NEC
ELECTRON DEVICE

MOS INTEGRATED CIRCUIT
μPD4711A

RS-232C LINE DRIVER/RECEIVER

DESCRIPTION

The μPD4711A is a silicon gate CMOS IC which combines 2 sets of line drivers and receivers comforming to the RS-232C standard. A single +5 V power source operation is realized by built-in DC-DC converter. Moreover, the attractive additional functions are provided such as driver output control function, receiver input threshold hysteresis select function and standby function etc.

By these features, the μPD4711A is the best choice for DTE (Data Terminal Equipment), DCE (Data Circuit Terminating Equipment) and OA equipment.

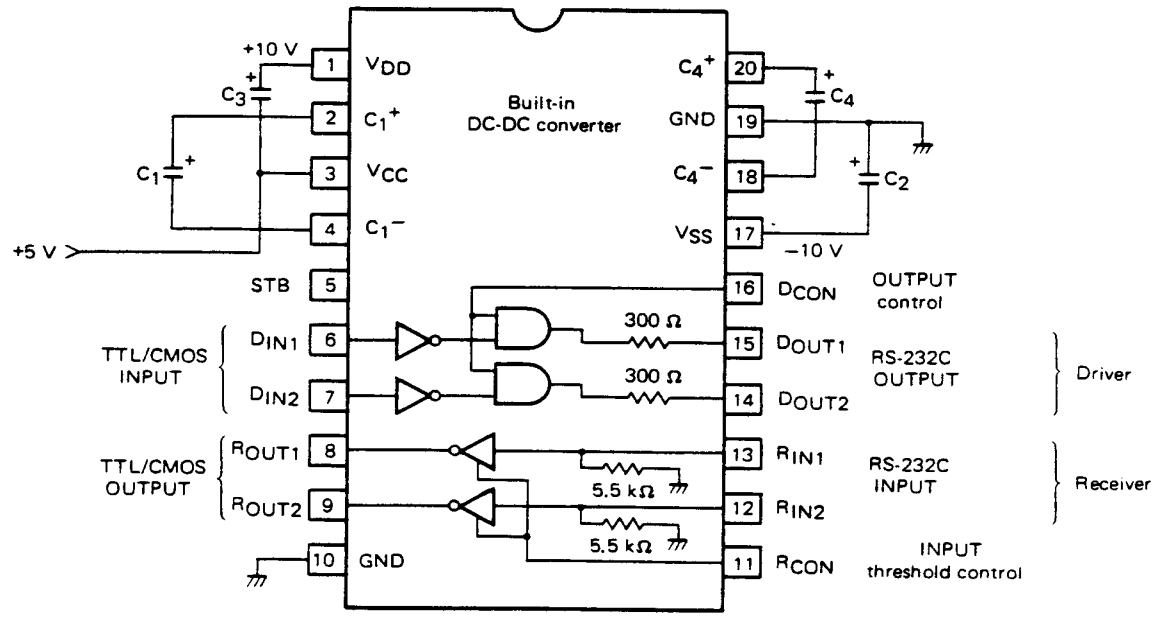
FEATURES

- Conforms to EIA RS-232C standard
- Operates on a single +5 V power source
- Provided power-ON reset function
- Provided power-OFF driver output OFF hold function
- Two types of receiver input threshold hysteresis are selectable
- Standby function
- Latch-up free

ORDERING INFORMATION

Part Number	Package
μPD4711ACX	20 Pin Plastic DIP (300 mil)
μPD4711AGS	20 Pin Plastic SOP (300 mil)

BLOCK DIAGRAM/CONNECTION DIAGRAM (Top View)



* STB terminal is pulled down to ground by internal resistor.

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Supply Voltage	V_{CC}	−0.5 to +6.0	V
Driver Input Voltage	D_{IN}	−0.5 to V_{CC} +0.5	V
Receiver Input Voltage	R_{IN}	−30.0 to +30.0	V
Driver Output Voltage	D_{OUT}	−25.0 to +25.0 Note 1	V
Receiver Output Voltage	R_{OUT}	−0.5 to V_{CC} +0.5	V
Input Current	I_{IN}	±60.0	mA
Operating Temperature Range	T_{OPT}	−40 to +85	°C
Storage Temperature Range	T_{STG}	−55 to +150	°C
Power Dissipation	P_T	0.5	W

Note 1 Pulse width 1 ms, duty 10 % MAX.

RECOMMENDED OPERATING CONDITION

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
Operating Temperature Range	T_{OPT}	−20		80	°C
External Capacitor Note 2		4.7	22	47	μF

Note 2 The electrolytic capacitor's capacitance goes smaller, when ambient temperature is below 0 °C. Take the lowest operating temperature into account when choosing the capacitance value. Connect the external capacitor to minimize the wiring between the capacitor and the pin of μPD4711.

ELECTRICAL CHARACTERISTICS (Total)

(V_{CC} = +5 V ± 10 %, T_a = −40 °C to +85 °C, C_1 to C_4 = 22 μF)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Supply Current	I_{CC}		4.5	9	mA	V_{CC}=+5 V, R_L=∞, STB=GND or OPEN
Supply Current (standby)	ICC (standby)		50	100	μA	V_{CC}=+5 V, R_L=∞, STB=+5 V Note 3
Input Capacitance	C_{IN}			10	pF	Driver and Receiver Input

Note 3 When high level voltage is applied to STB terminal, internal DC-DC converter stops and Dout, Rout terminals go to high impedance.

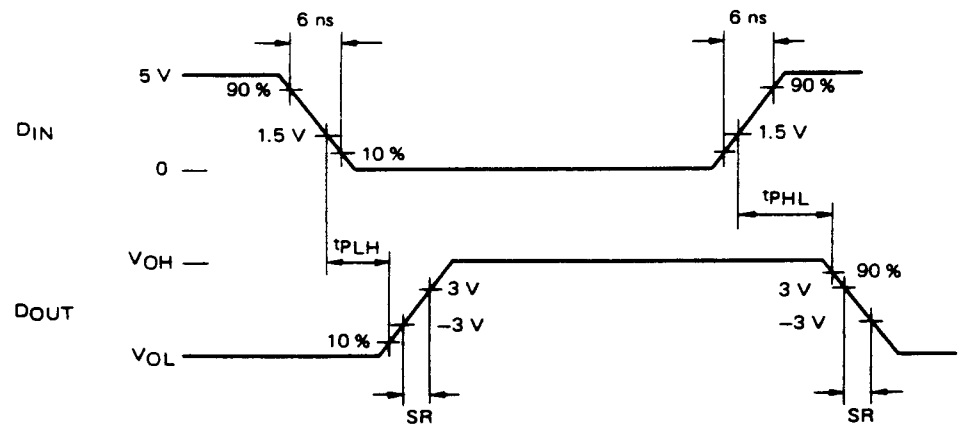
ELECTRICAL CHARACTERISTIC (Driver)

(V_{CC} = +5.0 V ± 10 %, T_a = −40 °C to +85 °C, C_1 to C_4 = 22 μF)

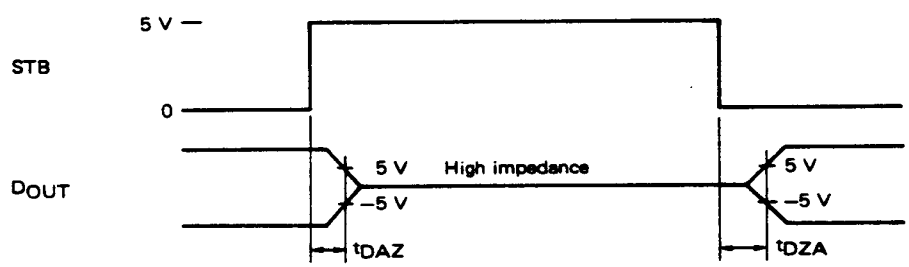
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Low Level Input Voltage	V_{IL}			0.8	V	
High Level Input Voltage	V_{IH}	2.0			V	
Low Level Input Current	I_{IL}	0		−1.0	μA	
High Level Input Current	I_{IH}	0		1.0	μA	
Output Voltage	V_{DO}		±9.7		V	V_{CC}=5.0 V, R_L=∞, T_a=25 °C
		±7	+8, −7.7		V	V_{CC}=5.0 V, R_L=3 kΩ, T_a=25 °C
		±5			V	V_{CC}=5.0 V, R_L=3 kΩ, T_a=T_{opt}
		±6			V	V_{CC}=4.5 V, R_L=3 kΩ, T_a=25 °C
Output Short Current	I_{SC}		±15	±40	mA	V_{CC}=5.0 V, to GND
Slew Rate Note 5	SR	1.5	4	30	V/μs	C_L=10 pF, R_L=3 to 7 kΩ
		1.5	4		V/μs	C_L=2 500 pF, R_L=3 to 7 kΩ
Propagation Delay Note 5	t_{PHL} t_{PLH}		0.8		μs	R_L=3.5 kΩ, C_L=2 500 pF
Output Resistance	R_O	300			Ω	V_{CC}=V_{DD}=V_{SS}=0 V, V_{OUT}=±2 V
Transition Time Note 6	t_{DAZ}			1	μs	
Transition Time Note 6	t_{DZA}			10	ms	

Note 4 The outputs of the two driver circuits can be fixed to the OFF (Low) status, independently of data signals, by lowering the signal level of the output control pin (D con terminal).

Note 5 Measurement Point.



Note 6 Measurement Point

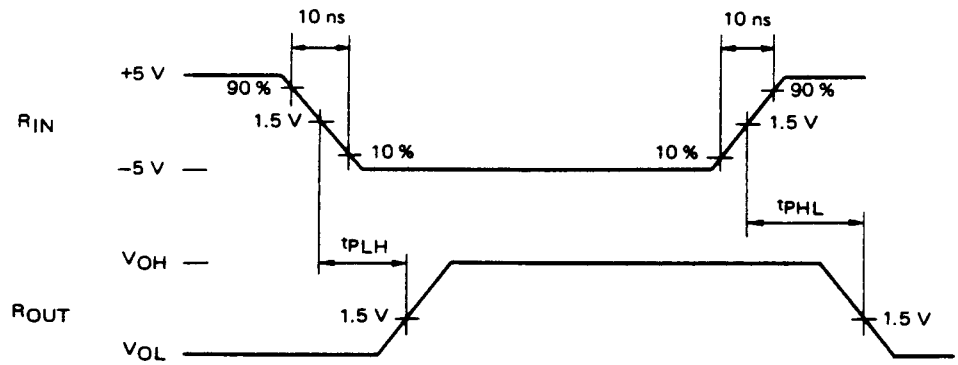


ELECTRICAL CHARACTERISTIC (Receiver)

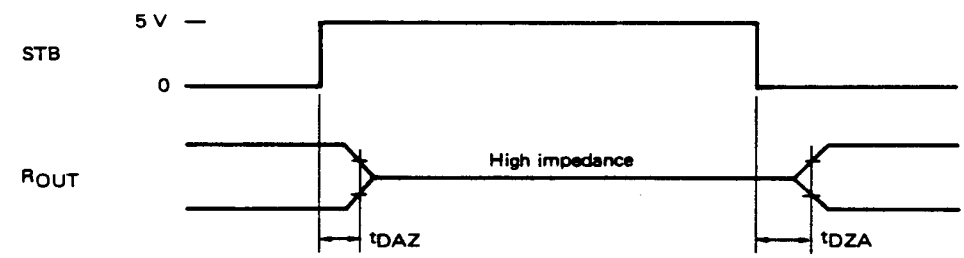
(V_{CC} = +5.0 V ± 10 %, T_a = −40 °C to +85 °C, C_1 to C_4 = 22 μF)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Low Level Output Voltage	V_{OL}			0.4	V	I_{OUT}=4 mA
High Level Output Voltage	V_{OH}	V_{CC}−0.8			V	I_{OUT}=−4 mA
Output Capacitance Load	C_L			150	pF	
Propagation Delay Note 7	t_{PHL} t_{PLH}		0.1		μs	R_L=1 kΩ, C_L=100 pF
Input Current	I_{IN}		0.9		mA	V_{IN}=±5V
Input Resistance	R_I	3	5.5	7	kΩ	V_{IN}=±3 to ±25 V
Input Voltage	V_{IN}	−30		+30	V	
Input Open Voltage	V_{IO}			0.5	V	Only Input Threshold TYPE A
Input Threshold TYPE A (RCON: Low)	V_{IH}	1.6	2	2.4	V	V_{CC}=+5 V
	V_{IL}	0.6	1	1.6	V	V_{CC}=+5 V
	V_H	0.5	1	1.5	V	V_{CC}=+5 V (Hysteresis width)
Input Threshold TYPE B (RCON: High)	V_{IH}	1.6	2	2.4	V	V_{CC}=+5 V
	V_{IL}	−0.4	−1.8	−3.0	V	V_{CC}=+5 V
	V_H	2.0	4.0	5.4	V	V_{CC}=+5 V (Hysteresis width)
Transition Time Note 8	t_{DAZ}			1	μs	
Transition Time Note 8	t_{DZA}			10	ms	

Note 7 Measurement Point.

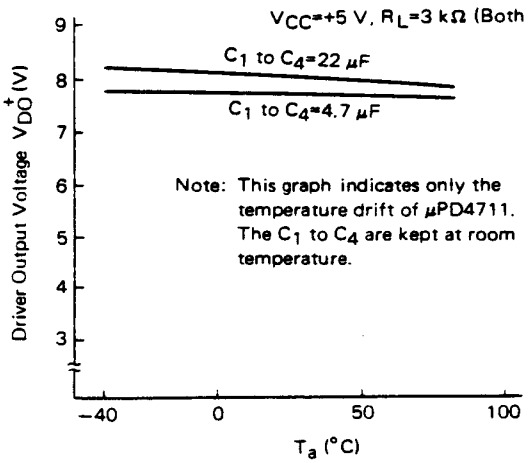


Note 8 Measurement Point.

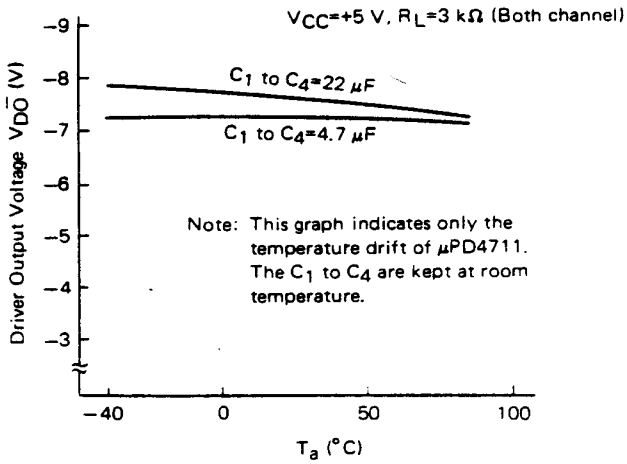


TYPICAL CHARACTERISTICS (T_a = 25 °C)

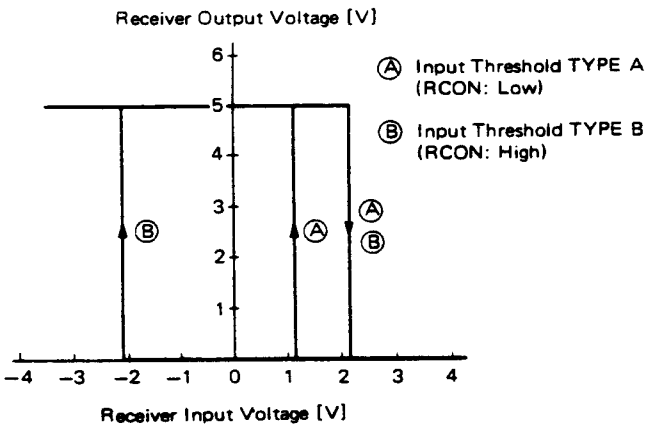
Driver Output Voltage V_{DO}^{+} – T_a



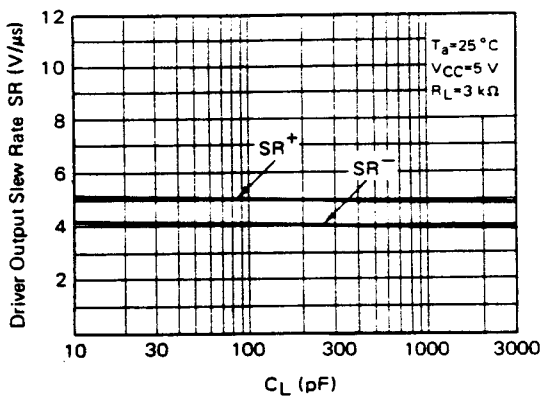
Driver Output Voltage V_{DO}^{-} – T_a



Receiver Input Hysteresis

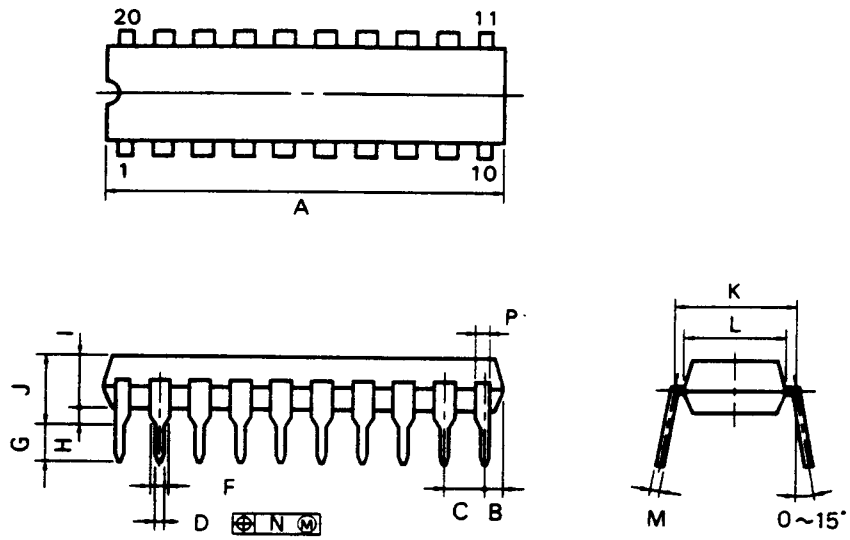


Driver Output Slew Rate – C_L



PACKAGE DIMENSION

20PIN PLASTIC DIP (300 mil)



P20C-100-300A,C

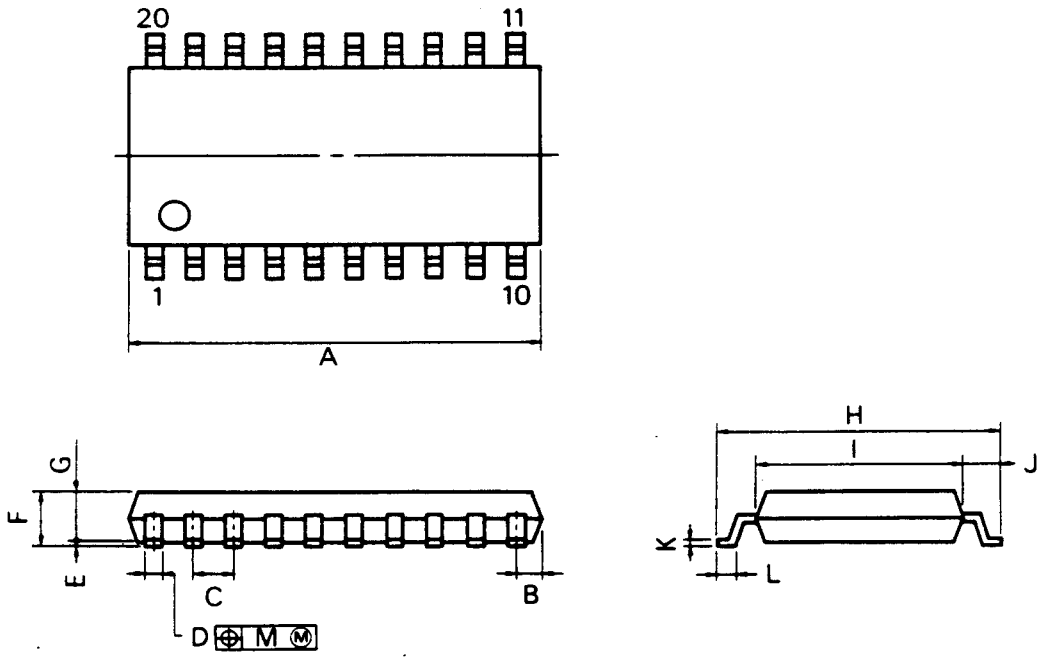
NOTES

1) Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

2) Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS	INCHES
A	25.40 MAX.	1.000 MAX.
B	1.27 MAX.	0.050 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
D	$0.50^{\pm 0.10}$	$0.020^{+0.004}_{-0.005}$
F	1.1 MIN.	0.043 MIN.
G	$3.5^{\pm 0.3}$	$0.138^{\pm 0.012}$
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
K	7.62 (T.P.)	0.300 (T.P.)
L	6.4	0.252
M	$0.25^{+0.10}_{-0.05}$	$0.010^{+0.004}_{-0.003}$
N	0.25	0.01
P	0.9 MIN.	0.035 MIN.

20PIN PLASTIC SOP (300 mil)



P20GM-50-300B,C

NOTE

Each lead centerline is located within 0.12 mm (0.005 inch) of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS	INCHES
A	13.00 MAX.	0.512 MAX.
B	0.78 MAX.	0.031 MAX.
C	1.27 (T.P.)	0.050 (T.P.)
D	$0.40^{+0.10}_{-0.05}$	$0.016^{+0.004}_{-0.003}$
E	0.1 ± 0.1	0.004 ± 0.004
F	1.8 MAX.	0.071 MAX.
G	1.55	0.061
H	7.7 ± 0.3	0.303 ± 0.012
I	5.6	0.220
J	1.1	0.043
K	$0.20^{+0.10}_{-0.05}$	$0.008^{+0.004}_{-0.002}$
L	0.6 ± 0.2	$0.024^{+0.008}_{-0.009}$
M	0.12	0.005

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