



## UF40N08

Preliminary

Power MOSFET

### 40A, 80V N-CHANNEL POWER MOSFET

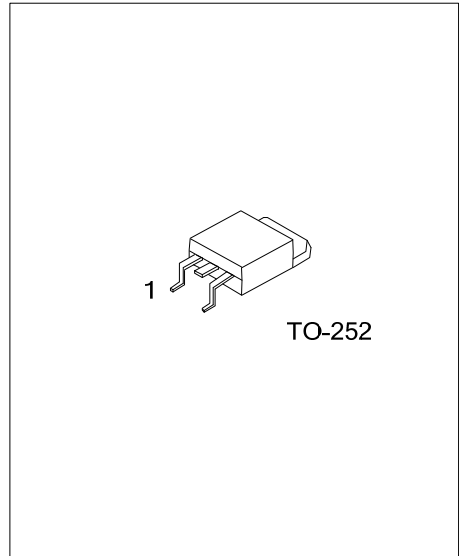
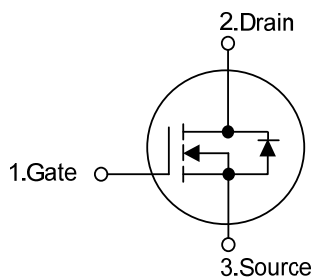
#### DESCRIPTION

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

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

#### SYMBOL



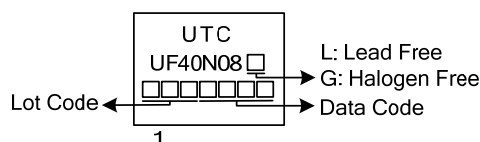
#### ORDERING INFORMATION

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 ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	80	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	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	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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.  $L=0.8\text{ mH}$ ,  $I_{AS}=22.5\text{ A}$ ,  $V_{DD}=50\text{ V}$ ,  $R_G=25\ \Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 30\text{ A}$ ,  $di/dt \leq 200\text{ A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	110	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	1.92	$^\circ\text{C}/\text{W}$

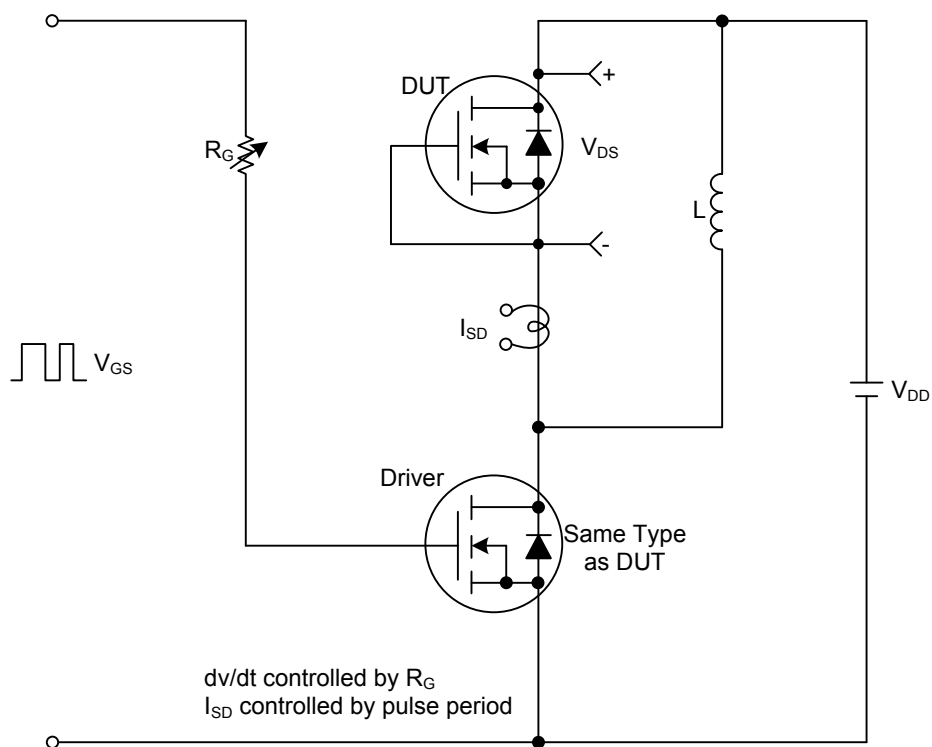
■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	80			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V			1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V			10	μA
	Reverse		V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-10	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	I <sub>D</sub> =250μA, V <sub>DS</sub> =V <sub>GS</sub>	2.0		4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A			28	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz		1480		pF
Output Capacitance		C <sub>OSS</sub>			286		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			35		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q <sub>G</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =1.3A I <sub>G</sub> =100μA (Note 1, 2)		123		nC
Gate to Source Charge		Q <sub>GS</sub>			10		nC
Gate to Drain Charge		Q <sub>GD</sub>			13		nC
Turn-ON Delay Time (Note 1)		t <sub>D(ON)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =30V, R <sub>G</sub> =25Ω, I <sub>D</sub> =0.5A (Note 1, 2)		68		ns
Rise Time		t <sub>R</sub>			64		ns
Turn-OFF Delay Time		t <sub>D(OFF)</sub>			400		ns
Fall-Time		t <sub>F</sub>			100		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I <sub>S</sub>				40	A
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>				160	A
Drain-Source Diode Forward Voltage (Note 1)		V <sub>SD</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t <sub>rr</sub>	I <sub>S</sub> =40A, V <sub>GS</sub> =0V		62		ns
Body Diode Reverse Recovery Charge		Q <sub>rr</sub>	dI <sub>F</sub> /dt = 100A/μs		0.15		μC

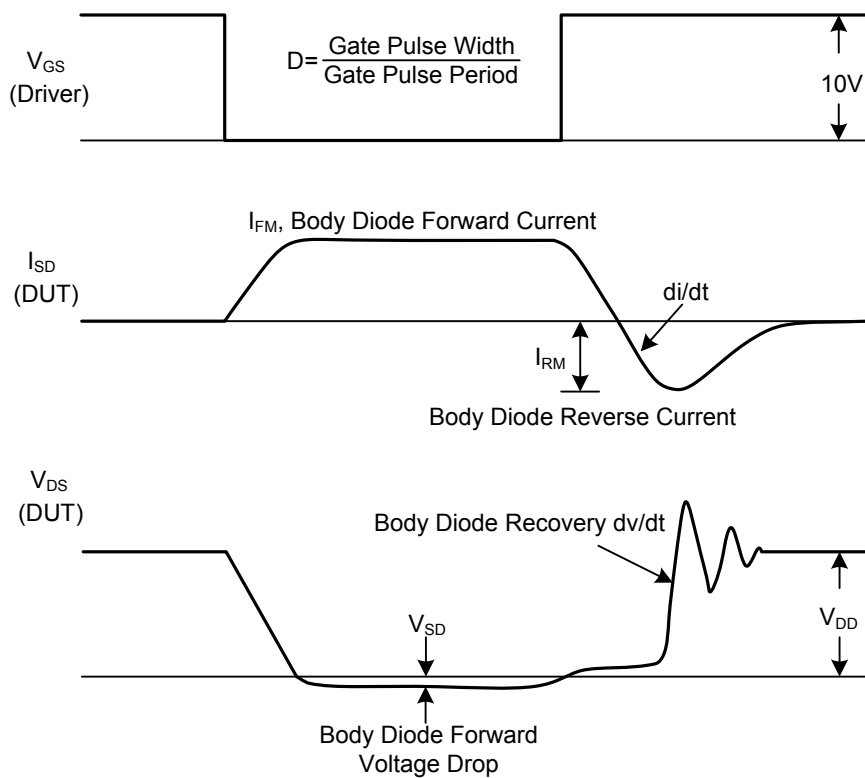
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

# ■ TEST CIRCUITS AND WAVEFORMS

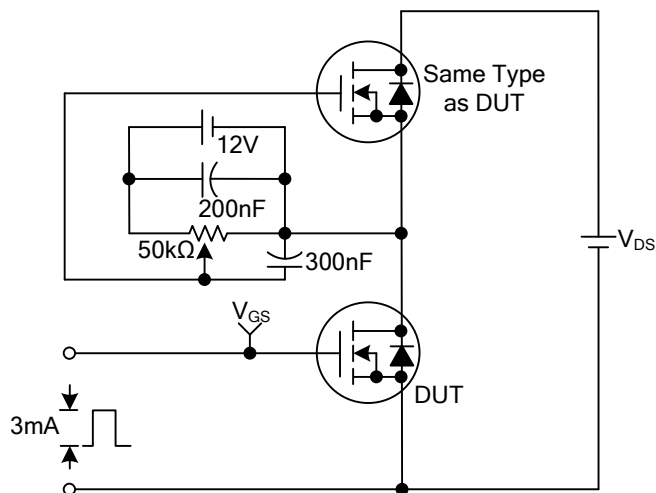


**Peak Diode Recovery dv/dt Test Circuit**

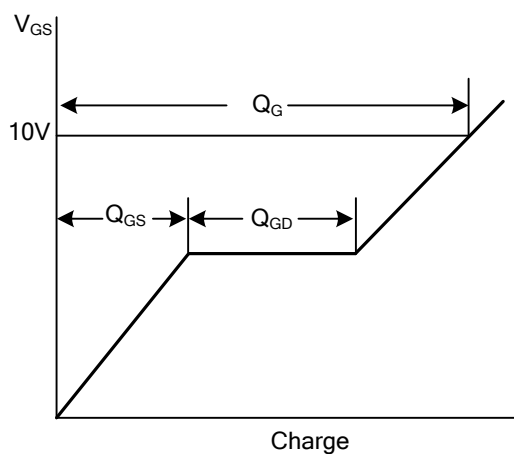


**Peak Diode Recovery dv/dt Waveforms**

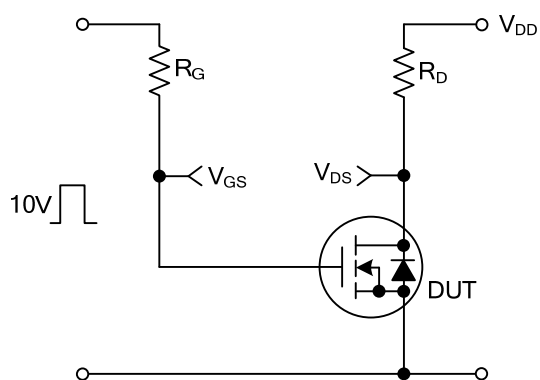
## ■ TEST CIRCUITS AND WAVEFORMS



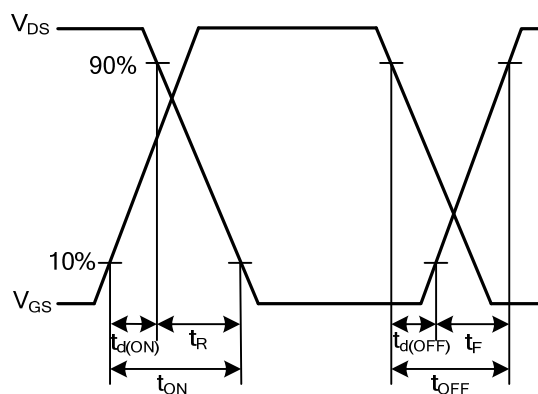
Gate Charge Test Circuit



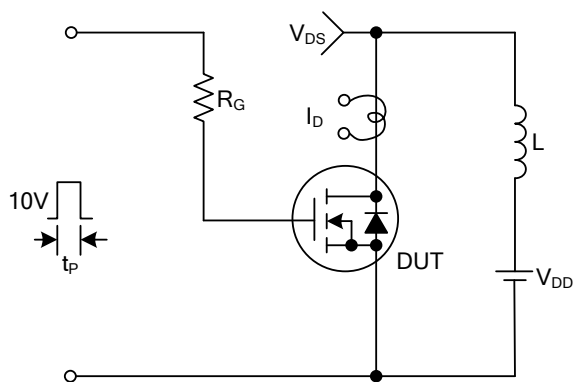
Gate Charge Waveforms



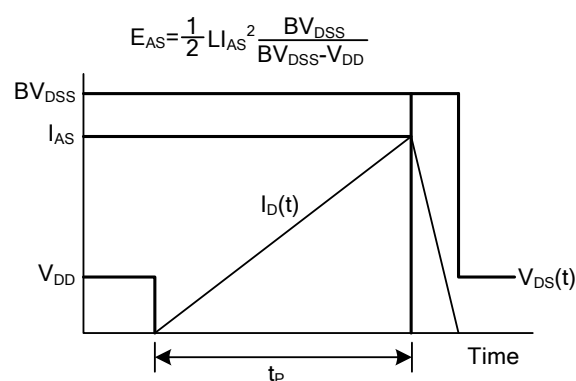
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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