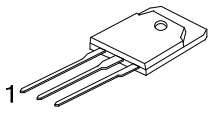
15A, 700V N-CHANNEL POWER MOSFET



TO-3P

■ DESCRIPTION

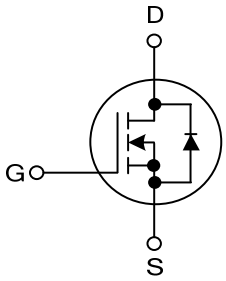
The UTC **15N70** is an N-Channel enhancement MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge. It can also withstand high energy pulse in the avalanche and commutation modes.

The UTC **15N70** is suitable for high efficiency switching DC/DC converter, motor control and switch mode power supply.

■ FEATURES

* $R_{DS(ON)}$=0.43Ω @V_{GS}=10V,I_D=7.5A
* Low gate charge (Typ=70nC)
* Low C_{RSS} (Typ=27pF)
* High switching speed

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
15N70L-T3P-T	15N70G-T3P-T	TO-3P	G	D	S	Tube

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

15N70L-T3P-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube (2) T3P: TO-3P (3) G: Halogen Free, L: Lead Free

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■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise noted)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	700	V
Gate-Source Voltage			V_{GSS}	±30	V
Drain Current	Continuous	T_C=25°C	I_D	15	A
		T_C=100°C		9.5	A
	Pulsed (Note 2)		I_{DM}	60	A
Avalanche Current (Note 2)			I_{AR}	15	A
Avalanche Energy	Single Pulsed (Note 3)		E_{AS}	950	mJ
	Repetitive (Note 2)		E_{AR}	30	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	4.5	V/ns
Power Dissipation (T_C=25°C)			P_D	300	W
Derate above 25°C				2.38	W/°C
Junction Temperature			T_J	-55~+150	°C
Storage Temperature Range			T_{STG}	-55~+150	°C
Maximum Lead Temperature for Soldering Purposes, 1/8" from Case for 5 Seconds			T_L	300	°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 max. junction temperature.
3. L=7.8mH, I_{AS}=15A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C,
4. I_{SD}≤15A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, T_J≤25°C.

■ THERMAL CHARACTERISTICS

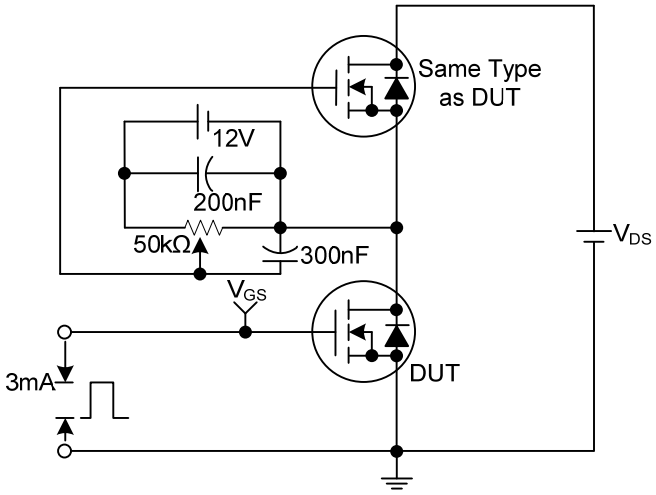
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	°C/W
Junction to Case	θ_{JC}	0.42	°C/W
Case to Sink	θ_{CS}	0.24	°C/W

■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

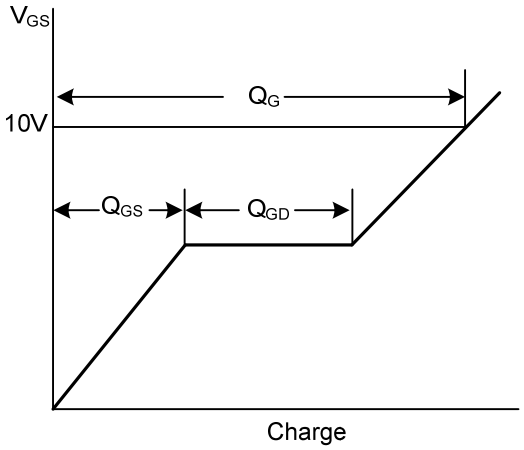
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	700			V
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=250μA		0.68		V/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=700V, V_{GS}=0V			10	μA
			V_{DS}=560V, T_C=125°C			100	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	3.0		5.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=7.5A		0.43	0.56	Ω
Forward Transconductance		g_{FS}	V_{DS}=50V, I_D=7.5A (Note 1)		15		S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		2790	3600	pF
Output Capacitance		C_{OSS}			300	390	pF
Reverse Transfer Capacitance		C_{RSS}			27	35	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{GS}=10V, V_{DS}=560V, I_D=15A (Note 1, 2)		70	90	nC
Gate to Source Charge		Q_{GS}			17		nC
Gate to Drain Charge		Q_{GD}			33		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=350V, I_D=15A, R_G=25Ω (Note 1, 2)		70	150	ns
Rise Time		t_R			180	370	ns
Turn-OFF Delay Time		$t_{D(OFF)}$			160	330	ns
Fall-Time		t_F			120	250	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		V_{SD}	I_S=15A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time		t_{RR}	I_S=15A, V_{GS}=0V, dI_F/dt=100A/μs (Note1)		460		ns
Body Diode Reverse Recovery Charge		Q_{RR}			5.7		μC

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

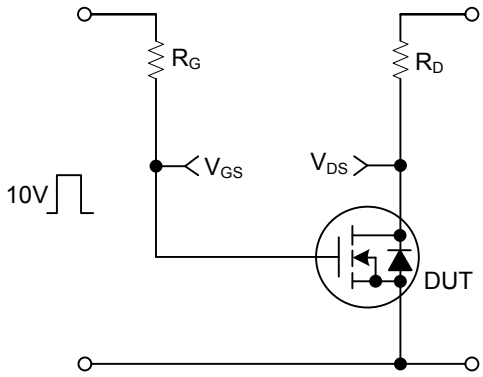
■ TEST CIRCUITS AND WAVEFORMS



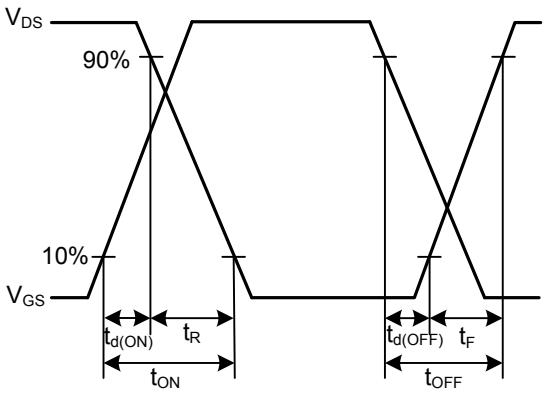
Gate Charge Test Circuit



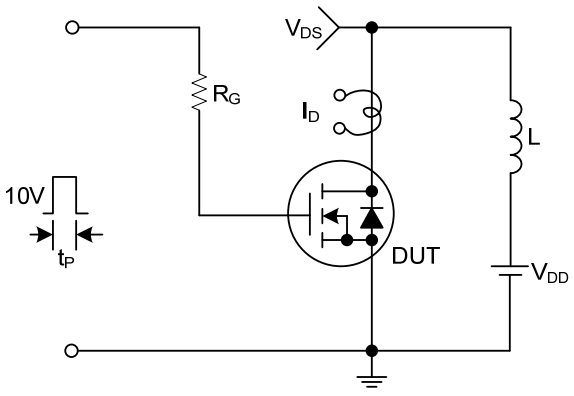
Gate Charge Waveforms



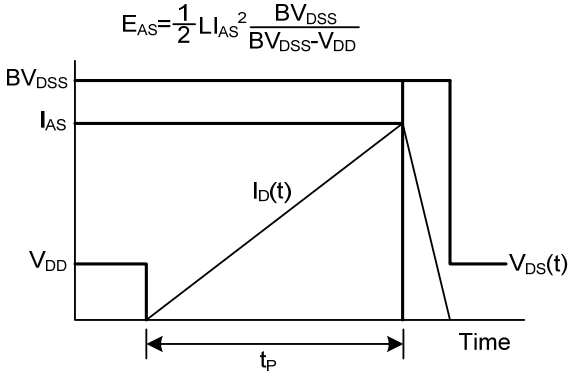
Resistive Switching Test Circuit



Resistive Switching Waveforms

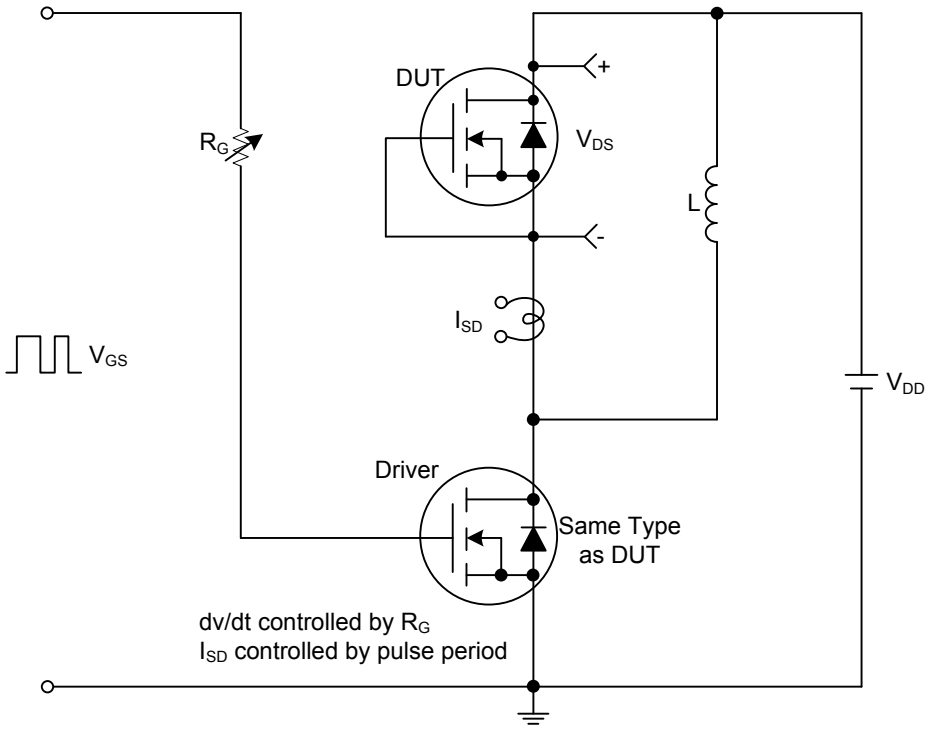


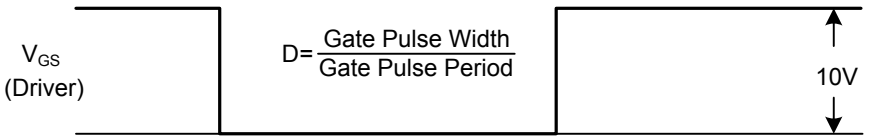
Unclamped Inductive Switching Test Circuit

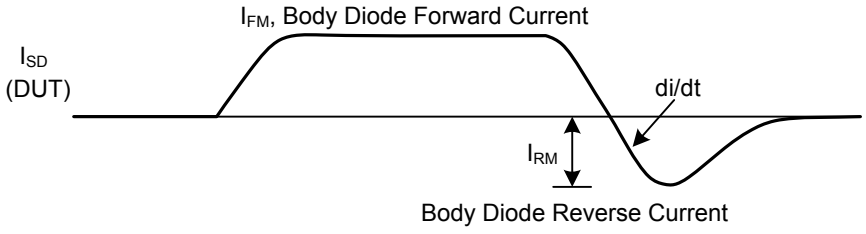


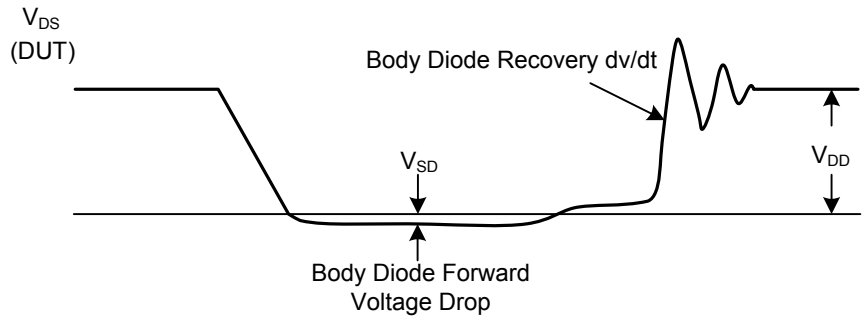
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS









Peak Diode Recovery dv/dt Test Circuit and Waveforms

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