



# UNISONIC TECHNOLOGIES CO., LTD

## UK2996

MOSFET

### 600V SILICON N-CHANNEL POWER MOSFET

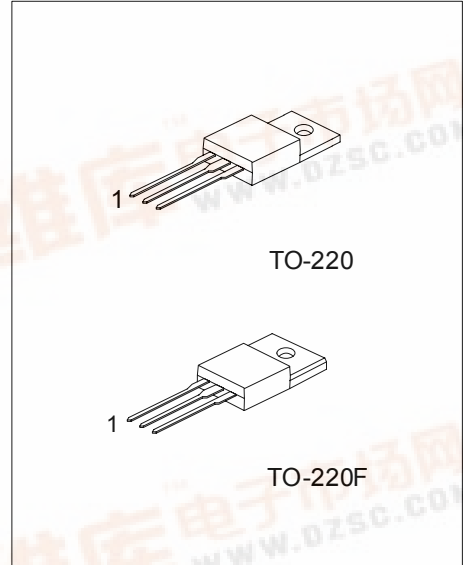
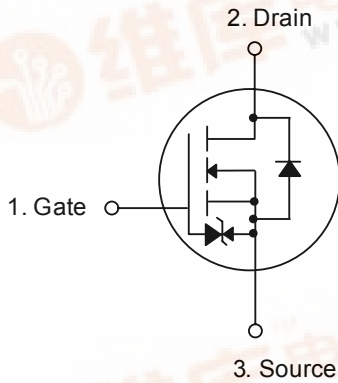
#### DESCRIPTION

The UK2996 is an N-channel enhancement mode field-effect power transistor. Intended for use in high voltage, high speed switching applications in power supplies, DC-DC converter, relay drive and PWM motor drive controls.

#### FEATURES

- \* Fast switching times
- \* Improved inductive ruggedness
- \* High forward transfer admittance
- \* Low on resistance
- \* Low leakage current
- \* Lower input capacitance

#### SYMBOL



\*Pb-free plating product number: UK2996L

#### ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
UK2996-TA3-T	UK2996L-TA3-T	TO-220	G	D	S	Tube
UK2996-TF3-T	UK2996L-TF3-T	TO-220F	G	D	S	Tube

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

<p>UK2996L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) T: Tube (2) TA3: TO-220, TF3: TO-220F (3) L: Lead Free Plating Blank: Pb/Sn</p>
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## ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage	$V_{DSS}$	600	V
Continuous Drain Current	$I_D$	10	A
Pulsed Drain Current	$I_{DM}$	30	A
Drain to Gate Voltage ( $R_{GS} = 20\text{ k}\Omega$ )	$V_{DGR}$	600	V
Gate to Source Voltage	$V_{GSS}$	$\pm 30$	V
Avalanche Current	$I_{AR}$	10	A
Single Pulsed Avalanche energy (Note 2)	$E_{AS}$	252	mJ
Repetitive Avalanche Energy (Note 3)	$E_{AR}$	4.5	mJ
Total Power Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_D$	45	W
Operating Temperature Range	$T_J$	-55 ~ +150	
Storage Temperature	$T_{STG}$	-55 ~ +150	

Note 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.  $L = 4.41\text{ mH}$ ,  $I_{AR} = 10\text{ A}$ ,  $V_{DD} = 90\text{ V}$ ,  $R_G = 25\ \Omega$ , starting  $T_J = 25^\circ\text{C}$ .

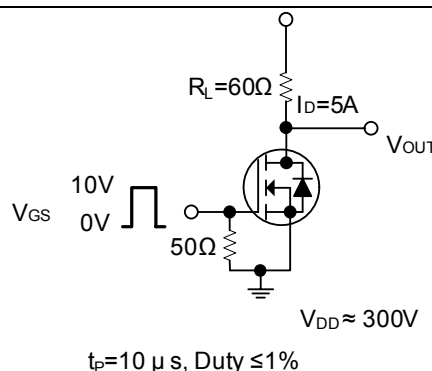
3. Pulse width and frequency is limited by  $T_J$ .

## ■ THERMAL DATA

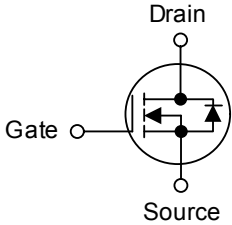
CHARACTERISTICS	SYMBOL	RATINGS	UNIT
Thermal Resistance, Channel to Ambient	$\theta_{JA}$	62.5	/ W
Thermal Resistance, Channel to Case	$\theta_{JC}$	2.78	/ W

## ■ ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

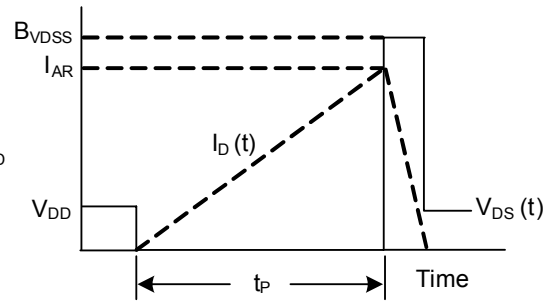
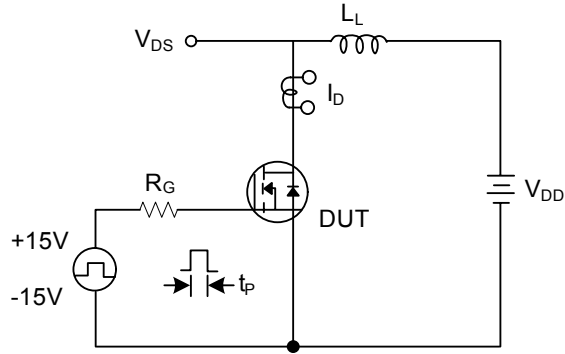
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Gate-Source Breakdown Voltage	$BV_{GSS}$	$V_{DS} = 0\text{V}$ , $I_G = \pm 10\ \mu\text{A}$	$\pm 30$			V
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{V}$ , $I_D = 10\text{mA}$	600			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = 10\text{V}$ , $I_D = 1\text{mA}$	2.0		4.0	V
Gate Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 25\text{V}$ , $V_{DS} = 0\text{V}$			$\pm 10$	$\mu\text{A}$
Drain Source Leakage Current	$I_{DSS}$	$V_{DS} = 600\text{V}$ , $V_{GS} = 0\text{V}$			100	$\mu\text{A}$
Static Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$ , $I_D = 5\text{A}$		0.74	1.0	$\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 10\text{V}$ , $I_D = 5\text{A}$	3.4	6.8		S
Input Capacitance	$C_{ISS}$	$V_{DS} = 20\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$		1500		pF
Reverse Transfer Capacitance	$C_{RSS}$			13		
Output Capacitance	$C_{OSS}$			140		
Total Gate Charge	$Q_G$	$I_D = 10\text{A}$ , $V_{DD} \approx 400\text{V}$ , $V_{GS} = 10\text{V}$		38		nC
Gate-Source Charge	$Q_{GS}$			21		
Gate-Drain Charge	$Q_{GD}$			17		
Switching Time	Turn-on Delay Time		$t_{ON}$		55	
	Turn-on Rise Time	$t_R$		15		
	Turn-off Delay Time	$t_{OFF}$		145		
	Turn-off Fall Time	$t_F$		27		



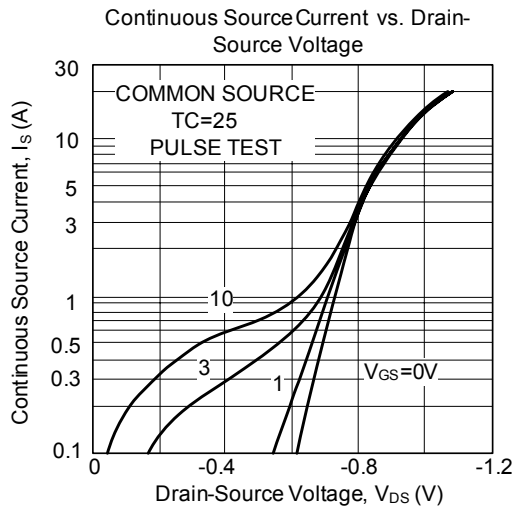
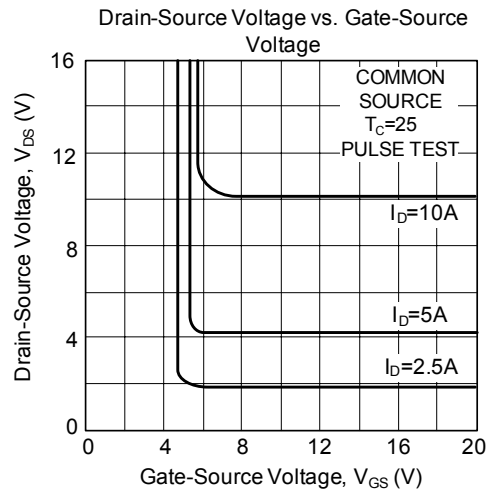
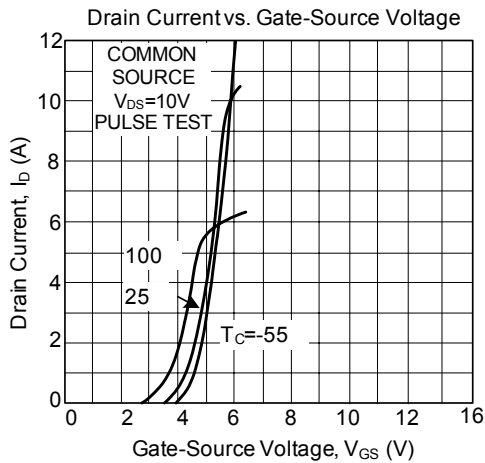
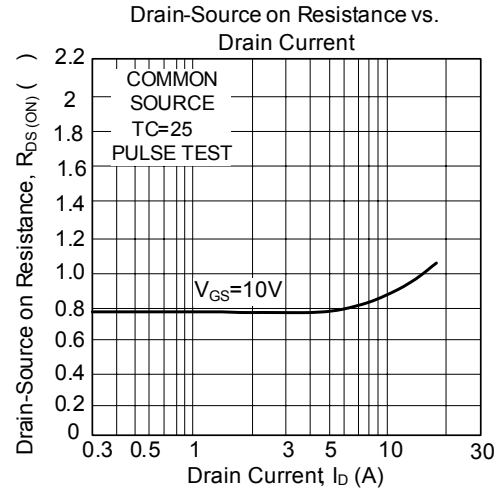
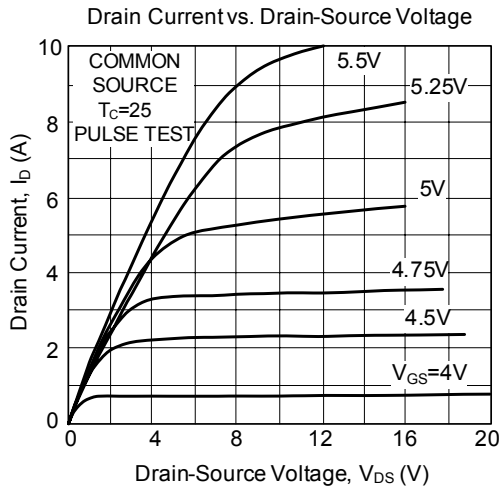
■ SOURCE-DRAIN DIODE CHARACTERISTICS (Ta = 25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 10A$			-1.7	V
Continuous Source Current (body diode)	$I_S$	Integral Reverse p-n Junction Diode in the MOSFET 			10	A
Pulse Source Current (body diode)	$I_{SM}$				30	A
Reverse Recovery Time	$t_{RR}$	$V_{GS} = 0V, I_S = 10A,$		1600		ns
Reverse Recovery Charge	$Q_{RR}$	$dI_F/dt = 100 A/\mu s$		17		$\mu C$

■ TEST CIRCUIT AND WAVE FORM



■ TYPICAL CHARACTERISTICS



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