



UF450

Power MOSFET

14A, 500V N-CHANNEL POWER MOSFET

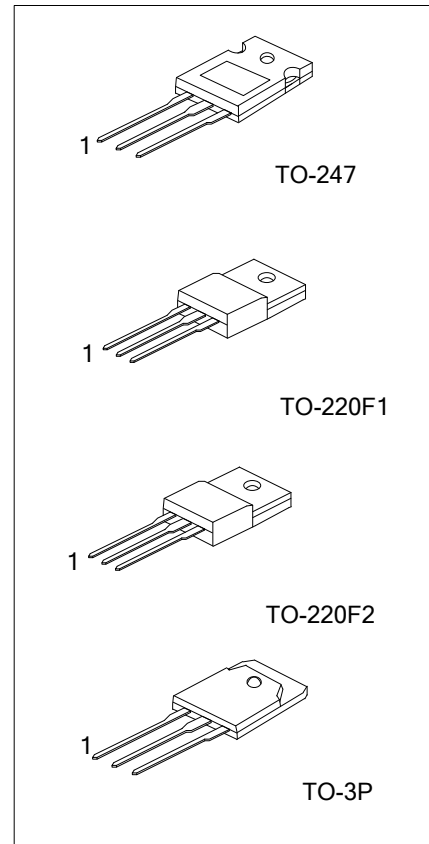
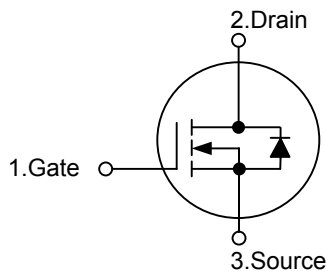
DESCRIPTION

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

- * $R_{DS(ON)} = 0.4\Omega @ V_{GS} = 10V$
- * 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

UF450L-T47-T (1)Packing Type (2)Package Type (3)Lead Free		(1) T: Tube (2) TF1: TO-220F1, TF2: TO-220F2, T3P: TO-3P, T47: TO-247, (3) G: Halogen Free, L: Lead Free
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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
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-247	P_D	190	W
	TO-220F1		36	
	TO-220F2		38	
	TO-3P		215	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.5	V/ns
Junction Temperature		T_J	+150	$^\circ\text{C}$
Strong 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. Pulse width limited by $T_{J(MAX)}$

3. $V_{DD}=50\text{V}$, starting $T_J=25^\circ\text{C}$, $L=7.0\text{mH}$, $I_{AS}=14\text{A}$, $R_G=25\Omega$

4. $I_{SD}\leq 14\text{A}$, $di/dt\leq 130\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, $T_J\leq 150^\circ\text{C}$

■ THERMAL DATA

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

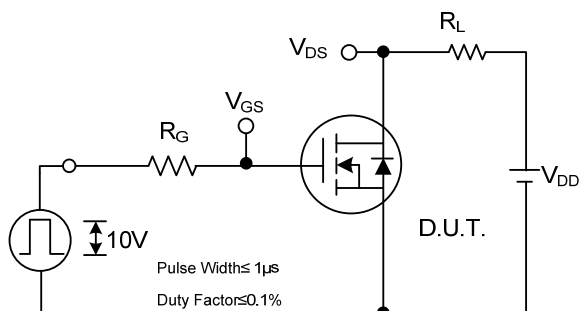
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

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} =0 V			25	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V			100	nA
	Reverse		V _{GS} =-20V			-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							
Drain-Source Diode Forward Voltage		V _{SD}	I _S =14A, V _{GS} =0V			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I _S				14	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				56	A
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

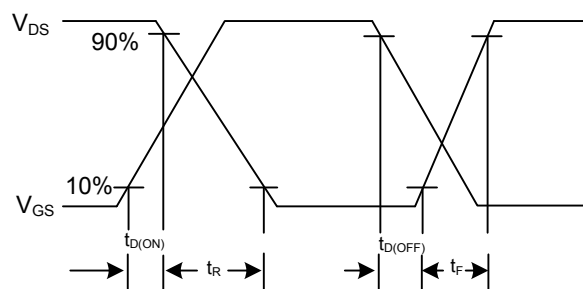
Note: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

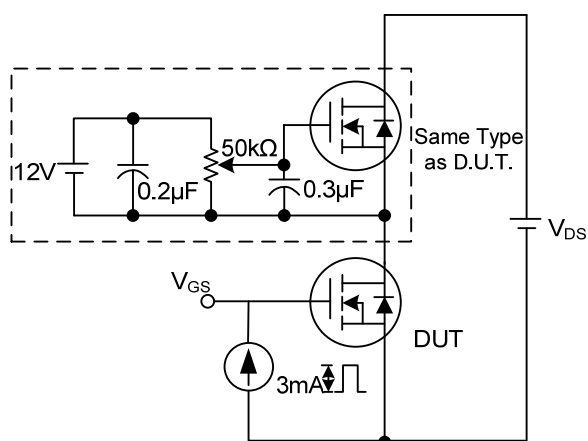
■ TEST CIRCUITS AND WAVEFORMS



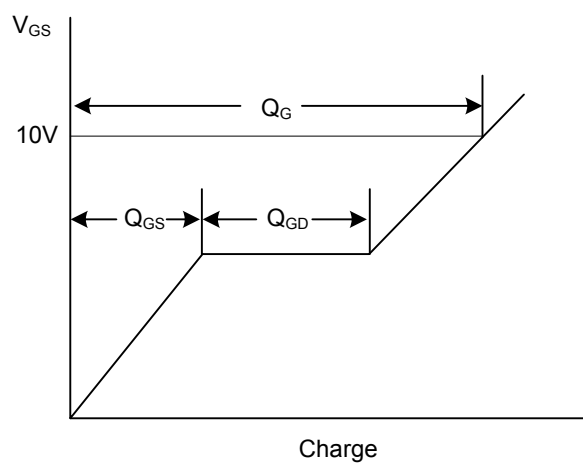
Switching Test Circuit



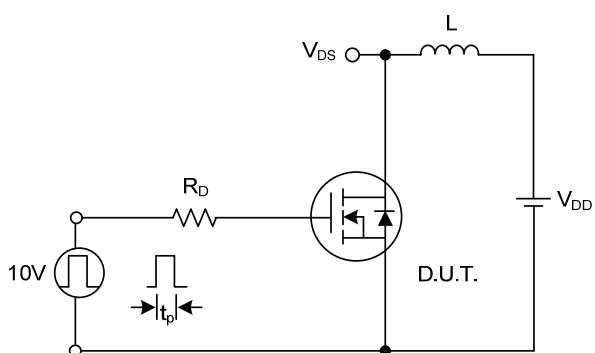
Switching Waveforms



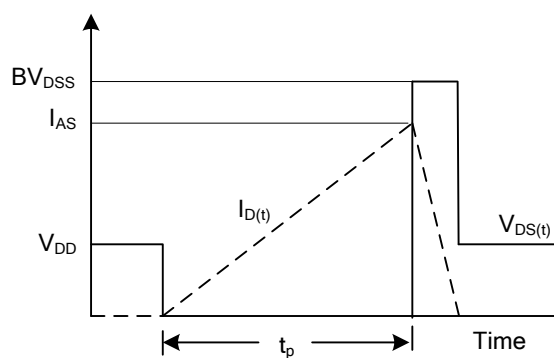
Gate Charge Test Circuit



Gate Charge Waveform

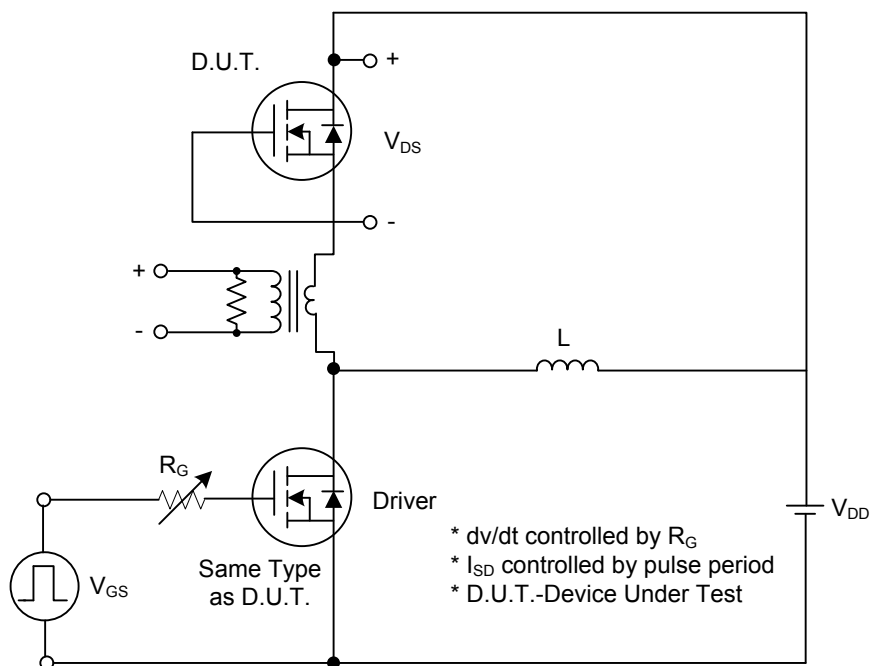


Unclamped Inductive Switching Test Circuit

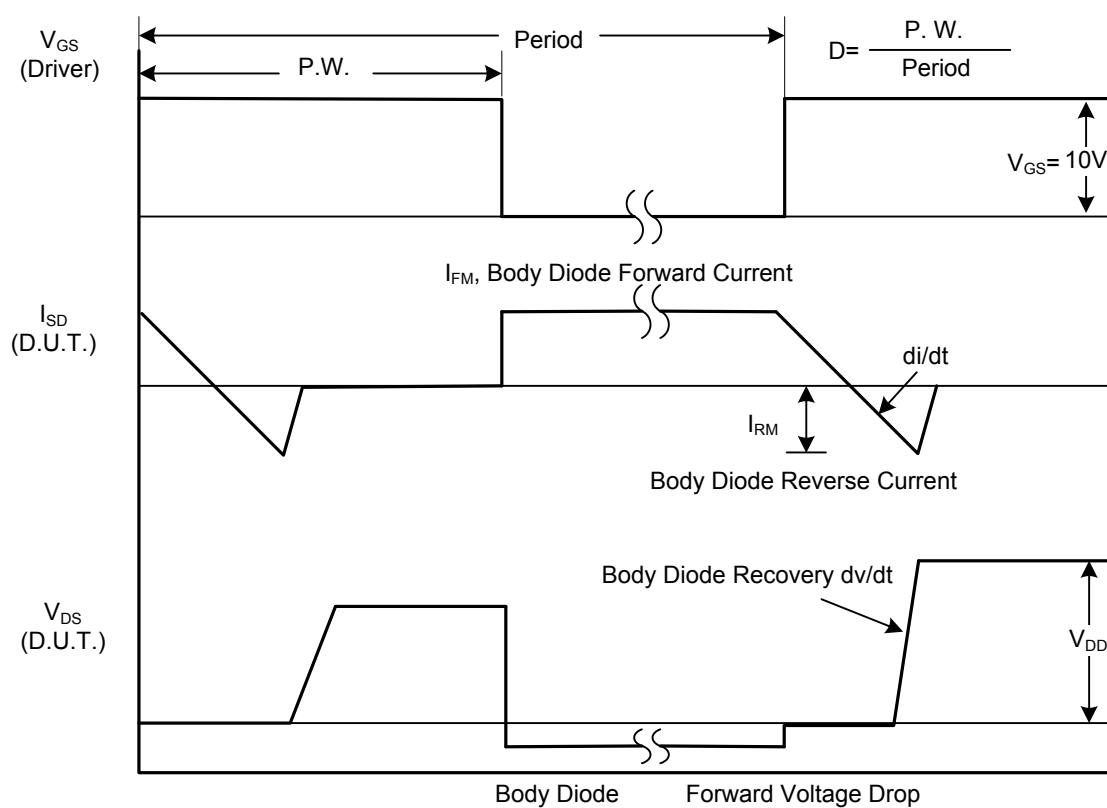


Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

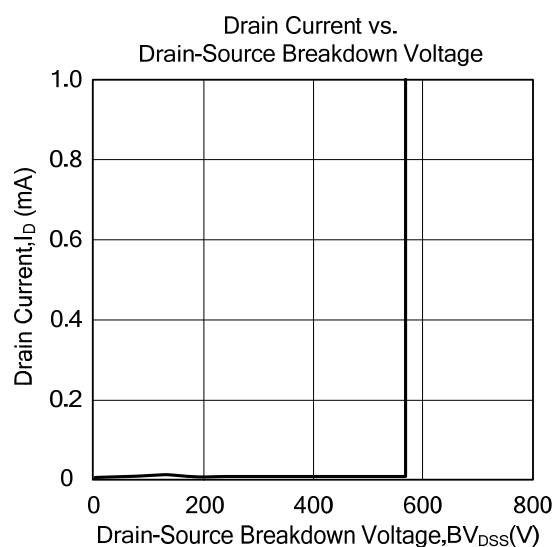
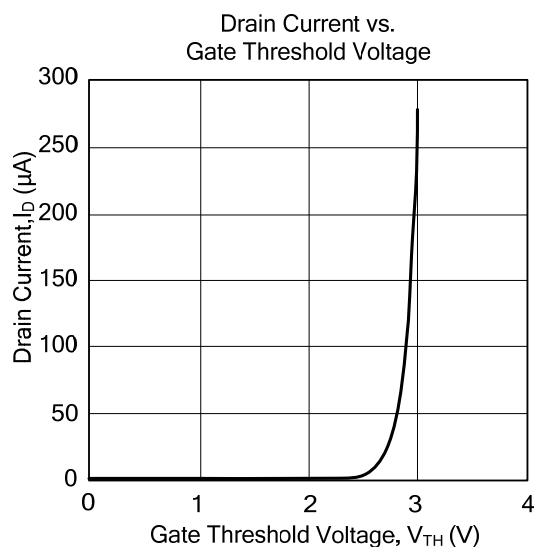
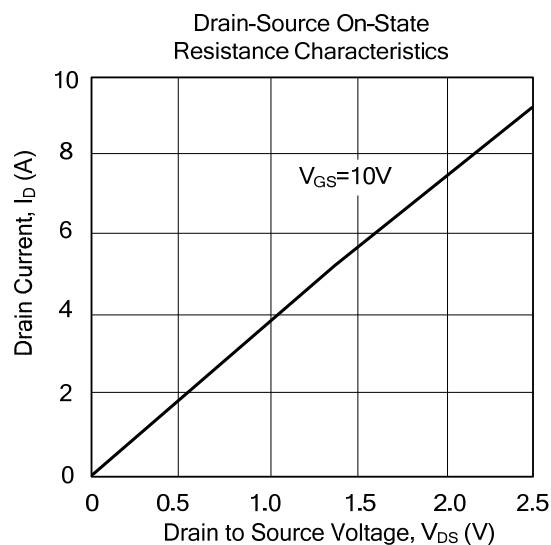
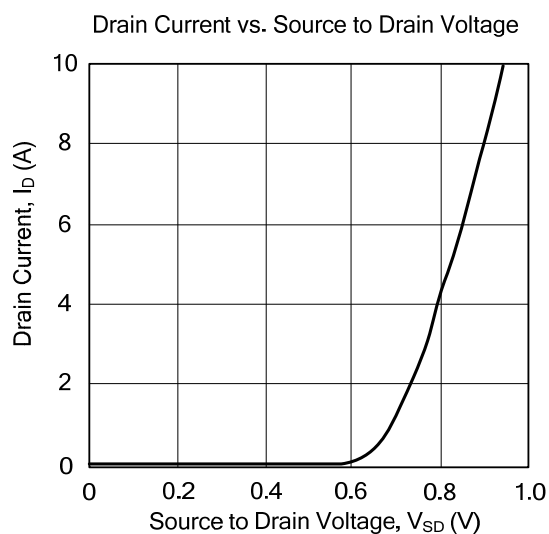


Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

■ TYPICAL CHARACTERISTICS



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