



20N15

Power MOSFET

20A, 150V N-CHANNEL POWER MOSFET

DESCRIPTION

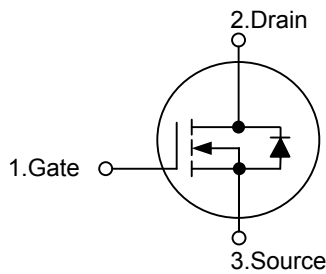
The UTC **20N15** is an N-Channel POWER MOSFET, it uses UTC's advanced technology to provide customers with high switching speed and low gate charge.

The UTC **20N15** is suitable for bridge circuits, power converters and PWM motor controls.

FEATURES

- * $R_{DS(on)} < 0.13\Omega$ @ $V_{GS} = 10V, I_D = 10A$
- * High switching speed
- * Low gate charge

SYMBOL

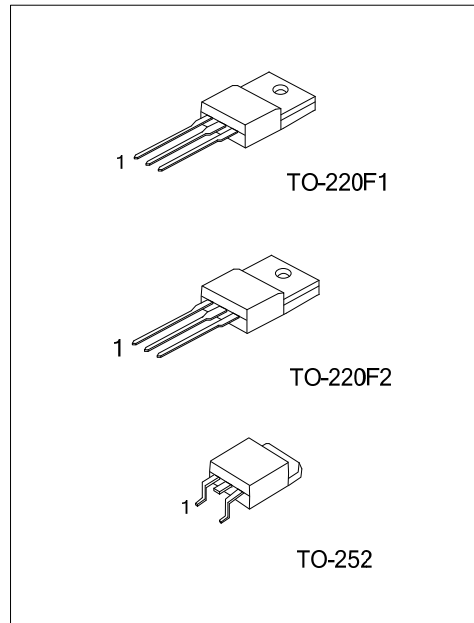


ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|--------------|----------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 20N15L-TF1-T | 20N15G-TF1-T | TO-220F1 | G | D | S | Tube |
| 20N15L-TF2-T | 20N15G-TF2-T | TO-220F2 | G | D | S | Tube |
| 20N15L-TN3-T | 20N15G-TN3-T | TO-252 | G | D | S | Tube |
| 20N15L-TN3-R | 20N15G-TN3-R | TO-252 | G | D | S | Tape Reel |

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

| | |
|--|--|
| <p>20N15L-TF1-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p> | <p>(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TF2: TO-220F2, TN3: TO-252 (3) L: Lead Free, G: Halogen Free</p> |
|--|--|



■ ABSOLUTE MAXIMUM RATINGS ($T_c=25^\circ\text{C}$, unless otherwise noted)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|--|-----------|----------|------------------|
| Drain-Source Voltage | | V_{DSS} | 150 | V |
| Gate-Source Voltage | Continuous | V_{GSS} | ± 20 | V |
| Drain Current | Continuous | I_D | 20 | A |
| | Single Pulsed ($t_p \leq 10\mu\text{s}$) | I_{DM} | 60 | A |
| Single Drain-to-Source Avalanche Energy | Starting $T_J=25^\circ\text{C}$ ($V_{DD}=120\text{V}$, $V_{GS}=10\text{V}$, $I_L=20\text{A}$, $L=0.3\text{mH}$) | E_{AS} | 60 | mJ |
| Power Dissipation | TO-220F1 | P_D | 36 | W |
| | TO-220F2 | | 38 | W |
| | TO-252 | | 50 | W |
| Operating Temperature | | T_J | +150 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{STG} | -55~+150 | $^\circ\text{C}$ |

Note: 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.

■ THERMAL CHARACTERISTICS

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---------------------|-------------------|---------------|---------|--------------------|
| Junction to Ambient | TO-220F1/TO-220F2 | θ_{JA} | 62.5 | $^\circ\text{C/W}$ |
| | TO-252 | | 110 | $^\circ\text{C/W}$ |
| Junction to Case | TO-220F1 | θ_{JC} | 3.47 | $^\circ\text{C/W}$ |
| | TO-220F2 | | 3.28 | $^\circ\text{C/W}$ |
| | TO-252 | | 2.5 | $^\circ\text{C/W}$ |

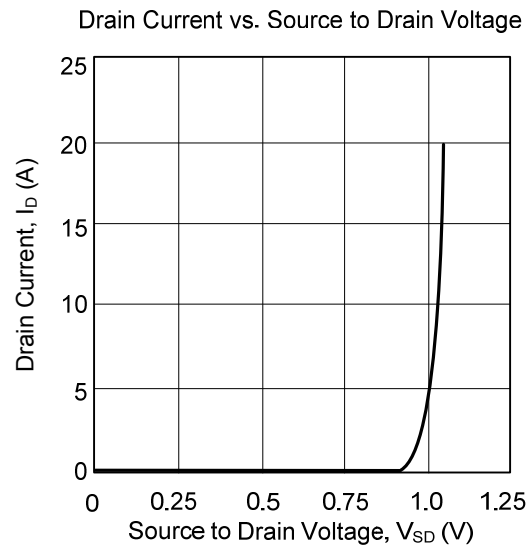
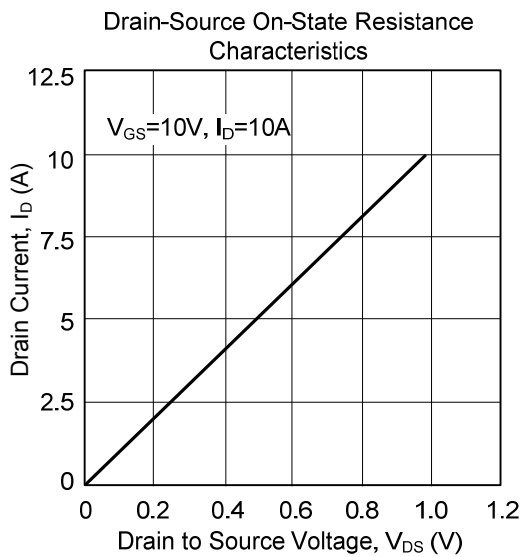
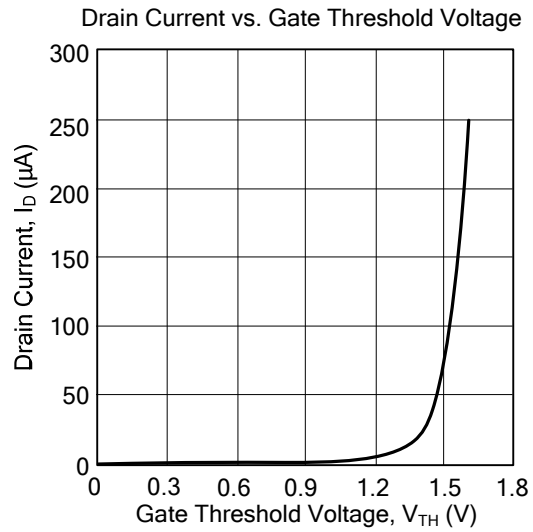
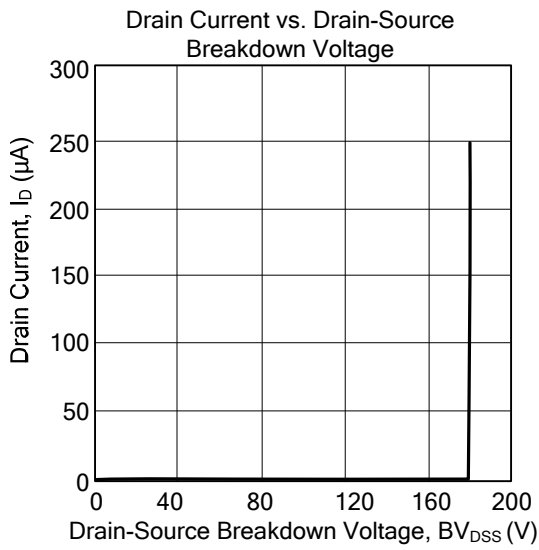
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|---|-----|------|------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $I_D=0.25\text{mA}$, $V_{GS}=0\text{V}$ | 150 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=150\text{V}$, $V_{GS}=0\text{V}$ | | | 10 | μA |
| | | $V_{DS}=150\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$ | | | 100 | μA |
| Gate-Source Leakage Current | Forward | I_{GSS} | | | 100 | nA |
| | Reverse | | | | | |
| | | | | | 100 | nA |
| ON CHARACTERISTICS (Note 1) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}$, $I_D=0.25\text{mA}$ | 2.0 | | 4.0 | V |
| Static Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10\text{V}$, $I_D=10\text{A}$ | | 0.12 | 0.13 | Ω |
| Drain-Source On-Voltage | $V_{DS(ON)}$ | $V_{GS}=10\text{V}$, $I_D=20\text{A}$ | | | 2.8 | V |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$ | | 1133 | 1627 | pF |
| Output Capacitance | C_{OSS} | | | 332 | 474 | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 105 | 174 | pF |
| SWITCHING PARAMETERS (Note 2) | | | | | | |
| Gate Charge | Q_G | $V_{GS}=10\text{V}$, $V_{DS}=75\text{V}$, $I_D=20\text{A}$ | | 39.1 | 55.9 | nC |
| | Q_{GS} | | | 7.5 | | nC |
| | Q_{GD} | | | 22 | | nC |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{DD}=75\text{V}$, $V_{GS}=10\text{V}$, $I_D=20\text{A}$, $R_G=9.1\Omega$ | | 11 | 25 | ns |
| Rise Time | t_R | | | 77 | 153 | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 33 | 67 | ns |
| Fall-Time | t_F | | | 49 | 97 | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage (Note 1) | V_{SD} | $I_S=20\text{A}$, $V_{GS}=0\text{V}$ | | | 1.5 | V |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | | | | 20 | A |
| Pulsed Drain-Source Current | I_{SM} | | | | 60 | A |
| Body Diode Reverse Recovery Time | t_{RR} | $I_S=20\text{A}$, $V_{GS}=0\text{V}$, $dI_S/dt=100\text{A}/\mu\text{s}$ | | 160 | | ns |
| Body Diode Reverse Recovery Charge | Q_{RR} | | | 1.1 | | μC |

Notes: 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

2. Switching characteristics are independent of operating junction temperature.

TYPICAL CHARACTERISTICS



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