



# UF830K-MT

*Power MOSFET*

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

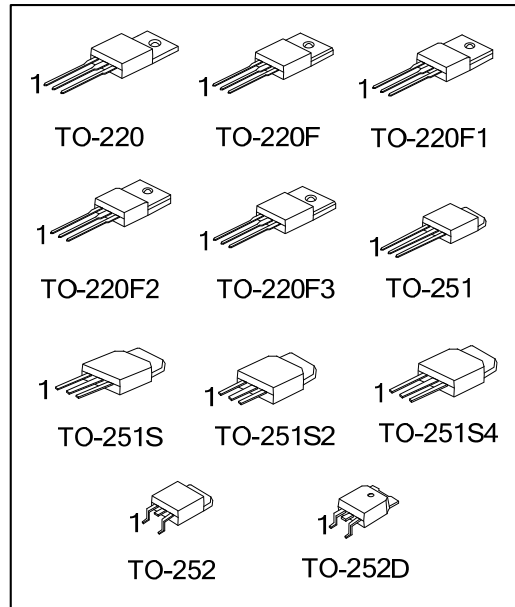
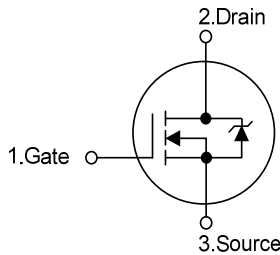
### DESCRIPTION

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



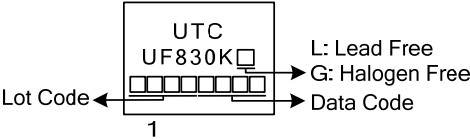
### ORDERING INFORMATION

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) T: Tube, R: Tape Reel                  (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                  (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25°C, Unless Otherwise Specified.)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage (T <sub>J</sub> =25°C ~125°C)		V <sub>DS</sub>	500	V
Drain to Gate Voltage (R <sub>GS</sub> =20kΩ, T <sub>J</sub> =25°C ~125°C)		V <sub>DGR</sub>	500	V
Gate to Source Voltage		V <sub>GS</sub>	±30	V
Drain Current	Continuous	I <sub>D</sub>	4.5	A
	Pulsed	I <sub>DM</sub>	18	A
Avalanche Current (Note 2)		I <sub>AR</sub>	5.0	A
Single Pulsed Avalanche Energy	Single Pulsed (Note 3)	E <sub>AS</sub>	125	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.9	V/ns
Power Dissipation (T <sub>C</sub> = 25°C)	TO-220	P <sub>D</sub>	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 <sub>J</sub>	+150	°C
Storage Temperature		T <sub>STG</sub>	-55 ~ +150	°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 = 10mH, I<sub>AS</sub> = 5.0A, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25Ω, Starting T<sub>J</sub> = 25°C.

4. I<sub>SD</sub> ≤ 4.5A, di/dt ≤ 200A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C.

### ■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-220F3	θ <sub>JA</sub>	62.5	°C/W
	TO-251/TO-251S TO-251S2/ TO-251S4 TO-252/TO-252D		100.3	°C/W
Junction to Case	TO-220	θ <sub>JC</sub>	1.71	°C/W
	TO-220F/TO-220F1 TO-220F3		3.31	°C/W
	TO-220F2		3.125	°C/W
	TO-251/TO-251S TO-251S2/ TO-251S4 TO-252/TO-252D		2.7	°C/W

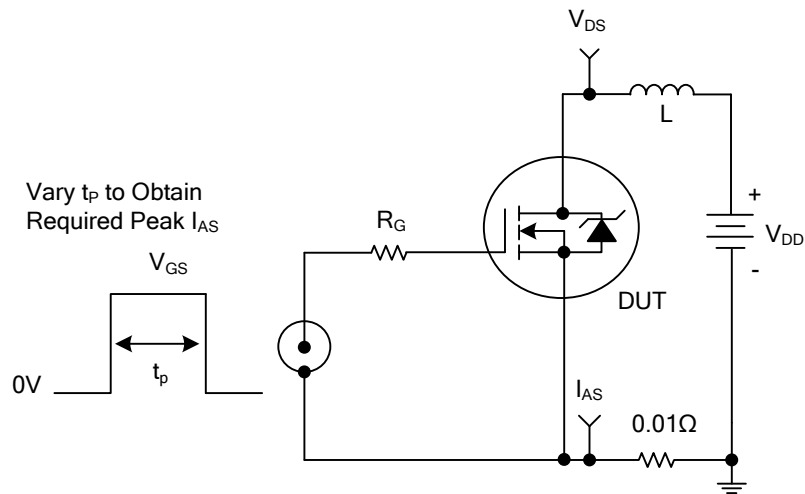
### ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>								
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	500			V	
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V			25	μA	
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> = 30V, V <sub>DS</sub> = 0V			100	nA	
	Reverse		V <sub>GS</sub> = -30V, V <sub>DS</sub> = 0V			-100	nA	
<b>ON CHARACTERISTICS</b>								
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0		4.0	V	
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A			1.5	Ω	
<b>DYNAMIC CHARACTERISTICS</b>								
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		420		pF	
Output Capacitance		C <sub>OSS</sub>				66		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>				6.5		pF
<b>SWITCHING CHARACTERISTICS</b>								
Total Gate Charge (Note 1)		Q <sub>G</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =1.3A, I <sub>G</sub> =100μA V <sub>GS</sub> =10V (Note 1,2)		13.8		nC	
Gate to Source Charge		Q <sub>GS</sub>				5.4		nC
Gate to Drain Charge		Q <sub>GD</sub>				6.0		nC
Turn-ON Delay Time (Note 1)		t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =0.5A, R <sub>G</sub> =25Ω, V <sub>GS</sub> =10V (Note 1,2)		48		nS	
Rise Time		t <sub>R</sub>				48		nS
Turn-OFF Delay Time		t <sub>D(OFF)</sub>				42		nS
Fall-Time		t <sub>F</sub>				44		nS
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>								
Maximum Body-Diode Continuous Current		I <sub>S</sub>				5.5	A	
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>				18	A	
Drain-Source Diode Forward Voltage (Note 1)		V <sub>SD</sub>	I <sub>S</sub> =4.5A, V <sub>GS</sub> =0V			1.6	V	
Body Diode Reverse Recovery Time (Note 1)		t <sub>rr</sub>	I <sub>S</sub> =4.5A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/μs		290		nS	
Body Diode Reverse Recovery Charge		Q <sub>rr</sub>				1.8		μC

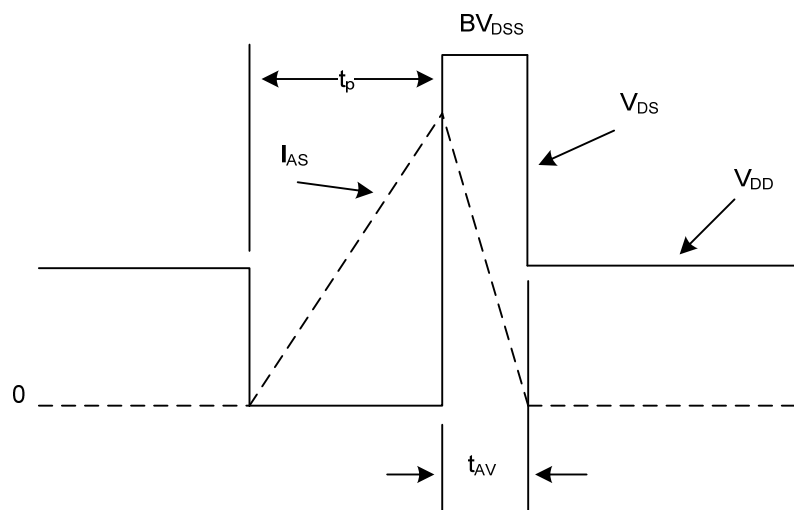
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

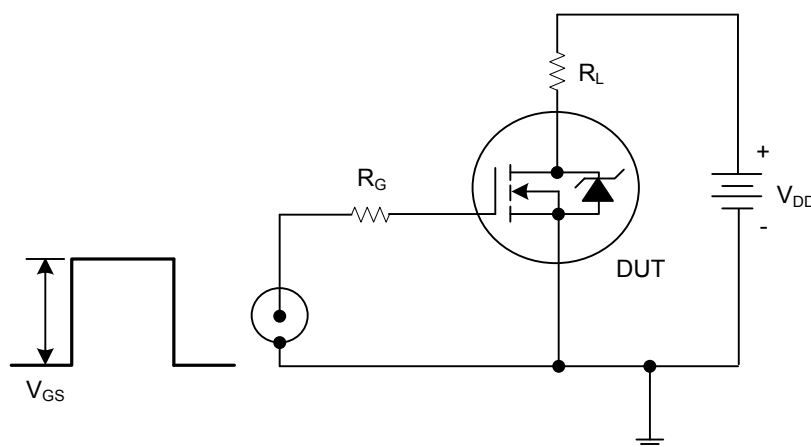
■ TEST CIRCUITS AND WAVEFORMS



Unclamped Energy Test Circuit

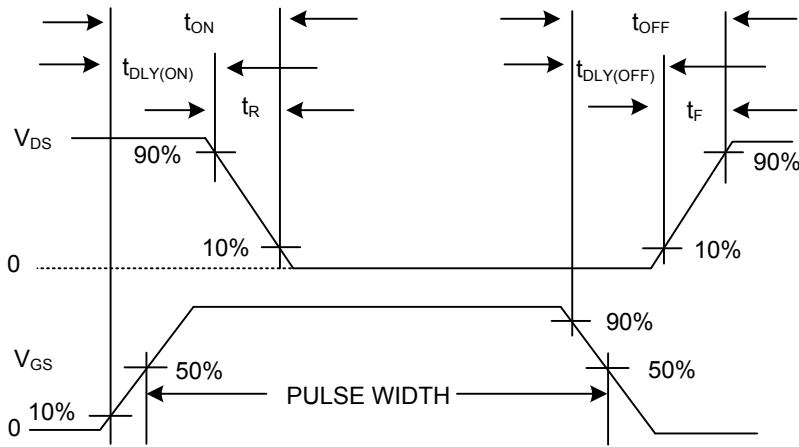


Unclamped Energy Waveforms

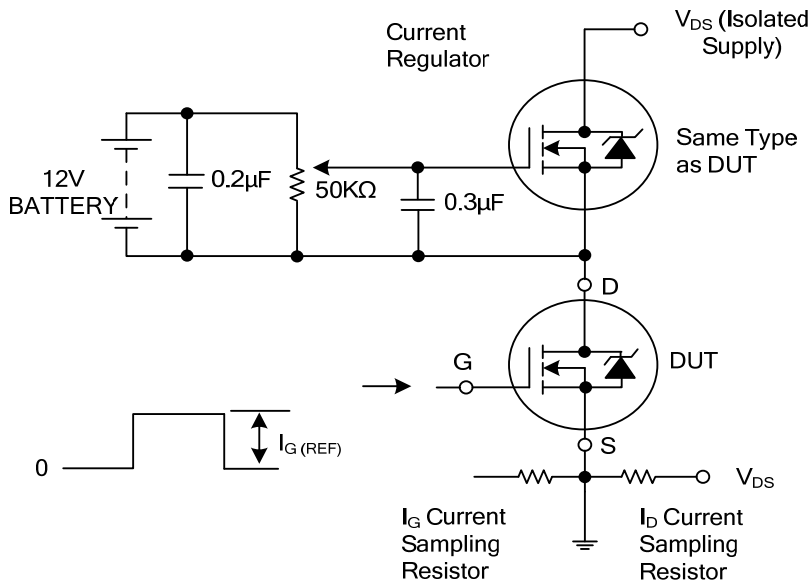


Switching Time Test Circuit

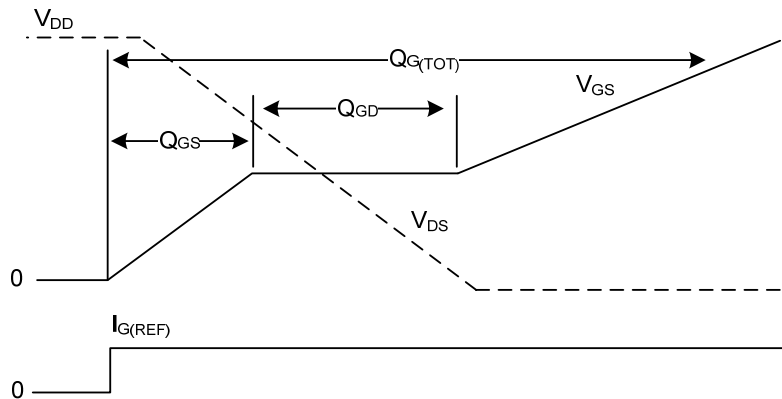
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



Resistive Switching Waveforms

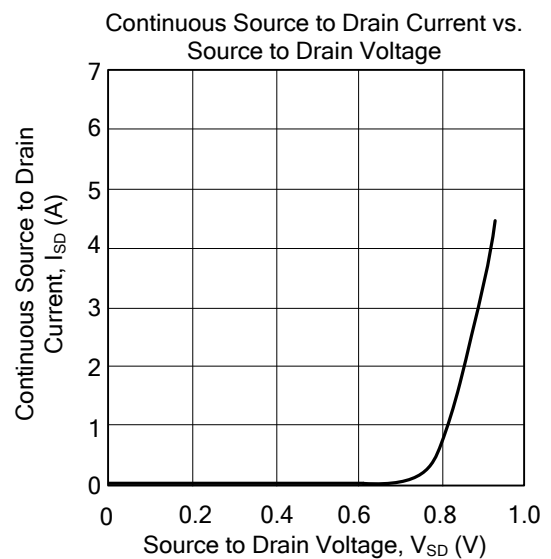
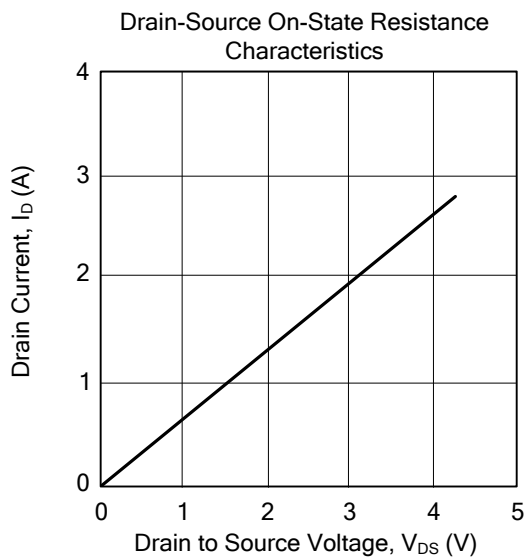
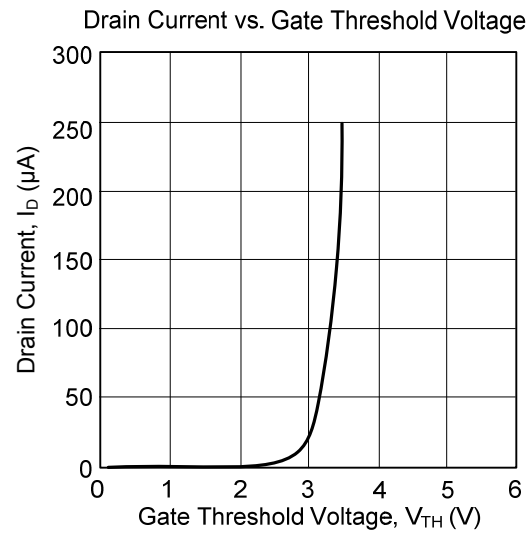
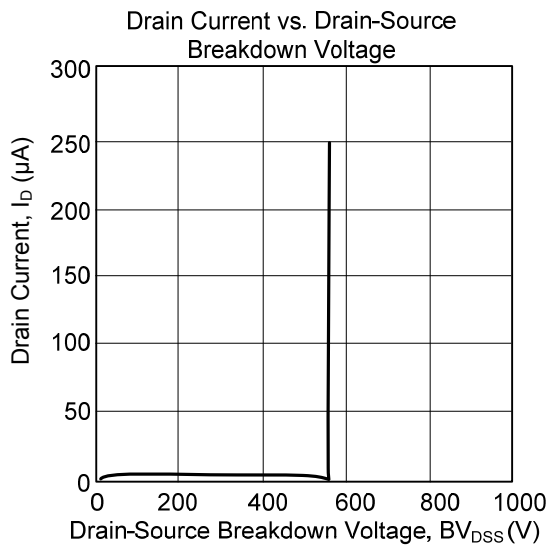


Gate Charge Test Circuit



Gate Charge Waveforms

## ■ TYPICAL CHARACTERISTICS



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