

KEC

SEMICONDUCTOR  
TECHNICAL DATA

KHB3D0N70P/F

N CHANNEL MOS FIELD  
EFFECT TRANSISTOR

## General Description

This planar stripe MOSFET has better characteristics, such as fast switching time, low on resistance, low gate charge and excellent avalanche characteristics. It is mainly suitable for switch mode power supplies.

## FEATURES

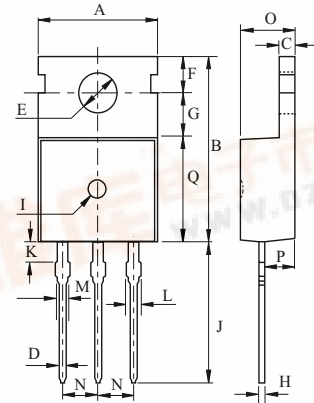
- $V_{DS}=700V$ ,  $I_D=3A$
- Drain-Source ON Resistance  
:  $R_{DS(ON)}=3.5\ \Omega$  @  $V_{GS}=10V$
- $Q_g(\text{typ.})=20.5nC$

## MAXIMUM RATING (Tc=25℃)

| CHARACTERISTIC                          |                      | SYMBOL            | RATING     |            | UNIT |
|-----------------------------------------|----------------------|-------------------|------------|------------|------|
|                                         |                      |                   | KHB3D0N70P | KHB3D0N70F |      |
| Drain-Source Voltage                    |                      | V <sub>DSS</sub>  | 700        |            | V    |
| Gate-Source Voltage                     |                      | V <sub>GSS</sub>  | ±30        |            | V    |
| Drain Current                           | @T <sub>C</sub> =25℃ | I <sub>D</sub>    | 3.0        | 3.0*       | A    |
|                                         | Pulsed (Note1)       | I <sub>DP</sub>   | 12         | 12*        |      |
| Single Pulsed Avalanche Energy (Note 2) |                      | E <sub>AS</sub>   | 345        |            | mJ   |
| Repetitive Avalanche Energy (Note 1)    |                      | E <sub>AR</sub>   | 8.0        |            | mJ   |
| Peak Diode Recovery dv/dt (Note 3)      |                      | dv/dt             | 4.0        |            | V/ns |
| Drain Power Dissipation                 | Tc=25℃               | P <sub>D</sub>    | 137        | 50         | W    |
|                                         | Derate above25℃      |                   | 1.04       | 0.34       | W/℃  |
| Maximum Junction Temperature            |                      | T <sub>j</sub>    | 150        |            | ℃    |
| Storage Temperature Range               |                      | T <sub>stg</sub>  | -55~150    |            | ℃    |
| Thermal Characteristics                 |                      |                   |            |            |      |
| Thermal Resistance, Junction-to-Case    |                      | R <sub>thJC</sub> | 0.91       | 2.5        | ℃/W  |
| Thermal Resistance, Junction-to-Ambient |                      | R <sub>thJA</sub> | 62.5       | 62.5       | ℃/W  |

\* : Drain current limited by maximum junction temperature.

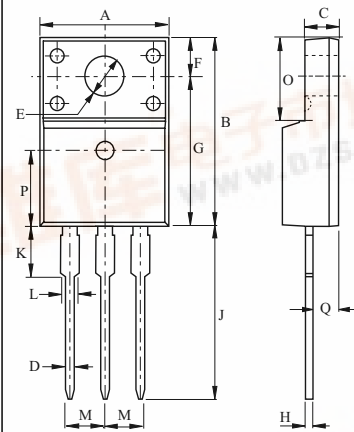
KHB3D0N70P



| DIM | MILLIMETERS     |
|-----|-----------------|
| A   | 9.9 ± 0.2       |
| B   | 15.95 MAX       |
| C   | 1.3 ± 0.1/-0.05 |
| D   | 0.8 ± 0.1       |
| E   | ∅ 3.6 ± 0.2     |
| F   | 2.8 ± 0.1       |
| G   | 3.7             |
| H   | 0.5 ± 0.1/-0.05 |
| I   | ∅ 1.5           |
| J   | 13.08 ± 0.3     |
| K   | 1.46            |
| L   | 1.4 ± 0.1       |
| M   | 1.27 ± 0.1      |
| N   | 2.54 ± 0.2      |
| O   | 4.5 ± 0.2       |
| P   | 2.4 ± 0.2       |
| Q   | 9.2 ± 0.2       |

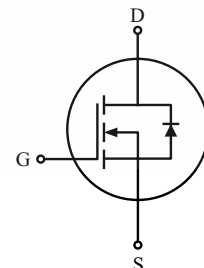
TO-220AB

KHB3D0N70F



| DIM | MILLIMETERS  |
|-----|--------------|
| A   | 10.16 ± 0.2  |
| B   | 15.87 ± 0.2  |
| C   | 2.54 ± 0.2   |
| D   | 0.8 ± 0.1    |
| E   | ∅ 3.18 ± 0.1 |
| F   | 3.3 ± 0.1    |
| G   | 12.57 ± 0.2  |
| H   | 0.5 ± 0.1    |
| J   | 13.0 MAX     |
| K   | 3.23 ± 0.1   |
| L   | 1.47 MAX     |
| M   | 2.54 ± 0.2   |
| N   | 4.7 ± 0.2    |
| O   | 6.68 ± 0.2   |
| P   | 6.5          |
| Q   | 2.76 ± 0.2   |

TO-220IS



# KHB3D0N70P/F

## ELECTRICAL CHARACTERISTICS (Tc=25 °C)

| CHARACTERISTIC                            | SYMBOL                       | TEST CONDITION                                                | MIN. | TYP. | MAX.      | UNIT     |
|-------------------------------------------|------------------------------|---------------------------------------------------------------|------|------|-----------|----------|
| Static                                    |                              |                                                               |      |      |           |          |
| Drain-Source Breakdown Voltage            | $BV_{DSS}$                   | $I_D=250\mu A$ , $V_{GS}=0V$                                  | 700  | -    | -         | V        |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_j$ | $I_D=250\mu A$ , Referenced to 25 °C                          | -    | 1    | -         | V/°C     |
| Gate Threshold Voltage                    | $V_{th}$                     | $V_{DS}=V_{GS}$ , $I_D=250\mu A$                              | 2.0  | -    | 4.0       | V        |
| Drain Cut-off Current                     | $I_{DSS}$                    | $V_{DS}=700V$ , $V_{GS}=0V$ ,                                 | -    | -    | 10        | $\mu A$  |
| Gate Leakage Current                      | $I_{GSS}$                    | $V_{GS}=\pm 30V$ , $V_{DS}=0V$                                | -    | -    | $\pm 100$ | nA       |
| Drain-Source ON Resistance                | $R_{DS(ON)}$                 | $V_{GS}=10V$ , $I_D=1.5A$                                     | -    | 3.0  | 3.5       | $\Omega$ |
| Dynamic                                   |                              |                                                               |      |      |           |          |
| Total Gate Charge                         | $Q_g$                        | $V_{DS}=560V$ , $I_D=3.0A$<br>$V_{GS}=10V$ (Note4, 5)         | -    | 20.5 | 25.6      | nC       |
| Gate-Source Charge                        | $Q_{gs}$                     |                                                               | -    | 3    | -         |          |
| Gate-Drain Charge                         | $Q_{gd}$                     |                                                               | -    | 10.5 | -         |          |
| Turn-on Delay time                        | $t_{d(on)}$                  | $V_{DD}=350V$ , $R_G=25\ \Omega$<br>$I_D=3.0A$ (Note4, 5)     | -    | 11.5 | 33        | ns       |
| Turn-on Rise time                         | $t_r$                        |                                                               | -    | 48.5 | 107       |          |
| Turn-off Delay time                       | $t_{d(off)}$                 |                                                               | -    | 50   | 110       |          |
| Turn-off Fall time                        | $t_f$                        |                                                               | -    | 57.5 | 125       |          |
| Input Capacitance                         | $C_{iss}$                    | $V_{DS}=25V$ , $V_{GS}=0V$ , $f=1.0MHz$                       | -    | 642  | 835       | pF       |
| Output Capacitance                        | $C_{oss}$                    |                                                               | -    | 67.2 | 87.4      |          |
| Reverse Transfer Capacitance              | $C_{rss}$                    |                                                               | -    | 10.2 | 13.3      |          |
| Source-Drain Diode Ratings                |                              |                                                               |      |      |           |          |
| Continuous Source Current                 | $I_S$                        | $V_{GS}<V_{th}$                                               | -    | -    | 3.0       | A        |
| Pulsed Source Current                     | $I_{SP}$                     |                                                               | -    | -    | 12        |          |
| Diode Forward Voltage                     | $V_{SD}$                     | $I_S=3.0A$ , $V_{GS}=0V$                                      | -    | -    | 1.6       | V        |
| Reverse Recovery Time                     | $t_{rr}$                     | $I_S=3.0A$ , $V_{DD}=350V$ ,<br>$dI_S/dt=100A/\mu s$ (Note 4) | -    | 730  | -         | ns       |
| Reverse Recovery Charge                   | $Q_{rr}$                     |                                                               | -    | 3.2  | -         | $\mu C$  |

Note 1) Repetivity rating : Pulse width limited by junction temperature.

Note 2)  $L=71mH$ ,  $I_S=3.0A$ ,  $V_{DD}=50V$ ,  $R_G=25\Omega$ , Starting  $T_j=25^\circ C$ .

Note 3)  $I_S \leq 3.0A$ ,  $dI/dt \leq 200A/\mu s$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_j=25^\circ C$ .

Note 4) Pulse Test : Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

Note 5) Essentially independent of operating temperature.