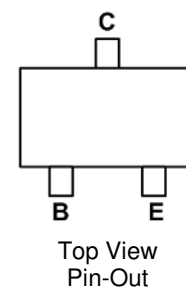
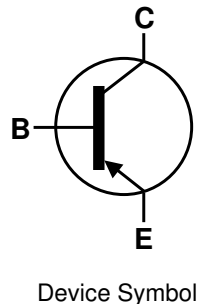


## Features

- $BV_{CEO} > -40V$
- $I_C = -1A$  Continuous Collector Current
- $I_{CM} = -2A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -500mV @ I_C = -1A$
- Ultra-Small Surface Mount Package
- Complementary NPN Type: DSS4140U
- **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**

## Mechanical Data

- Case: SOT323
- 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: 0.006 grams (Approximate)

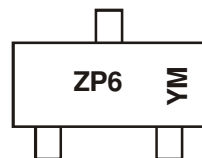


## Ordering Information (Note 4)

Device	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per reel
DSS5140U-7	AEC-Q101	ZP6	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](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



ZP6 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Code	X	Y	Z	A	B	C	D	E	F	G	H

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5	V
Collector Current - Continuous	I <sub>C</sub>	-1	A
Peak Pulse Collector Current	I <sub>CM</sub>	-2	A
Peak Base Current	I <sub>BM</sub>	-1	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5) 400	mW
		(Note 6) 500	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 313	°C/W
		(Note 6) 250	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	350	°C/W
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	C

- Notes:
5. For a device mounted with collector lead on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as Note 5, except the collector lead is on a 25mm x 25mm 1oz copper.
  7. Thermal resistance from junction to solder-point (at the end of the leads).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

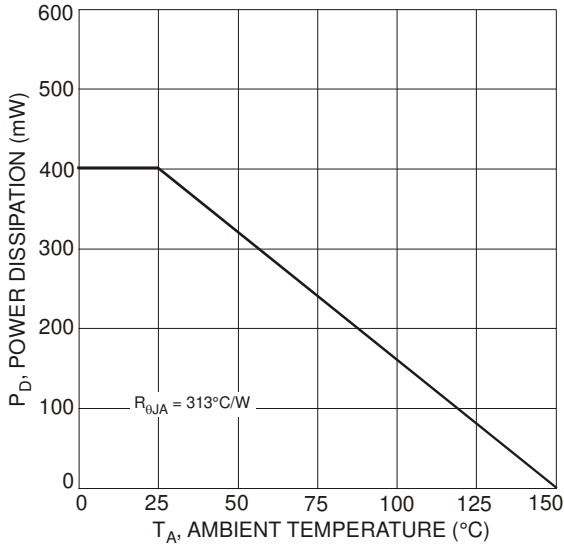


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

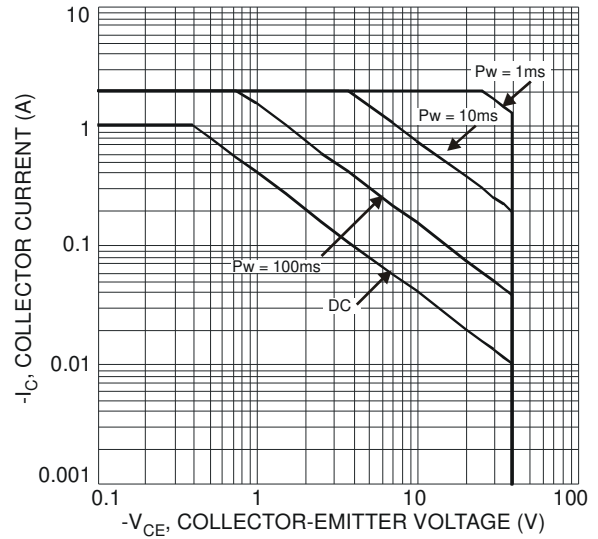


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage (Note 3)

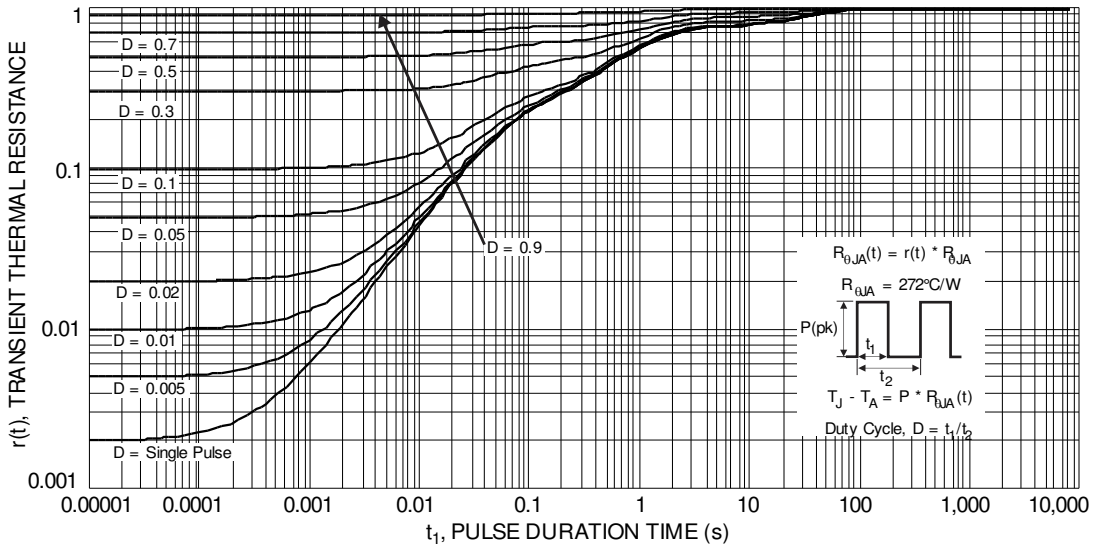


Fig. 3 Transient Thermal Response (Note 3)

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-40	—	—	V	I <sub>C</sub> = -100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-40	—	—	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>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> = -40V, I <sub>E</sub> = 0 V <sub>CB</sub> = -40V, I <sub>E</sub> = 0, T <sub>J</sub> = +150°C
Collector Cutoff Current	I <sub>CES</sub>	—	—	-100	nA	V <sub>CE</sub> = -40V, 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 9)</b>						
DC Current Gain	h <sub>FE</sub>	300 300 250 160	— — — —	— 800 — —	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -1mA V <sub>CE</sub> = -5V, I <sub>C</sub> = -100mA 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>	— — —	— — —	-200 -250 -500	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>	—	—	500	mΩ	I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	—	-1.1	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA
Base-Emitter Turn On Voltage	V <sub>BE(ON)</sub>	—	—	-1	V	V <sub>CE</sub> = -5V, I <sub>C</sub> = -1A
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	C <sub>obo</sub>	—	13	—	pF	V <sub>CB</sub> = -10V, f = 1.0MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	150	—	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Time	t <sub>on</sub>	—	60	—	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>	—	25	—	ns	
Rise Time	t <sub>r</sub>	—	35	—	ns	
Turn-Off Time	t <sub>off</sub>	—	250	—	ns	
Storage Time	t <sub>s</sub>	—	220	—	ns	
Fall Time	t <sub>f</sub>	—	30	—	ns	

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

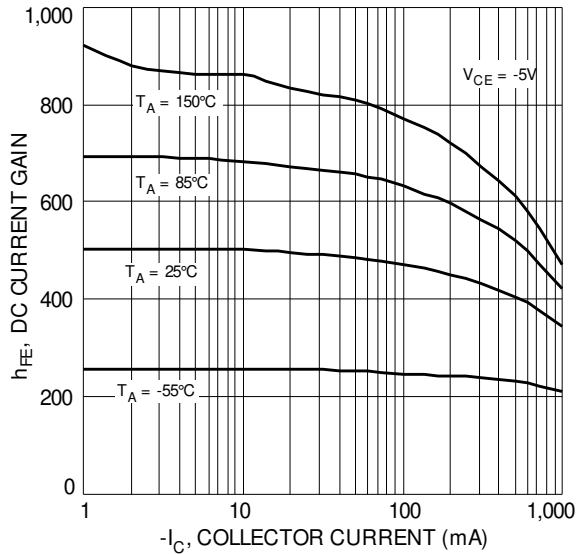


Fig. 4 Typical DC Current Gain vs. Collector Current

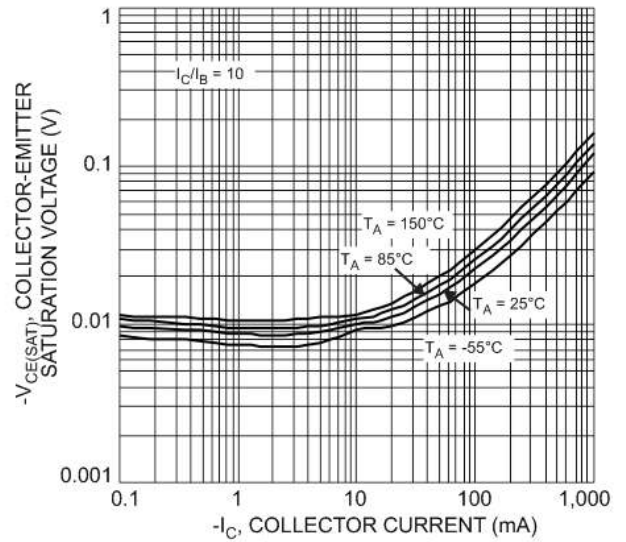


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

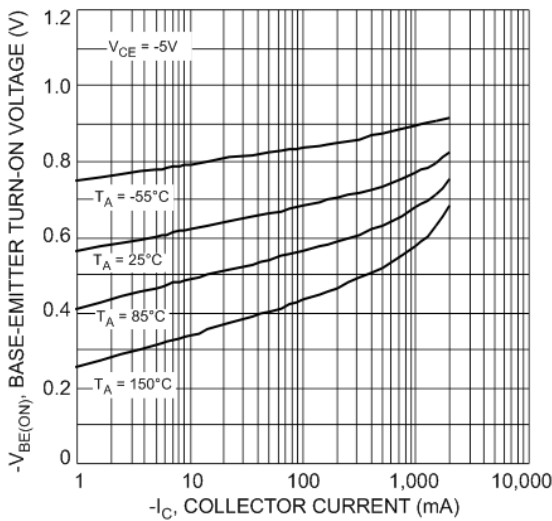


Fig. 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

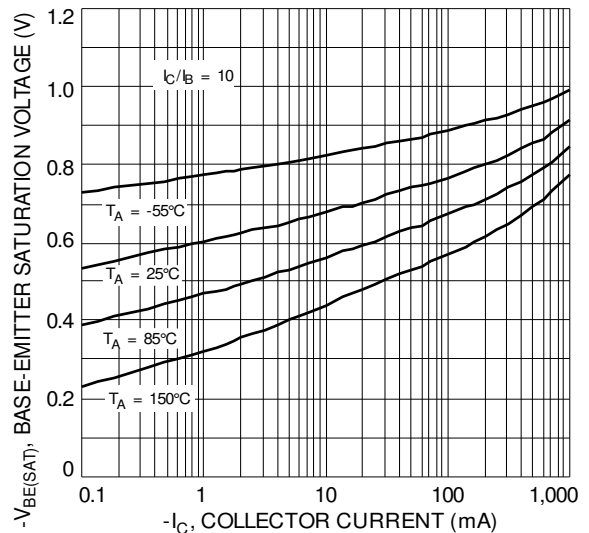


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

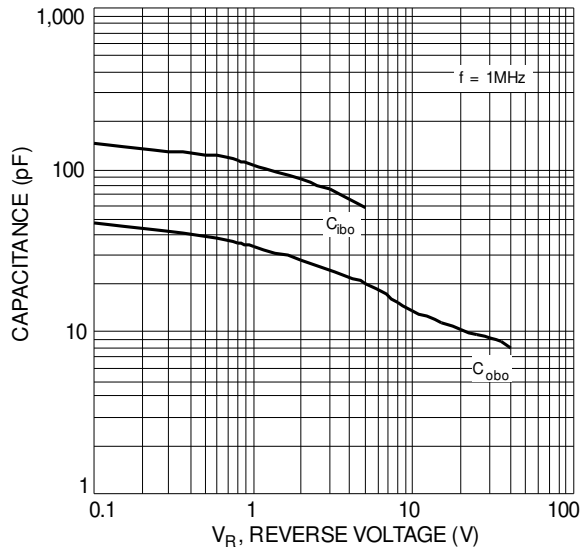
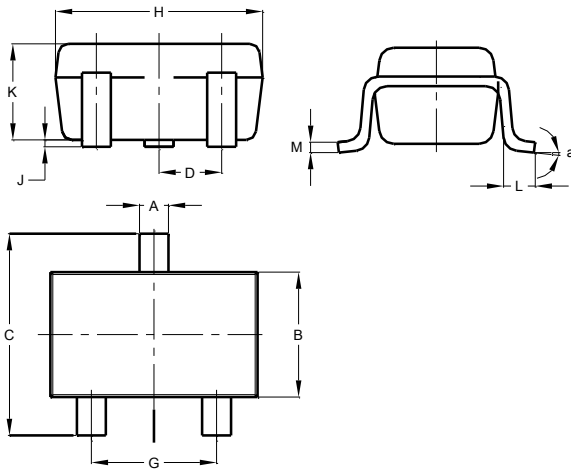


Fig. 8 Typical Capacitance Characteristics

**Package Outline Dimensions**

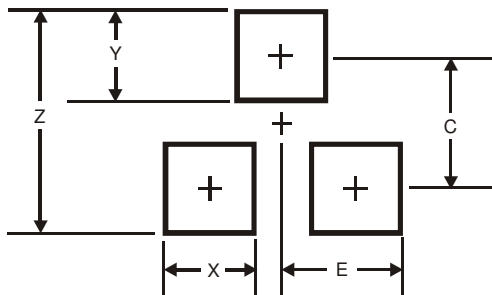
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.650 BSC		
F	0.375	0.475	0.425
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.00	0.10	0.05
K	0.90	1.00	0.95
L	0.25	0.40	0.30
M	0.10	0.18	0.11
a	8°		
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	SOT323
Z	2.8
X	0.7
Y	0.9
C	1.9
E	1.0

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