

### IC for CMOS Detector Monolithic IC KIC71\*\* Series

This IC functions in a variety of CPU systems and other logic systems, to detect supply voltage and reset the system accurately when the power is turned on or interrupted.

To 2% of detection voltage accuracy of the conventional models, a maximum of 1% of super-high precision is realized, and it is more suitable for battery detection etc.

### FEATURES

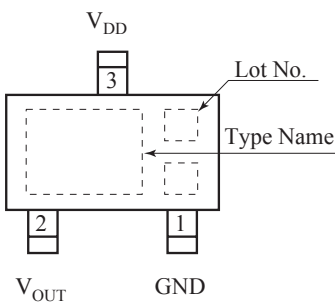
- High Accuracy :  $\pm 1\%$
- Ultra-low current consumption:  $0.25 \mu\text{A}(\text{Typ})$
- Operating temperature range :  $-40 \sim +105^\circ\text{C}$
- Detecting voltage rank :  $0.8 \sim 6.0\text{V}(0.1\text{V step})$
- Output configuration : CMOS output
- Suffix U : Qualified to AEC-Q100.  
ex) KIC71\*\*M-RTK/HU

### Applications

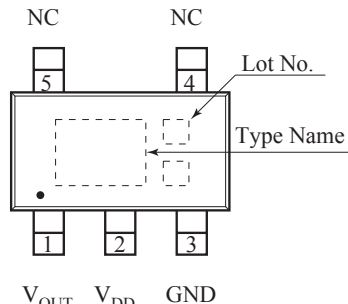
- Reset circuits for microcomputers, CPUs and MPUs
- Reset circuits for logic circuits
- Battery voltage check circuits
- Back-up power supply switching circuits
- Level detection circuits

### Pin Configuration

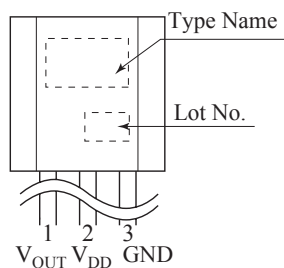
#### Top View



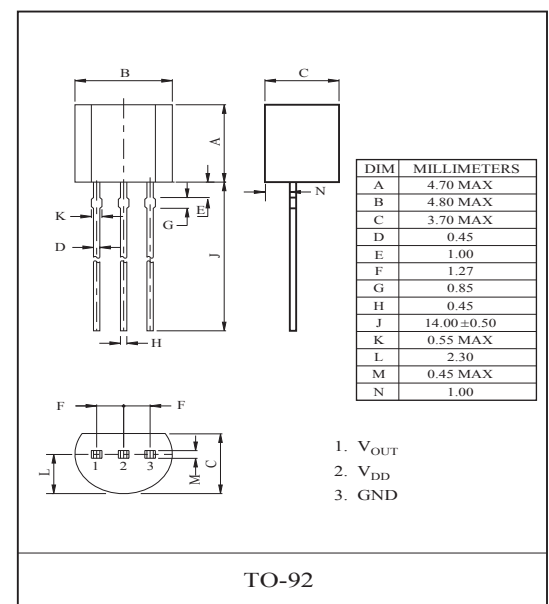
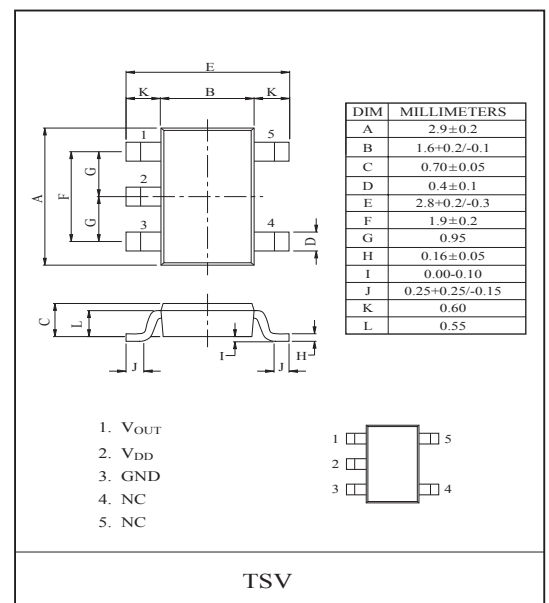
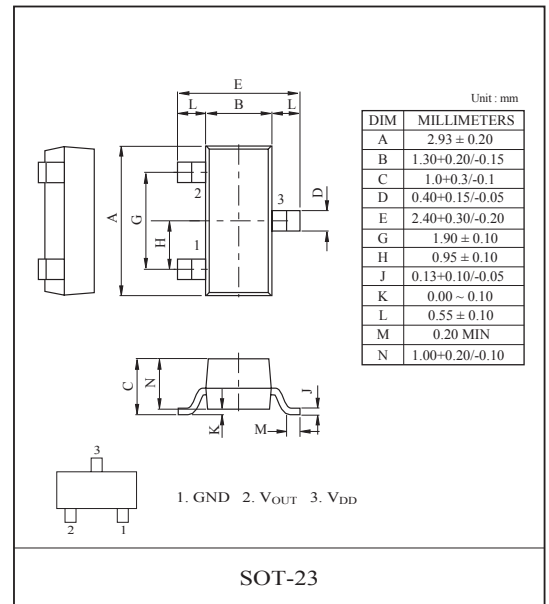
SOT-23



TSV

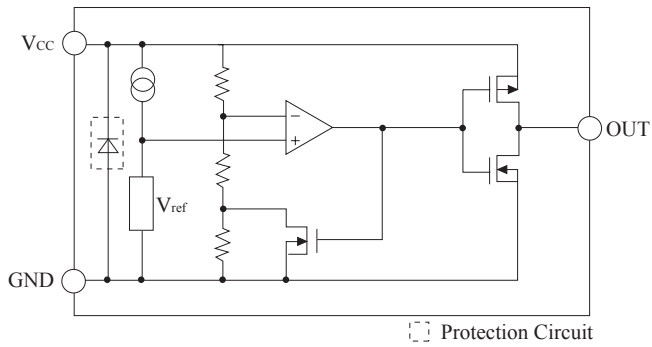


TO-92



# KIC7108~7160M/T5/P

## Block Diagram



Pin No		Symbol	Function
SOT-23	TSV		
1	3	GND	GND
2	1	V <sub>OUT</sub>	Detector Output
3	2	V <sub>DD</sub>	Power Supply Voltage
-	4.5	NC	No Connection.

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**   1   □□   □□  
 ①            ②            ③

NO.	Specifications	Description	
①	Function & Output Type	-	
②	Detection Voltage	0.8 ~ 6.0V	
③	Package	M	SOT - 23
		T5	TSV
		P	TO-92

# KIC7108~7160M/T5/P

## Line-up

Detection voltage	SOT-23 / TSV		TO-92		Detection voltage	SOT-23 / TSV		TO-92	
	Item	Marking	Item	Marking		Item	Marking	Item	Marking
0.8V	KIC7108M/T5	108	KIC7108P	KIC7108	3.5V	KIC7135M/T5	135	KIC7135P	KIC7135
0.9V	KIC7109M/T5	109	KIC7109P	KIC7109	3.6V	KIC7136M/T5	136	KIC7136P	KIC7136
1.0V	KIC7110M/T5	110	KIC7110P	KIC7110	3.7V	KIC7137M/T5	137	KIC7137P	KIC7137
1.1V	KIC7111M/T5	111	KIC7111P	KIC7111	3.8V	KIC7138M/T5	138	KIC7138P	KIC7138
1.2V	KIC7112M/T5	112	KIC7112P	KIC7112	3.9V	KIC7139M/T5	139	KIC7139P	KIC7139
1.3V	KIC7113M/T5	113	KIC7113P	KIC7113	4.0V	KIC7140M/T5	140	KIC7140P	KIC7140
1.4V	KIC7114M/T5	114	KIC7114P	KIC7114	4.1V	KIC7141M/T5	141	KIC7141P	KIC7141
1.5V	KIC7115M/T5	115	KIC7115P	KIC7115	4.2V	KIC7142M/T5	142	KIC7142P	KIC7142
1.6V	KIC7116M/T5	116	KIC7116P	KIC7116	4.3V	KIC7143M/T5	143	KIC7143P	KIC7143
1.7V	KIC7117M/T5	117	KIC7117P	KIC7117	4.4V	KIC7144M/T5	144	KIC7144P	KIC7144
1.8V	KIC7118M/T5	118	KIC7118P	KIC7118	4.5V	KIC7145M/T5	145	KIC7145P	KIC7145
1.9V	KIC7119M/T5	119	KIC7119P	KIC7119	4.6V	KIC7146M/T5	146	KIC7146P	KIC7146
2.0V	KIC7120M/T5	120	KIC7120P	KIC7120	4.7V	KIC7147M/T5	147	KIC7147P	KIC7147
2.1V	KIC7121M/T5	121	KIC7121P	KIC7121	4.8V	KIC7148M/T5	148	KIC7148P	KIC7148
2.2V	KIC7122M/T5	122	KIC7122P	KIC7122	4.9V	KIC7149M/T5	149	KIC7149P	KIC7149
2.3V	KIC7123M/T5	123	KIC7123P	KIC7123	5.0V	KIC7150M/T5	150	KIC7150P	KIC7150
2.4V	KIC7124M/T5	124	KIC7124P	KIC7124	5.1V	KIC7151M/T5	151	KIC7151P	KIC7151
2.5V	KIC7125M/T5	125	KIC7125P	KIC7125	5.2V	KIC7152M/T5	152	KIC7152P	KIC7152
2.6V	KIC7126M/T5	126	KIC7126P	KIC7126	5.3V	KIC7153M/T5	153	KIC7153P	KIC7153
2.7V	KIC7127M/T5	127	KIC7127P	KIC7127	5.4V	KIC7154M/T5	154	KIC7154P	KIC7154
2.8V	KIC7128M/T5	128	KIC7128P	KIC7128	5.5V	KIC7155M/T5	155	KIC7155P	KIC7155
2.9V	KIC7129M/T5	129	KIC7129P	KIC7129	5.6V	KIC7156M/T5	156	KIC7156P	KIC7156
3.0V	KIC7130M/T5	130	KIC7130P	KIC7130	5.7V	KIC7157M/T5	157	KIC7157P	KIC7157
3.1V	KIC7131M/T5	131	KIC7131P	KIC7131	5.8V	KIC7158M/T5	158	KIC7158P	KIC7158
3.2V	KIC7132M/T5	132	KIC7132P	KIC7132	5.9V	KIC7159M/T5	159	KIC7159P	KIC7159
3.3V	KIC7133M/T5	133	KIC7133P	KIC7133	6.0V	KIC7160M/T5	160	KIC7160P	KIC7160
3.4V	KIC7134M/T5	134	KIC7134P	KIC7134					

# KIC7108~7160M/T5/P

## ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

ITEM	SYMBOL	RATING		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
Power Dissipation	$P_D$	SOT-23	350 * Note 1)	mW
		TSV	900 * Note 2)	
		TO-92	400	
Operating Junction Temperature	$T_j$	-40~+150		°C
Operating temperature	$T_{OPR}$	-40~+105		°C
Storage temperature	$T_{STG}$	-65~+150		°C

\* Note 1) Package Mounted on 99.5% Alumina (10×8×0.6mm)

\* Note 2) Package Mounted on a Ceramic board (600mm<sup>2</sup>×0.8mm)

## Recommended Operating Conditions

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

## Electrical characteristics : Unless Otherwise Specified Ta=25°C

ITEM	SYMBOL	MEASUREMENT CONDITIONS	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Supply current	$I_{DD}$	$V_{DD} = V_{TH} + 1V$	-	0.25	1.0	uA	(1)
Reset threshold	$V_{TH}$	Ta = +25°C	$V_{TH}-1\%$	$V_{TH}$	$V_{TH}+1\%$	V	(2)
		Ta = -40~+85°C (note1)	$V_{TH}-2.5\%$	0.8~6.0V (0.1Vstep)	$V_{TH}+2.5\%$		
Reset threshold hysteresis	$\Delta V_{TH}$	$V_{DD}=0V \rightarrow V_{TH}+1V \rightarrow 0V$	$V_{TH} \times 0.03$	-	$V_{TH} \times 0.08$	V	(2)
Reset threshold temp. coefficient	$\Delta V_{TH}/^{\circ}C$	Ta=-40~+85°C (note 1)	-	± 100	-	ppm/°C	(2)
L transfer delay time	$t_{PHL}$	$V_{DD}=V_{TH}+0.4V \rightarrow V_{TH}-0.4V$ (note 2)	-	-	100	us	(5)
H transfer delay time	$t_{PLH}$	$V_{DD}=V_{TH}+0.4V \rightarrow V_{TH}-0.4V$ (note 2)	-	-	100	us	(5)
"L" output current	$I_{OL1}$	$V_{DD}=0.7V, V_{DS}=0.05V$	0.01	0.10	-	mA	(3)
	$I_{OL2}$	$V_{DD}=1.2V, V_{DS}=0.5V$ $V_{TH} > 1.3V$	0.23	2.00			
	$I_{OL3}$	$V_{DD}=2.4V, V_{DS}=0.5V$ $V_{TH} > 2.5V$	1.60	8.00			
	$I_{OL4}$	$V_{DD}=3.6V, V_{DS}=0.5V$ $V_{TH} > 3.7V$	3.20	12.0			
"H" output current	$I_{OH1}$	$V_{DD}=4.8V, V_{DS}=0.5V, V_{TH} < 4.7V$	0.36	0.62	-	mA	(4)
	$I_{OH2}$	$V_{DD}=6.1V, V_{DS}=0.5V, V_{TH} < 5.9V$	0.46	0.75			

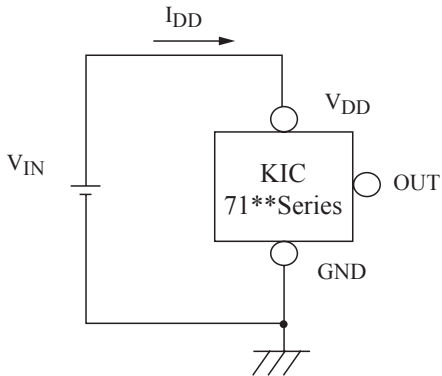
note 1: This device is tested at Ta=25°C, over temperature limits guaranteed by design only.

note 2: The parameter is guaranteed by design.

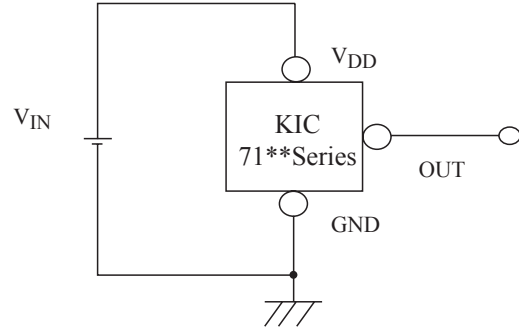
# KIC7108~7160M/T5/P

## Test Circuits

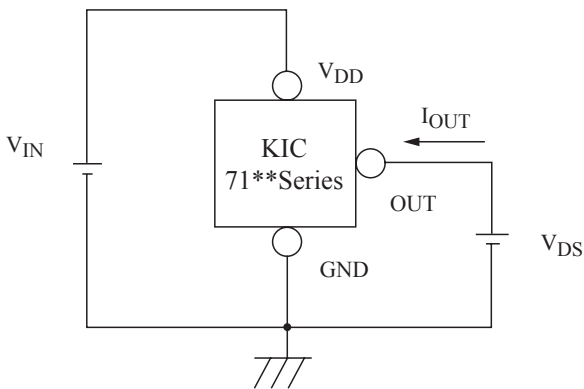
(1)  $I_{DD}$



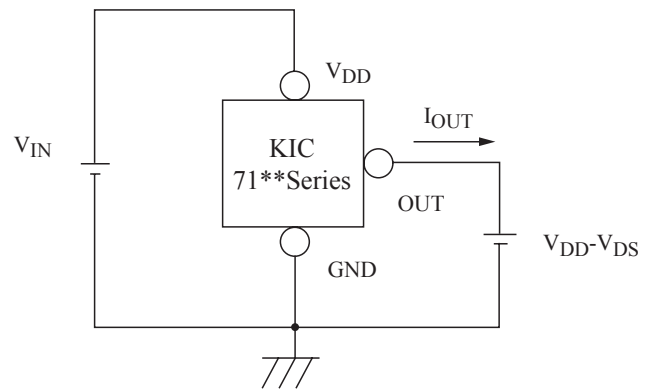
(2)  $V_{TH}$ ,  $\Delta V_{TH}$ ,  $\Delta V_{TH}/^{\circ}C$



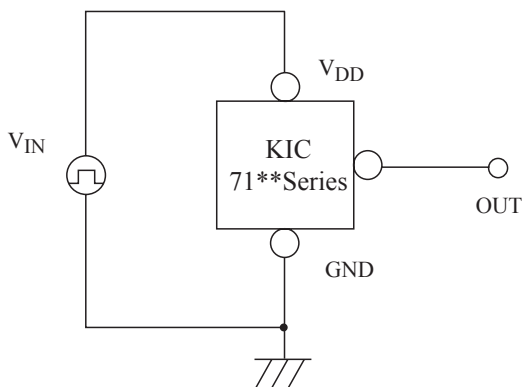
(3)  $I_{OL1}$ ,  $I_{OL2}$ ,  $I_{OL3}$ ,  $I_{OL4}$



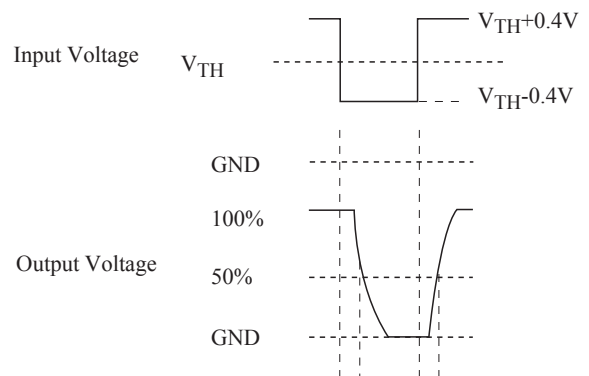
(4)  $I_{OH1}$ ,  $I_{OH2}$



(5)  $T_{PLH}$ ,  $T_{PHL}$

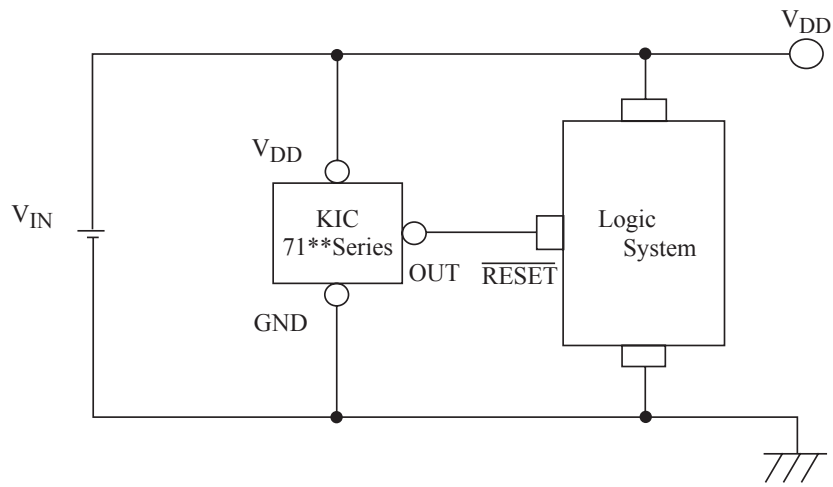


Test Wave



# KIC7108~7160M/T5/P

## Application Circuit



# KIC7108~7160M/T5/P

## Typical Characteristics (Typical Performance Characteristics 2.8V)

note : These are typical characteristics

Fig1. Detecting Voltage

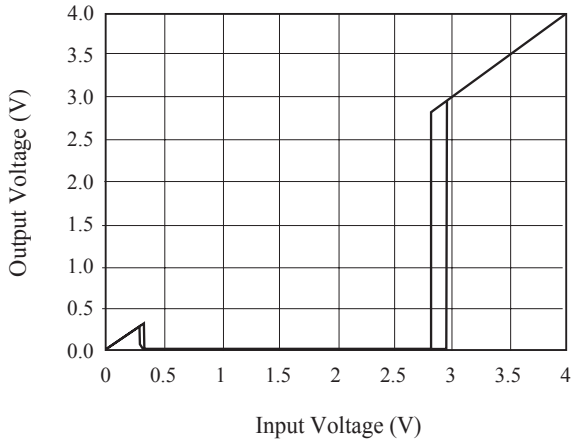


Fig2. Supply Current

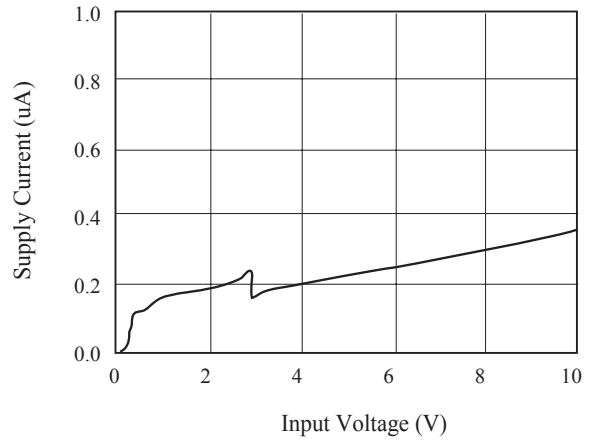


Fig3. Detecting Voltage vs Temperature

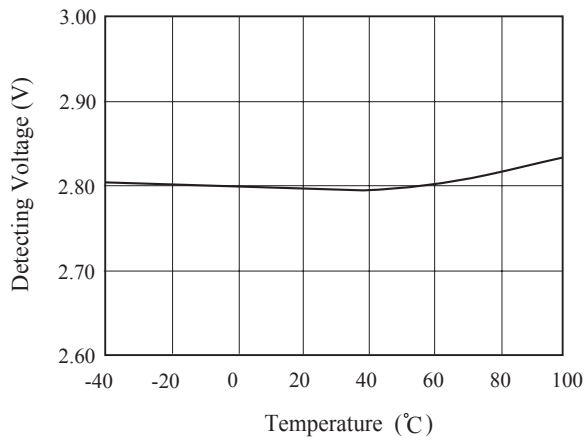


Fig4. Hysteresis Voltage vs Temperature

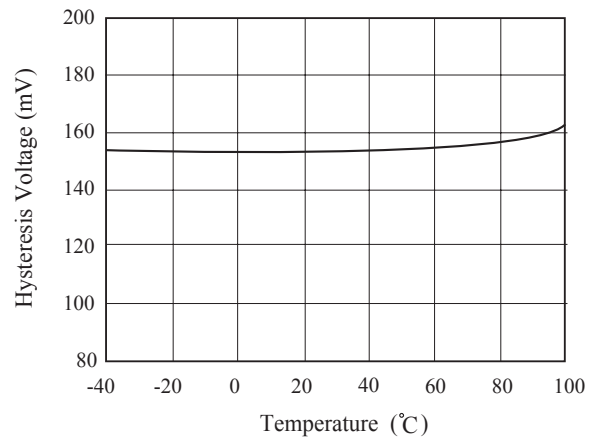


Fig5. "L" Output Current 1 vs Temperature

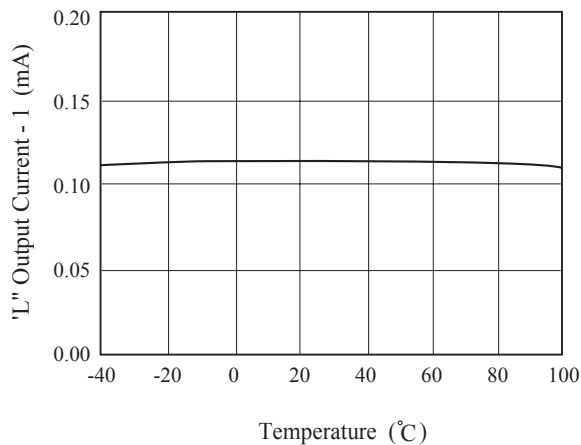
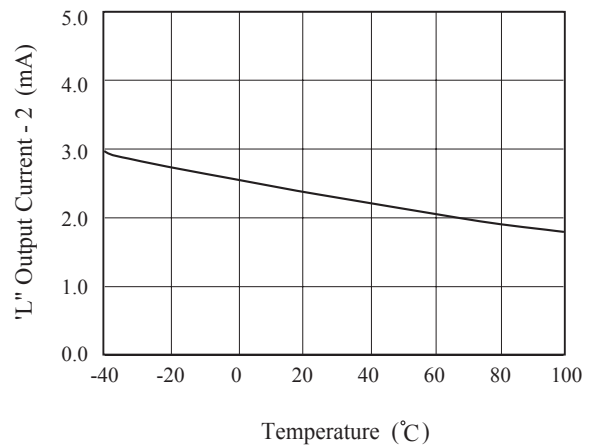
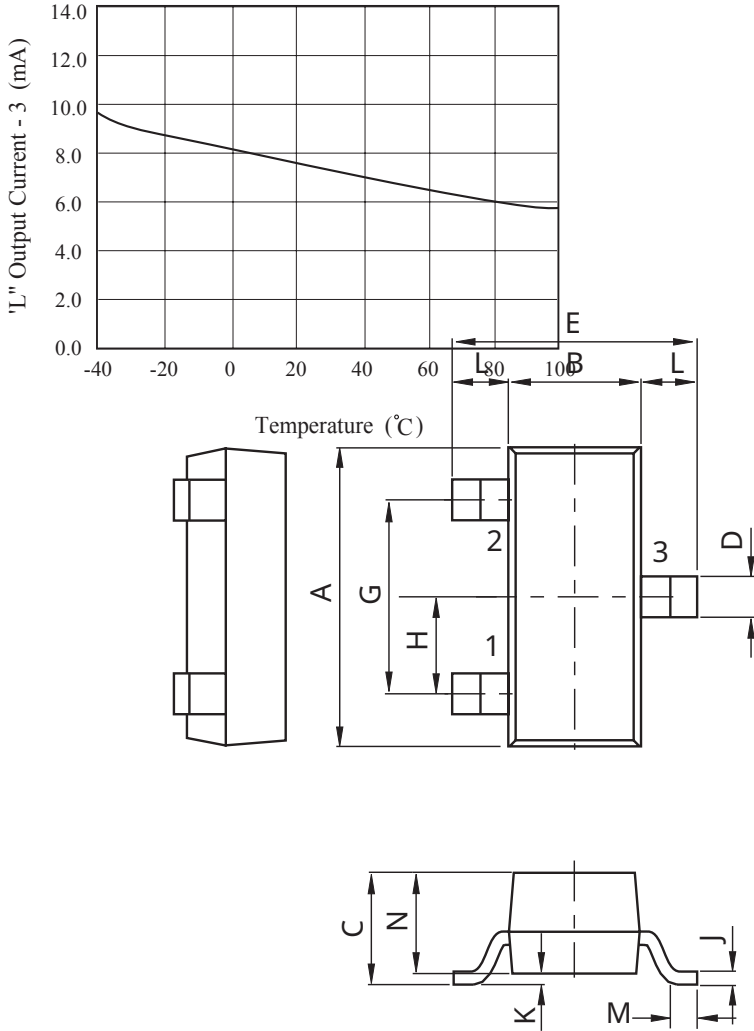


Fig6. "L" Output Current 2 vs Temperature



# KIC7108~7160M/T5/P

Fig7. "L" Output Current 3 vs Temperature



Unit : mm

DIM	MILLIMETERS
A	2.93 ± 0.20
B	1.30+0.20/-0.15
C	1.0+0.3/-0.1
D	0.40+0.15/-0.05
E	2.40+0.30/-0.20
G	1.90 ± 0.10
H	0.95 ± 0.10
J	0.13+0.10/-0.05
K	0.00 ~ 0.10
L	0.55 ± 0.10
M	0.20 MIN
N	1.00+0.20/-0.10