



UF5210

POWER MOSFET

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

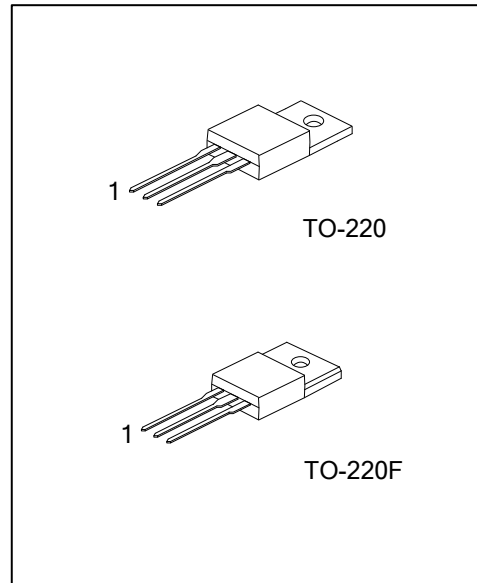
■ **DESCRIPTION**

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.

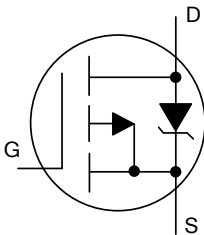
The UTC **UF5210** is suitable for all commercial-industrial applications, etc.

■ **FEATURES**

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



■ **SYMBOL**



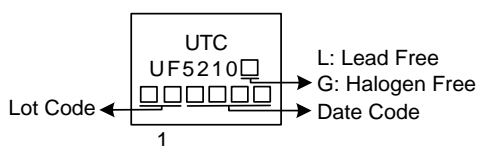
■ **ORDERING INFORMATION**

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

<p>UF5210G-TA3-T</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220, TF3: TO-220F</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ **MARKING**



■ **ABSOLUTE MAXIMUM RATING** ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous $V_{GS} = -10\text{V}$	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	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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. $L = 0.1 \text{ mH}$, $I_{AS} = -35\text{A}$, $V_{DD} = -50\text{V}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$
4. $I_{SD} \leq -30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.75	$^\circ\text{C}/\text{W}$
	TO-220F		2.1	$^\circ\text{C}/\text{W}$

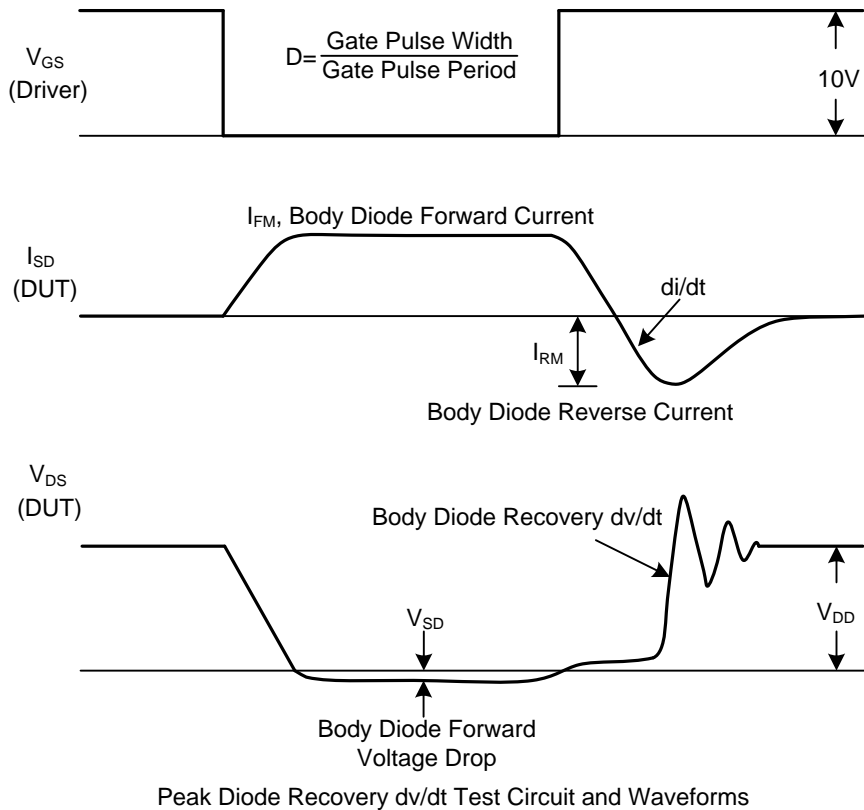
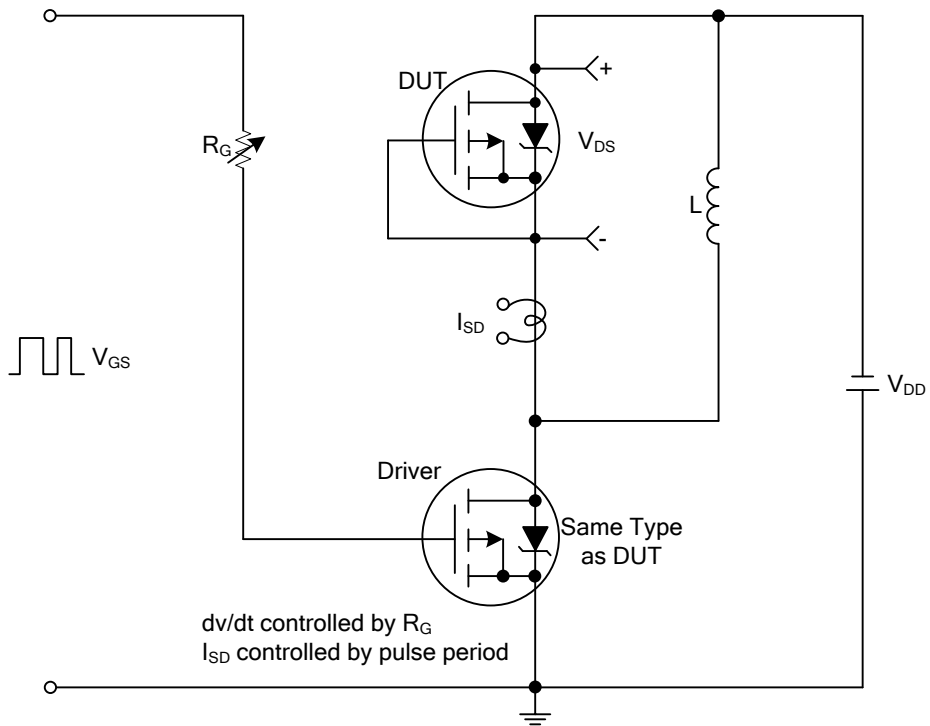
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-100V, V_{GS}=0V$			-25	μA
		$V_{DS}=-80V, V_{GS}=0V, T_J=150^\circ C$			-250	μA
Gate-Source Leakage Current	Forward	I_{GSS}				nA
	Reverse					
		$V_{GS}=20V, V_{DS}=0V$			100	nA
		$V_{GS}=-20V, V_{DS}=0V$			-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	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-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)	$t_{D(ON)}$	$V_{DD}=-40V, V_{GS}=-10\Omega, I_D=-40A,$ $R_G=6\Omega$ (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}	$I_F=-30A, di/dt=-100A/\mu s, V_{GS}=0V$		170		ns
Body Diode Reverse Recovery Charge	Q_{rr}				0.7	μC

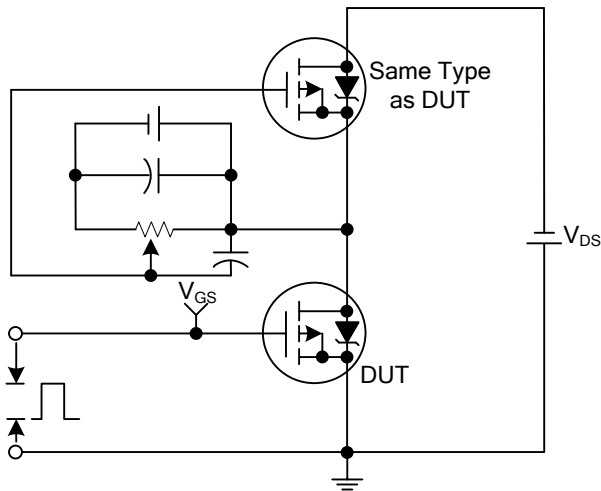
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

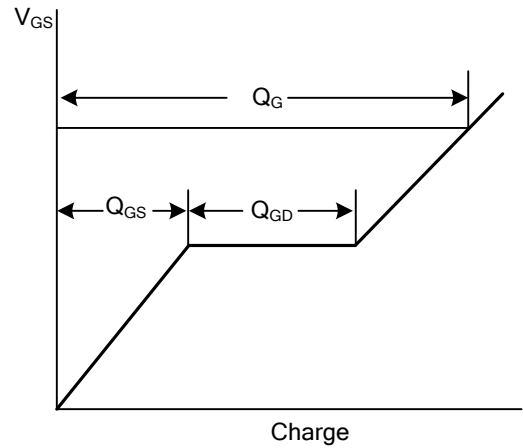
■ TEST CIRCUITS AND WAVEFORMS



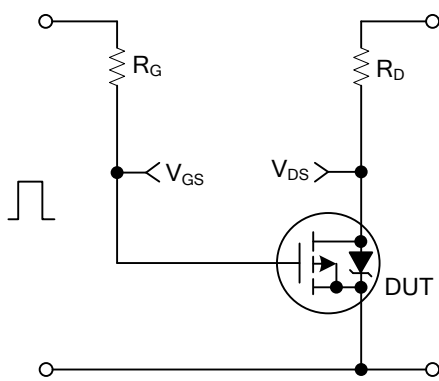
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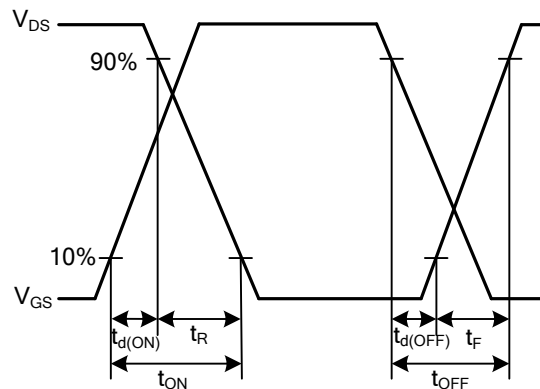
Gate Charge Test Circuit



Gate Charge Waveforms

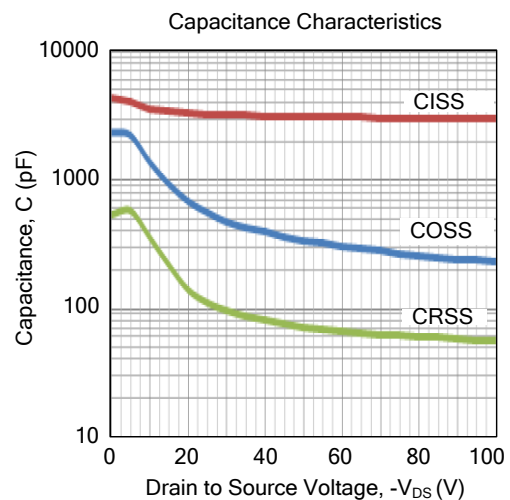
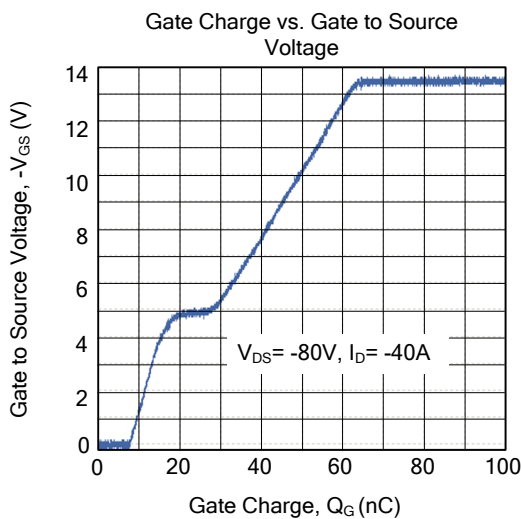
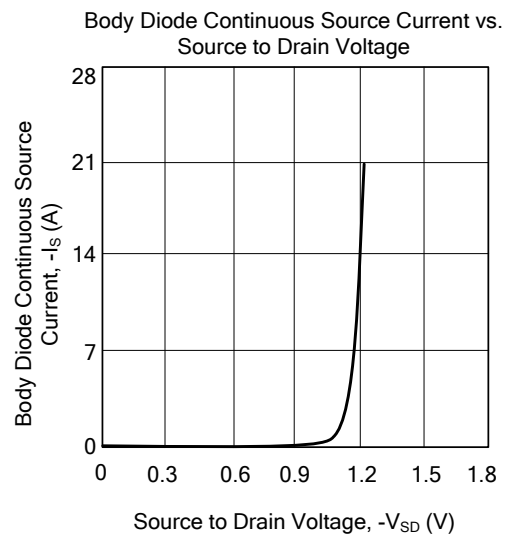
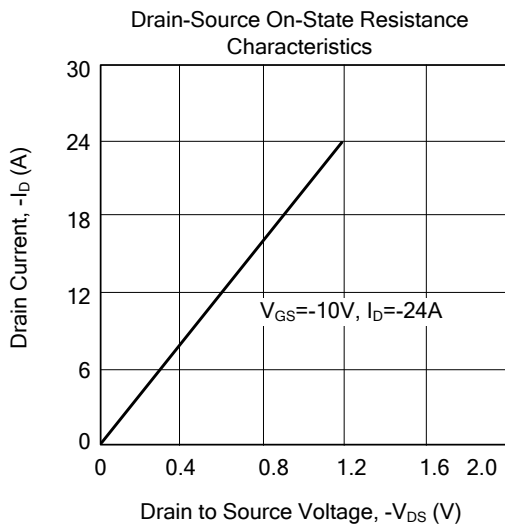
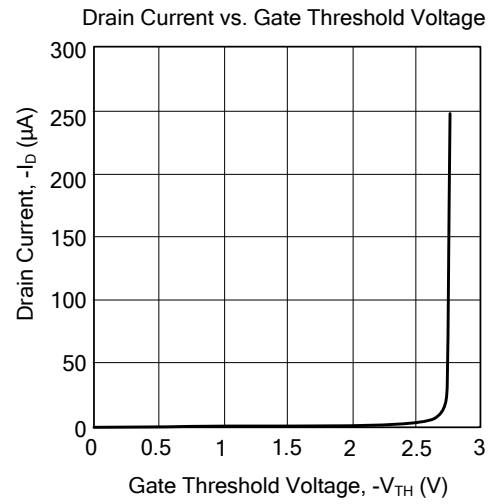
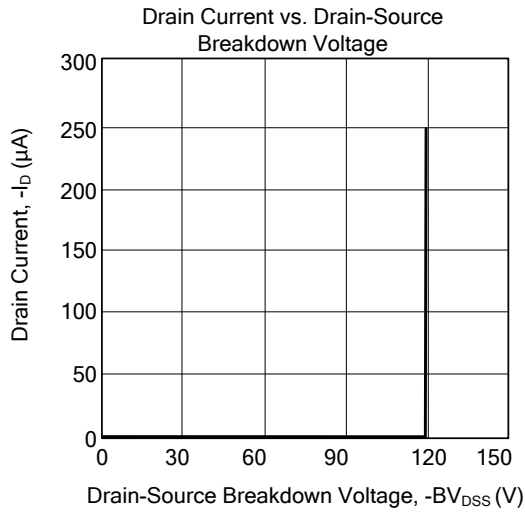


Resistive Switching Test Circuit



Resistive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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