



UFZ24N

Power MOSFET

28A, 60V N-CHANNEL POWER MOSFET

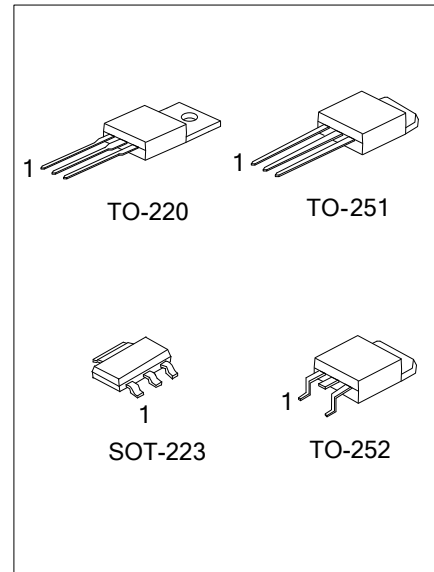
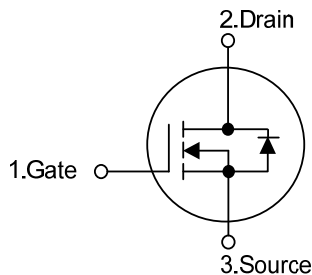
DESCRIPTION

The UTC **UFZ24N** is 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** is suitable for high efficiency synchronous rectification in SMPS, primary side switch and telecom bricks.

FEATURES

- * $R_{DS(ON)} < 0.59\Omega @ V_{GS}=10V, I_D=4.5A$
- * 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-TM3-T	UFZ24NG-TM3-T	TO-251	G	D	S	Tube
UFZ24NL-TN3-T	UFZ24NG-TN3-T	TO-252	G	D	S	Tube
UFZ24NL-TN3-R	UFZ24NG-TN3-R	TO-252	G	D	S	Tape Reel

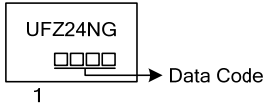
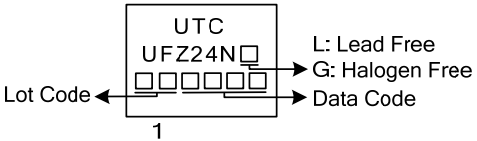
Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UFZ24NG-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) AA3: SOT-223, TA3: TO-220, TM3: TO-251, TN3: TO-252</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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Power MOSFET

MARKING

SOT-223	TO-220 / TO-251 / TO-252
 <p>UFZ24NG □□□□ → Data Code 1</p>	 <p>UTC UFZ24N □ □□□□□□ → Data Code Lot Code ← 1</p> <p>L: Lead Free G: Halogen Free</p>

■ 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}	± 20	V
Drain Current	Continuous	$T_C=25^\circ\text{C}$	17	A
		$T_C=100^\circ\text{C}$	12	A
	Pulsed (Note 1)		I_{DM}	68
Avalanche Current (Note 1)		I_{AR}	10	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	71	mJ
	Repetitive (Note 1)	E_{AR}	4.5	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	5.0	V/ns
Power Dissipation ($T_C=25^\circ\text{C}$)	SOT-223	P_D	10	W
	TO-220		73	W
	TO-251/TO-252		46	W
Linear Derating Factor			0.30	W/ $^\circ\text{C}$
Junction Temperature		T_J	-55 ~ +175	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +175	$^\circ\text{C}$

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 T_J .

3. $L=1.0\text{mH}$, $I_{AS}=10\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.

4. $I_{SD}\leq 10\text{A}$, $di/dt\leq 280\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J\leq 175^\circ\text{C}$.

■ THERMAL CHARACTERISTICS

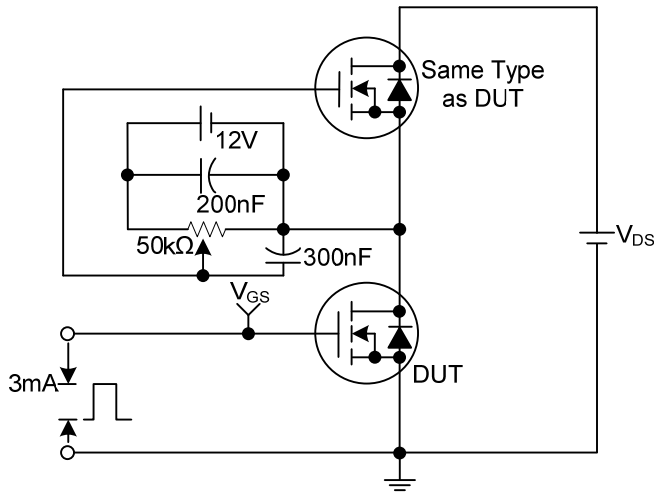
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223	θ_{JA}	150	$^\circ\text{C}/\text{W}$
	TO-220		62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		100	$^\circ\text{C}/\text{W}$
Junction to Case	SOT-223	θ_{JC}	12.5	$^\circ\text{C}/\text{W}$
	TO-220		1.71	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		2.7	$^\circ\text{C}/\text{W}$

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

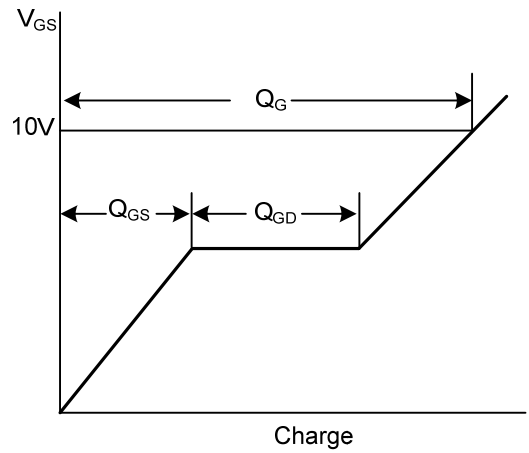
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	55			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =55V, V _{GS} =0V			25	μA
Gate-Source Leakage Current	Forward	I _{GSS}			+100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A			0.07	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		800		pF
Output Capacitance	C _{OSS}			160		pF
Reverse Transfer Capacitance	C _{RSS}			23		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A, I _G =100μA (Note 1, 2)		65		nC
Gate to Source Charge	Q _{GS}			4		nC
Gate to Drain Charge	Q _{GD}			7		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		40		ns
Rise Time	t _R			40		ns
Turn-OFF Delay Time	t _{D(OFF)}			250		ns
Fall-Time	t _F			70		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				17	A
Maximum Body-Diode Pulsed Current	I _{SM}				68	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =10A, V _{GS} =0V			1.3	V
Reverse Recovery Time (Note 1)	t _{rr}	I _S =10A, V _{GS} =0V, dI _F /dt =100A/μs		56	83	ns
Reverse Recovery Charge	Q _{rr}			120	180	nC

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

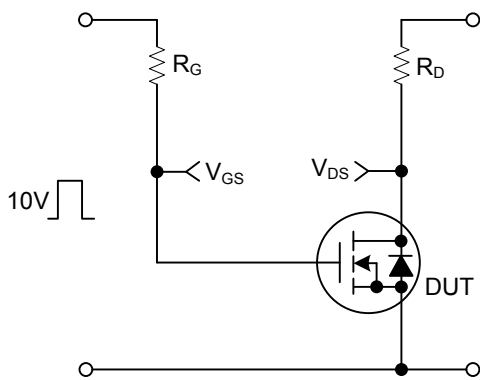
TEST CIRCUITS AND WAVEFORMS



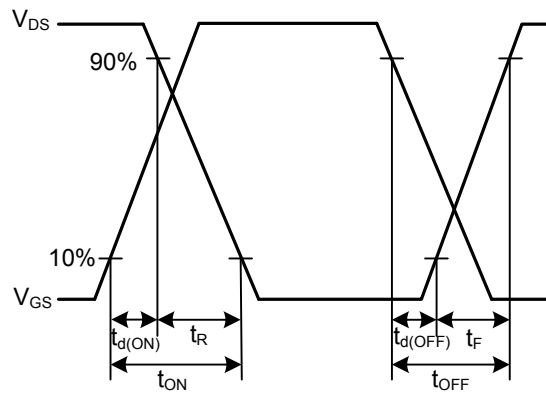
Gate Charge Test Circuit



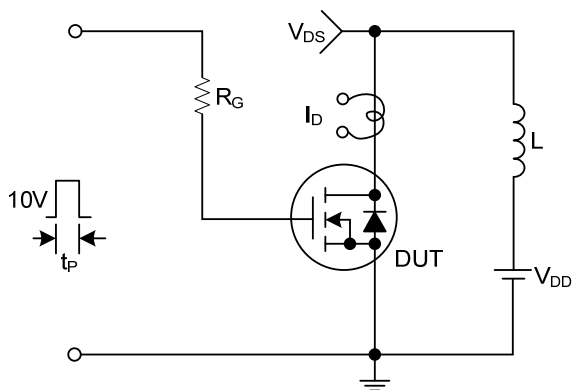
Gate Charge Waveforms



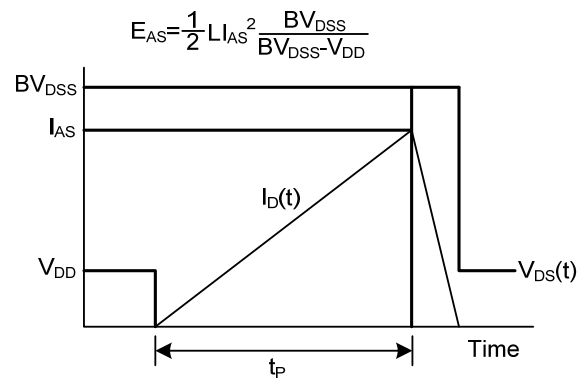
Resistive Switching Test Circuit



Resistive Switching Waveforms

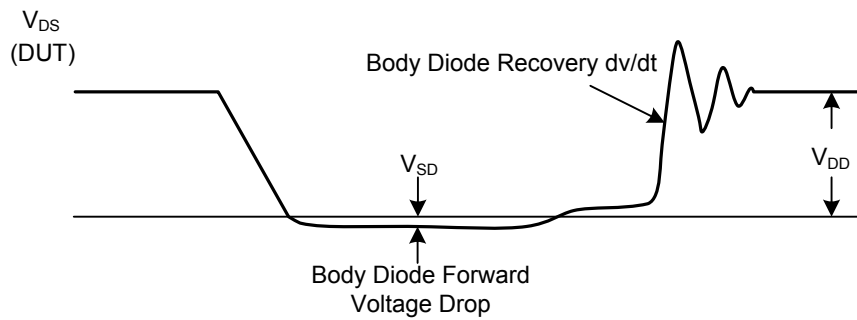
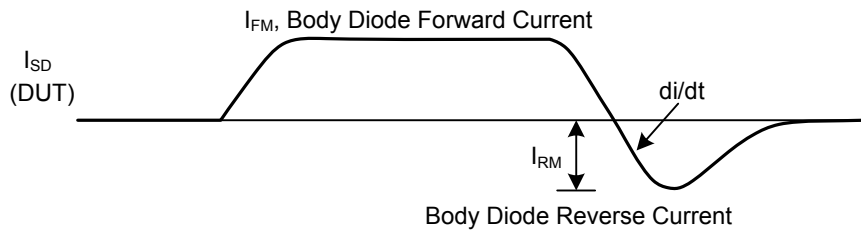
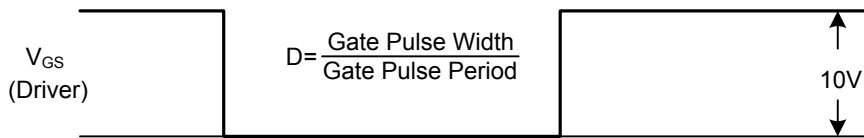
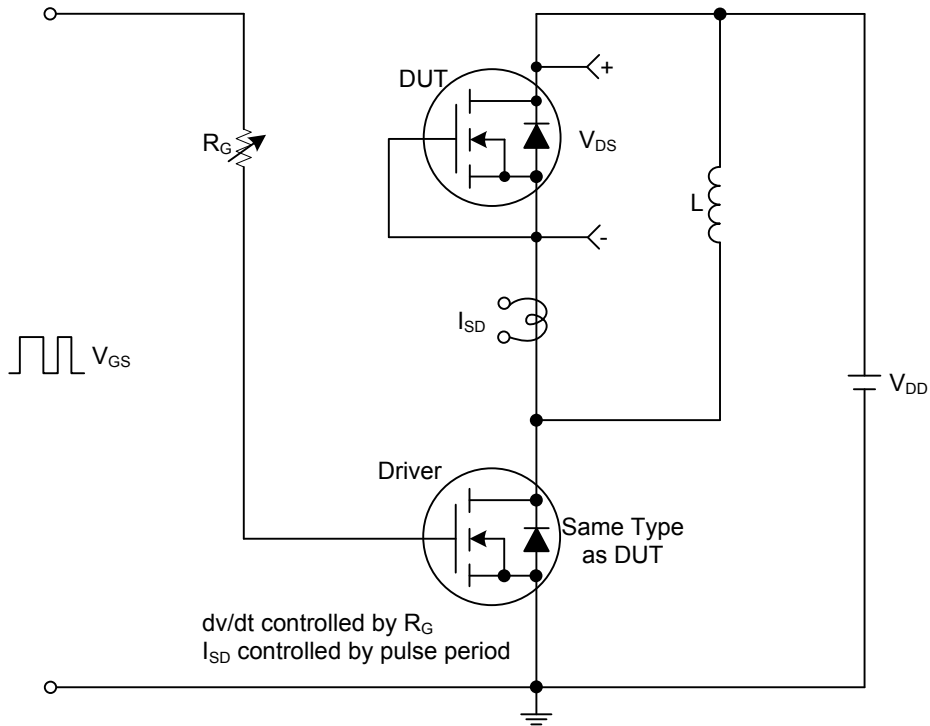


Unclamped Inductive Switching Test Circuit



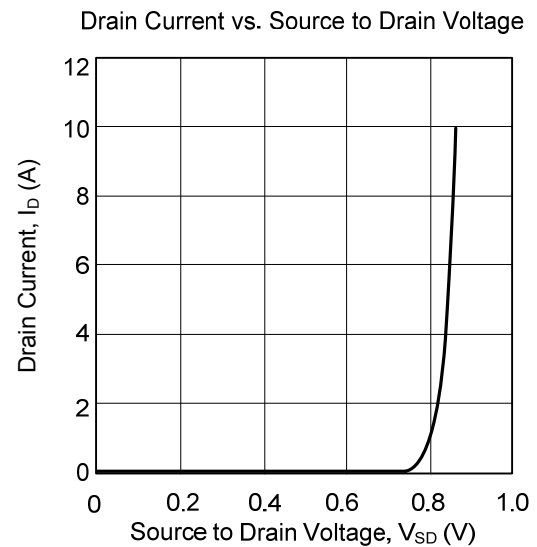
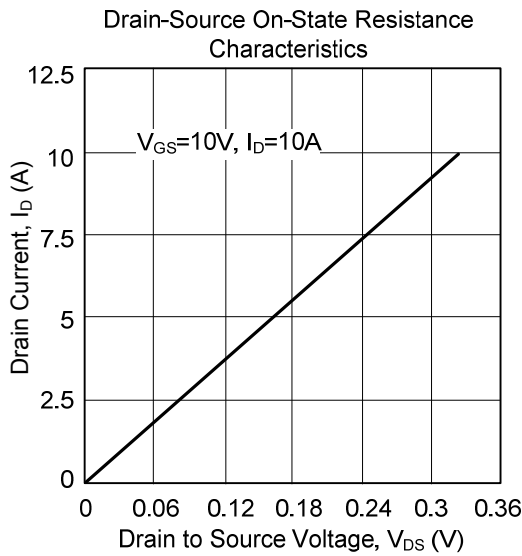
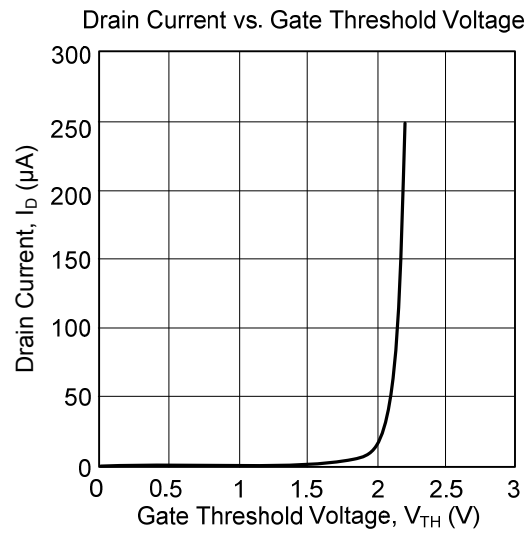
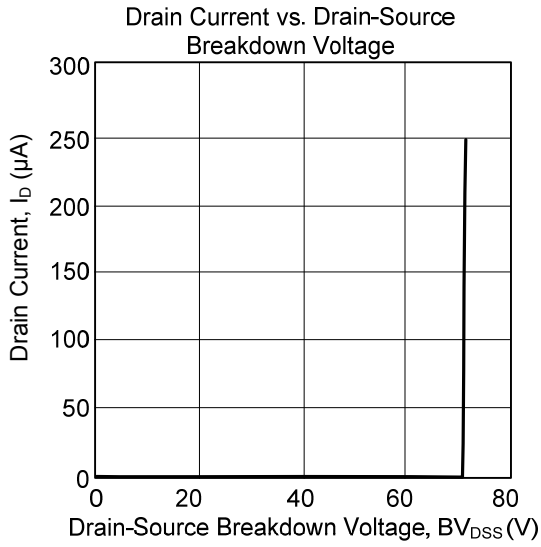
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)



Peak Diode Recovery dv/dt Test Circuit and Waveforms

TYPICAL CHARACTERISTICS



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