



# UF9Z24

*Power MOSFET*

## 12A, 55V P-CHANNEL POWER MOSFET

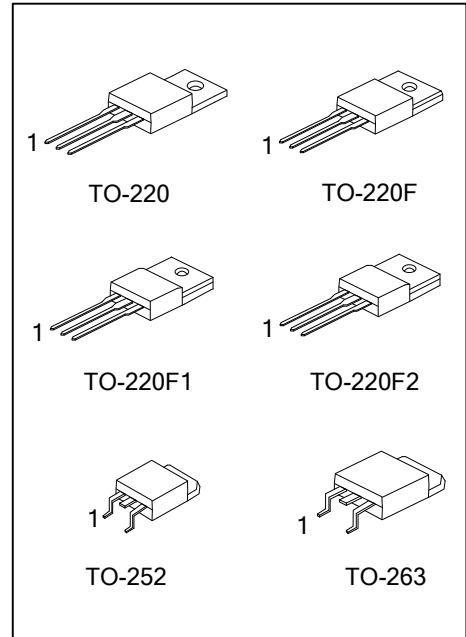
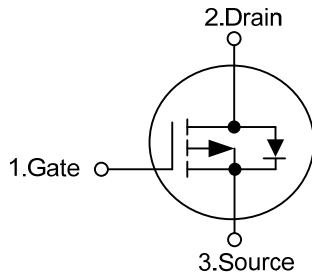
■ **DESCRIPTION**

The UTC **UF9Z24** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and minimum on-state resistance. It can also withstand high energy in the avalanche.

■ **FEATURES**

- \*  $R_{DS(ON)} < 175m\Omega$  @  $V_{GS} = -10V, I_D = -12A$
- \* High Switching Speed

■ **SYMBOL**



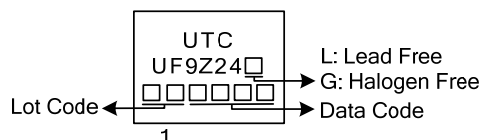
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF9Z24L-TA3-T	UF9Z24G-TA3-T	TO-220	G	D	S	Tube
UF9Z24L-TF3-T	UF9Z24G-TF3-T	TO-220F	G	D	S	Tube
UF9Z24L-TF1-T	UF9Z24G-TF1-T	TO-220F1	G	D	S	Tube
UF9Z24L-TF2-T	UF9Z24G-TF2-T	TO-220F2	G	D	S	Tube
UF9Z24L-TN3-R	UF9Z24G-TN3-R	TO-252	G	D	S	Tape Reel
UF9Z24L-TQ2-T	UF9Z24G-TQ2-T	TO-263	G	D	S	Tube
UF9Z24L-TQ2-R	UF9Z24G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>UF9Z24L-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TN3: TO-252, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ **MARKING**



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	-55	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous $T_C=25^{\circ}\text{C}$	$I_D$	-12	A
	Pulsed	$I_{DM}$	-48	A
Single Pulsed Avalanche Current (L=0.1mH)		$I_{AS}$	-7.2	A
Single Pulsed Avalanche Energy (L=0.1mH)(Note 1)		$E_{AS}$	96	mJ
Power Dissipation	TO-220/TO-263	$P_D$	38	W
	TO-220F/TO-220F1		23	W
	TO-220F2		25	W
	TO-252		27	W
Junction Temperature		$T_J$	+150	$^{\circ}\text{C}$
Storage Temperature		$T_{STG}$	-55~+150	$^{\circ}\text{C}$

Note: 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	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-263	$\theta_{JA}$	62	$^{\circ}\text{C/W}$
	TO-252		110	$^{\circ}\text{C/W}$
	TO-220/TO-263		3.3	$^{\circ}\text{C/W}$
Junction to Case	TO-220F/TO-220F1	$\theta_{JC}$	5.5	$^{\circ}\text{C/W}$
	TO-220F2		5	$^{\circ}\text{C/W}$
	TO-252		4.6	$^{\circ}\text{C/W}$

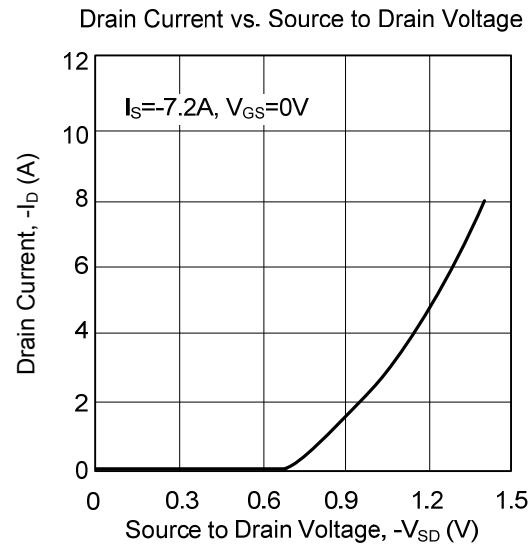
Notes: 1. Duty cycle  $\leq 1\%$ .

■ 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	$BV_{DSS}$	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-55			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-55\text{V}$ , $V_{GS}=0\text{V}$			-25	$\mu\text{A}$
Gate-Source Leakage Current	Forward	$V_{GS}=+20\text{V}$			+100	nA
	Reverse	$V_{GS}=-20\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-2.0		-4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$ , $I_D=-12\text{A}$ (Note 1)			0.175	$\Omega$
On State Drain Current (Note 1)	$I_{D(ON)}$	$V_{GS}=-10\text{V}$ , $V_{DS}=-5\text{V}$	-12			A
<b>DYNAMIC PARAMETERS</b> (Note 2)						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=-25\text{V}$ , $f=1.0\text{MHz}$ (Note 2)		350		pF
Output Capacitance	$C_{OSS}$			170		pF
Reverse Transfer Capacitance	$C_{RSS}$			92		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=-10\text{V}$ , $V_{DS}=-44\text{V}$ , $I_D=-7.2\text{A}$ (Note 3)		52		nC
Gate to Source Charge	$Q_{GS}$			6.6		nC
Gate to Drain Charge	$Q_{GD}$			12		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-28\text{V}$ , $I_D=-7.2\text{A}$ , $R_G=24\Omega$ , $R_D=3.7\Omega$ (Note 3)		13		ns
Rise Time	$t_R$			55		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			23		ns
Fall-Time	$t_F$			37		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b> (Note 2)						
Maximum Body-Diode Continuous Current	$I_S$				-12	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				-48	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_F=-12\text{A}$ , $V_{GS}=0\text{V}$ (Note 1)			-1.6	V

- Notes: 1. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 2. Guaranteed by design, not subject to production testing.  
 3. Independent of operating temperature.

■ TYPICAL CHARACTERISTICS



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