



## 60N15

Preliminary

Power MOSFET

### 60A, 150V N-CHANNEL POWER MOSFET

#### DESCRIPTION

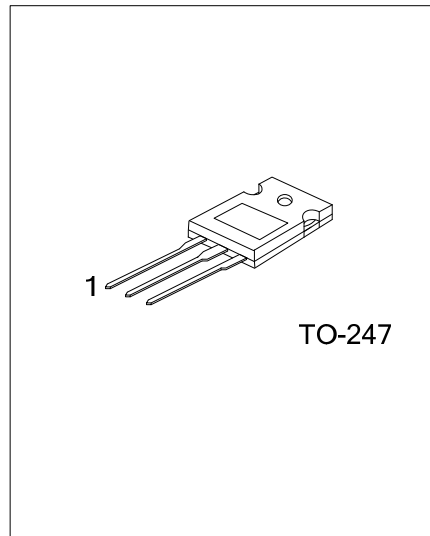
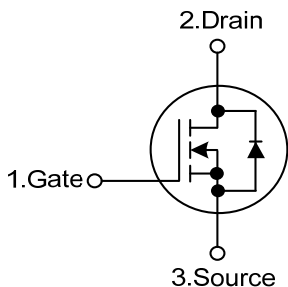
The UTC **60N15** is an N-channel power MOSFET using UTC's advanced technology to provide the customers with perfect  $R_{DS(ON)}$ , high switching speed, high current capacity and low gate charge.

The UTC **60N15** is suitable for motor control, AC-DC or DC-DC converters and audio amplifiers, etc.

#### FEATURES

- \*  $R_{DS(ON)} < 30m\Omega$  @  $V_{GS}=10V, I_D=30A$
- \* 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 |         |
| 60N15L-T47-T    | 60N15G-T47-T | TO-247  | G              | D | S | Tube    |

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

|              |                  |                                   |
|--------------|------------------|-----------------------------------|
| 60N15L-T47-T | (1) Packing Type | (1) T: Tube                       |
|              | (2) Package Type | (2) T47: TO-247                   |
|              | (3) Lead Free    | (3) G: Halogen Free, L: Lead Free |



### ■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER                           |                 | SYMBOL    | RATINGS    | UNIT               |
|-------------------------------------|-----------------|-----------|------------|--------------------|
| Drain-Source Voltage ( $V_{GS}=0$ ) |                 | $V_{DSS}$ | 150        | V                  |
| Gate-Source Voltage                 |                 | $V_{GSS}$ | $\pm 20$   | V                  |
| Drain Current                       | Continuous      | $I_D$     | 60         | A                  |
|                                     | Pulsed (Note 1) | $I_{DM}$  | 240        | A                  |
| Avalanche Current                   |                 | $I_{AR}$  | 60         | A                  |
| Avalanche Energy                    |                 | $E_{AS}$  | 1000       | 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 | $\theta_{JA}$ | 62.5    | $^{\circ}\text{C}/\text{W}$ |
| Junction to Case    | $\theta_{JC}$ | 1       | $^{\circ}\text{C}/\text{W}$ |

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

| PARAMETER  | SYMBOL       | TEST CONDITIONS   | MIN | TYP  | MAX  | UNIT          |
|--|--------------|---|-----|------|------|---------------|
| <b>OFF CHARACTERISTICS</b>                             |              |   |     |      |      |               |
| Drain-Source Breakdown Voltage                         | $BV_{DSS}$   | $I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$   | 150 |      |      | V             |
| Drain-Source Leakage Current                           | $I_{DSS}$    | $V_{DS}=150\text{V}$ , $V_{GS}=0\text{V}$   |     |      | 1    | $\mu\text{A}$ |
| Gate-Source Leakage Current                            | $I_{GSS}$    | Forward   |     |      | +100 | nA            |
|  |              | Reverse   |     |      | -100 | nA            |
| <b>ON CHARACTERISTICS (Note 2)</b>                     |              |   |     |      |      |               |
| 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                | $R_{DS(ON)}$ | $V_{GS}=10\text{V}$ , $I_D=30\text{A}$  |     |      | 30   | m $\Omega$    |
| <b>DYNAMIC PARAMETERS</b>                              |              |   |     |      |      |               |
| 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            |
| <b>SWITCHING PARAMETERS</b>                            |              |   |     |      |      |               |
| Total Gate Charge                                      | $Q_G$        | $V_{GS}=10\text{V}$ , $V_{DD}=75\text{V}$ , $I_D=60\text{A}$                      |     | 130  | 170  | nC            |
| Gate to Source Charge                                  | $Q_{GS}$     |   |     | 26   |      | nC            |
| Gate to Drain Charge                                   | $Q_{GD}$     |   |     | 55   |      | nC            |
| Turn-ON Delay Time                                     | $t_{D(ON)}$  | $V_{DD}=30\text{V}$ , $I_D=60\text{A}$ , $R_G=4.7\Omega$ ,<br>$V_{GS}=10\text{V}$ |     | 30   |      | ns            |
| Rise Time  | $t_R$        |   |     | 180  |      | ns            |
| Fall-Time  | $t_F$        |   |     | 35   |      | ns            |
| Off-Voltage Rise Time                                  | $t_{R(OFF)}$ |   |     | 135  |      | ns            |
| <b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b> |              |   |     |      |      |               |
| 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             |

Notes: 1. Pulse width limited by safe operating area

2. Pulsed: Pulse duration=300 $\mu\text{s}$ , Duty cycle 1.5%

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