

9A, 650V N-CHANNEL **POWER MOSFET**

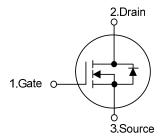
DESCRIPTION

The UTC 9N65-TC is a high voltage power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)}$ < 1.1 Ω @ V_{GS} =10 V, I_D =4.5A
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

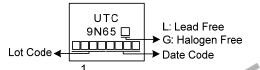
-**SYMBOL**

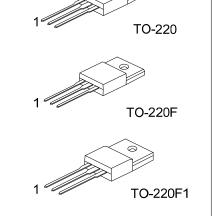


ORDERING INFORMATION

Ordering Number				Package	Pin Assignment			Packing	
Lead	l Free	Halogen Free		Fackage	1	2	3	Facking	
9N65L	-TA3-T	9N65G-TA3-T		TO-220	G	D	S	Tube	
9N65L	9N65L-TF1-T 9N65G-TF1-T			TO-220F1	G	D	S	Tube	
9N65L-TF3-T 9N65G-TF3-T			TO-220F	G	D	S	Tube		
Note: Pin Assignment: G: Gate C: Collector E: Emitter									
9N65G-TA3-T (1)Packing Type (2)Package Type		(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F							

	kage Type	(2) TA3: TO-220, TFT: TO-220FT, TF3: TO-220F
(3)Gre	en Package	(3) G: Halogen Free and Lead Free, L: Lead Free
MARKING UTC 9N65 C L: Lead Fr G: Haloger Date Code	n Free	A BARA TA 1688.com
www.unisonic.com.tw	N	





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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	650	V
Gate-Source Voltage		V _{GSS}	±30	V
Continuous Drain Current		I _D 9		А
Pulsed Drain Current (Note	2)	I _{DM}	18	А
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	250	mJ
Peak Diode Recovery dv/dt	(Note 4)	dv/dt	4.22	V/ns
Dower Dissinction	TO-220	Р	150	W
Power Dissipation	TO-220F/TO-220F1	P _D	35	W
Junction Temperature		TJ	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°C

Notes: 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.

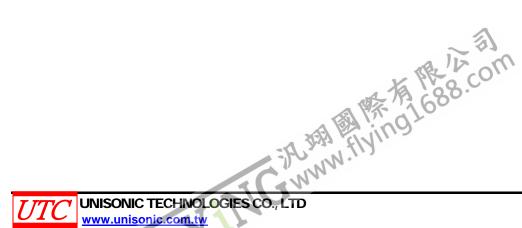
2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. L = 10mH, I_{AS} = 7.07A, V_{DD} = 50V, R_{G} = 25 Ω , Starting T_{J} = 25°C

4. $I_{SD} \le 9.0A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT	
Junction to Ambient	to Ambient		62.5	°C/W	
lunction to Case	TO-220	0	0.83	°C/W	
Junction to Case	TO-220F/TO-220F1	θ _{JC}	3.57	°C/W	



PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250µA	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			10	μA
Gate- Source Leakage Current	orward	I _{GSS}	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
	everse		$V_{GS} = -30V, V_{DS} = 0V$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} = 10V, I _D = 4.5A			1.1	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		CISS			1386		рF
Output Capacitance		Coss	V _{DS} =25V, V _{GS} =0V, f=1.0 MHz		126		pF
Reverse Transfer Capacitance		C _{RSS}			4.7		pF
SWITCHING CHARACTERISTICS						_	
Total Gate Charge (Note 1)		Q_{G}	V _{DS} =100V, V _{GS} =10V, I _D =9.0A, I _D =1mA (Note 1, 2)		27		nC
Gate-Source Charge		Q_{GS}			8.4		nC
Gate-Drain Charge		Q_{GD}	$I_D = IIIA (NOLE 1, 2)$		2.6		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}			21		ns
Turn-On Rise Time		t _R	V _{DD} =100V, V _{GS} =10V, I _D =9.0A, R _G =25Ω (Note 1, 2)		21		ns
Turn-Off Delay Time		t _{D(OFF)}			61		ns
Turn-Off Fall Time		t _F			32		ns
DRAIN-SOURCE DIODE CHARAC	TERISTIC	S AND MA	XIMUM RATINGS				
Maximum Continuous Drain-Source Diode		I _S				9	А
Forward Current						9	А
Maximum Pulsed Drain-Source Diode						18	А
Forward Current		I _{SM}				10	А
Drain-Source Diode Forward Voltage		V_{SD}	I _S =9.0A , V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	;	t _{rr}	$1_{-9,00}$ $1_{9,00}$ $1_{9,00}$ $1_{9,00}$		340		ns
Body Diode Reverse Recovery Charge		Qrr	I _S =9.0A , V _{GS} =0V di/dt=100A/µs		4.2		μC

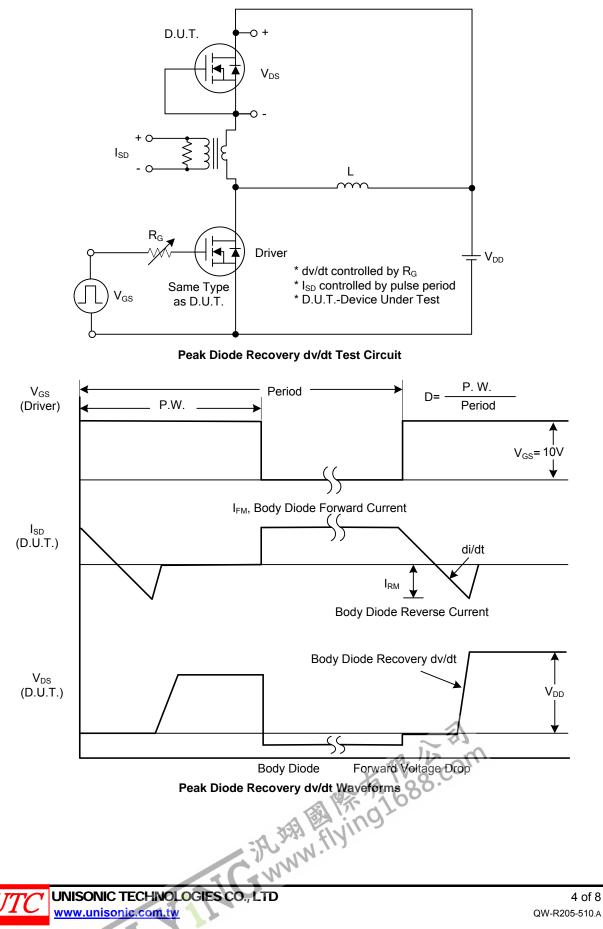
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%.

2. Essentially independent of operating temperature.

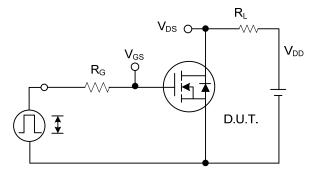


■ TEST CIRCUITS AND WAVEFORMS

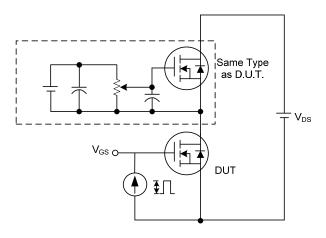


Power MOSFET

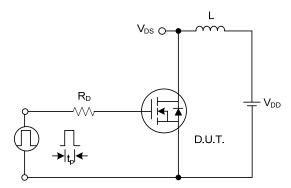
TEST CIRCUITS AND WAVEFORMS



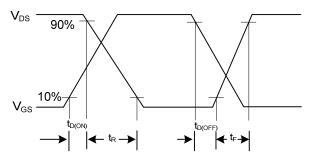
Switching Test Circuit



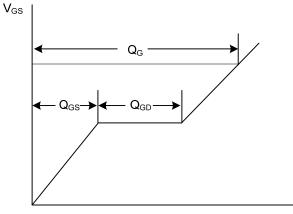
Gate Charge Test Circuit



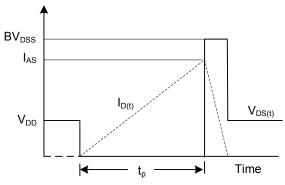
Unclamped Inductive Switching Test Circuit

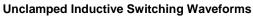


Switching Waveforms



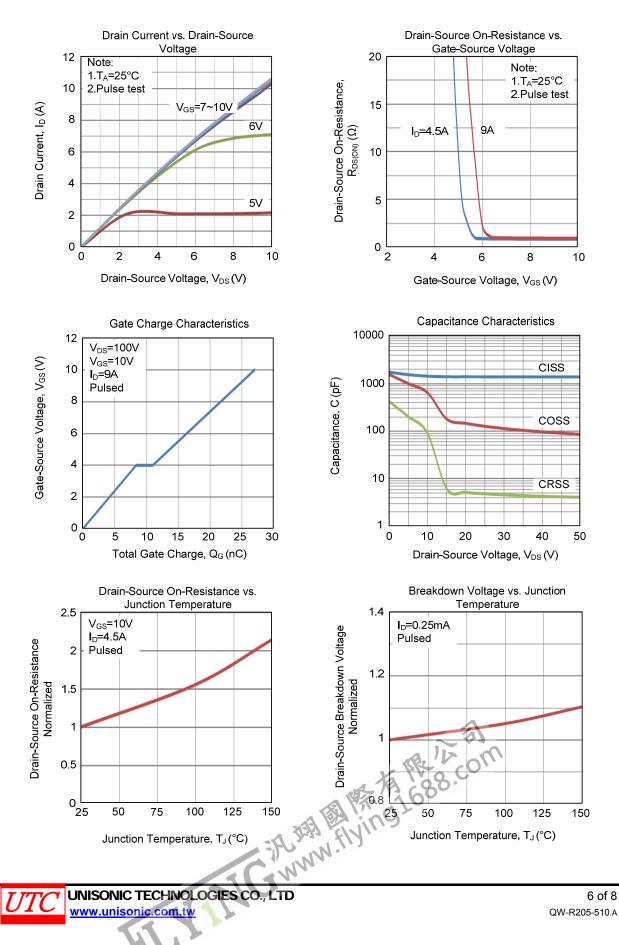
Charge Gate Charge Waveform



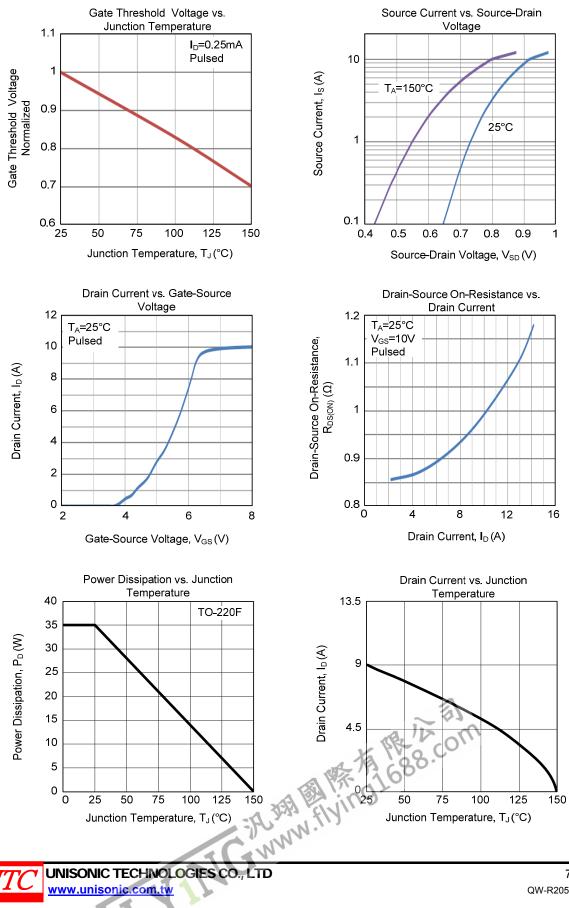




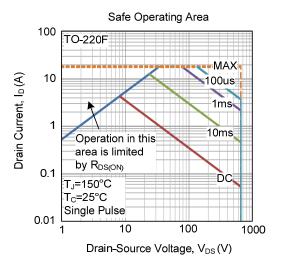
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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