



UF640

Power MOSFET

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

DESCRIPTION

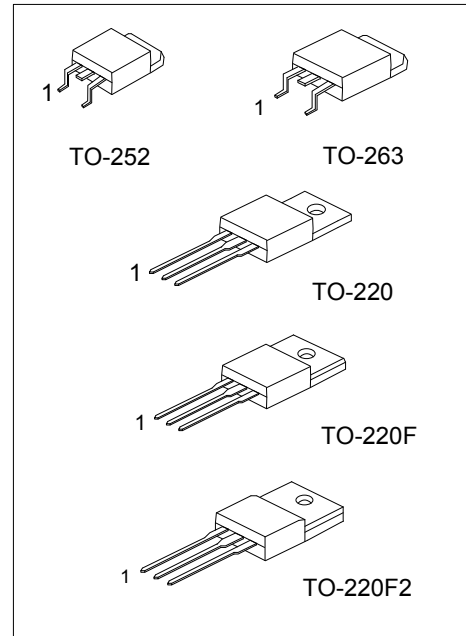
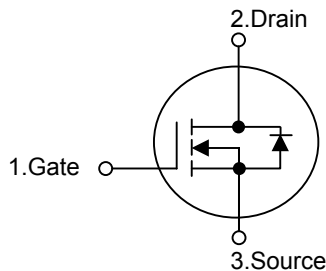
These kinds of n-channel power MOSFET field effect transistor have low conduction power loss, high input impedance, and high switching speed, Linear Transfer Characteristics, so can be use in a variety of power conversion applications.

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



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen-Free		1	2	3	
UF640L-TA3-T	UF640G-TA3-T	TO-220	G	D	S	Tube
UF640L-TF2-T	UF640G-TF2-T	TO-220F2	G	D	S	Tube
UF640L-TF3-T	UF640G-TF3-T	TO-220F	G	D	S	Tube
UF640L-TN3-R	UF640G-TN3-R	TO-252	G	D	S	Tape Reel
UF640L-TN3-T	UF640G-TN3-T	TO-252	G	D	S	Tube
UF640L-TQ2-R	UF640G-TQ2-R	TO-263	G	D	S	Tape Reel
UF640L-TQ2-T	UF640G-TQ2-T	TO-263	G	D	S	Tube

	(1)Packing Type	(1) R: Tape Reel, T: Tube (2) TA3: TO-220, TF3: TO-220F, TF2: TO-220F2, TN3: TO-252, TQ3: TO-263 (3) G: Halogen Free, L: Lead Free
	(2)Package Type	
	(3)Lead Free	

■ ABSOLUTE MAXIMUM RATING (T_C = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V _{DSS}	200	V
Drain-Gate Voltage (R _{GS} =20kΩ)	V _{DGR}	200	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current	I _D	18	A
Pulsed Drain Current (Note 2)	I _{DM}	72	A
Single Pulse Avalanche Energy Rating (Note 2)	E _{AS}	580	mJ
Maximum Power Dissipation	TO-220	123	W
	TO-220F	40	
	TO-220F2	42	
	TO-252	83	
	TO-263	139	
Junction Temperature	T _J	+150	°C
Storage Temperature	T _{STG}	-55 ~ +150	°C

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

3. Pulse width limited by T_{J(MAX)}

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/ TO-220F	62.5	°C/W
	TO-220F2/ TO-263	62.5	
	TO-252	110	
Junction to Case	TO-220	1.01	°C/W
	TO-220F	3.1	
	TO-220F2	2.9	
	TO-252	1.5	
	TO-263	0.9	

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

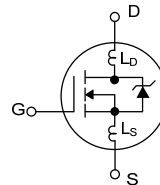
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	200			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = Rated BV _{DSS} , V _{GS} = 0V			25	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(THR)}	V _{GS} =V _{DS} , I _D =250μA	2		4	V
On-State Drain Current	I _{D(ON)}	V _{DS} > I _{D(ON)} × R _{DS(ON)} MAX, V _{GS} =10V	18			A
Drain-Source On Resistance	R _{DS(ON)}	I _D =10A, V _{GS} =10V		0.14	0.18	Ω
DYNAMIC PARAMETERS						
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

■ **ELECTRICAL CHARACTERISTICS(Cont.)** ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=100\text{V}$, $I_D \approx 18\text{A}$, $R_G=9.1\Omega$, $R_L=5.4\Omega$,		13	21	ns
Turn-ON Rise Time	t_R	MOSFET Switching Times are Essentially Independent of Operating Temperature		50	77	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			46	68	ns
Turn-OFF Fall-Time	t_F			35	54	ns
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10\text{V}$, $I_D \approx 18\text{A}$, $V_{DS}=0.8 \times \text{Rated}$		43	64	nC
Gate Source Charge	Q_{GS}	BV_{DSS} Gate Charge is Essentially Independent of Operating Temperature $I_{G(REF)} = 1.5\text{mA}$		8		nC
Gate Drain Charge	Q_{GD}			22		nC

■ **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		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)	V_{SD}	$T_J = 25^\circ\text{C}$, $I_S = 18\text{A}$, $V_{GS} = 0\text{V}$,			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)	I_{SM}				72	A
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}$, $I_S=18\text{A}$, $dI_S/dt=100\text{A}/\mu\text{s}$	120	240	530	ns
Reverse Recovery Charge	Q_{RR}	$T_J=25^\circ\text{C}$, $I_S=18\text{A}$, $dI_S/dt=100\text{A}/\mu\text{s}$	1.3	2.8	5.6	μC

Note: Pulse Test: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

■ TEST CIRCUIT

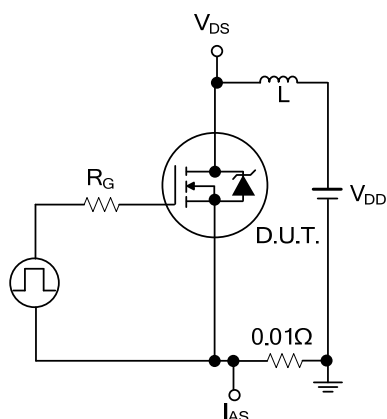


Fig. 1 Unclamped Energy Test Circuit

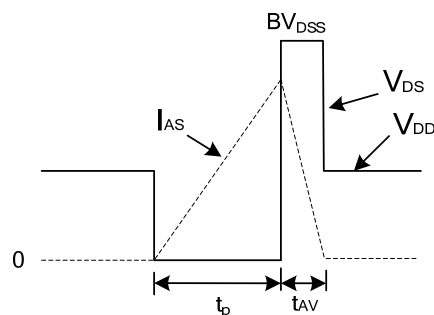


Fig.2 Unclamped Energy Waveforms

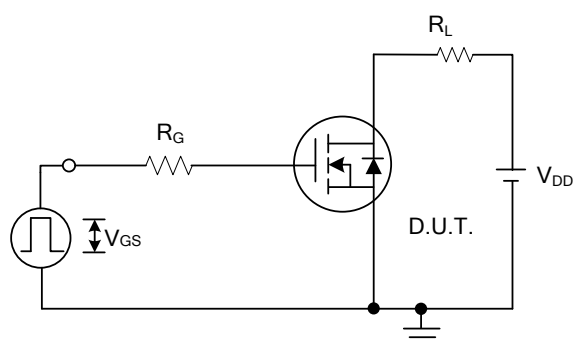


Fig.3 Switching Time Test Circuit

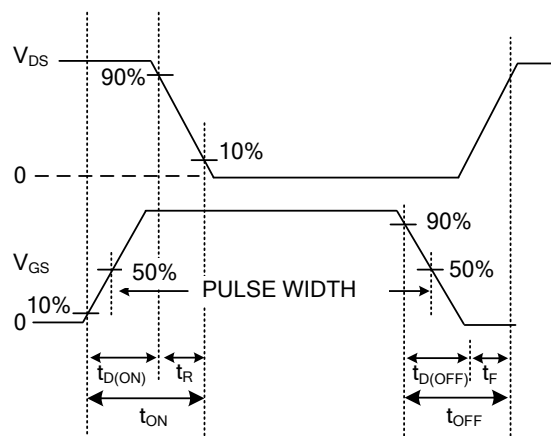


Fig.4 Resistive Switching Waveforms

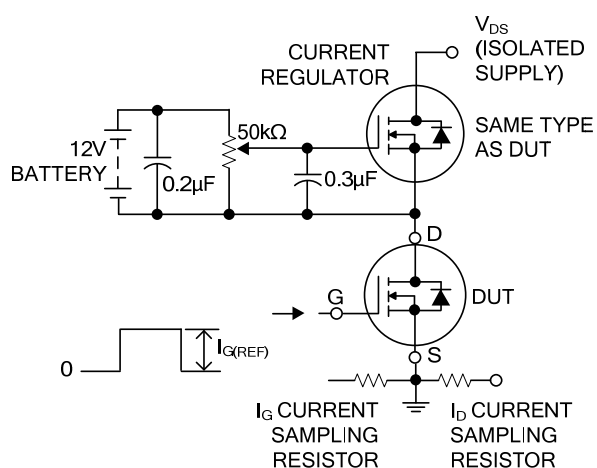


Fig.5 Gate Charge Test Circuit

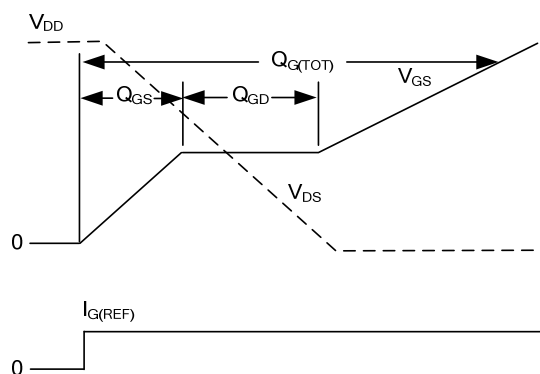
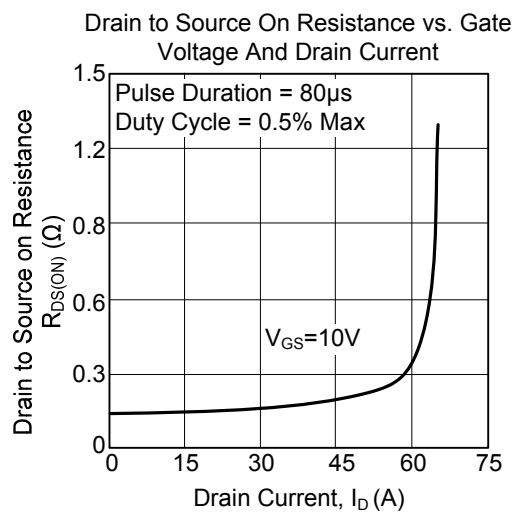
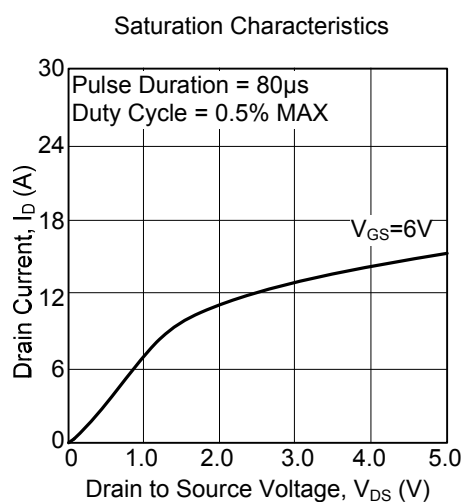


Fig.6 Gate Charge Waveforms

■ TYPICAL CHARACTERISTICS



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