



## UF9520S

Preliminary

POWER MOSFET

### -6.8A, -100V P-CHANNEL POWER MOSFET

#### DESCRIPTION

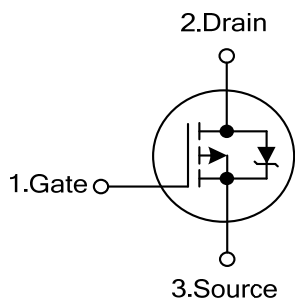
The UTC **UF9520S** is a P-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

The UTC **UF9520S** is suitable for high current applications, etc.

#### FEATURES

- \*  $R_{DS(ON)} < 0.6\Omega$  @  $V_{GS} = -10V, I_D = -4.1A$
- \* High switching speed
- \* Dynamic dv/dt rating

#### SYMBOL

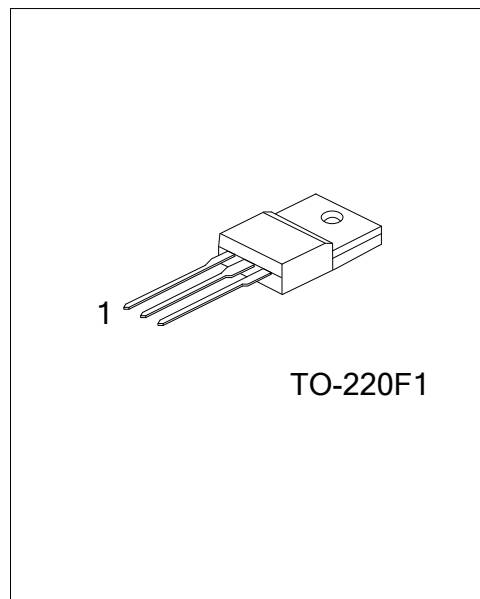


#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF9520SL-TF1-T	UF9520SG-TF1-T	TO-220F1	G	D	S	Tube

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

<p>UF9520SL-TF1-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) T: Tube (2) TF1: TO-220F1 (3) L: Lead Free, G: Halogen Free</p>
--	--



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		$V_{DSS}$	-100	V	
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V	
Drain Current	Continuous	$I_D$	$V_{GS}=-10V, T_C=25^\circ C$	-6.8	A
			$V_{GS}=-10V, T_C=100^\circ C$	-4.8	A
	Pulsed (Note 2)	$I_{DM}$	-27	A	
Avalanche Current (Note 2)		$I_{AR}$	-6.8	A	
Avalanche Energy	Single Pulse (Note 3)	$E_{AS}$	300	mJ	
	Repetitive (Note 2)	$E_{AR}$	6.0	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	-5.5	V/ns	
Power Dissipation		$P_D$	$T_C=25^\circ C$	60	W
Power Dissipation (PCB Mount) (Note 5)			$T_A=25^\circ C$	3.7	W
Linear Derating Factor			0.40	W/ $^\circ C$	
Linear Derating Factor (PCB Mount) (Note 5)			0.025	W/ $^\circ C$	
Junction Temperature			$T_J$	-55~+175	$^\circ C$
Storage Temperature Range		$T_{STG}$	-55~+175	$^\circ C$	

### ■ THERMAL RESISTANCE

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62	$^\circ C/W$
Junction to Ambient (PCB Mount) (Note 5)		40	$^\circ C/W$
Junction to Case	$\theta_{JC}$	2.5	$^\circ C/W$

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 max. junction temperature.

3.  $V_{DD}=-25V$ , starting  $T_J=25^\circ C$ ,  $L=9.7mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=-6.8A$ .

4.  $I_{SD}\leq -6.8A$ ,  $di/dt\leq 110A/\mu s$ ,  $V_{DD}\leq BV_{DSS}$ ,  $T_J\leq 175^\circ C$ .

5. When mounted on 1" square PCB (FR-4 or G-10 Material)

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

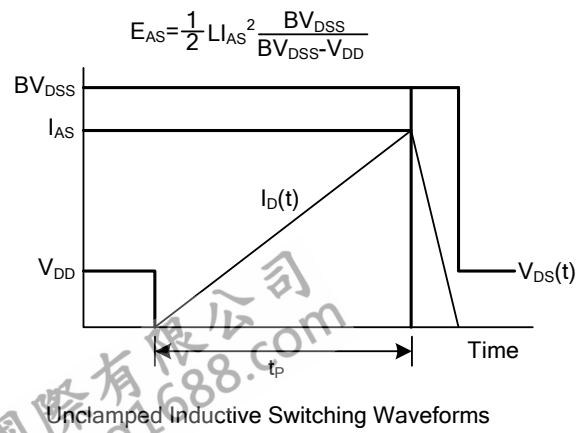
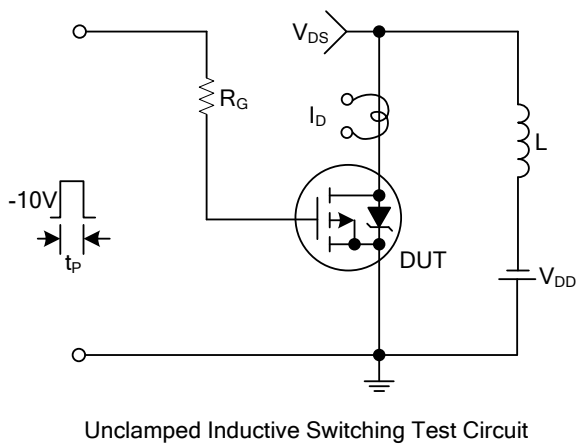
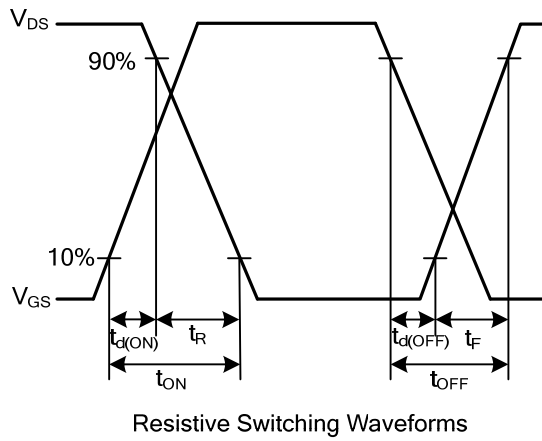
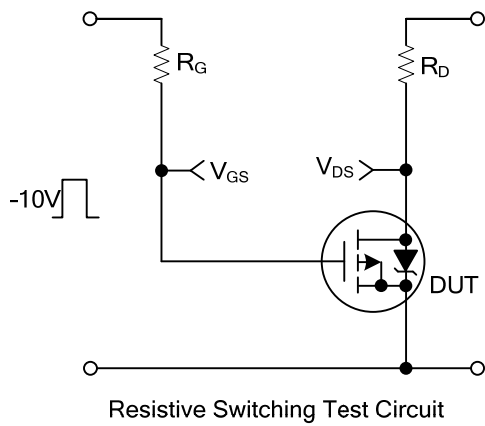
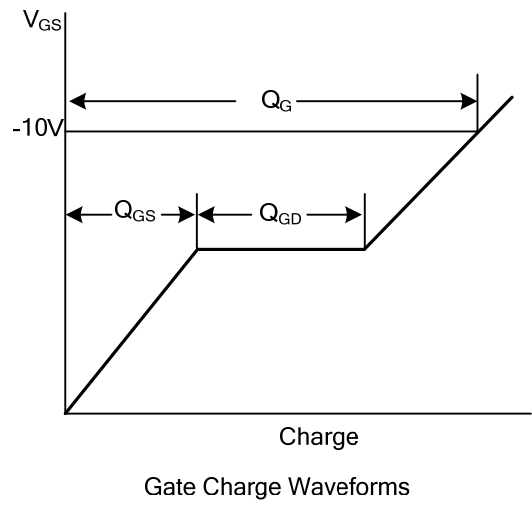
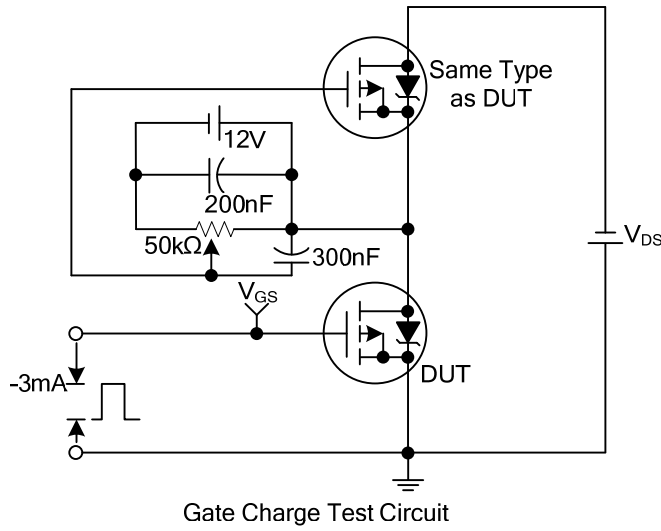
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=-250\mu A, V_{GS}=0V$	-100			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ C$ , $I_D=-1mA$		-0.10		V/ $^\circ C$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-100V, V_{GS}=0V$			-100	$\mu A$
		$V_{DS}=-80V, V_{GS}=0V, T_J=150^\circ C$			-500	$\mu A$
Gate-Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=-20V, V_{DS}=0V$			nA
	Reverse					
<b>ON CHARACTERISTICS</b>						
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4.1A$ (Note 2)			0.60	$\Omega$
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-2.0		-4.0	V
Forward Transconductance	$g_{FS}$	$V_{DS}=-50V, I_D=-4.1A$ (Note 2)	2.0			S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-25V, f=1.0MHz$		390		pF
Output Capacitance	$C_{OSS}$			170		pF
Reverse Transfer Capacitance	$C_{RSS}$			45		pF

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$I_D=-6.8A, V_{DS}=-80V, V_{GS}=-10V,$ (Note 2)			18	nC
Gate to Source Charge	$Q_{GS}$				3.0	nC
Gate to Drain ("Miller") Charge	$Q_{GD}$				9.0	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-50V, I_D=-6.8A, R_G=18\Omega$ $R_D=7.1\Omega$ (Note 2)		9.6		ns
Rise Time	$t_R$			29		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			21		ns
Fall Time	$t_F$			25		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body Diode Continuous Source Current	$I_S$				-6.8	A
Maximum Body Diode Pulsed Current (Note 1)	$I_{SM}$				-27	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$T_J=25^\circ C, I_S=-6.8A, V_{GS}=0V$ (Note 2)			-6.3	V
Body Diode Reverse Recovery Time	$t_{RR}$	$T_J=25^\circ C, I_F=-6.8A,$ $di/dt=100A/\mu s$ (Note 2)		98	200	ns
Body Diode Reverse Recovery Charge	$Q_{RR}$			0.33	0.66	$\mu C$
Forward Turn-On Time	$t_{ON}$	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S+L_D$ )				

Notes: 1. Repetitive rating; pulse width limited by max. junction temperature.  
2. Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

■ TEST CIRCUITS AND WAVEFORMS



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.