



NEC
ELECTRON DEVICE

MOS INTEGRATED CIRCUIT

μ PD4713

RS-232C LINE DRIVER/RECEIVER

DESCRIPTION

The μ PD4713 is a silicon gate CMOS IC which combines 3 sets of line drivers and 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 PD4713 is the best choice for DTE (Data Terminal Equipment), DCE (Data Circuit Terminating Equipment) and OAD (On-line Asynchronous Data).

FEATURES

- Conforms to EIA RS-232C standard
- Operates using +5 V power source
- Provides power-ON reset function
- Provides driver output OFF hold function
- Widths of receiver input threshold hysteresis are selectable
- Standby function
- Latch-up free

ORDERING INFORMATION

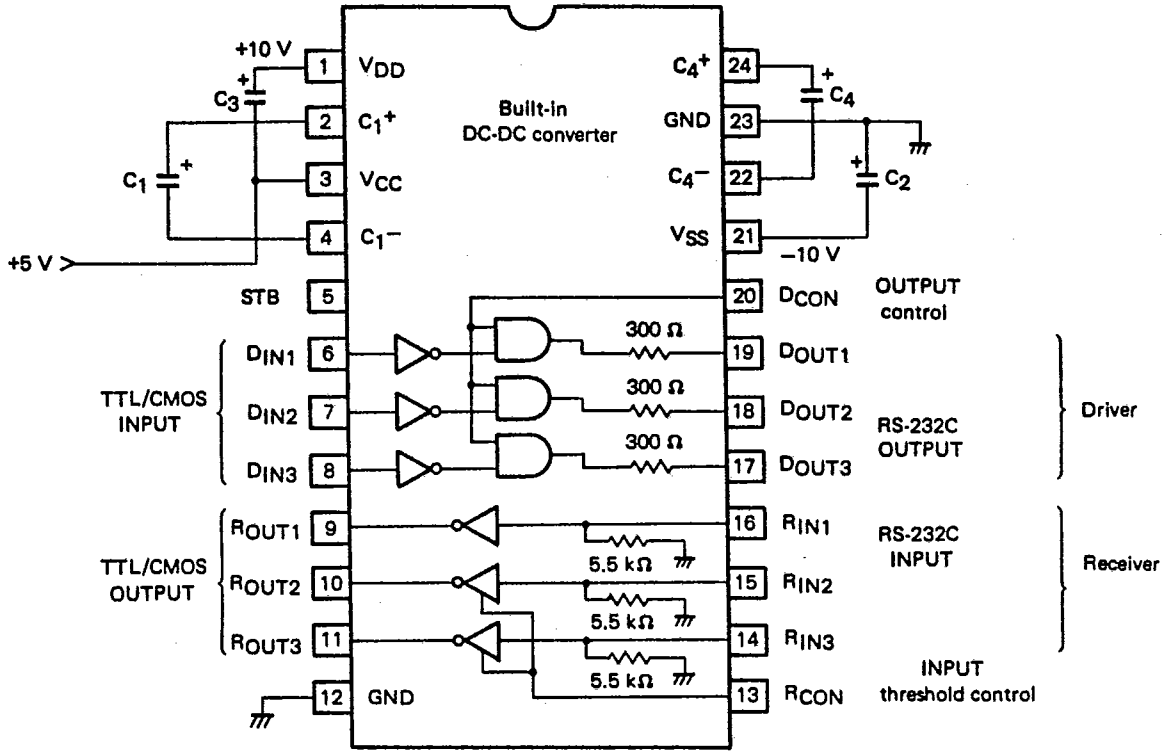
Part Number	Package
μ PD4713CX	24 Pin Plastic DIP (300 mil)
μ PD4713GS	24 Pin Plastic SOP (300 mil)

μPD4713

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T-75-45-05

BLOCK DIAGRAM/CONNECTION DIAGRAM (Top View)



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

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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 μPD4713.

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 D_{OUT}, R_{OUT} terminals go to high impedance.

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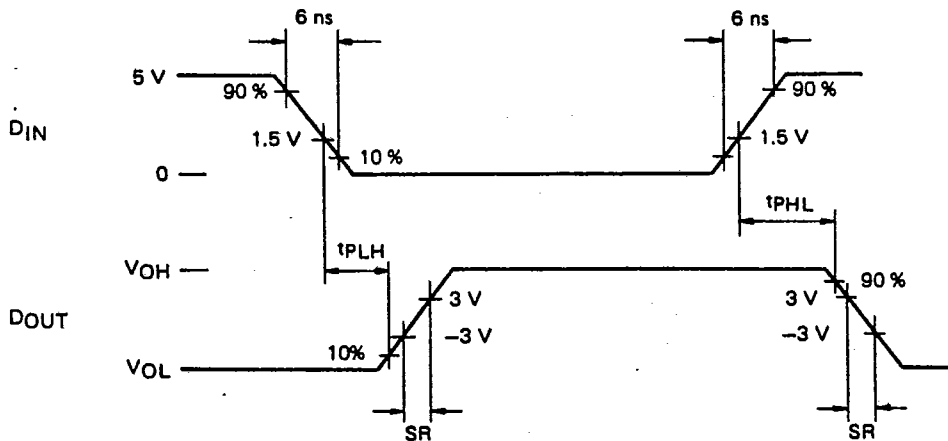
ELECTRICAL CHARACTERISTIC (Driver)

(V_{CC} = +5.0 V ± 10 %, T_a = -40 °C to +85 °C, C₁ to C₄ = 22 μF)

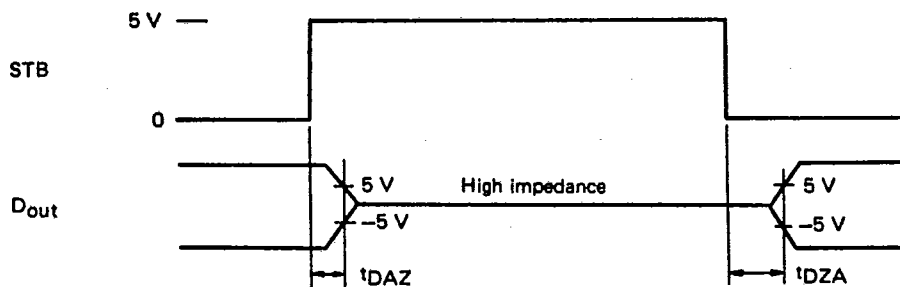
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Low Level Input Voltage	V _{IL}			0.8	V	
High Level Input Voltage	V _{IH}	2.0			V	
Low Level Input Current	I _{IL}	0		-1.0	μA	
High Level Input Current	I _{IH}	0		1.0	μA	
Output Voltage	V _{DO}		±9.7		V	V _{CC} =5.0 V, R _L =∞, T _a =25 °C
		±6.5	+7.7, -7.2		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}		0.8		μs	R _L =3.5 kΩ, C _L =2 500 pF
	t _{PLH}					
Output Resistance	R _O	300			Ω	V _{CC} =V _{DD} =V _{SS} =0 V, V _{OUT} =±2 V
Transition Time Note 6	t _{DZ}			1	μs	
Transition Time Note 6	t _{DZA}			10	ms	

Note 4 The outputs of the three 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.



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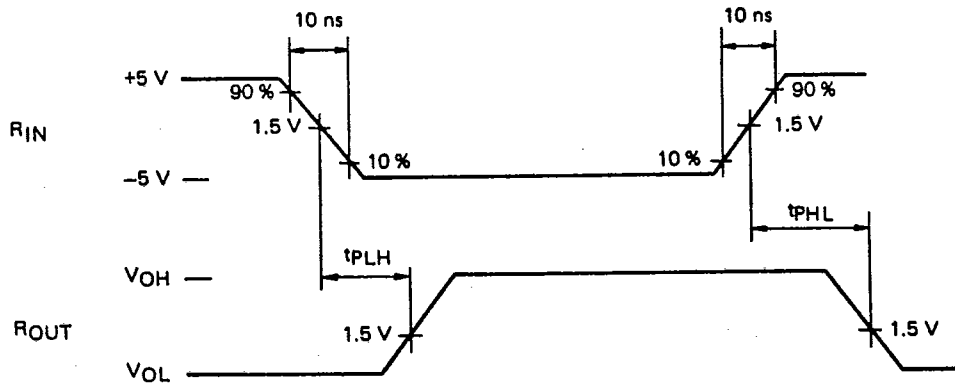
ELECTRICAL CHARACTERISTIC (Receiver)

(V_{CC} = +5.0 V ± 10 %, T_a = -40 °C to +85 °C, C₁ to C₄ = 22 μF)

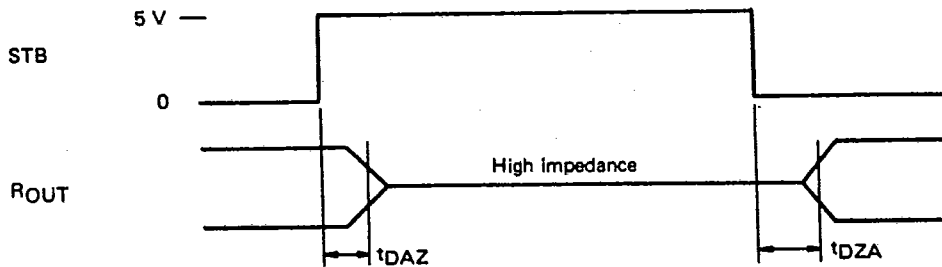
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Low Level Output Voltage	V _{OL}			0.4	V	I _{OUT} =4 mA
High Level Output Voltage	V _{OH}	V _{CC} -0.8			V	I _{OUT} =-4 mA
Output Capacitance Load	C _L			150	pF	
Propagation Delay Note 8	t _{PHL}		0.1		μs	R _L =1 kΩ, C _L =100 pF
	t _{PLH}					
Input Current	I _{IN}		0.9		mA	V _{IN} =±5 V
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	2.6	V	V _{CC} =+5 V
	V _{IL}	0.6	1	1.6	V	V _{CC} =+5 V
	V _H	0.5	1.2	1.5	V	V _{CC} =+5 V (Hysteresis width)
Input Threshold TYPE B (RCON: High) Note 7	V _{IH}	1.6	2.2	2.6	V	V _{CC} =+5 V
	V _{IL}	-0.4	-1.8	-3.0	V	V _{CC} =+5 V
	V _H	2.6	4.0	5.4	V	V _{CC} =+5 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.



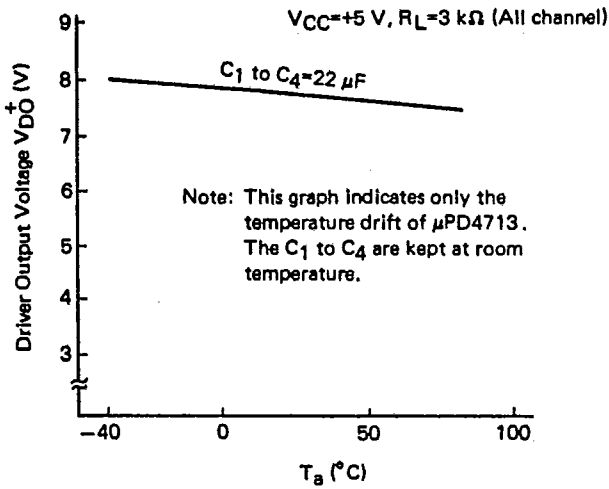
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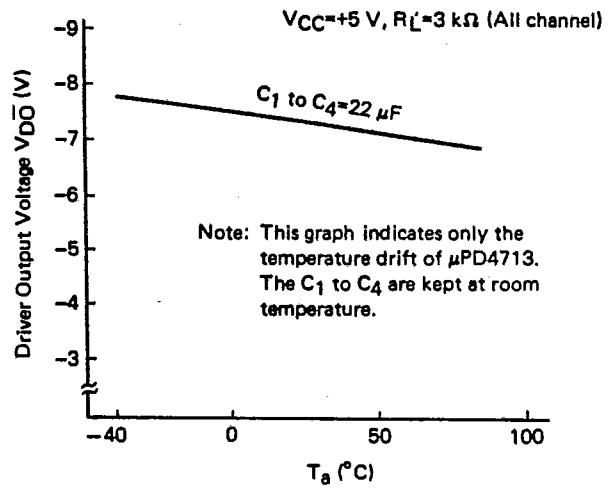
TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

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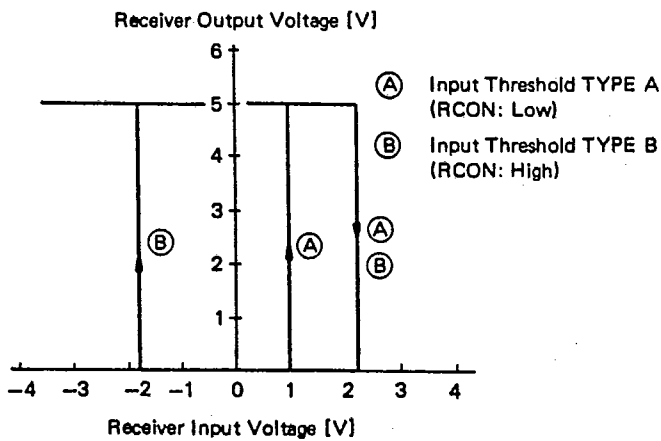
Driver Output Voltage $V_{DO+} - T_a$



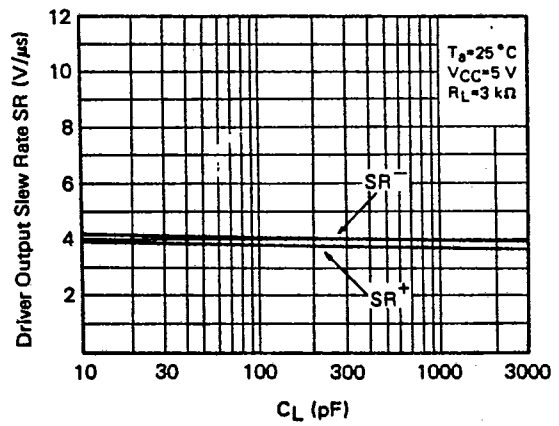
Driver Output Voltage $V_{DO-} - T_a$



Receiver Input Hysteresis



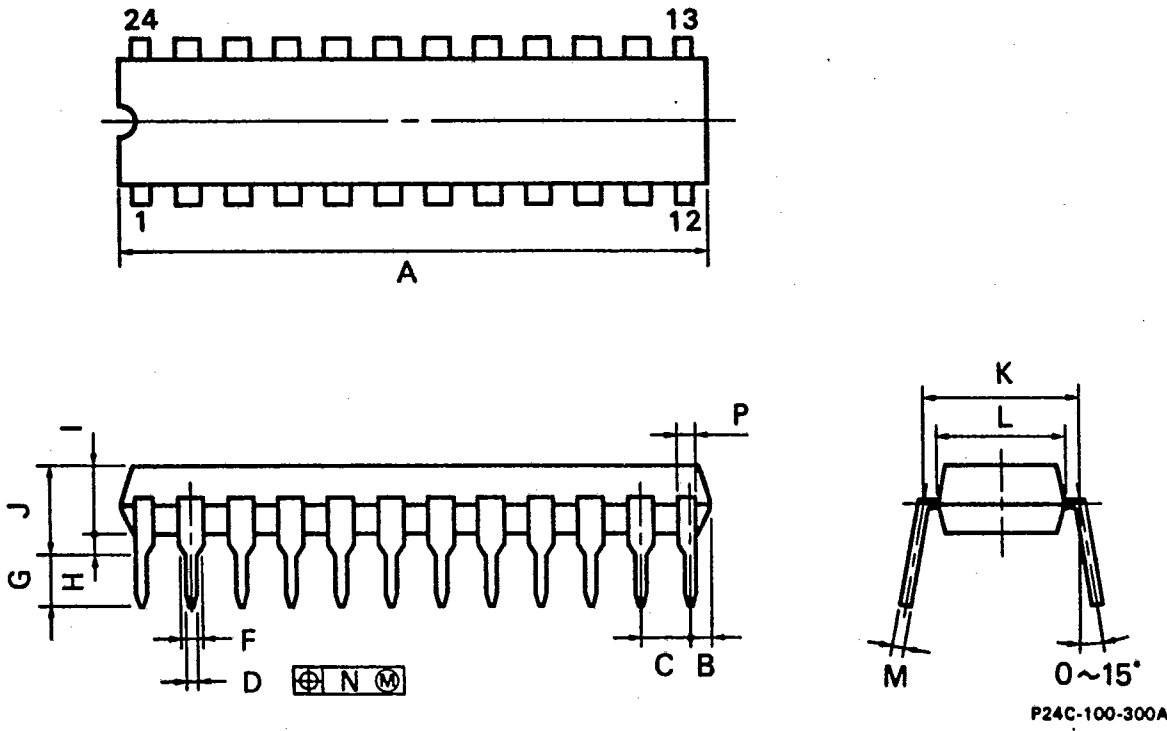
Driver Output Slew Rate - C_L



PACKAGE DIMENSION

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24PIN PLASTIC DIP (300 mil)



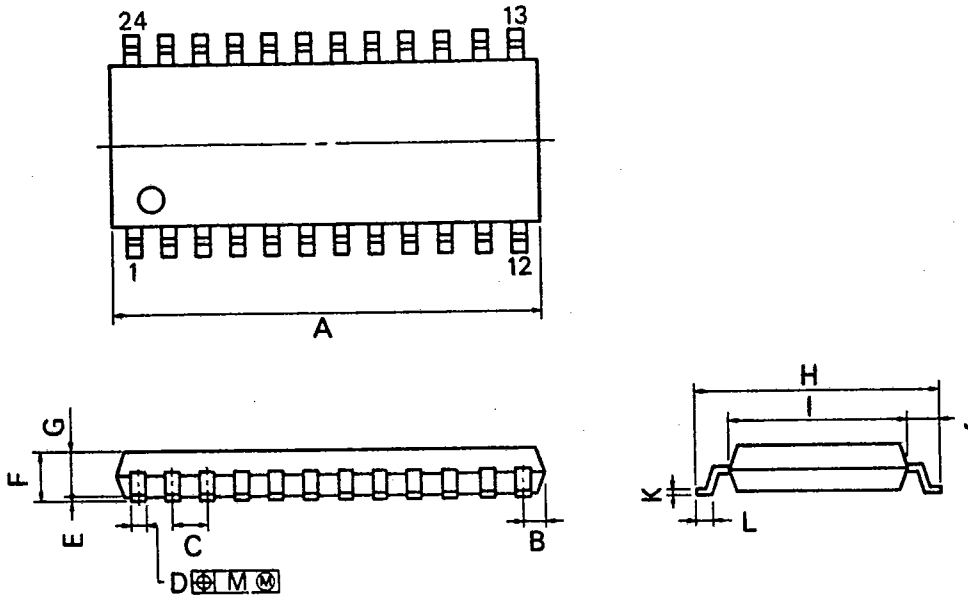
NOTES

- 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	33.02 MAX.	1.300 MAX.
B	2.54 MAX.	0.100 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
D	0.50 ^{±0.10}	0.020 ^{+0.004} _{-0.008}
F	1.2 MIN.	0.047 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	5.08 MAX.	0.200 MAX.
K	7.62 (T.P.)	0.300 (T.P.)
L	6.4	0.252
M	0.25 ^{±0.10}	0.010 ^{+0.004} _{-0.003}
N	0.25	0.01
P	1.0 MIN.	0.039 MIN.

24PIN PLASTIC SOP (300 mil)

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P24GM-50-300B

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	15.54 MAX.	0.612 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	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} / _{-0.08}	0.008 ^{+0.004} / _{-0.003}
L	0.6 ^{±0.2}	0.024 ^{+0.008} / _{-0.009}
M	0.12	0.005