

# ECN2102/2112

ECN2102 / 2112 is a single chip row driver IC for electroluminescent (EL) display panel.

**Functions**

- \* Low-voltage serial to high-voltage parallel converter
- \* 34 outputs of totem pole type

**Features**

- \* Output terminal voltage up to 250V
- \* Source / Sink current 500mA

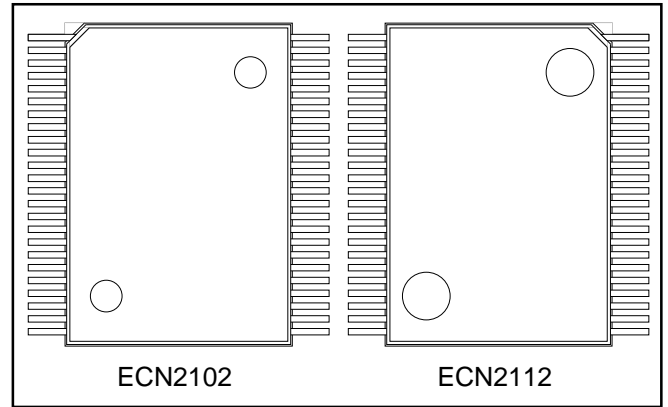
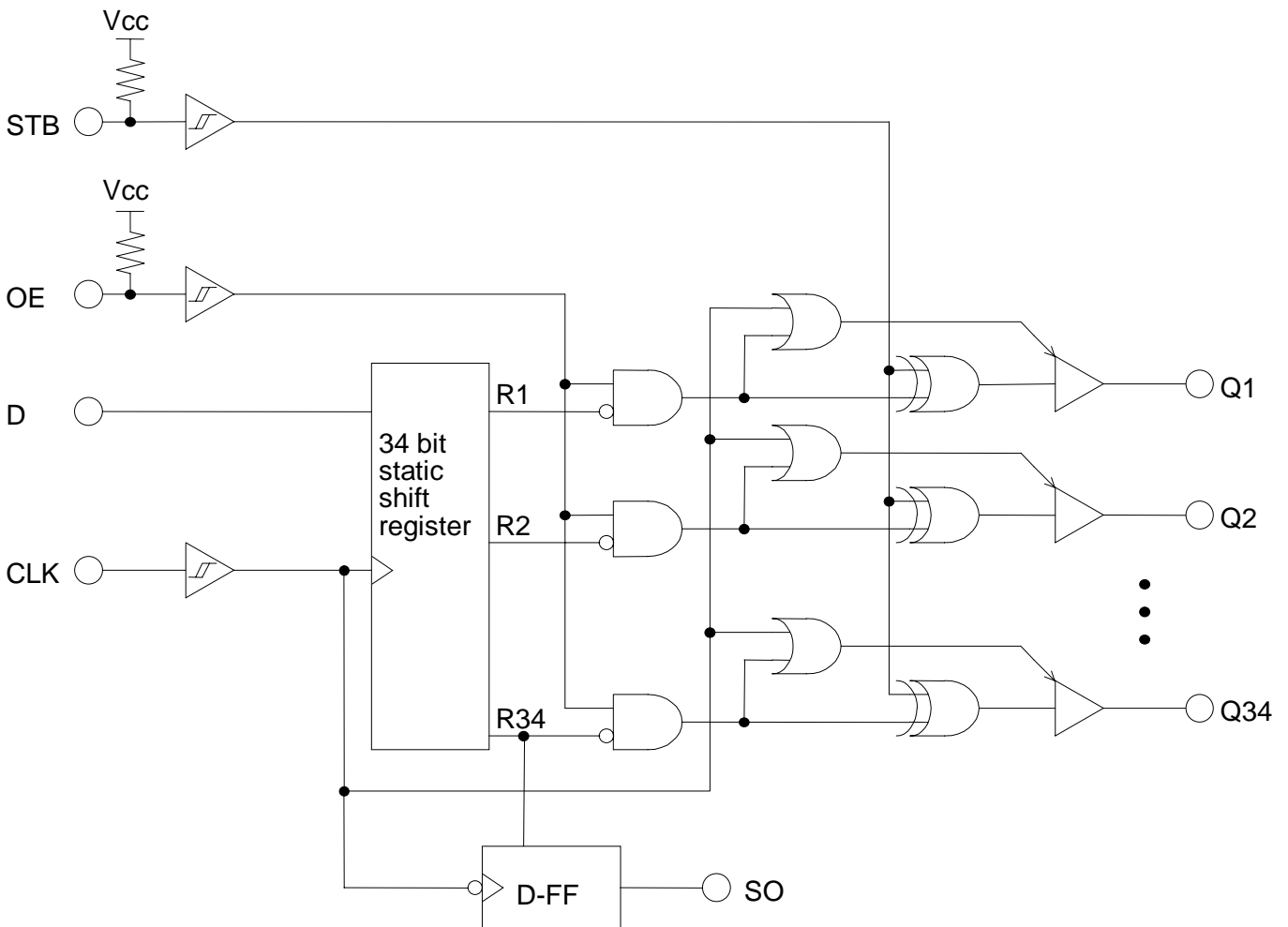


Fig. 1. OUTLINE OF FP-48 PACKAGE



Function Block Diagram (Positive Logic)

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## 1. GENERAL

- (1) TYPE                    ECN2102/ECN2112
- (2) APPLICATION        Row line driver for Electroluminescent (EL) display panel
- (3) STRUCTURE         Monolithic IC, processed Dielectric Isolation.
- (4) PACKAGE            FP-48 (Fig.1)

## 2. MAXIMUM ALLOWABLE RATING (Ta=25°C)

No	ITEMS	SYMBOLS	RATINGS	UNITS	CONDITIONS
1	Supply Voltage (logic)	Vcc	-0.5 ~ +7.0	V	to GND terminal
2	Input Voltage (logic)	Vin	-0.5 ~ Vcc+0.5	V	to GND terminal
3	Vs - GND Voltage	VSG	Vcc	V	to GND terminal
4	Output Terminal Voltage	VQ	±250	V	Between Vs, Vcc, GND, Input and Q output
5	Allowable Power Dissipation	PT	800	mW	
6	Operating Temperature	TOP	-40 ~ +85	°C	
7	Storage Temperature	Tstg	-55 ~ +150	°C	

## 3. RECOMMENDED OPERATING CONDITIONS

No	ITEMS	SYMBOLS	Min.	Typ.	Max.	UNITS	CONDITIONS
1	Supply Voltage (logic)	Vcc	5.0	5.5	6.0	V	
2	Clock Frequency	fCLK	–	–	250	kHz	Vcc= 5.5V Vin= 0V/5.5V
3	Clock Pulse Width	twCLK	80	–	–	ns	
4	Data Setup Time	tsu	80	–	–	ns	
5	Data Hold Time	th	80	–	–	ns	
6	Output Terminal Voltage	VQ	–	±230	–	V	Vcc= 5.5V
7	Peak Output Source Current	HI0H	–	–	-500	mA	Note 1
8	Peak Output Sink Current	HI0L	–	–	+500	mA	Note 1

Note1 : Conduction period ≤ 5 μs per 1 IC

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## 4. ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta= 25°C, Vcc= 5.5V, HVCC=230V)

No	ITEMS	SYMBOLS	Min.	Typ.	Max.	UNITS	C O N D I T I O N S	
1	Output Voltage (logic)	VOL	–	–	0.1	V	IOL= 20μA	
		VOH	5.4	–	–	V	IOH=-20μA	
2	Output Current (logic)	IOL	1.0	–	–	mA	VOL= 0.8V	
		IOH	-1.0	–	–	mA	VOLH 4.7V	
3	Input Voltage (logic)	VIL	–	–	1.0	V	D input	
		VIH	3.5	–	–	V		
		VTHL	–	–	0.4	V	CLK,STB input	
		VTLH	4.5	–	–	V		
4	Input Current (logic)	IiH	–	–	10	μA	Vin=5.5V all input/1 input	
		IiL	–	–	-10	μA	Vin=0V D,CLK/1 input	
			–	–	-100	μA	Vin=0V STB/1 input	
5	Dissipation Current(logic)	Istb	–	–	10	μA	No signal all input 5.5V, all output Off	
			–	–	25	mA	No signal, 1ch source output On	
			–	–	5	mA	No signal, 1ch sink output On	
6	Output Voltage	HVOL	–	–	3.0	V	HIOL=1mA	Q out-GND
			–	–	6.0	V	HIOL=200mA	Q out-GND
		HVOH	–	–	4.0	V	HI0H=-1mA	Vs-Q out
			–	–	8.0	V	HI0H=-200mA	Vs-Q out
7	Output SCR dv/dt capability	dv/dt1	200	–	–	V/μs	Vs-Q out,+dv/dt apply.Fig.6	
		dv/dt2	200	–	–	V/μs	Q out-GND,-dv/dt apply.Fig.7	
8	Output SCR Off Period	toff	–	–	6.0	μs	Source side	Fig.8
			–	–	7.0	μs	Sink side	

## 5. SWITCHING CHARACTERISTICS (Unless otherwise specified, Ta= 25°C, Vcc= 5.5V, Fig.5)

No	ITEMS	SYMBOLS	Min.	Typ.	Max.	UNITS	C O N D I T I O N S	
1	Output Delay Time (logic)	tPLH	–	–	300	ns	CL=15pF	
		tPHL	–	–	300	ns		
2	Output Delay Time	tQLH	–	–	3	μs	RLQ=1kΩ	
		tQHL	–	–	3	μs	CLQ=2000pF	

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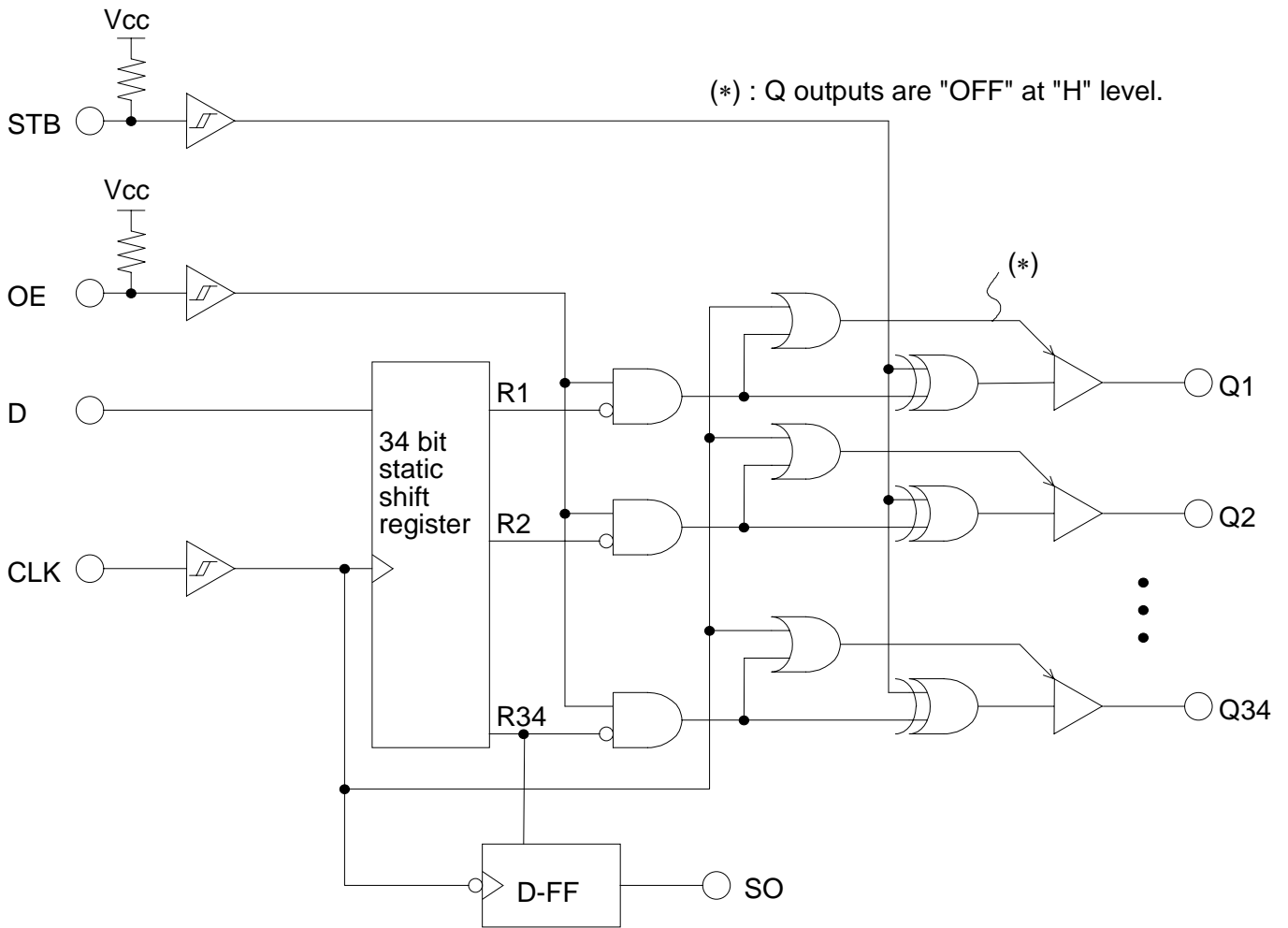


Fig. 2. Function Block Diagram (Positive Logic)

## 6. FUNCTION TABLE

	CONTROL INPUT				SHIFT REGISTER	OUTPUT	
	CLK	D	OE(*4)	STB	Rn	SO(*1)	Q
SHIFT OPERATION	↑	*	H	*	shift	R34	
	no↑	*	H	*	keep		
OUTPUT OPERATION	L	*	H	H	H		H (*2)
				L	L		OFF
				L	H		L (*3)
				L	L		OFF
	H	*	H	*	*	ALL OFF	

(\*1) 34th data is pushed out as output at the state of down edge↓ of clock signal.

(\*2) When shift register is "H", source SCR of Q output is driven to ON.

(\*3) When shift register is "H", sink SCR of Q output is driven to ON.

(\*4) OE must be kept "H".

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## 7. INPUT / OUTPUT CIRCUIT

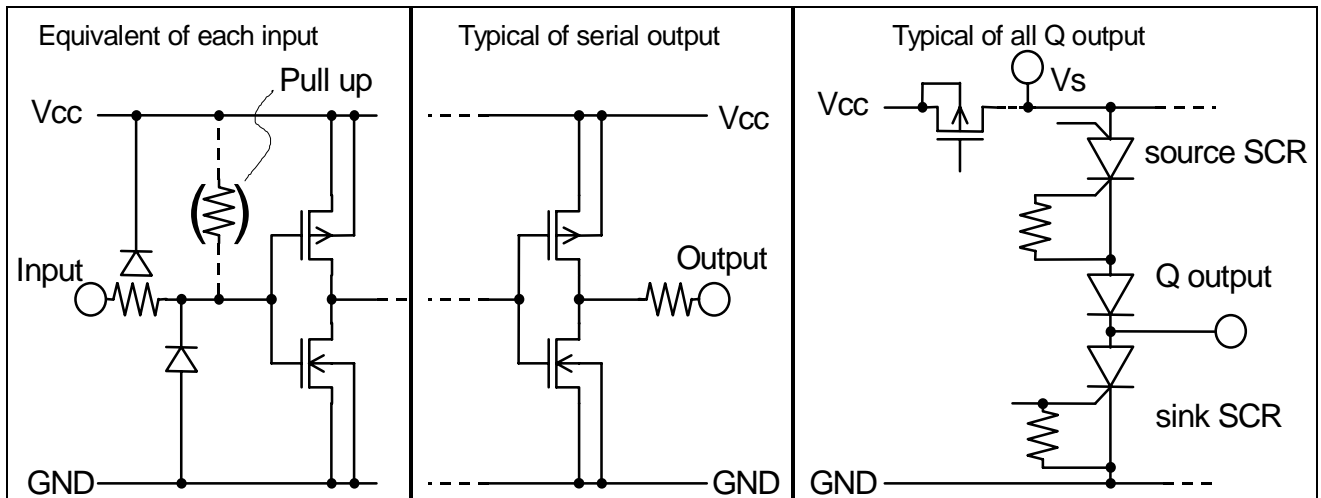


Fig. 3. Input / Output Circuit

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## 8. EXAMPLE OF OPERATING TIMING CHART

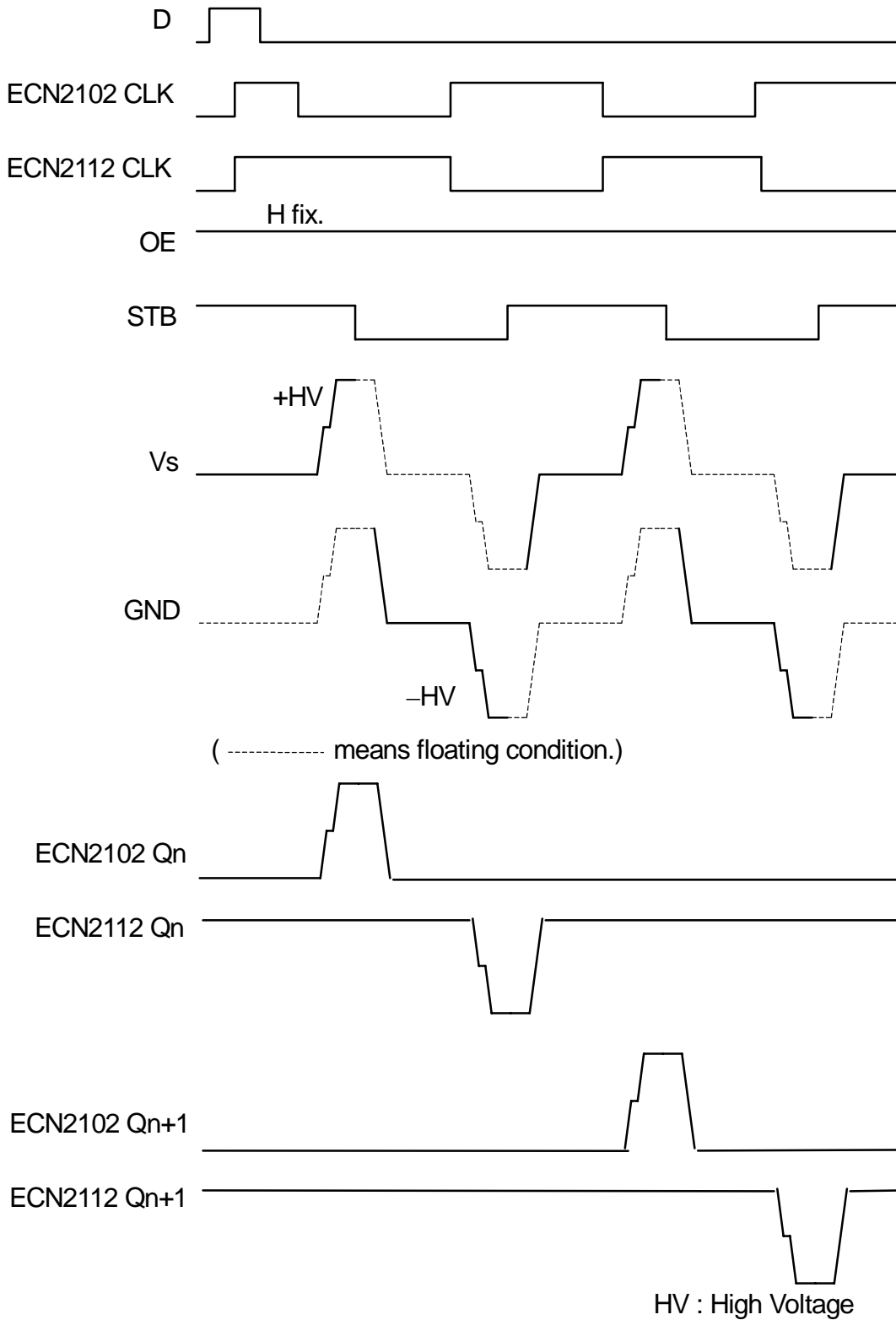
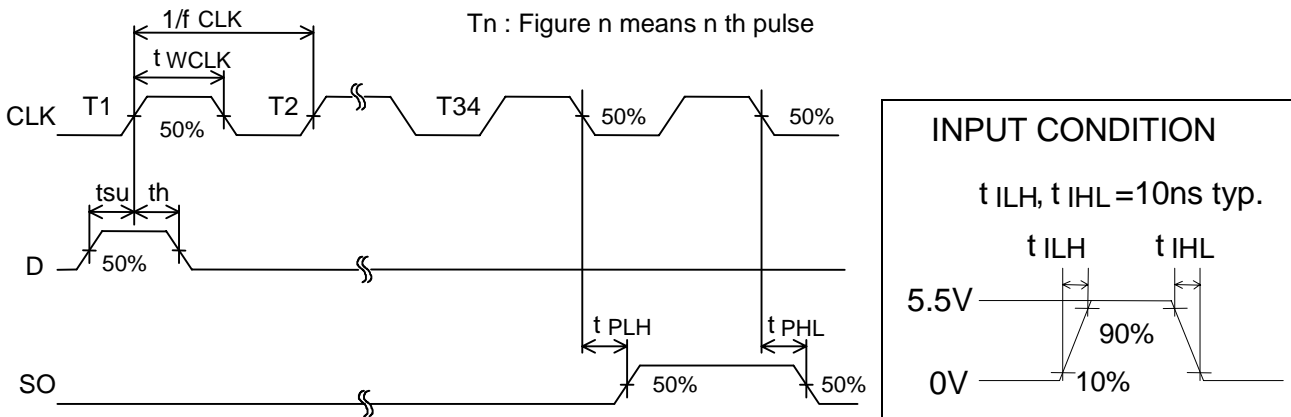


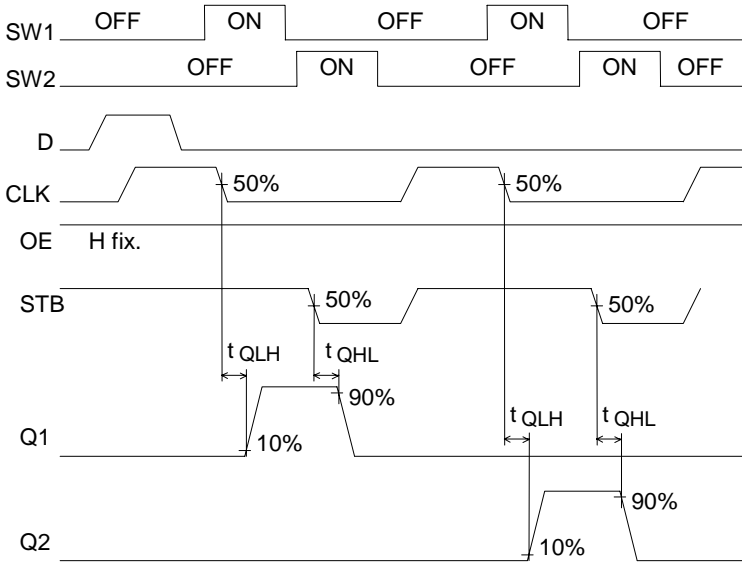
Fig. 4. Example of Operating Timing Chart

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## 9. MEASUREMENT AND MEASUREMENT CIRCUIT



(a) Shift function (SW1→OFF, SW2,3→ON)



Other Q output

(b) Output Function (SW3→OFF)

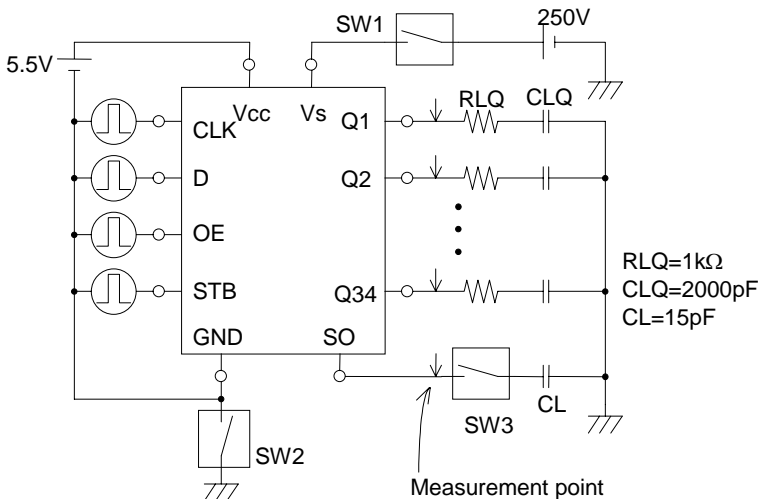


Fig. 5. Switching Characteristics Measurement Circuit

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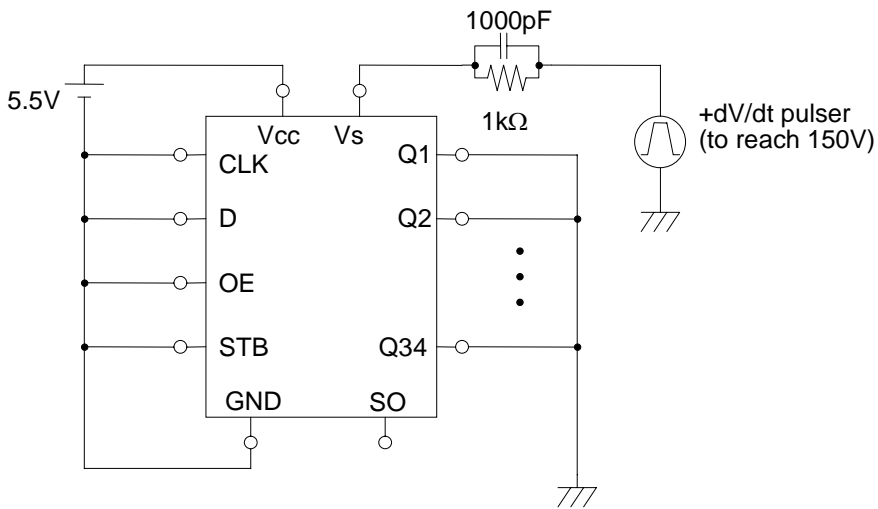


Fig. 6. Output SCR dV/dt capability (dV/dt1) Measurement Circuit

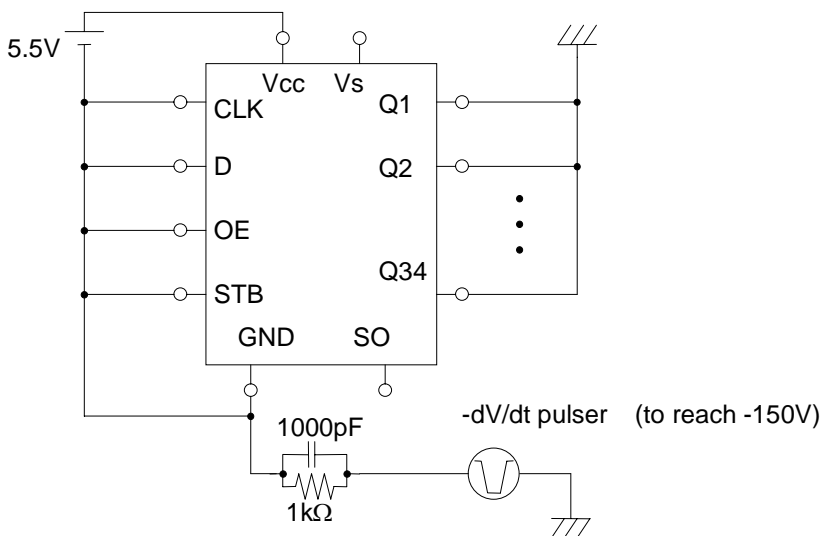
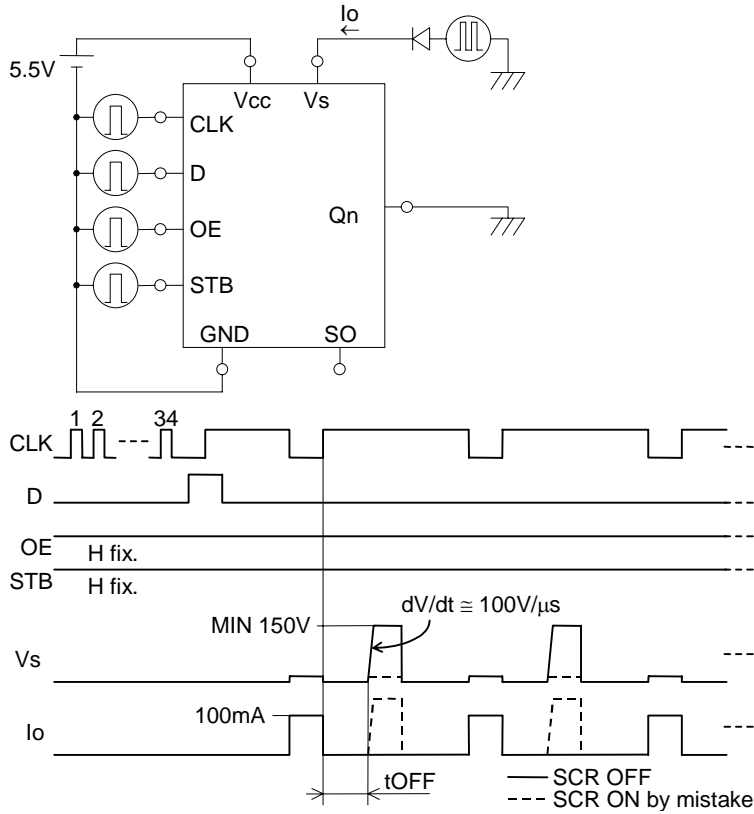


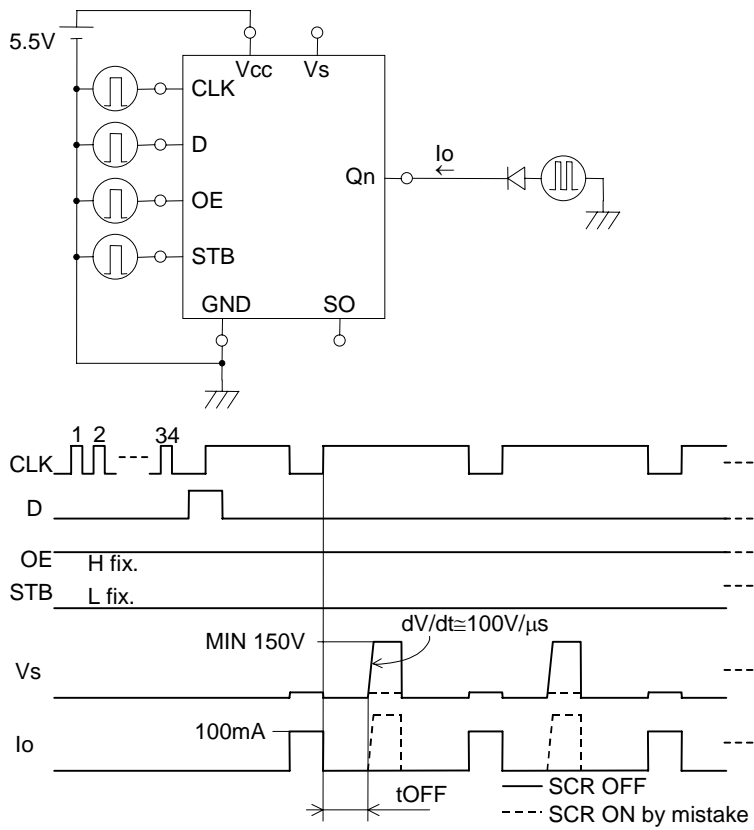
Fig. 7. Output SCR dV/dt capability (dV/dt2) Measurement Circuit



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(a) Source SCR

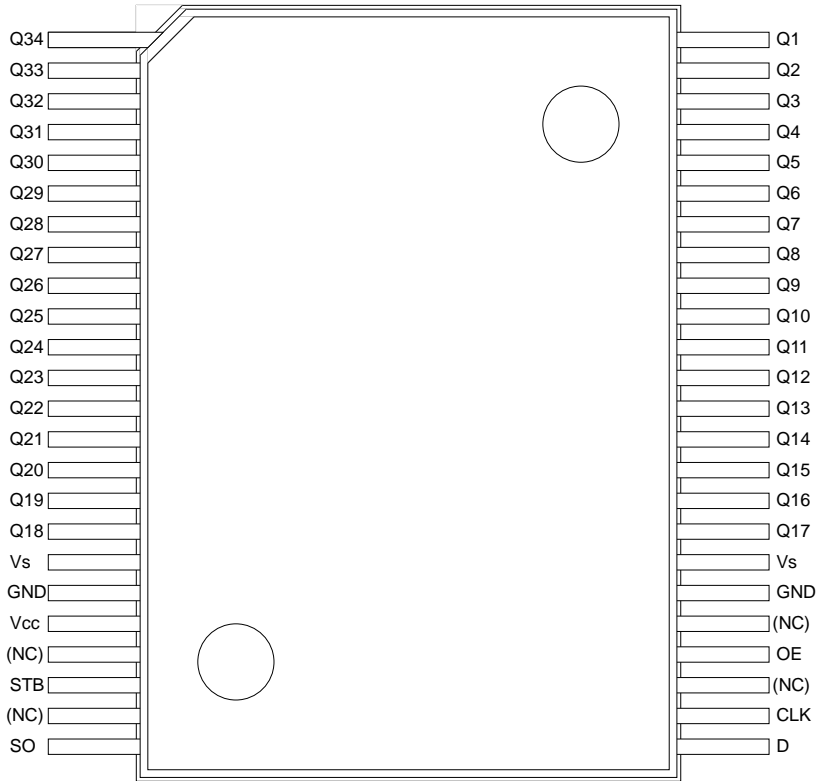


(b) Sink SCR

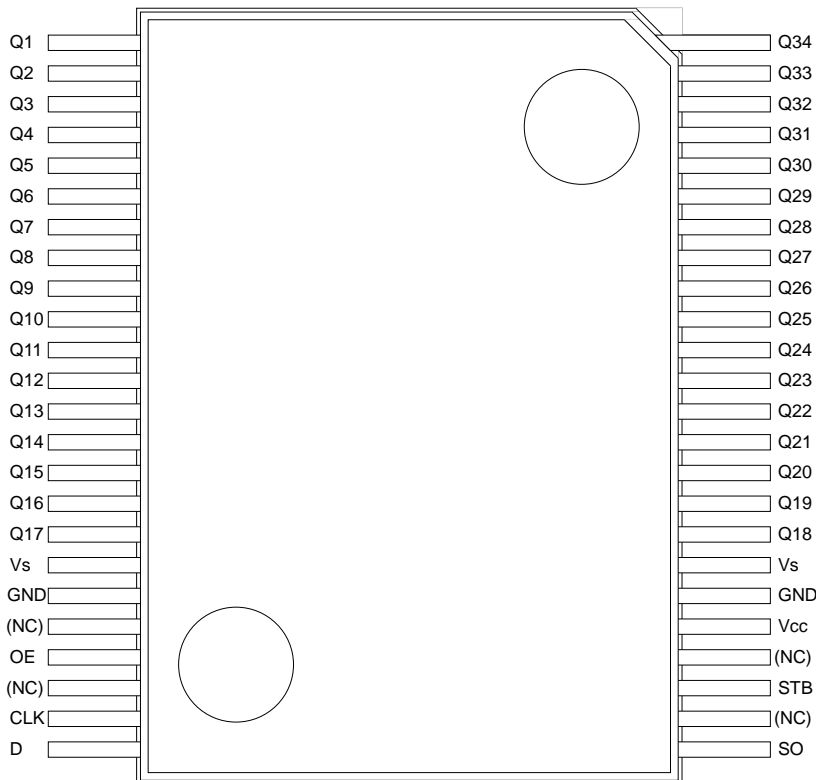
Fig. 8. Output SCR tOFF Measurement

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## 10. PIN LOCATION



(a) ECN2102



(b) ECN2112

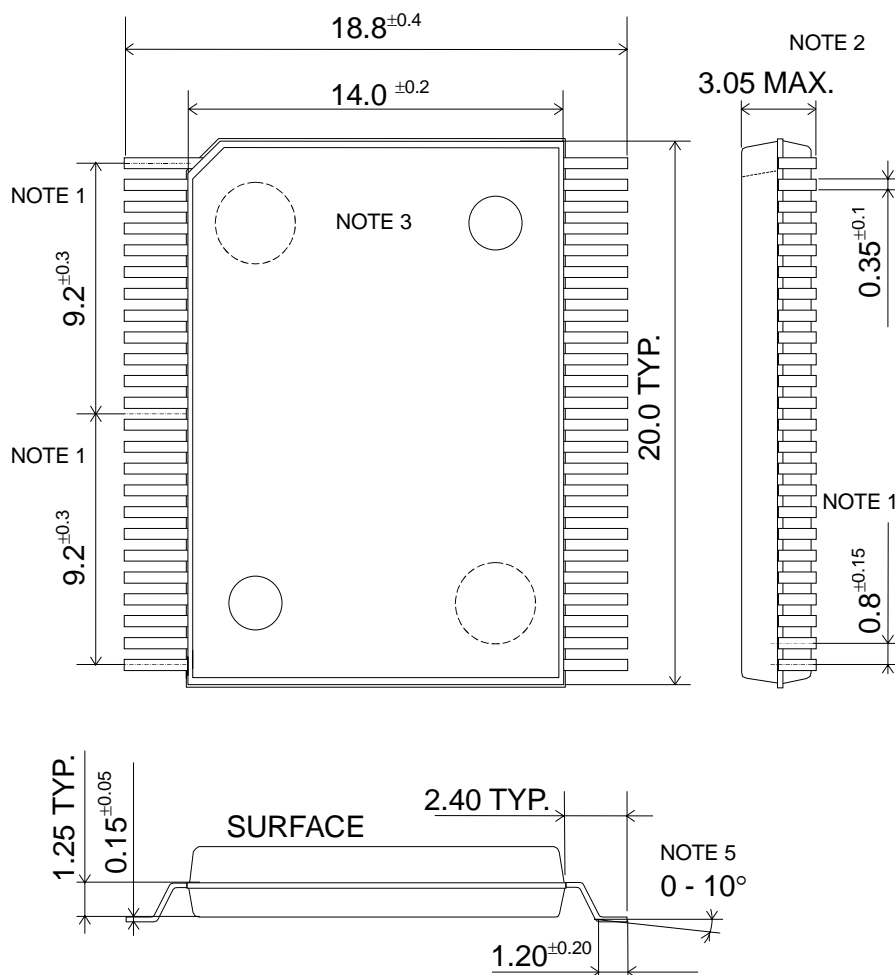
Fig. 9. Pin Location (Top view)

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## 11. PACKAGE OUTLINE

(Unit : mm)

### (1) ECN2102



#### Notes.

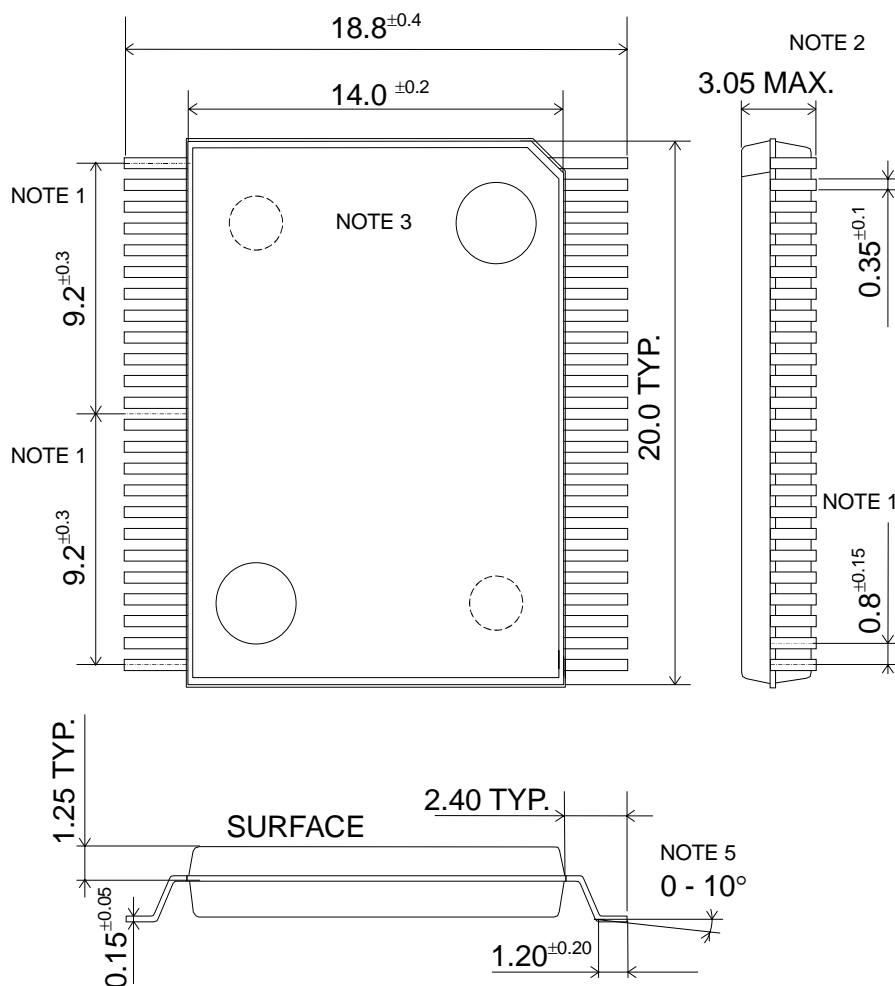
1. THIS DIMENSION IS MEASURED AT ROOT OF LEAD. SPACING AT TIP OF LEAD IS MIN 0.2.
2. THIS DIMENSION INCLUDES A WARPAGE OF PACKAGE.
3. MARKING IS ON THE SURFACE OF PACKAGE, INCLUDING HITACHI MARK, TYPE NAME, LOT NUMBER, AND JAPAN MARK.
4. LEADS ARE SOLDER PLATED.
5. THIS IS THE BENDING ANGLE WITH HORIZONTAL PLANE.

Fig. 10. Package outline (ECN2102)

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(Unit : mm)

(2) ECN2112



Notes.

1. THIS DIMENSION IS MEASURED AT ROOT OF LEAD. SPACING AT TIP OF LEAD IS MIN 0.2.
2. THIS DIMENSION INCLUDES A WARPAGE OF PACKAGE.
3. MARKING IS ON THE SURFACE OF PACKAGE, INCLUDING HITACHI MARK, TYPE NAME, LOT NUMBER, AND JAPAN MARK.
4. LEADS ARE SOLDER PLATED.
5. THIS IS THE BENDING ANGLE WITH HORIZONTAL PLANE.

Fig. 11. Package outline (ECN2112)

# HITACHI POWER SEMICONDUCTORS

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