



## UT4421

Power MOSFET

### -6.2A, -60V P-CHANNEL POWER MOSFET

#### DESCRIPTION

The UTC **UT4421** is a P-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance and high switching speed.

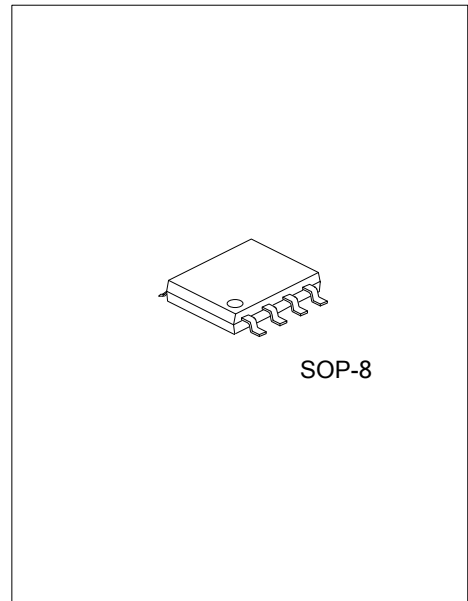
The UTC **UT4421** is suitable for load switch and battery protection applications.

#### FEATURES

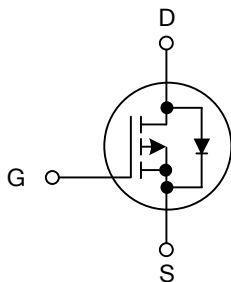
\*  $R_{DS(ON)} < 40m\Omega @ V_{GS} = -10V, I_D = -6.2A$

$R_{DS(ON)} < 50m\Omega @ V_{GS} = -4.5V, I_D = -5A$

\* High switching speed



#### SYMBOL



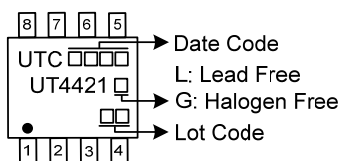
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT4421L-S08-R	UT4421G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT4421G-S08-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(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 noted)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			$V_{DSS}$	-60	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous (Note 1)	$T_A=25^{\circ}\text{C}$	$I_D$	-6.2	A
		$T_A=70^{\circ}\text{C}$		-5	A
	Pulsed (Note 2)		$I_{DM}$	-40	A
Power Dissipation (Note 1)			$P_D$	2	W
Junction Temperature			$T_J$	-55 ~ +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 DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	75	$^{\circ}\text{C}/\text{W}$
Junction to Case		$\theta_{JC}$	30	$^{\circ}\text{C}/\text{W}$

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

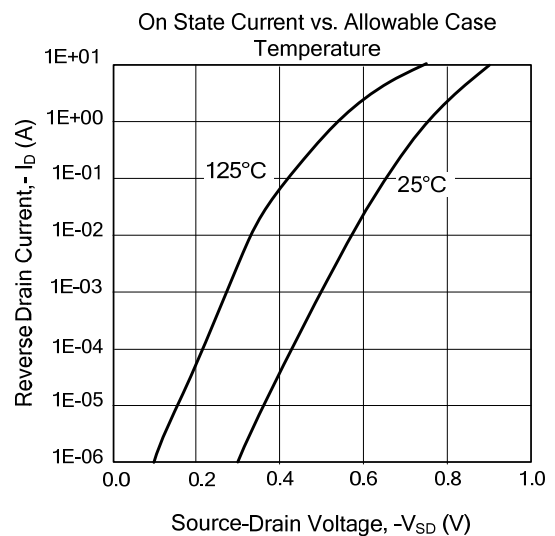
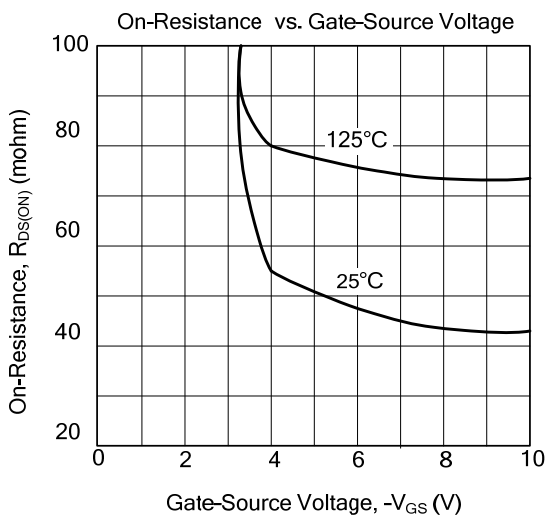
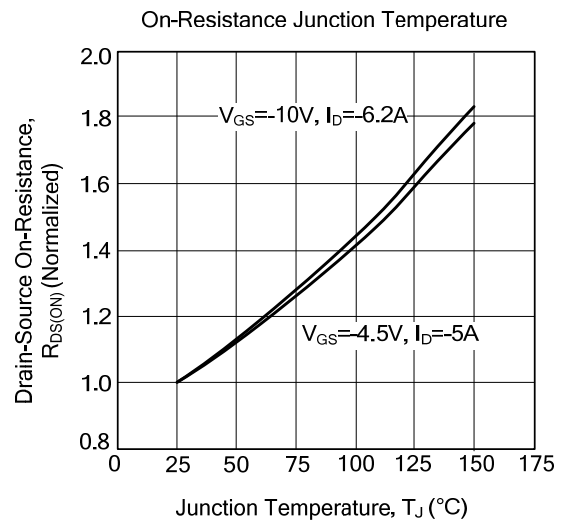
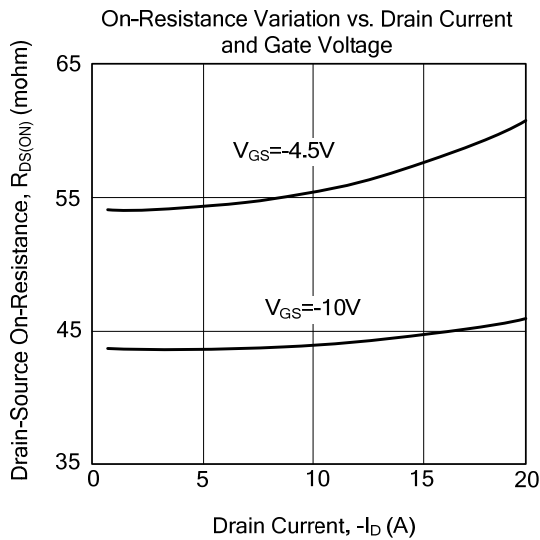
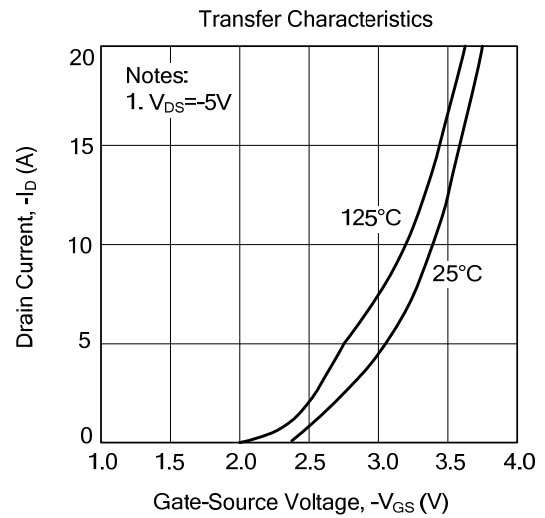
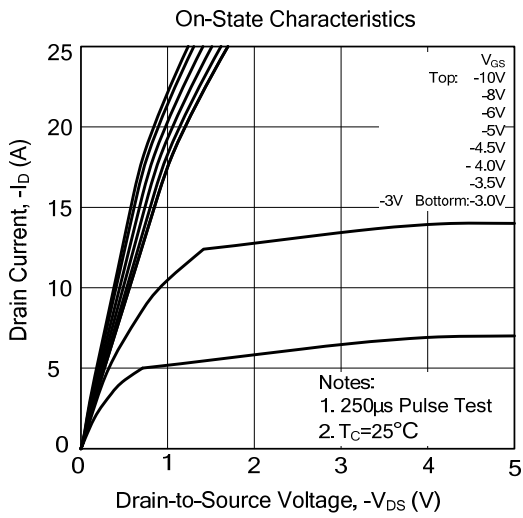
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=-250\mu\text{A}, V_{GS}=0\text{V}$	-60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-48\text{V}, V_{GS}=0\text{V}$			-1	$\mu\text{A}$
		$V_{DS}=-48\text{V}, V_{GS}=0\text{V}, T_J=55^\circ\text{C}$			-5	$\mu\text{A}$
Gate-Source Leakage Current	Forward	$I_{GSS}$				nA
	Reverse					
		$V_{GS}=-20\text{V}, V_{DS}=0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1.0	-2.0	-3.0	V
On State Drain Current	$I_{D(ON)}$	$V_{GS}=-10\text{V}, V_{DS}=-5\text{V}$	-40			A
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}, I_D=-6.2\text{A}$		43	48	m $\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-5\text{A}$		58	63	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5\text{V}, I_D=-6.2\text{A}$		18		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}, V_{DS}=-30\text{V}, f=1.0\text{MHz}$		2417	2900	pF
Output Capacitance	$C_{OSS}$			179		pF
Reverse Transfer Capacitance	$C_{RSS}$			120		pF
Gate Resistance	$R_G$	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$			10	$\Omega$
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=-4.5\text{V}, V_{DS}=-30\text{V}, I_D=-6.2\text{A}$		22.7		nC
Total Gate Charge	$Q_G$	$V_{GS}=-10\text{V}, V_{DS}=-30\text{V}, I_D=-6.2\text{A}$		46.5	55	nC
Gate to Source Charge	$Q_{GS}$			9.1		nC
Gate to Drain Charge	$Q_{GD}$			9.2		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{GS}=-10\text{V}, V_{DS}=-30\text{V}, R_L=4.7\Omega, R_{GEN}=3\Omega$		9.8		ns
Rise Time	$t_R$			6.1		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			44		ns
Fall-Time	$t_F$			12.7		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				-4.2	A
Diode Forward Voltage	$V_{SD}$	$I_S=-1\text{A}, V_{GS}=0\text{V}$		-0.74	-1	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=-6.2\text{A}, dI/dt=100\text{A}/\mu\text{S}$		34	42	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$				47	

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.

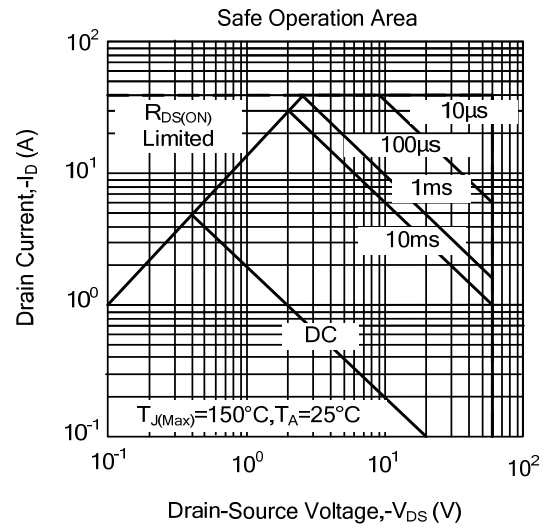
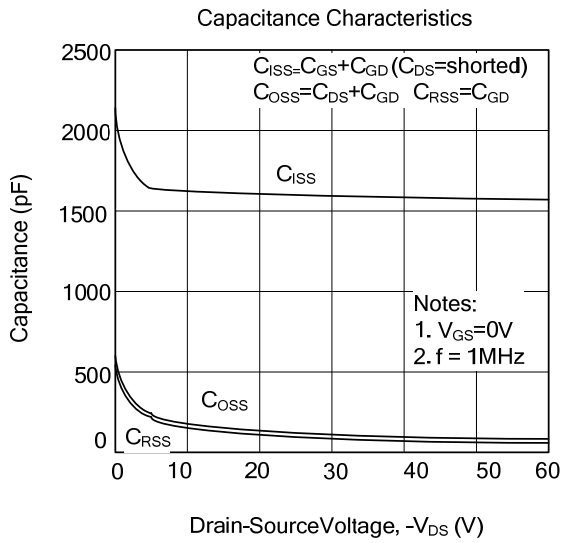
2. Repetitive rating, pulse width limited by junction temperature.

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

## TYPICAL CHARACTERISTICS



### ■ TYPICAL CHARACTERISTICS (Cont.)



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