



19N10

Preliminary

Power MOSFET

100V N-Channel MOSFET

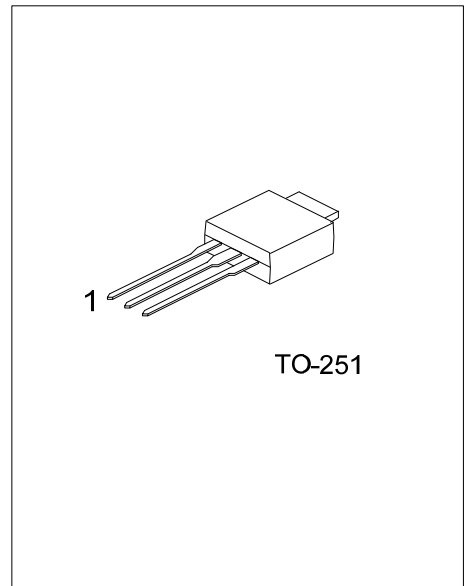
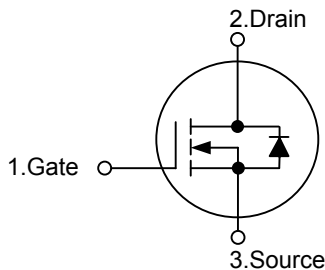
DESCRIPTION

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



Lead-free: 19N10L
 Halogen-free: 19N10G

ORDERING INFORMATION

Ordering Number			Package	Pin Assignment			Packing
Normal	Lead Free	Halogen Free		1	2	3	
19N10-TM3-T	19N10L-TM3-T	19N10G-TM3-T	TO-251	G	D	S	Tube

<p>19N10L-TM3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Plating</p>	<p>(1) T: Tube</p> <p>(2) TM3: TO-251</p> <p>(3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</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	P_D	50	W
Derate above 25°C		0.4	W/ $^\circ\text{C}$
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.

- Pulse width limited by $T_{J(MAX)}$
- $L=1.35\text{mH}$, $I_{AS}=15.6\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\ \Omega$, Starting $T_J=25^\circ\text{C}$
- $I_{SD}\leq 19\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction-to-Ambient	θ_{JA}	110	$^\circ\text{C}/\text{W}$
Junction-to-Case	θ_{JC}	2.5	$^\circ\text{C}/\text{W}$

■ 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	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	$I_D=250\mu\text{A}$, Referenced to 25°C		0.1		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 Reverse	I_{GSS} $V_{GS}=25\text{V}$, $V_{DS}=0\text{V}$ $V_{GS}=-25\text{V}$, $V_{DS}=0\text{V}$			100	nA
					-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
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=80\text{V}$, $I_D=19\text{A}$, $V_{GS}=10\text{V}$ (Note 1, 2)		19	25	nC
Gate Source Charge	Q_{GS}			3.9		nC
Gate Drain Charge	Q_{GD}			9.0		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=50\text{V}$, $I_D=19\text{A}$, $R_G=25\Omega$ (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

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
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}	$V_{GS}=0V, I_S=19A,$		78		ns
Body Diode Reverse Recovery Charge	Q_{RR}	$dI_F/dt=100A/\mu s$ (Note 1)		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

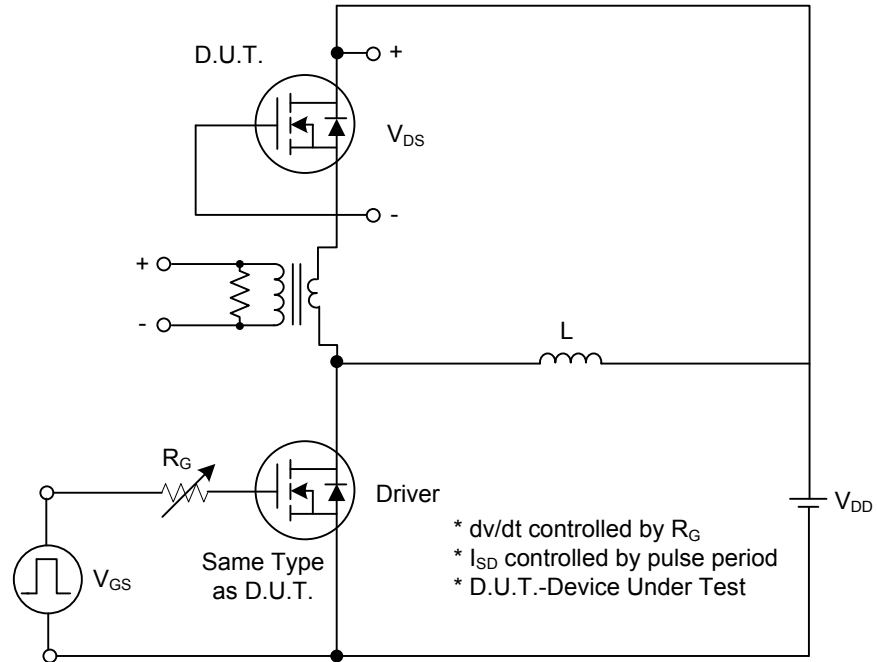


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

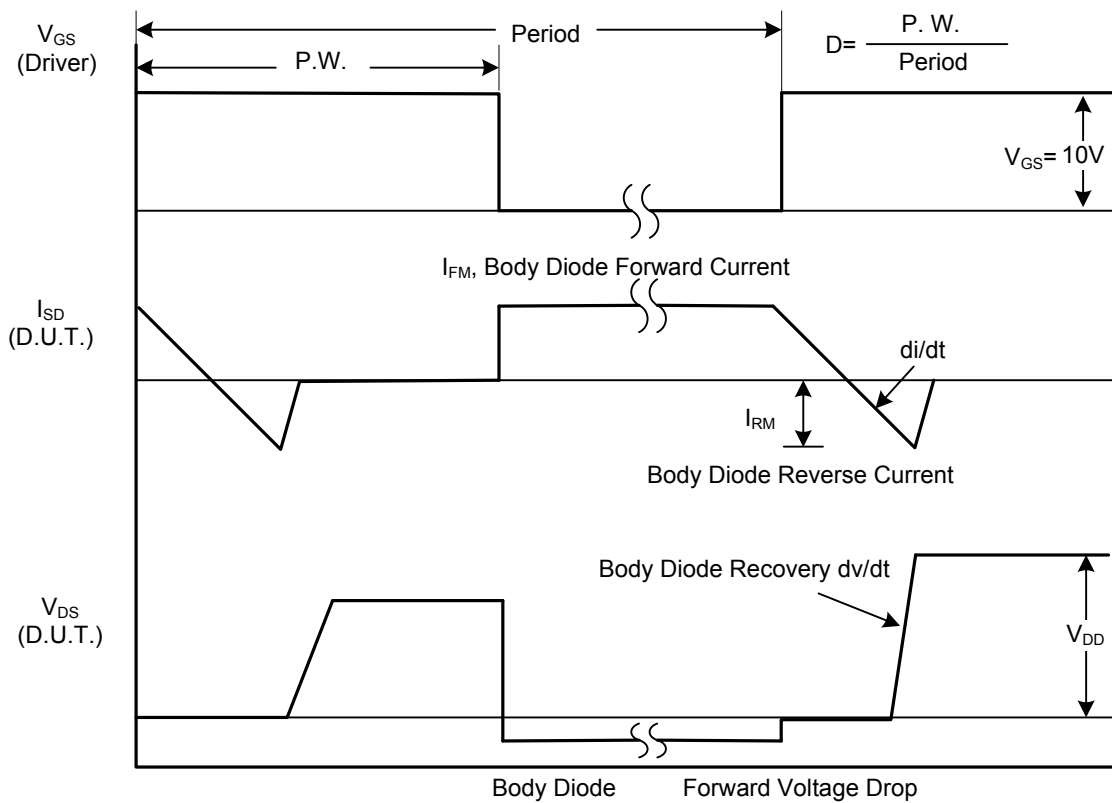


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

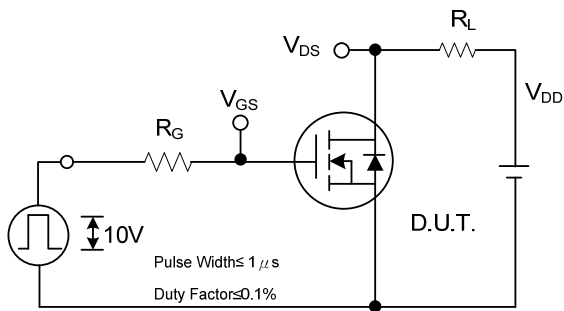


Fig. 2A Switching Test Circuit

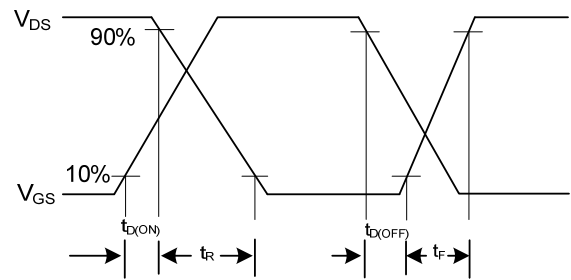


Fig. 2B Switching Waveforms

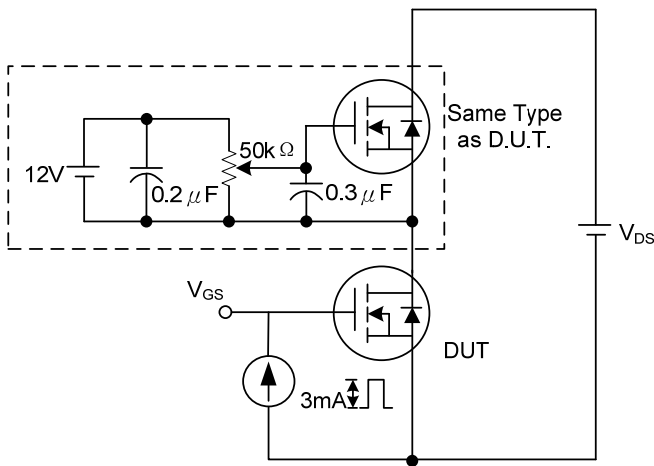


Fig. 3A Gate Charge Test Circuit

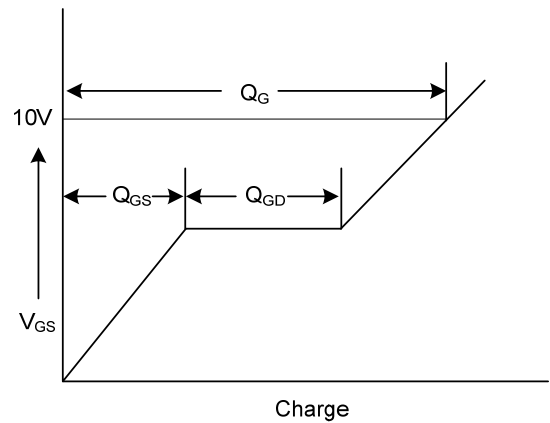


Fig. 3B Gate Charge Waveform

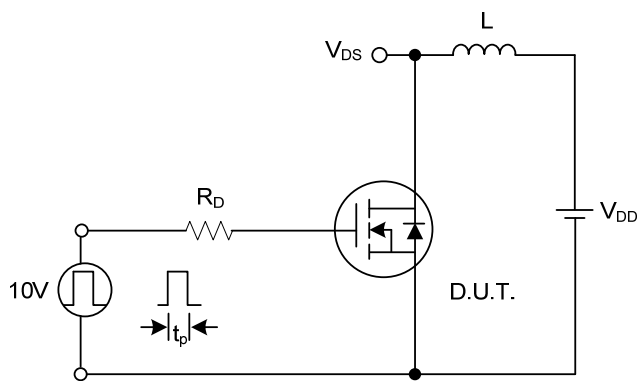


Fig. 4A Unclamped Inductive Switching Test Circuit

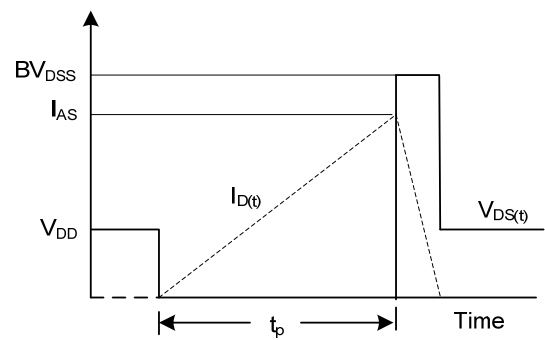


Fig. 4B Unclamped Inductive Switching Waveforms

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