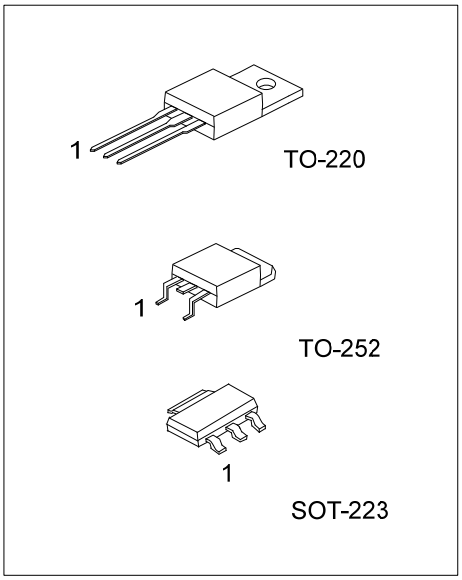
UTZ24N

Power MOSFET

17A, 55V N-CHANNEL POWER MOSFET



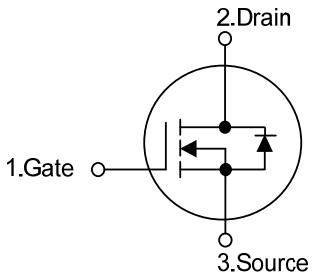
■ DESCRIPTION

The UTC **UTZ24N** 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 **UTZ24N** is suitable for high efficiency synchronous rectification in SMPS, primary side switch and telecom bricks.

■ FEATURES

* $R_{DS(ON)}$ ≤ 38 mΩ @ V_{GS}=10V, I_D=10A
  $R_{DS(ON)}$ ≤ 55 mΩ @ V_{GS}=4.5V, I_D=10A
* High switching speed
* Low gate charge

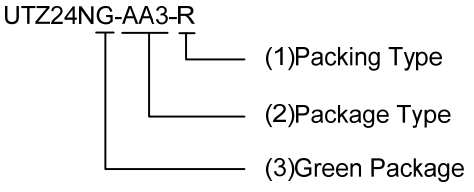
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTZ24NL-AA3-R	UTZ24NG-AA3-R	SOT-223	G	D	S	Tape Reel
UTZ24NL-TA3-T	UTZ24NG-TA3-T	TO-220	G	D	S	Tube
UTZ24NL-TN3-R	UTZ24NG-TN3-R	TO-252	G	D	S	Tape Reel

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

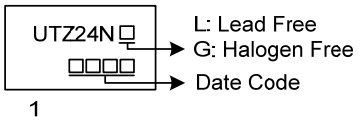
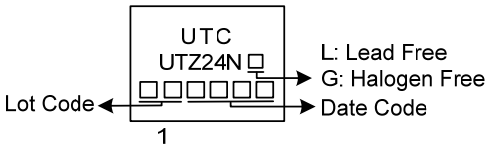


(1) R: Tape Reel, T: Tube

(2) AA3: SOT-223, TA3: TO-220, TN3: TO-252

(3) G: Halogen Free and Lead Free L: Lead Free

■ MARKING

SOT-223	TO-220 / TO-252
	

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°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	I_D	17	A
	Pulsed	I_{DM}	68	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	16	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.3	V/ns
Power Dissipation	SOT-223	P_D	4	W
	TO-220		92	W
	TO-252		44	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=0.1mH, I_{AS}=18A, V_{DD}=25V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 17A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	150	°C/W
	TO-220		62.5	°C/W
	TO-252		50	°C/W
Junction to Case	SOT-223	θ_{JC}	31.25 (Note)	°C/W
	TO-220		1.35	°C/W
	TO-252		2.85 (Note)	°C/W

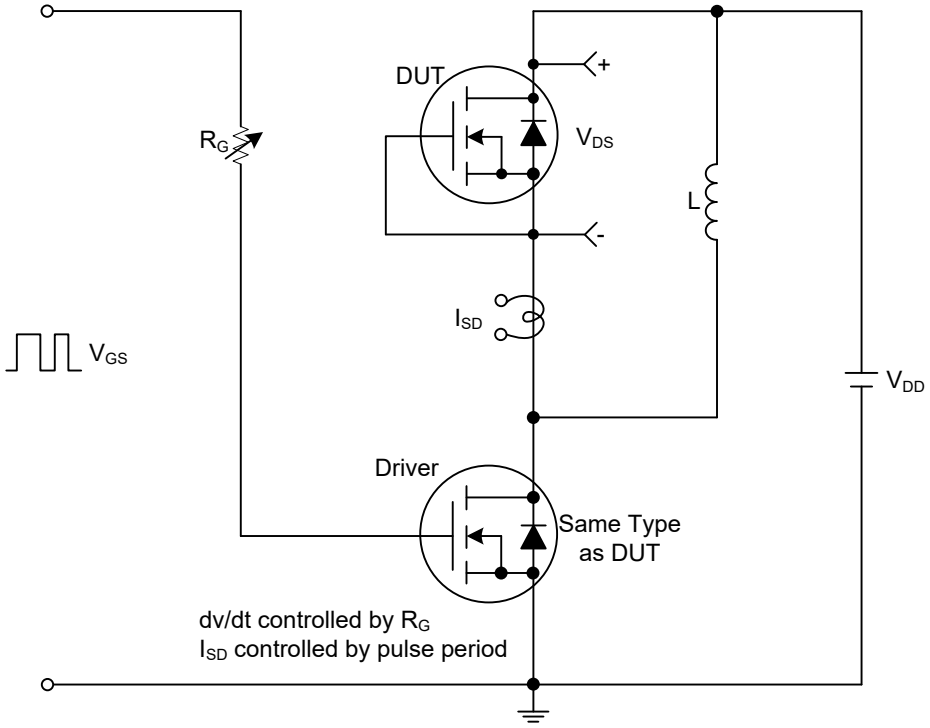
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

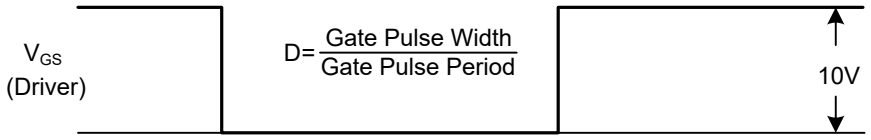
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

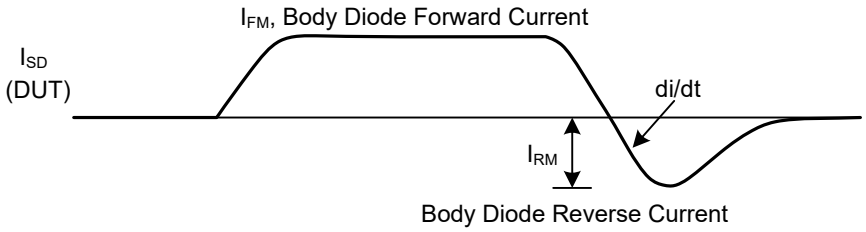
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	55			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=55V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.5		3.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=10A			38	mΩ
			V_{GS}=4.5V, I_D=10A			55	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		1020		pF
Output Capacitance		C_{OSS}			213		pF
Reverse Transfer Capacitance		C_{RSS}			152		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=30V, V_{GS}=10V, I_D=17A , I_G=1mA(Note 1, 2)		25		nC
Gate to Source Charge		Q_{GS}			4.5		nC
Gate to Drain Charge		Q_{GD}			5		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=30V, V_{GS}=10V, I_D=17A, R_G=3Ω (Note 1, 2)		5		ns
Rise Time		t_R			16		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			17.5		ns
Fall-Time		t_F			18.5		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		35		ns
Reverse Recovery Charge		Q_{rr}			14		nC

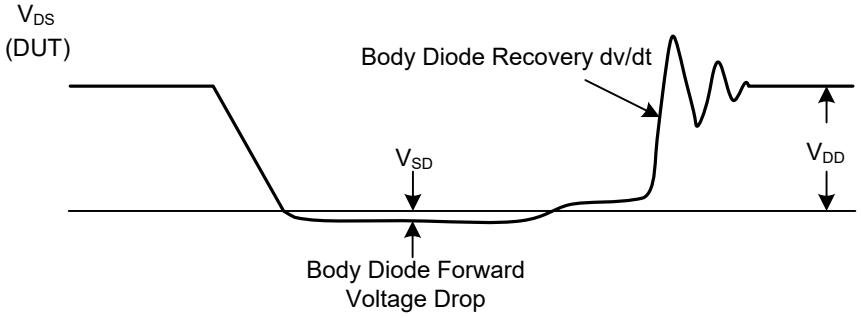
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



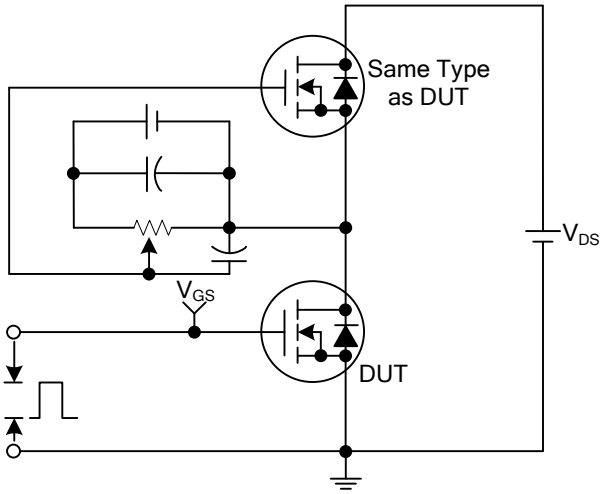




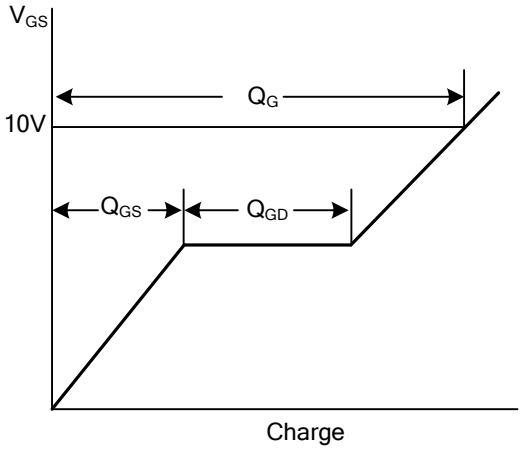


Peak Diode Recovery dv/dt Test Circuit and Waveforms

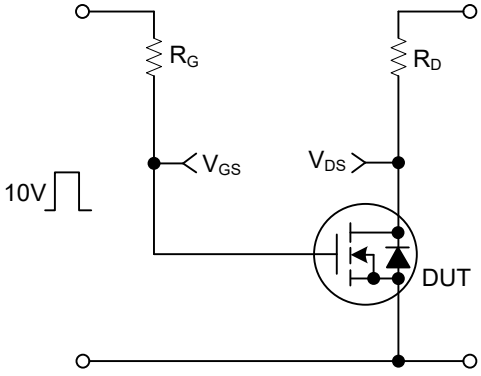
■ TEST CIRCUITS AND WAVEFORMS



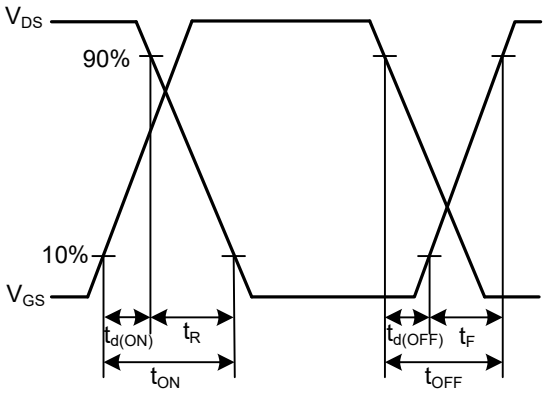
Gate Charge Test Circuit



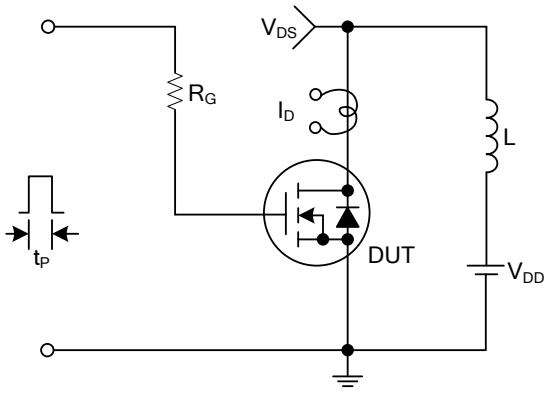
Gate Charge Waveforms



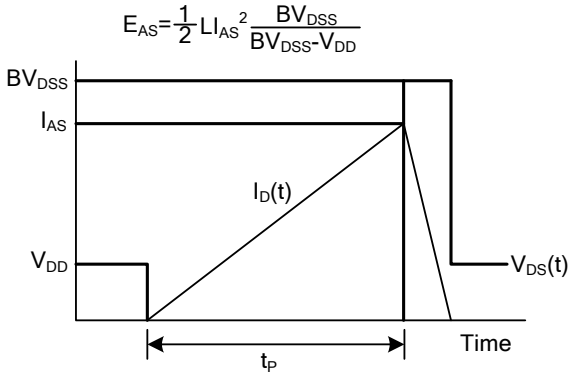
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms