

# ±60V Fault Tolerant RS-485 Transceivers

## OVERVIEW

XR33152/XR33052	Half duplex 250kbps
XR33155/XR33055	Half duplex 1Mbps
XR33053	Full duplex 1Mbps
XR33158/XR33058	Half duplex 20Mbps
XR33156	Full duplex 20Mbps
Supply Voltage Range	3.0V to 5.5V
Operating Temperature Range	-40°C to 105°C

## PERFORMANCE

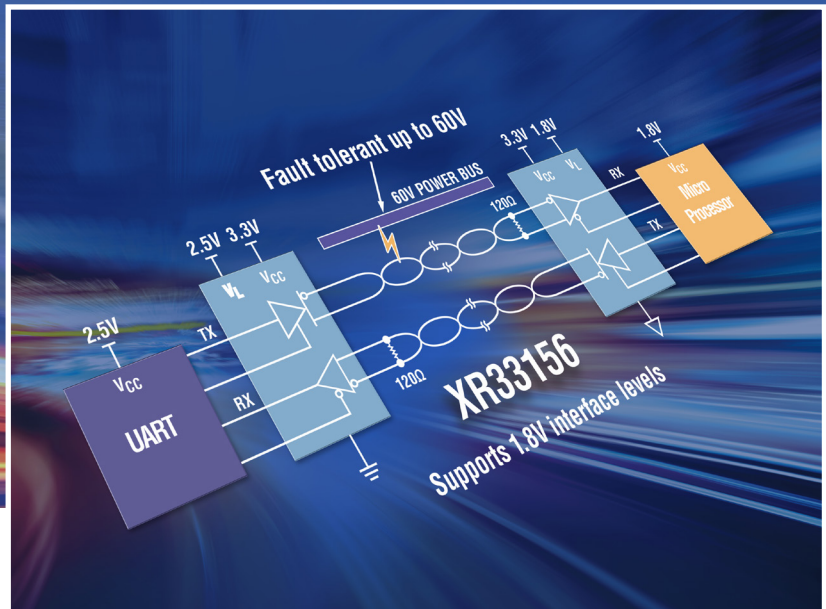
Fault Tolerance	±60V
Supply Current (Max)	4mA
Disable Supply Current (Max)	1µA
ESD Protection (Bus Pins)	±15kV HBM
ESD Protection (Non-bus Pins)	±4kV HBM
Common Mode Voltage	±25V

## FEATURES

- ±60V fault tolerance on analog bus pins
- Extended ±25V common mode operation
- 1.65V to 5.5V logic interface VL pin (XR3315x)
- Cable invert pin (XR3315x)
- Enhanced receiver fail-safe protection for open, shorted or terminated-but-idle data lines
- Hot-swap glitch protection on DE and RE pins (XR33156, XR33052, XR33053, XR33055)
- Driver short-circuit current limit and thermal shutdown for overload protection

## BENEFITS

- Analog bus pins can survive direct shorts up to ±60V and are protected against ESD events up to ±15kV
- Wide ±25V common mode allows for operation in harsh environments with large ground differences
- Invert control corrects for reversed bus pins
- Low voltage logic pin eliminates the need for a level shifter in low voltage applications



The **XR33052**, **XR33053**, **XR33055**, **XR33058**, **XR33152**, **XR33155**, **XR33156** and **XR33158** are a family of high performance RS-485/RS-422 transceivers designed for improved performance in noisy industrial environments and increased tolerance to system faults.

The analog bus pins can withstand direct shorts up to ±60V and are protected against ESD events up to ±15kV HBM. An extended ±25V common mode operating range allows for more reliable operation in noisy environments. These transceivers feature a wide supply voltage range (3.0V to 5.5V) and operate at maximum data rates of 250kbps (XR33152, XR33052), 1Mbps (XR33053, XR33055, XR33155) and 20Mbps (XR33058, XR33156, XR33158). The XR33156 features a 1.65V to 5.5V I/O logic supply, simplifying multi-voltage system interfacing requirements and an invert pin to compensate for reversed polarity on bus pins.

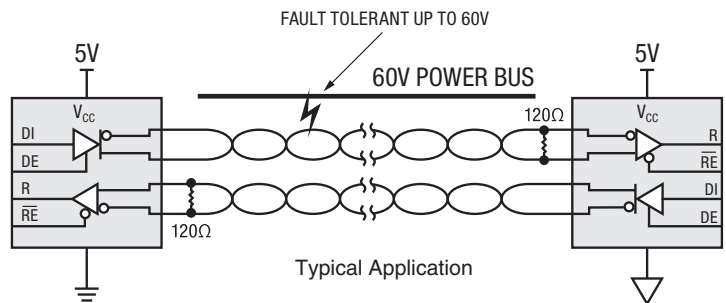
The family includes several inherent protection features including overload protection and enhanced receiver fail-safe protection for open, shorted, or terminated-but-idle data lines. The XR33156 and XR3305x include hot swap glitch protection to prevent false transitions on the bus during power up or live insertion and can enter a 1nA low current shutdown mode for extreme power savings.

The transceivers feature the industry's lowest standby current of 1nA (typ), 1µA (max). The ±60V fault tolerance, wide operating voltage range, flexible logic interface and low standby current make these transceivers well suited for industrial control networks, HVAC networks, building and process automation, energy metering and other industrial applications. Multipoint applications over long cable runs will benefit from the wide common mode voltage range of these transceivers.

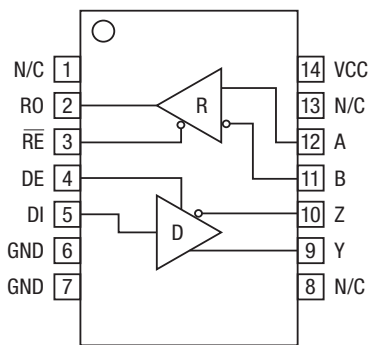
## ±60V Fault Tolerant RS-485/RS-422 Transceivers

Part Number	Duplex	Data Rate (Mbps)	HBM ESD (kV)	Rx Fail-Safe	Shutdown	Multi-Drop Nodes	Hot Swap	Transient Tolerance	Fault Tolerance	Tx EN	Rx EN	Cable Invert Pin	VL Pin	Supply Voltage Range (V)	Temp Range (°C)	Packages
XR33052	Half	0.25	15	Open, Short, Idle	•	320	•	±100V	±60V	•	•			3 to 5.5	-40 to 85 -40 to 105	NSOIC-8
XR33053	Full	1				320										NSOIC-14
XR33055	Half	1				320										NSOIC-8
XR33058	Half	20				80										NSOIC-8
XR33152	Half	0.25	15	Open, Short, Idle	•	320	•	±100V	±60V	•	•		3 to 5.5	-40 to 85 -40 to 105	NSOIC-8	
XR33155	Half	1				320									NSOIC-8	
XR33156	Full	20				80									NSOIC-14	
XR33158	Half	20				80									NSOIC-8	

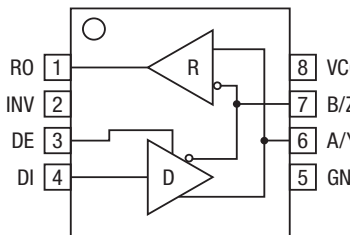
The XR33052, XR33053, XR33055, XR33058, XR33152, XR33155, XR33156 and XR33158 ±60V fault protected transceivers are designed to survive overvoltage faults such as direct shorts to power supplies, connector failures, cable crushes and wiring faults while simultaneously protecting against ESD events up to ±15kV.



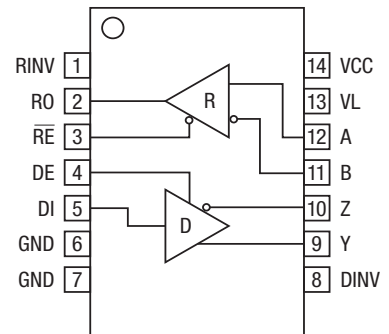
## Pin Configuration



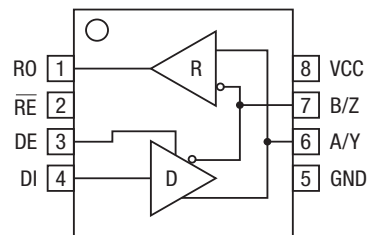
Full Duplex XR33053



Half Duplex XR33152, XR33155 and XR33158



Full Duplex XR33156



Half Duplex XR33052, XR33055 and XR33058



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