



UF9640

Preliminary

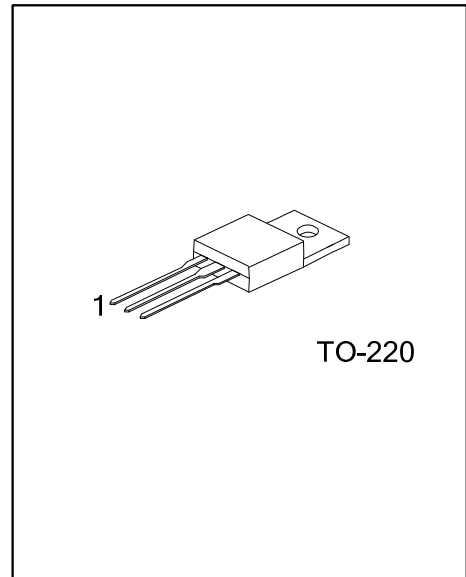
Power MOSFET

11 Amps, 200 Volts P-CHANNEL POWER MOSFET

DESCRIPTION

The **UF9640** is a P-channel Power MOSFET that developed by UTC's advanced technology. The device has an advantage of including fast switching, low on-resistance, ruggedized device design and low cost-effectiveness.

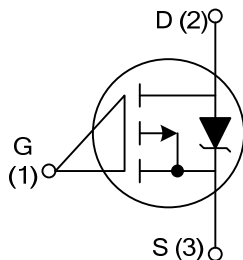
This type of package is generally applied in applications in the commercial-industrial field especially suitable for the power consumption at approximately 50W. Because of its low package cost and low thermal resistance, this package is widely applied in the industry field.



FEATURES

- * Fast switching speed
- * P-channel MOSFET
- * 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	
UF9640L -TA3 -T	UF9640G -TA3 -T	TO-220	G	D	S	Tube

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

<p>UF9640L - TA3 - T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS (T_c=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Gate to Source Voltage		V _{GSS}	±20	V
Avalanche Current (Note 1)		I _{AR}	-11	A
Drain Current	Continuous	I _D	-11	A
	Pulsed (Note 1)	I _{DM}	-44	A
Avalanche Energy	Single Pulsed (Note 2)	E _{AS}	700	mJ
	Repetitive (Note 1)	E _{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	-5.0	V/ns
Power Dissipation		P _D	125	W
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°C

Notes: 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	TYP.	MAX.	UNIT
Junction-to-Ambient	θ _{JA}		62.5	°C/W
Junction-to-Case	θ _{JC}		1.0	°C/W

■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-200			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	$I_D=-1mA$, Referenced to 25°C		-0.20		$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-200V, V_{GS}=0V$			-100	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+100	nA
		Reverse			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-2.0		-4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-6.6A$ (Note 4)			0.50	Ω
Forward Transconductance	g_{FS}	$V_{DS}=-50V, I_D=-6.6A$ (Note 4)	4.1			S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=-25V, V_{GS}=0V, f=1.0MHz$		1200		pF
Output Capacitance	C_{OSS}			370		pF
Reverse Transfer Capacitance	C_{RSS}			81		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=-160V, V_{GS}=-10V$, $I_D=-11A$ (Note4)			44	nC
Gate-Source Charge	Q_{GS}				7.1	nC
Gate-Drain Charge	Q_{GD}				27	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-100V, I_D=-11A, R_G=9.1\Omega$, $R_D=8.6\Omega$ (Note 4)		14		ns
Turn-ON Rise Time	t_R			43		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			39		ns
Turn-OFF Fall Time	t_F			38		ns
Internal Drain Inductance	L_D		Between lead, 6mm (0.25in.) from package and center of die contact		4.5	
Internal Source Inductance	L_S			7.5		nH
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				-11	A
Maximum Body-Diode Pulsed Current	I_{SM}				-44	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=-11A, V_{GS}=0V, T_J=25^\circ\text{C}$			-5.0	V
Body Diode Reverse Recovery Time	t_{RR}	$I_F=-11A, T_J=25^\circ\text{C}$		250	300	ns
Body Diode Reverse Recovery Charge	Q_{RR}	$di/dt=100A/\mu s$ (Note 4)		2.9	3.6	μC
Forward Turn-On Time	t_{ON}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes: 1. Repetitive Rating : Pulse width limited by maximum junction temperature

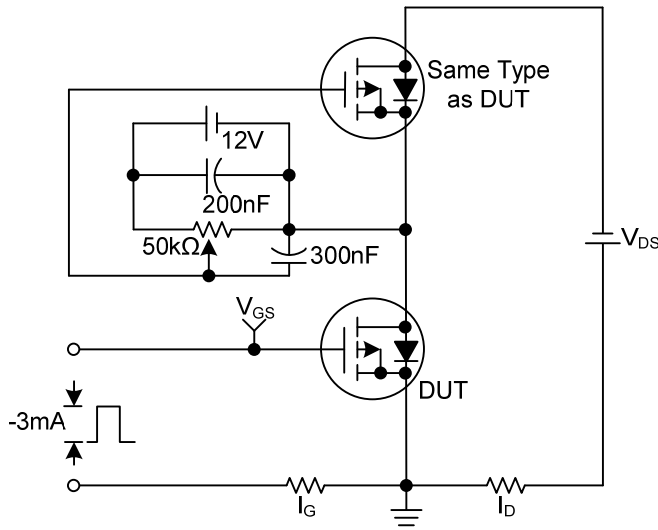
2. $V_{DD}=-50V$, Starting $T_J=25^\circ\text{C}$, $L=8.7mH$, $R_G=25\Omega$, $I_{AS}=-11A$

3. $I_{SD}\leq-11A$, $di/dt\leq 150A/\mu s$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=150^\circ\text{C}$

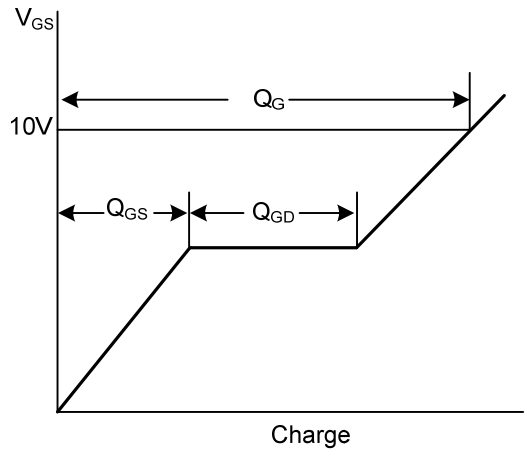
4. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

■ TEST CIRCUITS AND WAVEFORMS

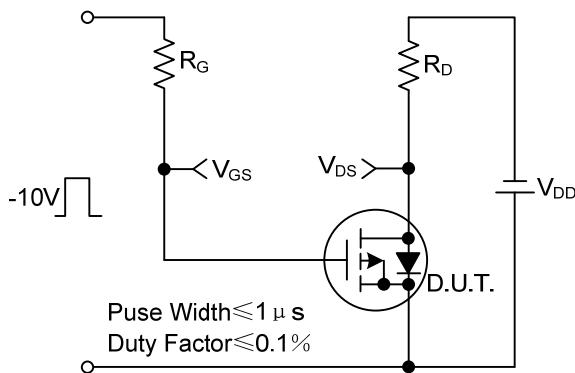
Gate Charge Test Circuit



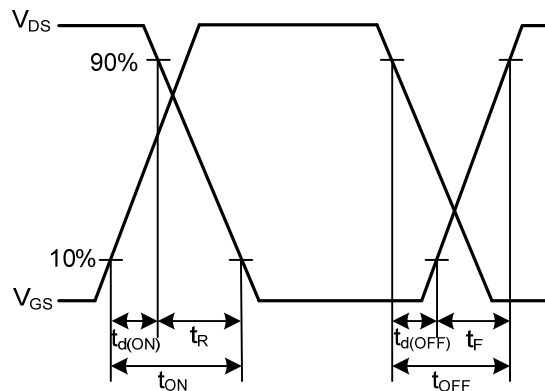
Gate Charge Waveforms



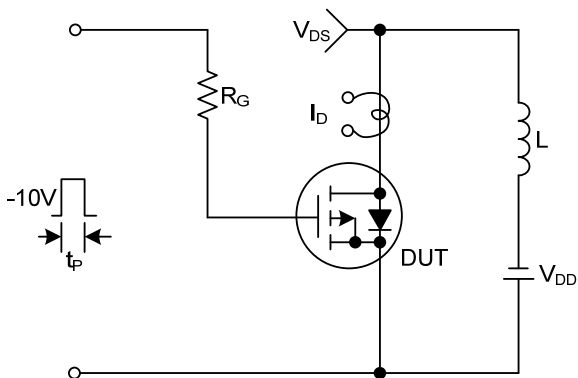
Resistive Switching Test Circuit



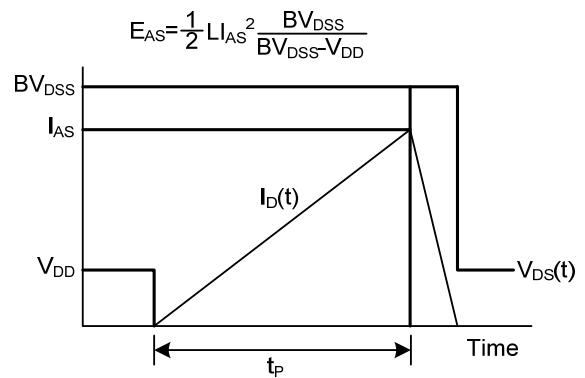
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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