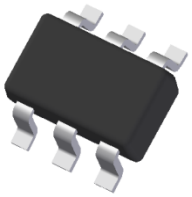
NPN TRANSISTOR WITH DUAL SERIES SWITCHING DIODE

Features

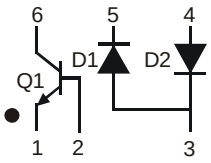
- Integrates one NPN Transistor (Q1) and two Switching Diodes (D1, D2) in a Single Compact Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

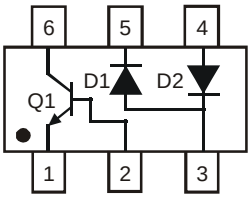
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe (Lead-Free Plating). Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.01 grams (Approximate)



Top View



Device Schematic



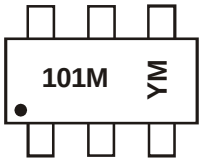
Top View
Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DSM80101M-7	SOT26	3,000/Tape & Reel

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



101M = Product Type Marking Code
(See Electrical Characteristics Table)
YM = Date Code Marking
Y = Year (ex: B = 2014)
M = Month (ex: 9 = September)

Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020	2021
Code	B	C	D	E	F	G	H	I

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

Maximum Ratings – Q1 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	80	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Continuous Collector Current	$I_{C(MAX)}$	500	mA
Peak Pulse Collector Current @ DC Increment for I_C; I_B = 300mA; Test Duration >10s for each Step	I_{CM}	0.8	A
Base Current	I_B	200	mA

Maximum Ratings – D1, D2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Non-Repetitive Peak Reverse Voltage	V_{RM}	100	V
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	75	V
RMS Reverse Voltage	$V_{R(RMS)}$	53	V
Forward Continuous Current (Note 5)	I_{FM}	300	mA
Average Rectified Output Current (Note 5)	I_O	200	mA
Non-Repetitive Peak Forward Surge Current @ t = 1.0µs	I_{FSM}	20	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	600	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	208	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to +150	°C

Electrical Characteristics – Q1 (@T_A = +25°C, unless otherwise specified.)

Characteristic (Note 6)	Symbol	Min	Typical	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	I_C = 100µA, I_E = 0
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	—	—	V	I_C = 1.0mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	6.0	—	—	V	I_E = 100µA, I_C = 0
Collector Cutoff Current	I_{CBO}	—	—	100	nA	V_{CB} = 80V, I_E = 0
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	0.3	V	I_C = 100mA, I_B = 10mA
DC Current Transfer Ratio	h_{FE}	120	180	350	—	I_C = 10mA, V_{CE} = 1.0V

Electrical Characteristics – D1, D2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 6)	$V_{(BR)R}$	75	—	V	I_R = 100µA
Forward Voltage	V_F	—	0.715	V	I_F = 5.0mA
		—	0.855		I_F = 10mA
		—	1.0		I_F = 50mA
		—	1.25		I_F = 150mA
Leakage Current (Note 6)	I_R	—	0.1	µA	V_R = 75V
		—	25	nA	V_R = 20V
Total Capacitance	C_T	—	2.0	pF	V_R = 0V, f = 1.0MHz
Reverse Recovery Time	t_{rr}	—	4	ns	I_F = I_R = 10mA, I_{rr} = 0.1 x I_R, R_L = 100Ω

Notes: 5. Device mounted on FR-4 PC board with recommended pad layout, which can be found on our website at http://www.diodes.com.
6. Short duration pulse test used to minimize self-heating effect.

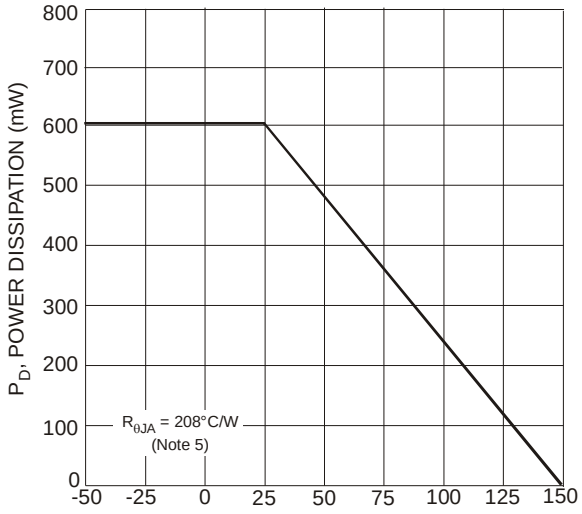


Fig. 1 Power Derating Curve

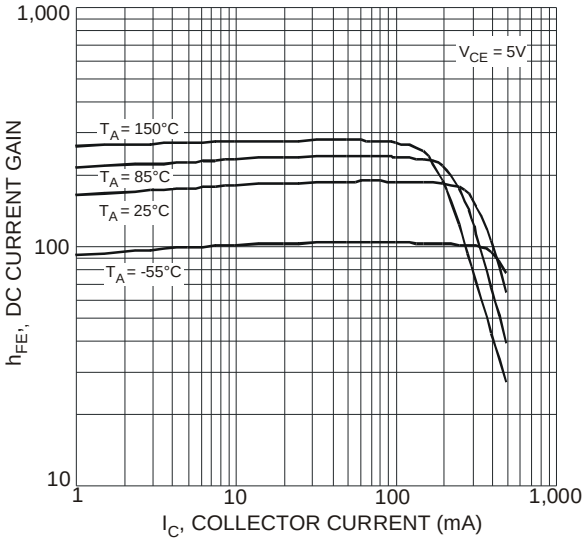


Fig. 2 Typical DC Current Gain vs. Collector Current

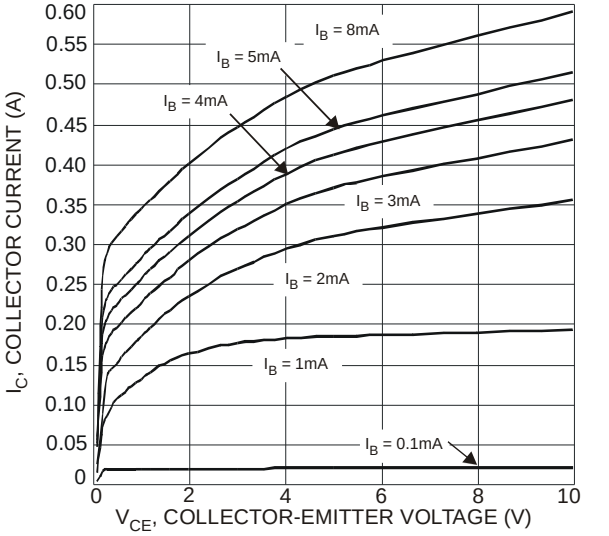


Fig. 3 Typical Collector Current vs. Collector-Emitter Voltage

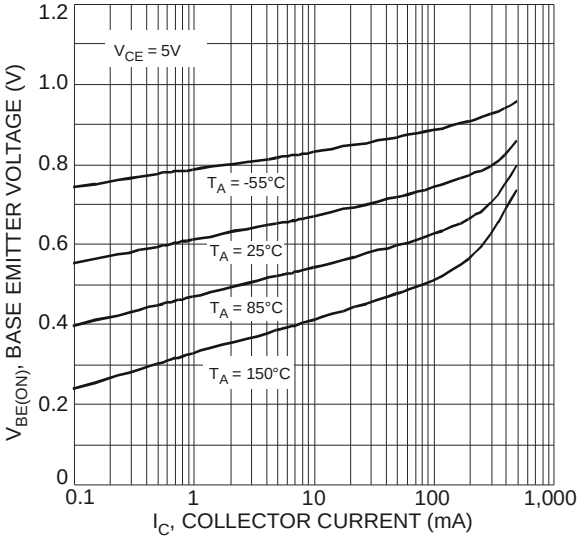


Fig. 4 Typical Base Emitter Voltage vs. Collector Current

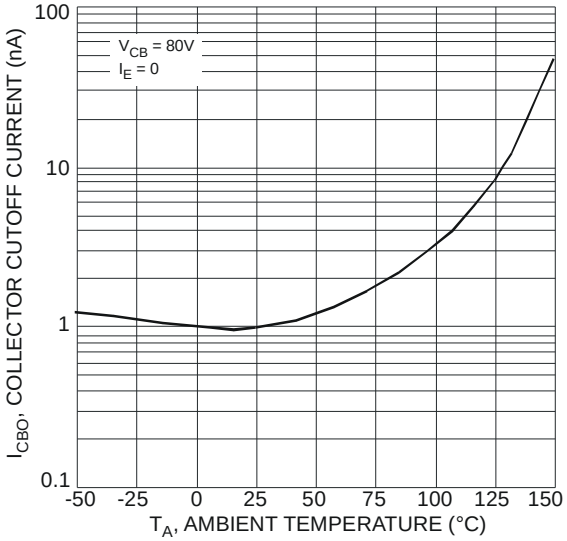


Fig. 5 Collector Cutoff Current
vs. Ambient Temperature

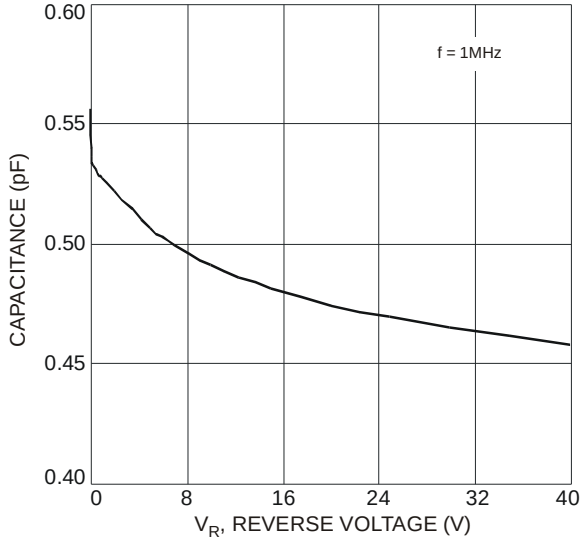


Fig. 6 Typical Capacitance Characteristics - D1, D2

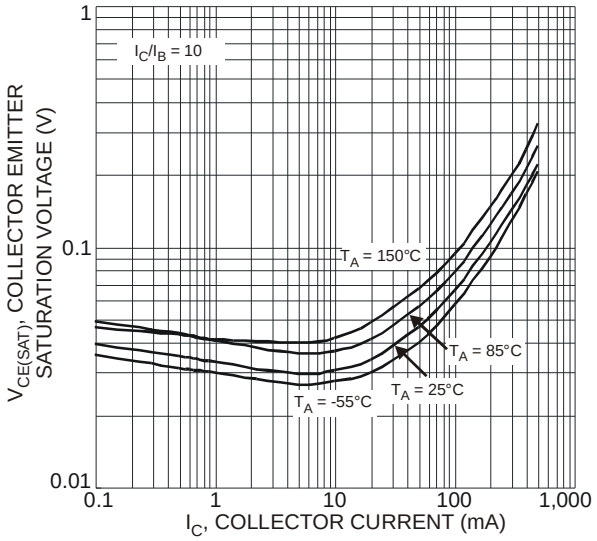


Fig. 7 Typical Collector Emitter Saturation Voltage vs. Ambient Temperature

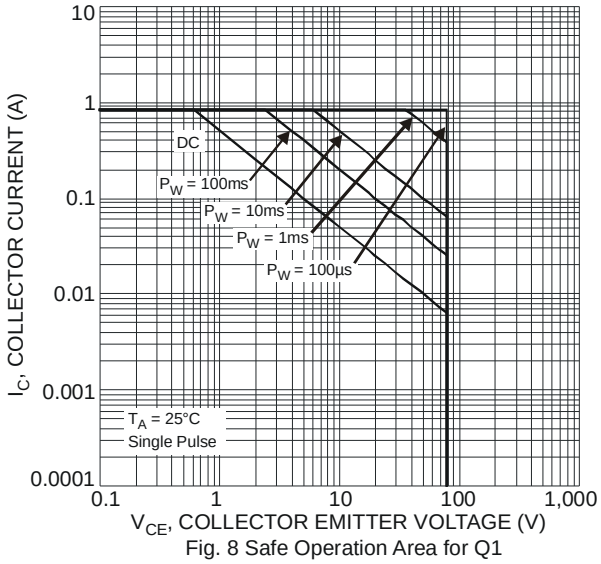


Fig. 8 Safe Operation Area for Q1

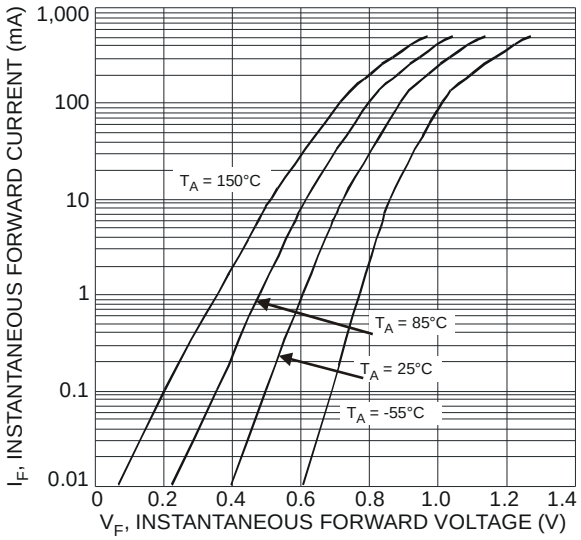


Fig. 9 Typical Forward Characteristics - D1, D2

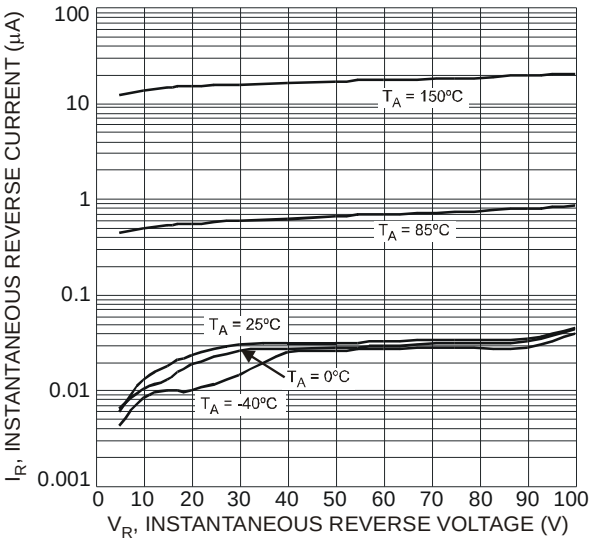


Fig. 10 Typical Reverse Characteristics - D1, D2

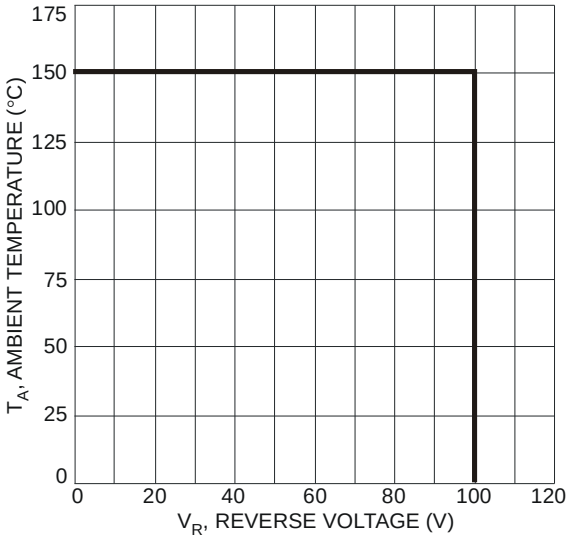
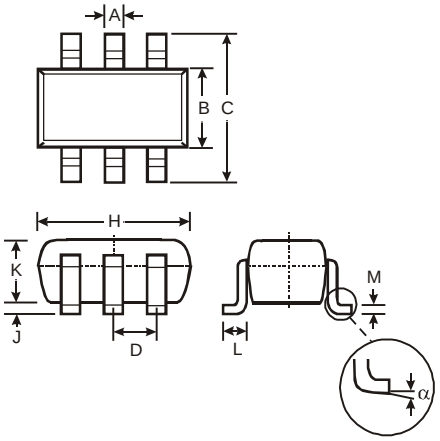


Fig 11 Operating Temperature Derating - D1, D2

Package Outline Dimensions

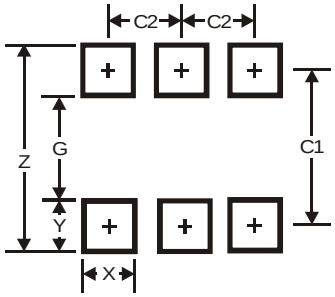
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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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