

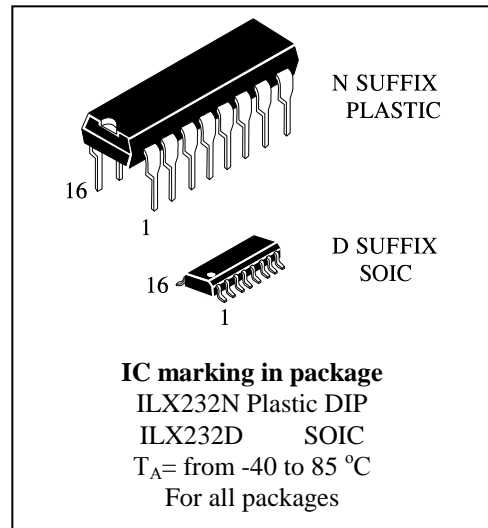
Interface transceiver of RS-232 standard with one supply voltage

ILX232

IC ILX232 is purposed for application in high-performance information processing systems and control devices of wide application.

Input voltage levels are compatible with standard CMOS levels.

- Output voltage levels are compatible with input levels of K-MOS, N-MOS and TTL integrated circuits
- Supply voltage : 5V
- Low input current: 1.0 μA ; 0.1 μA at $T = 25\text{ }^\circ\text{C}$
- Output current 24 mA
- Latching current not less than 450 mA at $T = 25\text{ }^\circ\text{C}$
- Enhanced ESD Specifications:
 $\pm 15\text{kV}$ IEC61000-4-2 Air Discharge
 $\pm 8\text{kV}$ IEC61000-4-2 Contact Discharge



Truth table

| Inputs | Outputs |
|--|--------------------|
| R_{IN}, T_{IN} | R_{OVT}, T_{OVT} |
| H | L |
| L | H |
| Note - H – voltage high level; L – low voltage level | |

Pin symbols in package

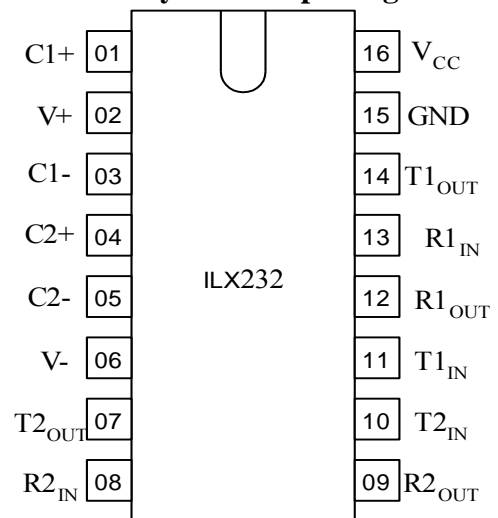


Table of pin description

| Pin No. | Symbol | Pin name |
|---------|-------------------|--|
| 01 | C1+ | Output of external capacitance of positive voltage multiplier unit |
| 02 | V+ | Output of positive voltage of multiplier unit |
| 03 | C1- | Output of external capacitance of positive voltage multiplier unit |
| 04 | C2+ | Output of external capacitance of negative voltage multiplier unit |
| 05 | C2- | Output of external capacitance of negative voltage multiplier unit |
| 06 | V- | Output of negative voltage of multiplier unit |
| 07 | T2 _{OUT} | Output of transmitter data (levels RS – 232) |
| 08 | R2 _{IN} | Input of receiver data (levels RS – 232) |
| 09 | R2 _{OUT} | Output of receiver data (levels TTL/KMOS) |
| 10 | T2 _{IN} | Input of transmitter data (levels TTL/KMOS) |
| 11 | T1 _{IN} | Input of transmitter data (levels TTL/KMOS) |
| 12 | R1 _{OUT} | Output of receiver data (levels TTL/KMOS) |
| 13 | R1 _{IN} | Input of receiver data (levels RS – 232) |
| 14 | T1 _{OUT} | Output of transmitter data (levels RS – 232) |
| 15 | GND | Common output |
| 16 | V _{CC} | Supply output of voltage source |

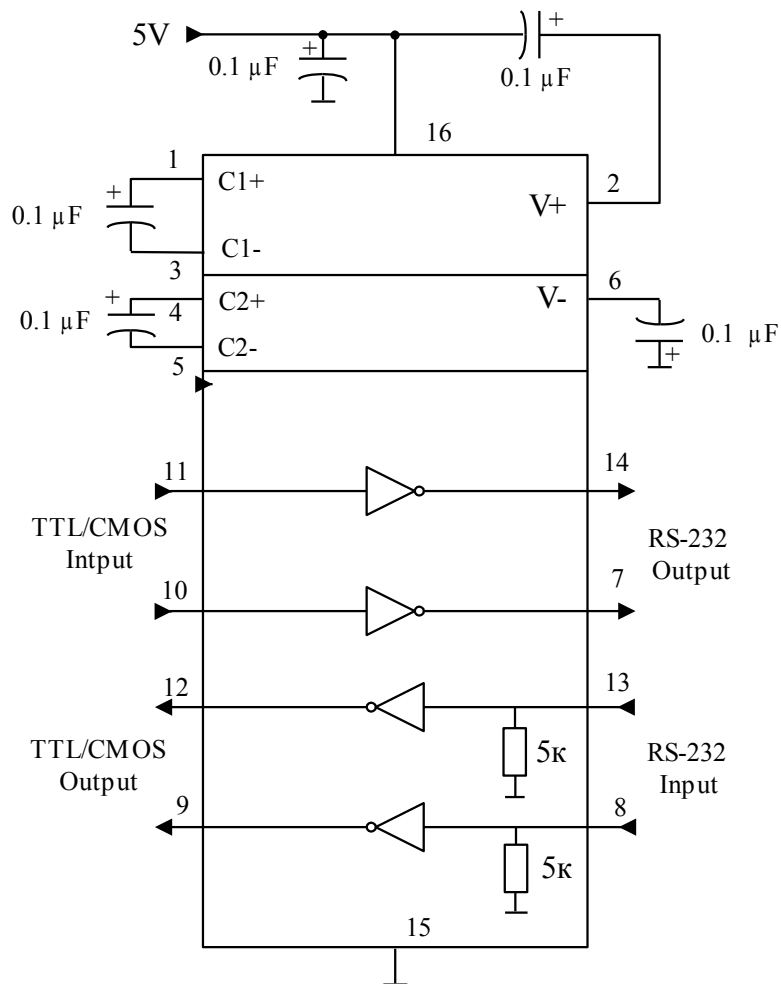
Maximum conditions

| Symbol | Parameter | Rate | | Unit |
|------------------|---|----------------------|--------------|------|
| | | min | max | |
| V _{CC} | Supply voltage | -0.3 | 6.0 | V |
| V+ | Transmitter high output voltage | V _{CC} -0.3 | 14 | |
| V- | Transmitter low output voltage | -0.3 | -14 | |
| V _{TIN} | Transmitter input voltage | -0.3 | V+ +0.3 | |
| V _{RIN} | Receiver input voltage | -30 | 30 | |
| P _D | Dissipated power | - | 842 | mW |
| | DIP – package | | | |
| | SO - package | | 762 | |
| I _{SC} | Output current of transmitter short circuit | - | Continuously | mA |
| T _a | Ambient temperature | -60 | 150 | °C |

* Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Recommended Operating Conditions

| Symbol | Parameter | Rate | | Unit |
|------------------|--|------|-----------------|------|
| | | min | max | |
| V _{CC} | Supply voltage | 4.5 | 5.5 | V |
| V ₊ | Transmitter output high voltage | 5.0 | - | |
| V ₋ | Transmitter output low voltage | -5.0 | - | |
| V _{TIN} | Transmitter input voltage | 0 | V _{CC} | |
| V _{RIN} | Receiver input voltage | -30 | 30 | |
| I _{SC} | Transmitter short circuit output current | - | ±60 | mA |
| T _a | Ambient temperature | -40 | 85 | °C |



Static parameters

| Symbol | Parameter | Test conditions | Rate | | | | Unit |
|-----------------|----------------------------|---|------|------|-----------------|-------|------|
| | | | 25°C | | -40 °C to 85 °C | | |
| | | | min | max | min | max | |
| I _{CC} | Consumption current static | V _{CC} =5.0 V V _{IL} = 0 V | - | 10.0 | - | 14.0* | mA |

Receiver electrical parameters

| | | | | | | | |
|------------------|------------------------|---|-----|-----|-----|-----|------|
| V _h | Hysteresis voltage | V _{CC} =5.0 V | 0.2 | 0.9 | 0.2 | 1.0 | V |
| V _{On} | On (operation) voltage | V _O ≤ 0.1 V I _{OL} ≤ 20 uA | - | 2.4 | - | 2.3 | |
| V _{off} | Off (dropout) voltage | V _O ≥ V _{CC} -0.1 V I _{OH} ≤ -20 uA | 0.8 | - | 0.9 | - | |
| V _{OL} | Output low voltage | I _{OL} = 3.2 mA V _{CC} = 4.5 V V _{IH} = 2.4 V | - | 0.3 | - | 0.4 | |
| V _{OH} | Output high voltage | I _{OH} = -1.0 mA V _{CC} = 4.5 V V _{IL} = 0.8 V | 3.6 | - | 3.5 | - | |
| R _I | Input resistance | V _{CC} = 5.0 V | 3.0 | 7.0 | 3.0 | 7.0 | kOhm |

Transmitter electrical parameters

| | | | | | | | |
|-----------------|-----------------------------------|--|-----|-----------|-----|-----------|------|
| V _{OL} | Output low voltage | V _{CC} = 4.5 V V _{IH} = 2.0 V R _L = 3.0 kOhm | - | -5.2 | - | -5.0 | V |
| V _{OH} | Output high voltage | V _{CC} = 4.5 V V _{IL} = 0.8 V R _L = 3.0 kOhm | 5.2 | - | 5.0 | - | |
| I _{IL} | Input low current | V _{CC} =5.5 V V _{IL} = 0 V | - | -1.0 | - | -10.0 | uA |
| I _{IH} | Input high current | V _{CC} =5.5 V V _{IH} = V _{CC} | | 1.0 | | 10.0 | |
| SR | Speed of output front change | V _{CC} =5.0 V C _L =50 - 1000 pF R _L = 3.0 - 7.0 kOhm | 3.0 | 30 | 2.7 | 27 | V/μs |
| R _O | Output resistance | V _{CC} = V ₊ = V ₋ = 0 V V _O = ± 2 V | 350 | - | 300 | - | Ohm |
| I _{SC} | Short circuit output current | V _{CC} =5.5 V V _O = 0 V V _I = V _{CC} V _I = 0 V | | -50 50 | | -60 60 | mA |
| ST | Speed of information transmission | V _{CC} =4.5 V C _L = 1000 pF R _L = 3.0 kOhm t _w = 7us (for extreme -t _w = 8us) | 140 | - | 120 | - | kbps |

Dynamic parameters

| Symbol | Parameter | Test conditions | Rate | | | | Unit |
|------------------------------|---|---|-------|------|----------------------|------|------|
| | | | 25 °C | | from -40 °C to 85 °C | | |
| | | | min | max | min | max | |
| t_{PHLR} (t_{PLHR}) | Signal propagation delay time when switching on (off) | $V_{CC} = 4.5\text{ V}$ $C_L = 150\text{ pF}$ $V_{IL} = 0\text{ V}$ $V_{IH} = 3.0\text{ V}$ $t_{LH} = t_{HL} \leq 10\text{ ns}$ | - | 9.7 | - | 10 | us |
| t_{PHLT} (t_{PLHT}) | Signal propagation delay time when switching on (off) | $V_{CC} = 4.5\text{ V}$ $C_L = 2500\text{ pF}$ $V_{IL} = 0\text{ V}$ $V_{IH} = 3.0\text{ V}$ $R_L = 3\text{ kOhm}$ $t_{LH} = t_{HL} \leq 10\text{ ns}$ | | 5.0* | | 6.0* | |

Capacitance

| Symbol | Parameter | V_{CC} | Rate | Unit |
|----------|---------------------|----------|------|------|
| C_{IN} | Input capacitance | 5.0 | 9.0 | pF |
| C_{PD} | Dynamic capacitance | | 90 | |

Timing diagram when measuring IC dynamic parameters

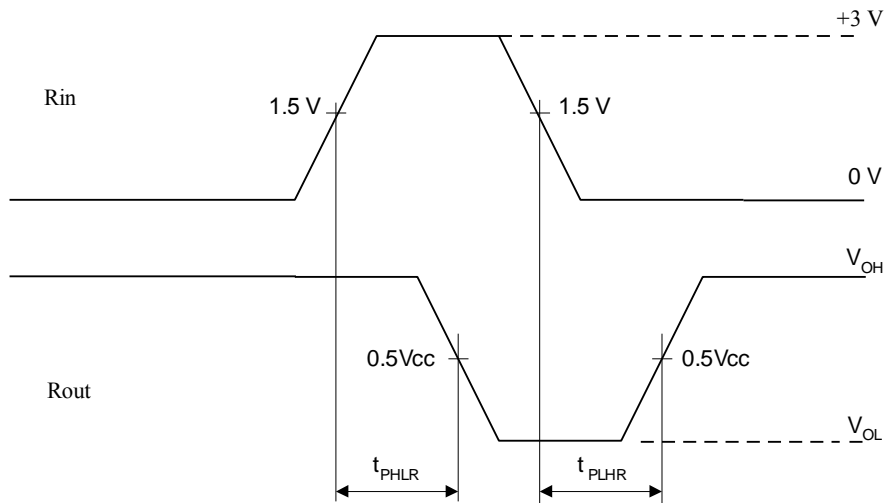


Figure 3

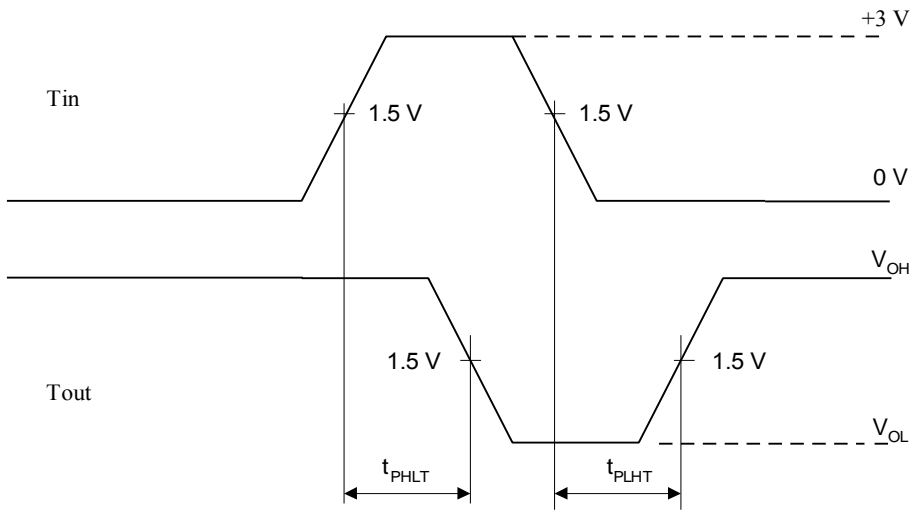


Figure 4

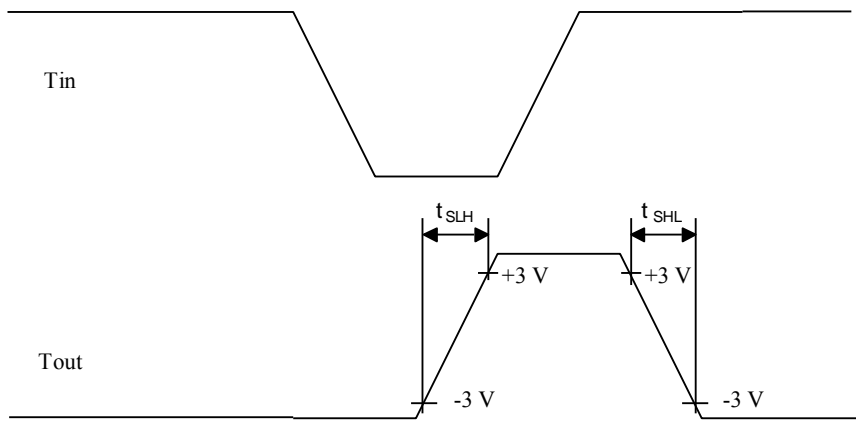


Figure 5

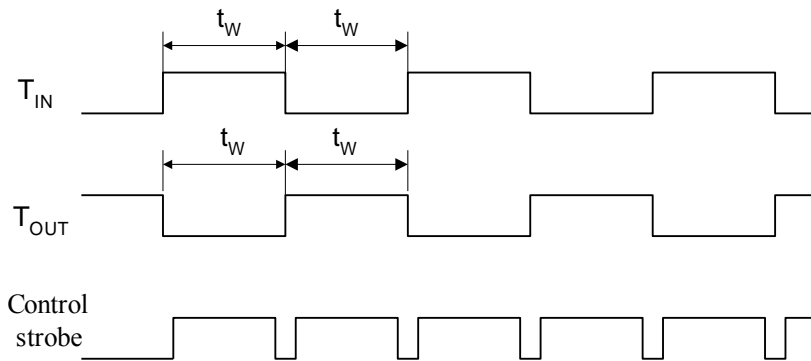
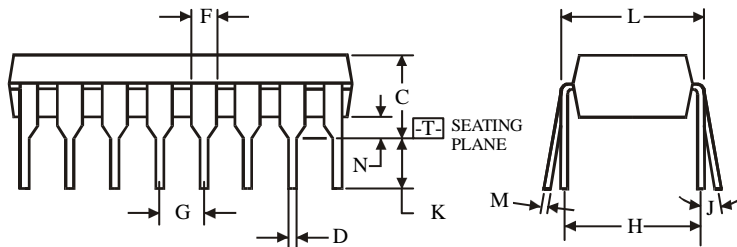
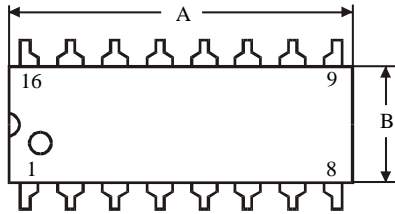
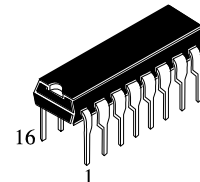


Figure 6

**N SUFFIX PLASTIC DIP
(MS - 001BB)**



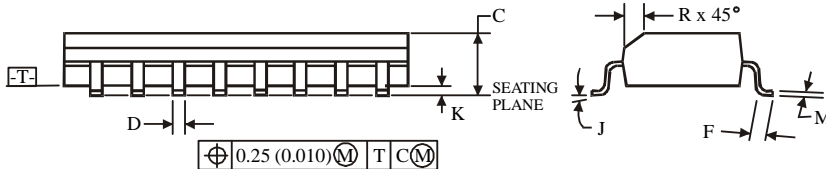
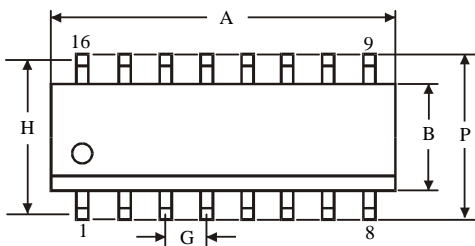
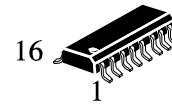
$\oplus 0.25 (0.010) \text{ (M) T}$

NOTES:

- Dimensions "A", "B" do not include mold flash or protrusions.
Maximum mold flash or protrusions 0.25 mm (0.010) per side.

| Dimension, mm | | |
|---------------|-------|-------|
| Symbol | MIN | MAX |
| A | 18.67 | 19.69 |
| B | 6.1 | 7.11 |
| C | | 5.33 |
| D | 0.36 | 0.56 |
| F | 1.14 | 1.78 |
| G | 2.54 | |
| H | 7.62 | |
| J | 0° | 10° |
| K | 2.92 | 3.81 |
| L | 7.62 | 8.26 |
| M | 0.2 | 0.36 |
| N | 0.38 | |

**D SUFFIX SOIC
(MS - 012AC)**



$\oplus 0.25 (0.010) \text{ (M) T (C) (M)}$

NOTES:

- Dimensions A and B do not include mold flash or protrusion.
- Maximum mold flash or protrusion 0.15 mm (0.006) per side
for A; for B - 0.25 mm (0.010) per side.

| Dimension, mm | | |
|---------------|------|------|
| Symbol | MIN | MAX |
| A | 9.8 | 10 |
| B | 3.8 | 4 |
| C | 1.35 | 1.75 |
| D | 0.33 | 0.51 |
| F | 0.4 | 1.27 |
| G | 1.27 | |
| H | 5.72 | |
| J | 0° | 8° |
| K | 0.1 | 0.25 |
| M | 0.19 | 0.25 |
| P | 5.8 | 6.2 |
| R | 0.25 | 0.5 |