



UF640

MOSFET

18 A, 200 V, 0.18 OHM, N-CHANNEL POWER MOSFET

DESCRIPTION

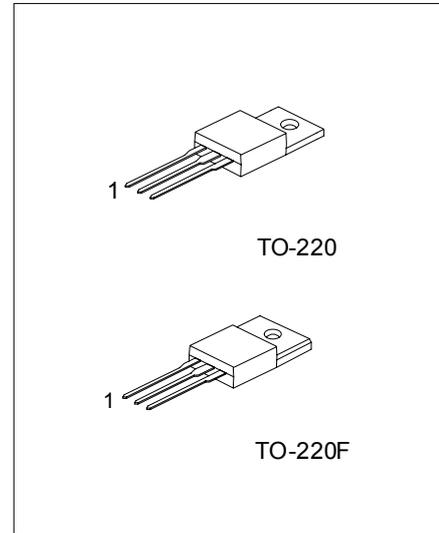
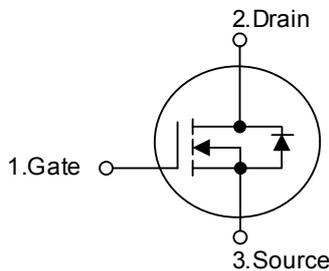
These kinds of n-channel power mos field effect transistor have low conduction power loss, high input impedance, and high switching speed, Linear Transfer Characteristics, so can be use in a variety of power conversion applications.

The UF640 suitable for resonant and PWM converter topologies.

FEATURES

- * $R_{DS(ON)} = 0.18\Omega @ V_{GS} = 10V$.
- * Ultra Low gate charge (typical 43nC)
- * Low reverse transfer capacitance ($C_{RSS} =$ typical 100 pF)
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



*Pb-free plating product number: UF640L

ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
UF640-TA3-T	UF640L-TA3-T	TO-220	G	D	S	Tube
UF640-TF3-T	UF640L-TF3-T	TO-220F	G	D	S	Tube

<p>UF640L-TA3-T</p>	<p>(1) T: Tube (2) TA3: TO-220, TF3: TO-220F (3) L: Lead Free Plating Blank: Pb/Sn</p>
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■ ABSOLUTE MAXIMUM RATING ($T_C = 25$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT	
Drain-Source Voltage	V_{DSS}	200	V	
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)	V_{DGR}	200	V	
Gate-Source Voltage	V_{GSS}	± 20	V	
Continuous Drain Current	I_D	$T_C = 25$	18	A
		$T_C = 100$	11	A
Pulsed Drain Current (Note 2)	I_{DM}	72	A	
Single Pulse Avalanche Energy Rating (Note 3)	E_{AS}	580	mJ	
Maximum Power Dissipation	P_D	125	W	
Dissipation Derating Factor		1.0	W/	
Junction Temperature	T_J	+150		
Storage Temperature	T_{STG}	-55 ~ +150		

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.

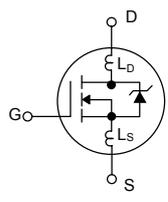
■ THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Thermal Resistance, Channel to Ambient	θ_{JA}			62	$^{\circ}C/W$
Thermal Resistance, Channel to Case	θ_{JC}			1	$^{\circ}C/W$

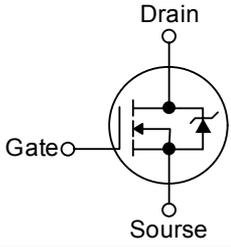
■ ELECTRICAL CHARACTERISTICS ($T_C = 25$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	200			V
Gate Threshold Voltage	$V_{GS(THR)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2		4	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = \text{Rated } BV_{DSS}, V_{GS} = 0V$			25	μA
		$V_{DS} = 0.8 \times \text{Rated } BV_{DSS}, V_{GS} = 0V, T_J = 125$			250	μA
On-State Drain Current	$I_{D(ON)}$	$V_{DS} > I_{D(ON)} \times R_{DS(ON)MAX}, V_{GS} = 10V$	18			A
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V$			± 100	nA
Drain-Source On Resistance	$R_{DS(ON)}$	$I_D = 10A, V_{GS} = 10V$		0.14	0.18	Ω
Forward Transconductance	g_{FS}	$V_{DS} \geq 10V, I_D = 11A$	6.7	10		S
Input Capacitance	C_{ISS}	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$		1275		pF
Output Capacitance	C_{OSS}			400		pF
Reverse Transfer Capacitance	C_{RSS}			100		pF
Total Gate Charge (Gate to Source + Gate to Drain)	$Q_{G(TOT)}$	$V_{GS} = 10V, I_D \approx 18A, V_{DS} = 0.8 \times \text{Rated } BV_{DSS}$ Gate Charge is Essentially Independent of Operating Temperature $I_{G(REF)} = 1.5mA$		43	64	nC
Gate-Source Charge	Q_{GS}			8		nC
Gate-Drain "Miller" Charge	Q_{GD}			22		nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD} = 100V, I_D \approx 18A, R_{GS} = 9.1\Omega, R_L = 5.4\Omega,$		13	21	ns
Rise Time	t_R			50	77	ns
Turn-Off Delay Time	$t_{D(OFF)}$	MOSFET Switching Times are Essentially Independent of Operating Temperature		46	68	ns
Fall Time	t_F			35	54	ns

■ 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

Diode Forward Voltage (Note 1)	V _{SD}	T _J = 25 °C, I _S = 18A, V _{GS} = 0V,			2.0		V
Continuous Source Current (body diode)	I _S	Integral Reverse p-n Junction Diode in the MOSFET			18		A
Pulse Source Current (body diode) (Note 1)	I _{SM}				72		A
Reverse Recovery Time	t _{RR}	T _J = 25 °C, I _S = 18A, dI _S /dt = 100A/μs		120	240	530	ns
Reverse Recovery Charge	Q _{RR}	T _J = 25 °C, I _S = 18A, dI _S /dt = 100A/μs		1.3	2.8	5.6	μC

Note 1. Pulse Test: Pulse width ≤ 300μs, duty cycle ≤ 2%.

2. Repetitive Rating: Pulse width limited by maximum junction temperature. See Transient Thermal Impedance curve.

3. L = 3.37mH, V_{DD} = 50V, R_G = 25Ω, peak I_{AS} = 18A, starting T_J = 25 °C.

■ TEST CIRCUIT

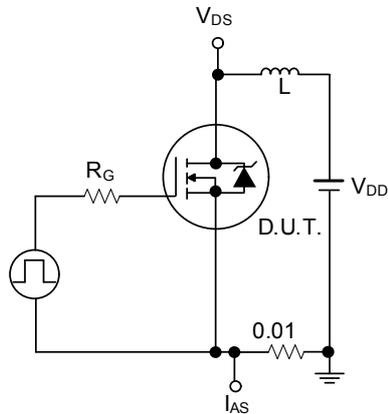


Figure 1A. Unclamped Energy Test Circuit

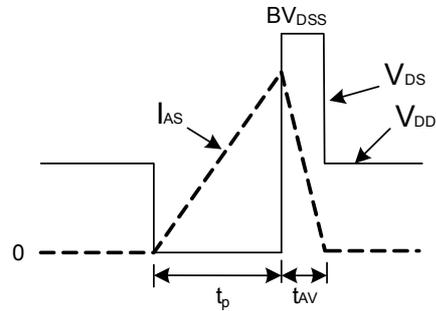


Figure 1B. Unclamped Energy Waveforms

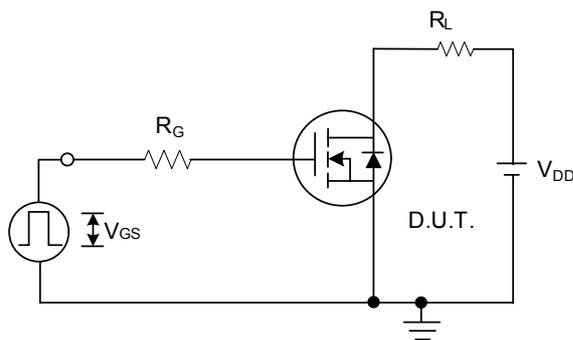


Figure 2A. Switching Time Test Circuit

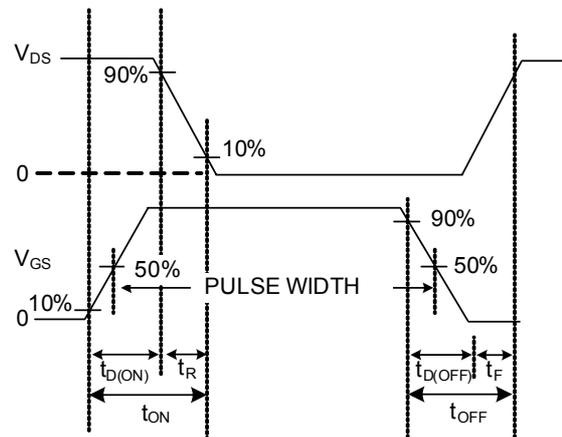


Figure 2B. Resistive Switching Waveforms

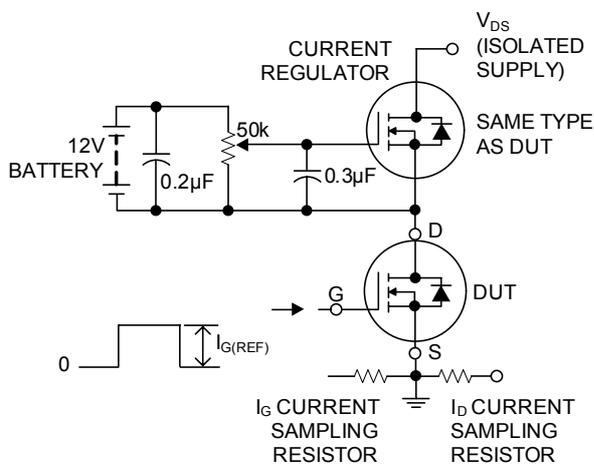


Figure 3A. Gate Charge Test Circuit

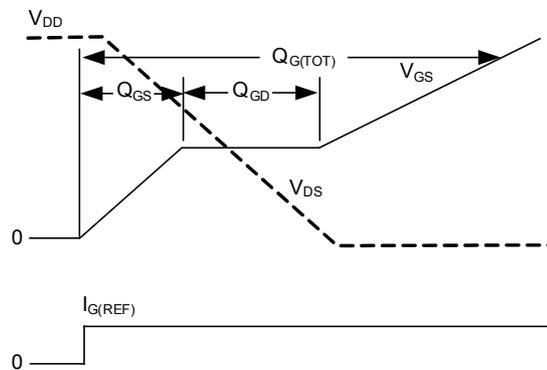
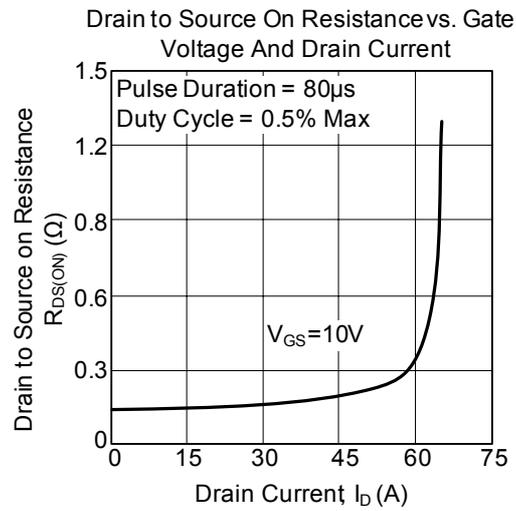
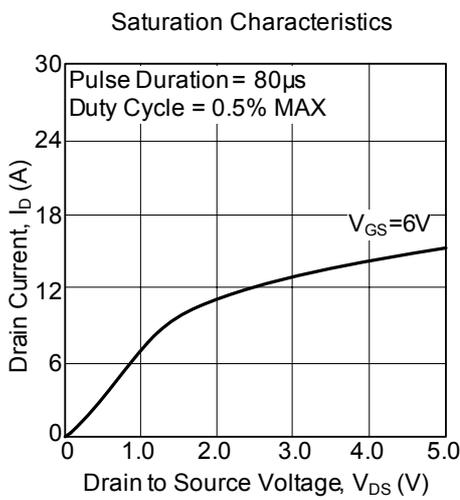


Figure 3B. Gate Charge Waveforms

■ TYPICAL CHARACTERISTICS



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