



22N65

Power MOSFET

22A, 650V N-CHANNEL POWER MOSFET

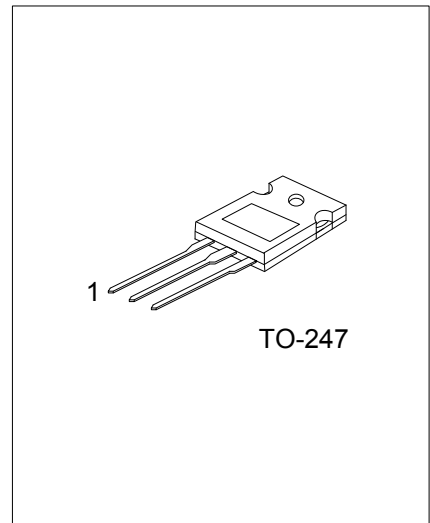
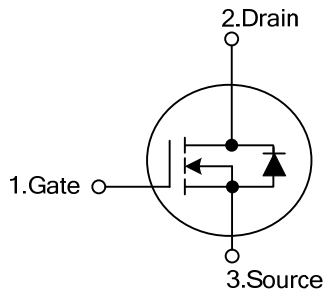
■ DESCRIPTION

As the SMPS MOSFET, the UTC **22N65** uses UTC's advanced technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

- * $R_{DS(ON)} = 0.35\Omega$
- * Ultra low gate charge (Typical 150 nC)
- * Low reverse transfer capacitance ($C_{RSS} = \text{typical } 36 \text{ pF}$)
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
22N65L-T47-T	22N65G-T47-T	TO-247	G	D	S	Tube

<p>22N65L-T47-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>	<p>(1) T: Tube</p> <p>(2) T47: TO-247</p> <p>(3) L: Lead Free, G: Halogen Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ($T_c = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT	
Drain-Source Voltage	V_{DSS}	650	V	
Gate-Source Voltage	V_{GSS}	± 30	V	
Avalanche Current	I_{AR}	22	A	
Continuous Drain Current	I_D	22	A	
Pulsed Drain Current (Note 1)	I_{DM}	88	A	
Avalanche Energy	Single Pulsed	E_{AS}	380	mJ
	Repetitive	E_{AR}	37	mJ
Peak Diode Recovery dv/dt (Note 2)	dv/dt	18	V/ns	
Power Dissipation	P_D	370	W	
Junction Temperature	T_J	150	$^\circ\text{C}$	
Operating Temperature	T_{OPR}	-55 ~ +150	$^\circ\text{C}$	
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$	

Note: 1. Repetitive rating; pulse width limited by max. junction temperature.

2. $I_{SD} \leq 22\text{A}$, $di/dt \leq 540\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$.

3. 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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.30	$^\circ\text{C}/\text{W}$

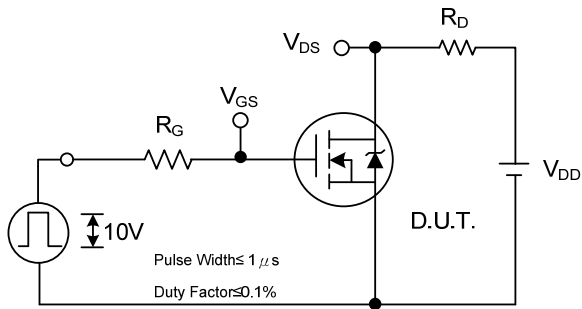
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, $L = 1.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 22\text{A}$, Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	650			V	
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 650\text{V}$, $V_{GS} = 0\text{V}$			50	μA	
Gate- Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 30\text{V}$			± 100	nA	
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D = 1\text{mA}$, Referenced to 25°C		0.30		$\text{V}/^\circ\text{C}$	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.0		4.0	V	
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$, $I_D = 13\text{A}$ (Note 2)		0.3	0.35	Ω	
DYNAMIC PARAMETERS							
Input Capacitance	C_{ISS}	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$		3200		pF	
Output Capacitance	C_{OSS}				350		pF
Reverse Transfer Capacitance	C_{RSS}				36		pF
SWITCHING PARAMETERS							
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD} = 300\text{V}$, $I_D = 22\text{A}$, $R_G = 6.2\Omega$, $V_{GS} = 10\text{V}$ (Note 2)		100		ns	
Turn-ON Rise Time	t_R			250		ns	
Turn-OFF Delay Time	$t_{D(OFF)}$			650		ns	
Turn-OFF Fall-Time	t_F			550		ns	
Total Gate Charge	Q_G	$V_{DS} = 480\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 22\text{A}$ (Note 2)			150	nC	
Gate Source Charge	Q_{GS}				45	nC	
Gate Drain Charge	Q_{GD}				76	nC	
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 22\text{A}$			1.5	V	
Continuous Source Current (Body Diode)	I_S	(Note 1)			22	A	
Pulsed Source Current (Body Diode)	I_{SM}				88	A	
Reverse Recovery Time	t_{RR}	$I_S = 22\text{A}$,		590	890	ns	
Reverse Recovery Charge	Q_{RR}	$di/dt = 100\text{A}/\mu\text{s}$ (Note 2)		7.2	11	μC	

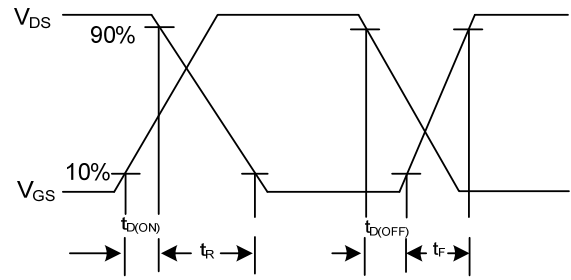
Note: 1. Repetitive rating; pulse width limited by max. junction temperature.

2. Pulse Width $\leq 300\text{ s}$, Duty Cycle $\leq 2\%$.

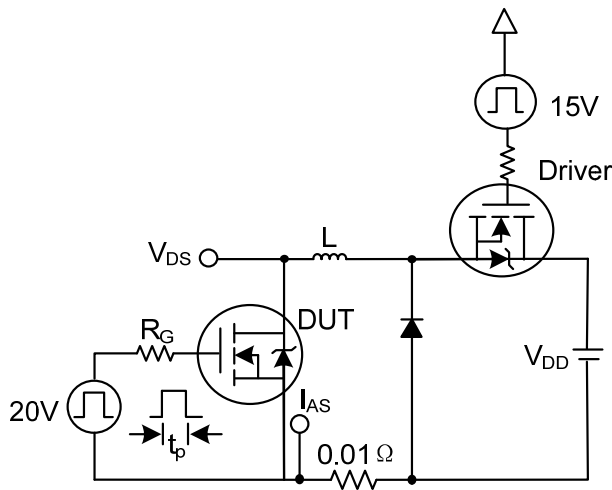
TEST CIRCUITS



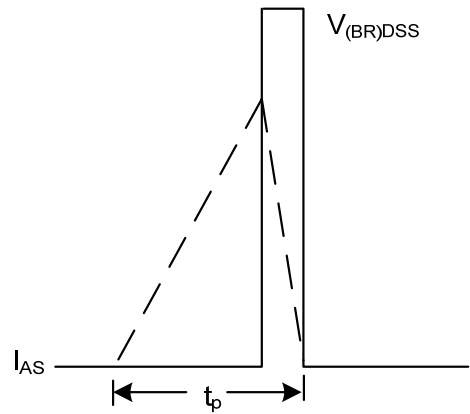
Switching Test Circuit



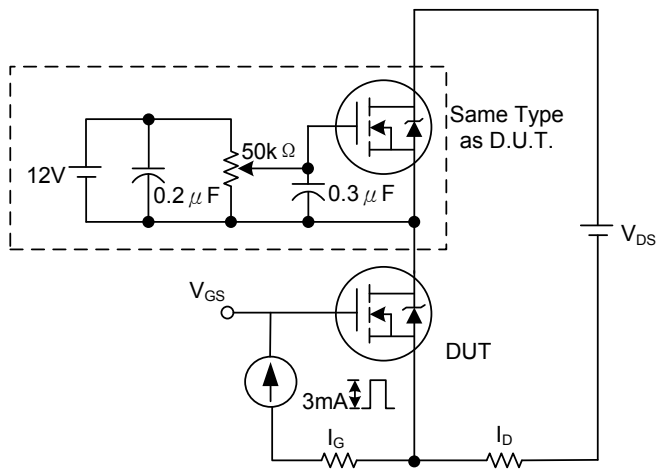
Switching Waveforms



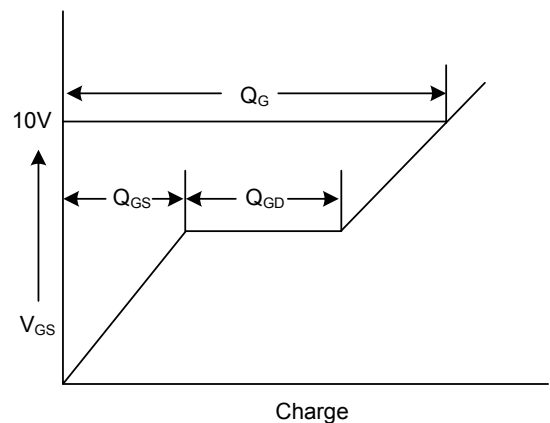
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Gate Charge Test Circuit



Gate Charge Waveform

■ TEST CIRCUITS(Cont.)

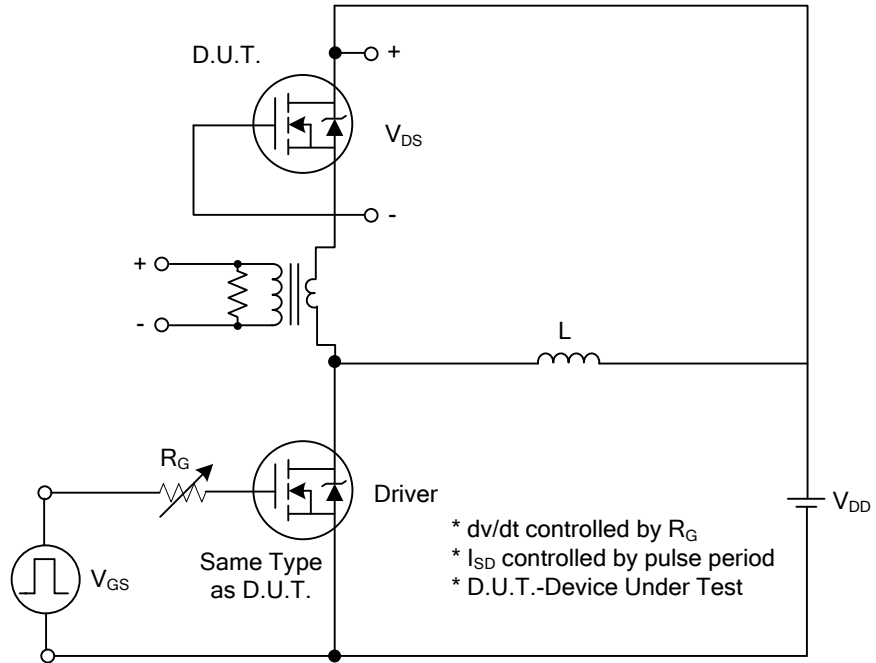
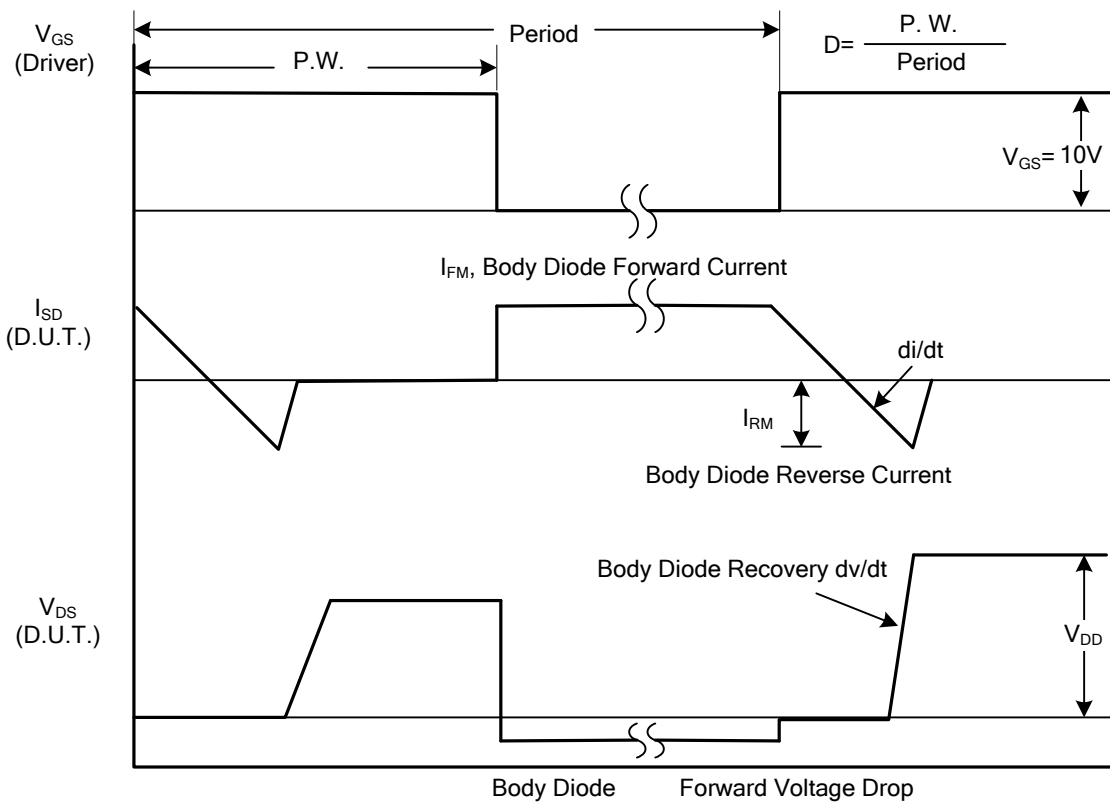
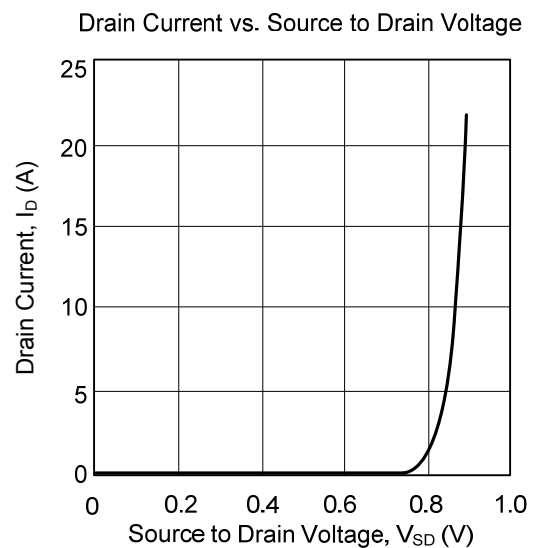
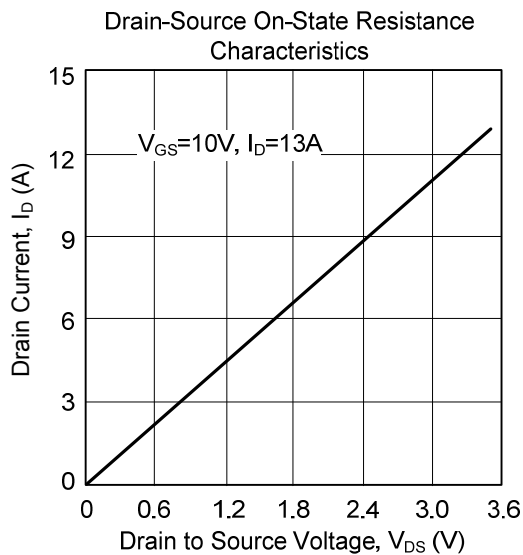
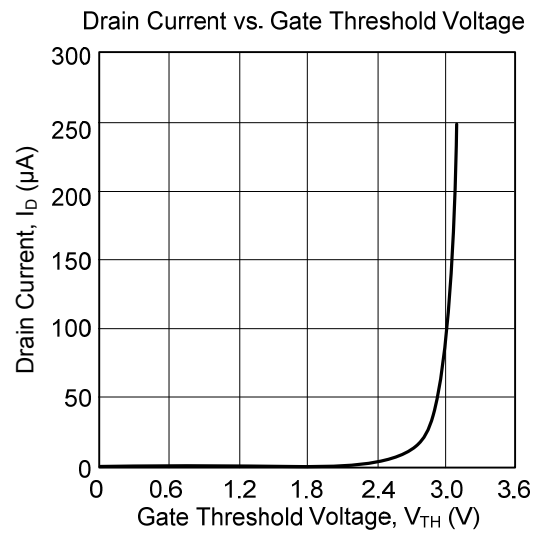
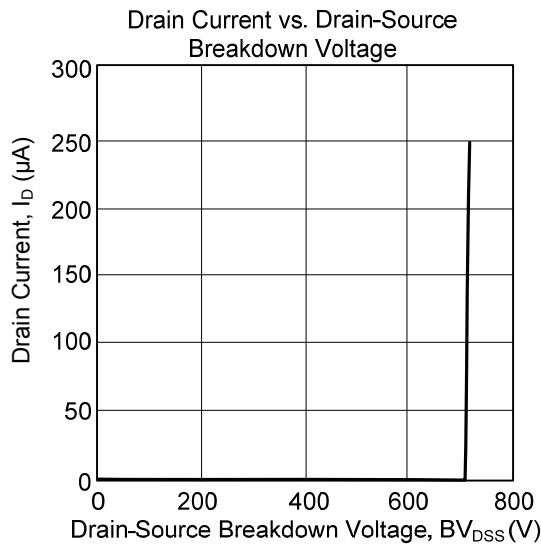


Fig. 1A Peak Diode Recovery dv/dt Test Circuit



TYPICAL CHARACTERISTICS



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