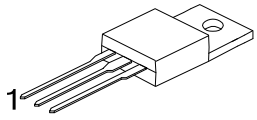
140A, 75V N-CHANNEL POWER MOSFET



TO-220

■ DESCRIPTION

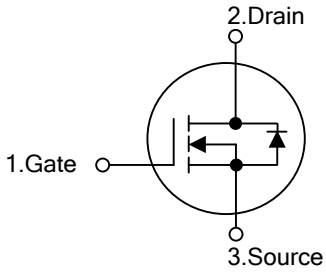
The UTC **UF3808** is an N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

The UTC **UF3808** is suitable for Automotive applications and Anti-lock Braking System (ABS), etc.

■ FEATURES

* $R_{DS(ON)}$<8.0mΩ @ V_{GS}=10V
* High Switching Speed
* Dynamic dv/dt Rating

■ SYMBOL



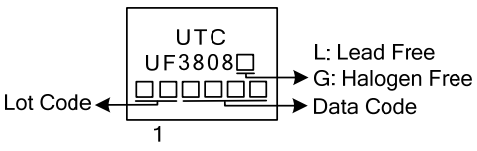
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF3808L-TA3-T	UF3808G-TA3-T	TO-220	G	D	S	Tube

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

UF3808L-TA3-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) TA3: TO-220 (3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATING

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	75	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous (Note 6)	V_{GS}=10V, T_C=25°C	I_D	140	A
		V_{GS}=10V, T_C=100°C		97	A
	Pulsed (Note 5)		I_{DM}	550	A
Avalanche Current (Note 5)			I_{AR}	82	A
Avalanche Energy	Single Pulse (Note 3)		E_{AS}	430	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	5.5	V/ns
Power Dissipation (T_C=25°C)			P_D	330	W
Linear Derating Factor				2.2	W/°C
Junction Temperature			T_J	-55~+175	°C
Storage Temperature Range			T_{STG}	-55~+175	°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 safe operating area.
3. L=0.13mH, I_{AS}=82A, V_{DD}=38V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD}≤82A, di/dt≤310A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
5. Repetitive rating; pulse width limited by max. junction temperature.
6. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62	°C/W
Junction to Case	θ_{JC}	0.45	°C/W

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

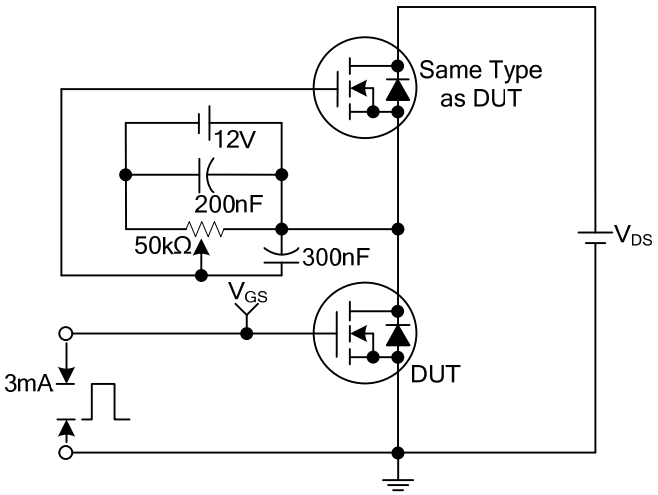
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	75			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1mA		0.086		V/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=75V, V_{GS}=0V			20	μA
			V_{DS}=60V, V_{GS}=0V, T_J=150°C			250	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			200	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-200	nA
ON CHARACTERISTICS							
Static Drain-Source On-State Resistance (Note 1)		$R_{DS(ON)}$	V_{GS}=10V, I_D=82A			8.0	mΩ
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=10V I_D=250μA	2.0		4.0	V
Forward Transconductance		g_{FS}	V_{DS}=25V, I_D=82A	100			S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1510		pF
Output Capacitance		C_{OSS}			780		pF
Reverse Transfer Capacitance		C_{RSS}			350		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{GS}=10V, V_{DS}=50V, I_D=1.3A I_G=100μA (Note 1)		138	160	nC
Gate to Source Charge		Q_{GS}			41		nC
Gate to Drain ("Miller") Charge		Q_{GD}			27		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=30V, I_D=1A, R_G=25Ω V_{GS}=10V (Note 1)		170		ns
Rise Time		t_R			440		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			1000		ns
Fall Time		t_F			480		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body Diode Continuous Source Current (Note 1)		I_S				140	A
Maximum Body-Diode Pulsed Current (Note 3)		I_{SM}				550	A
Drain-Source Diode Forward Voltage		V_{SD}	T_J=25°C, I_S=82A, V_{GS}=0V (Note 1)			1.3	V
Body Diode Reverse Recovery Time		t_{RR}	T_J=25°C, I_F=82A, dI/dt=100A/μs (Note 1)		93	140	ns
Body Diode Reverse Recovery Charge		Q_{RR}			340	510	nC

Notes: 1. Pulse width ≤ 400μs; duty cycle ≤ 2%.

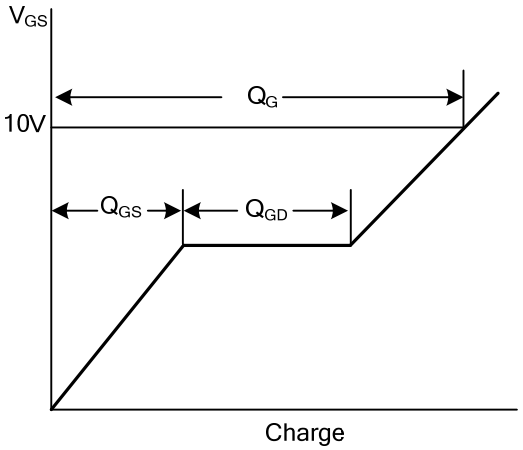
2. C_{OSS} eff. is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 80% V_{DSS}.

3. Repetitive rating; pulse width limited by max. junction temperature.

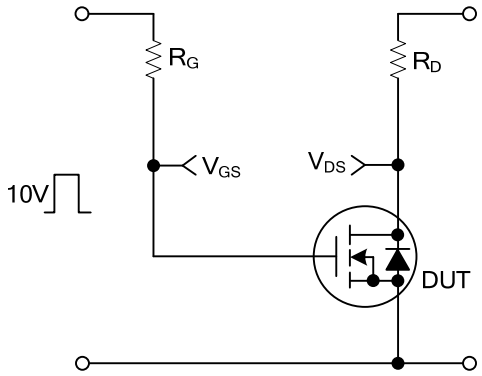
■ TEST CIRCUITS AND WAVEFORMS



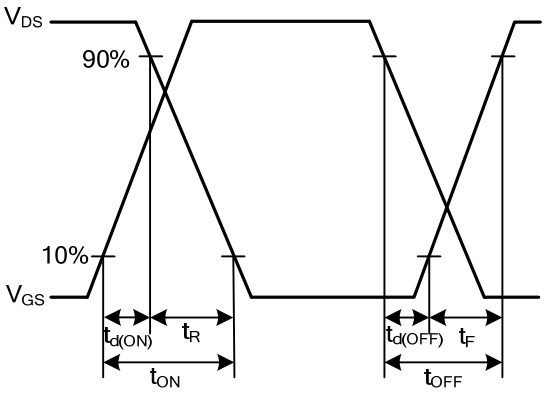
Gate Charge Test Circuit



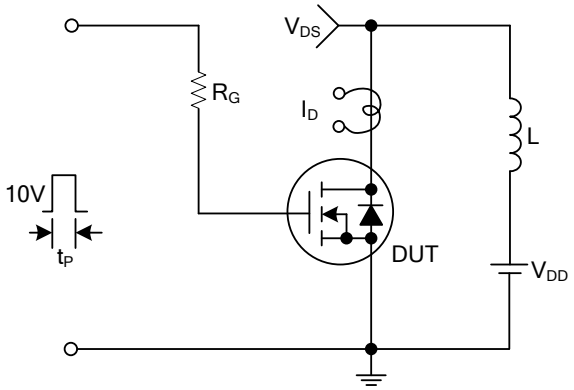
Gate Charge Waveforms



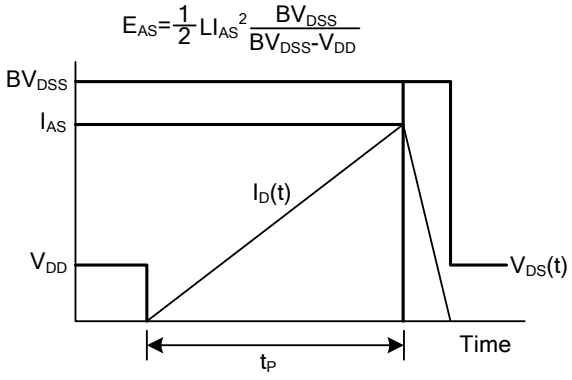
Resistive Switching Test Circuit



Resistive Switching Waveforms

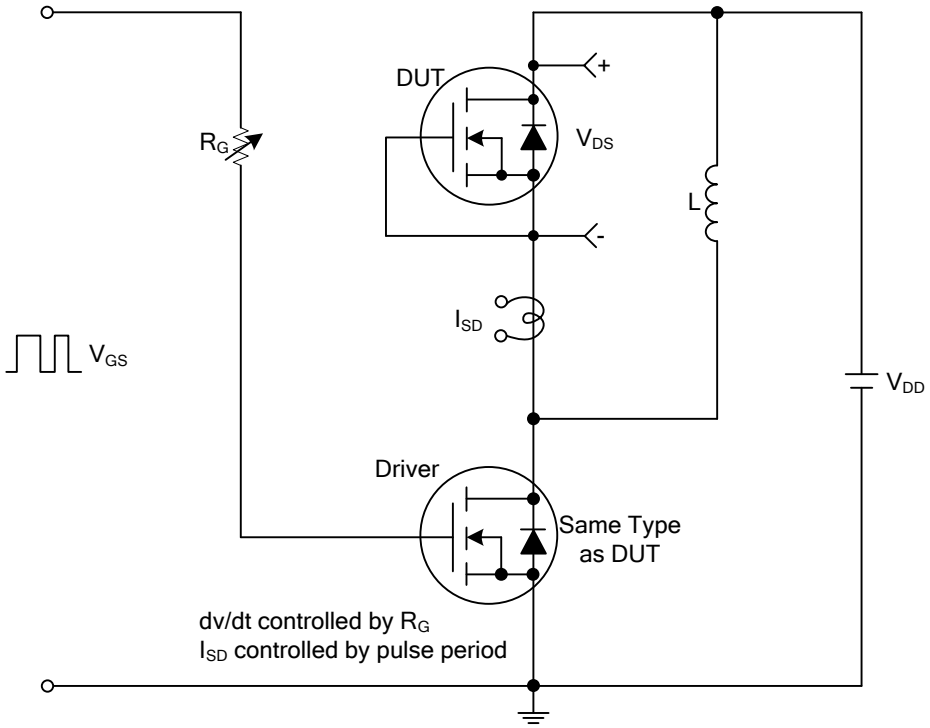


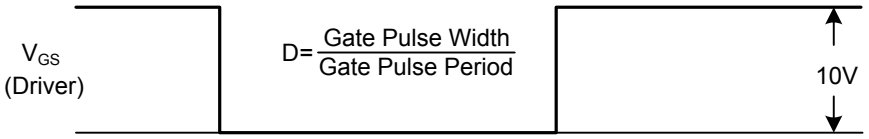
Unclamped Inductive Switching Test Circuit

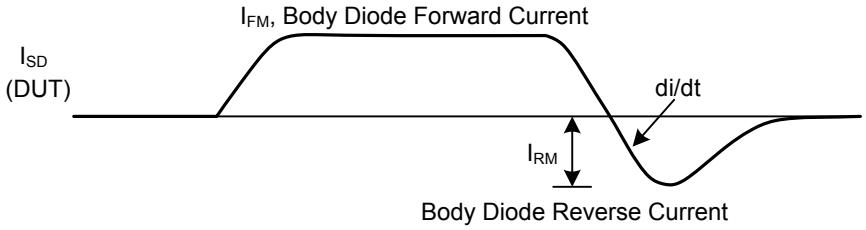


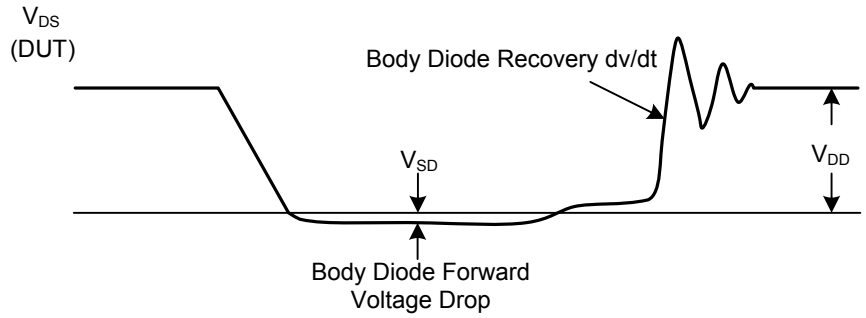
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS









Peak Diode Recovery dv/dt Test Circuit and Waveforms