



**SO2222AW**

## SMALL SIGNAL NPN TRANSISTOR

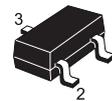
PRELIMINARY DATA

Type	Marking
SO2222AW	20W

- SILICON EPITAXIAL PLANAR NPN TRANSISTOR
- MINIATURE SOT-323 PLASTIC PACKAGE FOR SURFACE MOUNTING CIRCUITS
- TAPE & REEL PACKING
- THE PNP COMPLEMENTARY TYPE IS SO2907AW

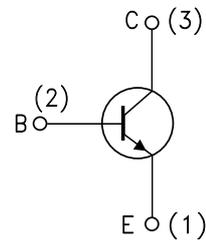
### APPLICATIONS

- WELL SUITABLE FOR PORTABLE EQUIPMENT
- SMALL LOAD SWITCH TRANSISTOR WITH HIGH GAIN AND LOW SATURATION VOLTAGE



**SOT-323**

### INTERNAL SCHEMATIC DIAGRAM



DS10130

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Emitter Voltage ( $I_E = 0$ )	75	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	40	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	6	V
$I_C$	Collector Current	0.6	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	0.8	A
$P_{tot}$	Total Dissipation at $T_{amb} = 25$ °C	200	mW
$T_{stg}$	Storage Temperature	-65 to 150	°C
$T_j$	Max. Operating Junction Temperature	150	°C

# SO2222AW

## THERMAL DATA

R <sub>thj-amb</sub> •	Thermal Resistance Junction-Ambient	Max	625	°C/W
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• Device mounted on a PCB area of 1 cm<sup>2</sup>.

## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CEX</sub>	Collector Cut-off Current (V <sub>BE</sub> = -3 V)	V <sub>CE</sub> = 60 V			10	nA
I <sub>BEX</sub>	Base Cut-off Current (V <sub>BE</sub> = -3 V)	V <sub>CE</sub> = 60 V			20	nA
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = 75 V V <sub>CB</sub> = 75 V T <sub>j</sub> = 150 °C			10 10	nA μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 3 V			15	nA
V <sub>(BR)CEO</sub> *	Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 10 mA	40			V
V <sub>(BR)CBO</sub>	Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)	I <sub>C</sub> = 10 μA	75			V
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 10 μA	6			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 150 mA I <sub>B</sub> = 15 mA I <sub>C</sub> = 500 mA I <sub>B</sub> = 50 mA			0.3 1	V V
V <sub>BE(sat)</sub> *	Collector-Base Saturation Voltage	I <sub>C</sub> = 150 mA I <sub>B</sub> = 15 mA I <sub>C</sub> = 500 mA I <sub>B</sub> = 50 mA	0.6		1.2 2	V V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 0.1 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 1 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA V <sub>CE</sub> = 1 V I <sub>C</sub> = 500 mA V <sub>CE</sub> = 10 V	35 50 75 100 50 40		300	
f <sub>T</sub>	Transition Frequency	I <sub>C</sub> = 20 mA V <sub>CE</sub> = 20V f = 100MHz	270			MHz
C <sub>CBO</sub>	Collector-Base Capacitance	I <sub>E</sub> = 0 V <sub>CB</sub> = 10 V f = 1 MHz		4	8	pF
C <sub>EBO</sub>	Emitter-Base Capacitance	I <sub>C</sub> = 0 V <sub>EB</sub> = 0.5 V f = 1MHz		20	25	pF
NF	Noise Figure	I <sub>C</sub> = 0.1 mA V <sub>CE</sub> = 10 V f = 1 KHz Δf = 200 Hz R <sub>G</sub> = 1 KΩ		4		dB
h <sub>ie</sub> *	Input Impedance	V <sub>CE</sub> = 10 V I <sub>C</sub> = 1 mA f = 1 KHz V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA f = 1 KHz	2 0.25		8 1.25	KΩ KΩ
h <sub>re</sub> *	Reverse Voltage Ratio	V <sub>CE</sub> = 10 V I <sub>C</sub> = 1 mA f = 1 KHz V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA f = 1 KHz			8 4	10 <sup>-4</sup> 10 <sup>-4</sup>
h <sub>fe</sub> *	Small Signal Current Gain	V <sub>CE</sub> = 10 V I <sub>C</sub> = 1 mA f = 1 KHz V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA f = 1 KHz	50 75		300 375	
h <sub>oe</sub> *	Output Admittance	V <sub>CE</sub> = 10 V I <sub>C</sub> = 1 mA f = 1 KHz V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA f = 1 KHz	5 25		35 200	μS μS

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %

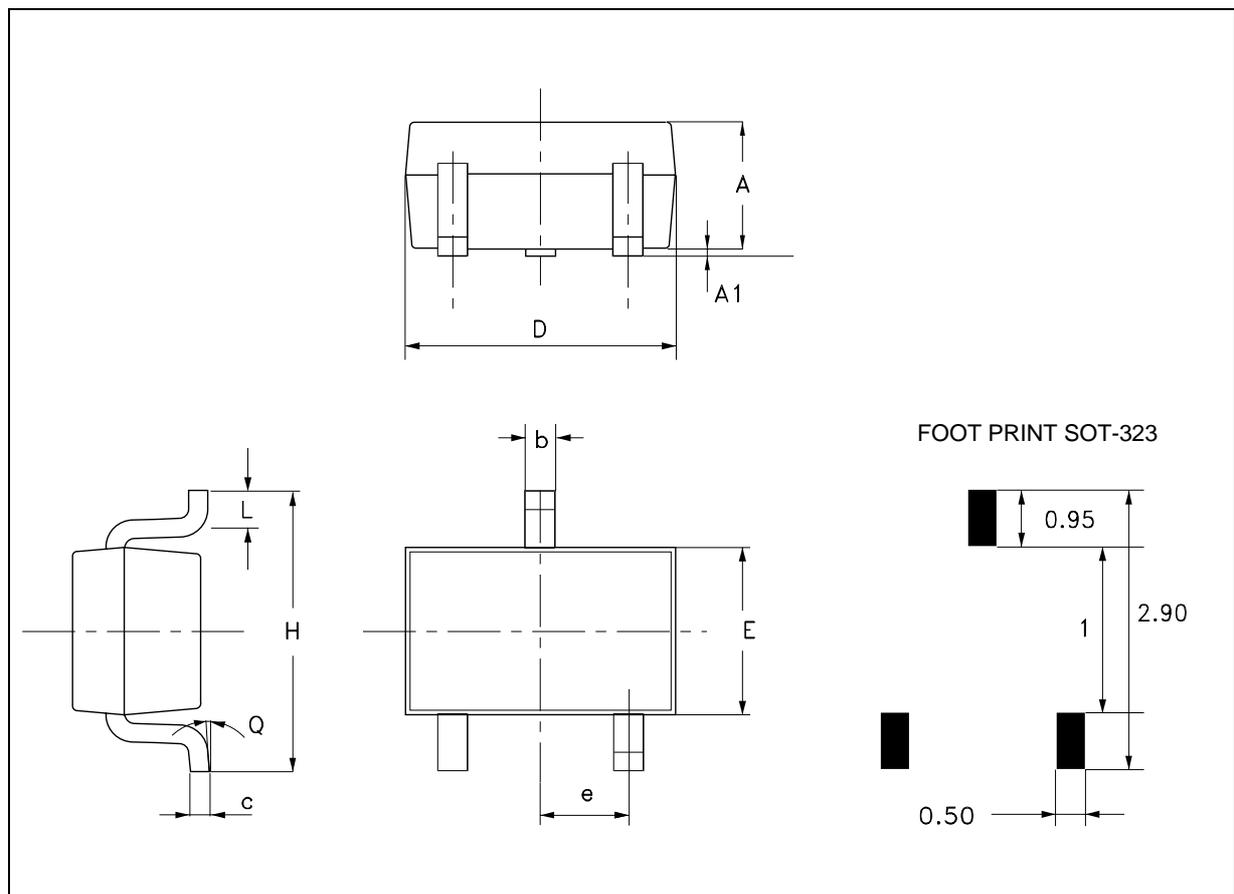
**ELECTRICAL CHARACTERISTICS** (Continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_d$	Delay Time	$I_C = 150 \text{ mA}$ $I_B = 15 \text{ mA}$		5	10	ns
$t_r$	Rise Time	$V_{CC} = 30 \text{ V}$		12	25	ns
$t_s$	Storage Time	$I_C = 150 \text{ mA}$ $I_{B1} = - I_{B2} = 15 \text{ mA}$		185	225	ns
$t_f$	Fall Time	$V_{CC} = 30 \text{ V}$		24	60	ns

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 2\%$

**SOT-323 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.8		1.1	0.031		0.043
A1	0		0.1	0		0.003
b	0.25		0.4	0.009		0.015
c	0.1		0.26	0.004		0.010
D	1.8	2.0	2.2	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e		0.65			0.025	
H	1.8	2.1	2.4	0.070	0.082	0.094
L	0.1	0.2	0.3	0.004	0.007	0.011
Q	0		10°	0		10°



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