



**UFZ24N-F**

*Power MOSFET*

**17A, 55V N-CHANNEL  
POWER MOSFET**

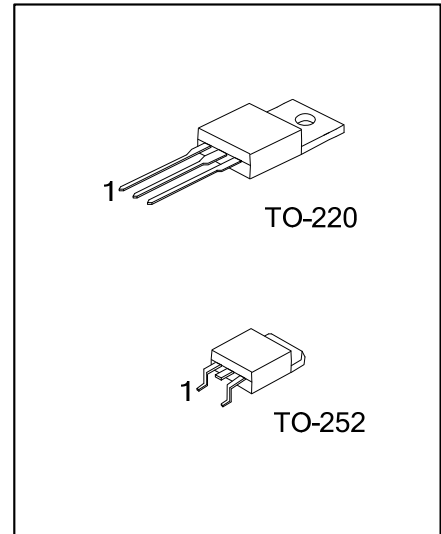
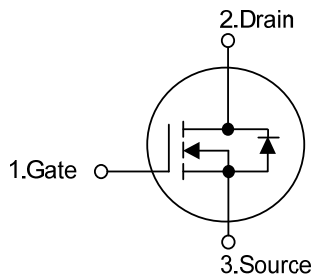
■ DESCRIPTION

The UTC **UFZ24N-F** is a N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance. The UTC **UFZ24N-F** is suitable for high efficiency synchronous rectification in SMPS, primary side switch and telecom bricks.

■ FEATURES

- \*  $R_{DS(ON)} \leq 43 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=10\text{A}$
- \* High switching speed
- \* Low gate charge

■ SYMBOL



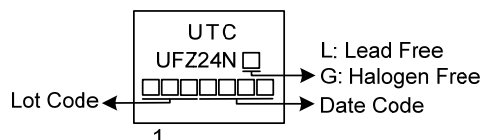
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UFZ24NL-TA3-T	UFZ24NG-TA3-T	TO-220	G	D	S	Tube
UFZ24NL-TN3-R	UFZ24NG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UFZ24NG-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	55	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	17	A
	Pulsed	$I_{DM}$	68	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	172	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	5.2	V/ns
Power Dissipation	TO-220	$P_D$	45	W
	TO-252		30	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.  $L=1.4\text{mH}$ ,  $I_{AS}=15.7\text{A}$ ,  $V_{DD}=25\text{V}$ ,  $R_G=25\ \Omega$ , Starting  $T_J = 25^\circ\text{C}$   
 4.  $I_{SD}\leq 17\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
	TO-252		100	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	$\theta_{JC}$	2.7	$^\circ\text{C}/\text{W}$
	TO-252		4.16 (Note)	$^\circ\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

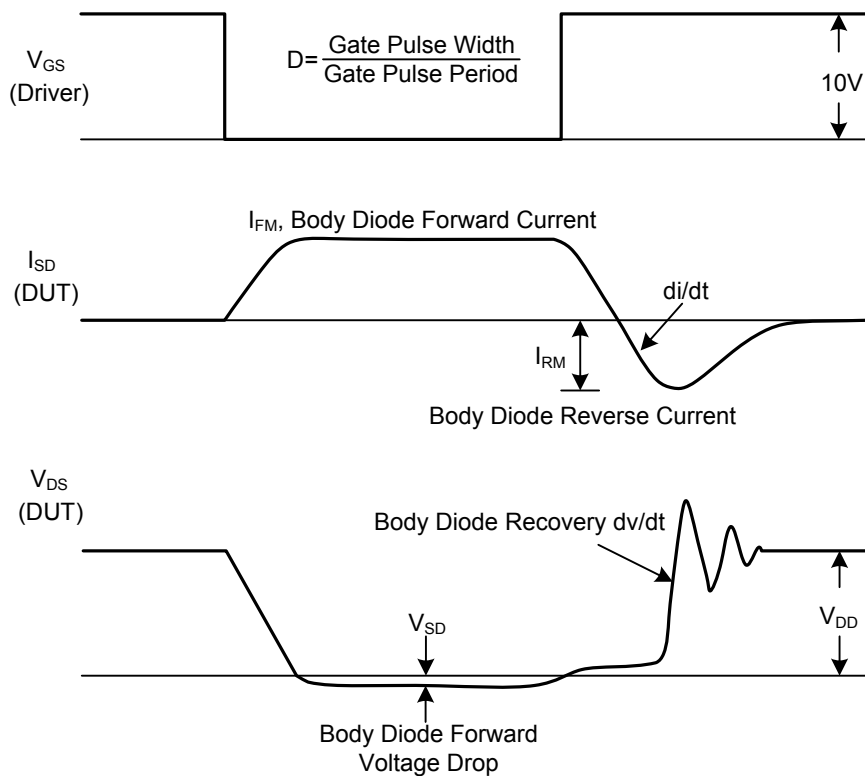
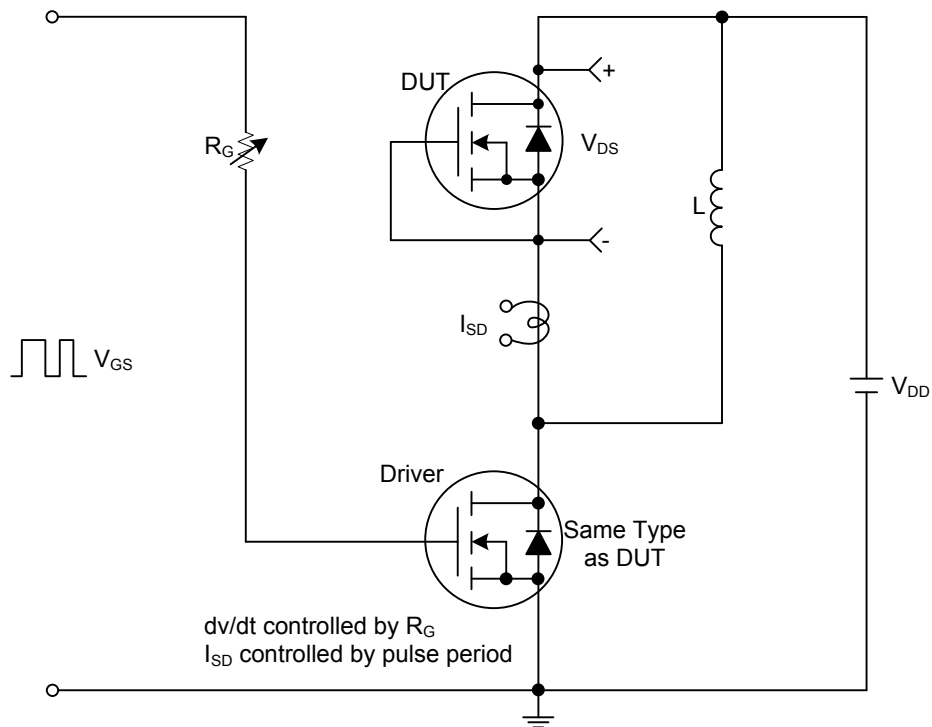
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	55			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =55V, V <sub>GS</sub> =0V			1	μA
Gate-Source Leakage Current	Forward	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.5		3.5	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A			43	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		710		pF
Output Capacitance	C <sub>OSS</sub>			210		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			40		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =17A, I <sub>G</sub> =1mA(Note 1, 2)		26.5		nC
Gate to Source Charge	Q <sub>GS</sub>			6.3		nC
Gate to Drain Charge	Q <sub>GD</sub>			6.8		nC
Turn-ON Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =17A, R <sub>G</sub> =25Ω (Note 1, 2)		8.0		ns
Rise Time	t <sub>R</sub>			19		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			58		ns
Fall-Time	t <sub>F</sub>			26		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				17	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				68	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V			1.3	V
Reverse Recovery Time (Note 1)	t <sub>rr</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt =100A/μs		44.6		ns
Reverse Recovery Charge	Q <sub>rr</sub>				71.2	

Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

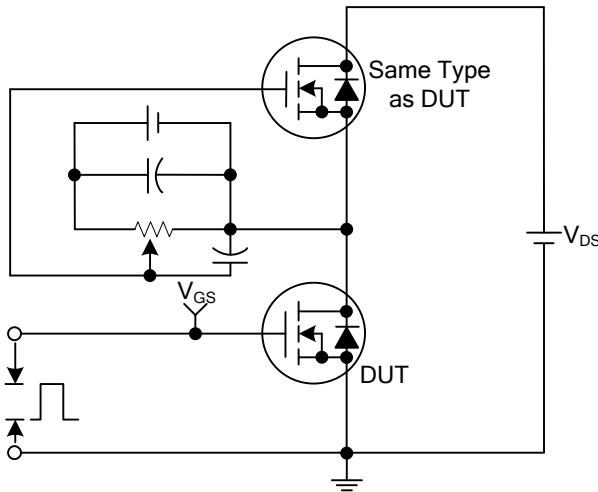
2. Essentially independent of operating temperature.

## TEST CIRCUITS AND WAVEFORMS

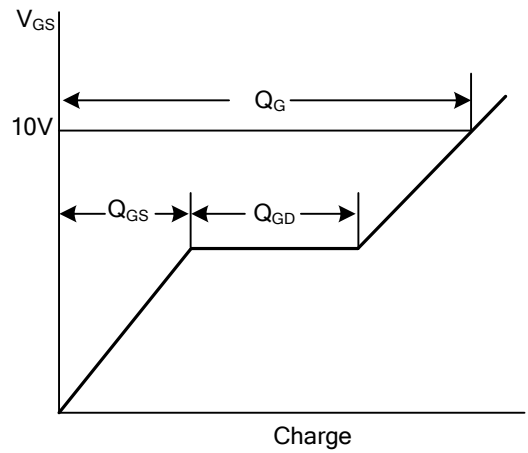


Peak Diode Recovery dv/dt Test Circuit and Waveforms

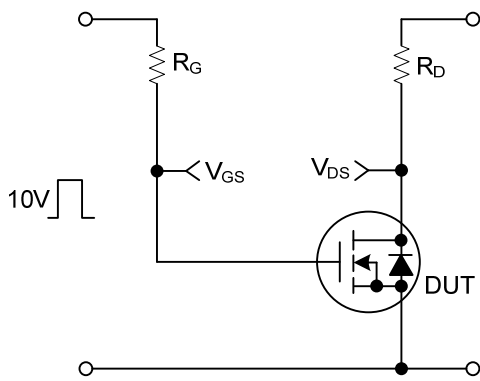
## TEST CIRCUITS AND WAVEFORMS



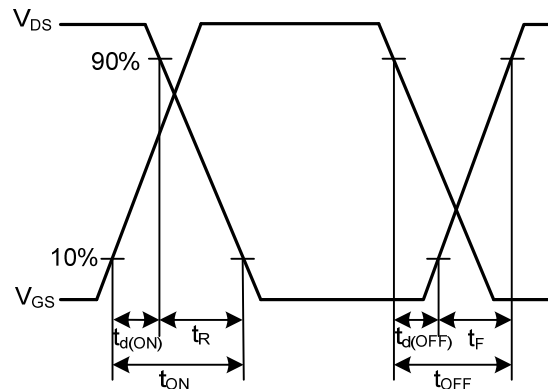
Gate Charge Test Circuit



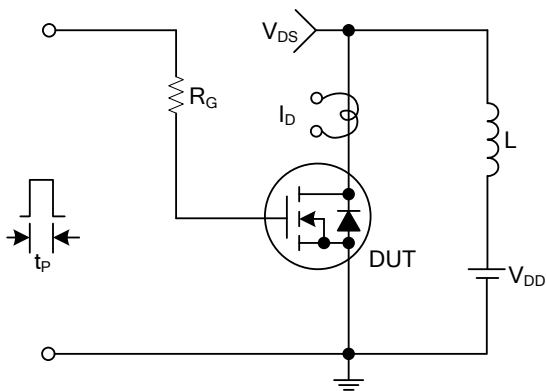
Gate Charge Waveforms



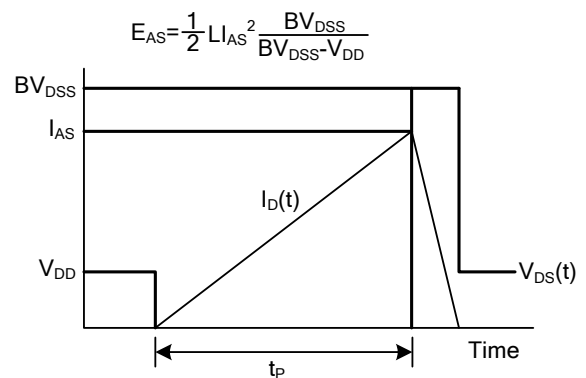
Resistive Switching Test Circuit



Resistive Switching Waveforms

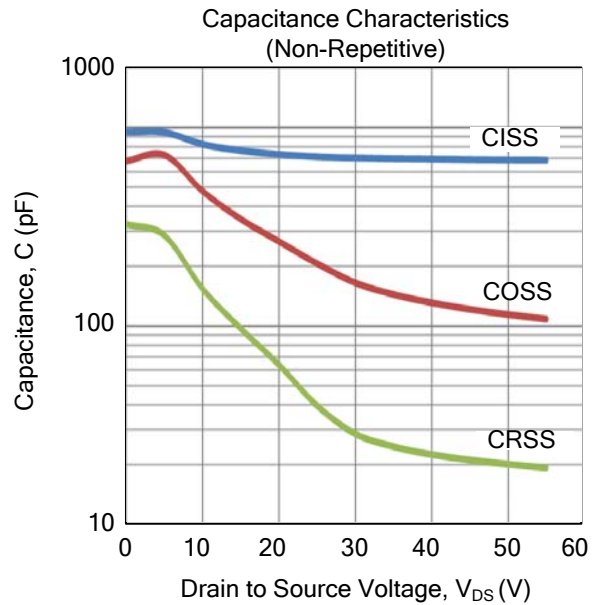
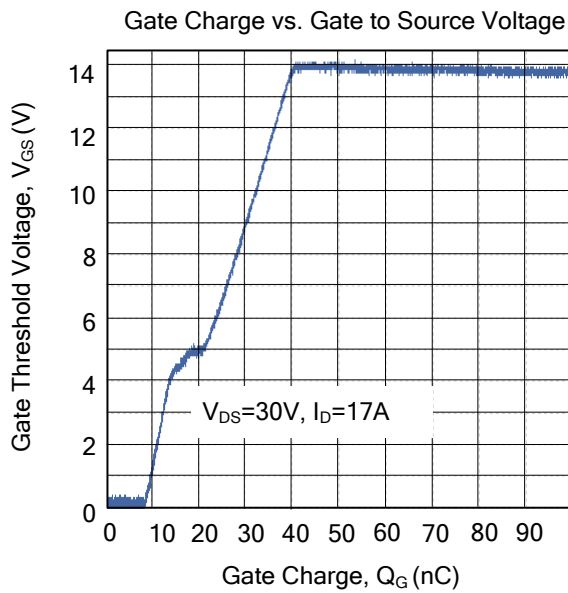


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

### TYPICAL CHARACTERISTICS



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