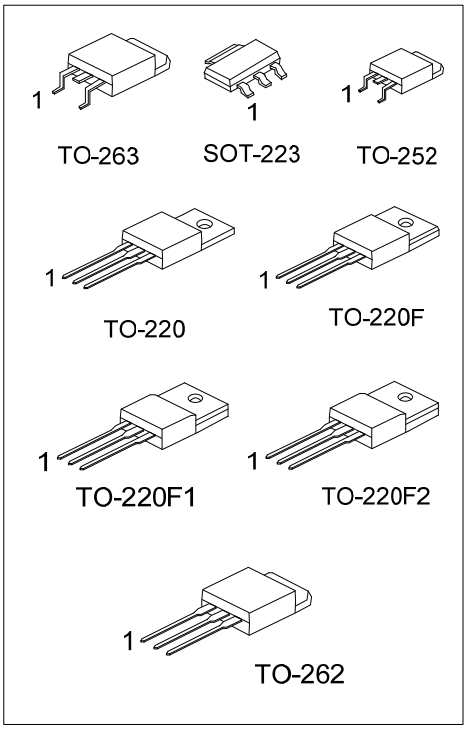
UF640

Power MOSFET

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



■ DESCRIPTION

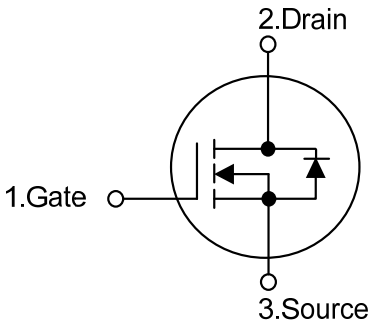
These kinds of n-channel power MOSFET field effect transistor have low conduction power loss, high input impedance, and high switching speed, Linear Transfer Characteristics, so can be use in a variety of power conversion applications.

The **UF640** suitable for resonant and PWM converter topologies.

■ FEATURES

* $R_{DS(ON)}$ < 0.18Ω @ V_{GS}=10V, I_D=10A
* 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

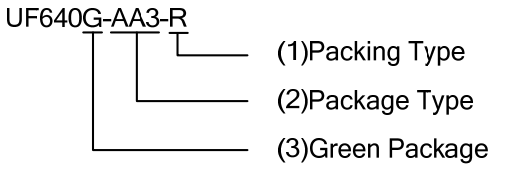


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■ ORDERING INFORMATION

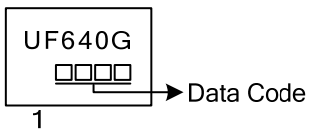
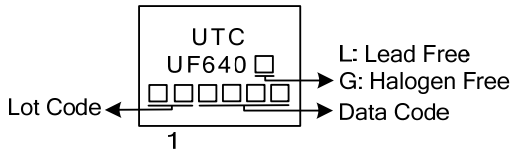
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen-Free		1	2	3	
-	UF640G-AA3-R	SOT-223	G	D	S	Tape Reel
UF640L-TA3-T	UF640G-TA3-T	TO-220	G	D	S	Tube
UF640L-TF1-T	UF640G-TF1-T	TO-220F1	G	D	S	Tube
UF640L-TF2-T	UF640G-TF2-T	TO-220F2	G	D	S	Tube
UF640L-TF3-T	UF640G-TF3-T	TO-220F	G	D	S	Tube
UF640L-TN3-R	UF640G-TN3-R	TO-252	G	D	S	Tape Reel
UF640L-T2Q-T	UF640G-T2Q-T	TO-262	G	D	S	Tube
UF640L-T2Q-R	UF640G-T2Q-R	TO-262	G	D	S	Tape Reel
UF640L-TQ2-T	UF640G-TQ2-T	TO-263	G	D	S	Tube
UF640L-TQ2-R	UF640G-TQ2-R	TO-263	G	D	S	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source



(1) T: Tube, R: Tape Reel
(2) AA3: SOT-223, TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, TN3: TO-252, T2Q: TO-262, TQ2: TO-263
(3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING

SOT-223	TO-220 / TO-220F / TO-220F1 TO-220F2 / TO-252 / TO-262 / TO-263
	

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

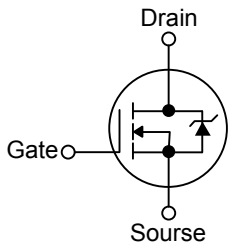
PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	200	V
Drain-Gate Voltage (R_{GS}=20kΩ)		V_{DGR}	200	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current		I_D	18	A
Pulsed Drain Current (Note 2)		I_{DM}	72	A
Single Pulse Avalanche Energy Rating (Note 2)		E_{AS}	242	mJ
Maximum Power Dissipation	SOT-223	P_D	66	W
	TO-220		123	
	TO-220F		40	
	TO-220F1/TO-220F2		42	
	TO-252		83	
	TO-262/TO-263		139	
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Notes: 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}=12A, starting T_J=25°C
3. Pulse width limited by $T_{J(MAX)}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	57	°C/W
	TO-220/TO-220F TO-220F1/TO-220F2 TO-262/TO-263		62.5	
	TO-252		110	
Junction to Case	SOT-223	θ_{JC}	1.8	°C/W
	TO-220		1.01	
	TO-220F		3.1	
	TO-220F1/TO-220F2		2.9	
	TO-252		1.5	
	TO-262/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
Drain-Source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A		0.14	0.18	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1MHz		805		pF
Output Capacitance	C_{OSS}			240		pF
Reverse Transfer Capacitance	C_{RSS}			46		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=100V,I_D≈18A, R_G=9.1Ω,R_L=5.4Ω, MOSFET Switching Times are Essentially Independent of Operating Temperature		40	52	ns
Turn-ON Rise Time	t_R			58	72	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			127	152	ns
Turn-OFF Fall-Time	t_F			86	104	ns
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=10V, I_D≈18A, V_{DS}=0.8 x Rated BV_{DSS} Gate Charge is Essentially Independent of Operating Temperature $I_{G(REF)}$ = 1.5mA		89	110	nC
Gate Source Charge	Q_{GS}			9		nC
Gate Drain Charge	Q_{GD}			24		nC
SOURCE TO DRAIN DIODE SPECIFICATIONS						
Diode Forward Voltage (Note)	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)	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: Pulse Test: Pulse width ≤ 300μs, duty cycle ≤ 2%.

■ TEST CIRCUIT

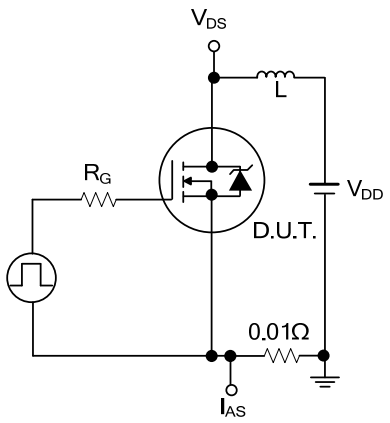


Fig. 1 Unclamped Energy Test Circuit

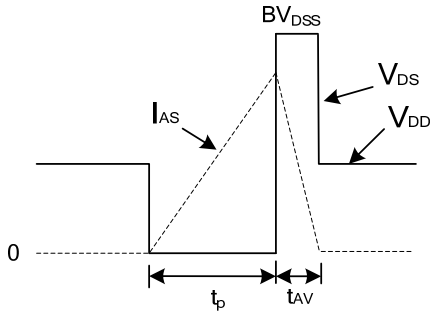


Fig.2 Unclamped Energy Waveforms

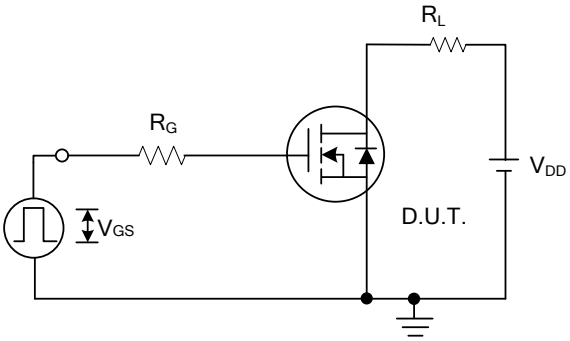


Fig.3 Switching Time Test Circuit

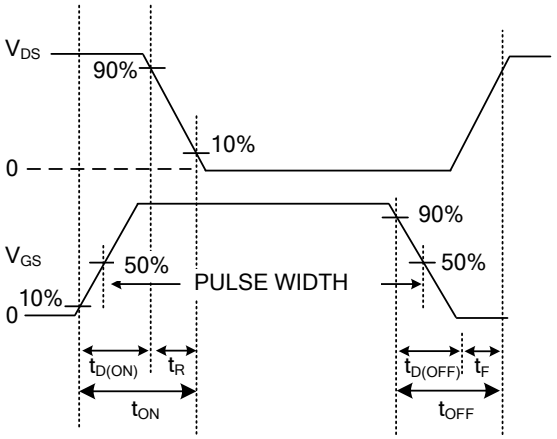


Fig.4 Resistive Switching Waveforms

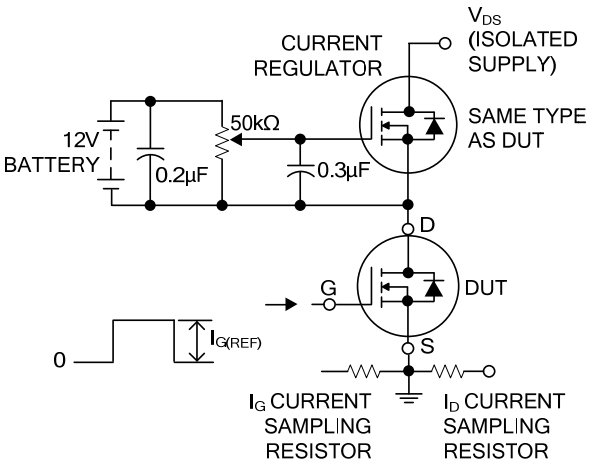


Fig.5 Gate Charge Test Circuit

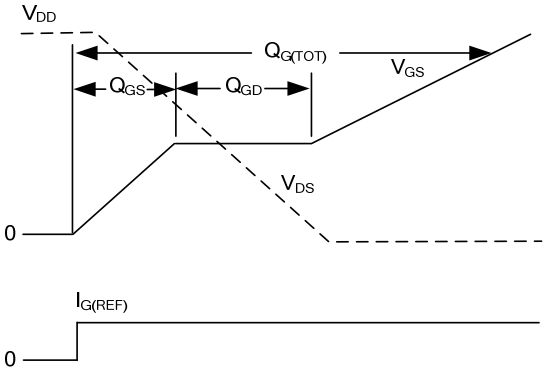
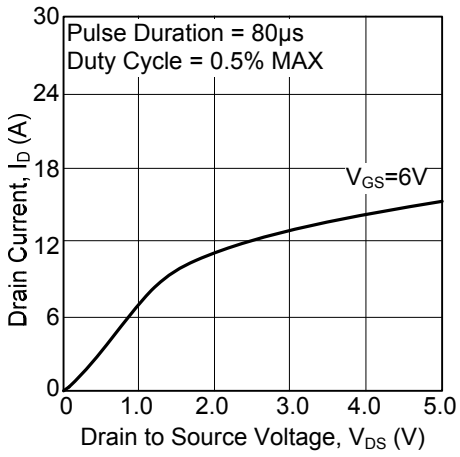


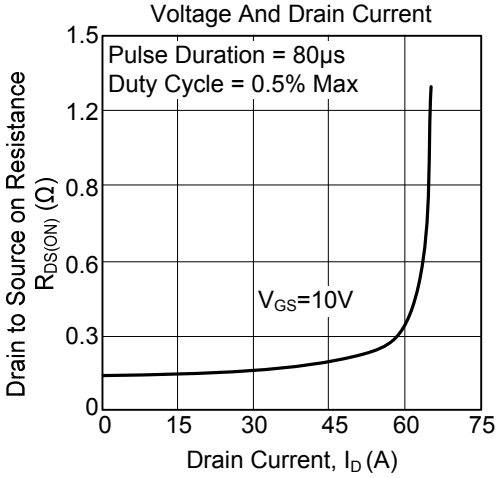
Fig.6 Gate Charge Waveforms

■ TYPICAL CHARACTERISTICS

Saturation Characteristics



Drain to Source On Resistance vs. Gate Voltage And Drain Current



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