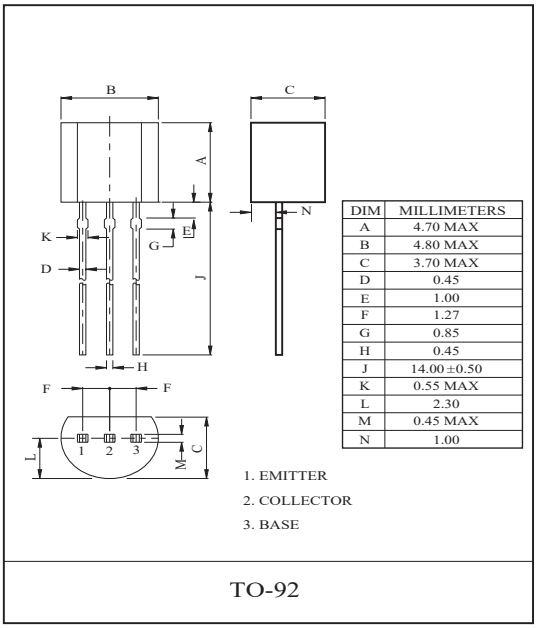
# KRA101~KRA106

## EPITAXIAL PLANAR PNP TRANSISTOR

SWITCHING APPLICATION.
INTERFACE CIRCUIT AND DRIVER CIRCUIT APPLICATION.

FEATURES

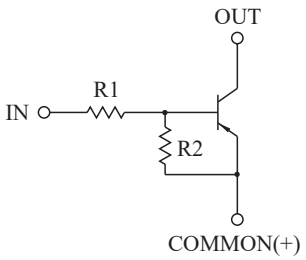
- With Built-in Bias Resistors.
- Simplify Circuit Design.
- Reduce a Quantity of Parts and Manufacturing Process.




| DIM | MILLIMETERS |
|---|---|
| A | 4.70 MAX |
| B | 4.80 MAX |
| C | 3.70 MAX |
| D | 0.45 |
| E | 1.00 |
| F | 1.27 |
| G | 0.85 |
| H | 0.45 |
| J | 14.00±0.50 |
| K | 0.55 MAX |
| L | 2.30 |
| M | 0.45 MAX |
| N | 1.00 |

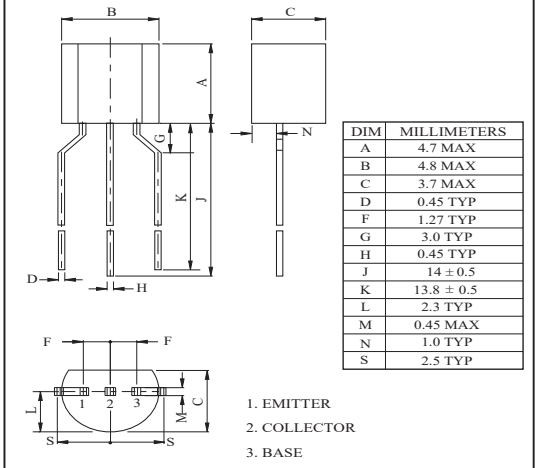
TO-92

EQUIVALENT CIRCUIT




BIAS RESISTOR VALUES

| TYPE NO. | R1(kΩ) | R2(kΩ) |
|---|---|---|
| KRA101 | 4.7 | 4.7 |
| KRA102 | 10 | 10 |
| KRA103 | 22 | 22 |
| KRA104 | 47 | 47 |
| KRA105 | 2.2 | 47 |
| KRA106 | 4.7 | 47 |




| DIM | MILLIMETERS |
|---|---|
| A | 4.7 MAX |
| B | 4.8 MAX |
| C | 3.7 MAX |
| D | 0.45 TYP |
| F | 1.27 TYP |
| G | 3.0 TYP |
| H | 0.45 TYP |
| J | 14 ± 0.5 |
| K | 13.8 ± 0.5 |
| L | 2.3 TYP |
| M | 0.45 MAX |
| N | 1.0 TYP |
| S | 2.5 TYP |

TO-92 AT TAPING TYPE

MAXIMUM RATING (Ta=25℃)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Output Voltage | KRA101~106 | $V_O$ | -50 | V |
| Input Voltage | KRA101 | $V_I$ | -20, 10 | V |
| | KRA102 | | -30, 10 | |
| | KRA103 | | -40, 10 | |
| | KRA104 | | -40, 10 | |
| | KRA105 | | -12, 5 | |
| | KRA106 | | -20, 5 | |
| Output Current | KRA101~106 | $I_O$ | -100 | mA |
| Power Dissipation | | $P_D$ | 625 | mW |
| Junction Temperature | | $T_j$ | -55~150 | ℃ |
| Storage Temperature Range | | $T_{stg}$ | -55~150 | ℃ |

ELECTRICAL CHARACTERISTICS (Ta=25℃)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Output Cut-off Current | KRA101~106 | $I_{O(OFF)}$ | $V_O$=-50V, $V_I$=0 | - | - | -500 | nA |
| DC Current Gain | KRA101 | $G_I$ | $V_O$=-5V, $I_O$=-10mA | 30 | 55 | - | |
| | KRA102 | | | 50 | 80 | - | |
| | KRA103 | | | 70 | 120 | - | |
| | KRA104 | | | 80 | 200 | - | |
| | KRA105 | | | 80 | 200 | - | |
| | KRA106 | | | 80 | 200 | - | |
| Output Voltage | KRA101~106 | $V_{O(ON)}$ | $I_O$=-10mA, $I_I$=-0.5mA | - | -0.1 | -0.3 | V |
| Input Voltage (ON) | KRA101 | $V_{I(ON)}$ | $V_O$=-0.2V, $I_O$=-5mA | - | -1.5 | -2.0 | V |
| | KRA102 | | | - | -1.8 | -2.4 | |
| | KRA103 | | | - | -2.1 | -3.0 | |
| | KRA104 | | | - | -2.8 | -5.0 | |
| | KRA105 | | | - | -0.8 | -1.1 | |
| | KRA106 | | | - | -0.9 | -1.3 | |
| Input Votlage (OFF) | KRA101~104 | $V_{I(OFF)}$ | $V_O$=-5V, $I_O$=-0.1mA | -1.0 | -1.2 | - | V |
| | KRA105~106 | | | -0.5 | -0.65 | - | |
| Transition Frequency | KRA101~106 | $f_T$* | $V_O$=-10V, $I_O$=-5mA | - | 200 | - | MHz |
| Input Current | KRA101 | $I_I$ | $V_I$=-5V | - | - | -1.8 | mA |
| | KRA102 | | | - | - | -0.88 | |
| | KRA103 | | | - | - | -0.36 | |
| | KRA104 | | | - | - | -0.18 | |
| | KRA105 | | | - | - | -3.6 | |
| | KRA106 | | | - | - | -1.8 | |
| Input Resistor | KRA101 | R1 | - | 3.29 | 4.7 | 6.11 | kΩ |
| | KRA102 | | | 7 | 10 | 13 | |
| | KRA103 | | | 15.4 | 22 | 28.6 | |
| | KRA104 | | | 32.9 | 47 | 61.1 | |
| | KRA105 | | | 1.54 | 2.2 | 2.86 | |
| | KRA106 | | | 3.29 | 4.7 | 6.11 | |
| Input Resistor | KRA101 | R2 | - | 3.29 | 4.7 | 6.11 | kΩ |
| | KRA102 | | | 7 | 10 | 13 | |
| | KRA103 | | | 15.4 | 22 | 28.6 | |
| | KRA104 | | | 32.9 | 47 | 61.1 | |
| | KRA105 | | | 32.9 | 47 | 61.1 | |
| | KRA106 | | | 32.9 | 47 | 61.1 | |

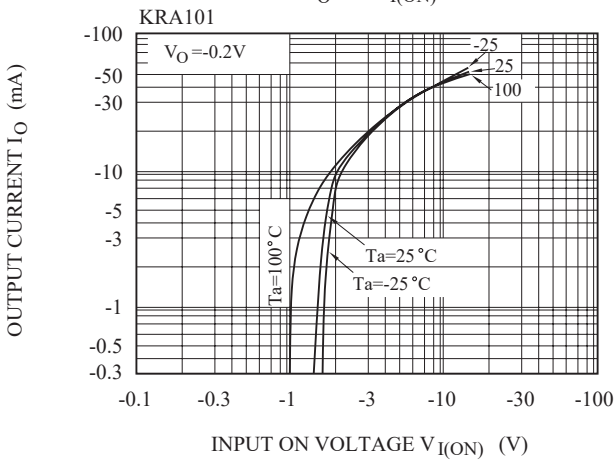
Note : *Characteristic of Transistor Only

ELECTRICAL CHARACTERISTICS (Ta=25℃)

| CHARACTERISTIC | | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|---|
| Switching Time | Rise Time | KRA101 | $t_r$ | $V_O$=-5V<br>$V_{IN}$=-5V<br>$R_L$=1kΩ | - | 0.07 | - | μS |
| | | KRA102 | | | - | 0.06 | - | |
| | | KRA103 | | | - | 0.2 | - | |
| | | KRA104 | | | - | 0.24 | - | |
| | | KRA105 | | | - | 0.02 | - | |
| | | KRA106 | | | - | 0.07 | - | |
| | Storage Time | KRA101 | $t_{stg}$ | | - | 1.1 | - | |
| | | KRA102 | | | - | 1.1 | - | |
| | | KRA103 | | | - | 1.1 | - | |
| | | KRA104 | | | - | 1.1 | - | |
| | | KRA105 | | | - | 1.1 | - | |
| | | KRA106 | | | - | 1.1 | - | |
| | Fall Time | KRA101 | $t_f$ | | - | 0.15 | - | |
| | | KRA102 | | | - | 0.24 | - | |
| | | KRA103 | | | - | 0.38 | - | |
| | | KRA104 | | | - | 0.63 | - | |
| | | KRA105 | | | - | 0.1 | - | |
| | | KRA106 | | | - | 0.2 | - | |

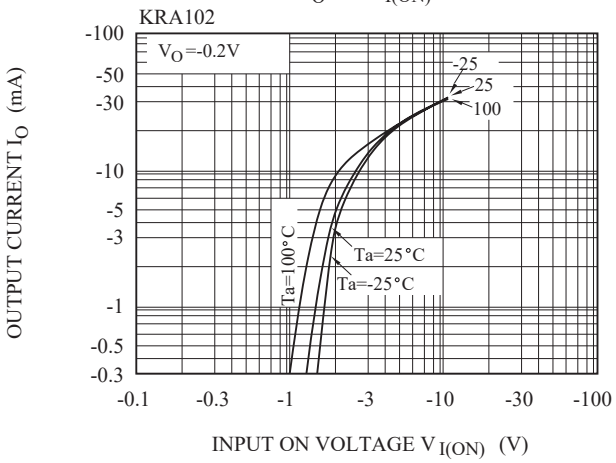
$I_O$ - $V_{I(ON)}$

KRA101



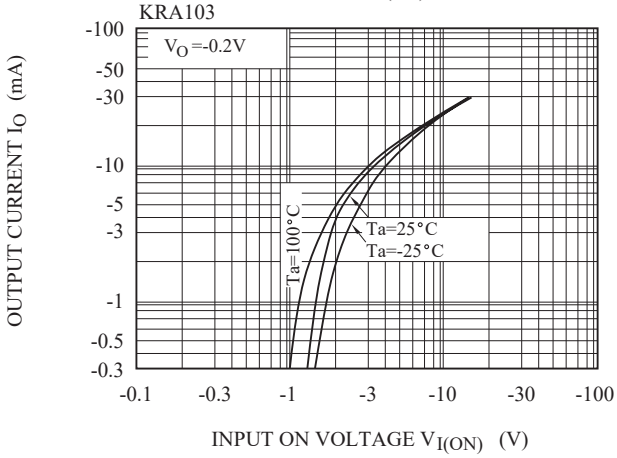

$I_O$ - $V_{I(ON)}$

KRA102



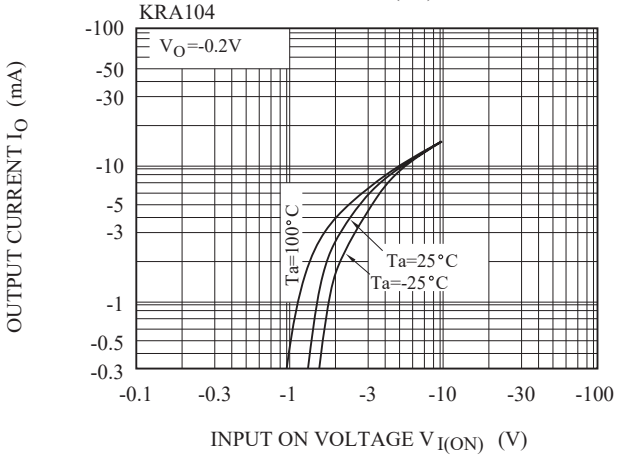

$I_O$ - $V_{I(ON)}$

KRA103



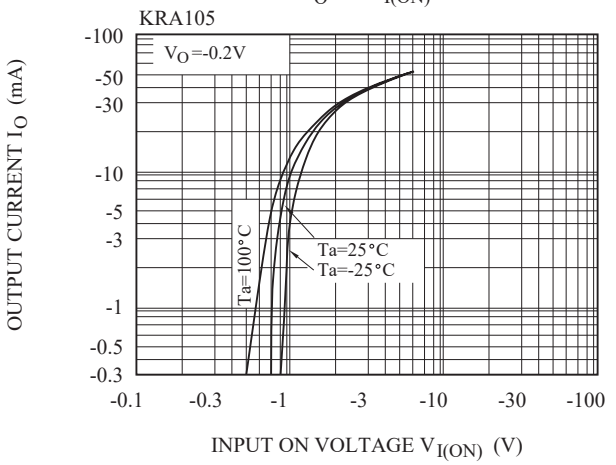

$I_O$ - $V_{I(ON)}$

KRA104



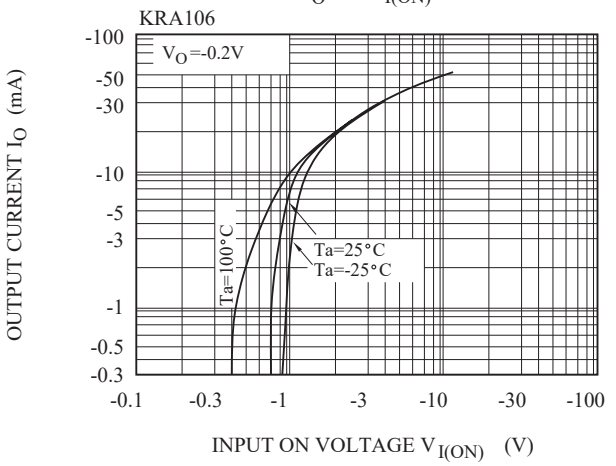

$I_O$ - $V_{I(ON)}$

KRA105



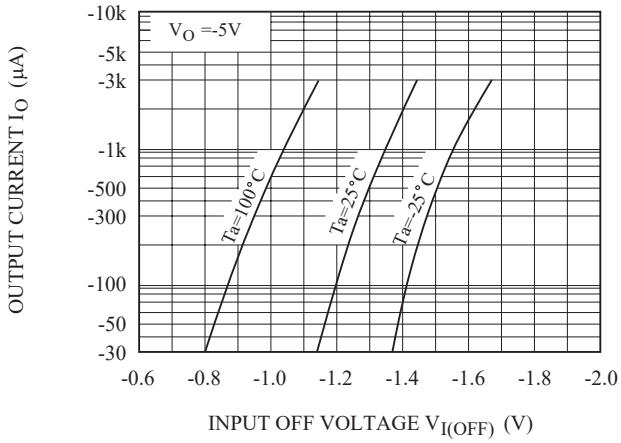

$I_O$ - $V_{I(ON)}$

KRA106



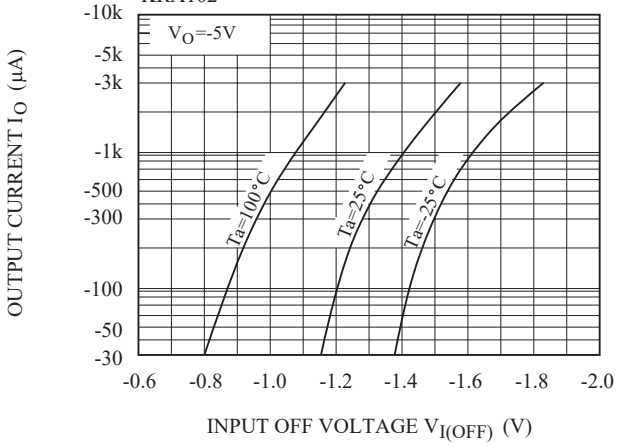
$I_O$ - $V_{I(OFF)}$

KRA101



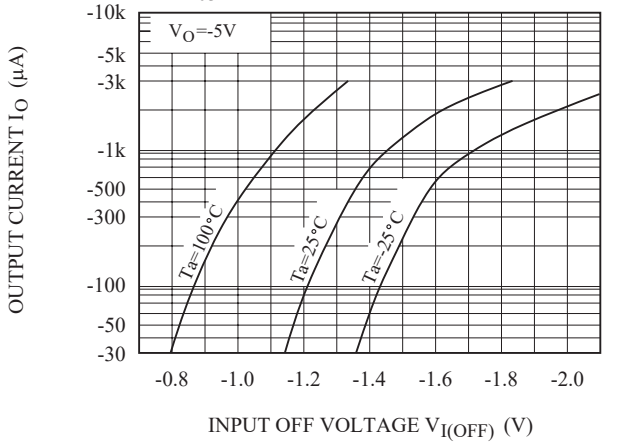

$I_O$ - $V_{I(OFF)}$

KRA102



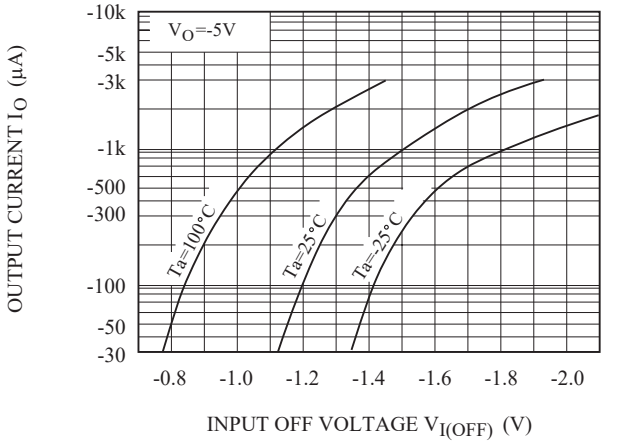

$I_O$ - $V_{I(OFF)}$

KRA103



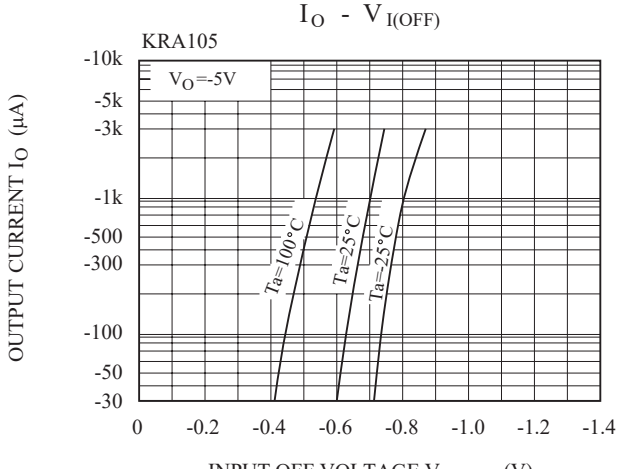

$I_O$ - $V_{I(OFF)}$

KRA104



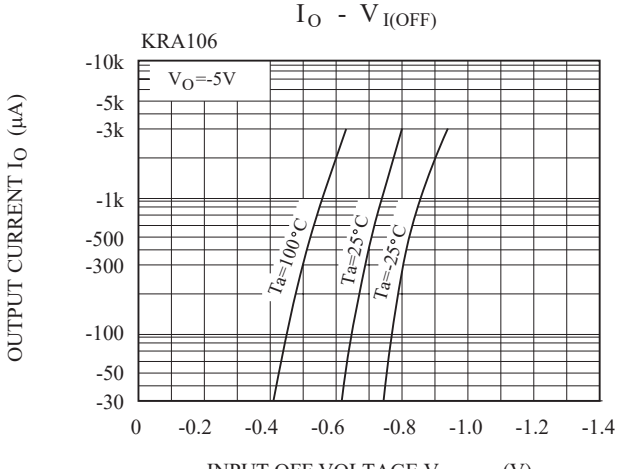

$I_O$ - $V_{I(OFF)}$

KRA105



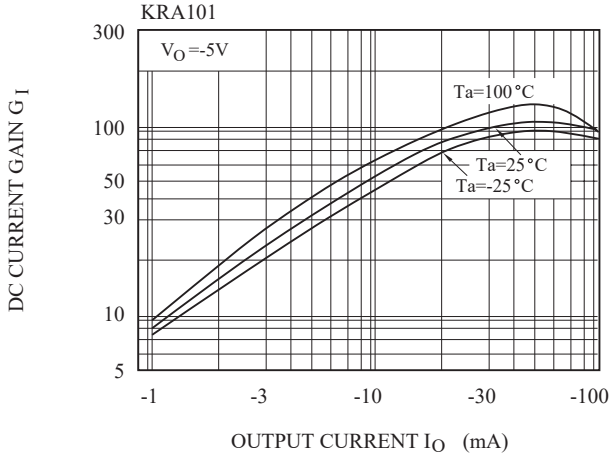

$I_O$ - $V_{I(OFF)}$

KRA106



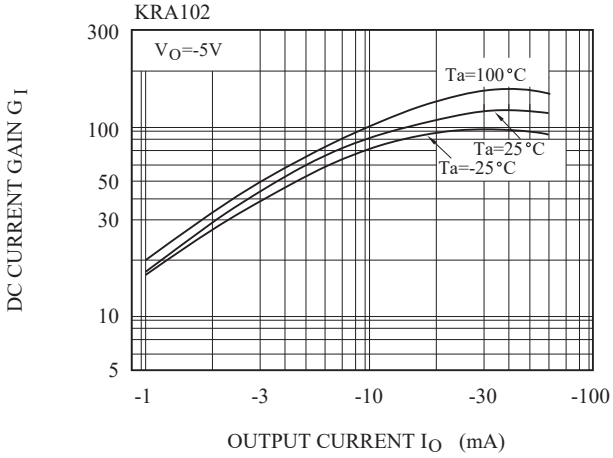
$G_I$ - $I_O$

KRA101



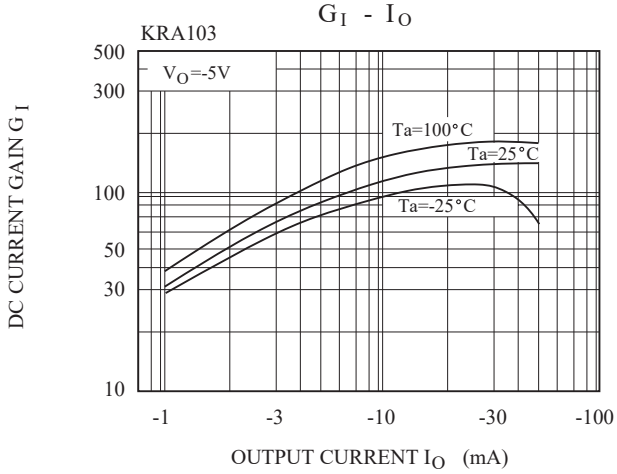

$G_I$ - $I_O$

KRA102



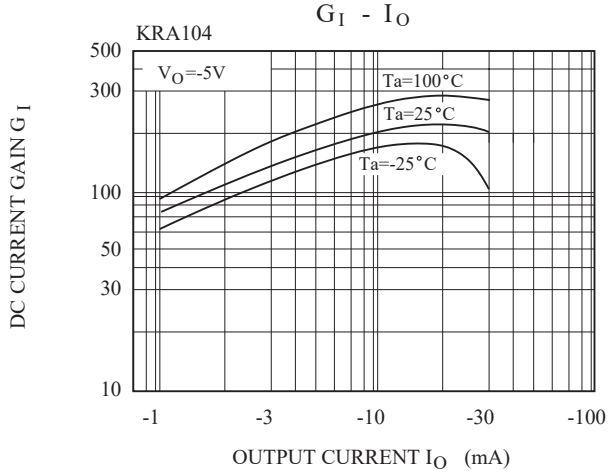

$G_I$ - $I_O$

KRA103



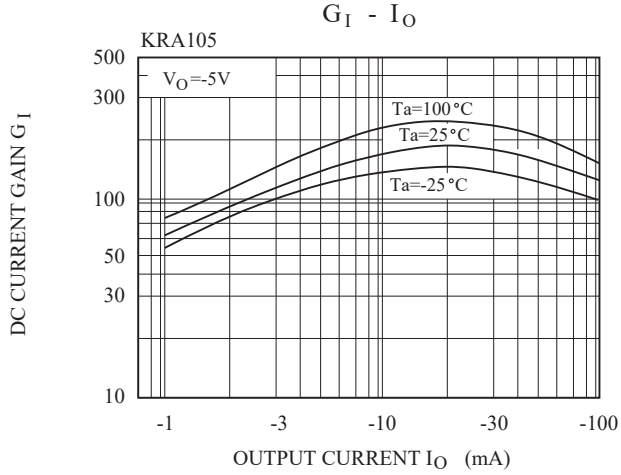

$G_I$ - $I_O$

KRA104




$G_I$ - $I_O$

KRA105




$G_I$ - $I_O$

KRA106