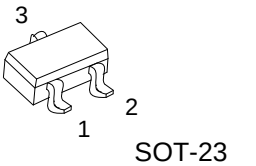
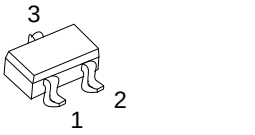
UT3409

Power MOSFET

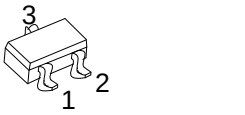
P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR



SOT-23
(EIAJ SC-59)



SOT-23-3
(JEDEC TO-236)



SOT-323

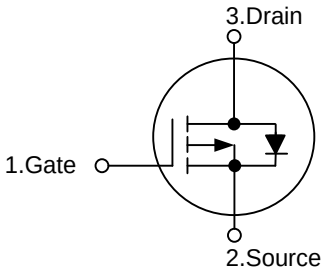
■ DESCRIPTION

The UTC **UT3409** uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

* SOT-23-3/SOT-23
  $R_{DS(ON)}$ ≤ 130 mΩ @ V_{GS}=-10V, I_D=-2.6A
  $R_{DS(ON)}$ ≤ 200 mΩ @ V_{GS} =-4.5V, I_D=-2.0A
* SOT-323
  $R_{DS(ON)}$ ≤ 160 mΩ @ V_{GS}=-10V, I_D=-2.6A
  $R_{DS(ON)}$ ≤ 260 mΩ @ V_{GS} =-4.5V, I_D=-2.0A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



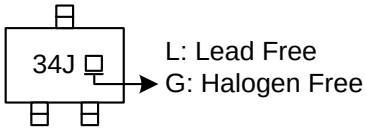
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3409L-AE2-R	UT3409G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT3409L-AE3-R	UT3409G-AE3-R	SOT-23	G	S	D	Tape Reel
UT3409L-AL3-R	UT3409G-AL3-R	SOT-323	G	S	D	Tape Reel

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

UT3409G-AE3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE2: SOT-23-3, AE3: SOT-23, AL3: SOT-323 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATING (T_A = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	-30	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (Note 3)	I_D	-2.6	A
Pulsed Drain Current (Note 2)	I_{DM}	-20	A
Power Dissipation	P_D	1.4	W
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Notes: 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. Repetitive Rating : Pulse width limited by maximum junction temperature.
3. Surface mounted on 1 in^2 copper pad of FR4 board.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23	θ_{JA}	90	°C/W
	SOT-23-3		150	°C/W
	SOT-323		170	°C/W

Note: Surface mounted on FR4 board using 1 sq in pad size, (Cu Area 1.127 sq in [2 oz] including traces)..

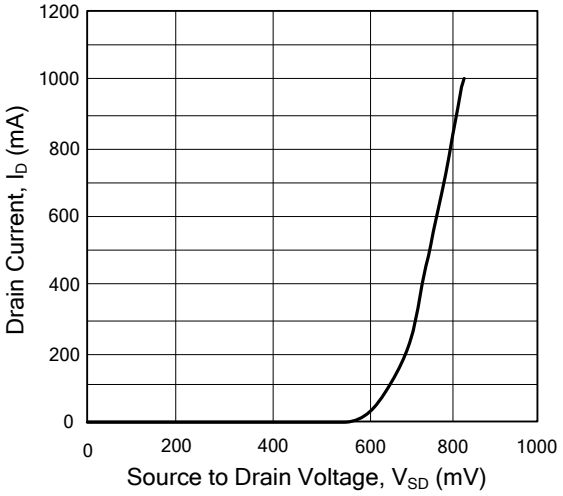
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC PARAMETERS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-30			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current		I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.9	-3	V
Static Drain-Source On-Resistance	SOT-23-3 SOT-23	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2.6A		97	130	mΩ
			V_{GS}=-4.5V, I_D=-2.0A		166	200	mΩ
	SOT-323		V_{GS}=-10V, I_D=-2.6A			160	mΩ
			V_{GS}=-4.5V, I_D=-2.0A			260	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-15V, f=1MHz		240		pF
Output Capacitance		C_{OSS}			58		pF
Reverse Transfer Capacitance		C_{RSS}			48		pF
SWITCHING PARAMETERS							
Total Gate Charge	10V	Q_G	V_{GS}=-10V, V_{DS}=-15V, I_D=-2.6A		8		nC
	4.5V				4		nC
Gate Source Charge		Q_{GS}			1.5		nC
Gate Drain Charge		Q_{GD}			1.4		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{GS}=-10V, V_{DS}=-15V, I_D=-2.6A, R_L=5.8Ω, R_G=3.0Ω		5		ns
Turn-ON Rise Time		t_R			15		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			12		ns
Turn-OFF Fall-Time		t_F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				-2	A
Diode Forward Voltage		V_{SD}	I_S=-1.0A, V_{GS}=0V		-0.82	-1	V

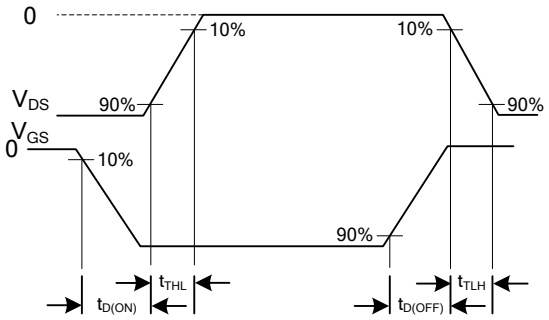
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

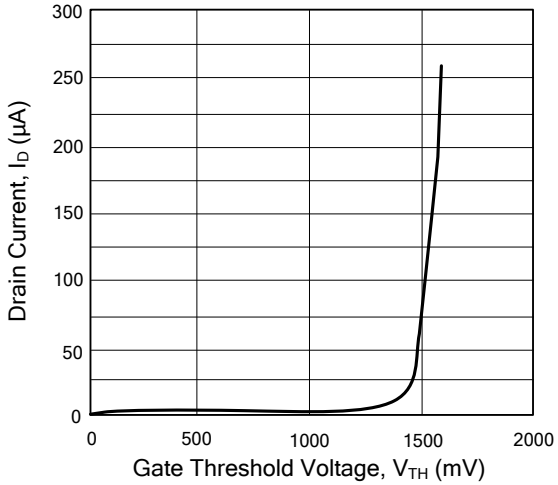
Drain Current vs. Source to Drain Voltage



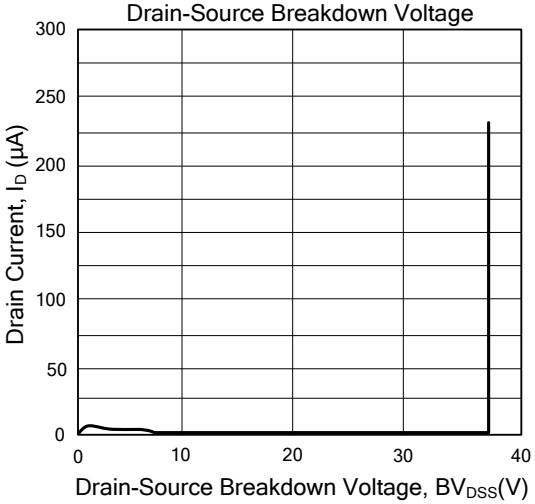
Switching Time Waveforms



Drain Current vs. Gate Threshold Voltage



Drain Current vs.
Drain-Source Breakdown Voltage



Drain-Source
On-State Resistance Characteristics