



MOS INTEGRATED CIRCUIT
 μ PD4715

RS-232C LINE DRIVER/RECEIVER

DESCRIPTION

The μ PD4715 is a silicon gate CMOS IC which combines 5 drivers and 3 receivers conforming 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 μ PD4715 is the best choice for DTE (Data Terminal Equipment), DCE (Data Circuit Terminating Equipment) and OA equipment.

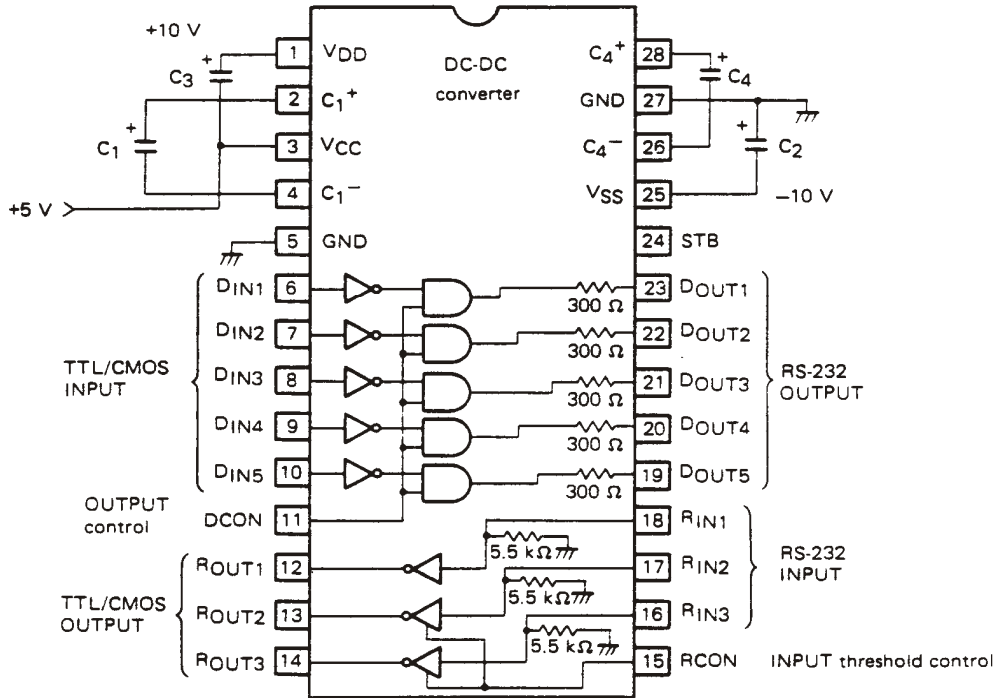
FEATURES

- 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
μ PD4715CY	28-Pin Plastic DIP (400 mil)
μ PD4715GT	28-Pin Plastic SOP (375 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		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 μPD4715.

ELECTRICAL CHARACTERISTICS (Total)

(V_{CC} = +5 V ± 10 %, T_a = -40 °C to +85 °C, C₁ to C₄ = 22 μF)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Supply Current	I _{CC}		9.0	18	mA	V _{CC} =+5 V, R _L =∞, STB=GND or OPEN
Supply Current (Standby)	I _{CC} (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.

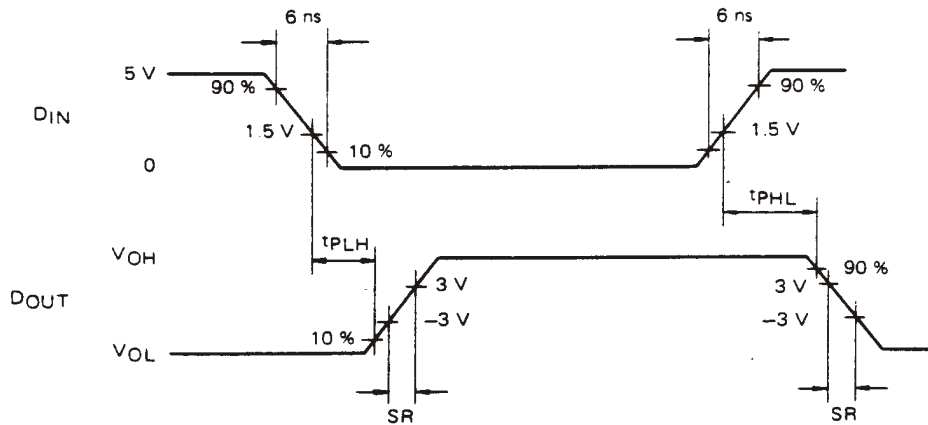
ELECTRICAL CHARACTERISTIC (Driver)

($V_{CC} = +5.0\text{ V} \pm 10\%$, $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$, C_1 to $C_4 = 22\ \mu\text{F}$)

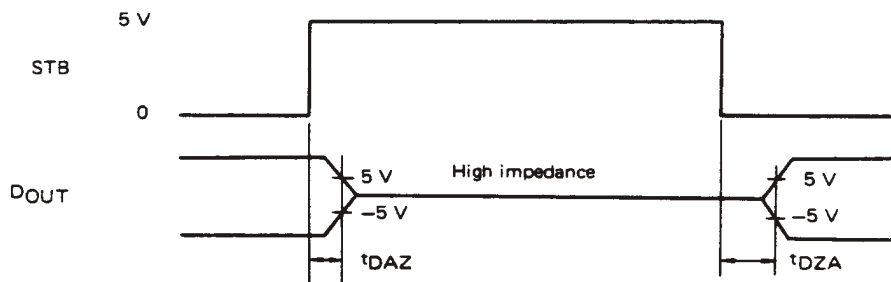
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Low Level Input Voltage	V_{IL}			0.8	V	
High Level Input Voltage	V_{IH}	2.0			V	
Low Level Input Current	I_{IL}	0		-1.0	μA	
High Level Input Current	I_{IH}	0		1.0	μA	
Output Voltage	V_{DO}		± 9.7		V	$V_{CC}=5.0\text{ V}$, $R_L=\infty$, $T_a=25^\circ\text{C}$
		± 6.5	$+7.7, -7.2$		V	$V_{CC}=5.0\text{ V}$, $R_L=3\text{ k}\Omega$, $T_a=25^\circ\text{C}$
		± 5			V	$V_{CC}=5.0\text{ V}$, $R_L=3\text{ k}\Omega$, $T_a=T_{opt}$
		± 6			V	$V_{CC}=4.5\text{ V}$, $R_L=3\text{ k}\Omega$, $T_a=25^\circ\text{C}$
Output Short Current	I_{SC}		± 15	± 40	mA	$V_{CC}=5.0\text{ V}$, to GND
Slew Rate Note 5	SR	1.5	4	30	V/ μs	$C_L=10\text{ pF}$, $R_L=3 \sim 7\text{ k}\Omega$
		1.5	4		V/ μs	$C_L=2\ 500\text{ pF}$, $R_L=3 \sim 7\text{ k}\Omega$
Propagation Delay Note 5	t_{PHL}		0.8		μs	$R_L=3.5\text{ k}\Omega$, $C_L=2\ 500\text{ pF}$
	t_{PLH}					
Output Resistance	R_O	300			Ω	$V_{CC}=V_{DD}=V_{SS}=0\text{ V}$, $V_{OUT}=\pm 2\text{ V}$
Transition Time Note 6	t_{DAZ}			1	μs	
Transition Time Note 6	t_{DZA}			10	ms	

Note 4 The outputs of the five 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.



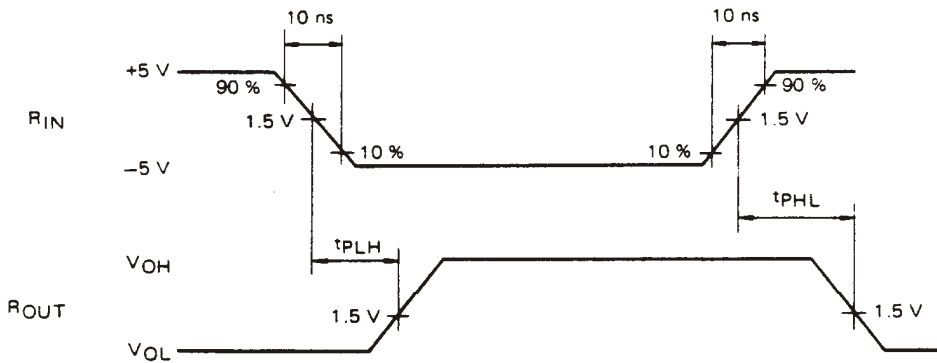
ELECTRICAL CHARACTERISTIC (Receiver)

($V_{CC} = +5.0\text{ V} \pm 10\%$, $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$, C_1 to $C_4 = 22\ \mu\text{F}$)

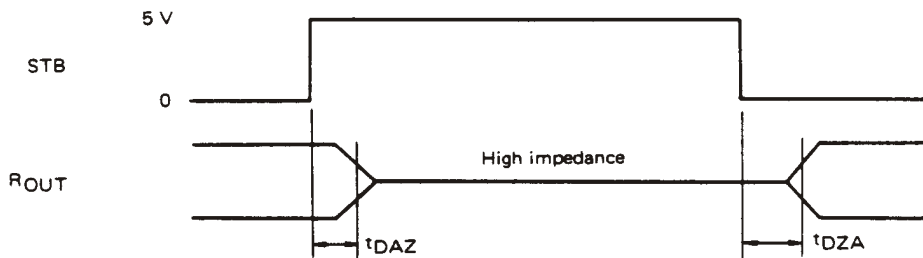
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Low Level Output Voltage	V_{OL}			0.4	V	$I_{OUT}=4\text{ mA}$
High Level Output Voltage	V_{OH}	$V_{CC}-0.8$			V	$I_{OUT}=-4\text{ mA}$
Output Capacitance Load	C_L			150	pF	
Propagation Delay Note 8	t_{PHL} t_{PLH}		0.1		μs	$R_L=1\text{ k}\Omega$, $C_L=100\text{ pF}$
Input Current	I_{IN}		0.9		mA	$V_{IN} = \pm 5\text{ V}$
Input Resistance	R_I	3	5.5	7	kΩ	$V_{IN} = \pm 3\text{ V}$ to $\pm 25\text{ V}$
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	2.6	V	$V_{CC}=+5\text{ V}$
	V_{IL}	0.6	1	1.6	V	$V_{CC}=+5\text{ V}$
	V_H	0.5	1.2	1.5	V	$V_{CC}=+5\text{ V}$ (Hysteresis width)
Input Threshold TYPE B (RCON: High) Note 7	V_{IH}	1.6	2.2	2.6	V	$V_{CC}=+5\text{ V}$
	V_{IL}	-0.4	-1.8	-3.0	V	$V_{CC}=+5\text{ V}$
	V_H	2.6	4.0	5.4	V	$V_{CC}=+5\text{ V}$ (Hysteresis width)
Transition Time Note 9	t_{DAZ}			1	μs	
Transition Time Note 9	t_{DZA}			10	ms	

Note 7 Applied to only receiver 2,3.

Note 8 Measurement Point.

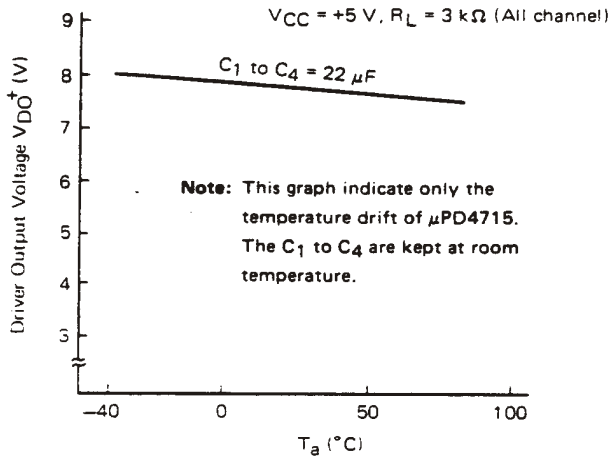


Note 9 Measurement Point.

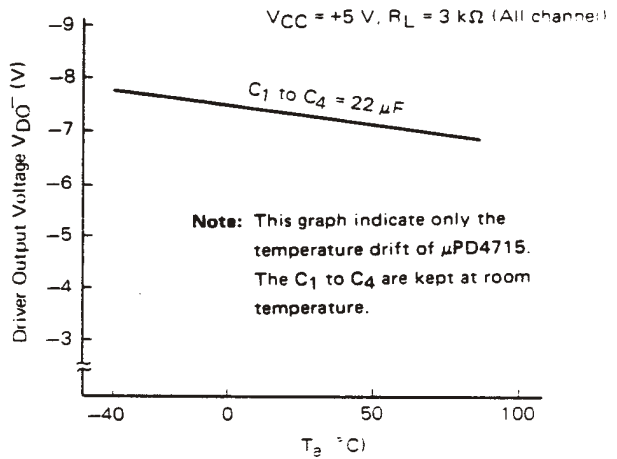


TYPICAL CHARACTERISTICS (T_a = 25 °C)

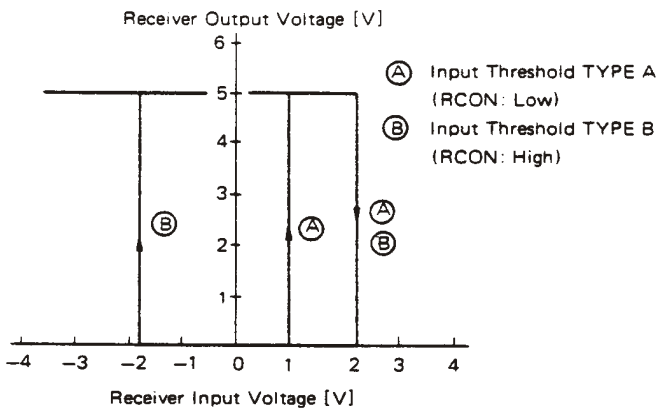
Driver Output Voltage V_{DO}⁺ - T_a



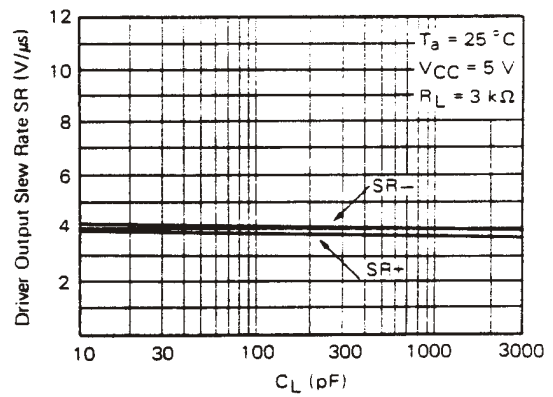
Driver Output Voltage V_{DO}⁻ - T_a



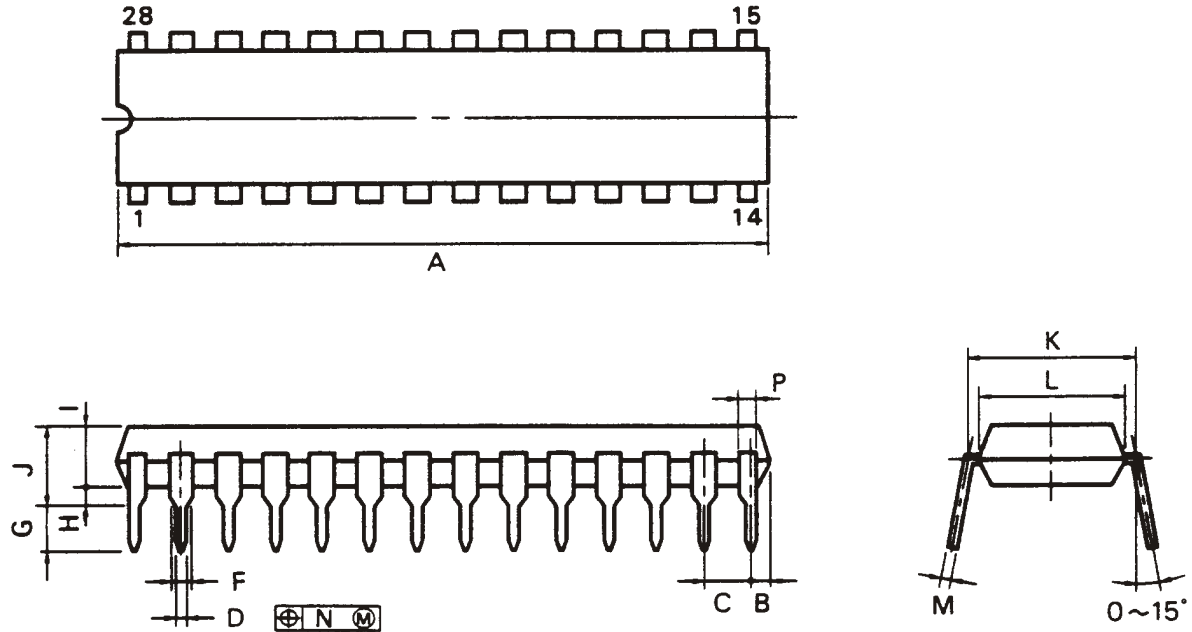
Receiver Input Hysteresis



Driver Output Slew Rate - C_L



PACKAGE DIMENSION
28PIN PLASTIC DIP (400 mil)



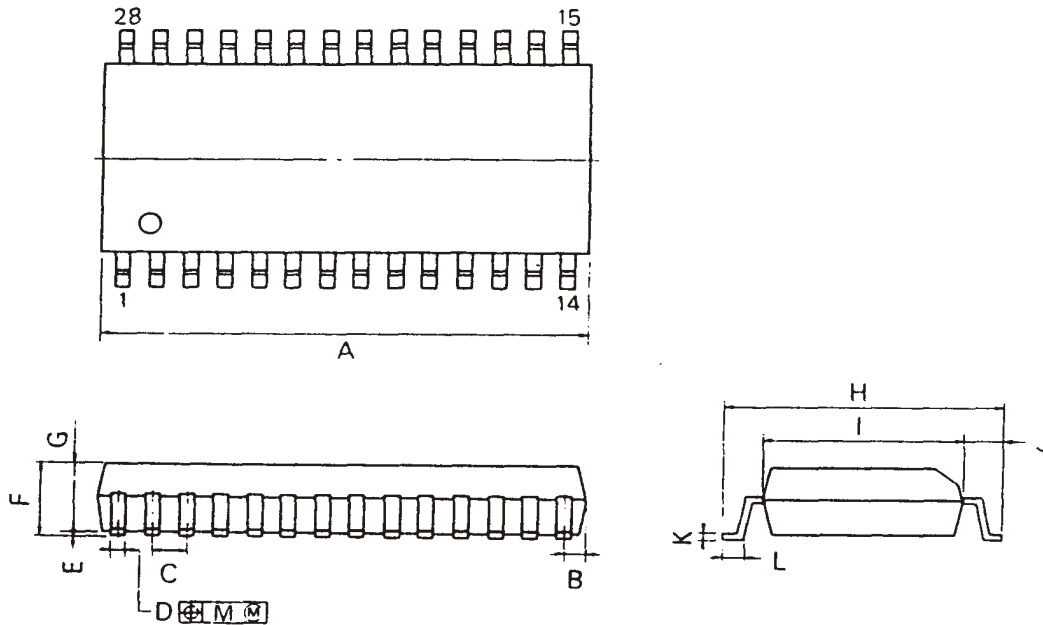
P28C-100-400

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	35.56 MAX.	1.400 MAX.
B	1.27 MAX.	0.050 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
D	0.50 ^{+0.10}	0.020 ^{+0.004}
F	1.1 MIN.	0.043 MIN.
G	3.5 ^{+0.3}	0.138 ^{+0.012}
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.72 MAX.	0.226 MAX.
K	10.16 (T.P.)	0.400 (T.P.)
L	8.6	0.339
M	0.25 ^{+0.10}	0.010 ^{+0.003}
N	0.25	0.01
P	0.9 MIN.	0.035 MIN.

28PIN PLASTIC SOP (375 mil)



P28GM-50-375B

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	18.07 MAX.	0.712 MAX.
B	0.78 MAX.	0.031 MAX.
C	1.27 (T.P.)	0.050 (T.P.)
D	0.40 ^{+0.10} _{-0.08}	0.016 ^{+0.004} _{-0.003}
E	0.1 ^{±0.1}	0.004 ^{±0.004}
F	2.9 MAX.	0.115 MAX.
G	2.50	0.098
H	10.3 ^{±0.3}	0.406 ^{+0.012} _{-0.013}
I	7.2	0.283
J	1.6	0.063
K	0.15 ^{+0.10} _{-0.08}	0.006 ^{+0.004} _{-0.003}
L	0.8 ^{±0.2}	0.031 ^{+0.008} _{-0.009}
M	0.12	0.005