



## MMBF170

Power MOSFET

### 0.5A, 60V N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

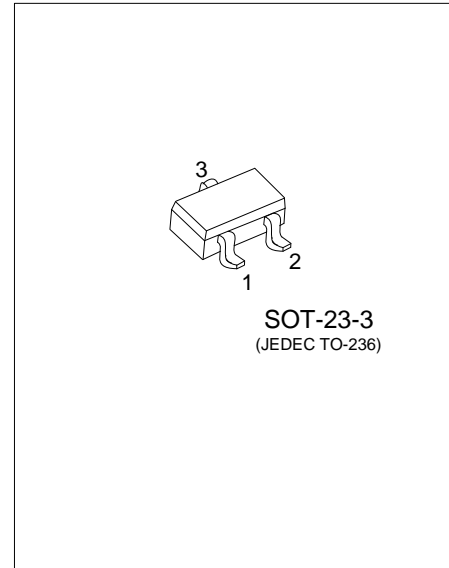
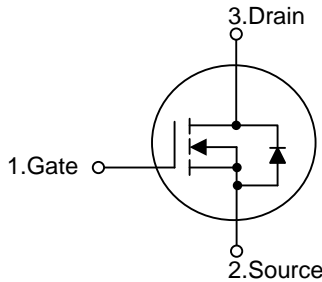
#### DESCRIPTION

The UTC **MMBF170** is an N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect  $R_{DS(ON)}$ , low input capacitance, low gate threshold voltage and high switching speed.

#### FEATURES

- \*  $R_{DS(ON)} \leq 5.0 \Omega$  @  $V_{GS}=10V, I_D=0.2A$
- \* High Switching Speed
- \* Low Input Capacitance (typical 22pF)

#### SYMBOL



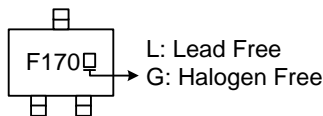
#### ORDERING INFORMATION

| Ordering Number |                | Package  | Pin Assignment |   |   | Packing   |
|-----------------|----------------|----------|----------------|---|---|-----------|
| Lead Free       | Halogen Free   |          | 1              | 2 | 3 |           |
| MMBF170L-AE2-R  | MMBF170G-AE2-R | SOT-23-3 | G              | S | D | Tape Reel |

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

|   |   |
|---|---|
| <p>MMBF170G-AE2-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p> | <p>(1) R: Tape Reel</p> <p>(2) AE2: SOT-23-3</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|---|

#### MARKING



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

| PARAMETER                                    | SYMBOL           | RATINGS         | UNIT   |
|--|------------------|-----------------|--------|
| Drain-Source Voltage                         | V <sub>DSS</sub> | 60              | V      |
| Gate-Source Voltage                          | Continuous       | ±20             | V      |
|  | Pulsed           | ±40             | V      |
| Drain-Gate Voltage R <sub>GS</sub> ≤ 1.0MΩ   | V <sub>DGR</sub> | 60              | V      |
| Drain Current (Note 2)                       | Continuous       | I <sub>D</sub>  | 500 mA |
|  | Pulsed           | I <sub>DM</sub> | 800 mA |
| Power Dissipation (Note 2)                   | P <sub>D</sub>   | 225             | mW     |
| Derating above T <sub>A</sub> =25°C (Note 2) |                  | 1.80            | mW/°C  |
| Junction Temperature                         | T <sub>J</sub>   | +150            | °C     |
| Storage Temperature                          | T <sub>STG</sub> | -55 ~ +150      | °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. Valid provided that terminals are kept at specified ambient temperature.

### ■ THERMAL CHARACTERISTICS

| PARAMETER           | SYMBOL          | RATINGS | UNIT |
|---------------------|-----------------|---------|------|
| Junction to Ambient | θ <sub>JA</sub> | 556     | °C/W |

### ■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

| PARAMETER                               | SYMBOL              | TEST CONDITIONS   | MIN | TYP | MAX | UNIT |
|---|---------------------|---|-----|-----|-----|------|
| <b>OFF CHARACTERISTICS (Note 1)</b>     |                     |   |     |     |     |      |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | I <sub>D</sub> =100μA, V <sub>GS</sub> =0V                        | 60  | 70  |     | V    |
| Drain-Source Leakage Current            | I <sub>DSS</sub>    | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V                         |     |     | 1.0 | μA   |
| Gate- Source Leakage Current            | I <sub>GSS</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =+15V                        |     |     | +10 | nA   |
|   |                     | V <sub>DS</sub> =0V, V <sub>GS</sub> =-15V                        |     |     | -10 | nA   |
| <b>ON CHARACTERISTICS (Note 1)</b>      |                     |   |     |     |     |      |
| Gate Threshold Voltage                  | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA         | 0.8 | 2.1 | 3.0 | V    |
| Static Drain-Source On-State Resistance | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =200mA                       |     |     | 5.0 | Ω    |
|   |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =50mA                       |     |     | 5.3 | Ω    |
| Forward Transconductance                | g <sub>FS</sub>     | V <sub>DS</sub> =10V, I <sub>D</sub> =0.2A                        | 80  |     |     | mS   |
| <b>DYNAMIC PARAMETERS</b>               |                     |   |     |     |     |      |
| Input Capacitance                       | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1.0MHz               |     | 22  | 40  | pF   |
| Output Capacitance                      | C <sub>OSS</sub>    |   |     | 11  | 30  | pF   |
| Reverse Transfer Capacitance            | C <sub>RSS</sub>    |   |     | 2.0 | 5.0 | pF   |
| <b>SWITCHING PARAMETERS</b>             |                     |   |     |     |     |      |
| Turn-ON Delay Time                      | t <sub>D(ON)</sub>  | V <sub>DD</sub> =25V, I <sub>D</sub> =0.5A, V <sub>GS</sub> =10V, |     |     | 10  | ns   |
| Turn-OFF Delay Time                     | t <sub>D(OFF)</sub> | R <sub>GEN</sub> =50Ω   |     |     | 10  | ns   |

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

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