**SCOPE: +5V-Powered Multi-Channel RS-232 Drivers/Receivers**

| Device Type | Generic Number | Pkg Code |
|---|---|---|
| 01 | MAX232M(x)/883B | J16 & L20 |
| 02 | MAX230MJP/883B | J20 |
| 03 | MAX231MJD/883B | J14 |
| 04 | MAX234MJE/883B | J16 |
| 05 | MAX236MRG/883B | R24 |
| 06 | MAX237MRG/883B | R24 |
| 07 | MAX238MRG/883B | R24 |
| 08 | MAX239MRG/883B | R24 |

**Case Outline(s).** The case outlines shall be designated in Mil-Std-1835 and as follows:

| Outline Letter | Mil-Std-1835 | Case Outline | Package Code |
|---|---|---|---|
| JD | GDIP1-T14 or CDIP2-T14 | 14 LEAD CERDIP | J14 |
| JE | GDIP1-T16 or CDIP2-T16 | 16 LEAD CERDIP | J16 |
| JP | GDIP1-T20 or CDIP2-T20 | 20 LEAD CERDIP | J20 |
| RG | GDIP1-T24 or CDIP2-T24 | 24 LEAD CERDIP | R24 |
| LP | CQCC1-N20 | 20 Leadless Chip Carrier | L20 |

**Absolute Maximum Ratings**

$V_{CC}$ ..... -0.3V to +6V
V+ ..... ($V_{CC}$-0.3V) to +14V
V- ..... +0.3V to -14V
Input Voltages:
$T_{IN}$ ..... -0.3V to ($V_{CC}$ +0.3V)
$R_{IN}$ ..... ±30V
Output Voltages:
$T_{OUT}$ ..... (V+ +0.3V) to (V- -0.3V)
$R_{OUT}$ ..... -0.3V to ($V_{CC}$ +0.3V)
Short-Circuit Duration, $T_{OUT}$..... Continuous
Lead Temperature (soldering, 10 seconds) ..... +300°C
Storage Temperature ..... -65°C to +160°C

Continuous Power Dissipation ..... $T_A$=+70°C
14 pin CERDIP(derate 9.1mW/°C above +70°C) ..... 727mW
16 pin CERDIP(derate 10mW/°C above +70°C) ..... 800mW
20 pin CERDIP(derate 11.1mW/°C above +70°C) ..... 889mW
24 pin CERDIP(derate 12.5mW/°C above +70°C) ..... 1000mW
20 pin LCC(derate 9.1mW/°C above +70°C) ..... 727mW
Junction Temperature $T_J$ ..... +150°C
Thermal Resistance, Junction to Case, ΘJC
14 pin CERDIP..... 55°C/W
16 pin CERDIP..... 50°C/W
20 pin CERDIP..... 40°C/W
24 pin CERDIP..... 40°C/W
20 pin LCC ..... 20°C/W
Thermal Resistance, Junction to Ambient, ΘJA:
14 pin CERDIP..... 110°C/W
16 pin CERDIP..... 100°C/W
20 pin CERDIP..... 90°C/W
24 pin CERDIP..... 80°C/W
20 pin LCC ..... 110°C/W

**Recommended Operating Conditions**

Ambient Operating Range ($T_A$) ..... -55°C to +125°C
Supply Voltage Range ..... -30V to 30V

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.

**TABLE 1. ELECTRICAL TESTS:**

| TEST | Symbol | CONDITIONS<br>-55 °C <=$T_A$<= +125°C 1/<br>Unless otherwise specified | Group A Subgroup | Device type | Limits Min | Limits Max | Units |
|---|---|---|---|---|---|---|---|
| Output Voltage Swing | $V_{OUT}$ | All transmitter outputs loaded with 3kΩ to Gnd | 1,2,3 | All | ±5.0 | | V |
| $V_{CC}$ Power-Supply Current | | No load | 1 | 01 | | 10 | mA |
| | | | | 02,04,05, 06,07 | | 15 | |
| | | | | 03,08 | | 1 | |
| V+ Power-Supply Current | | No load | 1 | 03 | | 5 | mA |
| | | | | 08 | | 15 | |
| Shutdown Supply Current | | | 1 | 02,05 | | 10 | µA |
| **RS-232 TRANSMITTERS** | | | | | | | |
| Input Logic Threshold Low | $V_{IL}$ | $T_{IN}$ | 1,2,3 | All | | 0.8 | V |
| | | $\overline{EN}$ | | 05,08 | | 0.8 | |
| | | SHDN | | 02,05 | | 0.8 | |
| Input Logic Threshold High | $V_{IN}$ | $T_{IN}$ | 1,2,3 | All | 2.0 | | V |
| | | $\overline{EN}$ | | 05,08 | 2.4 | | |
| | | SHDN | | 02,05 | 2.4 | | |
| Logic Pull-up/Current Low | $I_{IL}$ | $T_{IN}$=0V | 1,2,3 | All | | 200 | µA |
| Output short circuit current | $I_{OST}$ | $V_{OUT}$=0V, Sourcing current | 1 | 01 | | ±25 | mA |
| | | $V_{OUT}$=0V, Sinking current | | 02,03,04, 05,06,07, 08 | | ±45 | |
| Transmitter Output Resistance | $R_{TOUT}$ | $V_{CC}$=V+=V-=0V, $V_{OUT}$=±2V | 1,2,3 | All | 300 | | Ω |
| **RS-232 RECEIVERS** | | | | | | | |
| Receiver Input Voltage Operating Range | | | 1,2,3 | 01,03,05, 06,07,08 | -30 | +30 | V |
| RS-232 Input Threshold Low | $V_{IL}$ | Normal Operation | 1 | 01,03,05, 06,07,08 | 0.8 | | V |
| | | $V_{CC}$=5V | 2,3 | | 0.4 | | |
| RS-232 Input Threshold High | $V_{IH}$ | Normal Operation | 1 | 01,03,05, 06,07,08 | | 2.4 | V |
| | | $V_{CC}$=5V | 2,3 | | | 3.0 | |
| RS-232 Input Hysteresis | $V_{TH}$ | $V_{CC}$=5V | 1,2,3 | 01,03,05, 06,07,08 | 0.2 | 1.0 | V |
| RS-232 Input Resistance | $R_{IN}$ | $V_{CC}$=5V | 1,2,3 | 01,03,05, 06,07,08 | 3.0 | 7.0 | kΩ |

| TEST | Symbol | CONDITIONS<br>-55 °C <=$T_A$<= +125°C 1/<br>Unless otherwise specified | Group A Subgroup | Device type | Limits Min | Limits Max | Units |
|---|---|---|---|---|---|---|---|
| TTL/CMOS Output Voltage Low | $V_{OL}$ | $I_{OUT}$=3.2mA | 1,2,3 | 01,03 | | 0.4 | V |
| | | $I_{OUT}$=1.6mA | | 05,06<br>07,08 | | 0.4 | |
| TTL/CMOS Output Voltage High | $V_{OH}$ | $I_{OUT}$=1.0mA | 1,2,3 | 01,03,05,<br>06,07,08 | 3.5 | | V |
| TTL/CMOS Output Leakage Current | | 0V≤$R_{OUT}$≤$V_{CC}$, $\overline{EN}$=$V_{CC}$ | 1,2,3 | 05,08 | | ±10 | µA |
| Receiver Output Enable Time | | NOTE 2 | | 05,08 | | 400 | ns |
| Receiver Output Disable Time | | NOTE 2 | | 05,08 | | 250 | ns |
| Propagation Delay | | RS-232 IN to TTL/CMOS OUT, $C_L$=150pF | 9,10,11 | 01,03,05,<br>06,07,08 | | 10 | µs |
| Transition Region Slew Rate | tSLEW | $C_L$=50pF to 2500pF, RL=3kΩ-7kΩ, VCC=5V measured from +3V to -3V or -3V to +3V | 9 | 02,04,05,<br>06,07,08 | 3.0 | 30 | V/µs |
| | | | | 01,03 | 1.5 | 30 | |

NOTE 1: $V_{CC}$=+5V ±10% for MAX230, MAX232, MAX234, MAX236, MAX237 or MAX238.
for dash 02, 01, 04, 05, 06, 07 respectively.
$V_{CC}$=+5V ±10%, V+=9.0V to 13.2V for MAX231 and MAX239 or for dash 03 and 08 respectively.
NOTE 2: Typical design limit.

TERMINAL CONNECTIONS FOR 01, 02, 03, 04, 05, 06, 07, 08

| | 02 | 03 | 01 | 01 LCC | 04 | 05 | 06 | 07 | 08 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | $T3_{OUT}$ | C+ | C1+ | NC | $T1_{OUT}$ | $T3_{OUT}$ | $T3_{OUT}$ | $T2_{OUT}$ | $R1_{OUT}$ |
| 2 | $T1_{OUT}$ | C- | V+ | C1+ | $T2_{OUT}$ | $T1_{OUT}$ | $T1_{OUT}$ | $T1_{OUT}$ | $R1_{IN}$ |
| 3 | $T2_{OUT}$ | V- | C1- | V+ | $T2_{IN}$ | $T2_{OUT}$ | $T2_{OUT}$ | $R2_{IN}$ | GND |
| 4 | $T2_{IN}$ | $T2_{OUT}$ | C2+ | C1- | $T1_{IN}$ | $R1_{IN}$ | $R1_{IN}$ | $R2_{OUT}$ | $V_{CC}$ |
| 5 | $T1_{IN}$ | $R2_{IN}$ | C2- | C2+ | GND | $R1_{OUT}$ | $R1_{OUT}$ | $T1_{IN}$ | V+ |
| 6 | GND | $R2_{OUT}$ | V- | NC | $V_{CC}$ | $T2_{IN}$ | $T2_{IN}$ | $R1_{OUT}$ | C+ |
| 7 | $V_{CC}$ | $T2_{IN}$ | $T2_{OUT}$ | C2- | C1+ | $T1_{IN}$ | $T1_{IN}$ | $R1_{IN}$ | C- |
| 8 | C1+ | $T1_{IN}$ | $R2_{IN}$ | V- | V+ | GND | GND | GND | V- |
| 9 | V+ | $R1_{OUT}$ | $R2_{OUT}$ | $T2_{OUT}$ | C1- | $V_{CC}$ | $V_{CC}$ | $V_{CC}$ | $R5_{IN}$ |
| 10 | C1- | $R1_{IN}$ | $T2_{IN}$ | $R2_{IN}$ | C2+ | C1+ | C1+ | C1+ | $R5_{OUT}$ |
| 11 | C2+ | $T1_{OUT}$ | $T1_{IN}$ | NC | C2- | V+ | V+ | V+ | $R4_{OUT}$ |
| 12 | C2- | GND | $R1_{OUT}$ | $R2_{OUT}$ | V- | C1- | C1- | C1- | $R4_{IN}$ |
| 13 | V- | $V_{CC}$ | $R1_{IN}$ | $T2_{IN}$ | $T3_{IN}$ | C2+ | C2+ | C2+ | $T3_{OUT}$ |
| 14 | $T3_{IN}$ | V+ | $T1_{OUT}$ | $T1_{IN}$ | $T4_{IN}$ | C2- | C2- | C2- | $\overline{EN}$ |
| 15 | $T4_{IN}$ | | GND | $R1_{OUT}$ | $T4_{OUT}$ | V- | V- | V- | NC |
| 16 | $T5_{OUT}$ | | $V_{CC}$ | NC | $T3_{OUT}$ | $R3_{IN}$ | $R3_{IN}$ | $R4_{IN}$ | $T3_{IN}$ |
| 17 | SHDN | | | $R1_{IN}$ | | $R3_{OUT}$ | $R3_{OUT}$ | $R4_{OUT}$ | $R3_{OUT}$ |
| 18 | NC | | | $T1_{OUT}$ | | $T3_{IN}$ | $T3_{IN}$ | $T2_{IN}$ | $R3_{IN}$ |
| 19 | $T5_{IN}$ | | | GND | | $T4_{IN}$ | $T4_{IN}$ | $T3_{IN}$ | $T1_{OUT}$ |
| 20 | $T4_{OUT}$ | | | $V_{CC}$ | | $\overline{EN}$ | $T5_{OUT}$ | $T4_{OUT}$ | $T2_{OUT}$ |
| 21 | | | | | | SHDN | $T5_{IN}$ | $T4_{IN}$ | $R2_{IN}$ |
| 22 | | | | | | $R2_{OUT}$ | $R2_{OUT}$ | $R3_{OUT}$ | $R2_{OUT}$ |
| 23 | | | | | | $R2_{IN}$ | $R2_{IN}$ | $R3_{IN}$ | $T2_{IN}$ |
| 24 | | | | | | $T4_{OUT}$ | $T4_{OUT}$ | $T3_{OUT}$ | $T1_{IN}$ |

| | Package | ORDERING INFORMATION: | SMD Number |
|---|---|---|---|
| 01 | 16 pin CERDIP | MAX232MJE/883B | 5962-8987701EA |
| 01 | 20 pin LCC | MAX232MLP/883B | 5962-89877012C |
| 02 | 20 pin CERDIP | MAX230MJP/883B | 5962-8987702RA |
| 03 | 14 pin CERDIP | MAX231MJD/883B | 5962-8987703CA |
| 04 | 16 pin CERDIP | MAX234MJE/883B | 5962-8987704EA |
| 05 | 24 pin CERDIP | MAX236MRG/883B | 5962-8987705JA |
| 06 | 24 pin CERDIP | MAX237MRG/883B | 5962-8987706JA |
| 07 | 24 pin CERDIP | MAX238MRG/883B | 5962-8987707JA |
| 08 | 24 pin CERDIP | MAX239MRG/883B | 5962-8987708JA |

**QUALITY ASSURANCE**

Sampling and inspection procedures shall be in accordance with MIL-Prf-38535, Appendix A as specified in Mil-Std-883.

Screening shall be in accordance with Method 5004 of Mil-Std-883. Burn-in test Method 1015:

1. Test Condition, A, B, C, or D.
2. TA = +125°C minimum.
3. Interim and final electrical test requirements shall be specified in Table 2.

Quality conformance inspection shall be in accordance with Method 5005 of Mil-Std-883, including Groups A, B, C, and D inspection.

Group A inspection:

1. Tests as specified in Table 2.
2. Selected subgroups in Table 1, Method 5005 of Mil-Std-883 shall be omitted.

Group C and D inspections:

a. End-point electrical parameters shall be specified in Table 1.
b. Steady-state life test, Method 1005 of Mil-Std-883:
   1. Test condition A, B, C, D.
   2. TA = +125°C, minimum.
   3. Test duration, 1000 hours, except as permitted by Method 1005 of Mil-Std-883.

**TABLE 2. ELECTRICAL TEST REQUIREMENTS**

| Mil-Std-883 Test Requirements | Subgroups per Method 5005, Table 1 |
|---|---|
| Interim Electric Parameters Method 5004 | 1 |
| Final Electrical Parameters Method 5005 | 1*, 2, 3, 9, 10, 11 |
| Group A Test Requirements Method 5005 | 1, 2, 3, 9, 10, 11 |
| Group C and D End-Point Electrical Parameters Method 5005 | 1 |

* PDA applies to Subgroup 1 only.

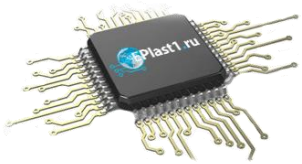
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- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

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