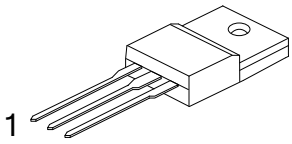
-6.8A, -100V P-CHANNEL POWER MOSFET



TO-220F1

■ DESCRIPTION

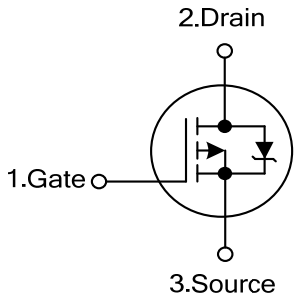
The UTC **UF9520S** is a P-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

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

■ FEATURES

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

■ SYMBOL



■ RDERING 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

UF9520SL-TF1-T

(1)Packing Type — (1) T: Tube

(2)Package Type — (2) TF1: TO-220F1

(3)Lead Free — (3) L: Lead Free, G: Halogen Free

■ ABSOLUTE MAXIMUM RATING

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	-100	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous	V_{GS}=-10V, T_C=25°C	I_D	-6.8	A
		V_{GS}=-10V, T_C=100°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		T_C=25°C	P_D	60	W
Power Dissipation (PCB Mount) (Note 5)		T_A=25°C		3.7	W
Linear Derating Factor				0.40	W/°C
Linear Derating Factor (PCB Mount) (Note 5)				0.025	W/°C
Junction Temperature			T_J	-55~+175	°C
Storage Temperature Range			T_{STG}	-55~+175	°C

■ THERMAL RESISTANCE

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62	°C/W
Junction to Ambient (PCB Mount) (Note 5)		40	°C/W
Junction to Case	θ_{JC}	2.5	°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°C, L=9.7mH, R_G=25Ω, I_{AS}= -6.8A.
4. I_{SD}≤-6.8A, di/dt≤110A/μs, V_{DD}≤BV_{DSS}, T_J≤175°C.
5. When mounted on 1" square PCB (FR-4 or G-10 Material)

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

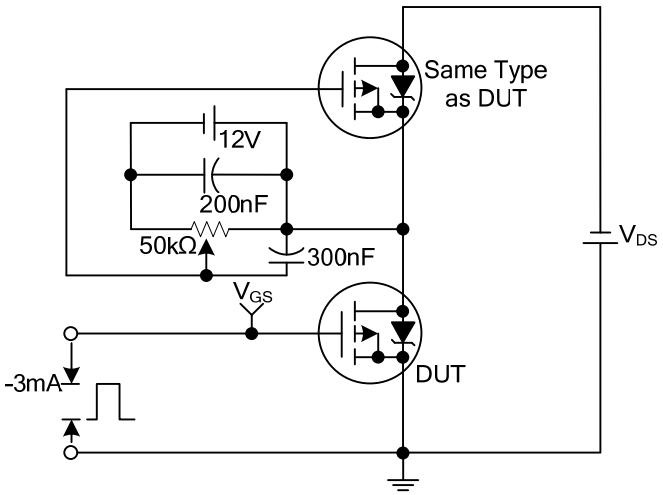
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-100			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=-1mA		-0.10		V/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-100V, V_{GS}=0V			-100	μA
			V_{DS}=-80V, V_{GS}=0V, T_J=150°C			-500	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=-20V, V_{DS}=0V			-100	nA
	Reverse		V_{GS}=+20V, V_{DS}=0V			+100	nA
ON CHARACTERISTICS							
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.1A (Note 2)			0.60	Ω
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0		-4.0	V
Forward Transconductance		g_{FS}	V_{DS}=-50V, I_D=-4.1A (Note 2)	2.0			S
DYNAMIC PARAMETERS							
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.)

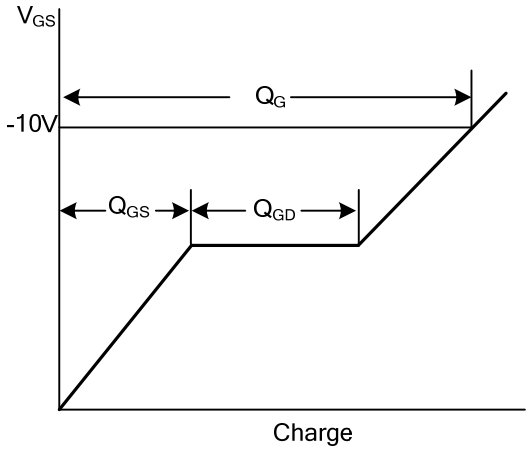
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	I_D=-6.8A, V_{DS}=-80V, V_{GS}=-10V, (Note 2)			18	nC
Gate to Source Charge	Q_{GS}				3.0	nC
Gate to Drain ("Miller") Charge	Q_{GD}				9.0	nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=-50V, I_D=-6.8A, R_G=18Ω R_D=7.1Ω (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
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
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°C, I_S=-6.8A, V_{GS}=0V (Note 2)			-6.3	V
Body Diode Reverse Recovery Time	t_{RR}	T_J=25°C, I_F=-6.8A, di/dt=100A/μs (Note 2)		98	200	ns
Body Diode Reverse Recovery Charge	Q_{RR}			0.33	0.66	μC
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≤300μs; duty cycle≤2%.

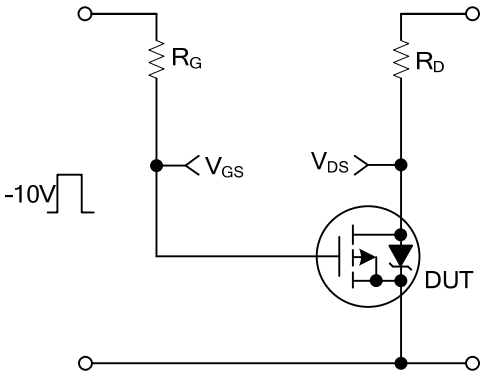
■ TEST CIRCUITS AND WAVEFORMS



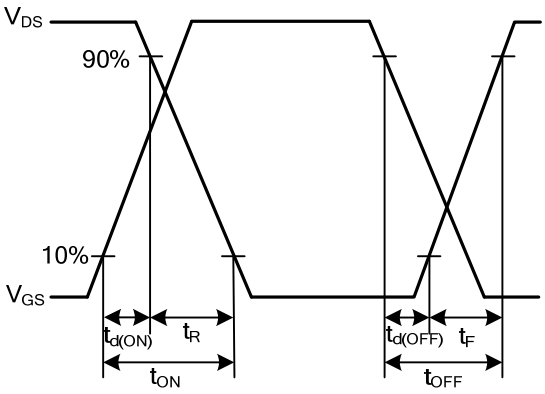
Gate Charge Test Circuit



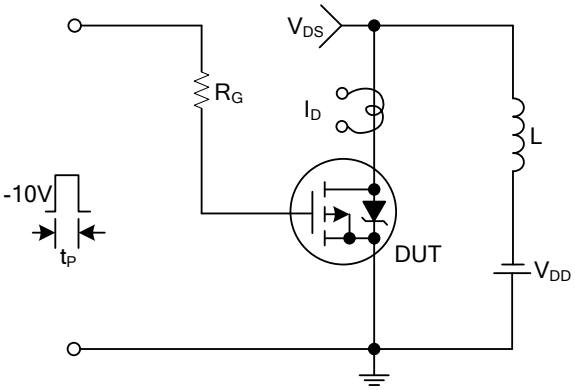
Gate Charge Waveforms



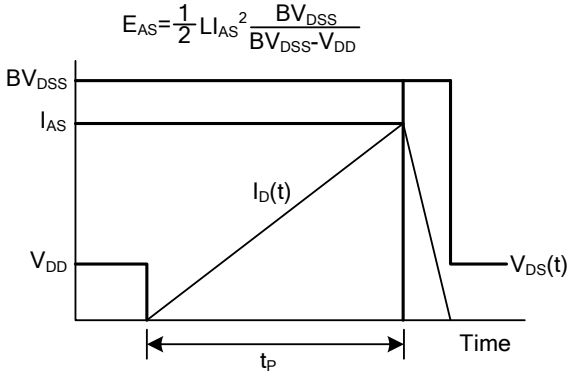
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms