



UF450

Power MOSFET

14A, 500V N-CHANNEL POWER MOSFET

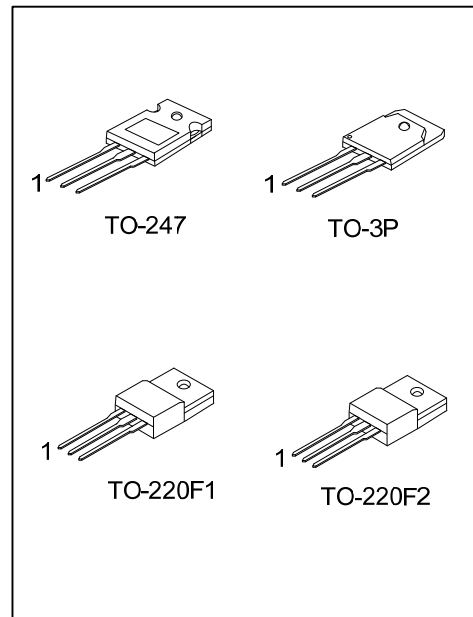
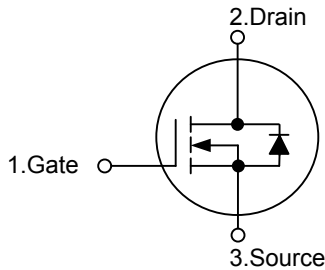
■ DESCRIPTION

The **UF450** uses advanced UTC 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, in PWM applications, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.

■ FEATURES

- * $R_{DS(ON)} \leq 0.4\Omega$ @ $V_{GS}=10V, I_D=8.4A$
- * Ultra Low Gate Charge (Max. 150nC)
- * Low Reverse Transfer Capacitance (C_{RSS} = Typical 340pF)
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF450L-TF1-T	UF450G-TF1-T	TO-220F1	G	D	S	Tube
UF450L-TF2-T	UF450G-TF2-T	TO-220F2	G	D	S	Tube
UF450L-T47-T	UF450G-T47-T	TO-247	G	D	S	Tube
UF450L-T3P-T	UF450G-T3P-T	TO-3P	G	D	S	Tube

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

<p>UF450G-TF1-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube (2) TF1: TO-220F1, TF2: TO-220F2, T47: TO-247 T3P: TO-3P (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate to Source Voltage		V_{GSS}	±20	V
Continuous Drain Current		I_D	14	A
Pulsed Drain Current (Note 2)		I_{DM}	56	A
Avalanche Current (Note 2)		I_{AR}	14	A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	760	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.5	V/ns
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220F1	P_D	36	W
	TO-220F2		38	
	TO-247		190	
	TO-3P		215	
Junction Temperature		T_J	+150	$^\circ\text{C}$
Strong 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. $L = 7\text{mH}$, $I_{AS} = 14\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 14\text{A}$, $di/dt \leq 130\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL CHARACTERISTICS

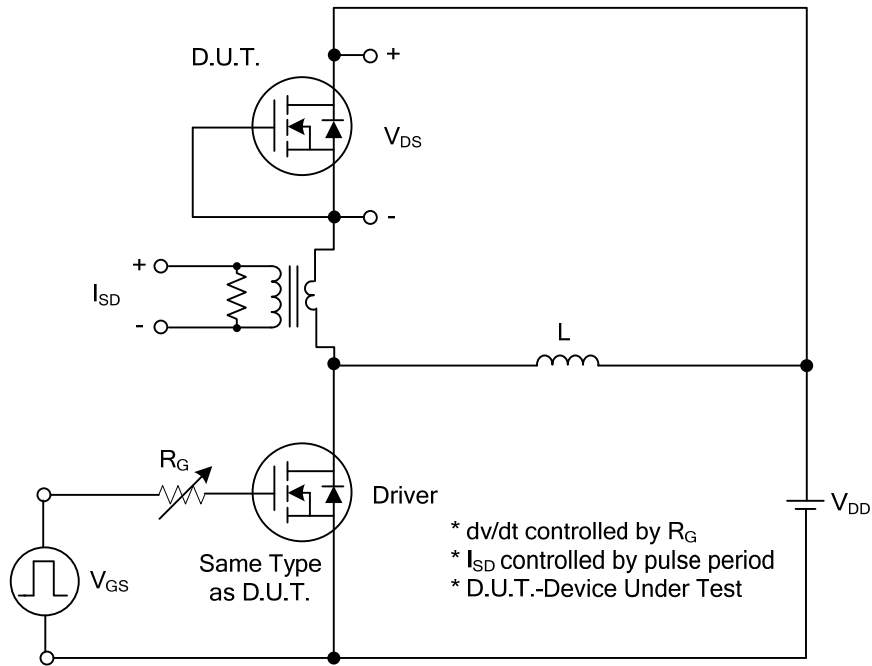
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1/ TO-220F2	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-247/TO-3P		40	
Junction to Case	TO-220F1	θ_{JC}	3.47	$^\circ\text{C}/\text{W}$
	TO-220F2		3.29	
	TO-247		0.65	
	TO-3P		0.58	

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

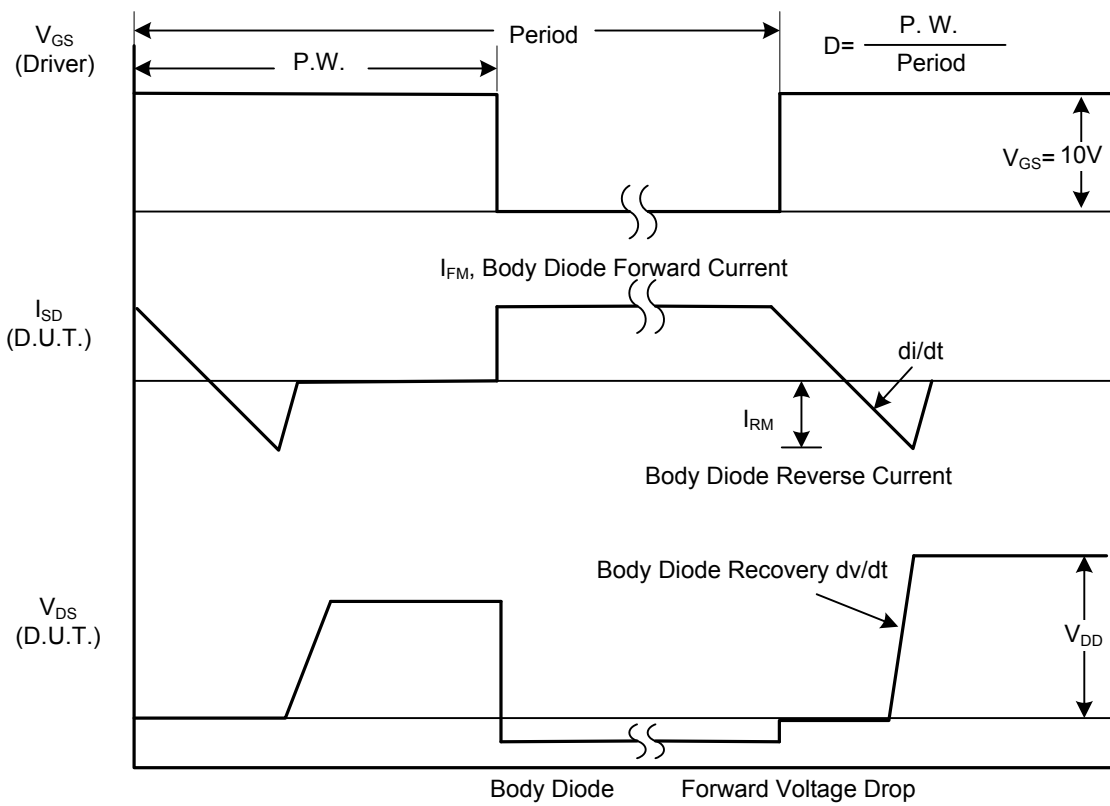
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0 V, I _D =250μA	500			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			25	μA
		V _{DS} =400V, V _{GS} =0V, T _J =125°C			250	μA
Gate-Source Leakage Current	Forward	I _{GSS}			100	nA
	Reverse				-100	
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1.0mA		0.63		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =8.4A		0.31	0.4	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2600		pF
Output Capacitance	C _{OSS}			720		pF
Reverse Transfer Capacitance	C _{RSS}			340		pF
SWITCHING PARAMETERS (Note 1)						
Total Gate Charge	Q _G	V _{DS} =400V, V _{GS} =10V, I _D =14A (Note 1,2)			150	nC
Gate Source Charge	Q _{GS}				20	nC
Gate Drain Charge	Q _{GD}				80	nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =250V, I _D =14A, R _G =6.2Ω, R _D =17Ω(Note 1,2)		17		ns
Turn-ON Rise Time	t _R			47		ns
Turn-OFF Delay Time	t _{D(OFF)}			92		ns
Turn-OFF Fall-Time	t _F			44		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				14	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				56	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =14A, V _{GS} =0V			1.4	V
Reverse Recovery Time	t _{rr}	I _F =14A, di/dt≤100A/μs,		540	810	ns
Reverse Recovery Charge	Q _{rr}	V _{DD} ≤50V (Note 1)		4.8	7.2	μc

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
 2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

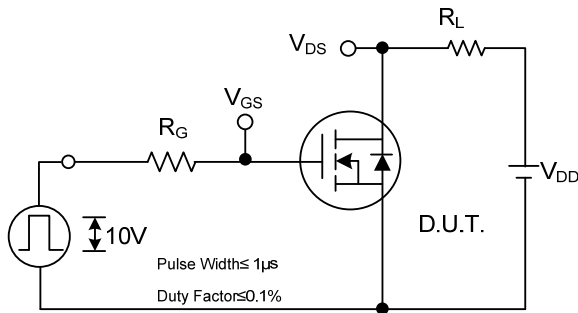


Peak Diode Recovery dv/dt Test Circuit

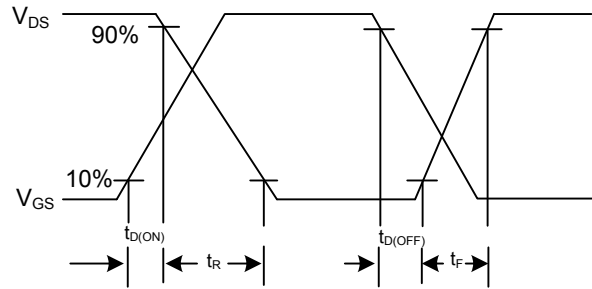


Peak Diode Recovery dv/dt Waveforms

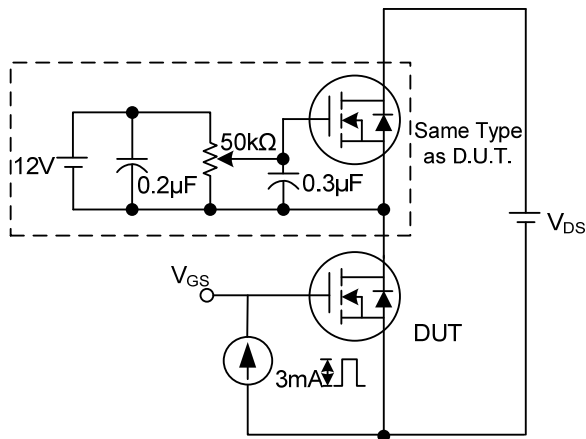
■ TEST CIRCUITS AND WAVEFORMS



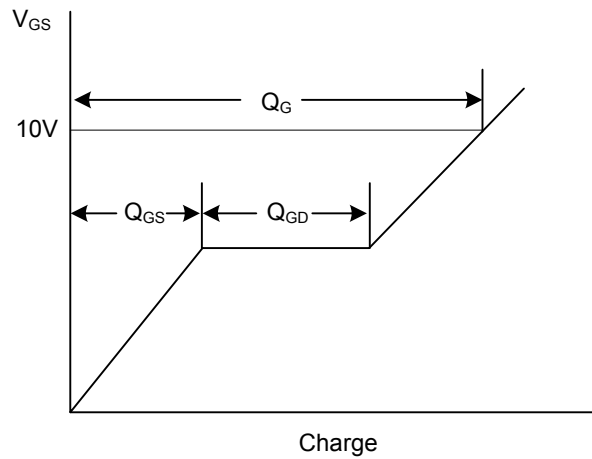
Switching Test Circuit



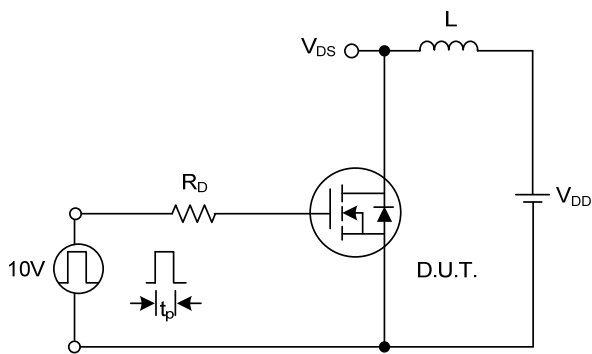
Switching Waveforms



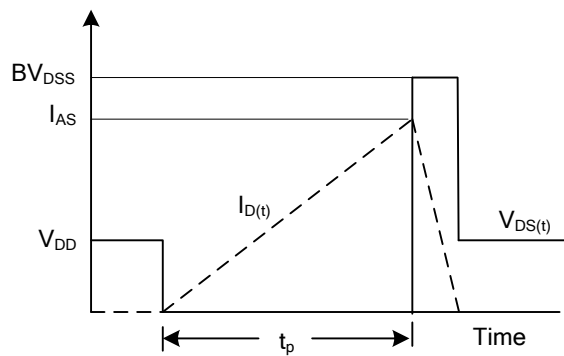
Gate Charge Test Circuit



Gate Charge Waveform

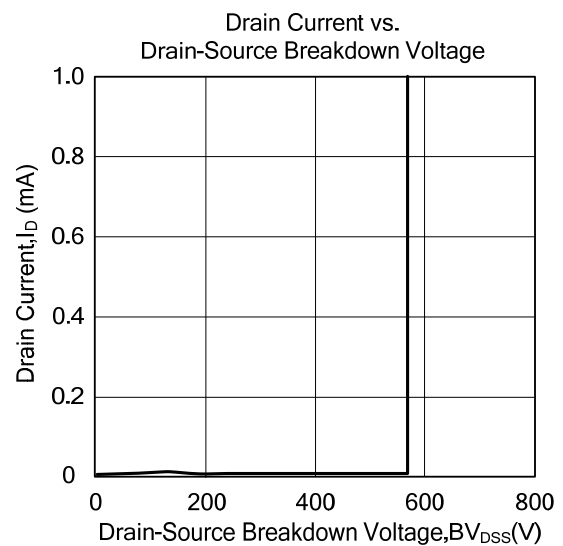
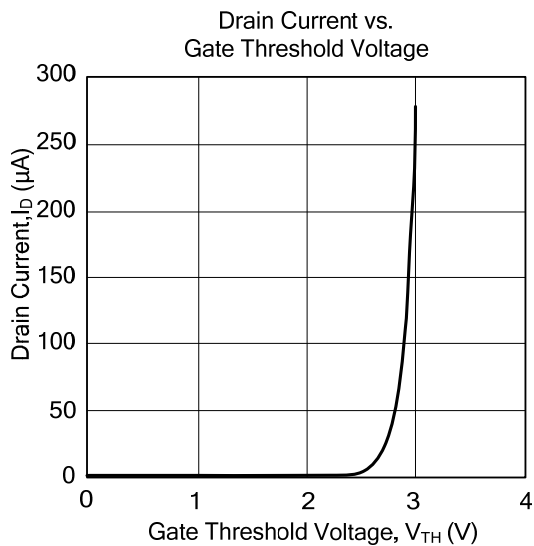
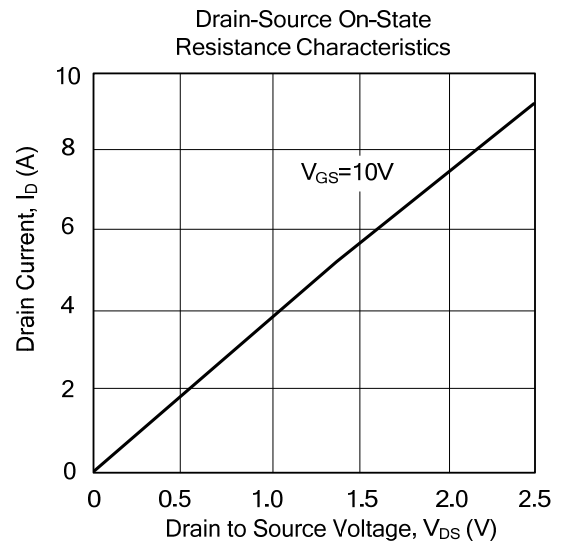
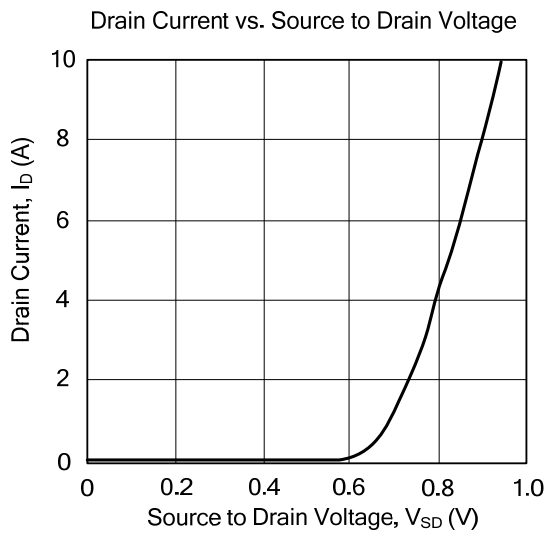


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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