



UF1010-S

Preliminary

Power MOSFET

84A, 60V N-CHANNEL POWER MOSFET

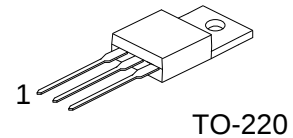
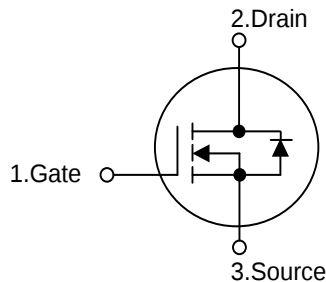
DESCRIPTION

The UTC UF1010-S is a N-channel mode power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications at power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

FEATURES

- * $R_{DS(ON)} \leq 12 \text{ m}\Omega$ @ $V_{GS} = 10\text{V}$, $I_D = 50\text{A}$
- * Fast Switching Capability
- * Improved dv/dt Capability, High Ruggedness

SYMBOL



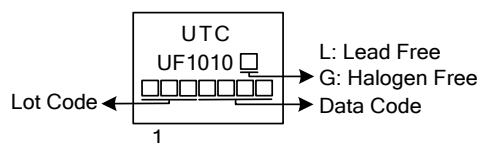
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF1010L-TA3-T	UF1010G-TA3-T	TO-220	G	D	S	Tube

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

UF1010G-TA3-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube (2) TA3: TO-220 (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}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	84	A
	Pulsed (Note 2)	I_{DM}	330	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	490	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	11	V/ns
Power Dissipation		P_D	200	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. $L = 0.1\text{ mH}$, $I_{AS} = 99\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\ \Omega$, 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	$^\circ\text{C/W}$
Junction to Case		θ_{JC}	0.75	$^\circ\text{C/W}$

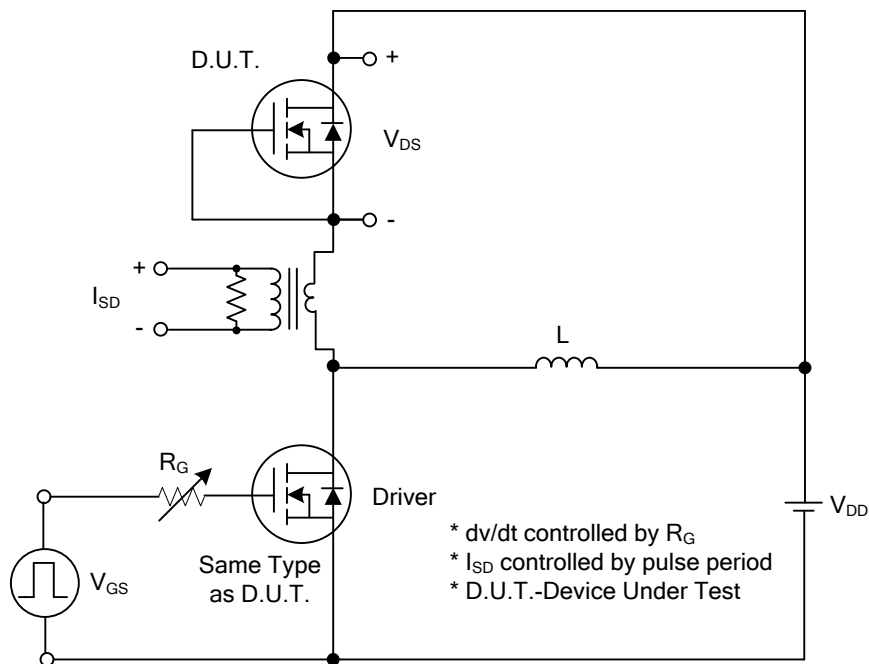
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, 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	
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =50A			12	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		3385		pF
Output Capacitance		C _{OSS}			580		pF
Reverse Transfer Capacitance		C _{RSS}			80		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A , I _G =100μA (Note 1, 2)		224		nC
Gate to Source Charge		Q _{GS}			14.7		nC
Gate to Drain Charge		Q _{GD}			21.6		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		60		ns
Rise Time		t _R			105		ns
Turn-OFF Delay Time		t _{D(OFF)}			1180		ns
Fall-Time		t _F			345		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				84	A
Maximum Body-Diode Pulsed Current		I _{SM}				330	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =30A, V _{GS} =0V			1.3	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		55		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs		102		μC

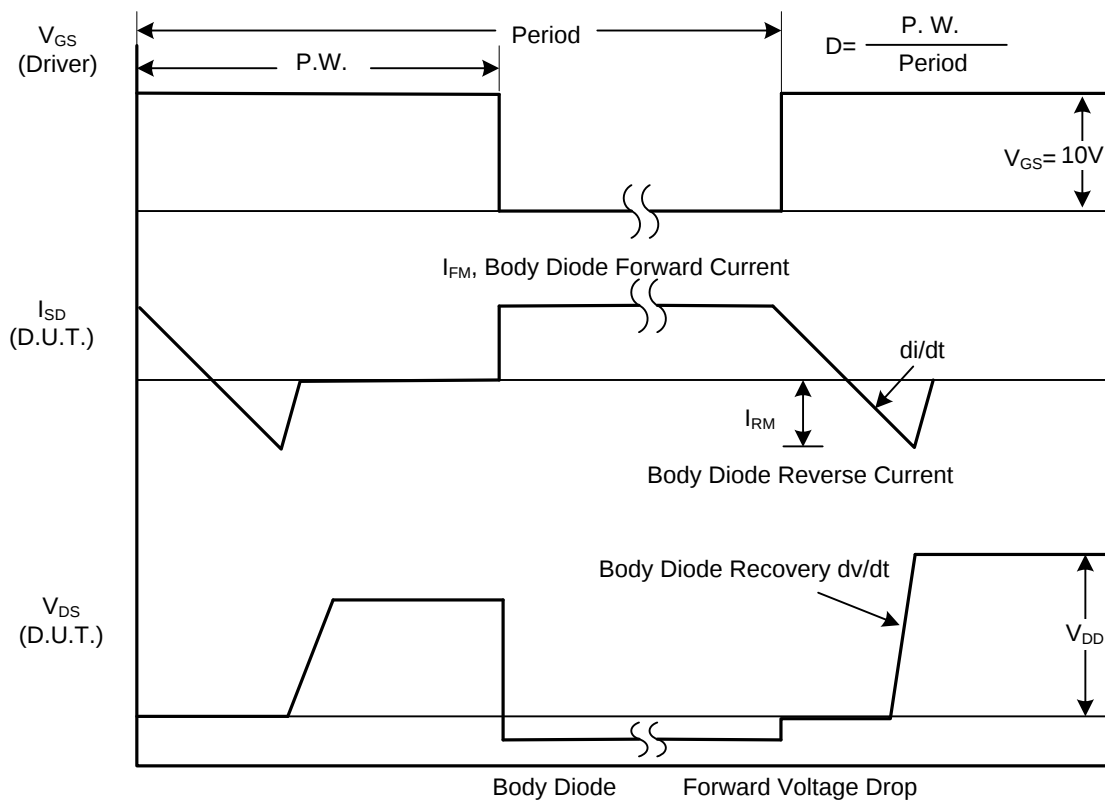
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

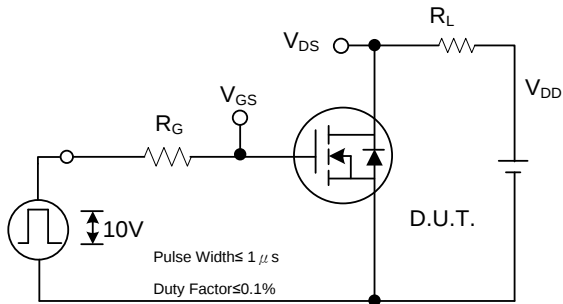


Peak Diode Recovery dv/dt Test Circuit

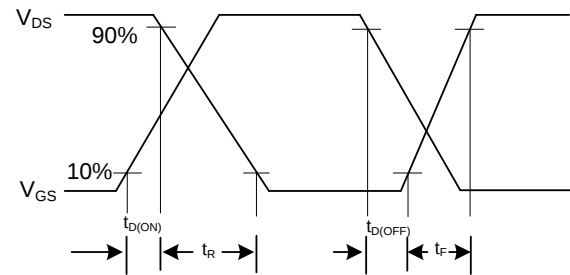


Peak Diode Recovery dv/dt Waveforms

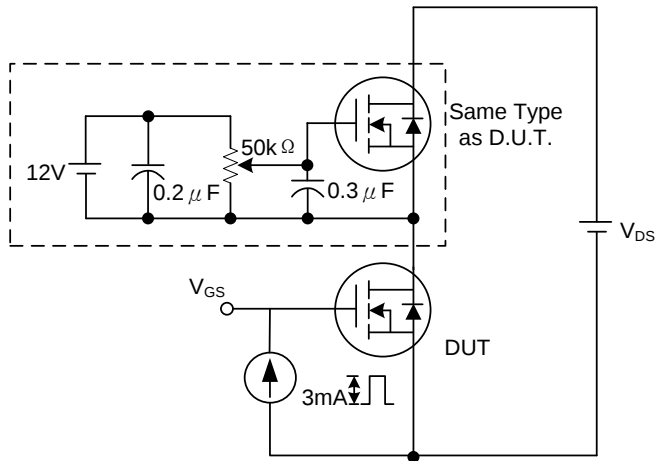
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



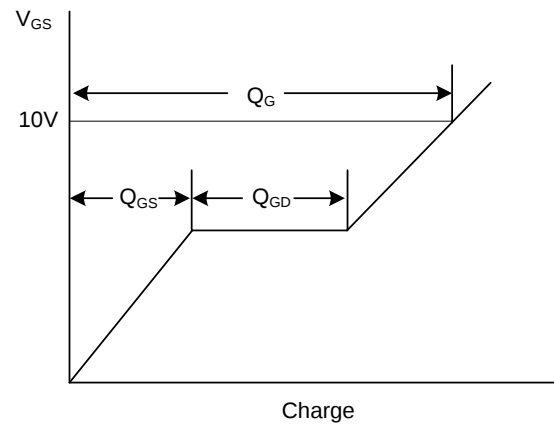
Switching Test Circuit



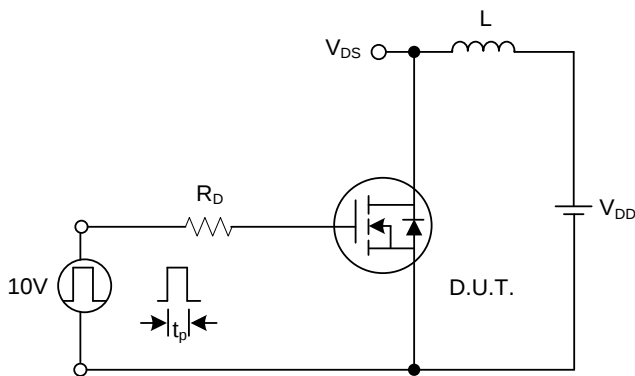
Switching Waveforms



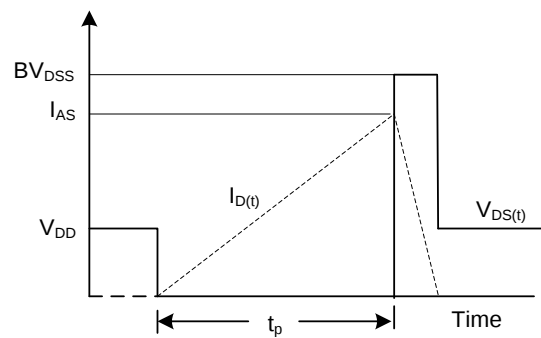
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.