



YOUSHANG SEMICONDUCTOR

**设计研发新型功率器件**

**各类小信号开关**

**中低压及高压大电流等场效应管**

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## Features

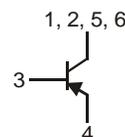
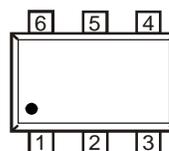
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (DNLS160V)
- Surface Mount Package Suited for Automated Assembly
- Ultra Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green Device" (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**



SOT-563

## Mechanical Data

- Case: SOT-563
- 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 4
- Ordering Information: See Page 4
- Weight: 0.003 grams (approximate)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-80	V
Collector-Emitter Voltage	$V_{CEO}$	-60	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Collector Current - Continuous	$I_C$	-1	A
Peak Pulse Collector Current	$I_{CM}$	-2	A
Base Current (DC)	$I_B$	-300	mA

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Thermal Resistance, Junction to Ambient (Note 3) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
1. No purposefully added lead.
  2. Diode's Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; 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<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 4)</b>						
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	-80	—	—	V	I <sub>C</sub> = -100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	-60	—	—	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	-5	—	—	V	I <sub>E</sub> = -100μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CBO</sub>	—	—	-100 -50	nA μA	V <sub>CB</sub> = -60V, I <sub>E</sub> = 0 V <sub>CB</sub> = -60V, I <sub>E</sub> = 0, T <sub>A</sub> = 150°C
Collector Cutoff Current	I <sub>CES</sub>	—	—	-100	nA	V <sub>CE</sub> = -60V, V <sub>BE</sub> = 0
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	-100	nA	V <sub>EB</sub> = -5V, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 4)</b>						
DC Current Gain	h <sub>FE</sub>	200 150 100	325 250 180	— — —	V	V <sub>CE</sub> = -5V, I <sub>C</sub> = -1mA V <sub>CE</sub> = -5V, I <sub>C</sub> = -500mA V <sub>CE</sub> = -5V, I <sub>C</sub> = -1A
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	— — —	-90 -90 -160	-160 -175 -330	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -1mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
Collector-Emitter Saturation Resistance	R <sub>CE(SAT)</sub>	—	160	330	mΩ	I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	-0.95	-1.1	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA
Base-Emitter Turn On Voltage	V <sub>BE(ON)</sub>	—	-0.82	-0.9	V	V <sub>CE</sub> = -5V, I <sub>C</sub> = -1A
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	C <sub>obo</sub>	—	10	15	pF	V <sub>CB</sub> = -10V, f = 1.0MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	150	220	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Time	t <sub>on</sub>	—	36	—	ns	V <sub>CC</sub> = -10V I <sub>C</sub> = -0.5A, I <sub>B1</sub> = I <sub>B2</sub> = -25mA
Delay Time	t <sub>d</sub>	—	12	—	ns	
Rise Time	t <sub>r</sub>	—	24	—	ns	
Turn-Off Time	t <sub>off</sub>	—	163	—	ns	
Storage Time	t <sub>s</sub>	—	132	—	ns	
Fall Time	t <sub>f</sub>	—	31	—	ns	

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

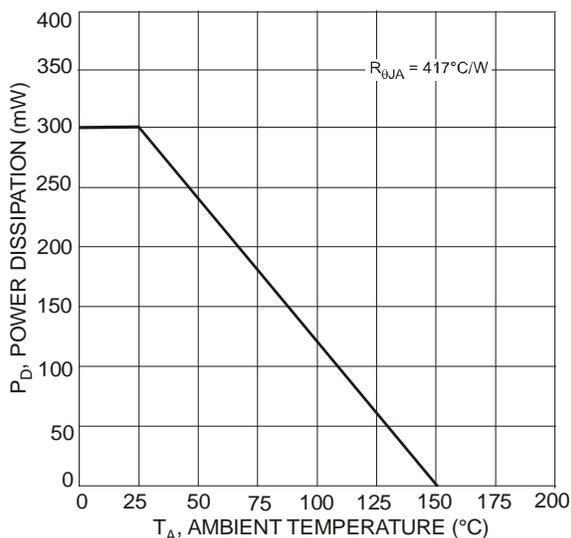


Fig. 1 Maximum Power Dissipation vs. Ambient Temperature

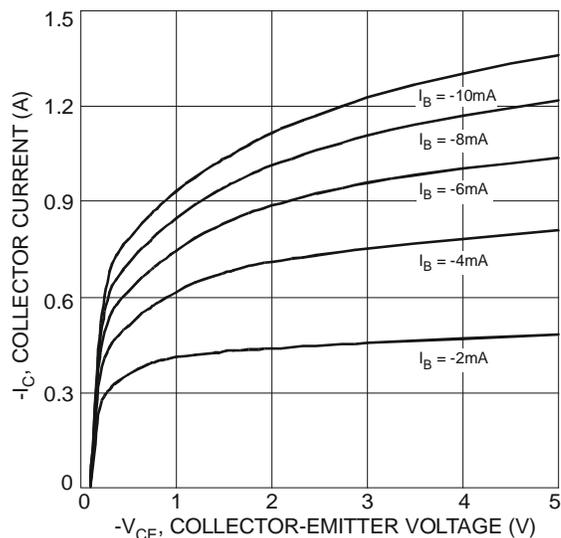


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

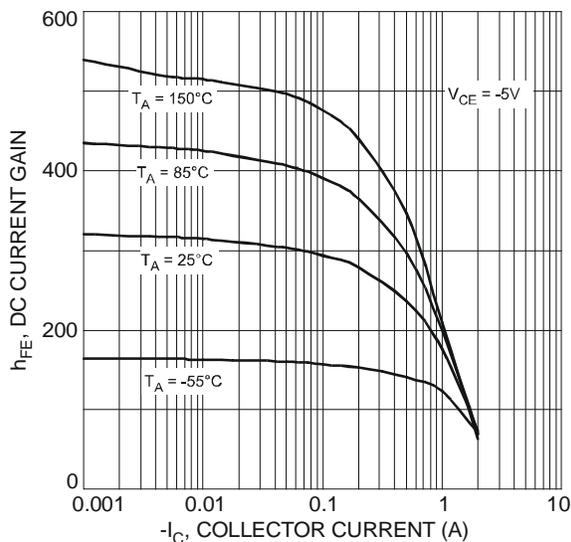


Fig. 3 Typical DC Current Gain vs. Collector Current

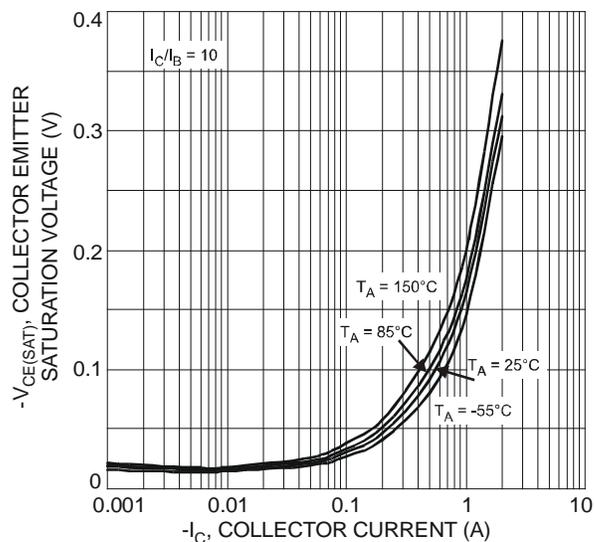


Fig. 4 Typical Collector Emitter Saturation Voltage vs. Collector Current

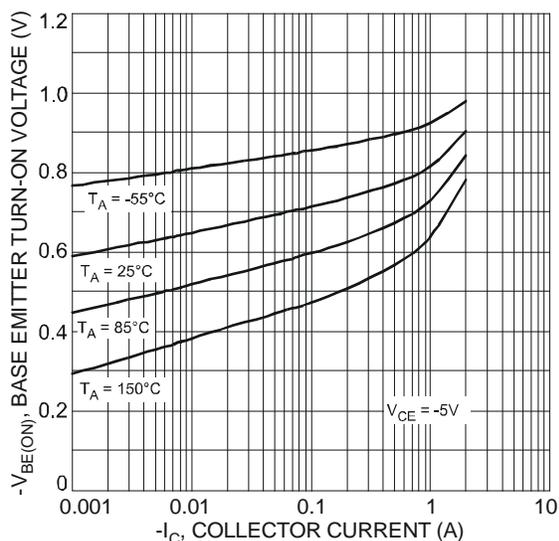


Fig. 5 Typical Base Emitter Turn-On Voltage vs. Collector Current

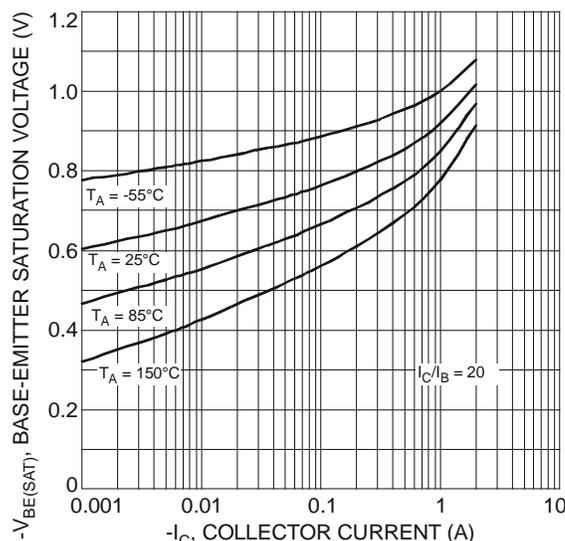


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

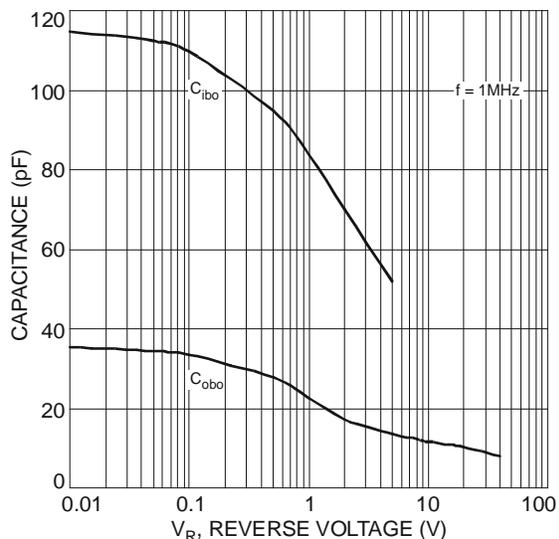


Fig. 7 Typical Total Capacitance

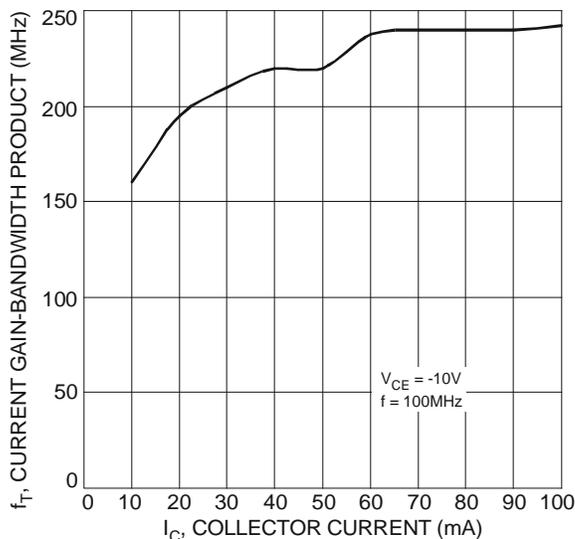
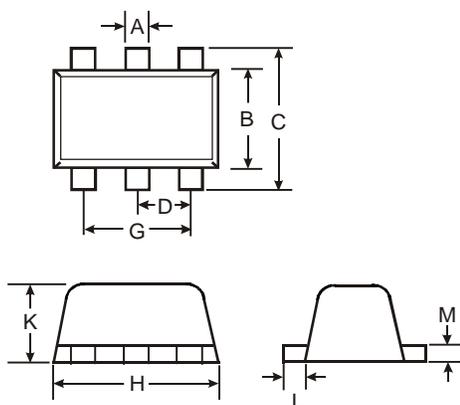


Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**



SOT-563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

**Suggested Pad Layout (in mm)**

