



## UF2307

Preliminary

Power MOSFET

### 42A, 75V N-CHANNEL POWER MOSFET

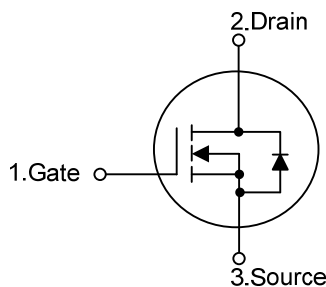
#### DESCRIPTION

The UTC **UF2307** is a N-channel Power MOSFET, utilizes the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of this design are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device.

#### FEATURES

- \*  $R_{DS(ON)} \leq 14 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=32\text{A}$
- \* Fast Switching
- \* Ultra Low On-Resistance
- \* With 100% Avalanche Tested

#### SYMBOL

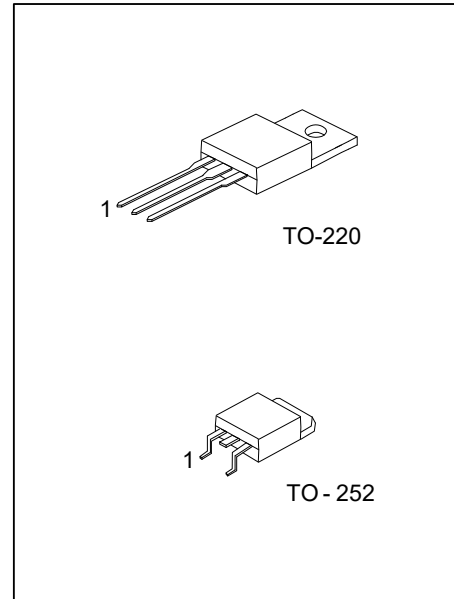


#### ORDERING INFORMATION

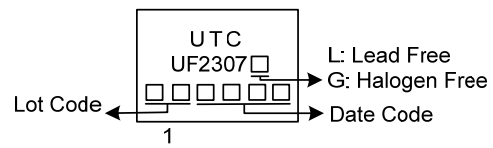
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF2307L-TA3-T	UF2307G-TA3-T	TO-220	G	D	S	Tube
UF2307L-TN3-R	UF2307G-TN3-R	TO-252	G	D	S	Tape Reel

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

UF2307G-TA3-T	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type	(2) TA3: TO-220, TN3: TO-252
	(3)Green Package	(3) G: Halogen Free and Lead Free L: Lead Free



### ■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DS}$	75	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	42	A
	Pulsed (Note 2)	$I_{DM}$	84	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	45	mJ
Peak Diode Recovery $dv/dt$ (Note 4)		$dv/dt$	2.9	V/ns
Power Dissipation	TO-220	$P_D$	70	W
	TO-252		56	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.  $L = 0.1\text{mH}$ ,  $I_{AS} = 30\text{A}$ ,  $V_{DD} = 25\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^{\circ}\text{C}$

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

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220	$\theta_{JA}$	62.5	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	$\theta_{JC}$	1.78	$^{\circ}\text{C}/\text{W}$
	TO-252		2.23 (Note)	$^{\circ}\text{C}/\text{W}$

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

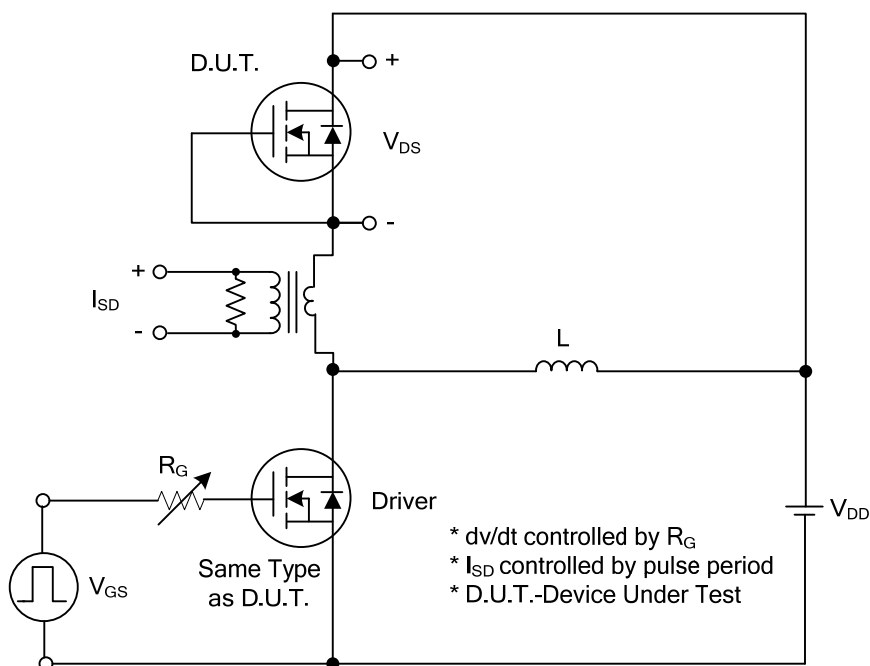
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	75			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =75V			1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V			+100	nA
	Reverse		V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	I <sub>D</sub> =250μA, V <sub>DS</sub> =V <sub>GS</sub>	2.0		4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =32A			14	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		2340		pF
Output Capacitance		C <sub>OSS</sub>			235		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			190		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q <sub>G</sub>	V <sub>DD</sub> =60V, V <sub>GS</sub> =10V, I <sub>D</sub> =42A (Note 1, 2)		85		nC
Gate to Source Charge		Q <sub>GS</sub>			18		nC
Gate to Drain Charge		Q <sub>GD</sub>			30		nC
Turn-ON Delay Time		t <sub>D(ON)</sub>	V <sub>DD</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =42A, R <sub>G</sub> =3Ω, (Note 1, 2)		13		ns
Rise Time		t <sub>R</sub>			19		ns
Turn-OFF Delay Time		t <sub>D(OFF)</sub>			39		ns
Fall-Time		t <sub>F</sub>			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I <sub>S</sub>				42	A
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>				84	A
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	I <sub>S</sub> =42A			1.4	V
Reverse Recovery Time		t <sub>rr</sub>	I <sub>S</sub> =30A, V <sub>GS</sub> =0V		44		nS
Reverse Recovery Charge (Note 1)		Q <sub>rr</sub>	dI <sub>F</sub> /dt=100A/μs		45		nC

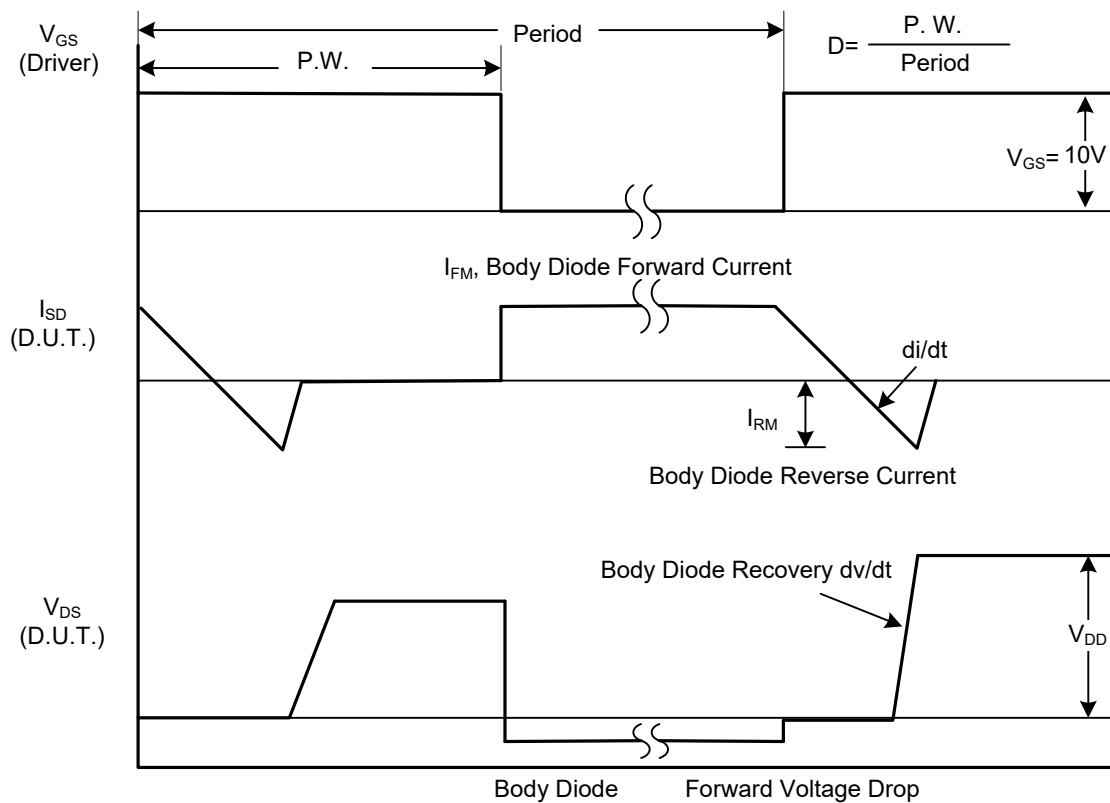
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

# ■ TEST CIRCUITS AND WAVEFORMS

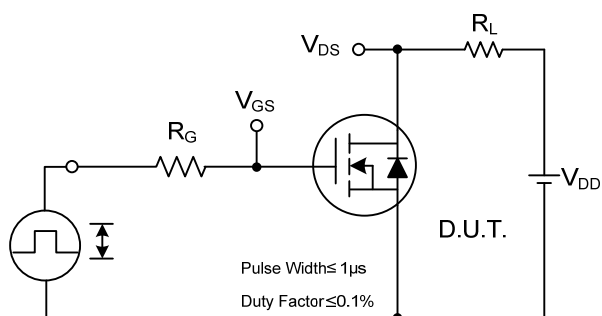


**Peak Diode Recovery  $dv/dt$  Test Circuit**

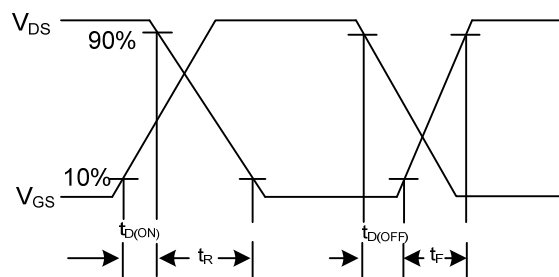


**Peak Diode Recovery  $dv/dt$  Waveforms**

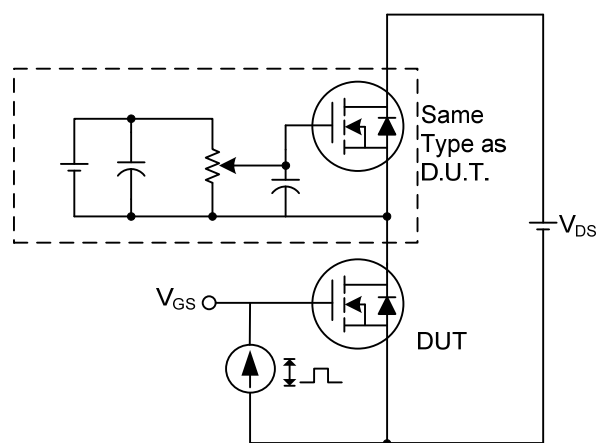
# ■ TEST CIRCUITS AND WAVEFORMS



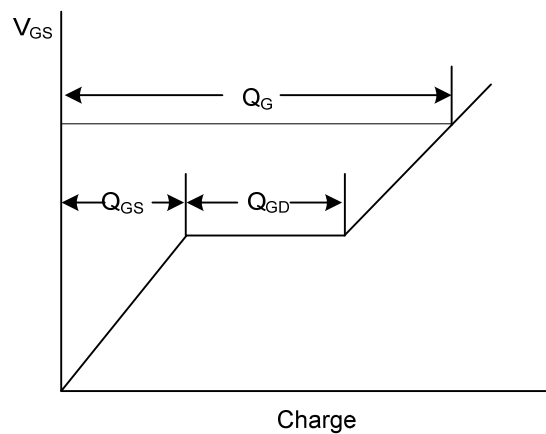
Switching Test Circuit



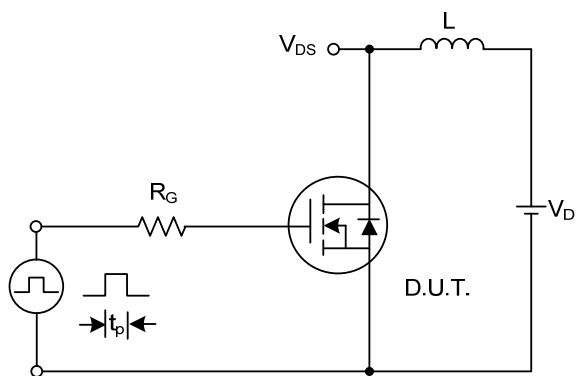
Switching Waveforms



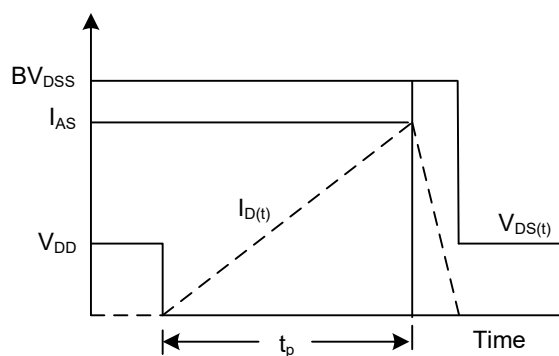
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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