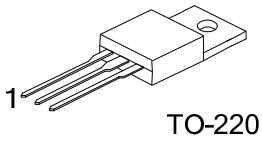
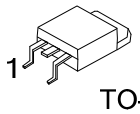
UT23P09 **Preliminary** ***POWER MOSFET***

-23A, -100V P-CHANNEL POWER MOSFET



TO-220



TO-252

■ DESCRIPTION

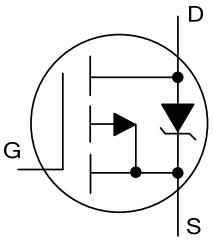
The UTC **UT23P09** is a P-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

The UTC **UT23P09** is suitable for all commercial-industrial applications, etc.

■ FEATURES

* $R_{DS(ON)}$<0.117Ω @ V_{GS}=-10V, I_D=-11A
* High Switching Speed
* Dynamic dv/dt Rating

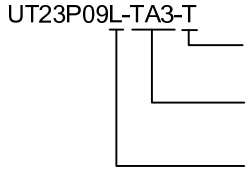
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT23P09L-TA3-T	UT23P09G-TA3-T	TO-220	G	D	S	Tube
UT23P09L-TN3-R	UT23P09G-TN3-R	TO-252	G	D	S	Tape Reel

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

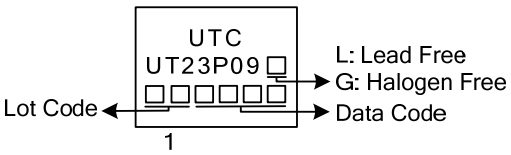


(1) T: Tube, R: Tape Reel

(2) TA3: TO-220, TN3: TO-252

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

■ MARKING



■ 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	-23	A
		V_{GS}=-10V, T_C=100°C		-16	A
	Pulsed (Note 2)		I_{DM}	-76	A
Avalanche Current (Note 2)			I_{AR}	-11	A
Avalanche Energy	Single Pulse (Note 3)		E_{AS}	430	mJ
	Repetitive (Note 2)		E_{AR}	14	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	-5.0	V/ns
Power Dissipation (T_C=25°C)		TO-220	P_D	140	W
		TO-252		35	W
Linear Derating Factor		TO-220		1.12	W/°C
		TO-252		0.28	W/°C
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 max. junction temperature.
3. L=7.1mH, I_{AS}=-11A, R_G=25Ω, Starting T_J = 25°C
4. I_{SD} ≤ -11A, di/dt ≤ -470A/μs, V_{DD} ≤ BV_{DSS}, T_J ≤ 150°C

■ THERMAL RESISTANCE

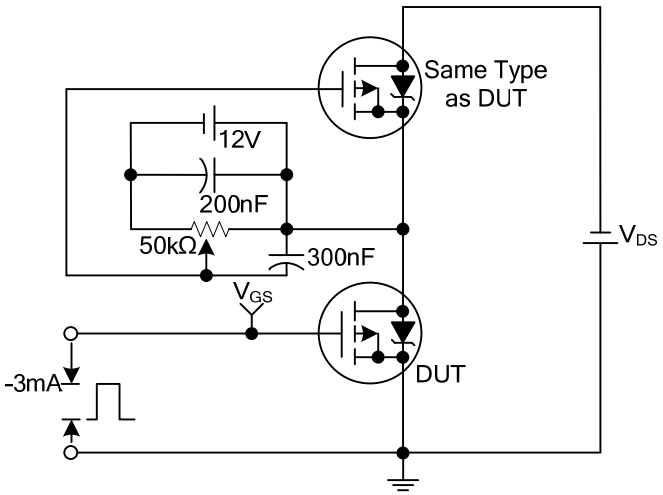
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220	θ_{JC}	0.89	°C/W
	TO-252		3.57	°C/W

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

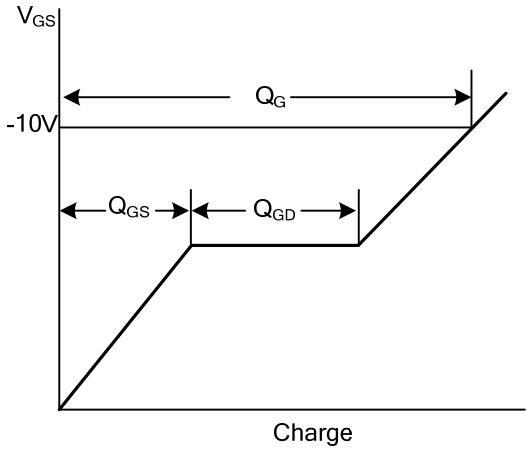
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=-250μA	-100			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=-1mA		-0.11		V/°C
Drain-Source Leakage Current		I_{DSS}	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-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-11A (Note 5)			0.117	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		1300		pF
Output Capacitance		C_{OSS}			400		pF
Reverse Transfer Capacitance		C_{RSS}			240		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	I_D=-11A, V_{DS}=-80V, V_{GS}=-10V, (Note 5)			97	nC
Gate-to-Source Charge		Q_{GS}				15	nC
Gate-to-Drain ("Miller") Charge		Q_{GD}				51	nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-50V, I_D=-11A, R_G=5.1Ω R_D=4.2Ω (Note 5)		15		ns
Rise Time		t_R			67		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			51		ns
Fall Time		t_F			51		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body Diode Continuous Source Current		I_S				-23	A
Maximum Body-Diode Pulsed Current (Note 2)		I_{SM}				-76	A
Drain-Source Diode Forward Voltage		V_{SD}	T_J=25°C, I_S=-11A, V_{GS}=0V (Note 5)			-1.6	V
Body Diode Reverse Recovery Time		t_{rr}	T_J=25°C, I_F=-11A, di/dt=-100A/μs (Note 5)		150	220	ns
Body Diode Reverse Recovery Charge		Q_{RR}			830	1200	nC

Note: 5. Pulse width≤300μs; duty cycle≤2%.

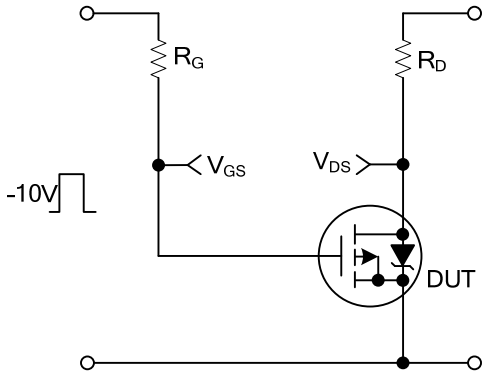
■ TEST CIRCUITS AND WAVEFORMS



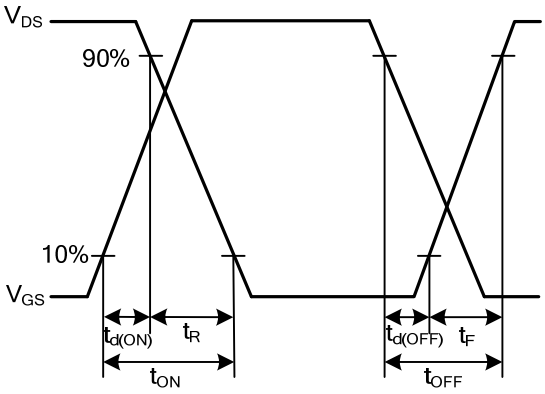
Gate Charge Test Circuit



Gate Charge Waveforms

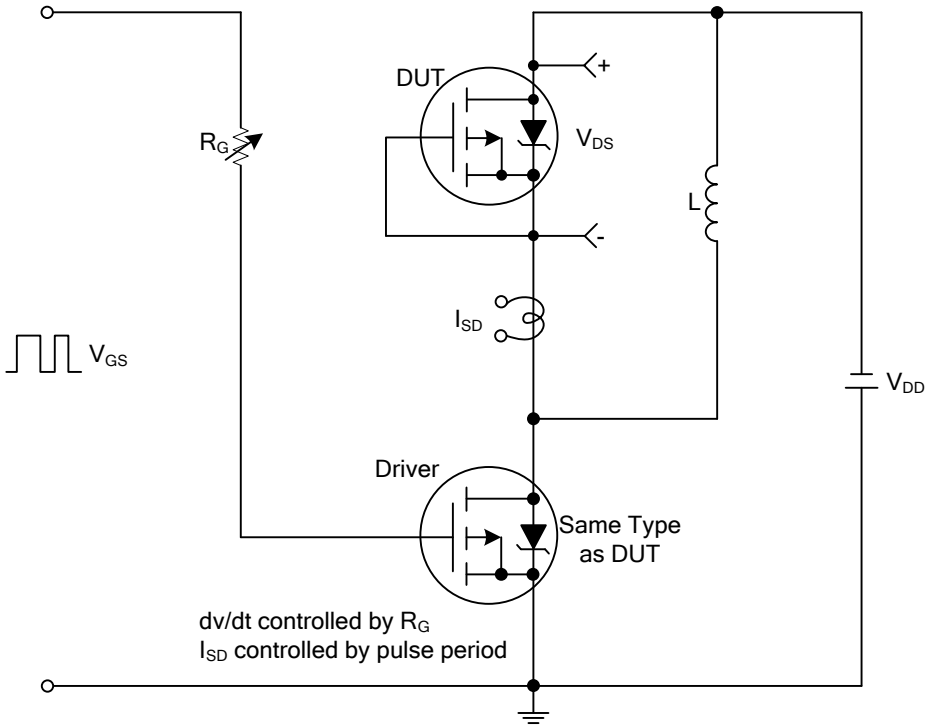


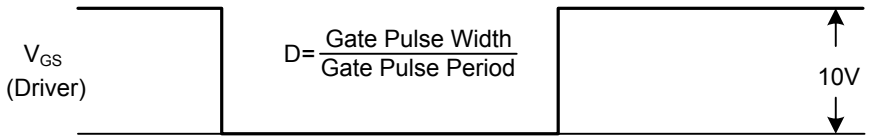
Resistive Switching Test Circuit

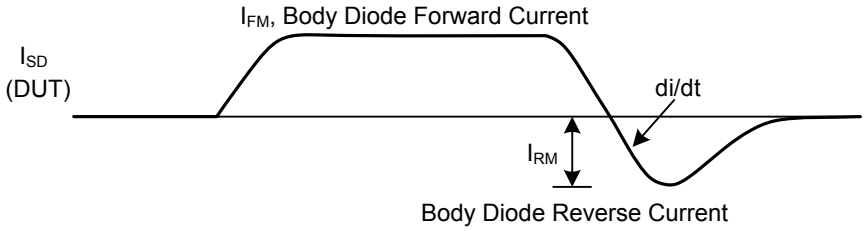


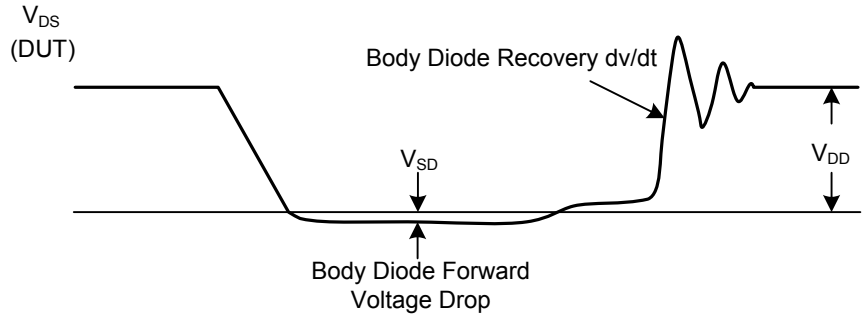
Resistive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)









Peak Diode Recovery dv/dt Test Circuit and Waveforms