



# Mitsubishi Carisma GDI



## What's different?

**Gasoline direct injection (GDI) is a Mitsubishi first that promises lower emissions and less thirst with more power. 1998 cars have additional standard kit, as well.**

**T**HE 1.8 CARISMA WE TESTED LAST YEAR has been squeezed out by a higher powered 1.6-litre/100bhp version with similar gearing, that's extremely price-competitive, plus a new 125bhp 1.8 with something unique under its bonnet.

### GDI technology

That special something is a petrol engine that, for the first time, uses direct injection of the fuel straight into the combustion chamber. The benefits of this technique (already used in the latest diesels) mainly concern complete burning of the mixture, thus benefitting exhaust emissions and fuel economy.

In most petrol-powered rivals the mix of air and fuel is regulated at just under 15 to 1 (even when full power isn't required), simply to make the exhaust catalyser function properly and to avoid jerky, uneven accelerator response. In some "lean-burn" engines

(the Toyota Carina/Avensis and Honda Civic for example) a special cat and other measures, including variable valve timing, enable weaker mixtures to be used when cruising. The Carisma's direct injection takes lean-burn even further (and even weaker), producing three entirely distinct types of fuel spray pattern and timing, depending on the needs of the moment. To achieve this, the injector has to be located at the centre of the action, exposed to all the heat and pressure of the combustion process.

So much for theory, but how does it work out? For a start, 125bhp is an impressive output for a 1.8 litre (last year's version, with indirect injection, managed 115bhp and produced a less favourable torque curve, as well). The GDI cashes in on this by using higher gearing, which is always good for economy and relaxed cruising.

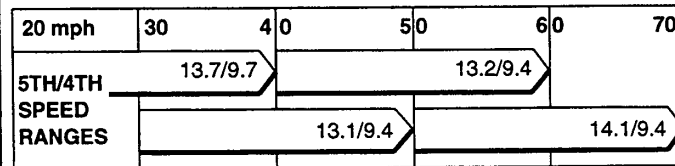
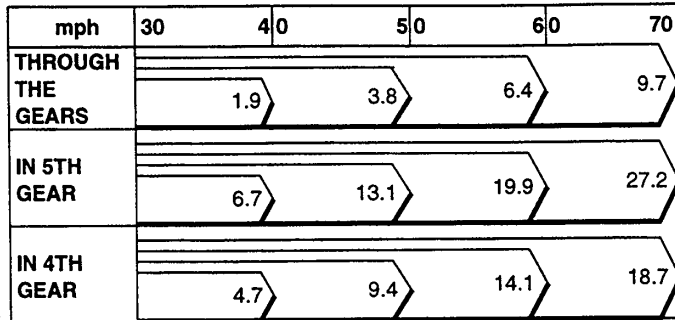
Performance will be blunted by taller gearing, of course, and, sure enough, in-gear acceleration isn't as good as for last year's 1.8. More surprising, however, is that the GDI is  $\frac{1}{2}$ sec slower *through* the gears (30–70mph) as well, although compared with the rivals in our table, it acquits itself very well.

The longer-legged gearing contributes towards the Carisma's impressive mechanical smoothness and refinement; to a point just short of the 70 limit, its

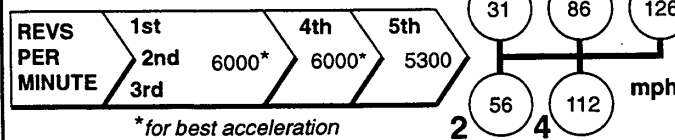
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**PERFORMANCE**

**Acceleration** time in seconds



**Maximum speeds**



**FUEL CONSUMPTION**

Type of use – with air conditioning off*	mpg
Urban (17mph average/heavy traffic)	24
Suburban (27mph average/6.4 miles from cold start)	30
Motorway (70mph cruising)	41½
Cross-country (brisk driving/20 miles from cold start)	38
Rural (gentle driving/20 miles from cold start)	44
<b>Typical mpg overall</b>	<b>38</b>
Realistic tank range (not nominal tank capacity)	53 litres/445 miles

\* with air conditioning switched on, consumption will increase by 2–4% in winter and 4–8% in summer

**FOR THE TECHNICAL**

**ENGINE**

**Type** transverse four in line with iron block and alloy head; five main bearings  
**Size** 81.0 x 89.0mm = 1834cc  
**Power** 125bhp at 5500rpm  
**Torque** 128 lb ft at 3750rpm  
**Valves** belt-driven twin overhead camshafts actuating four valves per cylinder via roller rocker arms  
**Fuel/ignition** electronically controlled three-mode direct (in cylinder) injection, integrated with programmed distributorless direct ignition (no plug leads). 60-litre tank, with low-level warning lamp

**TRANSMISSION**

**Type** five-speed manual (auto optional); front-wheel drive  
**Mph per 1000rpm** 23.7 in 5th, 18.8 in 4th

**CHASSIS**

**Suspension** front: independent MacPherson damper/struts with coil springs. Rear: independent multi-link (one trailing and twin transverse), coil springs. Telescopic dampers and anti-roll bars all round  
**Steering** rack and pinion with hydraulic power assistance; 3.2 turns between full locks. Turning circles average 10.5m between kerbs, with 16.2m circle for one turn of the wheel  
**Wheels** 5½J steel (or alloy on GLS) with 185/65R14H tyres (Goodyear NCT3 on test car)  
**Brakes** ventilated discs front, drums rear with vacuum servo. Electronic anti-lock control (fitted to test car) optional extra

**SAFETY AND SECURITY FEATURES**

Assessed on their effectiveness and convenience (the more black blobs the better)

<b>Seatbelts</b> front ●●●●○ rear ●●●●○	<b>Door locking</b> ●●○○○ central locking? <input checked="" type="checkbox"/>
<b>Head restraints</b> front ●●●●○ rear ●●●●○	remote control? <input type="checkbox"/>
<b>Interior</b> safety padding ●●●●○	auto window closure? <input checked="" type="checkbox"/>
driver's airbag? <input checked="" type="checkbox"/>	deadlocks? <input checked="" type="checkbox"/>
other airbags? <input checked="" type="checkbox"/>	<b>Luggage</b> secure from interior/hidden from view ●●○○○
side impact protection ●●●●○	<b>Alarm</b> <input type="checkbox"/> ●●○○○
<b>Fuel anti-spillage</b> ●●●●○	engine immobilised? <input checked="" type="checkbox"/>

standard on test car     factory fitted option     not available

**BRAKES**

Pedal feel ●●●○○ Behaviour in an emergency ●●●○○ Handbrake ●●●○○

Dry road stopping distance from 50mph (with ABS option)  
 (A good-to-average best stop is about 28m at 20-30kg pedal load)

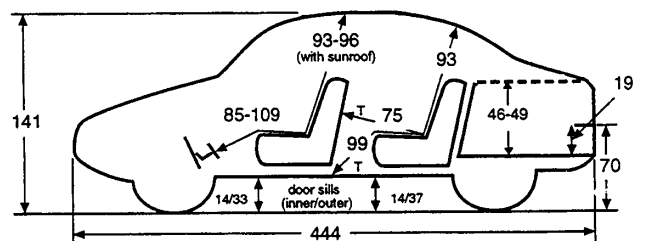
Pedal load	Distance (m)
9kg	39m
11kg	30m
14kg (ABS working)	27m
20kg	26m (.97g – best stop)

Distance 10m 20m 30m 40m 50m 60m

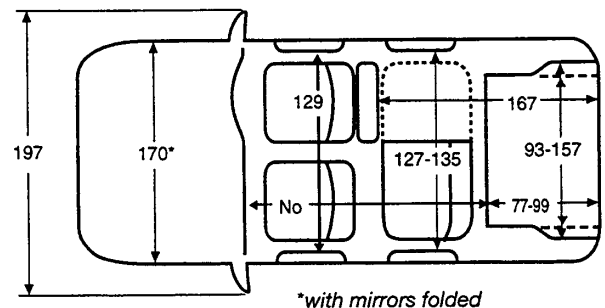
Fade test: pedal load required for a moderate (34m/.75g) stop: 11kg at start of test, 15kg at end of test. (Ideal brakes show no change)

**MEASUREMENTS**

Centimetres Four-door saloon



T: typical back seat space behind medium-sized front occupants



\*with mirrors folded

accelerator response and quietness remain unimpeachable. Thereafter, a harsher edge begins to surface, but generates no serious criticism.

For many car manufacturers, the bottom line is low emissions (especially as the even stricter year 2000 regs are beginning to worry them – we're sure Mitsubishi had this as a prime consideration when it opted to develop GDI. However, most potential owners will be more preoccupied with mpg and whether this petrol-powered car can deliver diesel economy.

Sadly, on the basis of our carefully conducted tests, this Carisma doesn't deliver, despite the manufacturer's claimed 20 per cent improvement. A car's size and weight must be taken into account when assessing what mpg it's reasonable to expect; again, the Carisma is on the small side compared with the VW Passat, Ford Mondeo and Peugeot 406, which all shape up more closely to the Galant.

On the other hand, its Volvo clone, the S40, puts the Carisma GDI in a much better light in terms of both performance and 15 per cent better economy, despite the two-litre Volvo's ambitious claimed power output.

#### 1998 Upgrade

All Carismas – even the competitively priced 1.6GL – now come with a passenger's airbag and side protection mouldings on their flanks. The industry-wide move to air conditioning also applies here and

our GLS had full climate control, with dial-a-temperature laid on. This sort of system is easy to set and forget, but there are times when it gets it wrong – cold air to the feet first thing and a lot of warm air delivered at face level at times.

This top GLS version also features side airbags and an outside temperature display as standard, but its optional alarm with remote-control handset proved a mixed blessing – press the wrong button and it sounds a panic alarm – embarrassing in the small hours, as we found out!

The ignition immobiliser, built into a key transponder, presents no difficulties, however, and we like the way that the electric windows and sunroof go into reverse if they meet any obstruction (such as a child's hand) – a nice injury-prevention feature.

#### VERDICT

**If you choose to forget about the technical wizardry under the bonnet and merely concentrate on results, the Carisma GDI emerges as a lively and commendably economical, if rather compact, medium sector saloon. It's distinctly more mechanically refined than any diesel in stop-start, lower-speed driving, but lacks the low-speed lugging power or the higher-speed quietness of the best diesels. Like the new boy's school report, we find ourselves concluding "Shows promise, but must try harder to come top".**

#### Likes . . . and gripes

Useful trip computer and twin trip odometers . . . but hard to see on a dull day

Super-smooth accelerator response . . . but pedal action too light

Seat height and thigh support adjusters . . . but lumbar adjustment sorely missed

Twenty-minute timer on heated rear window . . . but heating elements don't cover top of glass

HOW THE CARISMA GDI COMPARES*	Engine cap/power (cc/bhp)	Revs at 70mph (rpm)	30-70mph through gears (sec)	30-70mph in 5th/4th gears (sec)	Fuel economy (mpg)	Brakes† best stop (m/kg)	Maximum legroom – front (cm)	Typical leg/kneerom – rear (cm)	Steering (p) turns/ circle (m)	Overall length (cm)
MITSUBISHI CARISMA 1.8GDI	1834/125	2950	9.7	27.2/18.7	38	26/20	109	99/75	3.2/10.5	444
Honda Civic 1.5i LS	1493/115	2900	10.5	38.5/22.4	43	24½/18	111	101/70	3.5/10.55	446
BMW 325tds (Diesel/6 cyl)	2498/143	2500	8.9	21.5/14.6	39	26/16	112	98/70	3.4/9.9	443
Ford Mondeo 1.8LX	1796/115	3240	10.7	26.3/17.2	36½	27/16	110	102/76	3.0/10.4	456
Volvo S40 2.0	1948/140	3150	10.0	26.7/18.1	33	25/23	113	99/75	2.9/10.5	448
VW Passat 1.9 TDi/110	1896/110	2450	11.1	21.4/15.9	53	24½/18	110	102/74	2.8/10.9	468
*all four-door saloons						† all with ABS			(p) all with power steering	