

650V 10A N-Channel Enhancement Mode Power MOSFET

Description

The AKT10N65T is an N-Channel enhancement mode power MOSFET which using proprietary planar stripe and DMOS technology.

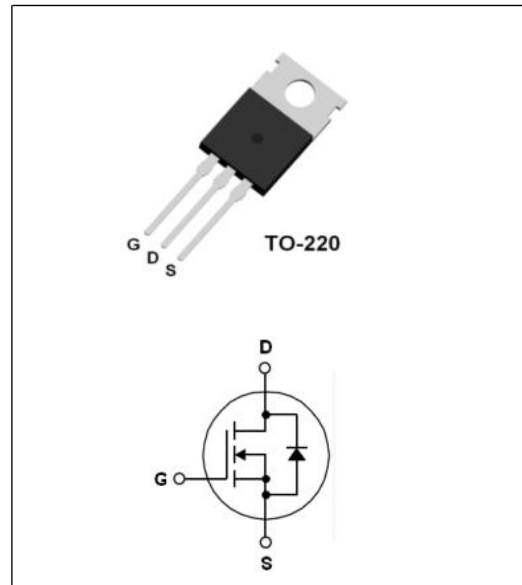
This MOSFET has low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for UPS,DC-DC converters and AC-DC power supply.

Features

- Low on-Resistance: $R_{DS(on)}=0.85\Omega(\text{typ.})$
- 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 | 650 | V |
| V_{GSS} | Gate to Source Voltage | ± 30 | V |
| I_D | Drain Current | $T_C=25^\circ\text{C}$ | 10 |
| | | $T_C=100^\circ\text{C}$ | 6.5 |
| I_{DM} | Pulsed Drain Current (Note1) | 38 | A |
| P_D | Maximum Power Dissipation | $T_C=25^\circ\text{C}$ | 156 |
| | Derate above 25°C | | 2.22 |
| E_{AS} | Single Pulsed Avalanche Energy (Note 2) | 490 | 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 | 0.83 | $^\circ\text{C}/\text{W}$ |
| $R_{th(J-A)}$ | Thermal Resistance, Junction to Ambient | 62.5 | $^\circ\text{C}/\text{W}$ |

Electrical Characteristics @T_C=25 °C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|--|------|------|------|------|
| BV _{DSS} | Drain to Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 650 | - | - | V |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250uA | 2.0 | - | 4.0 | V |
| R _{DS(on)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =5A | - | 0.85 | 0.9 | Ω |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =650V, V _{GS} =0V | - | - | 1 | uA |
| I _{GSS} | Gate to Source Leakage Current | V _{GS} =±30V, V _{DS} =0V | - | - | ±100 | nA |

D-S Diode Characteristics and Maximum Rating @T_C=25 °C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---|---|------|------|------|------|
| I _S | Maximum Drain to Source Diode Forward Current | | - | - | 10 | A |
| V _{SD} | Drain-Source Diode Forward Voltage | V _{GS} =0V, I _S =10A | - | 0.88 | 1 | V |
| t _{rr} | Reverse Recovery Time | V _{GS} =0V, I _S =10A, | - | 575 | - | ns |
| Q _{rr} | Reverse Recovery Charge | di/dt=-100A/us | - | 4.6 | - | uC |

Switching Characteristics @T_C=25 °C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|--|------|------|------|------|
| t _{d(on)} | Turn-on Delay Time | I _D =10A, V _{DD} =325V, R _G =25Ω (Note 3) | - | 41 | - | ns |
| t _r | Rising Time | | - | 75 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 55 | - | ns |
| t _f | Falling Time | | - | 36 | - | ns |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =25V, f=1.0MHz | - | 1200 | - | pF |
| C _{oss} | Output Capacitance | | - | 165 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 8 | - | pF |
| Q _g | Total Gate Charge | I _D =10A, V _{DS} =520V V _{GS} =10V (Note 3) | - | 25 | - | nC |
| Q _{gs} | Gate to Source Charge | | - | 7.7 | - | nC |
| Q _{gd} | Gate to Drain Charge | | - | 6.9 | - | nC |

Note:

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

Typical Performance Characteristics

Fig. 1. Typical on-Region Characteristics

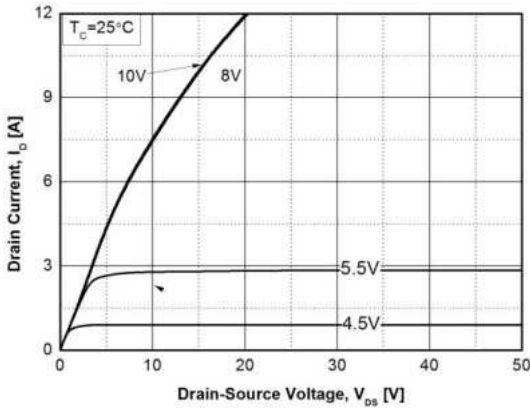


Fig. 2. Typical Transfer Characteristics

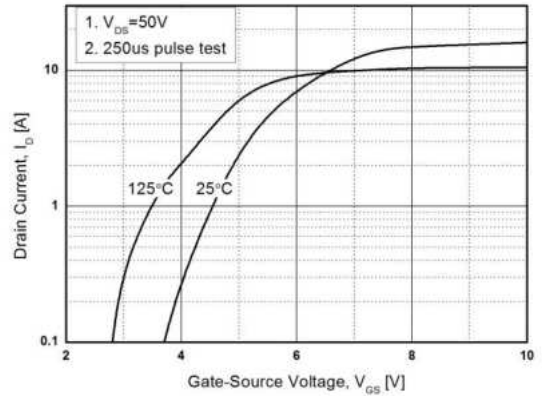


Fig. 3. Static on-Resistance vs. I_D

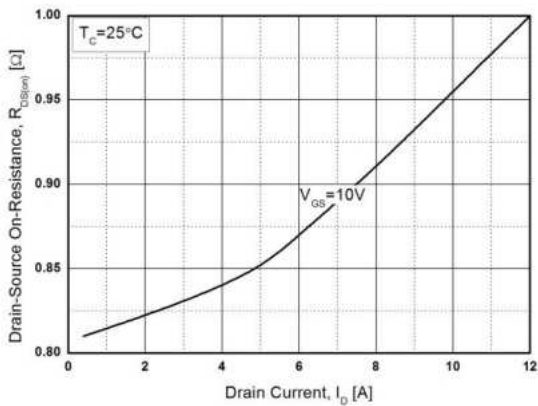


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

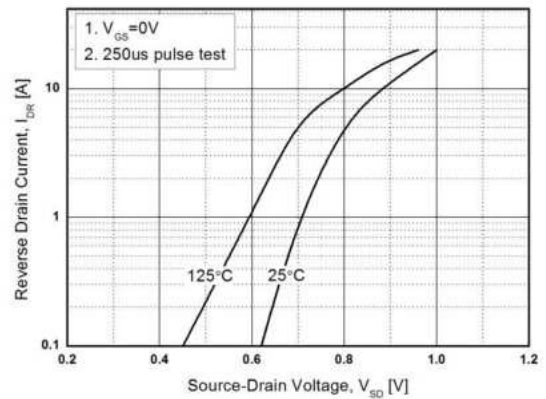


Fig. 5. Capacitance Characteristics

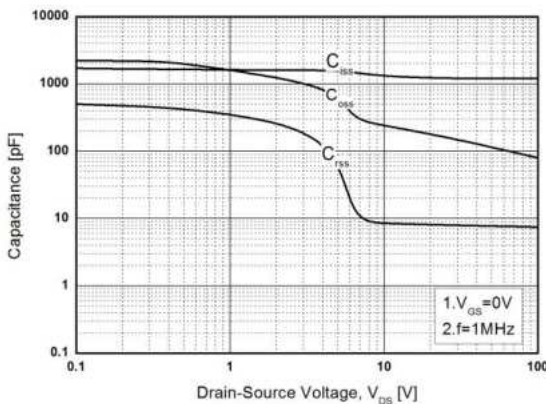
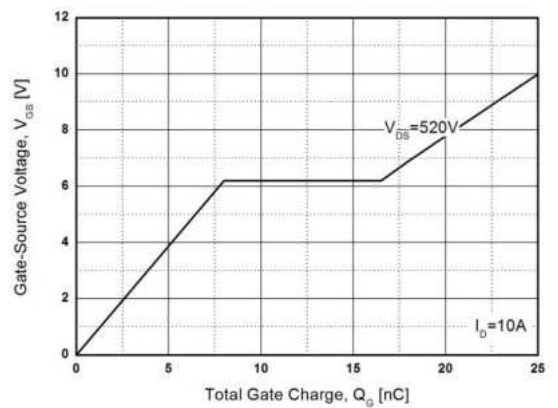


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

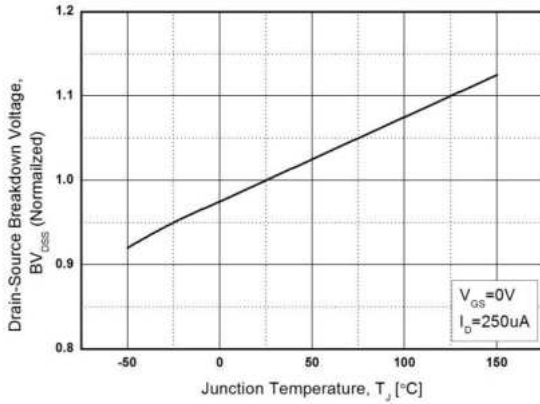


Fig. 8. Static on-Resistance vs. Temperature

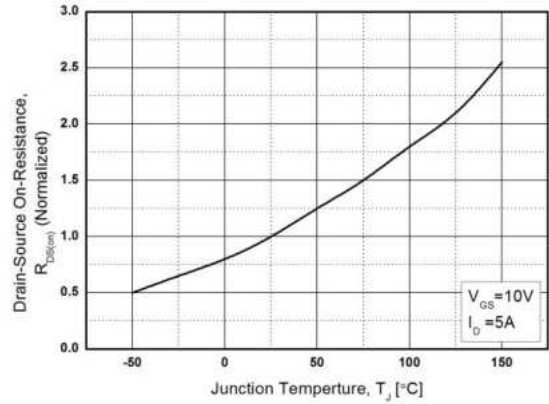


Fig. 9. Maximum Safe Operating Area

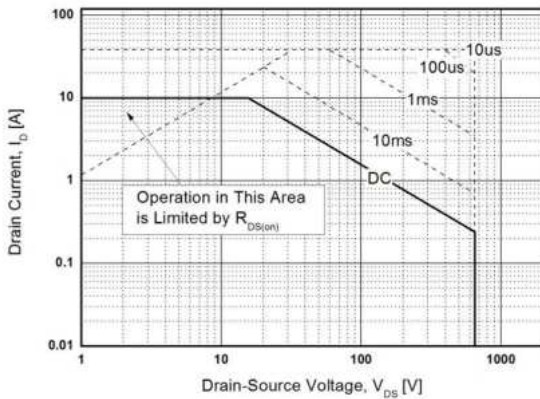


Fig. 10. Maximum Drain Current vs. Temperature

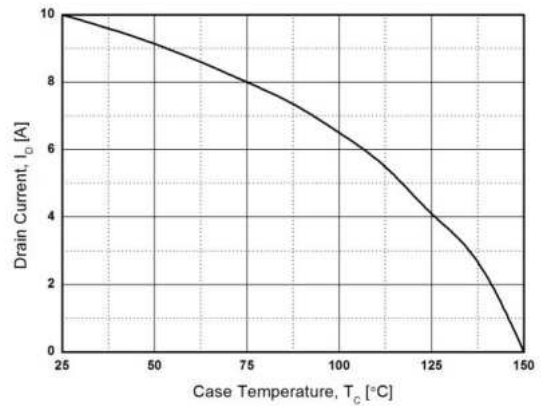
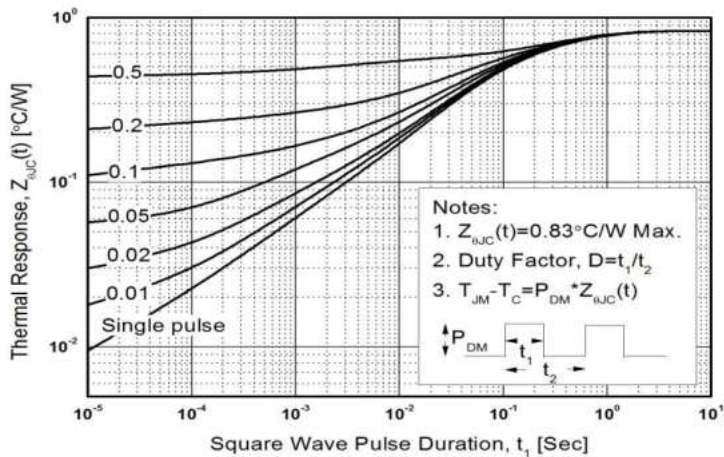


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-220

(Dimensions in Millimeters)

