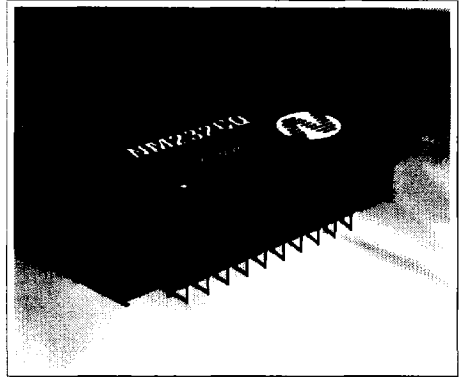


features

- 5V Only Operation
- No External Components
- Meets EIA RS-232-C Standards
- 20 Pin DIP Package Style
- Low Profile
- Low Power Consumption
- Flexible Supply Voltage Range
- TTL/CMOS Logic Compatible
- Downward Pin Compatible with NM232C and NM232CD

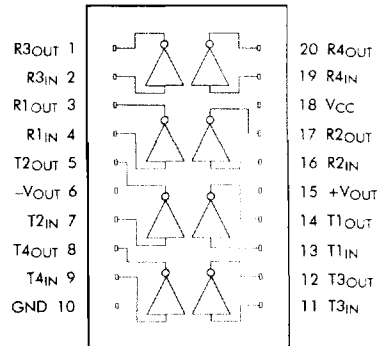


description

The NM232CQ is a quad transmitter and receiver designed to interface data terminal equipment (DTE) with data communications equipment (DCE). Each circuit conforms with the specifications of the EIA RS-232-C standard. The device provides four data receive channels and four data transmit channels. Each channel is completely compatible at the interface boundary and TTL/CMOS compatible at the logic connections. The internally generated positive and negative supplies are made available for external use at limited current levels. Total device power consumption is typically 125mW.

pin connections

20 Pin DIP (top view)



NM232CQ

Quad EIA RS-232-C Transmitter and Receiver

absolute maximum ratings over operating free air temperature range

Supply voltage V_{CC} 4V to 7V
 Input voltage at receiver $\pm 30V$
 Output current from receiver 30mA
 Output voltage at transmitter $\pm 15V$
 Input voltage to transmitter $-0.3V$ to 30V

NM232CQ operating free-air temperature range $0^{\circ}C$ to $70^{\circ}C$
 NM232CQX operating free-air temperature range $-40^{\circ}C$ to $80^{\circ}C$
 Storage temperature range $-55^{\circ}C$ to $125^{\circ}C$
 Lead temperature 1.5mm from case for 10 seconds $300^{\circ}C$

Current supplied by V_{OUT} or $-V_{OUT}$ singularly 15mA
 Current supplied by V_{OUT} and $-V_{OUT}$ combined per output 10mA

other parameters

Weight (typical) 7.9 grams

electrical characteristics over operating free air temperature range

Parameter	Test Conditions	Value			Unit
		MIN	TYP	MAX	
Supply Current, I_{CC}	Inputs at 0.8V, $R_L=3k\Omega$ at all TXOUT'S		60	80	mA
	Inputs at 1.9V, $R_L=3k\Omega$ at all TXOUT'S		50	70	
Total Power Dissipation, P_D	No Load		125	150	mW
	No Load, $V_{CC}=4.5V$		100	145	
Positive Output Voltage, V_{OUT+}	No External Load	9.5	10.5	14.8	V
	10mA External Load		10		
Negative Output Voltage, V_{OUT-}	No External Load	-14.8	-10.5	-10	V
	10mA External Load		-9.5		

Note : All data taken at $T_A=25^{\circ}C$, $V_{CC}=5V$.

each transmitter

electrical characteristics over operating free air temperature range

Parameter	Test Conditions	Value			Unit
		MIN	TYP	MAX	
High Level Input Voltage, V_{IH}		2.4			V
Low Level Input Voltage, V_{IL}				0.8	V
High Level Output Voltage, V_{OH}	$V_{IL}=0.8V, R_L=3k\Omega$	8.0	9.0		V
	$V_{IL}=0.8V, R_L=3k\Omega, V_{CC}=4.5V$	7.5	8.5		
Low Level Output Voltage, V_{OL}	$V_{IH}=1.9V, R_L=3k\Omega$		-8.0	-7.5	V
	$V_{IH}=1.9V, R_L=3k\Omega, V_{CC}=4.5V$		-7.5	-6.5	
High Level Input Current, I_{IH}	$V_{IN}=5.0V$			0.25	μA
Low Level Input Current, I_{IL}	$V_{IN}=0V$			0.25	μA
Short Circuit Output Current, $I_{OS(H)}$	$V_{IN}=0.8V$	15	20		mA
Short Circuit Output Current, $I_{OS(L)}$	$V_{IN}=1.9V$		-15	-10	mA
Output Resistance Power Off, R_O	$V_{CC}=0V$	300			Ω

switching characteristics

Parameter	Test Conditions	Value			Unit
		MIN	TYP	MAX	
Propagation Delay Time L to H, T_{PLH}	$R_L=3k\Omega, C_L=30pF$		650	800	ns
Propagation Delay Time H to L, T_{PHL}	$R_L=3k\Omega, C_L=30pF$		1.0	1.2	μs
Transition Time L to H Level, T_{TLH}	$R_L=3k\Omega, C_L=30pF$		0.9	1.0	μs
	$R_L=3-7k\Omega, C_L=2500pF$		2.0	2.5	
Transition Time H to L Level, T_{THL}	$R_L=3k\Omega, C_L=30pF$		0.9	1.0	μs
	$R_L=3-7k\Omega, C_L=2500pF$		2.0	2.5	

Note : All data taken at $T_A=25^\circ C, V_{CC}=5V$.

NM232CQ

Quad EIA RS-232-C Transmitter and Receiver

each receiver

electrical characteristics over operating free air temperature range

Parameter	Test Conditions	Value			Unit
		MIN	TYP	MAX	
Positive Going Threshold, V_{T+}			2.4	2.8	V
Negative Going Threshold, V_{T-}		1.6	2.0		V
High Level Output Voltage, V_{OH}	$V_{IN}=0.75V, I_{OH}=-0.5mA$	4.4		5.0	V
	Input Open, $I_{OH}=-0.5mA$	4.4		5.0	
Low Level Output Voltage, V_{OL}	$V_{IN}=3V, I_{OL}=10mA$	0.1	0.2	0.4	V
High Level Input Current, I_{IH}	$V_{IN}=25V$	4.5		5.0	mA
	$V_{IN}=3.0V$		0.5	0.55	
Low Level Input Current, I_{IL}	$V_{IN}=-25V$	-5.0		-4.5	mA
	$V_{IN}=-3.0V$	-0.55	-0.5		
Short Circuit Output Current, I_{OS}	$V_{IN}=0V$		-5.0		mA

switching characteristics

($V_{IN}=\pm 6V$)

Parameter	Test Conditions ¹	Value			Unit
		MIN	TYP	MAX	
Propagation Delay Time L to H, T_{PLH}	$R_L=3.9k\Omega, C_L=30pF$		1.3		μs
Propagation Delay Time H to L, T_{PHL}	$R_L=390\Omega, C_L=30pF$		350	450	ns
Transition Time L to H Level, T_{TLH}	$R_L=3.9k\Omega, C_L=30pF$		500		ns
Transition Time H to L Level, T_{THL}	$R_L=390\Omega, C_L=30pF$		250		ns

Note : All data taken at $T_A=25^\circ C, V_{CC}=5V$.

¹ Test load is simulated TTL and STTL.

mean time to failure (MTTF) in thousands of hours

Part Number	0°C	25°C	70°C
NM232CQ	1914	1175	140
NM232CQX			

Note : MTTF figures are derived from hybrid model of MIL-HDBK-217F.

ordering information

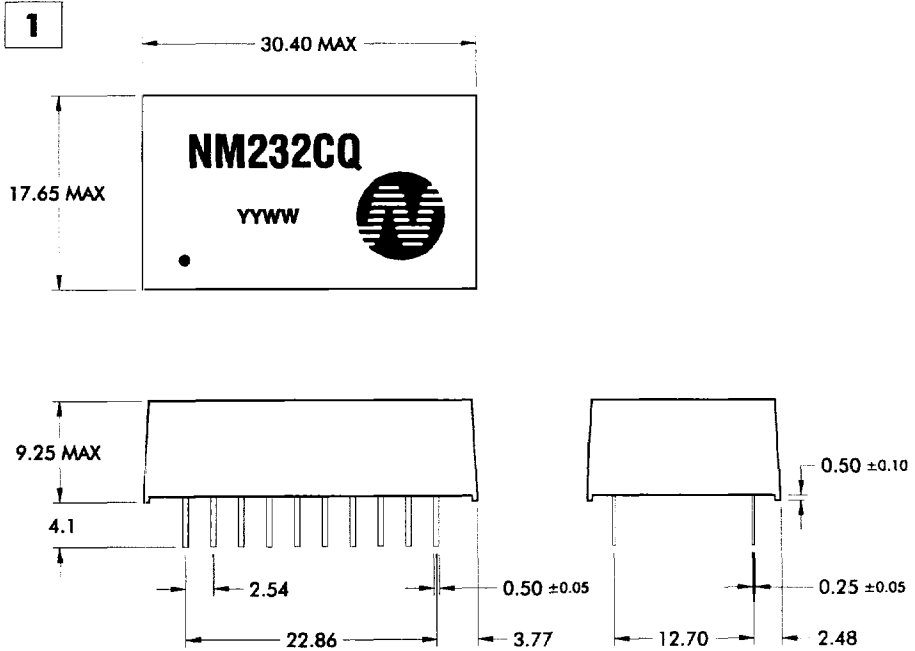
Part Number	Function	Package Style
NM232CQ	5V only Quad EIA RS-232-C Transmitter and Receiver	1
NM232CQX	NM232CQ with Extended Temperature Range.	

NM232CQ

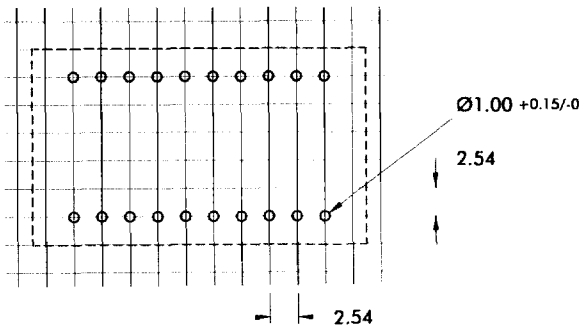
Quad EIA RS-232-C Transmitter and Receiver

outline dimensions

20 Pin DIP package style



recommended footprint details



All pins on a 2.54mm pitch.

All dimensions in mm XX.X ± 0.50, XX.XX ± 0.25.