

## Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[STMicroelectronics](#)  
[STR2N2VH5](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)



# STR2N2VH5

## N-channel 20 V, 0.025 $\Omega$ typ., 2.3 A STripFET™ H5 Power MOSFET in a SOT-23 package

Datasheet — production data

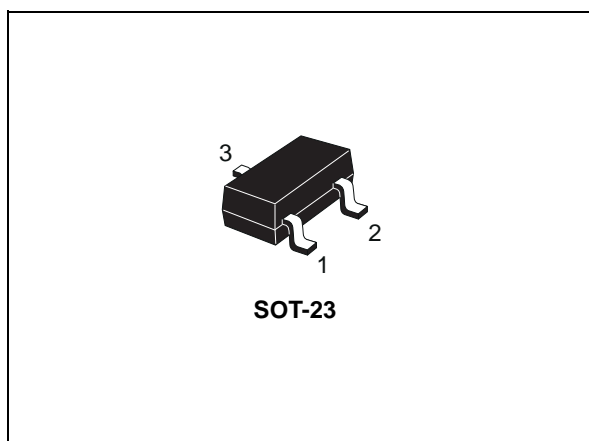
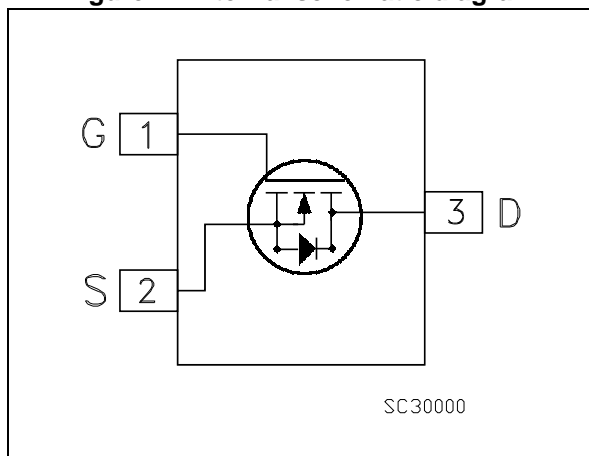


Figure 1. Internal schematic diagram



### Features

Order code	V <sub>DS</sub>	R <sub>DS(on)</sub> max	I <sub>D</sub>	P <sub>TOT</sub>
STR2N2VH5	20 V	0.03 $\Omega$ (V <sub>GS</sub> =4.5 V)	2.3 A	0.35 W

- Low on-resistance R<sub>DS(on)</sub>
- High avalanche ruggedness
- Low gate drive power loss

### Applications

- Switching applications

### Description

This device is an N-channel Power MOSFET developed using STMicroelectronics' STripFET™ H5 technology. The device has been optimized to achieve very low on-state resistance, contributing to a FoM that is among the best in its class.

Table 1. Device summary

Order code	Marking	Packages	Packaging
STR2N2VH5	STD1	SOT-23	Tape and reel

---

## Contents

<b>1</b>	<b>Electrical ratings</b> .....	<b>3</b>
<b>2</b>	<b>Electrical characteristics</b> .....	<b>4</b>
2.1	Electrical characteristics (curves) .....	6
<b>3</b>	<b>Test circuits</b> .....	<b>8</b>
<b>4</b>	<b>Package mechanical data</b> .....	<b>9</b>
<b>5</b>	<b>Revision history</b> .....	<b>12</b>

STR2N2VH5

Electrical ratings

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-source voltage	20	V
$V_{GS}$	Gate-source voltage	$\pm 8$	V
$I_D^{(1)}$	Drain current (continuous) at $T_{pcb} = 25\text{ }^\circ\text{C}$	2.3	A
$I_D^{(1)}$	Drain current (continuous) at $T_{pcb} = 100\text{ }^\circ\text{C}$	1.4	A
$I_{DM}^{(1)(2)}$	Drain current (pulsed)	9.2	A
$P_{TOT}^{(1)}$	Total dissipation at $T_{pcb} = 25\text{ }^\circ\text{C}$	0.35	W
$T_{stg}$	Storage temperature	- 55 to 150	$^\circ\text{C}$
$T_j$	Max. operating junction temperature		$^\circ\text{C}$

1. This value is rated according to  $R_{thj-pcb}$
2. Pulse width is limited by safe operating area

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb max	357	$^\circ\text{C/W}$

1. When mounted on 1 inch<sup>2</sup> FR-4, 2 Oz Cu,  $t < 10$  sec.

Electrical characteristics

STR2N2VH5

## 2 Electrical characteristics

( $T_C = 25\text{ °C}$  unless otherwise specified)

**Table 4. On /off states**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0, I_D = 1\text{ mA}$	20			V
$I_{DSS}$	Zero gate voltage drain current	$V_{GS} = 0, V_{DS} = 20\text{ V}$			1	$\mu\text{A}$
		$V_{GS} = 0, V_{DS} = 20\text{ V}, T_C = 125\text{ °C}$			10	$\mu\text{A}$
$I_{GSS}$	Gate-body leakage current	$V_{DS} = 0, V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.7			V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 4.5\text{ V}, I_D = 2\text{ A}$		0.025	0.03	$\Omega$
		$V_{GS} = 2.5\text{ V}, I_D = 2\text{ A}$		0.031	0.04	$\Omega$

**Table 5. Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$C_{iss}$	Input capacitance	$V_{GS} = 0, V_{DS} = 16\text{ V}, f = 1\text{ MHz}$	-	367	-	pF
$C_{oss}$	Output capacitance		-	92	-	pF
$C_{rss}$	Reverse transfer capacitance		-	16	-	pF
$Q_g$	Total gate charge	$V_{DD} = 16\text{ V}, I_D = 2\text{ A}, V_{GS} = 4.5\text{ V}$ (see <a href="#">Figure 14</a> )	-	4.6	-	nC
$Q_{gs}$	Gate-source charge		-	0.9	-	nC
$Q_{gd}$	Gate-drain charge		-	1	-	nC

**Table 6. Switching times**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Voltage delay time	$V_{DD} = 16\text{ V}, I_D = 2\text{ A}, R_G = 4.7\text{ }\Omega, V_{GS} = 4.5\text{ V}$ (see <a href="#">Figure 15</a> and <a href="#">Figure 18</a> )	-	4.8	-	ns
$t_r(V)$	Voltage rise time		-	14.4	-	ns
$t_{d(off)}$	Current fall time		-	17	-	ns
$t_f$	Crossing time		-	4	-	ns

**STR2N2VH5**

**Electrical characteristics**

**Table 7. Source drain diode**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain current		-		2.3	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		9.2	A
$V_{SD}^{(2)}$	Forward on voltage	$V_{GS} = 0, I_{SD} = 2\text{ A}$	-		1.1	V
$t_{rr}$	Reverse recovery time	$I_{SD} = 2\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 16\text{ V}, T_j = 150\text{ }^\circ\text{C}$ (see <a href="#">Figure 18</a> )	-	10		ns
$Q_{rr}$	Reverse recovery charge		-	24		nC
$I_{RRM}$	Reverse recovery current		-	4.8		A

1. Pulse width limited by safe operating area.
2. Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5%

Electrical characteristics

STR2N2VH5

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

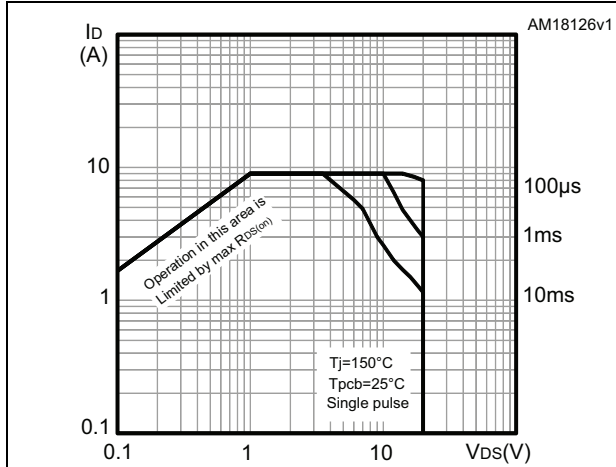


Figure 3. Thermal impedance

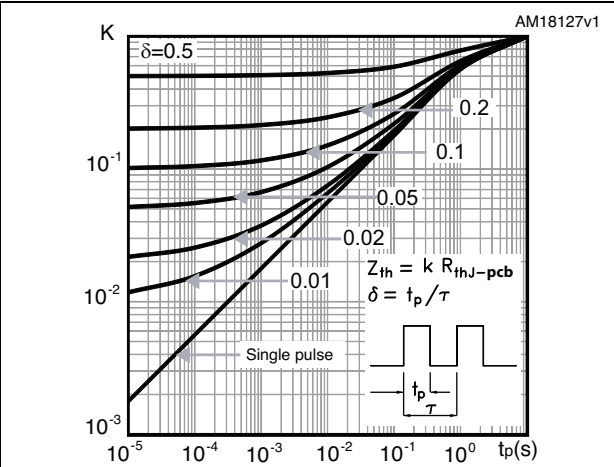


Figure 4. Output characteristics

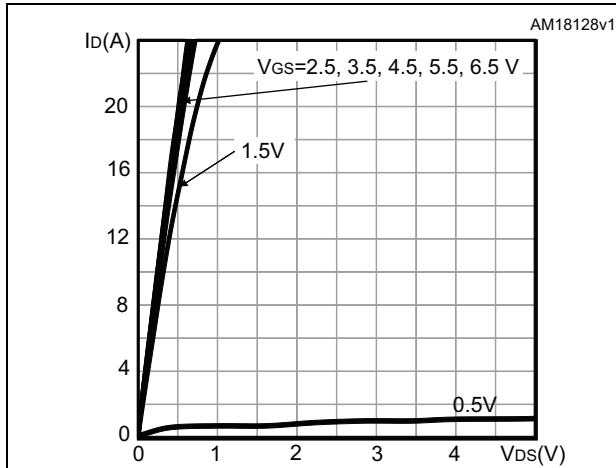


Figure 5. Transfer characteristics

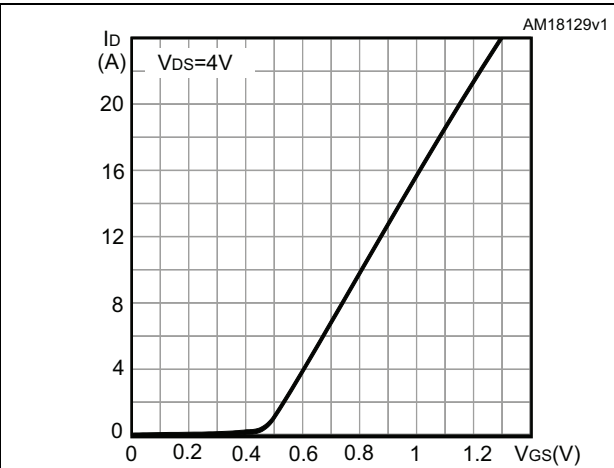


Figure 6. Gate charge vs gate-source voltage

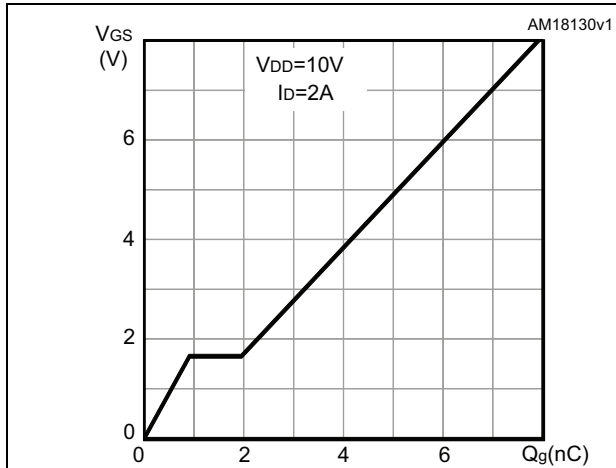
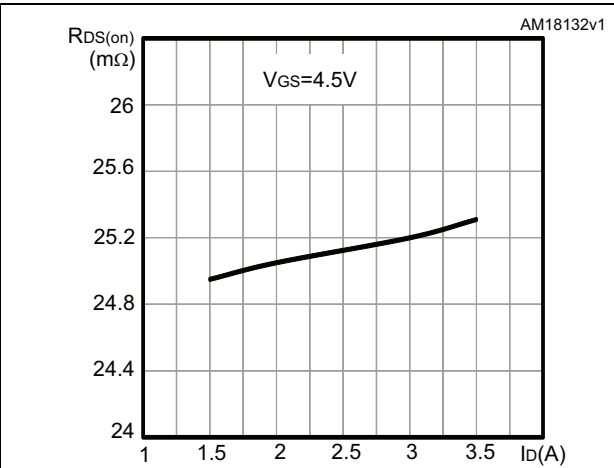


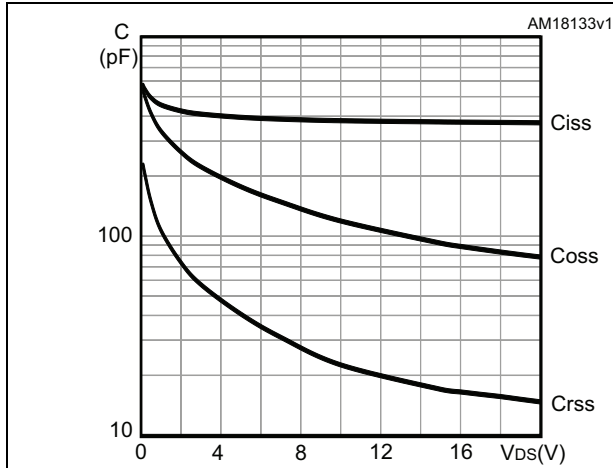
Figure 7. Static drain-source on-resistance



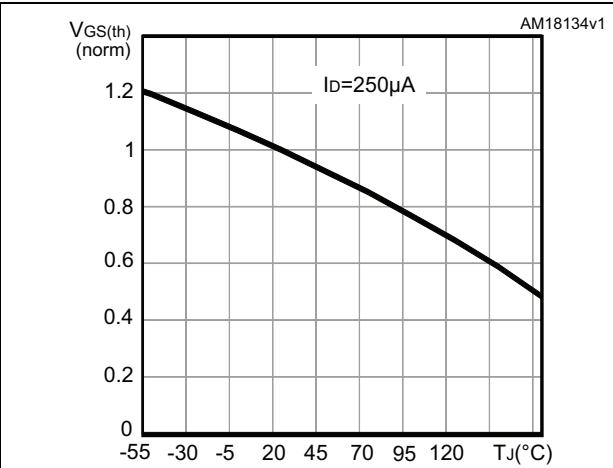
**STR2N2VH5**

**Electrical characteristics**

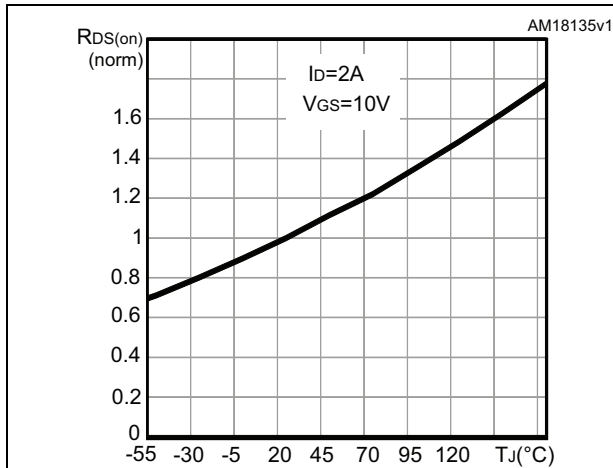
**Figure 8. Capacitance variations**



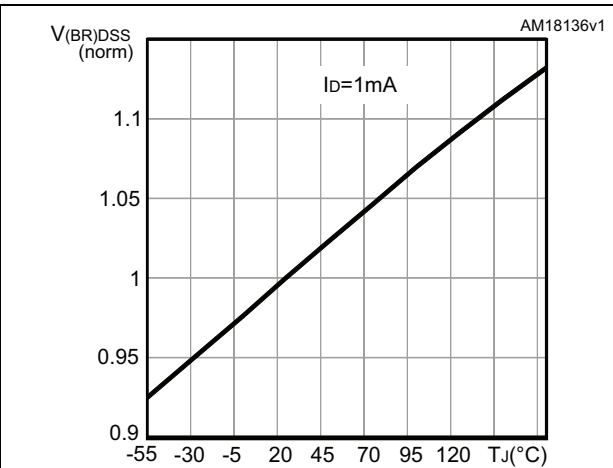
**Figure 9. Normalized gate threshold voltage vs temperature**



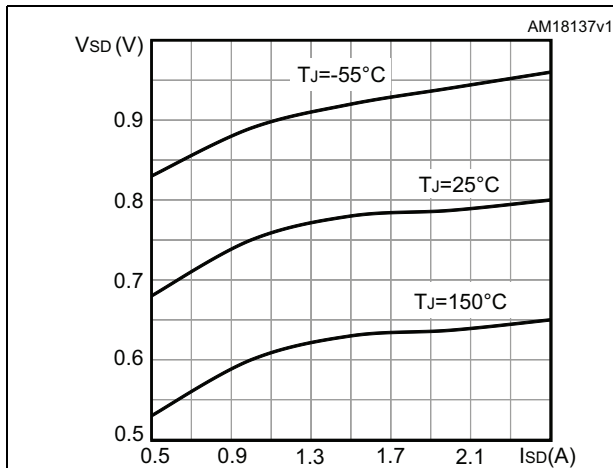
**Figure 10. Normalized on-resistance vs temperature**



**Figure 11. Normalized V(BR)DSS vs temperature**



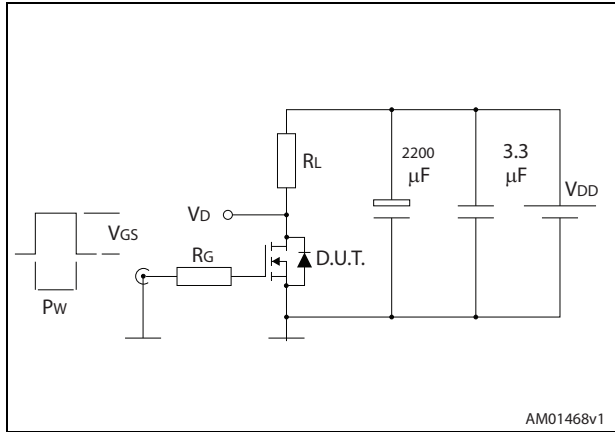
**Figure 12. Source-drain diode forward characteristics**



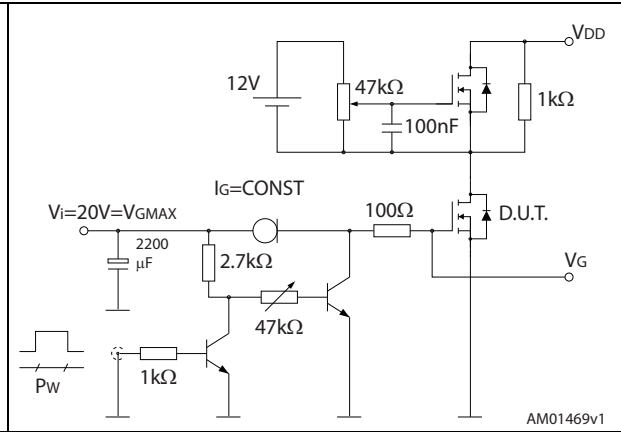


### 3 Test circuits

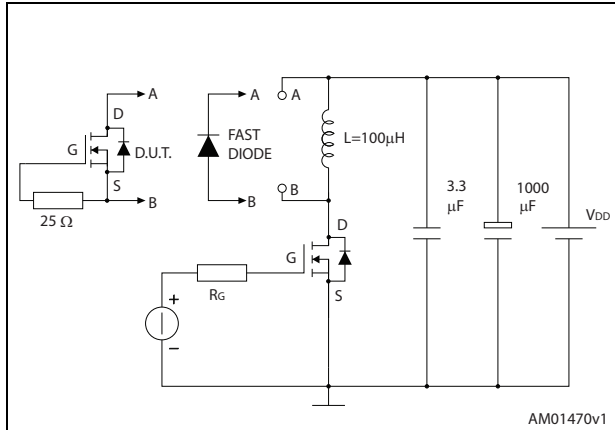
**Figure 13. Switching times test circuit for resistive load**



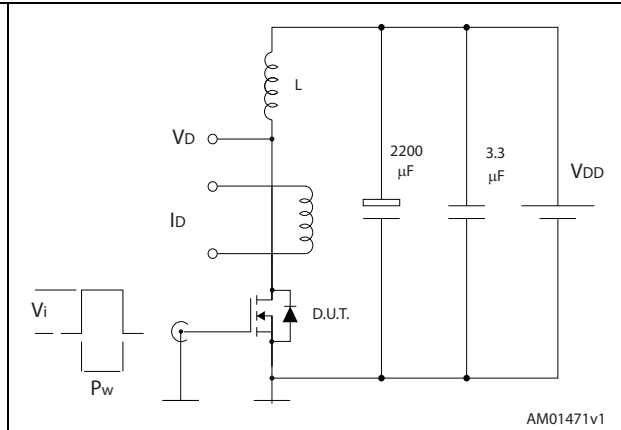
**Figure 14. Gate charge test circuit**



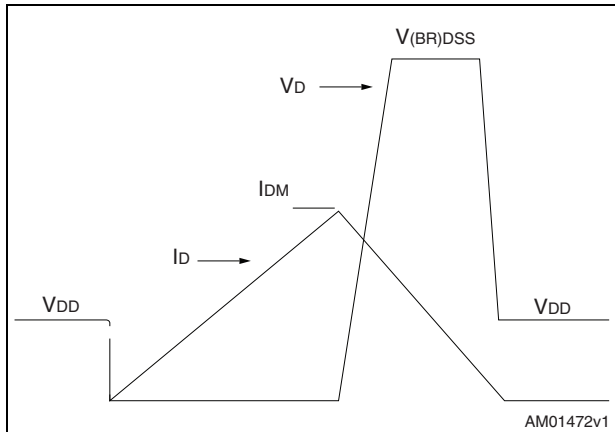
**Figure 15. Test circuit for inductive load switching and diode recovery times**



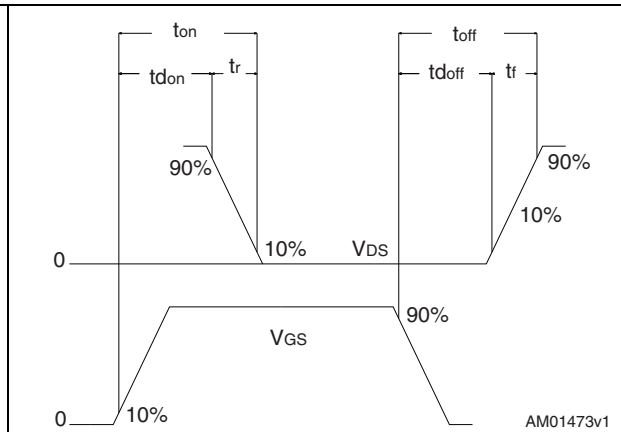
**Figure 16. Unclamped inductive load test circuit**



**Figure 17. Unclamped inductive waveform**



**Figure 18. Switching time waveform**



## 4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Package mechanical data

STR2N2VH5

Figure 19. SOT-23 mechanical drawing

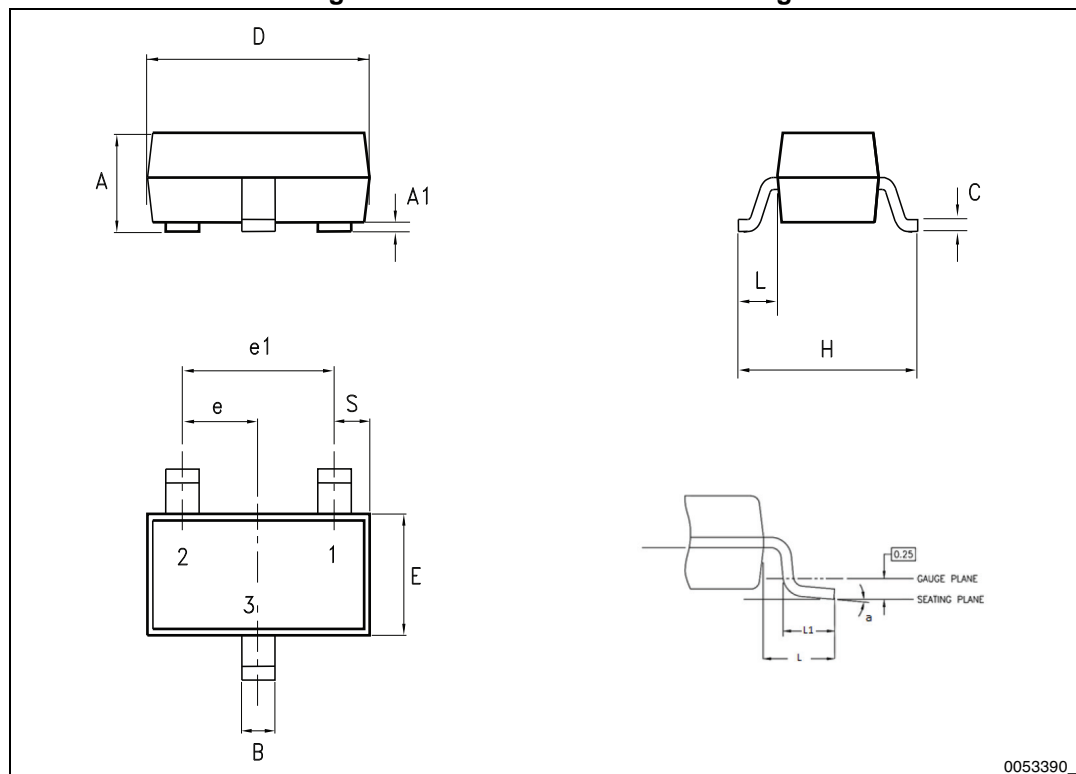


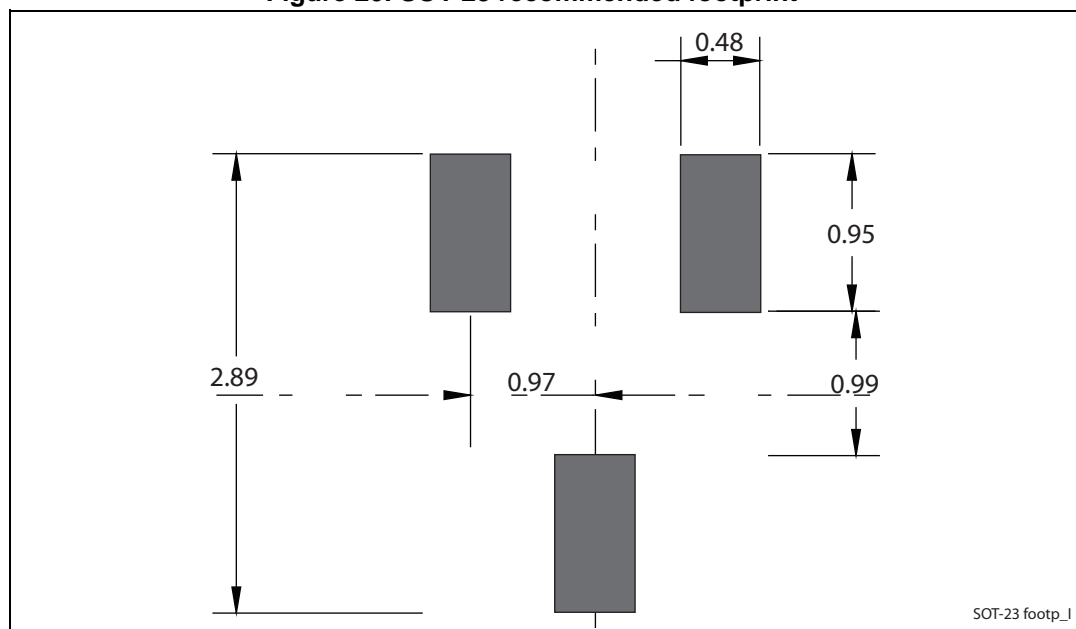
Table 8. SOT-23 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.89		1.40
A1	0		0.10
B	0.30		0.51
C	0.085		0.18
D	2.75		3.04
e	0.85		1.05
e1	1.70		2.10
E	1.20		1.75
H	2.10		3.00
L		0.60	
S	0.35		0.65
L1	0.25		0.55
a	0°		8°

**STR2N2VH5**

**Package mechanical data**

**Figure 20. SOT-23 recommended footprint (a)**



a. Dimensions are in mm.

## 5 Revision history

Table 9. Document revision history

Date	Revision	Changes
19-Oct-2012	1	First release.
14-Jan-2013	2	Modified: $R_{DS(on)}$ values
19-Mar-2014	3	<ul style="list-style-type: none"> <li>– The part number STT5N2VH5 has been moved to a separate datasheet</li> <li>– Modified: the entire typical values in <a href="#">Table 5</a>, <a href="#">6</a> and <a href="#">7</a></li> <li>– Added: <a href="#">Section 2.1: Electrical characteristics (curves)</a></li> <li>– Minor text changes</li> </ul>
25-Jul-2014	4	<ul style="list-style-type: none"> <li>– Modified: title, description and features</li> <li>– Updated: <a href="#">Figure 12</a></li> <li>– Minor text changes</li> </ul>

## STR2N2VH5

---

### IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2014 STMicroelectronics – All rights reserved