

**UT90N03-Q**

Preliminary

Power MOSFET**90A, 30V N-CHANNEL(D-S)
POWER MOSFET****DESCRIPTION**

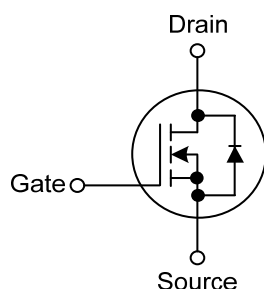
The UTC **UT90N03-Q** is a N-channel enhancement mode Power FET, it uses UTC's advanced technology to provide customers a minimum on-state resistance.

The UTC **UT90N03-Q** is suitable for server and DC-DC converters.

FEATURES

* $R_{DS(ON)} < 5.5 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=28.8\text{A}$

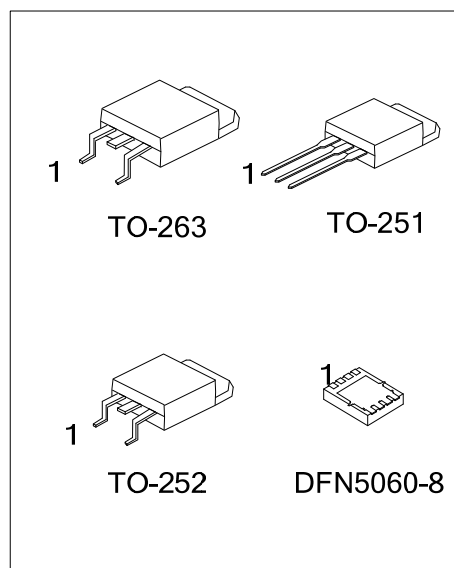
* Improved dv/dt capability

SYMBOL**ORDERING INFORMATION**

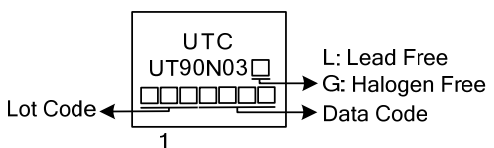
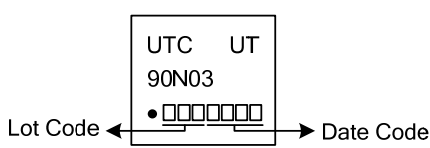
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT90N03L-TM3-T	UT90N03G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UT90N03L-TN3-R	UT90N03G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT90N03L-TQ2-T	UT90N03G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UT90N03L-TQ2-R	UT90N03G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UT90N03L-K08-5060-R	UT90N03G-K08-5060-R	DFN5060-8	S	S	S	G	D	D	D	D	Tape Reel

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

UT90N03G-TM3-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube, R: Tape Reel (2) TM3: TO-251, TN3: TO-252, TQ2: TO-263 K08-5060: DFN5060-8 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-251 / TO-252 / TO-263	DFN5060-8
 UTC UT90N03 Lot Code → [] [] [] [] → Data Code L: Lead Free G: Halogen Free 1	 UTC UT 90N03 Lot Code → [] [] [] [] → Date Code

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	T _C =25°C (Note 2, 5)		I _D	90	A
	T _A =25°C (Note 3, 4)			28.8	A
	Pulsed		I _{DM}	90	A
Avalanche Current Pulse (L=0.074mH)			I _{AS}	90	A
Single Pulsed Avalanche Energy (L=0.074mH)			E _{AS}	300	mJ
Continuous Source-Drain Diode Current	T _C =25°C (Note 2, 5)		I _S	90	A
	T _A =25°C (Note 3, 4)			3.13	A
Power Dissipation	T _C =25°C (Note 2)	TO-251/TO-252	P _D	187	W
		TO-263		220	
		DFN5060-8		21	
	T _A =25°C (Note 3, 4)			3.75	W
Junction Temperature			T _J	-55 ~ +150	°C
Storage Temperature Range			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. Based on $T_C=25^{\circ}\text{C}$.

3. Surface Mounted on 1"x1" FR4 board.

4. $t=10\text{sec}$.

5. Calculated based on maximum junction temperature. Package limitation current is 90A.

■ **THERMAL CHARACTERISTICS**

PARAMETER			SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 1, 2)	$t \leq 10\text{sec}$	TO-251/TO-252	θ_{JA}	40	$^{\circ}\text{C/W}$
		TO-263			
		DFN5060-8		40.3	
Junction to Case	Steady State	TO-251/TO-252	θ_{JC}	0.6	$^{\circ}\text{C/W}$
		TO-263		0.5	
		DFN5060-8		6	

Notes: 1. Maximum under Steady State conditions is 90°C/W .

2. Surface Mounted on 1" x1" FR4 board.

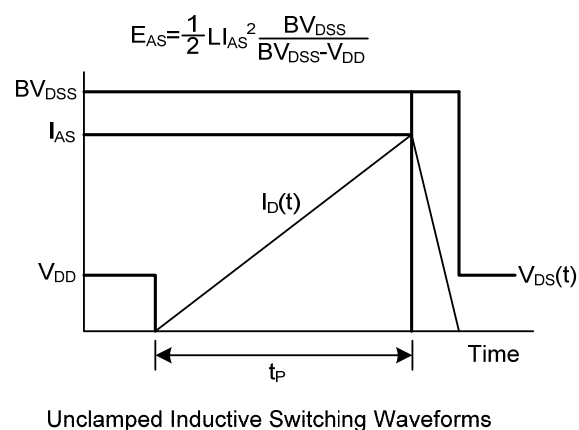
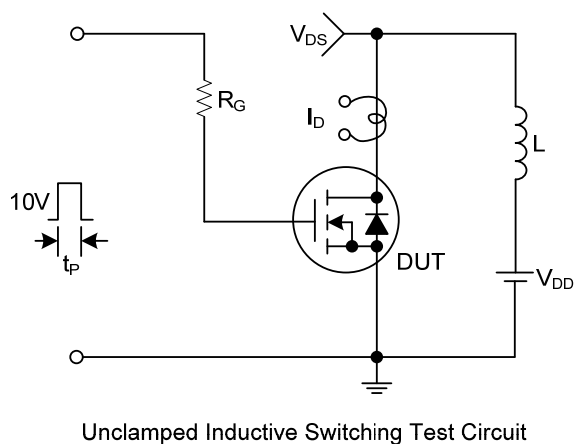
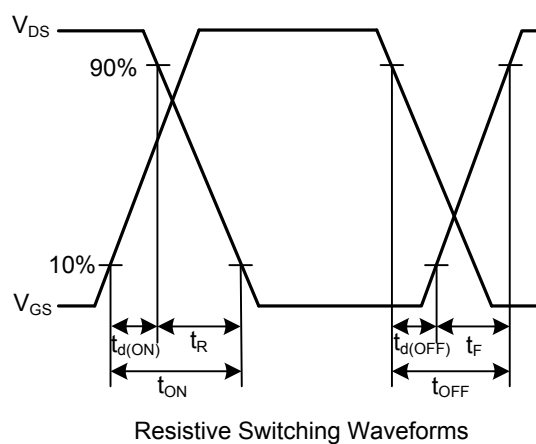
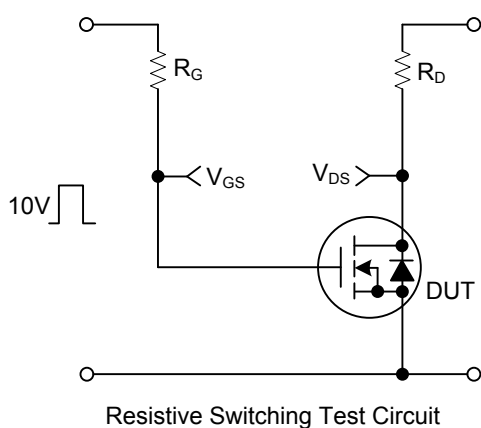
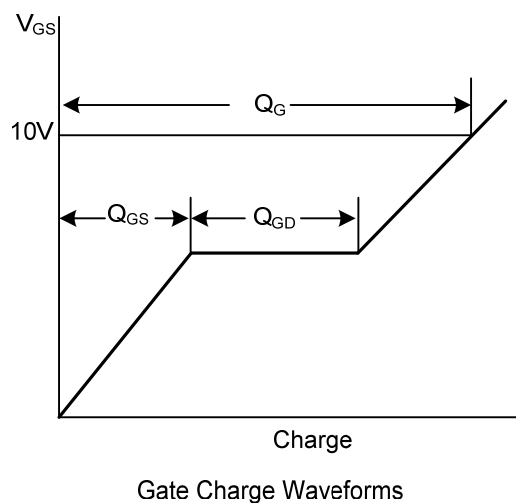
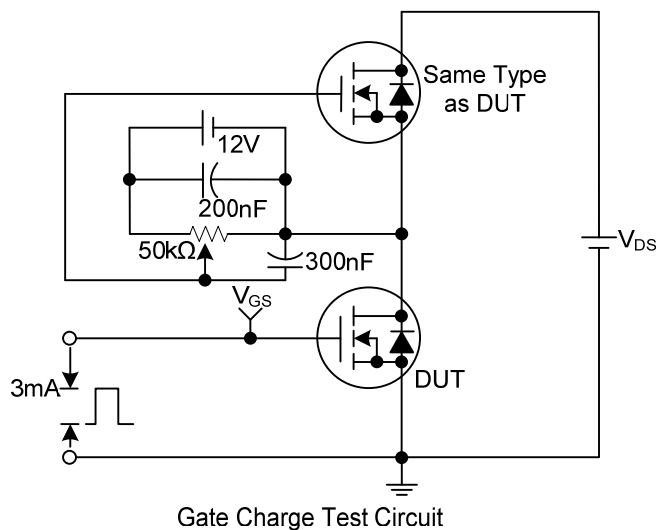
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

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			1	μA
			V _{DS} =30V, V _{GS} =0V, T _J =55°C			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 (Note 1)		R _{DS(ON)}	V _{GS} =10V, I _D =28.8A			5.5	mΩ
			V _{GS} =4.5V, I _D =27A			6.5	mΩ
Forward Transconductance (Note 1)		g _{FS}	V _{DS} =15V, I _D =28.8A		160		S
On State Drain Current (Note 1)		I _{D(ON)}	V _{GS} =10V, V _{DS} ≥5V	90			A
DYNAMIC PARAMETERS (Note 2)							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =15V, f=1.0MHz		12065		pF
Output Capacitance		C _{OSS}			1725		pF
Reverse Transfer Capacitance		C _{RSS}			970		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =15V, V _{GS} =10V, I _D =28.8A		171	257	nC
Total Gate Charge		Q _G	V _{DS} =15V, V _{GS} =4.5V, I _D =28.8A		81.5	123	nC
Gate to Source Charge		Q _{GS}			34		nC
Gate to Drain Charge		Q _{GD}			29		nC
Gate Resistance		R _G	f=1MHz		1.4	2.1	Ω
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =15V, R _L =0.625Ω, I _D =24A, V _{GEN} =10V, R _G =1Ω		18	27	ns
Rise Time		t _R			11	17	ns
Turn-OFF Delay Time		t _{D(OFF)}			70	105	ns
Fall-Time		t _F			10	15	ns
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =15V, R _L =0.67Ω, I _D =22.5A, V _{GEN} =4.5V, R _G =1Ω		55	83	ns
Rise Time		t _R			180	270	ns
Turn-OFF Delay Time		t _{D(OFF)}			55	83	ns
Fall-Time		t _F			12	18	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S	T _C =25°C			90	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				90	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =22A		0.8	1.2	V
Body Diode Reverse Recovery Time		t _{RR}	I _F =20A, di/dt=100A/μs, T _J =25°C		52	78	ns

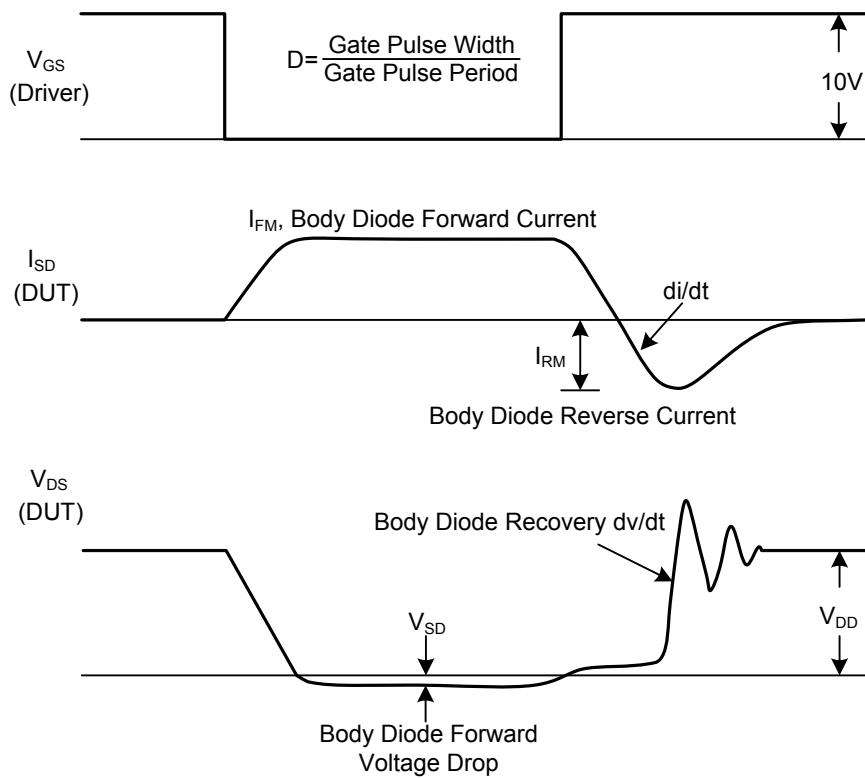
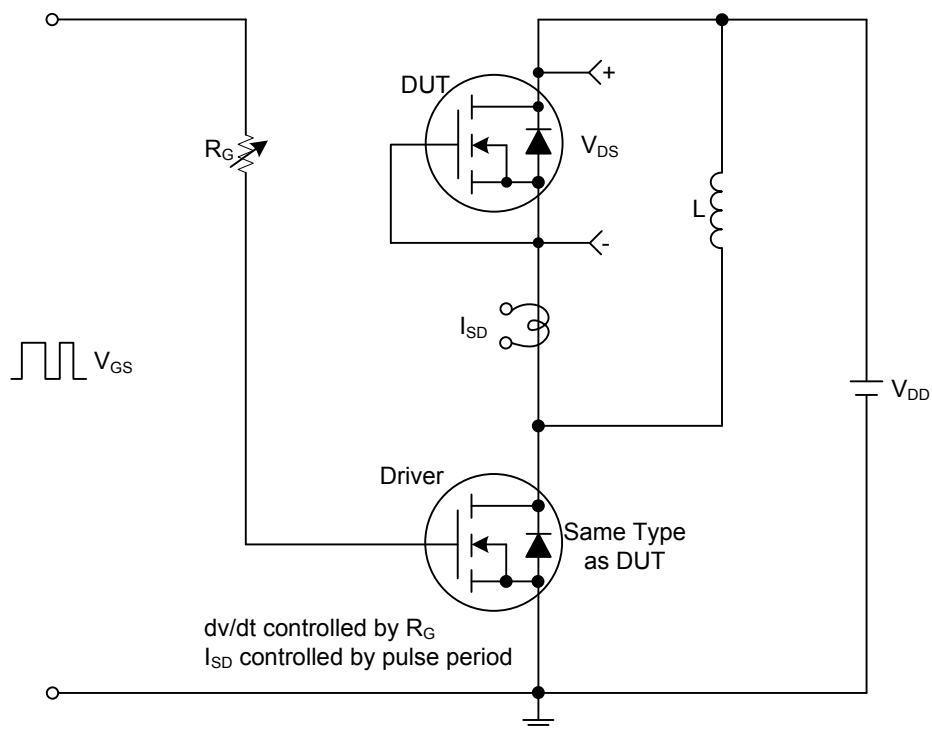
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycles $\leq 2\%$.

2. Guaranteed by design, not subject to production testing.

■ TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit and Waveforms

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