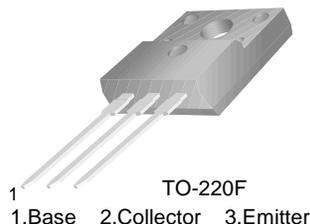


# KSD1589

KSD1589

## Low Frequency Power Amplifier Low Speed Switching Industrial Use

- Complement to KSB1098

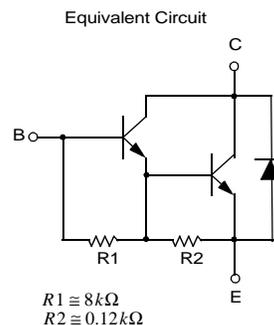


## NPN Silicon Darlington Transistor

### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol    | Parameter  | Value      | Units            |
|-----------|--|------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage                           | 150        | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                        | 100        | V                |
| $V_{EBO}$ | Emitter-Base Voltage                             | 7          | V                |
| $I_C$     | Collector Current (DC)                           | 5          | A                |
| $I_{CP}$  | *Collector Current (Pulse)                       | 8          | A                |
| $I_B$     | Base Current                                     | 0.5        | A                |
| $P_C$     | Collector Dissipation ( $T_a=25^\circ\text{C}$ ) | 1.5        | W                |
|           | Collector Dissipation ( $T_C=25^\circ\text{C}$ ) | 20         | W                |
| $T_J$     | Junction Temperature                             | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                              | - 55 ~ 150 | $^\circ\text{C}$ |

\*  $PW \leq 10\text{ms}$ , Duty Cycles  $\leq 50\%$



### Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol        | Parameter                             | Test Condition  | Min. | Typ. | Max. | Units         |
|---------------|---------------------------------------|---|------|------|------|---------------|
| $I_{CBO}$     | Collector Cut-off Current             | $V_{CB} = 100\text{V}$ , $I_E = 0$  |      |      | 1    | $\mu\text{A}$ |
| $h_{FE1}$     | *DC Current Gain                      | $V_{CE} = 2\text{V}$ , $I_C = 3\text{A}$  | 2K   | 6K   | 15K  |               |
| $h_{FE2}$     |                                       | $V_{CE} = 2\text{V}$ , $I_C = 5\text{A}$  | 500  |      |      |               |
| $V_{CE(sat)}$ | *Collector-Emitter Saturation Voltage | $I_C = 3\text{A}$ , $I_B = 3\text{mA}$  |      | 0.9  | 1.5  | V             |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage       | $I_C = 3\text{A}$ , $I_B = 3\text{mA}$  |      | 1.6  | 2    | V             |
| $t_{ON}$      | Turn On Time                          | $V_{CC} = 50\text{V}$ , $I_C = 3\text{A}$<br>$I_{B1} = - I_{B2} = 3\text{mA}$<br>$R_L = 16.7\Omega$ |      | 1    |      | $\mu\text{s}$ |
| $t_{stg}$     | Storage Time                          |   |      | 3.5  |      | $\mu\text{s}$ |
| $t_f$         | Fall Time                             |   |      |      | 1.2  | $\mu\text{s}$ |

\* Pulse Test:  $PW \leq 350\mu\text{s}$ , Duty Cycle  $\leq 2\%$  Pulsed

### $h_{FE}$ Classification

| Classification | R           | O           | Y            |
|----------------|-------------|-------------|--------------|
| $h_{FE1}$      | 2000 ~ 5000 | 3000 ~ 7000 | 5000 ~ 15000 |

# Typical Characteristics

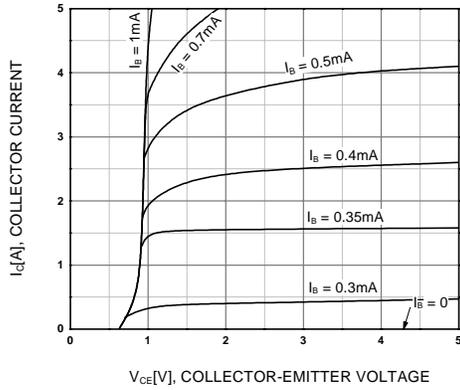


Figure 1. Static Characteristic

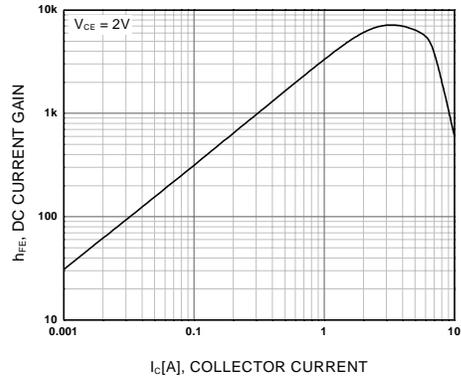


Figure 2. DC current Gain

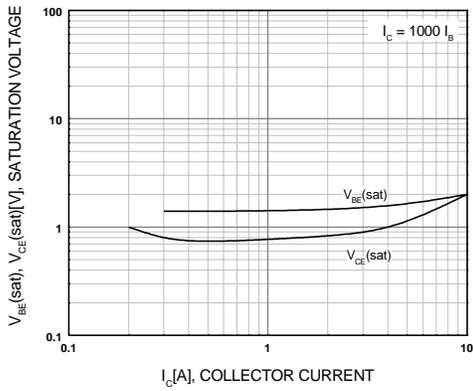


Figure 3. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

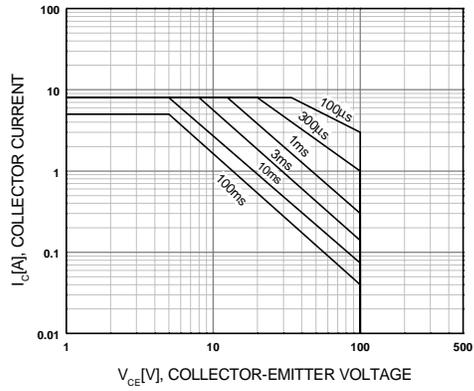


Figure 4. Safe Operating Area

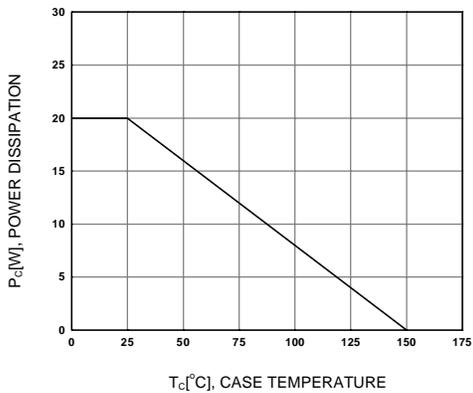
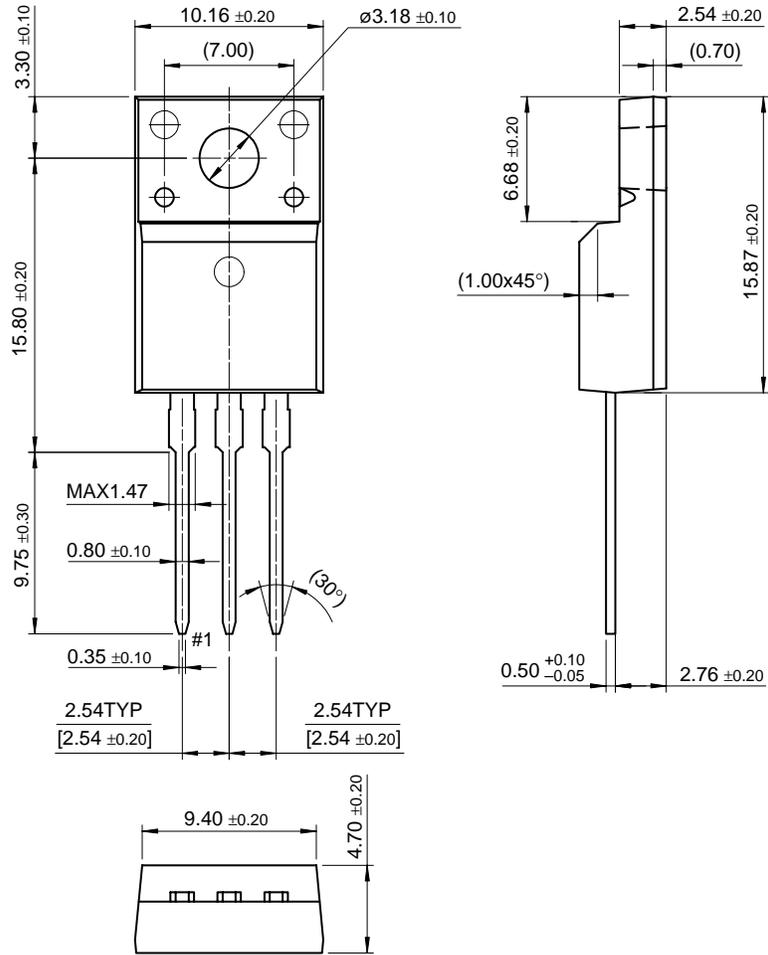


Figure 5. Power Derating

# Package Dimensions

KSD1589

## TO-220F



Dimensions in Millimeters

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| ActiveArray <sup>TM</sup>                         | FAST <sup>®</sup>                | MICROCOUPLER <sup>TM</sup> | PowerTrench <sup>®</sup>         | SuperSOT <sup>TM</sup> -8    |
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| CoolFET <sup>TM</sup>                             | FRFET <sup>TM</sup>              | MicroPak <sup>TM</sup>     | QS <sup>TM</sup>                 | TinyLogic <sup>®</sup>       |
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