

## General Descriptions

- DCX100NS is best suited for applications where the load needs to be turned on and off using control circuits like micro-controllers, comparators etc. particularly at a point of load. It features a discrete PNP pass transistor which can support continuous maximum current up to 100 mA. It also contains an NPN transistor which can be used as a control switch and can also be biased using higher supply. The component devices can be used as part of a circuit or as stand alone discrete devices.

## Features

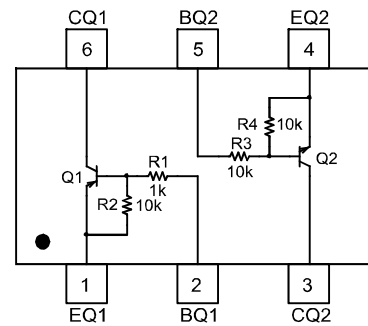
- Built in Biasing Resistors
- Epitaxial Planar Die Construction
- Lead Free By Design/ROHS Compliant (Note 1)**
- "Green" Device (Note 2)**
- Ideally Suited for Automated Assembly Processes**

## 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-020C
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 5
- Ordering Information: See Page 5
- Weight: 0.0035 grams (approximate)



SOT-563



Schematic and Pin Configuration

Reference	Device Type	R1 (NOM)	R2 (NOM)	R3, R4 (NOM)
Q1	PNP	1K $\Omega$	10K $\Omega$	—
Q2	NPN	—	—	10K $\Omega$

## Maximum Ratings: Total Device @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	P <sub>D</sub>	150	mW
Collector Current (using PNP as Pass Transistor)	I <sub>C(max)</sub>	100	mA
Thermal Resistance, Junction to Ambient Air (Note 3)	R <sub>θJA</sub>	833	°C/W
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## Sub-Component Device - Pre-Biased PNP Transistor @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	-50	V
Input Voltage	V <sub>in</sub>	+5 to -10	V
Output Current	I <sub>C</sub>	-100	mA

- Notes:
- No purposefully added lead.
  - Diodes 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).
  - Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; please see page 6 or as per Diodes Inc. suggested pad layout document AP02001 on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

## Sub-Component Device - Pre-Biased NPN Transistor @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	50	V
Input Voltage	V <sub>in</sub>	-10 to +40	V
Output Current	I <sub>O</sub>	50	mA

## Electrical Characteristics: Pre-Biased PNP Transistor @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	V <sub>I(off)</sub>	-0.3	—	—	V	V <sub>CC</sub> = -5V, I <sub>O</sub> = -100uA
	V <sub>I(on)</sub>	—	—	-3.0	V	V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA
Output Voltage	V <sub>O(on)</sub>	—	0.1	-0.3	V	I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA
Input Current	I <sub>I</sub>	—	—	-7.2	mA	V <sub>I</sub> = -5V
Output Current	I <sub>O(off)</sub>	—	—	-0.5	uA	V <sub>CC</sub> = -50V, V <sub>I</sub> = 0V
DC Current Gain	G <sub>I</sub>	33	—	—	—	V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA
Input Resistor Tolerance	ΔR1	-30	—	+30	%	—
Resistance Ratio Tolerance	R2/R1	0.8	1	1.2	%	—
Gain-Bandwidth Product	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100 MHz

## Electrical Characteristics: Pre-Biased NPN Transistor @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	V <sub>I(off)</sub>	0.5	1.18	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100uA
	V <sub>I(on)</sub>	—	1.85	3	V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 10mA
Output Voltage	V <sub>O(on)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA
Input Current	I <sub>I</sub>	—	—	0.88	mA	V <sub>I</sub> = 5V
Output Current	I <sub>O(off)</sub>	—	—	0.5	uA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
DC Current Gain	G <sub>I</sub>	30	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
Input Resistor Tolerance	ΔR1	-30	—	+30	%	—
Resistor Ratio Tolerance	R2/R1	0.8	1	1.2	—	—
Gain-Bandwidth Product	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100 MHz

## Typical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

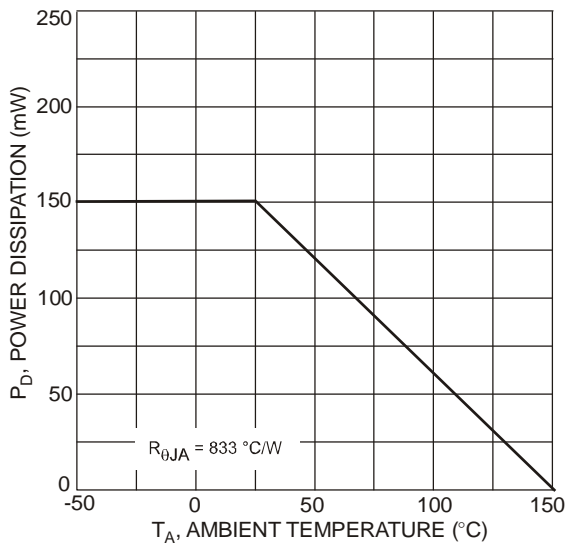


Fig. 1 Power Derating Curve (Total Device)

## Characteristics Curves of PNP Transistor (Q1)

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

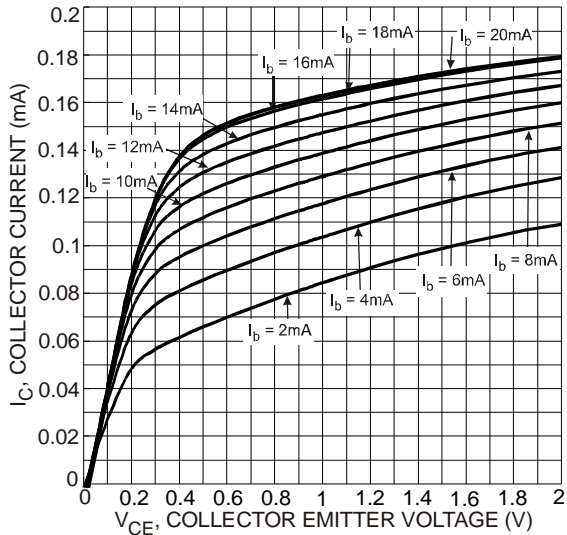


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

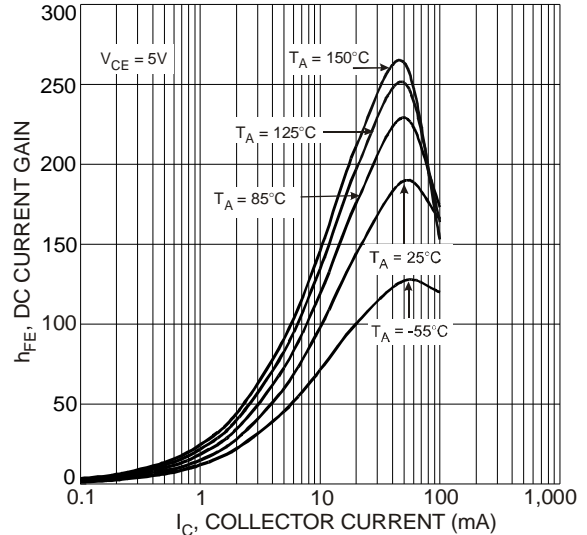


Fig. 3 Typical DC Current Gain vs. Collector Current

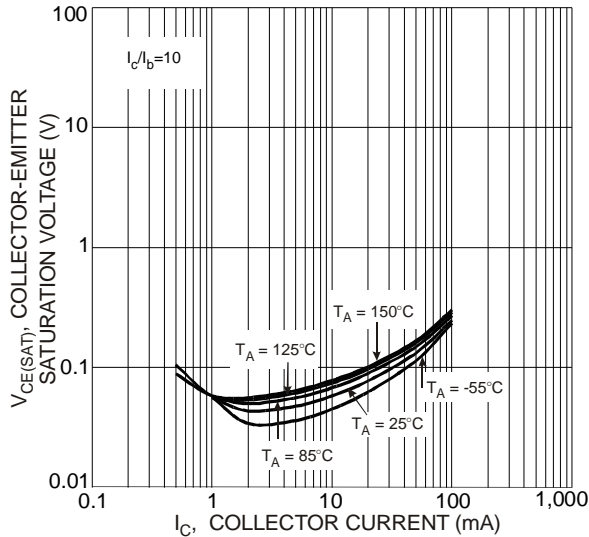


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

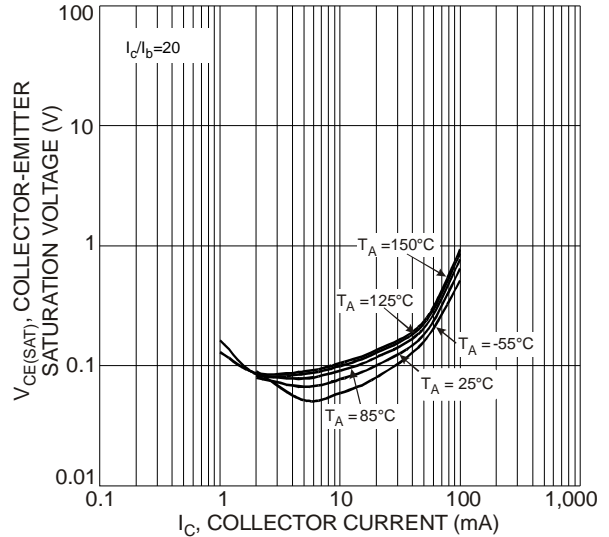


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

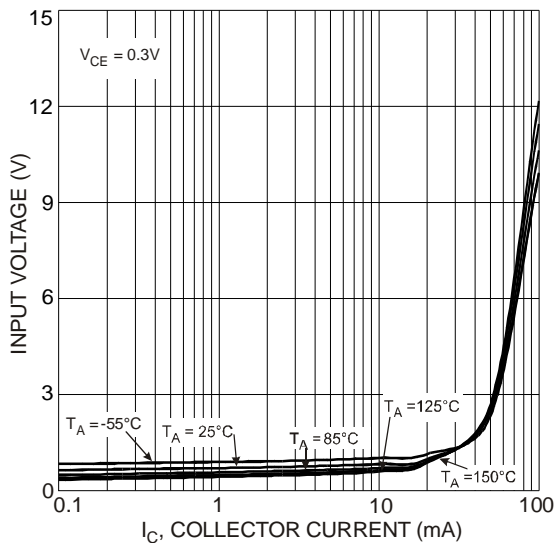


Fig. 6 Typical Input Voltage vs. Collector Current

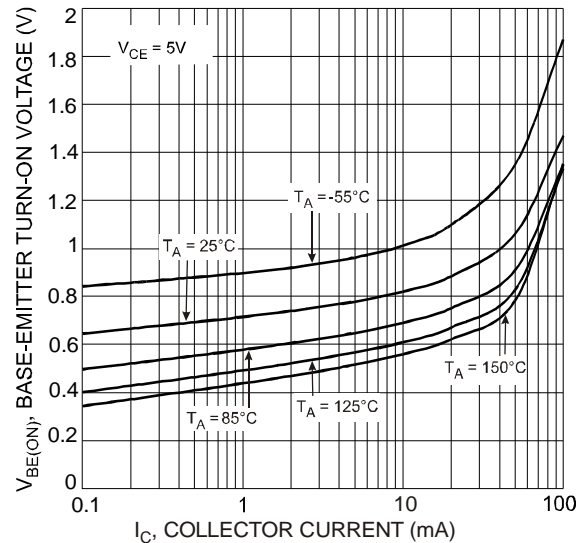


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

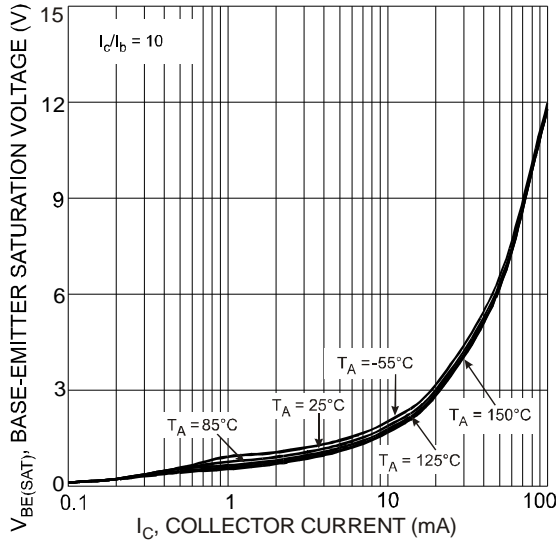


Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current

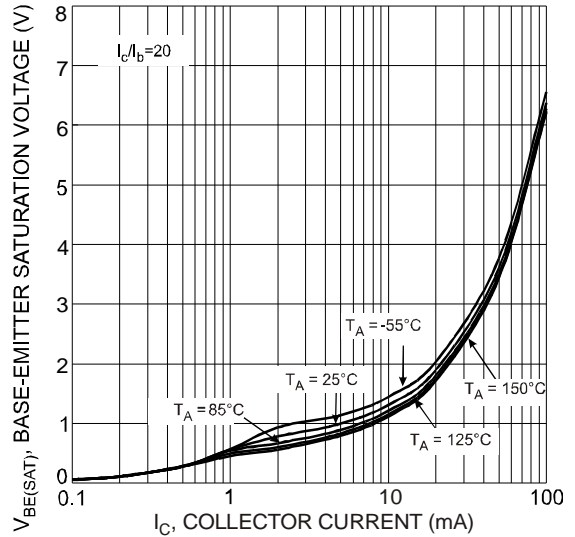


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

**Characteristics Curves of NPN Transistor (Q2)**

@T<sub>A</sub> = 25°C unless otherwise specified

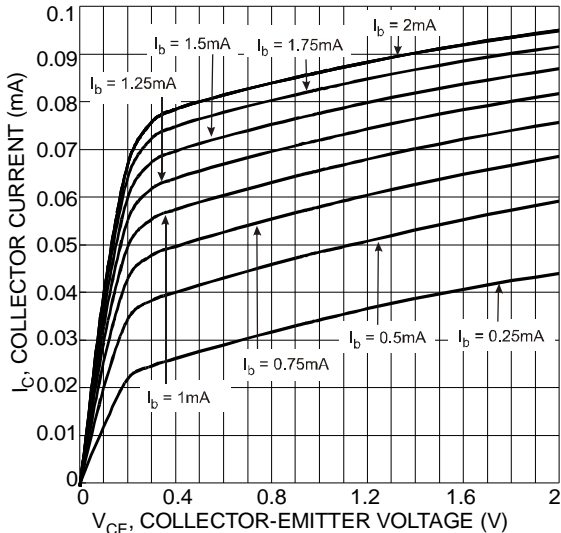


Fig. 10 Typical Collector Current vs. Collector-Emitter Voltage

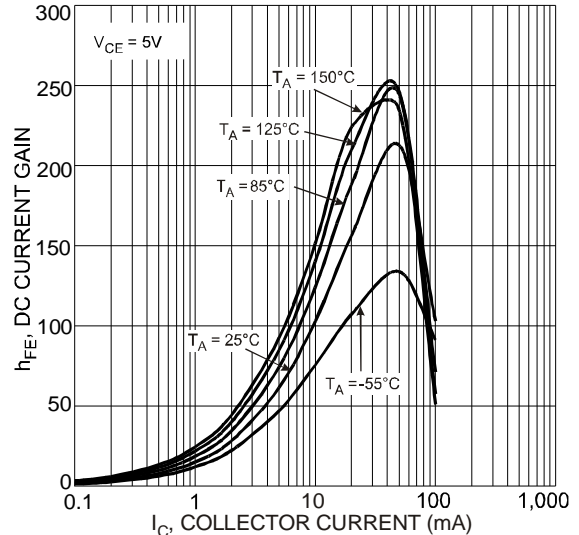


Fig. 11 Typical DC Current Gain vs. Collector Current

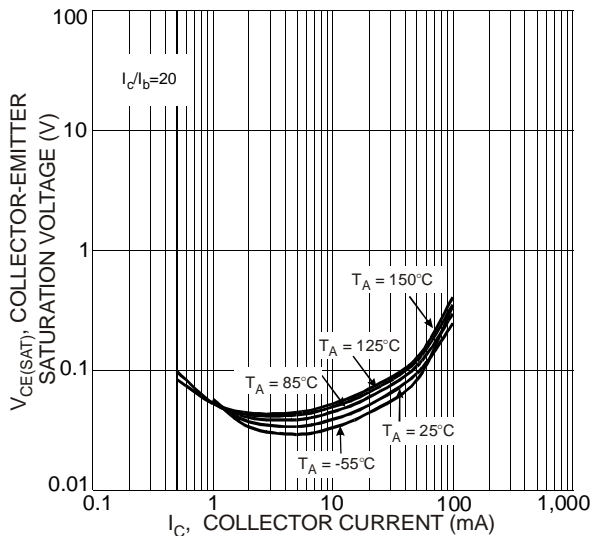


Fig. 12 Typical Collector-Emitter Saturation Voltage vs. Collector Current

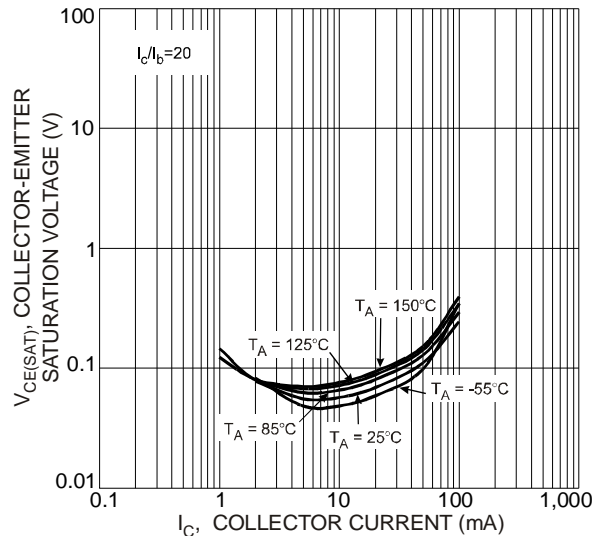


Fig. 13 Typical Collector-Emitter Saturation Voltage vs. Collector Current

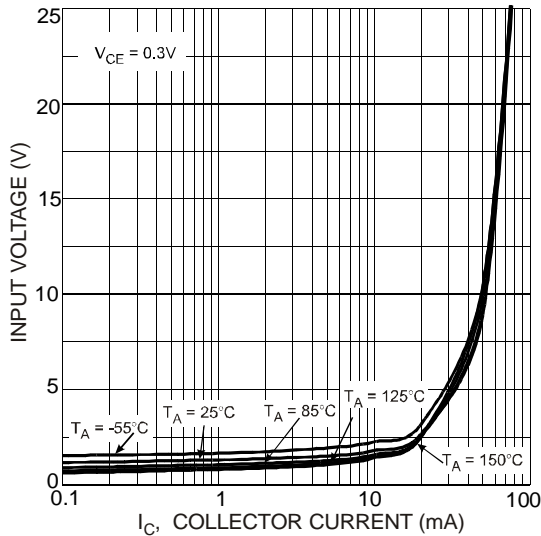


Fig. 14 Typical Input voltage vs. Output Current

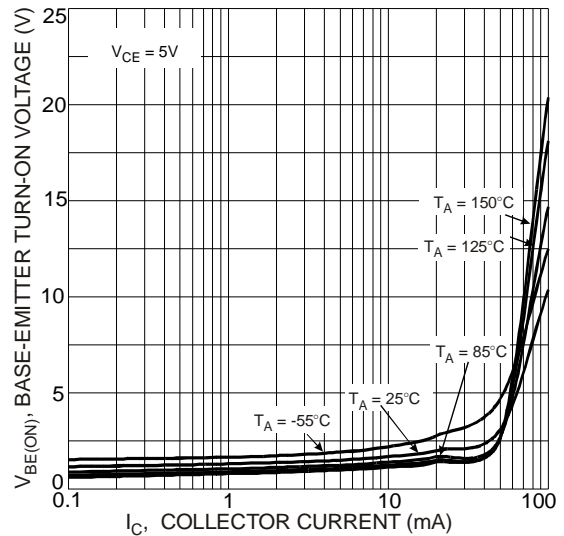


Fig. 15 Typical Base-Emitter Turn-On Voltage vs. Collector Current

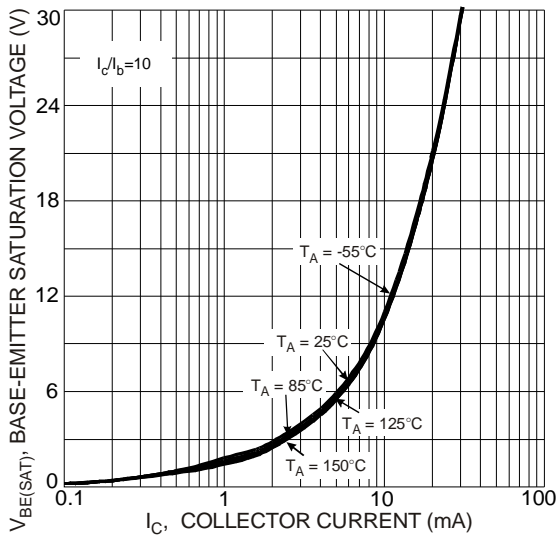


Fig. 16 Typical Base-Emitter Saturation Voltage vs. Collector Current

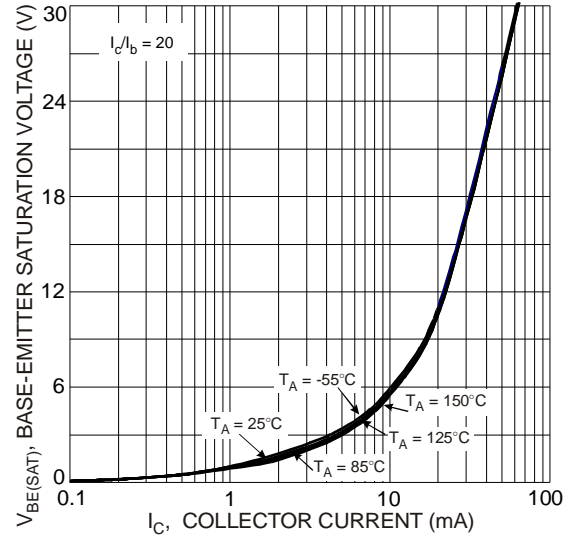


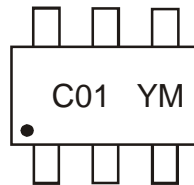
Fig. 17 Typical Base-Emitter Saturation Voltage vs. Collector Current

## Ordering Information (Note 4)

Device	Packaging	Shipping
DCX100NS-7	SOT-563	3000/Tape & Reel

Notes: 4. For packaging details, please see page 6 or go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



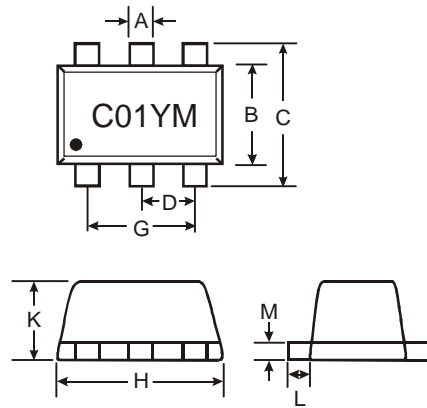
C01 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year e.g., T = 2006  
 M = Month e.g., 9 = September

### Date Code Key

Year	2005	2006	2007	2008	2009	2010	2011	2012
Code	S	T	U	V	W	X	Y	Z

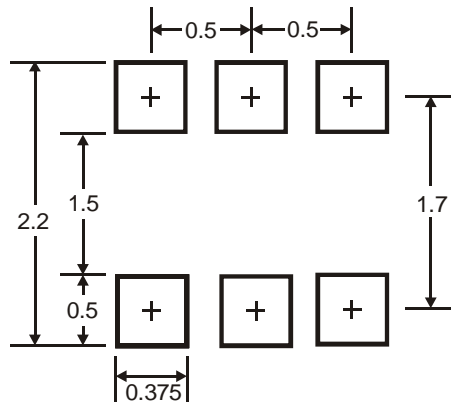
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Package Outline Dimensions**



SOT-563			
Dim	Min	Max	Typ
A	0.15	0.3	0.25
B	1.1	1.25	1.2
C	1.55	1.7	1.6
D	0.5		
G	0.90	1.1	1.00
H	1.5	1.7	1.6
K	0.56	0.6	0.6
L	0.15	0.25	0.2
M	0.1	0.18	0.11
All Dimensions in mm			

**Suggested Pad Layout** (Dimensions in mm)



**IMPORTANT NOTICE**

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

**LIFE SUPPORT**

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.