



UF740

Power MOSFET

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

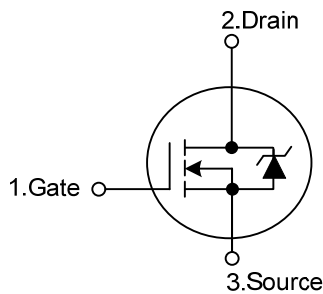
■ DESCRIPTION

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

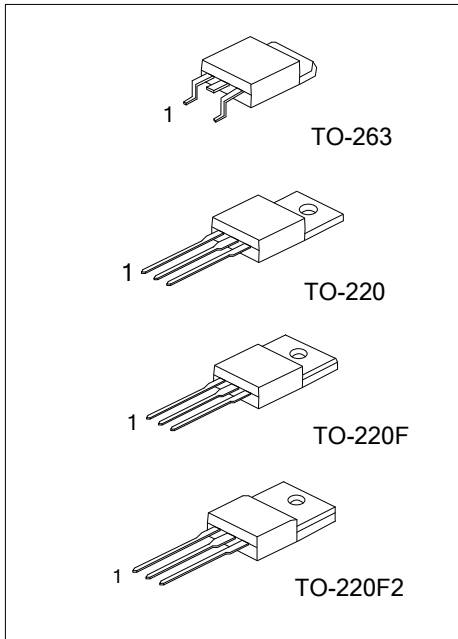


■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF740L-TA3-T	UF740G-TA3-T	TO-220	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

UF740L-TA3-T (1)Packing Type (2)Package Type (3)Lead Free		(1) R: Tape Reel, T: Tube (2) TA3: TO-220, TF2: TO-220F2, TF3: TO-220F, TQ2: TO-263 (3) G: Halogen Free, L: Lead Free
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■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, Unless Otherwise Specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage (T _J = 25°C~125°C)		V _{DS}	400	V
Drain to Gate Voltage (R _{GS} = 20kΩ) (T _J = 25°C~125°C)		V _{DGR}	400	V
Gate to Source Voltage		V _{GS}	±20	V
Drain Current	Continuous	I _D	10	A
	T _C = 100°C	I _D	6.3	A
	Pulsed	I _{DM}	40	A
Power Dissipation	TO-220/TO-263	P _D	125	W
	TO-220F		44	
	TO-220F2		46	
Derating above 25°C	TO-220/TO-263	P _D	1.0	W/°C
	TO-220F		0.35	
	TO-220F2		0.37	
Single Pulse Avalanche Energy Rating(Note3)		E _{AS}	520	mJ
Junction Temperature		T _J	+150	°C
Operating Temperature		T _{OPR}	-55 ~ +150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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.

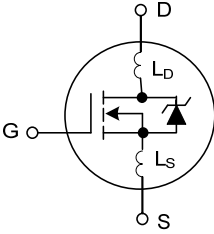
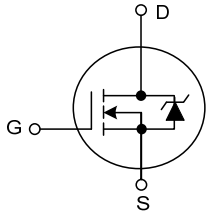
■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ _{JA}	62.5	°C/W
Junction to Case	TO-220/TO-263	θ _{Jc}	1.0	°C/W
	TO-220F		2.86	
	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	400			V
Gate to Threshold Voltage	V _{GS(THR)}	V _{GS} = V _{DS} , I _D = 250μA	2.0		4.0	V
On-State Drain Current (Note 1)	I _{D(ON)}	V _{DS} > I _{D(ON)} × R _{DS(ON)MAX} , V _{GS} = 10V	10			A
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = Rated BV _{DSS} , V _{GS} = 0V			25	μA
		V _{DS} = 0.8 × Rated BV _{DSS} , V _{GS} = 0V, T _J = 125°C			250	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} = ±20V			±500	nA
Drain to Source On Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 5.2A (Note 1)		0.47	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, R _{GS} = 9.1Ω, R _L = 20Ω, V _{GS} = 10V		15	21	ns
Rise Time	t _R	MOSFET Switching Times are Essentially Independent of Operating Temperature		25	41	ns
Turn-Off Delay Time	t _{DLY(OFF)}			52	75	ns
Fall Time	t _F			25	36	ns
Total Gate Charge (Gate to Source + Gate to Drain)	Q _{G(TOT)}	V _{GS} = 10V, I _D = 10A, I _{G(REF)} = 1.5mA, V _{DS} = 0.8 × Rated BV _{DSS}		41	63	nC
Gate to Source Charge	Q _{GS}	Gate Charge is Essentially Independent of Operating Temperature		6.5		nC
Gate to Drain "Miller" Charge	Q _{GD}			23		nC
Input Capacitance	C _{ISS}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz		1250		pF
Output Capacitance	C _{OSS}			300		pF
Reverse - Transfer Capacitance	C _{RSS}			80		pF

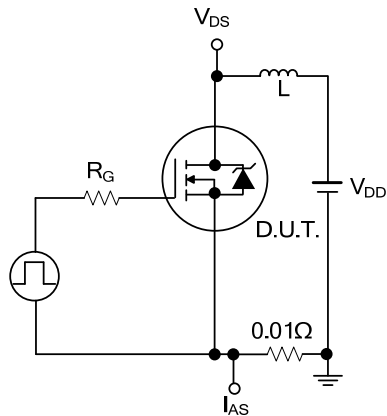
ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Internal Drain Inductance	L_D	Measured From the Contact Screw on Tab to Center of Die	Modified MOSFET Symbol Showing the Internal Devices Inductances		3.5		nH
		Measured From the Drain Lead, 6mm (0.25in) From Package to Center of Die			4.5		nH
Internal Source Inductance	L_S	Measured From the Source Lead, 6mm (0.25in) From Header to Source Bonding Pad			7.5		nH
SOURCE TO DRAIN DIODE SPECIFICATIONS							
Source to Drain Diode Voltage	V_{SD}	$T_J = 25^{\circ}\text{C}$, $I_{SD} = 10\text{A}$, $V_{GS} = 0\text{V}$ (Note 1)				2.0	V
Continuous Source to Drain Current	I_S	Modified MOSFET Symbol Showing the Integral Reverse P-N Junction Diode				10	A
Pulse Source to Drain Current (Note 2)	I_{SM}					40	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}$, $I_{SD} = 10\text{A}$, $dI_{SD}/dt = 100\text{A}/\mu\text{s}$		170	390	790	ns
Reverse Recovery Charge	Q_{RR}	$T_J = 25^{\circ}\text{C}$, $I_{SD} = 10\text{A}$, $dI_{SD}/dt = 100\text{A}/\mu\text{s}$		1.6	4.5	8.2	μC

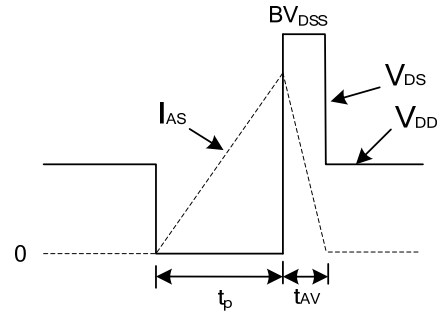
Notes:

1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
2. Repetitive rating: Pulse width limited by maximum junction temperature.
3. ($V_{DD}=50\text{V}$, starting $T_J=25^\circ\text{C}$, $L=9.1\text{mH}$, $R_G=25\Omega$, peak $I_{AS} = 10\text{A}$)

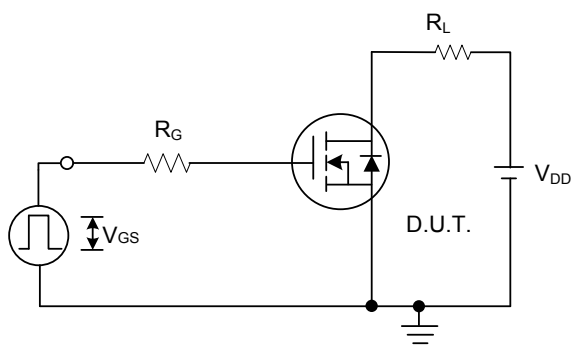
■ TEST CIRCUITS AND WAVEFORMS



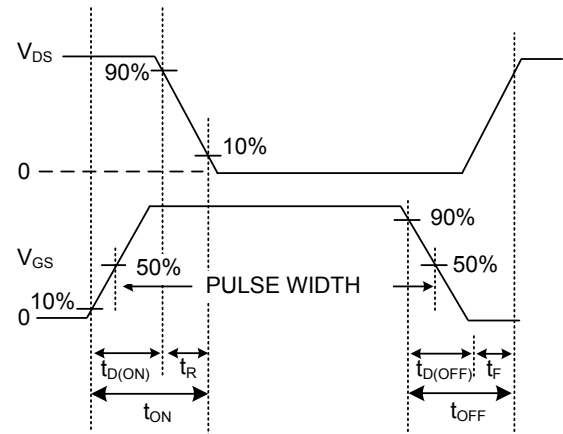
Unclamped Energy Test Circuit



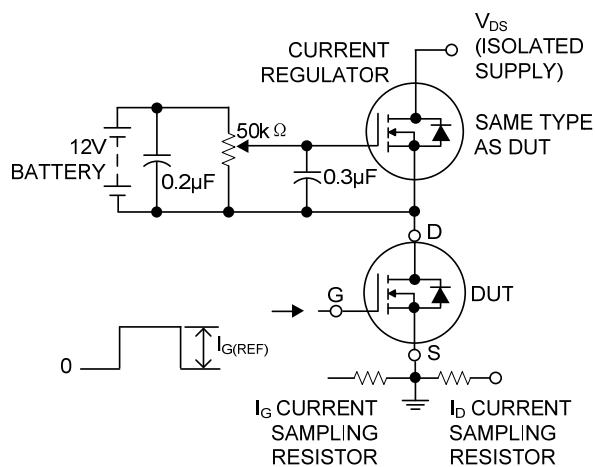
Unclamped Energy Waveforms



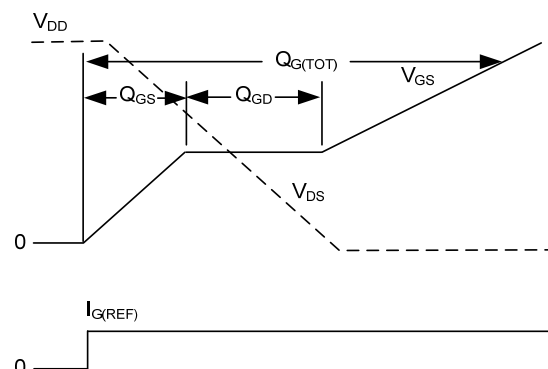
Switching Time Test Circuit



Resistive Switching Waveforms



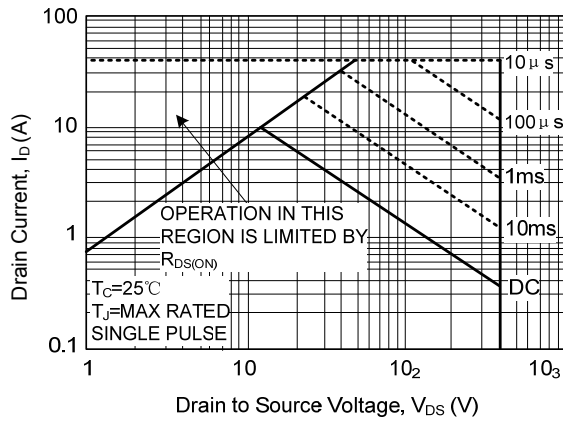
Gate Charge Test Circuit



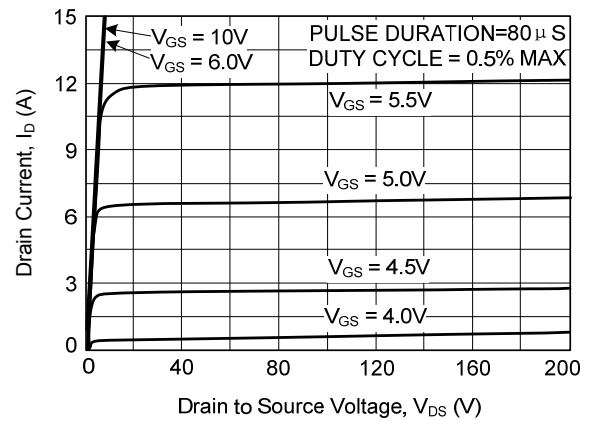
Gate Charge Waveforms

■ TYPICAL PERFORMANCE CUVES (Unless Otherwise Specified)

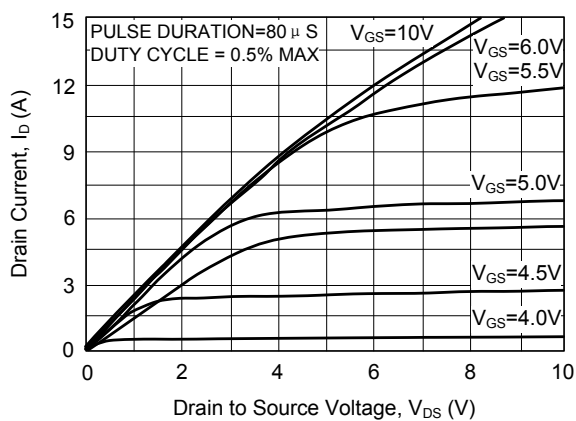
Forward Bias Safe Operating Area



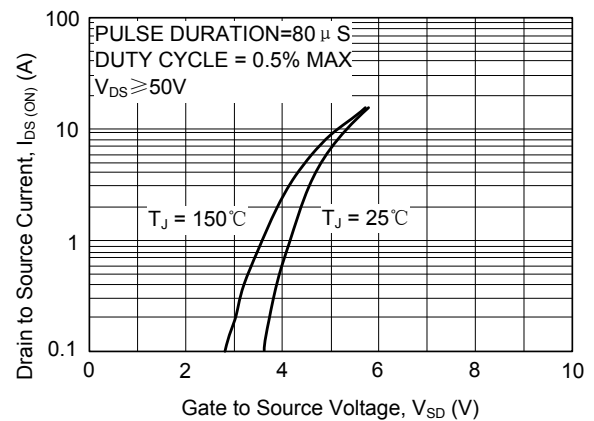
Output Characteristics



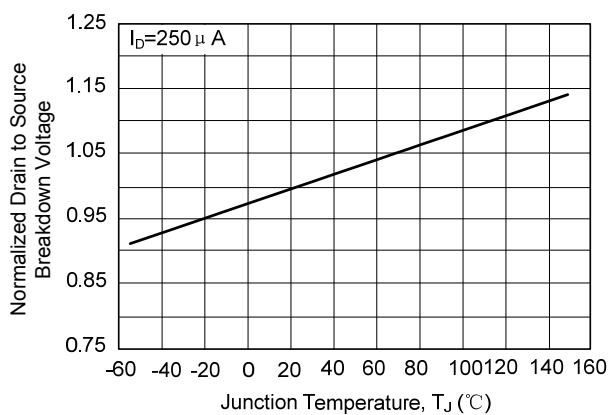
Saturation Characteristics



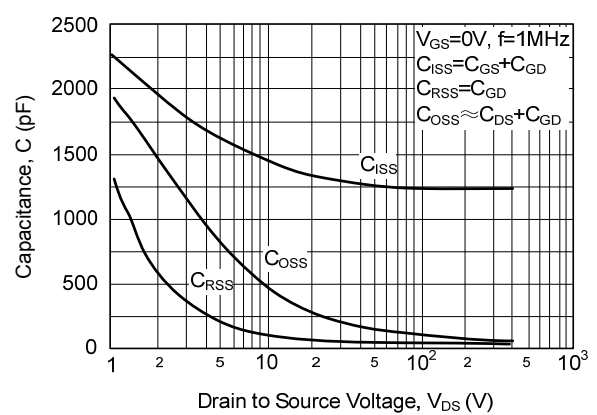
Transfer Characteristics



Normalized Drain to Source Breakdown Voltage vs. Junction Temperature

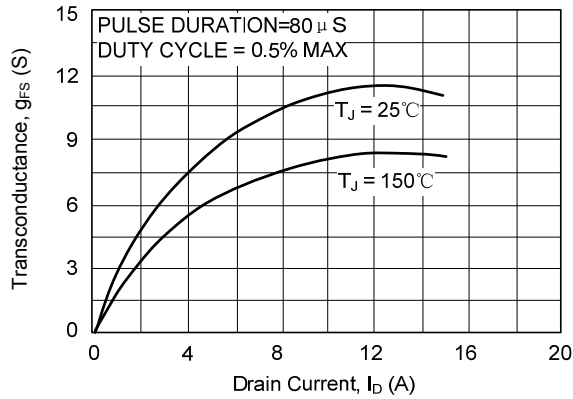


Capacitance vs. Drain to Source Voltage

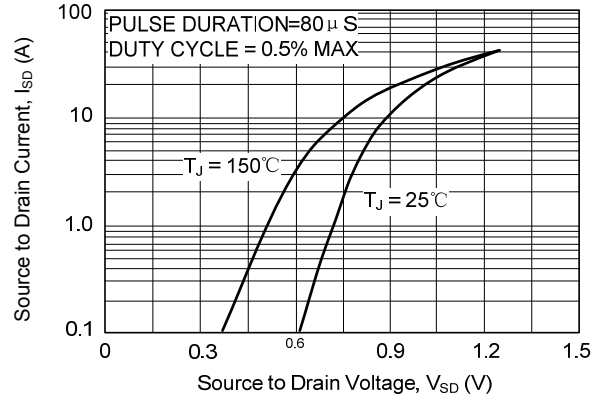


■ TYPICAL PERFORMANCE CUVES (Cont.)

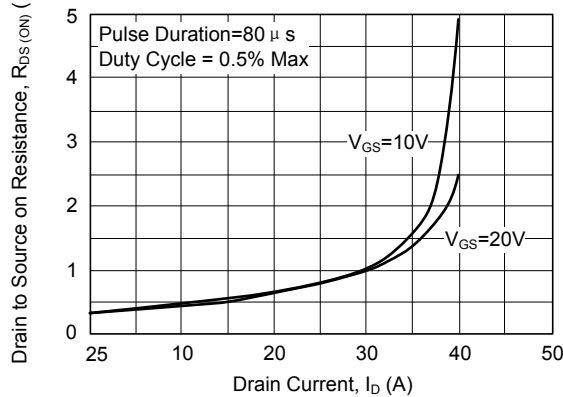
Transconduce vs. Drain Current



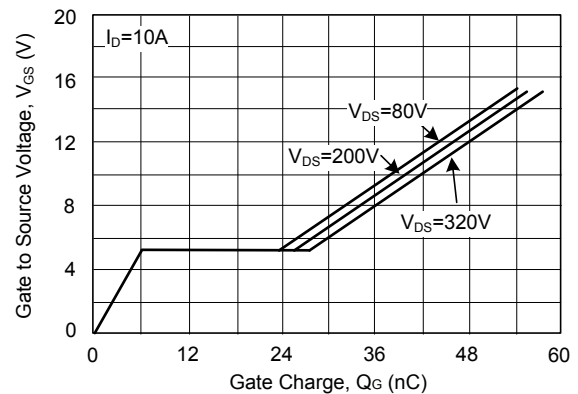
Source to Drain Diode Voltage



Drain to Source on Resistance vs. Voltage and Drain Current



Gate to Source Voltage vs. Gate Charge



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