DTE Power Supply Options

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Requirements

- low cost
- efficient
- small size
- wide input voltage range
- multiple outputs
- isolation

Linear Regulator

Advantages

- simple, reliable, low cost

Disadvantages

- low efficiency
- non-isolated
- single output

Linear Regulator Example

- industry standard 7805 in TO-220 pkg
- 35V maximum input voltage
- 300mW Pout limit at max Vin
- efficiency < 15%
- 250mA input yields 1.25W output and 7.5W of device dissipation

Switching Regulator

Advantages

- high efficiency >70%
- multiple outputs possible
- isolation possible

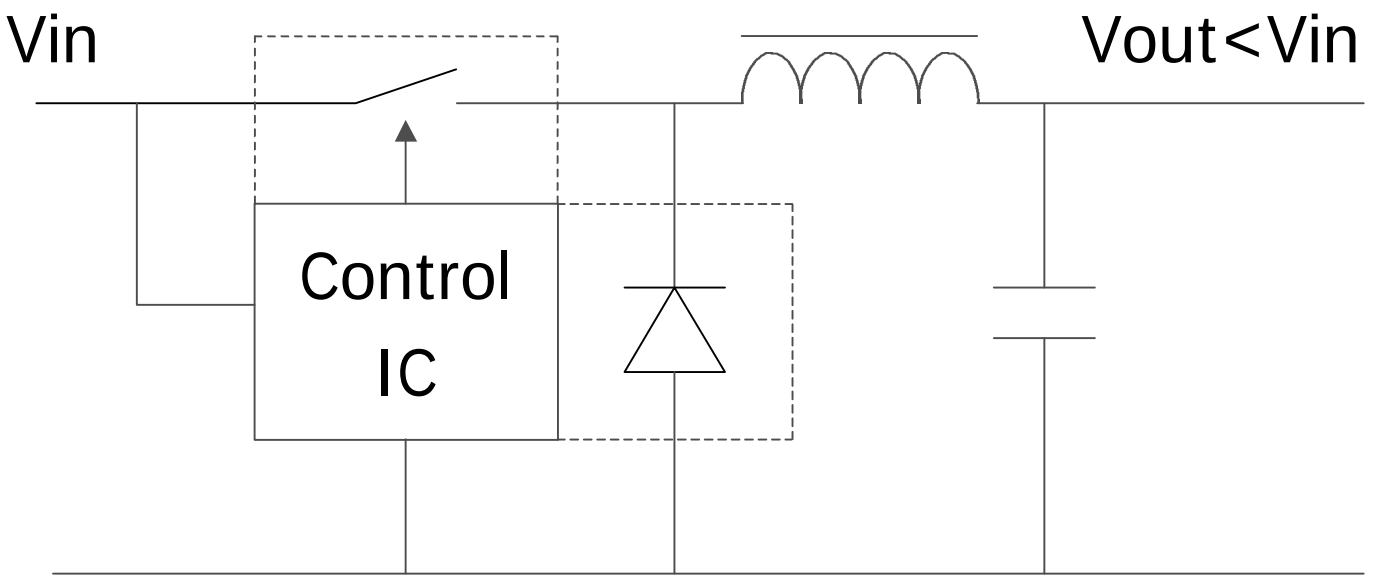
Disadvantages

- cost, complexity

Buck Topology

- steps down input voltage
- 40V max IC supply voltages available
- high input voltage limits practical operating frequency: ton x f = Vout/Vin
- lower operating frequency requires larger energy storage elements
- voltage conversion efficiencies > 70%

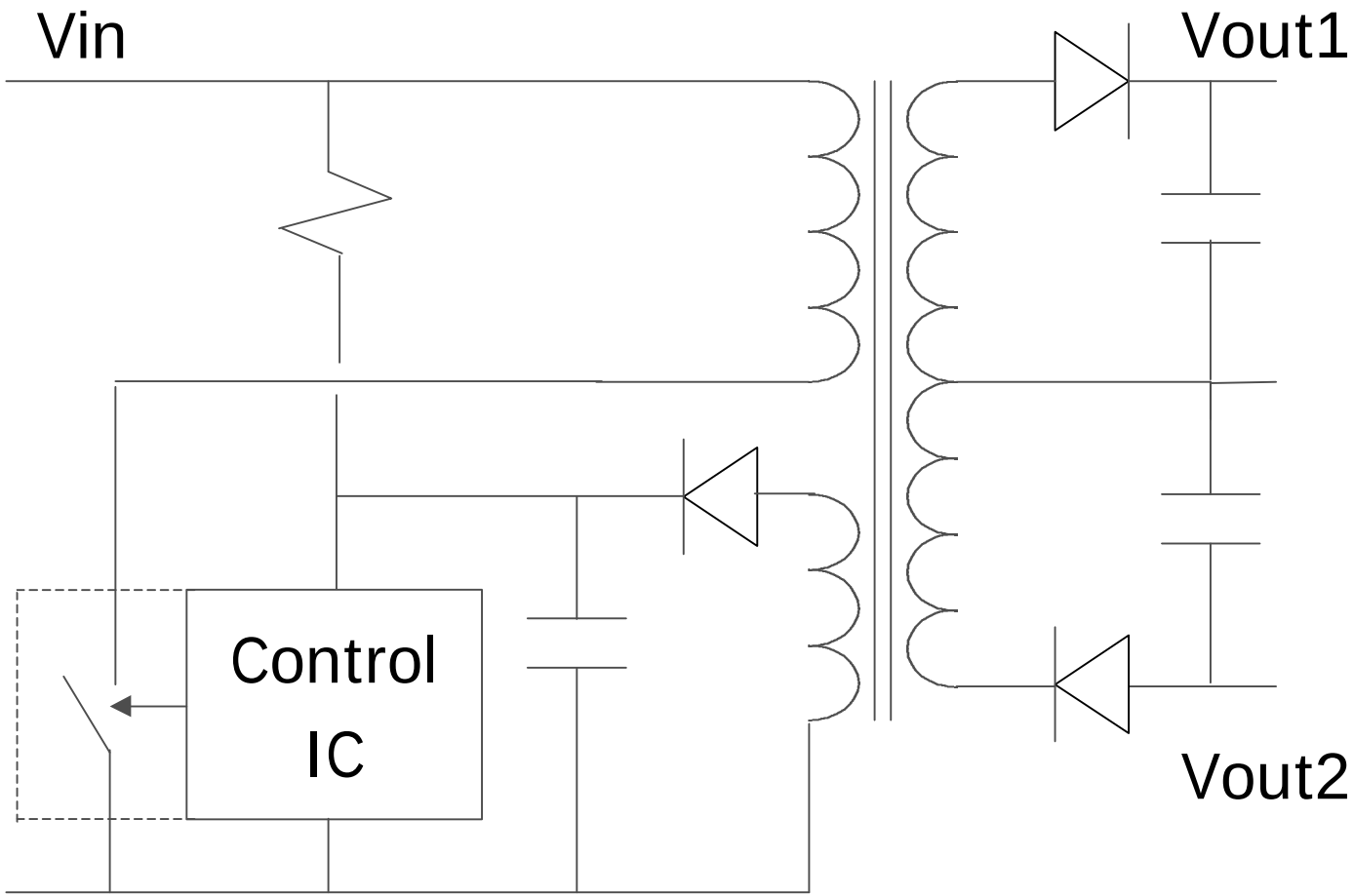
Buck Converter



Flyback Topology

- most flexible, low-power topology
- steps voltage up or down
- single or multiple outputs
- isolated or non-isolated
- controller supply voltage a non-issue

Flyback Converter



DC-DC Converter Modules

- 18-36VDC and 36-72VDC standard input voltage ranges (some 20-60VDC offered)
- wide selection in 1-30W range
- 70-90% voltage conversion efficiencies
- 500VDC and 1500VDC input-output isolation voltages available

Conclusions

- feed voltage > 40VDC suited to flyback topology and modules
- feed voltage < 30VDC is compatible with both linear and switching approaches, but available power from LAN is limited
- avoid 30-40VDC DTE voltage range
- 1500VAC isolation possible with flyback