



UTT15P10

Preliminary

Power MOSFET

**-15A, -100V P-CHANNEL
POWER MOSFET**

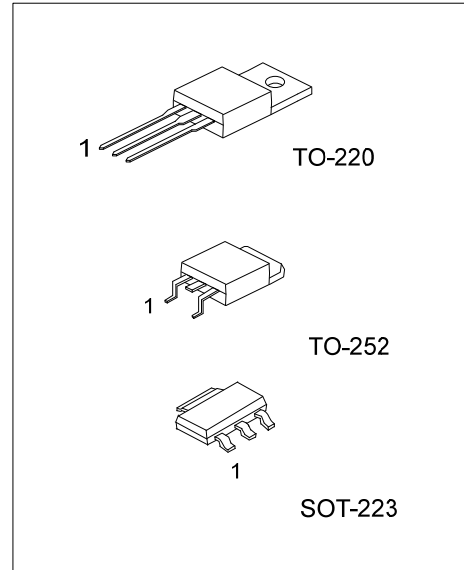
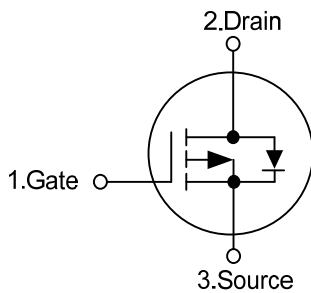
■ DESCRIPTION

The UTC **UTT15P10** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and minimum on-state resistance. It can also withstand high energy in the avalanche.

■ FEATURES

- * $R_{DS(ON)} \leq 260 \text{ m}\Omega @ V_{GS} = -10V, I_D = -7.5A$
- $R_{DS(ON)} \leq 400 \text{ m}\Omega @ V_{GS} = -4.5V, I_D = -7.5A$
- * High Switching Speed

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT15P10L-AA3-R	UTT15P10G-AA3-R	SOT-223	G	D	S	Tape Reel
UTT15P10L-TA3-T	UTT15P10G-TA3-T	TO-220	G	D	S	Tube
UTT15P10L-TN3-R	UTT15P10G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UTT15P10G-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) AA3: SOT-223, TA3: TO-220, TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

SOT-223	TO-220 / TO-252

■ 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}	± 25	V
Drain Current	Continuous	I_D	-15	A
	Pulsed	I_{DM}	-60	A
Avalanche Energy (Note 3)		E_{AS}	45	mJ
Power Dissipation	SOT-223	P_D	2	W
	TO-220		90	W
	TO-252		44.5	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. $L=0.4\text{mH}$, $I_{AS}=-15\text{A}$, $V_{DD}=-50\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$
 4. $I_{SD}\leq -15\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140	$^\circ\text{C}/\text{W}$
	TO-220		62.5	$^\circ\text{C}/\text{W}$
	TO-252		110	$^\circ\text{C}/\text{W}$
Junction to Case	SOT-223	θ_{JC}	62.5 (Note.)	$^\circ\text{C}/\text{W}$
	TO-220		1.38	$^\circ\text{C}/\text{W}$
	TO-252		2.8 (Note.)	$^\circ\text{C}/\text{W}$

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

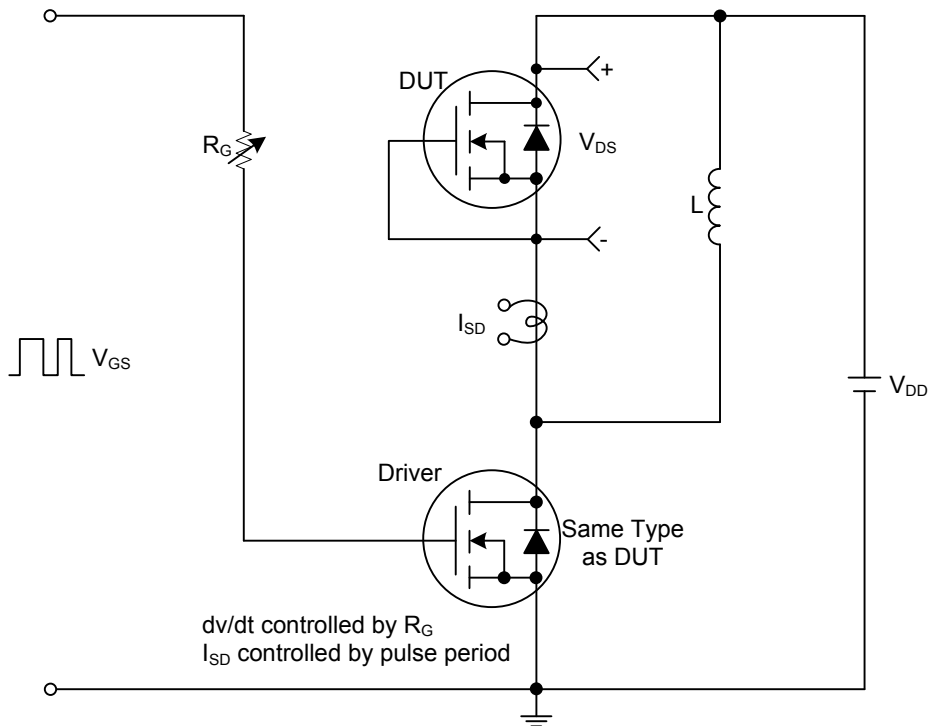
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

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	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+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		-3.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$, $I_D=-7.5\text{A}$			260	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}$, $I_D=-7.5\text{A}$			400	$\text{m}\Omega$
DYNAMIC PARAMETERS (Note 2)						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=-25\text{V}$, $f=1.0\text{MHz}$		1200		pF
Output Capacitance	C_{OSS}			64		pF
Reverse Transfer Capacitance	C_{RSS}			56		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=-50\text{V}$, $I_D=-1.3\text{A}$, $V_{GS}=-10\text{V}$, $I_G=-100\mu\text{A}$		85		nC
Gate to Source Charge	Q_{GS}			4		nC
Gate to Drain Charge	Q_{GD}			8.8		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=-30\text{V}$, $I_D=-0.5\text{A}$, $R_G=25\Omega$, $V_{GS}=0\text{V}$		10		ns
Rise Time	t_R			46		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			364		ns
Fall-Time	t_F			180		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				-15	A
Maximum Body-Diode Pulsed Current	I_{SM}				-60	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_F=-15\text{A}$, $V_{GS}=0\text{V}$			-3.0	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	$I_S=-50\text{A}$, $V_{GS}=0\text{V}$,		280		nS
Body Diode Reverse Recovery Charge	Q_{rr}	$dI_F/dt=100\text{A}/\mu\text{s}$		1385		nC

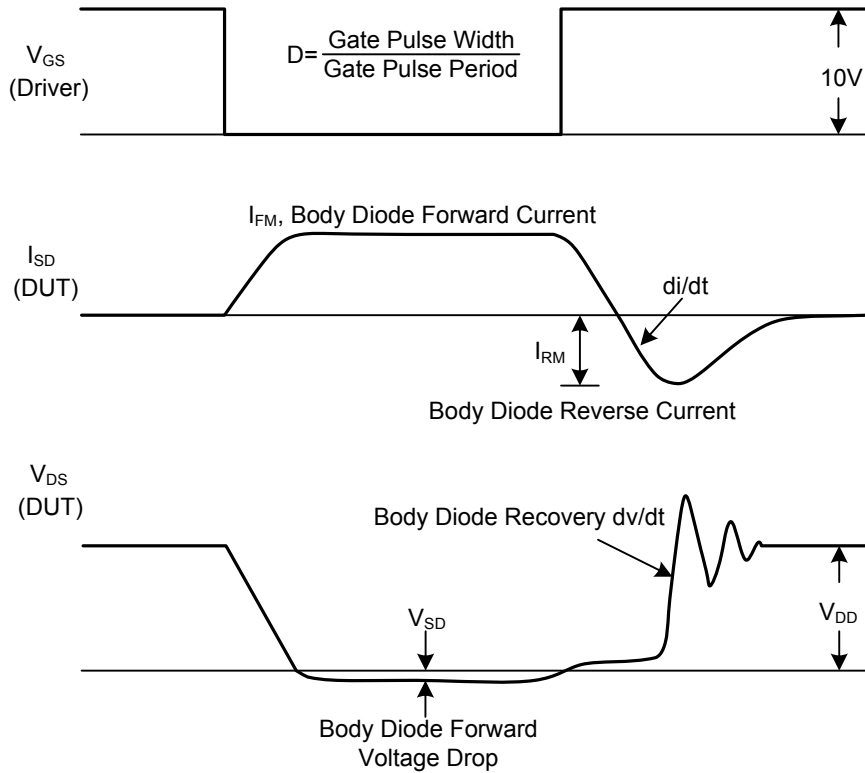
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



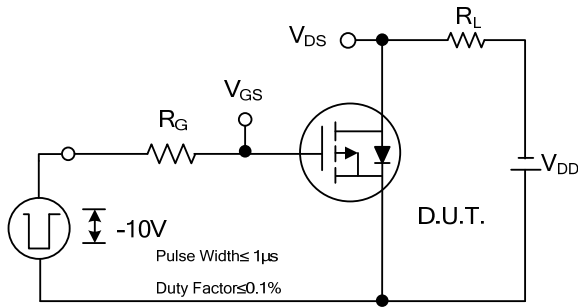
Peak Diode Recovery dv/dt Test Circuit



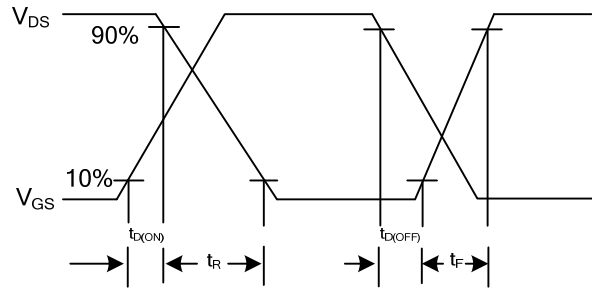
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

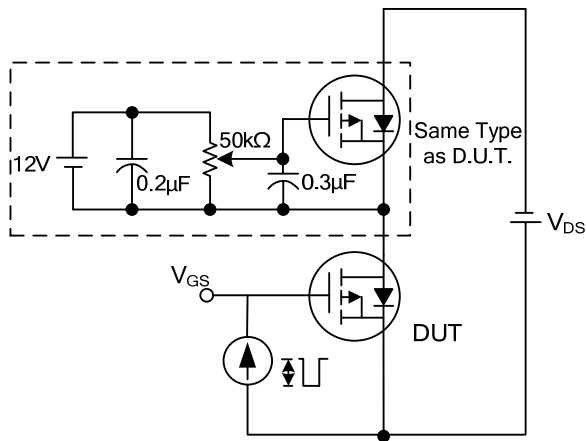
TEST CIRCUITS AND WAVEFORMS



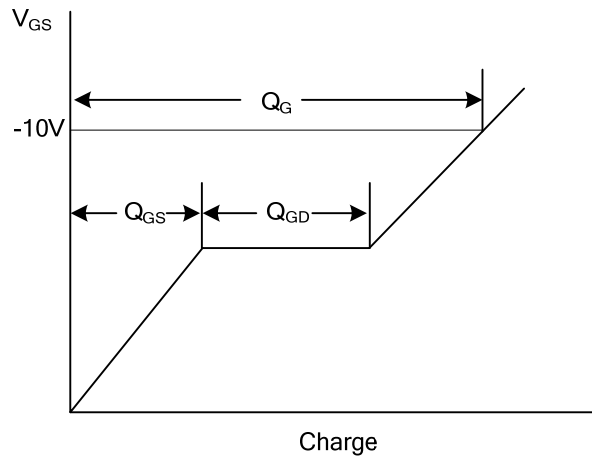
Switching Test Circuit



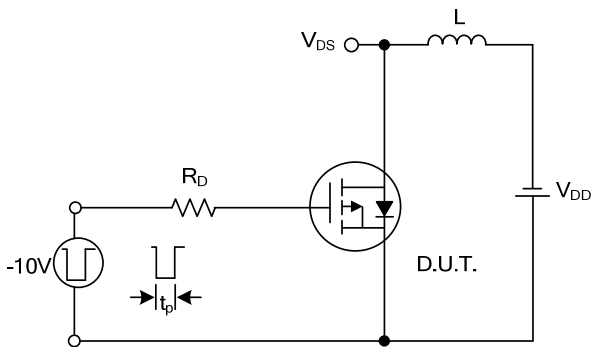
Switching Waveforms



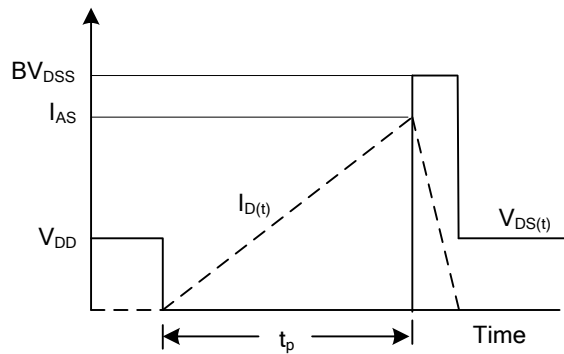
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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