



## UK2996

MOSFET

### 600V SILICON N-CHANNEL POWER MOSFET

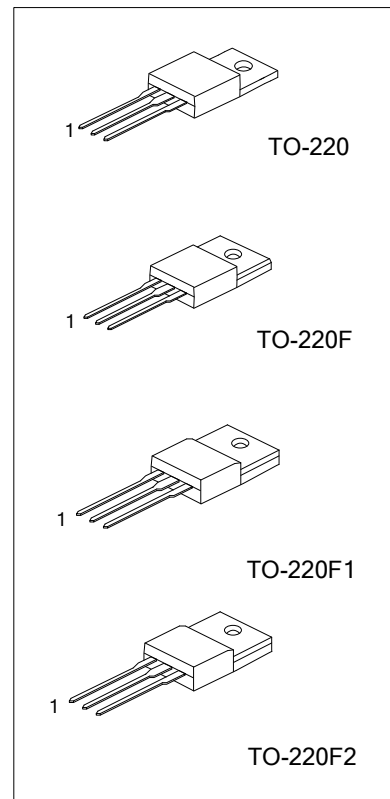
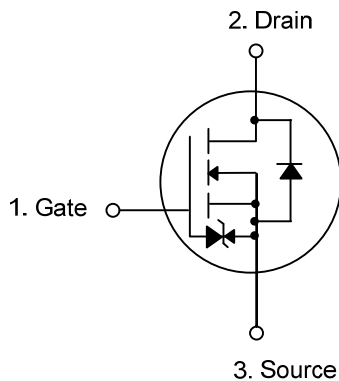
#### DESCRIPTION

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



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UK2996L-TA3-T	UK2996G-TA3-T	TO-220	G	D	S	Tube
UK2996L-TF1-T	UK2996G-TF1-T	TO-220F1	G	D	S	Tube
UK2996L-TF2-T	UK2996G-TF2-T	TO-220F2	G	D	S	Tube
UK2996L-TF3-T	UK2996G-TF3-T	TO-220F	G	D	S	Tube

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

	<p>(1) T: Tube  (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2  (3) L: Lead Free, G: Halogen Free</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
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	TO-220	45	W
	TO-220F/TO-220F1	36	
	TO-220F2	38	
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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  $T_J$ .

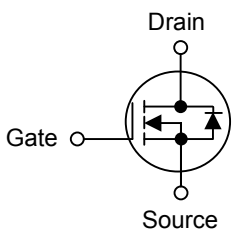
## ■ THERMAL DATA

CHARACTERISTICS	SYMBOL	RATINGS	UNIT
Channel to Ambient	$\theta_{JA}$	62.5	$^\circ\text{C} / \text{W}$
Channel to Case	TO-220	2.78	$^\circ\text{C} / \text{W}$
	TO-220F/TO-220F1	3.47	
	TO-220F2	3.29	

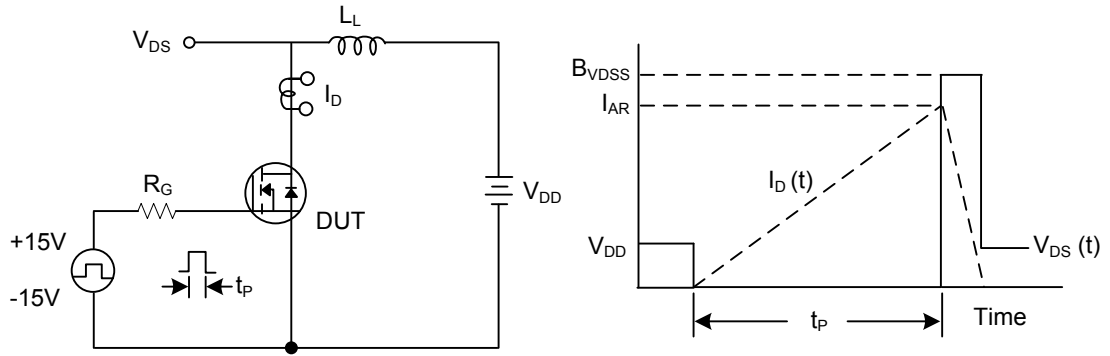
## ■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

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			55		ns
	Turn-on Rise Time			15		
	Turn-off Delay Time			145		
	Turn-off Fall Time		$t_f$		27	

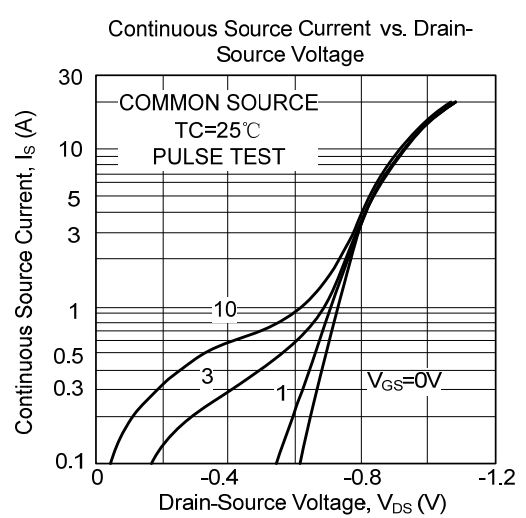
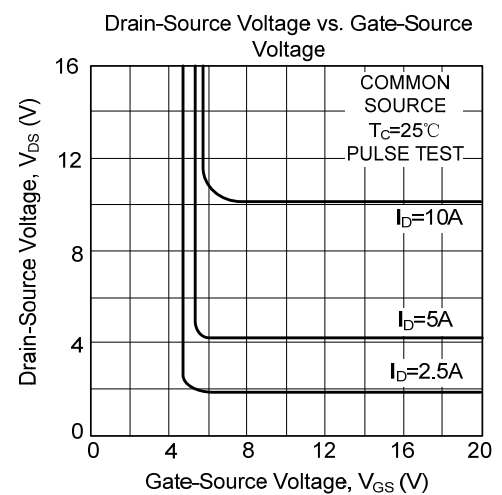
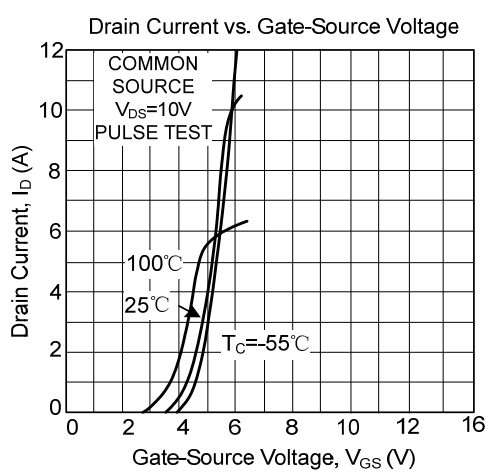
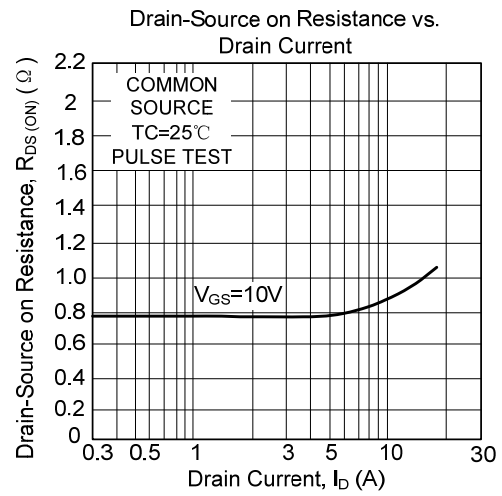
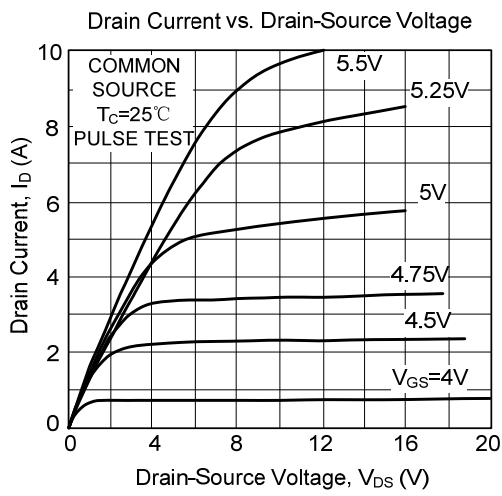
■ **SOURCE-DRAIN DIODE CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ )

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	$t_{RR}$	$V_{GS} = 0V, I_S = 10A,$ $di_F/dt = 100 A/\mu s$		1600		ns
Reverse Recovery Charge	$Q_{RR}$			17		$\mu C$

■ TEST CIRCUIT AND WAVE FORM



■ TYPICAL CHARACTERISTICS



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