

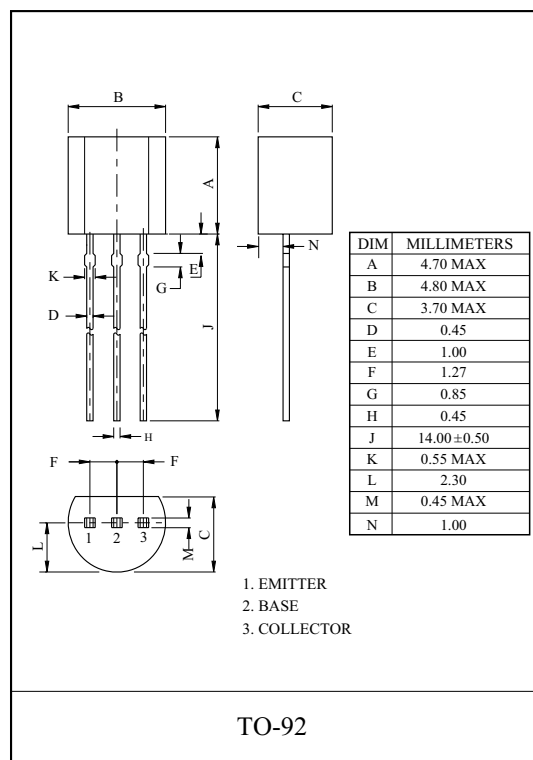
GENERAL PURPOSE APPLICATION.  
SWITCHING APPLICATION.

### FEATURES

- Low Leakage Current  
:  $I_{CEX}=10\text{nA}(\text{Max.})$  ;  $V_{CE}=60\text{V}$ ,  $V_{EB(\text{OFF})}=3\text{V}$ .
- Low Saturation Voltage  
:  $V_{CE(\text{sat})}=0.3\text{V}(\text{Max.})$  ;  $I_C=150\text{mA}$ ,  $I_B=15\text{mA}$ .
- Complementary to the KTN2907/2907A.
- KTN2222/2222A Electrically Similar to 2N2222/2222A.

### MAXIMUM RATING (Ta=25 °C)

| CHARACTERISTIC                            | SYMBOL    | RATING    |          | UNIT |
|-------------------------------------------|-----------|-----------|----------|------|
|                                           |           | KTN2222   | KTN2222A |      |
| Collector-Base Voltage                    | $V_{CBO}$ | 60        | 75       | V    |
| Collector-Emitter Voltage                 | $V_{CEO}$ | 30        | 40       | V    |
| Emitter-Base Voltage                      | $V_{EBO}$ | 5         | 6        | V    |
| Collector Current                         | $I_C$     | 600       |          | mA   |
| Collector Power Dissipation<br>(Ta=25 °C) | $P_C$     | 625       |          | mW   |
| Junction Temperature                      | $T_j$     | 150       |          | °C   |
| Storage Temperature Range                 | $T_{stg}$ | -55 ~ 150 |          | °C   |



# KTN2222/A

## ELECTRICAL CHARACTERISTICS (Ta=25 °C)

| CHARACTERISTIC                         |                     | SYMBOL         | TEST CONDITION                   | MIN. | TYP. | MAX. | UNIT    |
|----------------------------------------|---------------------|----------------|----------------------------------|------|------|------|---------|
| Collector Cut-off Current              | KTN2222A            | $I_{CEX}$      | $V_{CE}=60V, V_{EB(OFF)}=3V$     | -    | -    | 10   | nA      |
| Collector Cut-off Current              | KTN2222             | $I_{CBO}$      | $V_{CB}=50V, I_E=0$              | -    | -    | 0.01 | $\mu A$ |
|                                        | KTN2222A            |                | $V_{CB}=60V, I_E=0$              | -    | -    | 0.01 |         |
| Emitter Cut-off Current                | KTN2222A            | $I_{EBO}$      | $V_{EB}=3V, I_C=0$               | -    | -    | 10   | nA      |
| Collector-Base Breakdown Voltage       | KTN2222             | $V_{(BR)CBO}$  | $I_C=10\mu A, I_E=0$             | 60   | -    | -    | V       |
|                                        | KTN2222A            |                |                                  | 75   | -    | -    |         |
| Collector-Emitter Breakdown Voltage *  | KTN2222             | $V_{(BR)CEO}$  | $I_E=10mA, I_B=0$                | 30   | -    | -    | V       |
|                                        | KTN2222A            |                |                                  | 40   | -    | -    |         |
| Emitter-Base Breakdown Voltage         | KTN2222             | $V_{(BR)EBO}$  | $I_E=10\mu A, I_C=0$             | 5    | -    | -    | V       |
|                                        | KTN2222A            |                |                                  | 6    | -    | -    |         |
| DC Current Gain *                      | KTN2222<br>KTN2222A | $h_{FE(1)}$    | $I_C=0.1mA, V_{CE}=10V$          | 35   | -    | -    |         |
|                                        |                     | $h_{FE(2)}$    | $I_C=1mA, V_{CE}=10V$            | 50   | -    | -    |         |
|                                        |                     | $h_{FE(3)}$    | $I_C=10mA, V_{CE}=10V$           | 75   | -    | -    |         |
|                                        |                     | $h_{FE(4)}$    | $I_C=150mA, V_{CE}=10V$          | 100  | -    | 300  |         |
|                                        | KTN2222<br>KTN2222A | $h_{FE(5)}$    | $I_C=500mA, V_{CE}=10V$          | 30   | -    | -    |         |
|                                        |                     |                |                                  | 40   | -    | -    |         |
| Collector-Emitter Saturation Voltage * | KTN2222             | $V_{CE(sat)1}$ | $I_C=150mA, I_B=15mA$            | -    | -    | 0.4  | V       |
|                                        | KTN2222A            |                |                                  | -    | -    | 0.3  |         |
|                                        | KTN2222             | $V_{CE(sat)2}$ | $I_C=500mA, I_B=50mA$            | -    | -    | 1.6  |         |
|                                        | KTN2222A            |                |                                  | -    | -    | 1    |         |
| Base-Emitter Saturation Voltage *      | KTN2222             | $V_{BE(sat)1}$ | $I_C=150mA, I_B=15mA$            | -    | -    | 1.3  | V       |
|                                        | KTN2222A            |                |                                  | 0.6  | -    | 1.2  |         |
|                                        | KTN2222             | $V_{BE(sat)2}$ | $I_C=500mA, I_B=50mA$            | -    | -    | 2.6  |         |
|                                        | KTN2222A            |                |                                  | -    | -    | 2.0  |         |
| Transition Frequency                   | KTN2222             | $f_T$          | $I_C=20mA, V_{CE}=20V, f=100MHz$ | 250  | -    | -    | MHz     |
|                                        | KTN2222A            |                |                                  | 300  | -    | -    |         |
| Collector Output Capacitance           |                     | $C_{ob}$       | $V_{CB}=10V, I_E=0, f=1.0MHz$    | -    | -    | 8    | pF      |
| Input Capacitance                      | KTN2222             | $C_{ib}$       | $V_{EB}=0.5V, I_C=0, f=1.0MHz$   | -    | -    | 30   | pF      |
|                                        | KTN2222A            |                |                                  | -    | -    | 25   |         |

\* Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

# KTN2222/A

## ELECTRICAL CHARACTERISTICS (Ta=25 °C)

| CHARACTERISTIC               |              | SYMBOL              | TEST CONDITION                                        | MIN. | TYP. | MAX. | UNIT             |
|------------------------------|--------------|---------------------|-------------------------------------------------------|------|------|------|------------------|
| Input Impedance              | KTN2222A     | $h_{ie}$            | $I_C=1mA, V_{CE}=10V, f=1kHz$                         | 2    | -    | 8    | $k\Omega$        |
|                              |              |                     | $I_C=10mA, V_{CE}=10V, f=1kHz$                        | 0.25 | -    | 1.25 |                  |
| Voltage Feedback Ratio       | KTN2222A     | $h_{re}$            | $I_C=1mA, V_{CE}=10V, f=1kHz$                         | -    | -    | 8    | $\times 10^{-4}$ |
|                              |              |                     | $I_C=10mA, V_{CE}=10V, f=1kHz$                        | -    | -    | 4    |                  |
| Small-Signal Current Gain    | KTN2222A     | $h_{fe}$            | $I_C=1mA, V_{CE}=10V, f=1kHz$                         | 50   | -    | 300  |                  |
|                              |              |                     | $I_C=10mA, V_{CE}=10V, f=1kHz$                        | 75   | -    | 375  |                  |
| Collector Output Admittance  | KTN2222A     | $h_{oe}$            | $I_C=1mA, V_{CE}=10V, f=1kHz$                         | 5    | -    | 35   | $\mu S$          |
|                              |              |                     | $I_C=10mA, V_{CE}=10V, f=1kHz$                        | 25   | -    | 200  |                  |
| Collector-Base Time Constant | KTN2222A     | $C_c \cdot r_{bb'}$ | $I_E=20mA, V_{CB}=20V, f=31.8MHz$                     | -    | -    | 150  | pS               |
| Noise Figure                 | KTN2222A     | NF                  | $I_C=100\mu A, V_{CE}=10V,$<br>$R_g=1k\Omega, f=1kHz$ | -    | -    | 4    | dB               |
| Switching Time               | Delay Time   | $t_d$               | $V_{CC}=30V, V_{BE(OFF)}=0.5V$                        | -    | -    | 10   | nS               |
|                              | Rise Time    | $t_r$               | $I_C=150mA, I_{B1}=15mA$                              | -    | -    | 25   |                  |
|                              | Storage Time | $t_{stg}$           | $V_{CC}=30V, I_C=150mA$                               | -    | -    | 225  |                  |
|                              | Fall Time    | $t_f$               | $I_{B1}=-I_{B2}=15mA$                                 | -    | -    | 60   |                  |

