

## Ultra Low ON-Resistance, +1.1V to +4.5V Single Supply, SPST Analog Switches

The Intersil ISL43L110 and ISL43L111 devices are low ON-resistance, low voltage, bidirectional, single pole/single throw (SPST) analog switches designed to operate from a single +1.1V to +4.5V supply. Targeted applications include battery powered equipment that benefit from low  $R_{ON}$  resistance, excellent  $R_{ON}$  flatness, and fast switching speeds ( $t_{ON} = 8ns$ ,  $t_{OFF} = 5ns$ ). The digital logic input is 1.8V CMOS compatible when using a single +3V supply.

Cell phones, for example, often face ASIC functionality limitations. The number of analog input or GPIO pins may be limited and digital geometries are not well suited to analog switch performance. This family of parts may be used to switch in additional functionality while reducing ASIC design risk. The ISL43L11X are offered in a 5 lead SC70 package, alleviating board space limitations.

The ISL43L110 has one normally open (NO) switch and ISL43L111 has one normally closed (NC) switch.

**TABLE 1. FEATURES AT A GLANCE**

|                                         | ISL43L110     | ISL43L111     |
|-----------------------------------------|---------------|---------------|
| <b>Number of Switches</b>               | 1             | 1             |
| <b>SW</b>                               | NO            | NC            |
| <b>1.8V <math>R_{ON}</math></b>         | 0.45 $\Omega$ | 0.45 $\Omega$ |
| <b>1.8V <math>t_{ON}/t_{OFF}</math></b> | 17ns/7ns      | 17ns/7ns      |
| <b>3V <math>R_{ON}</math></b>           | 0.24 $\Omega$ | 0.24 $\Omega$ |
| <b>3V <math>t_{ON}/t_{OFF}</math></b>   | 9ns/6ns       | 9ns/6ns       |
| <b>4.3V <math>R_{ON}</math></b>         | 0.21 $\Omega$ | 0.21 $\Omega$ |
| <b>4.3V <math>t_{ON}/t_{OFF}</math></b> | 8ns/5ns       | 8ns/5ns       |
| <b>Package</b>                          | 5 Ld SC70     |               |

## Features

- Pb-Free available (RoHS compliant)
- Drop in replacement for the MAX4715 and MAX4716
- ON resistance ( $R_{ON}$ )
  - $V_{CC} = +4.3V$  ..... 0.21 $\Omega$
  - $V_{CC} = +3.0V$  ..... 0.24 $\Omega$
  - $V_{CC} = +1.8V$  ..... 0.45 $\Omega$
- $R_{ON}$  flatness ..... 0.03 $\Omega$
- Single supply operation ..... +1.1V to +4.5V
- Fast switching action (+3.9V Supply)
  - $t_{ON}$  ..... 8ns
  - $t_{OFF}$  ..... 5ns
- ESD HBM rating ..... >4kV
- 1.8V, CMOS logic compatible (+3V supply)
- 5 lead SC70 packaging

## Applications

- Battery powered, handheld, and portable equipment
  - Cellular/mobile phones
  - Pagers
  - Laptops, notebooks, palmtops
- Portable test and measurement
- Medical equipment
- Audio and video switching

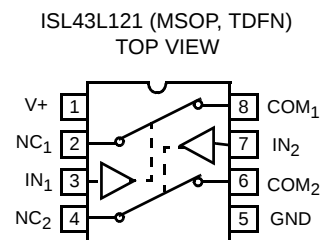
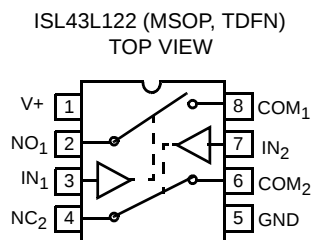
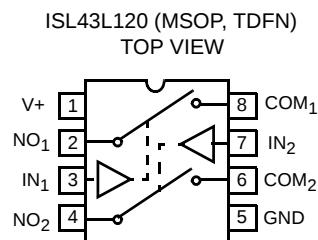
## Related Literature

- Technical Brief TB363 "Guidelines for Handling and Processing Moisture Sensitive Surface Mount Devices (SMDs)"



# ISL43L120, ISL43L121, ISL43L122

## Pinouts (Note 1)



NOTE:

1. Switches Shown for Logic "0" Input.

## Ordering Information

| (Note 2)<br>PART NO. (BRAND)      | TEMP.<br>RANGE (°C) | PACKAGE                        | PKG.<br>DWG. # |
|-----------------------------------|---------------------|--------------------------------|----------------|
| ISL43L120IU (L120)                | -40 to 85           | 8 Ld MSOP                      | M8.118         |
| ISL43L120IR (L10)                 | -40 to 85           | 8 Ld 3x3 thin DFN              | L8.3x3A        |
| ISL43L121IU (L121)                | -40 to 85           | 8 Ld MSOP                      | M8.118         |
| ISL43L121IR (L11)                 | -40 to 85           | 8 Ld 3x3 thin DFN              | L8.3x3A        |
| ISL43L122IU (L122)                | -40 to 85           | 8 Ld MSOP                      | M8.118         |
| ISL43L122IR (L12)                 | -40 to 85           | 8 Ld 3x3 thin DFN              | L8.3x3A        |
| ISL43L120IUZ *<br>(L120) (Note 3) | -40 to 85           | 8 Ld MSOP<br>(Pb-free)         | M8.118         |
| ISL43L120IRZ *<br>(L10) (Note 3)  | -40 to 85           | 8 Ld 3x3 thin DFN<br>(Pb-free) | L8.3x3A        |
| ISL43L121IUZ *<br>(L121) Note 3   | -40 to 85           | 8 Ld MSOP<br>(Pb-free)         | M8.118         |
| ISL43L121IRZ *<br>(L11) (Note 3)  | -40 to 85           | 8 Ld 3x3 thin DFN<br>(Pb-free) | L8.3x3A        |
| ISL43L122IUZ *<br>(L122) (Note 3) | -40 to 85           | 8 Ld MSOP<br>(Pb-free)         | M8.118         |
| ISL43L122IRZ *<br>(L12) (Note 3)  | -40 to 85           | 8 Ld 3x3 thin DFN<br>(Pb-free) | L8.3x3A        |

NOTES:

2. Most surface mount devices are available on tape and reel; add "-T" to suffix.
3. Intersil Pb-free products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which is compatible with both SnPb and Pb-free soldering operations. Intersil Pb-Free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J Std-020B.

\* Pb-free Parts Coming Soon.

## Truth Table

| LOGIC | ISL43L120 | ISL43L121 | ISL43L122 |      |
|-------|-----------|-----------|-----------|------|
|       | SW 1, 2   | SW 1, 2   | SW 1      | SW 2 |
| 0     | OFF       | ON        | OFF       | ON   |
| 1     | ON        | OFF       | ON        | OFF  |

NOTE: Logic "0" d0.5V. Logic "1" t 1.4V with a 3V Supply.

## Pin Descriptions

| PIN | FUNCTION                                    |
|-----|---------------------------------------------|
| V+  | System Power Supply Input (+1.65V to +3.6V) |
| GND | Ground Connection                           |
| IN  | Digital Control Input                       |
| COM | Analog Switch Common Pin                    |
| NO  | Analog Switch Normally Open Pin             |
| NC  | Analog Switch Normally Closed Pin           |













## ISL43L120, ISL43L121, ISL43L122

### Typical Performance Curves $T_A = 25^\circ\text{C}$ , Unless Otherwise Specified (Continued)

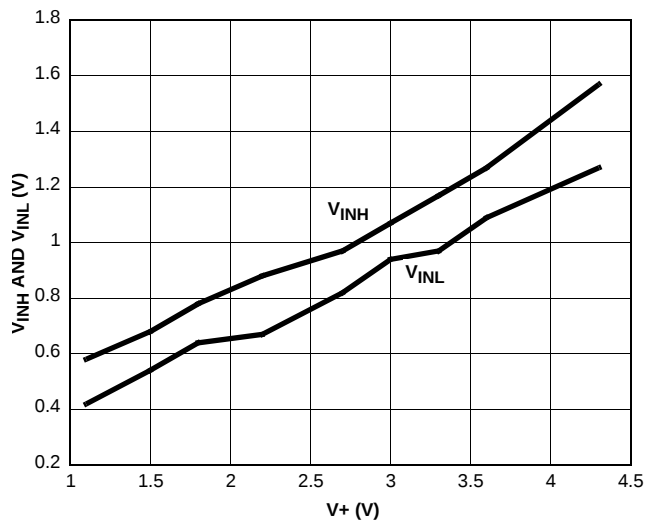


FIGURE 14. DIGITAL SWITCHING POINT vs SUPPLY VOLTAGE

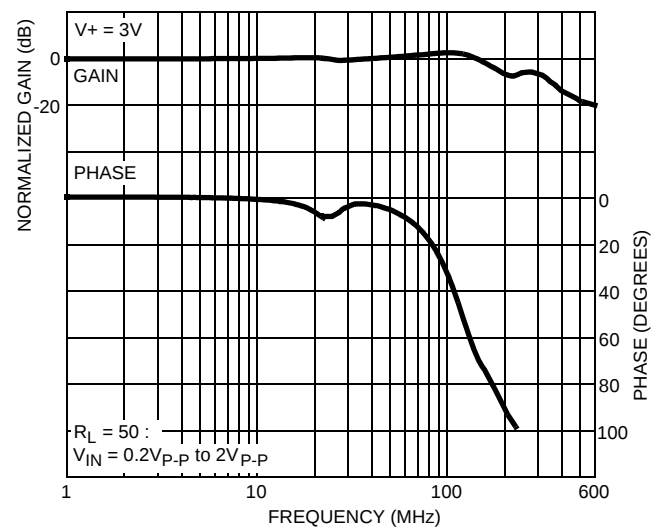


FIGURE 15. FREQUENCY RESPONSE

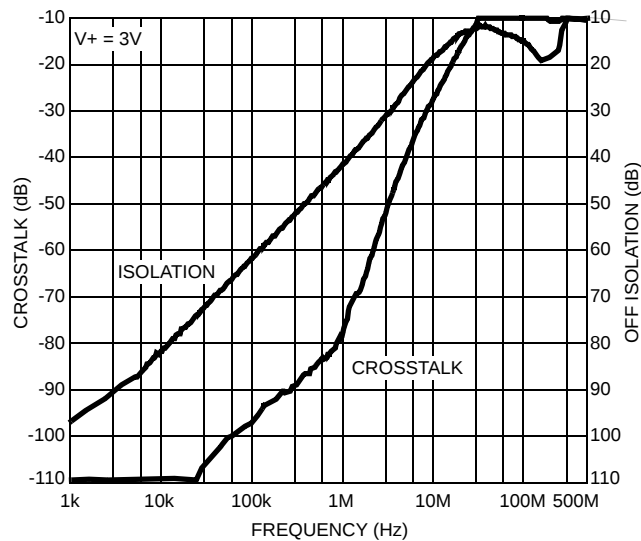


FIGURE 16. CROSSTALK AND OFF ISOLATION

### Die Characteristics

SUBSTRATE POTENTIAL (POWERED UP):

GND

TRANSISTOR COUNT:

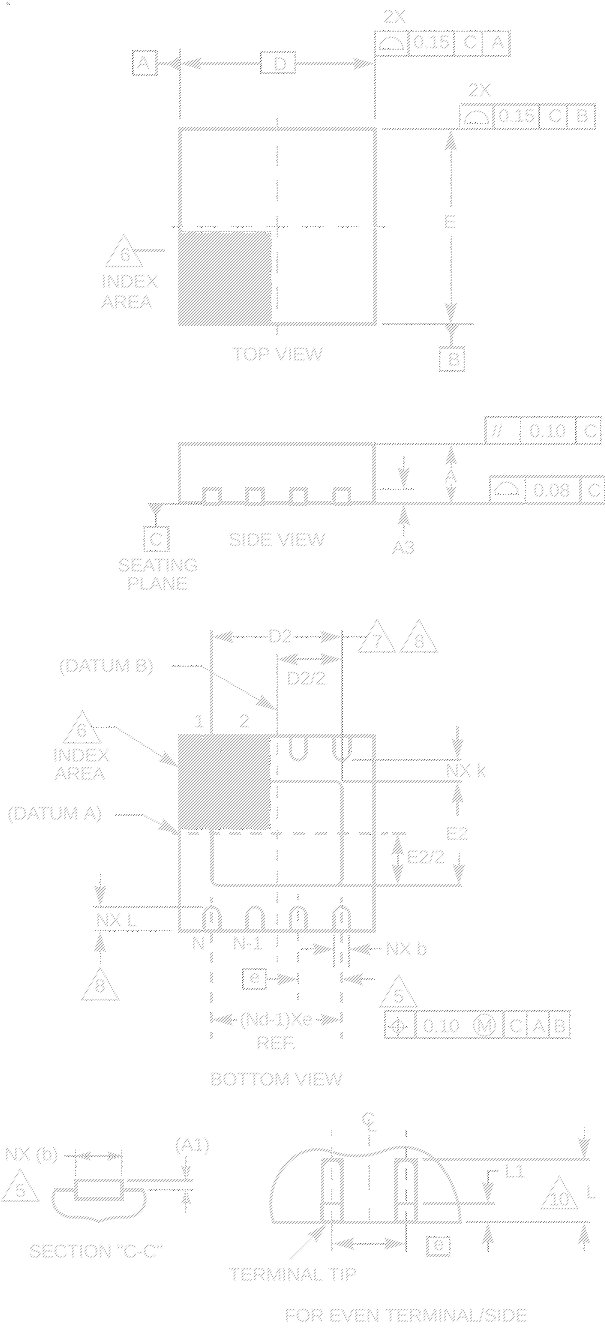
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PROCESS:

Submicron CMOS

ISL43L120, ISL43L121, ISL43L122

Thin Dual Flat No-Lead Plastic Package (TDFN)



L8.3x3A  
8 LEAD THIN DUAL FLAT NO-LEAD PLASTIC PACKAGE

| SYMBOL | MILLIMETERS |         |      | NOTES |
|--------|-------------|---------|------|-------|
|        | MIN         | NOMINAL | MAX  |       |
| A      | 0.70        | 0.75    | 0.80 | -     |
| A1     | -           | -       | 0.05 | -     |
| A3     | 0.20 REF    |         |      | -     |
| b      | 0.25        | 0.30    | 0.35 | 5,8   |
| D      | 3.00 BSC    |         |      | -     |
| D2     | 2.20        | 2.30    | 2.40 | 7,8   |
| E      | 3.00 BSC    |         |      | -     |
| E2     | 1.40        | 1.50    | 1.60 | 7,8   |
| e      | 0.65 BSC    |         |      | -     |
| k      | 0.25        | -       | -    | -     |
| L      | 0.20        | 0.30    | 0.40 | 8     |
| L1     | -           | -       | 0.15 | 1     |
| N      | 8           |         |      | 2     |
| Nd     | 4           |         |      | 3     |

Rev. 2 6/04

- NOTES:
1. Dimensioning and tolerancing conform to ASME Y14.5-1994.
  2. N is the number of terminals.
  3. Nd refers to the number of terminals on D.
  4. All dimensions are in millimeters. Angles are in degrees.
  5. Dimension b applies to the metallized terminal and is measured between 0.15mm and 0.30mm from the terminal tip.
  6. The configuration of the pin #1 identifier is optional, but must be located within the zone indicated. The pin #1 identifier may be either a mold or mark feature.
  7. Dimensions D2 and E2 are for the exposed pads which provide improved electrical and thermal performance.
  8. Nominal dimensions are provided to assist with PCB Land Pattern Design efforts, see Intersil Technical Brief TB389.
  9. Depending on the method of lead termination at the edge of the package, a maximum 0.15mm pull back (L1) maybe present. L minus L1 to be equal to or greater than 0.3mm.
  10. COMPLIANT TO JEDEC MO-229-WEEC-1 except for dimensions E2 & D2.

