



UT200N03

Preliminary

POWER MOSFET

200A, 30V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **UT200N03** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(ON)}$ characteristic by high cell density trench technology.

The UTC **UT200N03** is suitable for high efficiency synchronous rectification in SMPS, UPS, hard switched and high frequency circuits.

FEATURES

* TO-220

$R_{DS(ON)} \leq 2.0 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=50\text{A}$

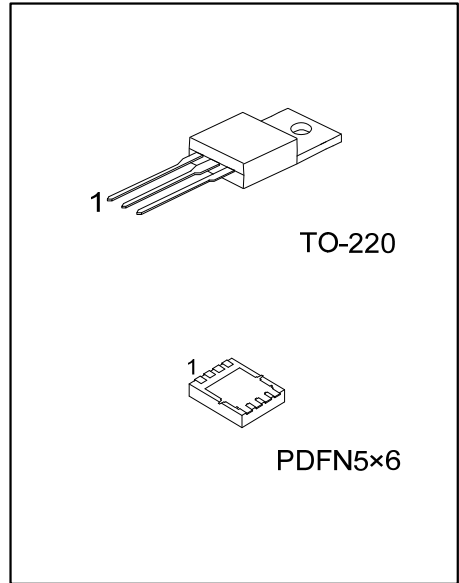
$R_{DS(ON)} \leq 2.3 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=50\text{A}$

* PDFN5×6

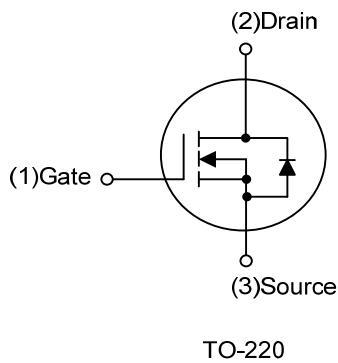
$R_{DS(ON)} \leq 1.6 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=50\text{A}$

$R_{DS(ON)} \leq 2.2 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=50\text{A}$

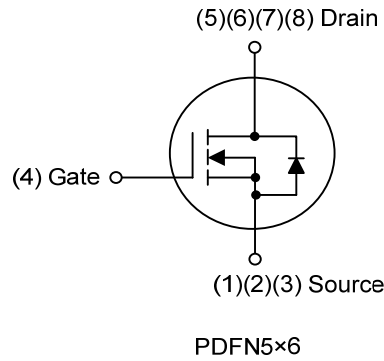
* High Switching Speed



SYMBOL



TO-220



PDFN5×6

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT200N03L-TA3-T	UT200N03G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT200N03L-P5060-R	UT200N03G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT200N03G-TA3-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube, R: Tape Reel (2) TA3: TO-220, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free
---	--	--

■ MARKING

TO-220	PDFN5×6
UTC UT200N03 Lot Code 1 L: Lead Free G: Halogen Free Date Code	UTC UT 200N03 Lot Code Date Code

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	Continuous	TO-220	I _D	200	A
		PDFN5×6		150	A
	Pulsed (Note 2)	TO-220	I _{DM}	400	A
		PDFN5×6		300	A
Avalanche Energy	Single Pulsed (Note 3)		E _{AS}	560	mJ
Power Dissipation	TO-220		P _D	150	W
	PDFN5×6			110	W
Junction Temperature			T _J	+150	°C
Storage Temperature Range			T _{STG}	-20 ~ +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. $L = 0.1\text{mH}$, $I_{AS} = 106\text{A}$, $V_{DD} = 10\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	PDFN5×6		65(Note)	$^{\circ}\text{C/W}$
Junction to Case	TO-220	θ_{JC}	0.83	$^{\circ}\text{C/W}$
	PDFN5×6		1.13(Note)	$^{\circ}\text{C/W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

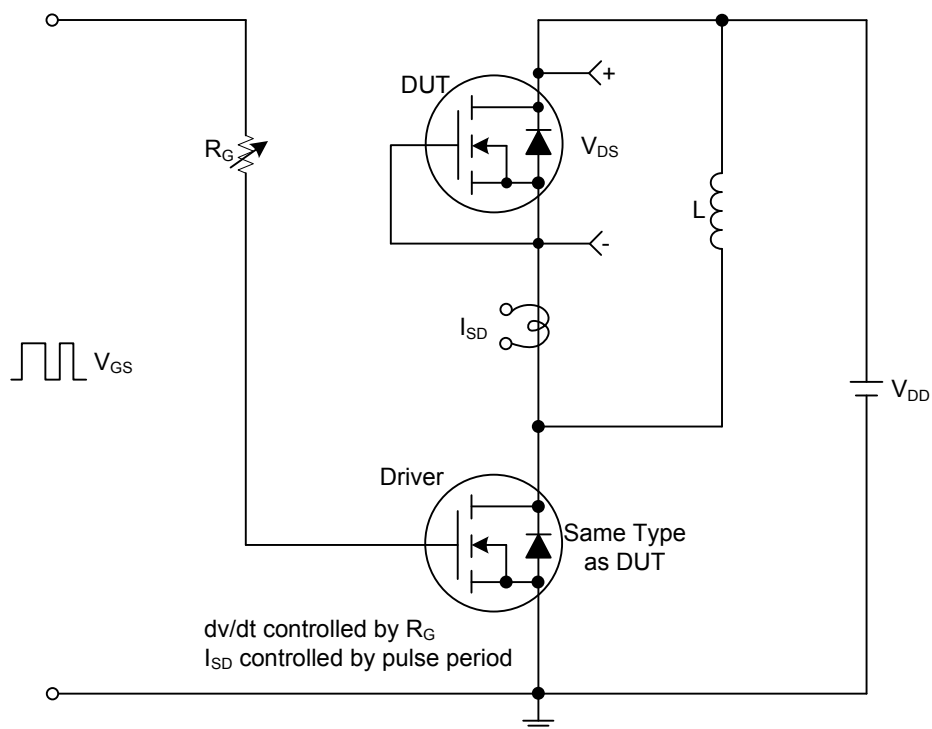
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	30			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance	TO-220	R _{DS(ON)}	V _{GS} =10V, I _D =50A			2.0	mΩ
			V _{GS} =4.5V, I _D =50A			2.3	mΩ
	PDFN5×6		V _{GS} =10V, I _D =50A			1.6	mΩ
			V _{GS} =4.5V, I _D =50A			2.2	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =15V, f=1.0MHz		9000		pF
Output Capacitance		C _{OSS}			2190		pF
Reverse Transfer Capacitance		C _{RSS}			1870		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =24V, V _{GS} =10V, I _D =200A (Note 1, 2)		232		nC
Gate to Source Charge		Q _{GS}			20		nC
Gate to Drain Charge		Q _{GD}			80		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DD} =15V, V _{GS} =10V, I _D =200A, R _G =3.3Ω (Note 1, 2)		20		ns
Rise Time		t _R			30		ns
Turn-off Delay Time		t _{D(OFF)}			180		ns
Fall-Time		t _F			165		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				200	A
Maximum Body-Diode Pulsed Current		I _{SM}				400	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =200A, V _{GS} =0V			1.4	V

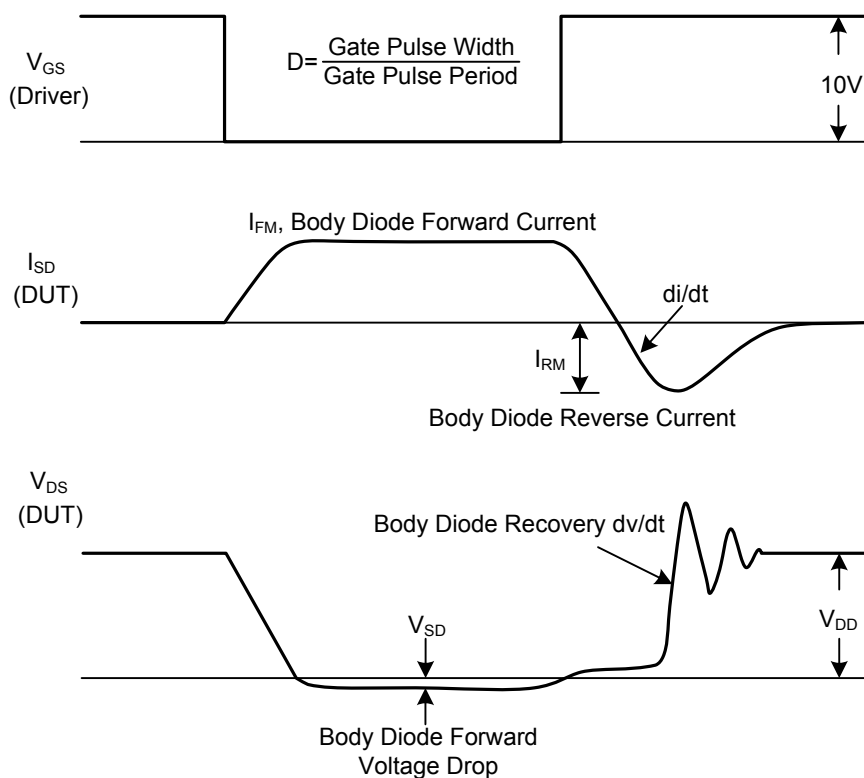
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



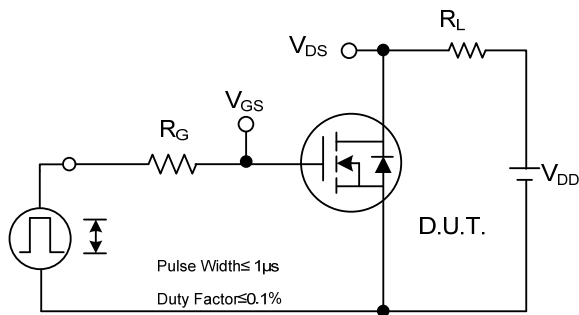
Peak Diode Recovery dv/dt Test Circuit



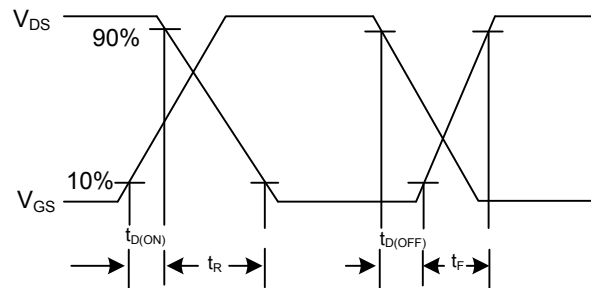
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

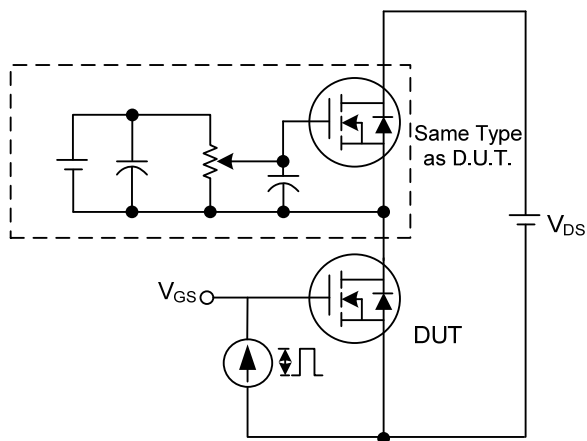
■ TEST CIRCUITS AND WAVEFORMS



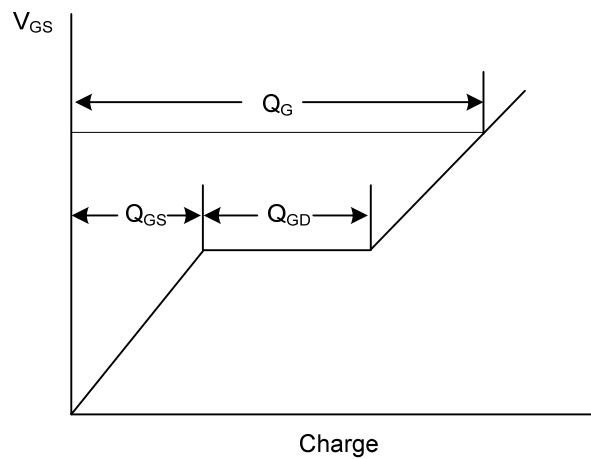
Switching Test Circuit



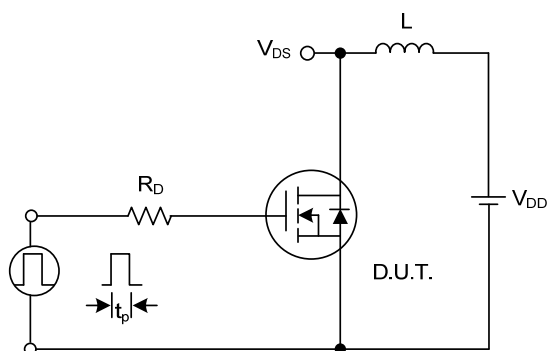
Switching Waveforms



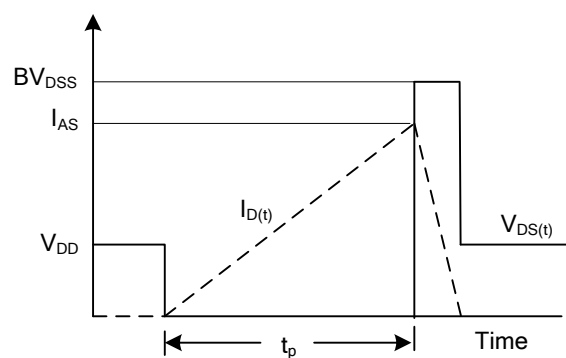
Gate Charge Test Circuit



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.