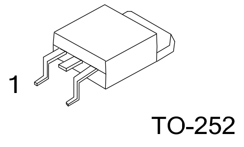
40A, 80V N-CHANNEL POWER MOSFET



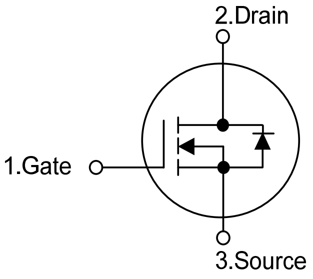
DESCRIPTION

The UTC **UF40N08** 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

* $R_{DS(ON)}$ < 28 mΩ @ V_{GS}=10V, I_D=20A
* High switching speed
* 100% avalanche tested

SYMBOL



ORDERING INFORMATION

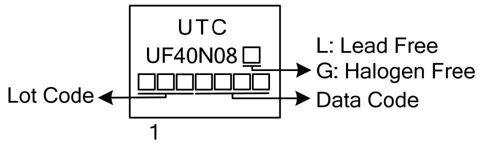
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF40N08L-TN3-R	UF40N08G-TN3-R	TO-252	G	D	S	Tape Reel

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

UF40N08G-TN3-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) TN3: TO-252
(3)Green Package	(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}	80	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	Continuous	I_D	40	A
	Pulsed	I_{DM}	160	A
Avalanche Current (Note 2)		I_{AR}	22.5	A
Avalanche Energy		E_{AS}	202	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	13	V/ns
Power Dissipation		P_D	1.1	W
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=0.8 mH, I_{AS}=22.5 A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C
4. $I_{SD} \le$ 30A, di/dt ≤ 200A/μs, $V_{DD} \le BV_{DSS}$, Starting T_J = 25°C

■ THERMAL DATA

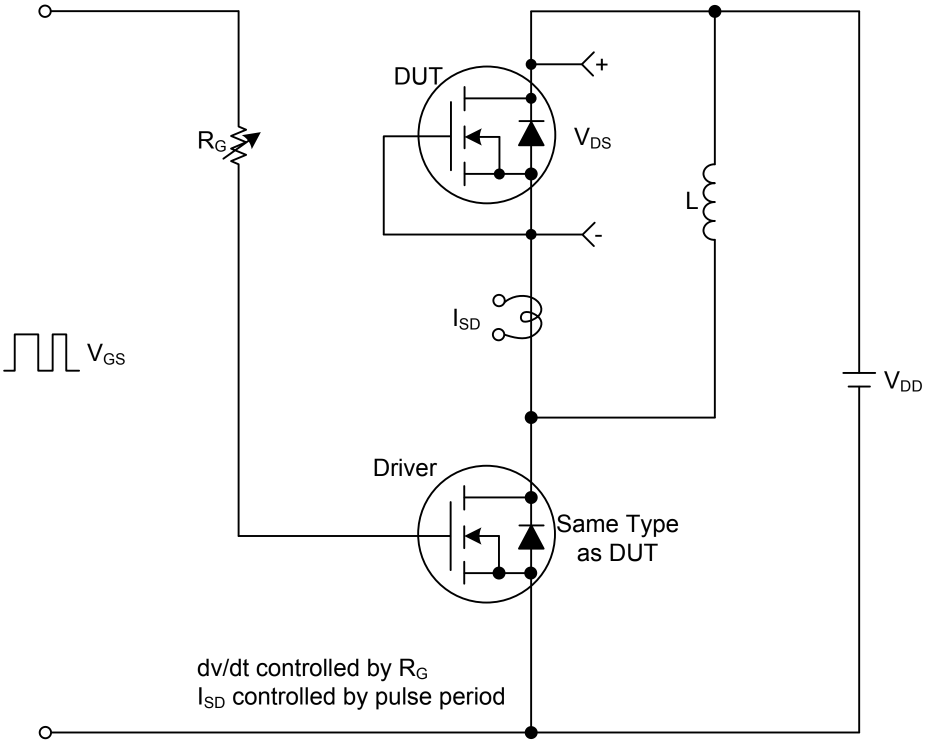
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	°C/W
Junction to Case	θ_{JC}	1.92	°C/W

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

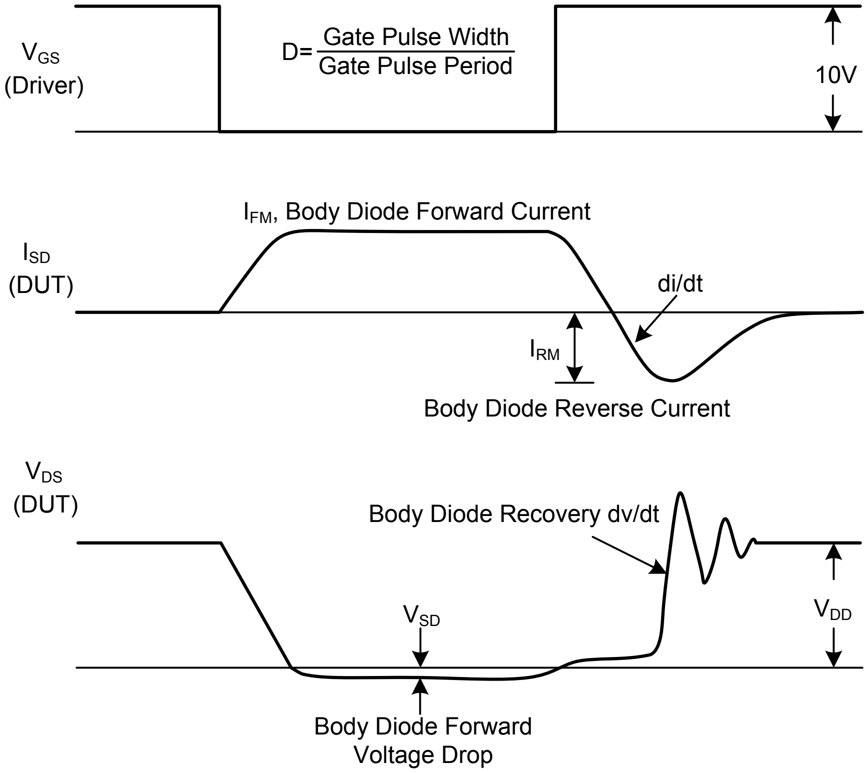
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	80			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=80V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			10	μA
	Reverse		V_{GS}=-20V, 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=20A			28	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		1480		pF
Output Capacitance		C_{OSS}			286		pF
Reverse Transfer Capacitance		C_{RSS}			35		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)		123		nC
Gate to Source Charge		Q_{GS}			10		nC
Gate to Drain Charge		Q_{GD}			13		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)		68		ns
Rise Time		t_R			64		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			400		ns
Fall-Time		t_F			100		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				40	A
Maximum Body-Diode Pulsed Current		I_{SM}				160	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		62		ns
Body Diode Reverse Recovery Charge		Q_{rr}			0.15		μC

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

■ TEST CIRCUITS AND WAVEFORMS

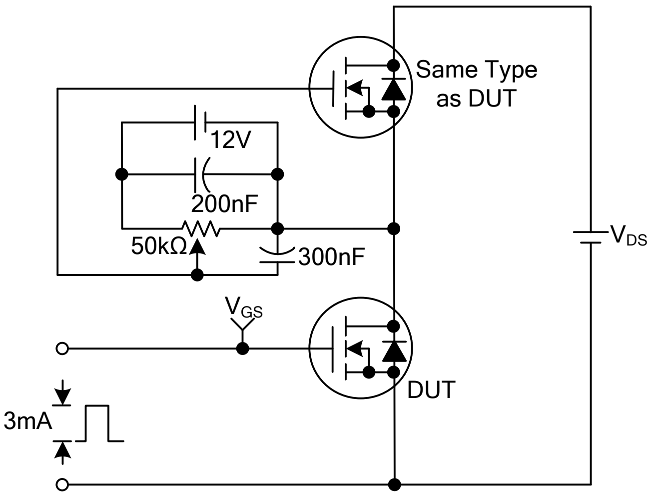


Peak Diode Recovery dv/dt Test Circuit

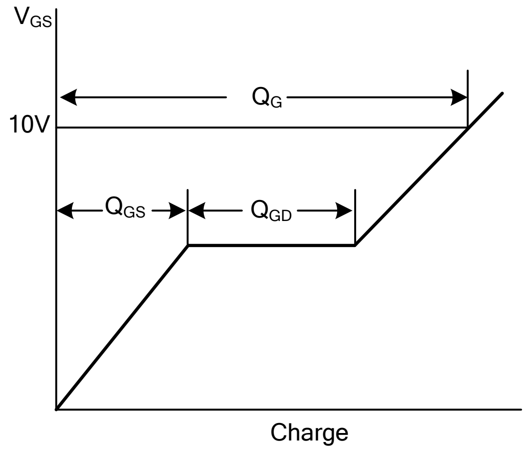


Peak Diode Recovery dv/dt Waveforms

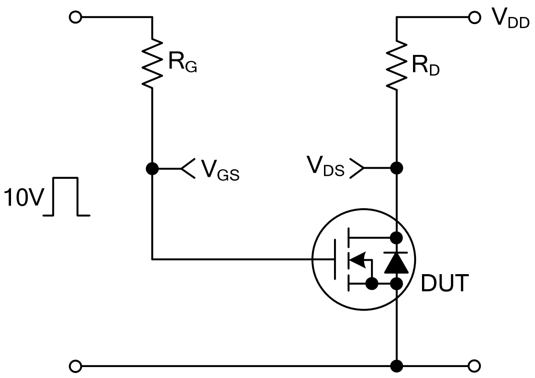
■ TEST CIRCUITS AND WAVEFORMS



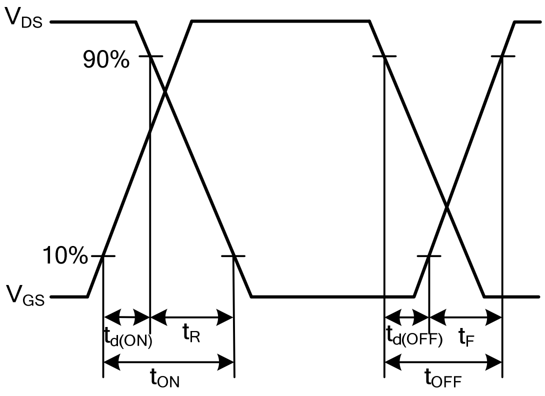
Gate Charge Test Circuit



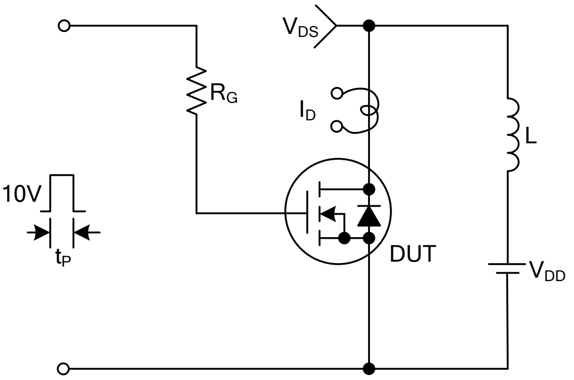
Gate Charge Waveforms



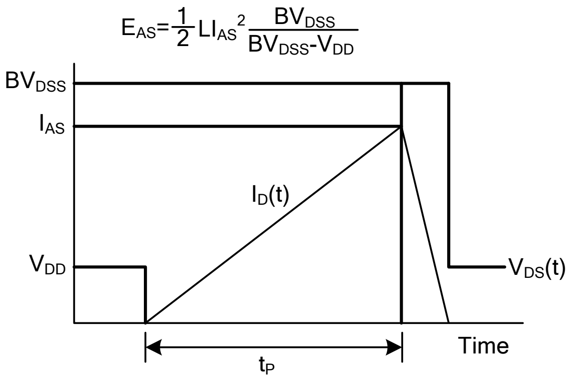
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms