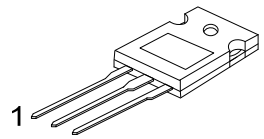
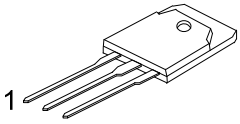
UF460

Power MOSFET

21A, 500V N-CHANNEL POWER MOSFET



TO-247



TO-3P

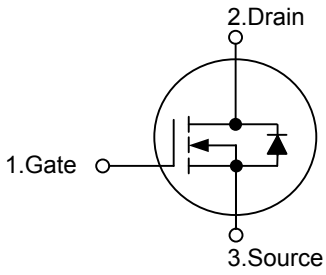
■ DESCRIPTION

The **UF460** 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

* $R_{DS(ON)}$ = 310mΩ@V_{GS} = 10V, I_D =21A
* Ultra low gate charge (max. 190nC)
* Low reverse transfer capacitance (C_{RSS} = typical 250pF)
* 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	
UF460L-T3P-T	UF460G-T3P-T	TO-3P	G	D	S	Tube
UF460L-T47-T	UF460G-T47-T	TO-247	G	D	S	Tube

UF460L-T3P-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube (2) T3P: TO-3P, T47: TO-247 (3) G: Halogen Free, L: Lead Free

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	Continuous (V_{GS}=0V)	I_D	21	A
Pulsed Drain Current	Pulsed (Note 2)	I_{DM}	84	A
Avalanche Current (Note2)		I_{AR}	21	A
Avalanche Energy	Repetitive(Note2)	E_{AR}	30	mJ
	Single Pulsed(Note3)	E_{AS}	1200	
Power Dissipation (T_C=25°C)		P_D	190	W
Peak Diode Recovery dv/dt (Note4)		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. Pulse width limited by $T_{J(MAX)}$
3. V_{DD}=50V, Starting T_J=25°C, Peak I_L=21A
4. I_{SD}≤21A, di/dt≤160A/μs, V_{DD}≤500V, T_J≤150°C, Suggested=2.35Ω

■ THERMAL DATA

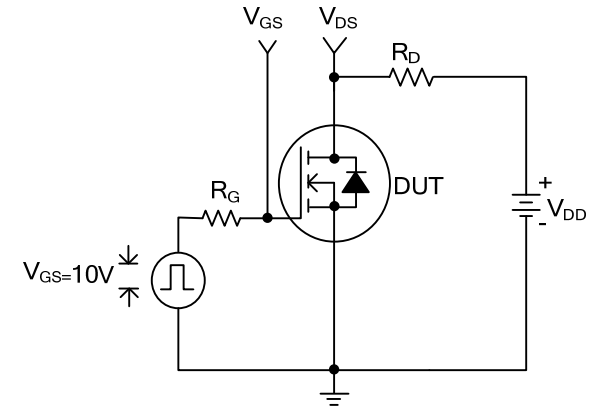
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	30	°C/W
Junction to Case	θ_{JC}	0.42	°C/W

■ 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}=400V,V_{GS} =0 V			25	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS} =0 V, V_{GS} = ±20V			±100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1.0mA		0.78		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250 μA	2.0		4.0	V
Static Drain-Source On Resistance (Note)	$R_{DS(ON)}$	V_{GS} =10V, I_D =14A		210	270	mΩ
		V_{GS} =10V, I_D =21A			310	
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS} =0V, f=1.0MHz		4300		pF
Output Capacitance	C_{OSS}			1000		
Reverse Transfer Capacitance	C_{RSS}			250		
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS} =250V, V_{GS} =10V, I_D =21A	84		190	nC
Gate Source Charge	Q_{GS}		12		27	
Gate Drain Charge	Q_{GD}		60		135	
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=250V, I_D =21A, R_G =2.35Ω			35	ns
Turn-ON Rise Time	t_R				120	
Turn-OFF Delay Time	$t_{D(OFF)}$				130	
Turn-OFF Fall-Time	t_F				98	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	I_S=21A,V_{GS}=0V, T_J =25°C			1.8	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				21	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				84	
Reverse Recovery Time	t_{RR}	I_F=21 A, dI/dt=100A/μs, T_J =25°C,V_{DD}≤50V(Note)			580	ns
Reverse Recovery Charge	Q_{RR}				8.1	μC

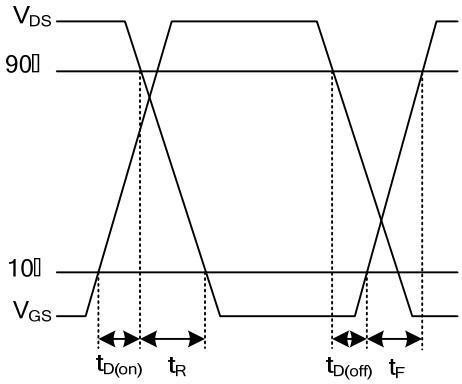
Note: Pulse Test: Pulse width ≤300μs, Duty cycle ≤2%

■ TEST CIRCUITS AND WAVEFORMS

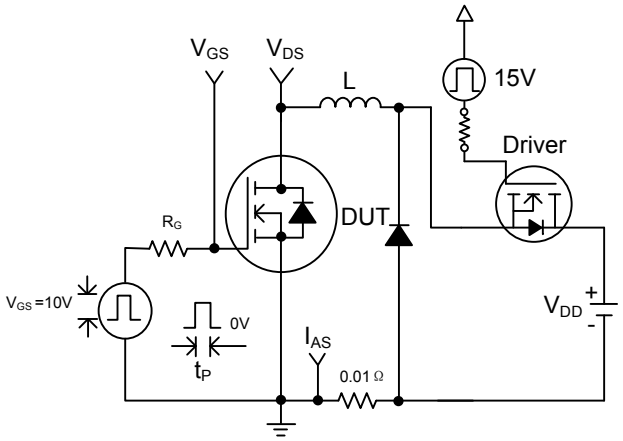


Pulse Width≤1μs Duty Cycle≤0.1%

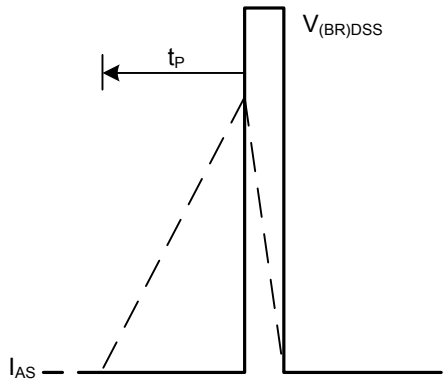
Switching Time Test Circuit



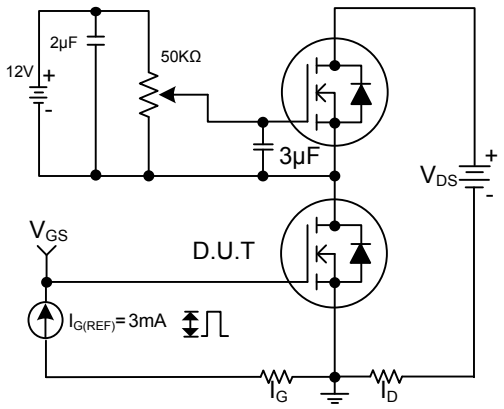
Switching Time Waveforms



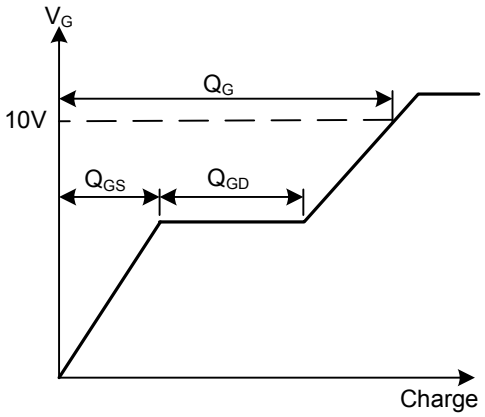
Unclamped Inductive Test Circuit



Unclamped Inductive Waveforms

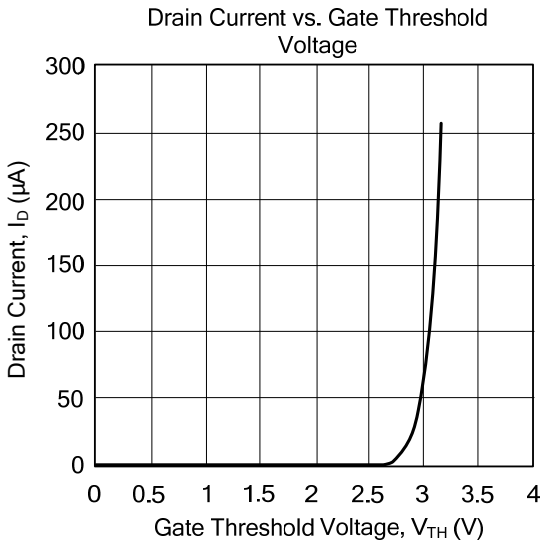


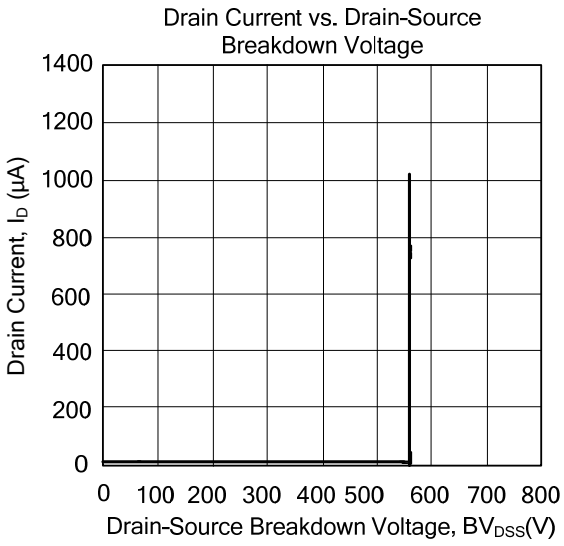
Gate Charge Test Circuit

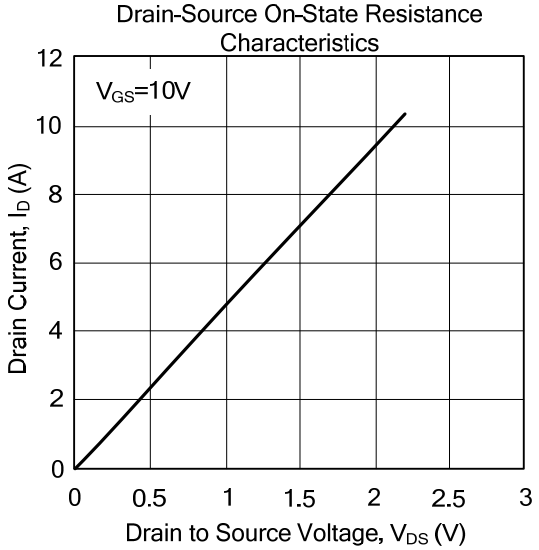


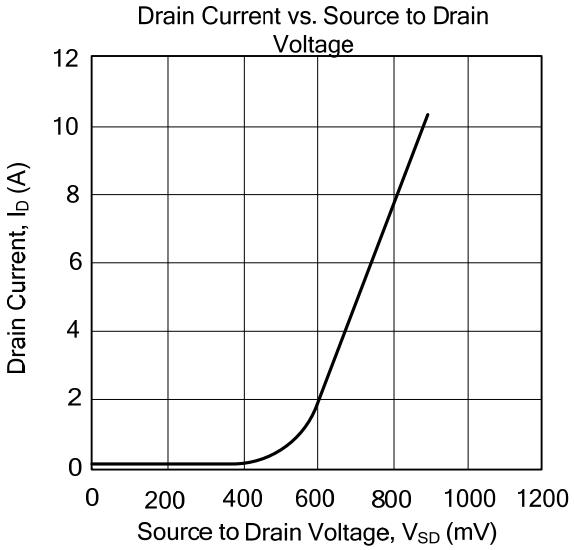
Basic Gate Charge Waveform

■ TYPICAL CHARACTERISTICS









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