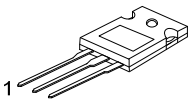
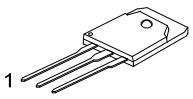
UF450-Q

Power MOSFET

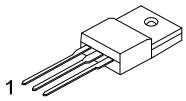
14A, 500V N-CHANNEL POWER MOSFET



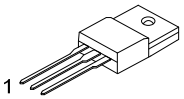
TO-247



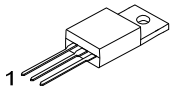
TO-3P



TO-220F1



TO-220F2



TO-230

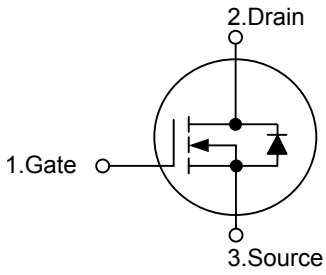
■ DESCRIPTION

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

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

■ SYMBOL



■ ORDERING INFORMATION

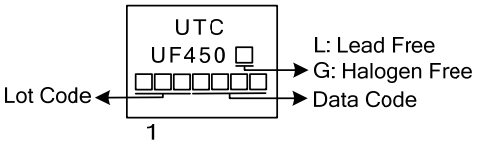
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF450L-TF1-T	UF450G-TF1-T	TO-220F1	G	D	S	Tube
UF450L-TF2-T	UF450G-TF2-T	TO-220F2	G	D	S	Tube
UF450L-T47-T	UF450G-T47-T	TO-247	G	D	S	Tube
UF450L-TC3-T	UF450G-TC3-T	TO-230	G	D	S	Tube
UF450L-T3P-T	UF450G-T3P-T	TO-3P	G	D	S	Tube

UF450L-T47-T

(1)Packing Type
(2)Package Type
(3)Green Package

(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

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°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	P_D	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	°C
Strong Temperature		T_{STG}	-55 ~ +150	°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=7.0mH, I_{AS}=14A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
4. I_{SD} ≤ 14A, di/dt ≤ 130A/μs, V_{DD}≤BV_{DSS}, starting T_J=25°C

■ THERMAL DATA

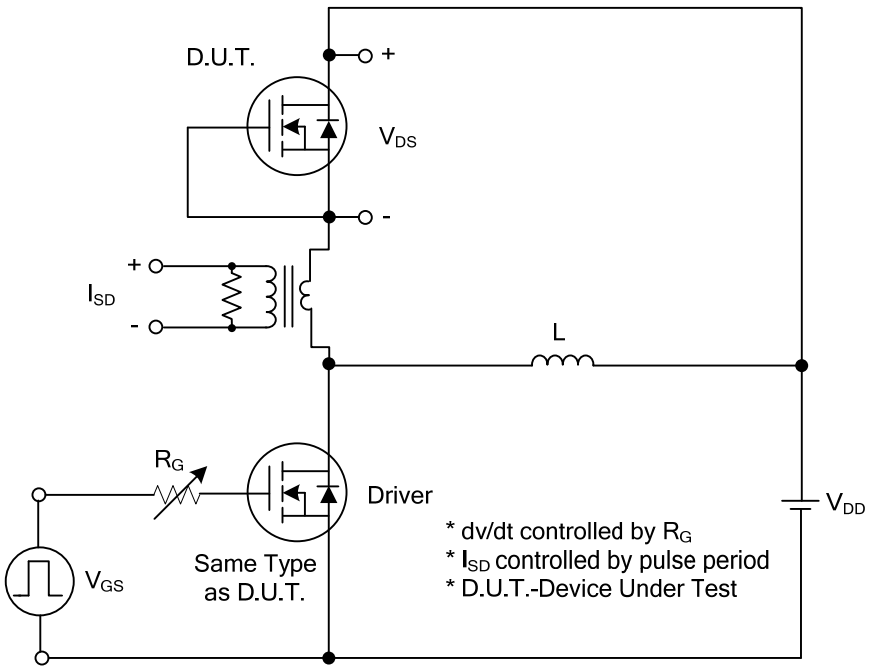
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1/TO-220F2 TO-230	θ_{JA}	62.5	°C/W
	TO-247/TO-3P		40	°C/W
Junction to Case	TO-220F1	θ_{JC}	3.47	°C/W
	TO-220F2		3.29	°C/W
	TO-247		0.65	°C/W
	TO-230		0.85	°C/W
	TO-3P		0.58	°C/W

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

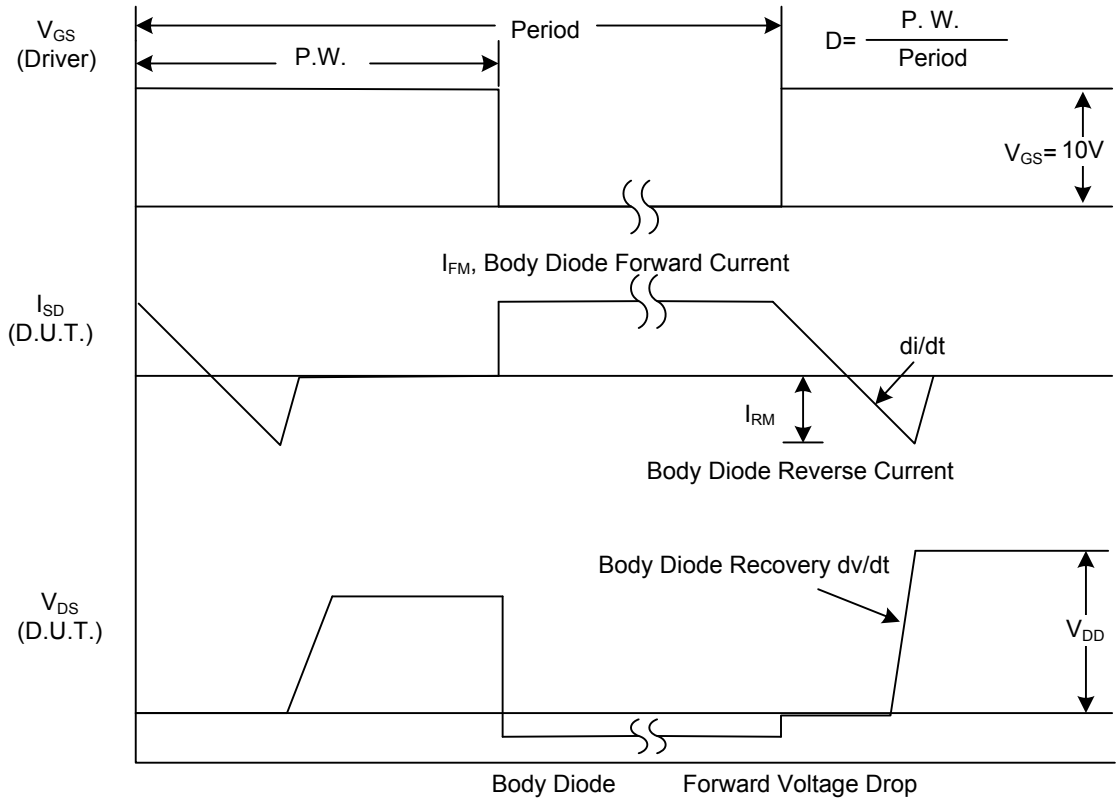
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0 V, I_D=250μA	500			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=500V,V_{GS}=0V			25	μA
			V_{DS}=400V,V_{GS}=0V, T_J=125°C			250	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V			100	nA
	Reverse		V_{GS}=-20V			-100	
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	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, V_{DD}≤50V		540	810	ns
Reverse Recovery Charge		Q_{rr}			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

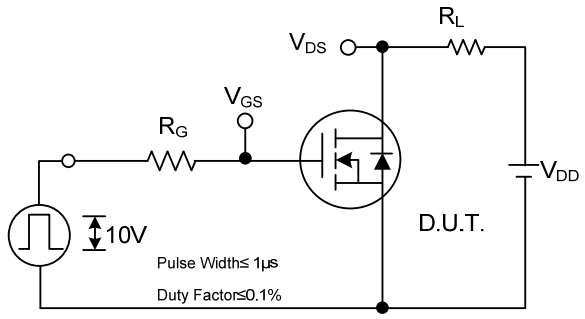


Peak Diode Recovery dv/dt Test Circuit

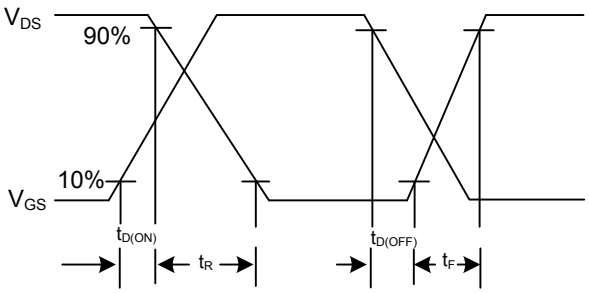


Peak Diode Recovery dv/dt Waveforms

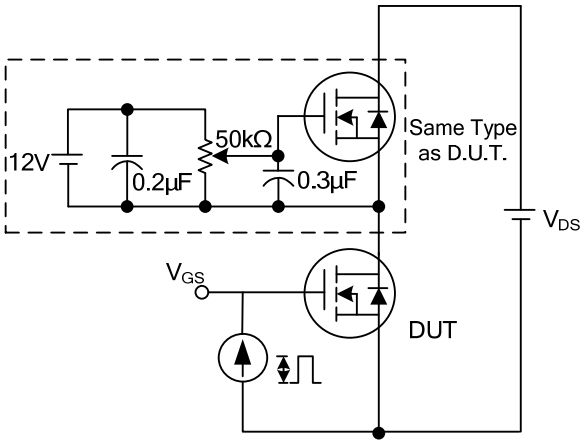
■ TEST CIRCUITS AND WAVEFORMS



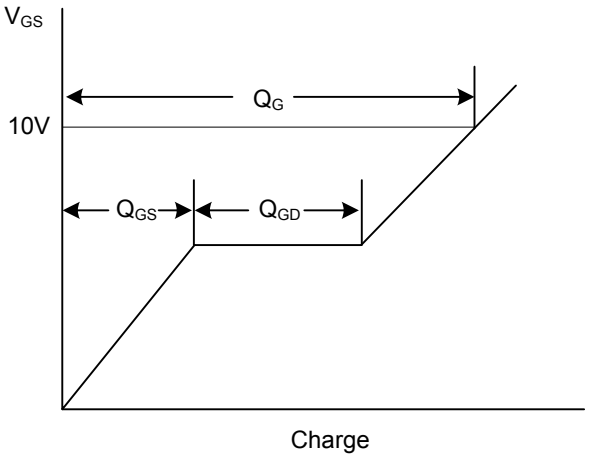
Switching Test Circuit



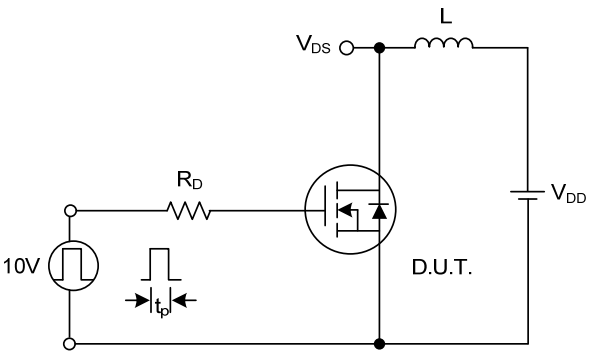
Switching Waveforms



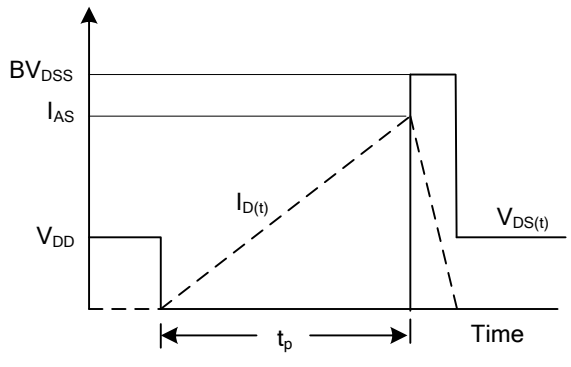
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms