



**UF740-C**

Preliminary

**Power MOSFET**

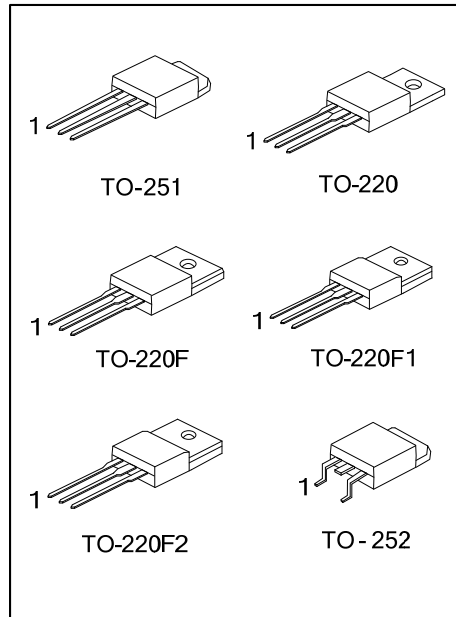
**10A, 400V N-CHANNEL  
POWER MOSFET**

■ DESCRIPTION

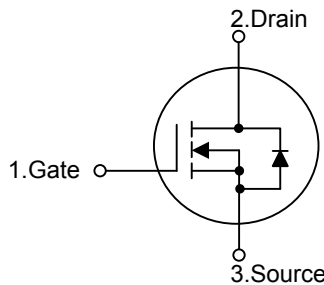
The UTC **UF740-C** is a N-Channel enhancement mode silicon gate power MOSFET is designed for high voltage, high speed power switching applications such as switching regulators, switching converters, solenoid, motor drivers, relay drivers.

■ FEATURES

- \*  $R_{DS(ON)} < 0.47\Omega @ V_{GS} = 10V, I_D = 5.0A$
- \* Single Pulse Avalanche Energy Rated
- \* Rugged - SOA is Power Dissipation Limited
- \* Fast Switching Speeds
- \* Linear Transfer Characteristics
- \* High Input Impedance



■ SYMBOL



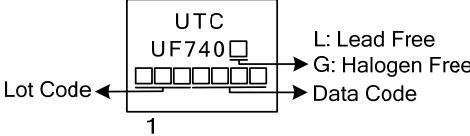
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF740L-TA3-T	UF740G-TA3-T	TO-220	G	D	S	Tube
UF740L-TF1-T	UF740G-TF1-T	TO-220F1	G	D	S	Tube
UF740L-TF2-T	UF740G-TF2-T	TO-220F2	G	D	S	Tube
UF740L-TF3-T	UF740G-TF3-T	TO-220F	G	D	S	Tube
UF740L-TM3-T	UF740G-TM3-T	TO-251	G	D	S	Tube
UF740L-TN3-R	UF740G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UF740L-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, TN3: TO-252</p> <p>(3) L: Lead Free, G: Halogen Free and 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		$V_{DSS}$	400	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	10	A
	Pulsed (Note 2)	$I_{DM}$	40	A
Avalanche Current (Note 2)		$I_{AR}$	8.1	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	328	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation ( $T_C=25^\circ\text{C}$ )	TO-220	$P_D$	125	W
	TO-220F/TO-220F1		45	W
	TO-220F2			
	TO-251/TO-252			
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.  $L = 10 \text{ mH}$ ,  $I_{AS} = 8.1 \text{ A}$ ,  $V_{DD} = 50 \text{ V}$ ,  $R_G = 25 \Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 10 \text{ A}$ ,  $di/dt \leq 200 \text{ A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	PACKAGE	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2			
	TO-251/TO-252			
Junction to Case	TO-220	$\theta_{JC}$	1	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.78	$^\circ\text{C}/\text{W}$
	TO-220F2			
	TO-251/TO-252			

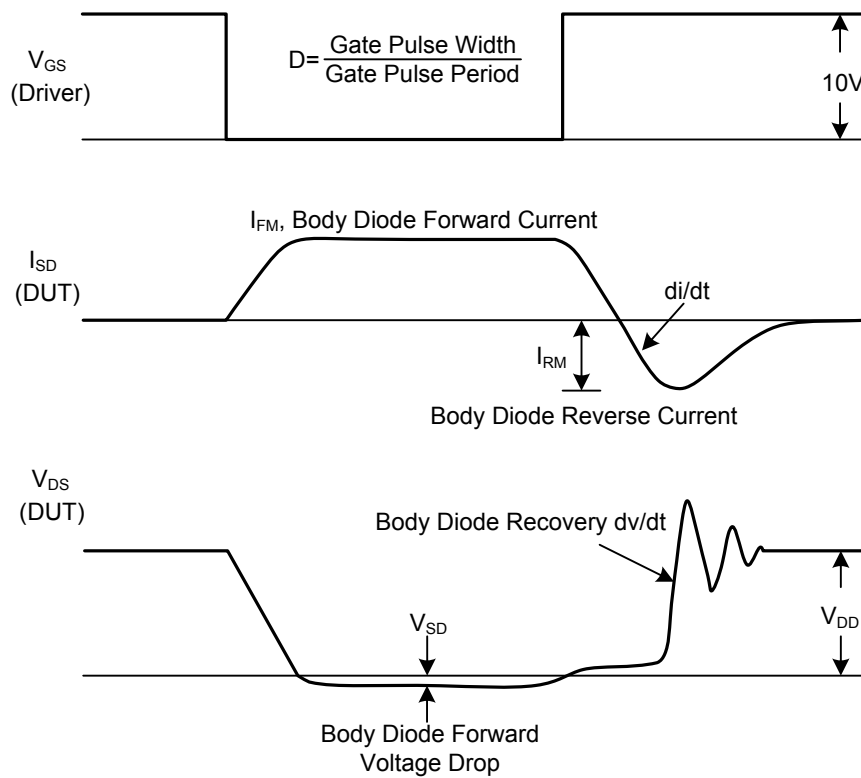
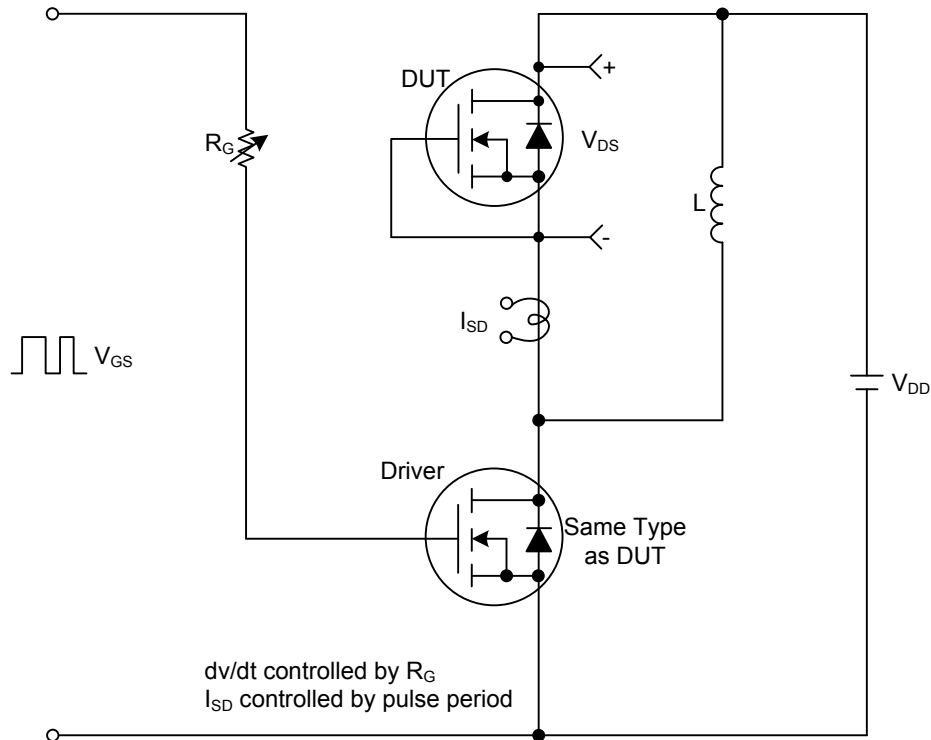
■ ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	400			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=400\text{V}$ , $V_{GS}=0\text{V}$			25	$\mu\text{A}$
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$ , $V_{DS}=0\text{V}$			+100	nA
	Reverse	$V_{GS}=-30\text{V}$ , $V_{DS}=0\text{V}$			-100	nA
<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	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=5.0\text{A}$			0.47	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		1195		pF
Output Capacitance	$C_{OSS}$			135		pF
Reverse Transfer Capacitance	$C_{RSS}$			11		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=50\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=1.3\text{A}$ , $I_G=100\mu\text{A}$ (Note 1, 2)		78		nC
Gate to Source Charge	$Q_{GS}$			6		nC
Gate to Drain Charge	$Q_{GD}$			11.6		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=30\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=0.5\text{A}$ , $R_G=25\Omega$ (Note 1, 2)		60		ns
Rise Time	$t_R$			57		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			276		ns
Fall-Time	$t_F$			68		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				10	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				40	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_S=10\text{A}$ , $V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time (Note 1)	$t_{rr}$	$I_S=10\text{A}$ , $V_{GS}=0\text{V}$ ,		280		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$dI_F/dt=100\text{A}/\mu\text{s}$		2.4		$\mu\text{C}$

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

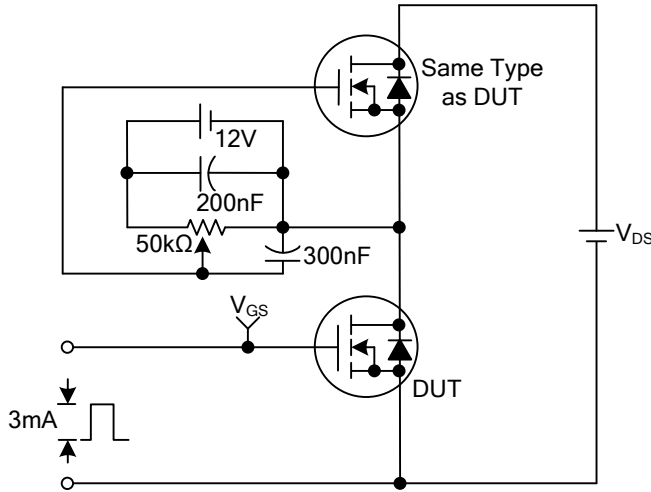
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

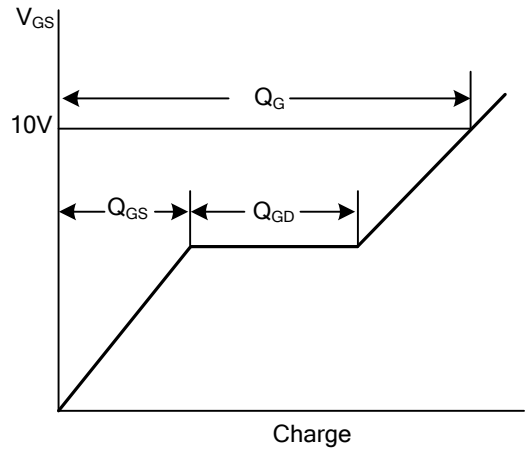


Peak Diode Recovery dv/dt Waveforms

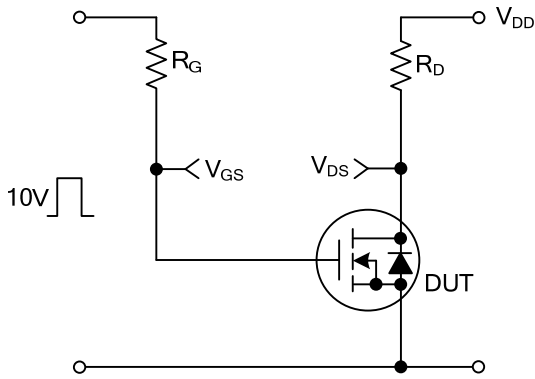
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



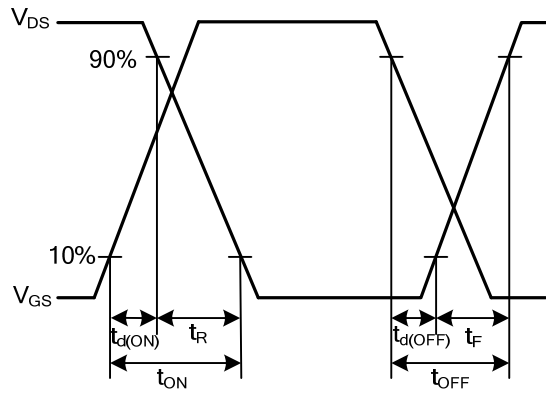
Gate Charge Test Circuit



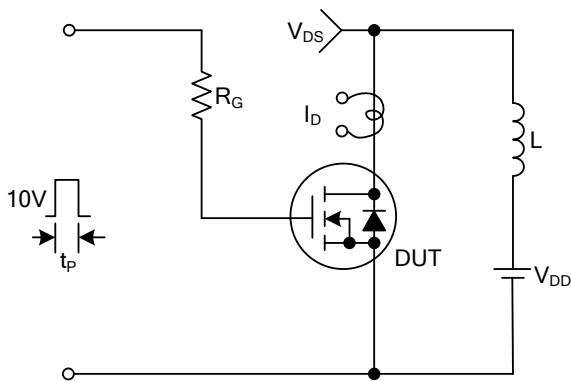
Gate Charge Waveforms



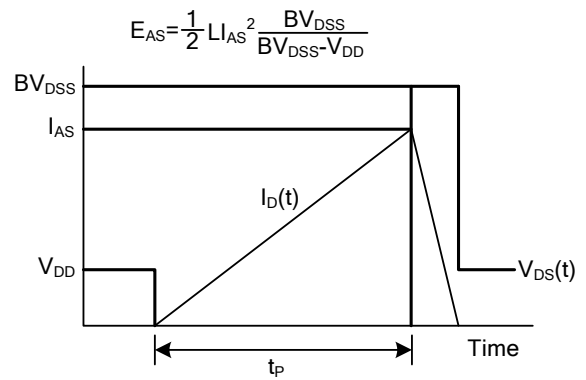
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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