



Not for new design, this product will be obsoleted soon

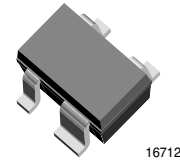
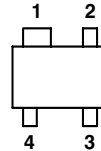
TSDf1920W

Vishay Semiconductors

## 25 GHz Silicon NPN Planar RF Transistor

### Features

- Very low noise figure
- Very high power gain
- High transition frequency  $f_T = 24$  GHz
- Low feedback capacitance
- Emitter pins are thermal leads
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



Electrostatic sensitive device.  
Observe precautions for handling.

### Applications

For RF front-ends, low noise, and wideband applications, such as in analogue and digital cellular and cordless phones (DECT, PHD), in TV systems (e.g. satellite tuners), in high frequency oscillators up to 12 GHz, in pagers and radar detectors.

### Mechanical Data

**Case:** SOT-343R Plastic case

**Weight:** approx. 6.0 mg

**Pinning:** 1 = Emitter, 2 = Base,

3 = Emitter, 4 = Collector

### Parts Table

Part	Marking	Package
TSDf1920W	YH3	SOT-343R

### Absolute Maximum Ratings

$T_{amb} = 25$  °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Collector-base voltage		$V_{CBO}$	10	V
Collector-emitter voltage		$V_{CEO}$	3.5	V
Emitter-base voltage		$V_{EBO}$	1.5	V
Collector current		$I_C$	40	mA
Total power dissipation	$T_{amb} \leq 60$ °C	$P_{tot}$	200	mW
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	- 65 to + 150	°C

### Maximum Thermal Resistance

Parameter	Test condition	Symbol	Value	Unit
Junction ambient	1)	$R_{thJA}$	450	K/W

1) on glass fibre printed board (25 x 20 x 1.5) mm<sup>3</sup> plated with 35 µm Cu

### Electrical DC Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

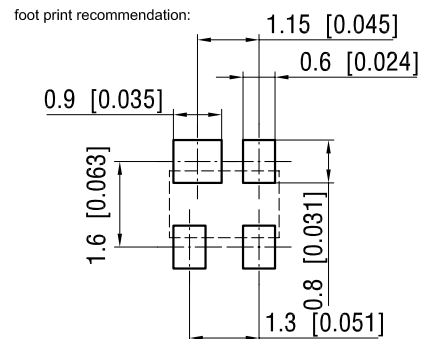
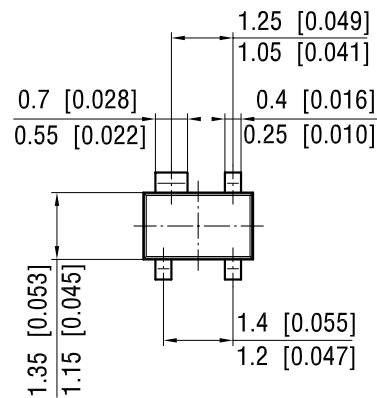
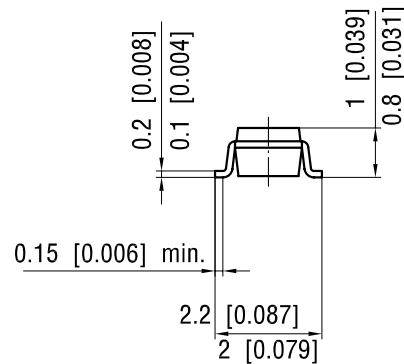
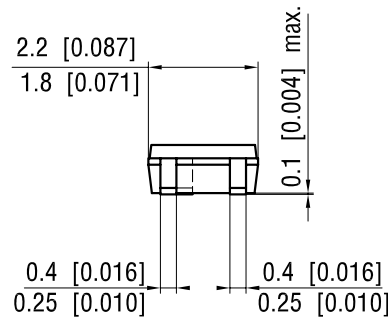
Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter cut-off current	$V_{CE} = 5\text{ V}, V_{BE} = 0$	$I_{CES}$			100	$\mu\text{A}$
Collector-base cut-off current	$V_{CB} = 5\text{ V}, I_E = 0$	$I_{CBO}$			100	nA
Collector-emitter breakdown voltage	$I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	3.5			V
Collector-emitter saturation voltage	$I_C = 30\text{ mA}, I_B = 3\text{ mA}$	$V_{CEsat}$		0.1	0.25	V
DC forward current transfer ratio	$V_{CE} = 2\text{ V}, I_C = 20\text{ mA}$	$h_{FE}$	50	100	150	

## Electrical AC Characteristics

T<sub>amb</sub> = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Transition frequency	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 25 mA, f = 1 GHz	f <sub>T</sub>		24		GHz
Collector-base capacitance	V <sub>CB</sub> = 2 V, f = 1 MHz	C <sub>cb</sub>		0.15	0.3	pF
Collector-emitter capacitance	V <sub>CE</sub> = 2 V, f = 1 MHz	C <sub>ce</sub>		0.4		pF
Emitter-base capacitance	V <sub>EB</sub> = 0.5 V, f = 1 MHz	C <sub>eb</sub>		0.6		pF
Noise figure	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 5 mA, Z <sub>S</sub> = Z <sub>Sopt</sub> , Z <sub>L</sub> = Z <sub>Lopt</sub> , f = 2 GHz	F		1.2		dB
Power gain, maximum stable gain	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 25 mA, Z <sub>S</sub> = Z <sub>Sopt</sub> , Z <sub>L</sub> = Z <sub>Lopt</sub> , f = 2 GHz	G <sub>pe</sub> = G <sub>ms</sub> =  S <sub>21e</sub> /S <sub>12e</sub>		19		dB
Transducer gain	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 25 mA, Z <sub>S</sub> = Z <sub>L</sub> = 50 Ω, f = 2 GHz	S <sub>21e</sub>   <sup>2</sup>	13.5	16.4		dB
Third order intercept point at output	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 25 mA, Z <sub>S</sub> = Z <sub>L</sub> = 50 Ω, f = 2 GHz	IP <sub>3</sub>		22		dBm
1 dB compression point	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 25 mA, Z <sub>S</sub> = Z <sub>L</sub> = 50 Ω, f = 2 GHz	P <sub>-1dB</sub>		12		dBm

## Package Dimensions in mm



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### Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

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Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



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