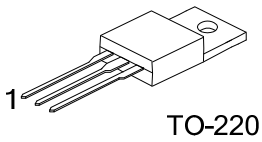
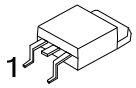
50A, 60V N-CHANNEL POWER MOSFET



TO-220



TO-252

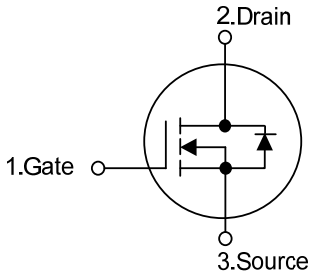
■ DESCRIPTION

The UTC **UF50N06-Q** is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

■ FEATURES

* $R_{DS(ON)}$ < 25mΩ @ V_{GS}=10V, I_D=25A
* High switching speed
* 100% avalanche tested

■ SYMBOL



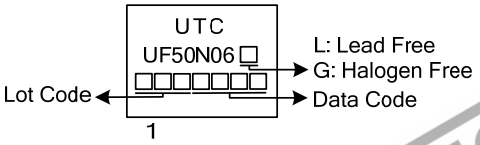
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF50N06L-TA3-T	UF50N06G-TA3-T	TO-220	G	D	S	Tube
UF50N06L-TN3-R	UF50N06G-TN3-R	TO-252	G	D	S	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

UF50N06G-TA3-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252 (3) G: Halogen Free and Lead Free L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±25	V
Continuous Drain Current	Continuous	I_D	50	A
	Pulsed	I_{DM}	200	A
Avalanche Energy		E_{AS}	287	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	12.6	V/ns
Power Dissipation	TO-220	P_D	80	mW
	TO-252		50	mW
Junction Temperature		T_J	+150	°C
Storage Temperature Range		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=0.38mH, I_{AS}=38A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD} ≤50A, di/dt ≤ 250A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

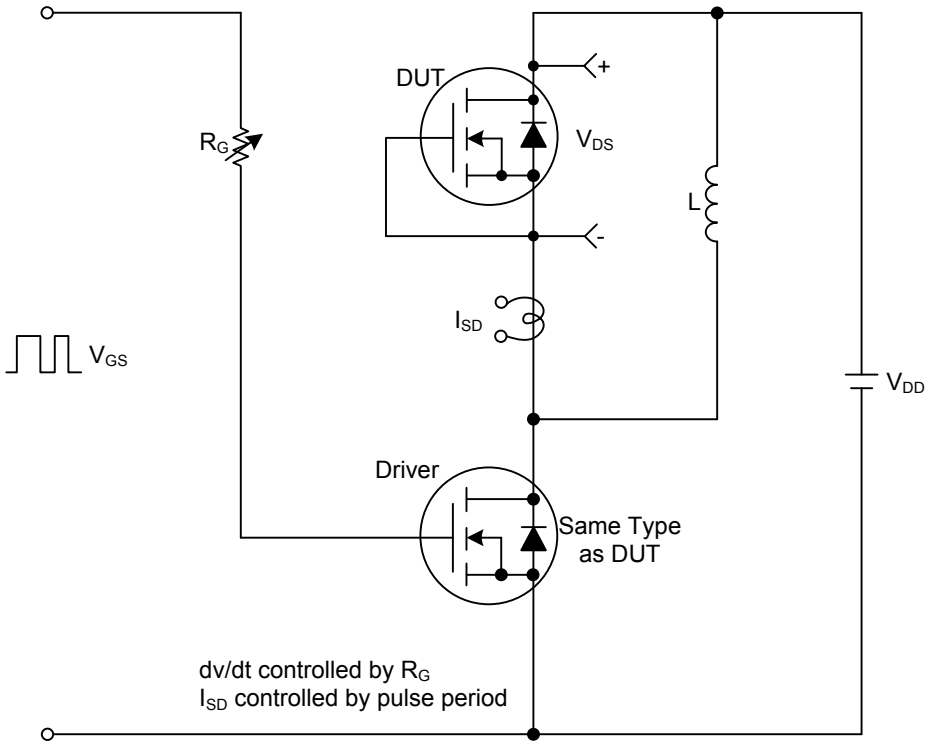
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220	θ_{JC}	1.56	°C/W
	TO-252		2.5	°C/W

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

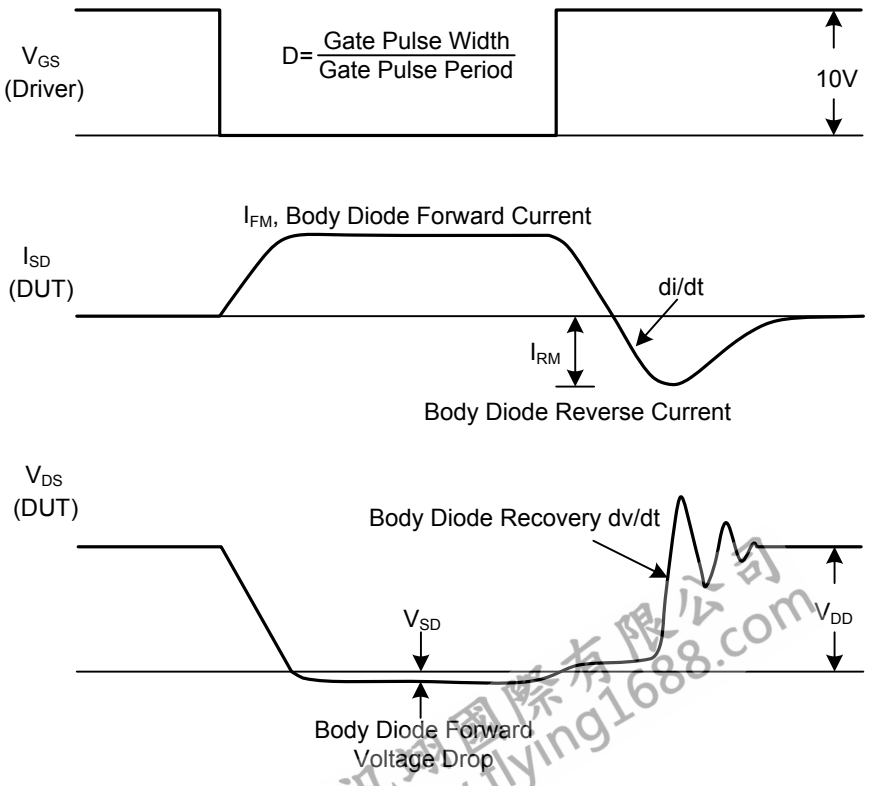
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			10	μA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-10	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	I_D=250μA, V_{DS}=V_{GS}	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=25A			25	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		1800		pF
Output Capacitance		C_{OSS}			390		pF
Reverse Transfer Capacitance		C_{RSS}			64		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{GS}=10V, V_{DS}=50V, I_D=1.3A I_G=100μA (Note 1, 2)		63.6		nC
Gate to Source Charge		Q_{GS}			9.2		nC
Gate to Drain Charge		Q_{GD}			12		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{GS}=10V, V_{DD}=30V, R_G=25Ω, I_D=0.5A (Note 1, 2)		78		ns
Rise Time		t_R			81		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			340		ns
Fall-Time		t_F			162		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				50	A
Maximum Body-Diode Pulsed Current		I_{SM}				200	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=20A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=40A, V_{GS}=0V dI_F/dt = 100A/μs		66		ns
Body Diode Reverse Recovery Charge		Q_{rr}			0.5		μC

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

■ TEST CIRCUITS AND WAVEFORMS

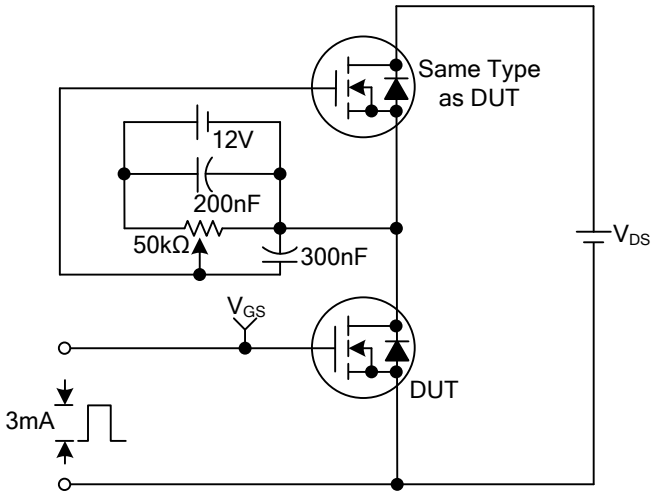


Peak Diode Recovery dv/dt Test Circuit

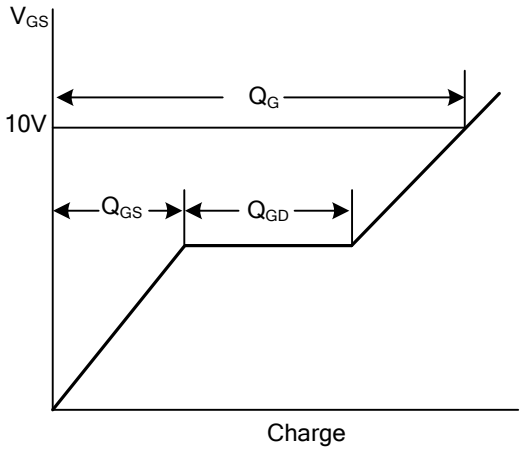


Peak Diode Recovery dv/dt Waveforms

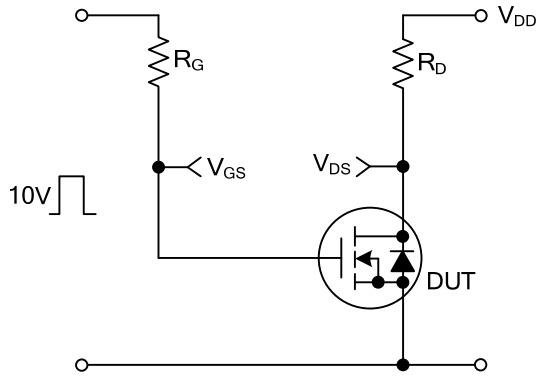
■ TEST CIRCUITS AND WAVEFORMS



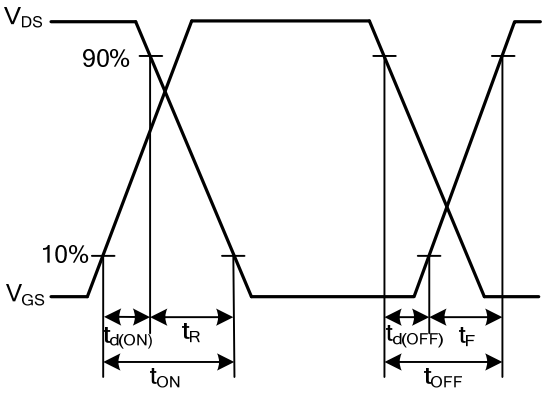
Gate Charge Test Circuit



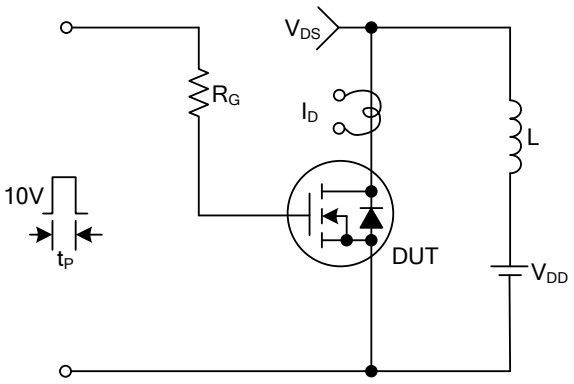
Gate Charge Waveforms



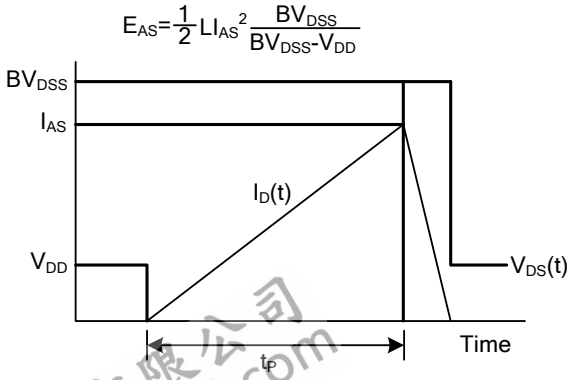
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms