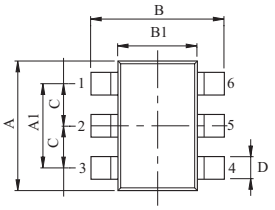
# KTX321U

**EPITAXIAL PLANAR PNP TRANSISTOR**
**N CHANNEL MOS FIELD EFFECT TRANSISTOR**

POWER MANAGEMENT.

FEATURES

· Including two devices in US6.
(Ultra Super mini type with 6 leads)
· Simplify circuit design.
· Reduce a quantity of parts and manufacturing process.

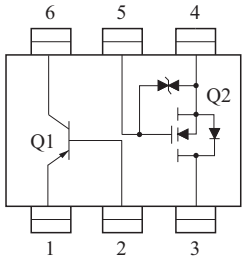



| DIM | MILLIMETERS |
|---|---|
| A | 2.00±0.20 |
| A1 | 1.3±0.1 |
| B | 2.1±0.1 |
| B1 | 1.25± 0.1 |
| C | 0.65 |
| D | 0.2+0.10/-0.05 |
| G | 0-0.1 |
| H | 0.9±0.1 |
| T | 0.15+0.1/-0.05 |

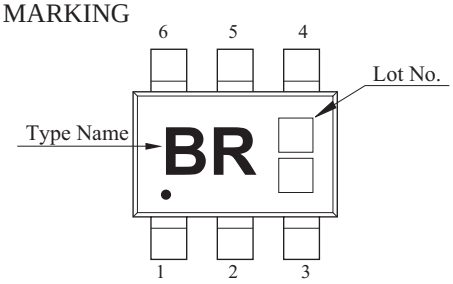
1. $Q_1$ EMITTER
2. $Q_1$ BASE
3. $Q_2$ DRAIN
4. $Q_2$ SOURCE
5. $Q_2$ GATE
6. $Q_1$ COLLECTOR

US6

EQUIVALENT CIRCUIT (TOP VIEW)




MARKING




THIS TRANSISTOR IS ELECTROSTATIC SENSITIVE DEVICE.
PLEASE HANDLE WITH CAUTION.

## $Q_1$ MAXIMUM RATING (Ta=25℃)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -15 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -12 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -6 | V |
| Collector Current | $I_C$ | -500 | mA |
| | $I_{CP*}$ | -1 | A |
| Collector Power Dissipation | $P_{C*}$ | 150 | mW |
| Junction Temperature | $T_j$ | 150 | ℃ |
| Storage Temperature Range | $T_{stg}$ | -55 ~ 150 | ℃ |

* Single Pulse PW=1mS.
** 120mW per element must not be exceeded. Each terminal mounted on a recommended land.

## $Q_2$ MAXIMUM RATING (Ta=25℃)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GSS}$ | ±20 | V |
| DC Drain Current | $I_D$ | 100 | mA |
| Drain Power Dissipation | $P_{C**}$ | 150 | mW |
| Channel Temperature | $T_{ch}$ | 150 | ℃ |
| Storage Temperature Range | $T_{stg}$ | -55 ~ 150 | ℃ |

** 120mW per element must not be exceeded. Each terminal mounted on a recommended land.

$Q_1$ ELECTRICAL CHARACTERISTICS (Ta=25℃)

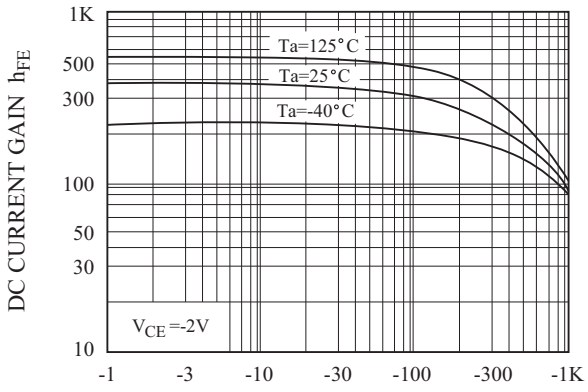
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Collector Cut-off Current | $I_{CBO}$ | $V_{CB}$=-15V, $I_E$=0 | - | - | -100 | nA |
| Emitter Cut-off Current | $I_{EBO}$ | $V_{EB}$=-6V, $I_C$=0 | - | - | -100 | nA |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$=-10㎂ | -15 | - | - | V |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$=-1mA | -12 | - | - | V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$=-10㎂ | -6 | - | - | V |
| DC Current Gain | $h_{FE}$ | $V_{CE}$=-2V, $I_C$=-10mA | 270 | - | 680 | - |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$=-200mA, $I_B$=-10mA | - | -100 | -250 | mV |
| Transition Frequency | $f_T$ | $V_{CE}$=-2V, $I_C$=-10mA, $f_T$=100MHz | - | 260 | - | MHz |
| Collector Output Capacitance | $C_{ob}$ | $V_{CB}$=-10V, $I_E$=0, f=1MHz | - | 6.5 | - | pF |

$Q_2$ ELECTRICAL CHARACTERISTICS (Ta=25℃)

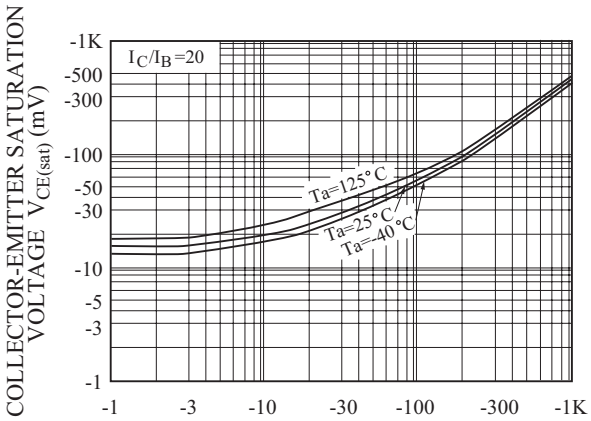
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Gate Leakage Current | | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$=0V | - | - | ±1 | ㎂ |
| Drain-Source Breakdown Voltage | | $V_{(BR)DSS}$ | $I_D$=100㎂, $V_{GS}$=0V | 30 | - | - | V |
| Drain Cut-off Current | | $I_{DSS}$ | $V_{DS}$=30V, $V_{GS}$=0V | - | - | 1 | ㎂ |
| Gate Threshold Voltage | | $V_{th}$ | $V_{DS}$=3V, $I_D$=0.1mA | 0.5 | - | 1.5 | V |
| Forward Transfer Admittance | | $\|Y_{fs}\|$ | $V_{DS}$=3V, $I_D$=10mA | 25 | - | - | mS |
| Drain-Source ON Resistance | | $R_{DS(ON)}$ | $I_D$=10mA, $V_{GS}$=2.5V | - | 4 | 7 | Ω |
| Input Capacitance | | $C_{iss}$ | $V_{DS}$=3V, $V_{GS}$=0V, f=1MHz | - | 8.5 | - | pF |
| Reverse Transfer Capacitance | | $C_{rss}$ | $V_{DS}$=3V, $V_{GS}$=0V, f=1MHz | - | 3.3 | - | pF |
| Output Capacitance | | $C_{oss}$ | $V_{DS}$=3V, $V_{GS}$=0V, f=1MHz | - | 9.3 | - | pF |
| Switching Time | Turn-on Time | $t_{on}$ | $V_{DD}$=5V, $I_D$=10mA, $V_{GS}$=0 ~5V | - | 50 | - | nS |
| | Turn-off Time | $t_{off}$ | | - | 160 | - | nS |

$Q_1$ (PNP TRANSISTOR)

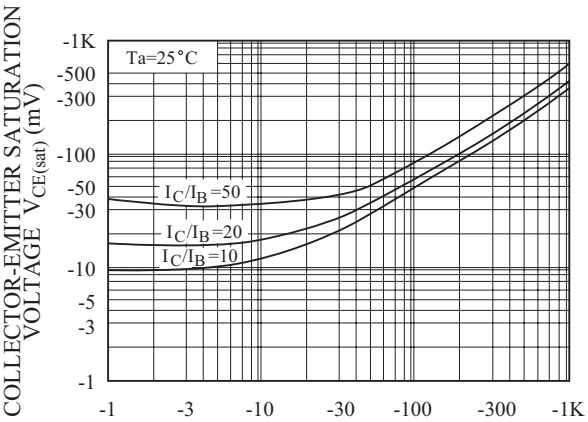
$h_{FE}$ - $I_C$



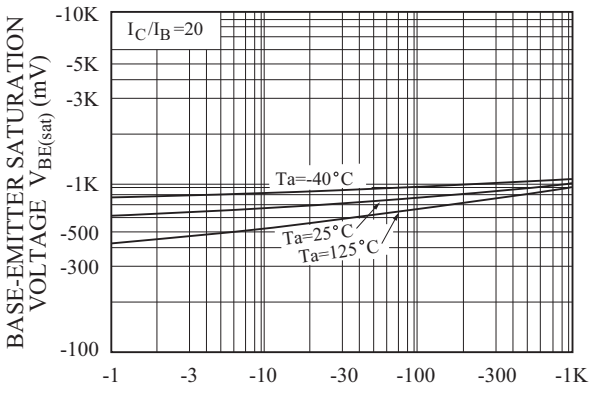

$V_{CE(sat)}$ - $I_C$



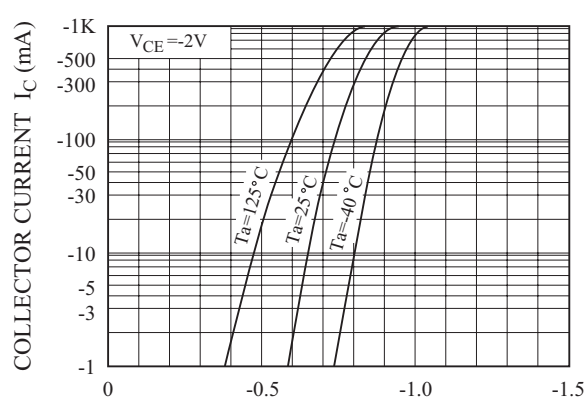

$V_{CE(sat)}$ - $I_C$



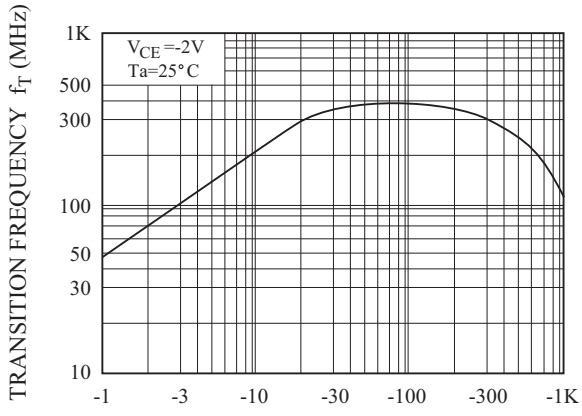

$V_{BE(sat)}$ - $I_C$



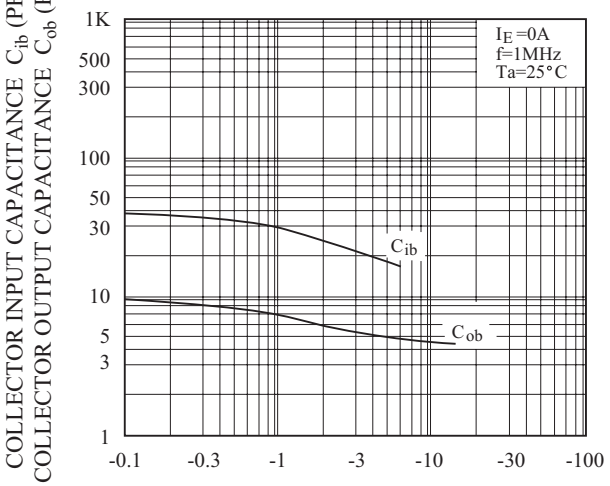

$I_C$ - $V_{BE}$



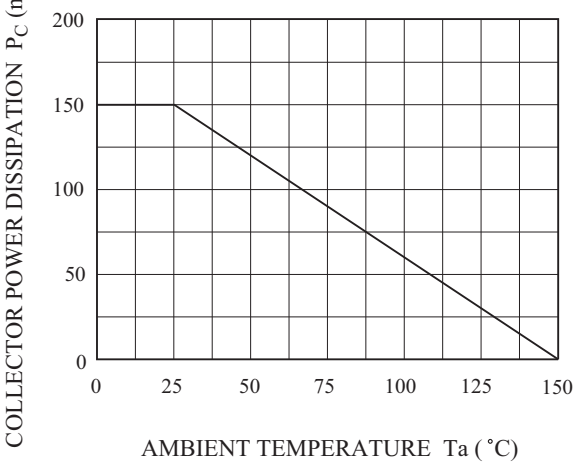

$f_T$ - $I_C$



$C_{ob}$ - $V_{CB}$ , $C_{ib}$ - $V_{EB}$

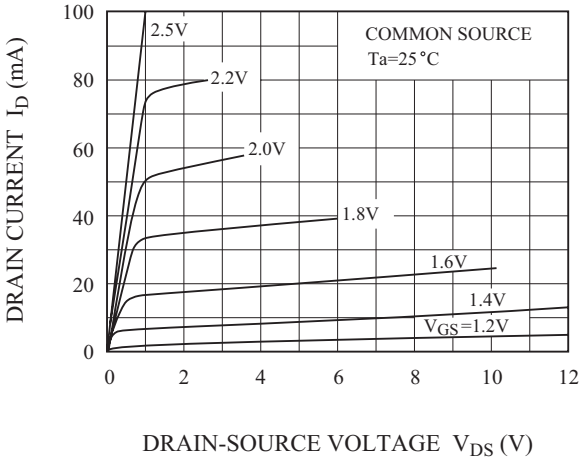



Pc - Ta

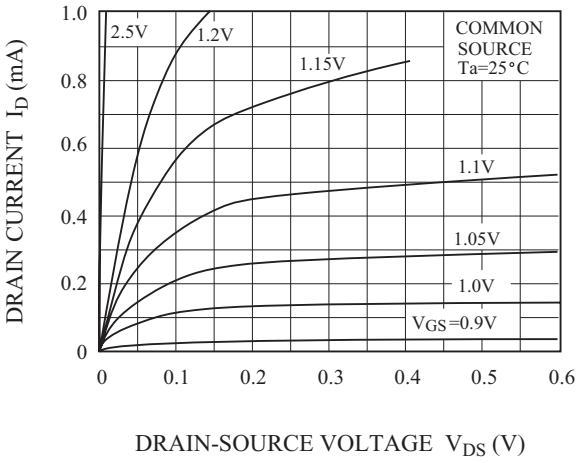


$Q_2$ (N CHANNEL MOS FIELD EFFECT TRANSISTOR)

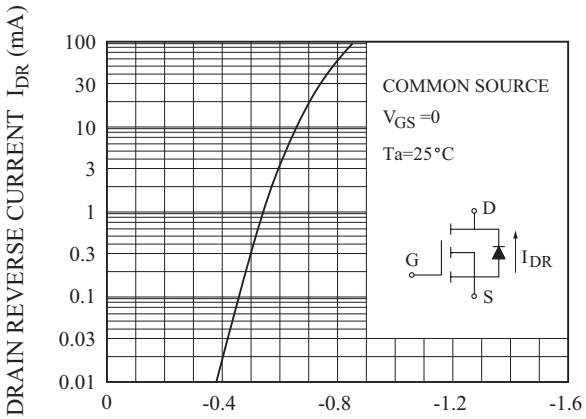
$I_D$ - $V_{DS}$



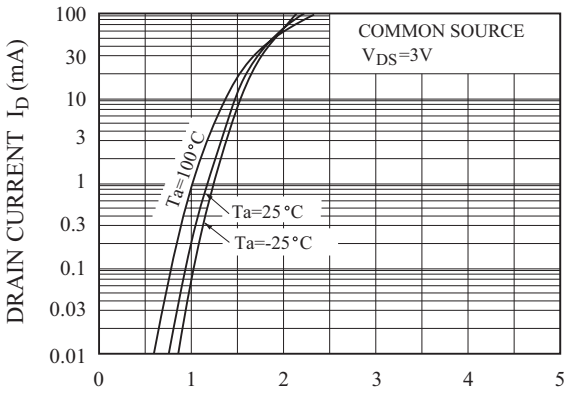

$I_D$ - $V_{DS}$
(LOW VOLTAGE REGION)



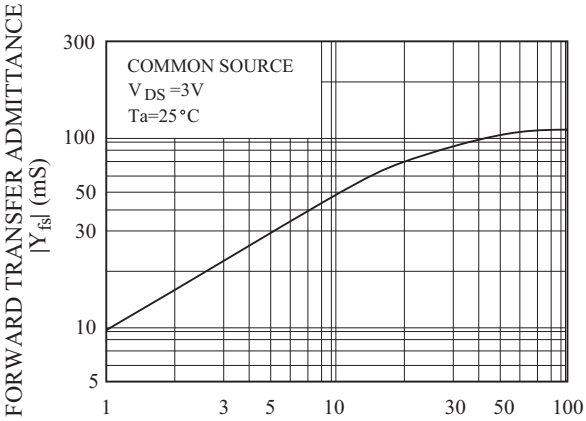

$I_{DR}$ - $V_{DS}$



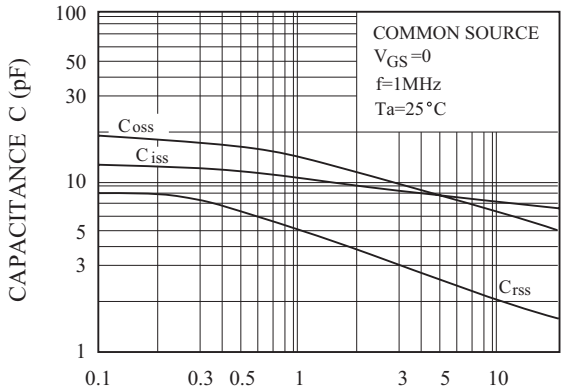

$I_D$ - $V_{GS}$



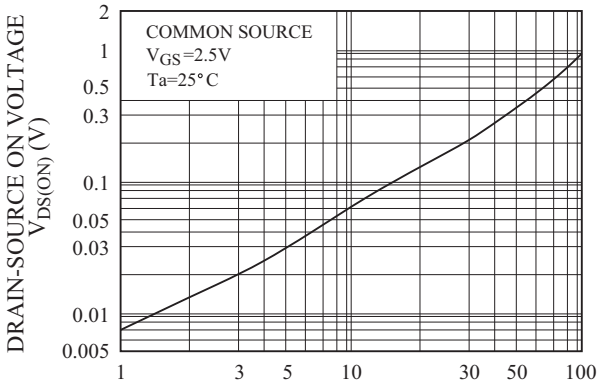

$|Y_{fs}|$ - $I_D$



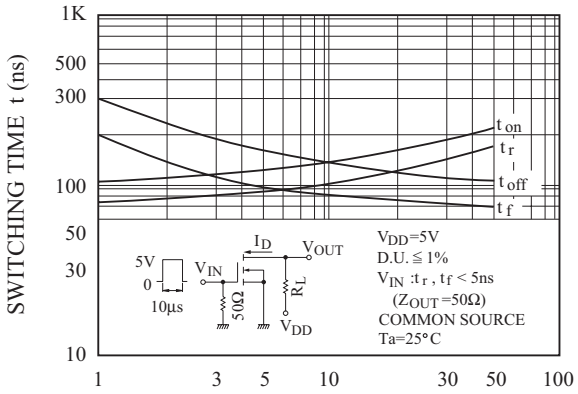

C - $V_{DS}$



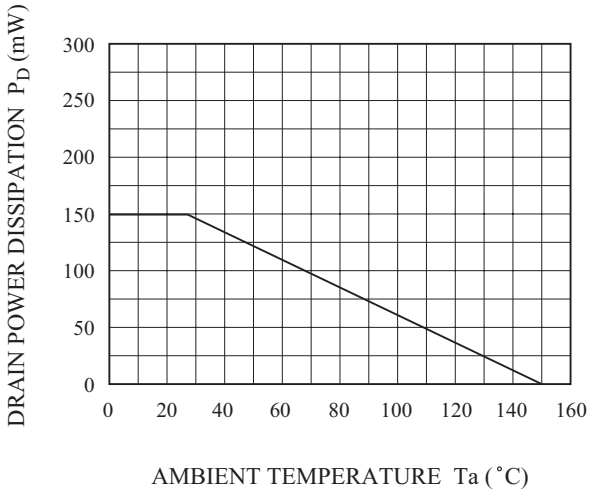
$V_{DS(ON)}$ - $I_D$



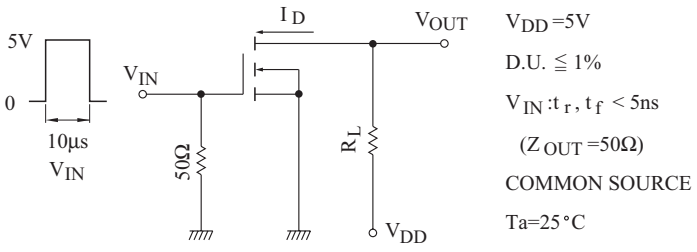

t - $I_D$




$P_D$ - Ta




SWITCHING TIME TEST CIRCUIT




$V_{DD}$ =5V
D.U. ≦ 1%
$V_{IN}$ :$t_r$ , $t_f$ < 5ns
($Z_{OUT}$ =50Ω)
COMMON SOURCE
Ta=25°C