



# UF8010

*Power MOSFET*

## 80A, 100V N-CHANNEL POWER MOSFET

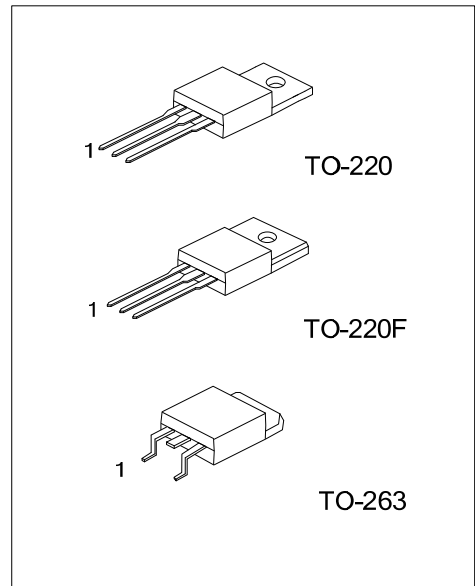
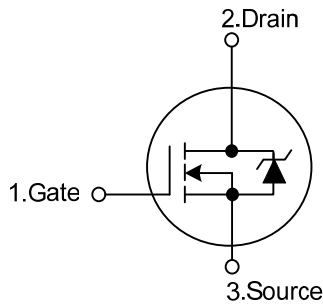
### DESCRIPTION

The UTC **UF8010** uses advanced technology to provide excellent  $R_{DS(ON)}$ , fast switching speed, low gate charge, and excellent efficiency. This device is suitable for high frequency DC-DC converters, UPS and motor control.

### FEATURES

- \*  $R_{DS(ON)}$  :12m $\Omega$  (Typ.)
- \* Lower gate-drain charge for lower switching losses
- \* Perfect avalanche voltage and current performance
- \* Fully characterized capacitance including effective  $C_{OSS}$  to simplify design

### SYMBOL



### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF8010L-TA3-T	UF8010G-TA3-T	TO-220	G	D	S	Tube
UF8010L-TF3-T	UF8010G-TF3-T	TO-220F	G	D	S	Tube
UF8010L-TQ2-T	UF8010G-TQ2-T	TO-263	G	D	S	Tube

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

<p>UF8010L-TA3-T</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220, TF3: TO-220F, TQ2: TO-263</p> <p>(3) L: Lead Free, G: Halogen Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Gate to Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $V_{GS}=10\text{V}, T_C=25^{\circ}\text{C}$ )		$I_D$	80 (Note 2)	A
Pulsed Drain Current		$I_{DM}$	320	A
Avalanche Energy	Single Pulse (Note 2)	$E_{AS}$	310	mJ
	Repetitive	$E_{AR}$	26	mJ
Avalanche Current		$I_{AR}$	45	A
Peak Diode Recovery $dv/dt$ (Note 3)		$dv/dt$	16	V/ns
Power Dissipation ( $T_C=25^{\circ}\text{C}$ )	TO-220 / TO-263	$P_D$	260	W
	TO-220F		54	W
Derating above $25^{\circ}\text{C}$	TO-220 / TO-263		1.8	W/ $^{\circ}\text{C}$
	TO-220F		0.36	W/ $^{\circ}\text{C}$
Junction Temperature		$T_J$	+150	$^{\circ}\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ + 150	$^{\circ}\text{C}$

Note: 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. Starting  $T_J = 25^{\circ}\text{C}$ ,  $L = 0.31\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 45\text{A}$ .

3.  $I_{SD} \leq 45\text{A}$ ,  $di/dt \leq 110\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ ,  $T_J \leq 150^{\circ}\text{C}$

■ THERMAL DATA

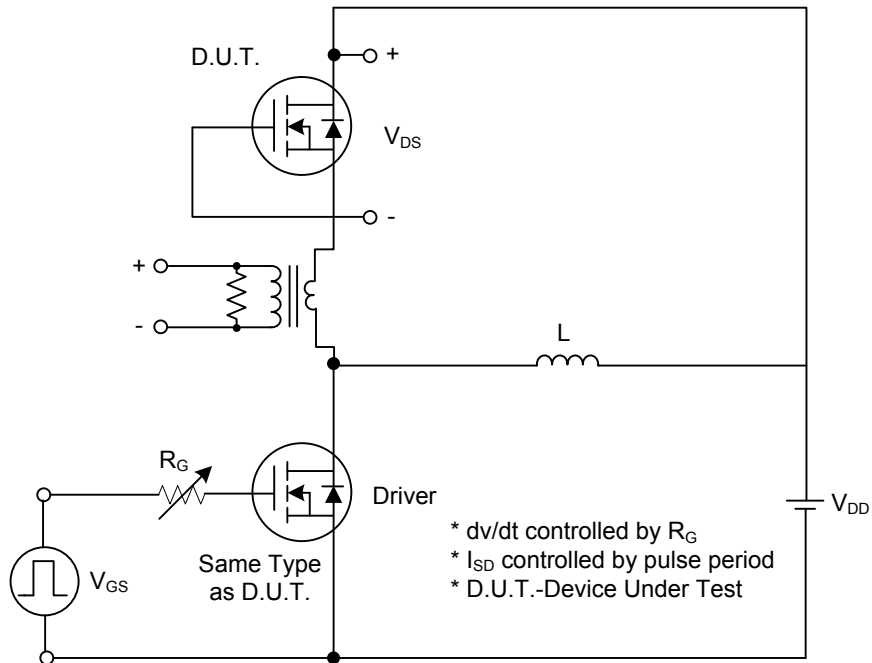
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220 / TO-263	$\theta_{JC}$	0.57	$^{\circ}\text{C}/\text{W}$
	TO-220F		2.3	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

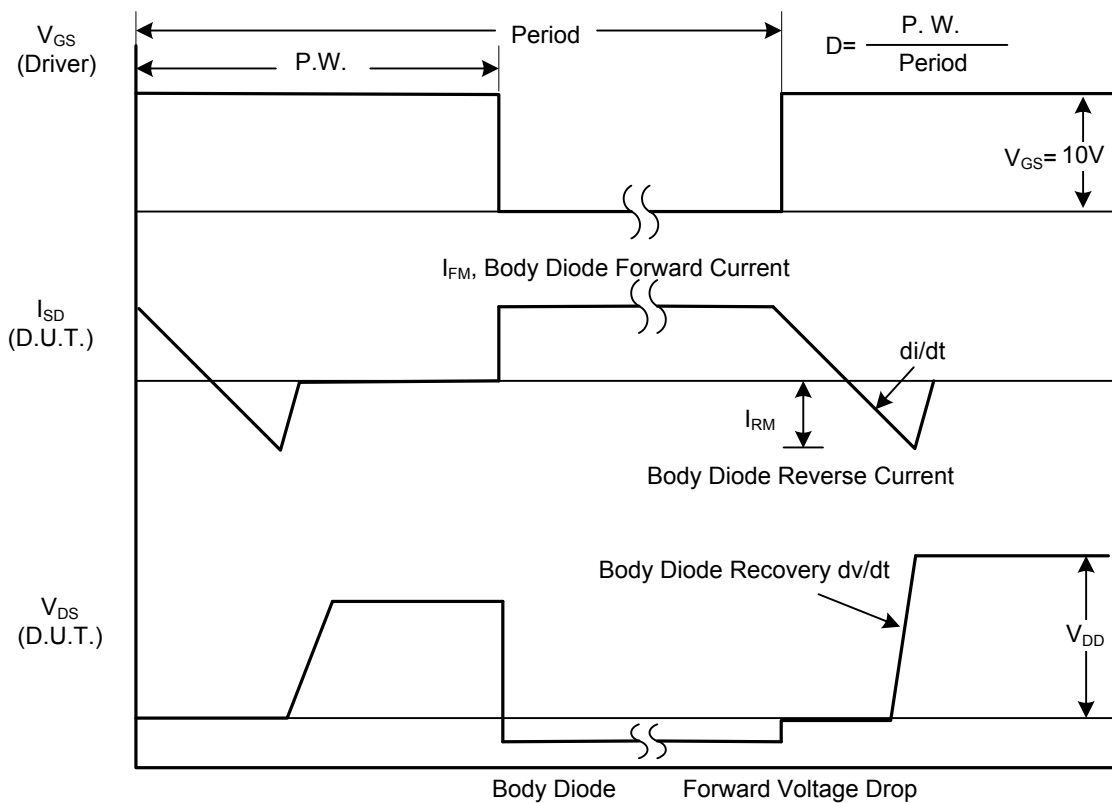
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>STATIC CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250μA	100			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V			20	μA
Gate-Source Forward Current	I <sub>GSS</sub>	V <sub>GS</sub> = 20 V			200	nA
Gate-Source Reverse Current		V <sub>GS</sub> = -20 V			-200	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0		4.0	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 45A (Note 1)		12	15	mΩ
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0V, f = 1.0MHz		3617		pF
Output Capacitance	C <sub>OSS</sub>			620		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			59		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DS</sub> = 30V, I <sub>D</sub> = 1A, R <sub>G</sub> = 39Ω V <sub>GS</sub> = 10V (Note 1)		174	200	ns
Rise Time	t <sub>R</sub>			370	450	ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			757	850	ns
Fall Time	t <sub>F</sub>			392	450	ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 10V I <sub>D</sub> = 80A (Note 1)		399	450	nC
Gate-Source Charge	Q <sub>GS</sub>			41		nC
Gate-Drain Charge	Q <sub>GD</sub>			96		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 80 A, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 25°C (Note 1)			1.3	V
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				80	A
Maximum Pulsed Drain-Source Diode Forward Current (Note 1)	I <sub>SM</sub>				320	A
Reverse Recovery Time	t <sub>RR</sub>	I <sub>F</sub> = 80A, V <sub>DD</sub> = 50V, T <sub>J</sub> = 150°C		99	150	ns
Reverse Recovery Charge	Q <sub>RR</sub>	di/dt = 100 A/μs (Note 1)		460	700	nC

Note: 1. Pulse width ≤ 300μs; duty cycle ≤ 2%

■ TEST CIRCUITS AND WAVEFORMS

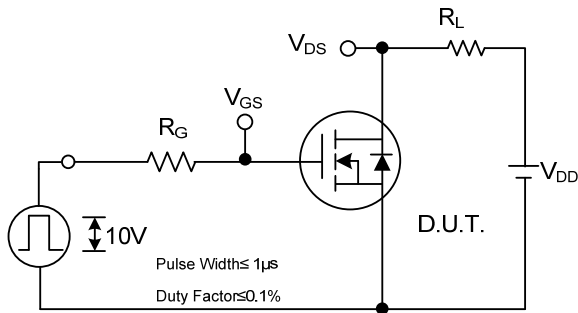


Peak Diode Recovery dv/dt Test Circuit

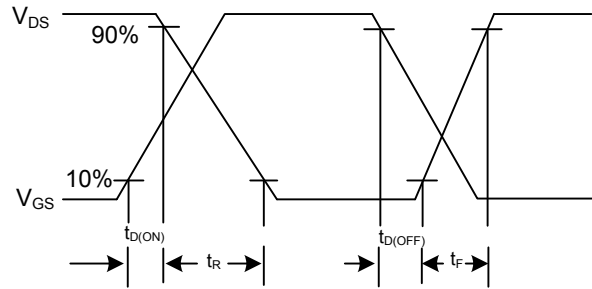


Peak Diode Recovery dv/dt Waveforms

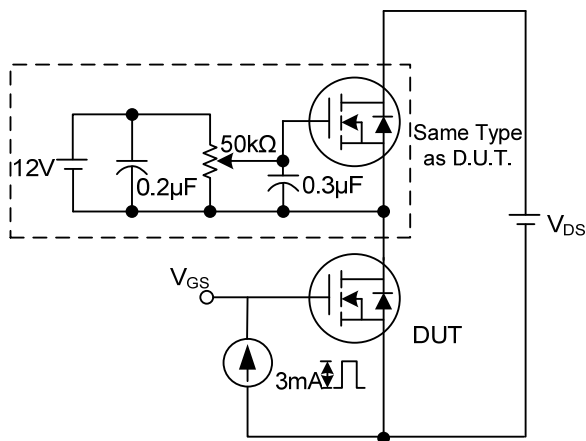
## ■ TEST CIRCUITS AND WAVEFORMS (Cont.)



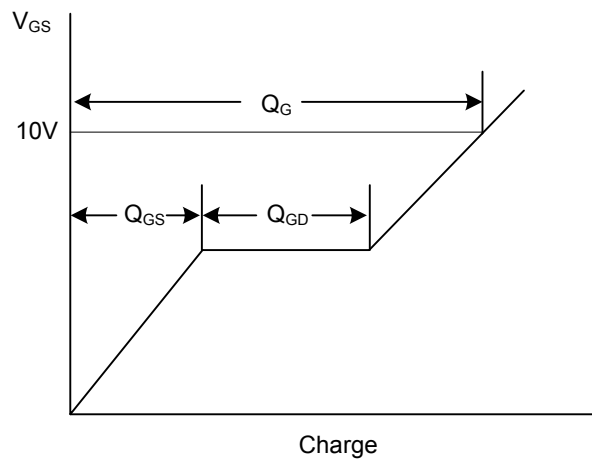
**Switching Test Circuit**



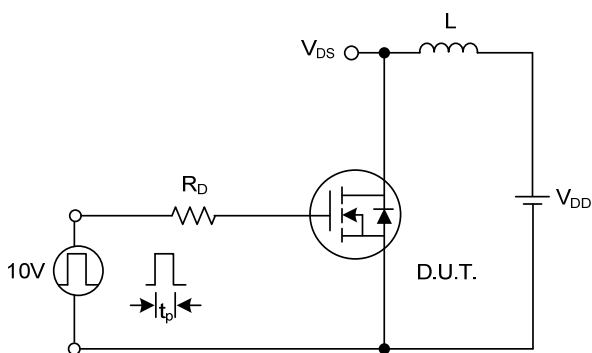
**Switching Waveforms**



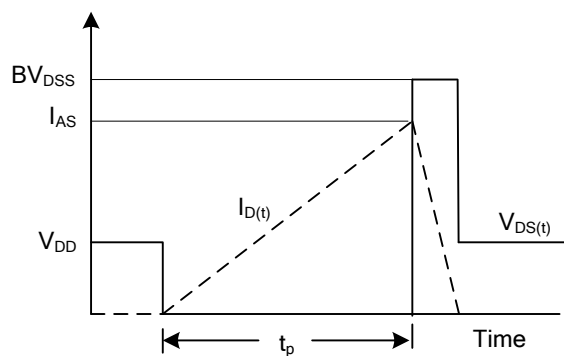
**Gate Charge Test Circuit**



**Gate Charge Waveform**

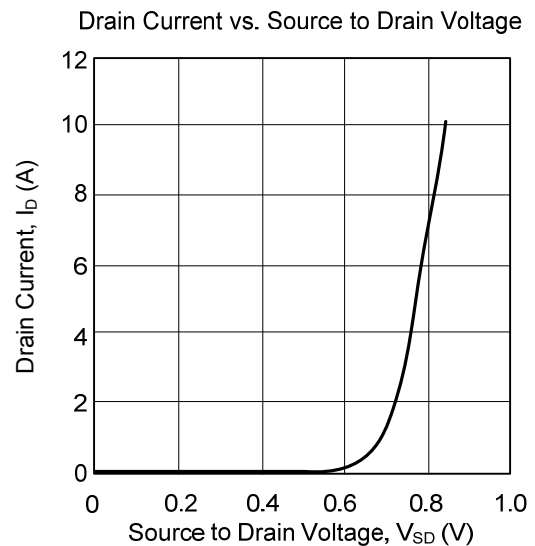
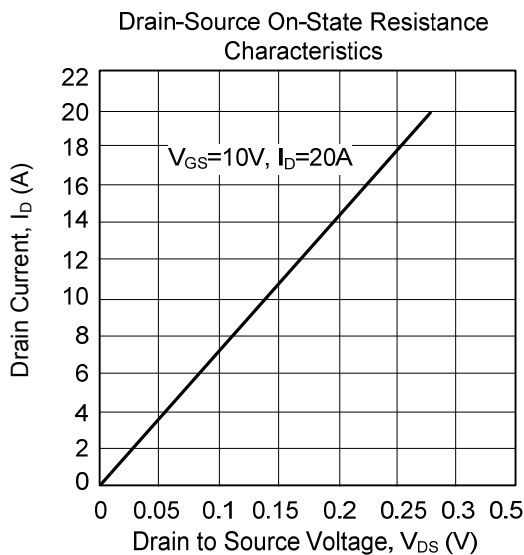
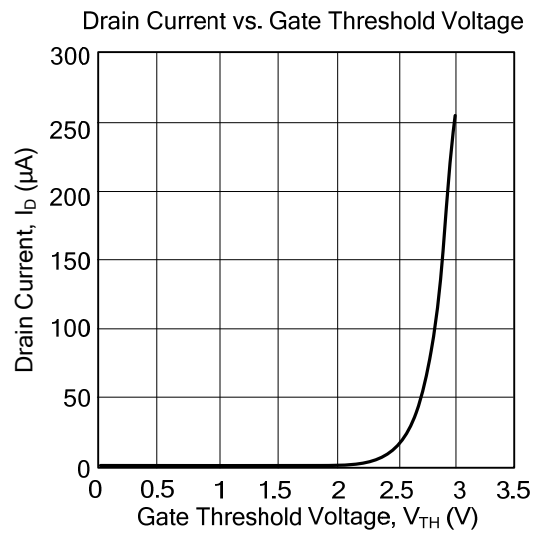
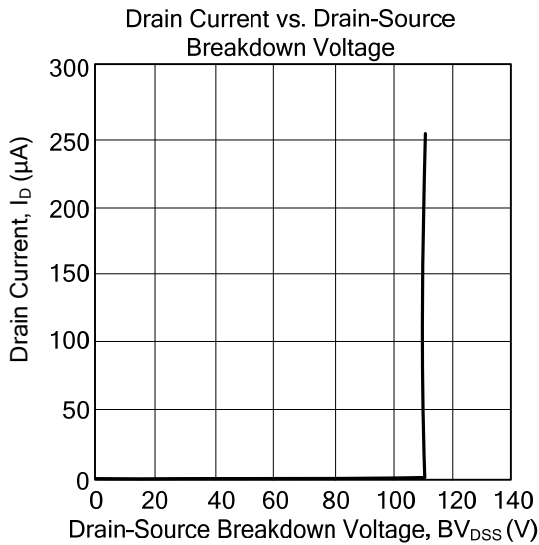


**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

## ■ TYPICAL CHARACTERISTICS



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