



19N10

Power MOSFET

100V N-Channel MOSFET

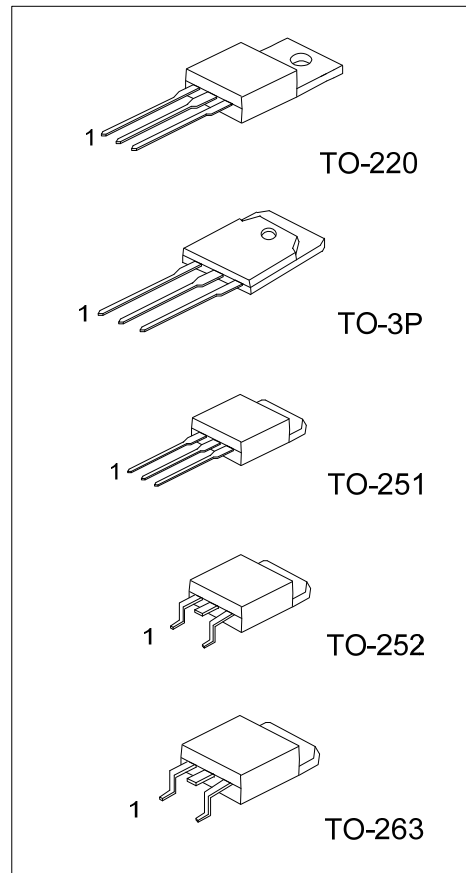
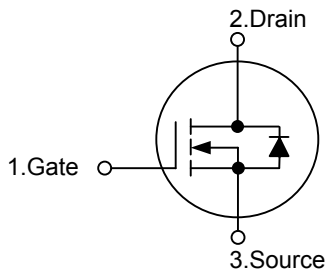
■ **DESCRIPTION**

The UTC 100V N-Channel enhancement mode power field effect transistors (MOSFET) are produced by UTC's planar stripe, DMOS technology which has been tailored especially in the avalanche and commutation mode to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse. They are suited for low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

■ **FEATURES**

- * $R_{DS(ON)} = 0.1\Omega @ V_{GS} = 10V$
- * Ultra low gate charge (typical 19nC)
- * Low reverse transfer Capacitance ($C_{RSS} =$ typical 32pF)
- * Fast switching capability
- * Avalanche energy Specified
- * Improved dv/dt capability, high ruggedness

■ **SYMBOL**



■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
19N10L-T3P-T	19N10G-T3P-T	TO-3P	G	D	S	Tube
19N10L-TA3-T	19N10G-TA3-T	TO-220	G	D	S	Tube
19N10L-TM3-T	19N10G-TM3-T	TO-251	G	D	S	Tube
19N10L-TN3-R	19N10G-TN3-R	TO-252	G	D	S	Tape Reel
19N10L-TQ2-R	19N10G-TQ2-R	TO-263	G	D	S	Tape Reel
19N10L-TQ2-T	19N10G-TQ2-T	TO-263	G	D	S	Tube

<p>19N10L-T3P-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) T3P: TO-3P, TA3: TO-220, TM3: TO-251, TN3: TO-252, TQ2: TO-263 (3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 25	V
Continuous Drain Current		I_D	15.6	A
Pulsed Drain Current (Note 2)		I_{DM}	62.4	A
Avalanche Current (Note 2)		I_{AR}	15.6	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	220	mJ
Repetitive Avalanche Energy (Note 2)		E_{AR}	5.0	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.0	V/ns
Power Dissipation	TO-251/TO-252	P_D	50	W
	TO-220/TO-263		62.5	W
	TO-3P		178	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Note: 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. Pulse width limited by $T_{J(MAX)}$

3. $L=1.35\text{mH}$, $I_{AS}=15.6\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\ \Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD}\leq 19\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-251/TO-252	θ_{JA}	50	$^\circ\text{C}/\text{W}$
	TO-220/TO-263		62.5	$^\circ\text{C}/\text{W}$
	TO-3P		40	$^\circ\text{C}/\text{W}$
Junction to Case	TO-251/TO-252	θ_{JC}	2.5	$^\circ\text{C}/\text{W}$
	TO-220/TO-263		2.0	$^\circ\text{C}/\text{W}$
	TO-3P		0.7	$^\circ\text{C}/\text{W}$

■ 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}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	100			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$, Referenced to 25°C		0.1		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=25\text{V}$, $V_{DS}=0\text{V}$			100	nA
	Reverse		$V_{GS}=-25\text{V}$, $V_{DS}=0\text{V}$			-100	
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=7.8\text{A}$		0.078	0.1	Ω
Forward Transconductance		g_{FS}	$V_{DS}=40\text{V}$, $I_D=7.8\text{A}$ (Note 1)			11	S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		600	780	pF
Output Capacitance		C_{OSS}			165	215	pF
Reverse Transfer Capacitance		C_{RSS}			32	40	pF

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=80V, I_D=19A, V_{GS}=10V$ (Note 1, 2)		19	25	nC
Gate Source Charge	Q_{GS}			3.9		
Gate Drain Charge	Q_{GD}			9.0		
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=50V, I_D=19A, R_G=25\Omega$ (Note 1, 2)		7.5	25	ns
Turn-ON Rise Time	t_R			150	310	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			20	50	ns
Turn-OFF Fall-Time	t_F			65	140	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=15.6A$			1.5	V
Maximum Body-Diode Continuous Current	I_S				15.6	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				62.4	A
Body Diode Reverse Recovery Time	t_{RR}	$V_{GS}=0V, I_S=19A,$ $dI_F/dt=100A/\mu s$ (Note 1)		78		ns
Body Diode Reverse Recovery Charge	Q_{RR}			200		nC

Note: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

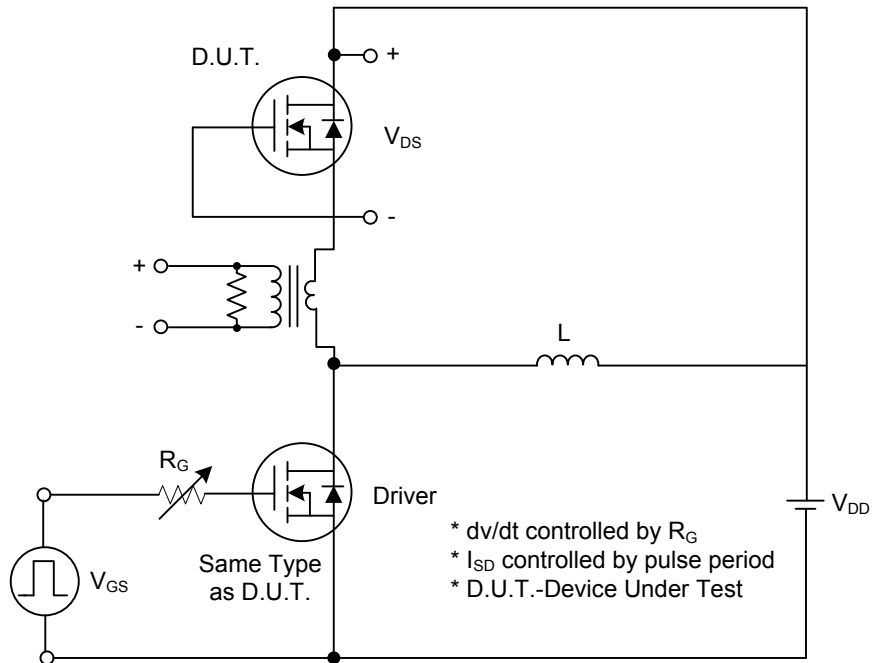


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

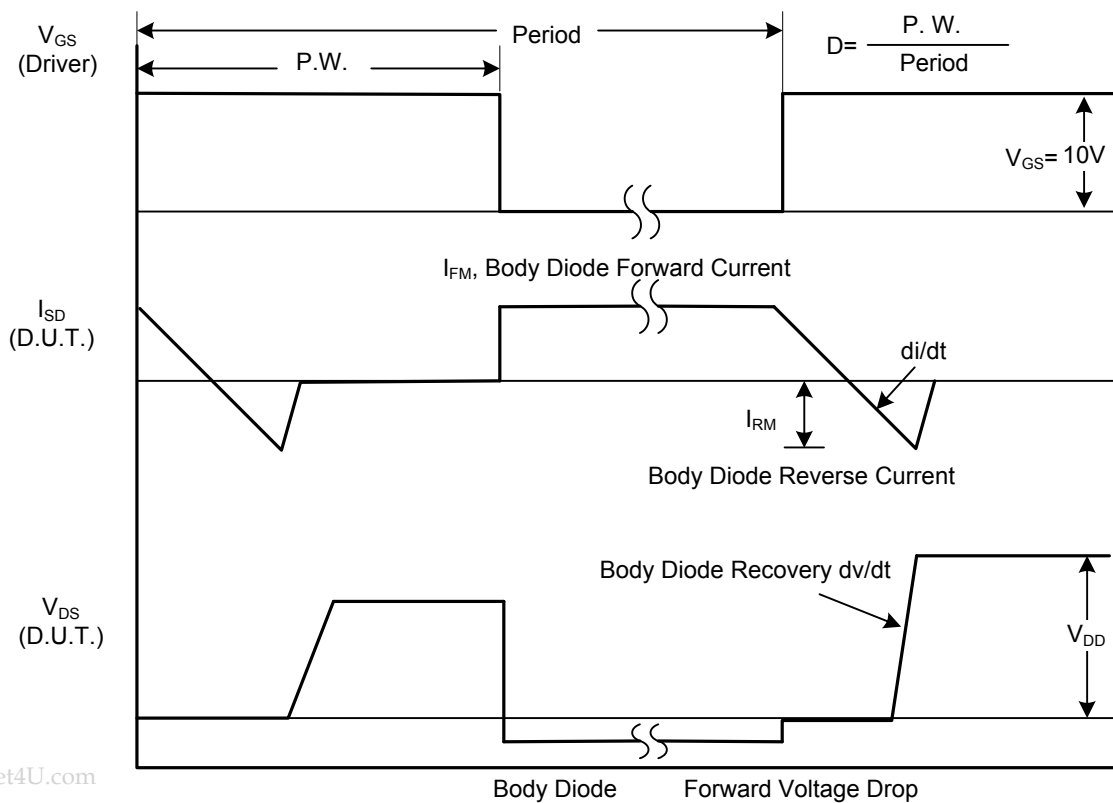


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

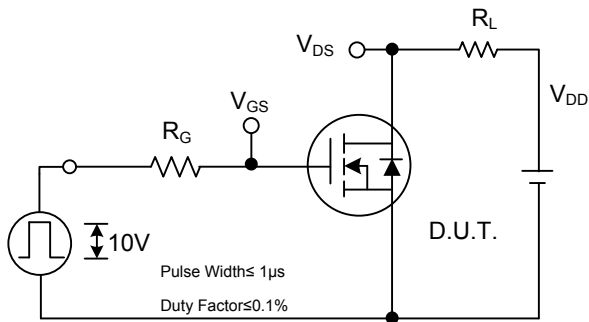


Fig. 2A Switching Test Circuit

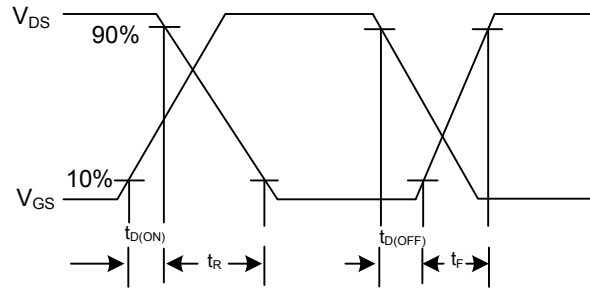


Fig. 2B Switching Waveforms

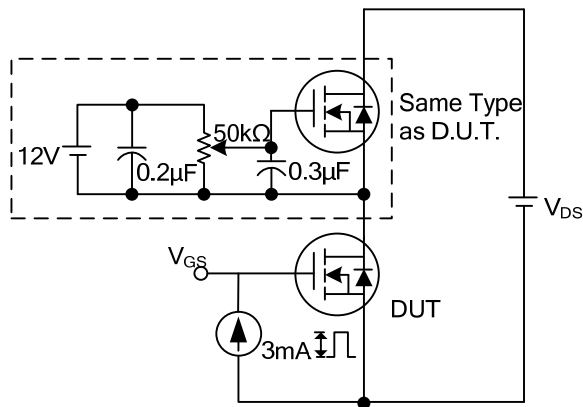


Fig. 3A Gate Charge Test Circuit

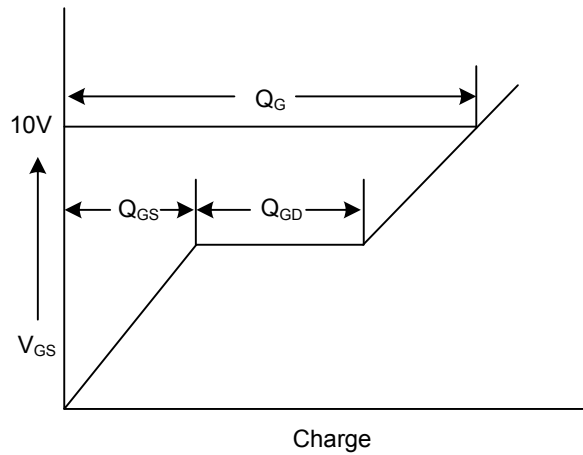


Fig. 3B Gate Charge Waveform

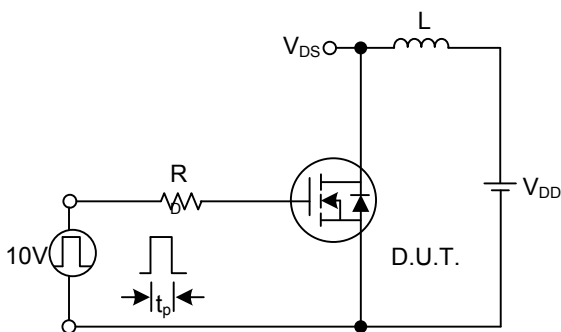


Fig. 4A Unclamped Inductive Switching Test Circuit

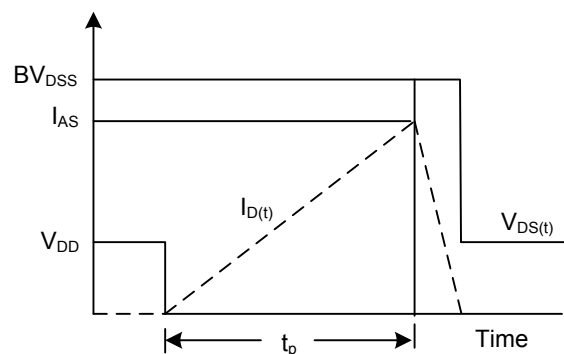
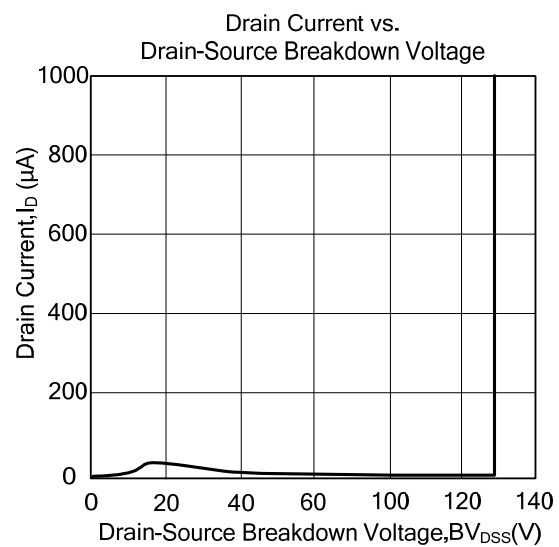
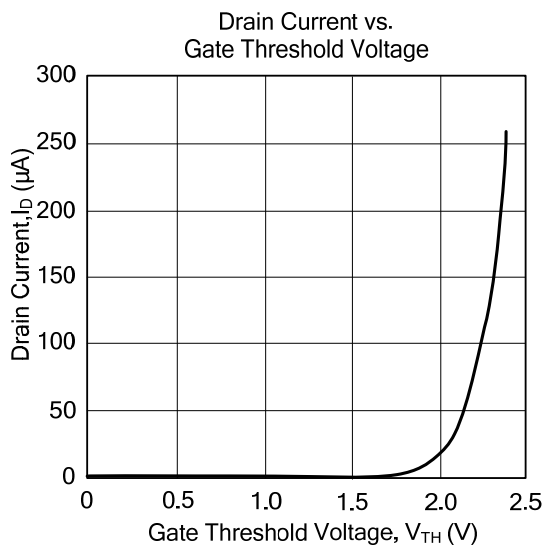
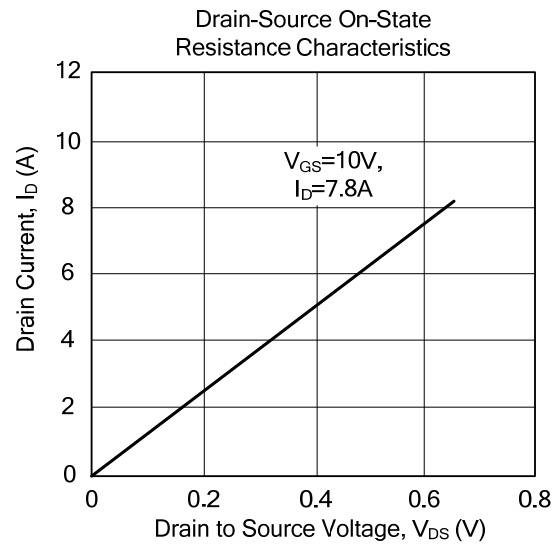
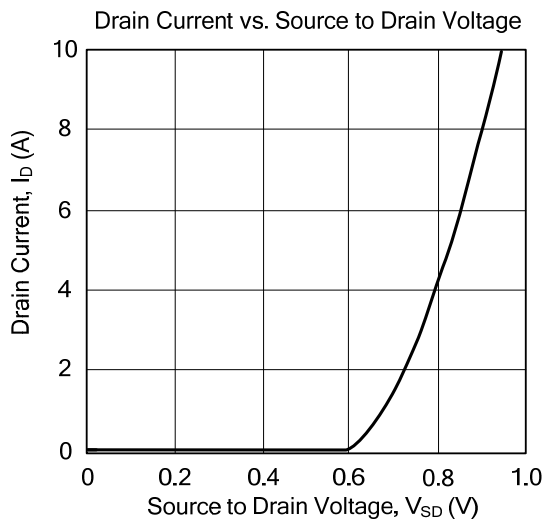


Fig. 4B Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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