2011 Mustang Powertrain

- Twin Independent Variable Camshaft Timing (Ti-VCT) technology is a key element helping both the new 3.7-liter V-6 and 5.0-liter V-8 Mustang engines deliver class-leading performance and fuel efficiency of 31 mpg and 26 mpg highway, respectively
- Variable camshaft timing uses oil pressure to adjust valve opening and closing events, providing improved off-the-line acceleration over non-VCT-equipped engines
- The Mustang GT 5.0-liter V-8 uses camshaft torque energy actuation for its Ti-VCT system, with assistance from pressurized oil, resulting in a broad torque curve

The heart of every Mustang is its engine, and beneath the hood of the new 2011 models beats a technological tour de force. On both the 3.7-liter V-6 and 5.0-liter V-8 engines, Twin Independent Variable Camshaft Timing (Ti-VCT) allows Mustang drivers to balance high performance and fuel economy.

"Ti-VCT is a win-win-win technology," said Barb Samardzich, vice president, Global Powertrain Development. "It helps our new range of engines to deliver high performance with unsurpassed highway fuel economy and reduced emissions."

Ti-VCT provides extremely precise variable – yet independent – control of timing for intake and exhaust valves. Drivers of the 2011 Mustang will notice abundant torque and class-leading fuel economy. An additional benefit of Ti-VCT is a reduction of emissions, especially in situations when the throttle is partially open.

Independent adjustment of intake and exhaust valve timing allows maximum fuel economy at part-throttle, while delivering optimized power in full-throttle situations. An added benefit is improved drivability and responsiveness across the torque curve.

The flexibility allowed by Ti-VCT means Mustang customers will experience:

- Better off-the-line launch feel, with plenty of the low-end "grunt" for which Mustang is famous. Ti-VCT can deliver up to a 5 percent improvement in low-end torque and a 7 percent improvement in peak power versus non-Ti-VCT-equipped engines
- Improved fuel economy at all engine speeds; Ti-VCT alone can account for up to a 4.5 percent fuel economy improvement over non-VCT-equipped engines
- Lower emissions, with better control of oxides of nitrogen and hydrocarbons throughout the range of engine operating speeds, reducing atmospheric pollution

How Ti-VCT works
The new 3.7-liter V-6 and 5.0-liter V-8 engines offered in the 2011 Mustang use a double-overhead-camshaft (DOHC) configuration that employs two camshafts per cylinder bank – one camshaft to operate the intake valves and one camshaft to operate the exhaust valves.

Traditionally, camshafts only have been able to open the valves at a fixed point defined during engine design and manufacturing. But with modern variable cam timing systems, the camshafts can be rotated slightly relative to their initial position, allowing the cam timing to be advanced or retarded. Ti-VCT takes this technology and applies it to both the intake and exhaust camshafts of the DOHC design.

Mustang 3.7-liter V-6 models use electronic solenoid valves to direct high-pressure oil to control vanes in each of the camshaft sprocket housings. By using one oil control solenoid valve per camshaft, controlled by the Electronic Control Module, each intake and exhaust cam can be advanced or retarded independently of the other as engine operating conditions change, providing an

exceptional degree of valve timing control.

The Mustang GT 5.0-liter V-8 uses a Ti-VCT system actuated by camshaft torque, with assistance from pressurized oil. Using camshaft torque energy provides even faster throttle response and maximizes use of existing energy to aid fuel economy. Working like a ratchet, the one-way valves allow precise timing of camshaft events, continually optimizing timing to provide maximum torque or maximum fuel economy, based on driver input.

"Ti-VCT technology will continue to proliferate across the Ford powertrain portfolio," said Samardzich. "By 2013, you can expect to see this advancement available on 90 percent of our nameplates."