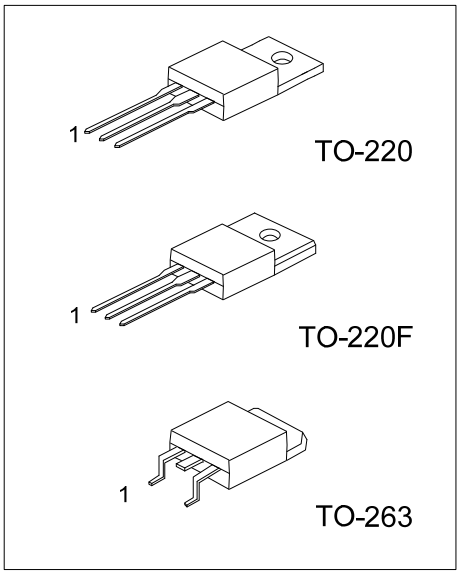
UF740

Power MOSFET

10Amps, 400Volts, 0.55 OHM, N-CHANNEL POWER MOSFET



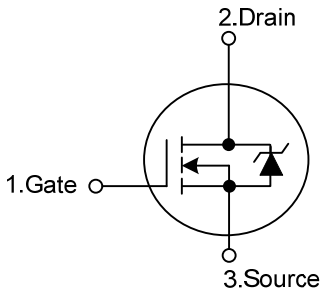
■ DESCRIPTION

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

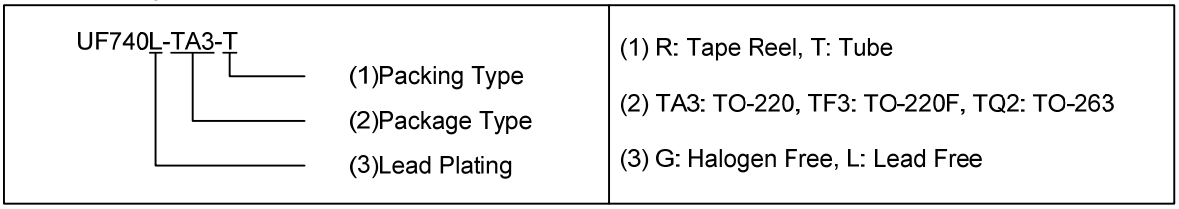
■ SYMBOL



■ 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-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



■ 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	W
Derating above 25°C	TO-220/TO-263		1.0	W/°C
	TO-220F		0.35	W/°C
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.

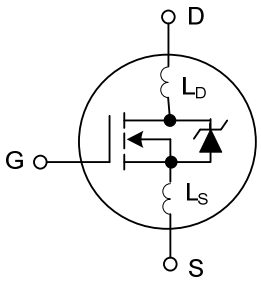
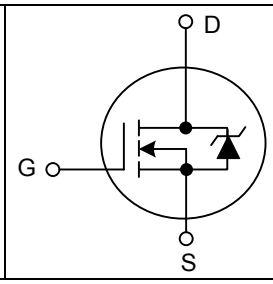
■ THERMAL DATA

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	°C/W

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

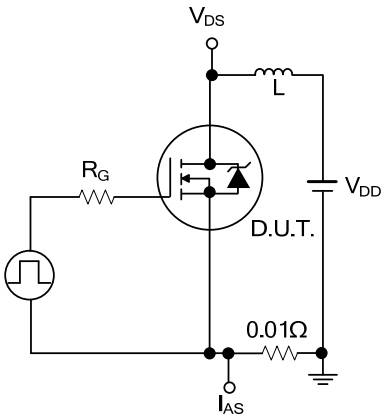
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain to Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	400			V
Gate to Threshold Voltage	$V_{GS(THR)}$	V_{GS} = V_{DS}, I_D = 250μA	2.0		4.0	V
On-State Drain Current (Note 1)	$I_{D(ON)}$	V_{DS} >$I_{D(ON)}$ x $R_{DS(ON)MAX}$, V_{GS} =10V	10			A
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = Rated BV_{DSS}, V_{GS} = 0V			25	μA
		V_{DS}=0.8 x 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 (Note 1)	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5.2A		0.47	0.55	Ω
Forward Transconductance (Note 1)	g_{FS}	V_{DS} ≥ 50V, I_D = 5.2A	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 MOSFET Switching Times are Essentially Independent of Operating Temperature		15	21	ns
Rise Time	t_R			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 V_{DS} = 0.8 x Rated BV_{DSS} $I_{G(REF)}$ = 1.5mA Gate Charge is Essentially Independent of Operating Temperature		41	63	nC
Gate to Source Charge	Q_{GS}			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.)

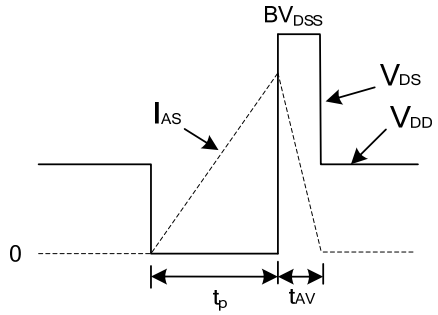
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Internal Drain Inductance	L_D	Measured From the Contact Screw on Tab to Center of Die	Modified MOSFET Symbol Showing the Internal Devices Inductances 		3.5		nH
		Measured From the Drain Lead, 6mm (0.25in) From Package to Center of Die			4.5		nH
Internal 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 (Note 1)	V_{SD}	T_J = 25°C, I_{SD} = 10A, V_{GS} = 0V				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°C, I_{SD} = 10A, dI_{SD}/dt = 100A/μs		170	390	790	ns
Reverse Recovery Charge	Q_{RR}	T_J = 25°C, I_{SD} = 10A, dI_{SD}/dt = 100A/μs		1.6	4.5	8.2	μC

NOTES:
1. Pulse Test: Pulse width ≤ 300μs, Duty Cycle≤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=25Ω, peak I_{AS} = 10A)

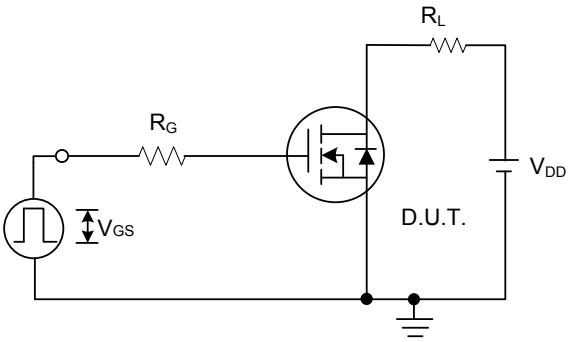
■ TEST CIRCUITS AND WAVEFORMS



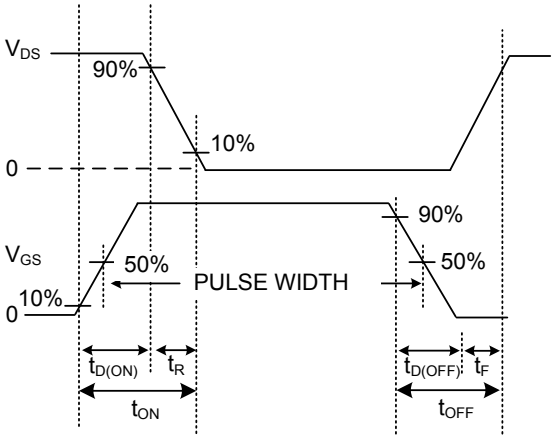
Unclamped Energy Test Circuit



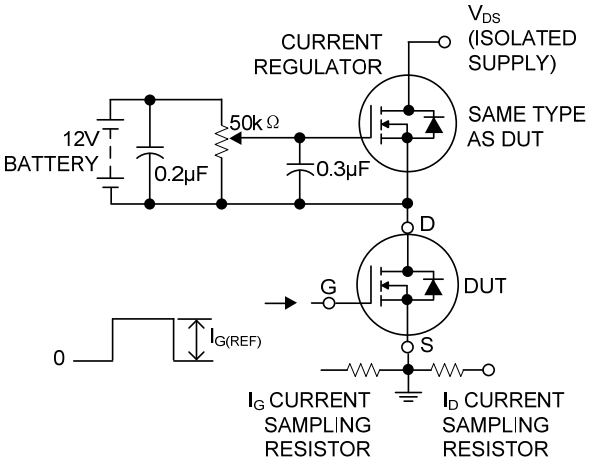
Unclamped Energy Waveforms



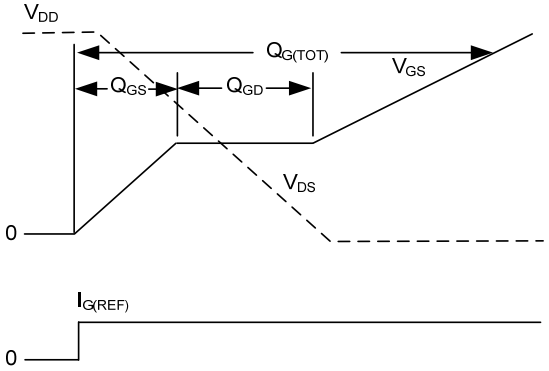
Switching Time Test Circuit



Resistive Switching Waveforms



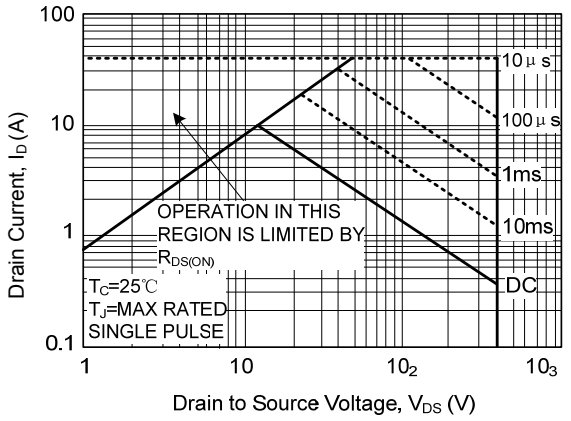
Gate Charge Test Circuit



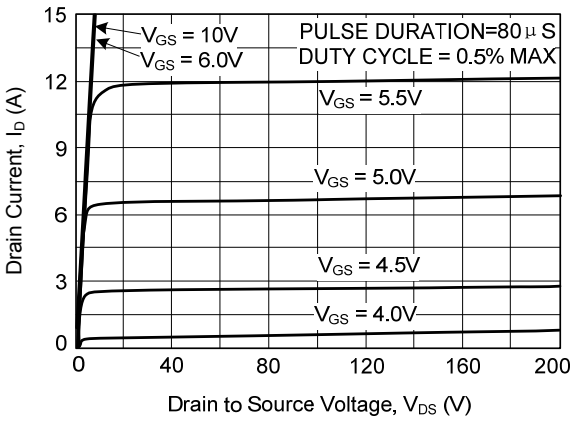
Gate Charge Waveforms

■ TYPICAL PERFORMANCE CUVES (Unless Otherwise Specified)

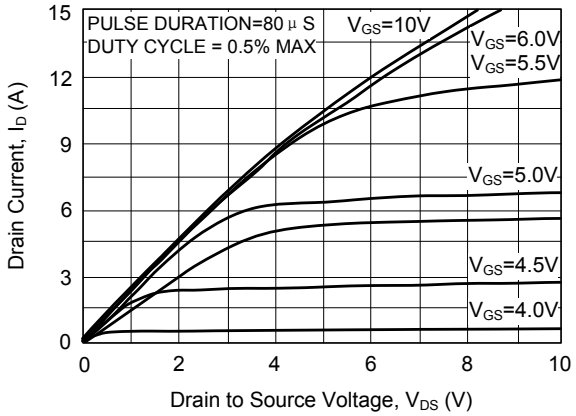
Forward Bias Safe Operating Area



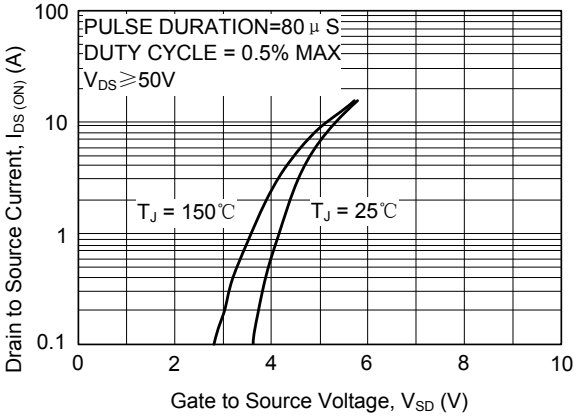
Output Characteristics



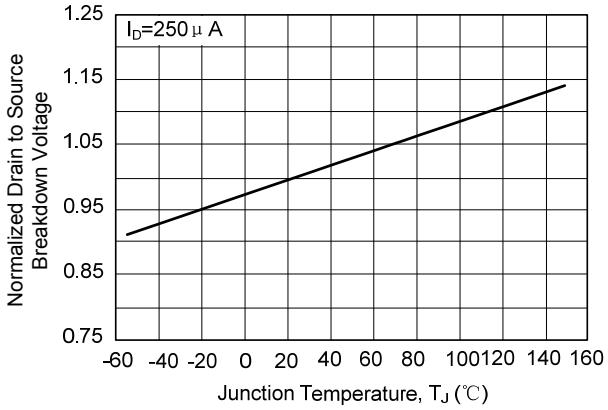
Saturation Characteristics



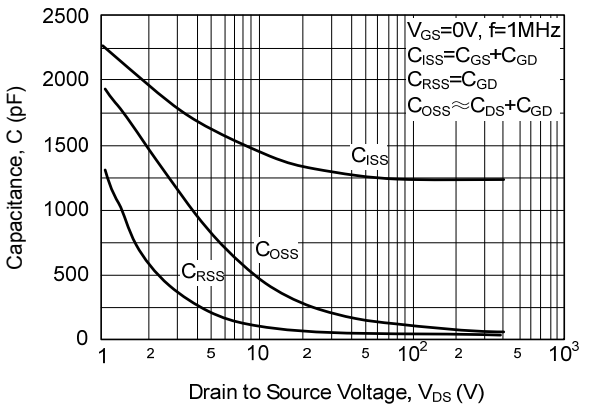
Transfer Characteristics



Normalized Drain to Source Breakdown Voltage vs. Junction Temperature

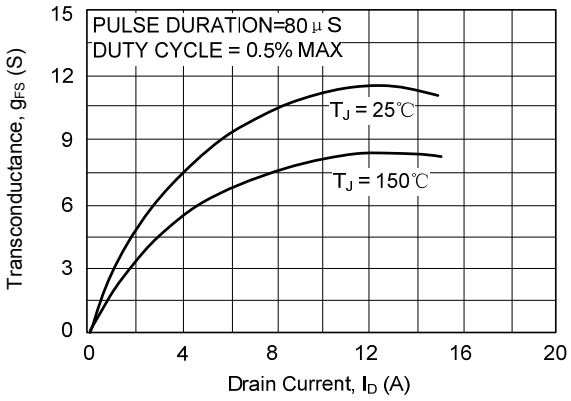


Capacitance vs. Drain to Source Voltage

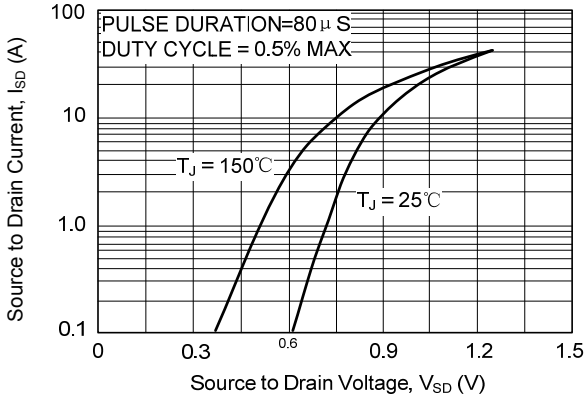


■ TYPICAL PERFORMANCE CUVES (Cont.)

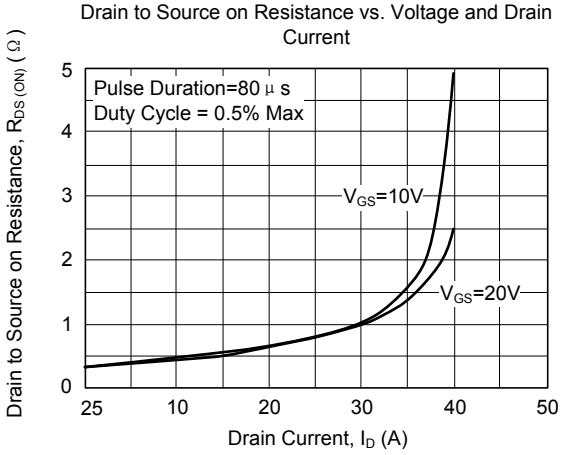
Transconduce vs. Drain Current



Source to Drain Diode Voltage



Drain to Source on Resistance vs. Voltage and Drain Current



Gate to Source Voltage vs. Gate Charge