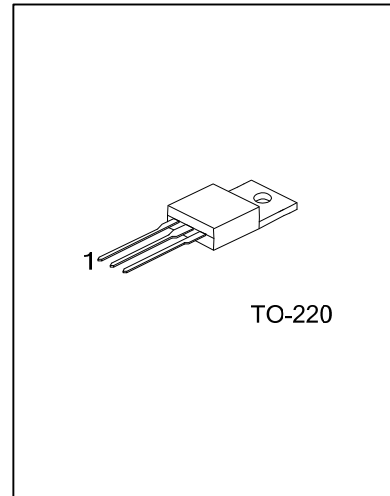




UTT220N03

Power MOSFET

220A, 30V N-CHANNEL ENHANCEMENT MODE POWER MOSFET



DESCRIPTION

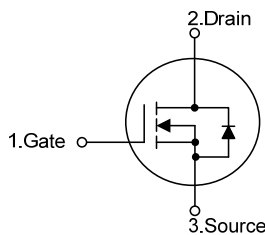
The UTC **UTT220N03** is a N-channel MOSFET, using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UTT220N03** is generally applied in DC to DC convertor or synchronous rectification

FEATURES

- * $R_{DS(ON)} < 2.4m\Omega @ V_{GS}=10V$
- * Low Gate Charge (Typical 84nC)
- * Fast Switching
- * 100% Avalanche Tested
- * High Power and Current Handling Capability
- * RoHS Compliant

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT220N03L-TA3-T	UTT220N03G-TA3-T	TO-220	G	D	S	Tube

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

UTT220N03L-TA3-T (1) Packing Type (2) Package Type (3) Lead Free	(1) T: Tube (2) TA3: TO-220 (3) L: Lead Free, G: Halogen Free
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MARKING INFORMATION

PACKAGE	MARKING
TO-220	<p> UTC UTT220N03 Lot Code ← [] [] [] [] [] → Data Code 1 </p> <p> L: Lead Free G: Halogen Free </p>

■ ABSOLUTE MAXIMUM RATINGS [$T_C=25^\circ\text{C}$, unless otherwise noted (Note 6)]

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	Continuous ($T_C=25^\circ\text{C}$)	220	A
	$T_C=100^\circ\text{C}$	170	A
	Pulsed (Note 1)	876	A
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	864	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	6.0	V/ns
Power Dissipation	$T_C=25^\circ\text{C}$	214	W
	$T_C=100^\circ\text{C}$	100	W
	Derate above 25°C	1.43	W/ $^\circ\text{C}$
Junction Temperature	T_J	-55~+175	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~+175	$^\circ\text{C}$

Note: 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 CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	θ_{JC}	0.7	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V, T _C =25°C	30			V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =250μA		30		mV/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =32V, V _{GS} =0V			10	μA
Gate- Source Leakage Current	Forward	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	R _{DS(ON)}	V _{GS} =10V, I _D =80A		2.0	2.4	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		5490	7300	pF
Output Capacitance	C _{OSS}			1220	1620	pF
Reverse Transfer Capacitance	C _{RSS}			155	233	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{GS} =10V, V _{DS} =30V, I _D =1.3A (Note 4, 5)		200	220	nC
Gate to Source Charge	Q _{GS}			19		nC
	Q _{GS2}			9.5		nC
Gate to Drain Charge	Q _{GD}		12		nC	
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _{GEN} =4.7Ω, V _{GS} =10V (Note 4, 5)		58	70	ns
Rise Time	t _R			260	310	ns
Turn-OFF Delay Time	t _{D(OFF)}			1810	1860	ns
Fall-Time	t _F			987	1160	ns
Equivalent Series Resistance (G-S)	ESR			1.1		Ω
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				219	A
Maximum Body-Diode Pulsed Current	I _{SM}				876	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =80A, V _{GS} =0V			1.3	V
Body Diode Reverse Recovery Time	t _{RR}	I _S =80A, V _{GS} =0V, di _F /dt=100A/μs		54		ns
Body Diode Reverse Recovery Charge	Q _{RR}	(Note 4)		49		nC

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. L = 3mH, I_{AS} = 24A, V_{DD} = 30V, R_G = 25Ω, Starting T_J = 25°C

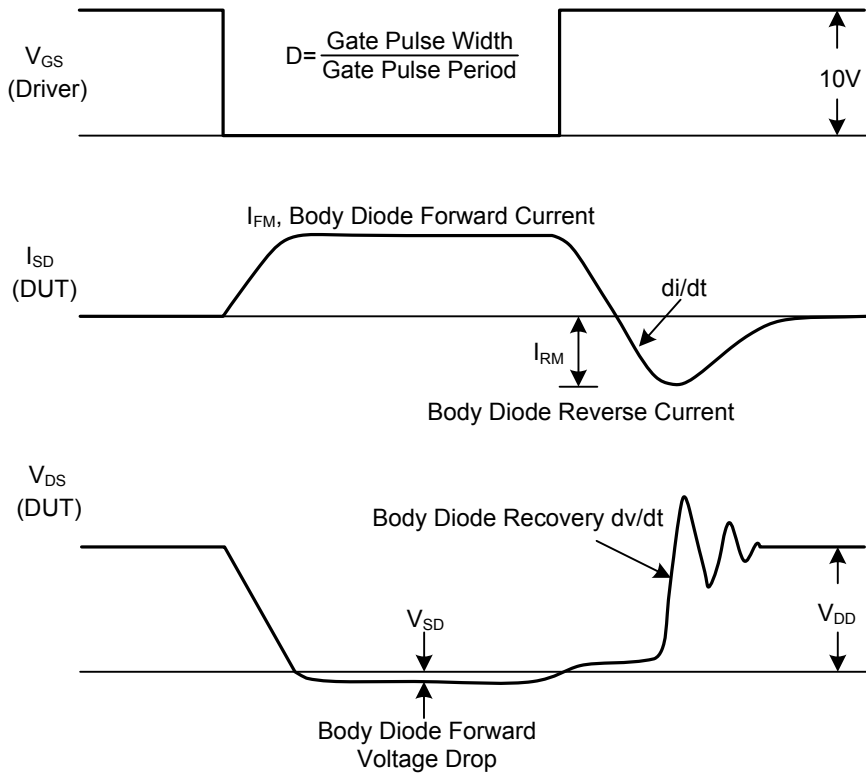
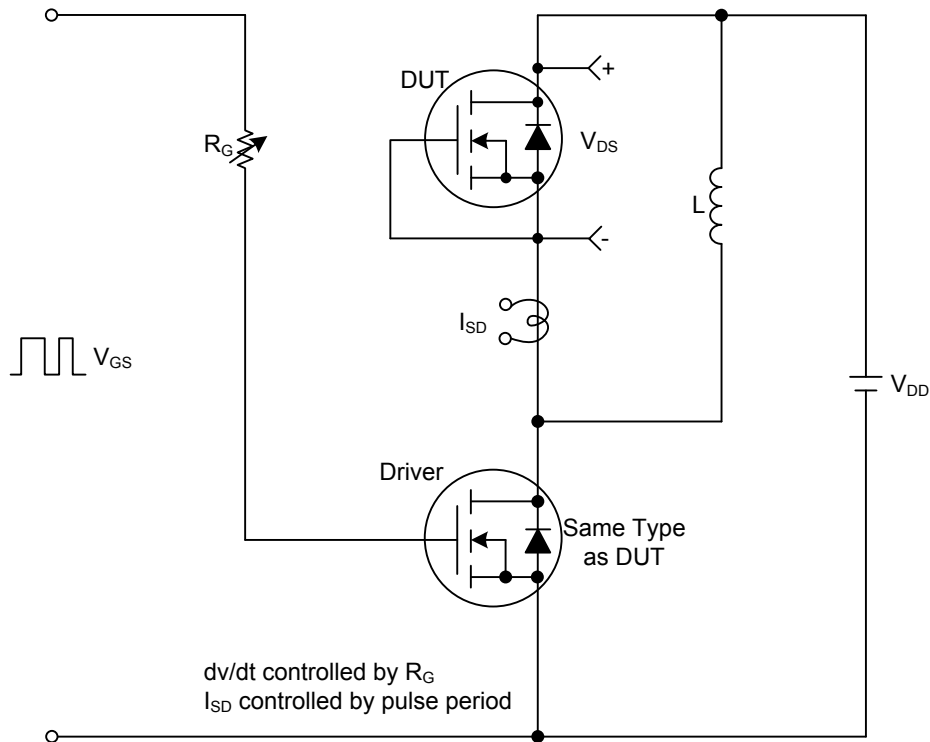
3. I_{SD} ≤ 80A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

4. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

5. Essentially independent of operating temperature

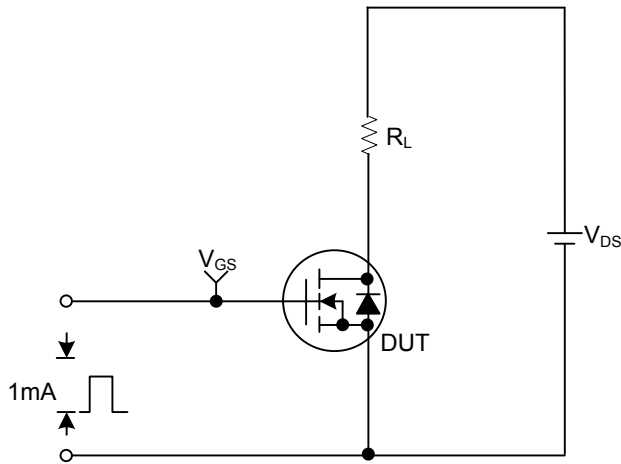
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

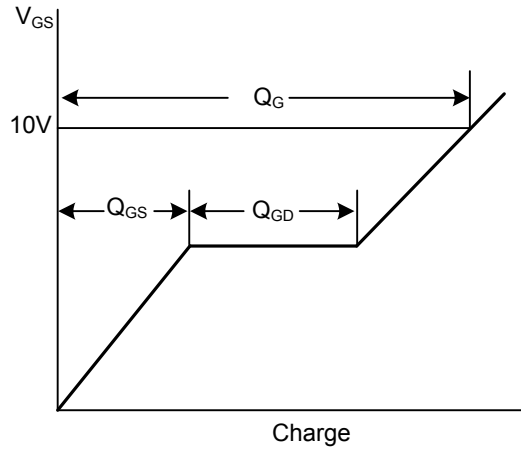


■ TEST CIRCUITS AND WAVEFORMS(Cont.)

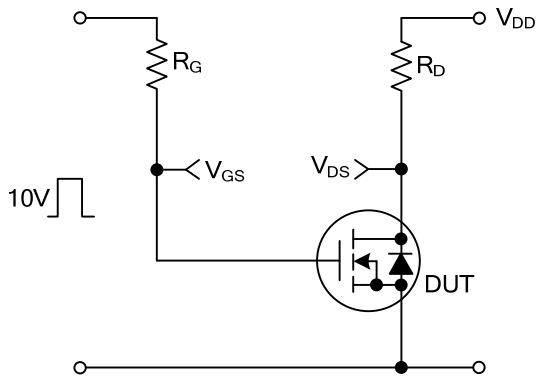
Gate Charge Test Circuit



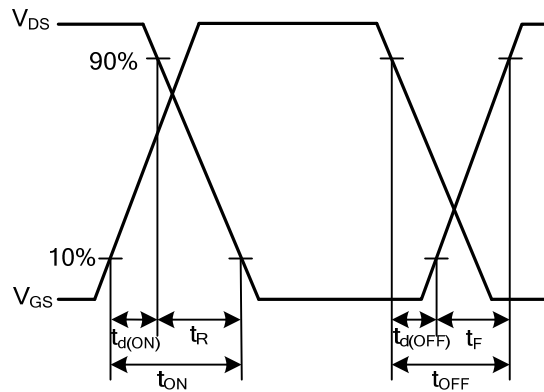
Gate Charge Waveforms



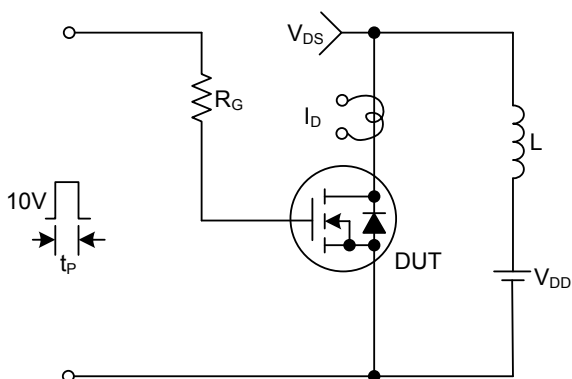
Resistive Switching Test Circuit



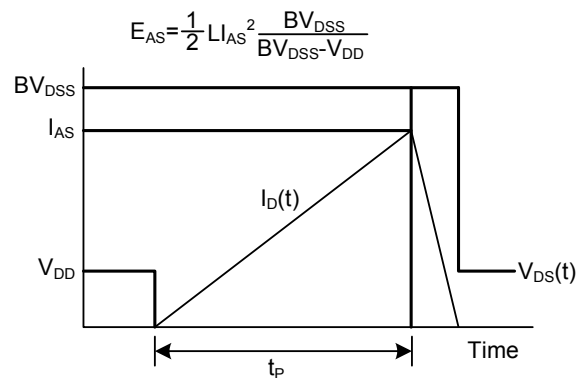
Resistive Switching Waveforms



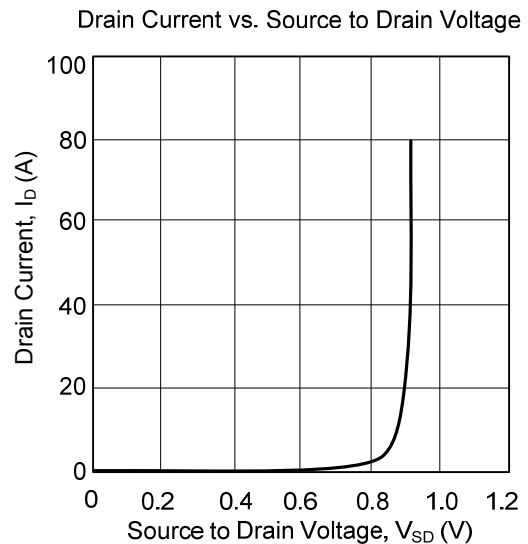
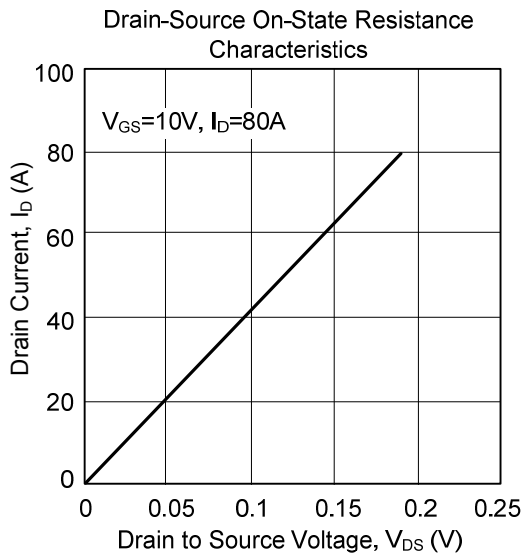
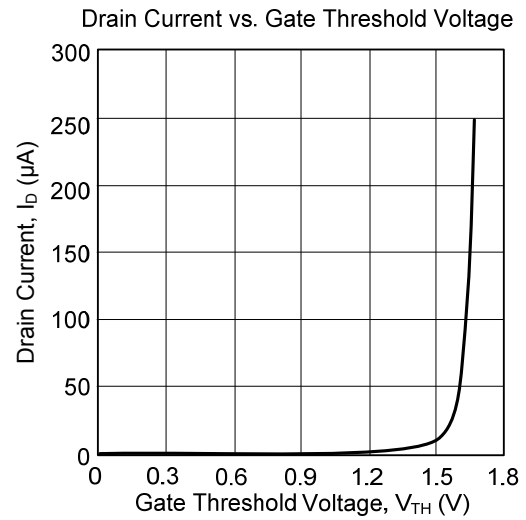
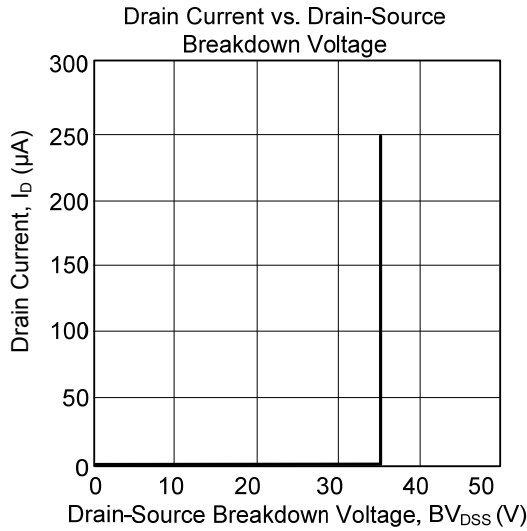
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



■ TYPICAL CHARACTERISTICS



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