



60N05

Preliminary

Power MOSFET

**60A, 50V N-CHANNEL
POWER MOSFET**

■ DESCRIPTION

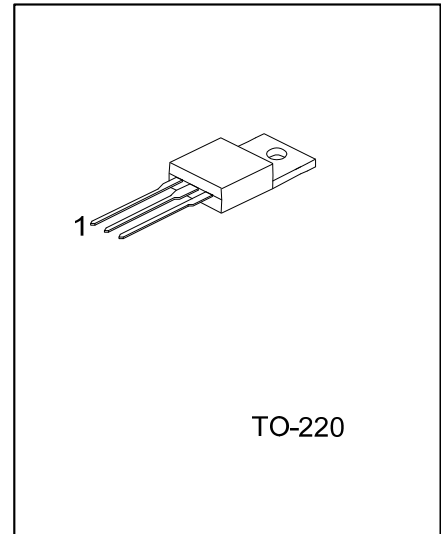
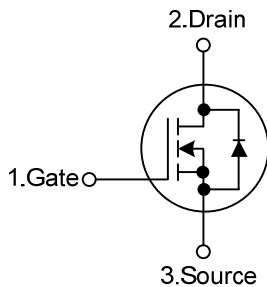
The UTC **60N05** is an N-channel power MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **60N05** is suitable for motor control, AC-DC or DC-DC converters and audio amplifiers, etc.

■ FEATURES

- * $R_{DS(ON)}=12m\Omega @ V_{GS}=10V, I_D=30A$
- * High Switching Speed
- * High Current Capacity
- * Low Gate Charge(typical 130nC)

■ SYMBOL



■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|--------------|---------|----------------|---|---|---------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 60N05L-TA3-T | 60N05G-TA3-T | TO-220 | G | D | S | Tube |

Note: Pin Assignment: G: Gate D: Drain S: Source

| | |
|---|--|
| <p>60N05L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p> | <p>(1) T: Tube (2) TA3: TO-220 (3) G: Halogen Free, L: Lead Free</p> |
|---|--|

■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | RATINGS | UNIT | |
|---|-----------------|-----------|-------------------------|------------------|---|
| Drain-Source Voltage ($V_{GS}=0$) | | V_{DSS} | 50 | V | |
| Drain-Gate Voltage ($R_{GS}=20k\ \Omega$) | | V_{DGR} | 50 | V | |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V | |
| Drain Current | Continuous | I_D | $T_C=25^\circ\text{C}$ | 60 | A |
| | | | $T_C=100^\circ\text{C}$ | 50 | A |
| | Pulsed (Note 1) | | I_{DM} | 240 | A |
| Avalanche Current | | I_{AR} | 60 | A | |
| Avalanche Energy | | E_{AS} | 600 | mJ | |
| | | E_{AR} | 150 | mJ | |
| Power Dissipation | | P_D | 125 | W | |
| Junction Temperature | | T_J | 150 | $^\circ\text{C}$ | |
| Storage Temperature | | T_{STG} | -55 ~ +150 | $^\circ\text{C}$ | |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Pulse width limited by safe operating area

■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|---------------|---------|--------------------|
| Junction to Ambient | θ_{JA} | 62.5 | $^\circ\text{C/W}$ |
| Junction to Case | θ_{JC} | 1 | $^\circ\text{C/W}$ |

■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|--------------|--|-----|-------|-------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$ | 60 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=\text{Max Rating}, V_{GS}=0\text{V}$ | | | 250 | μA |
| Gate-Source Leakage Current | I_{GSS} | Forward | | | +100 | nA |
| | | Reverse | | | -100 | nA |
| ON CHARACTERISTICS (Note 2) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$ | 2 | 3 | 4 | V |
| Static Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10\text{V}, I_D=30\text{A}$ | | 0.012 | 0.014 | Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$ | | 3900 | | pF |
| Output Capacitance | C_{OSS} | | | 950 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 250 | | pF |

■ ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|---|-----|------|-----|---------------|
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q_G | $V_{GS}=10\text{V}, V_{DD}=40\text{V}, I_D=60\text{A}$ | | 130 | 170 | nC |
| Gate to Source Charge | Q_{GS} | | | 26 | | nC |
| Gate to Drain Charge | Q_{GD} | | | 55 | | nC |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{DD}=25\text{V}, I_D=30\text{A}, R_G=4.7\Omega,$ $V_{GS}=10\text{V}$ | | 30 | | ns |
| Rise Time | t_R | | | 180 | | ns |
| Fall-Time | t_F | $V_{DD}=40\text{V}, I_D=60\text{A}, R_G=4.7\Omega,$ $V_{GS}=10\text{V}$ | | 35 | | ns |
| Off-Voltage Rise Time | $t_{R(OFF)}$ | | | 135 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Body-Diode Continuous Current | I_S | (Note 1) | | | 60 | A |
| Maximum Body-Diode Pulsed Current | I_{SM} | | | | 240 | A |
| Drain-Source Diode Forward Voltage | V_{SD} | $I_{SD}=60\text{A}, V_{GS}=0\text{V}$ (Note 2) | | | 1.6 | V |
| Body Diode Reverse Recovery Time | t_{rr} | $I_{SD}=60\text{A}, V_{DD}=30\text{V}, T_J=150^\circ\text{C},$ $di/dt=100\text{A}/\mu\text{s}$ | | 150 | | ns |
| Body Diode Reverse Recovery Charge | Q_{RR} | | | 0.56 | | μC |

Notes: 1. Pulse width limited by safe operating area

2. Pulsed: Pulse duration=300 μs , Duty cycle 1.5%

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.