60V DUAL NPN LOW SATURATION TRANSISTOR IN SOT26

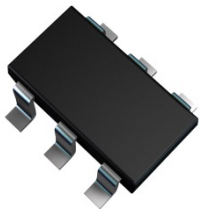
Features

- BV_{CEO} > 60V
- I_C = 1A high Continuous Collector Current
- I_{CM} = 2A Peak Pulse Current
- $R_{CE(sat)}$ = 100mΩ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(sat)}$ < 250mV @ 1A
- **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**

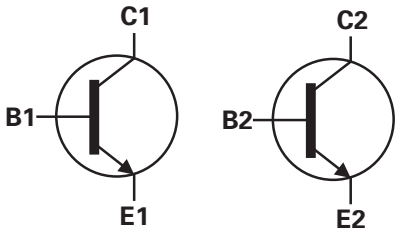
Mechanical Data

- Case: SOT26
- 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: 0.015 grams (approximate)

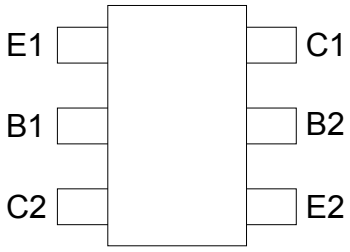
SOT26



Top View



Device Symbol



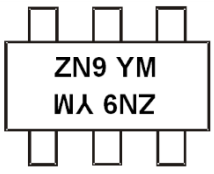
Top View
Pin-Out

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DSS4160DS-7	ZN9	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



ZN9 = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: A = 2013
M = Month ex: 9 = September

Date Code Key

Year	2013	2014	2015	2016	2017	2018	2019	2020
Code	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 – Q1 & Q2 Common (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	1	A
Peak Pulse Collector Current	I_{CM}	2	A
Base current	I_B	300	mA
Peak Pulse Base current	I_{BM}	1	A

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

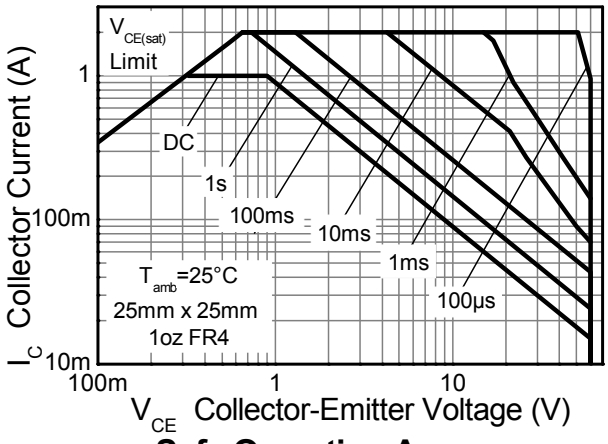
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 5 & 9)	P_D	0.7 5.6	W mW/°C
	(Notes 6 & 9)		0.9 7.2	
	(Notes 6 & 10)		1.1 8.8	
	(Notes 7 & 9)		1.1 8.8	
	(Notes 8 & 9)		1.7 13.6	
Thermal Resistance, Junction to Ambient	(Notes 5 & 9)	$R_{\theta JA}$	179	°C/W
	(Notes 6 & 9)		139	
	(Notes 6 & 10)		113	
	(Notes 7 & 9)		113	
	(Notes 8 & 9)		73	
Thermal Resistance, Junction to Lead	(Note 11)	$R_{\theta JL}$	96	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 12)

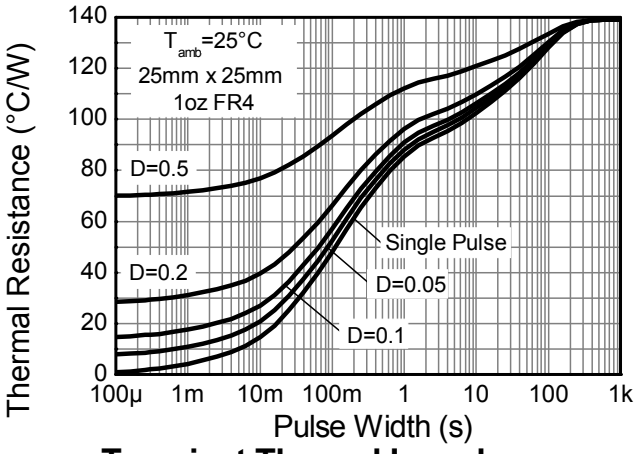
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 15mm x 15mm 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 device is mounted on 25mm x 25mm 1oz copper.
7. Same as note (5), except the device is mounted on 50mm x 50mm 2oz copper.
8. Same as note (7), except the device is measured at t < 5 seconds.
9. One active die operating with the collector attached to the heatsink.
10. Two active dice running at equal power with heatsink split 50% to each collector.
11. Thermal resistance from junction to solder-point (at the end of the collector lead).
12. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

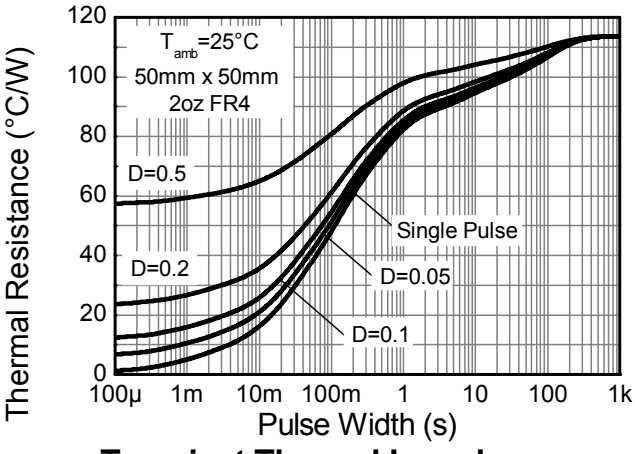
Thermal Characteristics and Derating Information



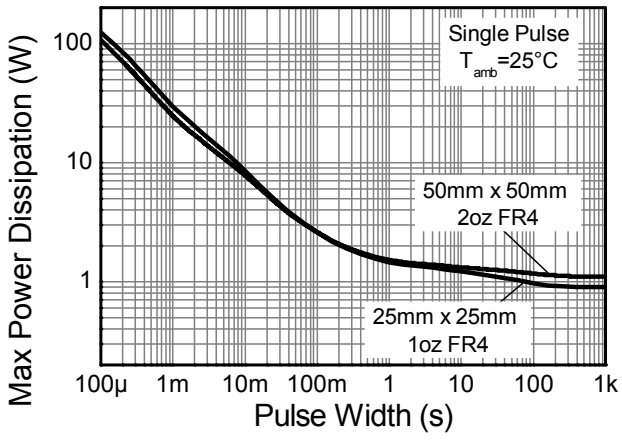
Safe Operating Area



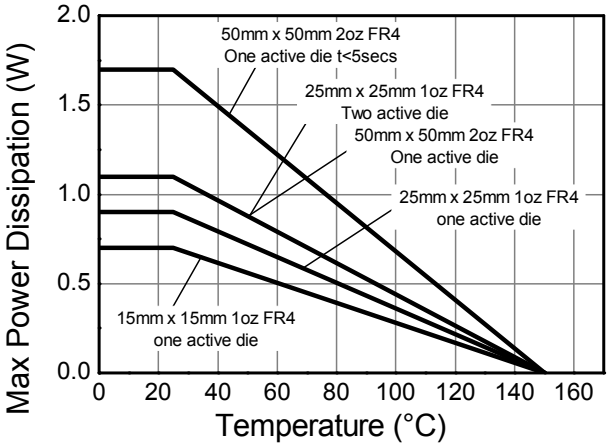
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

Electrical Characteristics - Q1 & Q2 common (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 13)	BV_{CEO}	60	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	I_E = 100μA
Collector-Base Cutoff Current	I_{CBO}	—	—	100	nA	V_{CB} = 60V, I_E = 0A
		—	—	50	μA	V_{CB} = 60V, I_E = 0A, T_J = +150°C
Collector-Emitter Cutoff Current	I_{CES}	—	—	100	nA	V_{CES} = 60V, V_{BE} = 0V
Emitter-Base Cutoff Current	I_{EBO}	—	—	100	nA	V_{EB} = 5V, I_C = 0A
DC Current Gain (Note 13)	h_{FE}	250 200 100	380 420 380	— — —	—	I_C = 1mA, V_{CE} = 5V I_C = 500mA, V_{CE} = 5V I_C = 1A, V_{CE} = 5V
Collector-Emitter Saturation Voltage (Note 13)	$V_{CE(sat)}$	— — —	60 70 100	110 140 250	mV	I_C = 100mA, I_B = 1mA I_C = 500mA, I_B = 50mA I_C = 1A, I_B = 100mA
Equivalent On-Resistance	$R_{CE(sat)}$	—	100	250	mΩ	I_C = 1A, I_B = 100mA
Base-Emitter Saturation Voltage (Note 13)	$V_{BE(sat)}$	—	940	1100	mV	I_C = 1A, I_B = 50mA
Base-Emitter Turn-On Voltage (Note 13)	$V_{BE(on)}$	—	780	900	mV	I_C = 1A, V_{CE} = 5V
Output Capacitance	C_{obo}	—	5.5	10	pF	V_{CB} = 10V, f = 1MHz
Transition Frequency	f_T	150	220	—	MHz	V_{CE} = 10V, I_C = 50mA f = 100MHz
Turn-On Time	t_{on}	—	63	—	ns	V_{CC} = 10V, I_C = 0.5A I_{B1} = -I_{B2} = 25mA
Delay Time	t_d	—	33	—	ns	
Rise Time	t_r	—	30	—	ns	
Turn-Off Time	t_{off}	—	420	—	ns	
Storage Time	t_s	—	380	—	ns	
Fall Time	t_f	—	40	—	ns	

Notes: 13. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%

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

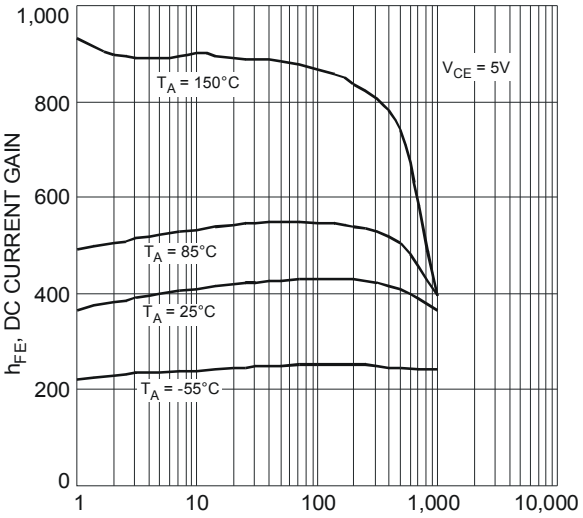


Fig. 5 Typical DC Current Gain vs. Collector Current

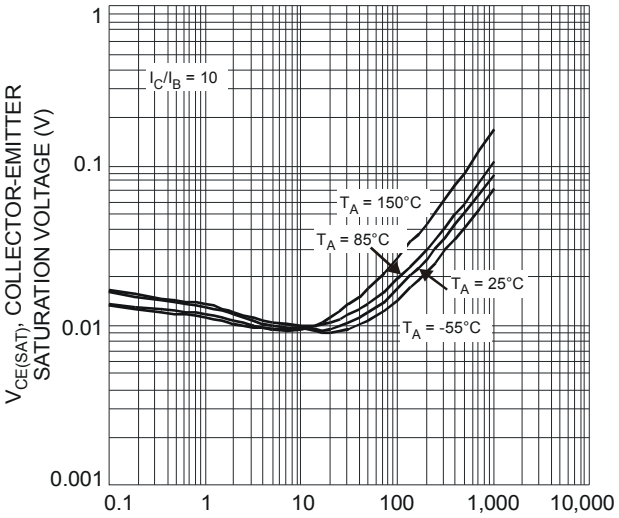


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

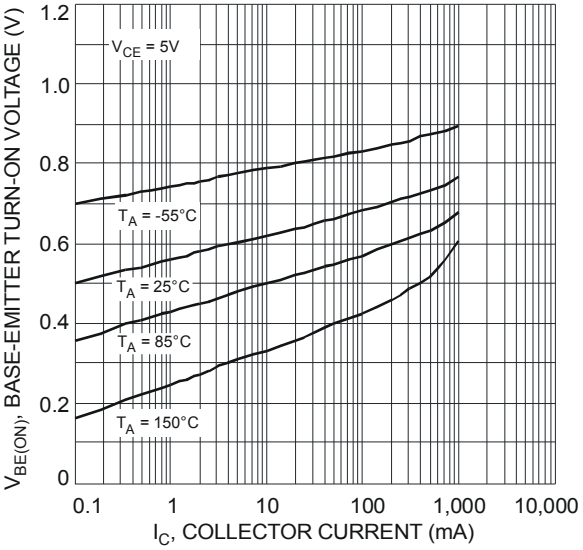


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

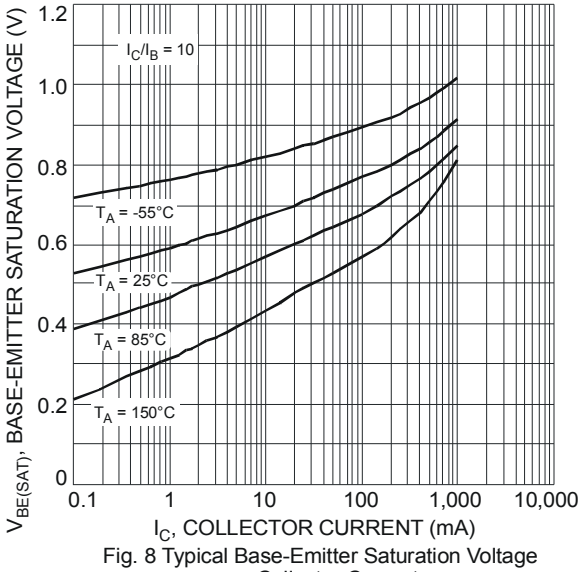


Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current

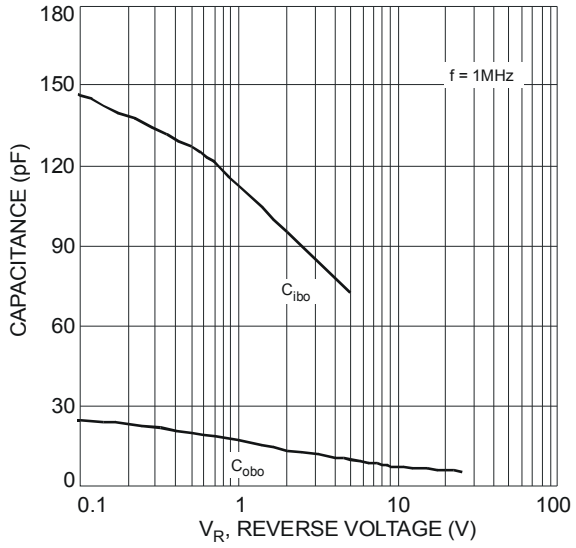
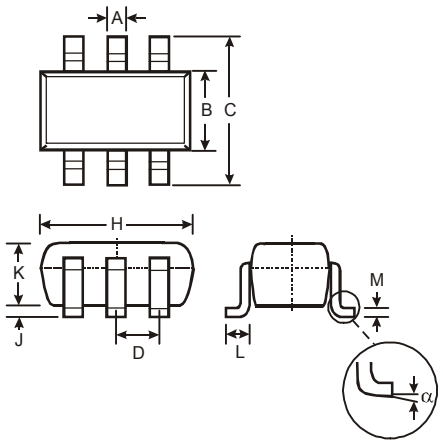


Fig. 9 Typical Capacitance Characteristics

Package Outline Dimensions

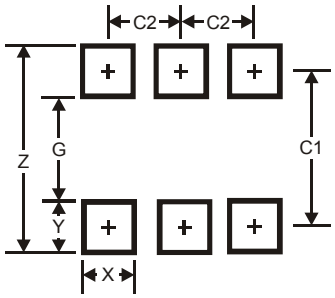
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT26			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

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