

# EVALUATION OF OPTIONS FOR A LOW LATENCY ISOLATED RS-422 INTERFACE

## Requirements

- Sufficient galvanic isolation from equipment side
  - ground loop prevention
  - hindering effects of external electromagnetic events such as ESD, EMP
  - protecting equipment side from fault voltages on the transmission line, e.g. in case of a short to other wiring
- Operation from 3.3V DC or 5V DC
- low signal propagation delay
- low deviance of propagation delay due to change in temperature
- subzero and over 80 °C operation
- symmetric signal propagation delay (line to equipment, equipment to line)

## RS-422 transceiver IC selection

part #	isolated	T <sub>pd</sub>	T <sub>pr</sub>	ΔT <sub>pd</sub>	ΔT <sub>pr</sub>	asymmetry	price
ISO3086T	yes	25 ns	103 ns	5.5 ns	3.25 ns	78 ns	2659 Ft
SN65LBC179A	no	6 ns	13 ns	1 ns	0.53 ns	7 ns	897 Ft
ADM2582E	yes	64 ns	95 ns	11 ns	NDA	31 ns	4495 Ft
LTM2881	yes	60 ns	100 ns	6 ns	10 ns	40 ns	4758 Ft
MAX14855	yes	NDA	NDA	9 ns	6 ns	5 ns	1685 FT
ISO35T	yes	205 ns	85 ns	28 ns	20 ns	120 ns	2461 FT
ISO35	yes	NDA	NDA	NDA	NDA	NDA	2461 FT

### Compact solution with ISO3086T

part #	quantity	$T_{pd}$	$T_{pr}$	$\Delta T_{pd}$	$\Delta T_{pr}$	asymmetry	price
ISO3086T	2 pcs	25 ns	103 ns	5.5 ns	3.25 ns	78 ns	2,659 Ft
DA2303-AL	1 pcs						809 Ft
TPS76350	1 pcs						260 Ft
10 $\mu$ F	2 pcs						50 Ft
4.7 $\mu$ F	1 pcs						26 Ft
Schottky diode	2 pcs						17 Ft
0.1 $\mu$ F	5 pcs						3 Ft
<b>7 types</b>	<b>14 pcs</b>	<b>25 ns</b>	<b>103 ns</b>	<b>5.5 ns</b>	<b>3.25 ns</b>	<b>78 ns</b>	<b>6,562 Ft</b>

This option requires fewer types of parts and fewer pieces of parts. However, it is more expensive, has a lower performance, and contains no parts which could prove redundant.

### Separate solution with SN65LBC179A and ISO7421E

part #	quantity	$T_{pd}$	$T_{pr}$	$\Delta T_{pd}$	$\Delta T_{pr}$	asymmetry	price
SN65LBC179A	2 pcs	6 ns	13 ns	1 ns	0.53 ns	7 ns	897 Ft
ISO7421E	2 pcs	7 ns	7 ns	0.75 ns	0.75 ns	0 ns	1,310 Ft
NXJ1S0505MC	1 pcs						897 Ft
LBR2518T100K	1 pcs						62 Ft
2.2 $\mu$ F	1 pcs						27 Ft
CVH252009-4R7M	1 pcs						75 Ft
4.7 $\mu$ F	1 pcs						26 Ft
0.1 $\mu$ F	6 pcs						3 Ft
<b>8 types</b>	<b>15 pcs</b>	<b>13 ns</b>	<b>20 ns</b>	<b>1.75 ns</b>	<b>1.28 ns</b>	<b>7 ns</b>	<b>5,519 Ft</b>

This option requires more types of parts and more pieces of parts. However, it is less expensive, has a much higher performance, and contains 2 parts which might be redundant.