



UT73P10M

Preliminary

Power MOSFET

-73A, -100V P-CHANNEL POWER MOSFET

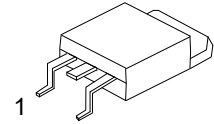
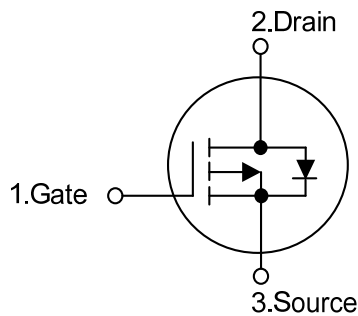
DESCRIPTION

The UTC **UT73P10M** provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} \leq 25 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -40\text{A}$
- * $R_{DS(ON)} \leq 28 \text{ m}\Omega$ @ $V_{GS} = -4.5\text{V}$, $I_D = -40\text{A}$
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL



TO-263

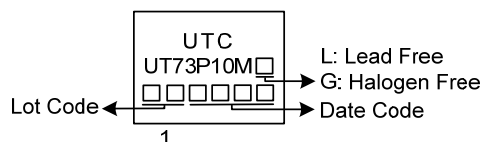
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT73P10ML-TQ2-T	UT73P10MG-TQ2-T	TO-263	G	D	S	Tube
UT73P10ML-TQ2-R	UT73P10MG-TQ2-R	TO-263	G	D	S	Tape Reel

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

UT73P10MG-TQ2-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube, R: Tape Reel (2) TQ2: TO-263 (3) G: Halogen Free and Lead Free L: Lead Free
---	--	---

MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$, 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	-73	A
	Pulsed (Note 2)	I_{DM}	-146	A
Avalanche Energy	Repetitive (Note 3)	E_{AS}	106	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2	V/ns
Power Dissipation ($T_C=25^{\circ}\text{C}$)		P_D	128	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		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. $L=0.1\text{mH}$, $I_{AS}=-46\text{A}$, $V_{DD}=-50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

4. $I_{SD}\leq -30\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.98 (Note)	$^{\circ}\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate P_c 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	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		R _{DS(ON)}	V _{GS} =-10V, I _D =-40A			25	mΩ
			V _{GS} = -4.5V, I _D = -40A			28	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =-25V, V _{GS} =0V, f=1MHz		8475		pF
Output Capacitance		C _{OSS}			385		pF
Reverse Transfer Capacitance		C _{RSS}			322		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =-80V, V _{GS} =-10V, I _D =-73A (Note 1, 2)		164		nC
Gate to Source Charge		Q _{GS}			20		nC
Gate to Drain Charge		Q _{GD}			52		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =-50V, I _D =-73A, R _G =3Ω (Note 1, 2)		15		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			140		ns
Fall-Time		t _F			55		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				-73	A
Maximum Body-Diode Pulsed Current		I _{SM}	(Note 1)			-146	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =-73A, V _{GS} =0V (Note 2)			-1.4	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =-30A, V _{GS} =0V,		160		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		224		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

D.U.T.

V_{DS}

I_{SD}

L

V_{DD}

R_G

Driver

V_{GS}

- * dv/dt controlled by R_G
- * I_{SD} controlled by pulse period
- * D.U.T.-Device Under Test

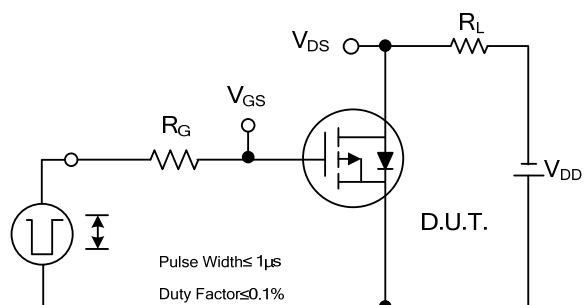
Timing diagram for a MOSFET switching a load inductor. The diagram shows three waveforms: V_{GS} (Driver), I_{SD} (D.U.T.), and V_{DS} (D.U.T.).

- V_{GS} (Driver): A square wave with period and pulse width (P.W.) indicated. The duty cycle is $D = \frac{P.W.}{Period}$. The peak voltage is $V_{GS} = 10V$.
- I_{SD} (D.U.T.): The source-drain current. It shows forward current I_{FM} during the pulse and reverse current I_{RM} during the off-time. The reverse current is labeled "Body Diode Reverse Current". The slope of the reverse current is labeled di/dt .
- V_{DS} (D.U.T.): The drain-source voltage. It shows the voltage drop during the on-state and the recovery dv/dt during the off-state. The recovery is labeled "Body Diode Recovery dv/dt ".

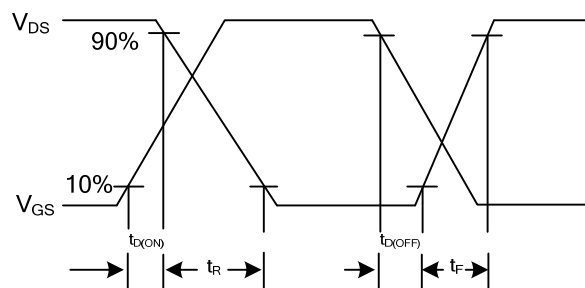
Labels at the bottom: "Body Diode", "Forward Voltage Drop".

4 of 6
QW-R209-515.a

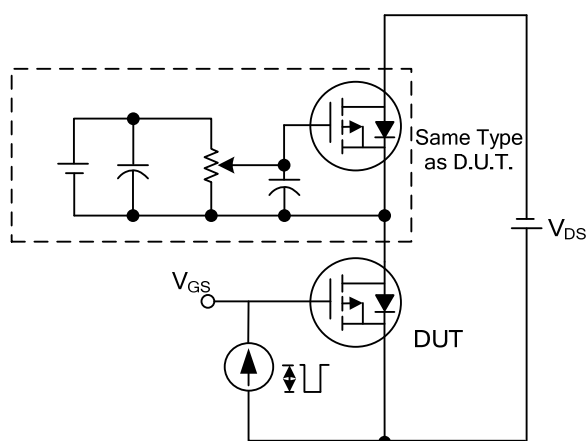
■ TEST CIRCUITS AND WAVEFORMS



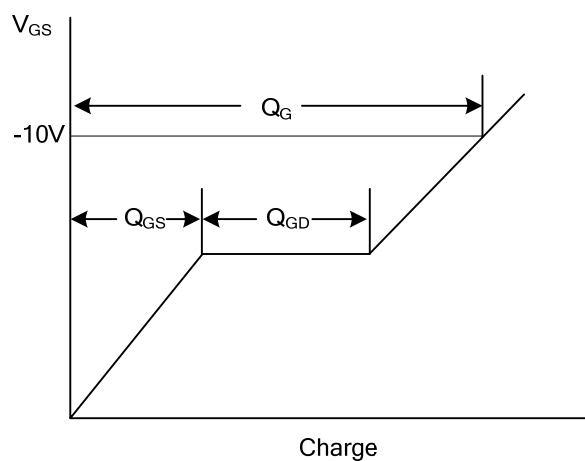
Switching Test Circuit



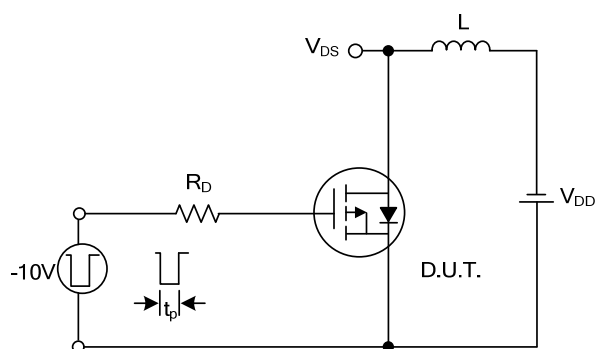
Switching Waveforms



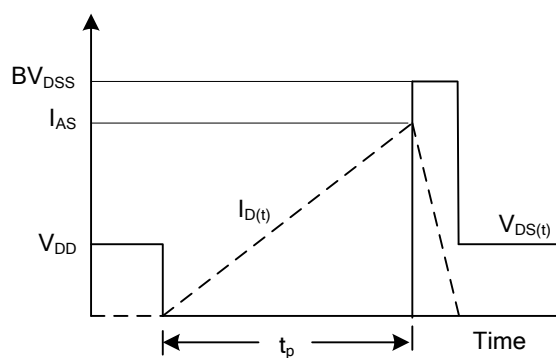
Gate Charge Test Circuit



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.