



## UTT5N15

Preliminary

POWER MOSFET

## 5A, 150V N-CHANNEL POWER MOSFET

### DESCRIPTION

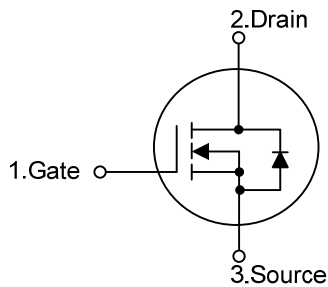
The UTC **UTT5N15** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

The UTC **UTT5N15** is suitable for high voltage synchronous rectifier and AC/DC converters, etc.

### FEATURES

- \*  $R_{DS(ON)} \leq 0.3 \Omega$  @  $V_{GS}=10V$ ,  $I_D=2.5A$
- \* High Switching Speed
- \* High Cell Density Trench Technology

### SYMBOL



### ORDERING INFORMATION

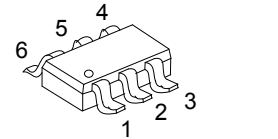
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT5N15L-AG6-R	UTT5N15G-AG6-R	SOT-26	G	D	S	Tape Reel
UTT5N15L-TN3-R	UTT5N15G-TN3-R	TO-252	G	D	S	Tape Reel

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

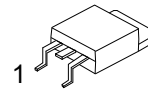
<p>UTT5N15G-TN3-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING

SOT-26	TO-252
<p>L: Lead Free G: Halogen Free</p>	<p>L: Lead Free G: Halogen Free Date Code</p>



SOT-26



TO-252

■ ABSOLUTE MAXIMUM RATING ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	150	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current ( $T_C = 25^\circ\text{C}$ )	Continuous	$I_D$	5	A
	Pulsed (Note 2)	$I_{DM}$	15	A
Avalanche Energy (Note 3)	Single Pulsed (Note 3)	$E_{AS}$	1.6	mJ
Peak Diode Recovery $dv/dt$ (Note 4)		$dv/dt$	3.9	V/nS
Power Dissipation	SOT-26	$P_D$	1.3	W
	TO-252		42	W
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-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.  $L = 0.1\text{mH}$ ,  $I_{AS} = 5.6\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 5.0\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ ,  $T_J \leq 25^\circ\text{C}$

■ THERMAL DATA (NOTE)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-26	$\theta_{JA}$	240	$^\circ\text{C}/\text{W}$
	TO-252		110	$^\circ\text{C}/\text{W}$
Junction to Case	SOT-26	$\theta_{JC}$	96	$^\circ\text{C}/\text{W}$
	TO-252		2.9	$^\circ\text{C}/\text{W}$

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

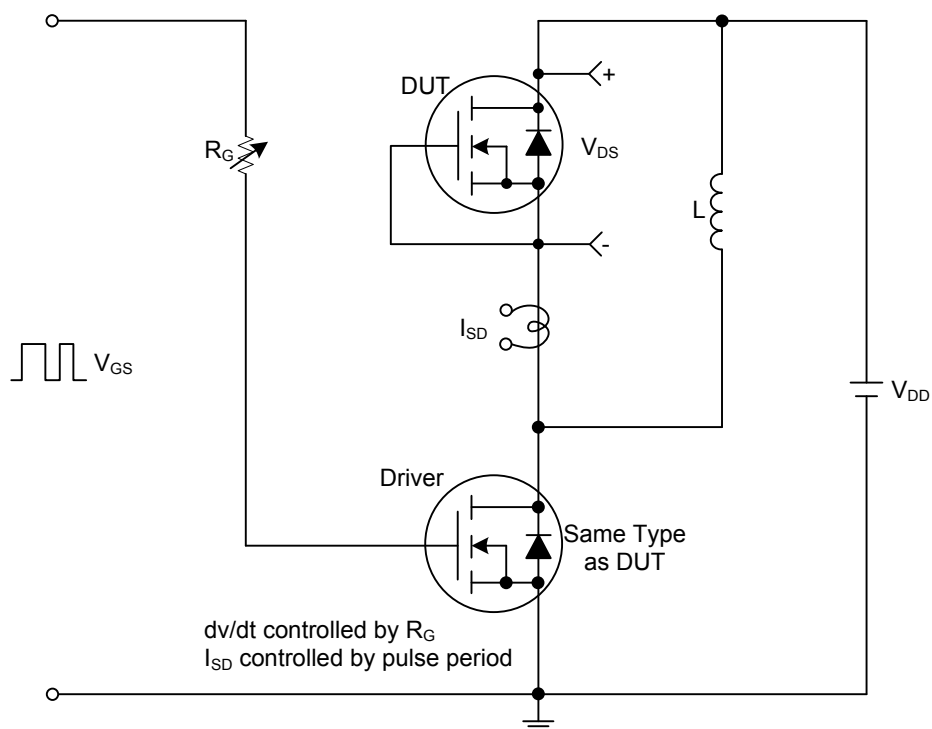
■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	150			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =150V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V			+100	nA
	Reverse		V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A			0.3	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		558.1		pF
Output Capacitance		C <sub>OSS</sub>			44.8		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			25.4		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q <sub>G</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A, I <sub>G</sub> =1mA (Note 1, 2)		19.7		nC
Gate to Source Charge		Q <sub>GS</sub>			5.1		nC
Gate to Drain Charge		Q <sub>GD</sub>			4.4		nC
Turn-on Delay Time (Note 1)		t <sub>D(ON)</sub>	V <sub>DD</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A, R <sub>G</sub> =6.0Ω (Note 1, 2)		4.9		ns
Rise Time		t <sub>R</sub>			17		ns
Turn-off Delay Time		t <sub>D(OFF)</sub>			15		ns
Fall-Time		t <sub>F</sub>			17.3		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I <sub>S</sub>				5	A
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>				15	A
Drain-Source Diode Forward Voltage (Note 1)		V <sub>SD</sub>	I <sub>S</sub> =5A, V <sub>GS</sub> =0V			1.4	V
Reverse Recovery Time (Note 1)		t <sub>rr</sub>	I <sub>S</sub> =5A, V <sub>GS</sub> =0V,		57.9		nS
Reverse Recovery Charge		Q <sub>rr</sub>	dI/dt=100A/μs		248.5		nC

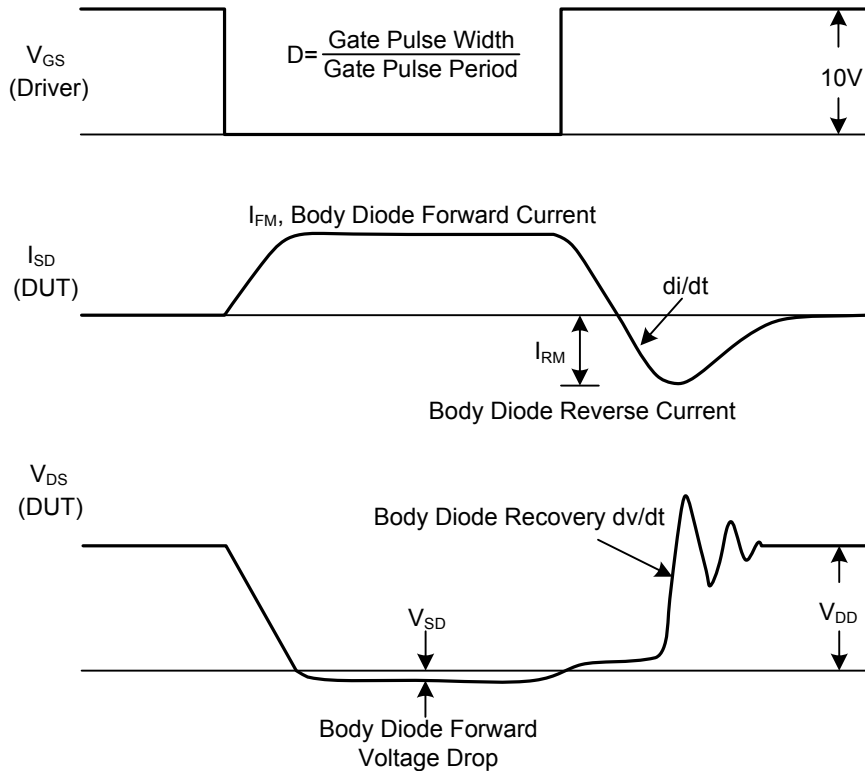
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

### ■ TEST CIRCUITS AND WAVEFORMS



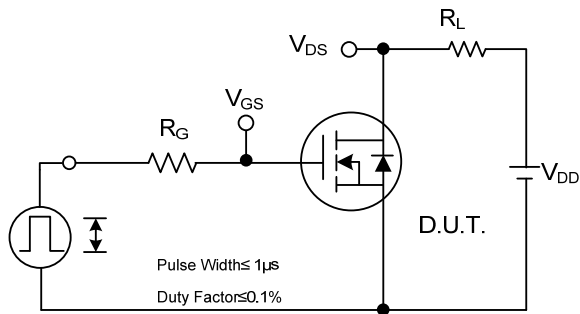
**Peak Diode Recovery dv/dt Test Circuit**



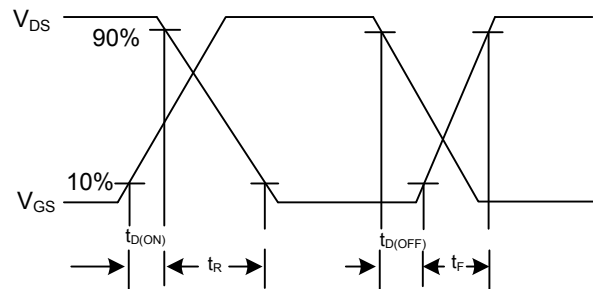
**Peak Diode Recovery dv/dt Test Circuit and Waveforms**

**Peak Diode Recovery dv/dt Waveforms**

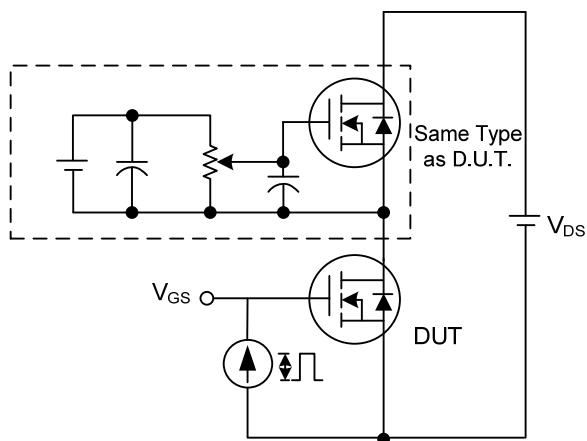
### ■ TEST CIRCUITS AND WAVEFORMS



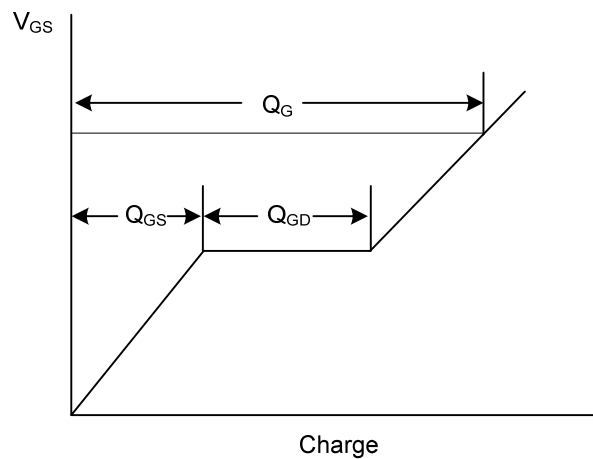
**Switching Test Circuit**



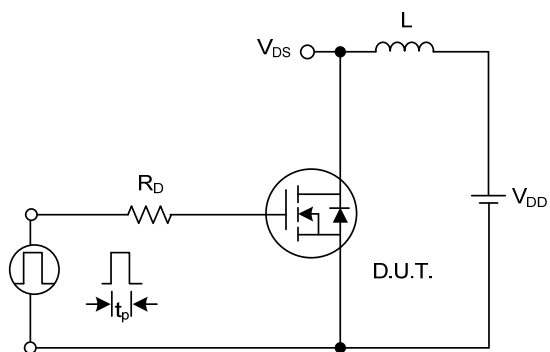
**Switching Waveforms**



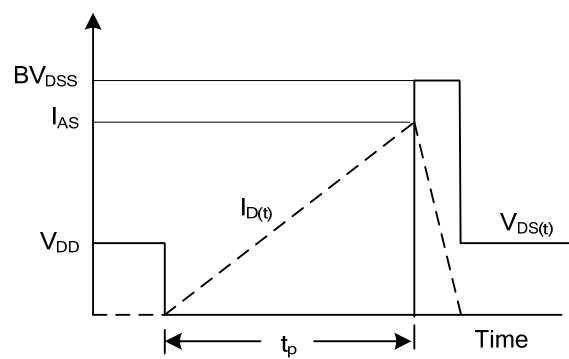
**Gate Charge Test Circuit**



**Gate Charge Waveform**



**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

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