

## 300V 70A N-Channel Enhancement Mode Power MOSFET

### Description

The AKT70N30H is an N-Channel enhancement mode power MOSFET which using proprietary planar stripe and DMOS technology.

This MOSFET has low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for UPS,DC-DC converters and AC-DC power supply.

### Features

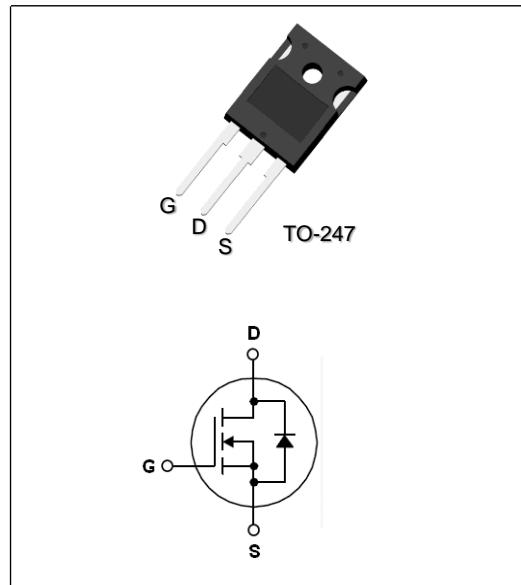
- Low on-Resistance:  $R_{DS(on)}=36.8\text{m}\Omega(\text{typ.})$
- Special Process Technology for high ESD Capability
- 100% Avalanche Test
- Good Stability and Uniformity with High  $E_{AS}$

### Applications

- UPS Applications
- DC-DC Converters and AC-DC Power Supply

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

| Symbol    | Parameter                            |                         | Ratings  | Unit                |
|-----------|--------------------------------------|-------------------------|----------|---------------------|
| $V_{DSS}$ | Drain to Source Voltage              |                         | 300      | V                   |
| $V_{GSS}$ | Gate to Source Voltage               |                         | $\pm 30$ | V                   |
| $I_D$     | Drain Current                        | $T_C=25^\circ\text{C}$  | 70       | A                   |
|           |                                      | $T_C=100^\circ\text{C}$ | 49       | A                   |
| $I_{DM}$  | Pulsed Drain Current                 | (Note1)                 | 280      | A                   |
| $P_D$     | Maximum Power Dissipation            | $T_C=25^\circ\text{C}$  | 295      | W                   |
|           | Derate above $25^\circ\text{C}$      |                         | 2.1      | W/ $^\circ\text{C}$ |
| $E_{AS}$  | Single Pulsed Avalanche Energy       | (Note 2)                | 2000     | mJ                  |
| $T_J$     | Operating Junction Temperature Range |                         | -55~+150 | $^\circ\text{C}$    |
| $T_{STG}$ | Storage Temperature Range            |                         | -55~+150 | $^\circ\text{C}$    |



### Thermal Characteristics

| Symbol        | Parameter                               | Ratings | Unit                      |
|---------------|---|---------|---------------------------|
| $R_{th(J-C)}$ | Thermal Resistance, Junction to case    | 0.42    | $^\circ\text{C}/\text{W}$ |
| $R_{th(J-A)}$ | Thermal Resistance, Junction to Ambient | 40      | $^\circ\text{C}/\text{W}$ |

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

| Symbol       | Parameter                         | Conditions                                | Min. | Typ. | Max.      | Unit             |
|--------------|-----------------------------------|---|------|------|-----------|------------------|
| $BV_{DSS}$   | Drain to Source Breakdown Voltage | $V_{GS}=0\text{V}, I_D=250\mu\text{A}$    | 300  | -    | -         | V                |
| $V_{GS(th)}$ | Gate Threshold Voltage            | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$       | 2.5  | -    | 4         | V                |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance | $V_{GS}=10\text{V}, I_D=35\text{A}$       | -    | 36.8 | -         | $\text{m}\Omega$ |
| $I_{DSS}$    | Zero Gate Voltage Drain Current   | $V_{DS}=300\text{V}, V_{GS}=0\text{V}$    | -    | -    | 1         | $\mu\text{A}$    |
| $I_{GSS}$    | Gate to Source Leakage Current    | $V_{GS}=\pm 30\text{V}, V_{DS}=0\text{V}$ | -    | -    | $\pm 100$ | nA               |

**D-S Diode Characteristics and Maximum Rating** @ $T_C=25\text{ }^\circ\text{C}$  unless otherwise noted

| Symbol   | Parameter                                     | Conditions   | Min. | Typ. | Max. | Unit |
|----------|---|--|------|------|------|------|
| $I_S$    | Maximum Drain to Source Diode Forward Current |  | -    | -    | 70   | A    |
| $V_{SD}$ | Drain-Source Diode Forward Voltage            | $V_{GS}=0\text{V}, I_S=70\text{A}$                                       | -    | -    | 1.2  | V    |
| $t_{rr}$ | Reverse Recovery Time                         |  | -    | 99   | -    | ns   |
| $Q_{rr}$ | Reverse Recovery Charge                       | $V_{GS}=0\text{V}, I_S=70\text{A}, \frac{dI}{dt}=-100\text{A}/\text{us}$ | -    | 265  | -    | nC   |

**Switching Characteristics** @ $T_C=25\text{ }^\circ\text{C}$  unless otherwise noted

| Symbol       | Parameter                    | Conditions  | Min. | Typ. | Max. | Unit |
|--------------|------------------------------|---|------|------|------|------|
| $t_{d(on)}$  | Turn-on Delay Time           | $I_D=70\text{A}, V_{DD}=150\text{V}, R_G=25\Omega$<br>(Note 3)          | -    | 42   | -    | ns   |
| $t_r$        | Rising Time                  |   | -    | 171  | -    | ns   |
| $t_{d(off)}$ | Turn-off Delay Time          |   | -    | 101  | -    | ns   |
| $t_f$        | Falling Time                 |   | -    | 23   | -    | ns   |
| $C_{iss}$    | Input Capacitance            | $V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$                  | -    | 4500 | -    | pF   |
| $C_{oss}$    | Output Capacitance           |   | -    | 595  | -    | pF   |
| $C_{rss}$    | Reverse Transfer Capacitance |   | -    | 10   | -    | pF   |
| $Q_g$        | Total Gate Charge            | $I_D=70\text{A}, V_{DS}=240\text{V}$<br>$V_{GS}=10\text{V}$<br>(Note 3) | -    | 63   | -    | nC   |
| $Q_{gs}$     | Gate to Source Charge        |   | -    | 23   | -    | nC   |
| $Q_{gd}$     | Gate to Drain Charge         |   | -    | 23   | -    | nC   |

**Note:**

1. Repetitive rating: pulse-width limited by maximum junction temperature
2.  $L=2\text{mH}, V_{DD}=100\text{V}, V_G=10\text{V}, @T_C=25\text{ }^\circ\text{C}$
3. Essentially independent of operating temperature typical characteristics

## Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

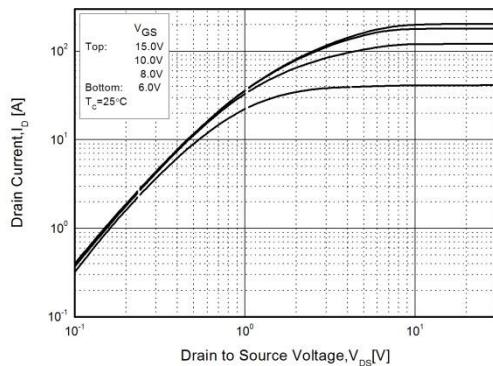


Fig. 3. Static on-Resistance vs.  $I_D$

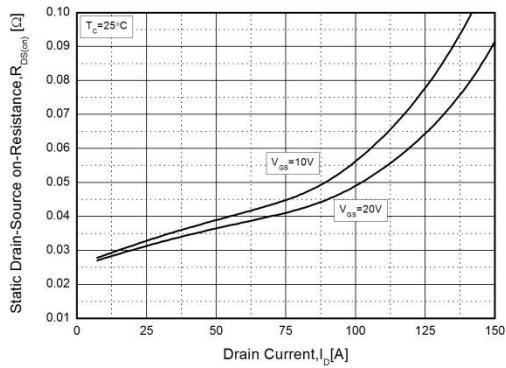


Fig. 5. Capacitance Characteristics

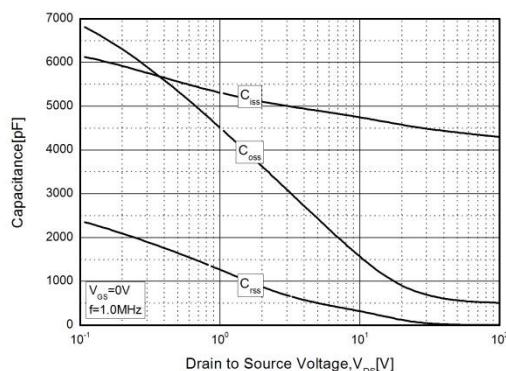


Fig. 2. Typical Transfer Characteristics

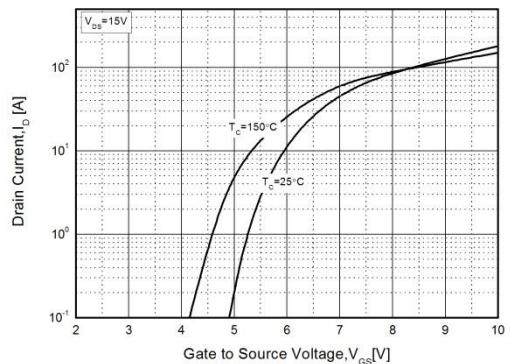


Fig. 4. Body Diode Forward Voltage vs.  $I_{DR}$

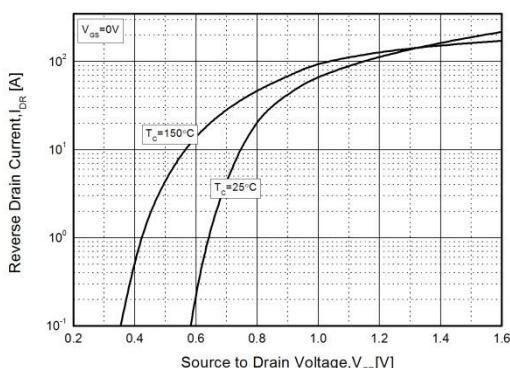
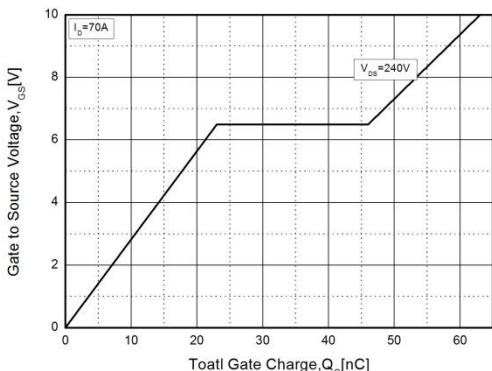


Fig. 6. Gate Charge Characteristics



## Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

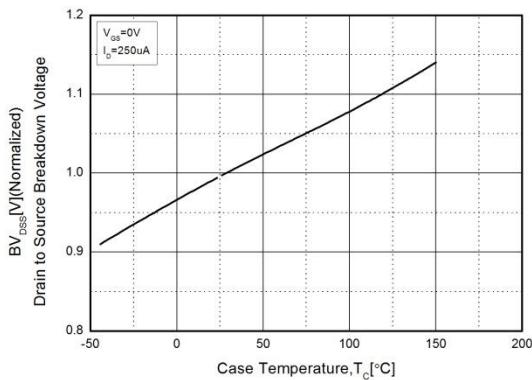


Fig. 8. Static on-Resistance vs. Temperature

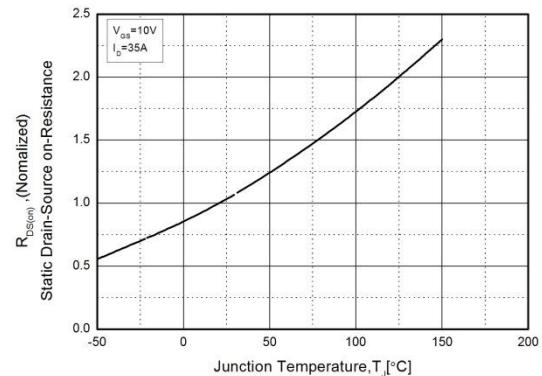


Fig. 9. Maximum Safe Operating Area

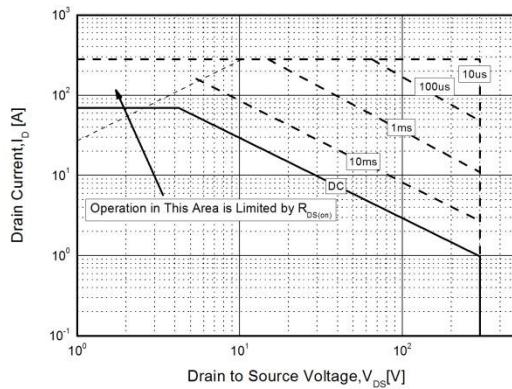


Fig. 10. Maximum Drain Current vs. Temperature

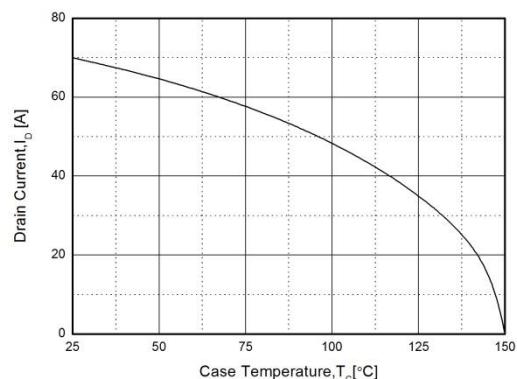
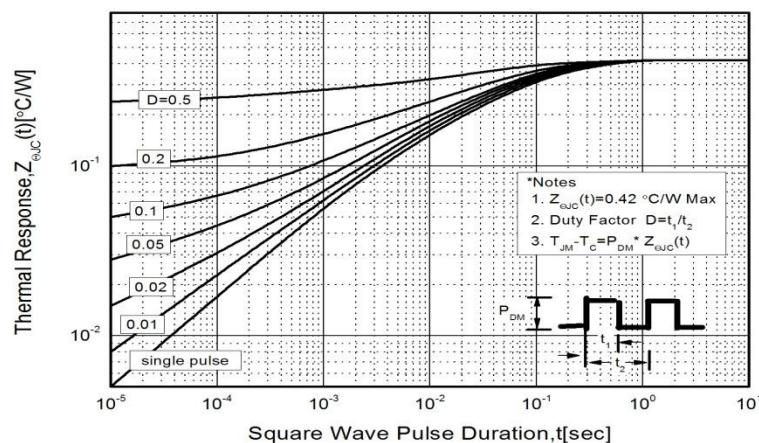


Fig. 11. Transient Thermal Response Curve



**Package Dimensions****TO-247**

(Dimensions in Millimeters)

