



UT70N15

Preliminary

POWER MOSFET

70A, 150V N-CHANNEL POWER MOSFET

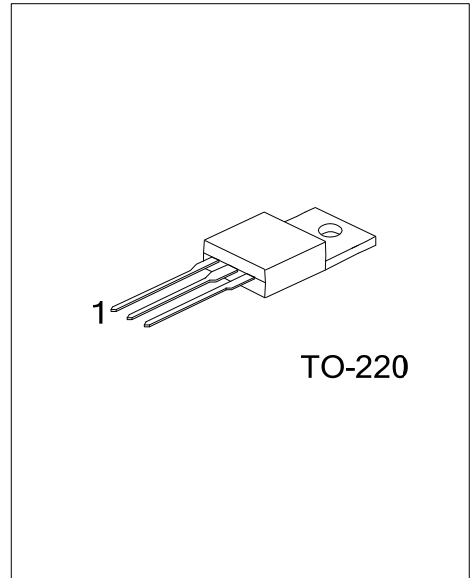
DESCRIPTION

The UTC **UT70N15** 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.

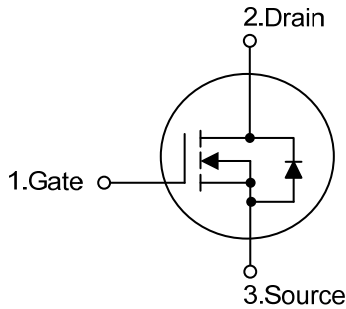
The UTC **UT70N15** is suitable for high voltage synchronous rectifier and DC/DC converters, etc.

FEATURES

- * $R_{DS(ON)} \leq 26 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=35\text{A}$
- * High Switching Speed
- * High Cell Density Trench Technology



SYMBOL



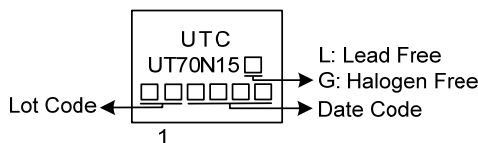
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT70N15L-TA3-T	UT70N15G-TA3-T	TO-220	G	D	S	Tube

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

<p>UT70N15G-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube (2) TA3: TO-220 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	150	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	70	A
	Pulsed (Note 2)	I_{DM}	140	A
Avalanche Energy (Note 3)	Single Pulsed (Note 3)	E_{AS}	231	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	23	V/ns
Power Dissipation		P_D	180	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-70 ~ +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. $L=0.1\text{mH}$, $I_{AS}=68\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, 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 (Note)	θ_{JC}	0.69	$^\circ\text{C}/\text{W}$

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

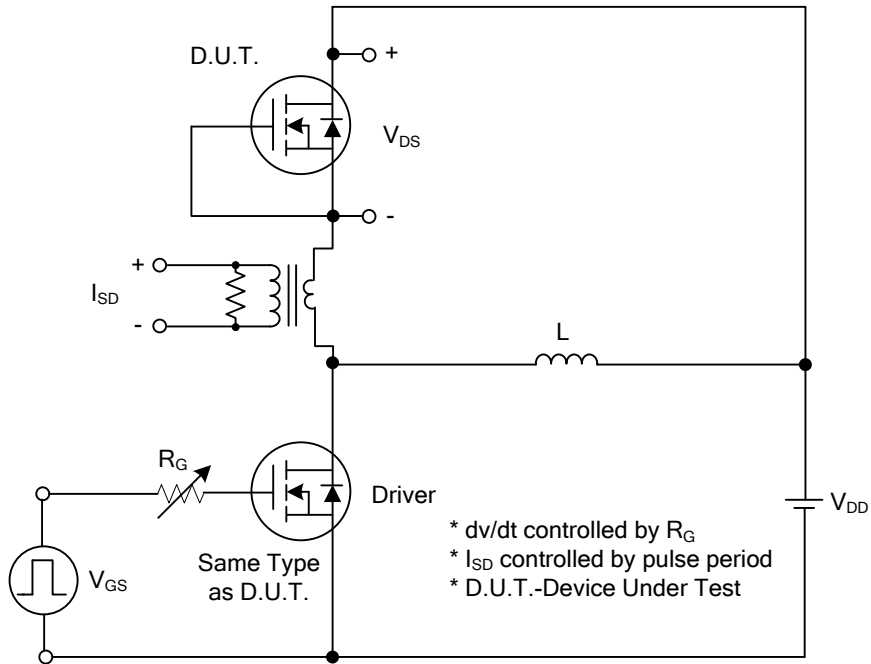
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	150			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=150\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	I_{GSS}	Forward			+100	nA
		Reverse			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	4.0		6.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=35\text{A}$			26	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		5450		pF
Output Capacitance	C_{OSS}			430		pF
Reverse Transfer Capacitance	C_{RSS}			264		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=120\text{V}$, $V_{GS}=10\text{V}$, $I_D=70\text{A}$ (Note 1, 2)		130		nC
Gate to Source Charge	Q_{GS}			56		nC
Gate to Drain Charge	Q_{GD}			64		nC
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=100\text{V}$, $V_{GS}=10\text{V}$, $I_D=70\text{A}$, $R_G=3\Omega$ (Note 1, 2)		32		ns
Rise Time	t_R			28		ns
Turn-off Delay Time	$t_{D(OFF)}$			38		ns
Fall-Time	t_F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				70	A
Maximum Body-Diode Pulsed Current	I_{SM}				140	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=70\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=30\text{A}$, $V_{GS}=0\text{V}$,		130		ns
Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$ (Note 1)		640		nC

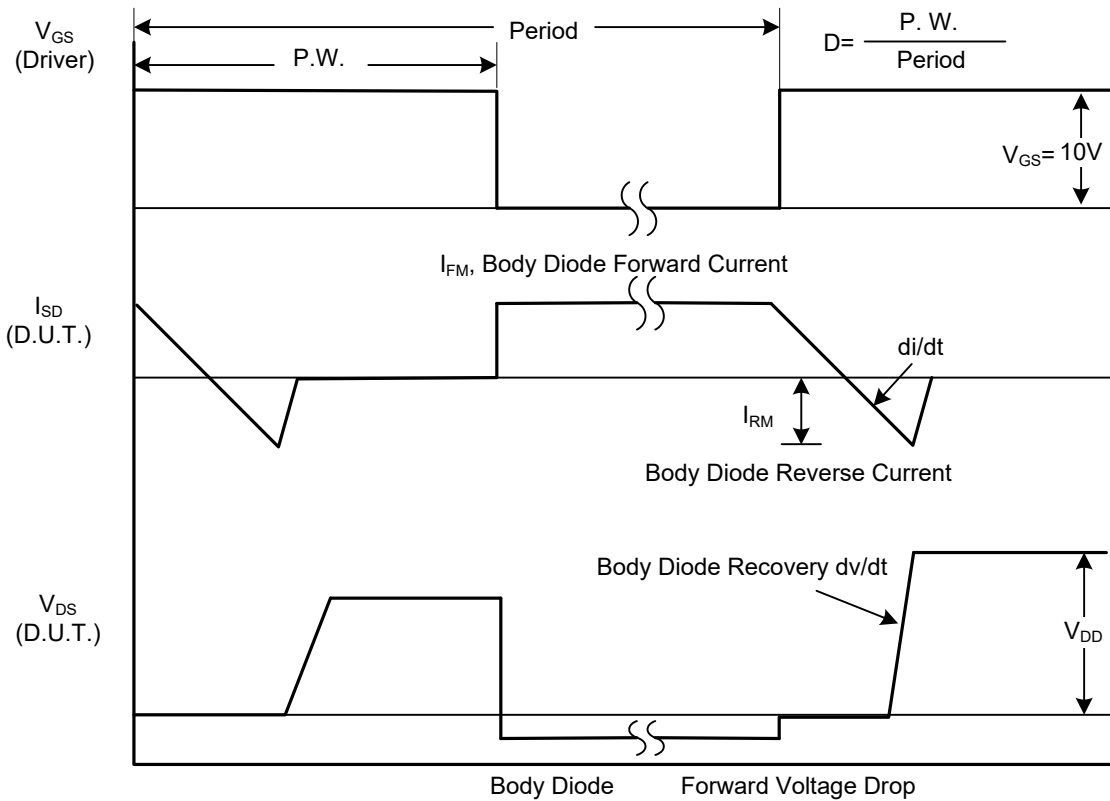
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

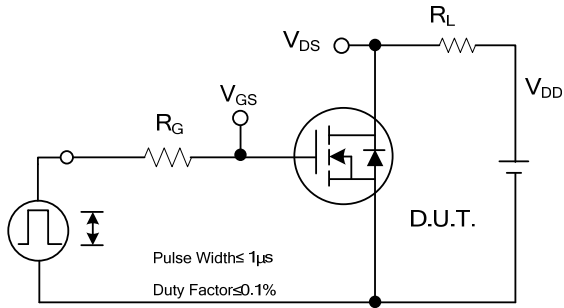


Peak Diode Recovery dv/dt Test Circuit

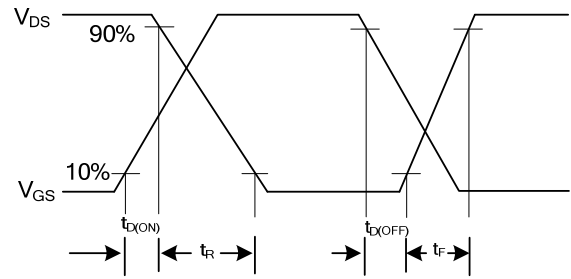


Peak Diode Recovery dv/dt Waveforms

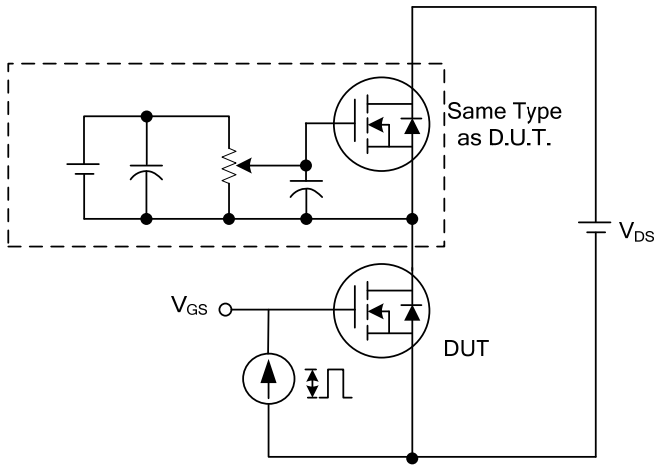
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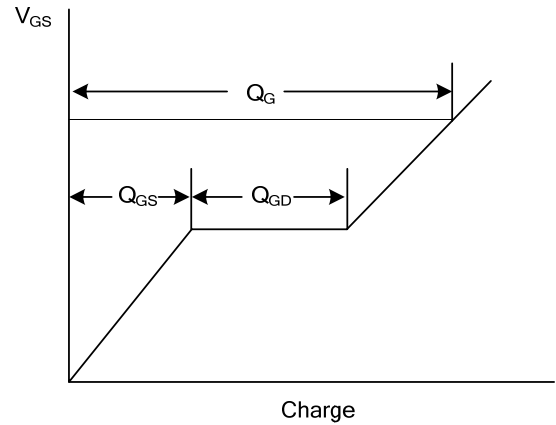
Switching Test Circuit



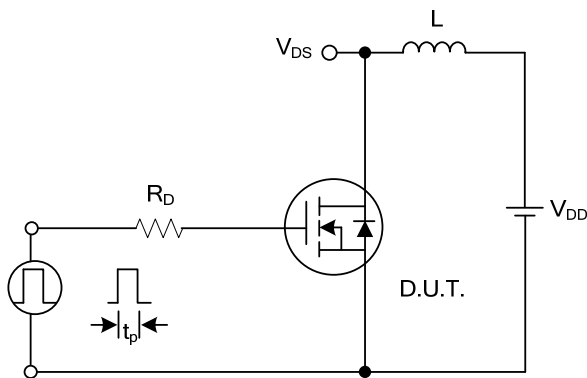
Switching Waveforms



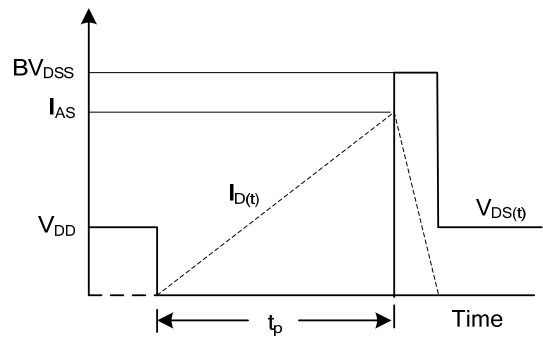
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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