LITEON®
OPTOELECTRONICS

LED Display

Product Data Sheet

LTM-0215F

Spec No.: DS30-2003-205

Effective Date: 11/12/2003

Revision: -

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

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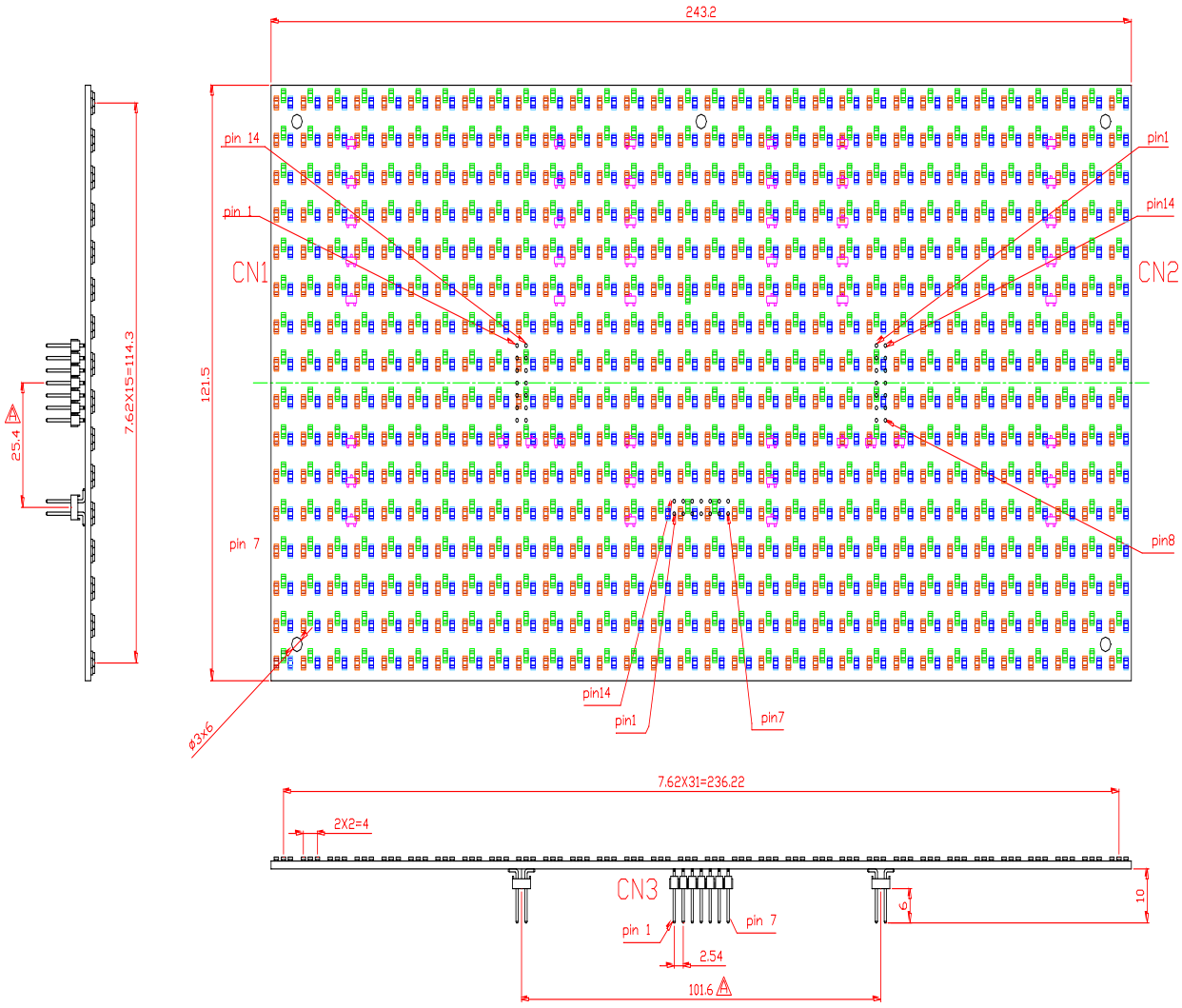
FEATURES

- ∗4.69 inch (119.3 mm) MATRIX HEIGHT
- ∗LOW POWER REQUIREMENT
- ∗SOLID STATE RELIABILITY
- ∗16×32 ARRAY WITH X-Y SELECT
- ∗FULL COLOR DISPLAYS
- ∗1/16 DUTY DYNAMIC SCAN METHOD
- ∗CONTROL METHOD: SHIFT REGISTER TYPE
- ∗COMPATIBLE WITH USASCII AND EBCDIC CODES.
- ∗STACKABLE HORIZONTALLY.
- ∗CATEGORIZED FOR LUMINOUS INTENSITY.

DESCRIPTION

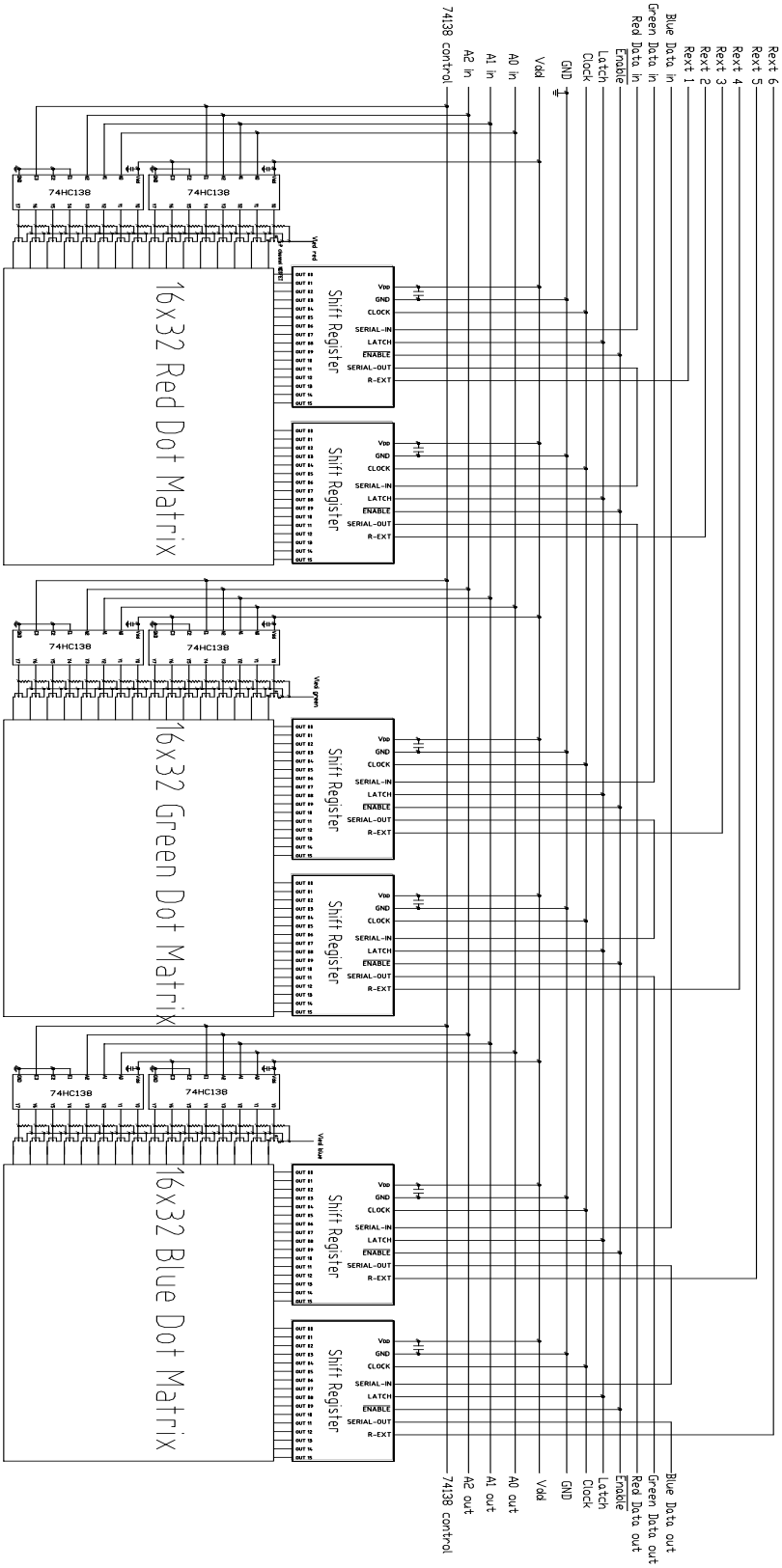
The LTM-0215F is a 4.69 inch (119.3 mm) matrix height 16×32 dot matrix display which are full color applicable displays and addition constant current drivers. Shift register control type. This device uses RED LED chips (AlInGaP epi on a non-transparent GaAs), GREEN LED chips (InGaN epi on transparent sapphire substrade), BLUE LED chips (InGaN epi on a transparent sapphire substrate.).

PACKAGE DIMENSIONS



NOTES: All dimensions are in millimeters. Tolerances are ± 0.25 mm (0.01“) unless otherwise noted

INTERNAL CIRCUIT DIAGRAM



PIN CONNECTION

CN1	
1	GND
2	GND
3	A1
4	Clock
5	Enable
6	Green In
7	Blue In
8	GND
9	Red In
10	Latch
11	A0
12	A2
13	74138 Control
14	GND

CN2	
1	GND
2	GND
3	A1
4	Clock
5	Enable
6	Green Out
7	Blue Out
8	GND
9	Red Out
10	Latch
11	A0
12	A2
13	74138 Control
14	GND

CN3	
1	Rext 5
2	Rext 1
3	Vred
4	GND
5	Vgreen
6	Rext4
7	Vblue
8	Vblue
9	Rext2
10	Vgreen
11	Vdd
12	Vred
13	Rext3
14	Rext6

ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25°C

Red

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_V	5	10		mcd	I_p=40mA 1/16Duty
Peak Emission Wavelength	λp		632		nm	I_F=20mA
Spectral Line Half-Width	$\Delta\lambda$		20		nm	I_F=20mA
Dominant Wavelength	λd		624		nm	I_F=20mA
Forward Voltage any Dot	V_F		2.0	2.4	V	I_F=20mA
Reverse Current any Dot	I_R			100	μA	V_R=5V
Luminous Intensity Matching Ratio	I_V-m			2:1		I_p=32mA 1/16Duty

InGaN Green

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_V	3.0	6.0		mcd	I_p=16mA 1/16Duty
Peak Emission Wavelength	λp		518		nm	I_F=20mA
Spectral Line Half-Width	$\Delta\lambda$		35		nm	I_F=20mA
Dominant Wavelength	λd		525		nm	I_F=20mA
Forward Voltage any Dot	V_F		3.5	3.9	V	I_F=20mA
Reverse Current any Dot	I_R			100	μA	V_R=5V
Luminous Intensity Matching Ratio	I_V-m			2:1		I_p=16mA 1/16Duty

Blue

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_V	3.6	5.4		mcd	I_p=40mA 1/16Duty
Peak Emission Wavelength	λp		468		nm	I_F=20mA
Spectral Line Half-Width	$\Delta\lambda$		25		nm	I_F=20mA
Dominant Wavelength	λd		470		nm	I_F=20mA
Forward Voltage any Dot	V_F		3.5	4.0	V	I_F=20mA
Reverse Current any Dot	I_R			100	μA	V_R=5V
Luminous Intensity Matching Ratio	I_V-m			2:1		I_p=32mA 1/16Duty

Note: Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commision Internationale De L'Eclairage) eye-response curve.

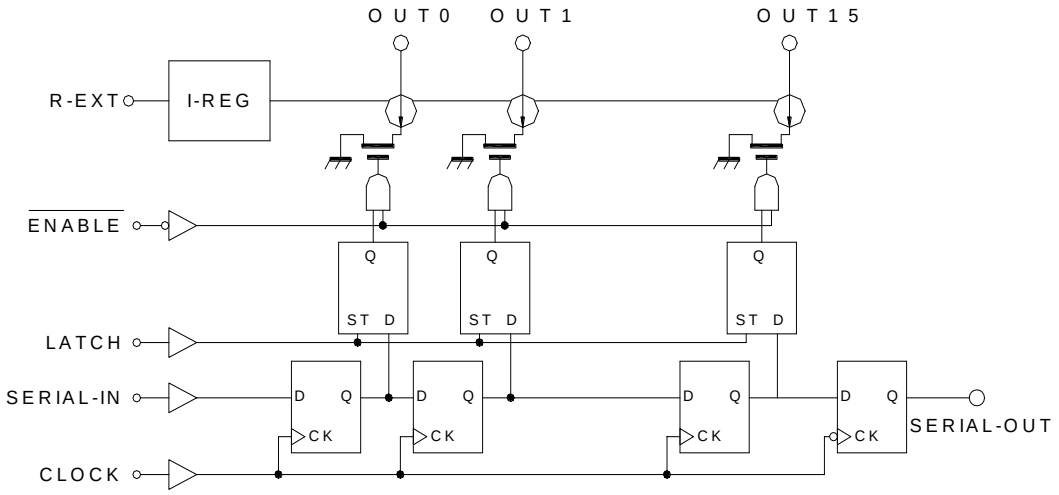
ABSOLUTE MAXIMUM RATING FOR SHIFT REGISTER AT Ta=25°C

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD}	0～7.0	V
Input Voltage	V_{IN}	-0.4～V_{DD}+0.4	V
Output Current per VOUT	I_{OUT}	120	mA
Output Voltage per VOUT	V_{CE}	-0.5～9.5	V
Clock Frequency	f_{CK}	25	MHz
GND Terminal Current	I_{GND}	1920	mA
Power Dissipation	P_D	1.27(T=25℃)	W
		0.61(T=85℃)	
Operating Temperature	Topr	-25℃～45℃	℃
Storage Temperature	Tstg	-25℃～85℃	℃
Solder Temperature 1/16 inch Below Seating Plane for 3 Seconds at 260℃			

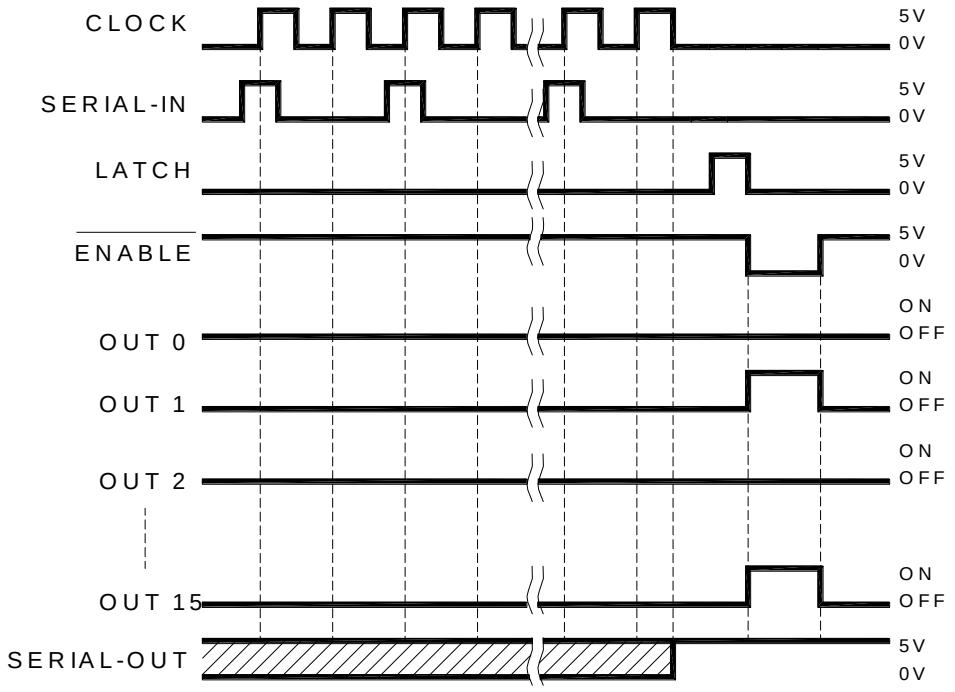
RECOMMENDED OPERATING CONDITION
(T=-40℃～85℃ unless otherwise noted)

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
LED Voltage Red	$V_{LED\ Red}$		3	3.5	4	V
LED Voltage Green	$V_{LED\ Green}$		5	5.5	6	V
LED Voltage Blue	$V_{LED\ Blue}$		5	5.5	6.	V
Supply Voltage	V_{DD}	-	4.5	5.0	5.5	V
Output Voltage	V_{OUT}	-	-	-	9	V
Output Current	I_O	OUTn	5	-	115	mA
	I_{OH}	SERIAL-OUT	-	-	1.0	
	I_{OL}	SERIAL-OUT	-	-	-1.0	
Input Voltage	V_{IH}		0.7V_{DD}	-	V_{DD}+0.3	V
	V_{IL}		-0.3	-	0.3V_{DD}	
LATCH Pulse Width	tw LAT	V_{DD}=4.5~5.5V	15	-	-	ns
CLOCK Pulse Width	tw CLK		15	-	-	ns
Set-up Time for DATA	tsetup(D)		20	-	-	ns
Hold Time for DATA	thold(D)		20	-	-	ns
Set-up Time for LATCH	tsetup(L)		15	-	-	ns
Clock Frequency	f_{CLK}	Cascde operation		-	25	MHz
Power Dissipation	P_D	T=85℃	-	-	0.61	W

BLOCK DIAGRAM



TIMING DIAGRAM



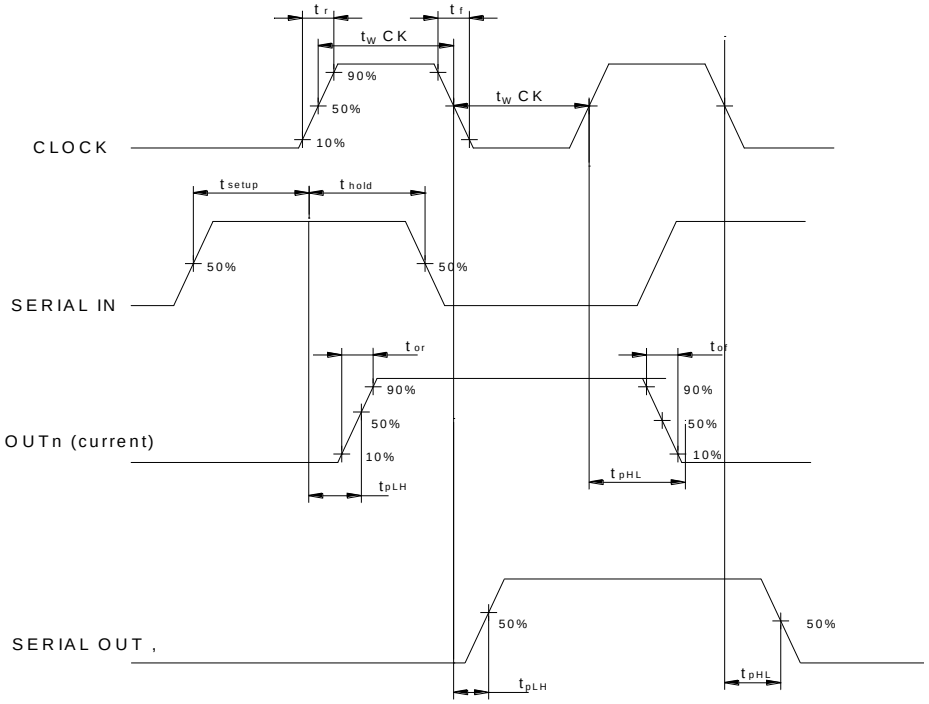
Latches are level sensitive(not edge triggered).

Latch-terminal= H level, latches become transparent; Latch-terminal= L level, hold data.

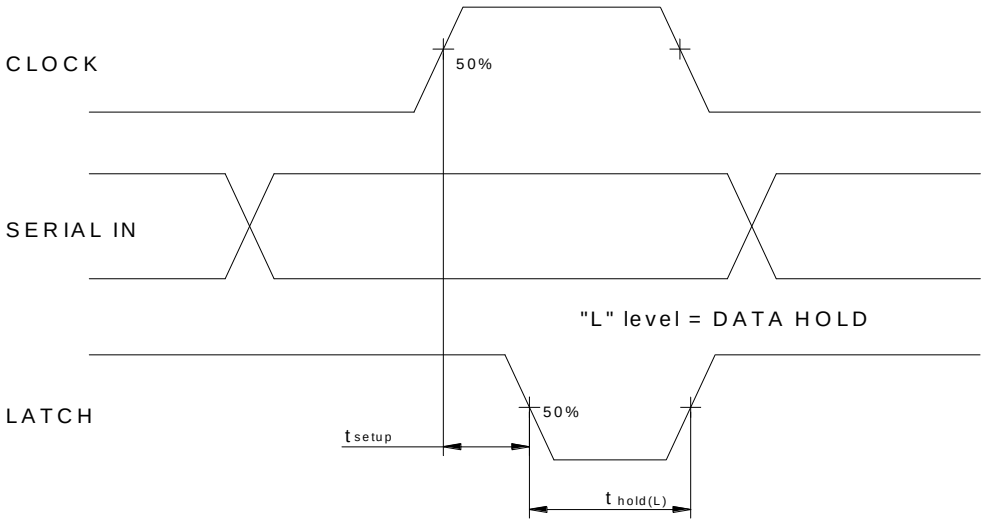
ENABLE-terminal= H level, all outputs(OUT0~15) are off.

SERIAL-OUT changes state on falling edges of clock.

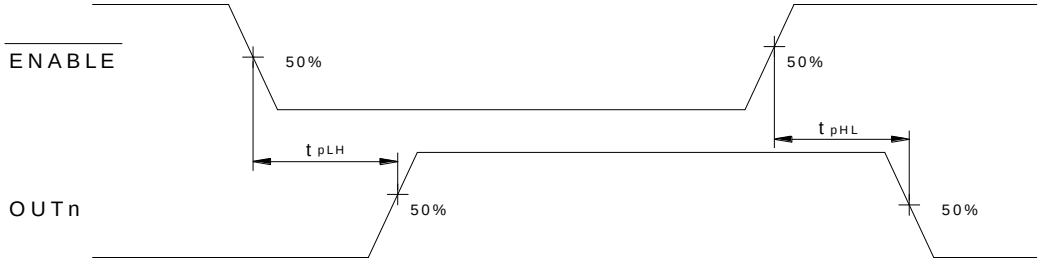
CLOCK – SERIAL , OUT , OUTn

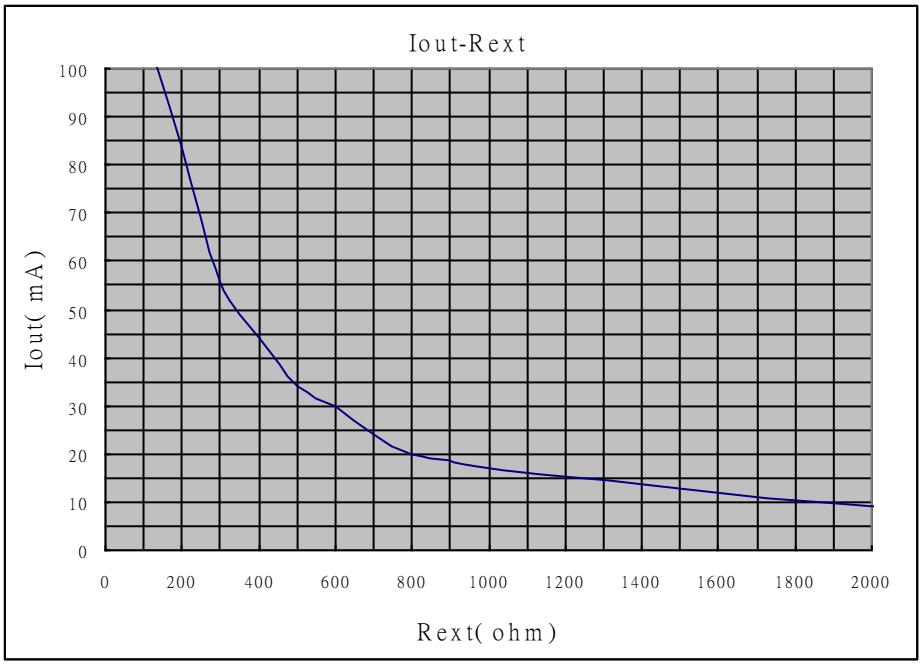


Clock - LATCH



ENABLE - OUTn


ENABLE
50%
50%
tpLH
tpHL
OUTn
50%
50%


Iout-Rext
Iout(mA)
100
90
80
70
60
50
40
30
20
10
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Rext(ohm)

74138 ELECTRICAL CHARACTERISTICS AT Ta=25°C

Function Table

INPUT						OUTPUT							
$\overline{E_1}$	$\overline{E_2}$	E_3	A_0	A_1	A_2	$\overline{Y_0}$	$\overline{Y_1}$	$\overline{Y_2}$	$\overline{Y_3}$	$\overline{Y_4}$	$\overline{Y_5}$	$\overline{Y_6}$	$\overline{Y_7}$
H	X	X	X	X	X	H	H	H	H	H	H	H	H
X	H	X	X	X	X	H	H	H	H	H	H	H	H
X	X	L	X	X	X	H	H	H	H	H	H	H	H
L	L	H	L	L	L	L	H	H	H	H	H	H	H
L	L	H	H	L	L	H	L	H	H	H	H	H	H
L	L	H	L	H	L	H	H	L	H	H	H	H	H
L	L	H	H	H	L	H	H	H	L	H	H	H	H
L	L	H	L	L	H	H	H	H	H	L	H	H	H
L	L	H	H	L	H	H	H	H	H	H	L	H	H
L	L	H	L	H	H	H	H	H	H	H	H	L	H
L	L	H	H	H	H	H	H	H	H	H	H	H	L

H= HIGH voltage level

L= LOW voltage level

X= don't care

74138 DC CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS		MIN.	TYP.	MAX	UNIT
		OTHER	Vcc (V)				
V_{IH}	Input High voltage		5.5	3.85	-	-	V
V_{IL}	Input LOW voltage		5.5	-	-	1.65	V
V_{OH}	Output HIGH voltage	$V_I = V_{IH}$ or V_{IL} ; I_o = -8mA	4.5	3.94	-	-	V
V_{OL}	Output LOW voltage-	$V_I = V_{IH}$ or V_{IL} ; I_o = 8mA	4.5	-	-	0.36	V

74138 AC CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN.	TYP.	MAX.	UNIT.
t_{PHL} /t_{PLH}	Propagation delay An to $\overline{Yn}$	Vcc=5.0V	-	4.4	8.1	ns
	Propagation delay E3 to $\overline{Yn}$	C_L =15pF	-	4.2	8.1	ns
	Propagation delay $\overline{E1}$, $\overline{E2}$ to $\overline{Yn}$		-	4.2	8.1	ns

AC Waveforms