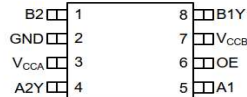


LOGIC INPUTS			MODE	A, B	Y, Z	R0	TERMINATOR
DE	RE	TE					
0	0	0	RECEIVE	R_{IN}	HIGH-Z	DRIVEN	OFF
0	0	1	RECEIVE WITH TERM	R_{TERM}	HIGH-Z	DRIVEN	ON
0	1	0	SHUTDOWN	R_{IN}	HIGH-Z	HIGH-Z	OFF
0	1	1	TERM ONLY	R_{TERM}	HIGH-Z	HIGH-Z	ON
1	0	0	TRANSMIT WITH RECEIVE	R_{IN}	DRIVEN	DRIVEN	OFF
1	0	1	TRANSMIT WITH RECEIVE AND TERM	R_{TERM}	DRIVEN	DRIVEN	ON
1	1	0	TRANSMIT	R_{IN}	DRIVEN	HIGH-Z	OFF
1	1	1	TRANSMIT WITH TERM	R_{TERM}	DRIVEN	HIGH-Z	ON

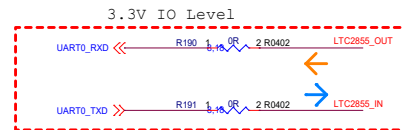
Table 8-1. Duplex switching function table

Signal state	Driver	Receiver	Comment
$H/F = V_{IO}$	Driver output pins are Y and Z	Receiver input pins are Y and Z	Half duplex mode: Driver and receiver share same bus pins, and device state is controlled by DE and RE pins
$H/F = GND$	Driver output pins are Y and Z	Receiver input pins are A and B	Full duplex mode: This is the default state of the device in case H/F is floating.



DCU Package, 8-Pin VSSOP (Top View)

RS485 CONTROL



Half-duplex

RS485_DIR=1, Enable TX
RS485_DIR=0, Enable RX

TXRM_RX for A/B Pins

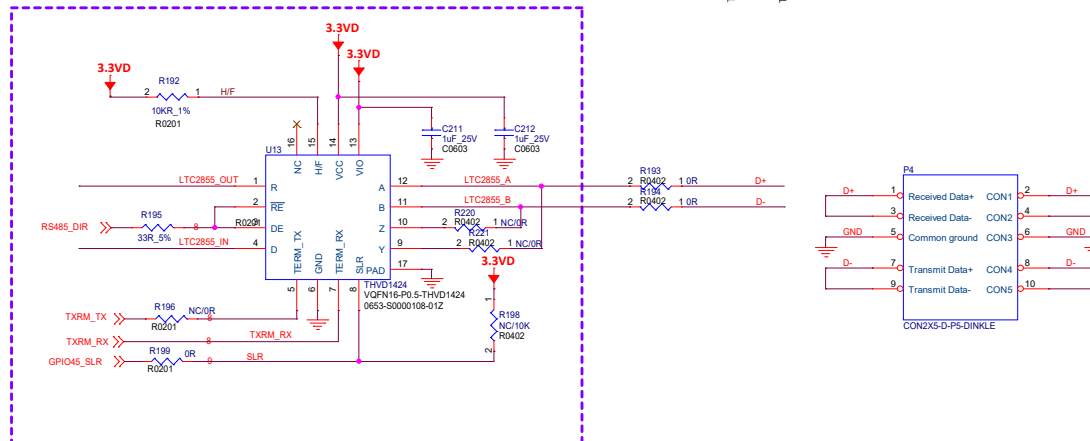


Table 8-2. Driver Function Table

TABLE 1: 16-1 FUNCTION TABLE				
INPUT	ENABLE	OUTPUTS		FUNCTION
D	DE	Y	Z	
H	H	H	L	Actively drive bus high
L	H	L	H	Actively drive bus low
X	L	Z	Z	Driver disabled
X	OPEN	Z	Z	Driver disabled by default
OPEN	H	H	L	Actively drive bus high by default

When the receiver enable pin, RE, is logic low, the receiver is enabled. When the differential input voltage defined as $V_{ID} = V_A - V_B$ in case of full duplex mode (or $V_Y - V_Z$ in case of half duplex mode) is positive and higher than the positive input threshold, V_{TH+} , the receiver output, R, turns high. When V_{ID} is negative and lower than the negative input threshold, V_{TH-} , the receiver output, R, turns low. If V_{ID} is between V_{TH+} and V_{TH-} , the output is indeterminate.

When RE is logic high or left open, the receiver output is high-impedance and the magnitude and polarity of V_{ID} are irrelevant. Internal biasing of the receiver inputs causes the output R to go failsafe-high when the transceiver is disconnected from the bus (open-circuit), the bus lines are shorted (short-circuit), or the bus is not actively driven (idle bus).

Table 8-3. Receiver Function Table

DIFFERENTIAL INPUT	ENABLE	OUTPUT	FUNCTION
$V_{ID} = V_A - V_B$ (full duplex mode) or $V_Y - V_Z$ (half duplex mode)	RE	R	
$V_{TH+} < V_{ID}$	L	H	Receive valid bus high
$V_{TH-} < V_{ID} < V_{TH+}$	L	?	Indeterminate bus state
$V_{ID} < V_{TH-}$	L	L	Receive valid bus low
X	H	Z	Receiver disabled
X	OPEN	Z	Receiver disabled by default
Open-circuit bus	L	H	Fail-safe high output
Short-circuit bus	L	H	Fail-safe high output
Idle (terminated) bus	L	H	Fail-safe high output

8.4.1 On-Chip Switchable Termination

THVD1424 has 2 termination resistors of nominal 120 Ω , one across Y/Z and another across A/B. Both termination resistors are enabled or disabled using pins as described in On-chip termination function table. Both the termination resistors can be enabled or disabled independent of the state of driver or receiver. Termination is OFF if the device is unpowered or in thermal shutdown.

Table 8-4. On-chip termination function table

Signal state	Device mode	Function	Comments
TERM_TX = V_{IO}	Full duplex mode	120 Ω enabled between Y and Z	Termination between Y/Z is disabled by default
TERM_TX = GND or floating	Full duplex mode	120 Ω disabled between Y and Z	Termination between Y/Z is disabled by default
TERM_RX = V_{IO}	Full duplex mode	120 Ω enabled between A and B	Termination between A/B is disabled by default
TERM_RX = GND or floating	Full duplex mode	120 Ω disabled between A and B	Termination between A/B is disabled by default
TERM_RX = X, TERM_TX = V_{IO}	Half duplex mode	120 Ω enabled between Y and Z	In half duplex mode, TERM_RX is don't care and TERM_TX has higher priority
TERM_RX = X, TERM_TX = GND	Half duplex mode	120 Ω disabled between Y and Z	

On-chip 120 Ω termination resistor variation with temperature and across common mode voltage is shown in following images.

