



UF4115

Preliminary

Power MOSFET

**90A, 150V N-CHANNEL
POWER MOSFET**

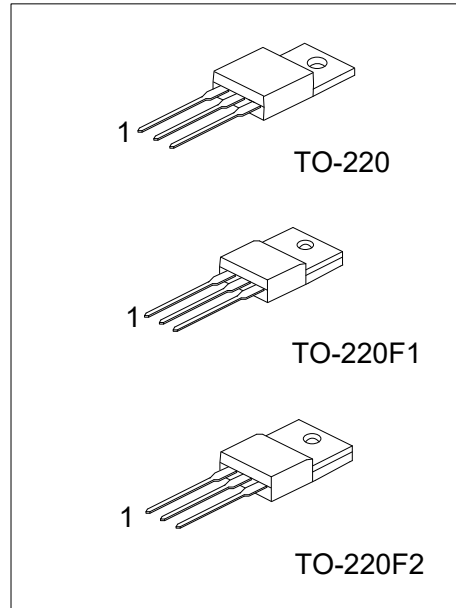
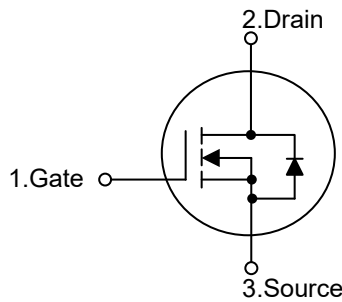
■ DESCRIPTION

The UTC **UF4115** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

■ FEATURES

- * $R_{DS(ON)} \leq 13 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=62\text{A}$
- * High Switching Speed

■ SYMBOL



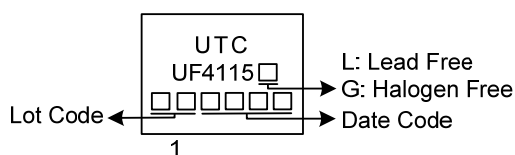
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF4115L-TA3-T	UF4115G-TA3-T	TO-220	G	D	S	Tube
UF4115L-TF1-T	UF4115G-TF1-T	TO-220F1	G	D	S	Tube
UF4115L-TF2-T	UF4115G-TF2-T	TO-220F2	G	D	S	Tube

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

<p>UF4115G-TA3-T</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	150	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	90	A
	Pulsed	I_{DM}	180	A
Avalanche Energy (Note 3)	Single Pulsed	E_{AS}	476	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	7.4	V/ns
Power Dissipation	TO-220	P_D	257	W
	TO-220F1/TO-220F2		49	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
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. $L = 0.1\text{mH}$, $I_{AS} = 97.6\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, 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	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.49	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2		2.55	$^\circ\text{C}/\text{W}$

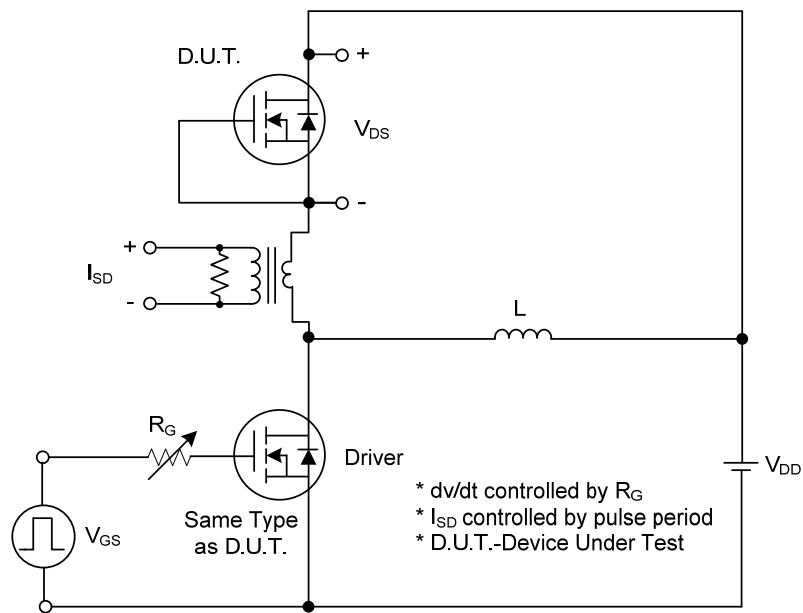
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	150			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=150\text{V}$, $V_{GS}=0\text{V}$			10	μA
Gate- Source Leakage Current	Forward	$V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$			+100	nA
	Reverse	$V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=62\text{A}$			13	$\text{m}\Omega$
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		14.2		nF
Output Capacitance	C_{OSS}			759		pF
Reverse Transfer Capacitance	C_{RSS}			628		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=120\text{V}$, $V_{GS}=10\text{V}$, $I_D=62\text{A}$ (Note 1, 2)		344		nC
Gate to Source Charge	Q_{GS}			68		nC
Gate to Drain Charge	Q_{GD}			197		nC
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=75\text{V}$, $V_{GS}=10\text{V}$, $I_D=62\text{A}$, $R_G=3\Omega$ (Note 1, 2)		61		ns
Rise Time	t_R			63		ns
Turn-off Delay Time	$t_{D(OFF)}$			110		ns
Fall-Time	t_F			59		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				90	A
Maximum Body-Diode Pulsed Current	I_{SD}				180	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=62\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time(Note 1)	t_{rr}	$I_S=30\text{A}$, $V_{GS}=0\text{V}$,		128		ns
Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$		731		nC

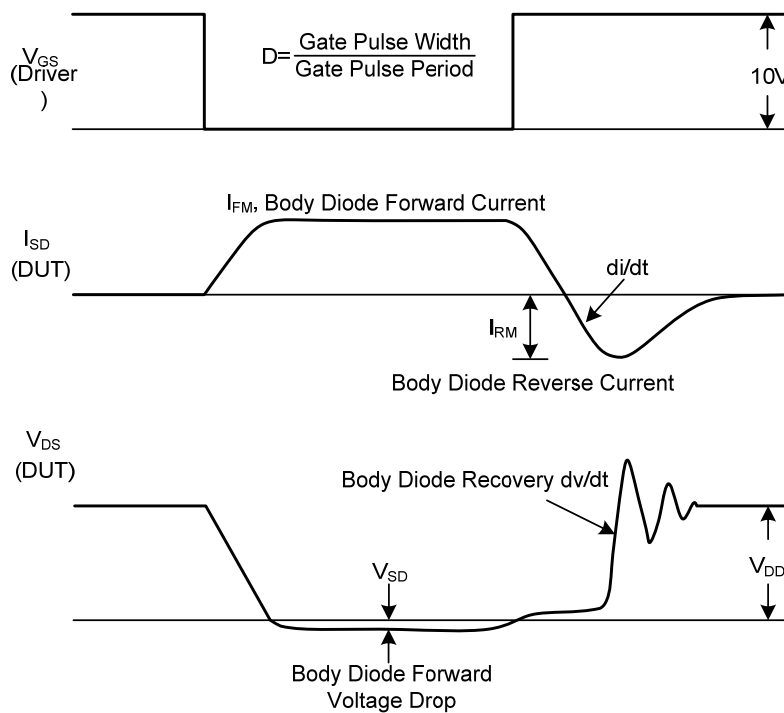
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

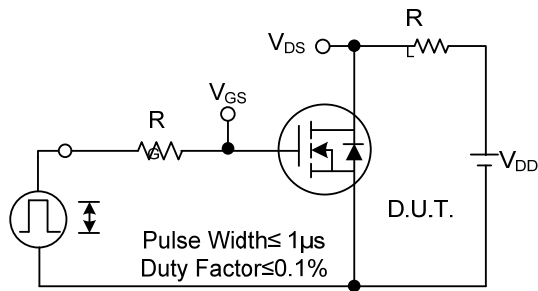


Peak Diode Recovery dv/dt Test Circuit

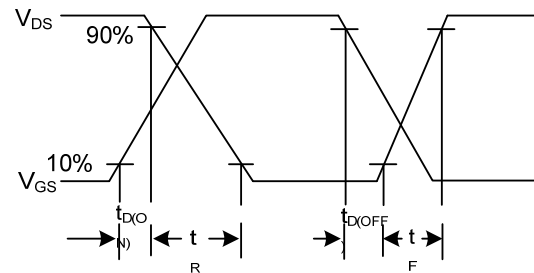


Peak Diode Recovery dv/dt Waveforms

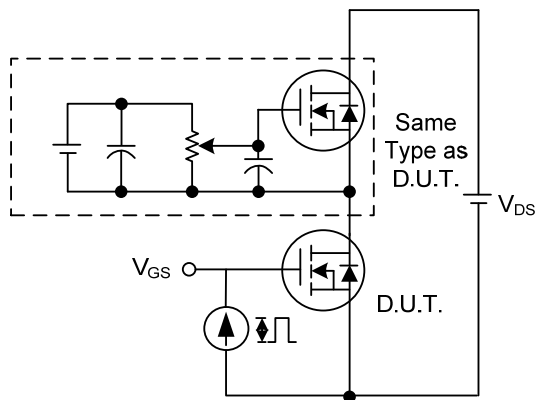
■ TEST CIRCUITS AND WAVEFORMS



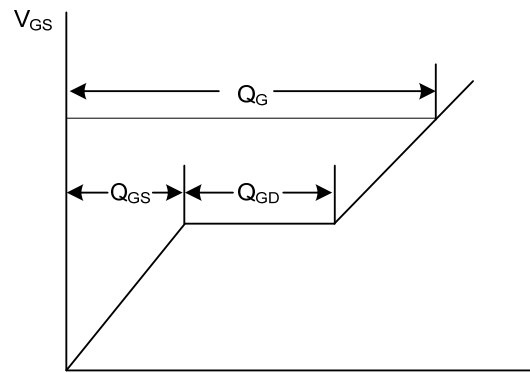
Switching Test Circuit



Switching Waveforms

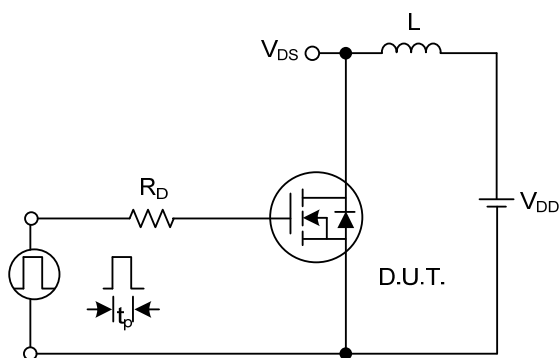


Gate Charge Test Circuit

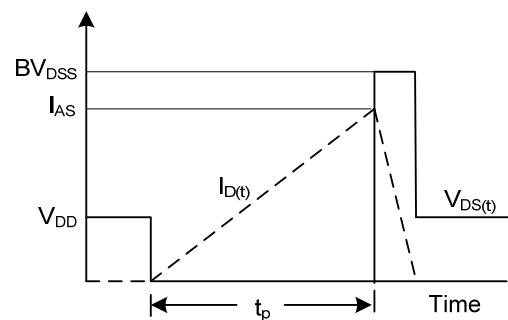


Charge

Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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