



15N70

Preliminary

Power MOSFET

15A, 700V N-CHANNEL POWER MOSFET

DESCRIPTION

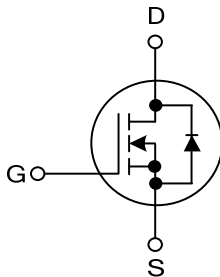
The UTC **15N70** is an N-Channel enhancement MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge. It can also withstand high energy pulse in the avalanche and commutation modes.

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

FEATURES

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

SYMBOL

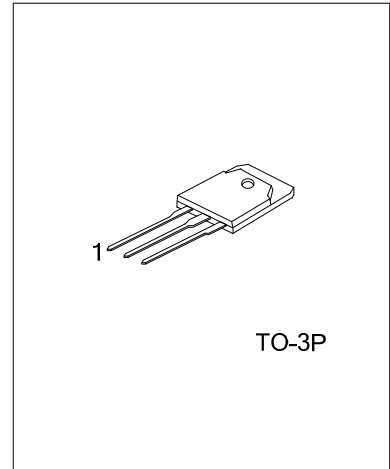


ORDERING INFORMATION

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



■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, 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. $L=7.8\text{mH}$, $I_{AS}=15\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$,

4. $I_{SD}\leq 15\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, $T_J\leq 25^\circ\text{C}$.

■ THERMAL CHARACTERISTICS

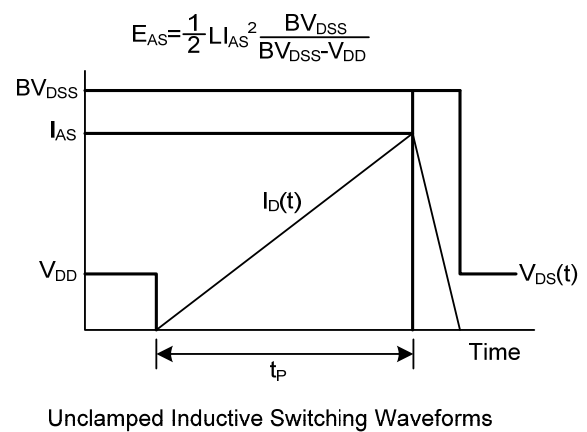
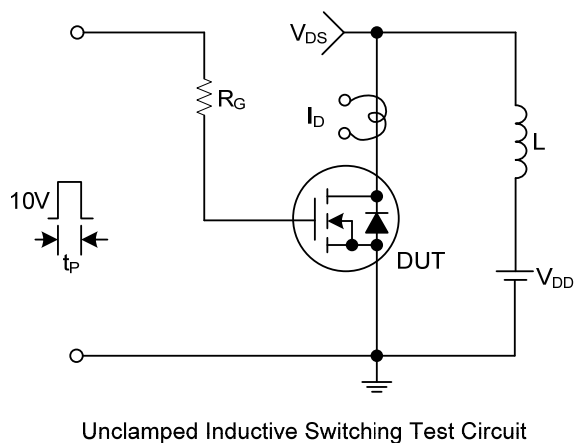
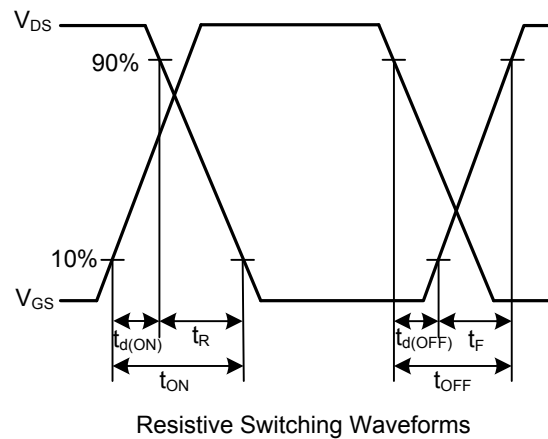
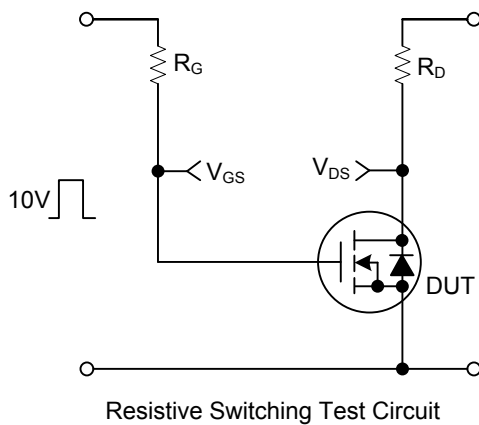
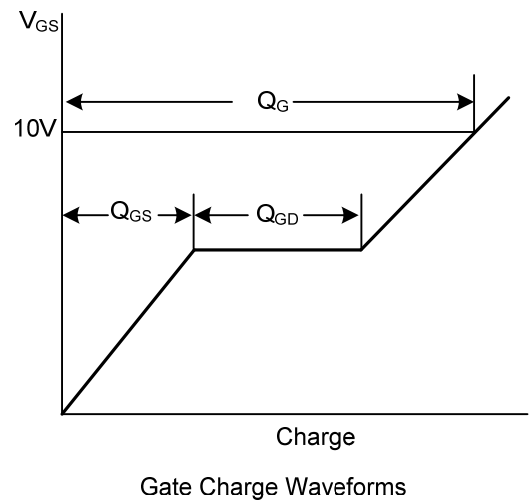
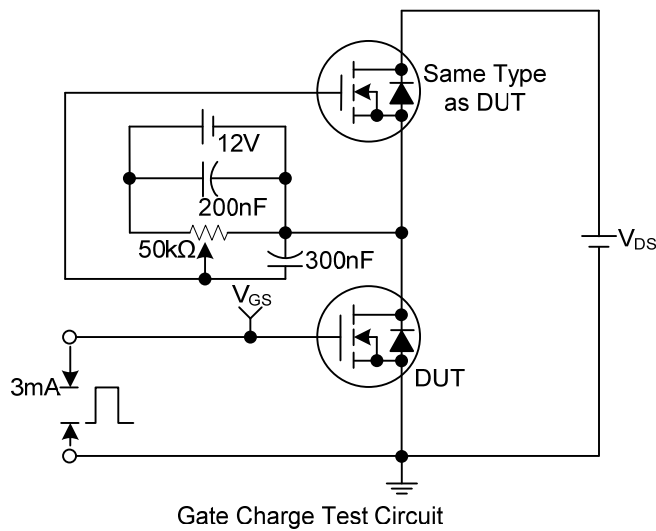
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.42	$^\circ\text{C}/\text{W}$
Case to Sink	θ_{CS}	0.24	$^\circ\text{C}/\text{W}$

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

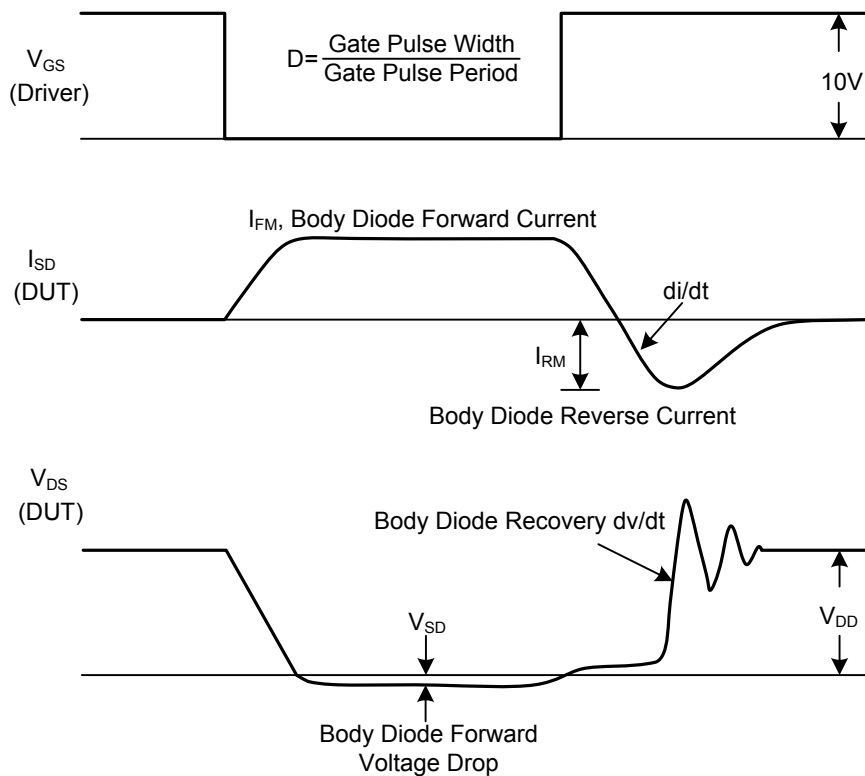
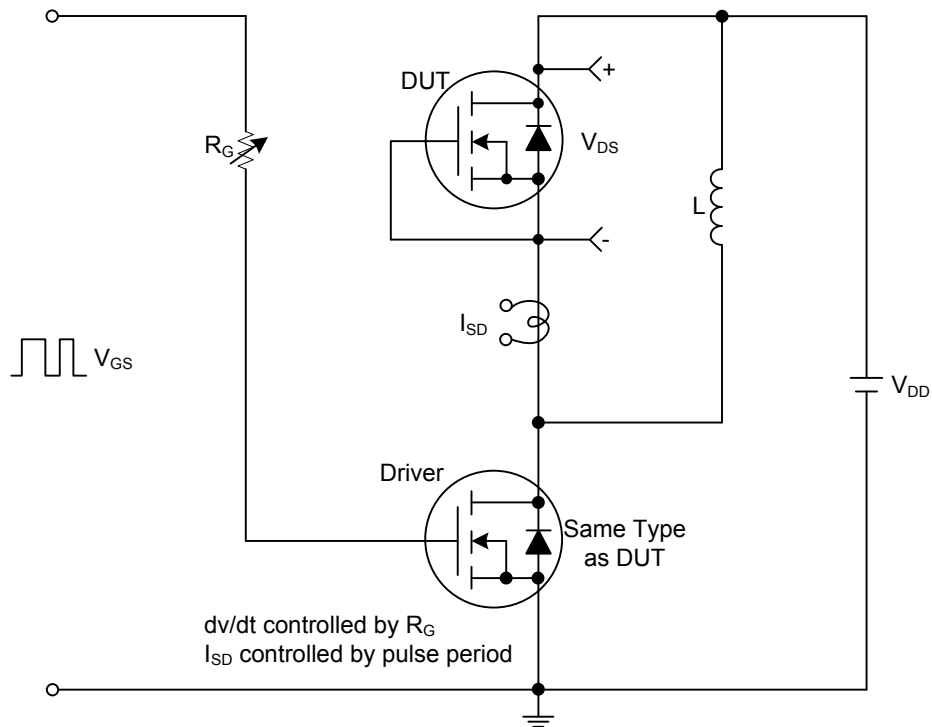
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	700			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =250μA		0.68		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =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		460		ns
Body Diode Reverse Recovery Charge		Q _{RR}	(Note1)		5.7		μC

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



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Peak Diode Recovery dv/dt Test Circuit and Waveforms

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