400V PNP HIGH VOLTAGE SWITCHING TRANSISTOR IN SOT89

Features

- BV_{CEO} > -400V
- Max Continuous Current I_C = -0.5A
- High Gain Holds up h_{FE} ≥ 140 @ I_C = -100mA
- **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

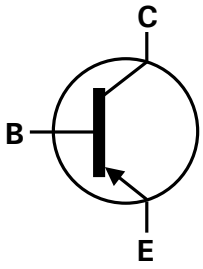
- Case: SOT89
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Applications

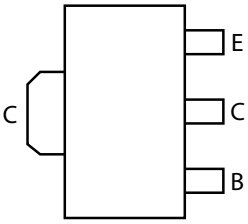
- High Voltage Switching

SOT89

Top View



Device symbol



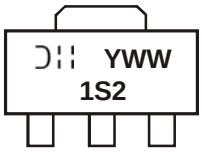
Top View
Pin Out

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
2DA1971-7	1S2	7	12	1,000
2DA1971-13	1S2	13	12	2,500

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 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

Marking Information



Top View

1S2 = Product Type Marking Code
YWW = Date Code Marking
Y = Last digit of year (ex: 1 = 2011)
WW = Week code (01 – 53)

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	A
Peak Pulse Current	I_{CM}	-1	A
Base Current	I_B	-250	mA

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

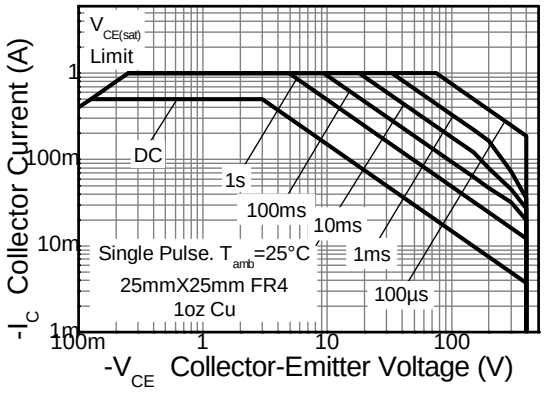
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Leads (Note 6)	$R_{\theta JL}$	10.4	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 7)

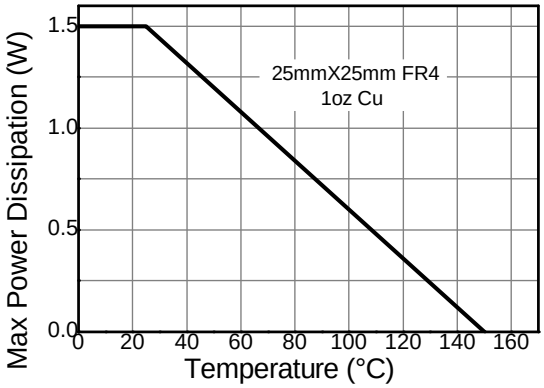
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	≥ 8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

Notes: 5. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions.
6. Thermal resistance from junction to solder-point (at the end of the collector lead).
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

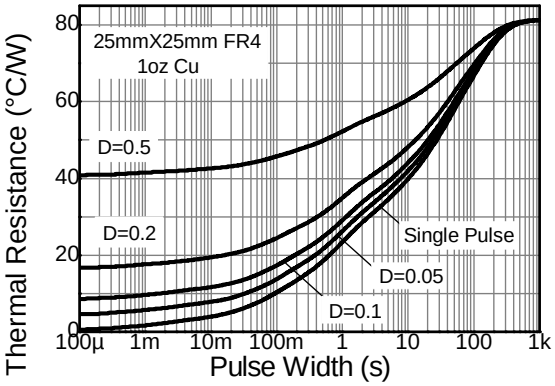
Thermal Characteristics and Derating information



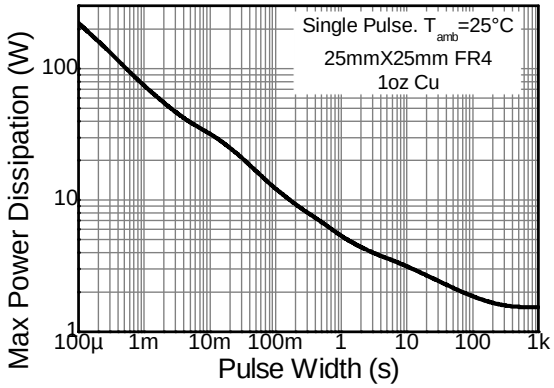
Safe Operating Area



Derating Curve



Transient Thermal Impedance



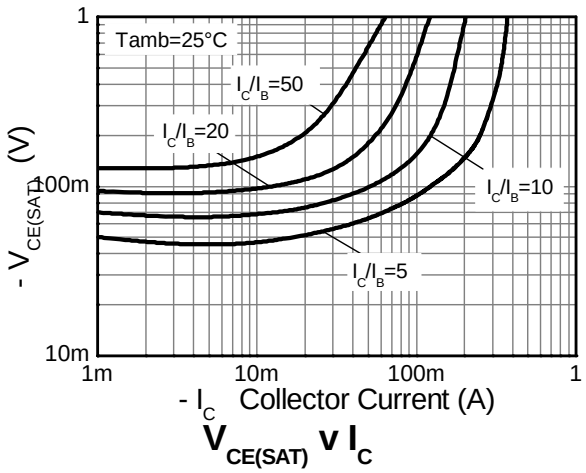
Pulse Power Dissipation

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

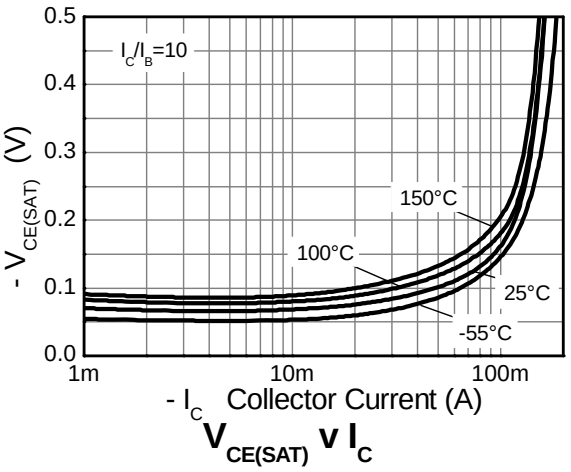
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-400	-	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	-400	-	-	V	I_C = -1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-	-	V	I_E = -100µA
Collector-Emitter Cut-off Current	I_{CES}	-	-	-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 8)	h_{FE}	140 140	-	450 400	-	I_C = -20mA, V_{CE} = -5V I_C = -100mA, V_{CE} = -5V
Collector-Emitter saturation Voltage (Note 8)	$V_{CE(sat)}$	-	-	-250	mV	I_C = -100mA, I_B = -10mA
				-400		I_C = -200mA, I_B = -40mA
Base-Emitter saturation Voltage (Note 8)	$V_{BE(sat)}$	-	-0.75	-0.9	V	I_C = -100mA, I_B = -10mA
Base-Emitter Turn-On Current (Note 8)	$V_{BE(on)}$	-	-	-0.8	V	I_C = -200mA, V_{CE} = -10V
Transition frequency	f_T	-	75	-	MHz	I_C = -50mA, V_{CE} = -5V, f = 50MHz
Collector Output Capacitance	C_{obo}	-	19	-	pF	V_{CB} = -10V, I_E = 0, f = 1MHz
Delay Time	$t_{(d)}$	-	89	-	ns	V_{CC} = -200V, I_C = -100mA, I_{B1} = -10mA, I_{B2} = 20mA
Rise Time	$t_{(r)}$	-	111	-	ns	
Storage Time	$t_{(s)}$	-	2165	-	ns	
Fall Time	$t_{(f)}$	-	185	-	ns	

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%

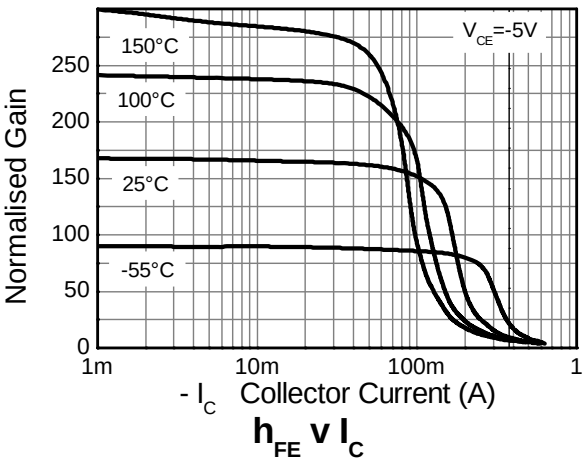
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



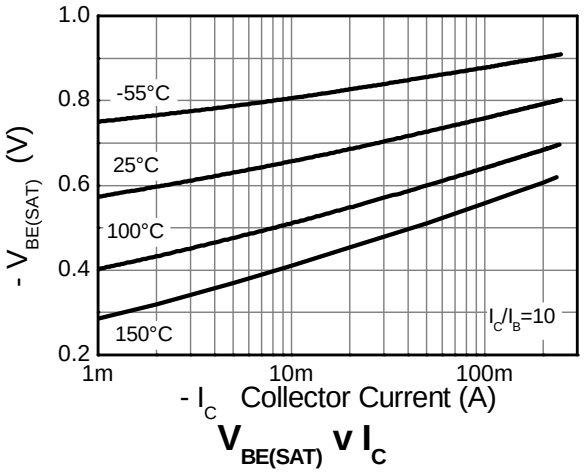
$V_{CE(SAT)}$ v I_C



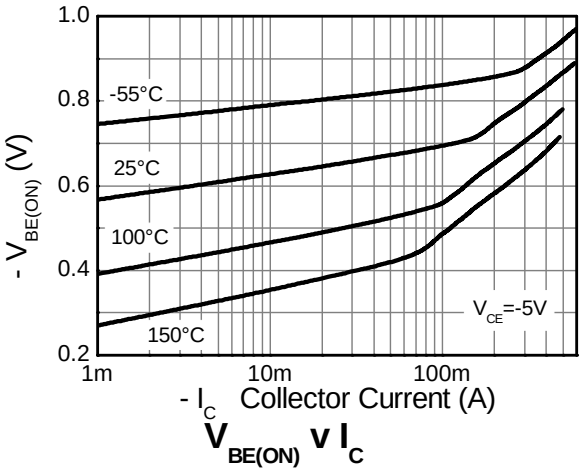
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



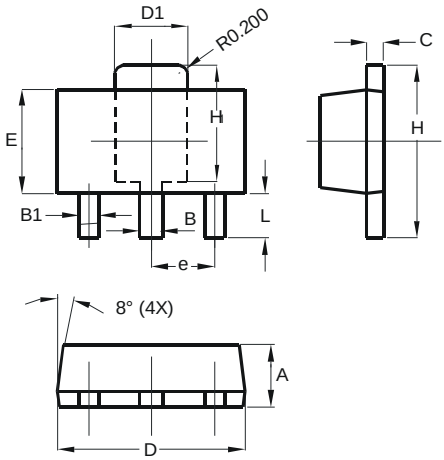
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

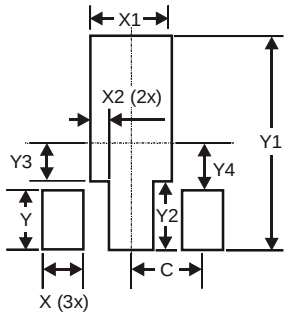
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT89		
Dim	**Min**	**Max**
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
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)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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