



**UF624**

Preliminary

*Power MOSFET*

**4.4 A, 250 V N-CHANNEL  
POWER MOSFET**

■ DESCRIPTION

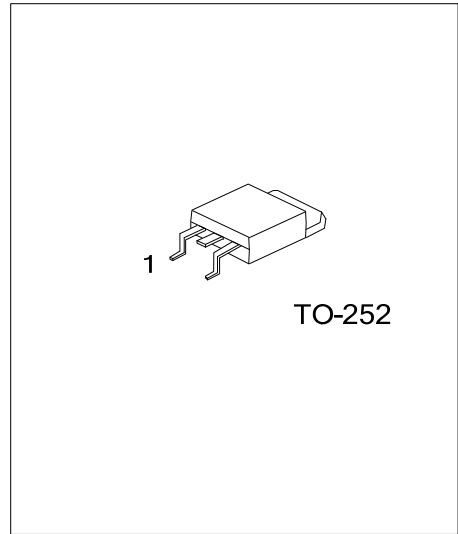
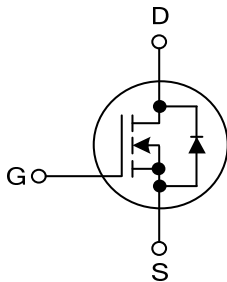
The UTC **UF624** is an N-Channel enhancement MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge.

The UTC **UF624** is suitable for all commercial-industrial applications.

■ FEATURES

- \*  $R_{DS(ON)}=1.1\Omega @V_{GS}=10V, I_D=2.6A$
- \* Low gate charge ( Max=14nC)
- \* Low  $C_{RSS}$  ( Typ=15pF)
- \* High switching speed

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF624L-TN3-T	UF624G-TN3-T	TO-252	G	D	S	Tube
UF624L-TN3-R	UF624G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UF624L-TN3-R</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Lead Free</li> </ul>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TN3: TO-252</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		$V_{DSS}$	250	V	
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V	
Drain Current	Continuous	$I_D$	$V_{GS}$ at 10V, $T_C=25^\circ\text{C}$	4.4	A
			$V_{GS}$ at 10V, $T_C=100^\circ\text{C}$	2.8	A
	Pulsed (Note 2)	$I_{DM}$	14	A	
Avalanche Current (Note 2)		$I_{AR}$	4.4	A	
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	100	mJ	
	Repetitive (Note 2)	$E_{AR}$	5.0	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.8	V/ns	
Power Dissipation		$P_D$	50	W	
Linear Derating Factor			0.40	W/ $^\circ\text{C}$	
Junction Temperature		$T_J$	-55~+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.

1. 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.  $V_{DD}=50\text{V}$ , starting  $T_J=25^\circ\text{C}$ ,  $L=8.3\text{mH}$ ,  $R_g=25\Omega$ ,  $I_{AS}=4.4\text{A}$ .

4.  $I_{SD}\leq 4.4\text{A}$ ,  $dI/dt\leq 90\text{A}/\mu\text{s}$ ,  $V_{DD}\leq V_{DS}$ ,  $T_J\leq 150^\circ\text{C}$ .

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	110	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	2.5	$^\circ\text{C}/\text{W}$

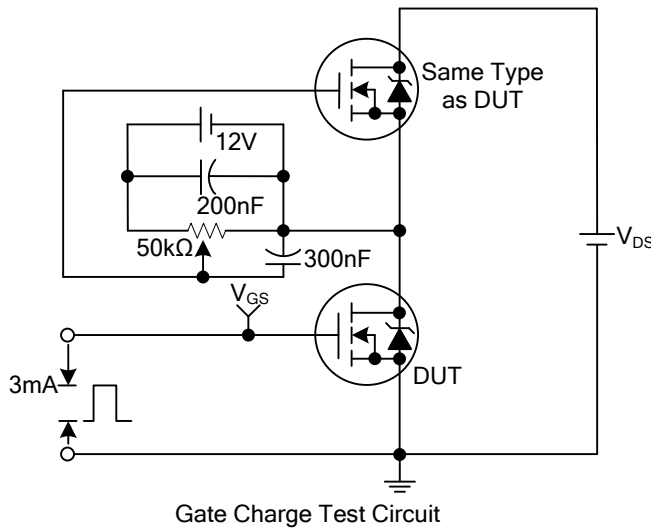
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	250			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$		0.36		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=250\text{V}$ , $V_{GS}=0\text{V}$			25	$\mu\text{A}$
		$V_{DS}=200\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=125^\circ\text{C}$			250	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=+20\text{V}$ , $V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
		$V_{GS}=-20\text{V}$ , $V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=2.6\text{A}$ (Note 2)			1.1	$\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=50\text{V}$ , $I_D=2.6\text{A}$ (Note 2)	1.5			S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		260		pF
Output Capacitance	$C_{OSS}$			77		pF
Reverse Transfer Capacitance	$C_{RSS}$			15		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DS}=200\text{V}$ , $I_D=4.4\text{A}$			14	nC
Gate to Source Charge	$Q_{GS}$				2.7	nC
Gate to Drain Charge	$Q_{GD}$				7.8	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=125\text{V}$ , $I_D=4.4\text{A}$ , $R_G=18\Omega$ , $R_D=28\Omega$		7.0		ns
Rise Time	$t_R$			13		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			20		ns
Fall-Time	$t_F$			12		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				4.4	A
Maximum Body-Diode Pulsed Current (Note 1)	$I_{SM}$				14	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$T_J=25^\circ\text{C}$ , $I_S=4.4\text{A}$ , $V_{GS}=0\text{V}$ (Note 2)			1.8	V
Body Diode Reverse Recovery Time	$t_{RR}$	$T_J=25^\circ\text{C}$ , $I_F=4.4\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$ (Note 2)		200	400	ns
Body Diode Reverse Recovery Charge	$Q_{RR}$			0.93	1.9	$\mu\text{C}$
Forward Turn-On Time	$t_{ON}$	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S$ and $L_D$ )				

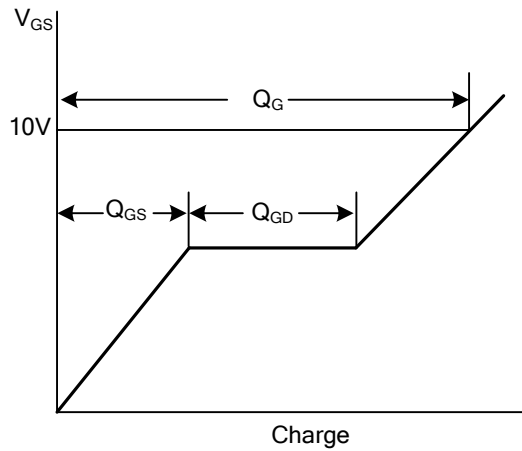
Notes: 1. Repetitive rating; pulse width limited by maximum junction temperature.

2. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

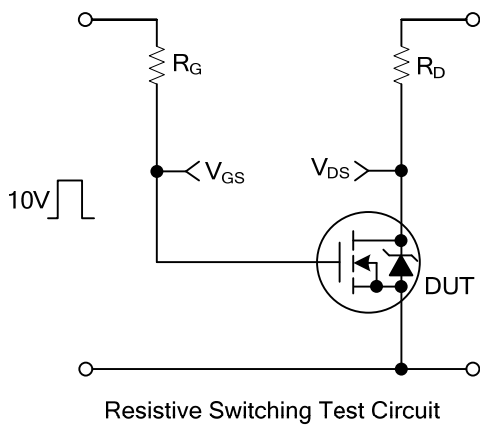
■ TEST CIRCUITS AND WAVEFORMS



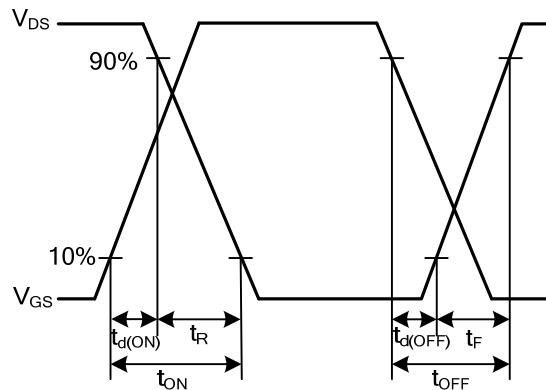
Gate Charge Test Circuit



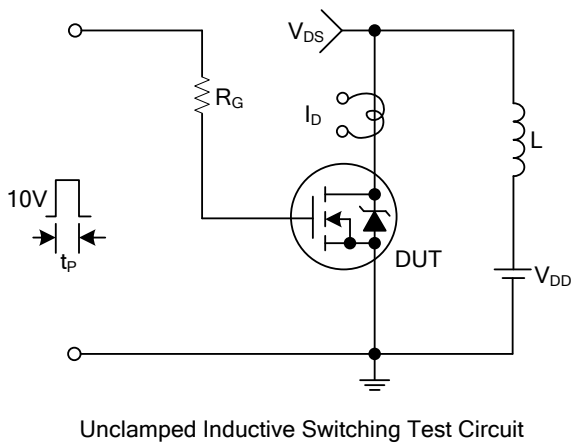
Gate Charge Waveforms



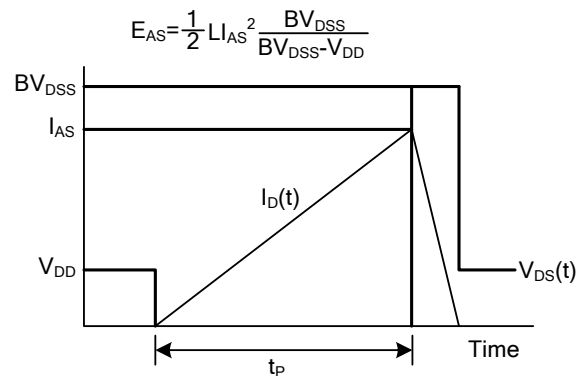
Resistive Switching Test Circuit



Resistive Switching Waveforms

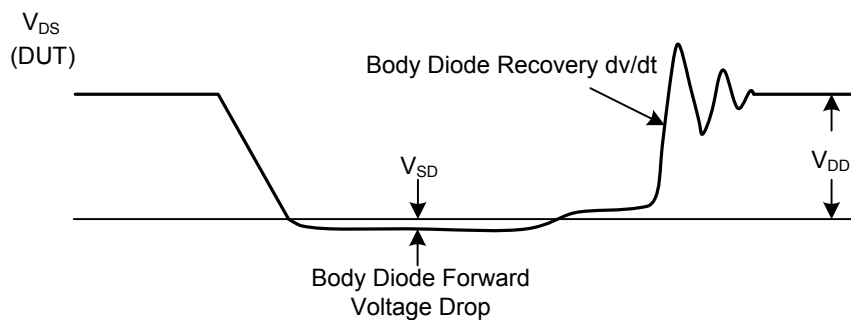
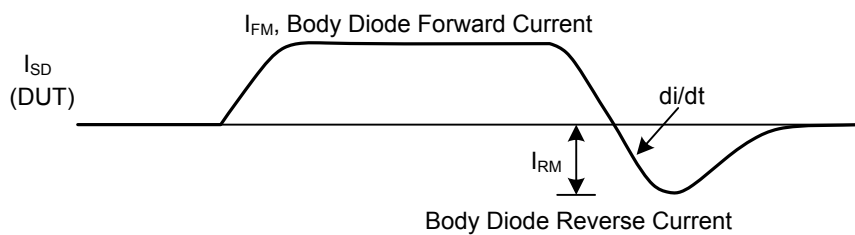
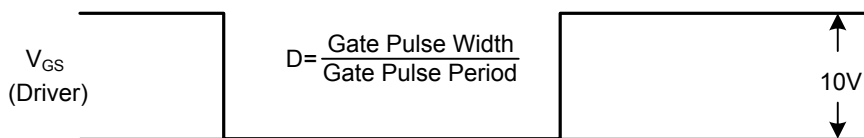
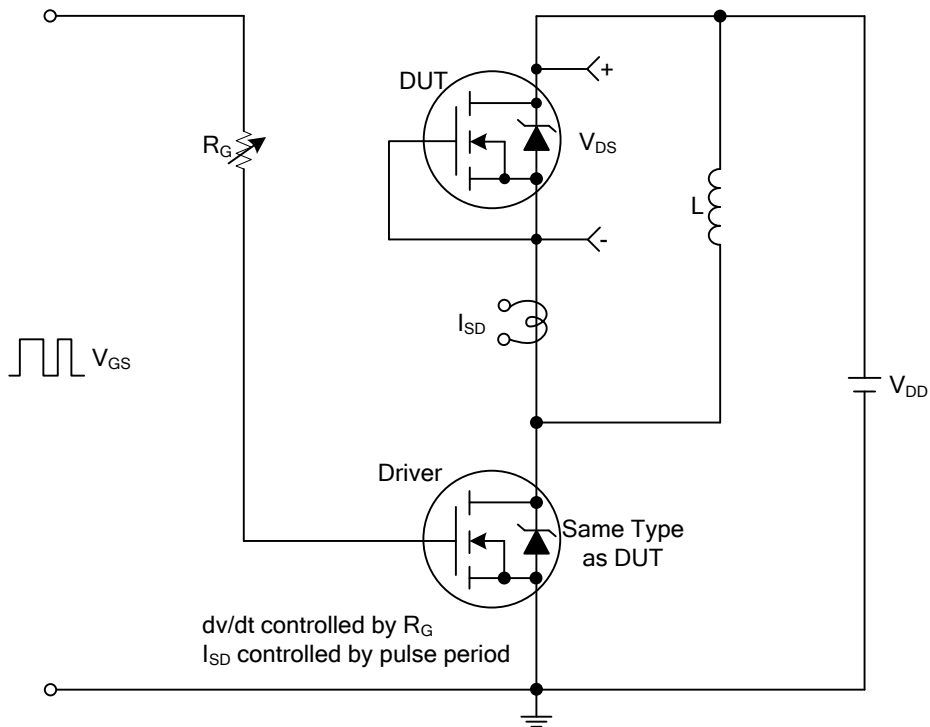


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery  $dv/dt$  Test Circuit and Waveforms

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