40V PNP LOW SATURATION TRANSISTOR IN SOT323

Features

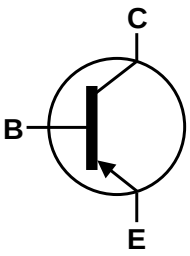
- BV_{CEO} > -40V
- I_C = -1A Continuous Collector Current
- I_{CM} = -2A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < -500mV @ I_C = -1A
- Ultra-Small Surface Mount Package
- Complementary NPN Type: DSS4140U
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

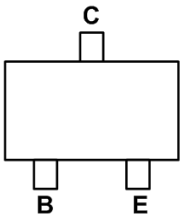
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Plated leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.006 grams (Approximate)

SOT323

Top View



Device Symbol



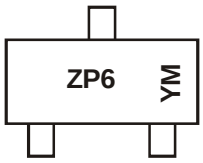
Top View
Pin-Out

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 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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current - Continuous	I_C	-1	A
Peak Pulse Collector Current	I_{CM}	-2	A
Peak Base Current	I_{BM}	-1	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	400	mW
	(Note 6)		500	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	313	°C/W
	(Note 6)		250	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	350	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-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

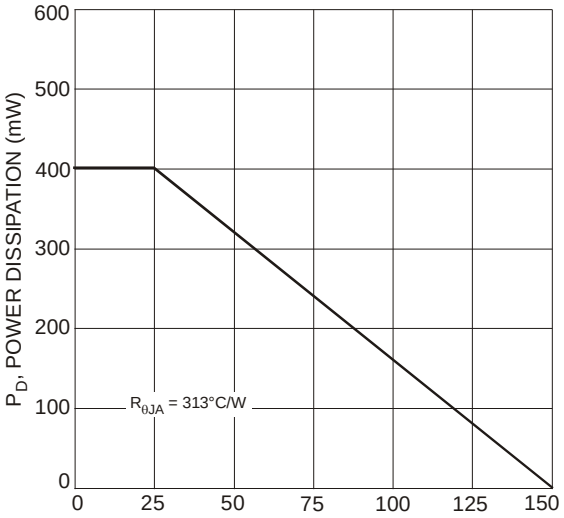


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

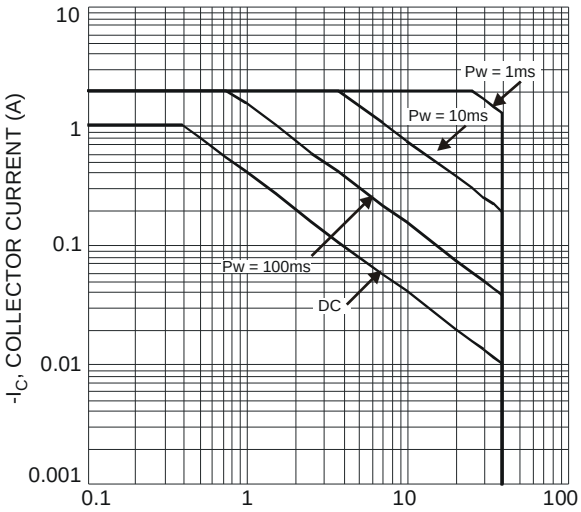


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage (Note 3)

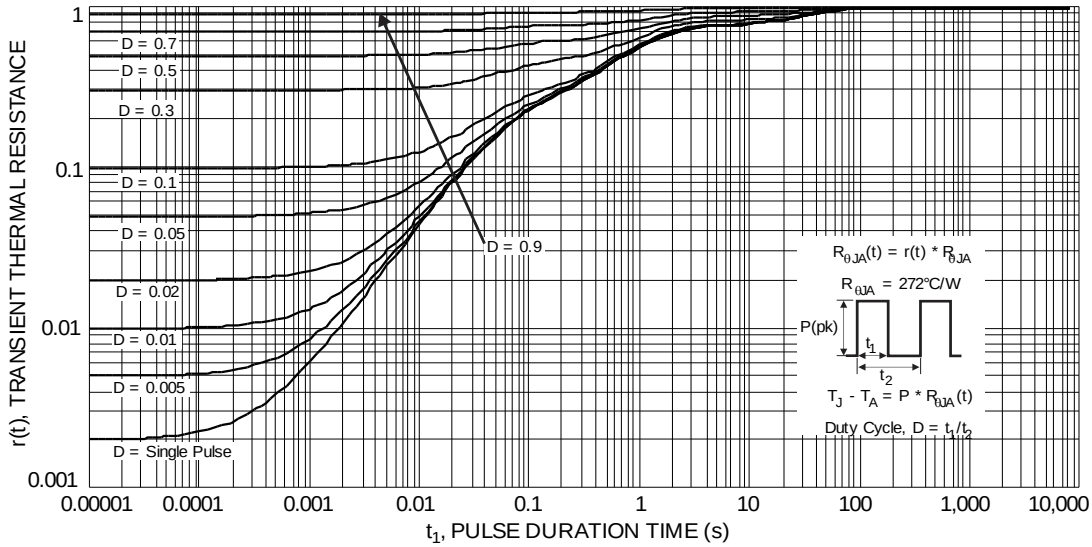


Fig. 3 Transient Thermal Response (Note 3)

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-40	—	—	V	I_C = -100µA, I_E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-40	—	—	V	I_C = -10mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	I_E = -100µA, I_C = 0
Collector Cutoff Current	I_{CBO}	—	—	-100 -50	nA µA	V_{CB} = -40V, I_E = 0 V_{CB} = -40V, I_E = 0, T_J = +150°C
Collector Cutoff Current	I_{CES}	—	—	-100	nA	V_{CE} = -40V, V_{BE} = 0
Emitter Cutoff Current	I_{EBO}	—	—	-100	nA	V_{EB} = -5V, I_C = 0
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h_{FE}	300 300 250 160	— — — —	— 800 — —	—	V_{CE} = -5V, I_C = -1mA V_{CE} = -5V, I_C = -100mA V_{CE} = -5V, I_C = -500mA V_{CE} = -5V, I_C = 1A
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	— — —	— — —	-200 -250 -500	mV	I_C = -100mA, I_B = -1mA I_C = -500mA, I_B = -50mA I_C = -1A, I_B = -100mA
Collector-Emitter Saturation Resistance	$R_{CE(SAT)}$	—	—	500	mΩ	I_C = -500mA, I_B = -50mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	—	-1.1	V	I_C = -1A, I_B = -50mA
Base-Emitter Turn On Voltage	$V_{BE(ON)}$	—	—	-1	V	V_{CE} = -5V, I_C = -1A
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	13	—	pF	V_{CB} = -10V, f = 1.0MHz
Current Gain-Bandwidth Product	f_T	150	—	—	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
SWITCHING CHARACTERISTICS						
Turn-On Time	t_{on}	—	60	—	ns	V_{CC} = -10V I_C = -0.5A, I_{B1} = -I_{B2} = -25mA
Delay Time	t_d	—	25	—	ns	
Rise Time	t_r	—	35	—	ns	
Turn-Off Time	t_{off}	—	250	—	ns	
Storage Time	t_s	—	220	—	ns	
Fall Time	t_f	—	30	—	ns	

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

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

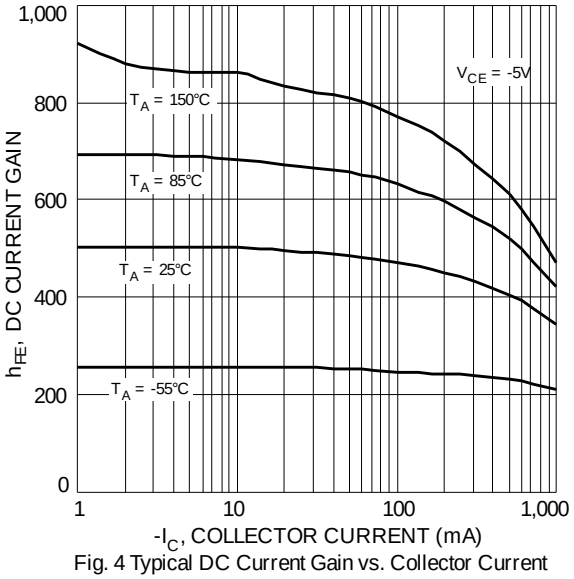


Fig. 4 Typical DC Current Gain vs. Collector Current

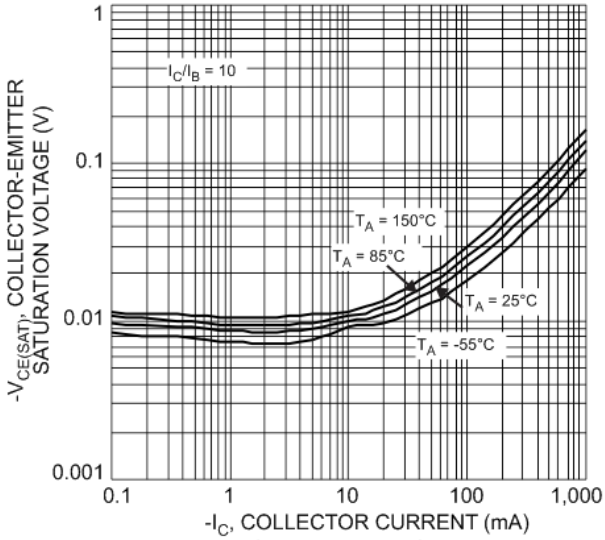


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

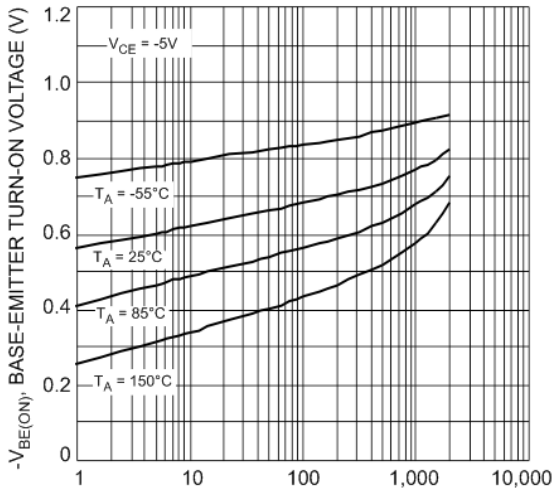


Fig. 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

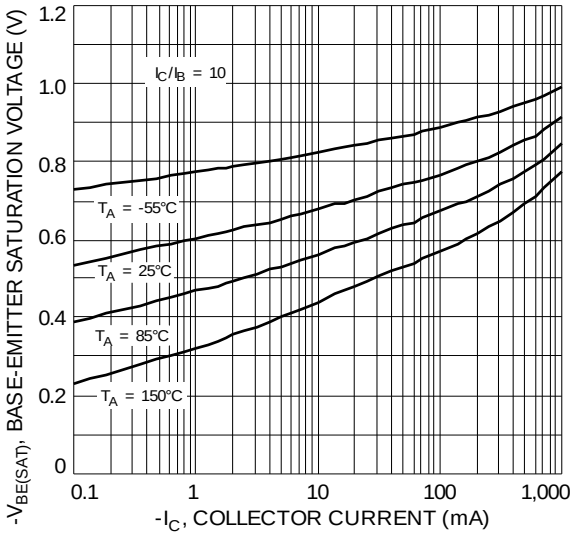


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

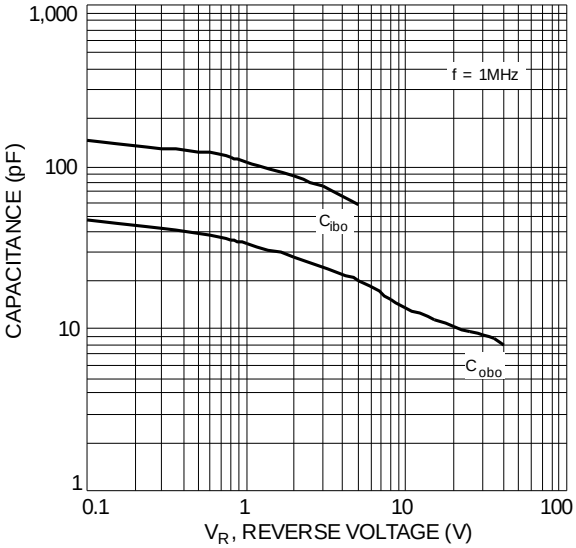
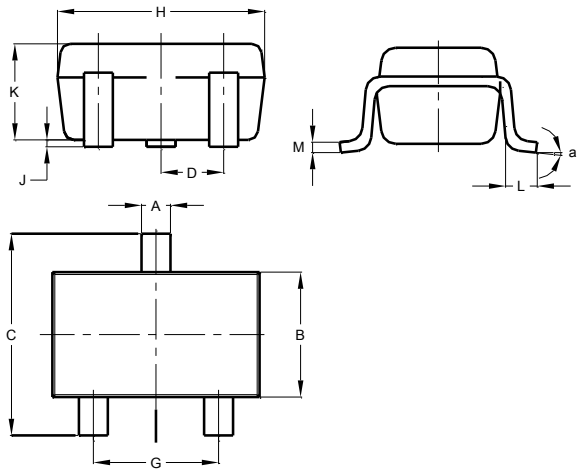


Fig. 8 Typical Capacitance Characteristics

Package Outline Dimensions

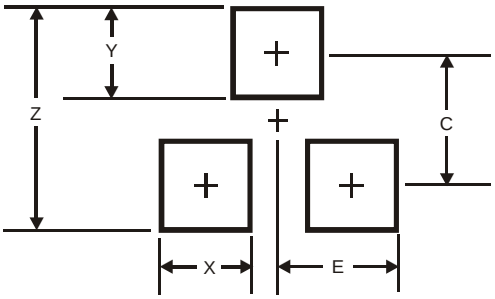
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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°C		
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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