DRIVING & TECH GUIDE

Volume 3: FIA GTC-76

Driving tips provided by Doug Arnao, three time SCCA champion, and physics director on GTR and GT Legends.

BMW CSL Alpina teams

Weight:
1180kg (with driver)
Weight Distribution % F/R:
53/47 no fuel
Engine:
3.2L BMW In-line 6
340hp @7700RPM
370NM Torque @ 5200
Transmission:
5-speed
Aerodynamics:
Lift @ 100mph: -827N
Drag @ 100mph: 927N
Tires:
Dunlop Radial Slicks
Front: 240/625-17
Rear: 240/625-17
Chassis:
Lateral Inertia: 1530 kg/m2
CG Height from ground: 430mm
Drive train layout:
Front Engine/Front trans
Rear wheel drive
Suspension:
Front: McPherson Strut
Rear: Semi-Trailing Arm

Driving Tips

"Factory built to take on the Ford Capris in the European Touring Car series in the 1970's. This "Alpina" tuner version of the BMW 3.0 CSL has the two valve 3.2L engine and current generation Dunlop Radial Slicks – same size front and rear providing great grip and low rolling drag. It's a well balanced package with its only fault being a bit of understeer on corner entry which can quickly turn to oversteer on exit with too much throttle. The culprit being the same size tires used at each end. These Dunlop Radial tires make the breakaway adhesion at the limit abrupt, but grip up to that point is substantial. The brakes are good, steering precise, and the 5-speed keeps the engine in a good power range.

In general, the driving style is pretty straightforward with no real sliding as the radials will bite you if hung out too far. " **DA**

BMW CSL Schnitzer teams

Weight:
1250kg (with driver)
Weight Distribution % F/R:
53/47 no fuel
Engine:
3.5L BMW In-line 6 4-valve
440hp @8700RPM
370NM Torque @ 6250
Transmission:
5-speed
Aerodynamics:
Lift @ 100mph: -845N
Drag @ 100mph: 955N
Tires:
Dunlop Bias-Ply Slicks
Front: 325/625-16
Rear: 350/650-16
Chassis:
Lateral Inertia: 1574 kg/m2
CG Height from ground: 430mm
Drive train layout:
Front Engine/Front trans
Rear wheel drive
Suspension:
Front: McPherson Strut
Rear: Semi-Trailing Arm

Driving Tips

"The culmination of BMW's assault on the ETCC championship in the 1970s was the CSL "Schnitzer" version. An increase in displacement to 3.5 liters, along with the allowance of 4-valve heads in the series, saw the output of the engine to rise to 440+HP. This car has huge Dunlop bias-ply slicks that have endless grip when hot.

This car needs to be man-handled a bit to get the most out of it. The steamroller tires allow lots of sliding near the limit and the horsepower doesn't upset it much. With peak HP occurring at nearly 9000 RPMs you want to keep the motor revs up to maintain momentum. It has big front and rear spoilers providing good downforce. Chucking the car into the corners works best with enough throttle to settle it into a slide. Have fun." **DA**

'74 Chevrolet Corvette teams

Weight:
1350kg (with driver)
Weight Distribution % F/R:
50/50 no fuel
Engine:
350 CI Chevy V-8 Small Block
450hp @6500RPM
580NM Torque @ 4500
Transmission:
4 speed
Aerodynamics:
Lift @ 100mph: +55N
Drag @ 100mph: 1072N
Tires:
Goodyear Bias-Ply Slicks
Front: 23.5"x11.5"-16
Rear: 25.0"x12.0"-16
Chassis:
Lateral Inertia: 1584 kg/m2
CG Height from ground: 450mm
Drive train layout:
Front Engine/Front trans
Rear wheel drive
Suspension:
Front: Upper/Lower Control arms
Rear: Trailing Arm w/ Later links

Driving Tips

"This version of the vintage racing Corvette has the 350 small-block V8. The torque is impressive and horsepower is ample. The handling is very good for such a heavy car; the 'Vette's near 50/50 weight distribution makes it feel balanced. The fully independent rear suspension, along with sticky Goodyear slicks, accepts the V8's power without complaint.

The driving style is pretty classic with the car doing small 4-wheel drifts easily. It will go straight off-course if pushed too far, and it is not easy to recover. It has no real downforce, so be careful in high speed corners where it can get light in the rear. The brakes will overheat, so avoid constant deep braking manoeuvres." **DA**

'69 Chevrolet Corvette teams

Weight:
1390kg (with driver)
Weight Distribution % F/R:
51/49 no fuel
Engine:
427 CI Chevy V-8 Big Block
575hp @6900RPM
680NM Torque @ 4800
Transmission:
4 speed
Aerodynamics:
Lift @ 100mph: -220N
Drag @ 100mph: 1240N
Tires:
Avon Bias-Ply Slicks
Front: 23.5"x11.0"-15
Rear: 27.0"x14.0"-15
Chassis:
Lateral Inertia: 1642 kg/m2
CG Height from ground: 510mm
Drive train layout:
Front Engine/Front trans
Rear wheel drive
Suspension:
Front: Upper/Lower Control arms
Rear: Trailing Arm w/ Later links

Driving Tips

"Big-block horsepower. Nearly 600 of it. The most of any car in this class. It's the main character of this version of the Corvette. It has huge Avon bias-ply rear tires to help cope with the tremendous torque of the 427 V8.

It's noticeably heavier feeling than its small-block cousin. It can't be driven in the same manner because the horsepower will break tires loose anywhere except when pointed straight. It will understeer in the corners, so get it through the corners with neutral throttle - then give it holy thunder down the straights. Gobs of fun to tame. It can actually win at all but the slow short tracks - if you can manage the throttle. Make sure to watch the brakes, as overheating is a problem when trying to stop this big rocket ship." **DA**

De Tomaso Pantera teams (factory)

Weight:
1300kg (with driver)
Weight Distribution % F/R:
44/56 no fuel
Engine:
Ford 351 CI "Cleveland" V-8
(4x Weber 48IDA induction)
475hp @6500RPM
600NM Torque @ 5000
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: -802N
Drag @ 100mph: 935N
Tires:
Avon Bias-Ply Slicks
Front: 23.5"x11.0"-15
Rear: 27.0"x14.0"-15
Chassis:
Lateral Inertia: 1260 kg/m2
CG Height from ground: 430mm
Drive train layout:
Mid-Engine/Rear-trans
Rear wheel drive
Suspension:
Front: Upper/Lower Control arms
Rear: Upper/Lower Control arms

Driving Tips

"It's wide, it's low, it's fast and it's *the* car to beat in this class. The factory-built Panteras have it all: mid-engine handling, big V8 power, great brakes, good aerodynamics. The huge Avon slicks, combined with the mid-engine rear weight bias, make putting the big Ford V8's power down easy.

Drive this car like a pure racecar with clean lines and precise placement. It can be brutally fast when driven with finesse. Best to get all your braking and downshifting done before you turn in as its real strength is from the apex on out and the more you maximize that the better. Sliding is relatively easy with the Pantera, but try to keep this to a minimum as the large slicks will scrub speed quickly." **DA**

De Tomaso Pantera teams (non-factory)

Weight:
1350kg (with driver)
Weight Distribution % F/R:
44/56 no fuel
Engine:
Ford 351 CI "Cleveland" V-8
(single 4-barrel carb)
400hp @6200RPM
540NM Torque @ 4000
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: +80N
Drag @ 100mph: 860N
Tires:
Avon Bias-Ply Slicks
Front: 23.5"x11.0"-15
Rear: 25.0"x13.0"-15
Chassis:
Lateral Inertia: 1260 kg/m2
CG Height from ground: 440mm
Drive train layout:
Mid-Engine/Rear-trans
Rear wheel drive
Suspension:
Front: Upper/Lower Control arms
Rear: Upper/Lower Control arms

Driving Tips

"This version of the Pantera is not nearly as capable as the factory race cars. Still, it's got all the mid-engine handling traits: low, wide stance and big slicks.

With less HP it's pretty easy to drive, but the driving style is still the same as the factory cars. A little more sliding is necessary to go fast with this Pantera's softer suspension." **DA**

Ford Capri 2600 RS teams

Weight:
1030kg (with driver)
Weight Distribution % F/R:
56/46 no fuel
Engine:
2.6L Ford V-6
310hp @7500RPM
330nm Torque@6200
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: +50N
Drag @ 100mph: 1050N
Tires:
Avon Bias-Ply Slicks
Front: 21.5"x9.5"-15
Rear: 21.5"x10.7"-15
Chassis:
Lateral Inertia: 1344 kg/m2
CG Height from ground: 430mm
Drive train layout:
Front-Engine/Front-trans
Rear wheel drive
Suspension:
Front: McPherson Strut
Rear: Live axle

Driving Tips

"The early ETCC version of the British Ford Capri. This was the car to beat before BMW's assault on the championship. No one thing about the car stands out. It's a deceptively well-balanced overall package. Light, great brakes, throaty sounding 300hp V6 power all get you around very nicely.

Handling is straight forward when the road is smooth. The suspension travel is short and the spring rates are on the stiff side, so it doesn't like big curbs. The live rear axle provides good camber control, but will sometimes jump out on you with the wrong amount of power application or on bumpy track surfaces. Gathering it back up is easy with a small lift off the throttle. Drive it aggressively, but watch for some understeer on corner entry. Once you get through that, the car will point into the corner with ample throttle." **DA**

Ford Capri 3100 RS teams

Weight:
1120kg (with driver)
Weight Distribution % F/R:
52/48 no fuel
Engine:
3.4L Cosworth Ford GAA
V-6 4-valve
440hp @8750RPM
375nm Torque@6750
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: -370N
Drag @ 100mph: 901N
Tires:
Avon Bias-Ply Slicks
Front: 23.5"x12.5"-16
Rear: 25"x13.5"-16
Chassis:
Lateral Inertia: 1276 kg/m2
CG Height from ground: 410mm
Drive train layout:
Front-Engine/Front-trans
Rear wheel drive
Suspension:
Front: McPherson Strut
Rear: Live axle

Driving Tips

"The Capri 3100 RS was the ultimate racing Capri of the era. This version has the awesome Cosworth GAA 3.4L 4-valve engine pumping out over 400 HP and revving to 9000 RPMs. Specifically built to compete with the factory BMW CSLs, in the 1973-74 ETCC, the Capri 3100 RS is a giant-killer. It has huge Avon bias-ply slicks under wide-body fenders. The weight balance and inertia were optimized by moving the cooling and radiators to the rear fender openings.

Driving this car can be really exhilarating. It gets down the straights at an alarming pace and has great brakes to handle the velocity in the braking zones. The entrance to the corners can be taken very fast as the big tires and aero downforce will give you lots of confidence. The only thing to watch is corner entry understeer as the front tires will give up a little if the entry speed is carried too far. Try to keep the engine up in revs in the corner so you have good power available for the exits. It's hard to break the rear tires loose so don't be shy with the throttle. This car can win anywhere." **DA**

Ford Escort 2000 RS teams

Weight:
890kg (with driver)
Weight Distribution % F/R:
52/48 no fuel
Engine:
2.0L In-Line 4
Cosworth Ford BDA 4-valve
285hp @8250RPM
262nm Torque@6500
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: +25N
Drag @ 100mph: 744N
Tires:
Avon Bias-Ply Slicks
Front: 21.5"x10.7"-15
Rear: 21.5"x10.7"-15
Chassis:
Lateral Inertia: 1276 kg/m2
CG Height from ground: 400mm
Drive train layout:
Front-Engine/Front-trans
Rear wheel drive
Suspension:
Front: McPherson Strut
Rear: Live axle

Driving Tips

"With a layout similar to its brother Capri, it's no surprise it drives similarly. The Escort's main advantage is its low weight combined with a 2.0L version of Cosworth's 4 cylinder BDA engine. Power to weight is right up there with the best in this class, and its light weight makes it a threat on the smaller tracks where the handling excels.

A blast to drive fast, you can out brake just about any car in the class. Carrying too much speed into the corners is almost required. There's confidence in tossing it about and scrubbing off speed once in the corner , and yet still pull it out the other end. Of course, driving it smoothly works too, but with the low torque of the high-revving Cosworth 4 cylinder, try not to get it bogged down mid-corner." **DA**

Porsche 906 teams

Weight:
700kg (with driver)
Weight Distribution % F/R:
45/55 no fuel
Engine:
2.0L Porsche Flat-Six
220hp @8000RPM
210nm Torque@6200
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: -87N
Drag @ 100mph: 481N
Tires:
Michelin Historic TB15
Front: 215/55-15
Rear: 270/45-15
Chassis:
Lateral Inertia: 653kg/m2
CG Height from ground: 310mm
Drive train layout:
Mid-Engine/Rear-trans
Rear wheel drive
Suspension:
Front: Upper & Lower control arms
Rear: Upper & Lower control arms

Driving Tips

"Born of a long line of factory built Porsche race cars, the 906 was the first true prototype car that Porsche built. It was an evolution of all that was learned from the 904. With a tubular space-frame and a bonded fiberglass body, the 906 was extremely light at 700kg. Double a-arm suspension all around, 220hp flat-six power, and great brakes made this car a joy to drive. It truly is a giant killer in this class with much bigger and more powerful cars.

Probably the most fun car to drive here, it can win at any track. Forced to use treaded Michelin Historic tires, it still handles like its on rails. A bit of sliding throughout the corner is normal and not much problem to control. It really just goes exactly where you point it and it's hard to get in over your head in any situation. The only thing to watch out for is how fast you can close in on other cars in the braking areas – have an escape route planned!" **DA**

Porsche 914-6 GT teams

Weight:
930kg (with driver)
Weight Distribution % F/R:
45/55 no fuel
Engine:
2.5L Porsche Flat-Six
250hp @7200RPM
275nm Torque@5500
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: +25N
Drag @ 100mph: 730N
Tires:
Dunlop Semi-Slick radial
Front: 205/50-16
Rear: 225/45-16
Chassis:
Lateral Inertia: 960kg/m2
CG Height from ground: 380mm
Drive train layout:
Mid-Engine/Rear-trans
Rear wheel drive
Suspension:
Front: McPherson Strut
Rear: Semi-trailing arm

Driving Tips

"Porsche's most underrated car. The 914 "VW-Porsche" got sneers from Porsche purists when it was first released in 1970. Assembled on the Volkswagen assembly line, and using many VW parts, it was labelled as a pretend Porsche. But it had all the design qualities of true-bred racecar: light weight, mid-engine, low center of gravity. The car quickly proved everyone wrong when Porsche supplanted the 911 2.0L flat six to created the "914-6". For racing they created the 914-6 GT that we have here. A lightweight version with engines up to 2.5L. This car started winning 2.5 liter class races, beating more powerful contenders with its superb handling, light weight, and reliable Porsche power.

It's a perfectly balanced package with its mid-engine. It drives exactly where you point it, with only a slight hint of trailing throttle oversteer (meaning don't lift too abruptly!). It changes direction easily, going from full braking to full cornering with great facility. Its only weakness being the slightly underpowered 2.5L engine, and sometimes turning in too quickly will leave you scrambling to undo your early apex. Nail the entrance, keep your momentum up in the corners, and there will be few cars that can stay with you there." **DA**

Porsche 911 RSR 3.0L teams

Weight:
1010kg (with driver)
Weight Distribution % F/R:
39/61 no fuel
Engine:
3.0L Porsche Flat-Six
320hp @7500RPM
342nm Torque@5750
Transmission:
5 speed
Aerodynamics:
Lift @ 100mph: -290N (-340N
Drag @ 100mph: 832N (955N
Tires:
Goodyear Slick radial
Front: 23.5x10.5-16
Rear: 25.5x12.0-16 (25.5x14.0-16 wi
Chassis:
Lateral Inertia: 1169kg/m2
CG Height from ground: 390mm
Drive train layout:
Rear-Engine/Mid-trans
Rear wheel drive
Suspension:
Front: McPherson Strut
Rear: Semi-trailing arm

Driving Tips

"The Porsche 911 RSR of the mid-70s was the pinnacle of the 911 evolution at the time. The 911's unique handling style is dominated by its large amount of rear weight bias (over 60%) from the rear mounted flat-6 engine.

While it can present challenges to going fast, it is always predictable. You never get a surprise while driving it. Its light front weight will always provide understeer going into the corners, while its heavy rear weight will allow lots of throttle to be used once you are ready for the exits. It has wonderful braking that gives a confident feel. General handling has a light feel from the low overall weight, with a dominant feeling of pivoting around the rear axle. The venerable Porsche 3.0L has lots of torque giving you good power just about anywhere. The body has decent drag characteristics along with good downforce from the air dam and rear wing. Two versions here: the standard with a "duck-tail" rear spoiler, and a version with a wider body using the "whale-tail" rear spoiler. (This version also uses bigger rear tires). The slicks being used are current generation Goodyear radials. These provide substantially better grip than the old bias-belts the RSR originally ran on. Their breakaway characteristics at the limit can be slightly abrupt, so watch how much you slide these classics." **DA**