



## UF8010

Preliminary

Power MOSFET

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

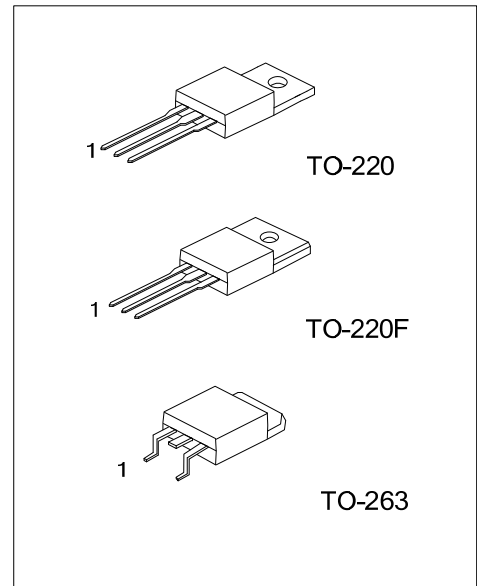
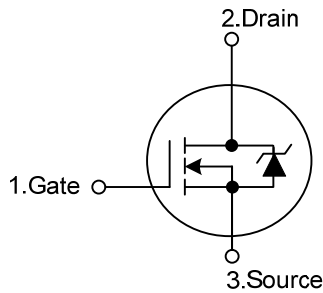
#### DESCRIPTION

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)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220, TF3: TO-220F, TQ2: TO-263</p> <p>(3) G: Halogen Free, L: Lead 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 ~ + 175	$^\circ\text{C}$

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.  $I_{SD} \leq 45\text{A}$ ,  $di/dt \leq 110\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ ,  $T_J \leq 175^\circ\text{C}$

■ THERMAL DATA

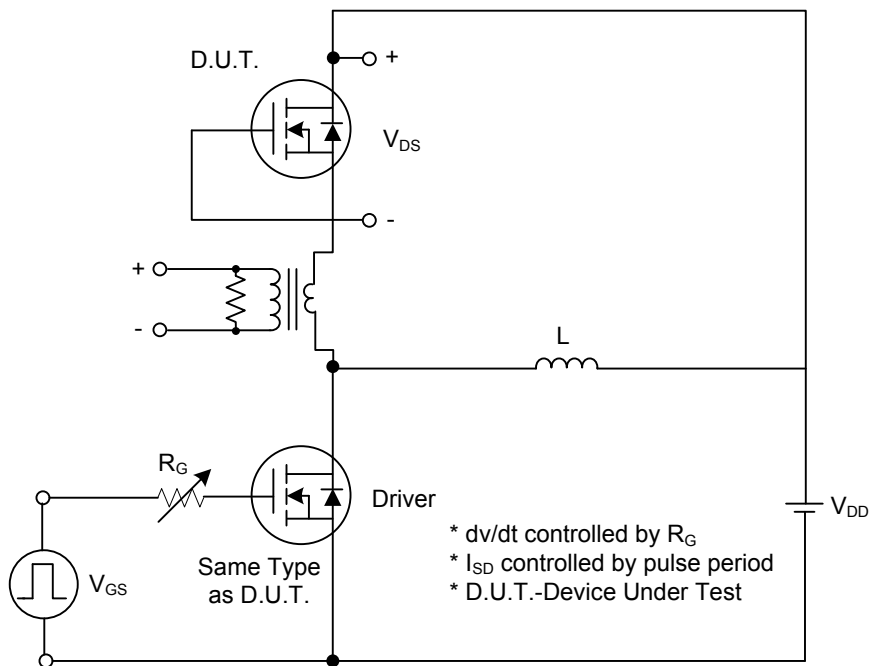
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220 / TO-263	$\theta_{JC}$	0.57	$^\circ\text{C}/\text{W}$
	TO-220F		2.3	$^\circ\text{C}/\text{W}$

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

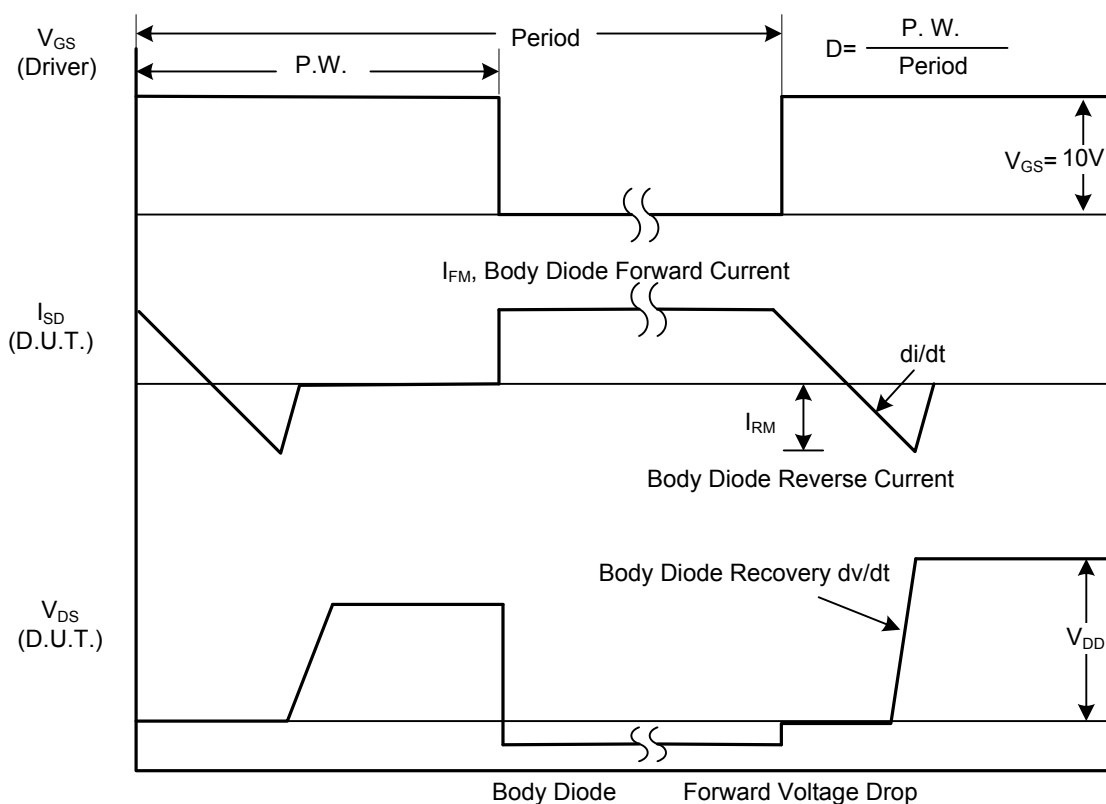
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>STATIC CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{ V}, I_D=250\mu\text{A}$	100			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$			20	$\mu\text{A}$
Gate-Source Forward Current	$I_{GSS}$	$V_{GS}=20\text{ V}$			200	nA
Gate-Source Reverse Current		$V_{GS}=-20\text{ V}$			-200	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
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{ V}, I_D=45\text{A}$ (Note 1)		12	15	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25\text{ V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$		3830		pF
Output Capacitance	$C_{OSS}$			480		pF
Reverse Transfer Capacitance	$C_{RSS}$			59		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DS}=50\text{V}, I_D=80\text{A}, R_G=39\Omega$ $V_{GS}=10\text{V}$ (Note 1)		15		ns
Rise Time	$t_R$			130		ns
Turn-Off Delay Time	$t_{D(OFF)}$			61		ns
Fall Time	$t_F$			120		ns
Total Gate Charge	$Q_G$	$V_{DS}=80\text{V}, V_{GS}=10\text{V}$ $I_D=80\text{A}$ (Note 1)		81	120	nC
Gate-Source Charge	$Q_{GS}$			22		nC
Gate-Drain Charge	$Q_{GD}$			26		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=80\text{ A}, V_{GS}=0\text{ V},$ $T_J=25^\circ\text{C}$ (Note 1)			1.3	V
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				80	A
Maximum Pulsed Drain-Source Diode Forward Current (Note 1)	$I_{SM}$				320	A
Reverse Recovery Time	$t_{RR}$	$I_F=80\text{A}, V_{DD}=50\text{V}, T_J=150^\circ\text{C}$		99	150	ns
Reverse Recovery Charge	$Q_{RR}$	$di/dt=100\text{ A}/\mu\text{s}$ (Note 1)		460	700	nC

Note: 1. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$

■ TEST CIRCUITS AND WAVEFORMS

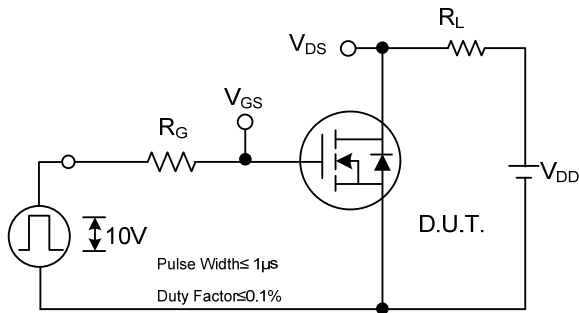


Peak Diode Recovery  $dv/dt$  Test Circuit

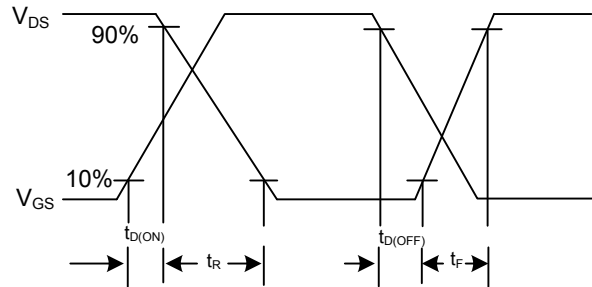


Peak Diode Recovery  $dv/dt$  Waveforms

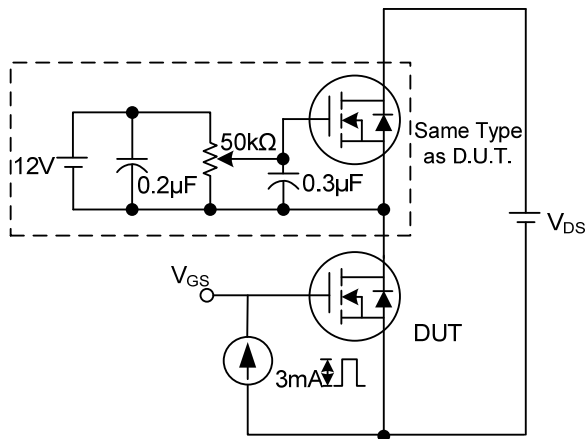
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



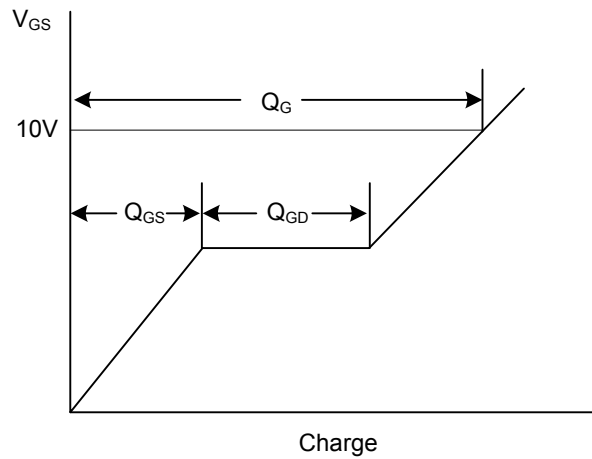
Switching Test Circuit



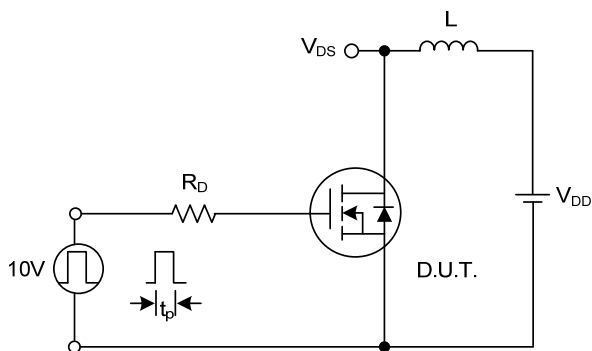
Switching Waveforms



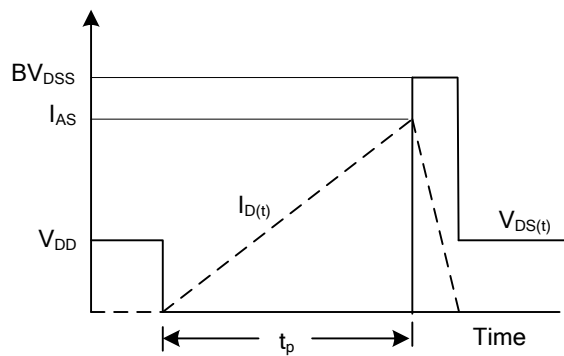
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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