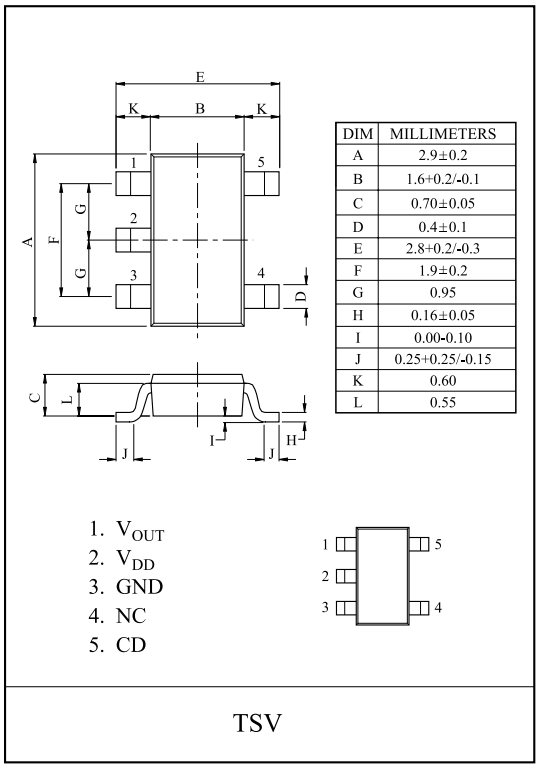
CMOS System Reset IC with Delay Time Circuit
Monolithic IC KIC72 Series**

In various CPU systems or other logic systems, when the time of a power suply injection and a power supply are severed for a momnet, this IC detects supply voltage and applies reset to a system.
To 2% of detection voltage accuracy of the conventional product, a maximum of 1% of super-high precision is realized, and it is more suitable for battery detection ets.



DIM	MILLIMETERS
A	2.9±0.2
B	1.6+0.2/-0.1
C	0.70±0.05
D	0.4±0.1
E	2.8+0.2/-0.3
F	1.9±0.2
G	0.95
H	0.16±0.05
I	0.00-0.10
J	0.25+0.25/-0.15
K	0.60
L	0.55

TSV

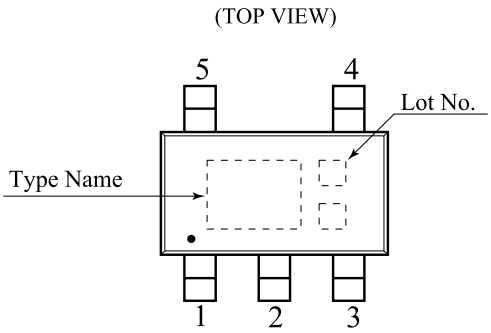
FEATURES

- High accuracy : ±1% MAX
- Super low supply current : 0.35 μA typ.
- Operating-temperature range : -40~+105℃
- Delay resistance accuracy :10MΩ ±10%
- Detecting voltage rank : 0.8~6.0V(0.1V step)
- Output Configuration : CMOS output

Applications

- Reset circuits for CPUs and MPUs
- Reset circuits for logic circuits
- Battery voltage check circuits
- Back-up power supply switching circuits
- Level detection circuits

Pin Configuration



TSV

Pin Description

Pin No.	Pin name	Functions
1	V_{OUT}	Reset Signal Output Pin
2	V_{DD}	V_{DD} Pin / Voltage Detect Pin
3	GND	GND Pin
4	NC	No Connection
5	C_D	Capacitor Connect Pin with Delay

Block Diagram

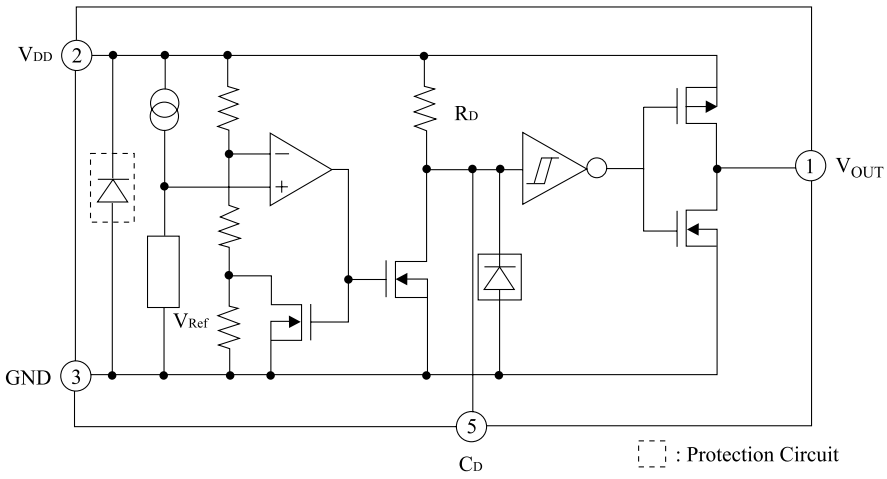


Figure. 1

Selection Guide

The Output voltage, package type for the ICs can be selected at the user s request.
The selection can be made with designating the part number as shown below

KIC7 2 □□ □
① ② ③

NO.	Specifications		Description
①	Function & Output Type		External Reset, CMOSOutput
②	Reset Voltage		0.8~6.0V
③	Package	T5	TSV

Absolute maximum ratings(Ta=25℃)

ITEM	SYMBOL	RATINGS	UNITS
Supply voltage	$V_{DD\ MAX.}$	-0.3 +12.0	V
Output voltage	V_{OUT}	-0.3 (V_{DD}+0.3)	V
Input current (V_{DD})	I_{DD}	20	mA
Output current ($\overline{RESET}$)	I_{OUT}	20	mA
C_D pin Input voltage	V_{CD}	V_{SS} -0.3 +12.0	V
Power dissipation	P_D	900 * Note)	mW
Operating temperature	T_{OPR}	-40~+105	℃
Storage temperature	T_{STG}	-65~+150	℃

* Note) Package Mounted on a Ceramic board ($600mm^2 \times 0.8mm$)

Recommended Operating Conditions

ITEM	SYMBOL	RATINGS	UNITS
Operating Temperature	T_{opr}	-40 +105	℃
Supply voltage	V_{DD}	0.70~10.0	V

Line-up

Detecting Voltage	KIC7208~25T5		Detecting Voltage	KIC7226~43T5		Detecting Voltage	KIC7244~60T5	
	Item	Marking		Item	Marking		Item	Marking
0.8V	KIC7208T5	608	2.6V	KIC7226T5	626	4.4V	KIC7244T5	644
0.9V	KIC7209T5	609	2.7V	KIC7227T5	627	4.5V	KIC7245T5	645
1.0V	KIC7210T5	610	2.8V	KIC7228T5	628	4.6V	KIC7246T5	646
1.1V	KIC7211T5	611	2.9V	KIC7229T5	629	4.7V	KIC7247T5	647
1.2V	KIC7212T5	612	3.0V	KIC7230T5	630	4.8V	KIC7248T5	648
1.3V	KIC7213T5	613	3.1V	KIC7231T5	631	4.9V	KIC7249T5	649
1.4V	KIC7214T5	614	3.2V	KIC7232T5	632	5.0V	KIC7250T5	650
1.5V	KIC7215T5	615	3.3V	KIC7233T5	633	5.1V	KIC7251T5	651
1.6V	KIC7216T5	616	3.4V	KIC7234T5	634	5.2V	KIC7252T5	652
1.7V	KIC7217T5	617	3.5V	KIC7235T5	635	5.3V	KIC7253T5	653
1.8V	KIC7218T5	618	3.6V	KIC7236T5	636	5.4V	KIC7254T5	654
1.9V	KIC7219T5	619	3.7V	KIC7237T5	637	5.5V	KIC7255T5	655
2.0V	KIC7220T5	620	3.8V	KIC7238T5	638	5.6V	KIC7256T5	656
2.1V	KIC7221T5	621	3.9V	KIC7239T5	639	5.7V	KIC7257T5	657
2.2V	KIC7222T5	622	4.0V	KIC7240T5	640	5.8V	KIC7258T5	658
2.3V	KIC7223T5	623	4.1V	KIC7241T5	641	5.9V	KIC7259T5	659
2.4V	KIC7224T5	624	4.2V	KIC7242T5	642	6.0V	KIC7260T5	660
2.5V	KIC7225T5	625	4.3V	KIC7243T5	643			

Electrical characteristics (Unless Otherwise Specified Ta=25℃)

ITEM	SYMBOL	MEASUREMENT CONDITIONS	RANK	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Reset Threshold	V_{TH}	Ta = +25℃ Ta = -40~+85℃	7208	0.792	0.8	0.808	V	(2)
				0.780	-	0.820		
			7209	0.891	0.9	0.909		
				0.878	-	0.923		
			7210	0.990	1.0	1.010		
				0.975	-	1.025		
			7211	1.089	1.1	1.111		
				1.073	-	1.128		
			7212	1.188	1.2	1.212		
				1.170	-	1.230		
			7213	1.287	1.3	1.313		
				1.268	-	1.333		
			7214	1.386	1.4	1.414		
				1.365	-	1.435		
			7215	1.485	1.5	1.515		
				1.463	-	1.538		
			7216	1.584	1.6	1.616		
				1.560	-	1.640		
			7217	1.683	1.7	1.717		
				1.658	-	1.743		
			7218	1.782	1.8	1.818		
				1.755	-	1.845		
			7219	1.881	1.9	1.919		
				1.853	-	1.948		
			7220	1.980	2.0	2.020		
				1.950	-	2.050		
			7221	2.079	2.1	2.121		
				2.048	-	2.153		
			7222	2.178	2.2	2.222		
				2.145	-	2.255		
			7223	2.277	2.3	2.323		
				2.243	-	2.358		
			7224	2.376	2.4	2.424		
				2.340	-	2.460		
			7225	2.475	2.5	2.525		
				2.438	-	2.563		
			7226	2.574	2.6	2.626		
				2.535	-	2.665		
			7227	2.673	2.7	2.727		
				2.633	-	2.768		
			7228	2.772	2.8	2.828		
				2.730	-	2.870		
			7229	2.871	2.9	2.929		
				2.828	-	2.973		
			7230	2.970	3.0	3.030		
				2.925	-	3.075		

Electrical characteristics (Unless Otherwise Specified Ta=25℃)

ITEM	SYMBOL	MEASUREMENT CONDITIONS	RANK	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Reset Threshold	V_{TH}	Ta = +25℃ Ta = -40~+85℃	7231	3.069	3.1	3.131	V	(2)
				3.023	-	3.178		
			7232	3.168	3.2	3.232		
				3.120	-	3.280		
			7233	3.267	3.3	3.333		
				3.218	-	3.383		
			7234	3.366	3.4	3.434		
				3.315	-	3.485		
			7235	3.465	3.5	3.535		
				3.413	-	3.588		
			7236	3.564	3.6	3.636		
				3.510	-	3.690		
			7237	3.663	3.7	3.737		
				3.608	-	3.793		
			7238	3.762	3.8	3.838		
				3.705	-	3.895		
			7239	3.861	3.9	3.939		
				3.803	-	3.998		
			7240	3.960	4.0	4.040		
				3.900	-	4.100		
			7241	4.059	4.1	4.141		
				3.998	-	4.203		
			7242	4.158	4.2	4.242		
				4.095	-	4.305		
			7243	4.257	4.3	4.343		
				4.193	-	4.408		
			7244	4.356	4.4	4.444		
				4.290	-	4.510		
			7245	4.455	4.5	4.545		
				4.388	-	4.613		
			7246	4.554	4.6	4.646		
				4.485	-	4.715		
			7247	4.653	4.7	4.747		
				4.583	-	4.818		
			7248	4.752	4.8	4.848		
				4.680	-	4.920		
			7249	4.851	4.9	4.949		
				4.778	-	5.023		
			7250	4.950	5.0	5.050		
				4.875	-	5.125		
			7251	5.049	5.1	5.151		
				4.973	-	5.228		
			7252	5.148	5.2	5.252		
				5.070	-	5.330		
			7253	5.247	5.3	5.353		
				5.168	-	5.433		

Electrical characteristics (Unless Otherwise Specified Ta=25℃)

ITEM	SYMBOL	MEASUREMENT CONDITIONS	RANK	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Reset Threshold	V_{TH}	Ta = +25℃ Ta = -40~+85℃	7254	5.346	5.4	5.454	V	(2)
				5.265	-	5.535		
			7255	5.445	5.5	5.555		
				5.363	-	5.638		
			7256	5.544	5.6	5.656		
				5.460	-	5.740		
			7257	5.643	5.7	5.757		
				5.558	-	5.843		
			7258	5.742	5.8	5.858		
				5.655	-	5.945		
			7259	5.841	5.9	5.959		
				5.753	-	6.048		
			7260	5.940	6.0	6.060		
				5.850	-	6.150		
Reset Threshold hysteresis	$\triangle V_{TH}$	V_{DD}= 0V→V_{TH}+1V→0V	7208	24	40	64	mV	(2)
			7209	27	45	72		
			7210	30	50	80		
			7211	33	55	88		
			7212	36	60	96		
			7213	39	65	104		
			7214	42	70	112		
			7215	45	75	120		
			7216	48	80	128		
			7217	51	85	136		
			7218	54	90	144		
			7219	57	95	152		
			7220	60	100	160		
			7221	63	105	168		
			7222	66	110	176		
			7223	69	115	184		
			7224	72	120	192		
			7225	75	125	200		
			7226	78	130	208		
			7227	81	135	216		
			7228	84	140	224		
			7229	87	145	232		
			7230	90	150	240		
			7231	93	155	248		
			7232	96	160	256		
			7233	99	165	264		
			7234	102	170	272		
			7235	105	175	280		
			7236	108	180	288		
			7237	111	185	296		
			7238	114	190	304		
			7239	117	195	312		
			7240	120	200	320		

ITEM	SYMBOL	MEASUREMENT CONDITIONS	RANK	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Reset Threshold hysteresis	ΔV_{TH}	V_{DD}= 0V→V_{TH}+1V→0V	7241	123	205	328	mV	(2)
			7242	126	210	336		
			7243	129	215	344		
			7244	132	220	352		
			7245	135	225	360		
			7246	138	230	368		
			7247	141	235	376		
			7248	144	240	384		
			7249	147	245	392		
			7250	150	250	400		
			7251	153	255	408		
			7252	156	260	416		
			7253	159	265	424		
			7254	162	270	432		
			7255	165	275	440		
			7256	168	280	448		
			7257	171	285	456		
			7258	174	290	464		
			7259	177	295	472		
			7260	180	300	480		
Supply Current	I_{DD}	V_{DD} = V_{TH} + 1V	7208 ~7260	-	0.35	1.0	uA	(1)
Reset threshold temp. coeficient	ΔV_{TH}/℃	Ta= -40 ~ 85℃	7208 ~7260	-	±100	-	ppm/℃	(2)
" L "transfer delay time	t_{PHL}	V_{DD}=V_{TH} +0.4V→V_{TH} -0.4V(note)	7208 ~7260	2	15	100	us	(7)
" H "transfer delay time	t_{PLH}	V_{DD}=V_{TH} -0.4V→V_{TH} +0.4V(note)	7208 ~7260	2	15	100	us	(7)
" L "output current	I_{OL1}	V_{DD}=0.7V, V_{DS}=0.05V	7208 ~7260	0.01	0.10	-	mA	(3)
	I_{OL2}	V_{DD}=1.2V, V_{DS}=0.5V, V_{TH}≧1.3V	7208 ~7260	0.23	2.00	-		
	I_{OL3}	V_{DD}=2.4V, V_{DS}=0.5V, V_{TH}≧2.5V	7225 ~7260	1.60	8.00	-		
	I_{OL4}	V_{DD}=3.6V, V_{DS}=0.5V, V_{TH}≧3.7V	7237 ~7260	3.20	12.0	-		
" H "output current	I_{OH1}	V_{DD}=4.8V, V_{DS}=0.5V, V_{TH}≦4.7V	7208 ~7260	0.36	0.62	0.1	mA	(4)
	I_{OH2}	V_{DD}=6.1V, V_{DS}=0.5V		0.46	0.75			

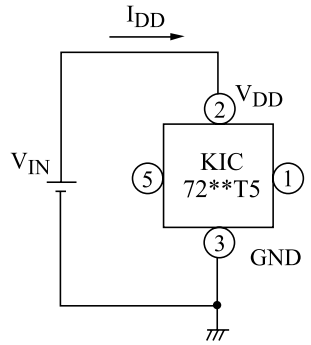
Note) This parameter is guaranteed by design.

ITEM	SYMBOL	TEST CONDITIONS	RANK	MIN.	TYP.	MAX.	UNITS	CIRCUIT
C_D pin resistance	R_D	-	7208 ~7260	9	10	11	MΩ	(6)
C_D pin threshold voltage	V_{TCD}	$V_{DD} = V_{TH} \times 1.1V$	7208 ~7260	$V_{DD} \times 0.3$	$V_{DD} \times 0.5$	$V_{DD} \times 0.7$	V	(5)
C_D pin output current 1	$I_{CD}1$	V_{DS} = 0.1V V_{DD} = 0.7V	7208 ~7260	2.0	30.0	-	uA	(6)
C_D pin output current 2	$I_{CD}2$	V_{DS} = 0.5V V_{DD} = 0.8V(Rank08 ~ 10) V_{DD} = 1.0V(Rank11 ~ 15) V_{DD} = 1.5V(Rank16 ~ 60)	7208 ~7210	10	100	-	uA	(6)
			7211 ~7215	50	200	-		
			7216 ~7260	200	800	-		

Note) This device is tested at Ta=25℃, over themperature limits guaranteed by design only

Test circuits

(1)



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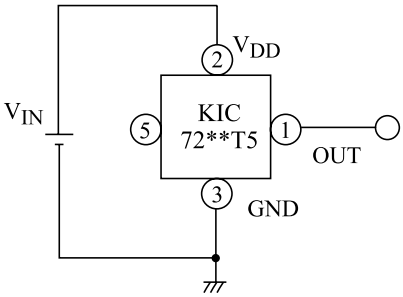

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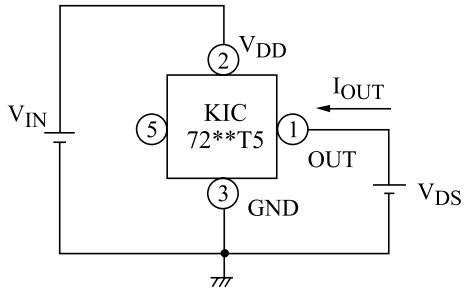

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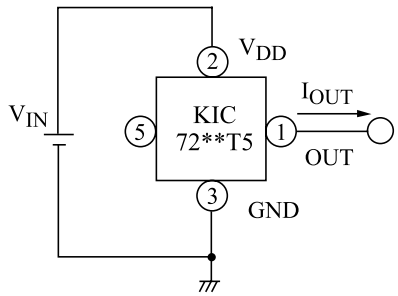

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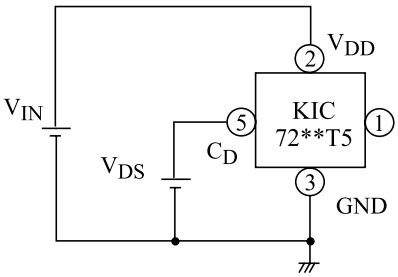

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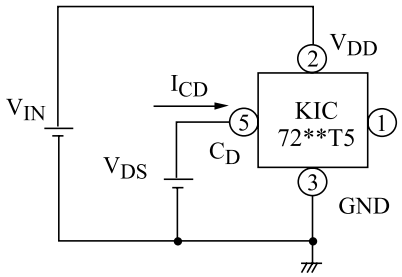

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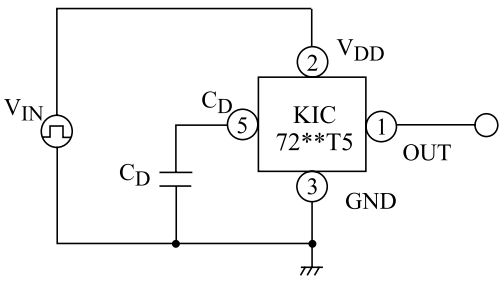
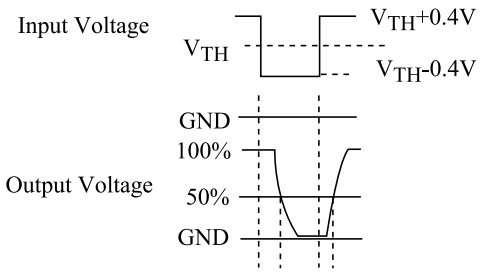
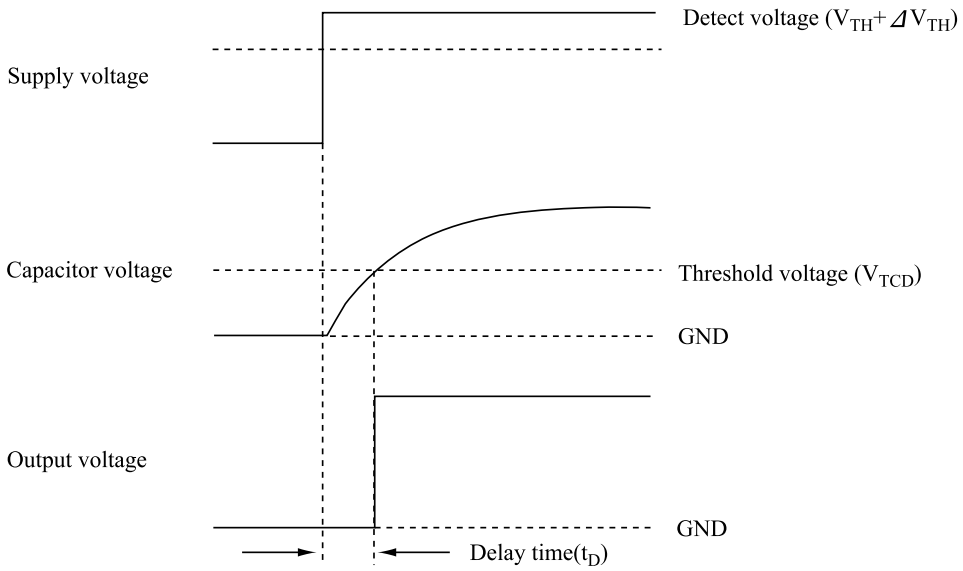
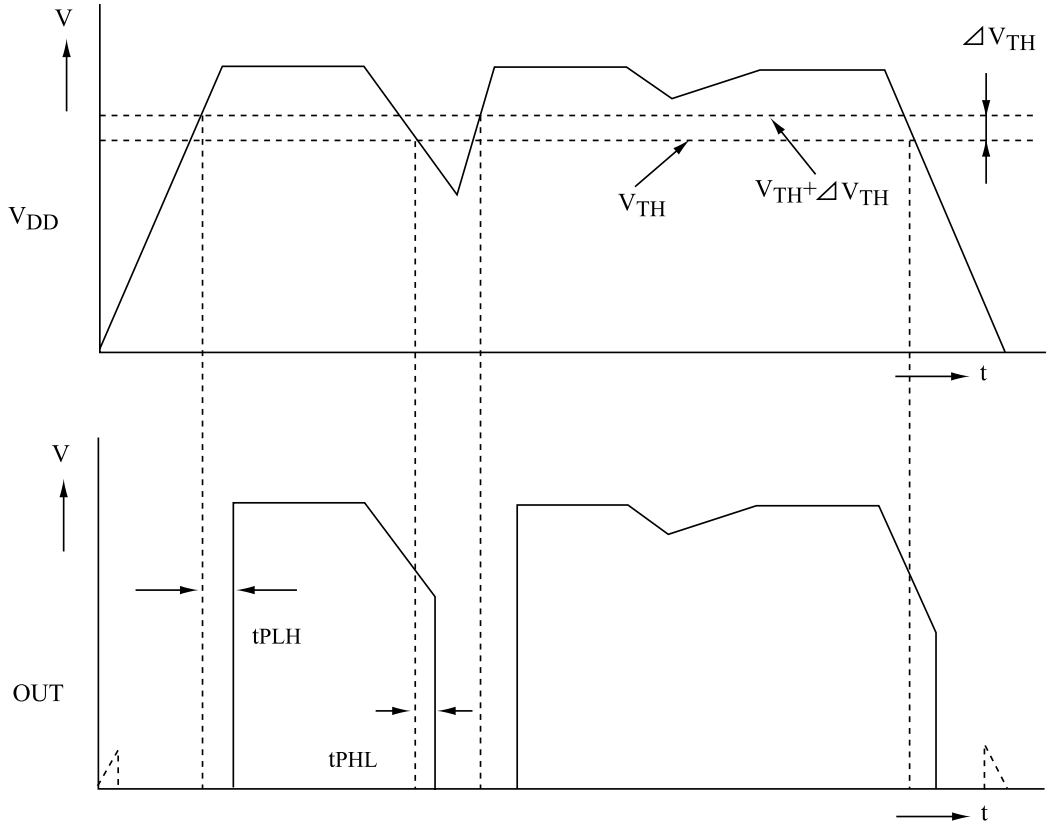




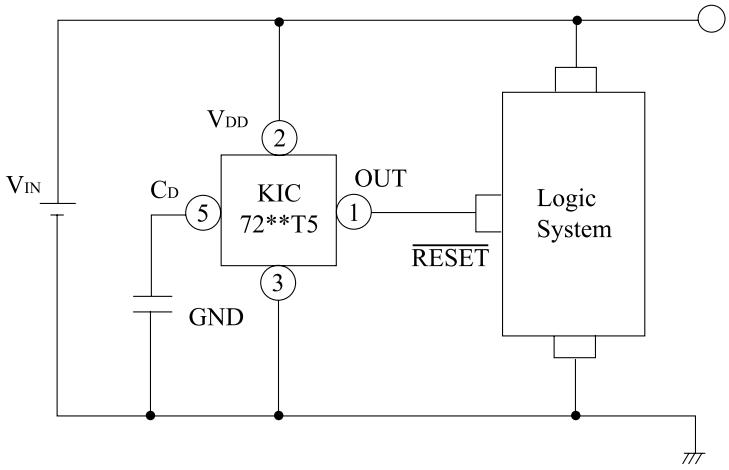
Timing Chart



Delay time(t_D) $t_D \fallingdotseq 0.69 \times R_D \times C_D(F)$ (s) R_D : C_D pin resistance
C_D : Capacitor



Application Circuits



· We shall not be liable for any trouble or damage caused by using this circuit.
· In the event a problem which may affect industrial property or any ohter rights of us or a third party is encountered during the use of information described in these circuit, KEC shall not be liable for any such problem, nor grant a license therefore.

Typical Characteristics (Typical performance Characteristics 2.9V)

note : These are typical characteristics

Fig1. Detecting Voltage

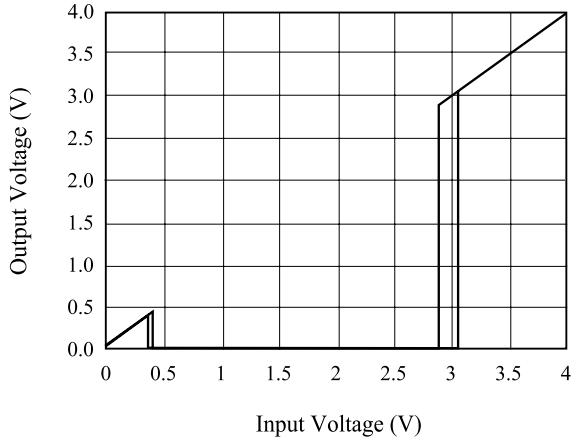


Fig2. Supply Current

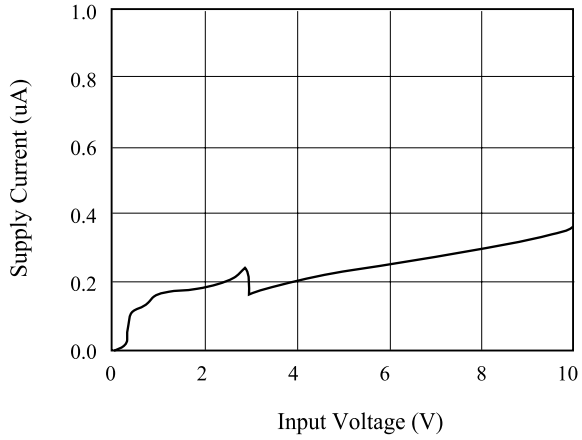


Fig3. C_D Pin Output Current

V_{DS} = 0.5V

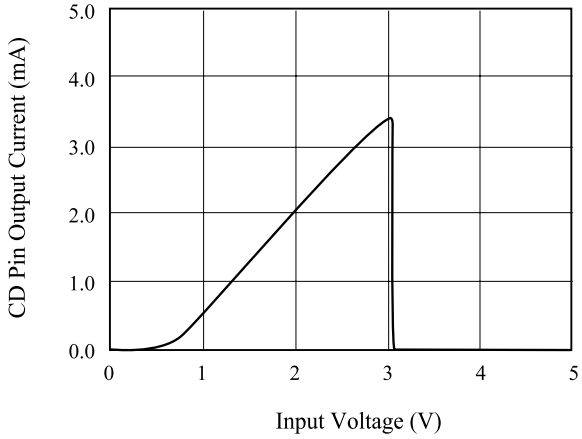


Fig4. Delay Time vs C_D

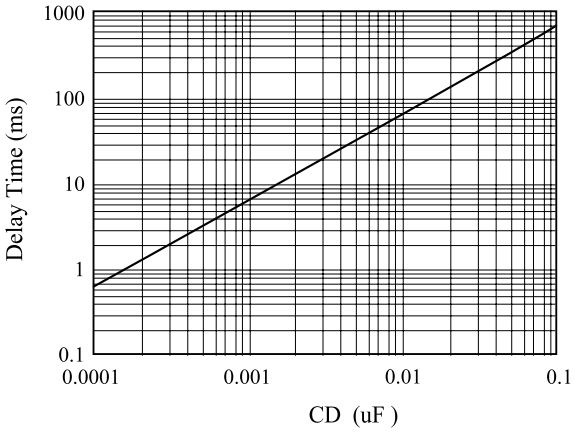


Fig5. Detecting Voltage vs Temperature

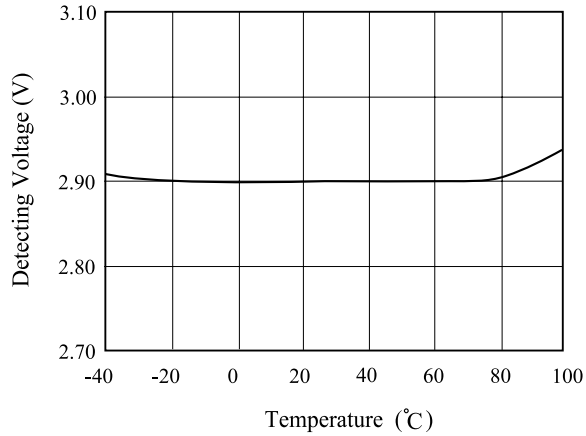


Fig6. Hysteresis Voltage vs Temperature

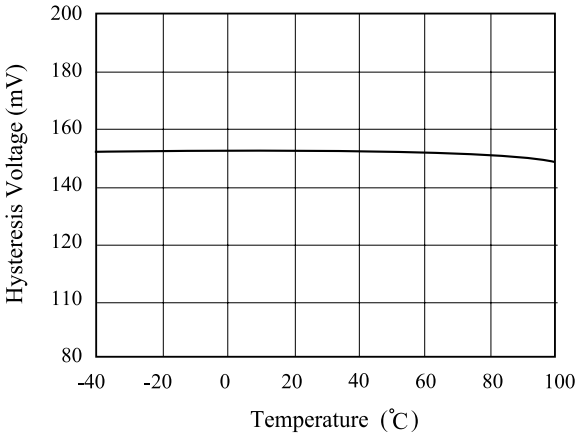


Fig7. "L" Output Current 1 vs Temperature

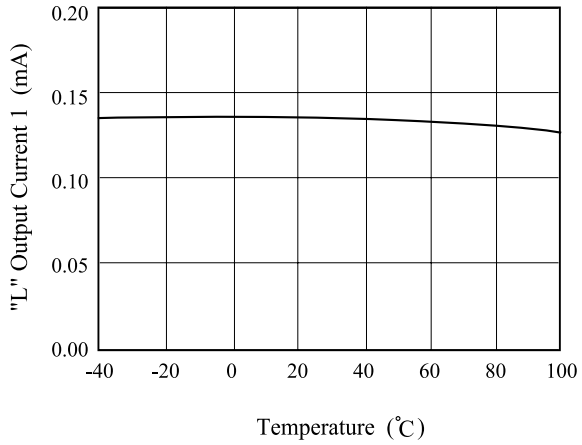


Fig8. "L" Output Current 2 vs Temperature

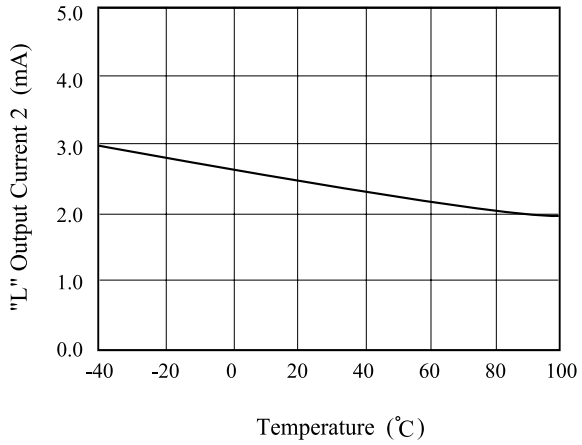


Fig9. "L" Output Current 3 vs Temperature

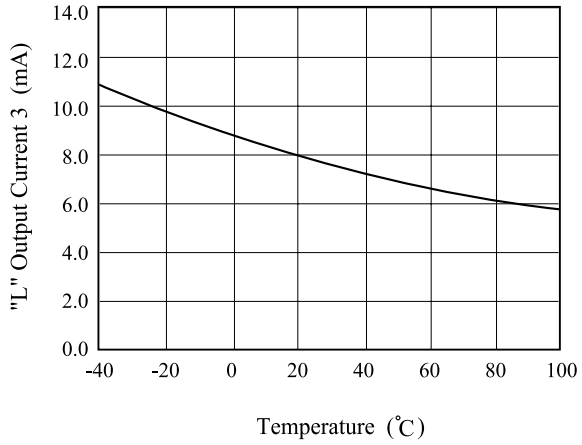


Fig10. C_D Pin Threshold Voltage vs Temperature

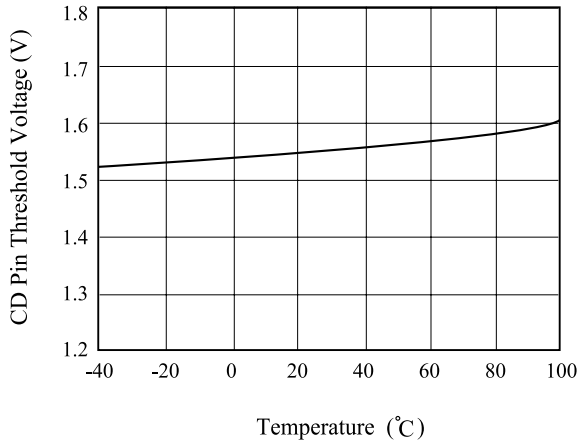


Fig11. C_D Pin Output Current 1 vs Temperature

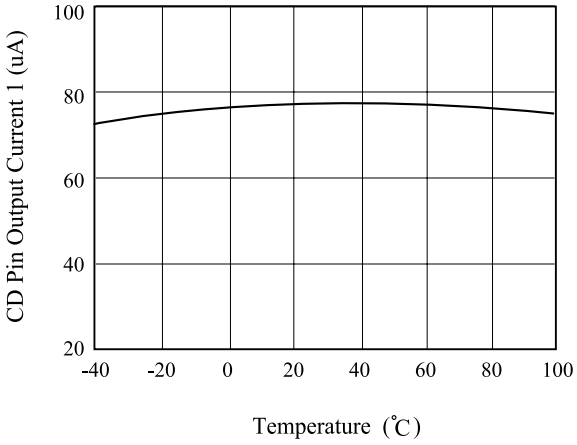


Fig12. C_D Pin Output Current 2 vs Temperature

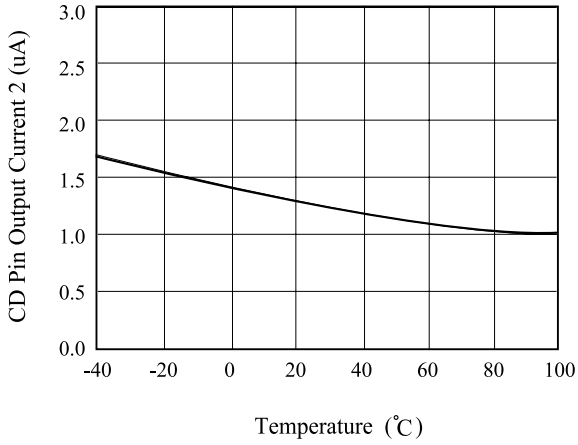


Fig13. N-ch Output Current