

20V PNP LOW SATURATION TRANSISTOR IN SOT23
Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

Features

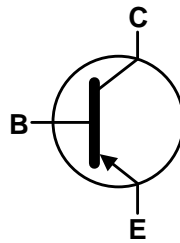
- $BV_{CEO} > -20V$
- $I_C = -2A$ Continuous Collector Current
- $I_{CM} = -3A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)} < -150mV @ -1A$
- $R_{CE(SAT)} = 113m\Omega$ for a Low Equivalent On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

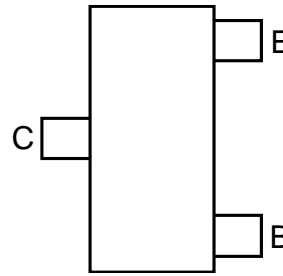
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 [Ⓔ]
- Weight 0.008 grams (Approximate)



Top View



Device Symbol

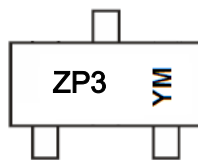


Top View Pin-Out

Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DSS5220TQ-7	Automotive	ZP3	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. 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: C = 2015)
 M = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	C	D	E	F	G	H	I	J	K	L	M	N
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

Absolute 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}	-7	V
Peak Pulse Collector Current	I _{CM}	-3	A
Continuous Collector Current	I _C	-2	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 6) 600	mW
		(Note 7) 1.2	W
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 6) 209	°C/W
		(Note 7) 104	
Thermal Resistance, Junction to Leads	(Note 8) R _{θJL}	75	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 9)

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	C

- Notes:
6. 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.
 7. Same as note 6, except mounted on 25mm x 25mm 1oz copper.
 8. Thermal resistance from junction to solder-point (at the end of collector lead).
 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating information

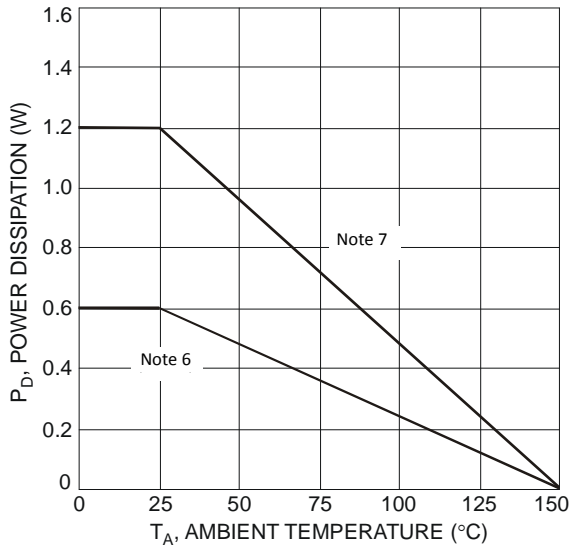


Figure 1 Power Dissipation vs. Ambient Temperature

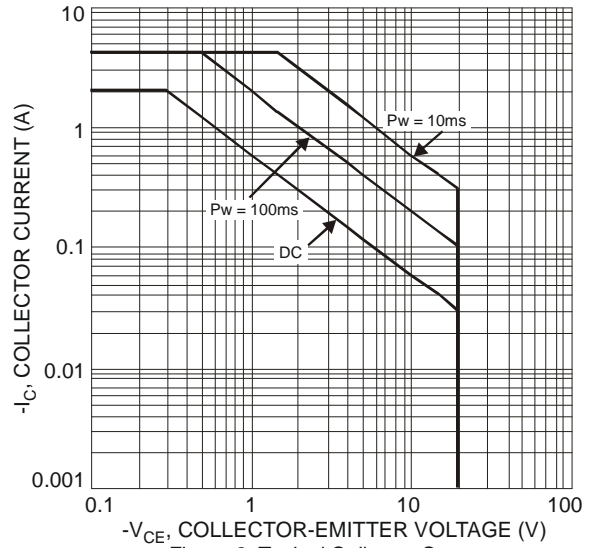


Figure 2 Typical Collector Current vs. Collector-Emitter Voltage

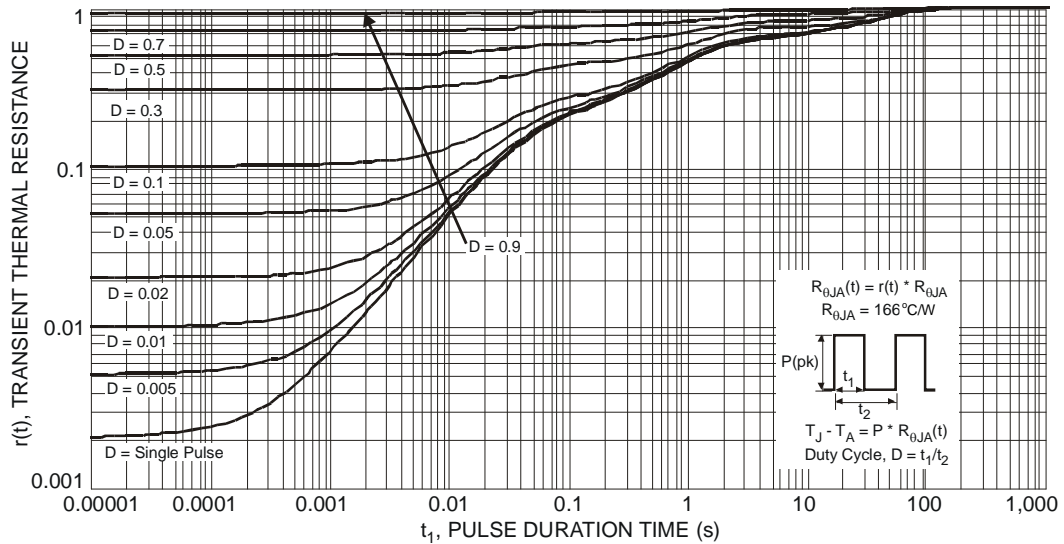


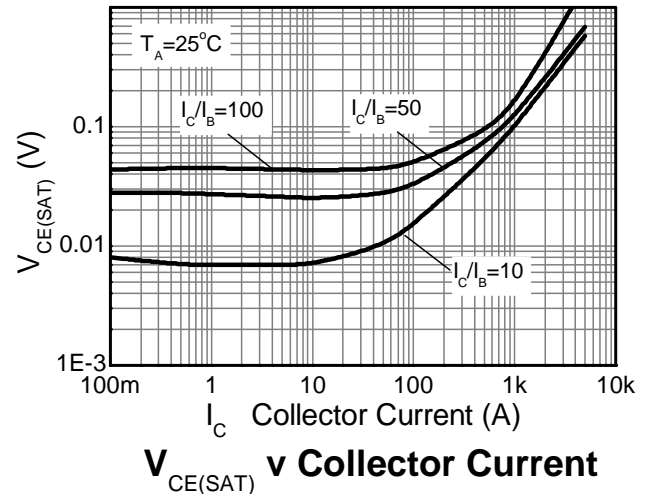
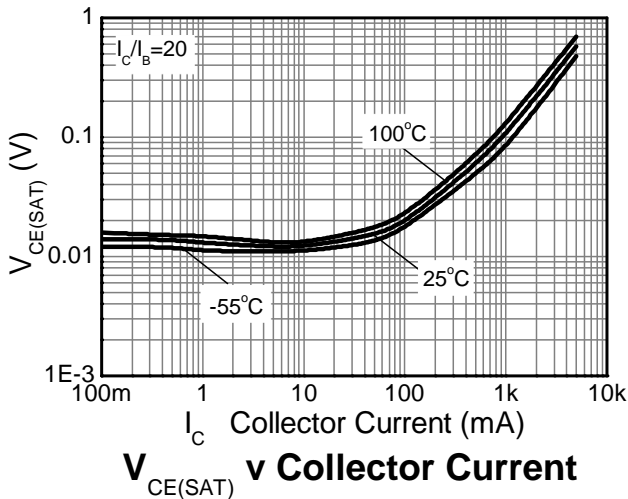
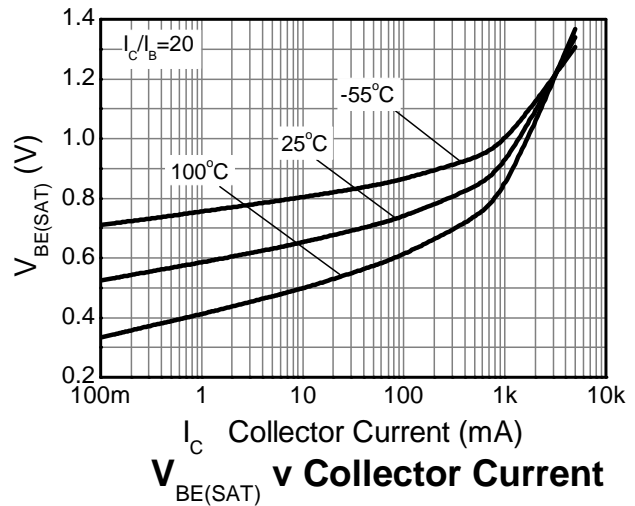
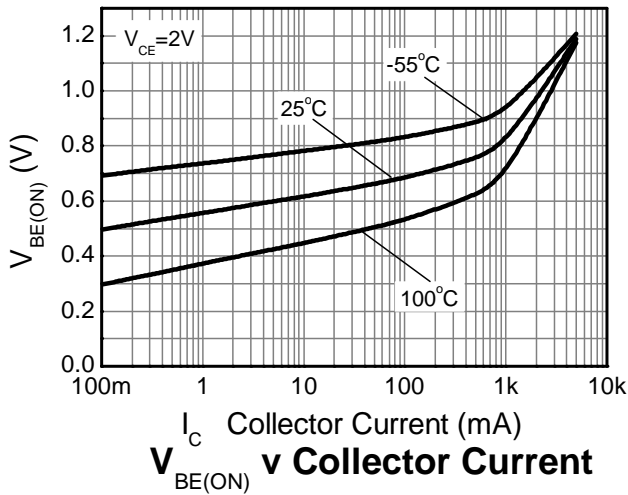
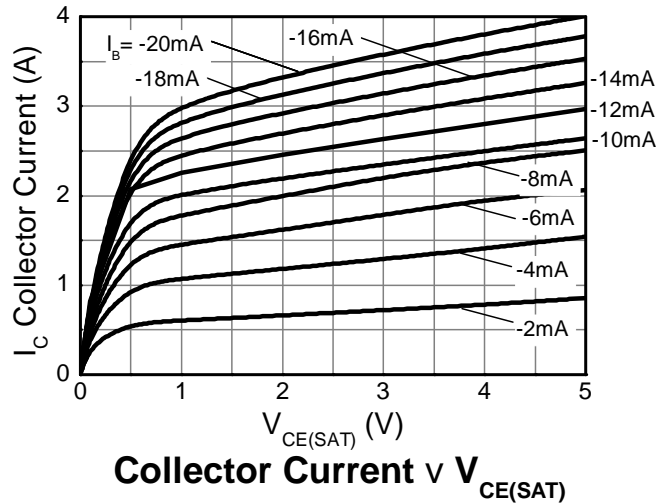
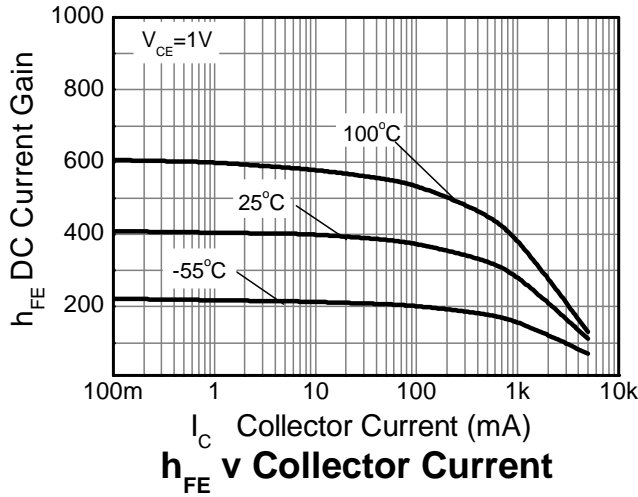
Figure 3 Transient Thermal Response

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	-20	—	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV _{CEO}	-20	—	—	V	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-7	—	—	V	I _E = -100μA
Collector-Base Cutoff Current	I _{CBO}	—	—	-100	nA	V _{CB} = -20V, I _E = 0
				-50	μA	V _{CB} = -20V, I _E = 0, T _J = +150°C
Emitter-Base Cutoff Current	I _{EBO}	—	—	-100	nA	V _{EB} = -6V, I _C = 0
ON CHARACTERISTICS (Note 10)						
DC Current Gain	h _{FE}	225	—	—	—	V _{CE} = -2V, I _C = -100mA
		225	—	—		V _{CE} = -2V, I _C = -500mA
		200	—	—		V _{CE} = -2V, I _C = -1A
		150	—	—		V _{CE} = -2V, I _C = -2A
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	-80	mV	I _C = -500mA, I _B = -50mA
		—	—	-150		I _C = -1A, I _B = -50mA
		—	—	-250		I _C = -2A, I _B = -100mA
		—	—	-225		I _C = -2A, I _B = -200mA
Equivalent On-Resistance	R _{CE(SAT)}	—	—	113	mΩ	I _C = -2A, I _B = -200mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	—	-1.1	V	I _C = -2A, I _B = -100mA
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	—	—	MHz	V _{CE} = -5V, I _C = -100mA, f = 100MHz
Collector-Base Capacitance	C _{cbo}	—	—	50	pF	V _{CB} = -10V, f = 1MHz

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

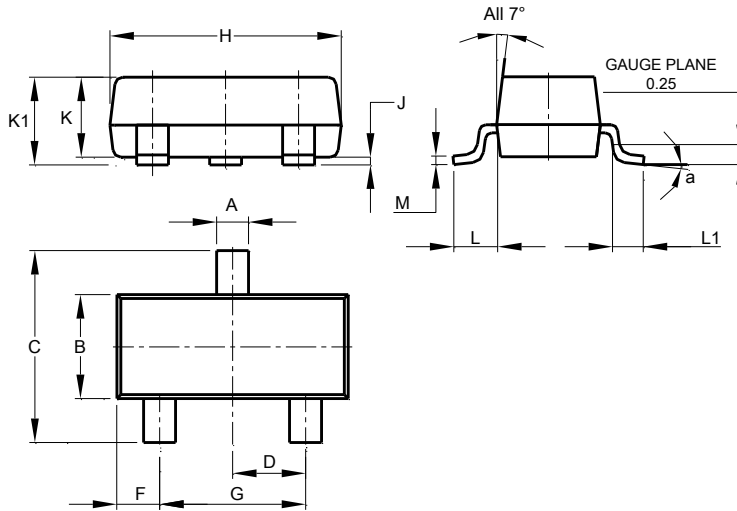
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

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

SOT23

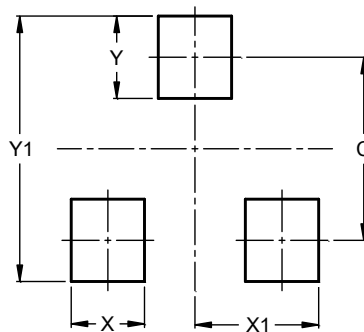


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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