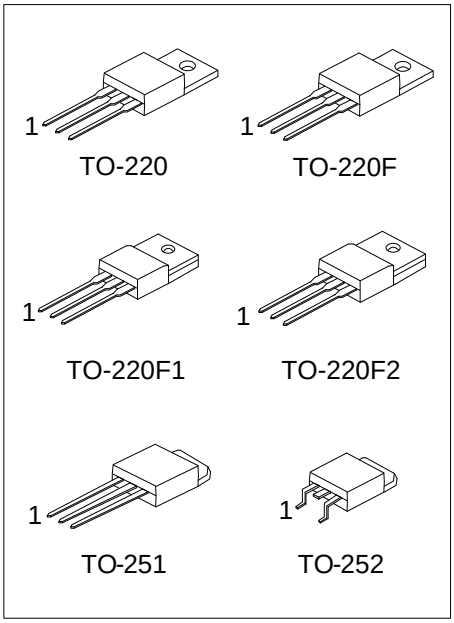
UTT15N10M-Q

POWER MOSFET

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



■ DESCRIPTION

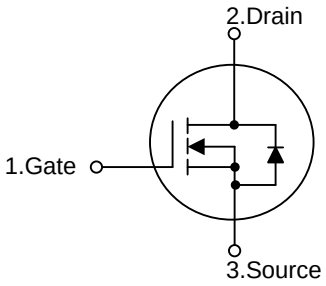
The UTC **UTT15N10M-Q** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low Rdson characteristic by high cell density trench technology.

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

■ FEATURES

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

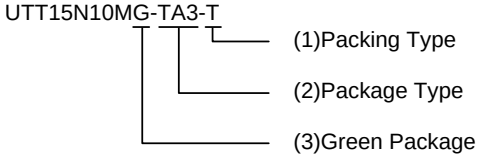
■ SYMBOL



■ ORDERING INFORMATION

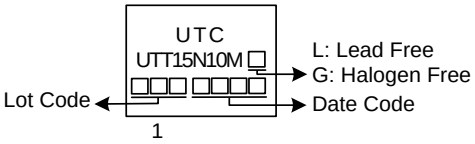
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT15N10ML-TA3-T	UTT15N10MG-TA3-T	TO-220	G	D	S	Tube
UTT15N10ML-TF1-T	UTT15N10MG-TF1-T	TO-220F1	G	D	S	Tube
UTT15N10ML-TF2-T	UTT15N10MG-TF2-T	TO-220F2	G	D	S	Tube
UTT15N10ML-TF3-T	UTT15N10MG-TF3-T	TO-220F	G	D	S	Tube
UTT15N10ML-TM3-T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



(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

■ MARKING



■ ABSOLUTE MAXIMUM RATING (T_C=25°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 TO-220F2		30	W
	TO-251/TO-252		42	W
Junction Temperature		T_J	+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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. I_{SD} ≤15A, di/dt ≤ 200A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2	θ_{JA}	62.5	°C/W
	TO-251/TO-252		110	°C/W
Junction to Case	TO-220	θ_{JC}	1.42	°C/W
	TO-220F/TO-220F1 TO-220F2		4.17	°C/W
	TO-251/TO-252		2.98 (Note)	°C/W

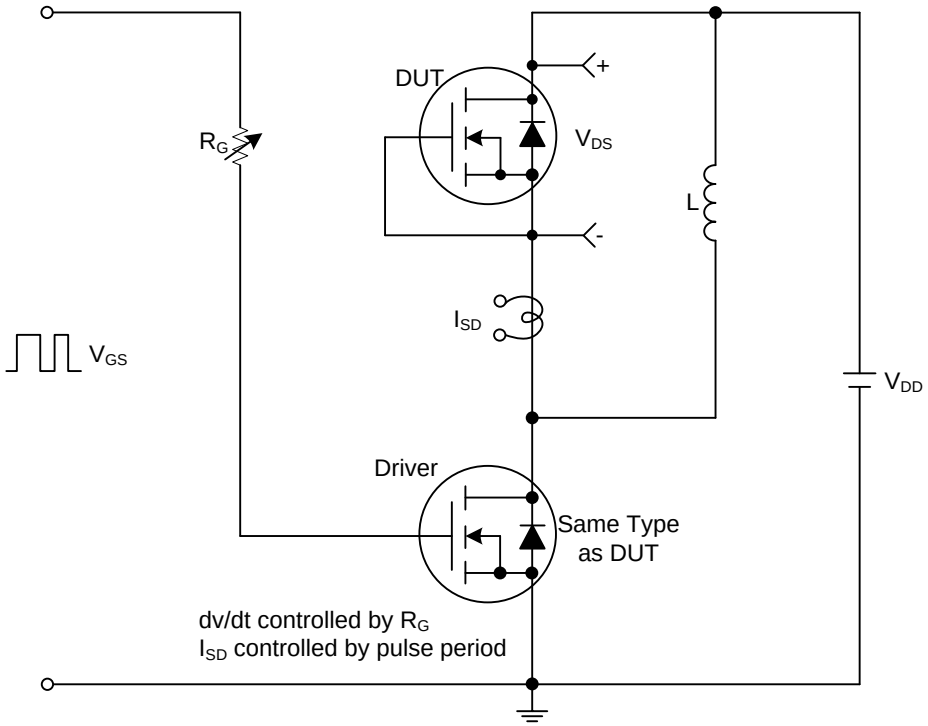
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

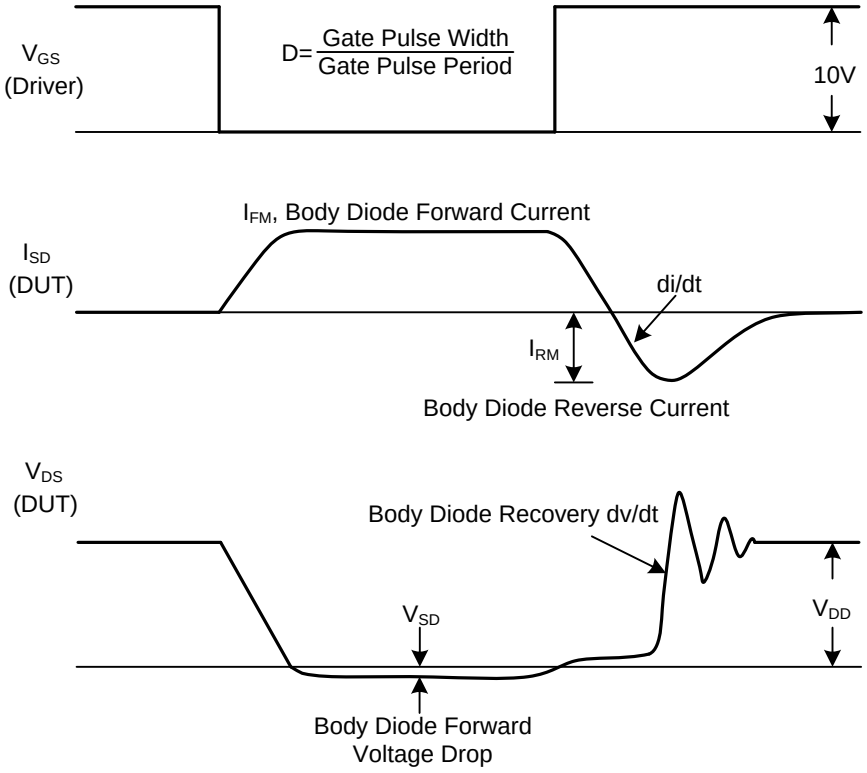
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V, V_{GS}=0V			1.0	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		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		2.2	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=8.0A			175	mΩ
			V_{GS}=4.5V, I_D=8.0A			203	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		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}=80V, V_{GS}=10V, I_D=15A, I_G=1mA (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}=50V, V_{GS}=10V, I_D=0.5A, R_G=25Ω (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=8.0A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=15A, V_{GS}=0V, dI_F/dt =100A/μs		50		nS
Reverse Recovery Charge		Q_{rr}			84		nC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



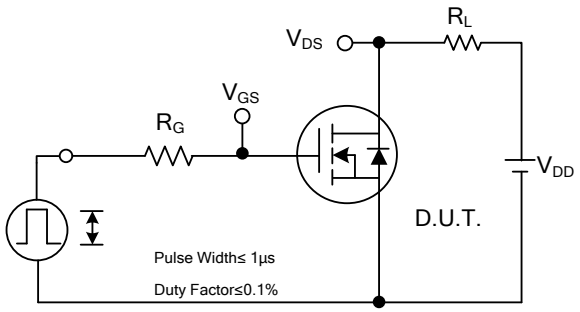
Peak Diode Recovery dv/dt Test Circuit



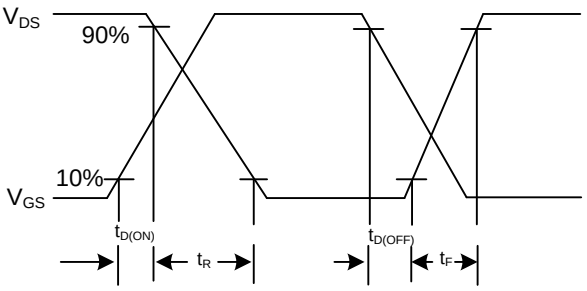
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

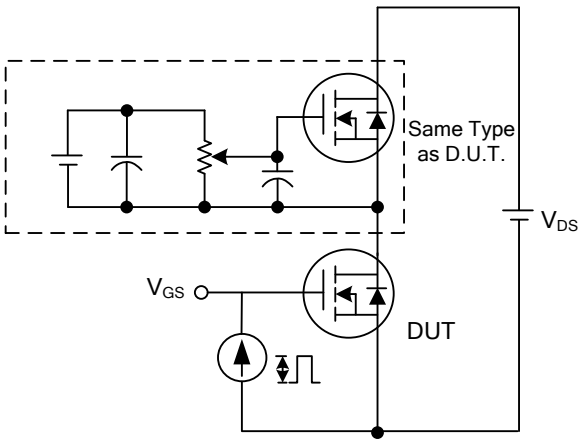
■ TEST CIRCUITS AND WAVEFORMS



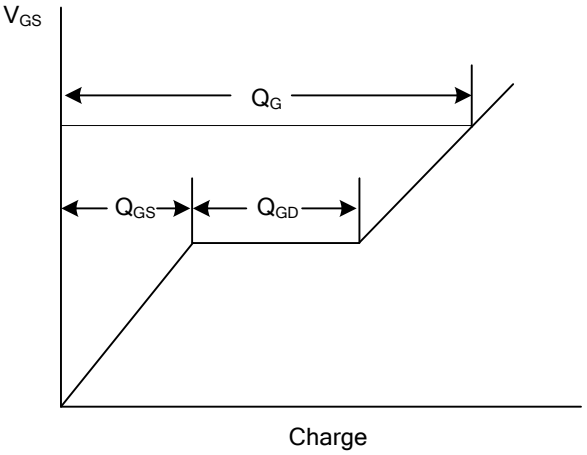
Switching Test Circuit



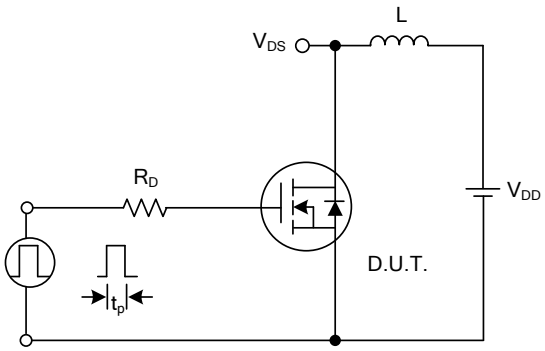
Switching Waveforms



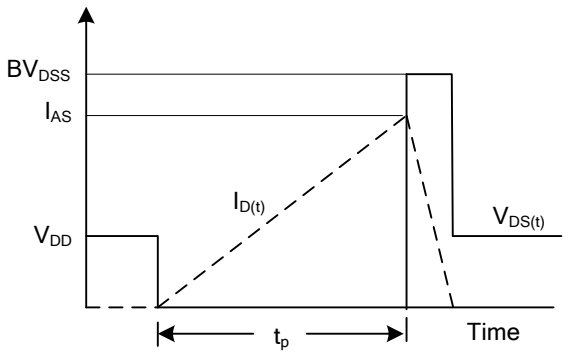
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS