## Application clip

## High-Speed 10/100 Base-T Switching With the TS5L100 and TS3L100 LAN Switches

The Texas Instruments (TI) TS5L100 and TS3L100 are local area network (LAN) multiplexers from TI's specialty switch portfolio. They are specifically designed to route $10 / 100$ base-T Ethernet signals. The major difference between these two multiplexers is the TS3L100 operates from a standard 3.3-V supply, and the TS5L100 operates from an easily implemented $6.2-\mathrm{V}$ supply.
In the LAN application shown here, the TS3L100 or TS5L100 is used to switch the 10/100 base-T Ethernet differential signals directly between the docking station (through the docking connector) and the laptop computer. Mating the laptop to the docking station flags a detection signal to switch the TS3L100 or TS5L100 automatically to accept the differential pair Ethernet signals from the docking station.

Prior mobile computing designs entailed placing an Ethernet Media Access Controller (MAC) and an Ethernet Physical Layer (PHY) device on the docking station. This
redundant circuitry unnecessarily increased total system cost, as it can be replaced quite efficiently with a LAN switch from TI without sacrificing signal quality.

High-Speed 10/100 Base-T Ethernet Switches Available From Texas Instruments


TI LAN Specialty Switches

| Key Features | TS3L100 | TS5L100 | Benefits |
| :--- | :---: | :---: | :--- |
| $r_{\text {on }}$ flatness | $4 \Omega$ typ. <br> $\left(0 \mathrm{~V}<\mathrm{V}_{\text {IN }}<3.3 \mathrm{~V}\right)$ | $8 \Omega$ typ. <br> $\left(0 \mathrm{~V}<\mathrm{V}_{\text {IN }}<4.5 \mathrm{~V}\right)$ | Maintains good signal quality at <br> frequencies up to 350 MHz |
| $\Delta \mathrm{r}_{\text {on }}$ | $1 \Omega$ typ. | $1 \Omega$ typ. | Low skew between channels |
| High off-isolation | -42 dB typ. | -40 dB typ. | Excellent isolation at high <br> frequencies when LAN switch <br> is open |
|  | -55 dB typ. | -60 dB typ. | Excellent isolation between <br> channels to prevent unwanted <br> interference |
| Supply voltage range | 3.0 to 3.6 V | - | Low-voltage operation |
|  | - | 6.0 to $6.5 \mathrm{~V}^{*}$ | Improved performance over <br> $4.5-\mathrm{V}$ input signal |
| Space-saving QFN package | Yes | Yes | Smallest 'L100 LAN switch <br> available today |
| ICC | $3 \mu \mathrm{~A}$ max. | $3 \mu \mathrm{~A}$ max. | Ideal for laptop computing |

*The TS5L100 requires a $6.2-\mathrm{V}$ supply to provide a better on-resistance performance. 6.2 V can be generated by tapping off between a $6-\mathrm{k} \Omega$ resistor and a $6.2-\mathrm{V}$ Zener (the other end of the resistor can be tied to the $12-\mathrm{V}$ supply and the anode of the Zener diode to ground).

Typical Characteristics of the TS5L100


Ordering Information

| Package* |  |  | Orderable Part Number | Top-Side <br> Marking |
| :---: | :---: | :---: | :---: | :---: |
| JEDEC | II | Carrier |  |  |
| QFN | RGY | Tape and reel | TS3L100RGYR | TK100 |
| SOIC | D | Tube | TS3L100D | TS3L100 |
|  |  | Tape and reel | TS3L100DR |  |
| SSOP (QSOP) | DB0 | Tape and reel | TS3L100DBQR | TK100 |
| TSSOP | PW | Tube | TS3L100PW | TK100 |
|  |  | Tape and reel | TS3L100PWR |  |
| TVSOP | DGV | Tape and reel | TS3L100DGVR | TK100 |
| QFN | RGY | Tape and reel | TS5L100RGYR | TG100 |
| SOIC | D | Tube | TS5L100D | TS5L100 |
|  |  | Tape and reel | TS5L100DR |  |
| SSOP (QSOP) | DBQ | Tape and reel | TS5L100DBQR | TG100 |
| TSSOP | PW | Tube | TS5L100PW | TG100 |
|  |  | Tape and reel | TS5L100PWR |  |
| TVSOP | DGV | Tape and reel | TS5L100DGVR | TG100 |

*Package drawings, standard packing quantities, thermal data, symbolization and PCB design guidelines are available at www.ti.com/sc/package

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TS5L100 Functional Diagram


## For More Information

Product Folders:
focus.ti.com/docs/prod/folders/ print/ts51100.html
focus.ti.com/docs/prod/folders/ print/ts31100.html
Datasheets:
focus.ti.com/lit/ds/symlink/
ts51100.pdf
focus.ti.com/lit/ds/symlink/
ts31100.pdf


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