



CDT70XX Low Voltage Detect

● General Description

The CDT70XX series is a low power consumption voltage detector, manufactured using MOS and fuse trimming technologies. Detect voltage is extremely accurate with minimal temperature drift.

● Features

- Detect voltage range: From 2.4V ~7.0V
- Low power consumption : 4 μ A typically (V_{DD}=8V)
- Hysteresis detect voltage
- Operating voltage range: 1.6V to 24V
- Detect voltage temperature characteristics: $\pm 1\text{mV}/^\circ\text{C}$
- Output configuration: N-channel open drain
- Package : SOT-89、 TO-92、 SOT-25

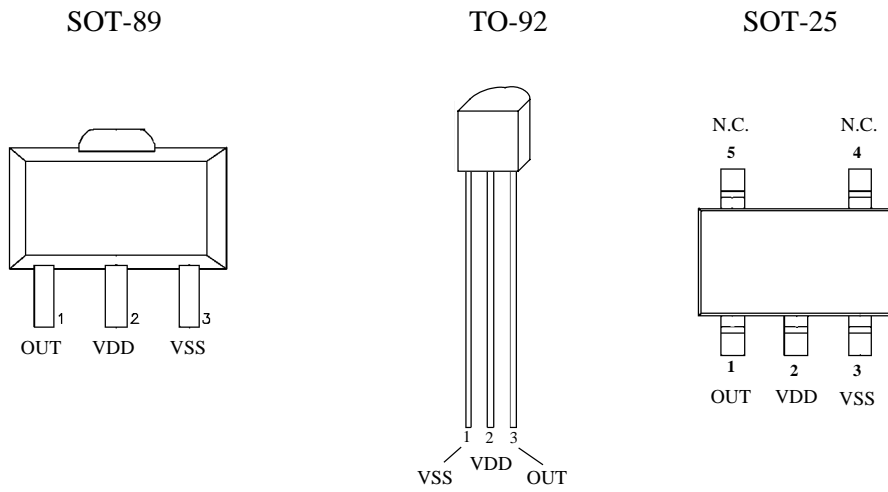
● Applications

- Microprocessor reset
- Memory battery back-up circuits
- Power-on reset circuits
- Power failure detection
- System battery life and charge voltage monitors

● Ordering Information

Part Number	V _{DET}	Hysteresis Range (Typ.)	Package
CDT7024	2.40V	0.12V	SOT-89
CDT7025	2.55V	0.13V	
CDT7027	2.70V	0.14V	
CDT7033	3.30V	0.17V	TO-92
CDT7039	3.90V	0.19V	SOT-25
CDT7050	5.00V	0.25V	
CDT7070	7.00V	0.35V	

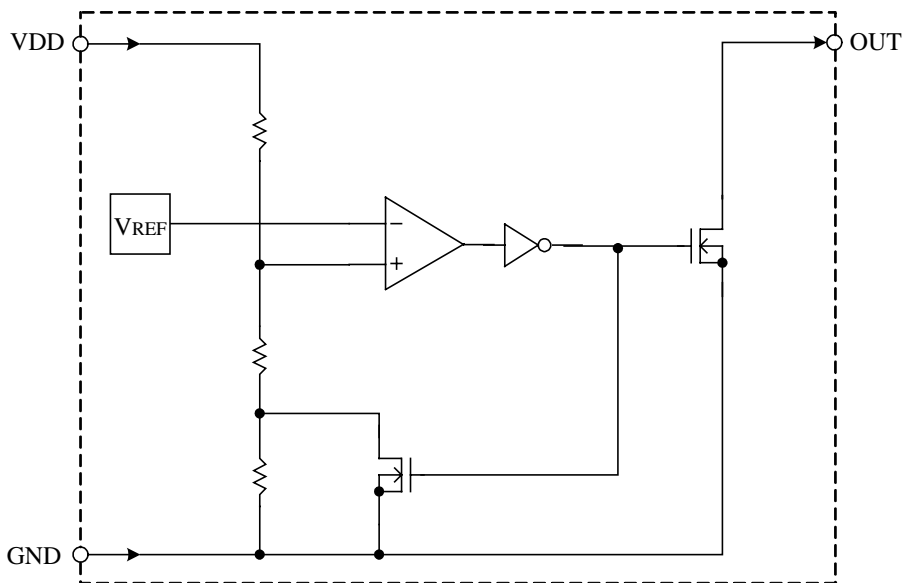
● Pin Assignment



● Pin Description

NO.	PIN_NAME	I/O	FUNCTION
1	OUT	O	Output
2	VDD	P	Power (+)
3	VSS	P	Power (-)

● Block Diagram



● Absolute Maximum ratings

- Supply Voltage ----- - 0.3V to 24V
- Input Voltage ----- $V_{SS}-0.3$ to $V_{DD}+0.3$
- Operating Temperature ----- 0 to 70
- Storage Temperature----- - 50 to 125

* Note : Stresses above those listed may cause permanent damage to the devices.

● Electrical Characteristics

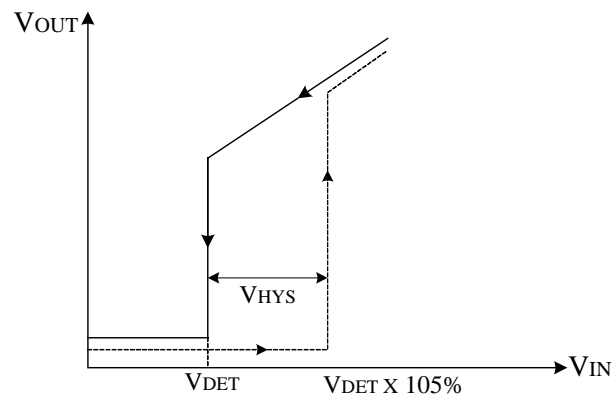
($V_{DD}=3V$, $T_A = 25$, unless otherwise specified)

Symbol	Parameter	Part Number	Condition	Min.	Typ.	Max.	Units
V_{DET}	Detect Voltage			$V_{DET} \times .97$	V_{DET}	$V_{DET} \times 1.03$	V
		CDT7024		2.33	2.4	2.47	
		CDT7025		2.47	2.55	2.63	
		CDT7027		2.62	2.7	2.78	
		CDT7033		3.20	3.3	3.40	
		CDT7039		3.78	3.9	4.02	
		CDT7050		4.85	5.0	5.15	
		CDT7070		6.79	7.0	7.21	
V_{HYS}	Hysteresis Range			$V_{DET} \times 2\%$	$V_{DET} \times 5\%$	$V_{DET} \times 10\%$	V
V_{DD}	Operating Voltage			1.6		24	V
I_{DD}	Operating Current		$V_{DD}=8V$		4	7	uA
I_{OUT}	OUT Sink current	CDT7024	$V_{OUT}=0.25V, V_{DD}=2.4V$	1.0	1.4		mA
		CDT7025	$V_{OUT}=0.25V, V_{DD}=2.55V$	1.5	1.8		
		CDT7027	$V_{OUT}=0.25V, V_{DD}=2.7V$	1.7	2.1		
		CDT7033	$V_{OUT}=0.25V, V_{DD}=3.3V$	2.0	2.5		
		CDT7039	$V_{OUT}=0.25V, V_{DD}=3.9V$	2.5	3.0		
		CDT7050	$V_{OUT}=0.25V, V_{DD}=5.0V$	3.5	4.0		
		CDT7070	$V_{OUT}=0.25V, V_{DD}=7.0V$	5.0	5.5		
V_{TC}	Temperature Coefficient		$0^\circ C < T_a < 70^\circ C$		1		mV/ $^\circ C$
T_{DLY}	Propagation Delay time		10pF load			200	μs

● Functional Description

CDT70XX contains a voltage reference, a comparator, an open-drain N-channel output transistor. It drives N-channel turns on when the voltage applied to the divided VDD dividing by internal resistors is less than the internal reference.

To ensure noise-free output switching, hysteresis is frequently used in voltage detectors. For the CDT70XX the hysteresis output recovering voltage is set up at 5% of V_{DET}^* .

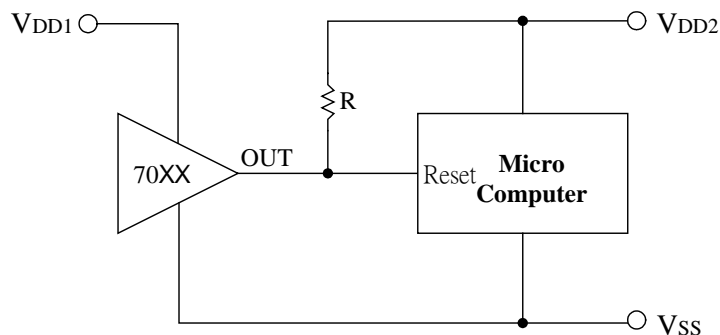


Note.

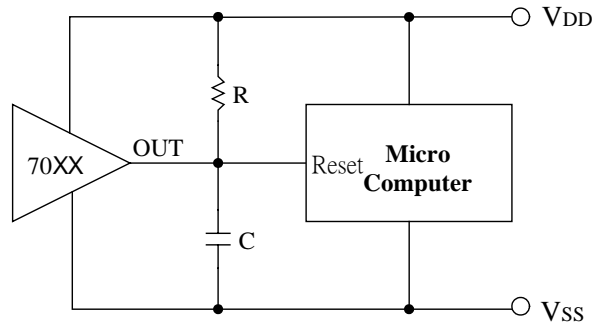
* : CDT70XX does not guarantee OUT will be off when the system powers on between V_{DET} and $V_{DET} + V_{HYS}$.

● Application Circuit

- NMOS open drain output application for separate power supply



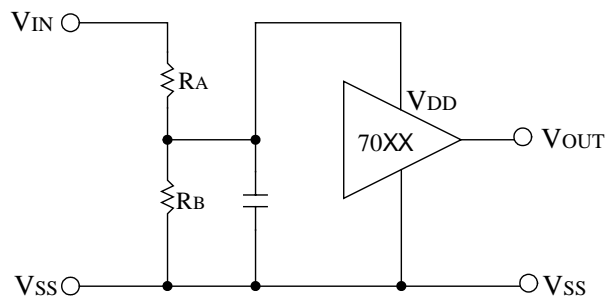
- NMOS open drain output application with R-C delay



- **Change of Detectable Voltage**

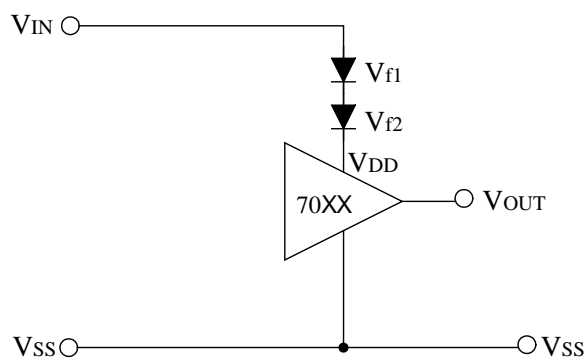
If required voltage is not found in the standard product selection table, it is possible to change it by using external resistance dividers or diodes.

- * Varying the detectable voltage with a resistance divider



$$\text{Detectable voltage} = \frac{R_A + R_B}{R_B} \times V_{\text{DET}}$$

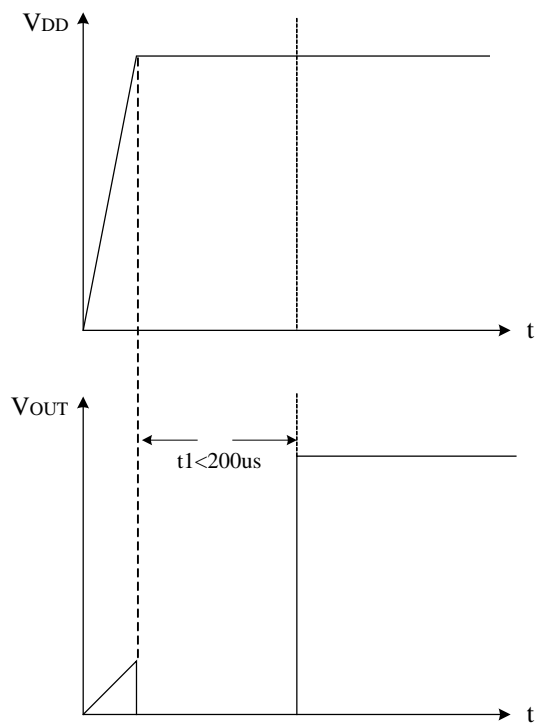
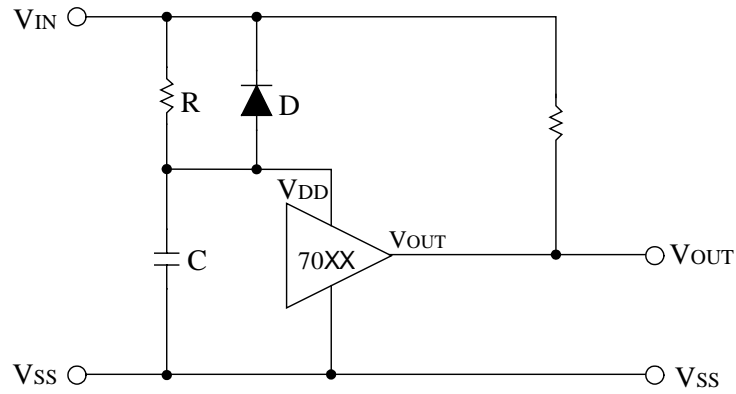
$$\text{Hysteresis width} = \frac{R_A + R_B}{R_B} \times V_{\text{HYS}}$$



$$\text{Detectable voltage} = V_{f1} + V_{f2} + V_{\text{DET}}$$

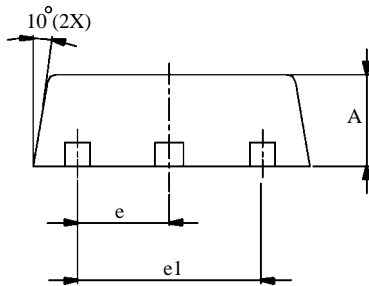
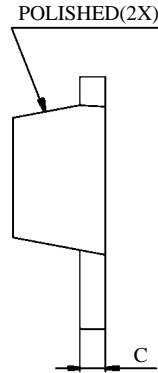
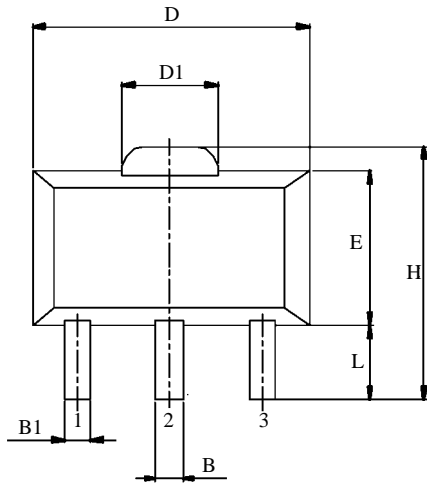
- **Power-on reset circuit**

With several external components, the NMOS open drain type of the CDT70XX can be used to perform a power-on reset function as shown.



● Package Information

• SOT-89 Outline Dimensions



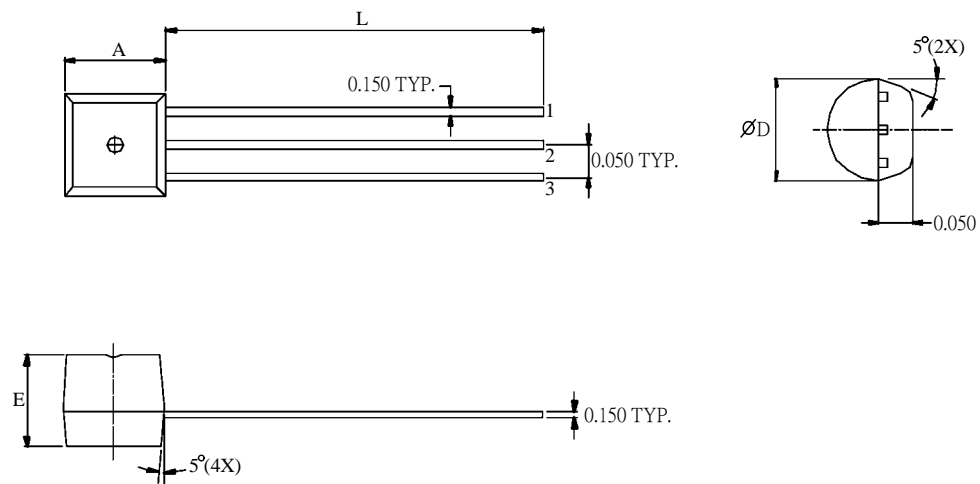
Symbols	MIN.	MAX.
A	1.40	1.60
B	0.44	0.56
B1	0.36	0.48
C	0.35	0.44
D	4.40	4.60
D1	1.35	1.83
E	2.29	2.60
H	3.94	4.25
e	1.50 BSC	
e1	3.00 BSC	
L	0.89	1.2

UNIT : MM

NOTES.

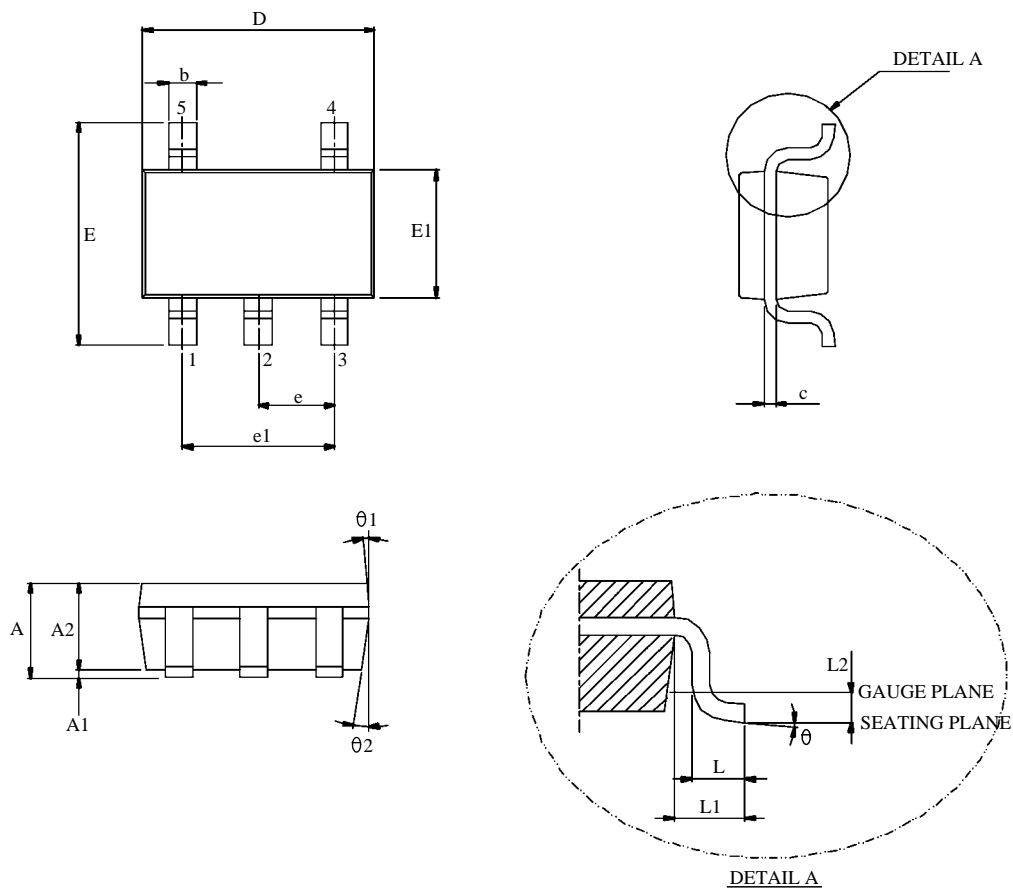
1. JEDEC OUTLINE : TO-243 AA
2. DIMENSION B1, 2 PLACES.

• TO-92 Outline Dimensions



Symbols	INCHES		
	MIN.	NOR.	MAX.
A	0.170	0.180	0.210
ØD	0.175	0.180	0.205
E	0.125	0.142	0.165
L	0.500	0.580	-

• SOT-25 Outline Dimensions



Symbols	MIN.	NOM.	MAX.
A	1.05	1.20	1.35
A1	0.05	0.10	0.15
A2	1.00	1.10	1.20
b	0.30	-	0.50
c	0.08	-	0.20
D	2.80	2.90	3.00
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e	0.95 BSC.		
e1	1.90 BSC.		
L	0.30	0.45	0.55
L1	0.60 REF.		
L2	0.25 BSC.		
	0°	5°	10°
1	3°	5°	7°
2	6°	8°	10°

VARIATION (ALL DIMENSIONS SHOWN IN MM)

NOTES.

1. JEDEC OUTLINE : MD-178 AA

* CDT assumes no responsibility for the use of the specification described. CDT reserves the right to modify the product specification without notice.

(以上規格僅供參考，本公司得逕行修正，不另通知)