



UF730-E

Power MOSFET

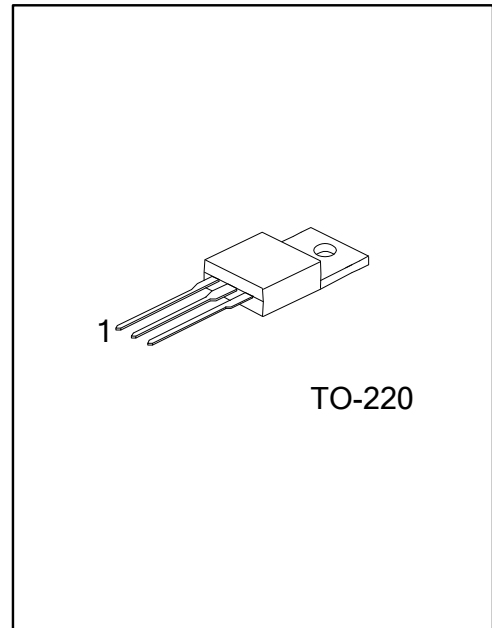
5.5 Amps, 400 Volts N-CHANNEL POWER MOSFET

DESCRIPTION

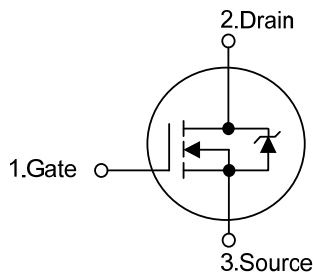
The N-Channel enhancement mode silicon gate power MOSFET is designed for high voltage, high speed power switching applications such as switching regulators, switching converters, solenoid, motor drivers, relay drivers.

FEATURES

- * $R_{DS(ON)}=0.85\Omega @ V_{GS}=10V, I_D=3.0A$
- * Avalanche Energy Specified
- * Rugged - SOA is Power Dissipation Limited
- * 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	
UF730L-TA3-T	UF730G-TA3-T	TO-220	G	D	S	Tube

<p>UF730L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) T: Tube (2) TA3: TO-220 (3) L: Lead Free, G: Halogen Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	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_{GS}	± 20	V
Continuous Drain Current	I_D	5.5	A
Pulsed Drain Current (Note 1)	I_{DM}	22	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	300	mJ
Power Dissipation	P_D	73	W
Junction Temperature	T_J	+150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Note: 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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction-to-Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction-to-Case	θ_{JC}	1.71	$^\circ\text{C}/\text{W}$

■ 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 3)	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		0.69	0.85	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		615	630	pF
Output Capacitance	C _{OSS}			115	125	pF
Reverse Transfer Capacitance	C _{RSS}			45	55	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =0.5A, V _{GS} =0~10V, R _G =25Ω (Note 3, 4)		98	120	ns
Turn-On Rise Time	t _R			104	125	ns
Turn-Off Delay Time	t _{D(OFF)}			238	250	ns
Turn-Off Fall Time	t _F			148	160	ns
Total Gate Charge	Q _G	V _{GS} =50V, I _D =1.3A, V _{DS} =10V, I _G =100μA		31	35	nC
Gate-Source Charge	Q _{GS}			5.5		nC
Gate-Drain Charge	Q _{GD}			10		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =5.5A			1.6	V
Maximum Continuous Drain-Source Diode Forward Current	I _S				5.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				22	A
Reverse Recovery Time	t _{RR}	I _{SD} = 5.5A, dI _{SD} /dt = 100A/μs (Note 3)	140	300	660	ns
Reverse Recovery Charge	Q _{RR}		0.93	2.1	4.3	μC

- Notes: 1. Repetitive Rating : Pulse width limited by T_J
 2. L = 20mH, I_{AS} = 5.5A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
 3. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
 4. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

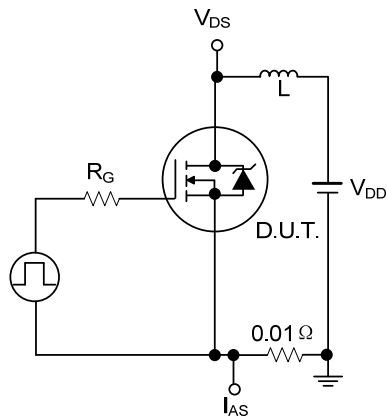


Figure 1A. Unclamped Energy Test Circuit

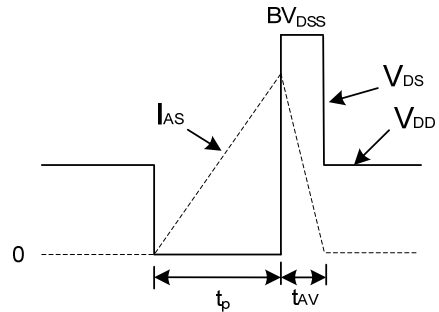


Figure 1B. Unclamped Energy Waveforms

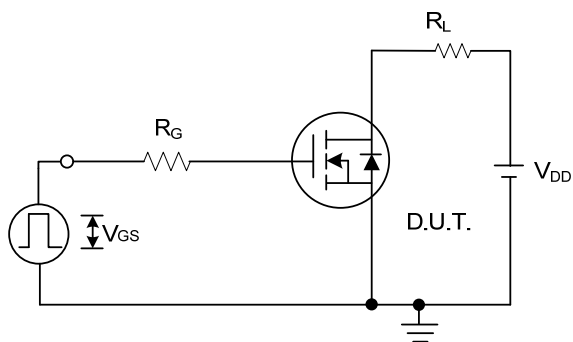


Figure 2A. Switching Time Test Circuit

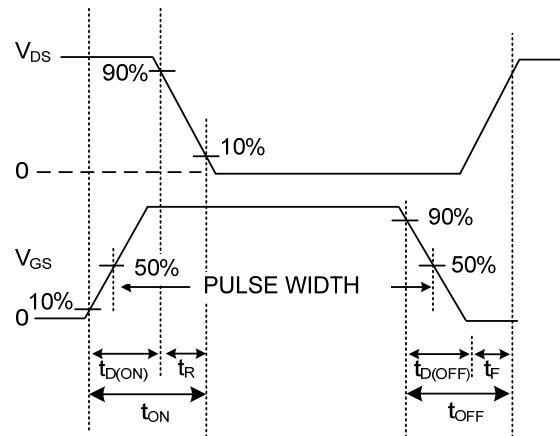


Figure 2B. Resistive Switching Waveforms

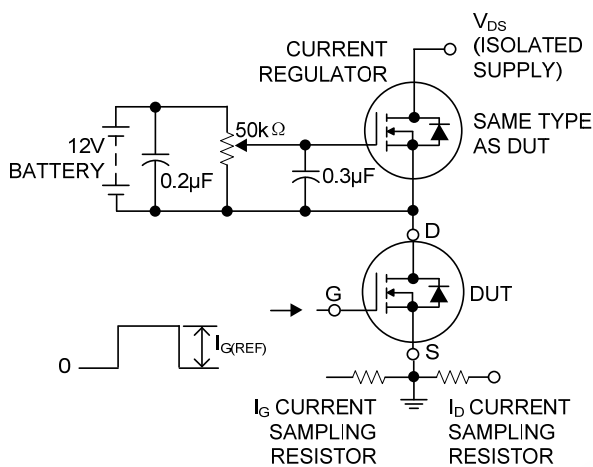


Figure 3A. Gate Charge Test Circuit

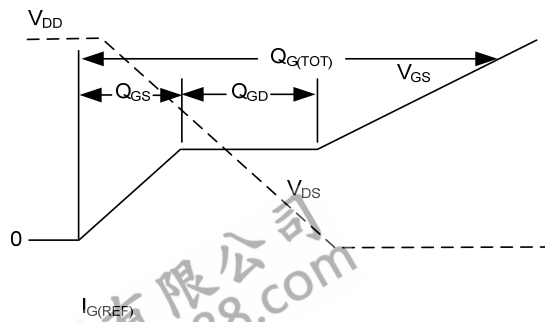
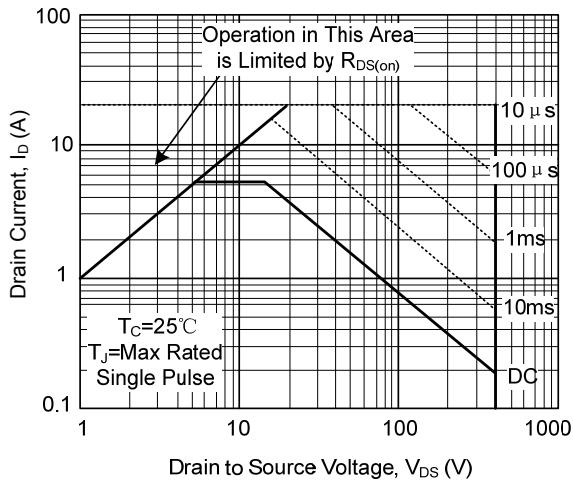


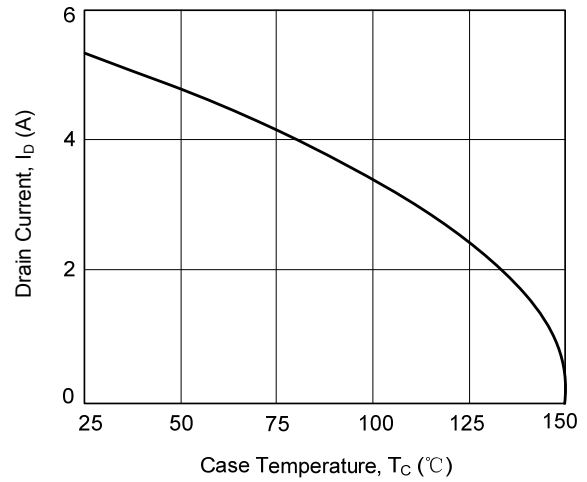
Figure 3B. Gate Charge Waveforms

TYPICAL CHARACTERISTICS

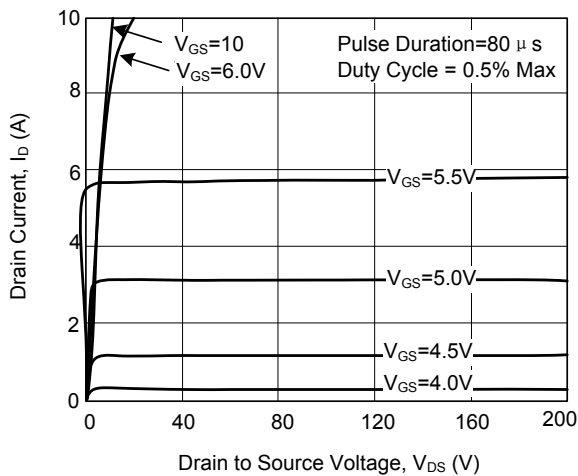
Forward Bias Safe Operating Area



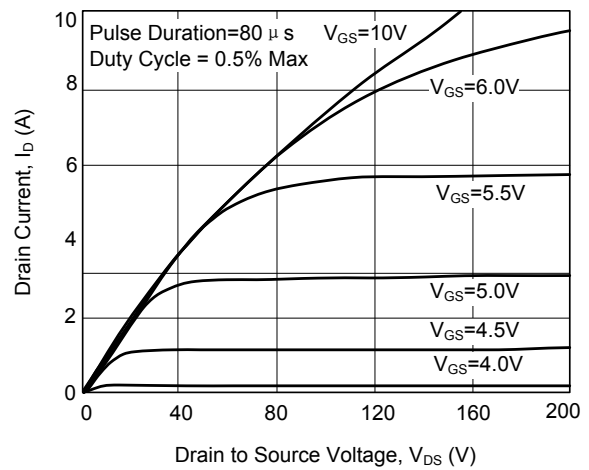
Maximum Continuous Drain Current vs. Case Temperature



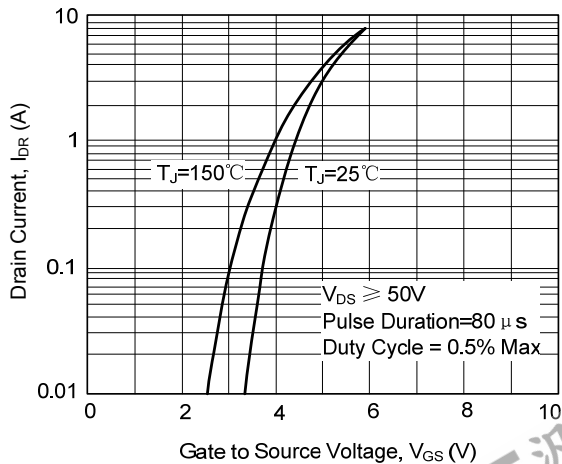
Output Characteristics



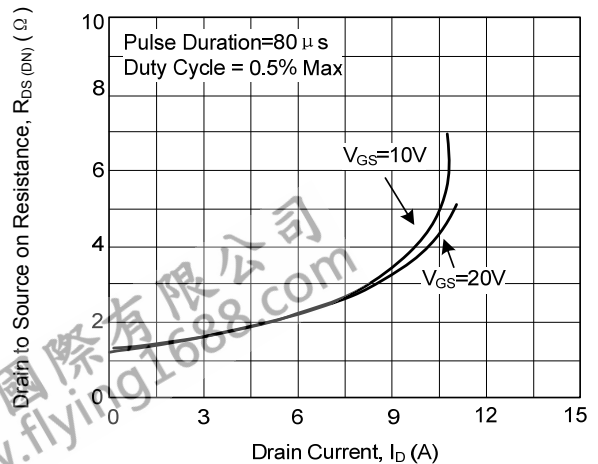
Sturation Characteristics



Transfer Characteristics

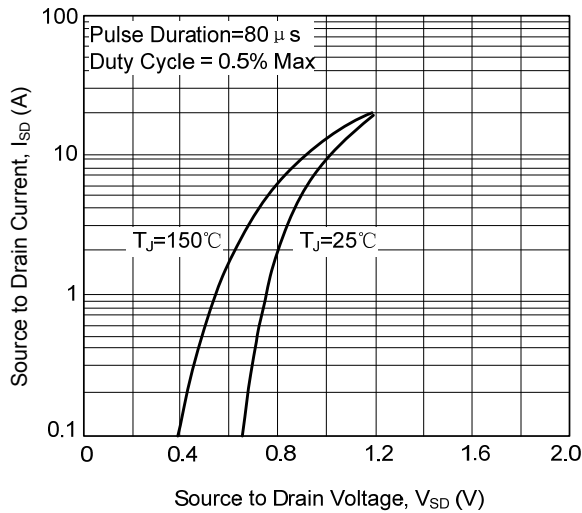


Drain to Source on Resistance vs. Gate Voltage and Drain Current

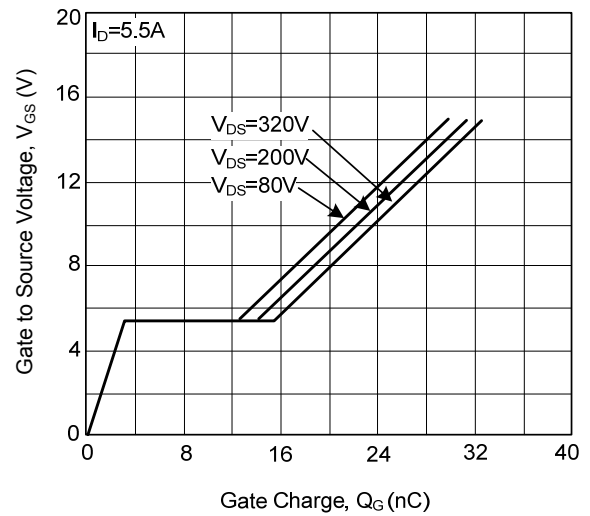


TYPICAL CHARACTERISTICS

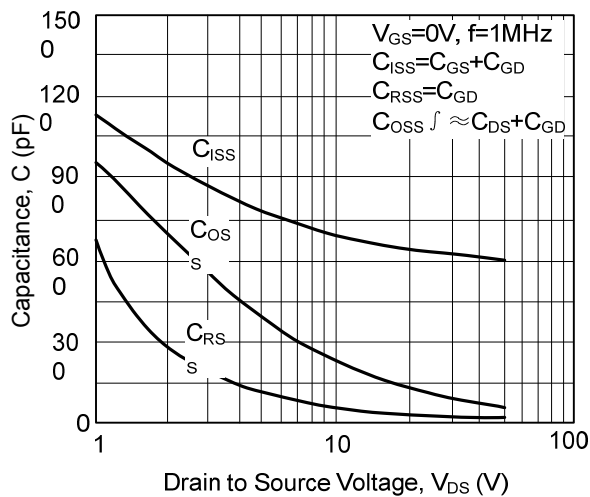
Source to Drain Diode Voltage



Gate to Source Voltage vs. Gate Charge



Capacitance vs. Drain to Source Voltage



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