Systems Engineering

Supervisor circuits and related problems

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iTIC http://itic.cat

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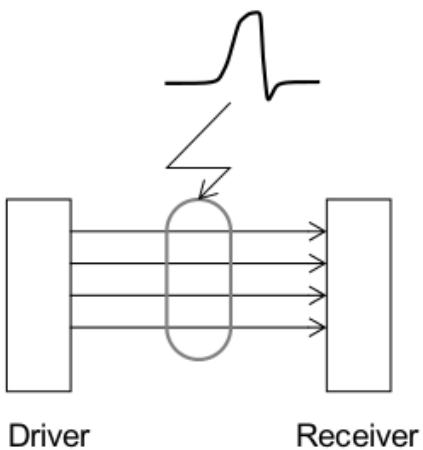
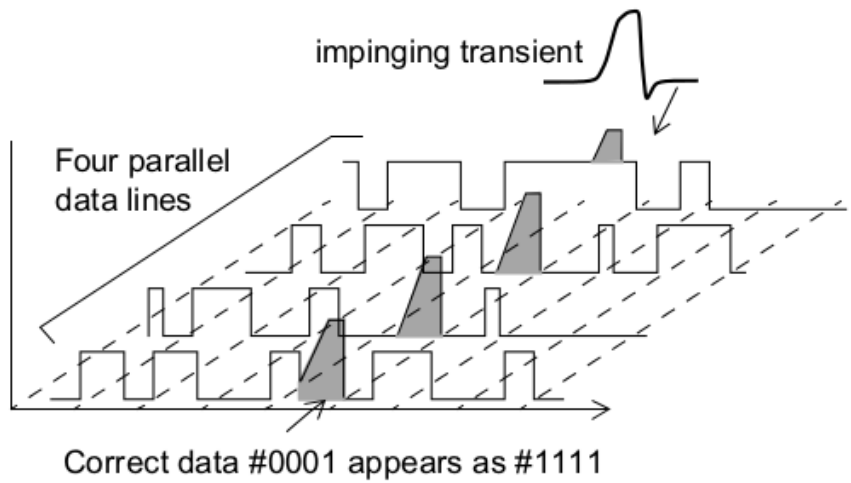
The threat of corruption

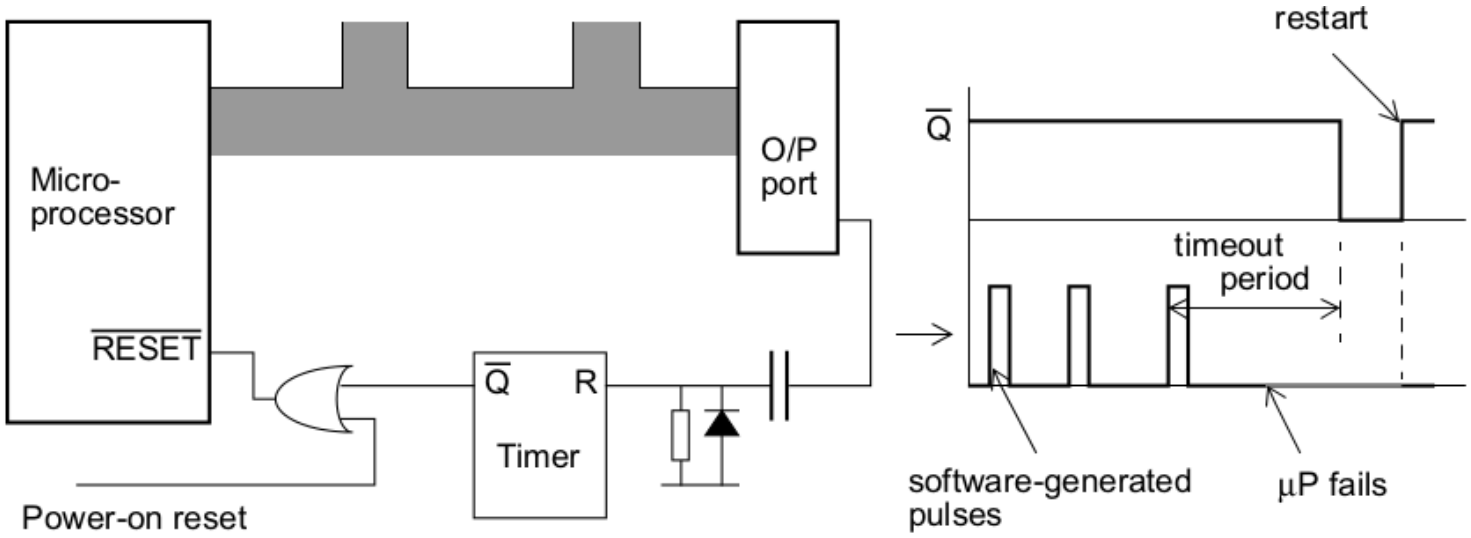
- Microprocessor : state machine
- Data and/or program *does* get corrupted
  - Electrostatic discharge
  - Transient from mains cables
  - RF fields
  - Cosmic radiation
- Accept that the data and/or program *will* be corrupted
- Provide automatic recovery





Source: The circuit designer's companion

Watchdog

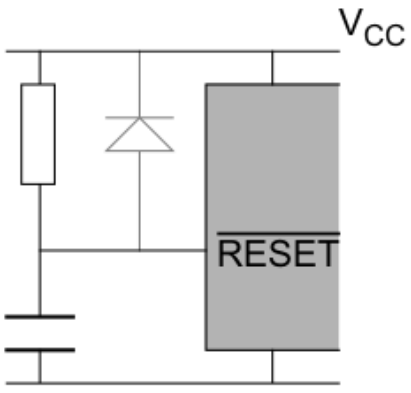


Source: The circuit designer's companion

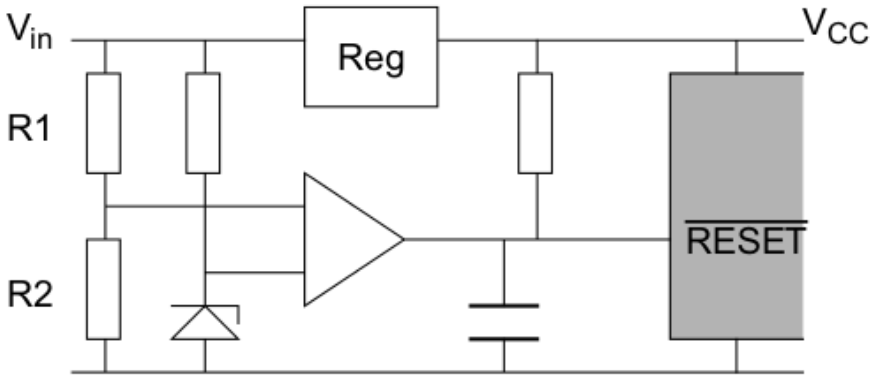
- Use built-in watchdog
- If external do not use a programmable one (could be programmed off!)
- Testing
  - Not easy. LED to signal "barking"
  - Weaken the hardware (lowering Vcc...)
  - Field test (by another person)

Power rail supervision

- Stable power rail assumed: 1.8 V, 3.3 V, 5 V with tolerances
- What happens during power cycling? And *during* power-up or power-down?

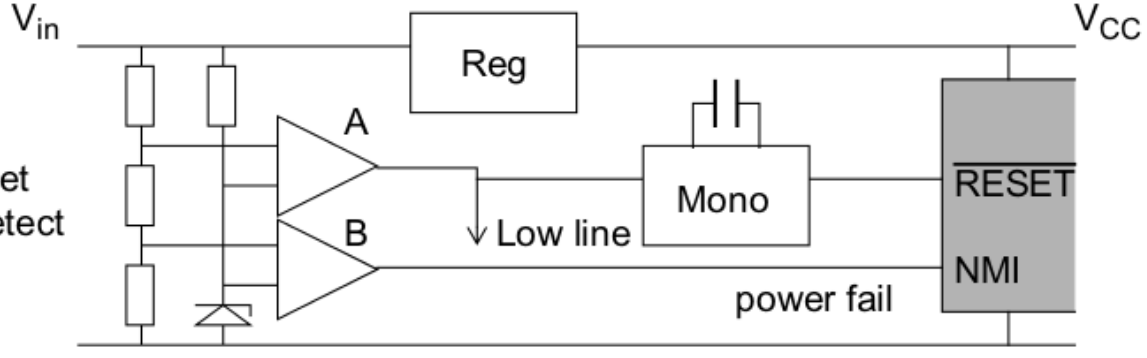


a) simple reset



b) undervoltage reset

c) combined
undervoltage reset
and power fail detect

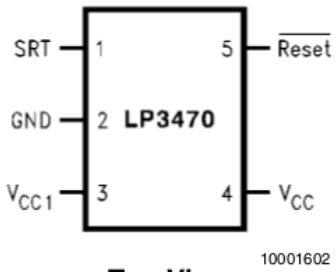


Source: The circuit designer's companion

LP3470

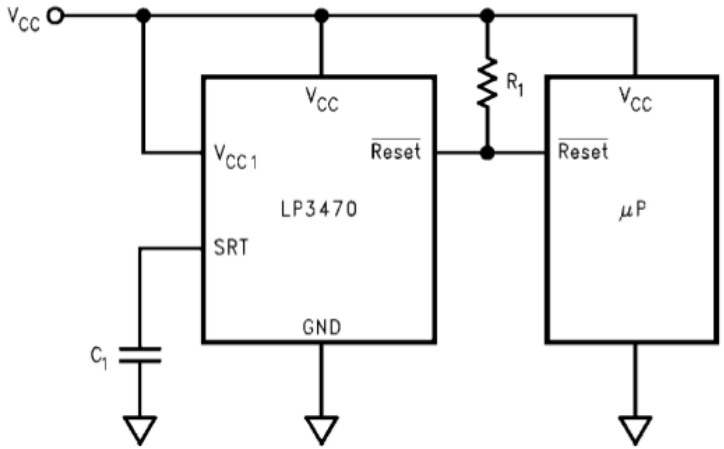
- Micropower (16 μA) CMOS voltage supervisory circuit
- Available in six standard reset threshold voltage (V_{RTH}) options: 2.63V, 2.93V, 3.08V, 3.65V, 4.00V, 4.38V, and 4.63V

Pin Configuration



Top View
See NS Package Number MF05A

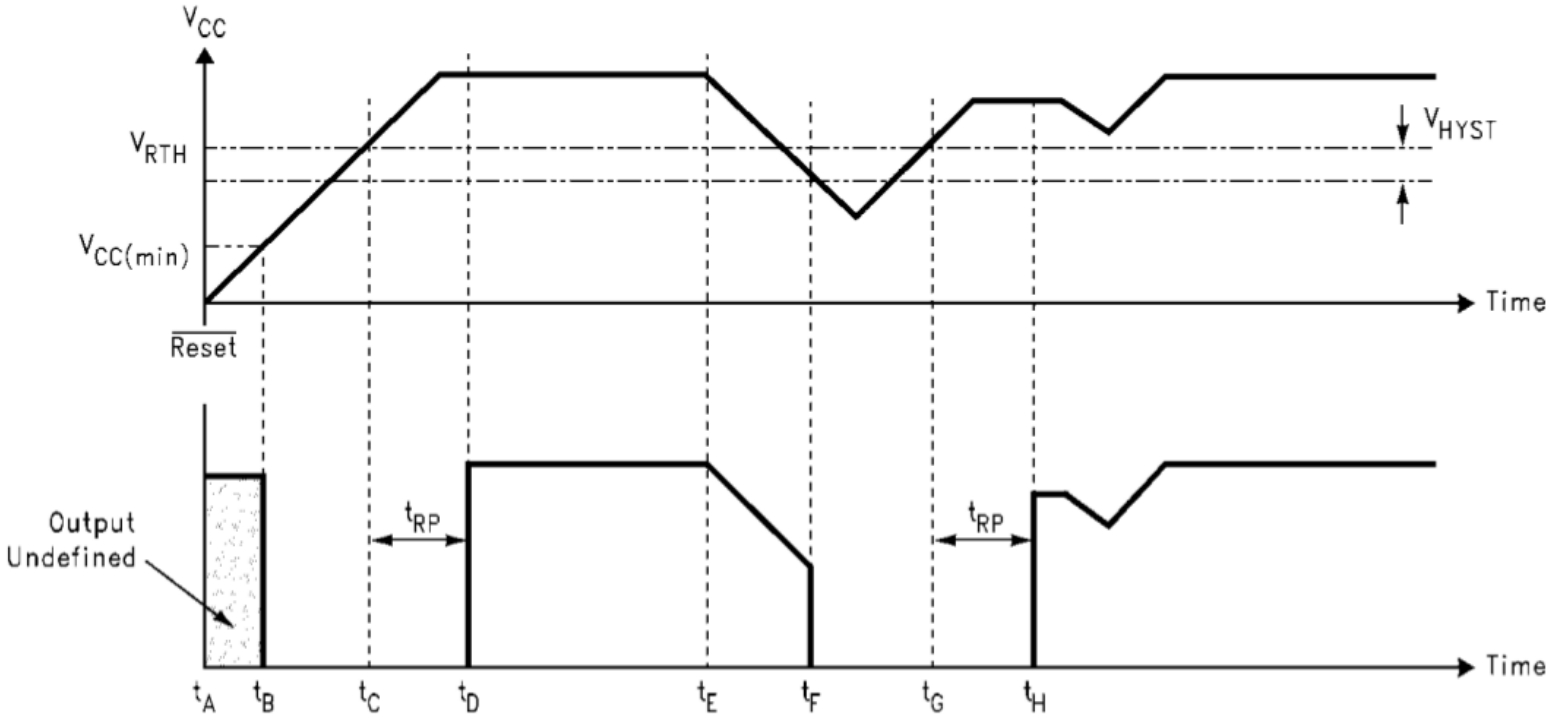
Basic Operating Circuit



Source: Texas Instruments

LP3470 timing

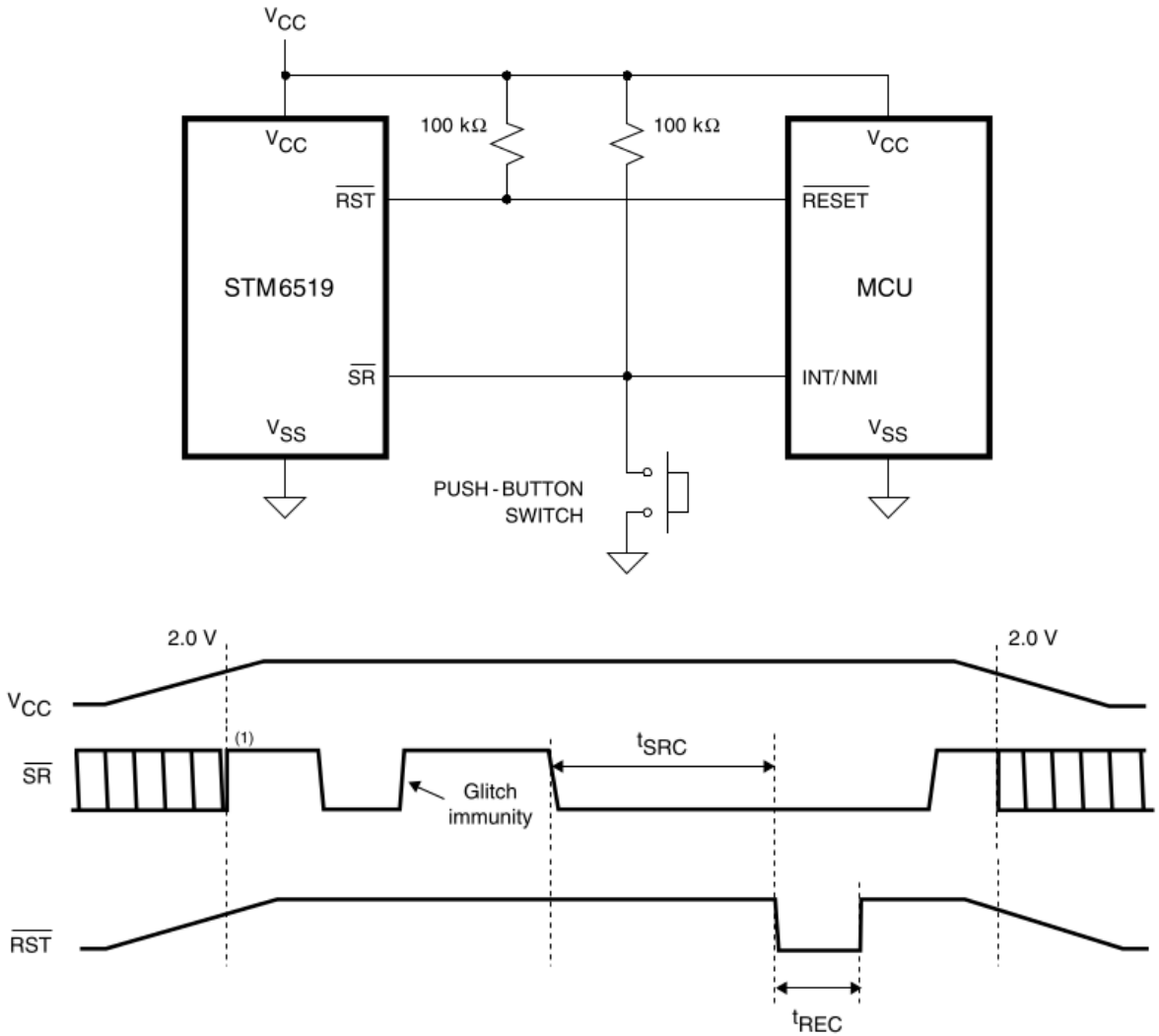
- $t_{RP}(\mathrm{ms}) = 2000 \times C_1(\mu\mathrm{F})$



Source: Texas Instruments

STM6519 smart reset

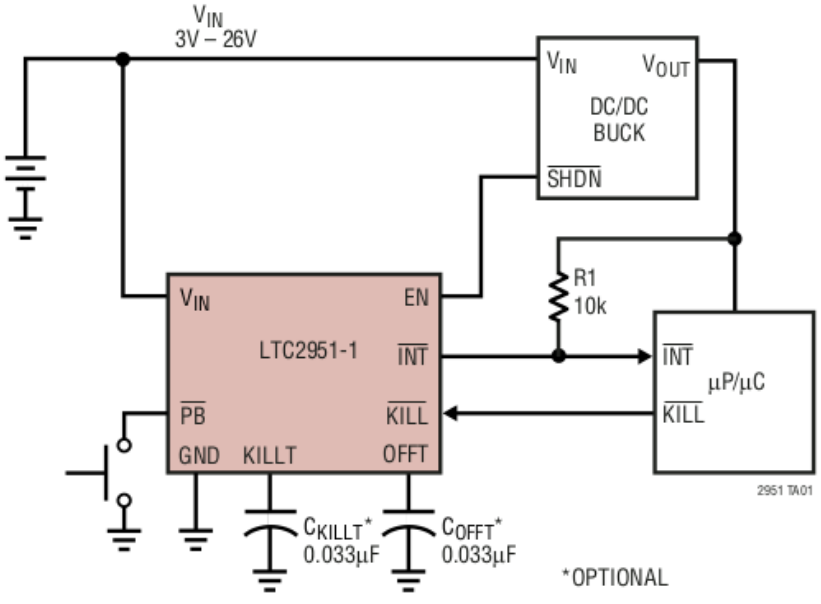
- Short reset push gives interrupt
- Long reset push makes hard reset

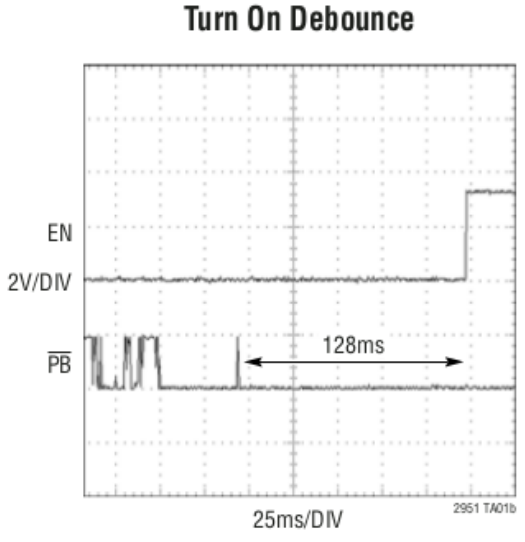


Source: ST Microelectronics

Push Button On/Off Controller

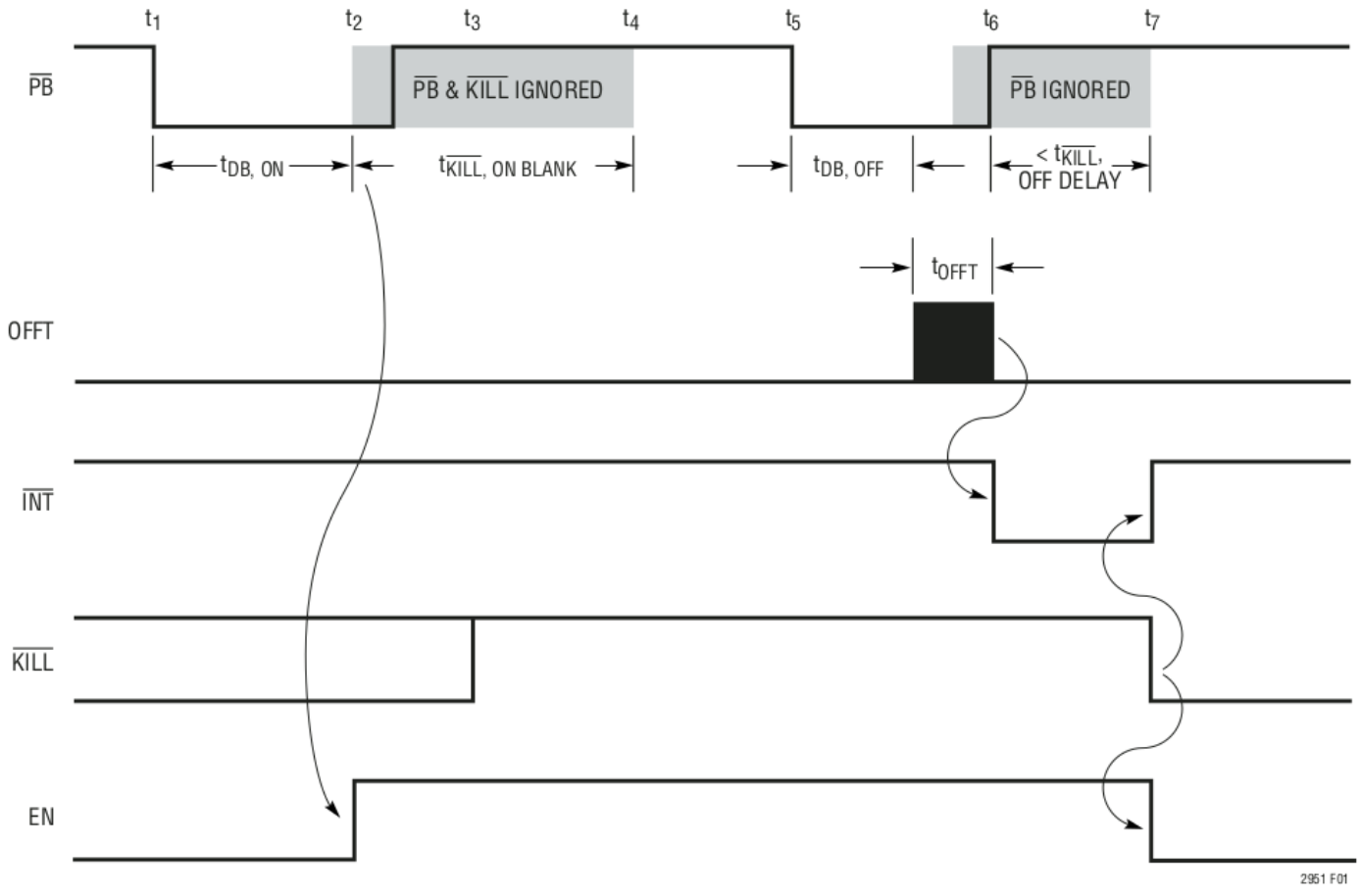
- Micropower (6 μA). Single button toggles enable output
- OFF debounce time programmable. ON time fixed 128 ms
- KILL timeout





Source: Linear Technology

Push Button On/Off Controller. Timing



Source: Linear Technology