



## UT3419

Power MOSFET

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

#### DESCRIPTION

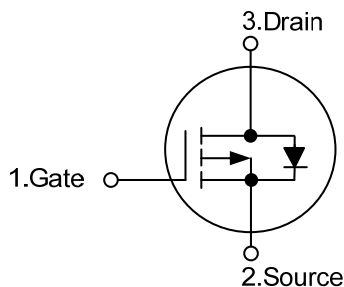
The UTC **UT3419** is a P-channel enhancement MOSFET providing designers with excellent  $R_{DS(ON)}$ , low gate charge. The gate voltage is as low as 2.5V.

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

#### FEATURES

- \*  $R_{DS(ON)} \leq 75m\Omega$  @  $V_{GS} = -10V$ ,  $I_D = -3.5A$
- \*  $R_{DS(ON)} \leq 95m\Omega$  @  $V_{GS} = -4.5V$ ,  $I_D = -3.0A$
- \*  $R_{DS(ON)} \leq 145m\Omega$  @  $V_{GS} = -2.8V$ ,  $I_D = -1.0A$

#### SYMBOL



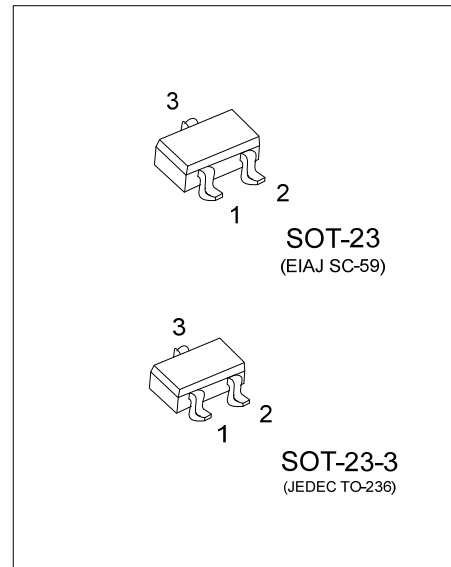
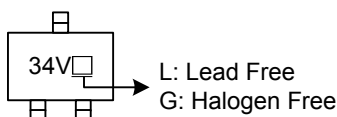
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3419L-AE2-R	UT3419G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT3419L-AE3-R	UT3419G-AE3-R	SOT-23	G	S	D	Tape Reel

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

<p>UT3419G-AE2-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AE2: SOT-23-3, AE3: SOT-23 (3) G: Halogen Free and Lead 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	$V_{DS}$	-20	V
Gate to Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current (Note 1)	$T_A = 25^\circ\text{C}$	$I_D$	-3.5
	$T_A = 70^\circ\text{C}$		-2.8
Pulsed Drain Current (Note 2)	$I_{DM}$	-15	A
Total Power Dissipation (Note 1)	$T_A = 25^\circ\text{C}$	$P_D$	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 CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 1)	$t \leq 10\text{s}$	$\theta_{JA}$	90
	Steady-State		125

Notes: 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.

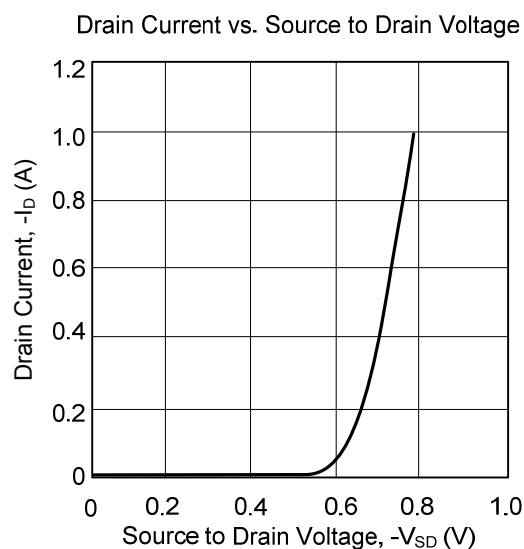
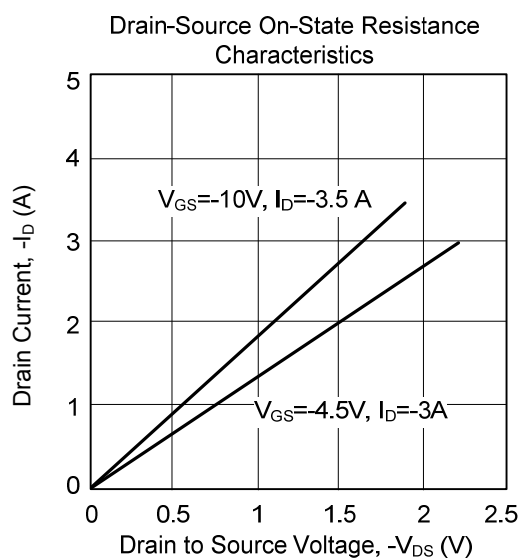
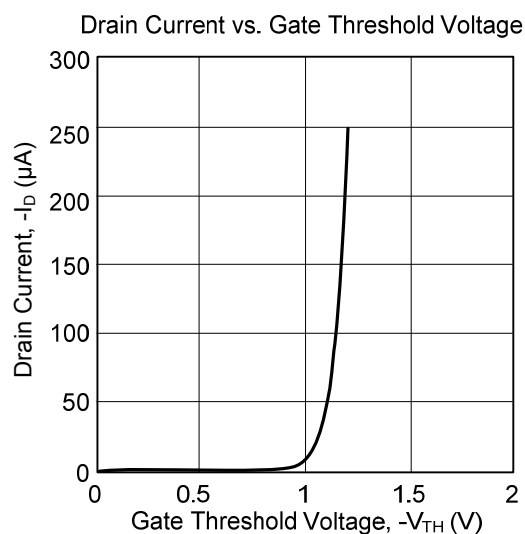
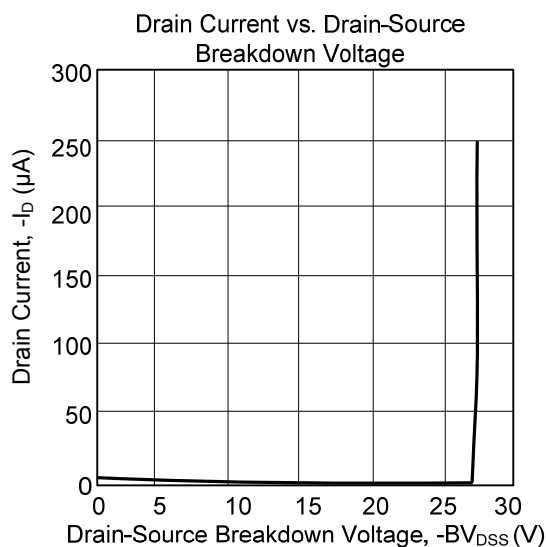
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

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

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

2. 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  $T_A=25^\circ\text{C}$ . The SOA curve provides a single pulse rating.

# TYPICAL CHARACTERISTICS



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