



UTT15N10M-Q

POWER MOSFET

15A, 100V N-CHANNEL ENHANCEMENT MODE TRENCH POWER MOSFET

DESCRIPTION

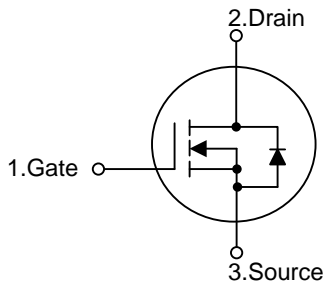
The UTC **UTT15N10M-Q** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(ON)}$ characteristic by high cell density trench technology.

The UTC **UTT15N10M-Q** is suitable for high efficiency synchronous rectification in SMPS, UPS, hard switched and high frequency circuits.

FEATURES

- * $R_{DS(ON)} \leq 175 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=8.0\text{A}$
- * $R_{DS(ON)} \leq 203 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=8.0\text{A}$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability

SYMBOL

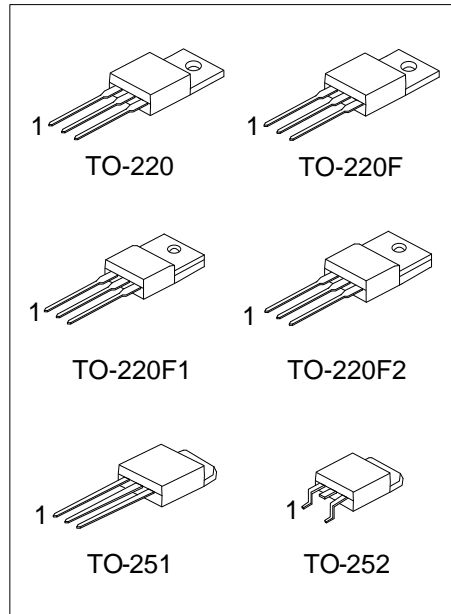


ORDERING INFORMATION

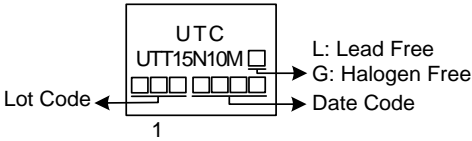
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT15N10ML-TA3-T	UTT15N10MG-TA3-T	TO-220	G	D	S	Tube
UTT15N10ML-TF1-T	UTT15N10MG-TF1-T	TO-220F1	G	D	S	Tube
UTT15N10ML-TF2-T	UTT15N10MG-TF2-T	TO-220F2	G	D	S	Tube
UTT15N10ML-TF3-T	UTT15N10MG-TF3-T	TO-220F	G	D	S	Tube
UTT15N10ML-TM3-T	UTT15N10MG-TM3-T	TO-251	G	D	S	Tube
UTT15N10ML-TN3-R	UTT15N10MG-TN3-R	TO-252	G	D	S	Tape Reel

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

UTT15N10MG-TA3-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, TM3: TO-251, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	15	A
	Pulsed (Note 2)	I_{DM}	30	A
Peak Diode Recovery dv/dt (Note 4)		dv/dt	10	V/ns
Power Dissipation	TO-220	P_D	88	W
	TO-220F/TO-220F1		30	W
	TO-220F2			
	TO-251/TO-252		42	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range		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. $I_{SD} \leq 15\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J = 25^{\circ}\text{C}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-220F1/TO-220F2			
	TO-251/TO-252			
Junction to Case	TO-220	θ_{JC}	1.42	$^{\circ}\text{C}/\text{W}$
	TO-220F/TO-220F1		4.17	$^{\circ}\text{C}/\text{W}$
	TO-220F2			
	TO-251/TO-252		2.98 (Note)	$^{\circ}\text{C}/\text{W}$

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

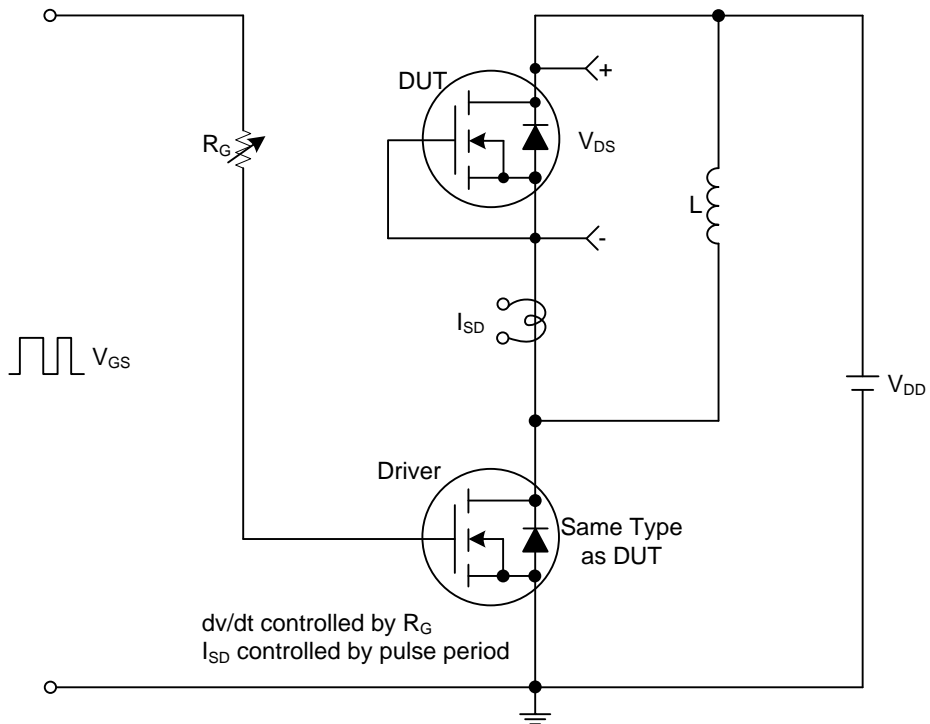
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$			1.0	μA
Gate-Source Leakage Current	Forward	$V_{GS}=+20\text{V}, V_{DS}=0\text{V}$ $V_{GS}=-20\text{V}, V_{DS}=0\text{V}$			+100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		2.2	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=8.0\text{A}$			175	m Ω
		$V_{GS}=4.5\text{V}, I_D=8.0\text{A}$			203	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		780		pF
Output Capacitance	C_{OSS}			47		pF
Reverse Transfer Capacitance	C_{RSS}			36		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=80\text{V}, V_{GS}=10\text{V}, I_D=15\text{A},$ $I_G=1\text{mA}$ (Note 1, 2)		25.8		nC
Gate to Source Charge	Q_{GS}			6.4		nC
Gate to Drain Charge	Q_{GD}			5.6		nC
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=50\text{V}, V_{GS}=10\text{V}, I_D=0.5\text{A},$ $R_G=25\Omega$ (Note 1, 2)		11.4		ns
Rise Time	t_R			11		ns
Turn-off Delay Time	$t_{D(OFF)}$			103		ns
Fall-Time	t_F			29		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				15	A
Maximum Body-Diode Pulsed Current	I_{SM}				30	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=8.0\text{A}, V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	$I_S=15\text{A}, V_{GS}=0\text{V},$		50		nS
Reverse Recovery Charge	Q_{rr}	$di_F/dt = 100\text{A}/\mu\text{s}$		84		nC

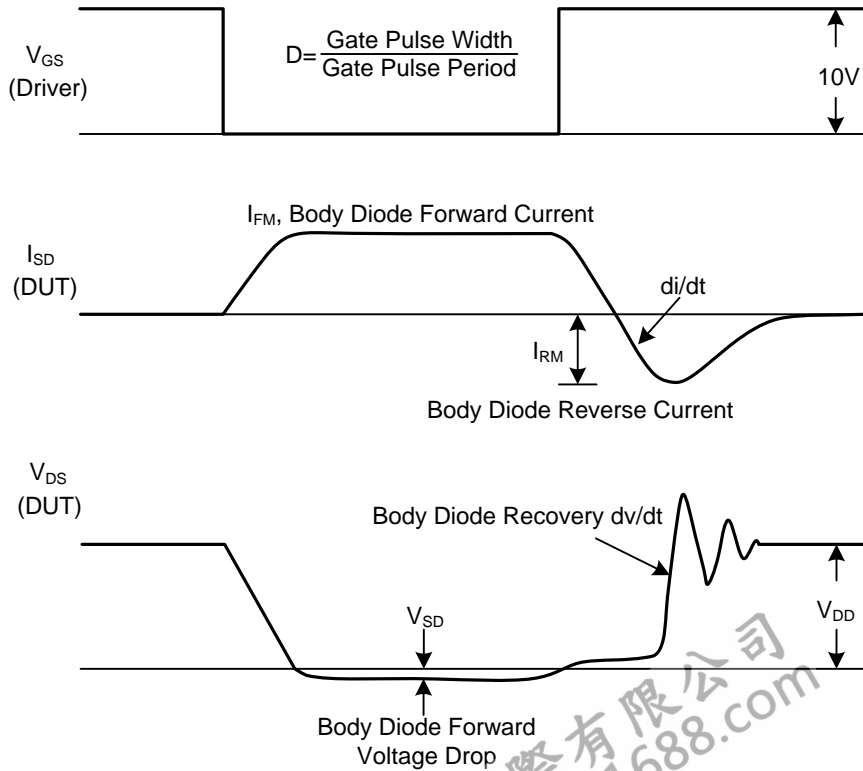
Notes: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

TEST CIRCUITS AND WAVEFORMS



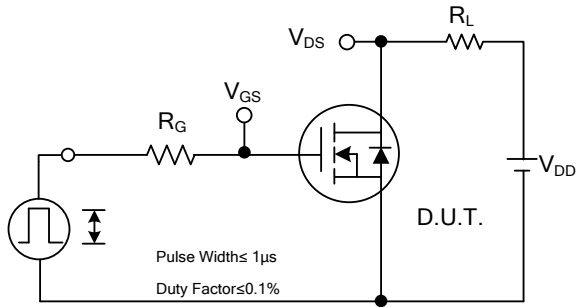
Peak Diode Recovery dv/dt Test Circuit



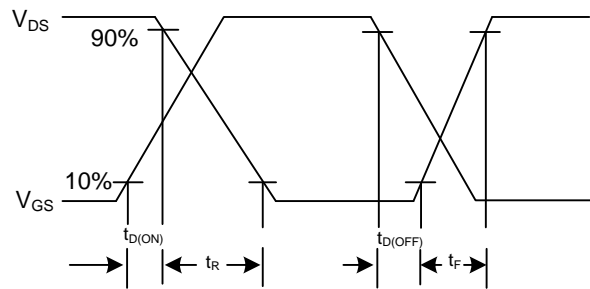
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

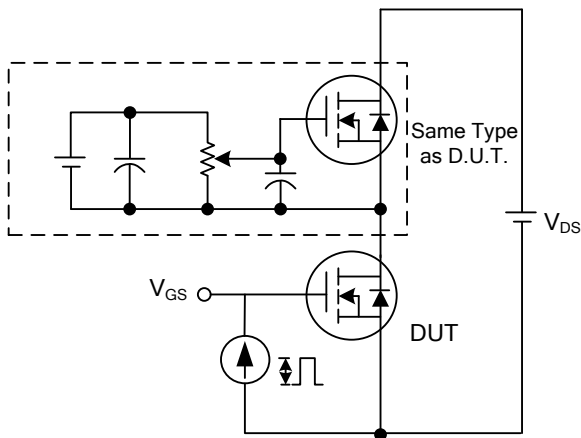
TEST CIRCUITS AND WAVEFORMS



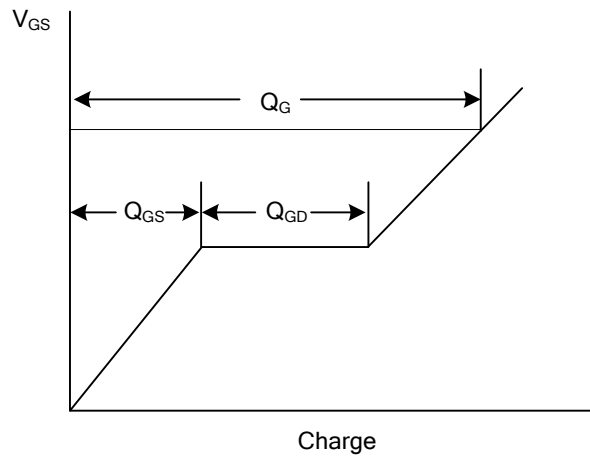
Switching Test Circuit



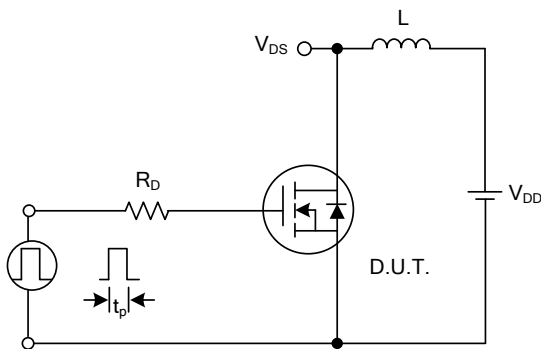
Switching Waveforms



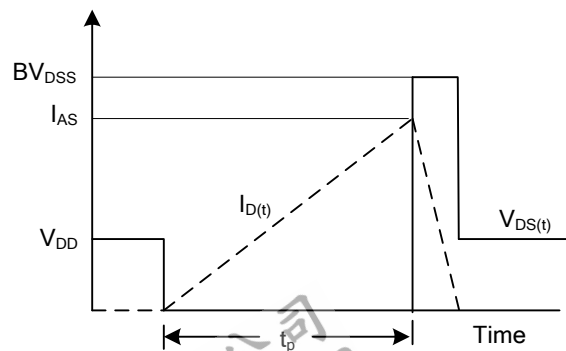
Gate Charge Test Circuit



Gate Charge Waveform

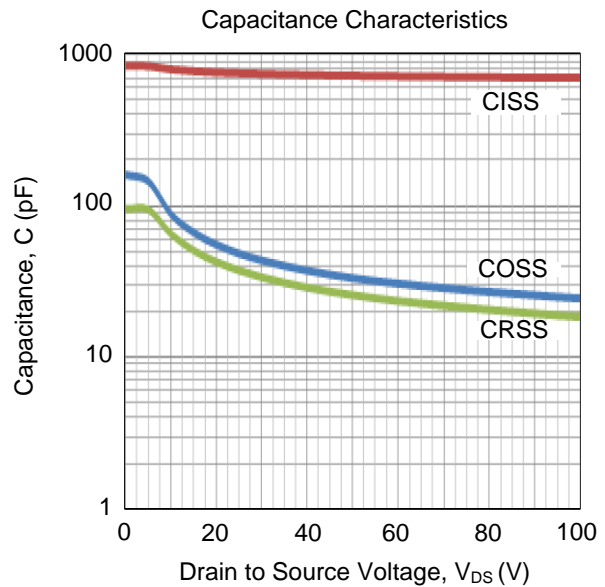
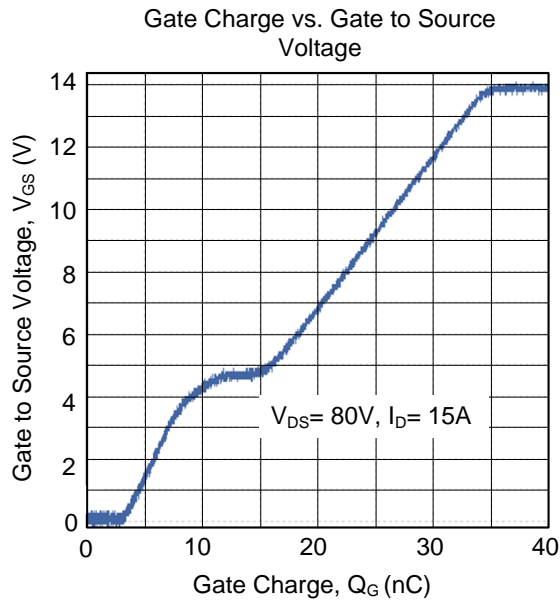


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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