



UF730K-TA

Preliminary

Power MOSFET

**5.5A, 400V N-CHANNEL
POWER MOSFET**

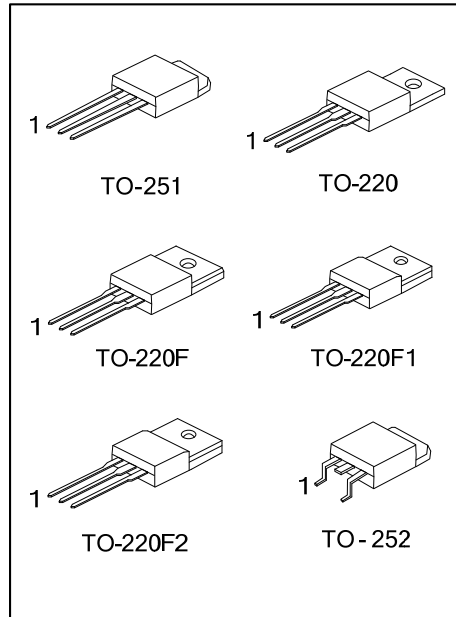
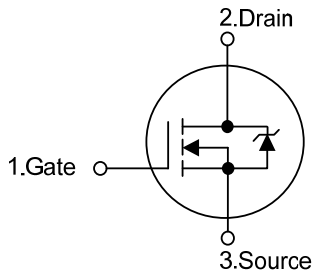
■ DESCRIPTION

The 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

- * $R_{DS(ON)} < 1.2\Omega @ V_{GS}=10V, I_D=3.0A$
- * Avalanche Energy Specified
- * Fast Switching Capability
- * Linear Transfer Characteristics
- * High Input Impedance

■ SYMBOL



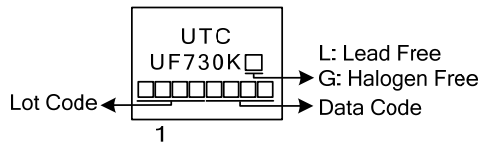
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF730KL-TA3-T	UF730KG-TA3-T	TO-220	G	D	S	Tube
UF730KL-TF1-T	UF730KG-TF1-T	TO-220F1	G	D	S	Tube
UF730KL-TF2-T	UF730KG-TF2-T	TO-220F2	G	D	S	Tube
UF730KL-TF3-T	UF730KG-TF3-T	TO-220F	G	D	S	Tube
UF730KL-TM3-R	UF730KG-TM3-R	TO-251	G	D	S	Tape Reel
UF730KL-TN3-R	UF730KG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UF730KL-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



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	400	V
Drain-Gate Voltage ($R_{GS} = 20\text{k}\Omega$) ($T_J = 25^\circ\text{C} \sim 125^\circ\text{C}$)		V_{DGR}	400	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current		I_D	5.5	A
Pulsed Drain Current (Note 2)		I_{DM}	22	A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	170	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	$T_C = 25^\circ\text{C}$	TO-220	73	W
		TO-220F/TO-220F1	38	W
		TO-220F2	40	W
		TO-251/TO-252	48	W
	Derate above 25°C	TO-220	0.584	$\text{W}/^\circ\text{C}$
		TO-220F/TO-220F1	0.304	$\text{W}/^\circ\text{C}$
		TO-220F2	0.32	$\text{W}/^\circ\text{C}$
		TO-251/TO-252	0.384	$\text{W}/^\circ\text{C}$
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. $L = 11\text{mH}$, $I_{AS} = 5.5\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 5.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, $T_J \leq T_{JMAX}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2			
	TO-251/TO-252			
Junction to Case	TO-220	θ_{JC}	1.71	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		3.31	
	TO-220F2		3.125	
	TO-251/TO-252		2.6	

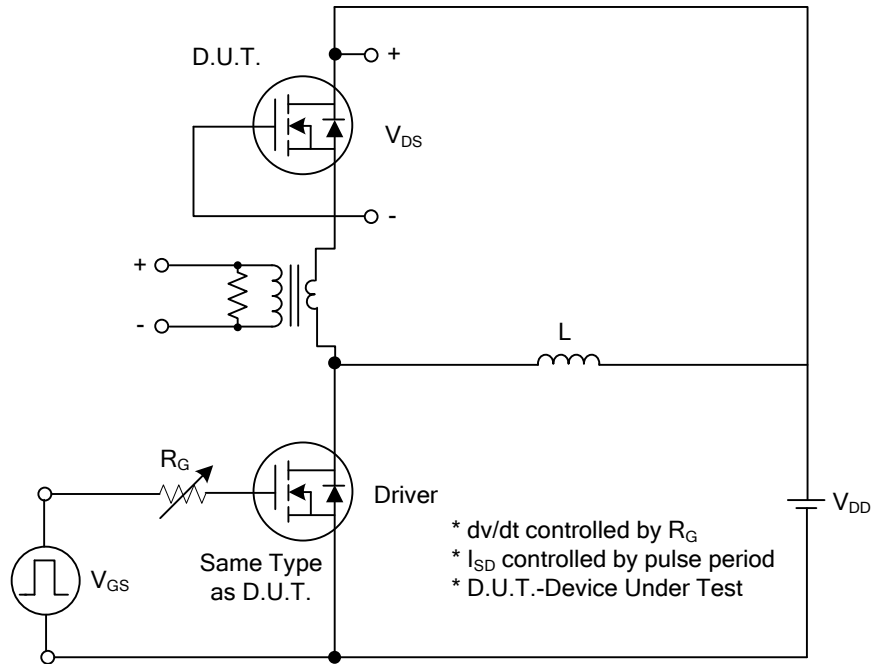
■ ELECTRICAL CHARACTERISTICS (T_c = 25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	400			V
On-State Drain Current (Note 1)	I _{D(ON)}	V _{DS} >I _{D(ON)} ×R _{DS(ON)MAX} , V _{GS} =10V	5.5			A
Drain-Source Leakage Current	I _{DSS}	V _{DS} =Rated BV _{DSS} , V _{GS} =0V			25	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3.0A			1.2	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		465		pF
Output Capacitance	C _{OSS}			63		pF
Reverse Transfer Capacitance	C _{RSS}			7		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A I _G = 100μA (Note1, 2)		40		nC
Gate-Source Charge	Q _{GS}			3.4		nC
Gate-Drain Charge	Q _{GD}			4.6		nC
Turn-On Delay Time	t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note1, 2)		40		ns
Turn-On Rise Time	t _R			35		ns
Turn-Off Delay Time	t _{D(OFF)}			105		ns
Turn-Off Fall Time	t _F			32		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				5.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				22	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =5.5A			1.6	V
Reverse Recovery Time	t _{RR}	I _{SD} = 5.5A, dI _{SD} /dt = 100A/μs (Note 1)		285		ns
Reverse Recovery Charge	Q _{RR}				1.9	

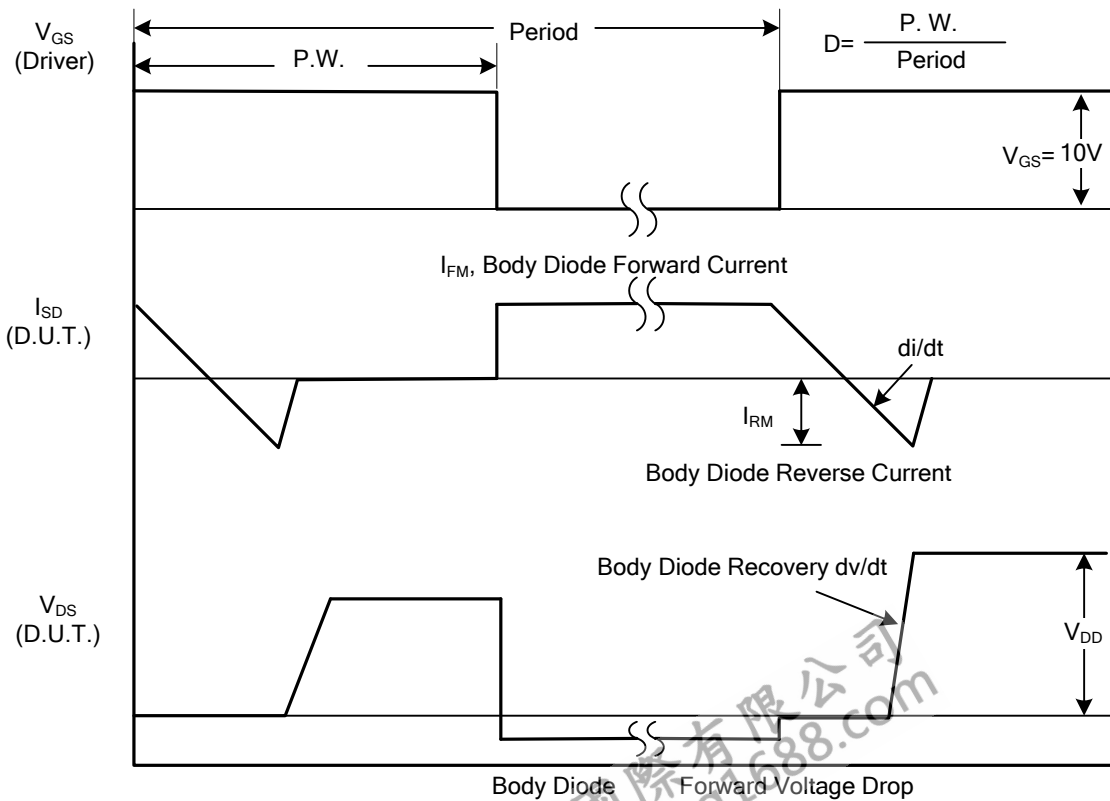
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

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

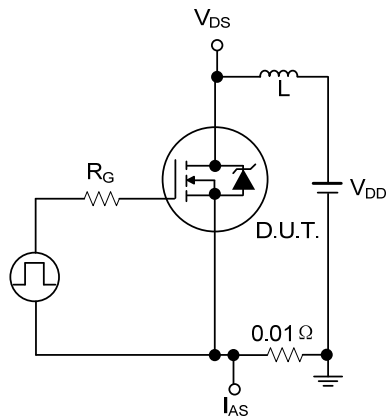


Figure 1A. Unclamped Energy Test Circuit

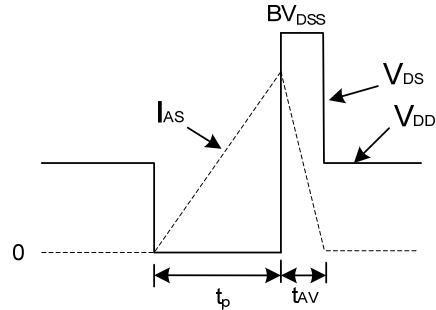


Figure 1B. Unclamped Energy Waveforms

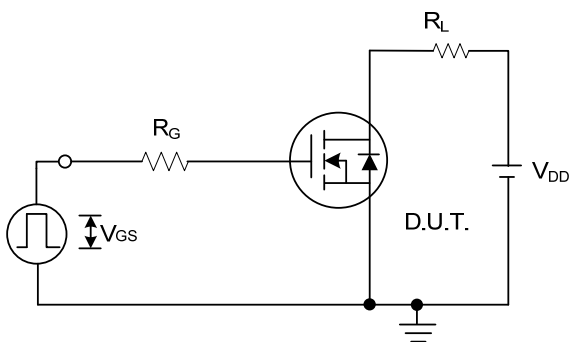


Figure 2A. Switching Time Test Circuit

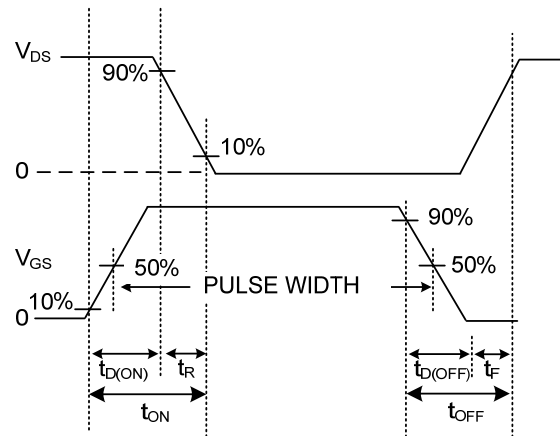


Figure 2B. Resistive Switching Waveforms

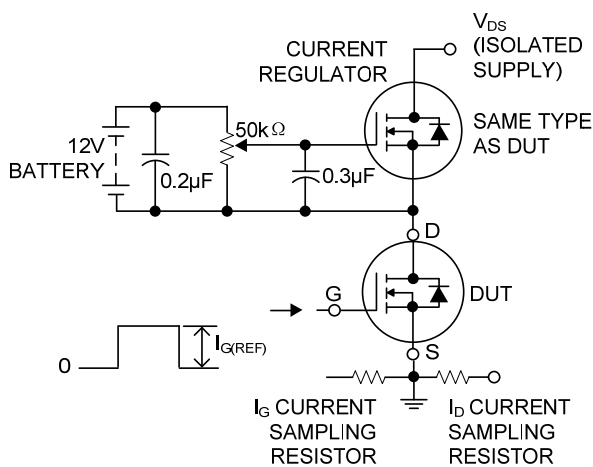


Figure 3A. Gate Charge Test Circuit

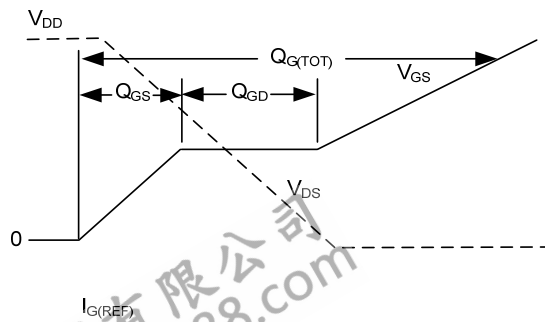


Figure 3B. Gate Charge Waveforms

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