

# UCT3400

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

|         |      |
|---------|------|
| BVDSS   | 30V  |
| RDS(ON) | 28mΩ |
| ID      | 5.8A |

## Description

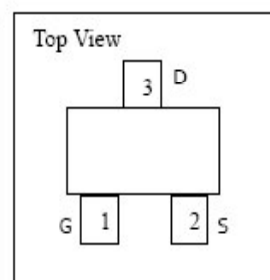
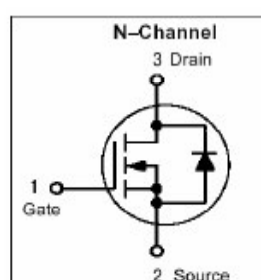
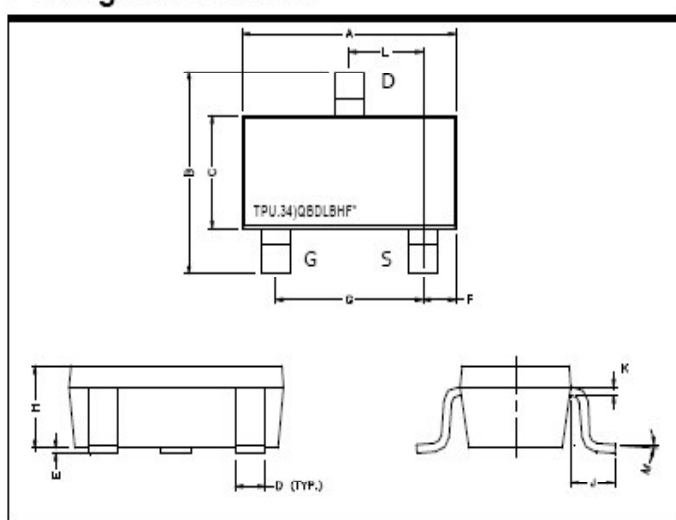
The UCT3400 uses advanced trench technology to provide excellent on-resistance extremely efficient and cost-effectiveness device.

The UCT3400 is universally used for all commercial-industrial applications.

## Features

- \*Lower Gate Charge
- \*Small Package Outline
- \*RoHS Compliant

## Package Dimensions



| REF. | Millimeter |      | REF. | Millimeter |      |
|------|------------|------|------|------------|------|
|      | Min.       | Max. |      | Min.       | Max. |
| A    | 2.70       | 3.10 | G    | 1.90       | REF. |
| B    | 2.40       | 2.80 | H    | 1.00       | 1.30 |
| C    | 1.40       | 1.60 | K    | 0.10       | 0.20 |
| D    | 0.35       | 0.50 | J    | 0.40       | -    |
| E    | 0          | 0.10 | L    | 0.85       | 1.15 |
| F    | 0.45       | 0.55 | M    | 0°         | 10°  |

## Absolute Maximum Ratings

| Parameter                                        | Symbol                   | Ratings    | Unit |
|--------------------------------------------------|--------------------------|------------|------|
| Drain-Source Voltage                             | $V_{DS}$                 | 30         | V    |
| Gate-Source Voltage                              | $V_{GS}$                 | $\pm 12$   | V    |
| Continuous Drain Current <sup>3</sup>            | $I_D @ T_A = 25^\circ C$ | 5.8        | A    |
| Continuous Drain Current <sup>3</sup>            | $I_D @ T_A = 70^\circ C$ | 4.9        | A    |
| Pulsed Drain Current <sup>1,2</sup>              | $I_{DM}$                 | 30         | A    |
| Total Power Dissipation                          | $P_D @ T_A = 25^\circ C$ | 1.38       | W    |
| Linear Derating Factor                           |                          | 0.01       | W/°C |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$           | -55 ~ +150 | °C   |

## Thermal Data

| Parameter                                             | Symbol      | Value | Unit |
|-------------------------------------------------------|-------------|-------|------|
| Thermal Resistance Junction-ambient <sup>3</sup> Max. | $R_{thj-a}$ | 90    | °C/W |

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

| Parameter                                          | Symbol              | Min. | Typ. | Max. | Unit | Test Conditions                                                                            |
|----------------------------------------------------|---------------------|------|------|------|------|--------------------------------------------------------------------------------------------|
| Drain-Source Breakdown Voltage                     | BV <sub>DSS</sub>   | 30   | -    | -    | V    | V <sub>GS</sub> =0, I <sub>D</sub> =250uA                                                  |
| Gate Threshold Voltage                             | V <sub>GS(th)</sub> | 0.7  | -    | 1.4  | V    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                   |
| Forward Transconductance                           | g <sub>fs</sub>     | -    | 15   | -    | S    | V <sub>DS</sub> =5V, I <sub>D</sub> =5A                                                    |
| Gate-Source Leakage Current                        | I <sub>GSS</sub>    | -    | -    | ±100 | nA   | V <sub>GS</sub> = ±12V                                                                     |
| Drain-Source Leakage Current(T <sub>j</sub> =25°C) | I <sub>DSS</sub>    | -    | -    | 1    | uA   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0                                                   |
| Drain-Source Leakage Current(T <sub>j</sub> =55°C) |                     | -    | -    | 5    | uA   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0                                                   |
| Static Drain-Source On-Resistance                  | R <sub>DS(ON)</sub> | -    | -    | 28   | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =5.8A                                                 |
|                                                    |                     | -    | -    | 33   |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.0A                                                |
|                                                    |                     | -    | -    | 52   |      | V <sub>GS</sub> =2.5V, I <sub>D</sub> =4.0A                                                |
| Total Gate Charge <sup>2</sup>                     | Q <sub>g</sub>      | -    | 9.7  | 12   | nC   | I <sub>D</sub> =5.8A<br>V <sub>DS</sub> =15V<br>V <sub>GS</sub> =4.5V                      |
| Gate-Source Charge                                 | Q <sub>gs</sub>     | -    | 1.6  | -    |      |                                                                                            |
| Gate-Drain ("Miller") Charge                       | Q <sub>gd</sub>     | -    | 3.1  | -    |      |                                                                                            |
| Turn-on Delay Time <sup>2</sup>                    | T <sub>d(on)</sub>  | -    | 3.3  | -    | ns   | V <sub>DS</sub> =15V<br>V <sub>GS</sub> =10V<br>R <sub>G</sub> =3Ω<br>R <sub>L</sub> =2.7Ω |
| Rise Time                                          | T <sub>r</sub>      | -    | 4.8  | -    |      |                                                                                            |
| Turn-off Delay Time                                | T <sub>d(off)</sub> | -    | 26.3 | -    |      |                                                                                            |
| Fall Time                                          | T <sub>f</sub>      | -    | 4.1  | -    |      |                                                                                            |
| Input Capacitance                                  | C <sub>iss</sub>    | -    | 823  | 1030 | pF   | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =15V<br>f=1.0MHz                                    |
| Output Capacitance                                 | C <sub>oss</sub>    | -    | 99   | -    |      |                                                                                            |
| Reverse Transfer Capacitance                       | C <sub>rss</sub>    | -    | 77   | -    |      |                                                                                            |
| Gate Resistance                                    | R <sub>g</sub>      | -    | 1.2  | 3.6  | Ω    | f=1.0MHz                                                                                   |

**Source-Drain Diode**

| Parameter                              | Symbol          | Min. | Typ. | Max. | Unit | Test Conditions                                          |
|----------------------------------------|-----------------|------|------|------|------|----------------------------------------------------------|
| Forward On Voltage <sup>2</sup>        | V <sub>SD</sub> | -    | -    | 1.0  | V    | I <sub>S</sub> =1.0A, V <sub>GS</sub> =0V                |
| Reverse Recovery Time <sup>2</sup>     | T <sub>rr</sub> | -    | 16   | -    | ns   | I <sub>S</sub> =5A, V <sub>GS</sub> =0V<br>dI/dt=100A/us |
| Reverse Recovery Charge                | Q <sub>rr</sub> | -    | 8.9  | -    | nC   |                                                          |
| Continuous Source Current (Body Diode) | I <sub>S</sub>  | -    | -    | 2.5  | A    | V <sub>D</sub> =V <sub>G</sub> =0V, V <sub>S</sub> =1.0V |

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 270°C/W when mounted on Min. copper pad.

## Characteristics Curve

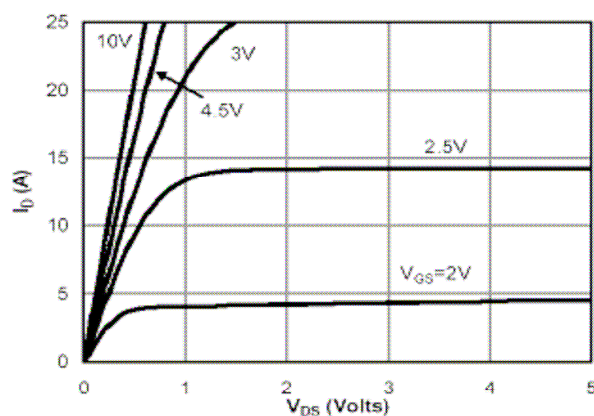


Fig 1. Typical Output Characteristics

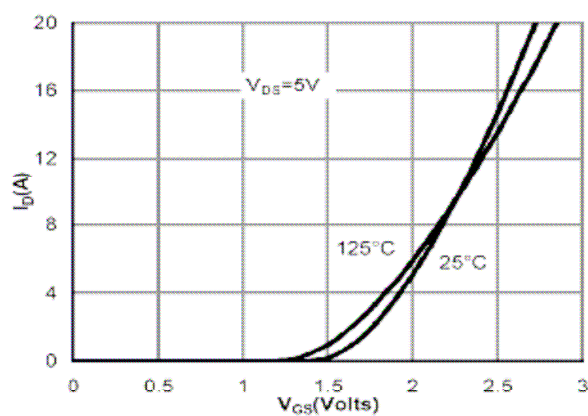


Fig 2. Transfer Characteristics

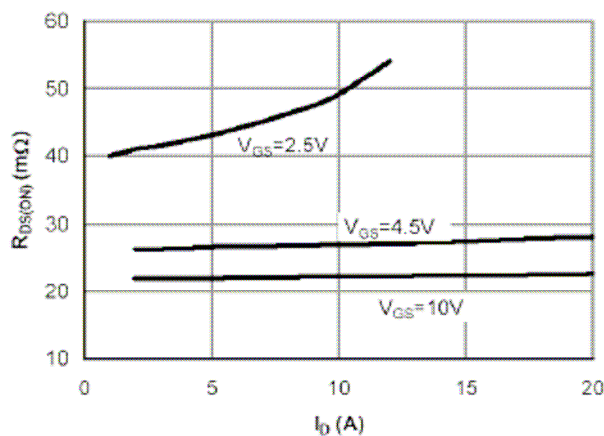


Fig 3. On-Resistance v.s. Drain Current and Gate Voltage

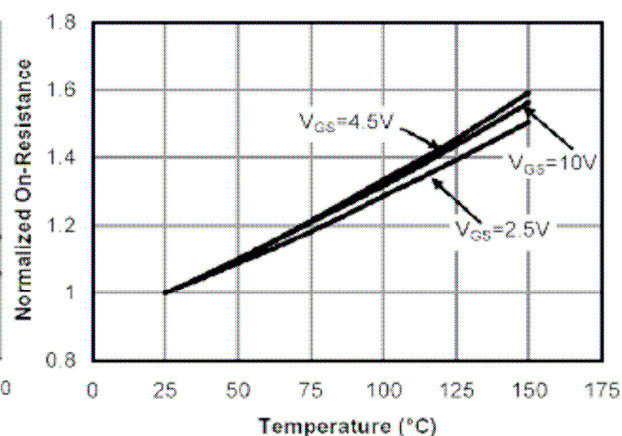


Fig 4. On-Resistance v.s. Junction Temperature

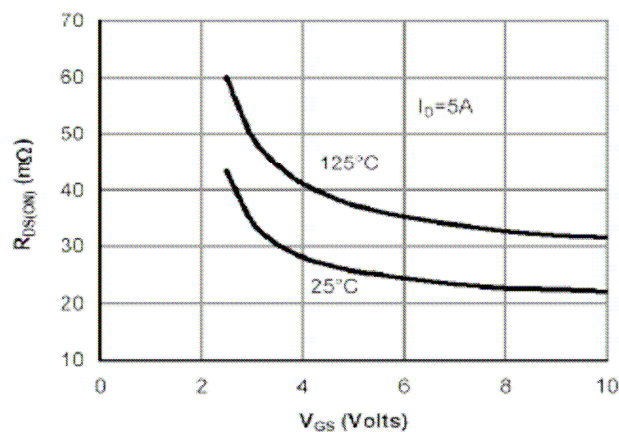


Fig 5. On-Resistance v.s. Gate-Source Voltage

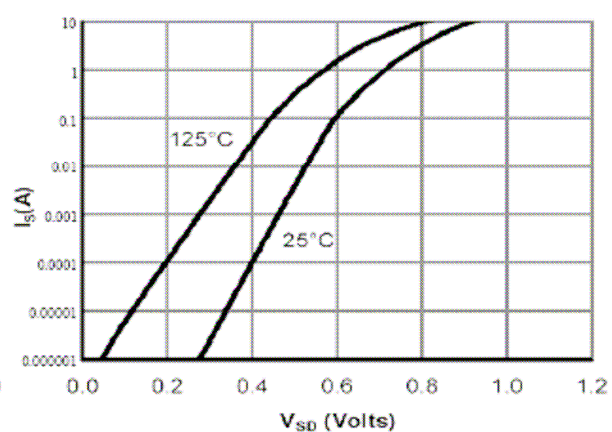


Fig 6. Body Diode Characteristics

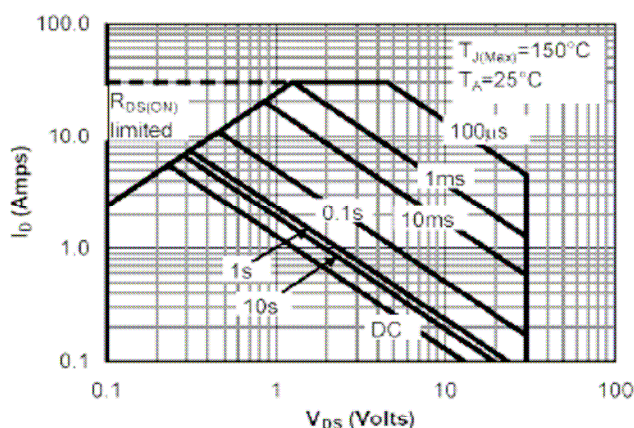


Fig 7. Maximum Safe Operating Area

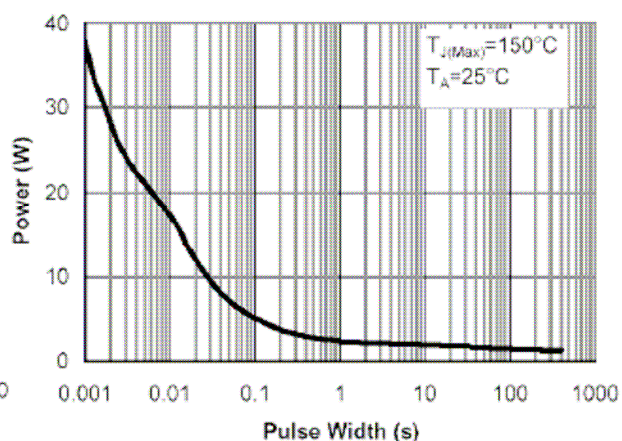


Fig 8. Single Pulse Power Rating  
Junction-to-Ambient

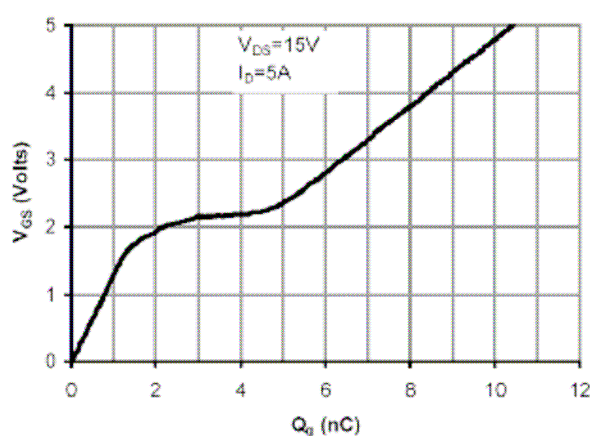


Fig 9. Gate Charge Characteristics

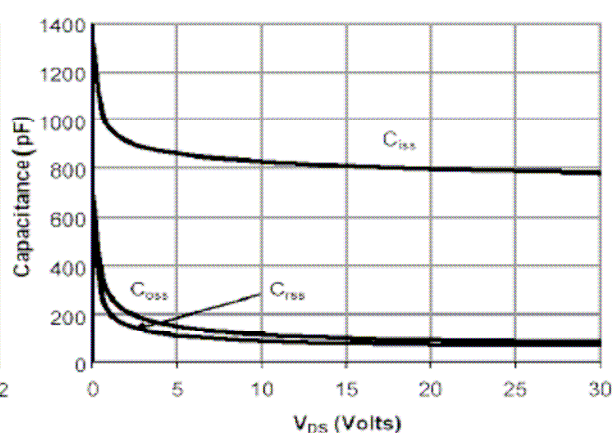


Fig 10. Typical Capacitance Characteristics

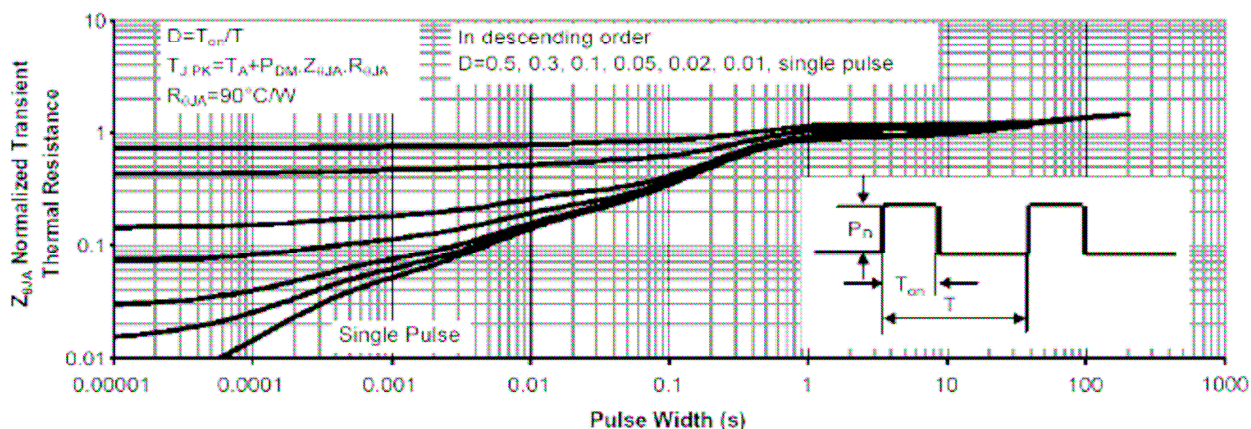


Fig 11. Normalized Maximum Transient Thermal Impedance

Pb Free Plating Product