

**20N65-HC**

Preliminary

Power MOSFET**20A, 650V N-CHANNEL
POWER MOSFET****DESCRIPTION**

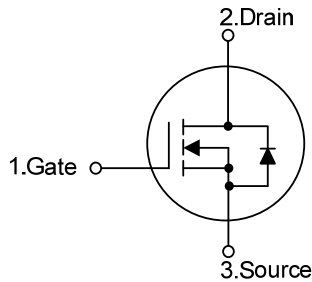
The UTC **20N65-HC** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **20N65-HC** is universally applied in low voltage such as automotive, high efficiency switching for AC/DC converters and DC motor control, etc.

FEATURES

* $R_{DS(ON)} \leq 0.4 \Omega$ @ $V_{GS}=10V$, $I_D=10A$

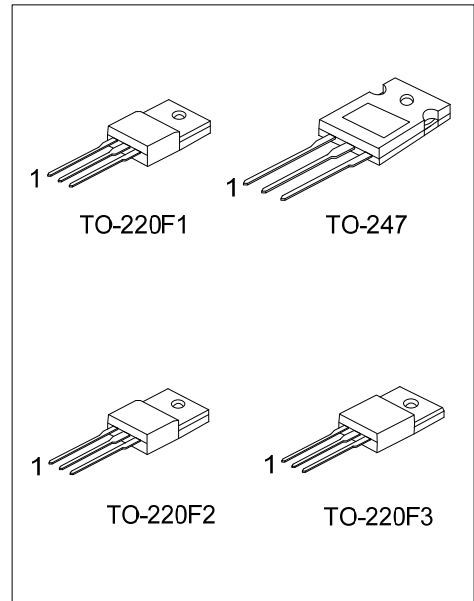
* High Switching Speed

SYMBOL**ORDERING INFORMATION**

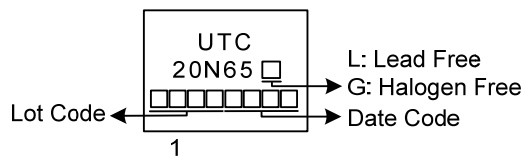
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
20N65L-TF1-T	20N65G-TF1-T	TO-220F1	G	D	S	Tube
20N65L-TF2-T	20N65G-TF2-T	TO-220F2	G	D	S	Tube
20N65L-TF3T-T	20N65G-TF3T-T	TO-220F3	G	D	S	Tube
20N65L-T47-T	20N65G-T47-T	TO-247	G	D	S	Tube

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

20N65G-T47-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube (2) TF1: TO-220F1, TF2: TO-220F2, TF3T: TO-220F3, T47: TO-247 (3) G: Halogen Free and Lead Free, L: Lead Free
--	--



■ MARKING



■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	± 30	V
Continuous Drain Current	Continuous	I_D	20	A
	Pulsed	I_{DM}	40	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	1242	mJ
Power Dissipation	TO-220F1/TO-220F2	P_D	44	W
	TO-220F3			
	TO-247		320	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

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. $L=30\text{mH}$, $I_{AS}=9.1\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F1/TO-220F2	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-220F3			
	TO-247		40	$^{\circ}\text{C/W}$
Junction to Case	TO-220F1/TO-220F2	θ_{JC}	2.84	$^{\circ}\text{C/W}$
	TO-220F3			
	TO-247		0.39	$^{\circ}\text{C/W}$

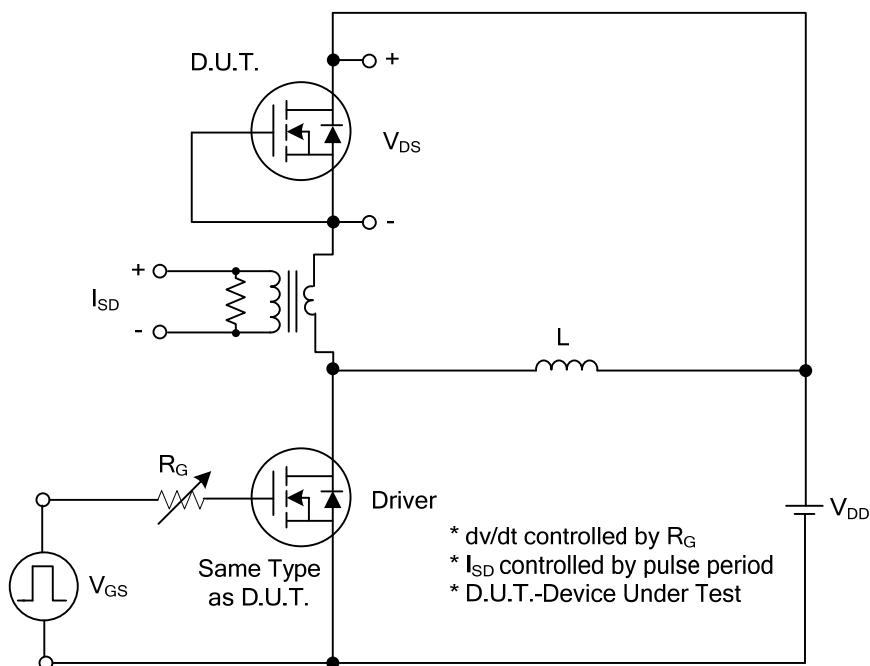
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =650V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =10A			0.4	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		3320		pF
Output Capacitance		C _{OSS}			300		pF
Reverse Transfer Capacitance		C _{RSS}			22		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =400V, V _{GS} =10V, I _D =20A I _G =1mA (Note 1, 2)		80		nC
Gate to Source Charge		Q _{GS}			22		nC
Gate to Drain Charge		Q _{GD}			23		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =20A, R _G =25Ω (Note 1, 2)		44		ns
Rise Time		t _R			31		ns
Turn-OFF Delay Time		t _{D(OFF)}			245		ns
Fall-Time		t _F			72		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				20	A
Maximum Body-Diode Pulsed Current		I _{SM}				40	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =20A, V _{GS} =0V			1.4	V

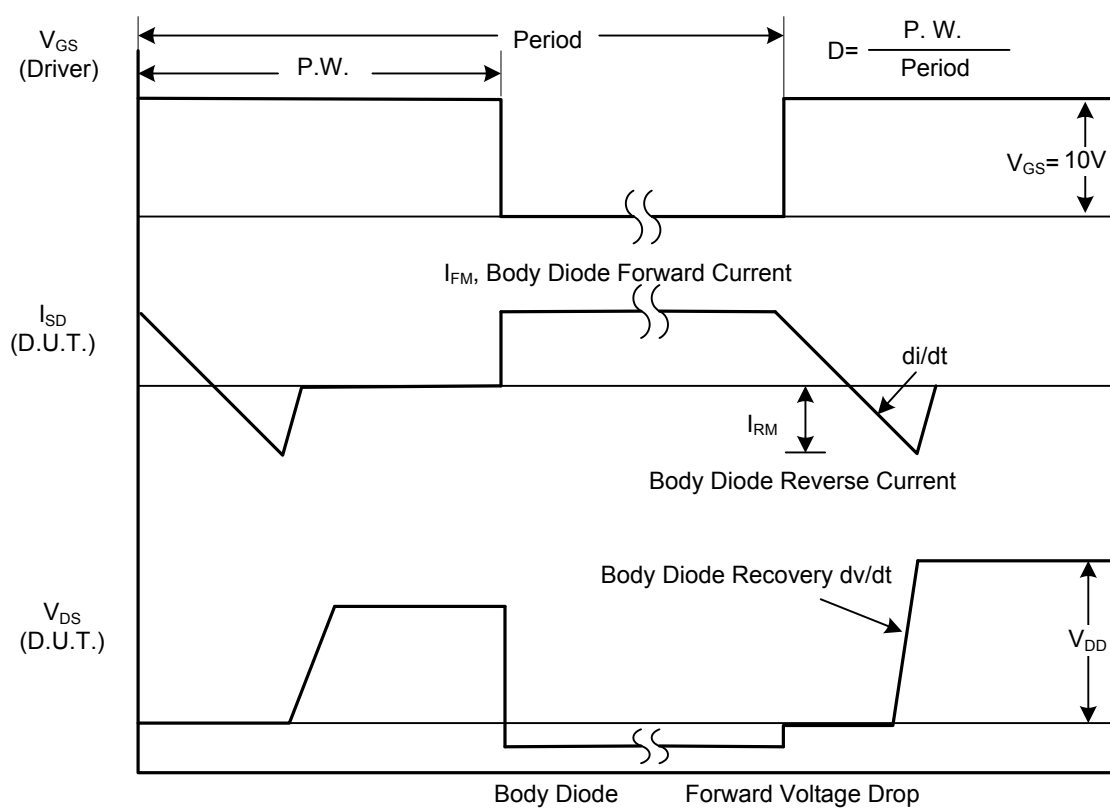
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

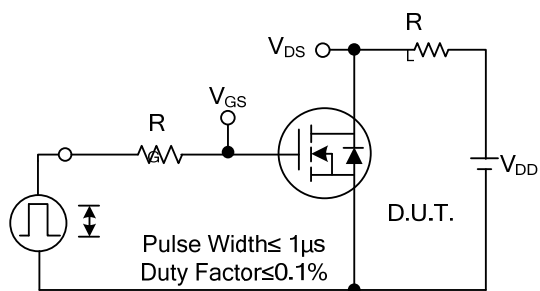


Peak Diode Recovery dv/dt Test Circuit

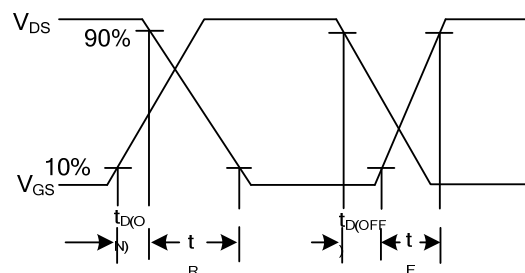


Peak Diode Recovery dv/dt Waveforms

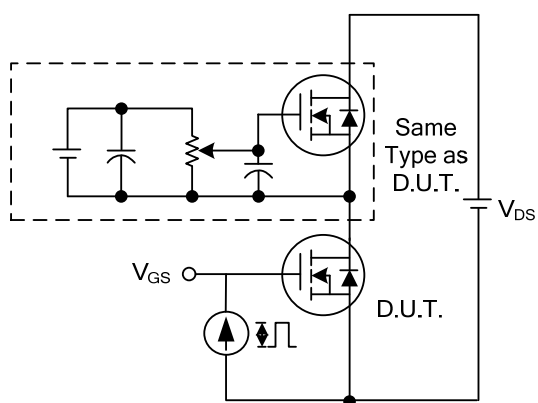
■ TEST CIRCUITS AND WAVEFORMS



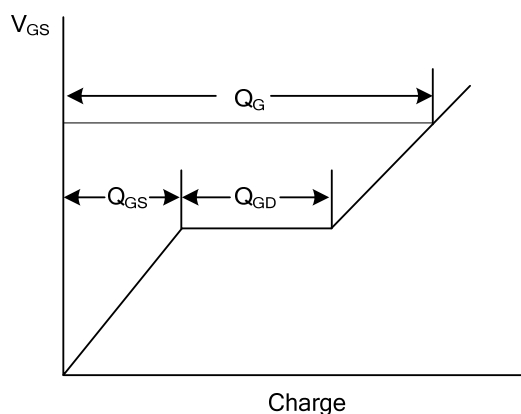
Switching Test Circuit



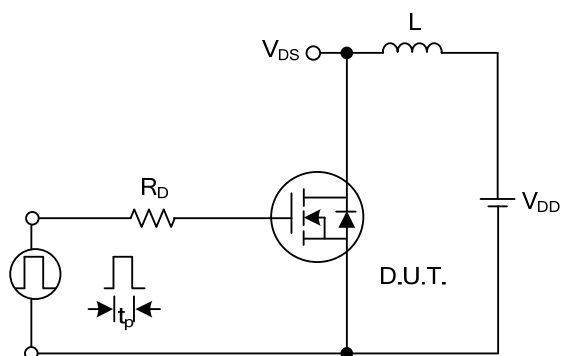
Switching Waveforms



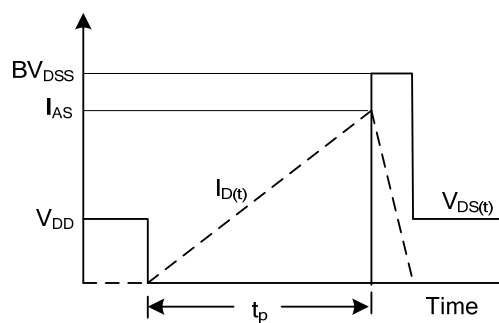
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.