

**UTT16P10Z**

Preliminary

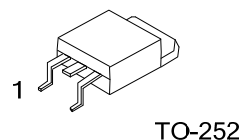
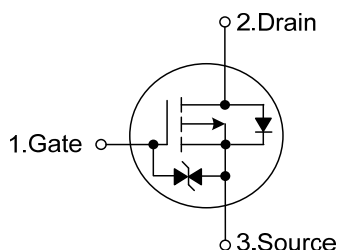
Power MOSFET

**-100V, -16A P-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UTT16P10Z** 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

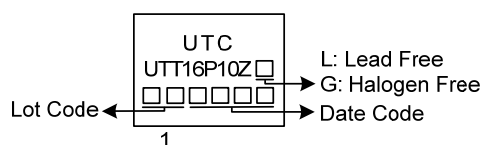
- * $R_{DS(ON)} \leq 0.21 \Omega$ @ $V_{GS} = -10V$, $I_D = -10A$
- * $R_{DS(ON)} \leq 0.22 \Omega$ @ $V_{GS} = -4.5V$, $I_D = -6.5A$
- * High Switching Speed

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT16P10ZL-TN3-R	UTT16P10ZG-TN3-R	TO-252	G	D	S	Tape Reel

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

UTT16P10ZG-TN3-R	
(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) TN3: TO-252
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

■ **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} @-10V	T _C =25°C	I _D	-16	A
		T _C =100°C		-9.8	A
	Pulsed (Note 2)		I _{DM}	-32	A
Avalanche Energy	Repetitive (Note 3)		E _{AS}	153	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	10.5	V/ns
Power Dissipation (T _C =25°C)			P _D	45	W
Junction Temperature			T _J	-55 ~ +150	°C
Storage Temperature			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 max. junction temperature.

3. $L=30\text{mH}$, $I_{AS}=-3.2\text{A}$, $V_{DD}=-50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$.

4. $I_{SD} \leq -16\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.77 (Note)	$^{\circ}\text{C}/\text{W}$

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

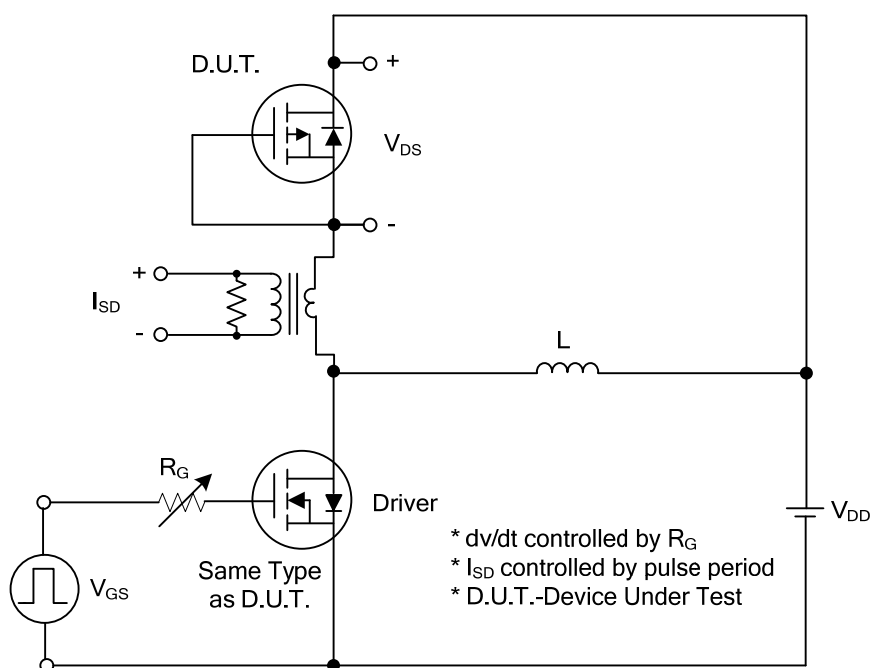
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =-250μA, V _{GS} =0V	-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			+10	uA
	Reverse		V _{GS} =-20V			-10	uA
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 =-10A		0.14	0.21	Ω
			V _{GS} =-4.5V, I _D =-6.5A		0.16	0.22	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =-25V, V _{GS} =0V, f=1.0MHz		1460		pF
Output Capacitance		C _{OSS}			82		pF
Reverse Transfer Capacitance		C _{RSS}			62		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =-80V, V _{GS} =-10V, I _D =-16A(Note 1, 2)		25		nC
Gate to Source Charge		Q _{GS}			5		nC
Gate to Drain ("Miller") Charge		Q _{GD}			5.2		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =50V, V _{GS} =10V, I _D =-16.0A,RG=6Ω(Note 1, 2)		6.6		ns
Rise Time		t _R			18		ns
Turn-OFF Delay Time		t _{D(OFF)}			38		ns
Fall-Time		t _F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				-16	A
Maximum Body-Diode Pulsed Current		I _{SM}	(Note 1)			-32	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =-16A, V _{GS} =0V (Note 2)			-2.6	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =-16A, V _{GS} =0V,		53		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		70		nC

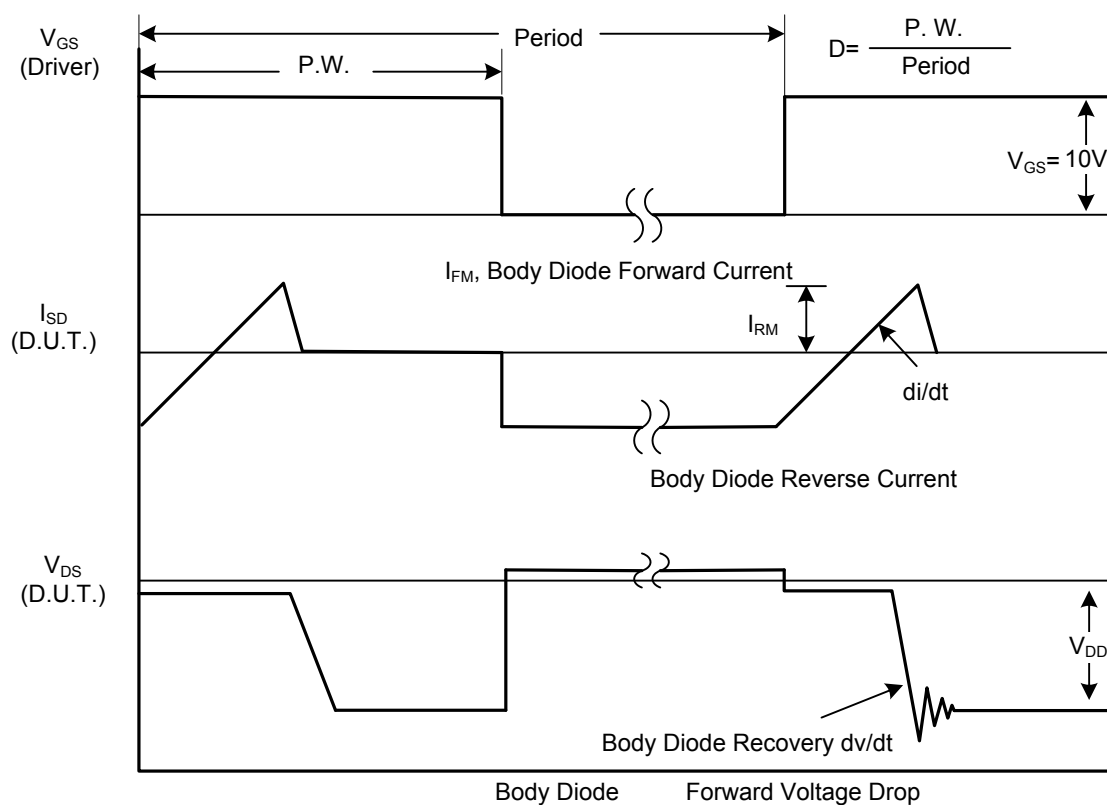
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

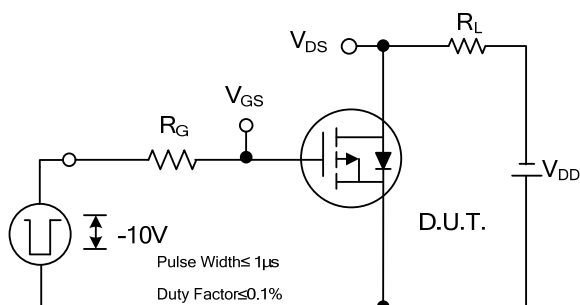


Peak Diode Recovery dv/dt Test Circuit

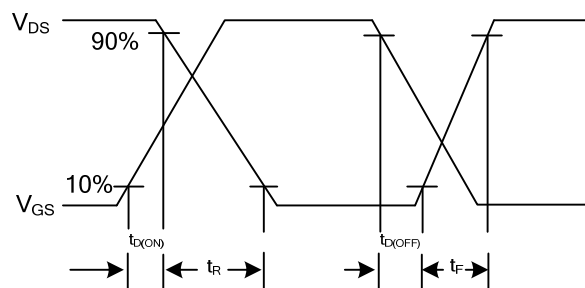


Peak Diode Recovery dv/dt Waveforms

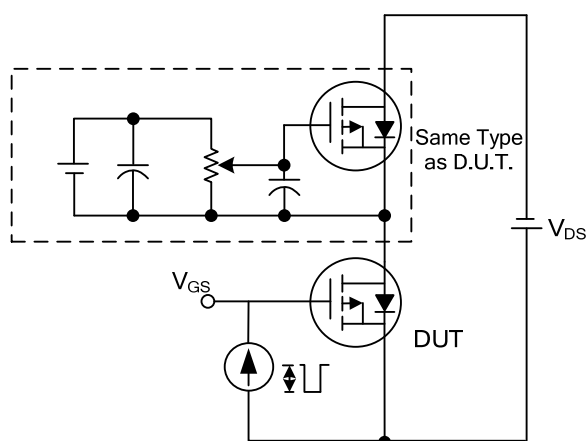
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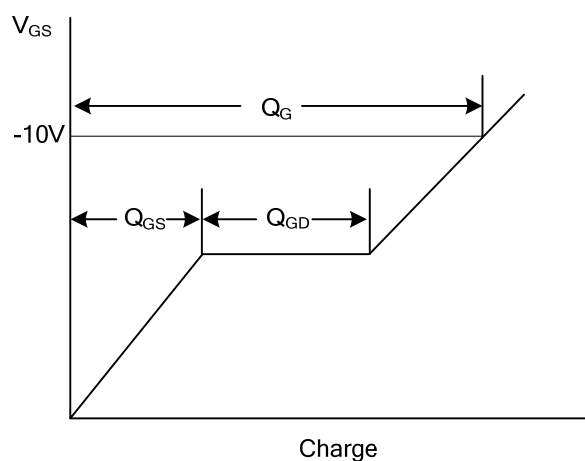
Switching Test Circuit



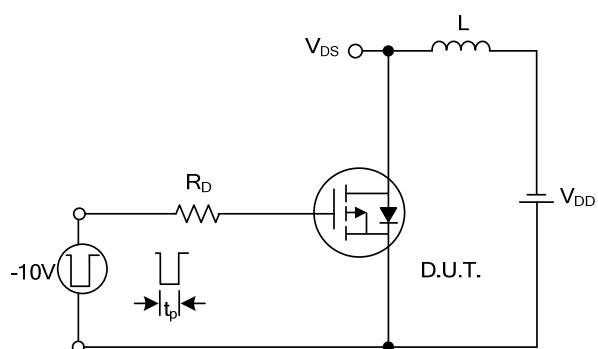
Switching Waveforms



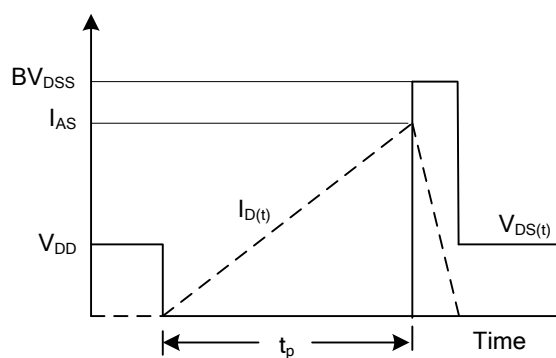
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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