



UF450

Power MOSFET

14A, 500V N-CHANNEL POWER MOSFET

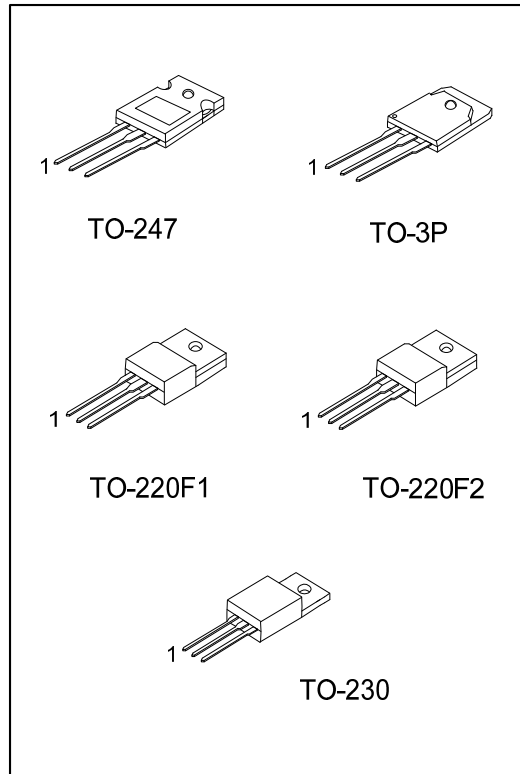
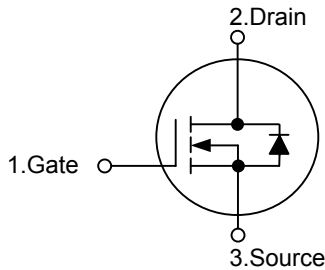
■ DESCRIPTION

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-TC3-T	UF450G-TC3-T	TO-230	G	D	S	Tube
UF450L-T3P-T	UF450G-T3P-T	TO-3P	G	D	S	Tube

<p>UF450L-T47-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) T: (2) TF1: TO-220F1, TF2: TO-220F2, T47: TO-247 TC3: TO-230, T3P: TO-3P (3) L: Lead Free, G: Halogen 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
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220F1	36	W
	TO-220F2	38	
	TO-247	190	
	TO-230	147	
	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	$^\circ\text{C}$

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. 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	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
		40	
Junction to Case	θ_{JC}	3.47	$^\circ\text{C}/\text{W}$
		3.29	
		0.65	
		0.85	
		0.58	

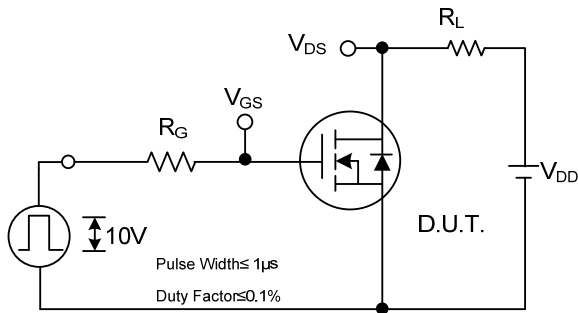
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	500			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500\text{V}, V_{GS}=0\text{V}$			25	μA
		$V_{DS}=400\text{V}, V_{GS}=0\text{V}, T_J=125^\circ\text{C}$			250	μA
Gate-Source Leakage Current	Forward	I_{GSS}				nA
	Reverse					
		$V_{GS}=-20\text{V}$			-100	
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}, I_D=1.0\text{mA}$		0.63		$\text{V}/^\circ\text{C}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=8.4\text{A}$		0.31	0.4	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$		2600		pF
Output Capacitance	C_{OSS}			720		pF
Reverse Transfer Capacitance	C_{RSS}			340		pF
SWITCHING PARAMETERS (Note 1)						
Total Gate Charge	Q_G	$V_{DS}=400\text{V}, V_{GS}=10\text{V},$ $I_D=14\text{A}$ (Note 1,2)			150	nC
Gate Source Charge	Q_{GS}				20	nC
Gate Drain Charge	Q_{GD}				80	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=250\text{V}, I_D=14\text{A},$ $R_G=6.2\Omega, R_D=17\Omega$ (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}	$I_S=14\text{A}, V_{GS}=0\text{V}$			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}	$I_F=14\text{A}, di/dt \leq 100\text{A}/\mu\text{s},$ $V_{DD} \leq 50\text{V}$ (Note 1)		540	810	ns
Reverse Recovery Charge	Q_{RR}			4.8	7.2	μC

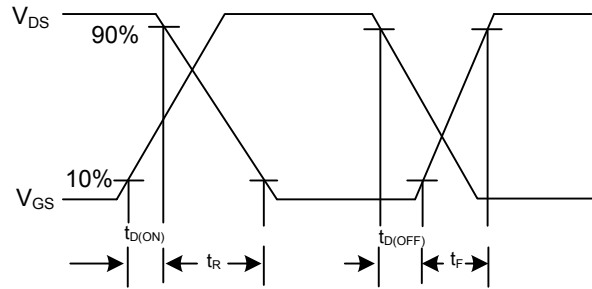
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature.

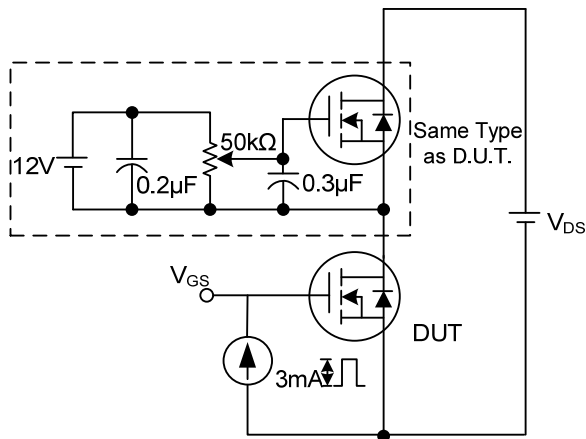
■ TEST CIRCUITS AND WAVEFORMS



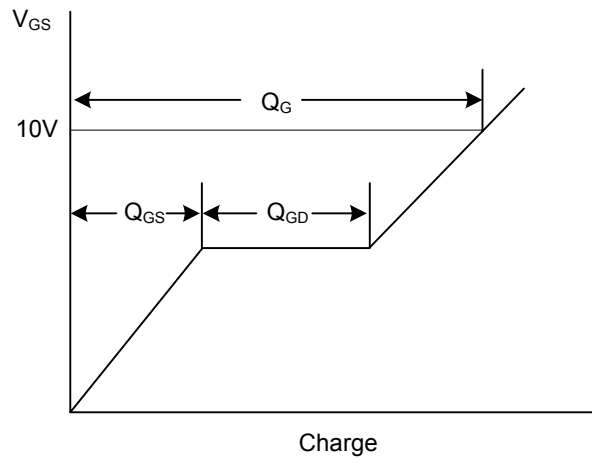
Switching Test Circuit



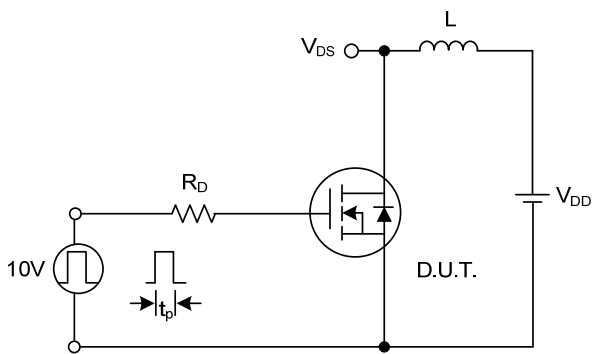
Switching Waveforms



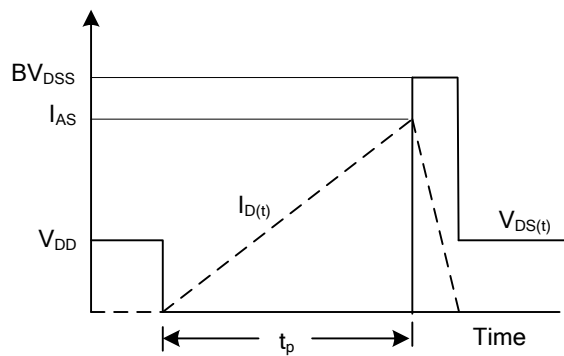
Gate Charge Test Circuit



Gate Charge Waveform

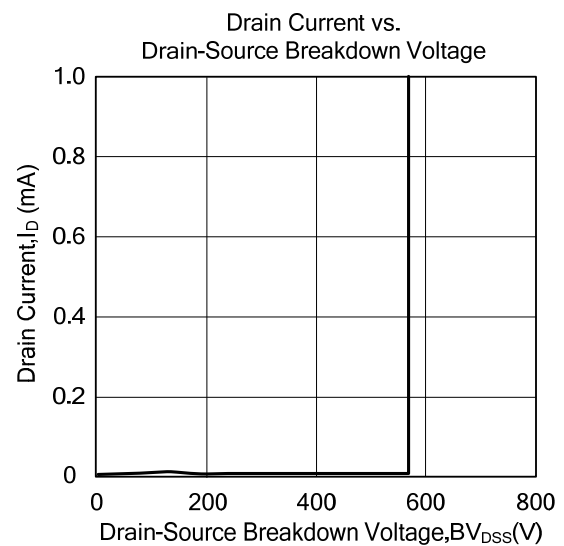
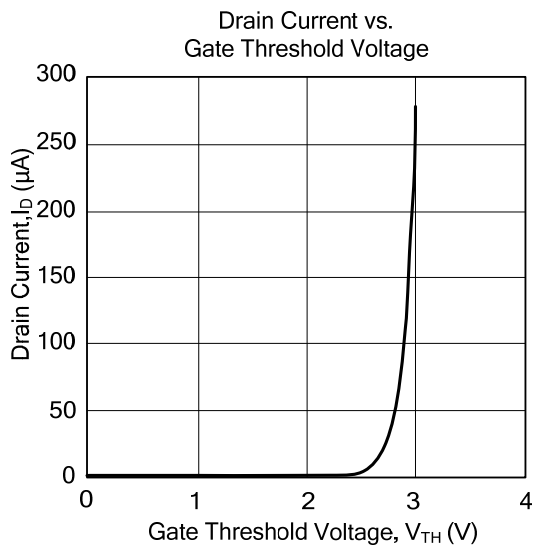
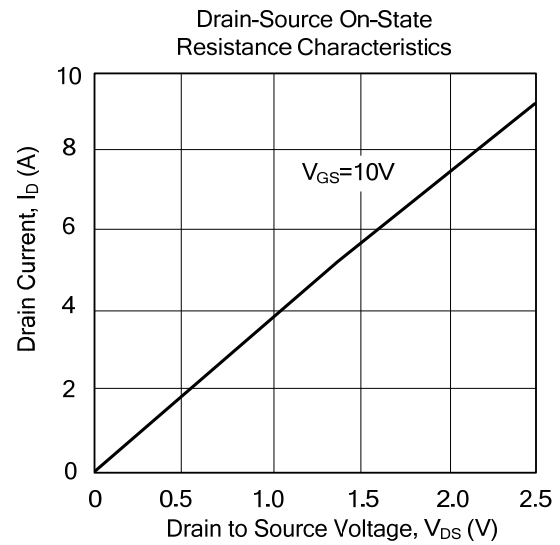
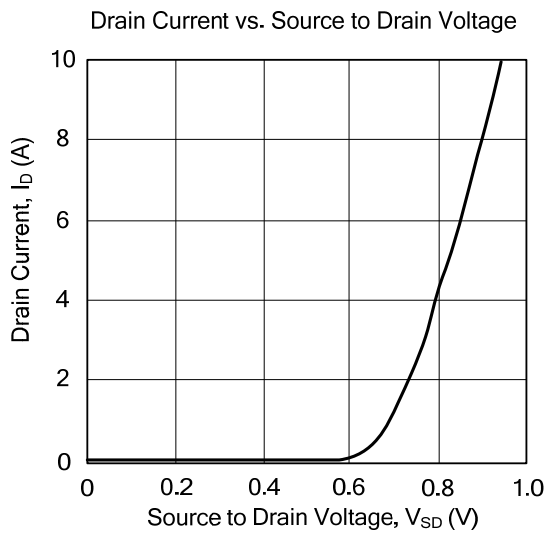


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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