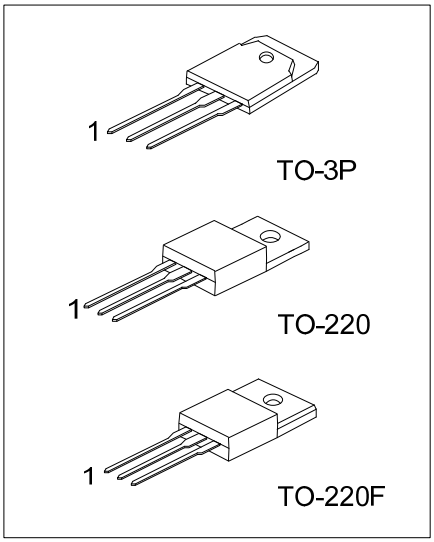
UF640V

Power MOSFET

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



■ DESCRIPTION

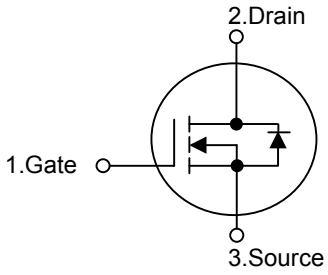
These kinds of n-channel power MOSFET field effect transistor have low conduction power loss, high input impedance, and high switching speed, Linear Transfer Characteristics, so can be use in a variety of power conversion applications.

The **UF640V** 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



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free Plating	Halogen Free		1	2	3	
UF640VL-TA3-T	UF640VG-TA3-T	TO-220	G	D	S	Tube
UF640VL-TF3-T	UF640VG-TF3-T	TO-220F	G	D	S	Tube
UF640VL-T3P-T	UF640VG-T3P-T	TO-3P	G	D	S	Tube

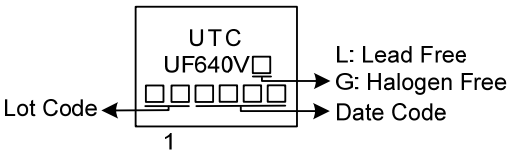
Note: Pin Assignment: B: Base C: Collector E: Emitter

UF640VG-TA3-T

(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube
(2) TA3: TO-220, TF3: TO-220F, T3P: TO-3P
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ 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 3)		I_{DM}	72	A
Single Pulse Avalanche Energy Rating (Note 3)		E_{AS}	216	mJ
Peak Diode Recovery dv/dt		dv/dt	5.5	V/ns
Maximum Power Dissipation	TO-3P	P_D	150	W
	TO-220		123	W
	TO-220F		40	W
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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L =1.8mH, I_{AS} = 15.5A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ 18A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-3P	θ_{JA}	50	°C/W
	TO-220 TO-220F		62.5	
Junction to Case	TO-3P	θ_{JC}	0.833	°C/W
	TO-220		1.01	
	TO-220F		3.1	

■ 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}=200V, V_{GS}=0V			25	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		2.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=10A			0.18	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1120		pF
Output Capacitance		C_{OSS}			190		pF
Reverse Transfer Capacitance		C_{RSS}			20		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=160V, V_{GS}=10V, I_D=16A I_G= 1mA (Note1, 2)		33		nC
Gate to Source Charge		Q_{GS}			8		nC
Gate to Drain Charge		Q_{GD}			6		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=100V, V_{GS}=10V, I_D=16A, R_G=25Ω (Note1, 2)		5.6		ns
Rise Time		t_R			20		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			124		ns
Fall-Time		t_F			34		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				18	A
Maximum Body-Diode Pulsed Current		I_{SM}				72	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=18A, V_{GS}=0V			2	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=18A, V_{GS}=0V, dI_F/dt=100A/μs (Note 1)		180		ns
Body Diode Reverse Recovery Charge		Q_{rr}			1.1		μC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUIT

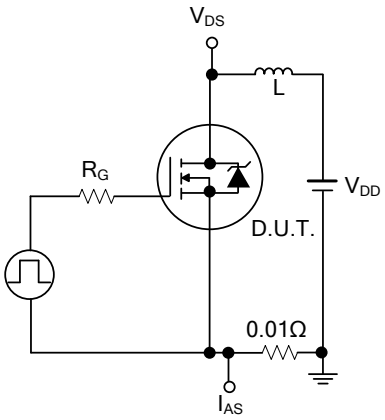


Fig. 1 Unclamped Energy Test Circuit

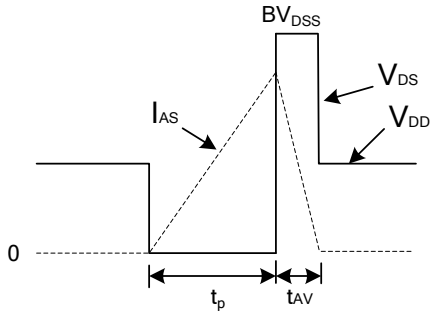


Fig.2 Unclamped Energy Waveforms

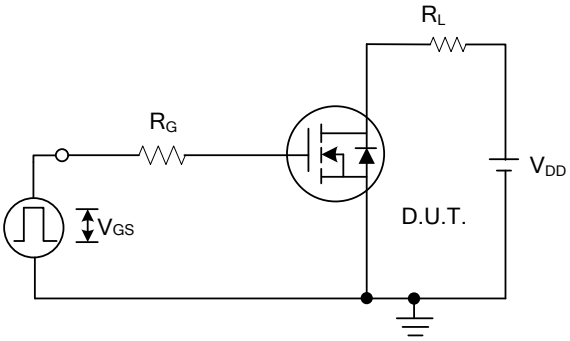


Fig.3 Switching Time Test Circuit

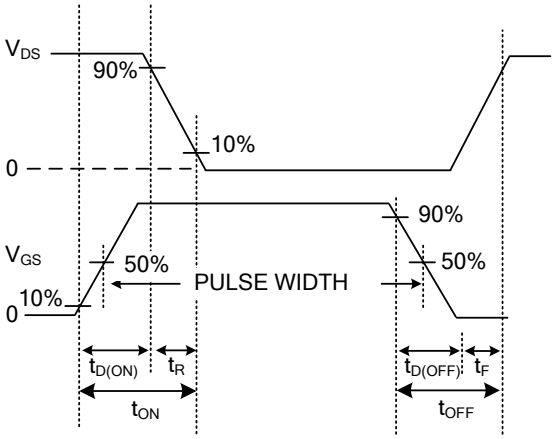


Fig.4 Resistive Switching Waveforms

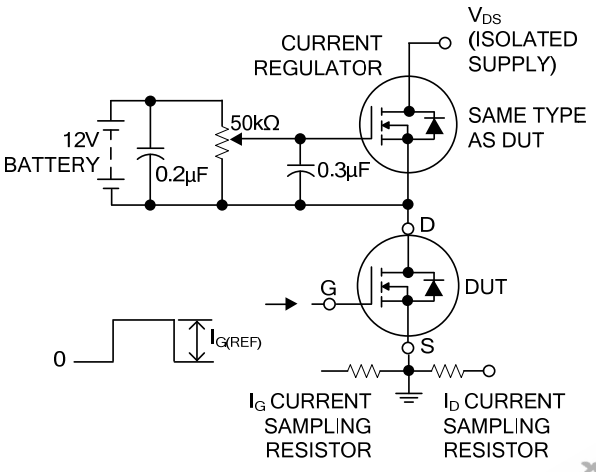


Fig.5 Gate Charge Test Circuit

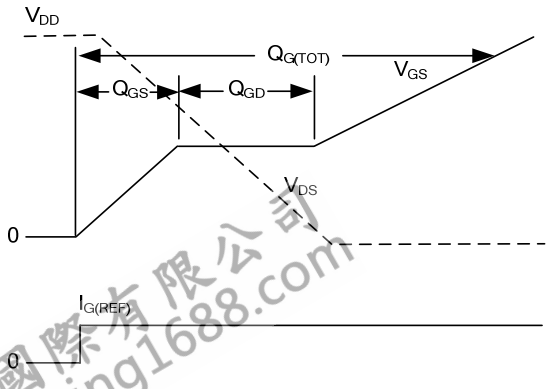
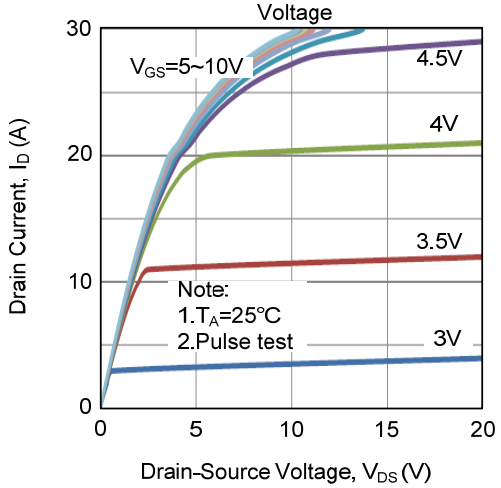


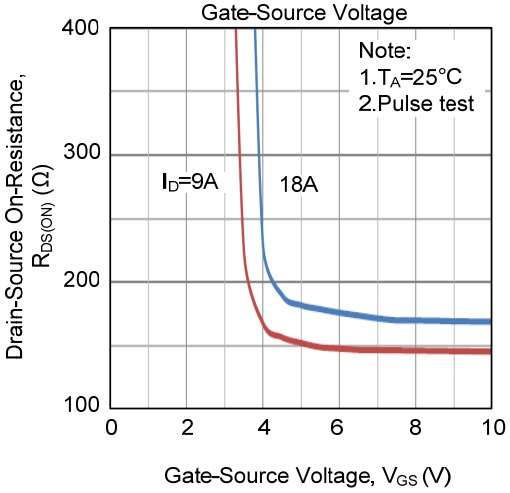
Fig.6 Gate Charge Waveforms

■ TYPICAL CHARACTERISTICS

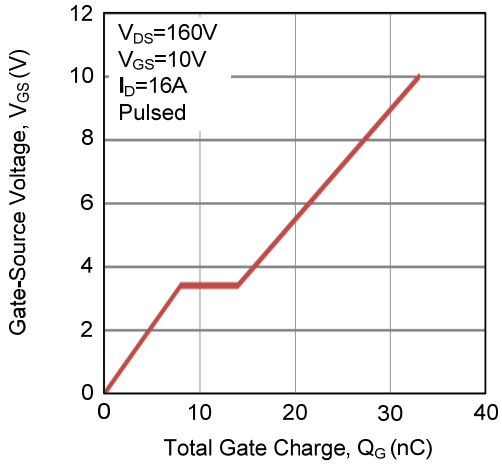
Drain Current vs. Drain-Source Voltage



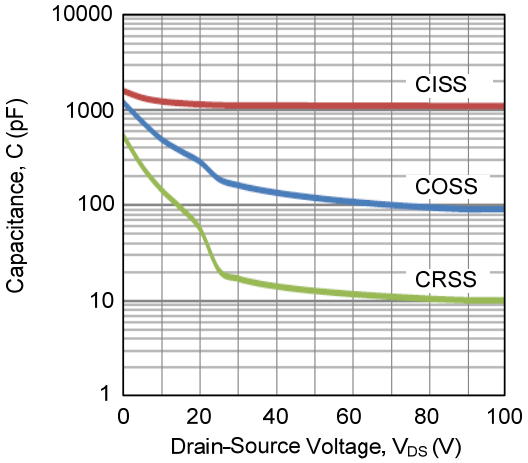
Drain-Source On-Resistance vs. Gate-Source Voltage



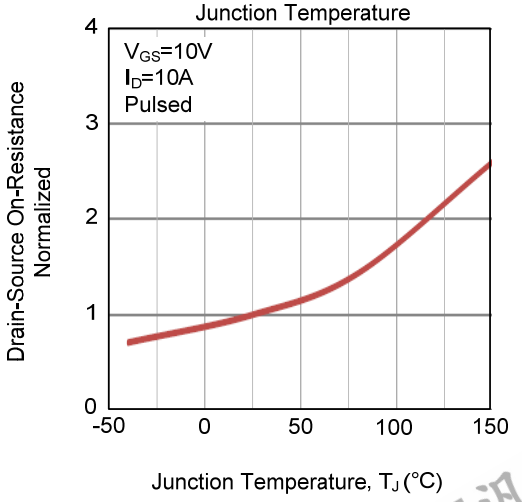
Gate Charge Characteristics



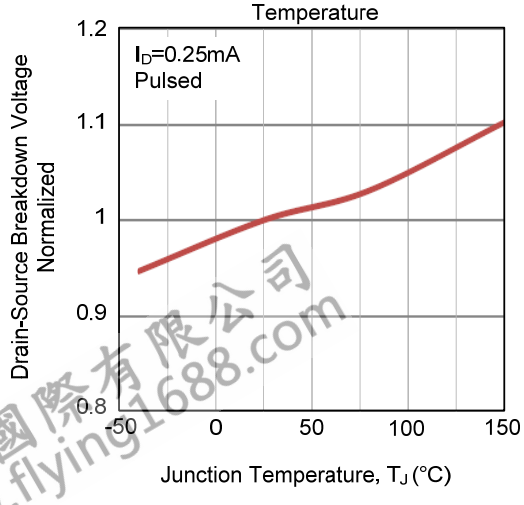
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

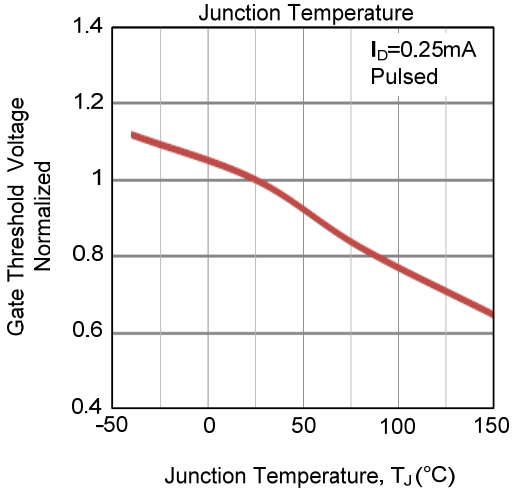


Breakdown Voltage vs. Junction Temperature

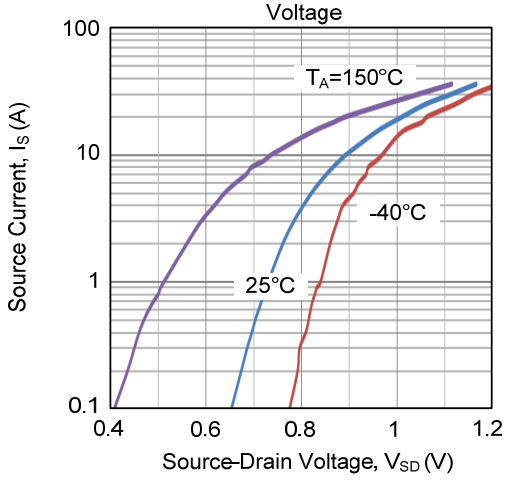


■ TYPICAL CHARACTERISTICS (Cont.)

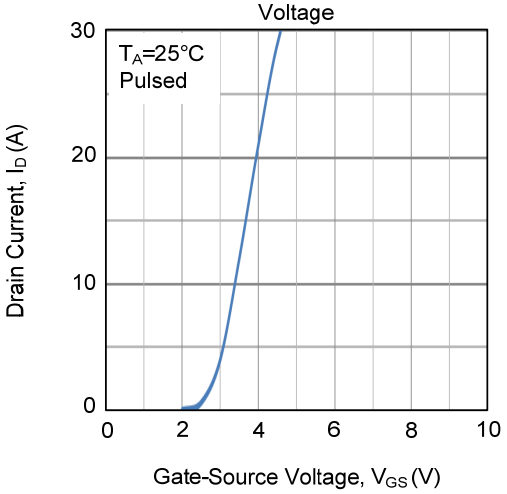
Gate Threshold Voltage vs. Junction Temperature



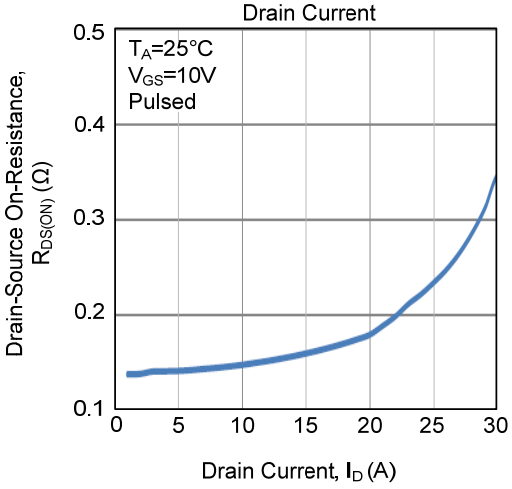
Source Current vs. Source-Drain Voltage



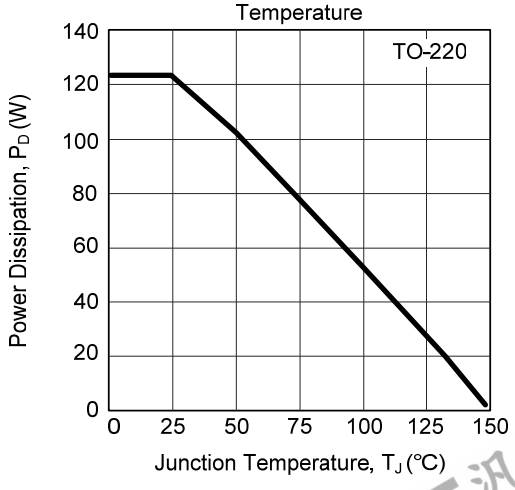
Drain Current vs. Gate-Source Voltage



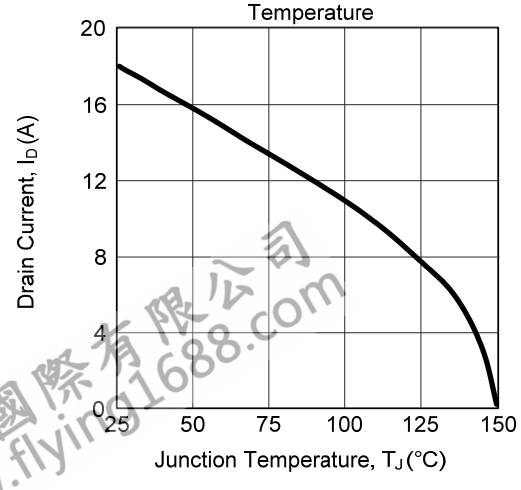
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)