



## UT3419

Power MOSFET

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

#### DESCRIPTION

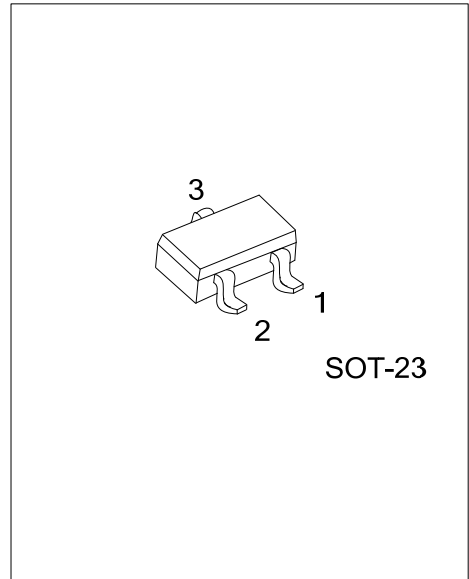
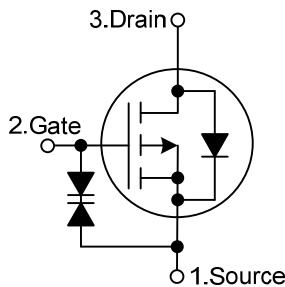
The UTC **UT3419** is a P-channel enhancement MOSFET providing designers with excellent  $R_{DS(ON)}$ , low gate charge. The gate voltage is as low as 2.5V. It is ESD protection.

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

#### FEATURES

- \* ESD Rating Is Up To 2000V HBM
- \*  $R_{DS(ON)} < 75m\Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 95m\Omega$  ( $V_{GS} = -4.5V$ )
- $R_{DS(ON)} < 145m\Omega$  ( $V_{GS} = -2.5V$ )

#### SYMBOL

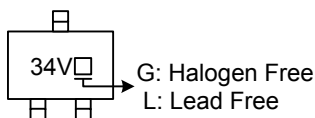


#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3419L-AE3-R	UT3419G-AE3-R	SOT-23	S	G	D	Tape Reel

<p>UT3419L-AE3-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) R: Tape Reel</p> <p>(2) AE3: SOT-23</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage	$V_{DSS}$	-20	V
Gate to Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 1)	$I_D$	$T_A = 25^\circ\text{C}$	-3.5
		$T_A = 70^\circ\text{C}$	-2.8
Pulsed Drain Current (Note 2)	$I_{DM}$	-15	A
Total Power Dissipation (Note 1)	$P_D$	$T_A = 25^\circ\text{C}$	1.4
		$T_A = 70^\circ\text{C}$	0.9
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)	$\theta_{JA}$	$t \leq 10\text{s}$	90
		Steady-State	125

Note: 1. The value of  $\theta_{JA}$  is measured with the device mounted on 1in<sup>2</sup> 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
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}, I_D=-250\mu\text{A}$	-20			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-16\text{V}, V_{GS}=0\text{V}$			-0.5	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0\text{V}, V_{GS}=\pm 10\text{V}$			$\pm 1$	$\mu\text{A}$
		$V_{DS}=0\text{V}, V_{GS}=\pm 12\text{V}$			$\pm 10$	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-0.7	-0.9	-1.4	V
On State Drain Current	$I_{D(ON)}$	$V_{GS}=-4.5\text{V}, V_{DS}=-5\text{V}$	-15			A
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}, I_D=-3.5\text{A}$		59	75	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-3\text{A}$		76	95	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}, I_D=-1\text{A}$		111	145	$\text{m}\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5\text{V}, I_D=-3.5\text{A}$		6.8		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=-10\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		512	620	pF
Output Capacitance	$C_{OSS}$			77		pF
Reverse Transfer Capacitance	$C_{RSS}$			62		pF
Gate Resistance	$R_G$	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$		9.2	13	$\Omega$
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{DS}=-10\text{V}, V_{GS}=-4.5\text{V}, I_D=-3.5\text{A}$		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	$t_{D(ON)}$	$V_{DS}=-10\text{V}, V_{GS}=-10\text{V}, R_L=2.8\Omega, R_{GEN}=3\Omega$		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

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
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	$t_{rr}$	$I_F = -3.5A, di/dt = 100A/\mu s$		9.8	12	ns
Body Diode Reverse Recovery Charge	$Q_{RR}$	$I_F = -3.5A, di/dt = 100A/\mu s$		2.7		nC

Note: 3. The  $\theta_{JA}$  is the sum of the thermal impedance from junction to lead  $\theta_{JL}$  and lead to ambient.

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

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