

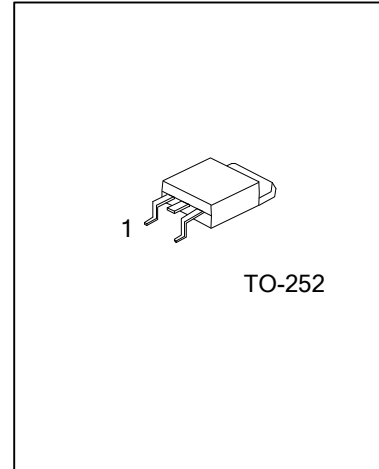


UTT12P10

Preliminary

Power MOSFET

100V, 12A P-CHANNEL POWER MOSFET



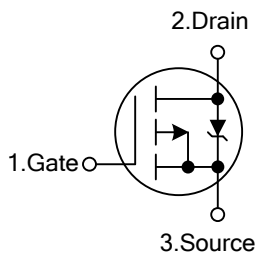
DESCRIPTION

The UTC **UTT12P10** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and a minimum on-state resistance. It can also withstand high energy in the avalanche.

FEATURES

- * $R_{DS(ON)} < 0.29\Omega @ V_{GS} = -10V, I_D = -12A$
- * High Switching Speed

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT12P10L-TN3-R	UTT12P10G-TN3-R	TO-252	G	D	S	Tape Reel

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

UTT12P10L-TN3-R (1) Packing Type (2) Package Type (3) Lead Free	(1) R: Tape Reel (2) TN3: TO-252 (3) G: Halogen Free, L: Lead Free
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■ ABSOLUTE MAXIMUM RATINGS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V_{DSS}	-100	V	
Gate-Source Voltage		V_{GSS}	± 20	V	
Drain Current	Continuous, $V_{GSS}@-10\text{V}$	I_D	$T_C=25^\circ\text{C}$	-19	A
	$T_C=100^\circ\text{C}$		-13	A	
	Pulsed (Note 2)	I_{DM}	-72	A	
Avalanche Current (Note 2)		I_{AR}	-19	A	
Avalanche Energy	Repetitive (Note 3)	E_{AS}	640	mJ	
	Single Pulsed (Note 2)	E_{AR}	15	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	-5.5	V/ns	
Power Dissipation ($T_C=25^\circ\text{C}$)		P_D	125	W	
Junction Temperature		T_J	-55~+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 max. junction temperature.

3. $V_{DD}=-25\text{V}$, starting $T_J=25^\circ\text{C}$, $L=2.7\text{mH}$, $R_G=25\Omega$, $I_{AS}=-19\text{A}$. (See Figure 2)

4. $I_{SD}\leq-19\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, $T_J\leq 175^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ_{JC}	1.0	$^\circ\text{C}/\text{W}$

■ 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}	$V_{DS}=-100\text{V}$, $V_{GS}=0\text{V}$,			-100	μA
		$V_{DS}=-80\text{V}$, $V_{GS}=0\text{V}$, $T_J=150^\circ\text{C}$			-500	μA
Gate- Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20\text{V}$		+100	nA
	Reverse	I_{GSS}	$V_{GS}=-20\text{V}$		-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-2.0		-4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$, $I_D=-12\text{A}$ (Note 2)			0.20	Ω
Forward Transconductance	g_{FS}	$V_{DS}=-50\text{V}$, $I_D=-11\text{A}$ (Note 2)	6.2			S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=-25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		1400		pF
Output Capacitance	C_{OSS}			590		pF
Reverse Transfer Capacitance	C_{RSS}			140		pF

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=-80\text{V}$, $V_{GS}=-10\text{V}$, $I_D=-19\text{A}$, See Fig 3 (Note 2)		21	27	nC
Gate to Source Charge	Q_{GS}			4.6		nC
Gate to Drain ("Miller") Charge	Q_{GD}			11.5		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-50\text{V}$, $I_D=-19\text{A}$, $R_G=9.1\Omega$, $R_D = 2.4\Omega$, See Fig. 1(Note 2)		16		ns
Rise Time	t_R			73		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			34		ns
Fall-Time	t_F			57		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				-19	A
Maximum Body-Diode Pulsed Current	I_{SM}	(Note 1)			-72	A
Drain-Source Diode Forward Voltage	V_{SD}	$T_J=25^\circ\text{C}$, $I_S=-19\text{A}$, $V_{GS}=0\text{V}$ (Note 2)			-5.0	V
Body Diode Reverse Recovery Time	t_{RR}	$T_J=25^\circ\text{C}$, $I_F=-19\text{A}$, $di/dt=100\text{A}/\mu\text{s}$ (Note 2)		130	260	ns
Body Diode Reverse Recovery Charge	Q_{RR}			0.35	0.70	μC

Notes: 1. Repetitive rating; pulse width limited by max. junction temperature.

2. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

■ TEST CIRCUITS AND WAVEFORMS

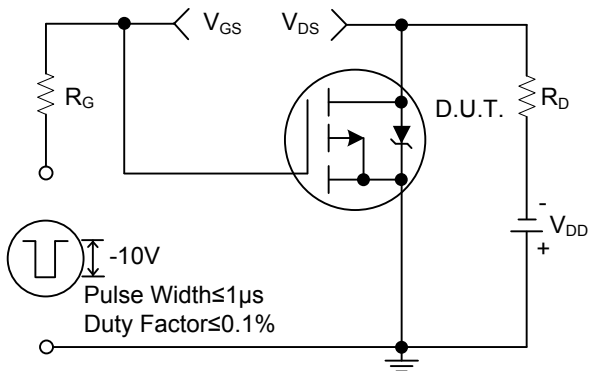


Fig. 1a Switching Time Test Circuit

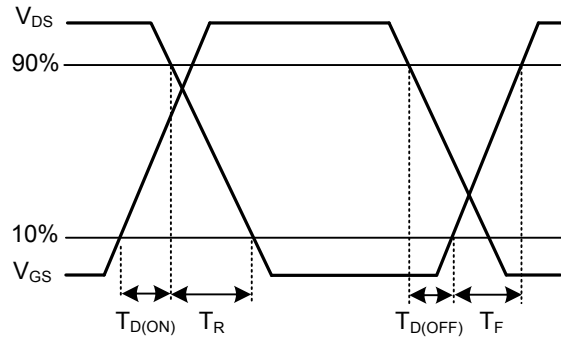


Fig. 1b Switching Time Waveforms

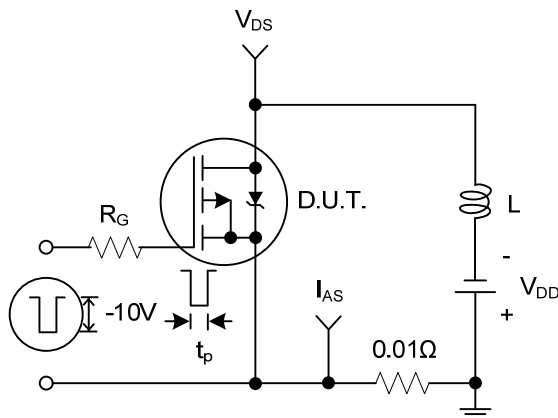


Fig. 2a Unclamped Inductive Test Circuit

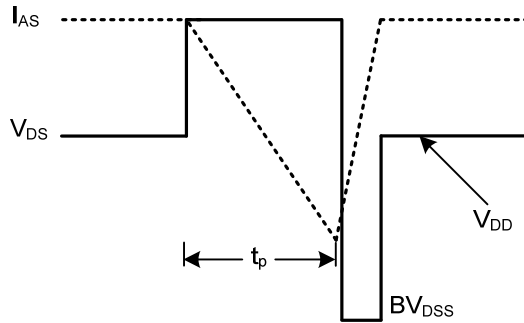


Fig. 2b Unclamped Inductive Waveforms

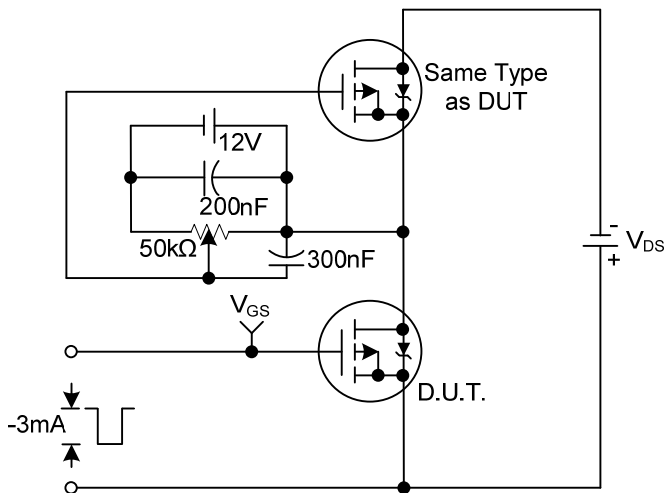


Fig.3a Gate Charge Test Circuit

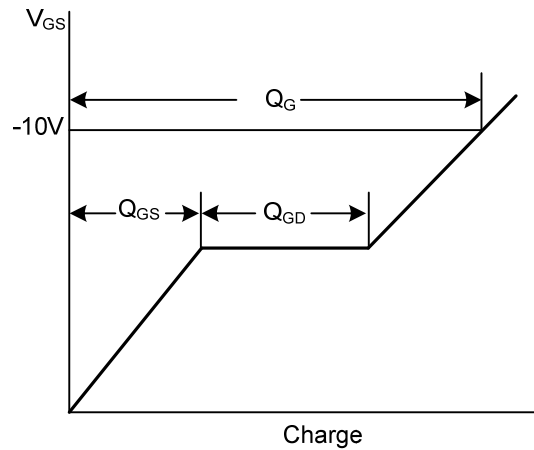


Fig. 3b Gate Charge Waveform

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