



UF7446

Preliminary

Power MOSFET

**100A, 40V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UF7446** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

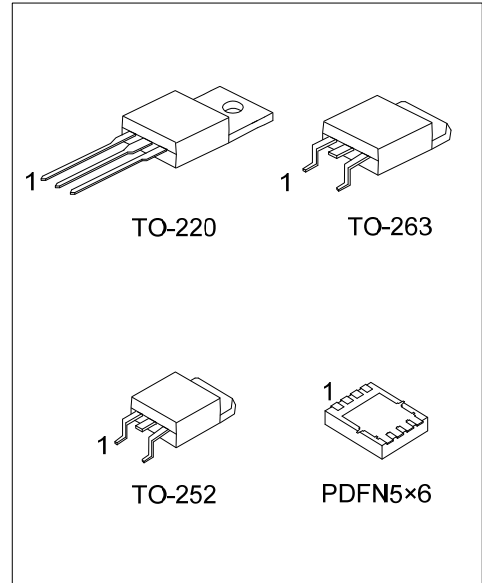
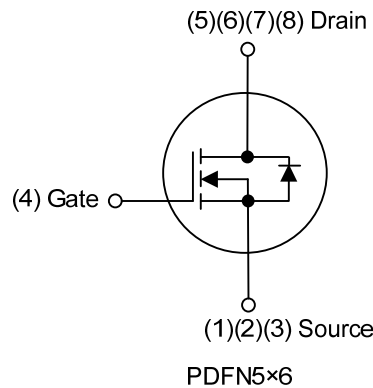
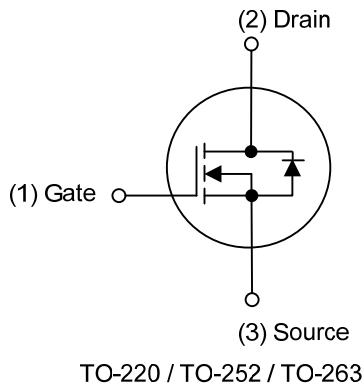
The UTC **UF7446** is generally applied in low power switching mode power appliances and electronic ballast.

FEATURES

* $R_{DS(ON)} \leq 3.7 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=50\text{A}$

* High Switching Speed

* Improved dv/dt capability

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UF7446L-TA3-R	UF7446G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UF7446L-TN3-R	UF7446G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UF7446L-TQ2-T	UF7446G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UF7446L-TQ2-R	UF7446G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UF7446L-P5060-R	UF7446G-P5080-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

UF7446G-TA3-T		(1) Packing Type	(1) T: Tube, R: Tape Reel
		(2) Package Type	(2) TA3: TO-220, TN3: TO-252, TQ2: TO-263
		(3) Green Package	P5060: PDFN5x6
			(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220 / TO-252 / TO-263	PDFN5×6
UTC UF7446 Lot Code → [] [] [] [] [] → Date Code 1 L: Lead Free G: Halogen Free	UTC UF 7446 Lot Code → • [] [] [] [] [] → Date Code

■ **ABSOLUTE MAXIMUM RATINGS** (Unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current		I_D	100	A
Pulsed Drain Current (Note 2)		I_{DM}	200	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	125	mJ
Peak Diode Recovery dv/dt		dv/dt	1.58	V/ns
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220	P_D	90	W
	TO-263			
	TO-252		49	W
	PDFN5×6		75	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operation and Storage Temperature		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. $L = 0.1\text{mH}$, $I_{AS} = 50\text{A}$, $V_{DD} = 25\text{V}$, $R_G = 20\Omega$ Starting $T_J = 25^\circ\text{C}$.

4. $I_{SD} \leq 30\text{A}$, $V_{DS} = 0\text{V}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-263			
	TO-252		110	$^\circ\text{C}/\text{W}$
	PDFN5×6		65	
Junction to Case (Note)	TO-220	θ_{JC}	1.38	$^\circ\text{C}/\text{W}$
	TO-263			
	TO-252		2.55 (Note)	$^\circ\text{C}/\text{W}$
	PDFN5×6		1.67 (Note)	$^\circ\text{C}/\text{W}$

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

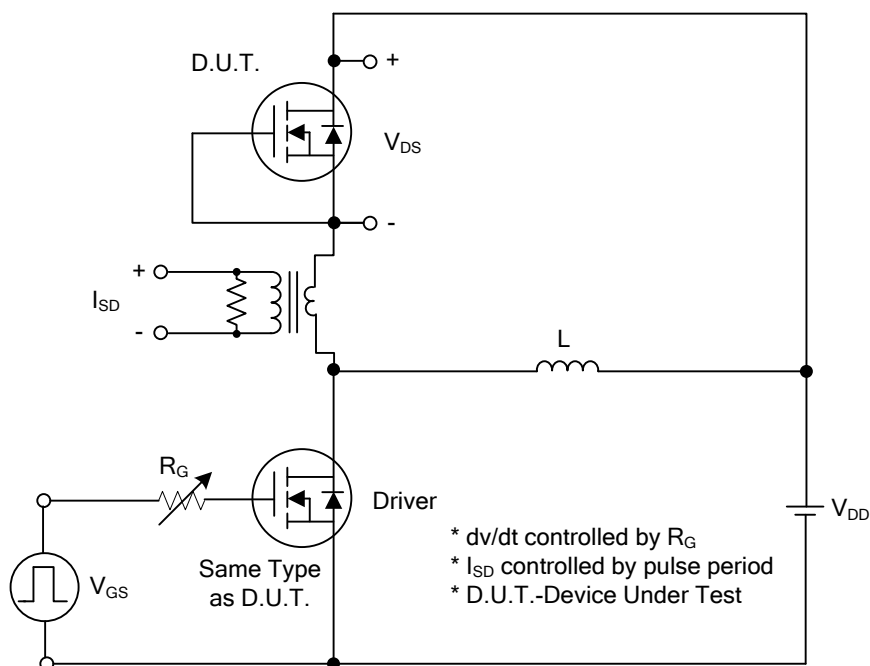
■ **ELECTRICAL CHARACTERISTICS** ($T_c = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	40			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =40V, 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	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =50A			3.7	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		4250		pF
Output Capacitance		C _{OSS}			540		pF
Reverse Transfer Capacitance		C _{RSS}			460		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =32V, V _{GS} =10V, I _D =100A (Note1,2)		115		nC
Gate-Source Charge		Q _{GS}			25		nC
Gate-Drain Charge		Q _{GD}			40		nC
Turn-On Delay Time		t _{D(ON)}	V _{DS} =20V, V _{GS} =10V, I _D =100A, R _G =3Ω (Note1,2)		20		ns
Turn-On Rise Time		t _{tr}			22		ns
Turn-Off Delay Time		t _{D(OFF)}			62		ns
Turn-Off Fall Time		t _f			28		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				100	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				200	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =100A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =30A, V _{GS} =0V,		45		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _S /dt=100A/μs		46		nC

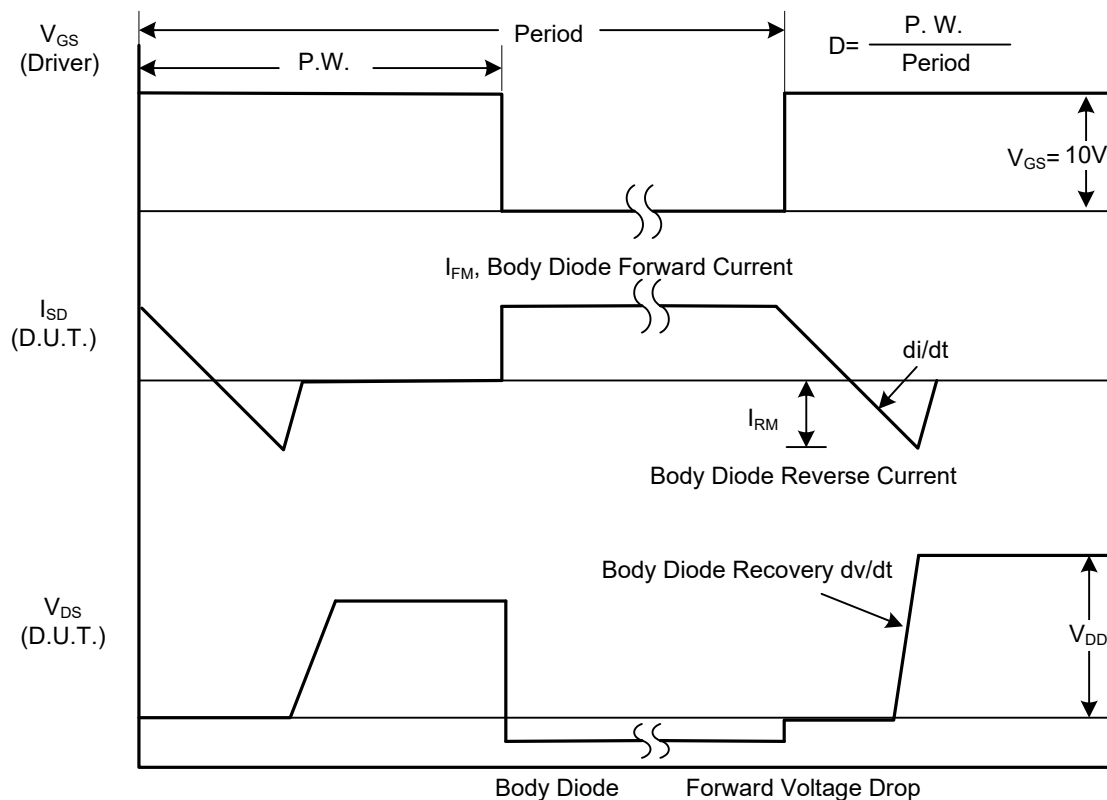
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

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

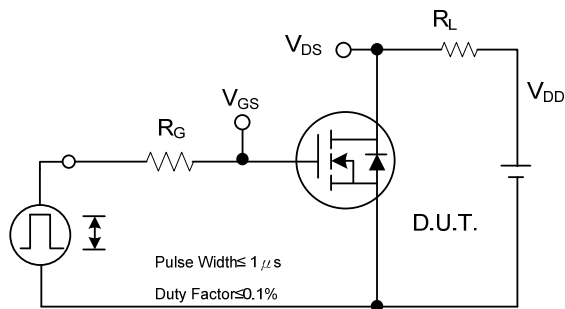


Fig. 2A Switching Test Circuit

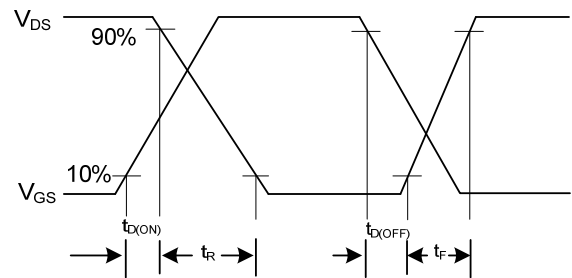


Fig. 2B Switching Waveforms

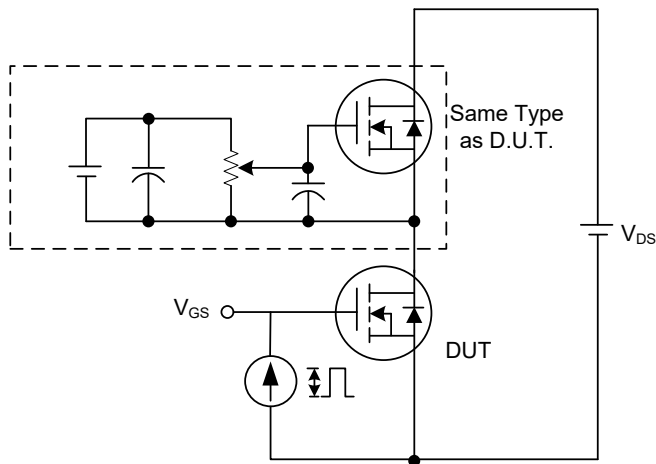


Fig. 3A Gate Charge Test Circuit

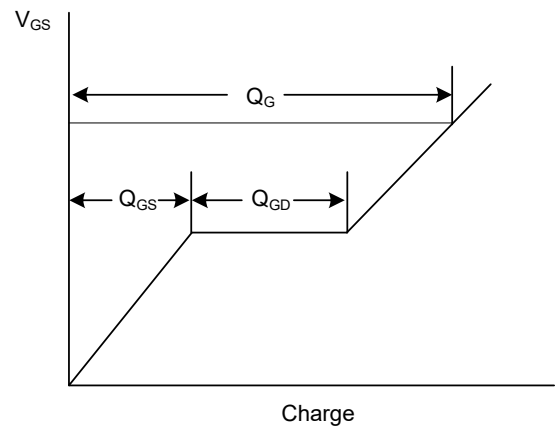


Fig. 3B Gate Charge Waveform

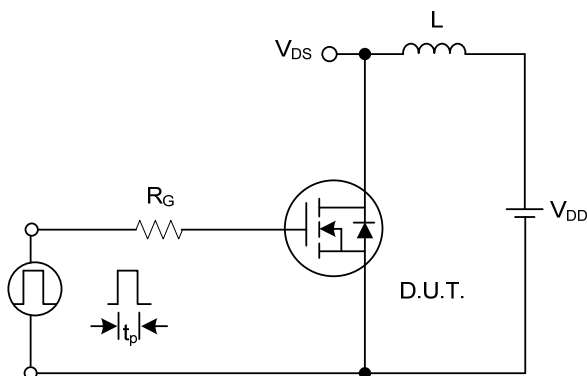


Fig. 4A Unclamped Inductive Switching Test Circuit

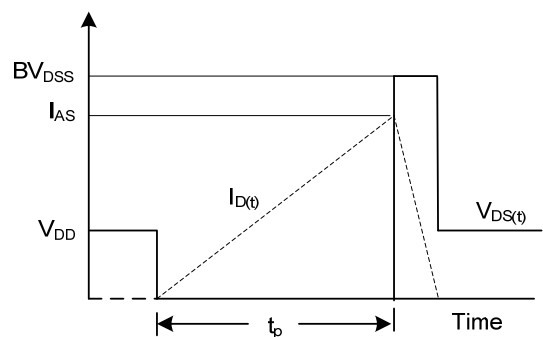


Fig. 4B Unclamped Inductive Switching Waveforms

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