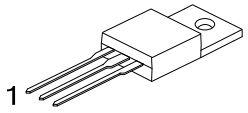
SWITCHING N-CHANNEL POWER MOSFET



TO-220

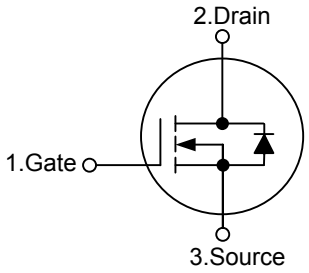
■ DESCRIPTION

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

■ FEATURES

* Low on-state resistance:
  $R_{DS(ON)}$ =10mΩ (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

UK4145G-TA3-T (1)Packing Type (2)Package Type (3) Lead Plating	(1) T: Tube (2) TA3: TO-220 (3) G: Halogen Free, L: Lead Free

■ ABSOLUTE MAXIMUM RATINGS (Ta =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage (V_{GS} =0 V)		V_{DSS}	60	V
Gate-Source Voltage (V_{DS} =0 V)		V_{GSS}	±20	V
Drain Current	DC (T_C =25°C)	I_D	±84	A
	Pulse (Note 2)	I_{DM}	±215	A
Single Avalanche Current (Note 3)		I_{AS}	32	A
Single Avalanche Energy (Note 3)		E_{AS}	102	mJ
Power Dissipation (Ta =25°C)		P_D	1.5	W
Junction Temperature		T_J	150	°C
Strong Temperature		T_{STG}	-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_{DD} =30V, R_G =25Ω, V_{GS} =20→ 0V, Starting T_J =25°C,

■ THERMAL DATA

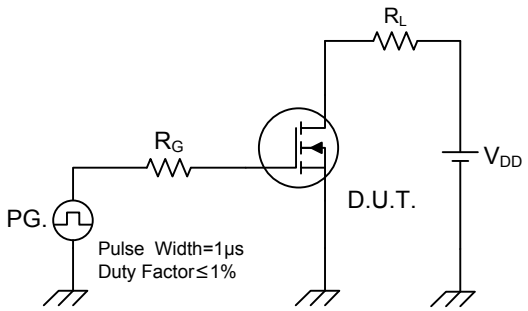
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	83.3	°C/W
Junction to Case	θ_{JC}	1.49	°C/W

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

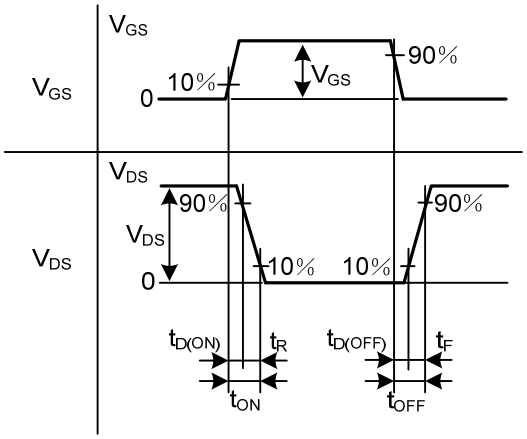
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	60			
Drain-Source Leakage Current	I_{DSS}	V_{DS} =60V,V_{GS} =0V			10	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(OFF)}$	V_{DS} =10V, I_D =1mA	2.0	3.0	4.0	V
Drain to Source On-state Resistance (Note)	$R_{DS(ON)}$	V_{GS} =10 V, I_D =42 A		7	10	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS} =10V, V_{GS} =0V, f=1MHz		5300		pF
Output Capacitance	C_{OSS}			540		Pf
Reverse Transfer Capacitance	C_{RSS}			330		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=30V, V_{GS} =10V I_D =42A, R_G =0Ω		25		ns
Turn-ON Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			66		ns
Turn-OFF Fall-Time	t_F			9		ns
Total Gate Charge	Q_G	V_{DD} =48V, V_{GS} =10V, I_D =84A		90		nC
Gate Source Charge	Q_{GS}			21		nC
Gate Drain Charge	Q_{GD}			30		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage (Note)	V_{SD}	V_{GS} =0V, I_S =84A		1.0	1.5	V
Reverse Recovery Time	t_{RR}	I_S =84A,V_{GS} =0V, di/dt =100A/μs		43		ns
Reverse Recovery Charge	Q_{RR}			62		nC

Note: Pulsed

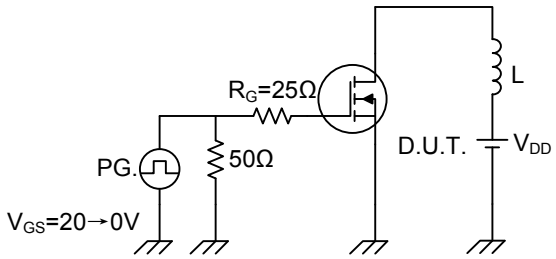
■ TEST CIRCUITS AND WAVEFORMS



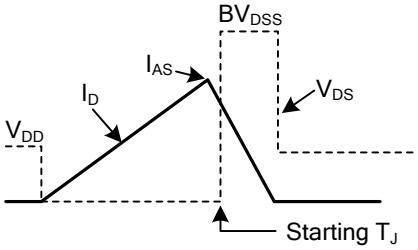
Switching Test Circuit



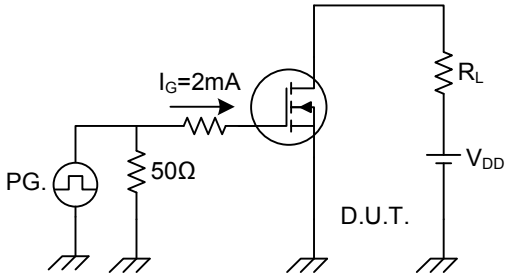
Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Gate Charge Test Circuit