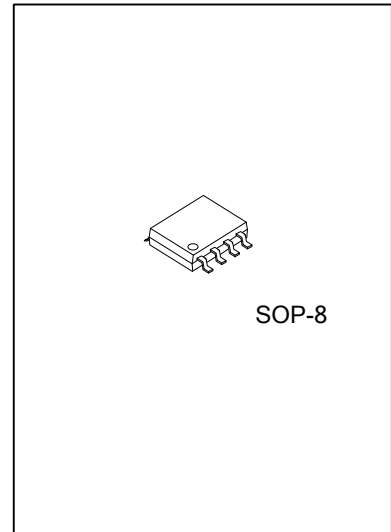




# DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET



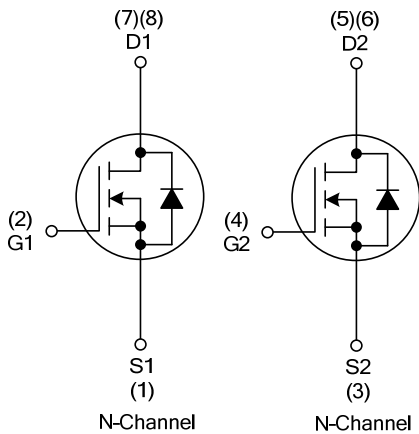
#### DESCRIPTION

The UTC **12NN10** is a dual N-Channel enhancement mode power MOSFET, it provides designer with fast switching speed, ruggedized device design, low on-resistance and cost-effectiveness.

#### FEATURES

- \* Low Gate Charge (Typically 10nC)
- \* 2.5A, 100V, 150mΩ @ V<sub>GS</sub>=10V
- \* Fast Switching Speed
- \* Simple Drive Requirement

#### SYMBOL



#### ORDERING INFORMATION

| Ordering Number |               | Package | Pin Assignment |    |    |    |    |    |    |    | Packing   |
|-----------------|---------------|---------|----------------|----|----|----|----|----|----|----|-----------|
| Lead Free       | Halogen Free  |         | 1              | 2  | 3  | 4  | 5  | 6  | 7  | 8  |           |
| 12NN10L-S08-R   | 12NN10G-S08-R | SOP-8   | S1             | G1 | S2 | G2 | D2 | D2 | D1 | D1 | Tape Reel |

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

|  |   |
|--|---|
| <p>12NN10L - S08 - R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Lead Free</li> </ul> | <ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) S08: SOP-8</li> <li>(3) L: Lead Free, G: Halogen Free</li> </ul> |
|--|---|

■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$  unless otherwise specified)

| PARAMETER            |                    | SYMBOL    | RATINGS  | UNIT             |
|----------------------|--------------------|-----------|----------|------------------|
| Drain-Source Voltage |                    | $V_{DSS}$ | 100      | V                |
| Gate-Source Voltage  |                    | $V_{GSS}$ | $\pm 20$ | V                |
| Drain Current        | Continuous(Note 3) | $I_D$     | 2.5      | A                |
|                      | Pulsed(Note 2)     | $I_{DM}$  | 10       | A                |
| Power Dissipation    |                    | $P_D$     | 2        | W                |
| Junction Temperature |                    | $T_J$     | +150     | $^\circ\text{C}$ |
| Storage Temperature  |                    | $T_{STG}$ | -55~+150 | $^\circ\text{C}$ |

- Note: 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 Max. junction temperature.  
 3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board,  $t < 10\text{sec}$ ;  $135^\circ\text{C/W}$  when mounted on Min. copper pad.

■ THERMAL DATA

| PARAMETER                    | SYMBOL        | RATING | UNIT               |
|------------------------------|---------------|--------|--------------------|
| Junction to Ambient (Note 1) | $\theta_{JA}$ | 62.5   | $^\circ\text{C/W}$ |

- Note: 1. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board,  $t < 10\text{sec}$ ;  $135^\circ\text{C/W}$  when mounted on Min. copper pad.

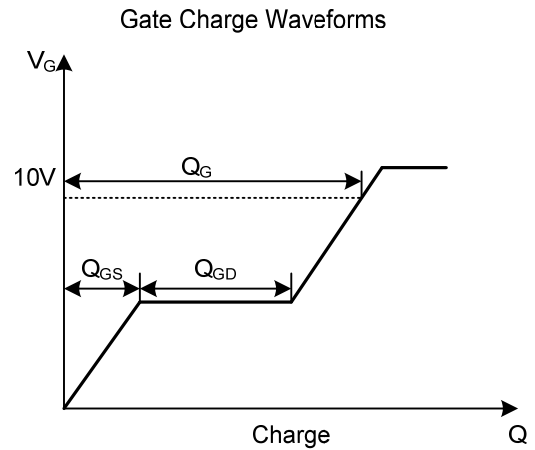
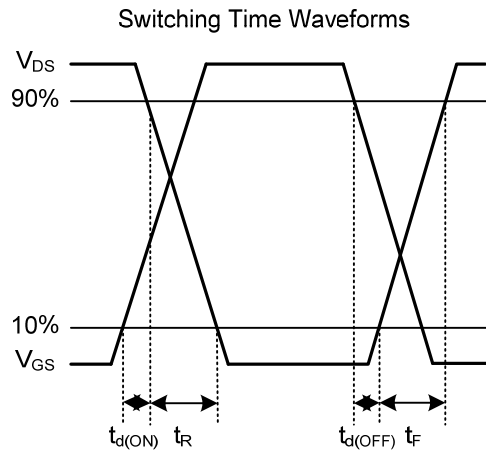
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER  |         | SYMBOL       | TEST CONDITIONS  | MIN                 | TYP | MAX  | UNIT          |    |
|--|---------|--------------|--|---------------------|-----|------|---------------|----|
| <b>OFF CHARACTERISTICS</b>                             |         |              |  |                     |     |      |               |    |
| Drain-Source Breakdown Voltage                         |         | $BV_{DSS}$   | $V_{GS}=0\text{V}, I_D=250\mu\text{A}$                 | 100                 |     |      | V             |    |
| Drain-Source Leakage Current                           |         | $I_{DSS}$    | $V_{DS}=80\text{V}, V_{GS}=0\text{V}$                  |                     |     | 10   | $\mu\text{A}$ |    |
| Gate-Source Leakage Current                            | Forward | $I_{GSS}$    | $V_{DS}=0\text{V}, V_{GS}=20\text{V}$                  |                     |     | 100  | nA            |    |
|  | Reverse |              | $V_{DS}=0\text{V}, V_{GS}=-20\text{V}$                 |                     |     | -100 | nA            |    |
| <b>ON CHARACTERISTICS</b>                              |         |              |  |                     |     |      |               |    |
| Gate Threshold Voltage                                 |         | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$                    | 1                   |     | 3    | V             |    |
| Drain-Source On-State Resistance (Note 1)              |         | $R_{DS(ON)}$ | $V_{GS}=10\text{V}, I_D=2\text{A}$                     |                     |     | 150  | m $\Omega$    |    |
| Forward Transconductance                               |         | $g_{FS}$     | $V_{DS}=10\text{V}, I_D=2\text{A}$                     |                     | 2.8 |      | S             |    |
| <b>DYNAMIC PARAMETERS</b>                              |         |              |  |                     |     |      |               |    |
| Input Capacitance                                      |         | $C_{ISS}$    | $V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$ |                     | 420 | 672  | pF            |    |
| Output Capacitance                                     |         | $C_{OSS}$    |  |                     | 60  |      | pF            |    |
| Reverse Transfer Capacitance                           |         | $C_{RSS}$    |  |                     | 40  |      | pF            |    |
| <b>SWITCHING PARAMETERS</b>                            |         |              |  |                     |     |      |               |    |
| Total Gate Charge (Note 1)                             |         | $Q_G$        | $V_{DS}=80\text{V}, V_{GS}=10\text{V}, I_D=2\text{A}$  |                     | 10  | 16   | nC            |    |
| Gate-Source Charge                                     |         | $Q_{GS}$     |  |                     | 2   |      | nC            |    |
| Gate-Drain Charge                                      |         | $Q_{GD}$     |  |                     | 4   |      | nC            |    |
| Turn-ON Delay Time (Note 1)                            |         | $t_{D(ON)}$  | $V_{DS}=50\text{V}, I_D=2\text{A}, R_G=3.3\Omega$      |                     | 6.5 |      | ns            |    |
| Turn-ON Rise Time                                      |         | $t_R$        |  |                     | 7   |      | ns            |    |
| Turn-OFF Delay Time                                    |         | $t_{D(OFF)}$ |  | $V_{GS}=10\text{V}$ |     | 14   |               | ns |
| Turn-OFF Fall Time                                     |         | $t_F$        |  |                     | 3.5 |      | ns            |    |
| <b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b> |         |              |  |                     |     |      |               |    |
| Drain-Source Diode Forward Voltage (Note 1)            |         | $V_{SD}$     | $I_S=1.5\text{A}, V_{GS}=0\text{V}$                    |                     |     | 1.3  | V             |    |

|   |          |  |  |    |  |    |
|---|----------|--|--|----|--|----|
| Body Diode Reverse Recovery Time (Note 1) | $t_{RR}$ | $V_{GS}=0V, I_S=2A,$<br>$di_F/dt=100A/\mu s$ |  | 40 |  | ns |
| Body Diode Reverse Recovery Charge        | $Q_{RR}$ |  |  | 75 |  | nC |

Note: 1. Pulse test

### ■ TEST CIRCUITS AND WAVEFORMS



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