STR2N2VH5, STT5N2VH5

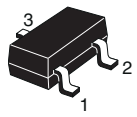
N-channel 20 V, 0.025 Ω typ., 5 A STripFET™ V Power MOSFET in SOT-23 and SOT23-6L packages

Datasheet – preliminary data

Features

Order codes	V_{DS}	$R_{DS(on)}$ max	I_D	P_{TOT}
STR2N2VH5	20 V	0.03 Ω (V_{GS}=4.5 V) 0.04 Ω (V_{GS}=2.5 V)	2.3 A	0.35 W
STT5N2VH5			5 A	1.6 W

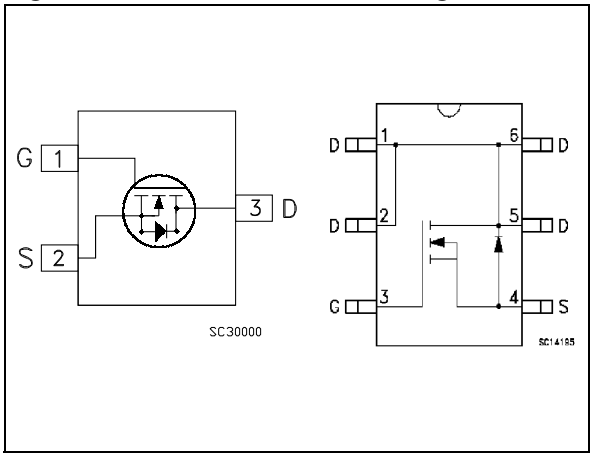
- Very low profile package
- Conduction losses reduced
- Switching losses reduced
- 2.5 V gate drive
- Very low threshold device



SOT-23

SOT23-6L

Figure 1. Internal schematic diagram



Applications

- Switching applications

Description

These devices are N-channel Power MOSFETs developed using STMicroelectronics' STripFET™V 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 codes	Marking	Package	Packaging
STR2N2VH5	STD1	SOT-23	Tape and reel
STT5N2VH5		SOT23-6L	

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		SOT-23	SOT23-6L	
V_{DS}	Drain-source voltage	20		V
V_{GS}	Gate-source voltage	± 8		V
I_D(1)	Drain current (continuous) at T_{pcb} = 25 °C	2.3	5	A
I_D (1)	Drain current (continuous) at T_{pcb} = 100 °C	1.4	3.1	A
I_{DM}(1)(2)	Drain current (pulsed)	9.2	20	A
P_{TOT}(1)	Total dissipation at T_{pcb} = 25 °C	0.35	1.6	W
T_{stg}	Storage temperature	- 55 to 150		°C
T_j	Max. operating junction temperature			°C

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

Table 3. Thermal data

Symbol	Parameter	Value		Unit
		SOT-23	SOT23-6L	
$R_{thj\text{-}pcb}$(1)	Thermal resistance junction-pcb max	357	78	°C/W

1. When mounted on 1 inch² FR-4, 2 Oz Cu, t< 10 sec.

2 Electrical characteristics

(T_C = 25 °C unless otherwise specified)

Table 4. On /off states

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

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 16 V, f = 1 MHz, V_{GS} = 0	-	550 110 16	-	pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD} = 16 V, I_D = 2 A, V_{GS} = 4.5 V (see *Figure 3*)	-	6 TBD TBD	-	nC nC nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ $t_{r\ (V)}$ $t_{d\ (off)}$ t_f	Voltage delay time Voltage rise time Current fall time Crossing time	V_{DD} = 16 V, I_D = 2 A, R_G = 4.7 Ω, V_{GS} = 4.5 V (see *Figure 4* and *Figure 7*)	-	TDB TBD TBD TBD	-	ns ns ns ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (1)	Source-drain current Source-drain current (pulsed)		-		2.3 9.2	A A
V_{SD} (2)	Forward on voltage	I_{SD} = 2 A, V_{GS} = 0	-		1.1	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD} = 2 A, di/dt = 100 A/µs V_{DD} = 16 V, T_j = 150 °C (see *Figure 7*)	-	TBD TBD TBD		ns µC A

1. Pulse width limited by safe operating area.
2. Pulsed: pulse duration = 300 µs, duty cycle 1.5%

3 Test circuits

Figure 2. Switching times test circuit for resistive load

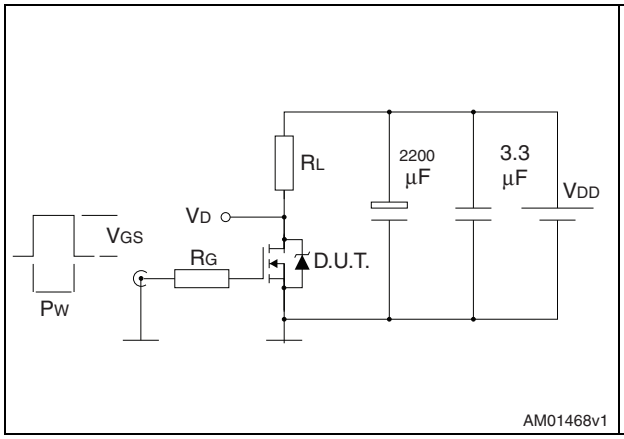


Figure 3. Gate charge test circuit

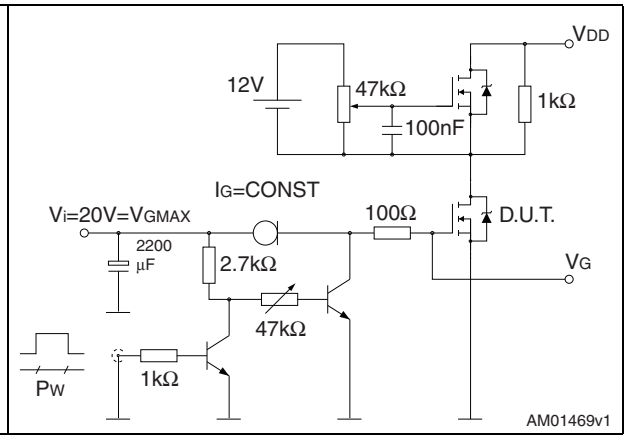


Figure 4. Test circuit for inductive load switching and diode recovery times

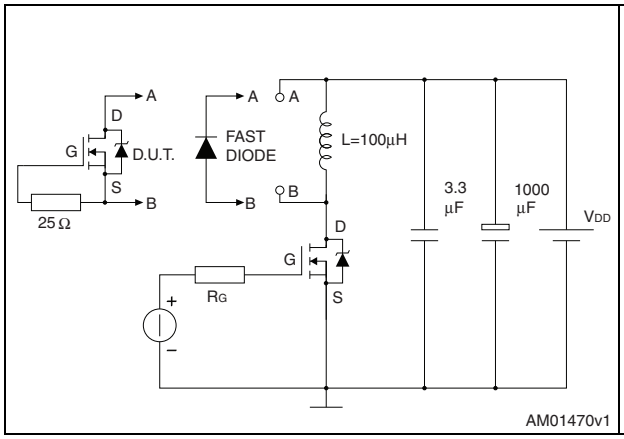


Figure 5. Unclamped inductive load test circuit

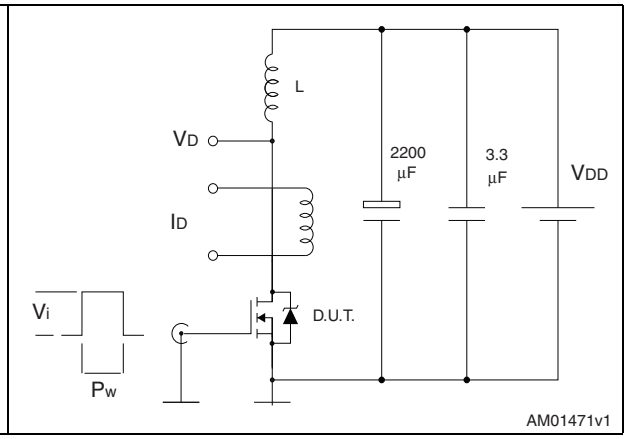


Figure 6. Unclamped inductive waveform

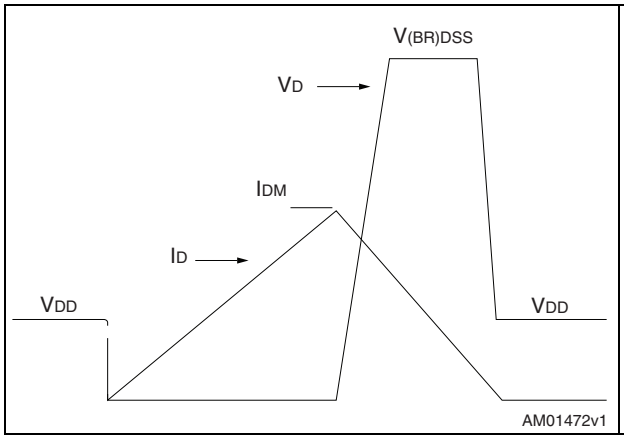
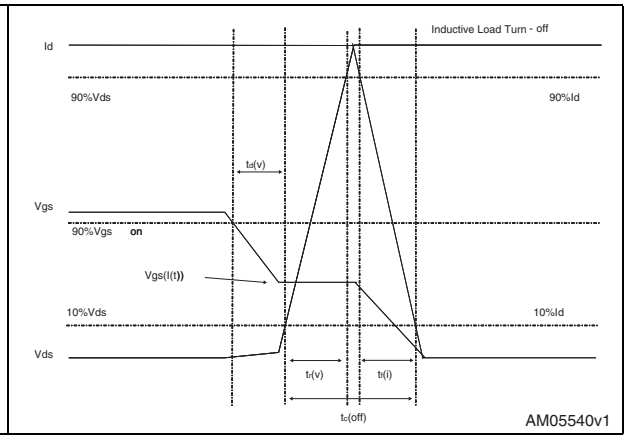


Figure 7. Switching time waveform



4 Package mechanical data

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

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°

Figure 8. SOT-23 mechanical drawing

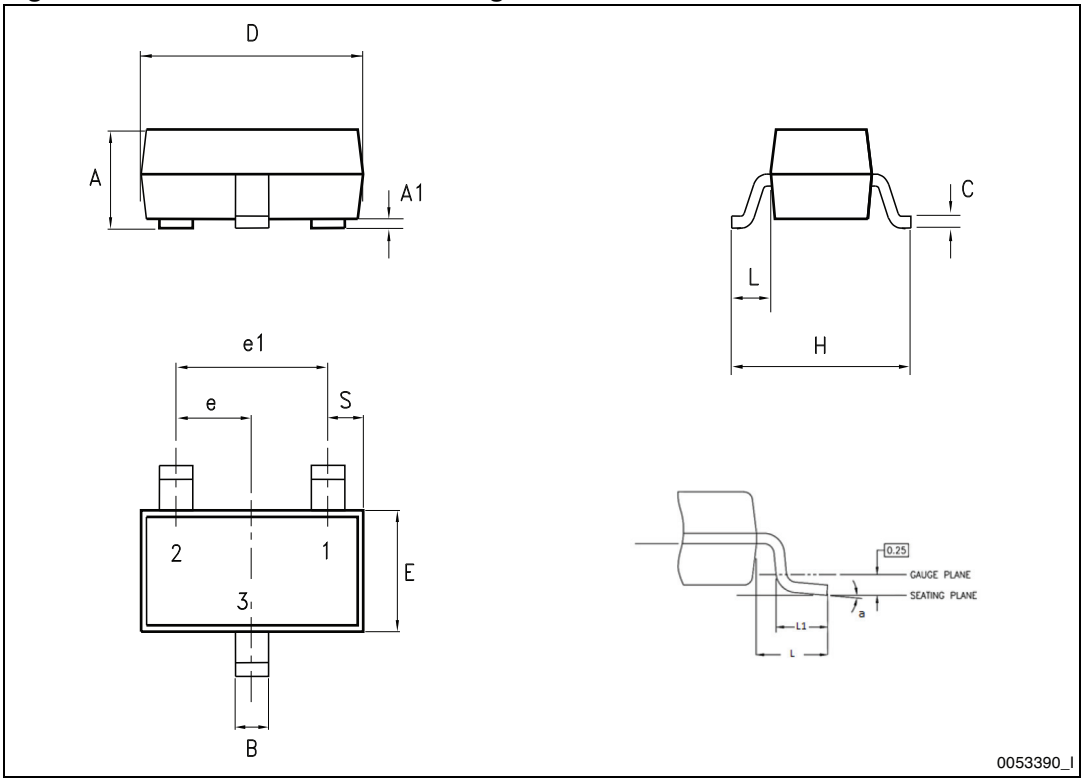
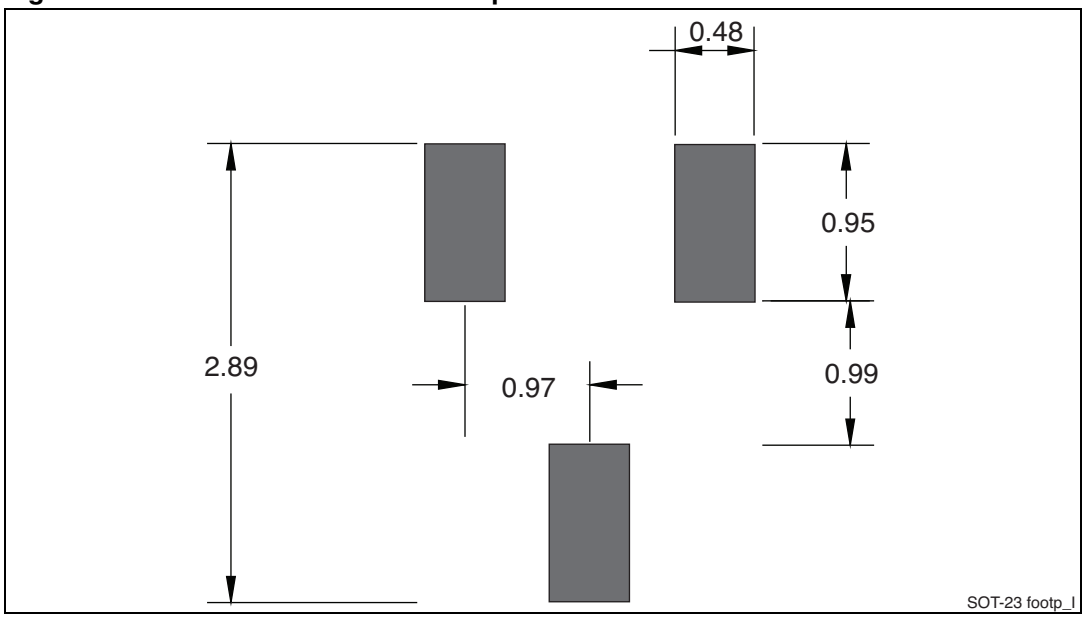


Figure 9. SOT-23 recommended footprint [(a)]



a. Dimensions are in mm.

Table 9. SOT23-6L package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.90		1.45
A1	0.00		0.15
A2	0.90		1.30
b	0.30		0.50
C	0.09		0.20
D	2.80		3.05
E	1.50		1.75
e		0.95	
H	2.60		3.00
L	0.30		0.60
ϕ	0°		10°

Figure 10. SOT23-6L package drawing

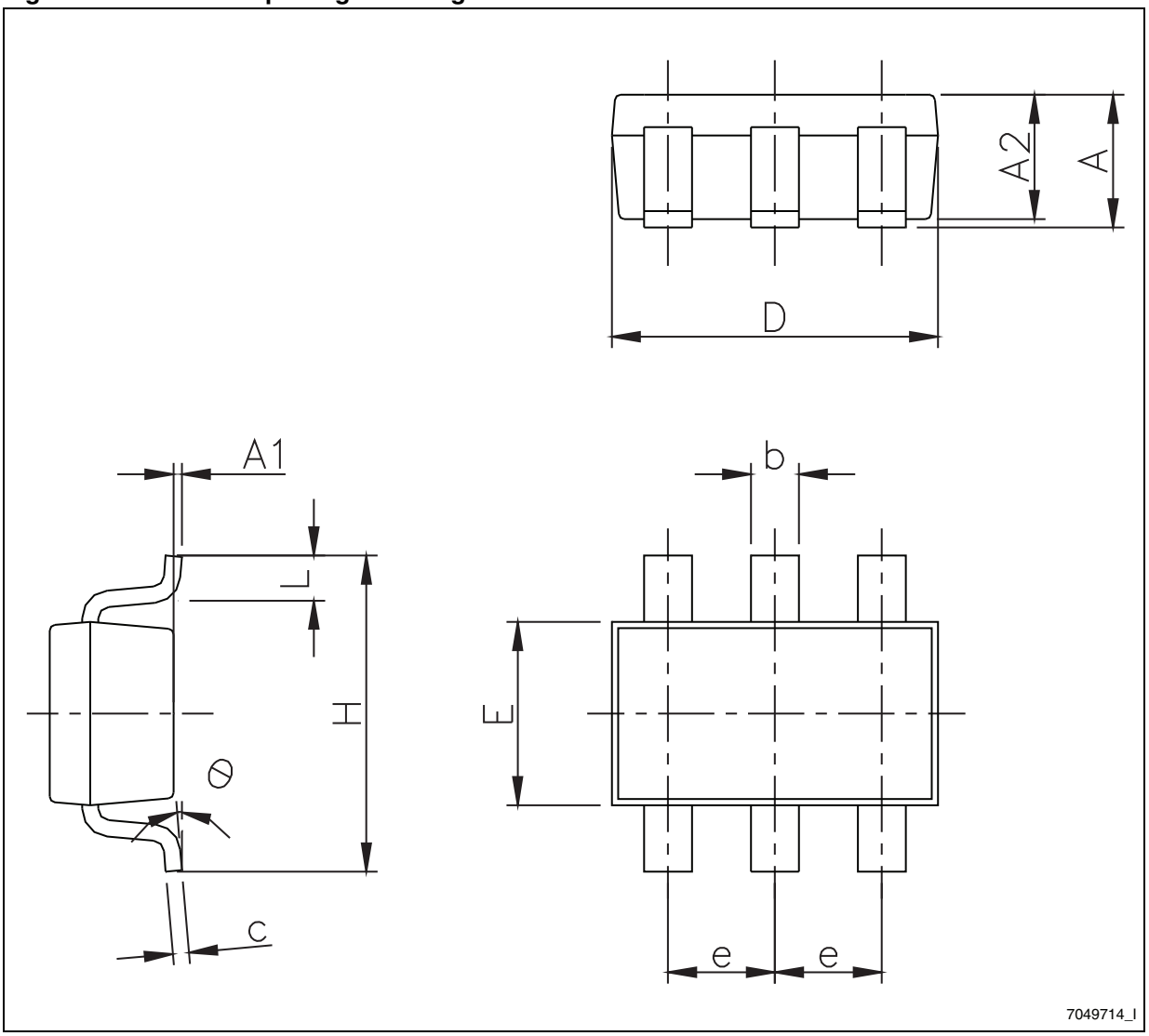
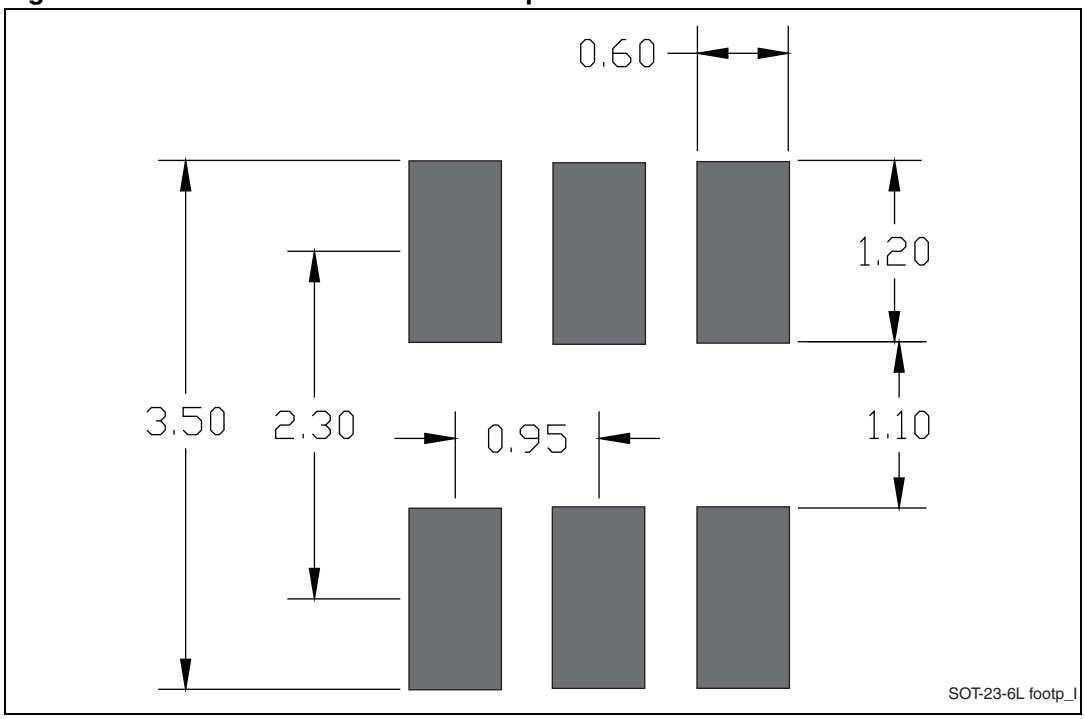


Figure 11. SOT23-6L recommended footprint(b)



b. All dimensions are in millimeters

5 Revision history

Table 10. Document revision history

Date	Revision	Changes
19-Oct-2012	1	First release.
14-Jan-2013	2	Modified: $R_{DS(on)}$ values