



15N50

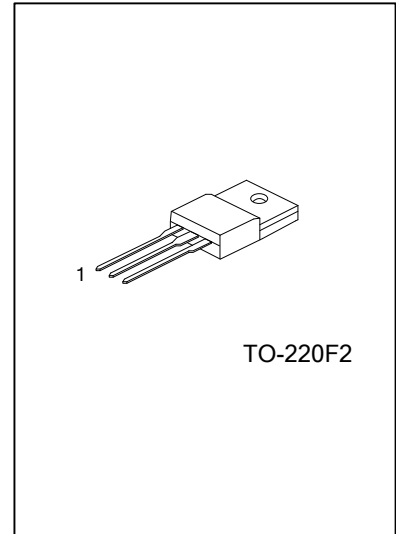
Power MOSFET

15A, 500V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **15N50** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **15N50** is generally applied in high efficiency switch mode power supplies.

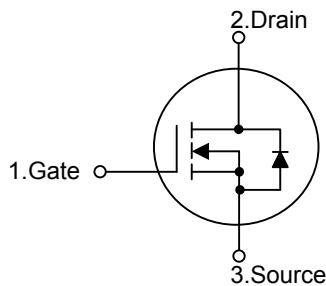


FEATURES

* $R_{DS(ON)}=0.35\Omega$ @ $V_{GS}=10V, I_D=7.5A$

* High Switching Speed

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
15N50L-TF2-T	15N50G-TF2-T	TO-220F2	G	D	S	Tube

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

15N50L-TF2-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) TF2: TO-220F2
	(3)Lead Free	(3) L: Lead Free, G: Halogen Free

■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, unless otherwise specified.) (Note 5)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain to Source Voltage			V _{DSS}	500	V
Gate-Source Voltage			V _{GSS}	±30	V
Drain Current	Continuous	T _C =25°C	I _D	15	A
		T _C =100°C		9	A
	Pulsed (Note 2)		I _{DM}	60	A
Avalanche Current (Note 2)			I _{AR}	15	A
Avalanche Energy	Single Pulsed (Note 3)		E _{AS}	731	mJ
	Repetitive (Note 2)		E _{AR}	17	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	15	V/ns
Power Dissipation (T _C =25°C)			P _D	170	W
Derate above 25°C				1.45	W/°C
Junction Temperature			T _J	+150	°C
Storage Temperature			T _{STG}	-55~+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. $L=6.5\text{mH}$, $I_{AS}=15\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

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

5. Drain current limited by maximum junction temperature

■ **THERMAL CHARACTERISTICS**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.7	$^{\circ}\text{C}/\text{W}$

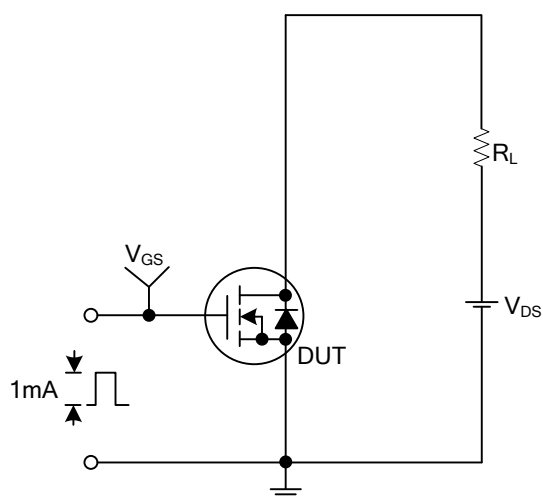
■ ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V, T _J =25°C	500			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =250μA		0.5		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V,			1	μA
			V _{DS} =320V, T _C =125°C			10	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 _{GS} =V _{DS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =7.5A		0.3	0.35	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2300	2600	pF
Output Capacitance		C _{OSS}			250	270	pF
Reverse Transfer Capacitance		C _{RSS}			26	30	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =320V, V _{GS} =10V, I _D =15A (Note 1, 2)		210	240	nC
Gate to Source Charge		Q _{GS}			35		nC
Gate to Drain ("Miller") Charge		Q _{GD}			60		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =200V, I _D =15A, R _G =25Ω (Note 1, 2)		100	120	ns
Rise Time		t _R			150	170	ns
Turn-OFF Delay Time		t _{D(OFF)}			460	500	ns
Fall-Time		t _F			180	210	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 _{SD} =15A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _{SD} =15A, V _{GS} =0V, dI _F /dt=100A/μs		333		ns
Body Diode Reverse Recovery Charge		Q _{RR}	(Note 1)		3.24		μC

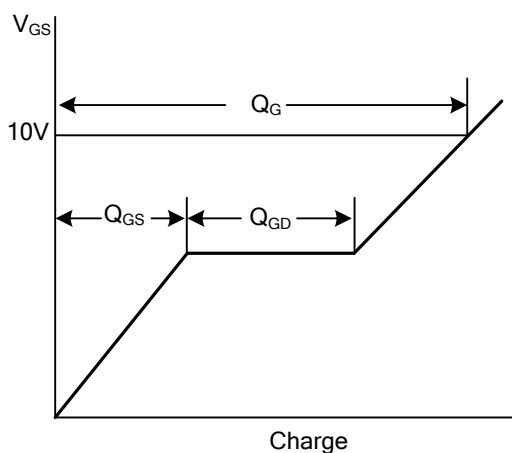
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$; Duty Cycle $\leq 2\%$.

2. Essentially Independent of Operating Temperature Typical Characteristics

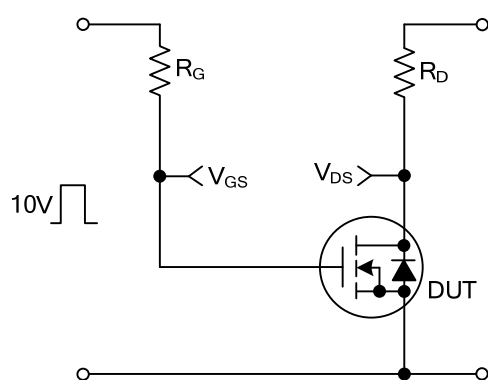
■ TEST CIRCUITS AND WAVEFORMS



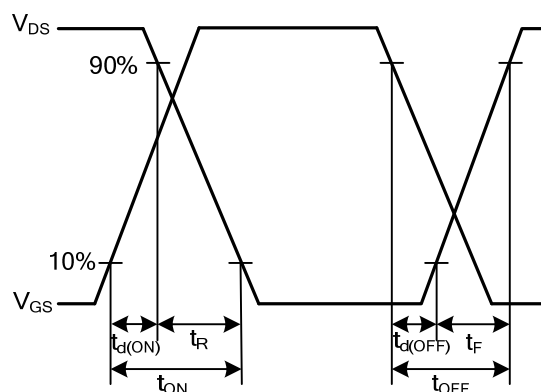
Gate Charge Test Circuit



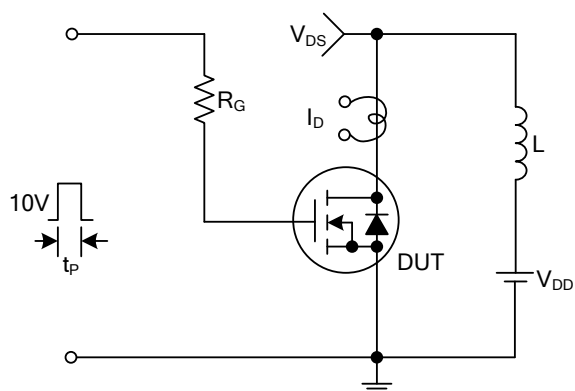
Gate Charge Waveforms



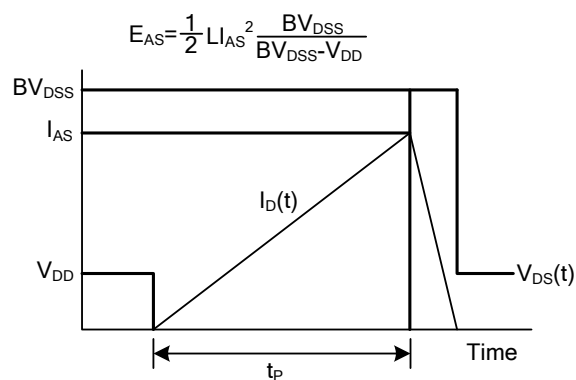
Resistive Switching Test Circuit



Resistive Switching Waveforms

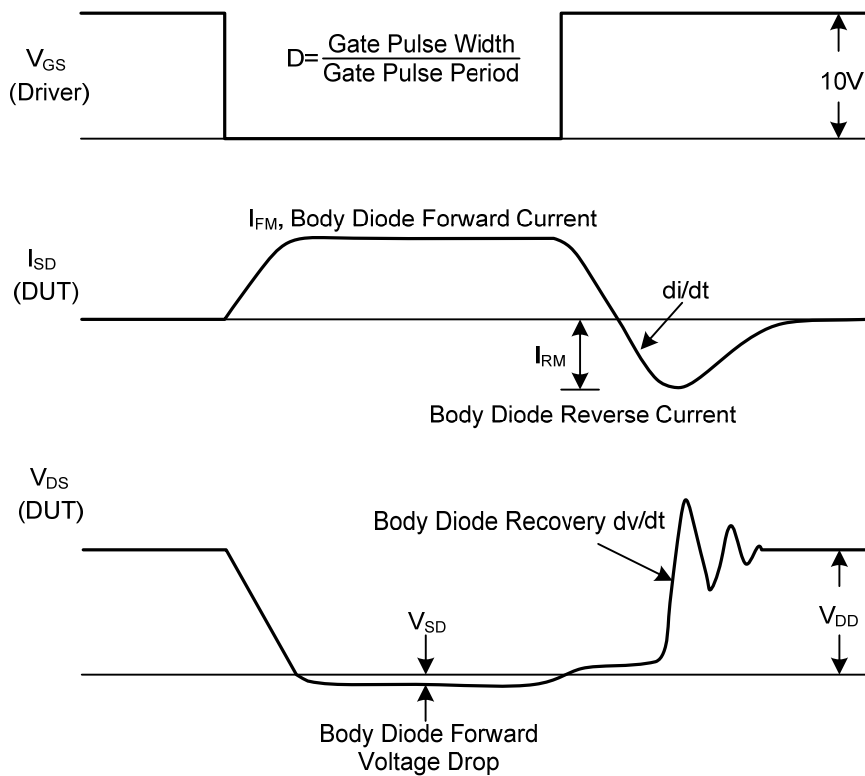
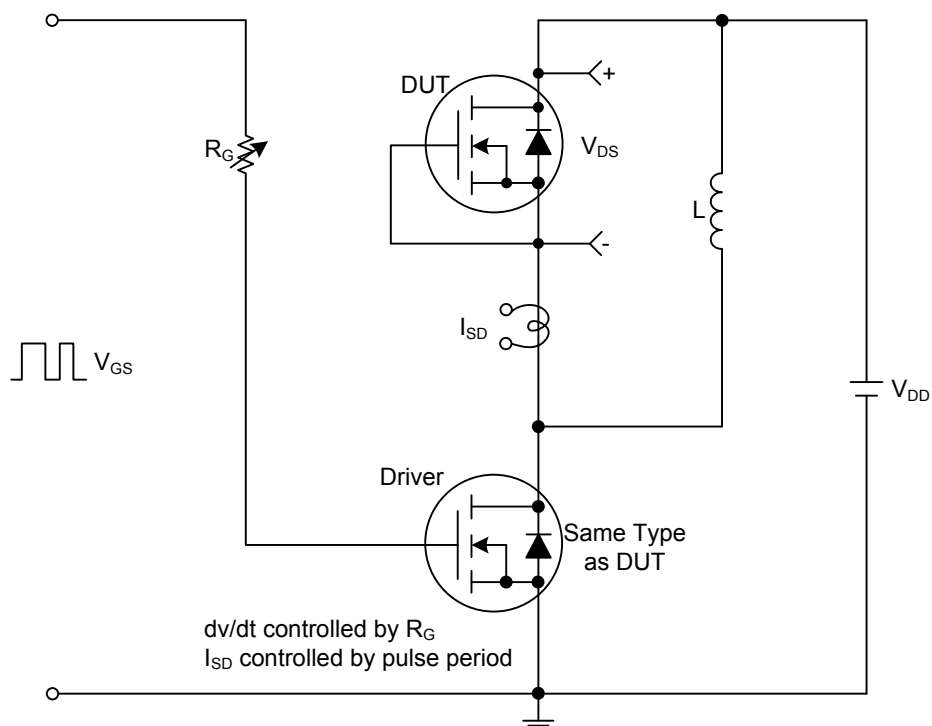


Unclamped Inductive Switching Test Circuit

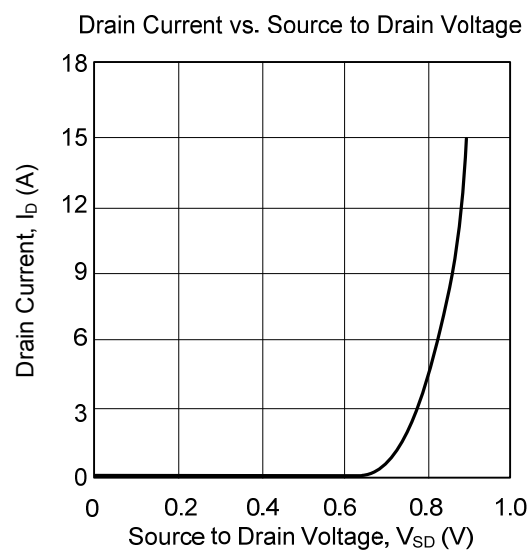
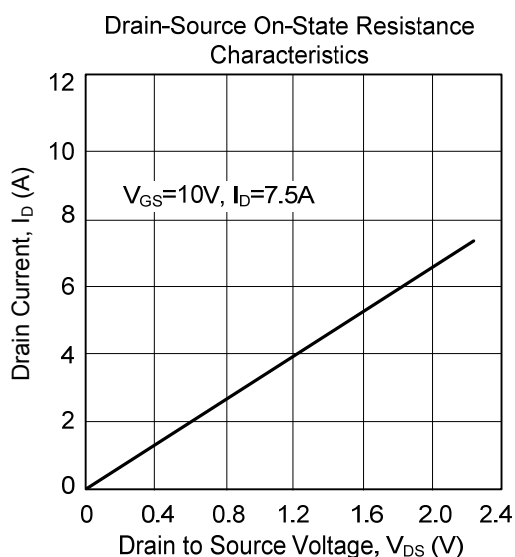
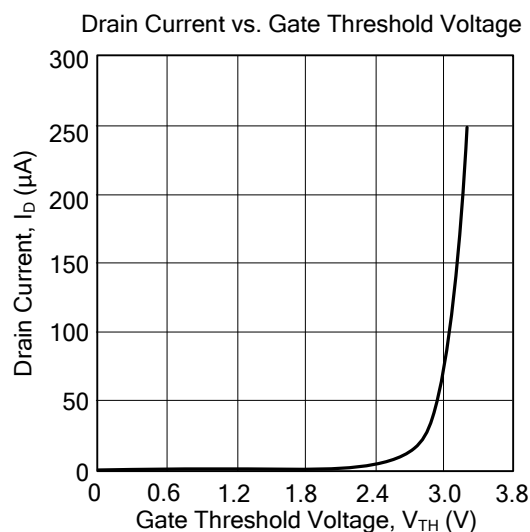
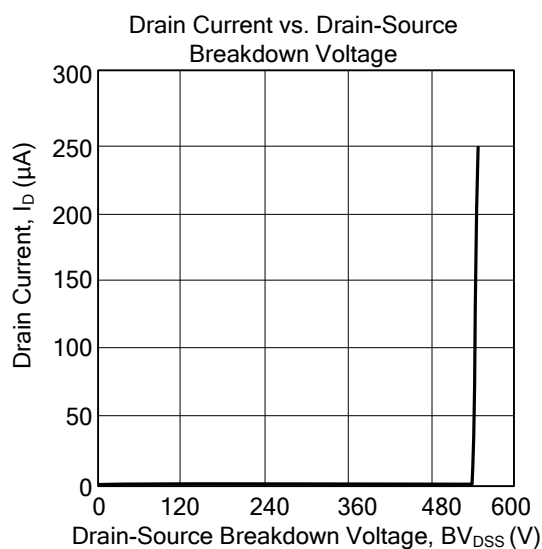


Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)

Peak Diode Recovery dv/dt Test Circuit & Waveforms

■ TYPICAL CHARACTERISTICS



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.