



2DA1971Q

400V PNP HIGH VOLTAGE SWITCHING TRANSISTOR

Description

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

Features

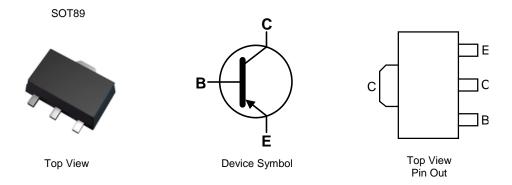
- BV_{CEO} > -400V
- I_C = -0.5A Continuous Collector Current
- I_{CM} = -1A Peak Pulse Current
- High Gain Holds up $h_{FE} \ge 140 @ I_C = -100 mA$
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.05 grams (Approximate)

Applications

• High Voltage Switching



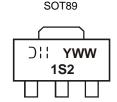
Ordering Information (Notes 4 and 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
2DA1971Q-7	Automotive	1S2	7	12	1,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/quality/.
- 5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/

Marking Information



The Manufacturer's Code Marking 1S2 = Product Type Marking Code YWW = Date Code Marking Y = Last Digit of Year (ex: 6 = 2016) WW = Week Code (01 to 53)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-400	V
Collector-Emitter Voltage	V _{CEO}	-400	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-0.5	Α
Peak Pulse Current	Ісм	-1	Α
Base Current	I _B	-250	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Leads (Note 7)	$R_{ heta JL}$	10.4	°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	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	С

Notes:

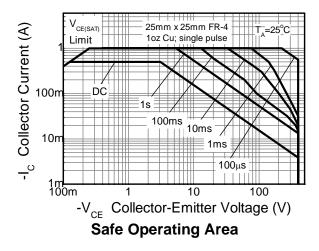
^{6.} For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.

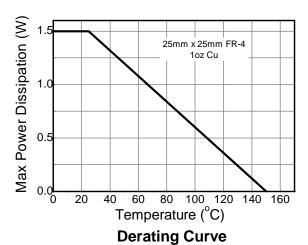
7. Thermal resistance from junction to solder-point (on the exposed collector pad).

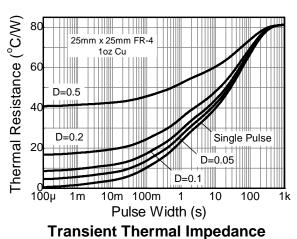
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

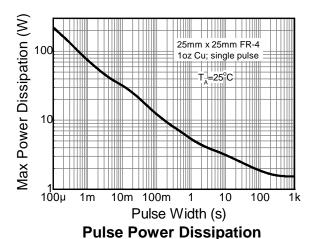


Thermal Characteristics and Derating information











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

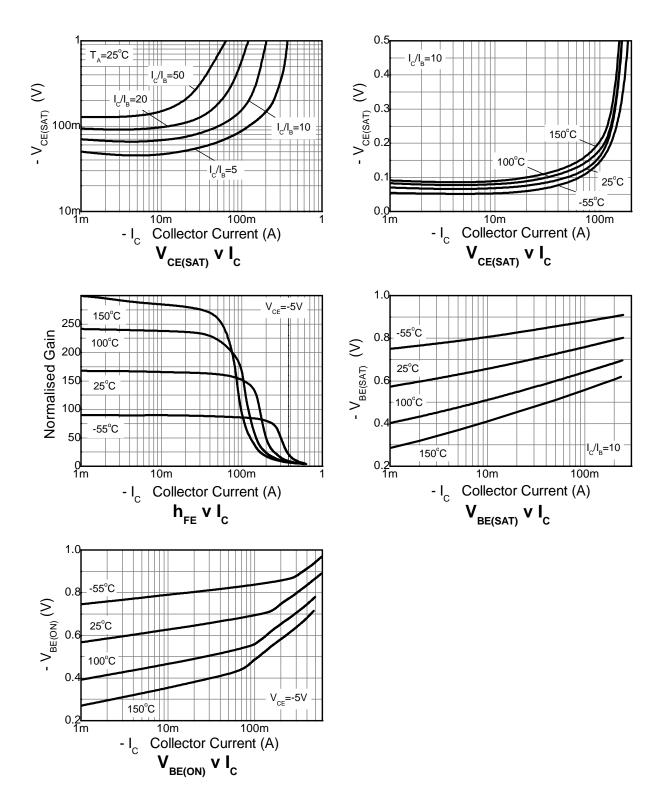
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-400	_		V	$I_{C} = -100\mu A$
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	-400	_	_	V	$I_C = -1mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	_	_	V	$I_E = -100 \mu A$
Collector-Emitter Cut-off Current	I _{CES}	_	_	-100	nA	V _{CE} = -320V
Collector Cut-off Current	I _{CBO}	_	_	-100	nA	$V_{CB} = -320V$
Emitter Cut-off Current	I _{EBO}	_	_	-100	nA	$V_{EB} = -6V$
Static Forward Current Transfer Ratio (Note 9)	h _{FE}	140 140	_	450 400	_	$I_C = -20 \text{mA}, V_{CE} = -5 \text{V}$ $I_C = -100 \text{mA}, V_{CE} = -5 \text{V}$
Collector-Emitter Saturation Voltage (Note 9)	V _{CE} (SAT)	_	_	-250 -400	mV	I _C = -100mA, I _B = -10mA I _C = -200mA, I _B = -40mA
Base-Emitter Saturation Voltage (Note 9)	V _{BE(SAT)}	_	-0.75	-0.9	V	$I_C = -100 \text{mA}, I_B = -10 \text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	V _{BE(ON)}	_	_	-0.8	V	I _C = -200mA, V _{CE} = -10V
Transition Frequency	f _T	_	75	1	MHz	$I_C = -50$ mA, $V_{CE} = -5$ V, $f = 50$ MHz
Collector Output Capacitance	C _{OBO}	_	19	_	pF	$V_{CB} = -10V$, $I_{E} = 0$, $f = 1MHz$
Delay Time	t _(D)	_	89	_	ns	
Rise Time	t _(R)	_	111	_	ns	$V_{CC} = -200V$, $I_{C} = -100mA$,
Storage Time	t _(S)	_	2165	_	ns	$I_{B1} = -10 \text{mA}, I_{B2} = 20 \text{mA}$
Fall Time	t _(F)	_	185	_	ns	

Note: 9.

^{9.} Measured under pulsed conditions. Pulse width $\leq 300 \mu s.$ Duty cycle $\leq 2\%.$



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

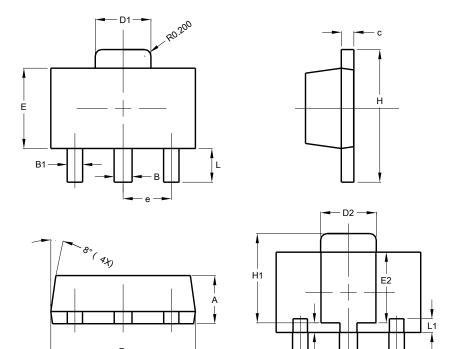




Package Outline Dimensions

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

SOT89

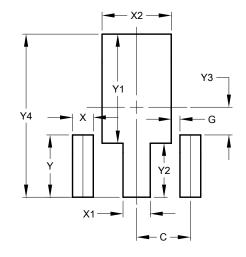


SOT89					
Dim	Min	Max	Тур		
Α	1.40	1.60	1.50		
В	0.50	0.62	0.56		
B1	0.42	0.54	0.48		
С	0.35	0.43	0.38		
D	4.40	4.60	4.50		
D1	1.62	1.83	1.733		
D2	1.61	1.81	1.71		
Е	2.40	2.60	2.50		
E2	2.05	2.35	2.20		
е	-	-	1.50		
Н	3.95	4.25	4.10		
H1	2.63	2.93	2.78		
L	0.90	1.20	1.05		
L1	0.327	0.527	0.427		
Z	0.20	0.40	0.30		
All Dimensions in mm					

Suggested Pad Layout

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

SOT89



Dimensions	Value (in mm)
С	1.500
G	0.244
Χ	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.



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