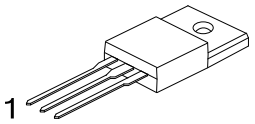
UF9640Z

Power MOSFET

-11A, -200V P-CHANNEL POWER MOSFET



TO-220F

■ DESCRIPTION

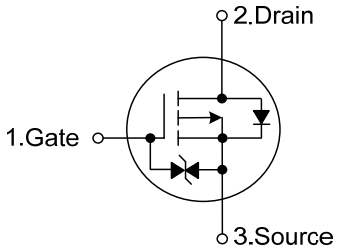
The **UF9640Z** is a P-channel Power MOSFET that developed by UTC's advanced technlogy. The device has an advantage of including fast switching, low on-resistance, ruggedized device design and low cost-effectiveness.

This type of package is generally applied in applications in the commercial-industrial field especially suitable for the power consumption at approximately 50W. Because of its low package cost and low thermal resistance, this package is widely applied in the industry field.

■ FEATURES

* Fast switching speed
* Repetitive avalanche rated
* Simple drive requirements
* Ease of paralleling

■ SYMBOL



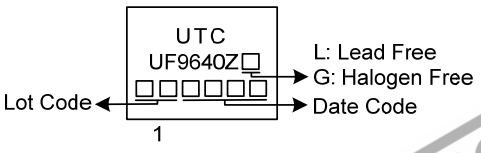
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF9640ZL-TF3-T	UF9640ZG-TF3-T	TO-220F	G	D	S	Tube

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

UF9640ZG-TF3-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) TF3: TO-220F (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Gate to Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	-11	A
	Pulsed (Note 1)	I_{DM}	-22	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	35	mJ
	Repetitive (Note 1)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	1.2	V/ns
Power Dissipation		P_D	38	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=12mH, I_{AS}=-2.4A, V_{DD}=-50V, R_G=25Ω, Starting T_J = 25°C.
4. I_{SD}≤-11A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_J=25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	PATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	3.31	°C/W

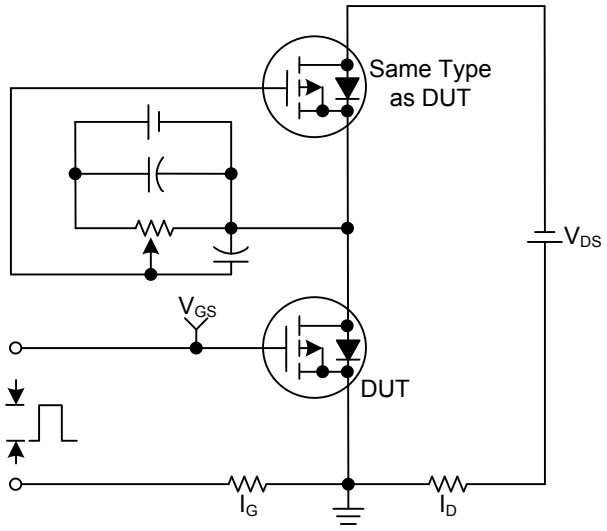
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-200			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-200V, V_{GS}=0V			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V			10	μA
	Reverse		V_{GS}=-20V			-10	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0		-4.0	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-6.6A (Note 2)			0.5	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-25V,V_{GS}=0V,f=1.0MHz		770		pF
Output Capacitance		C_{OSS}			185		pF
Reverse Transfer Capacitance		C_{RSS}			20		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=-50V, V_{GS}=-10V, I_D=-1.3A, I_G=-100mA (Note 2)		7.0		nC
Gate-Source Charge		Q_{GS}			6.8		nC
Gate-Drain Charge		Q_{GD}			8.4		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-50V, V_{GS}=-10Ω, I_D=-5A, R_G=25Ω (Note 2)		11		ns
Turn-ON Rise Time		t_R			19		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			58		ns
Turn-OFF Fall Time		t_F			25		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				-11	A
Maximum Body-Diode Pulsed Current		I_{SM}				-22	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S =-11A, V_{GS}=0V, T_J=25°C			-5.0	V
Body Diode Reverse Recovery Time		t_{rr}	I_F=-11A, T_J=25°C dI/dt=100A/μs (Note 2)		260		ns
Body Diode Reverse Recovery Charge		Q_{rr}			1.6		μC

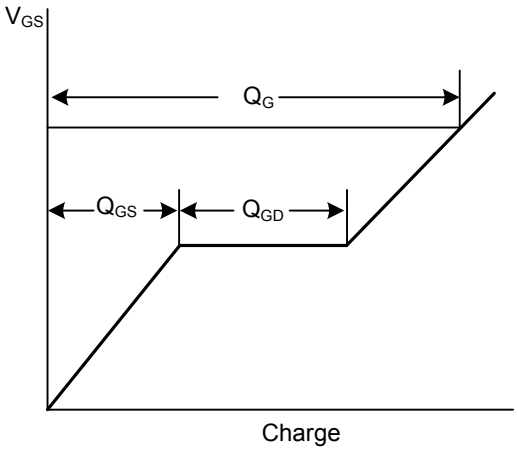
Notes: 1. Pulse width limited by maximum junction temperature.
2. Pulse Test : Pulse width≤300μs, Duty cycle≤2%

■ TEST CIRCUITS AND WAVEFORMS

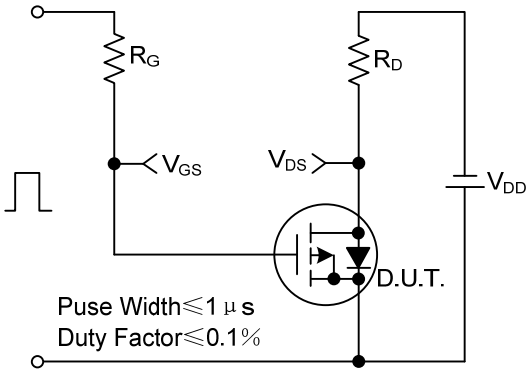
Gate Charge Test Circuit



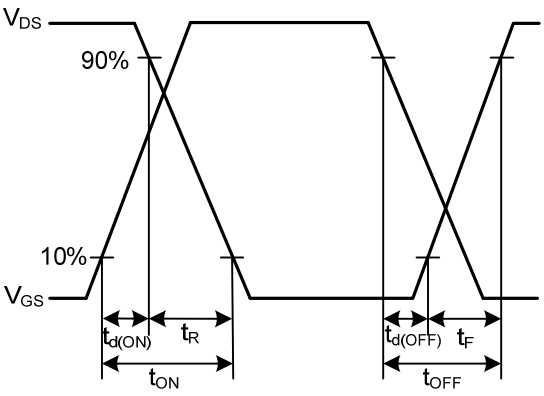
Gate Charge Waveforms



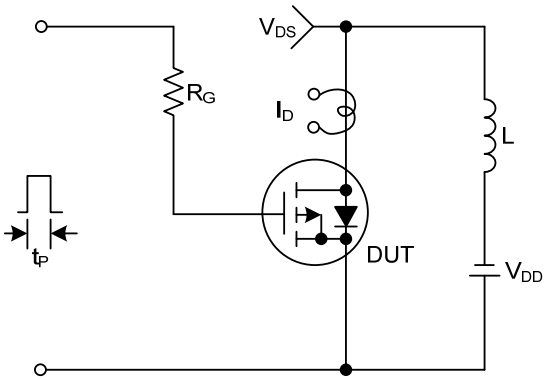
Resistive Switching Test Circuit



Resistive Switching Waveforms

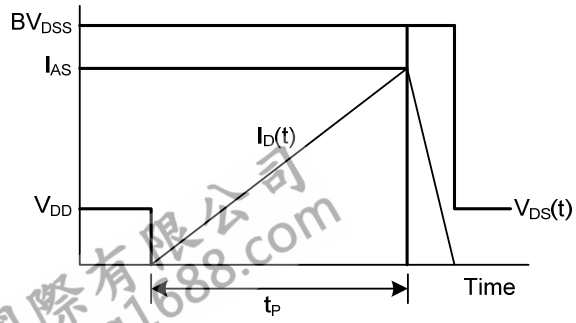


Unclamped Inductive Switching Test Circuit



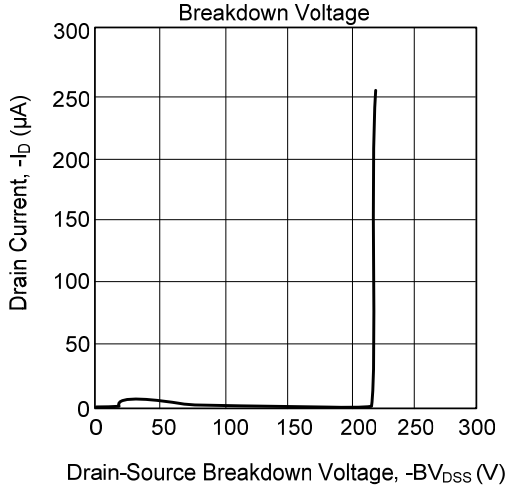
Unclamped Inductive Switching Waveforms

$$E_{AS}=\frac{1}{2}LI_{AS}^{2}\frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

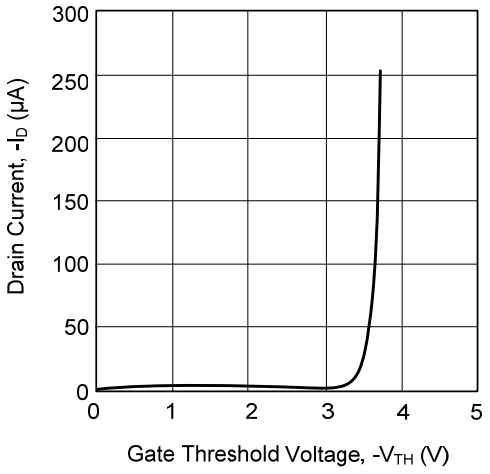


■ TYPICAL CHARACTERISTICS

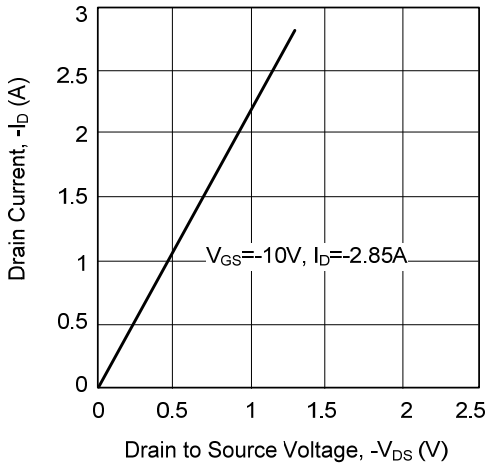
Drain Current vs. Drain-Source Breakdown Voltage



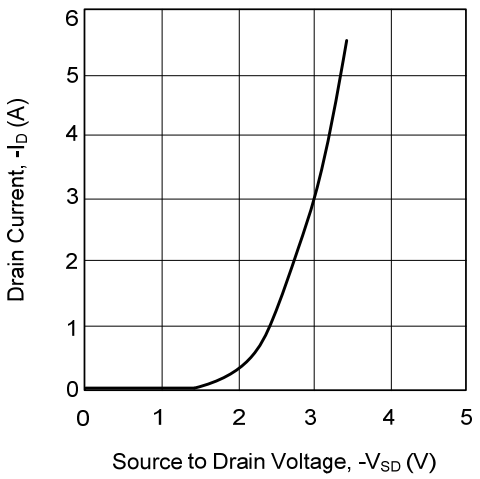
Drain Current vs. Gate Threshold Voltage



Drain-Source On-State Resistance Characteristics



Drain Current vs. Source to Drain Voltage



Maximum Safe Operating Area