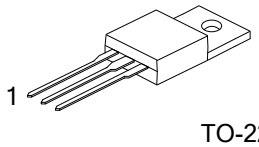
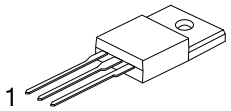
UF5210

POWER MOSFET

-40A, -100V P-CHANNEL POWER MOSFET



TO-220



TO-220F

■ DESCRIPTION

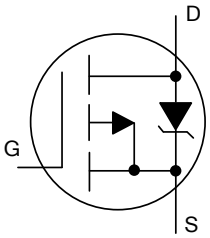
The UTC **UF5210** is a P-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

The UTC **UF5210** is suitable for all commercial-industrial applications, etc.

■ FEATURES

* $R_{DS(ON)} \leq 0.06\ \Omega$ @ V_{GS}=-10V, I_D=-24A
* High Switching Speed
* Dynamic dv/dt Rating

■ SYMBOL



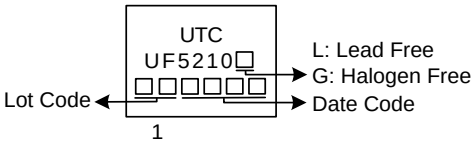
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF5210L-TA3-T	UF5210G-TA3-T	TO-220	G	D	S	Tube
UF5210L-TF3-T	UF5210G-TF3-T	TO-220F	G	D	S	Tube

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

UF5210G-TA3-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) TA3: TO-220, TF3: TO-220F (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	-100	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous	V_{GS}=-10V	I_D	-40	A
	Pulsed (Note 2)		I_{DM}	-120	A
Avalanche Energy	Single Pulse (Note 3)		E_{AS}	210	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	25	V/ns
Power Dissipation		TO-220	P_D	200	W
		TO-220F		60	W
Junction Temperature			T_J	-55 ~ +150	°C
Storage Temperature Range			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. L=0.1 mH, I_{AS}=-35A, V_{DD}=-50V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD}≤-30A, di/dt≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

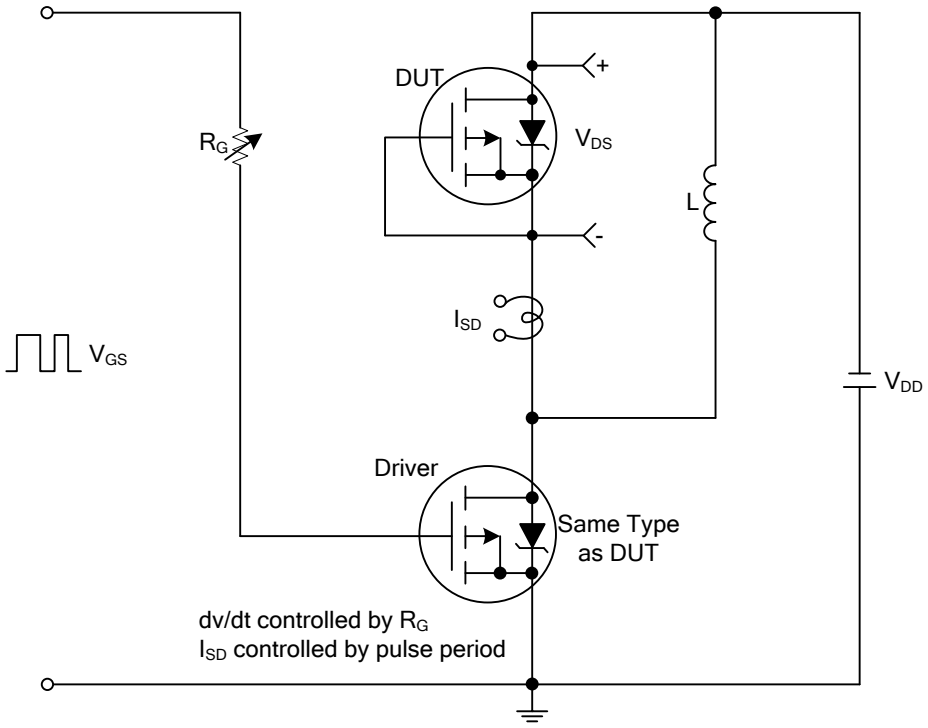
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	°C/W
Junction to Case	TO-220	θ_{JC}	0.75	°C/W
	TO-220F		2.1	°C/W

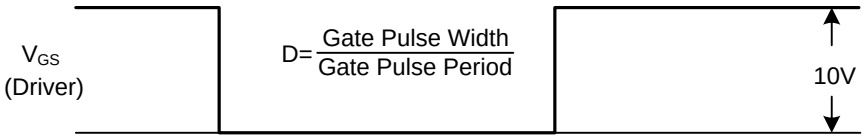
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

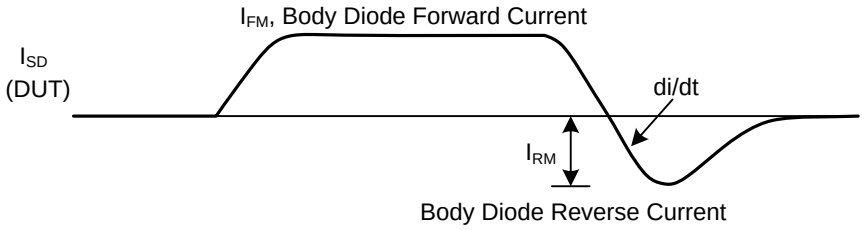
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=-250μA	-100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-100V, V_{GS}=0V			-25	μA
			V_{DS}=-80V, V_{GS}=0V, T_J=150°C			-250	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Static Drain-to-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-24A (Note 2)			0.06	Ω
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0		-4.0	V
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		3300		pF
Output Capacitance		C_{OSS}			550		pF
Reverse Transfer Capacitance		C_{RSS}			110		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=-80V, V_{GS}=-10V, I_D=-40A I_G=-1mA (Note 1, 2)		85		nC
Gate-to-Source Charge		Q_{GS}			22		nC
Gate-to-Drain ("Miller") Charge		Q_{GD}			18		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=-40V, V_{GS}=-10Ω, I_D=-40A, R_G=6Ω (Note 1, 2)		15.2		ns
Rise Time		t_R			8.8		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			74		ns
Fall Time		t_F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				-40	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				-120	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=-30A, V_{GS}=0V			-1.6	V
Body Diode Reverse Recovery Time		t_{rr}	I_F=-30A, di/dt=-100A/μs, V_{GS}=0V		170		ns
Body Diode Reverse Recovery Charge		Q_{rr}			0.7		μC

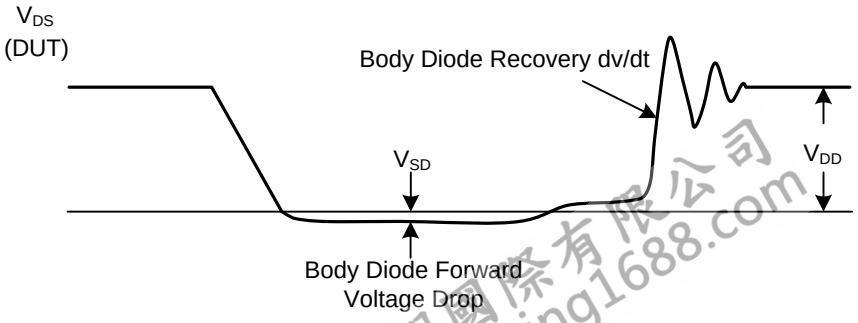
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle≤2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



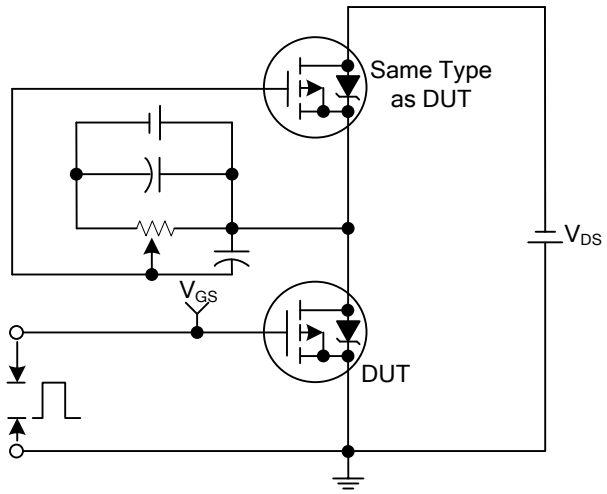




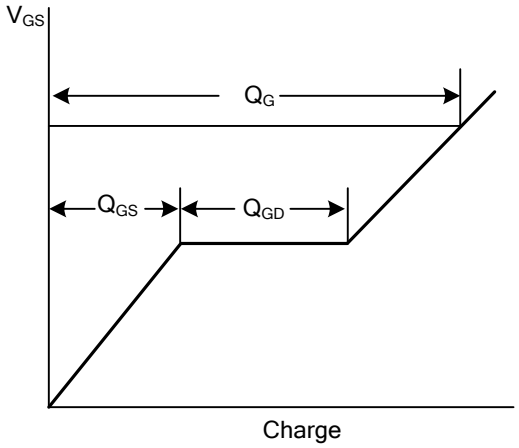


Peak Diode Recovery dv/dt Test Circuit and Waveforms

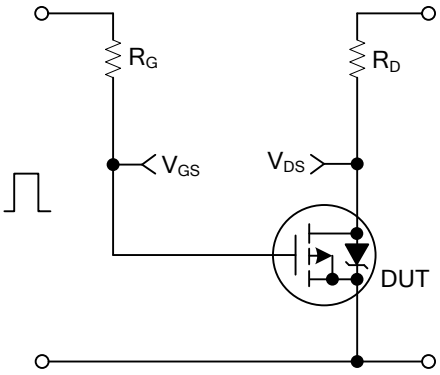
■ TEST CIRCUITS AND WAVEFORMS



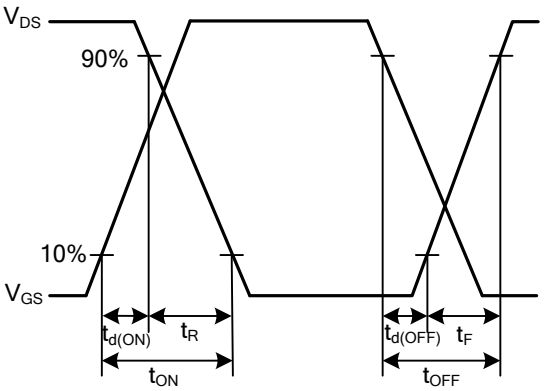
Gate Charge Test Circuit



Gate Charge Waveforms



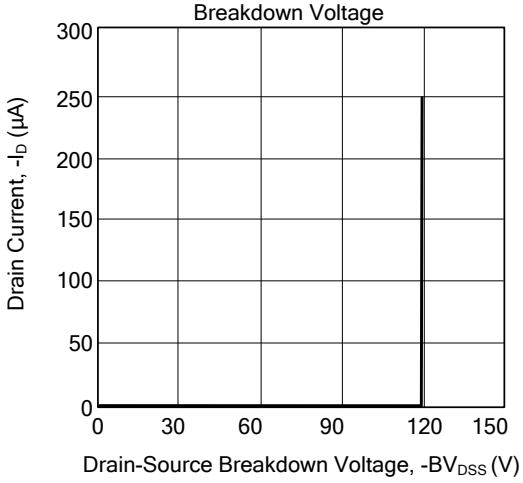
Resistive Switching Test Circuit



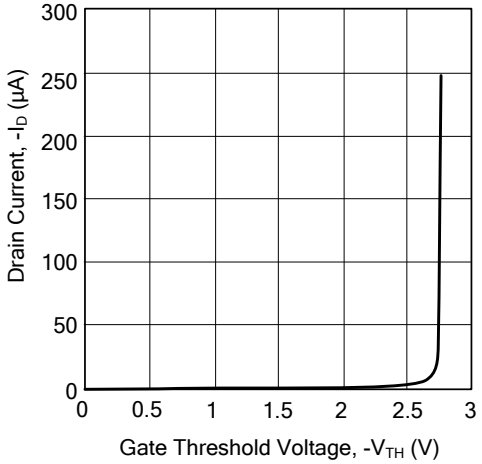
Resistive Switching Waveforms

■ TYPICAL CHARACTERISTICS

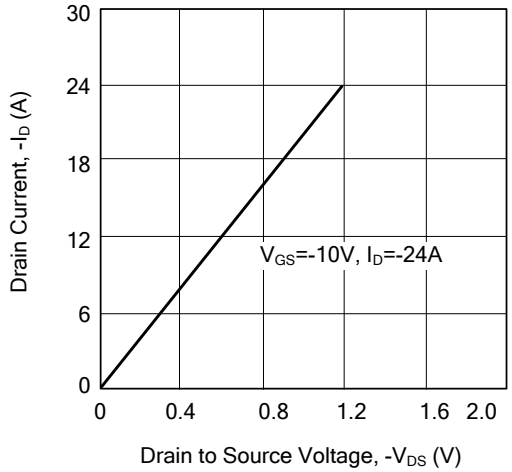
Drain Current vs. Drain-Source Breakdown Voltage



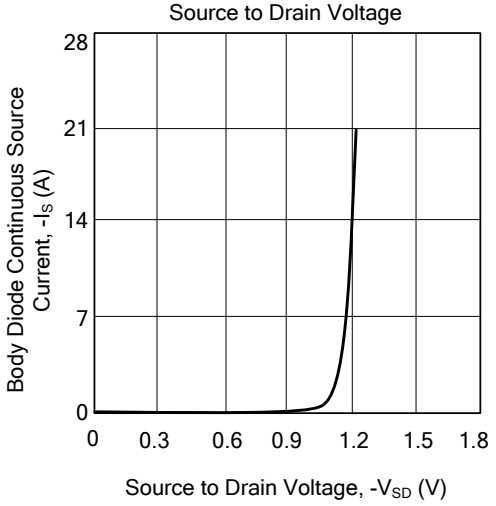
Drain Current vs. Gate Threshold Voltage



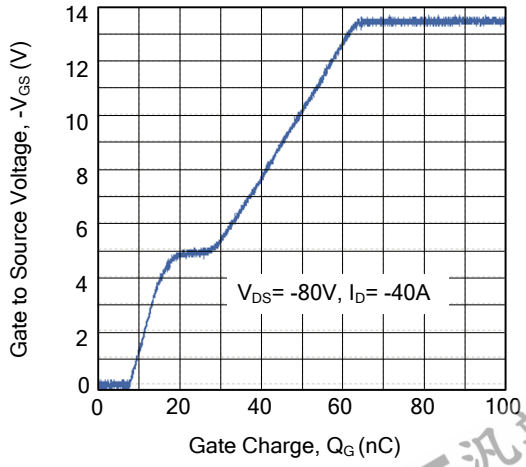
Drain-Source On-State Resistance Characteristics



Body Diode Continuous Source Current vs. Source to Drain Voltage



Gate Charge vs. Gate to Source Voltage



Capacitance Characteristics