



**DSS5220T** 

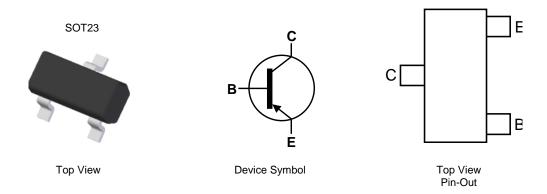
#### 20V PNP LOW SATURATION TRANSISTOR IN SOT23

#### **Features**

- BV<sub>CEO</sub> > -20V
- I<sub>C</sub> = -2A Continuous Collector Current
- I<sub>CM</sub> = -3A Peak Pulse Current
- Low Saturation Voltage V<sub>CE(sat)</sub> < -150mV @ -1A</li>
- $R_{CE(sat)} = 113m\Omega$  for a Low Equivalent On-Resistance
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please <u>contact us</u> or your local Diodes representative. <a href="https://www.diodes.com/quality/product-definitions/">https://www.diodes.com/quality/product-definitions/</a>
- An Automotive-Compliant Part is Available Under Separate Datasheet (DSS5220TQ)

#### **Mechanical Data**

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound;
   UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.008 grams (Approximate)



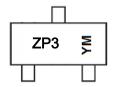
#### **Ordering Information** (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DSS5220T-7	Standard	ZP3	7	8	3,000
DSS5220T-13	Standard	ZP3	13	8	10,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

#### **Marking Information**



ZP3 = Product Type Marking Code (See Table Above)

YM = Date Code Marking Y = Year (ex: J = 2022) M = Month (ex: 9 = September)

Date Code Kev

Year	2016		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	D			J	K	L	М	N	0	Р	R	S
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec



### Absolute Maximum Ratings (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-20	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-20	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Peak Pulse Collector Current	I <sub>CM</sub>	-3	A
Continuous Collector Current	Ic	-2	A

# Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Power Dissipation	(Note 5)	£	600	mW
Power Dissipation	(Note 6)	$P_{D}$	1.2	W
Thermal Decistance, Junction to Ambient Air	(Note 5)	9	209	
Thermal Resistance, Junction to Ambient Air	(Note 6)	$R_{ heta JA}$	104	°C/W
Thermal Resistance, Junction to Leads (Note 7)		$R_{ heta JL}$	75	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	С

Notes:

- 5. For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still
- air conditions whilst operating in a steady-state.

  6. Same as note 5, except mounted on 25mm x 25mm 1oz copper.
- 7. Thermal resistance from junction to solder-point (at the end of collector lead).

  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

January 2022



# **Thermal Characteristics and Derating information**

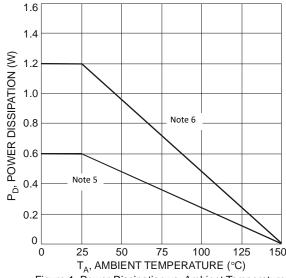
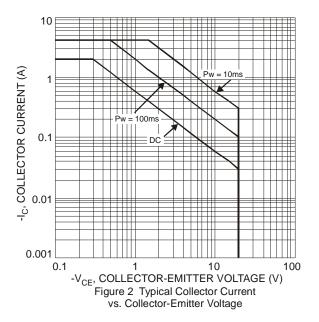
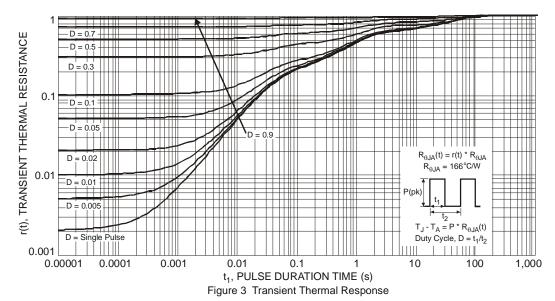


Figure 1 Power Dissipation vs. Ambient Temperature







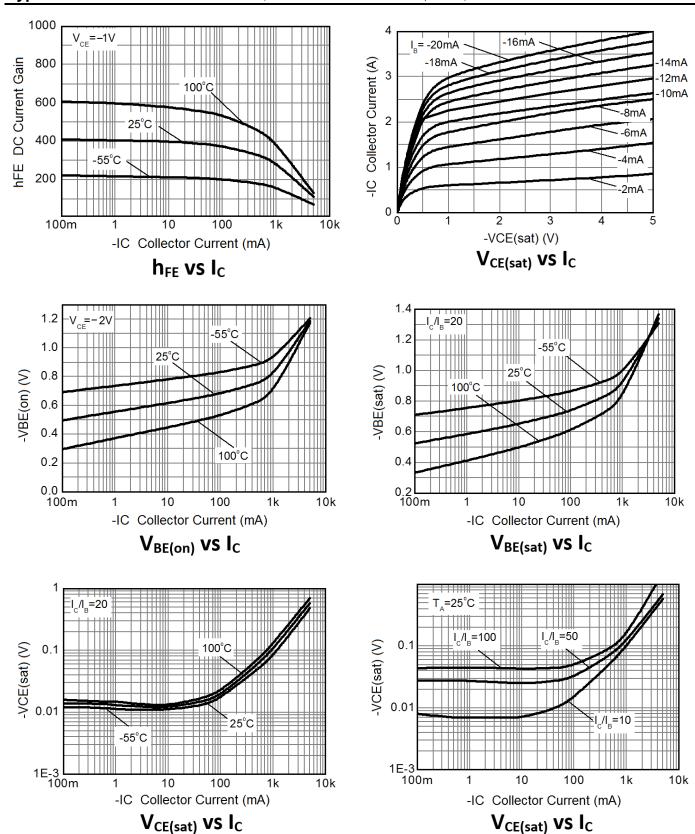
## **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Conditions		
OFF CHARACTERISTICS								
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-20	_	_	V	$I_{C} = -100 \mu A$		
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-20	_	_	V	I <sub>C</sub> = -10mA		
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	_	_	V	I <sub>E</sub> = -100μA		
Collector-Base Cutoff Current				-100	nA	$V_{CB} = -20V, I_{E} = 0$		
Collector-base Cutoff Current	Ісво		_	-50	μA	$V_{CB} = -20V$ , $I_E = 0$ , $T_J = +150$ °C		
Emitter-Base Cutoff Current	I <sub>EBO</sub>	_	_	-100	nA	$V_{EB} = -6V, I_C = 0$		
ON CHARACTERISTICS (Note 9)								
		225	_	_		$V_{CE} = -2V, I_{C} = -100mA$		
DC Current Gain	h	225	_	_		$V_{CE} = -2V, I_{C} = -500mA$		
Do Guirent Gain	h <sub>FE</sub>	200	_	_	_	$V_{CE} = -2V$ , $I_C = -1A$		
		150	_	_		$V_{CE} = -2V$ , $I_C = -2A$		
		_	_	-80		$I_C = -500 \text{mA}, I_B = -50 \text{mA}$		
Collector-Emitter Saturation Voltage	V	_	_	-150	mV	$I_C = -1A$ , $I_B = -50mA$		
Conector-Emitter Saturation Voltage	VCE(sat)	$V_{CE(sat)}$	VCE(sat)	_	_	-250	IIIV	$I_C = -2A$ , $I_B = -100mA$
		_	_	-225		$I_C = -2A$ , $I_B = -200mA$		
Equivalent On-Resistance	R <sub>CE(sat)</sub>	_	_	113	mΩ	$I_C = -2A$ , $I_B = -200mA$		
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	_	_	-1.1	V	$I_C = -2A$ , $I_B = -100mA$		
Base-Emitter Turn-on Voltage	V <sub>BE(on)</sub>	_	_	-1.2	V	$V_{CE} = -2V, I_{C} = -1A$		
SMALL SIGNAL CHARACTERISTICS						•		
Transition Frequency	f⊤	100	_	_	MHz	$V_{CE} = -5V$ , $I_{C} = -100mA$ , $f = 100MHz$		
Collector-Base Capacitance	C <sub>cbo</sub>	_	_	50	pF	V <sub>CB</sub> = -10V, f = 1MHz		
Turn-On Time	t <sub>on</sub>	_	190	_	ns			
Delay Time	t <sub>d</sub>	_	108	_	ns			
Rise Time	t <sub>r</sub>	_	82	_	ns	$V_{CC} = -10V, I_{C} = -100mA,$		
Turn-Off Time	t <sub>off</sub>	_	205	_	ns	$I_{B1} = -I_{B2} = -10mA$		
Storage Time	ts	_	156	_	ns	]		
Fall Time	t <sub>f</sub>	_	49	_	ns			

Note: 9. Measured under pulsed conditions. Pulse width  $\leq$  300 $\mu$ s. Duty cycle  $\leq$  2%.



## Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

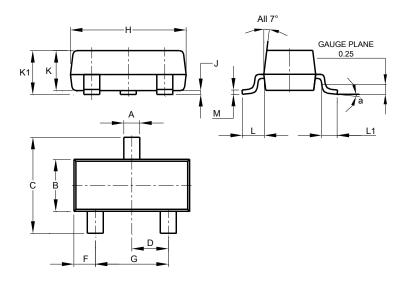




# **Package Outline Dimensions**

Please see http://www.diodes.com/package-outlines.html for the latest version.

#### SOT23

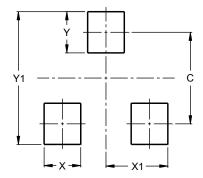


SOT23						
Dim	Min	Max	Тур			
Α	0.37	0.51	0.40			
В	1.20	1.40	1.30			
С	2.30	2.50	2.40			
D	0.89	1.03	0.915			
F	0.45	0.60	0.535			
G	1.78	2.05	1.83			
Н	2.80	3.00	2.90			
J	0.013	0.10	0.05			
K	0.890	1.00	0.975			
K1	0.903	1.10	1.025			
L	0.45	0.61	0.55			
L1	0.25	0.55	0.40			
М	0.085	0.150	0.110			
а	0°	8°				
All	Dimens	ions in	mm			

## **Suggested Pad Layout**

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23



Dimensions	Value (in mm)
C	2.0
Х	0.8
X1	1.35
Υ	0.9
Y1	2.9



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