



## UF03P20

Preliminary

Power MOSFET

### -0.3A, -200V P-CHANNEL POWER MOSFET

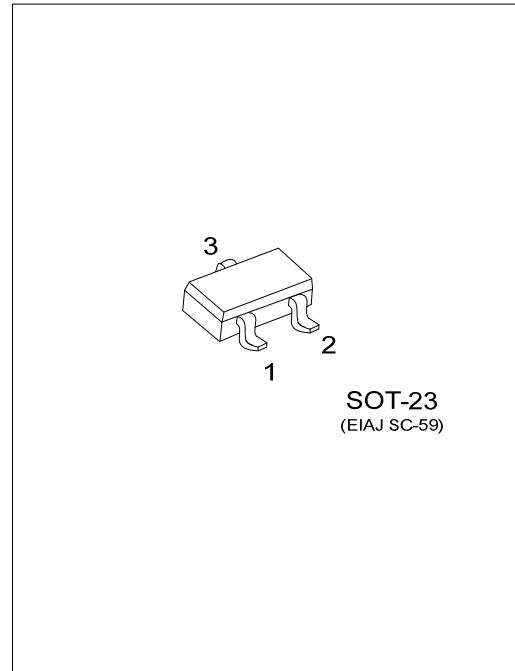
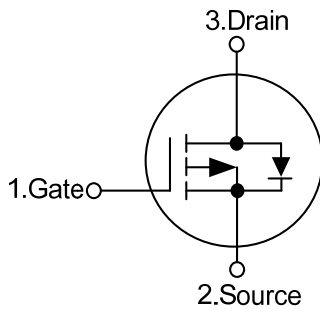
#### DESCRIPTION

The UTC **UF03P20** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and a minimum on-state resistance. It can also withstand high energy in the avalanche.

#### FEATURES

- \*  $R_{DS(ON)} \leq 9.0\Omega$  @  $V_{GS}=-10V, I_D=-0.5A$
- \* Fast switching capability
- \* Avalanche energy specified

#### SYMBOL



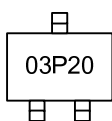
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF03P20L-AE3-R	UF03P20G-AE3-R	SOT-23	G	S	D	Tape Reel

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

<p>UF03P20G-AE3-R</p>	<p>(1) R: Tape Reel (2) AE3: SOT-23 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_c=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	-200	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	Continuous	$I_D$	-0.3	A
Pulsed Drain Current	Pulsed (Note 2)	$I_{DM}$	-1.2	A
Avalanche Current (Note 3)		$I_{AR}$	1.1	A
Avalanche energy	Single Pulsed (Note 3)	$E_{AS}$	6.0	mJ
Power Dissipation		$P_D$	0.5	W
Junction Temperature		$T_J$	+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.  $L=10\text{mH}$ ,  $I_{AS}=1.1\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J = 25^\circ\text{C}$ .

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	325	$^\circ\text{C/W}$
Junction to Case	$\theta_{JC}$	250	$^\circ\text{C/W}$

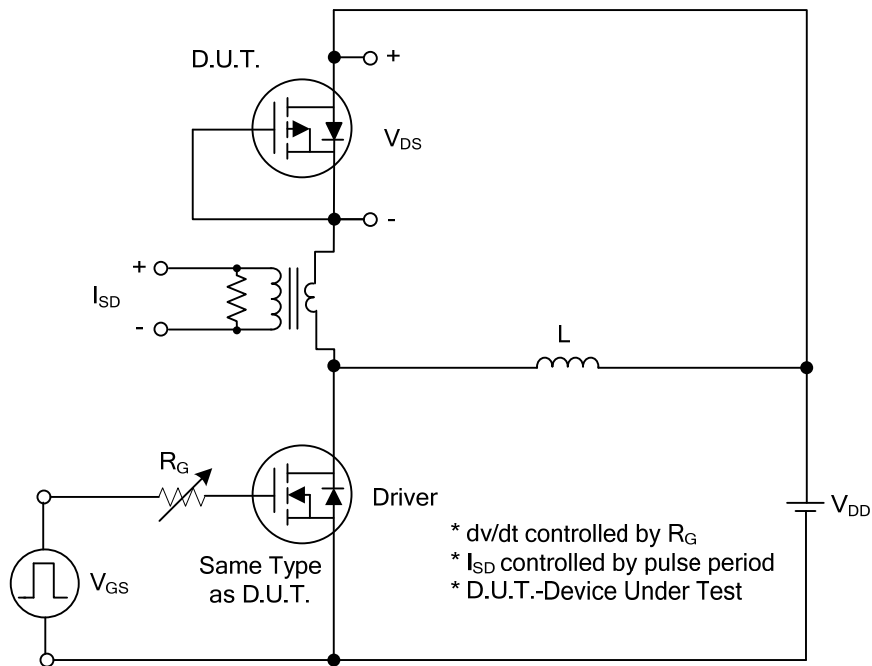
■ ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}$ , $I_D=-250\mu\text{A}$	-200			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-200\text{V}$ , $V_{GS}=0\text{V}$			-1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-2.0		-4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$ , $I_D=-0.5\text{A}$			9.0	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=-25\text{V}$ , $V_{GS}=0\text{V}$ , $f=1.0\text{MHz}$		70		pF
Output Capacitance	$C_{OSS}$			20		pF
Reverse Transfer Capacitance	$C_{RSS}$			9.0		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=-30\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-0.3\text{A}$ $I_G=-100\mu\text{A}$ (Note 1, 2)		8.5		nC
Gate Source Charge	$Q_{GS}$			1.1		nC
Gate Drain Charge	$Q_{GD}$			1.0		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=-30\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-0.3\text{A}$ , $R_G=25\Omega$ (Note 1, 2)		36		ns
Turn-ON Rise Time	$t_R$			50		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			60		ns
Turn-OFF Fall-Time	$t_F$			42		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				-0.3	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				-1.2	A
Diode Forward Voltage (Note 1)	$V_{SD}$	$I_S=-0.3\text{A}$ , $V_{GS}=0\text{V}$			-2.0	V

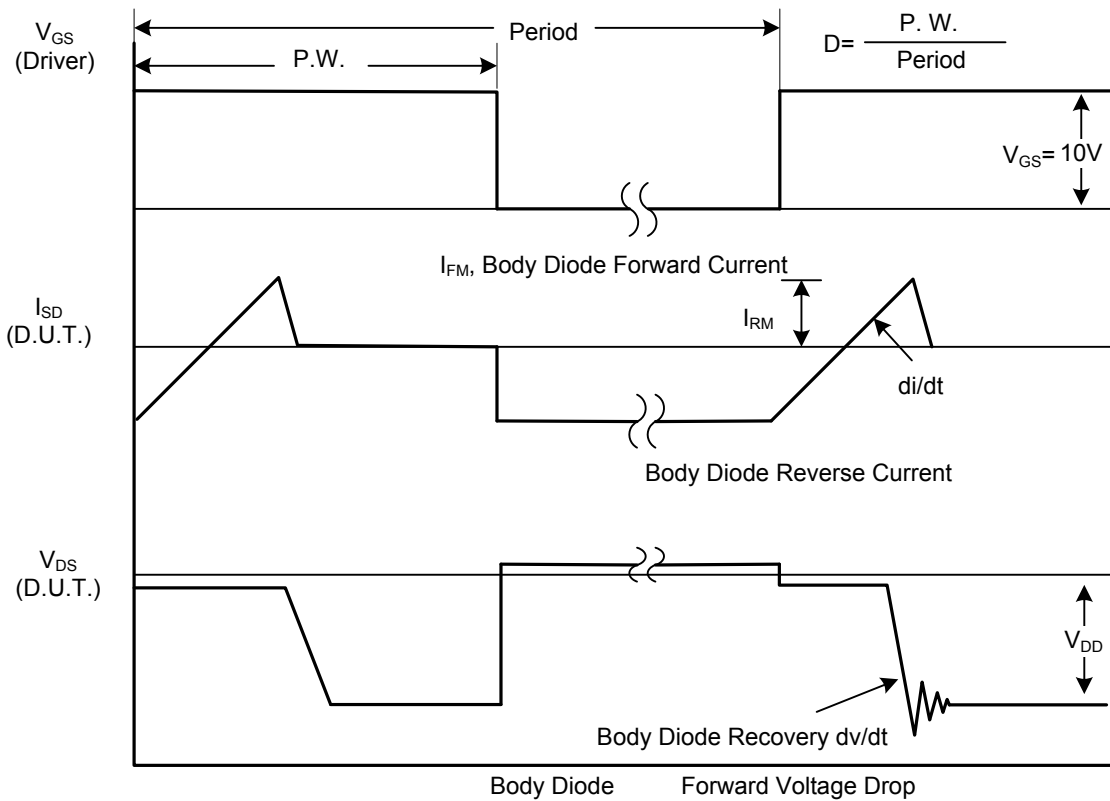
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

## TEST CIRCUITS AND WAVEFORMS

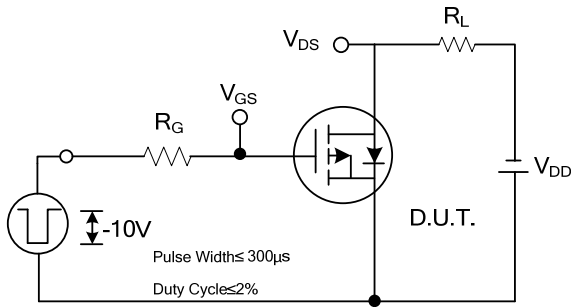


**Peak Diode Recovery dv/dt Test Circuit**

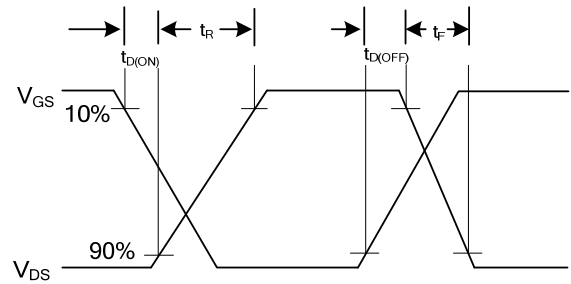


**Peak Diode Recovery dv/dt Waveforms**

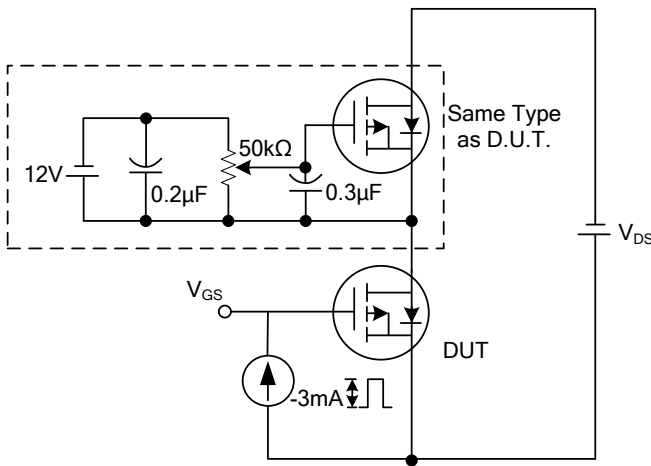
## ■ TEST CIRCUITS AND WAVEFORMS



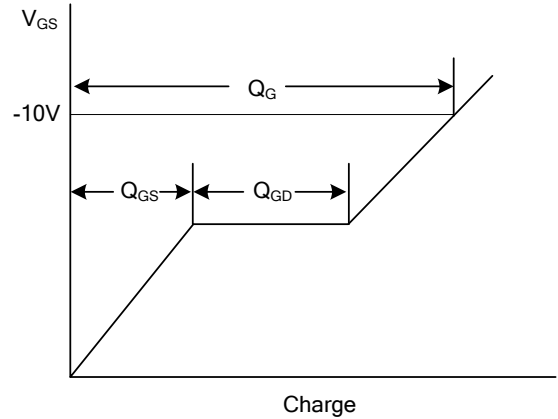
**Switching Test Circuit**



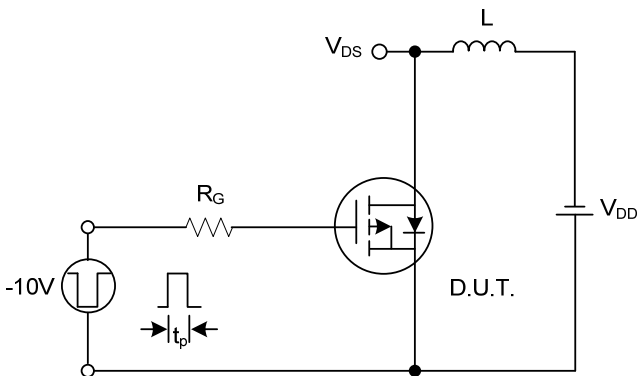
**Switching Waveforms**



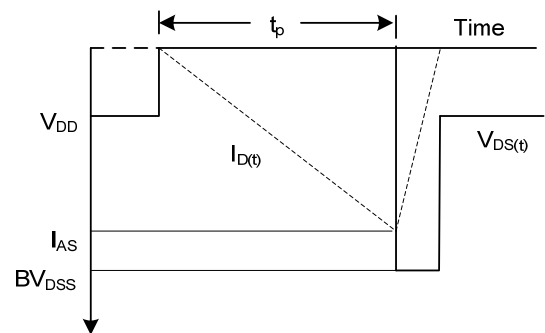
**Gate Charge Test Circuit**



**Gate Charge Waveform**



**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

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