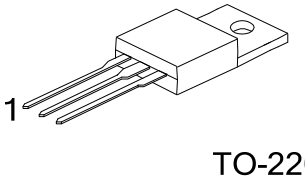
70A, 150V N-CHANNEL POWER MOSFET



TO-220

■ DESCRIPTION

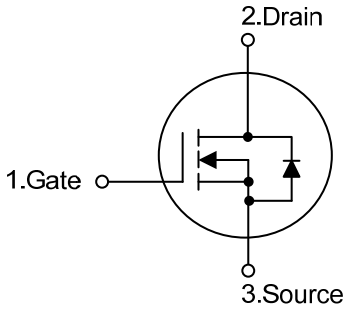
The UTC **UT70N15** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

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

■ FEATURES

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

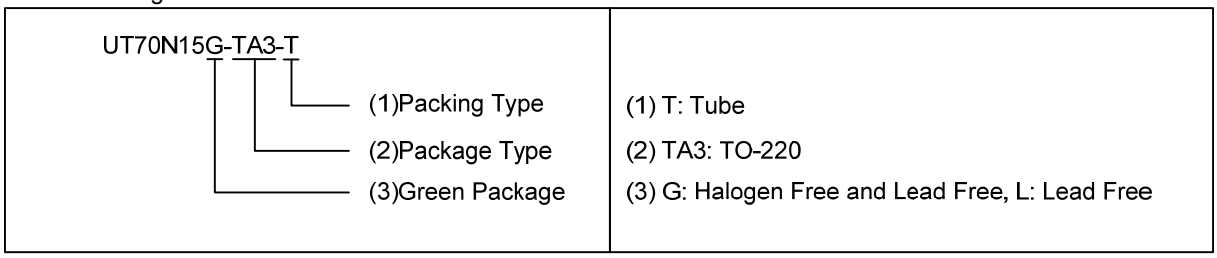
■ SYMBOL



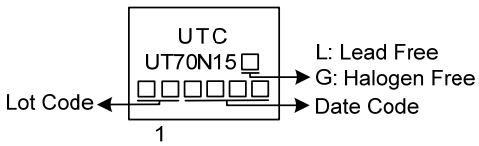
■ ORDERING INFORMATION

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



■ MARKING



■ ABSOLUTE MAXIMUM RATING (T_C=25°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	°C
Storage Temperature Range		T_{STG}	-70 ~ +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 maximum junction temperature
3. L=0.1mH, I_{AS}=68A, V_{DD}=50V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case (Note)	θ_{JC}	0.69	°C/W

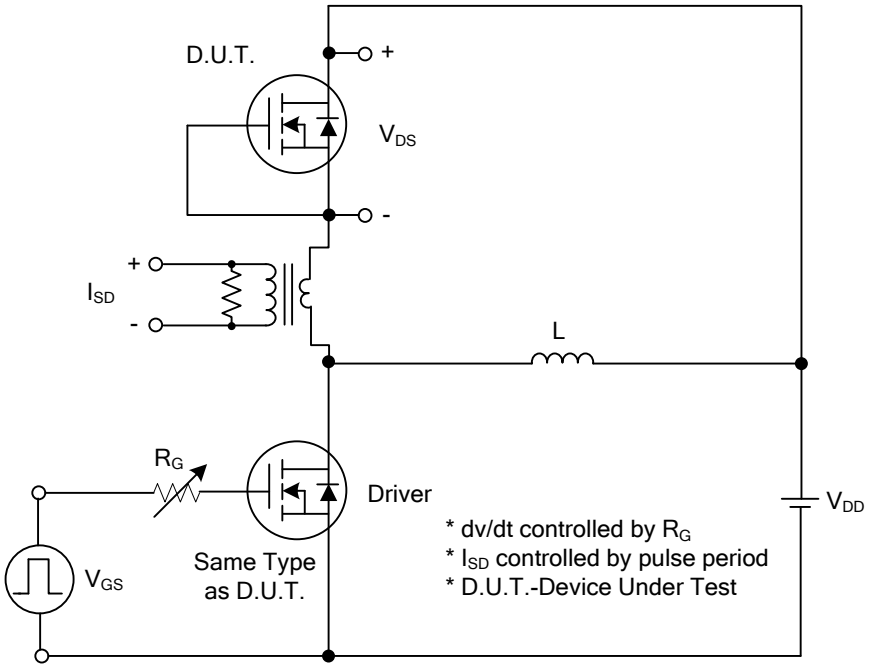
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

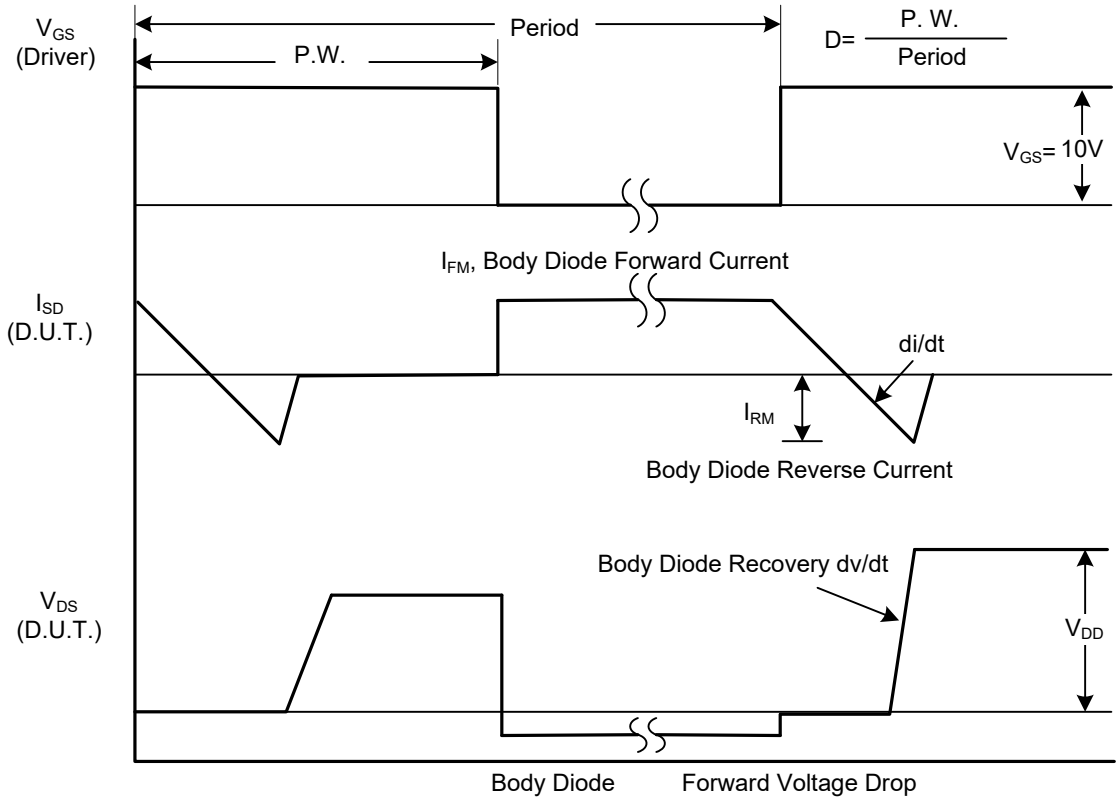
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	150			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=150V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		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, dI_F/dt=100A/μs (Note 1)		130		ns
Reverse Recovery Charge		Q_{rr}			640		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2 %.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

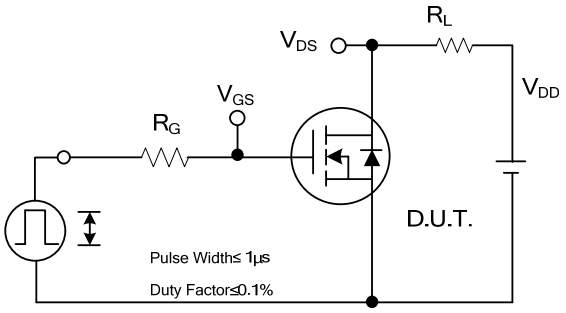


Peak Diode Recovery dv/dt Test Circuit

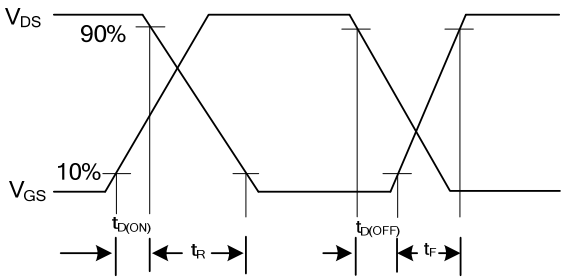


Peak Diode Recovery dv/dt Waveforms

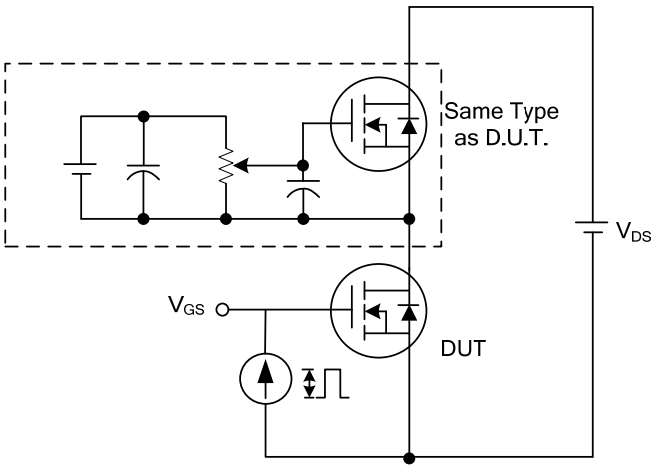
■ TEST CIRCUITS AND WAVEFORMS



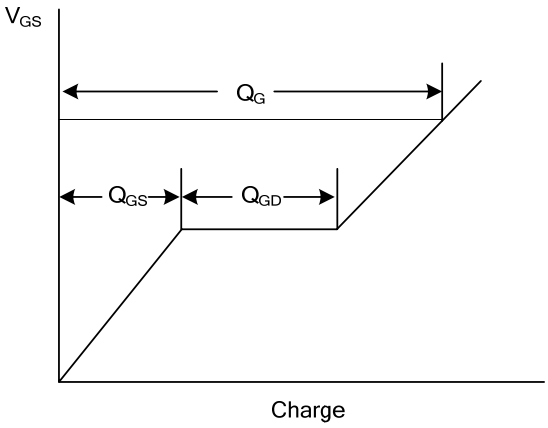
Switching Test Circuit



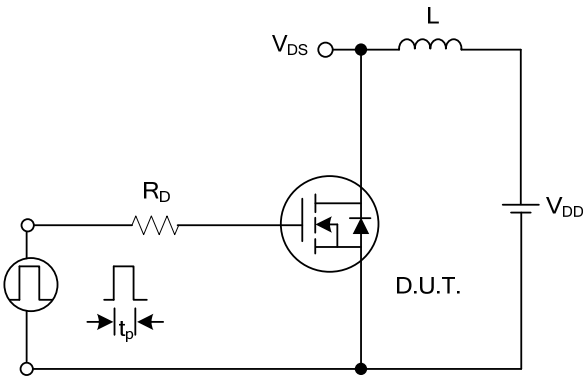
Switching Waveforms



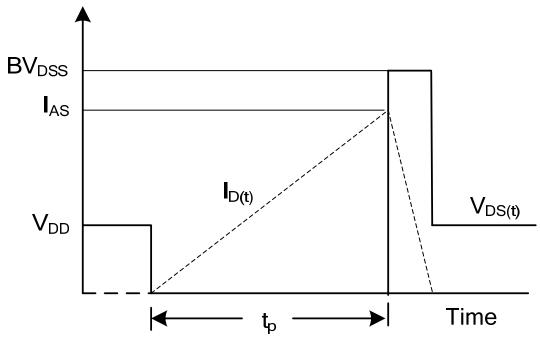
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms