



UF630

Power MOSFET

200V, 9A N-CHANNEL POWER MOSFET

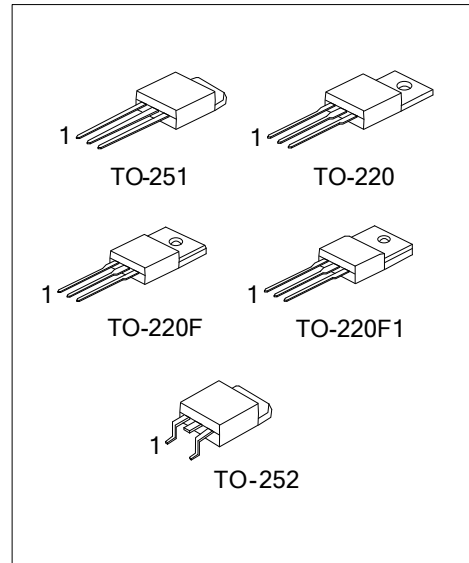
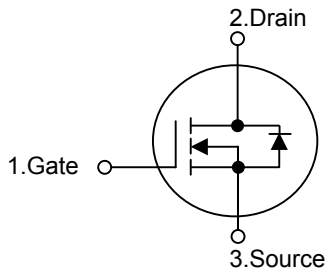
■ DESCRIPTION

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

- * $R_{DS(ON)} = 0.4\Omega @ V_{GS} = 10V$
- * Ultra Low Gate Charge (typical 19 nC)
- * Low Reverse Transfer Capacitance ($C_{RSS} =$ typical 80 pF)
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF630L-TA3-T	UF630G-TA3-T	TO-220	G	D	S	Tube
UF630L-TF1-T	UF630G-TF1-T	TO-220F1	G	D	S	Tube
UF630L-TF3-T	UF630G-TF3-T	TO-220F	G	D	S	Tube
UF630L-TM3-T	UF630G-TM3-T	TO-251	G	D	S	Tube
UF630L-TN3-R	UF630G-TN3-R	TO-252	G	D	S	Tape Reel
UF630L-TN3-T	UF630G-TN3-T	TO-252	G	D	S	Tube

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

<p>UF630L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) R: Tape Reel, T: Tube (2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F, TM3: TO-251, TN3: TO-252 (3) G: Halogen Free, L: Lead 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_{DSS}	200	V
Drain-Gate Voltage ($R_{GS} = 20\text{k}\Omega$, $T_J = 25^\circ\text{C} \sim 125^\circ\text{C}$)		V_{DGR}	200	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current		I_D	9	A
Pulsed Drain Current (Note 2)		I_{DM}	36	A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	150	mJ
Power Dissipation	TO-220	P_D	75	W
	TO-220F1/ TO-220F		51	
	TO-251/ TO-252		54	
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 T_J

3. $L = 4\text{mH}$, $I_{AS} = 8.3\text{A}$, $V_{DD} = 20\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/ TO-220F1/ TO-220F	θ_{JA}	80	$^\circ\text{C/W}$
	TO-251/ TO-252		110	
Junction to Case	TO-220	θ_{JC}	1.67	$^\circ\text{C/W}$
	TO-220F1/ TO-220F		2.45	
	TO-251/ TO-252		2.3	

■ ELECTRICAL SPECIFICATIONS (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	200			V	
On-State Drain Current (Note 1)		I _{D(ON)}	V _{DS} > I _{D(ON)} × R _{DS(ON)MAX} , V _{GS} = 10V	9			A	
Drain-Source Leakage Current		I _{DSS}	V _{DS} = Rated BV _{DSS} , V _{GS} = 0V			10	μA	
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} = 20V, V _{DS} = 0V			100	nA	
	Reverse		V _{GS} = -20V, V _{DS} = 0V			-100	nA	
ON CHARACTERISTICS								
Gate Threshold Voltage		V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250μA	2		4	V	
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} = 10V, I _D = 5A		0.25	0.4	Ω	
DYNAMIC CHARACTERISTICS								
Input Capacitance		C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz		600		pF	
Output Capacitance		C _{OSS}				250		pF
Reverse Transfer Capacitance		C _{RSS}				80		pF
SWITCHING CHARACTERISTICS								
Turn-On Delay Time		t _{D(ON)}	V _{DD} = 90V, I _D ≈ 9A, R _{GS} = 9.1Ω, V _{GS} = 10V, R _L = 9.6Ω (Note 1, 2)			30	ns	
Turn-On Rise Time		t _R				50		ns
Turn-Off Delay Time		t _{D(OFF)}				50		ns
Turn-Off Fall Time		t _F				40		ns
Total Gate Charge		Q _G		V _{GS} = 10V, I _D = 9A, V _{DS} = 0.8 × Rated BV _{DSS}		19	30	nC
Gate-Source Charge		Q _{GS}	I _{G(REF)} = 1.5mA		10		nC	
Gate-Drain Charge		Q _{GD}			9		nC	
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS								
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0V, I _S = 9.0A			2	V	
Maximum Continuous Drain-Source Diode Forward Current		I _S				9	A	
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				36	A	
Reverse Recovery Time		t _{rr}	I _S = 9.0A, di _S /dt = 100A/μs		450		ns	
Reverse Recovery Charge		Q _{RR}	(Note 1)		3		μC	

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

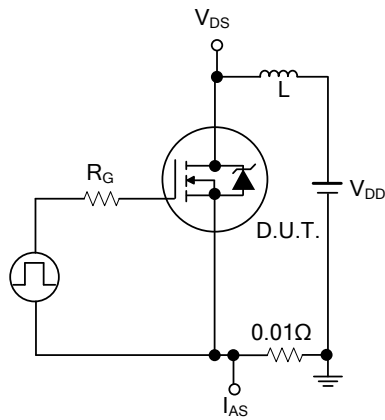


Fig.1. Unclamped Energy Test Circuit

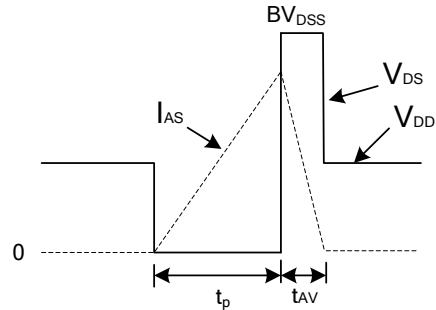


Fig.2 Unclamped Energy Waveforms

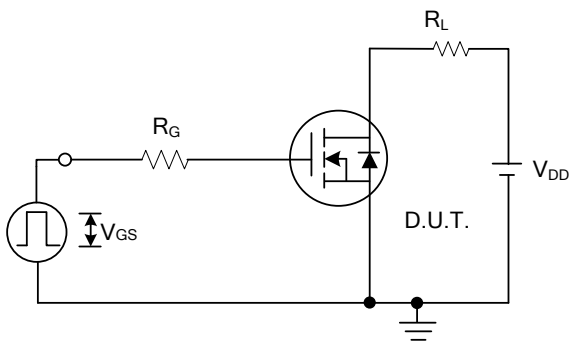


Fig.3 Switching Time Test Circuit

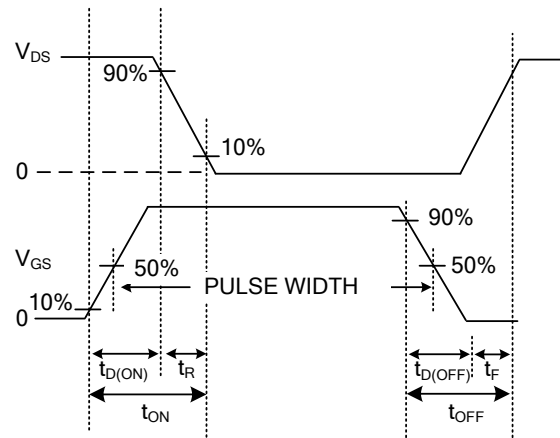


Fig.4 Resistive Switching Waveforms

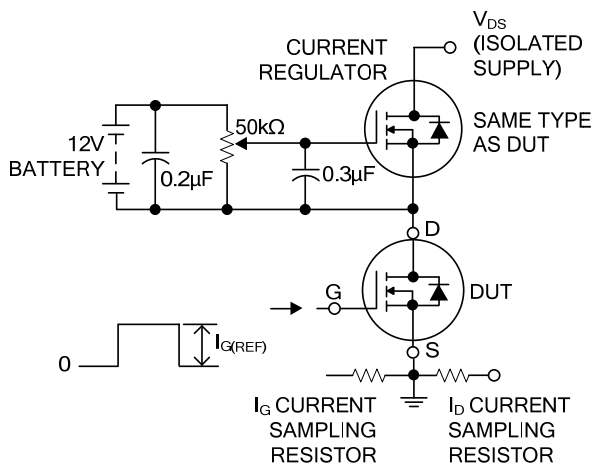


Fig.5 Gate Charge Test Circuit

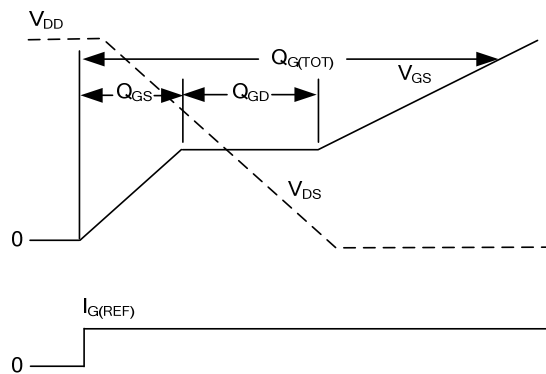
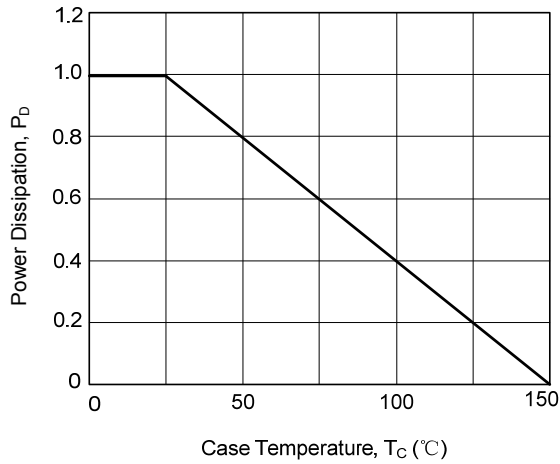


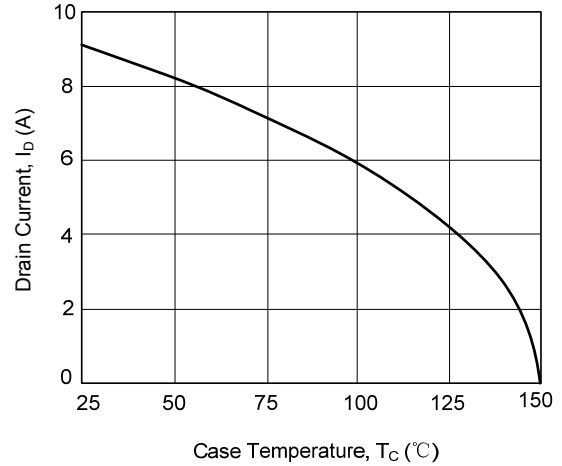
Fig.6 Gate Charge Waveforms

TYPICAL CHARACTERISTICS

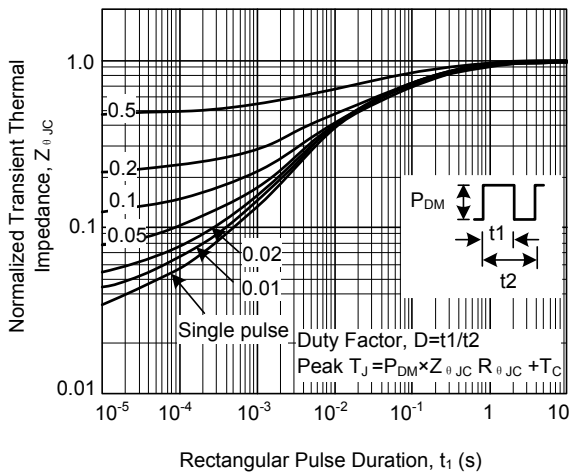
Normalized Power Dissipation vs. Case Temperature



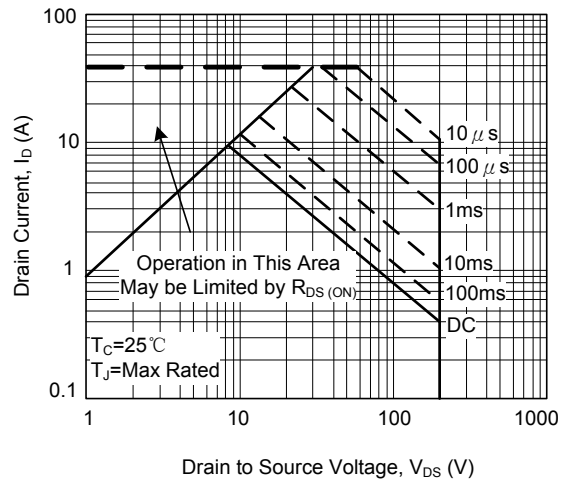
Maximum Continuous Drain Current vs. Case Temperature



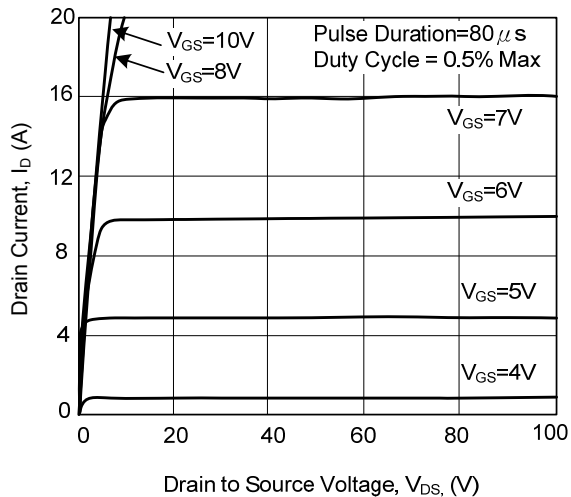
Normalized Transient Thermal Impedance



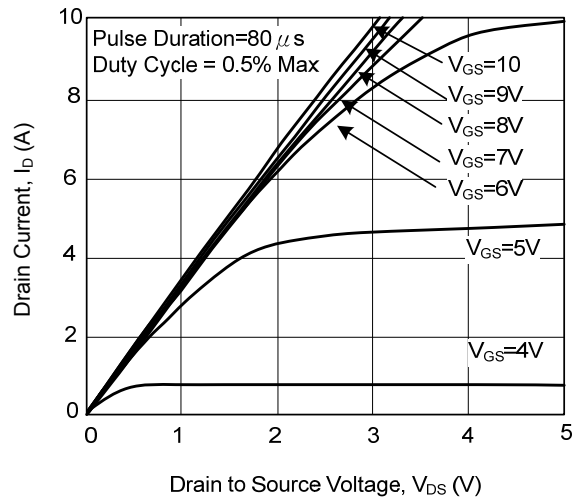
Forward Bias Safe Operating Area



Output Characteristics

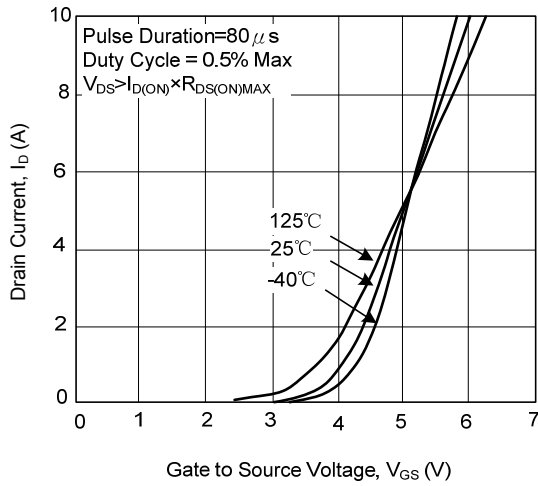


Saturation Characteristics

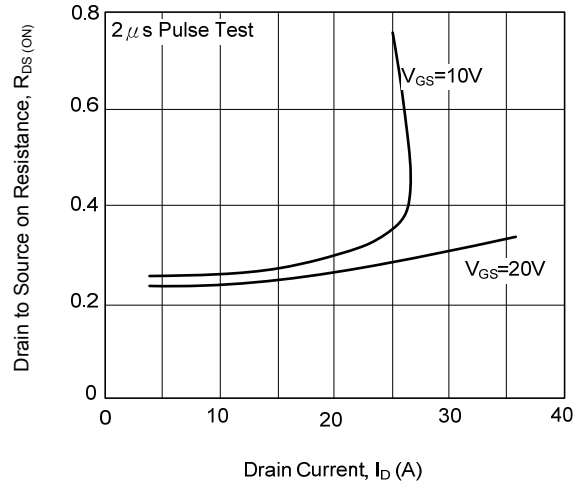


TYPICAL CHARACTERISTICS (Cont.)

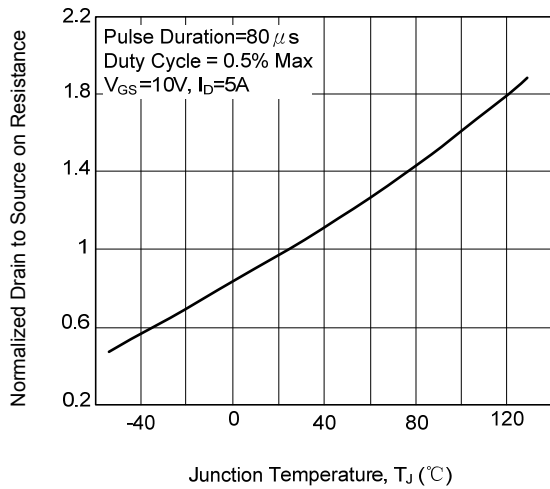
Transfer Characteristics



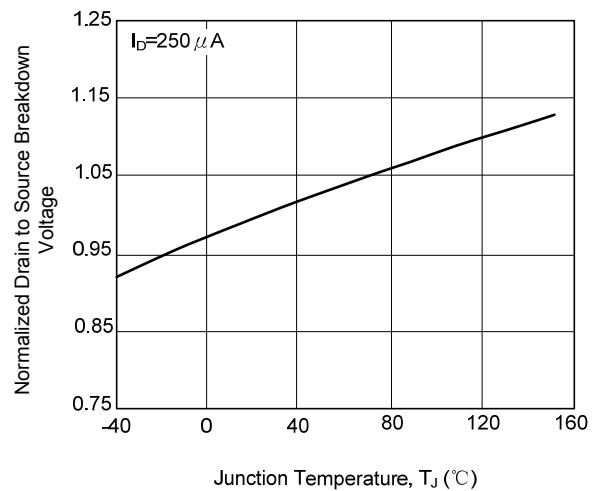
Drain to Source on Resistance vs. Gate Voltage and Drain Current



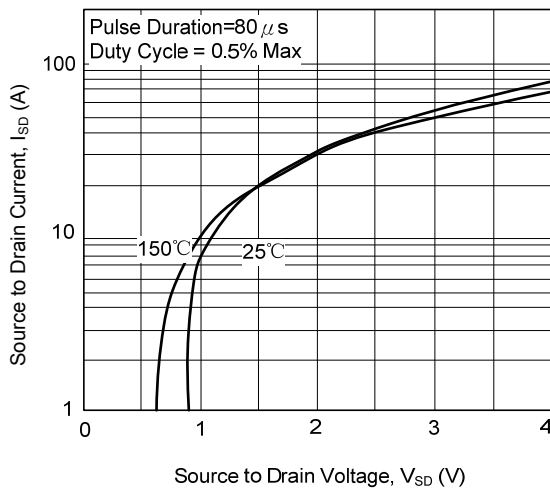
Normalized Drain to Source on Resistance vs. Junction Temperature



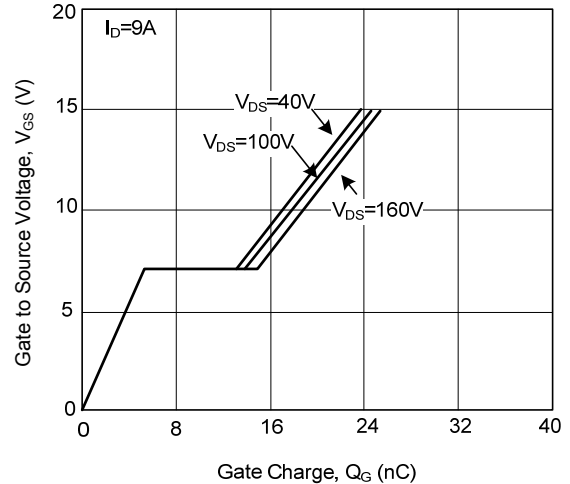
Normalized Drain to Source Breakdown Voltage vs. Junction Temperature



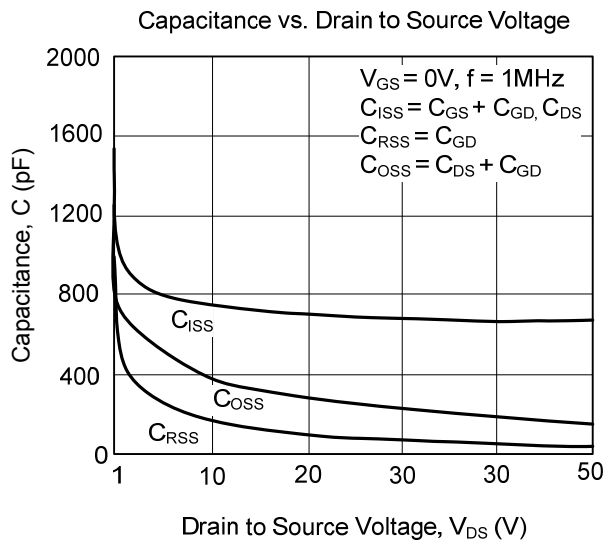
Source to Drain Diode Voltage



Gate to Source Voltage vs. Gate Charge



■ TYPICAL CHARACTERISTICS (Cont.)



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