

Corporate Communications Department
Audi Australia Pty Ltd
895 South Dowling St
Zetland NSW 2017

Anna Burgdorf
Tel: 02 9695 6250 / 0401 990 230
Email: anna.burgdorf@audi.com.au

Shaun Cleary
Tel: 02 9695 6252 / 0478 493 389
Email: shaun.cleary@audi.com.au

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The new Audi S4 and S4 Avant: dynamic understatement

At a glance	2
Full version	
Engine	4
Handling	6
Interior	8
Display and control	9
Infotainment and Audi connect	10
Driver assistance systems	11
Exterior design	12
Body	13
Audi S4 Avant	13
Audi S models in the mid-size class	13

At a glance

The new Audi S4 and the new Audi S4 Avant

Engine

- Newly developed 3.0 TFSI with turbocharging and direct injection:
 - peak power of 260kW, peak torque of 500Nm at a low 1370 rpm
- 15kW more power and 60Nm more torque compared to the previous model
- Sports car performance: from 0 to 100km/h in 4.7 seconds (Sedan), 4.9 seconds (Avant)
- Top efficiency: Audi S4 Sedan consumes just 7.7 litres of fuel per 100 kilometre and emits 175 grams CO₂ per km (Avant: 7.8 l/100km and 178 g/km)

Drivetrain

- Eight-speed tiptronic with fuel-saving freewheeling function is standard
- quattro permanent all-wheel drive with self-locking centre differential, torque vectoring, optional sport differential

Chassis

- New concept with lightweight five-link suspensions at front and rear axles
- Wheel size: 19 inch only
- Aluminium fixed caliper brakes with 350mm brake disc diameter at the front
- New electromechanical power steering, dynamic steering as an option
- Audi drive select is standard, chassis with damper control optional
- 23mm lower ride height than standard A4

Interior and controls

- Spacious interior with large areas of aluminium trim and continuous air vents afford a spacious feeling
- Optional S sport seats in fine Nappa leather with integrated head restraints,
 - adjustable lateral supports and lumbar support with pneumatic massage function
- Select colours and materials as well as leather and Alcantara, top-quality craftsmanship
- Audi S4 Avant has 505 to 1510 litres of luggage space, a power boot lid and power luggage compartment cover.
- Audi virtual cockpit with 12.3inch monitor and S-specific mode and optional head-up display available

- Fundamentally redesigned MMI operating concept including free-text search, can also be operated from multifunction steering wheel or by natural language voice control
- Multi-colour interior lighting (30 colours), illuminated door sill guard, side contour lights, capacitive switches for reading lights and illuminated cup holder

Infotainment and Audi connect

- Modular infotainment platform, second generation (MIB2)
- Top infotainment system MMI navigation plus with MMI touch including 8.3-inch monitor and Audi connect, LTE and Wi-Fi hotspot
- Audi connect services including Google functions
- Optional Audi phone box with inductive charging based on the Qi standard
- Optional Bang & Olufsen sound system with 3D sound
- Audi smartphone interface for iOS and Android

Driver assistance systems and integral safety

- adaptive cruise control with Stop&Go including traffic jam assist for slow-moving traffic
- Predictive efficiency assistant evaluates GPS information from local area and thereby contributes to even better fuel economy
- Park assist, rear cross traffic assist, exit warning system, turn assist and obstacle avoidance assist
- New safety systems: Audi pre sense city, basic and rear

Exterior design and body

- S specific design characteristic: distinctive bumpers, air inlets, side sills and spoiler, diffuser trim and four tailpipes
- LED headlights and dynamic turn signals rear are standard, optional Audi matrix LED headlights with dynamic turn signals front and rear
- Intelligent material mix with hot-formed parts makes the body extremely torsionally stiff, safe and lightweight
- 75kg of weight savings in comparison to the previous model

Full version

The new Audi S4 and S4 Avant – at the peak of the model line and the segment

The new Audi S4 and S4 Avant assume top positions in the new A4 family. And they will be leaders in their class – with a newly developed engine, intelligent lightweight design and a package of innovative technologies from the full-size class, especially in terms of their connectivity and driver assistance systems.

Audi has experienced great success with its sporty S models over a period of 20 years. The formula here is cultivated understatement – a modest sporty look plus superior performance plus the quattro permanent all-wheel drive. The brand with the four rings is continuing this philosophy in the new S4 and S4 Avant. Both models are based on the second generation modular longitudinal platform, and they use high-tech in all areas.

Engine

The turbocharged 3.0 TFSI in the Audi S4 and S4 Avant is an engine that has been redeveloped from the ground up. It combines sports car performance with new levels of efficiency and also impresses with powerful output, ample torque, spontaneous response and a sonorous sound.

From its 2,995cc of displacement, the V6 TFSI engine with 260kW produces 15kW more than the engine in the previous model. It transfers 500Nm of torque (60Nm more) to the crankshaft at a low 1370 revolutions per minute. This torque is constant up to 4500rpm. The ADR fuel consumption of the new 3.0 TFSI in the S4 is just 7.7 litres per 100km – with a CO₂ equivalent of 175 grams per km. The S4 Avant has a fuel consumption of 7.8 litres per 100km and therefore attains a CO₂ figure of 178 grams per km. Fuel economy has been improved five percent compared to the previous model.

New combustion method: higher level of efficiency

The key factor in successfully attaining efficiency is the new combustion method that originated in the V6 3.0 TFSI from Audi. It is based on what is known as the B-cycle, which is similar to the process used in the Audi A4

2.0 TFSI with 140kW and utilises the high-pressure injection valves that are arranged centrally in the combustion chambers.

In the V6 TFSI as well, the shortened compression phase of the further developed combustion method enables an engine process with a significantly elevated geometric compression ratio. Efficiency benefits have been achieved in combination with a normal expansion phase that is longer than the compression phase, improving the engine's efficiency.

Normally, this type of modification would result in significantly reduced chamber filling, and the high compression would increase the tendency to engine knock that would significantly reduce the attainable power. However, the Audi valvelift system resolves the conflict between efficiency and power goals. In the part-load region, it enables very short intake valve opening times of 130 crankshaft degrees while simultaneously closing the intake valves early. At higher loads, the inlet valves can be shifted over to a camshaft contour with a longer opening time and larger valve stroke that maximises engine power.

Turbocharger: separate exhaust gas streams

The turbocharger, which replaces the mechanical supercharger of the previous engine, operates according to the twin scroll principle. The exhaust branches of the two cylinder banks run separately in both the exhaust manifold and turbocharger housing, and they do not merge until just before the turbine wheel. This technology avoids undesirable interactions between the two gas streams, and it makes a large contribution toward early and strong torque build-up.

The turbocharger is placed inside the 90-degree V of the cylinder banks instead of the usual location outside next to the crankcase. Accordingly, the exhaust side is on the inner side of the cylinder heads and the intake side on the outer side. This layout enables compact construction and short gas flow paths with minimal flow losses – as a result, the 3.0 V6 TFSI responds extremely spontaneously and directly.

Less weight: reduced by 14kg

A fundamental redesign of the V6 TFSI has lowered its weight by 14kg to 172kg. The crankcase, which is produced from an aluminium alloy in a

complex sand-casting process, integrates thin-walled grey cast iron cylinder liners. This reduces friction in interplay with newly developed rings for the aluminium pistons.

Another key efficiency component is thermal management. The crankcase and cylinder head have separate coolant circulation loops. After a cold start, the switchable water pump controls the flow of coolant through the engine to bring the oil up to its operating temperature quickly. The exhaust manifold is integrated in the cylinder head, and coolant is circulated around it, which helps to warm up the engine quickly. When the engine is warm, the system reduces the exhaust gas temperature, which in turn reduces fuel consumption, especially when driving in a sporty style.

Handling

The drivetrain and chassis of the new Audi S4 and S4 Avant were thoroughly redeveloped – this also applies to the gentle, fast and spontaneously shifting eight-speed tiptronic. The layout of its gear sets and shifting elements results in low drag torques and thereby to a high efficiency level. Its large number of gears makes it possible to operate the engine close to its ideal load point very frequently. Their lower gears have short, sporty ratios, while the upper gears are long to reduce revs and fuel consumption.

The classic automatic transmission is integrated into the engine's thermal management system and is designed for start-stop operation (from 3km/h residual speed). The driver can select the D, S or E mode and can use shift paddles on the steering wheel for manual gear changes. All commands are transmitted to the transmission electrically – by wire. A new engine speed-adaptive vibration absorber makes engine running even smoother at low speeds.

If the driver releases the accelerator pedal between 55 and 160km/h, the transmission switches to freewheeling, provided that this enables fuel savings (not in S mode). If the optional predictive efficiency assistant and adaptive cruise control Stop&Go including traffic jam assist are installed, the coasting function is very predictive.

Traction, dynamics and safety: quattro drive is standard

The quattro permanent all-wheel drive system with its asymmetrically dynamic layout makes a large contribution toward sporty and stable handling of the new Audi S4 and S4 Avant. During normal driving, its all-mechanical centre differential directs 60 percent of the torque to the rear axle and 40 percent to the front. If slip occurs at one axle, most of the forces are rapidly redirected to the other axle – up to 85 percent to the front or up to 85 percent to the rear axle. These high locking figures enable a clearly defined torque distribution and precise interplay with control systems.

Torque vectoring – an intelligent software function – complements the work of the quattro drive system. In dynamic cornering, it applies minimal brake interventions at the wheels on the inside of the curve before they begin to spin.

These interventions are made even if the driver does not press the accelerator pedal. The difference between propulsive forces at the wheels makes the car turn into the curve ever so slightly – making handling even more precise, agile and stable.

Torque vectoring at the rear axle: the sport differential

The optional sport differential provides even more dynamic performance. It uses two superposition gears to variably adjust the distribution of torque between the wheels of the rear axle. In fast curves, it literally pushes the car into the radius. Its management, which runs on the newly conceptualised electronic chassis platform (ECP), is incorporated into the Audi drive select handling system. The sport differential performs even quicker than in the previous model, and it is around one kilogram lighter.

The chassis of the two new S models is based on two newly developed five-link suspensions, front and rear. The axle principle enables optimal absorption of longitudinal and transverse forces. Its mounts are sporty-stiff in a lateral direction and supple and soft longitudinally. Together with the further developed, electro-mechanical power steering – with direct steering ratios – the mounts create the right conditions for dynamic handling, good comfort and a high degree of stability. With their low weight, the new parts also reduce fuel consumption. As an option, Audi can install dynamic

steering, which adapts its steering gear ratio to the vehicle's driving speed and steering angle.

Up to five modes: Audi drive select

The Audi drive select handling system is standard equipment in the new Audi S4 and S4 Avant. It intervenes in control of the engine, steering, eight-speed tiptronic, optional sport differential and chassis with damper control that adds the CDC (continuous damping control) damper. The driver can control the characteristics of these units by choosing the comfort, auto, dynamic or efficiency mode or the individual mode (if a navigation system is installed). Both the controlled chassis and the standard S sport chassis lower the body ride height by 23mm compared to the A4 base model. The brakes are dimensioned to be large. At the front wheels, the internally-vented discs are 350mm in diameter. They are gripped by red painted six-piston fixed calipers with S lettering.

Audi delivers the new S4 and S4 Avant models with standard 19-inch wheels in a five V-spoke design, and the tyres are size 245/35. Electronic stabilisation control (ESC) operates even more precisely and sensitively than in the previous model. The driver can choose to deactivate it over two stages (partial or full deactivation).

Interior

The new S models are distinguished by their cultivated sportiness. The clean design with its strong horizontal orientation makes the spaciouly designed interior – which seats five persons – appear even larger. A broadly extended band of air vents, an elegant air conditioning panel and a large decorative surface define the instrument panel layout. The MMI monitor acts like a tablet computer. At night, LED light conductors trace the contours of the doors and the centre console – in 30 colours with the standard ambient light package.

Thanks to the vehicle's excellent aero-acoustics, the interior noise level is exceptionally low. The workmanship quality is on the high level that distinguishes an Audi. As a typical S model; black is the dominant colour. The decorative inlays provide elegant contrasts. The standard inlays are matt brushed aluminium. Optional inlay designs are black piano finish and carbon Atlas.

S sport seats

The optional S sport seats in the new Audi S4 and new S4 Avant are upholstered in fine Nappa leather. Audi can deliver the upholstery in black, rotor grey or magma red with diamond pattern and contrasting stitching in rock grey, anthracite and granite grey.

The S sport seats have standard adjustable side supports, integrated head restraints and a pneumatic massage function. The standard multi-function steering wheel has a flattened bottom.

Sophisticated details round out the range of features; they include stainless steel pedals and foot rest, a differentiated S instrument cluster with grey dials and white pointers, the red ring around the start button, the special start screen for the Audi MMI and the optional Audi virtual cockpit. The S logo with a red diamond appears on the steering wheel, frame of the gear shift gate and illuminated door sill guards, and it is embossed in the leather of the seats.

Display and control

Thanks to the fundamentally new control and display concept, the driver can control all functions of the new S models effortlessly and intuitively. The optional Audi virtual cockpit, the fully digital instrument cluster, shows all key information on a 12.3-inch TFT display in brilliant resolution, a high level of details and intricately rendered graphic effects. The 'View' button on the sport leather steering wheel with multifunction plus is used to switch between the different user interfaces. Three views are available, including an exclusive sport mode with the tachometer as the dominant element.

The main operating unit is the MMI control panel on the centre console, which is also new. With MMI navigation plus and MMI touch, the rotary push-button control has a touchpad for zooming on the map and entering characters. Like with a smartphone, the MMI operating logic is designed for the fewest steps possible, including intelligent free-text search known as MMI search. The new voice control can also process expressions and sentences from everyday speech such as: "Where can I refuel?"

Another high-end option for the new S4 and S4 Avant models is the head-up display. It projects relevant information onto the windshield as symbols and numbers. They appear to hover around two metres in front of the driver within a window area measuring 200 x 80mm. The human eye, which is accustomed to longer focal distances, acquires this information extremely quickly.

Infotainment and Audi connect

The top infotainment system is MMI navigation plus with MMI touch and an standard 8.3-inch monitor. It utilises the computing power of the second generation modular infotainment platform (MIB) that Audi is using to bring the latest consumer electronic innovations into the car without delay. The high-end media centre integrates the Audi connect hardware module which introduces the fast LTE standard for online connectivity into the new S4 and new S4 Avant. Passengers can use the Wi-Fi hotspot to surf the web, text or e-mail with their mobile devices, while the driver can use the customised services of Audi connect, e.g. to access Google Earth and Google Street View and Google local search.

New infotainment modules round out the options. The Audi smartphone interface integrates iOS and Android mobile phones in an environment specially developed for them in the Audi MMI. The optional Bang & Olufsen sound system with its new type of 3D sound adds the spatial dimension of height. Its amplifier delivers 755 watts of audio power to 19 loudspeakers.

Driver assistance systems

The wide range of driver assistance systems in the two new S models sets new standards. Audi is bringing them from the full-size class to mid-size cars, and in the S4 it is bundling them into the Tour, City and Parking packages.

Playing a central role here is adaptive cruise control (ACC) Stop&Go including traffic jam assist. It relieves drivers in slow-moving traffic up to a driving speed of 65km/h not only by assuming the tasks of braking and accelerating but also steering on well-built roads. The predictive efficiency assistant, unique in this vehicle class, helps by offering drivers situation-specific tips on how to save fuel. It evaluates GPS information in the

immediate vicinity of the car. On highways it can improve fuel economy by up to 10 percent in this way.

Moreover, Audi also offers an entire array of innovations that improve safety. Park assist uses 12 ultrasonic sensors to assist in parallel and perpendicular parking, so that the driver only has to control the accelerator, shift gears and brake. Rear cross traffic assist helps in backing out of parking spaces with poor visibility and warns of approaching traffic – visually, acoustically and by a brake jolt.

The exit warning system becomes active when the new Audi S4 and S4 Avant has come to a stop. Now, if other vehicles are approaching from the rear, the system warns all occupants before opening the doors by lighting LED light conductors in the interior side trim. Collision avoidance assist is automatically enabled if the new mid-size sports car has to drive around an obstacle to avoid an accident. Based on data from the front camera, ACC and radar sensors, it computes a recommended driving line within fractions of a second. Its first action is a warning jolt to alert the driver to the danger. As soon as the driver steers, the system helps to change lanes by intervening in the power steering system with steering torques that guide the driver.

Turn assist monitors oncoming traffic when turning left over a driving speed range from two to 10km/h. In a dangerous situation, it brakes the car to a stop. The system is active in the background as soon as the driver activates the turn signal to turn across the carriageway.

Audi pre sense city monitors for other vehicles and pedestrians up to a driving speed of 85km/h; in an emergency it can brake the car to a stop. Other assistance systems such as Audi active lane assist and Audi side assist round out the line-up.

Exterior design

With a length of 4.75 metres and a wheelbase of 2.83 metres, the new S4 models have a strong street presence. Their flowing design with sharp lines expresses the core trait of the Audi brand – sporty elegance. The front and rear designs are characterised by horizontal lines that emphasise the car's width. Dual aluminium cross bars give structure to the Singleframe grille. The air inlets, surrounded by distinctive contours, have arrow-shaped fins –

also coated with aluminium. To improve aerodynamics, they are designed to guide a portion of the airflow into the wheel housings.

The headlights with their distinctive serrated lower borders are rich in facets and designed with a three-dimensional look. In the Audi S4, Audi delivers them in standard LED technology with dynamic turn signals at the rear. Matrix LED headlights are available as an option; their 12 high-beam LEDs illuminate the road with a light similar to daylight. They also control the light beam such that it does not cause glare to oncoming road users. Matrix LED headlights also feature dynamic turn signals at the front. Another technical innovation is an anti-glare function for traffic signs. When the light falls on a very reflective traffic sign, it is dimmed by around one-third in that area.

On the car's sides, the exterior mirror housings in aluminium look create accents. The powerfully contoured side sill trim also contributes to the sharpened look of the new S models. On the trunk lid or at the back of the roof, a trailing edge and spoiler – whose profile descends sharply – improve air flow. The rear bumper integrates a flat, black honeycomb grille, and the diffuser trim in matt aluminium silver surrounds the two dual tailpipes.

The bumpers of the Audi S4 and S4 Avant sport V6 T logos, while S4 logos with a red diamond trim the radiator grille and the boot lid. The paint colours, with a total of 16 different choices, include the colours Navarra blue (new) and Misano red which are exclusively reserved for the new S models.

Body

The Audi intelligent mixed construction concept makes the car bodies of the new S4 models very torsionally stiff and safe. Hot-formed parts form the high-strength, crash-safe backbone of the passenger cell. In comparison to the previous model the bodies are 15 kilograms and therefore form the basis for the low unladen weight of the new S4 and S4 Avant. The Sedan weighs 1630kg with the standard quattro drive, while the Avant weighs 1675kg – each is 75kg less than the weight of the previous models.

Another of the body's strengths is aerodynamics. With a c_d figure of 0.31, the new Audi S4 Avant offers the best figure in its competitive field. The drag coefficient of the S4 Sedan is a low 0.29. These top results come from

refined design of the exterior skin and covering of large areas of the underbody which minimises lift.

Audi S4 Avant

The new Audi S4 Avant combines a sporty character with a high level of everyday utility. Its luggage compartment offers a basic cargo capacity of 505 litres – more than its competitors in the premium segment.

When the rear seat backrests are folded, and cargo is loaded to the headlining, stowage space increases to 1,510 litres. The rear seat backrest has a 40:20:40 split and can be folded down to the seat cushions using levers in the luggage compartment.

The tailgate also has a standard power drive unit. The sensor control initiates opening or closing of the tailgate in response to a foot movement. The car is rounded out by other features such as the storage and luggage compartment package, partition net and rail system. The S4 Sedan has a luggage capacity of 480 litres.

Audi S models in the mid-size class

At Audi the S is a direct reference to motorsport. The first car to bear the S designation was the Sport quattro S1 – the legendary rally car of the 1985 world championship season.

The letter S made its way into production cars in 1990 – in the S2 Coupé whose turbocharged five-cylinder engine produced 162kW. A small S family quickly grew; its members had two traits in common – a quattro drive and an understated visual image. Audi launched the S2 Avant on the market at the end of 1992; the S2 Sedan followed one year later. Engine power was increased to 169kW. By 1995, a total of 9488 cars came off the assembly line in three body versions.

Starting in 1997, two S models also came from the first generation Audi A4 that launched in 1994. The five-cylinder turbo engine gave way to a newly developed biturbo V6 with 2.7 litres of displacement which was derived from the 3.6-litre V8. The six-cylinder engine had five-valve cylinder heads and one turbocharger per bank and delivered 195kW of power and 400Nm of torque.

In 2003, Audi converted its mid-size S models over to naturally aspirated engines. The 4.2-litre V8, which could also be combined with a six-speed tiptronic, had a power output of 253kW and 410Nm of torque. It was used in the Sedan, the Avant and in the new edition of the Cabriolet.

Boosted to 260kW of power and 440Nm of torque, the eight-cylinder engine was also used in the next generation of Audi mid-size models, specifically in the S5 Coupé of 2007. The S4, S4 Avant, S5 Sportback and S5 Cabriolet, which followed somewhat later, already got a new 3.0-litre V6 with supercharging, and the two-door coupé followed in 2011. Its key specification data were 245kW and 440Nm, and propulsive forces could be transferred to all four wheels via a seven-speed S tronic.

As a side event to the 24 Hours of Le Mans endurance race in 2012, Audi presented the Audi SQ5 TDI – the first S model in the Q series. It was also the first S model to have a diesel engine. Its 3.0 TDI produces 230kW and a hefty 650Nm of torque. The SQ7 TDI now sits at the top end of the Q series, featuring an all-new 4.0 TDI V8 engine that features an innovative 48-volt electric compressor concept that reduces turbo lag.