

MAX3222/MAX3232/ MAX3237/MAX3241*

3.0V to 5.5V, Low-Power, Up to 1Mbps, True RS-232 Transceivers

General Description

The MAX3222/MAX3232/MAX3237/MAX3241 transceivers have a proprietary low-dropout transmitter output stage enabling true RS-232 performance from a 3.0V to 5.5V supply with a dual charge pump. The devices require only four small 0.1 μ F external charge-pump capacitors. The MAX3222, MAX3232, and MAX3241 are guaranteed to run at data rates of 120kbps while maintaining RS-232 output levels. The MAX3237 is guaranteed to run at data rates of 250kbps in normal operating mode and 1Mbps in the MegaBaud™ operating mode.

The MAX3222/MAX3232 have 2 receivers and 2 drivers. The MAX3222 and MAX3232 are pin, package, and functionally compatible with the industry-standard MAX242 and MAX232, respectively.

The MAX3241 has 5 receivers and 3 drivers, while the MAX3237 has 3 receivers and 5 drivers. Receivers R1 (MAX3237/MAX3241) and R2 (MAX3241) have extra outputs in addition to their standard outputs. These extra outputs are always active, allowing external devices to be monitored without forward biasing the protection diodes in circuitry that may have V_{CC} completely removed.

The MAX3222, MAX3232, and MAX3241 are available in space-saving TSSOP and SSOP packages with operating temperatures of either -40°C to +85°C or 0°C to 70°C.

Applications

- Battery-Powered Equipment
- Hand-Held Equipment
- Peripherals
- Datacom Equipment

Ordering Information continued at end of data sheet.

Typical Operating Circuits appear at end of data sheet.

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*Covered by U.S. Patent numbers 4,636,930; 4,679,134; 4,777,577; 4,797,899; 4,809,152; 4,897,774; 4,999,761; and other patents pending.

Benefits and Features

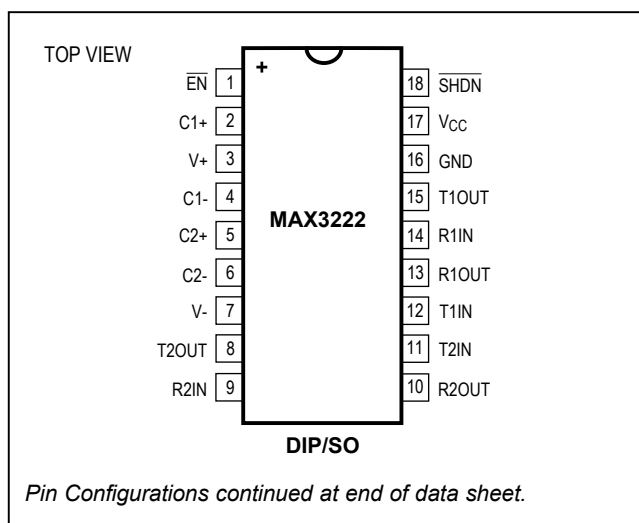
- Integrated Features Saves Board Space and Simplifies Design
 - Charge Pump Circuitry Eliminates the Need for a Bipolar \pm 12V Supply
 - Wide Single-Supply Operation From +3V to +5.5V Supply
 - Always-On Extra Outputs Enable Monitoring of External Devices
- Power Saving Extends Battery Life
 - 1 μ A Supply Current in Shutdown Mode While Receiver is Active (MAX3222, MAX3237, MAX3241)

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE	PKG CODE
MAX3222CUP+	0°C to +70°C	20 TSSOP	U20+2
MAX3222CAP+	0°C to +70°C	20 SSOP	A20+1
MAX3222CWN+	0°C to +70°C	18 SO	W18+1
MAX3222CPN+	0°C to +70°C	18 Plastic Dip	P18+5

+Denotes lead-free package.

Pin Configurations



Absolute Maximum Ratings

V _{CC}	-0.3V to +6V
V+ (Note 1).....	-0.3V to +7V
V- (Note 1).....	+0.3V to -7V
V+ + V- (Note 1).....	+13V
Input Voltages	
T_IN, SHDN, EN.....	-0.3V to +6V
MBAUD.....	-0.3V to (V _{CC} + 0.3V)
R_IN.....	±25V
Output Voltages	
T_OUT.....	±13.2V
R_OUT.....	-0.3V to (V _{CC} + 0.3V)
Short-Circuit Duration	
T_OUT.....	Continuous

Continuous Power Dissipation (T _A = +70°C)		
16-Pin TSSOP (derate 6.7mW/°C above +70°C).....	533mW	
16-Pin Narrow SO (derate 8.70mW/°C above +70°C)....	696mW	
16-Pin Wide SO (derate 9.52mW/°C above +70°C) ...	762mW	
16-Pin Plastic DIP (derate 10.53mW/°C above +70°C)..	842mW	
18-Pin SO (derate 9.52mW/°C above +70°C).....	762mW	
18-Pin Plastic DIP (derate 11.11mW/°C above +70°C)...	889mW	
20-Pin SSOP (derate 7.00mW/°C above +70°C).....	559mW	
20-Pin TSSOP (derate 8.0mW/°C above +70°C).....	640mW	
28-Pin TSSOP (derate 8.7mW/°C above +70°C).....	696mW	
28-Pin SSOP (derate 9.52mW/°C above +70°C).....	762mW	
28-Pin SO (derate 12.50mW/°C above +70°C).....	1W	
Operating Temperature Ranges		
MAX32_C.....	0°C to +70°C	
MAX32_E.....	-40°C to +85°C	
Storage Temperature Range.....		-65°C to +150°C
Lead Temperature (soldering, 10s).....		+300°C

Note 1: V+ and V- can have a maximum magnitude of 7V, but their absolute difference cannot exceed 13V.

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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics

(V_{CC} = +3.0V to +5.5V, C1–C4 = 0.1µF (Note 2), T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS	
DC CHARACTERISTICS						
V _{CC} Power-Supply Current	No load, V _{CC} = 3.3V or 5.0V, T _A = +25°C	MAX3222/MAX3232/ MAX3241		0.3	1.0	mA
		MAX3237		0.5	2.0	
Shutdown Supply Current	SHDN = GND, T _A = +25°C		1.0	10	µA	
LOGIC INPUTS AND RECEIVER OUTPUTS						
Input Logic Threshold Low (Note 3)	T_IN, EN, SHDN, MBAUD			0.8	V	
Input Logic Threshold High (Note 3)	V _{CC} = 3.3V	2.0			V	
	V _{CC} = 5.0V	2.4				
Input Leakage Current	T_IN, EN, SHDN, MBAUD		±0.01	±1.0	µA	
Output Leakage Current	Receivers disabled		±0.05	±10	µA	
Output Voltage Low	I _{OUT} = 1.6mA			0.4	V	
Output Voltage High	I _{OUT} = -1.0mA	V _{CC} - 0.6	V _{CC} - 0.1		V	
RECEIVER INPUTS						
Input Voltage Range		-25		25	V	
Input Threshold Low	T _A = +25°C	V _{CC} = 3.3V	0.6	1.2	V	
		V _{CC} = 5.0V	0.8	1.5		
Input Threshold High	T _A = +25°C	V _{CC} = 3.3V		1.5	2.4	V
		V _{CC} = 5.0V		1.8	2.4	