



## UF640-Q

Power MOSFET

### 18A, 200V, 0.20Ω, N-CHANNEL POWER MOSFET

#### DESCRIPTION

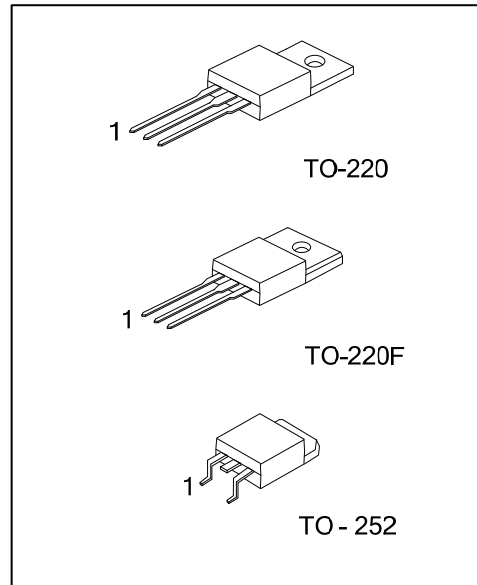
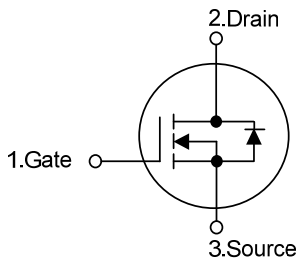
These kinds of n-channel power MOSFET field effect transistor have low conduction power loss, high input impedance, and high switching speed, Linear Transfer Characteristics, so can be use in a variety of power conversion applications.

The UF640-Q suitable for resonant and PWM converter topologies.

#### FEATURES

- \*  $R_{DS(ON)} < 0.2\Omega @ V_{GS}=10V, I_D=10A$
- \* Fast switching capability
- \* Avalanche energy specified
- \* Improved dv/dt capability, high ruggedness

#### SYMBOL



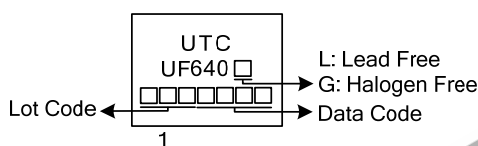
#### ORDERING INFORMATION

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-TF3-T	UF640G-TF3-T	TO-220F	G	D	S	Tube
UF640L-TN3-R	UF640G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UF640L-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF3: TO-220F, TN3: TO-252</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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#### MARKING



■ **ABSOLUTE MAXIMUM RATING** ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	200	V
Drain-Gate Voltage ( $R_{GS}=20\text{k}\Omega$ )	$V_{DGR}$	200	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	18	A
Pulsed Drain Current (Note 2)	$I_{DM}$	72	A
Single Pulse Avalanche Energy Rating (Note 2)	$E_{AS}$	200	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	3.8	V/ns
Maximum Power Dissipation	TO-220	123	W
	TO-220F	40	W
	TO-252	83	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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  $T_J$ .

3.  $L=1.2\text{mH}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , peak  $I_{AS}=18\text{A}$ , starting  $T_J=25^\circ\text{C}$ .

4.  $I_{SD} \leq 18\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$ .

■ **THERMAL RESISTANCES CHARACTERISTICS**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	62.5	$^\circ\text{C}/\text{W}$
	TO-252	110	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	1.01	$^\circ\text{C}/\text{W}$
	TO-220F	3.1	$^\circ\text{C}/\text{W}$
	TO-252	1.5	$^\circ\text{C}/\text{W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	200			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = \text{Rated } BV_{DSS}, V_{GS} = 0\text{V}$			25	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(THR)}$	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	2.0		4.0	V
Drain-Source On Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=10\text{A}$			0.2	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		805		pF
Output Capacitance	$C_{OSS}$			240		pF
Reverse Transfer Capacitance	$C_{RSS}$			46		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}, I_D=1.3\text{A}, V_{DS}=50\text{V}, I_G=100\mu\text{A}$		23		nC
Gate Source Charge	$Q_{GS}$			5.0		nC
Gate Drain Charge	$Q_{GD}$			8.8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{GS}=10\text{V}, I_D=0.5\text{A}, V_{DD}=10\text{V}, R_G=25\Omega$		40		ns
Turn-ON Rise Time	$t_R$			140		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			112		ns
Turn-OFF Fall-Time	$t_F$			125		ns
<b>SOURCE TO DRAIN DIODE SPECIFICATIONS</b>						
Continuous Source Current (body diode)	$I_S$				18	A
Pulse Source Current (body diode) (Note)	$I_{SM}$				72	A
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
Reverse Recovery Time	$t_{rr}$	$T_J=25^\circ\text{C}, I_S=18\text{A}, dI_S/dt=100\text{A}/\mu\text{s}$		170		ns
Reverse Recovery Charge	$Q_{rr}$	$T_J=25^\circ\text{C}, I_S=18\text{A}, dI_S/dt=100\text{A}/\mu\text{s}$		1.0		$\mu\text{C}$

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

■ TEST CIRCUIT

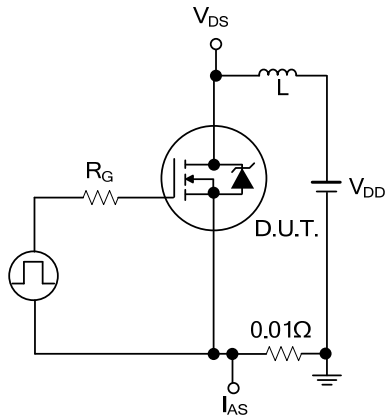


Fig. 1 Unclamped Energy Test Circuit

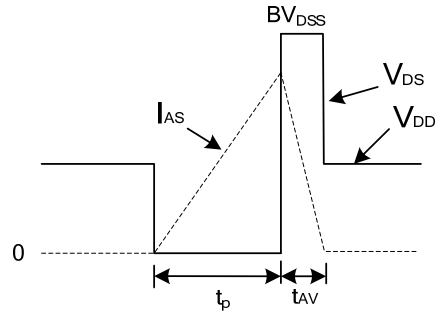


Fig.2 Unclamped Energy Waveforms

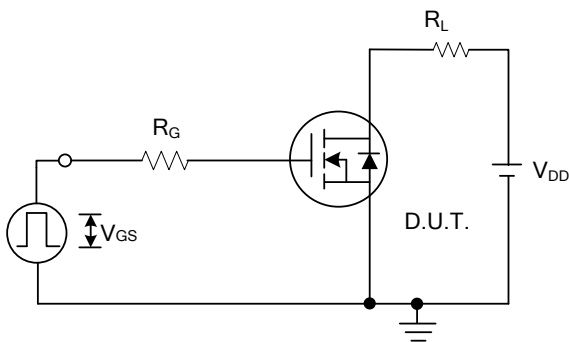


Fig.3 Switching Time Test Circuit

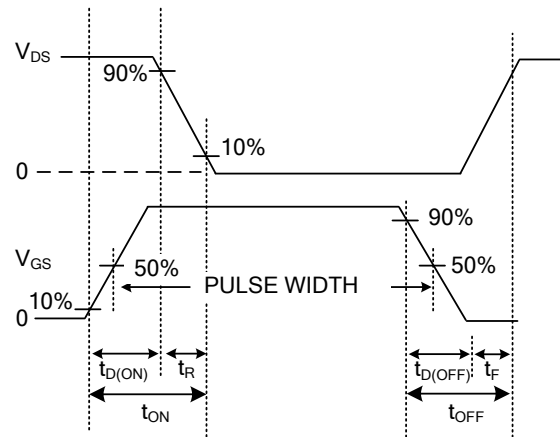


Fig.4 Resistive Switching Waveforms

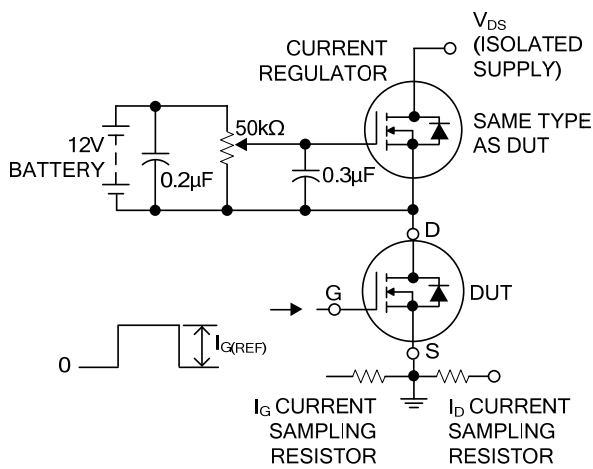


Fig.5 Gate Charge Test Circuit

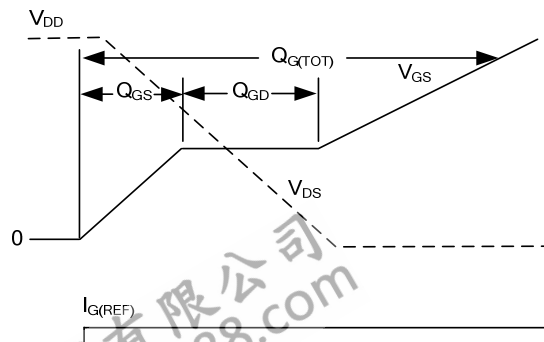
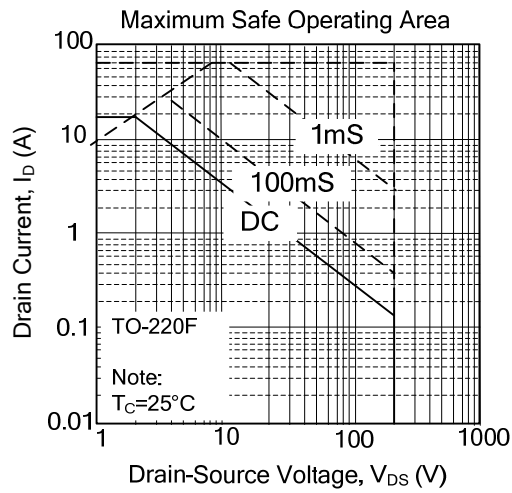


Fig.6 Gate Charge Waveforms

■ TYPICAL CHARACTERISTICS



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