

UF740

10A, 400V, 0.55**Ω** N-CHANNEL POWER MOSFET

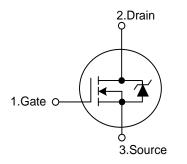
DESCRIPTION

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

- * 10A, 400V, R_{DS(ON)}(0.55Ω)
- * Single Pulse Avalanche Energy Rated
- * Rugged SOA is Power Dissipation Limited
- * Fast Switching Speeds
- * Linear Transfer Characteristics
- * High Input Impedance

SYMBOL



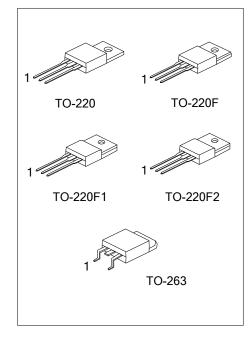
ORDERING INFORMATION

Ordering Number		Dookogo	Pin Assignment			Decking	
Lead Free	Halogen Free	Package	1	2	3	Packing	
UF740L-TA3-T	UF740G-TA3-T	0G-TA3-T TO-220 G D S				Tube	
UF740L-TF1-T	UF740G-TF1-T	TO-220F1	G	D	S	Tube	
UF740L-TF2-T	UF740G-TF2-T	TO-220F2	G	D	S	Tube	
UF740L-TF3-T	UF740G-TF3-T	TO-220F	G	D	S	Tube	
UF740L-TQ2-T	UF740G-TQ2-T	TO-263	G	D	S	Tube	
UF740L-TQ2-R	UF740G-TQ2-R	TO-263	G	D	S	Tape Reel	
Note: Pin Assignment: G: Gate D: Drain S: Source							
UF740 <u>Ļ-TẠ3-</u> Ţ	(1) R: Tape Reel, T: Tube						
(1)Packing Type (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-					2: TO-220F2,		

(2)Package Type (3)Lead Free

TF3: TO-220F,	TQ2: TO-263

(3) L: Lead Free, G: Halogen Free



Power MOSFET

PARAMETER		SYMBOL RATINGS		UNIT	
Drain to Source Voltage (T _J =25°C~125°C)		V _{DS}	400	V	
Drain to Gate Voltage ($R_{GS} = 20k\Omega$) ($T_J = 25^{\circ}C \sim 125^{\circ}C$)		V _{DGR}	400	V	
Gate to Source Voltage		V _{GS}	±20	V	
Drain Current	Continuous	I _D	10	А	
	$T_{\rm C} = 100^{\circ}{\rm C}$	I _D	6.3	А	
	Pulsed	I _{DM}	40	А	
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	520	mJ	
Power Dissipation	TO-220/TO-263		125		
	TO-220F/TO-220F1		44	W	
	TO-220F2		46		
Derating above 25°C	TO-220/TO-263	PD	1.0		
	TO-220F/TO-220F1		0.35	W/°C	
	TO-220F2		0.37		
Junction Temperature		TJ	+150	°C	
Operating Temperature		T _{OPR}	-55 ~ +150	°C	
Storage Temperature		T _{STG}	-55 ~ +150	°C	

■ **ABSOLUTE MAXIMUM RATINGS** (T_c = 25°C, Unless Otherwise Specified)

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	°C/W	
Junction to Case	TO-220/TO-263		1.0		
	TO-220F/TO-220F1	θ_{Jc}	2.86	°C/W	
	TO-220F2		2.72		



■ ELECTRICAL CHARACTERISTICS (T_c =25°C, Unless Otherwise Specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain to Source Breakdown Voltage	BV_{DSS}	V _{GS} = 0V, I _D = 250µA				V
Gate to Threshold Voltage	V _{GS(THR)}	-			4.0	V
On-State Drain Current (Note 1)	I _{D(ON)}	$V_{DS} > I_{D(ON)} \times R_{DS(ON)MAX}, V_{GS} = 10V$				Α
	I _{DSS}	$V_{DS} = Rated BV_{DSS}, V_{GS} = 0V$			25	μA
Zero Gate Voltage Drain Current		V _{DS} =0.8 x Rated BV _{DSS} ,			250	
		V _{GS} =0V,T _J =125°C			250	μA
Gate to Source Leakage Current	I _{GSS}	$V_{GS} = \pm 20V$			±500	nA
Drain to Source On Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 5.2A (Note 1)		0.38	0.55	Ω
Forward Transconductance	g fs	V _{DS} ≥ 50V, I _D = 5.2A (Note 1)	5.8	8.9		S
Turn-On Delay Time	t _{DLY(ON)}	V _{DD} = 200V, I _D ≈ 10A,		65	75	ns
Rise Time	t _R	$R_{GS} = 9.1\Omega, R_{L} = 20\Omega, V_{GS} = 10V$		130	145	ns
Turn-Off Delay Time	t _{DLY(OFF)}	MOSFET Switching Times are Essentially		240	260	ns
Fall Time	t _F	Independent of Operating Temperature		145	155	ns
Total Gate Charge	0	$V_{GS} = 10V, I_D = 10A, I_{G(REF)} = 1.5mA,$ $V_{DS} = 0.8 \text{ x Rated BV}_{DSS}$		100		
(Gate to Source + Gate to Drain)	Q _{G(TOT)}			138		nC
Gate to Source Charge	Q _{GS}	Gate Charge is Essentially Independent of		35		nC
Gate to Drain "Miller" Charge	Q_{GD}	Operating Temperature		35		nC
Input Capacitance	CISS			1170		pF
Output Capacitance	Coss	V _{GS} = 0V, V _{DS} =25V, f = 1.0MHz		160		pF
Reverse - Transfer Capacitance				26		pF
Internal Drain Inductance	LD	Measured FromModified MOSFETthe Contact ScrewSymbol Showing theon Tab to CenterInternal Devicesof DieInductances		3.5		nH
		Measured From the Drain Lead, 6mm (0.25in) From Package to Center of Die		4.5		nH
Internal Source Inductance	Ls	Measured From the Source Lead, 6mm (0.25in) From Header to Source Bonding Pad		7.5		nH
SOURCE TO DRAIN DIODE SPECIF	ICATION	<u>S</u>				
Source to Drain Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 10A, V _{GS} = 0V (Note 1)			2.0	V
Continuous Source to Drain Current	ls	Modified MOSFET			10	А
Pulse Source to Drain Current (Note 2)	I _{SM}	Symbol Showing the Integral Reverse P-N Junction Diode			40	A
Powerse Recovery Time	+	$=$ $=$ 25°C $ _{res} = 100$ $d _{res}/dt = 1000/100$	170	390	790	
Reverse Recovery Time Reverse Recovery Charge	t _{rr} Q _{RR}	$T_J = 25^{\circ}C, I_{SD} = 10A, dI_{SD}/dt = 100A/\mu s$ $T_J = 25^{\circ}C, I_{SD} = 10A, dI_{SD}/dt = 100A/\mu s$	1.6	4.5	790 8.2	ns µC

Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty Cycle \leq 2%.

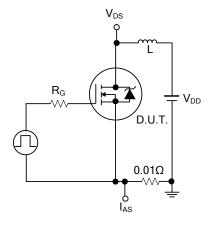
2. Repetitive rating: Pulse width limited by maximum junction temperature.

3. V_DD=50V, starting T_J =25°C, L=9.1mH, R_G=25\Omega, peak I_{AS} = 10A

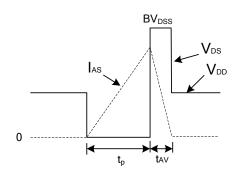


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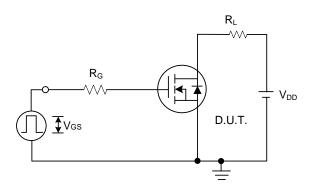
TEST CIRCUITS AND WAVEFORMS



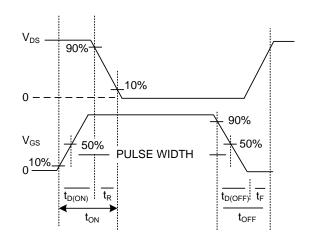
Unclamped Energy Test Circuit



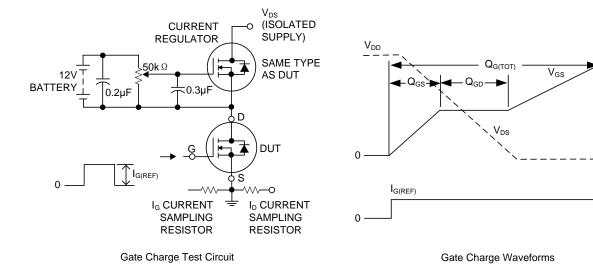
Unclamped Energy Waveforms



Switching Time Test Circuit



Resistive Switching Waveforms

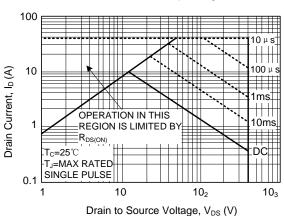




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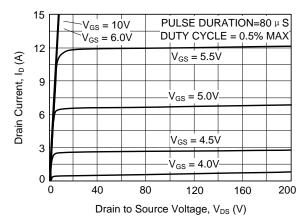
Power MOSFET

TYPICAL PERFORMANCE CUVES

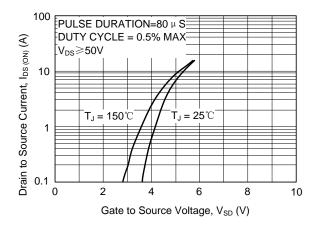


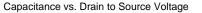
Forward Bias Safe Operating Area

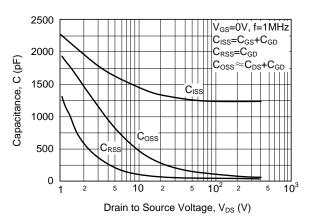
Output Characteristics



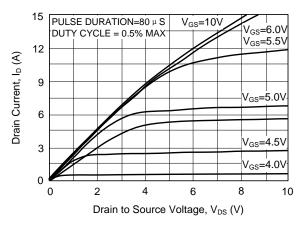
Transfer Characteristics



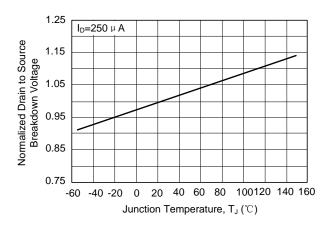




Saturation Characteristics



Normalized Drain to Source Breakdown Voltage vs. Junction Temperature





UF740

Drain to Source on Resistance, $R_{DS(ON)}$ (Ω)

5

4

3

2

1

0

25

Pulse Duration=80 µ s

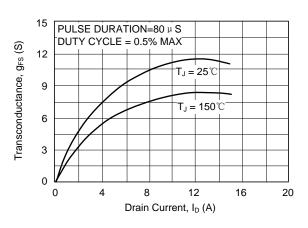
10

20

Duty Cycle = 0.5% Max

Power MOSFET

TYPICAL PERFORMANCE CUVES (Cont.)



Drain to Source on Resistance vs. Voltage and Drain

Current

V_{GS}=10V

30

Drain Current, I_D (A)

V_{GS}=20V

40

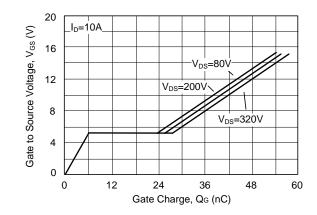
50

Transconduce vs. Drain Current

100 PULSE DURATION=80 µ S Source to Drain Current, I_{SD} (A) DUTY CYCLE = 0.5% MAX 10 T_J = 150℃ T_J = 25° 1.0 0.1 0.6 0 0.3 0.9 1.2 1.5 Source to Drain Voltage, V_{SD} (V)

Source to Drain Diode Voltage





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