



## UK4145

Preliminary

Power MOSFET

### SWITCHING N-CHANNEL POWER MOSFET

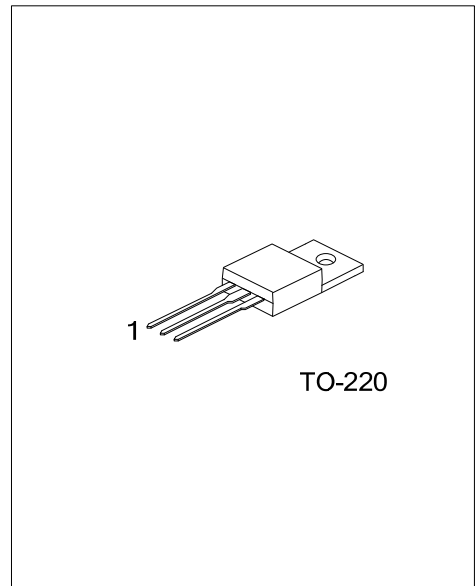
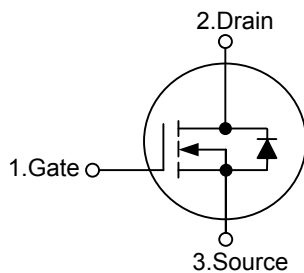
#### DESCRIPTION

The UTC **UK4145** is N-channel power MOSFET, suitable for high current switching applications.

#### FEATURES

- \* Low on-state resistance:  
 $R_{DS(ON)} = 10m\Omega$  (Max.) @  $V_{GS} = 10V, I_D = 42A$
- \* Low input capacitance:  
 $C_{ISS} = 5300pF$  (Typ.)

#### SYMBOL



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UK4145L-TA3-T	UK4145G-TA3-T	TO-220	G	D	S	Tube

<p>UK4145G-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Plating</p>	<p>(1) T: Tube (2) TA3: TO-220 (3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage (V <sub>GS</sub> =0 V)	V <sub>DSS</sub>	60	V
Gate-Source Voltage (V <sub>DS</sub> =0 V)	V <sub>GSS</sub>	±20	V
Drain Current	DC (T <sub>C</sub> =25°C)	I <sub>D</sub>	±84
	Pulse (Note 2)	I <sub>DM</sub>	±215
Single Avalanche Current (Note 3)	I <sub>AS</sub>	32	A
Single Avalanche Energy (Note 3)	E <sub>AS</sub>	102	mJ
Power Dissipation (Ta=25°C)	P <sub>D</sub>	1.5	W
Junction Temperature	T <sub>J</sub>	150	°C
Strong Temperature	T <sub>STG</sub>	-55 ~ +150	°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. PW≤10μs, Duty Cycle≤ 1%

3. L = 100μH, V<sub>DD</sub> =30V, R<sub>G</sub> =25Ω, V<sub>GS</sub> =20→ 0V, Starting T<sub>J</sub> =25°C,

■ THERMAL DATA

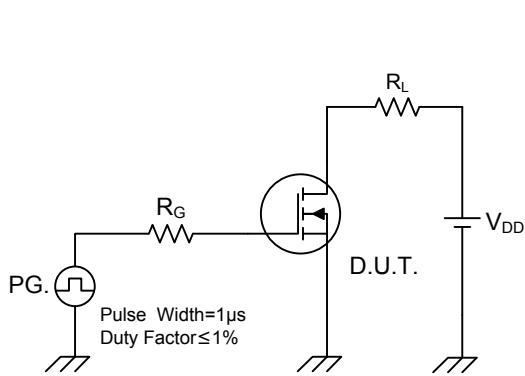
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ <sub>JA</sub>	83.3	°C/W
Junction to Case	θ <sub>JC</sub>	1.49	°C/W

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise noted)

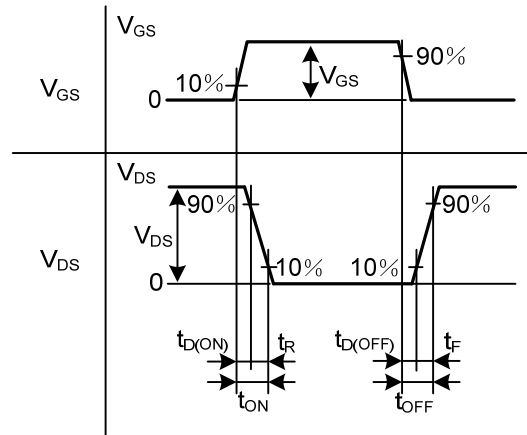
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	60			
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(OFF)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA	2.0	3.0	4.0	V
Drain to Source On-state Resistance (Note)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10 V, I <sub>D</sub> =42 A		7	10	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		5300		pF
Output Capacitance	C <sub>OSS</sub>			540		Pf
Reverse Transfer Capacitance	C <sub>RSS</sub>			330		pF
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V I <sub>D</sub> =42A, R <sub>G</sub> =0Ω		25		ns
Turn-ON Rise Time	t <sub>R</sub>			17		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			66		ns
Turn-OFF Fall-Time	t <sub>F</sub>			9		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> =48V, V <sub>GS</sub> =10V, I <sub>D</sub> =84A		90		nC
Gate Source Charge	Q <sub>GSS</sub>			21		nC
Gate Drain Charge	Q <sub>GD</sub>			30		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage (Note)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =84A		1.0	1.5	V
Reverse Recovery Time	t <sub>RR</sub>	I <sub>S</sub> =84A, V <sub>GS</sub> =0V, di/dt =100A/μs		43		ns
Reverse Recovery Charge	Q <sub>RR</sub>			62		nC

Note: Pulsed

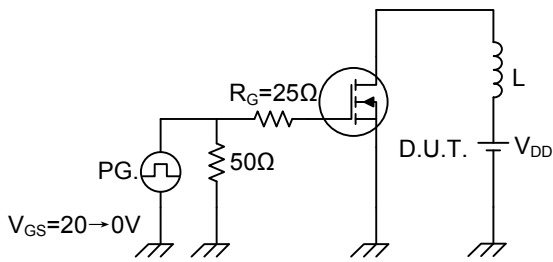
■ TEST CIRCUITS AND WAVEFORMS



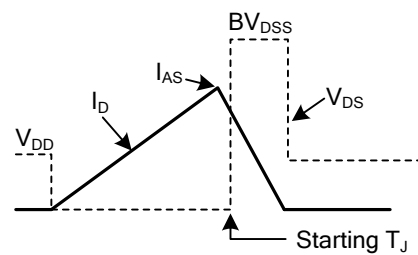
Switching Test Circuit



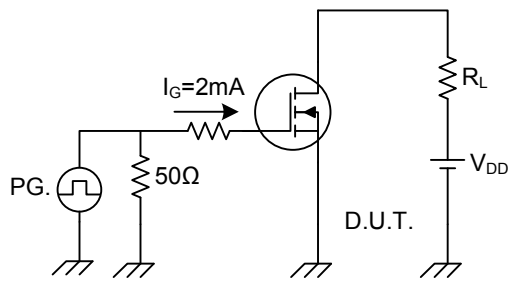
Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Gate Charge Test Circuit

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