



UT3419

Power MOSFET

20V, 3.5A P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

DESCRIPTION

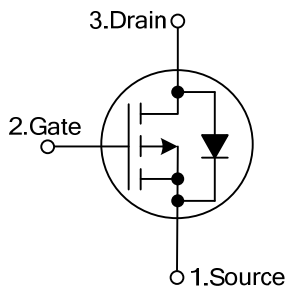
The UTC **UT3419** is a P-channel enhancement MOSFET providing designers with excellent $R_{DS(ON)}$, low gate charge. The gate voltage is as low as 2.5V.

The UTC **UT3419** can be applied in PWM applications or used as a load switch.

FEATURES

- * $R_{DS(ON)} < 75m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 95m\Omega$ ($V_{GS} = -4.5V$)
- $R_{DS(ON)} < 145m\Omega$ ($V_{GS} = -2.5V$)

SYMBOL



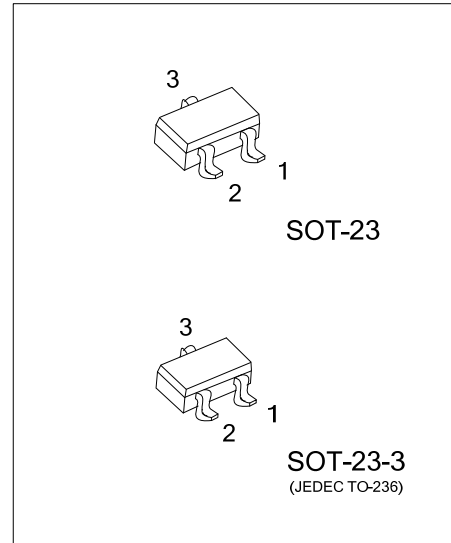
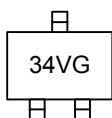
ORDERING INFORMATION

| Ordering Number | Package | Pin Assignment | | | Packing |
|-----------------|----------|----------------|---|---|-----------|
| | | 1 | 2 | 3 | |
| UT3419G-AE2-R | SOT-23-3 | S | G | D | Tape Reel |
| UT3419G-AE3-R | SOT-23 | S | G | D | Tape Reel |

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

| | | |
|---------------|------------------|-----------------------------------|
| UT3419G-AE2-R | (1)Packing Type | (1) R: Tape Reel |
| | (2)Package Type | (2) AE2: SOT-23-3, AE3: SOT-23 |
| | (3)Green Package | (3) G: Halogen Free and Lead Free |

MARKING



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

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|-----------------------------------|--------------------------|-----------|------------|------------------|
| Drain to Source Voltage | | V_{DS} | -20 | V |
| Gate to Source Voltage | | V_{GS} | ± 12 | V |
| Continuous Drain Current (Note 1) | $T_A = 25^\circ\text{C}$ | I_D | -3.5 | A |
| | $T_A = 70^\circ\text{C}$ | | -2.8 | A |
| Pulsed Drain Current (Note 2) | | I_{DM} | -15 | A |
| Total Power Dissipation (Note 1) | $T_A = 25^\circ\text{C}$ | P_D | 1.4 | W |
| | $T_A = 70^\circ\text{C}$ | | 0.9 | W |
| Junction Temperature | | T_J | -55 ~ +150 | $^\circ\text{C}$ |
| Storage Temperature | | 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 DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|------------------------------|---------------------|---------------|---------|--------------------|
| Junction to Ambient (Note 1) | $t \leq 10\text{s}$ | θ_{JA} | 90 | $^\circ\text{C/W}$ |
| | Steady-State | | 125 | $^\circ\text{C/W}$ |

Notes: 1. The value of θ_{JA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any a given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.
2. Repetitive rating, pulse width limited by junction temperature.

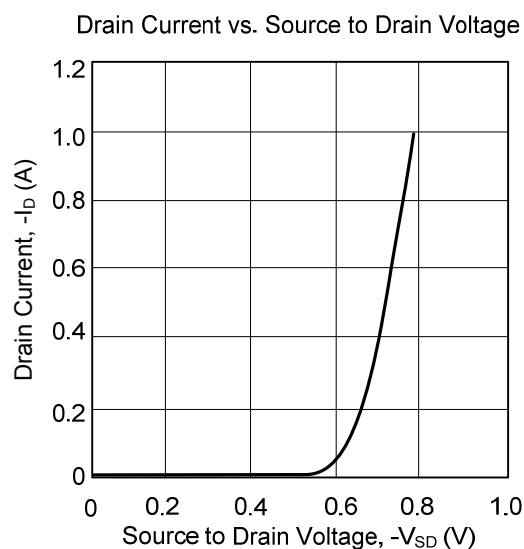
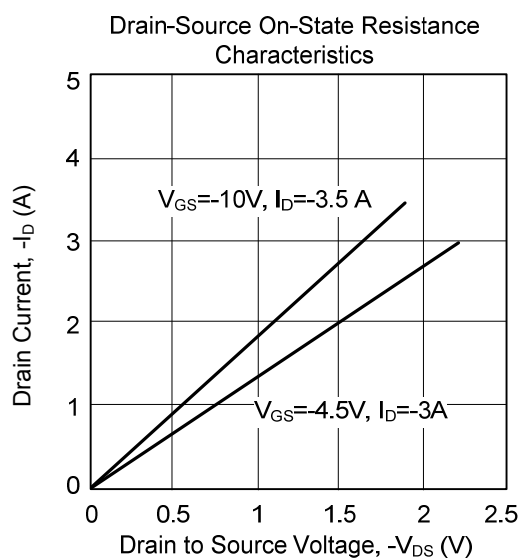
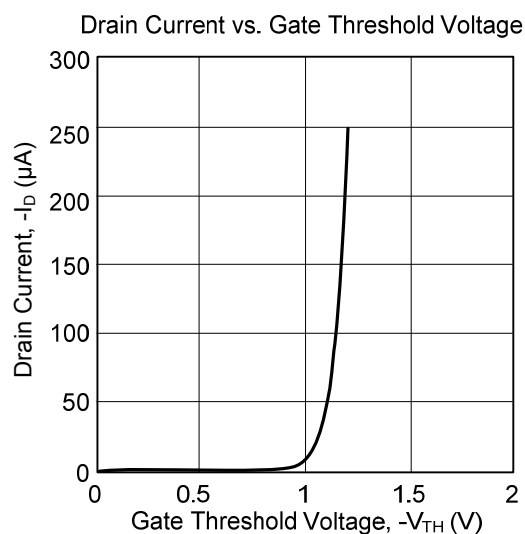
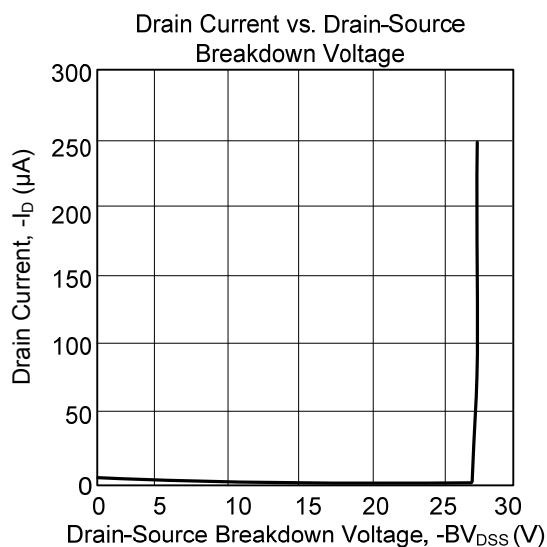
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---------------------|---|-------|-------|-------|------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =-250μA | -20 | | | V |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =-16V, V _{GS} =0V | | | -0.5 | μA |
| Gate-Source Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±10V | | | ±100 | nA |
| | | V _{DS} =0V, V _{GS} =±12V | | | ±100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | V _{DS} = V _{GS} , I _D =-250μA | -0.7 | -0.9 | -1.4 | V |
| On State Drain Current | I _{D(ON)} | V _{GS} =-4.5V, V _{DS} =-5V | -15 | | | A |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-10V, I _D =-3.5A | | 59 | 75 | mΩ |
| | | V _{GS} =-4.5V, I _D =-3A | | 76 | 95 | mΩ |
| | | V _{GS} =-2.5V, I _D =-1A | | 111 | 145 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =-5V, I _D =-3.5A | | 6.8 | | S |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} =-10V, V _{GS} =0V, f =1MHz | | 512 | 620 | pF |
| Output Capacitance | C _{OSS} | | | 77 | | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 62 | | pF |
| Gate Resistance | R _G | V _{GS} =0V, V _{DS} =0V, f =1MHz | | 9.2 | 13 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q _G | V _{DS} =-10V, V _{GS} =-4.5V, I _D =-3.5A | | 5.5 | 6.6 | nC |
| Gate-Source Charge | Q _{GS} | | | 0.8 | | nC |
| Gate-Drain Charge | Q _{GD} | | | 1.9 | | nC |
| Turn-ON Delay Time | t _{D(ON)} | V _{DS} =-10V, V _{GS} =-10V, R _L =2.8Ω, R _{GEN} =3Ω | | 5 | | ns |
| Turn-ON Rise Time | t _R | | | 6.7 | | ns |
| Turn-OFF Delay Time | t _{D(OFF)} | | | 28 | | ns |
| Turn-OFF Fall Time | t _F | | | 13.5 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage | V _{SD} | I _S =-1A, V _{GS} =0V | -0.65 | -0.81 | -0.95 | V |
| Maximum Body-Diode Continuous Current | I _S | | | | -2 | A |
| Body Diode Reverse Recovery Time | t _{rr} | I _F =-3.5A, dI/dt=100A/μs | | 9.8 | 12 | ns |
| Body Diode Reverse Recovery Charge | Q _{RR} | I _F =-3.5A, dI/dt=100A/μs | | 2.7 | | nC |

Notes: 1. The θ_{JA} is the sum of the thermal impedance from junction to lead θ_{JL} and lead to ambient.

2. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

■ TYPICAL CHARACTERISTICS



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