NEL 10Gbps 16bit Demultiplexer

NLB9259   Product Data Sheet

1. Description

1) The NLB9259(DEMUX-LSI) divides a single serial signal (up to 10Gb/s) into 16parallel output signals (up to 622Mb/s).
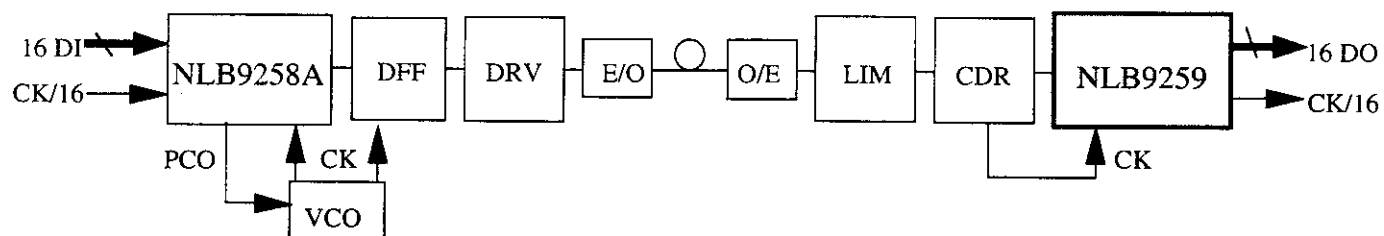
2. Features and Applications

Features

1) Performs 1:16 demux

2) 10Gb/s signal level interface : SCFL

3) 622Mb/s signal level interface : ECL

4) Standard -2.0V and -5.2V power supplies

Applications

1) STM-64 transmission system

VCO: Voltage Controlled Oscillator   LIM: Limitter amplifier
DRV: Driver   CDR: Clock Data Recovery

2) High-speed test equipments for STM-64 transmission system

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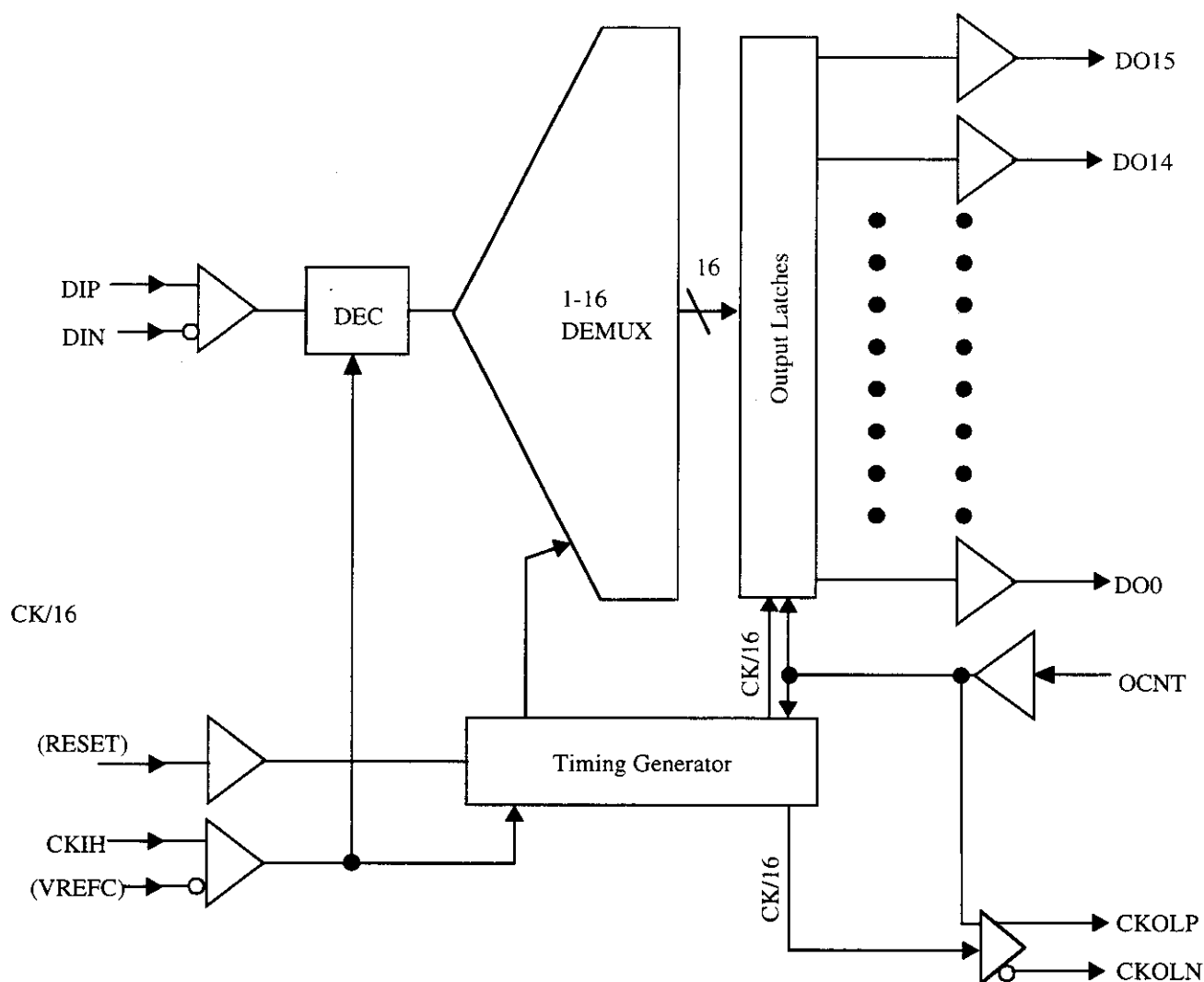
3. Function

3.1 Block diagram

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Fig.1 block diagram

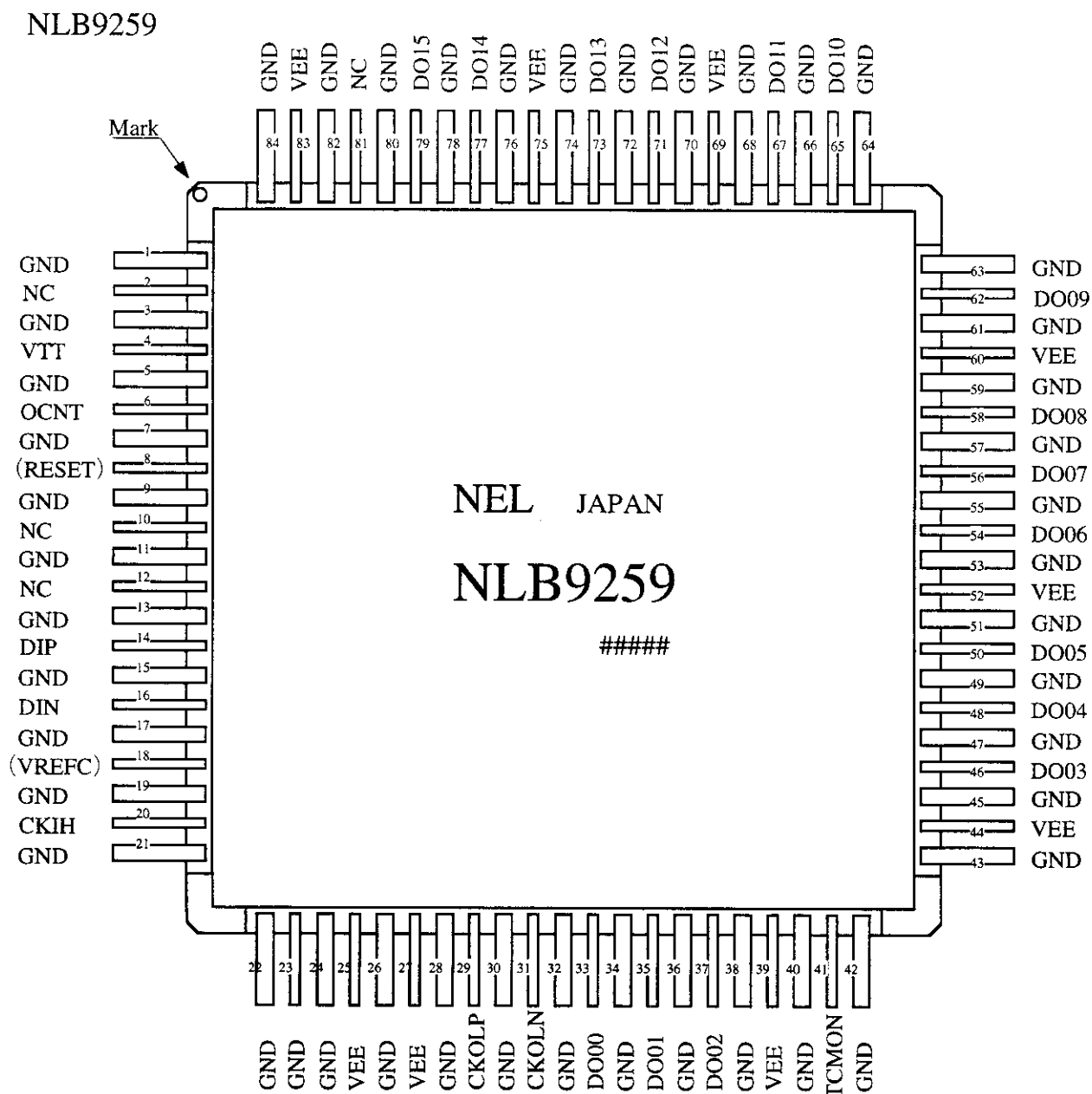# N*EL*   10Gbps 16bit Demultiplexer

3.2 Pin description

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DEMUX	Pin name	I/O	Function	Interface
Main Signals	DIP/DIN	I	10Gb/s data	SCFL(D)
	CK1H/(VREFC)		10GHz clock	SCFL(S)/internal VREFC with a monitor pad
	DOn(n=15~0)	O	622Mb/s data	ECL(S)
	CKOLP/CKOLN		622MHz clock	ECL(D)
Other Signals	(RESET)	I	Reset for test (Normally open)	DC ECL(S), internal 50Ω to VTT
	OCNT		Output control (input=H; DOn,CKOLP output=L, CKOLN output=H)	DC ECL(S), internal 50Ω to VTT

NOTE:

(S): Single ended

(D): Differential

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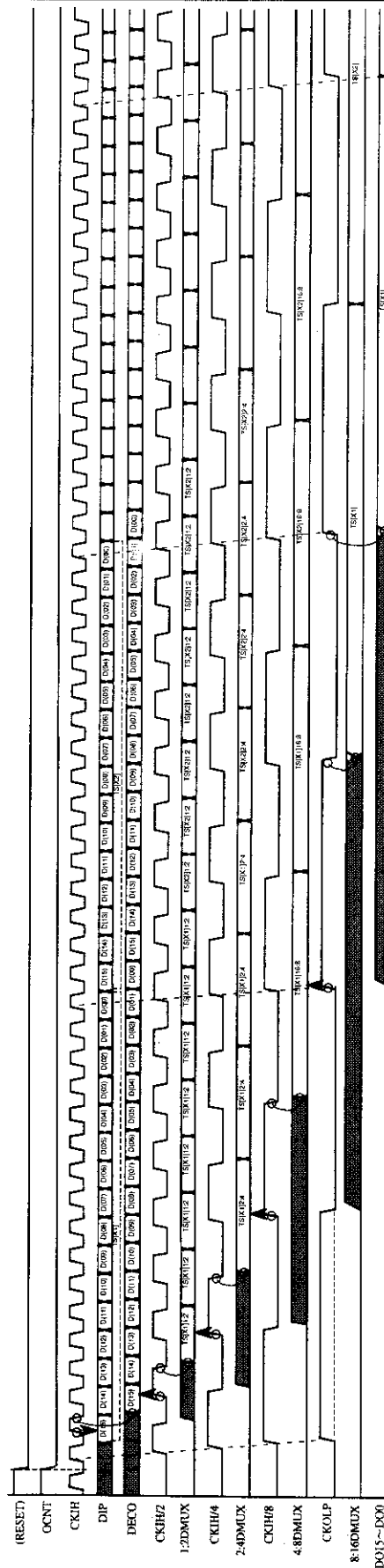
3.3 Pin Connection Diagram (Top View)

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Mark

Top pins (84–64): GND, VEE, GND, NC, GND, DO15, GND, DO14, GND, VEE, GND, DO13, GND, DO12, GND, VEE, GND, DO11, GND, DO10, GND

84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64

Left pins:
Pin	Signal
1	GND
2	NC
3	GND
4	VTT
5	GND
6	OCNT
7	GND
8	(RESET)
9	GND
10	NC
11	GND
12	NC
13	GND
14	DIP
15	GND
16	DIN
17	GND
18	(VREFC)
19	GND
20	CKIH
21	GND

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Right pins:
Pin	Signal
63	GND
62	DO09
61	GND
60	VEE
59	GND
58	DO08
57	GND
56	DO07
55	GND
54	DO06
53	GND
52	VEE
51	GND
50	DO05
49	GND
48	DO04
47	GND
46	DO03
45	GND
44	VEE
43	GND

Bottom pins (22–42):
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

GND, GND, GND, VEE, GND, VEE, GND, CKOLP, GND, CKOLN, GND, DO00, GND, DO01, GND, DO02, GND, VEE, GND, TCMON, GND

: Lot No

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3.4 Pin connection table
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No.	NAME	FUNCTION	No.	NAME	FUNCTION
1	GND	Ground (0.0V)	43	GND	Ground (0.0V)
2	NC	No internal Connection	44	VEE	VEE Power Supply (-5.2V)
3	GND	Ground (0.0V)	45	GND	Ground (0.0V)
4	VTT	VTT Power Supply (-2.0V)	46	DO03	1/16 Data Output
5	GND	Ground (0.0V)	47	GND	Ground (0.0V)
6	OCNT	Output Control	48	DO04	1/16 Data Output
7	GND	Ground (0.0V)	49	GND	Ground (0.0V)
8	(RESET)	Reset for test	50	DO05	1/16 Data Output
9	GND	Ground (0.0V)	51	GND	Ground (0.0V)
10	NC	No internal Connection	52	VEE	VEE Power Supply (-5.2V)
11	GND	Ground (0.0V)	53	GND	Ground (0.0V)
12	NC	No internal Connection	54	DO06	1/16 Data Output
13	GND	Ground (0.0V)	55	GND	Ground (0.0V)
14	DIP	High Speed Data Input (True)	56	DO07	1/16 Data Output
15	GND	Ground (0.0V)	57	GND	Ground (0.0V)
16	DIN	High Speed Data Input (Comp)	58	DO08	1/16 Data Output
17	GND	Ground (0.0V)	59	GND	Ground (0.0V)
18	(VREFC)	High Speed Clock Input Vref.	60	VEE	VEE Power Supply (-5.2V)
19	GND	Ground (0.0V)	61	GND	Ground (0.0V)
20	CKIH	High Speed Clock Input	62	DO09	1/16 Data Output
21	GND	Ground (0.0V)	63	GND	Ground (0.0V)
22	GND	Ground (0.0V)	64	GND	Ground (0.0V)
23	GND	Ground (0.0V)	65	DO10	1/16 Data Output
24	GND	Ground (0.0V)	66	GND	Ground (0.0V)
25	VEE	VEE Power Supply (-5.2V)	67	DO11	1/16 Data Output
26	GND	Ground (0.0V)	68	GND	Ground (0.0V)
27	VEE	VEE Power Supply (-5.2V)	69	VEE	VEE Power Supply (-5.2V)
28	GND	Ground (0.0V)	70	GND	Ground (0.0V)
29	CKOLP	1/16 Clock Output (True)	71	DO12	1/16 Data Output
30	GND	Ground (0.0V)	72	GND	Ground (0.0V)
31	CKOLN	1/16 Clock Output (Comp)	73	DO13	1/16 Data Output
32	GND	Ground (0.0V)	74	GND	Ground (0.0V)
33	DO00	1/16 Data Output	75	VEE	VEE Power Supply (-5.2V)
34	GND	Ground (0.0V)	76	GND	Ground (0.0V)
35	DO01	1/16 Data Output	77	DO14	1/16 Data Output
36	GND	Ground (0.0V)	78	GND	Ground (0.0V)
37	DO02	1/16 Data Output	79	DO15	1/16 Data Output
38	GND	Ground (0.0V)	80	GND	Ground (0.0V)
39	VEE	VEE Power Supply (-5.2V)	81	NC	No internal Connection
40	GND	Ground (0.0V)	82	GND	Ground (0.0V)
41	TCMON	Case Temperature Monitor	83	VEE	VEE Power Supply (-5.2V)
42	GND	Ground (0.0V)	84	GND	Ground (0.0V)

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3.5 Package Dimensions (mm)

Package name: TB84

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3.6 Timing chart

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Signals (left to right labels): (RESET), OCNT, CKIH, DIP, DECO, CKIH/2, 1/2DMUX, CKIH/4, 2/4DMUX, CKIH/8, 4/8DMUX, CKOLP, 8/16DMUX, DO15~DO0

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4. Absolute maximum ratings

Parameter	Symbol	Interface	Ratings	Units
Power Supply Voltage	VEE		0.5 ~ -6.0	V
Termination Voltage	VTT		0.5 ~ -2.5	V
Input Voltage	Vsin	SCFL	0.3 ~ -1.6	V
Input Voltage	Vrefc	SCFL	0.3 ~ -1.6	V
Input Voltage	Vein	ECL	0.3 ~ -2.1	V
Output Voltage	Veout	ECL	0.2 ~ -2.5	V
Storage Temperature	Tstg		-65 ~ +150	℃
Case Temperature Under Bias	Tc		-55 ~ +125	℃

Note: Input and Output Voltages are specified at VEE=-5.2V, VTT=-2.0V.
Stresses listed under "Absolute Maximum Ratings" may be applied to devices
one at a time without causing permanent damage. Functionality at or above
values listed is not implied. Exposure to these values for extended periods may
affect device reliability.

5. Recommended operating conditions

Parameter	Symbol	Min.	Typ.	Max.	Units
Power Supply Voltage	VEE	-4.90	-5.20	-5.50	V
Termination Voltage	VTT	-1.90	-2.00	-2.10	V
Operating Temperature*	T	0		70	℃

Note: Lower limit is ambient temperature and upper limit is case temperature.

All specifications described here are subject to change without notice.

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6. Electrical characteristics

6.1 DC characteristics

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(Tc=0～70℃)

Parameter	Symbol	Interface	Condition	Min.	Typ.	Max.	Units
Power Dissipation	Pd		VEE=-5.2±0.3V,VTT=-2.0±0.1V	—	4.3	6.1	W
Power Supply Current	IEE		VEE=-5.2±0.3V	—	810	1100	mA
Termination Supply Current	ITT		VTT=-2.0±0.1V	—	20	30	mA
Input H Voltage	VEIH	ECL	VEE=-5.2V	-1165	—	-880	mV
Input L Voltage	VEIL	ECL	VEE=-5.2V	VTT	—	-1575	mV
Output H Voltage	VEOH	ECL	VEE=-5.2V, 50Ω to -2.0V	-1100	-970	—	mV
Output L Voltage	VEOL	ECL	VEE=-5.2V, 50Ω to -2.0V	VTT	-1750	-1590	mV
Output Voltage Amplitude	VEAMP	ECL	VEE=-5.2V, 50Ω to -2.0V	600	—	—	mVpp
Input H Voltage	VSIH	SCFL	VEE=-5.2V	-250	-100	0	mV
Input L Voltage	VSIL	SCFL	VEE=-5.2V	-1000	-900	-700	mV

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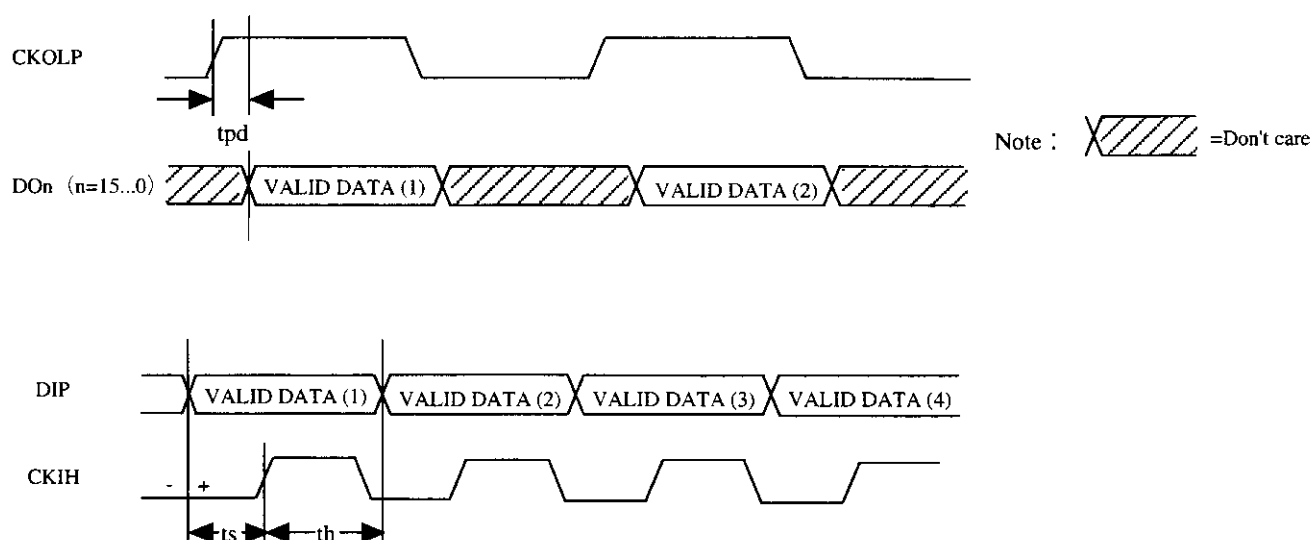## 6.2 AC Characteristics

1) Impeadance

Parameter	Symbol	Min.	Typ.	Max.	Units
Internal Termination Resistor	Rin	40	50	60	Ω
External Termination Resistor	Rout	45	50	55	Ω

2) Timing Characteristics
(VEE = -5.2V, VTT = -2.0V, GND = 0.0V, Rout = 50 Ω to GND, Tc=0~70℃)

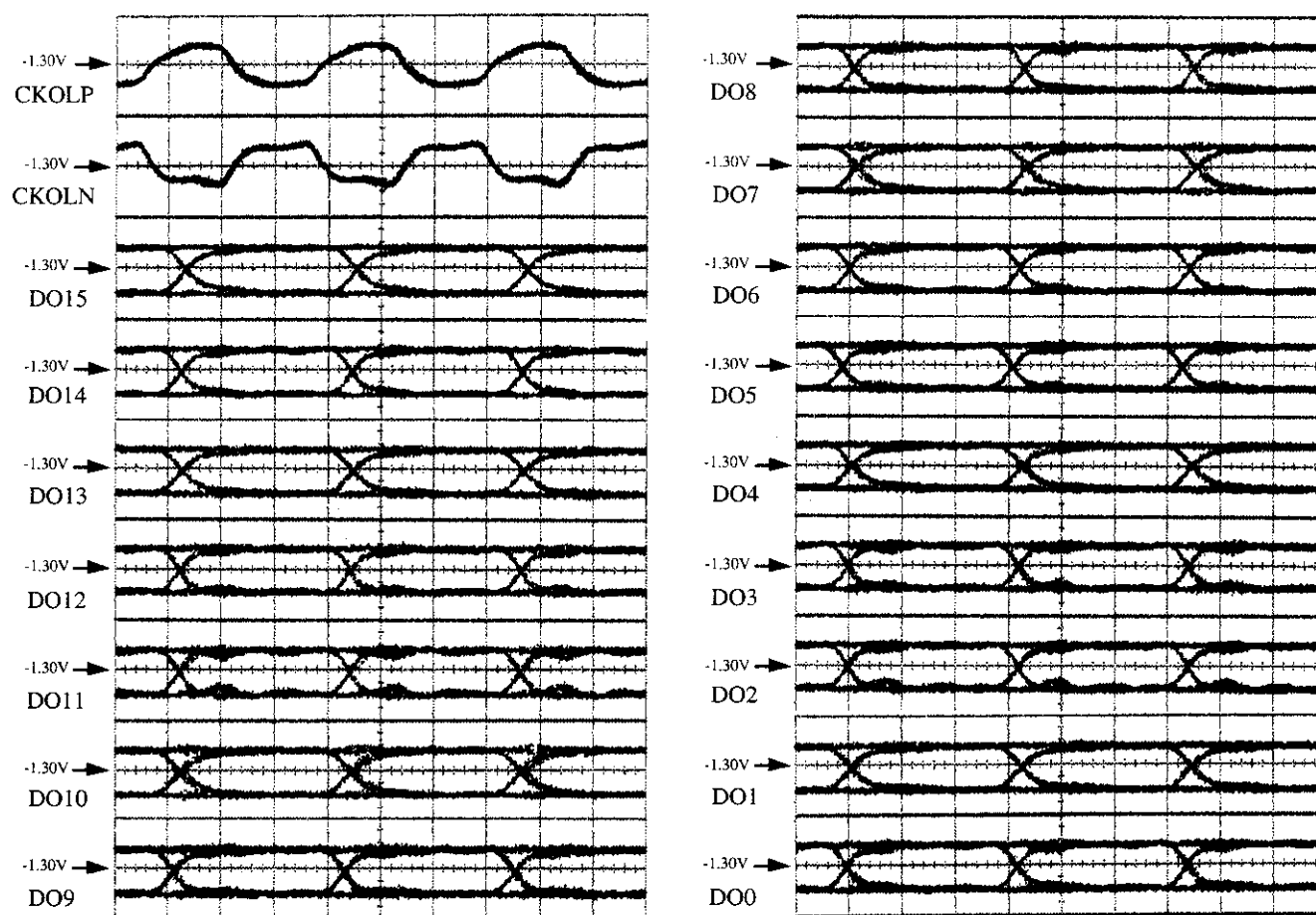VIH=-0.1V,VIL=-0.85V,PRBS 2^{31} -1 ,Mark Ratio=1/2, Error Ratio<10^{-8}

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Delay Time	tpd	CKOLP to DOn, 622MHz	80	220	350	ps
Minimum Setup Time	ts	DIP to CKIH, 9.95358GHz	---	-60	-50	ps
Minimum Hold Time	th	CKIH to DIP, 9.95328GHz	-----	90	100	ps
Phase Margin	phm	CKIH, 9.95328GHz	50	70	---	ps
Output Rise Time	tr	DOn, 622Mb/s, 20-80%	—	200	300	ps
Output Fall Time	tf	DOn, 622Mb/s, 20-80%	—	200	300	ps
Operating Frequency	fop	CKIH	9.95308	9.95328	9.95348	GHz

CKOLP

tpd

DOn (n=15...0)   VALID DATA (1)   VALID DATA (2)

Note :   =Don't care

DIP   VALID DATA (1) VALID DATA (2) VALID DATA (3) VALID DATA (4)

CKIH

ts th

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Fig.2
NLB9259   Output Waveforms (Example)

V : 800 mV / div. H : 500 ps / div.

NLB9259 Rev2.0j July.2000   All specifications described here are subject to change without notice.

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6.3 Typical Test Configuration
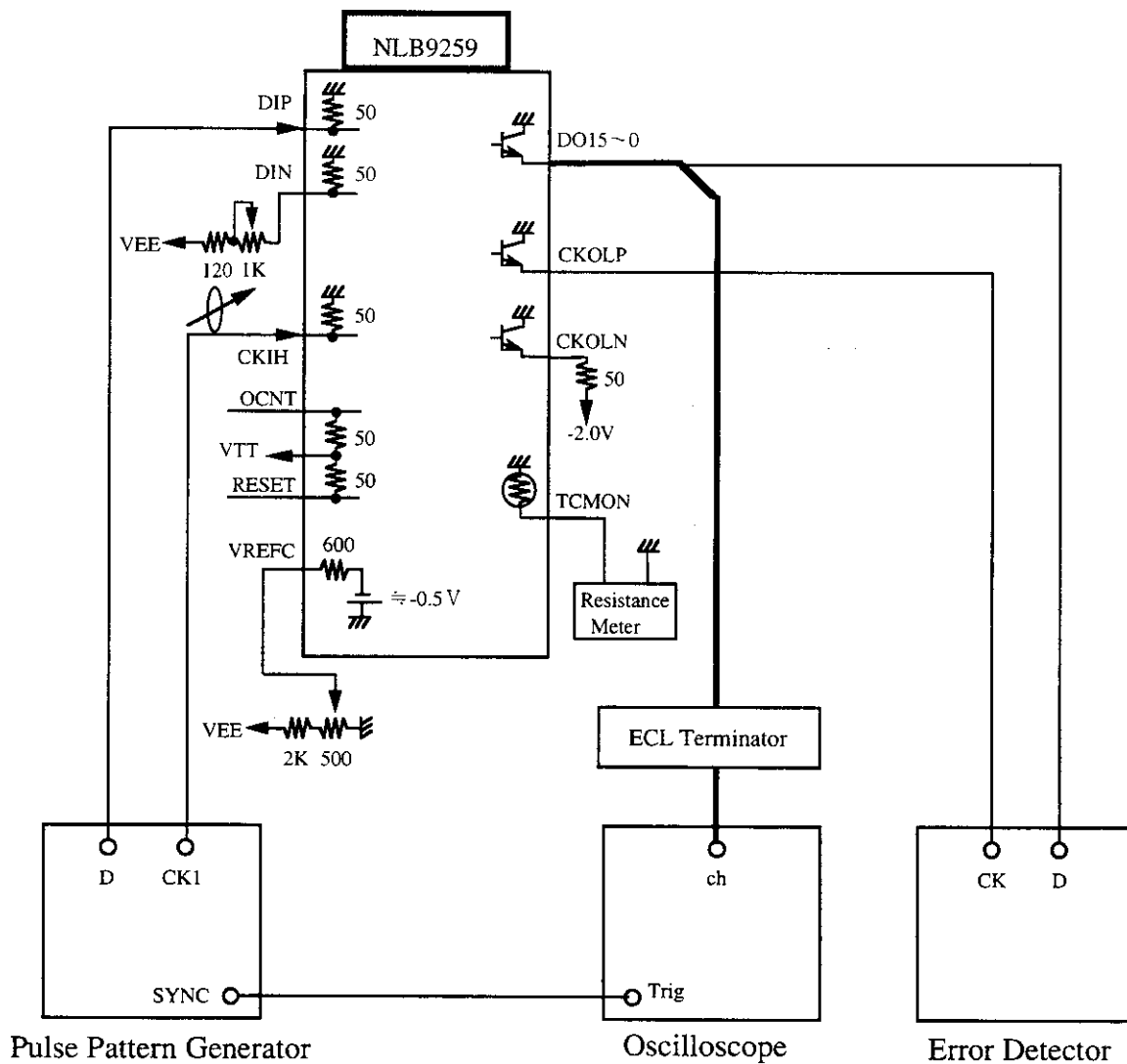
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7. Temperature monitor

TCMON Resistance Value Versus Case Temperature

Temperature (℃)	Resistance(KΩ)			Temperature (℃)	Resistance(KΩ)		
	Min.	Typ.	Max.		Min.	Typ.	Max.
0	26.11	28.08	30.12	55	3.221	3.464	3.716
5	21.07	22.56	24.09	60	2.734	2.950	3.175
10	17.11	18.24	19.39	65	2.331	2.523	2.724
15	13.98	14.84	15.71	70	1.995	2.166	2.345
20	11.49	12.15	12.81	75	1.715	1.867	2.027
25	9.500	10.00	10.50	80	1.479	1.615	1.759
30	7.833	8.277	8.725	85	1.281	1.402	1.531
35	6.493	6.887	7.286	90	1.113	1.221	1.337
40	5.410	5.759	6.115	95	0.9700	1.068	1.172
45	4.530	4.839	5.157	100	0.8484	0.9362	1.030
50	3.811	4.085	4.368				

Temperature (℃)
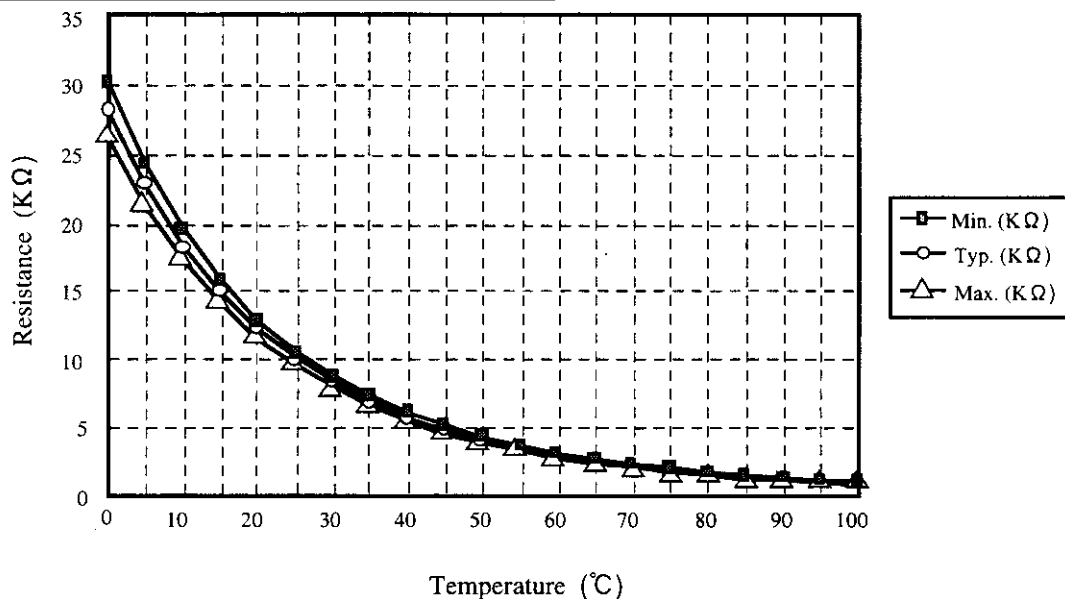
8. Important handling precautions

BEFORE USING THE IC, PLEASE READ THIS HANDLING INSTRUCTION IN ORDER TO PREVENT POSSIBLE DAMAGE FROM VARIOUS ELECTRIC SURGES SUCH AS POWER LINE LEAKAGE AND ELECTRIC STATIC DISCHARGE.

1. Determine the standard GND at the work bench. Standard GND should be connected to the highest quality GND in the room. Connect in common all of GND terminals of all equipment to the standard GND at the work bench. Work bench should be conductive and should be connected to the standard GND.
   Connection cables are recommended to be as short and as thick as possible.
2. Make sure to wear a conductive wrist-strap which should be connected to the standard GND on the work bench through a 1M-ohm resistor.
3. Make sure to confirm the voltage potentials of all surrounding materials including persons which may contact the IC with oscilloscope (Do not use a DC or AC volt meter.)
4. Make certain the power supply does not generate abnormal voltage spikes.

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CAUTION

1. In order to improve products and technology, specifications are subject to change without notice.
2. When using the products, be sure the latest information and specifications are used.
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8. Any questions should be directed to the Sales Department of NTT Electronics Corp.

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