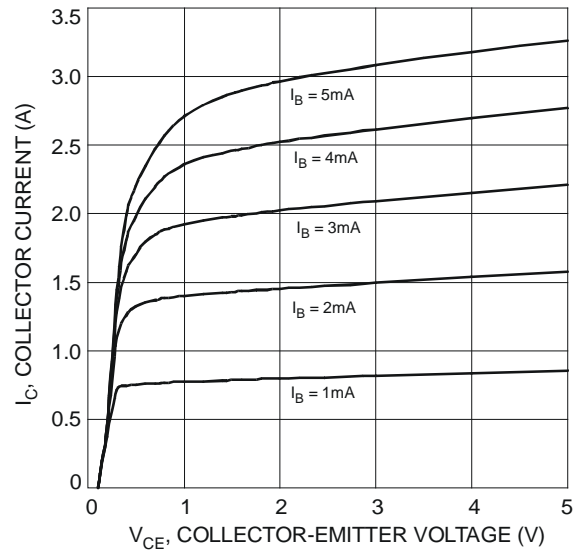


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage



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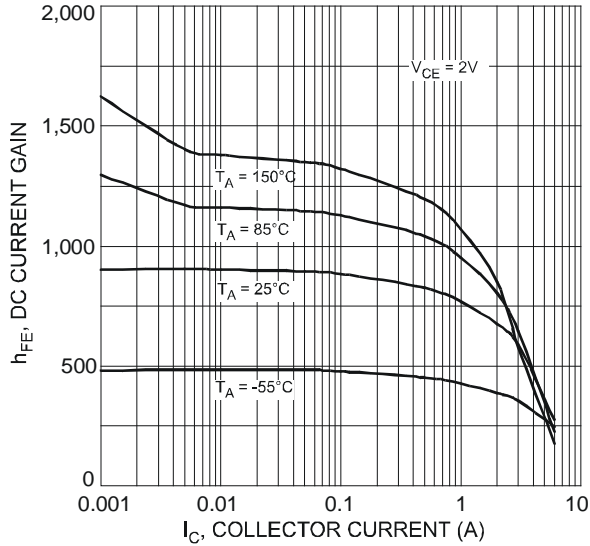


Fig. 3 Typical DC Current Gain vs. Collector Current

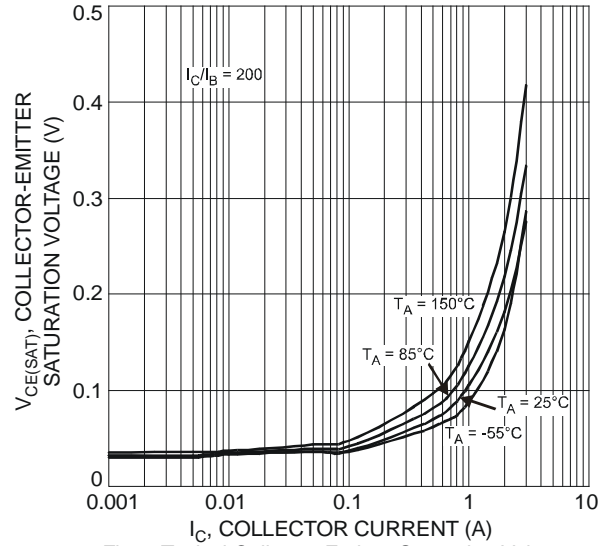


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

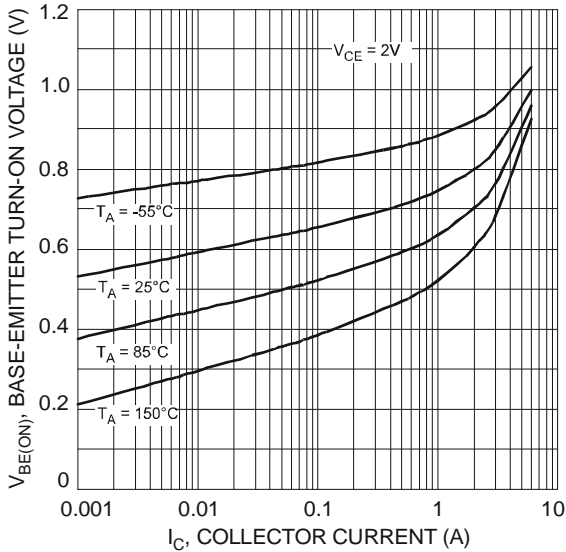


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

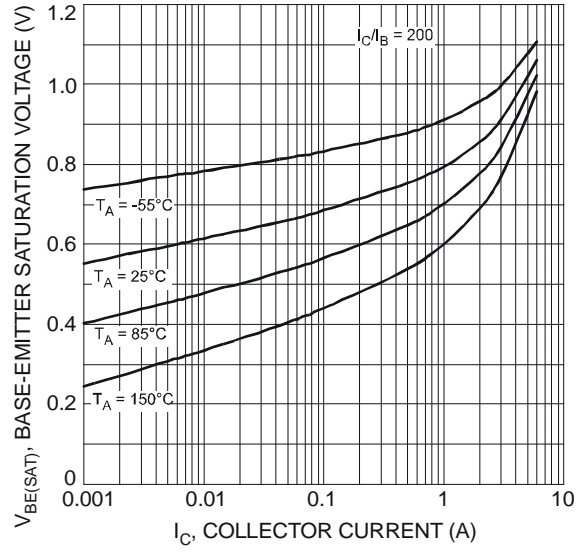


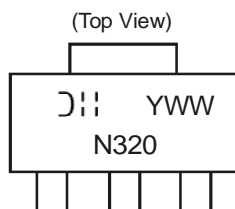
Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

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

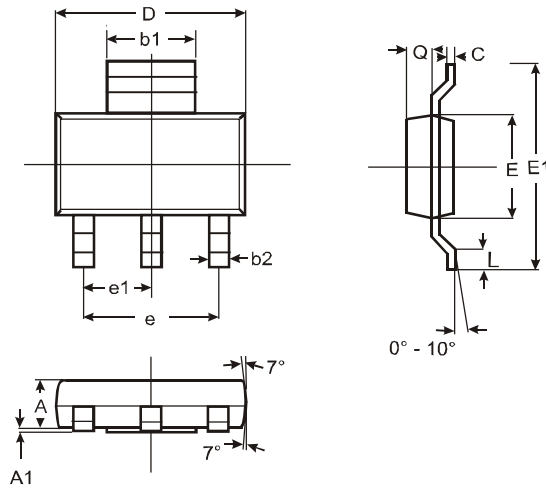


N320 = Product Type Marking Code
 YWW = Date Code Marking
 Y = Last digit of year ex: 7 = 2007
 WW = Week code 01 - 52



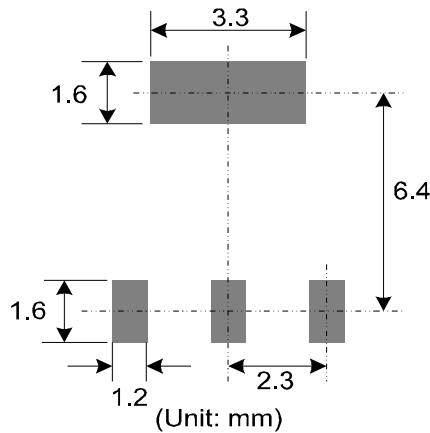
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Package Outline Dimensions



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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