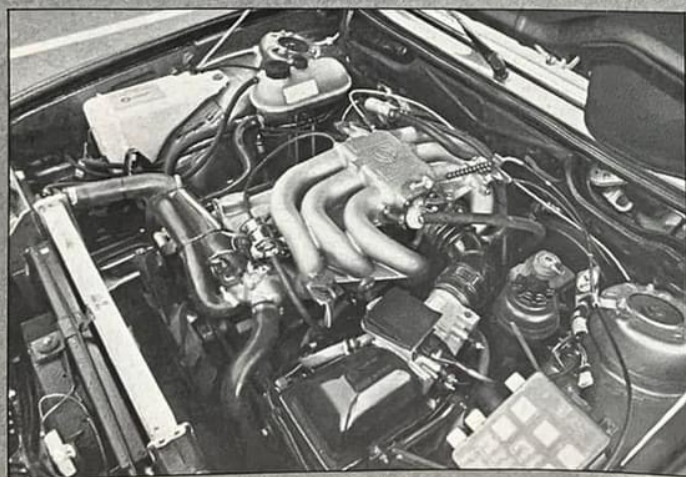
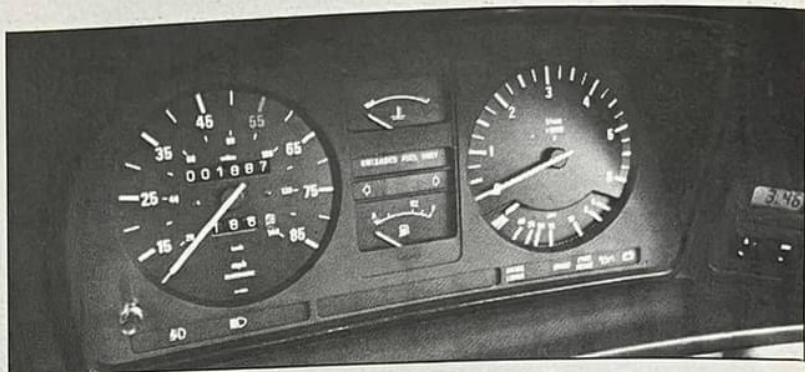


# BMW 528e

*Some things change, some things don't*

PHOTOS BY JOHN LAMM



## AT A GLANCE

	BMW 528e	Audi 5000 Turbo	Saab 900 Turbo 4-door
List price	est \$23,000	\$18,490	\$16,862
Curb weight, lb	3015	3250	2855
Engine	inline-6	inline-5	inline-4
Transmission	5-sp M	3-sp A	3-sp A
0-60 mph, sec	10.3	9.4	11.4
Standing 1/4 mi, sec	17.5	17.1	18.3
Speed at end of 1/4 mi, mph	79.0	80.0	75.5
Stopping distance from 60 mph, ft	153	160	140
Interior noise at 50 mph, dBA	66	71	70
Lateral acceleration, g	0.776	0.737	0.746
Slalom speed, mph	57.8	59.4	61.4
Fuel economy, mpg	24.0	17.0	23.0
Issue		10-80	6-81



YOUR FIRST QUESTION about the BMW 528e may be the same as ours: Why doesn't it look much different from the old 528i? Despite the mechanical changes in this latest 5-Series BMW, it is little different looking than its 7-year-old predecessor, U.S. headlight laws even preventing BMW from using larger outboard lamps as it does in Europe to help separate the old from the new. We've argued for years against change merely for the sake of change, but there's a limit and BMW is probing it with the 528e.

The company's answer to this question is that BMW felt a conservative, evolutionary revision of the successful 5-Series shape was the best direction for the new model, the production design being the least radical of three that were considered. A family resemblance from car line to car line is considered an important part of BMW's marketing strategy, and the new 528e fits right in with this thinking. The real money was then spent on the mechanical side of things—mainly the drivetrain—the body getting changes to lower weight and improve aerodynamics. And if the taillights came out looking like those on the 1969 BMW 2500/2800 sedans, "Well, in a market segment where resale value is very important, that's not all bad," commented a BMW official. Reportedly the 528e was viewed very favorably by 528i owners in recent showings in BMW's major sales areas.

In doing this latest model, BMW retained the former version's center section, including the roof and doors. Then it went about its subtle restyling. BMW succeeded in its aero aims, lowering the nose and smoothing its leading edge, raising the rear deck and reworking the area under the bumper to drop the drag coefficient to 0.40, down 12 percent from the 528i; overall lift has been lowered some 20 percent. Because of the aerodynamic problems it poses, this may be the last new BMW in which the grille slopes back from the leading edge of the hood. The aforementioned weight-loss program worked too—thanks to such things as thinner sheet metal where possible, a conventionally opening hood, a smaller engine, lighter glass—with the curb weight of our 528e at 3015 lb whereas the last 528i we tested weighed 3400 lb.

The conservative philosophy evident in the 528e's styling is apparent in more than just sheet metal. Remember that BMW is the company that has always steered the same basic conservative course as Daimler-Benz, but then took the good-time shortcut through the Alps to get there. You could imagine the board of directors in Munich dressed as pin-stripe conservative as their counterparts in Stuttgart, but with the Bimmer men wearing red underwear and being anxious to get to their motorcycles for an afternoon's ride. However, things are changing at BMW.

At the heart of this new philosophy at BMW is the "e" in the new model's designation. The letter stands for eta, seventh letter in the Greek alphabet and the engineering symbol for thermodynamic efficiency. Eta headlines BMW's new philosophy about an engine for the U.S. and, potentially, its entire market: the point is higher fuel economy. To begin with, the single-overhead-cam inline 6-cylinder in the new car is not the engine from past U.S. 5-Series BMWs, but the smaller M-60 six used in Europe. There this powerplant, introduced four years ago, has been in 1990- and 2315-cc form in the 3-Series, with the 1990-cc version also used in one of the fuel-economy versions of the 5-Series models. For the U.S. it is bored and stroked to 2693 cc, which is near the design limit for the engine. So why isn't this the 527e? BMW so confused its buyers when it dropped the 530i to the 528i, the company prefers to leave well enough alone, now having a 2.7-liter 528e and a 1.8-liter 320i. Would BMW do the same if it increased displacement?

So how does this new engine do in the 5-Series BMW? Fairly reasonably, all things considered. In developing the eta engine for the U.S., the company followed the thinking that the most efficient use of energy is to move the torque curve down the rpm scale, which sounds like heresy from a company known for the way its "big" inline-6 loves to rev. The eta's 6-cylinder gives up 95 cc to the big six and horsepower drops from 169 at 5500 rpm to 121 at 4250. Before you faint dead away, Bimmer fans, realize

that the torque figure remains at 170 lb-ft, with the peak torque developed at 3250 rpm instead of 4500 rpm as in the 528i. In fact, the redline in the 528e's engine is at 4750 rpm, marked by a fuel-shutoff rev limiter that is so abrupt we consider it almost dangerous.

More important, perhaps, to the eta system than just a lower torque curve is how it got there. The engine still uses Bosch L-Jetronic to get the fuel into the combustion chambers, but the air is fed through acoustically tuned intake runners, past smaller valves than in the past, with lighter valve springs (one reason for the low redline), into a new lean-burn combustion chamber. Mothering all this is something called Digital Motor Electronics (hereafter DME) that considers which gear you're in, how fast the engine is revving, how hot the engine is and the composition of the gases passing a sensor in the Lambda-Sond catalyst system. The DME's microprocessor then sets (and continually resets) the air/fuel mixture, timing and engine idle speed; this is similar to a number of such systems in the U.S. and Europe. Also important to the eta system is the higher compression ratio of 9.0:1 versus the 528i's 8.2:1.

In all fairness we have to point out that this moving of the torque peak (the torque curve is also slightly wider) down the rev range sounds suspiciously like a concept we've heard from Detroit for years. For proof, note that the Pontiac-built 2.5-liter inline 4-cylinder develops its maximum torque at 2400 rpm. As you'd suspect, however, the Germans approach the low-rpm theme in a different manner, having done it for different reasons than Detroit. The Munich philosophy, as Dennis Simanaitis pointed out in his article about BMW's research into such things (R&T, June 1981), is that lower revs minimize an engine's frictional losses. At the same time, an engine runs most efficiently when it is basically unthrottled and not having to draw air past a partially opened throttle plate. Move the peak torque down the rpm range to cut frictional losses and then teach owners to drive at three-quarters throttle, shifting in the 2000-2500 rpm range, until they are to cruising speed and they will get better fuel economy.

The only problem with the BMW fuel economy system is that the small six, like the big six, enjoys being revved regardless of where the torque curve may be, and we must admit we had trouble sticking with BMW's recommended 2500-rpm upshift points. At the track, redline acceleration runs returned a 0-60 mph time of 10.3 seconds, a full 2.1 sec slower than the 528i we last tested, but still impressive for a 3100-lb sedan. Interestingly enough, even though we were discouraged to see a BMW with slower acceleration numbers, the car doesn't feel slow. Thanks to the engine's impressive low- and mid-range torque, the test track numbers we got for the 528e belie what you feel under your foot and your backside when driving it. In fact, the impression of power the 528e left was so strong, several of us were amazed to find it was slower at all.

Then again, fuel economy was one of the main objects of the eta engine and here BMW helps the driver by adding a fuel economy gauge that is set in the speedometer dial. We are, of course, well past the days of mere vacuum gauges to monitor



mpg. BMW's gauge uses the computer in the DME to combine speedometer and fuel flow data. The result reads out on a 0-40 mpg scale and once you learn to use the scale and work with the BMW system the fuel economy gains are real. We suspect we can't necessarily prove that system's full worth with our fuel economy numbers—though we got a 24.0-mpg average with the 528e versus 22.0 with the 528i—but feel we were still in the upside of the learning curve during our few weeks with the car. In fact, we saw numbers that varied from 20.5 mpg when the 528e first arrived to a high of 26.5 for our last fill-up.

The other important ingredient in BMW's search for better fuel economy is the gearing of the 528e. The 528i in our last test had a 4-speed manual with basically the same gearing as the box in our 528e—excellent gear ratio spacing—now with the added benefit of a 0.81 5th gear. The big difference is in the final drive ratio, which drops from a 3.45:1 to a longer-legged 2.93:1 and makes the perceived acceleration of the 528e even more impressive, even with the 385-lb weight loss. The feel of the transmission hasn't changed and if you don't rush it too much the Getrag 5-speed rewards you with a crisp, almost delicate feel as you move from gear to gear.

We weren't very encouraged by the 528e's driveability, in particular a rough loping idle when cold, some stumbling before complete warm-up, part-throttle surging on the freeway and occasional stalling in traffic. What's more, the eta engine, for all its technical sophistication, does not have the smooth refinement the big six had in spades in the 528i, and we considered that model a comedown from the 530i in this regard. We miss the smoothness because it's an important part of the BMW package to us. BMW hinted that old feeling would be back again with a second engine—perhaps the big six—offered in the 5-Series in the future. There was also talk of the eta engine in a new BMW 328e, which is where the little six really belongs.

There's more to the 528e than just reworked styling and a new engine. Inside is the BMW theme revised. The seats have their nice firm-but-still-soft-er-than-Mercedes feel, our test car's covered in the optional leather. The instrument panel has the usual BMW aircraft aura, all properly placed instruments with white lettering on black dials that are set into the black dashboard. We must add too, that the a/c in the 528e is a great deal better than in past 5-Series BMWs, the result of putting several of the engineers in charge of that program in a black-on-black 528i in Texas in the middle of summer and having them drive 500 miles in a day.

Because there was no basic change in the passenger compartment, there are no great dimensional differences in interior measurements from the 528i to 528e, an inch traded here and there in head room, with the new car adding 3.5 in. of rear seat width. There's little difference in the trunk capacity. After the pains BMW went through to explain how much quieter the new car should be, we were surprised to find only minor differences in noise levels between the old and the new. At 30 mph it was 62 dBA and is now 60 dBA, at 50 mph we had 66 dBA and that number still holds. However, at 70 mph there's a significant 3 dBA drop to 71, probably because of improved aerodynamics.

Two additions to the 5-Series interior are a standard electric sunroof and a master warning light on the instrument panel that directs you to a panel above the rearview mirror, which specifically warns of various low fluid levels and burned-out bulbs. Missing from the 528e is a door-lock button on the right front door. Apparently BMW owners, unlike any other car owners in the world, lock themselves out of their cars because of it and so with the new central-locking system it was eliminated. Strange. Another unfortunate deletion from the U.S. 5-Series is BMW's ingenious maintenance interval reminder panel, which considers not just mileage but other factors that affect engine longevity and automatically adjusts the time between services. Oddly enough, U.S. emissions laws insist on a prescribed maintenance interval and this system, available in Europe, goes beyond that. BMW and the EPA are discussing the problem.

Although a MacPherson strut still forms the basis for the front suspension, the lower arm is no longer one solid wishbone, but actually two arms that still form the sides of an A, but never touch at the bottom of the strut (which would be the top of the A). This system, introduced on BMW's 7-Series sedans, moves the wheel pivot point closer to the vertical turning axis of the wheel; its advantages are said to be a reduction in brake dive and improvement in transitional roll response. The front anti-roll bar is now 17 mm thick, down from 24 mm last year, and weighing about half as much. Despite the smaller size, BMW claims the new bar actually does more work because it's attached directly to the strut rather than to the lower arm. And instead of being mounted ahead of the suspension in tension, the bar is now behind the suspension, working in compression.

There's still a semi-trailing arm independent rear suspension, the main thrust of any changes being to lighten the system. Again the anti-roll bar is smaller—14 mm against 18 mm—and mounted behind the suspension, but said to do the same work as before. The brakes are now 11.8-in. discs front and rear, the leading pair being ventilated. The 195/70HR-14 radials are mounted on standard BBS wheels.

The results? Fundamentally the ride and handling are all BMW, with a firm but supple ride, a fair amount of body roll and the steering we like so much, as it feeds back all the correct information and with just enough boost. Handling, however, is not exactly as before: It's better. Changes in the 528e's anti-dive characteristics have improved that aspect of the BMW's handling, one we've complained about in the past. And while the 528e may have the body roll of past BMWs, the transition from straight up to full lean feels more progressive and benign and so is less likely to upset the chassis. This newest BMW did outperform its predecessor on the skidpad, generating 0.766g while the 528i did 0.737g, and in the slalom, with 57.8 mph, up from 57.2 mph. In the former test the 528e felt close to neutral at the limit. During the slalom runs the BMW was quite stable, and while the back end felt light, as though it were coming close to letting go, it didn't. Although transitions don't upset the 5-Series chassis as badly as before, lurking out there at the limit is the characteristic final oversteer for which BMWs are famous.

Brake changes aside, the 528e stopped about the same as the 528i, which is fine with us because we had no complaints before. Pedal effort is up to a more desirable 25 lb from 12 lb last time, and the stopping distances—156 ft from 60 mph and 269 ft from 80 mph—were virtually identical to the previous test. The rear brakes were somewhat sensitive to lock and while this never led to any loss of control, modulating the brakes to lessen the locking did lengthen the stopping distances.

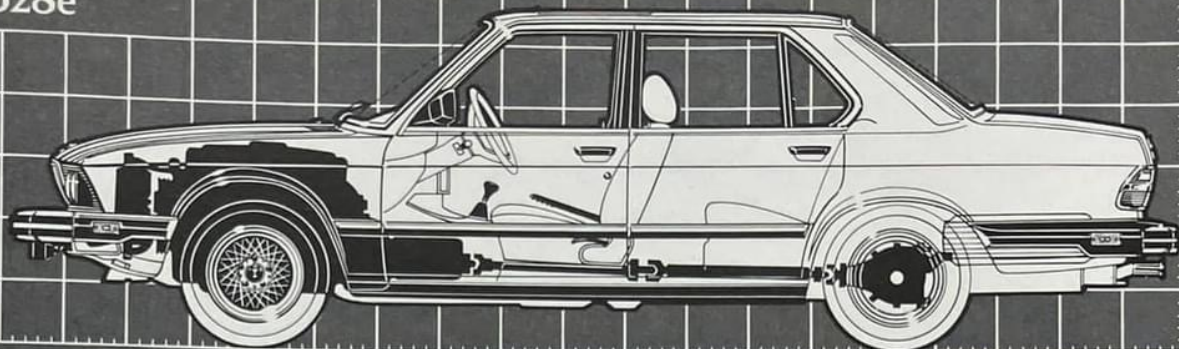
At the heart of our feelings about the 528e is the fact that this latest 5-Series BMW is an excellent automobile, one of the best in its class. The quality of construction is as high as ever, with the sort of interior fit and finish we expect from a German luxury sedan. There were, however, two things we expect to find in a BMW that weren't in the 528e. One is the abundant engine smoothness that we've come to enjoy in 6-cylinder BMWs; the eta engine is good, but not yet superior to the competition. The other missing element is the lack of progress in the 528e's styling; it's certainly not a bad-looking automobile, it just doesn't show the sort of advancement we expect from BMW. That's why the 5-Series is now one of the best in its class, while formerly it was the best.

It may sound unfair for us to be putting BMW up on a level where it is expected to do more and be better than its sports/luxury car competitors, but don't blame us because we didn't put it there—BMW did it itself. We appreciate the fact that a company such as BMW has to expand to succeed and that in doing so it has to appeal to a wider audience, one in which a 528e may even have to compete with a Cadillac Seville. We also know how this more general buyer group can affect the manner in which BMWs are developed for the U.S., but we hope BMW doesn't forget the reasons for its past successes here.



# ROAD TEST

## BMW 528e



SCALE: 10 in (254 mm) DIVISIONS

### PRICE

List price, all POE ..... est \$23,000  
 Price as tested ..... est \$24,000  
 Price as tested includes standard equipment (air cond, AM/FM stereo/cassette, elect. sunroof, elect. window lifts, elect. side mirrors, cruise control), leather interior (est \$1000)

### IMPORTER

BMW of North America, Inc, Montvale, N.J. 07654

### GENERAL

Curb weight, lb/kg ..... 3015 ..... 1369  
 Test weight ..... 3215 ..... 1460  
 Weight dist (with driver), f/r, % ..... 54/46  
 Wheelbase, in./mm ..... 103.3 ..... 2624  
 Track, front/rear ..... 56.3/57.9 ..... 1430/1471  
 Length ..... 189.0 ..... 4801  
 Width ..... 66.9 ..... 1699  
 Height ..... 55.7 ..... 1415  
 Ground clearance ..... 5.0 ..... 127  
 Overhang, f/r ..... 39.5/46.2 ..... 1003/1173  
 Trunk space, cu ft/liters ..... 15.8 ..... 447  
 Fuel capacity, U.S. gal./liters ..... 16.6 ..... 63

### INSTRUMENTATION

Instruments: 85-mph speedometer, 6000-rpm tach, 999,999 odo, 999.9 trip odo, coolant temp, fuel level, econometer, clock  
 Warning lights: oil press., brake fluid/handbrake, pad wear, alternator, coolant temp, low fuel, rear-window heat, oxygen sensor, warning panel, seat-belts, hazard, high beam, directionals

### ENGINE

Type ..... sohc inline-6  
 Bore x stroke, in./mm ..... 3.31 x 3.19 ..... 84.1 x 81.0  
 Displacement, cu in./cc ..... 164 ..... 2693  
 Compression ratio ..... 9.0:1  
 Bhp @ rpm, SAE net/kW ..... 121/90 @ 4250  
 Equivalent mph / km/h ..... 130/209  
 Torque @ rpm, lb-ft/Nm ..... 170/231 @ 3250  
 Equivalent mph / km/h ..... 100/161  
 Fuel injection ..... Bosch L-Jetronic  
 Fuel requirement ..... unleaded, 91-oct  
 Exhaust-emission control equipment: 3-way catalyst with Lambda-sensor

### DRIVETRAIN

Transmission ..... 5-sp manual  
 Gear ratios: 5th (0.81) ..... 2.37:1  
 4th (1.00) ..... 2.93:1  
 3rd (1.40) ..... 4.10:1  
 2nd (2.20) ..... 6.45:1  
 1st (3.82) ..... 11.19:1  
 Final drive ratio ..... 2.93:1

### ACCOMMODATION

Seating capacity, persons ..... 5  
 Head room, f/r, in./mm ..... 38.0/35.0 ..... 965/889  
 Seat width, f/r ..... 2 x 20.5/53.0 ..... 2 x 521/1346  
 Seatback adjustment, deg. .... 70

### MAINTENANCE

Service intervals, mi:  
 Oil/filter change ..... 7500/7500  
 Chassis lube ..... none  
 Tuneup ..... 15,000  
 Warranty, mo/mi ..... 36/36,000

### CHASSIS & BODY

Layout ..... front engine/rear drive  
 Body/frame ..... unit steel  
 Brake system ..... 11.8-in (300-mm) vented discs front, 11.8-in. (300-mm) discs rear; vacuum asst  
 Swept area, sq in./sq cm ..... 416 ..... 2684  
 Wheels ..... cast alloy, 14 x 6 1/2 J  
 Tires ..... Michelin XVS, 195/70HR-14  
 Steering type ..... recirc ball, power assisted  
 Overall ratio ..... 16.2:1  
 Turns, lock-to-lock ..... 3.5  
 Turning circle, ft/m ..... 32.8 ..... 10.0  
 Front suspension: MacPherson struts, lower lateral links, coil springs, tube shocks, anti-roll bar  
 Rear suspension: semi-trailing arms, coil springs, tube shocks, anti-roll bar

### CALCULATED DATA

Lb/bhp (test weight) ..... 26.6  
 Mph/1000 rpm (5th gear) ..... 20.3  
 Engine revs/mi (60 mph) ..... 2950  
 Piston travel, ft/mi ..... 1570  
 R&T steering index ..... 1.15  
 Brake swept area, sq in./ton ..... 259

### RELIABILITY

Owners of earlier-model BMWs reported 7 problem areas and 4 disabling reliability areas compared to overall Owner Survey averages of 12/6. So we expect the overall reliability of the BMW 528e to be better than average.

## ROAD TEST RESULTS

### ACCELERATION

Time to distance, sec:  
 0-100 ft ..... 3.6  
 0-500 ft ..... 9.5  
 0-1320 ft (1/4 mi) ..... 17.5  
 Speed at end of 1/4 mi, mph ..... 79.0  
 Time to speed, sec:  
 0-30 mph ..... 3.0  
 0-60 mph ..... 10.3  
 0-80 mph ..... 17.9

### SPEEDS IN GEARS

5th gear (3700 rpm) ..... 114  
 4th (4600) ..... 114  
 3rd (4700) ..... 84  
 2nd (4700) ..... 55  
 1st (4700) ..... 31

### FUEL ECONOMY

Normal driving, mpg ..... 24.0

### HANDLING

Lateral accel, 100-ft radius, g ..... 0.776  
 Speed thru 700-ft slalom, mph ..... 57.8

### BRAKES

Minimum stopping distances, ft:  
 From 60 mph ..... 153  
 From 80 mph ..... 270  
 Control in panic stop ..... good  
 Pedal effort for 0.5g stop, lb ..... 25  
 Fade: percent increase in pedal effort to maintain 0.5g deceleration in 6 stops from 60 mph ..... 20  
 Parking: hold 30% grade? ..... yes  
 Overall brake rating ..... very good

### INTERIOR NOISE

Idle in neutral, dBA ..... 50  
 Maximum, 1st gear ..... 71  
 Constant 30 mph ..... 62  
 50 mph ..... 66  
 70 mph ..... 74

### SPEEDOMETER ERROR

30 mph indicated is actually ..... 30.0  
 60 mph ..... 60.0  
 80 mph ..... 78.5

### ACCELERATION

