



UT70N15

Preliminary

POWER MOSFET

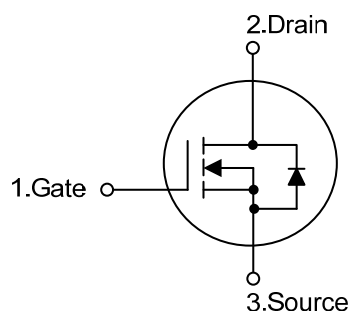
**70A, 150V N-CHANNEL
POWER MOSFET****DESCRIPTION**

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

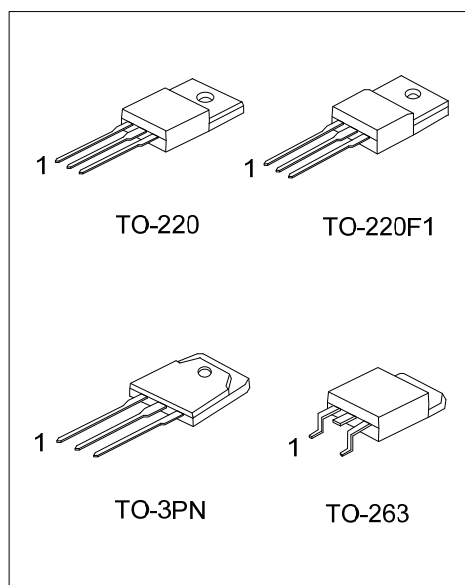
- * $R_{DS(ON)} \leq 26 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=35\text{A}$
- * High Switching Speed
- * High Cell Density Trench Technology

SYMBOL**ORDERING INFORMATION**

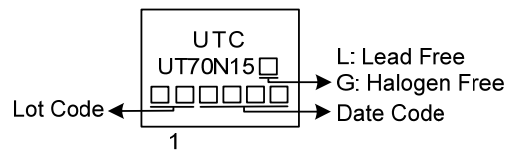
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT70N15L-TA3-T	UT70N15G-TA3-T	TO-220	G	D	S	Tube
UT70N15L-TF1-T	UT70N15G-TF1-T	TO-220F1	G	D	S	Tube
UT70N15L-TQ2-T	UT70N15G-TQ2-T	TO-263	G	D	S	Tube
UT70N15L-TQ2-R	UT70N15G-TQ2-R	TO-263	G	D	S	Tape Reel
UT70N15L-T3N-T	UT70N15G-T3N-T	TO-3PN	G	D	S	Tube

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

	(1) T: Tube, R: Tape Reel
	(2) TA3: TO-220, TF1: TO-220F1, TQ2: TO-263
	(3) G: Halogen Free and Lead Free, L: Lead Free



■ 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	TO-220/TO-263	P_D	180	W
	TO-220F1		40	W
	TO-3PN		250	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	TO-220/TO-263	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1			$^\circ\text{C}/\text{W}$
	TO-3PN		40	$^\circ\text{C}/\text{W}$
Junction to Case (Note)	TO-220/TO-263	θ_{JC}	0.69	$^\circ\text{C}/\text{W}$
	TO-220F1		3.125	$^\circ\text{C}/\text{W}$
	TO-3PN		0.5	$^\circ\text{C}/\text{W}$

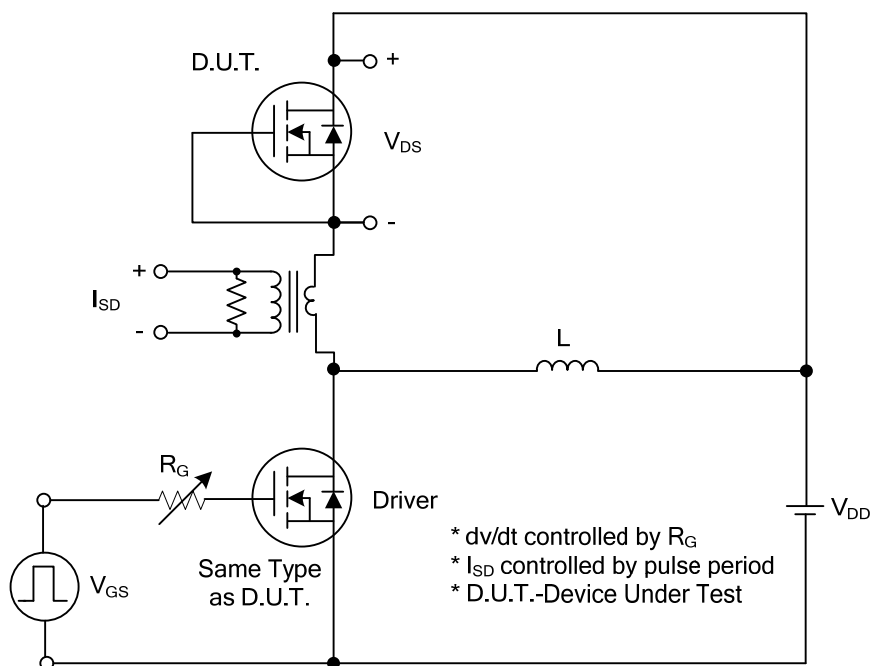
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	150			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =150V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	4.0		6.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =35A			26	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		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} =120V, V _{GS} =10V, I _D =70A (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} =100V, V _{GS} =10V, I _D =70A, R _G =3Ω (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 =70A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =30A, V _{GS} =0V,		130		ns
Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs (Note 1)		640		nC

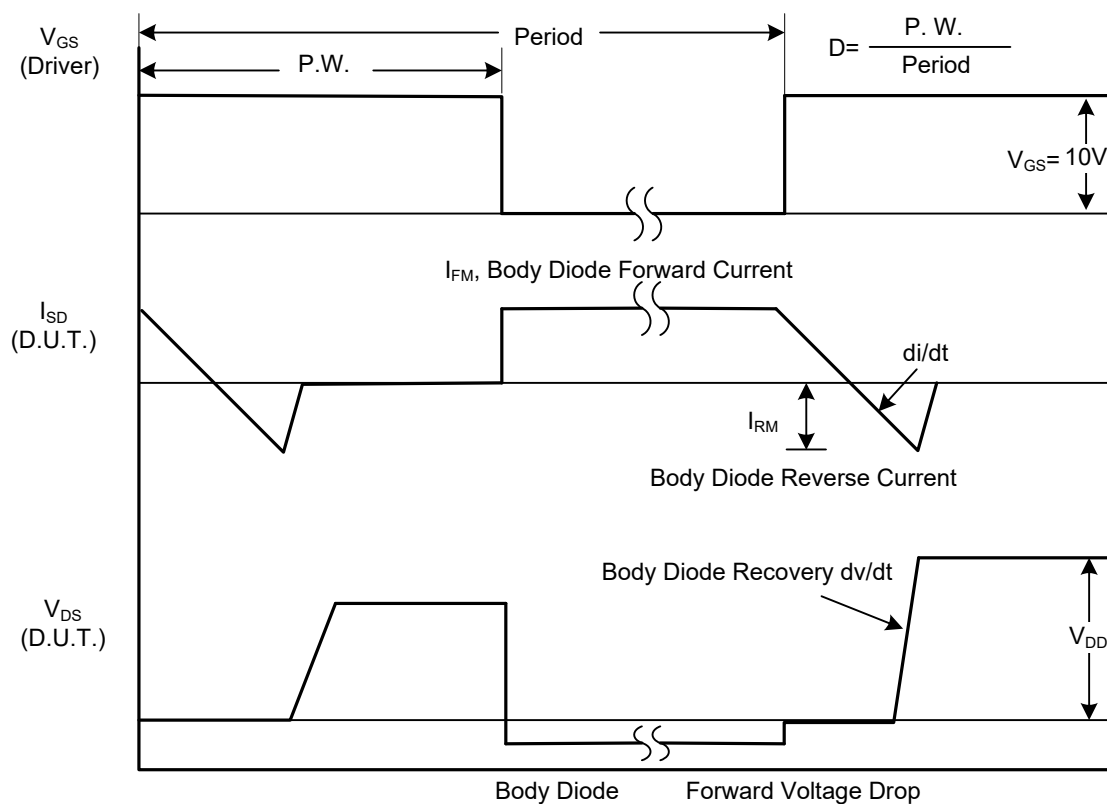
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

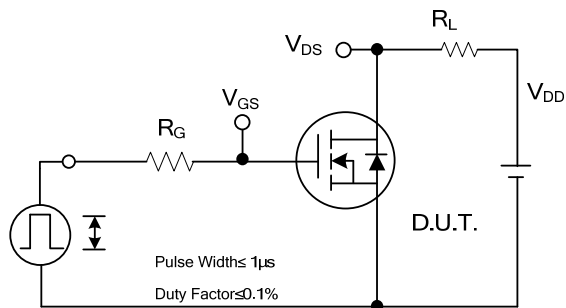


Peak Diode Recovery dv/dt Test Circuit

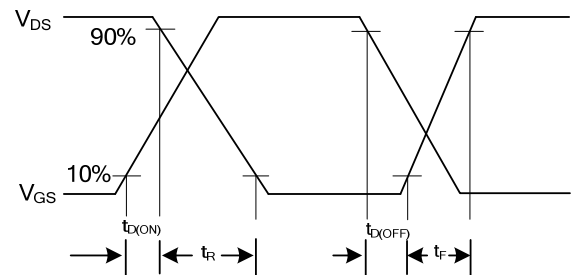


Peak Diode Recovery dv/dt Waveforms

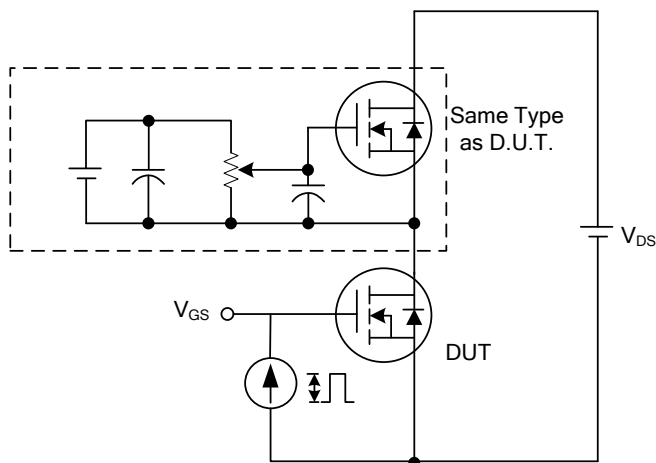
■ TEST CIRCUITS AND WAVEFORMS



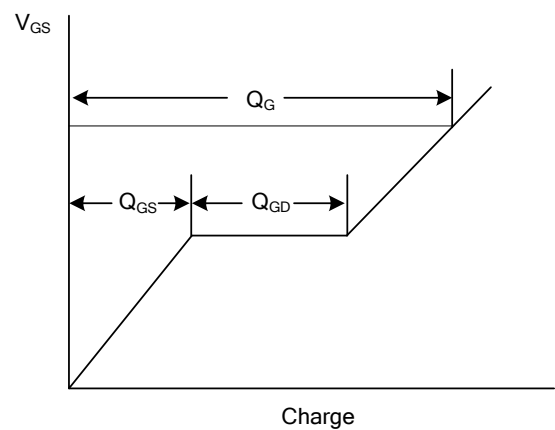
Switching Test Circuit



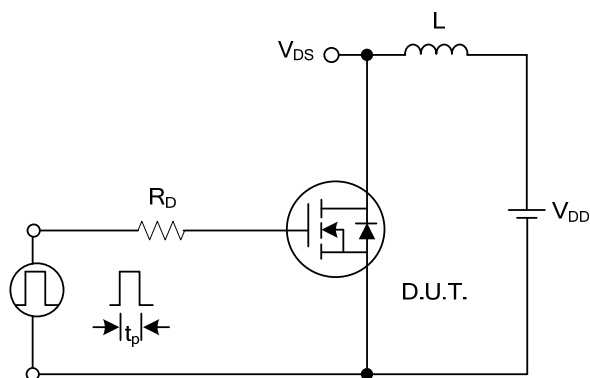
Switching Waveforms



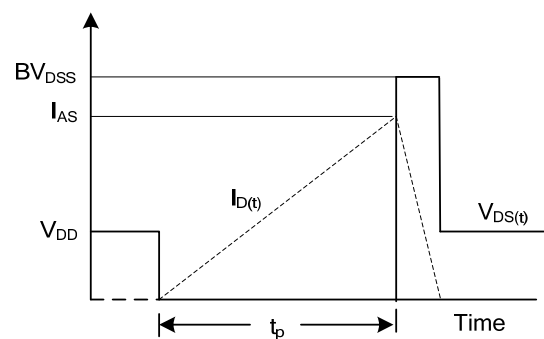
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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