



UF830K-MT

Power MOSFET

4.5A, 500V, 1.5Ω, N-CHANNEL POWER MOSFET

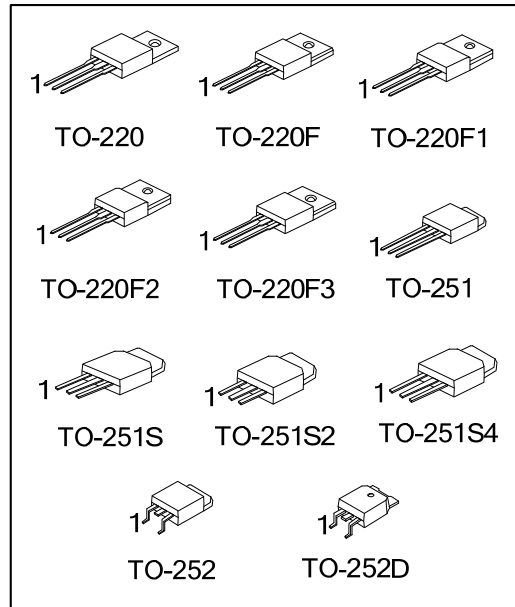
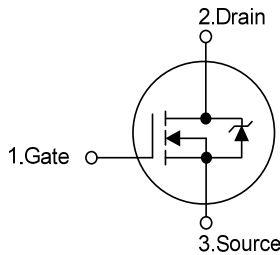
■ **DESCRIPTION**

The UTC **UF830K-MT** is a N-Channel enhancement mode silicon gate power MOSFET is designed high voltage, high speed power switching applications such as switching regulators, switching converters, solenoid, motor drivers, relay drivers.

■ **FEATURES**

- * $R_{DS(ON)} < 1.5\Omega @ V_{GS} = 10V, I_D = 2.5 A$
- * Single Pulse Avalanche Energy Rated
- * Rugged- SOA is Power Dissipation Limited
- * Fast Switching Speeds
- * Linear Transfer Characteristics
- * High Input Impedance

■ **SYMBOL**



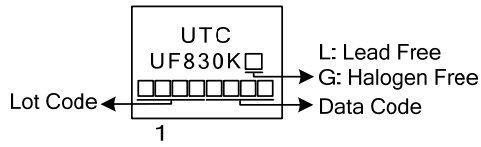
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF830KL-TA3-T	UF830KG-TA3-T	TO-220	G	D	S	Tube
UF830KL-TF3-T	UF830KG-TF3-T	TO-220F	G	D	S	Tube
UF830KL-TF1-T	UF830KG-TF1-T	TO-220F1	G	D	S	Tube
UF830KL-TF2-T	UF830KG-TF2-T	TO-220F2	G	D	S	Tube
UF830KL-TF3T-T	UF830KG-TF3T-T	TO-220F3	G	D	S	Tube
UF830KL-TM3-T	UF830KG-TM3-T	TO-251	G	D	S	Tube
UF830KL-TMS-T	UF830KG-TMS-T	TO-251S	G	D	S	Tube
UF830KL-TMS2-T	UF830KG-TMS2-T	TO-251S2	G	D	S	Tube
UF830KL-TMS4-T	UF830KG-TMS4-T	TO-251S4	G	D	S	Tube
UF830KL-TN3-R	UF830KG-TN3-R	TO-252	G	D	S	Tape Reel
UF830KL-TND-R	UF830KG-TND-R	TO-252D	G	D	S	Tape Reel

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

<p>UF830KL-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, TF3T: TO-220F3, TM3: TO-251, TMS: TO-251S, TMS2: TO-251S2, TMS4: TO-251S4, TN3: TO-252, TND: TO-252D</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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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_{DS}	500	V
Drain to Gate Voltage ($R_{GS}=20\text{k}\Omega$, $T_J=25^\circ\text{C} \sim 125^\circ\text{C}$)		V_{DGR}	500	V
Gate to Source Voltage		V_{GS}	± 30	V
Drain Current	Continuous	I_D	4.5	A
	Pulsed	I_{DM}	18	A
Avalanche Current (Note 2)		I_{AR}	5.0	A
Single Pulsed Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	125	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.9	V/ns
Power Dissipation ($T_C = 25^\circ\text{C}$)	TO-220	P_D	73	W
	TO-220F/TO-220F1		38	W
	TO-220F3			
	TO-220F2		40	W
	TO-251/TO-251S TO-251S2/ TO-251S4 TO-252/TO-252D		46	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. $L = 10\text{mH}$, $I_{AS} = 5.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$.

4. $I_{SD} \leq 4.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-220F3	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S TO-251S2/ TO-251S4 TO-252/TO-252D		100.3	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1.71	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1 TO-220F3		3.31	$^\circ\text{C}/\text{W}$
	TO-220F2		3.125	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S TO-251S2/ TO-251S4 TO-252/TO-252D		2.7	$^\circ\text{C}/\text{W}$

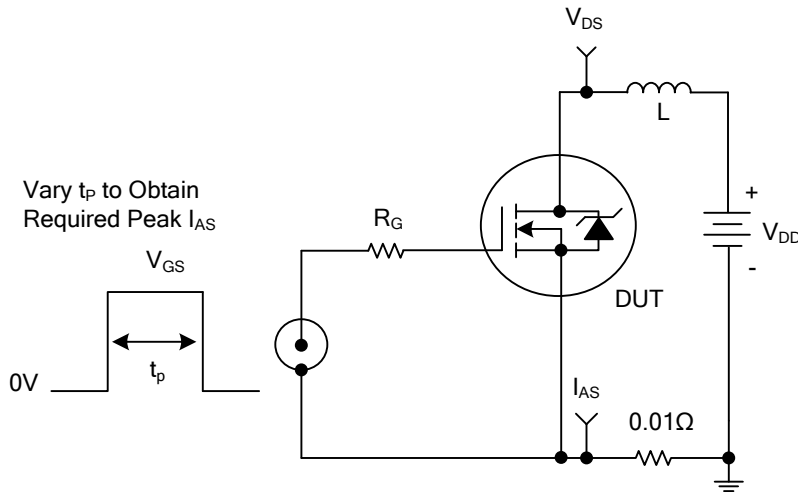
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage		BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	500			V	
Drain-Source Leakage Current		I_{DSS}	$V_{DS} = 500V, V_{GS} = 0V$			25	μA	
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS} = 30V, V_{DS} = 0V$			100	nA	
	Reverse		$V_{GS} = -30V, V_{DS} = 0V$			-100	nA	
ON CHARACTERISTICS								
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0		4.0	V	
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 2.5A$			1.5	Ω	
DYNAMIC CHARACTERISTICS								
Input Capacitance		C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		420		pF	
Output Capacitance		C_{OSS}				66		pF
Reverse Transfer Capacitance		C_{RSS}				6.5		pF
SWITCHING CHARACTERISTICS								
Total Gate Charge (Note 1)		Q_G	$V_{DS}=50V, I_D=1.3A, I_G=100\mu A$ $V_{GS}=10V$ (Note 1,2)		13.8		nC	
Gate to Source Charge		Q_{GS}				5.4		nC
Gate to Drain Charge		Q_{GD}				6.0		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	$V_{DD}=30V, I_D=0.5A, R_G=25\Omega,$ $V_{GS}=10V$ (Note 1,2)		48		nS	
Rise Time		t_R				48		nS
Turn-OFF Delay Time		$t_{D(OFF)}$				42		nS
Fall-Time		t_F				44		nS
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Maximum Body-Diode Continuous Current		I_S				5.5	A	
Maximum Body-Diode Pulsed Current		I_{SM}				18	A	
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	$I_S=4.5A, V_{GS}=0V$			1.6	V	
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	$I_S=4.5A, V_{GS}=0V,$ $di_F/dt=100A/\mu s$		290		nS	
Body Diode Reverse Recovery Charge		Q_{rr}				1.8		μC

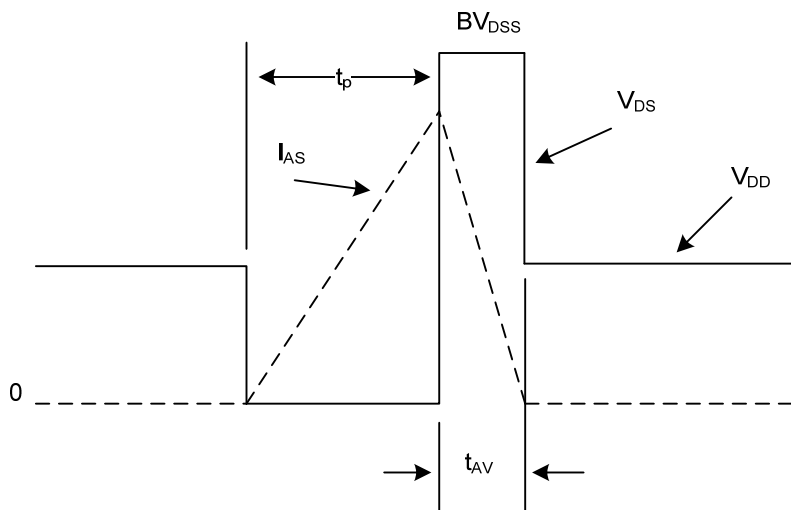
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

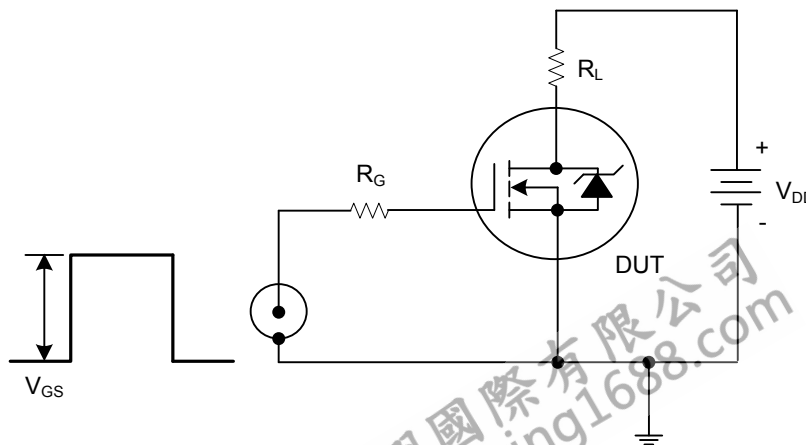
■ TEST CIRCUITS AND WAVEFORMS



Unclamped Energy Test Circuit

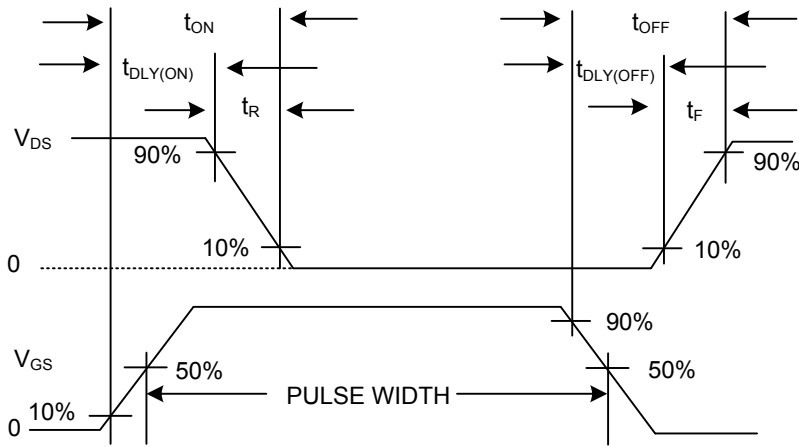


Unclamped Energy Waveforms

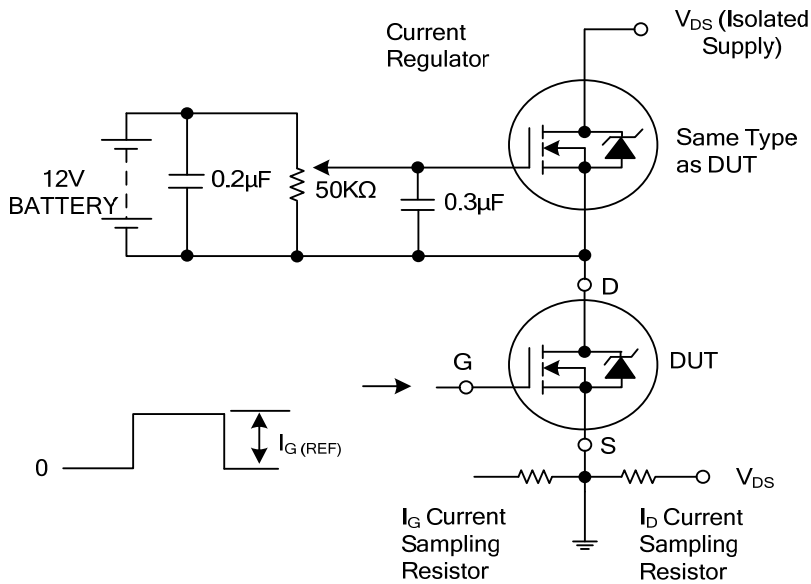


Switching Time Test Circuit

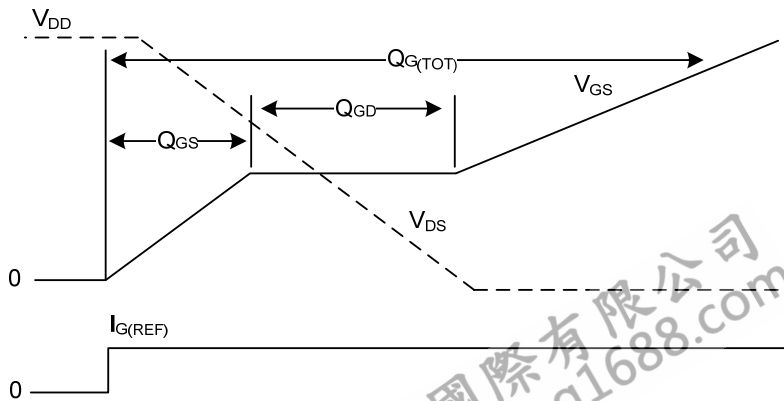
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



Resistive Switching Waveforms

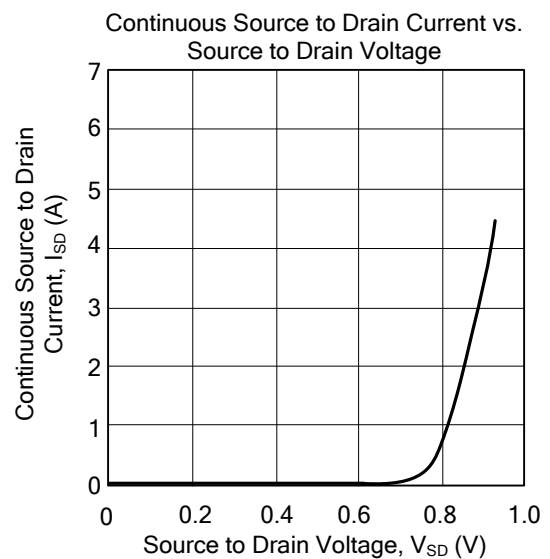
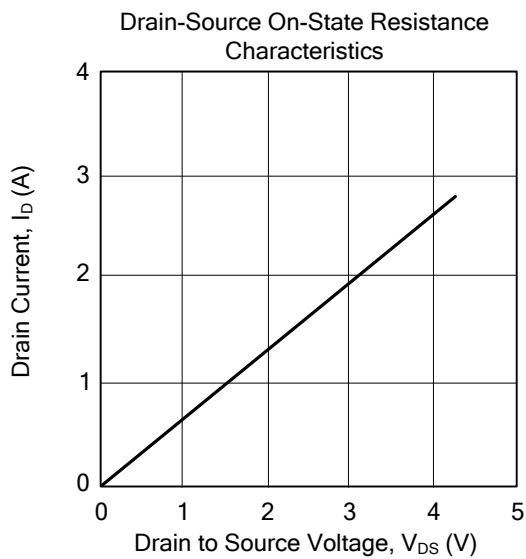
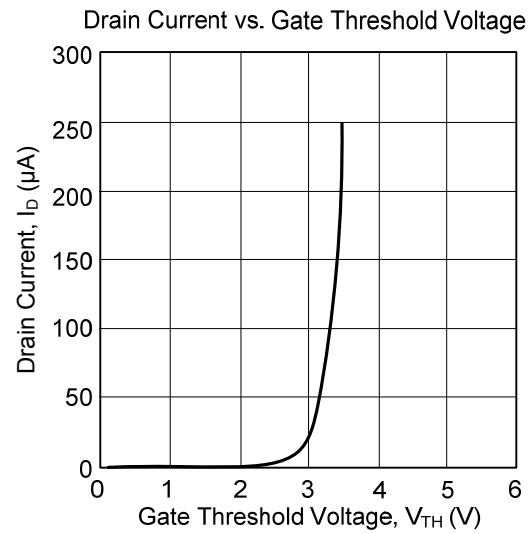
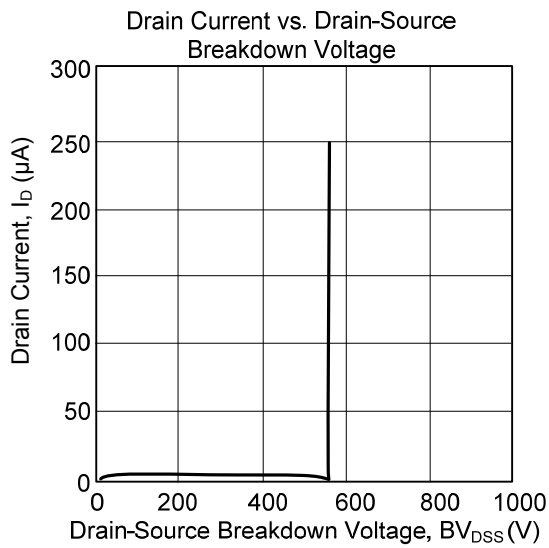


Gate Charge Test Circuit



Gate Charge Waveforms

■ TYPICAL CHARACTERISTICS



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