



## UF3710

Power MOSFET

### 57A, 100V N-CHANNEL POWER MOSFET

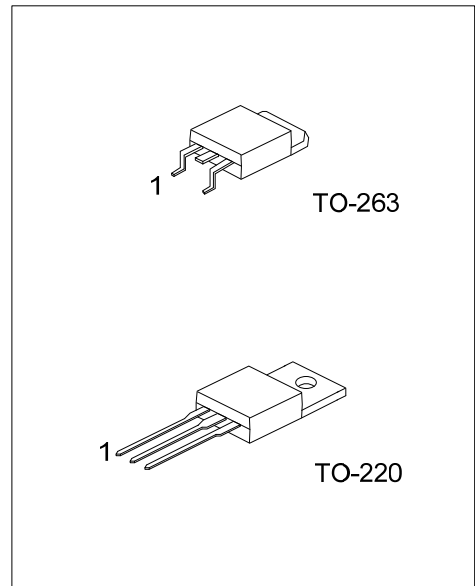
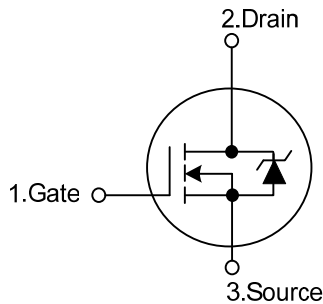
#### DESCRIPTION

The UTC **UF3710** uses advanced process technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

#### FEATURES

- \*  $R_{DS(ON)} = 23m\Omega @V_{GS} = 10V$
- \* Ultra low gate charge ( typical 130 nC )
- \* Low reverse transfer Capacitance (  $C_{RSS} =$  typical 72 pF )
- \* Fast switching capability
- \* Avalanche energy Specified
- \* Improved dv/dt capability, high ruggedness

#### SYMBOL



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF3710L-TA3-T	UF3710G-TA3-T	TO-220	G	D	S	Tube
UF3710L-TQ2-T	UF3710G-TQ2-T	TO-263	G	D	S	Tube
UF3710L-TQ2-R	UF3710G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>UF3710G-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TQ2: TO-263</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain-Source Voltage	$V_{DS}$	100	V
Drain Current	Continuous ( $V_{GS}=10\text{V}$ )	$I_D$	57
	Pulsed (Note 2)	$I_{DM}$	230
Avalanche Current (Note 2)	$I_{AR}$	57	A
Avalanche Energy	Repetitive (Note 2)	$E_{AR}$	20
	Single Pulsed (Note 3)	$E_{AS}$	1060 (Note 4)
Power Dissipation	$P_D$	165	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-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.  $T_J=25^\circ\text{C}$ ,  $L=0.65\text{mH}$ ,  $R_G=25\Omega$ ,  $I_{AS}=57\text{A}$ ,  $V_{GS}=10\text{V}$

4. This is a typical value at device destruction and represents operation outside rated limits.

■ THERMAL DATA

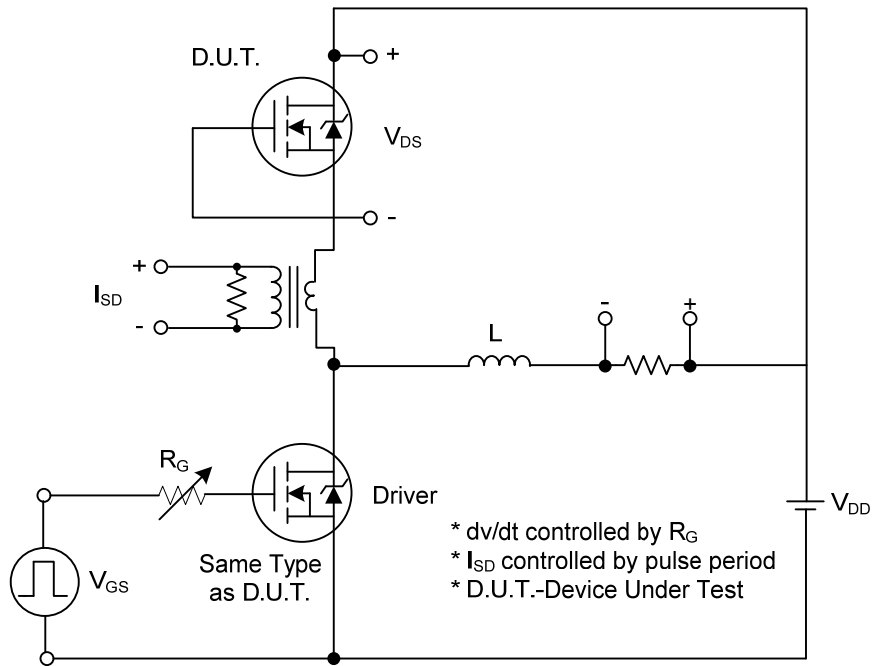
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62	$^\circ\text{C/W}$
Junction to Case	$\theta_{JC}$	0.75	$^\circ\text{C/W}$

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

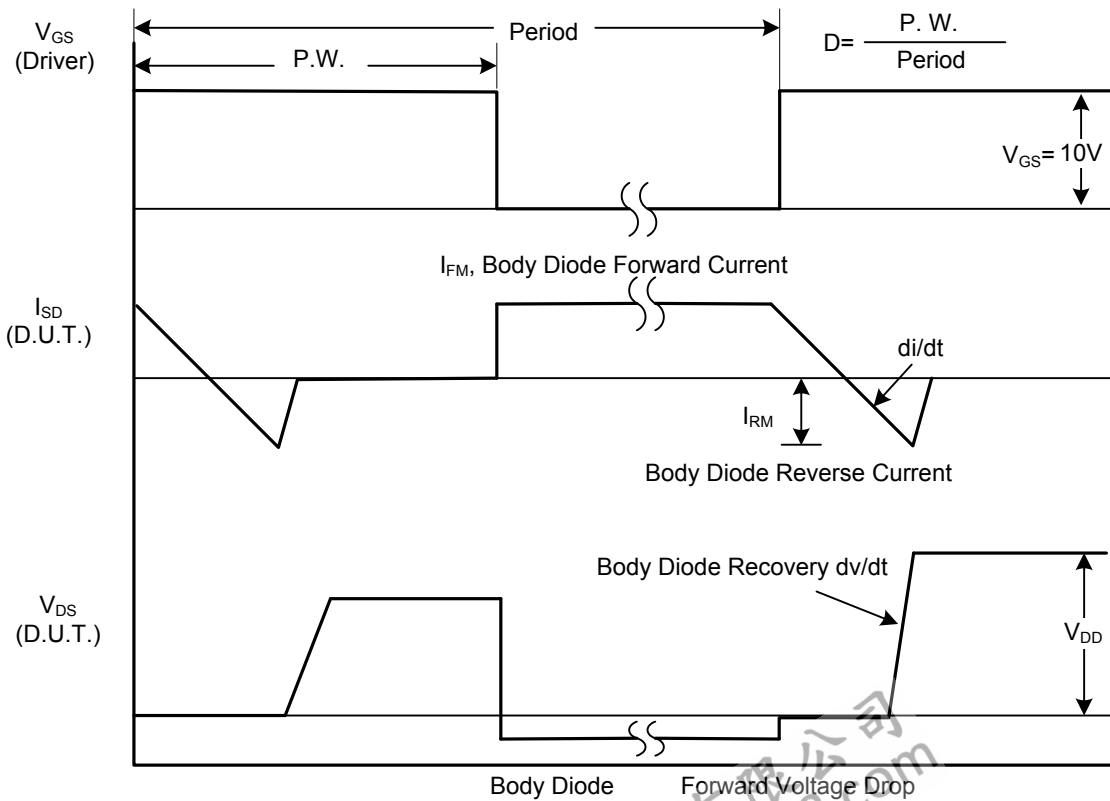
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V			25	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =1mμA, Referenced to 25°C		0.13		V/°C
<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
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =28A (Note)			23	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =25V, I <sub>D</sub> =28 A	32			S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f =1MHz		3130		pF
Output Capacitance	C <sub>OSS</sub>			410		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			72		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =80V, I <sub>D</sub> =28A, V <sub>GS</sub> =10V			130	nC
Gate Source Charge	Q <sub>GS</sub>				26	nC
Gate Drain Charge	Q <sub>GD</sub>				43	nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =50V, I <sub>D</sub> =28A, R <sub>G</sub> =2.5Ω V <sub>GS</sub> =10V (Note)		12		ns
Turn-ON Rise Time	t <sub>R</sub>			58		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			45		ns
Turn-OFF Fall-Time	t <sub>F</sub>			47		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =28A, V <sub>GS</sub> =0V (Note)			1.2	V
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>	MOSFET symbol showing the integral reverse P-N junction diode.			57	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				230	A
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =28A, di/dt=100A/μs (Note)		140	220	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			670	1010	nC

Note: Pulse width ≤ 400μs; duty cycle ≤ 2%.

■ TEST CIRCUITS AND WAVEFORMS

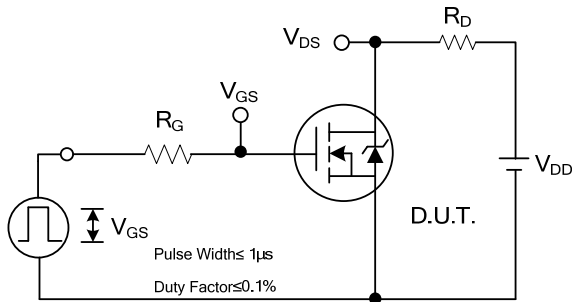


Peak Diode Recovery dv/dt Test Circuit

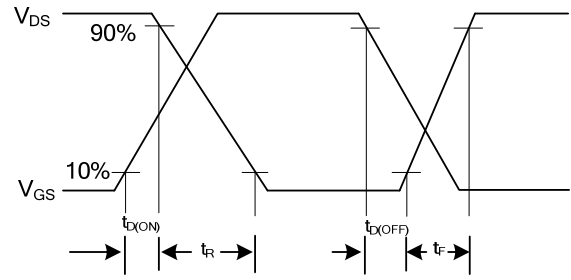


Peak Diode Recovery dv/dt Waveforms

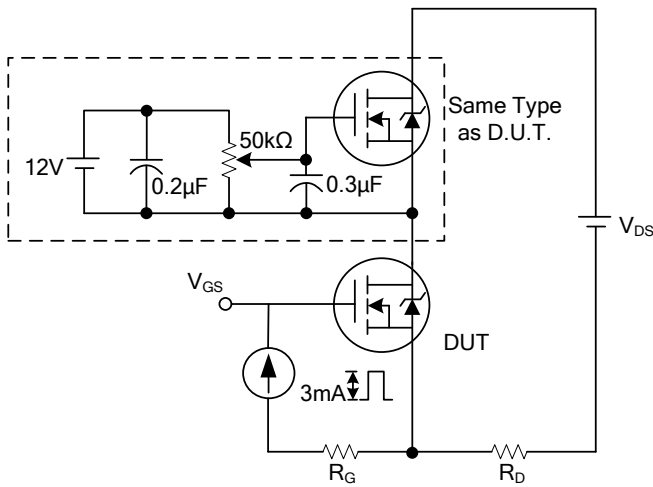
## TEST CIRCUITS AND WAVEFORMS



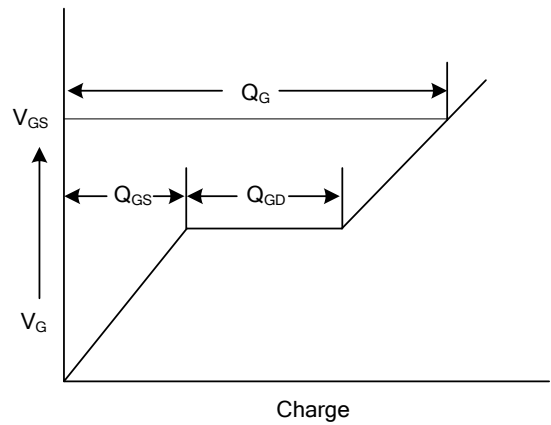
**Switching Test Circuit**



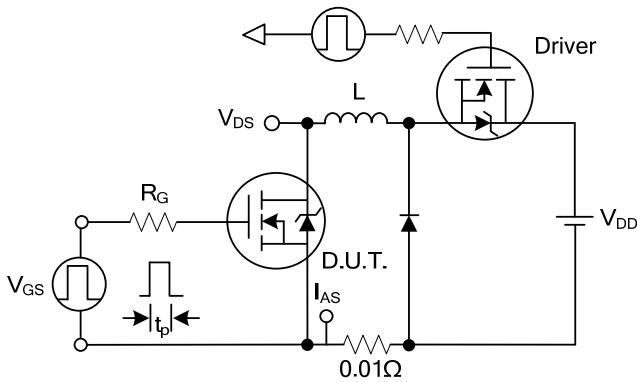
**Switching Waveforms**



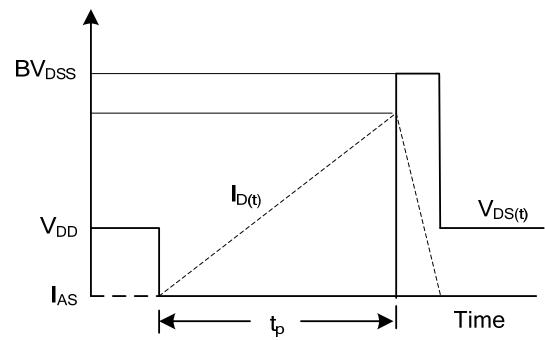
**Gate Charge Test Circuit**



**Gate Charge Waveform**

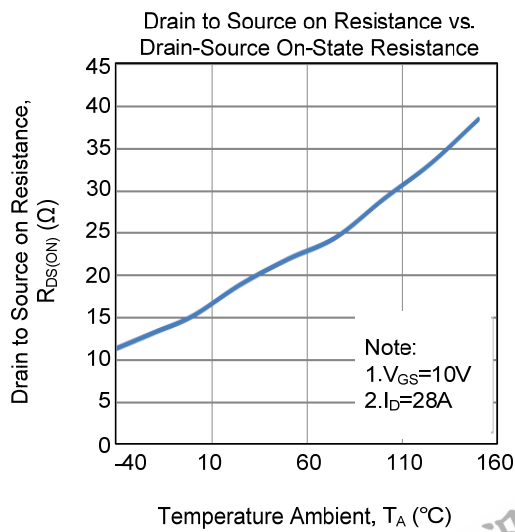
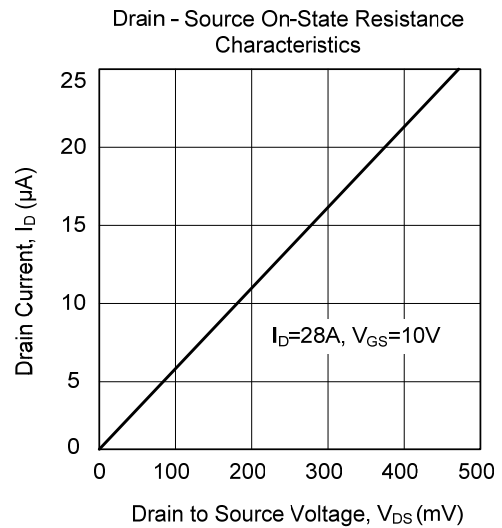
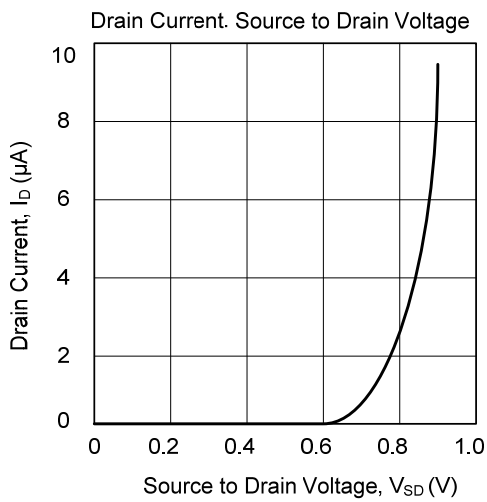
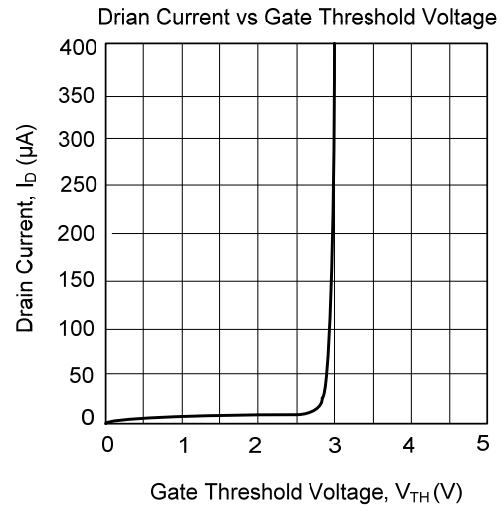
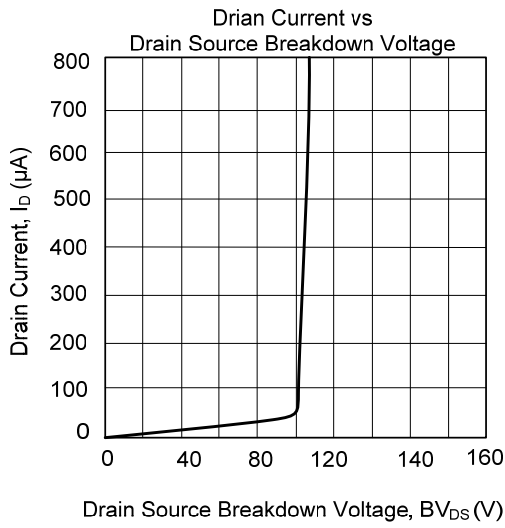


**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

## TYPICAL CHARACTERISTICS



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