



**UF840-C**

Preliminary

**Power MOSFET**

**8.0A, 500V N-CHANNEL  
POWER MOSFET**

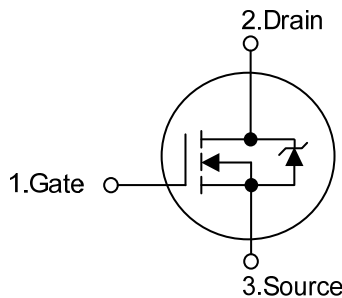
■ **DESCRIPTION**

The UTC **UF840-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**

- \* Low  $R_{DS(ON)} < 0.81\Omega @ V_{GS}=10V, I_D = 4.0A$
- \* Single Pulse Avalanche Energy Rated
- \* Fast Switching Speeds
- \* Linear Transfer Characteristics
- \* High Input Impedance

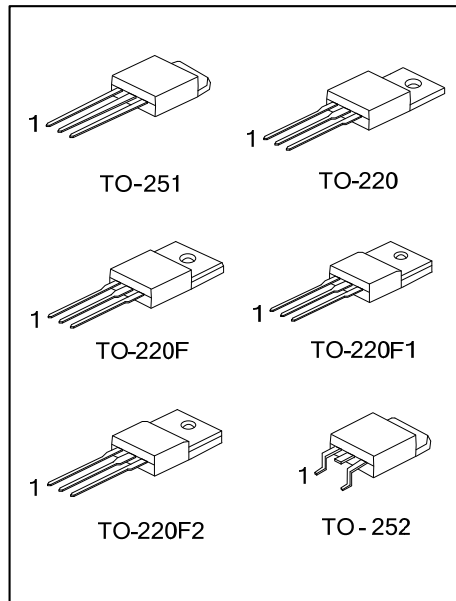
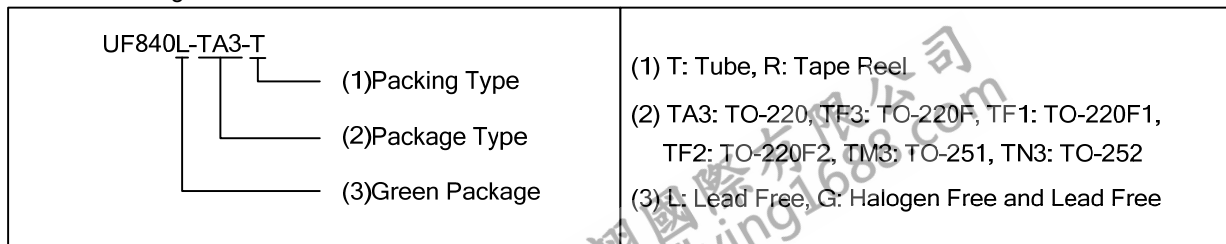
■ **SYMBOL**



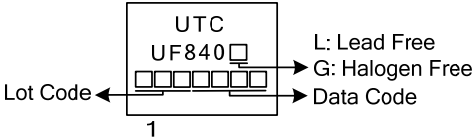
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF840L-TA3-T	UF840G-TA3-T	TO-220	G	D	S	Tube
UF840L-TF1-T	UF840G-TF1-T	TO-220F1	G	D	S	Tube
UF840L-TF3-T	UF840G-TF3-T	TO-220F2	G	D	S	Tube
UF840L-TF3-T	UF840G-TF3-T	TO-220F	G	D	S	Tube
UF840L-TM3-T	UF840G-TM3-T	TO-251	G	D	S	Tube
UF840L-TN3-R	UF840G-TN3-R	TO-252	G	D	S	Tape Reel

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



MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage ( $T_J = 25^\circ\text{C} \sim 125^\circ\text{C}$ )		$V_{DSS}$	500	V
Gate to Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	8.0	A
	Pulsed (Note 2)	$I_{DM}$	32	A
Avalanche Current (Note 2)		$I_{AR}$	7.3	A
Single Pulse Avalanche Energy (Note 3)		$E_{AS}$	266	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.6	V/ns
Power Dissipation	TO-220	$P_D$	134	W
	TO-220F/TO-220F1		44	W
	TO-220F2		46	W
	TO-251/TO-252		123	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.  $L = 10\text{mH}$ ,  $I_{AS} = 7.3\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$ .

4.  $I_{SD} \leq 8\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , 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	$\theta_{JC}$	0.93	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.86	$^\circ\text{C}/\text{W}$
	TO-220F2		2.72	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		1.01	$^\circ\text{C}/\text{W}$

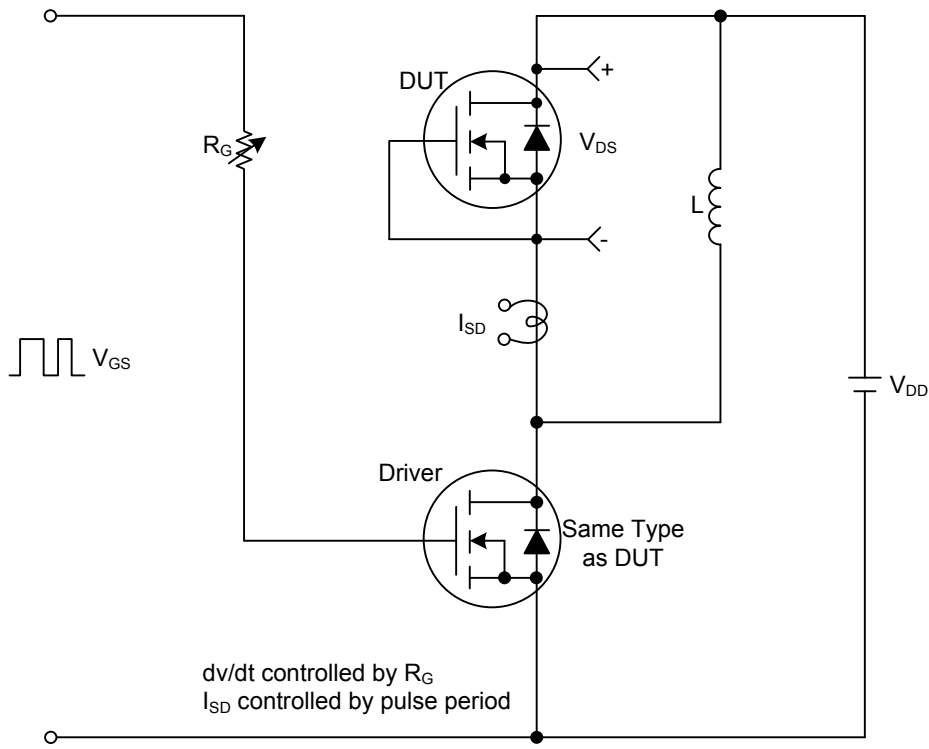
■ ELECTRICAL SPECIFICATIONS ( $T_J=25^\circ\text{C}$ , unless Otherwise Specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$	500			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=550\text{V}$ , $V_{GS}=0\text{V}$			25	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 30\text{V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$ , $I_D = 250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=4.0\text{A}$			0.81	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		1120		pF
Output Capacitance	$C_{OSS}$			120		pF
Reverse Transfer Capacitance	$C_{RSS}$			10		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	$Q_{GD}$			6		nC
Gate to Drain Charge	$Q_{GS}$			11.5		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	$t_{D(OFF)}$			274		ns
Fall-Time	$t_F$			69		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				8	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				32	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_S=8.0\text{A}$ , $V_{GS}=0\text{V}$			2	V
Body Diode Reverse Recovery Time (Note 1)	$t_{rr}$	$I_S=8.0\text{A}$ , $V_{GS}=0\text{V}$ , $dI_F/dt=100\text{A}/\mu\text{s}$		330		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			2.6		$\mu\text{C}$

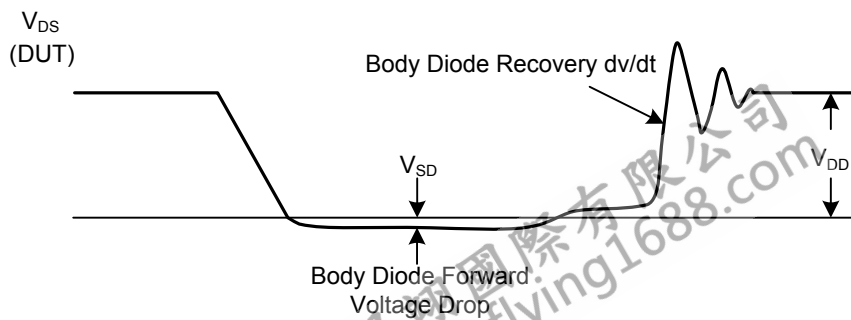
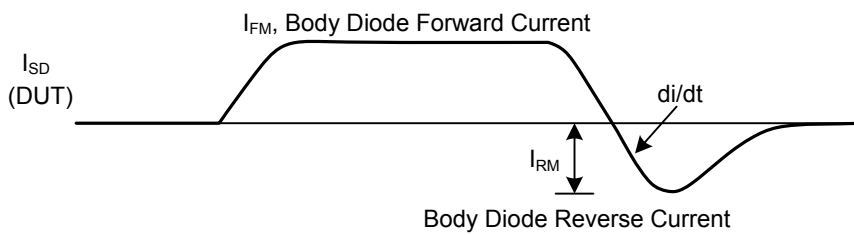
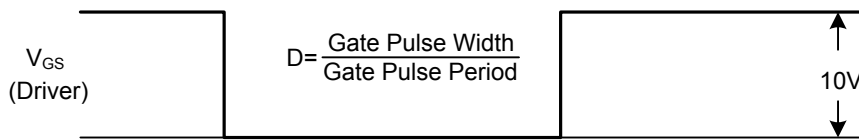
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

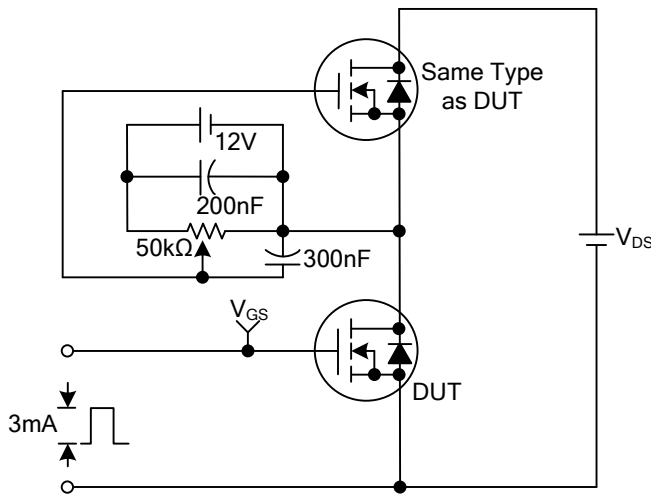


Peak Diode Recovery dv/dt Test Circuit & Waveforms

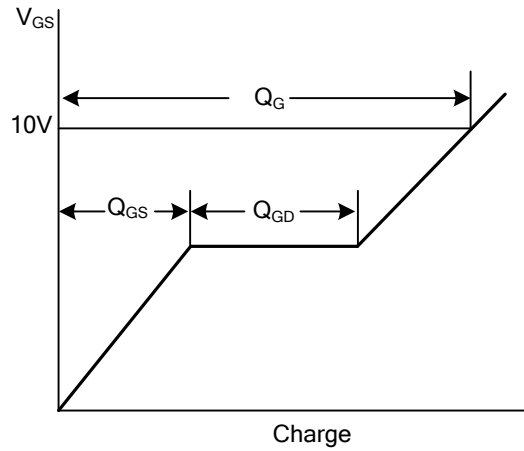


Peak Diode Recovery dv/dt Waveforms

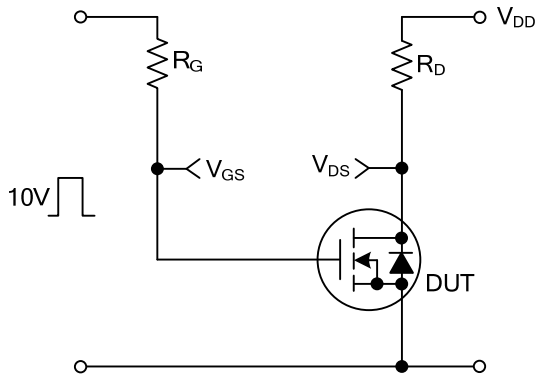
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



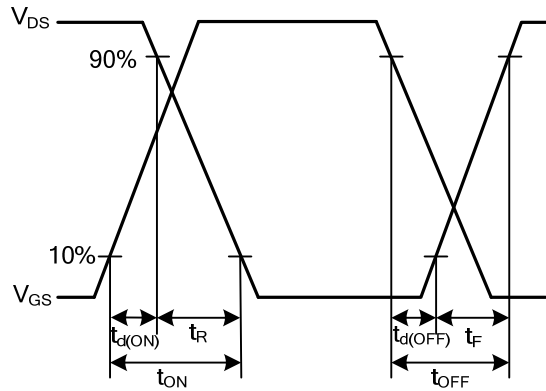
Gate Charge Test Circuit



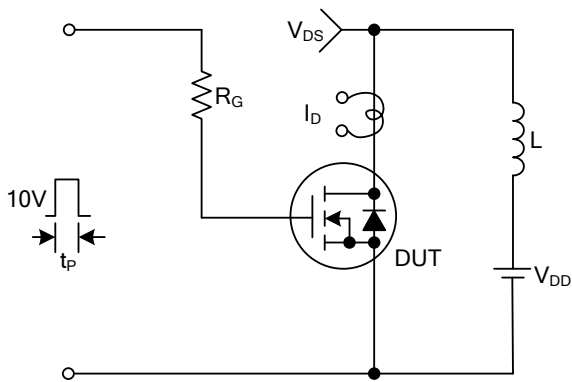
Gate Charge Waveforms



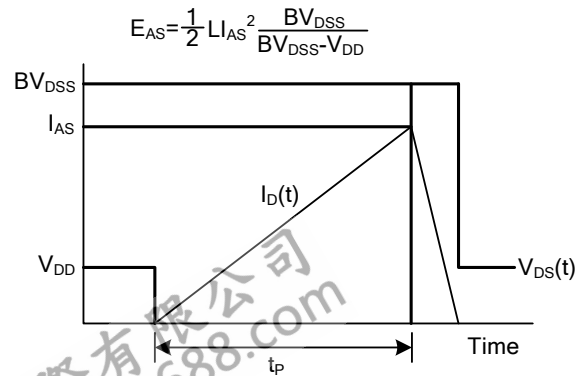
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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