



UF450-Q

Power MOSFET

14A, 500V N-CHANNEL POWER MOSFET

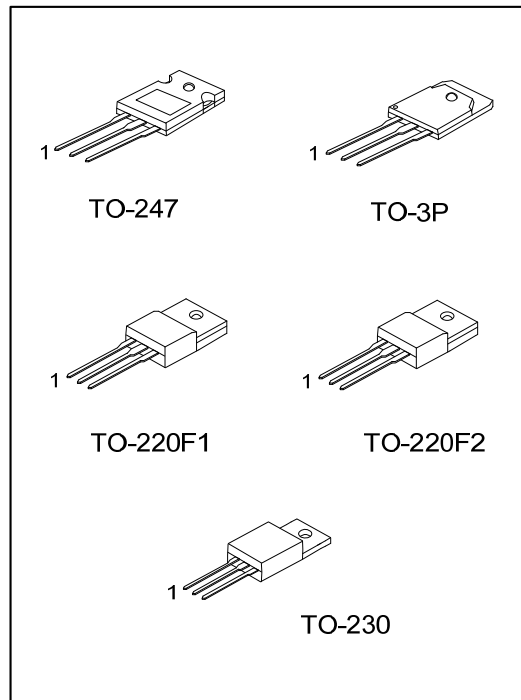
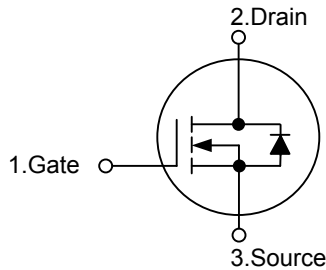
■ **DESCRIPTION**

The **UF450-Q** 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**

- * $R_{DS(ON)} < 0.4\Omega$ @ $V_{GS}=10V, I_D=8.4A$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability

■ **SYMBOL**

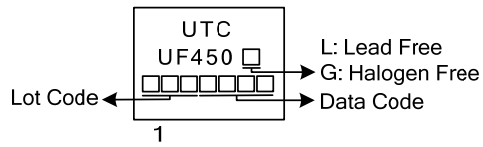


■ **ORDERING INFORMATION**

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)Green Package</p>	<p>(1) T: Tube (2) TF1: TO-220F1, TF2: TO-220F2, T47: TO-247 TC3: TO-230, T3P: TO-3P (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



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■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

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	TO-220F1	36	W
	TO-220F2	38	W
	TO-247	190	W
	TO-230	147	W
	TO-3P	215	W
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. Repetitive rating: Pulse width limited by maximum junction temperature.

3. $L=7.0\text{mH}$, $I_{AS}=14\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, 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 DATA

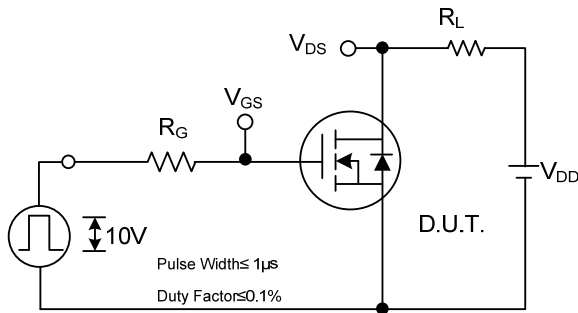
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1/TO-220F2 TO-230	62.5	$^{\circ}\text{C}/\text{W}$
	TO-247/TO-3P	40	$^{\circ}\text{C}/\text{W}$
	Junction to Case	TO-220F1	3.47
TO-220F2		3.29	$^{\circ}\text{C}/\text{W}$
TO-247		0.65	$^{\circ}\text{C}/\text{W}$
TO-230		0.85	$^{\circ}\text{C}/\text{W}$
TO-3P		0.58	$^{\circ}\text{C}/\text{W}$

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

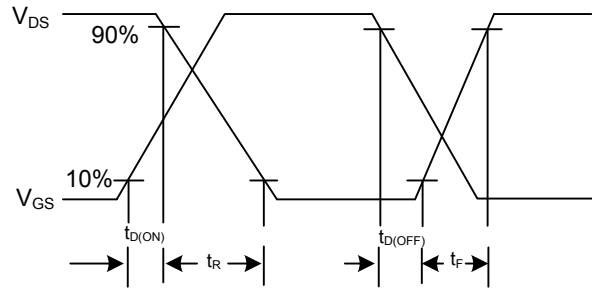
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0 V, I _D =250μA	500			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			25	μA
		V _{DS} =400V, V _{GS} =0V, T _J =125°C			250	μA
Gate-Source Leakage Current	Forward	I _{GSS}				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		0.26	0.4	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2600		pF
Output Capacitance	C _{OSS}			400		pF
Reverse Transfer Capacitance	C _{RSS}			120		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =120V, V _{GS} =10V, I _D =14A, I _G =3.3mA (Note 1,2)		290		nC
Gate Source Charge	Q _{GS}			20		nC
Gate Drain Charge	Q _{GD}			50		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, I _D =1.0A, R _G =2.35Ω		80		ns
Turn-ON Rise Time	t _R			140		ns
Turn-OFF Delay Time	t _{D(OFF)}			300		ns
Turn-OFF Fall-Time	t _F			200		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 (Note 1)	V _{SD}	I _S =14A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)	t _{rr}	I _F =14A, dI/dt≤100A/μs,		540	810	ns
Reverse Recovery Charge	Q _{rr}	V _{DD} ≤50V		4.8	7.2	μC

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

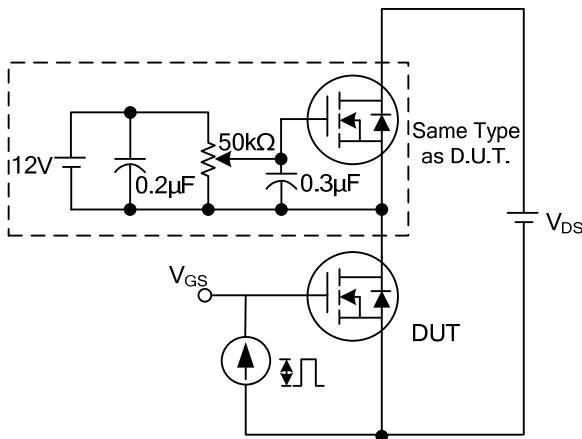
TEST CIRCUITS AND WAVEFORMS



Switching Test Circuit



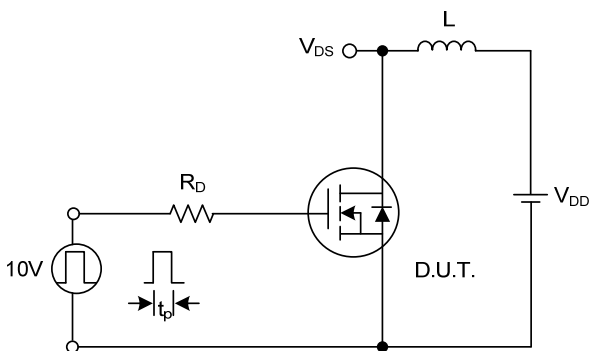
Switching Waveforms



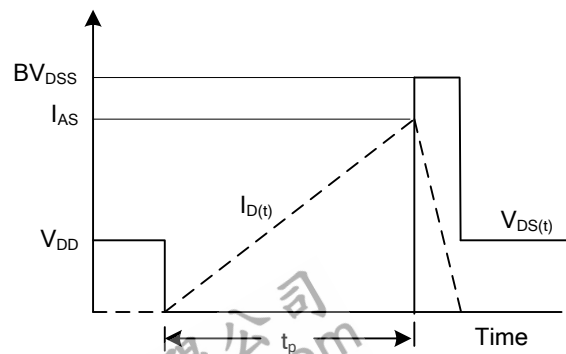
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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