



10N80

Power MOSFET

800V N-CHANNEL POWER MOSFET

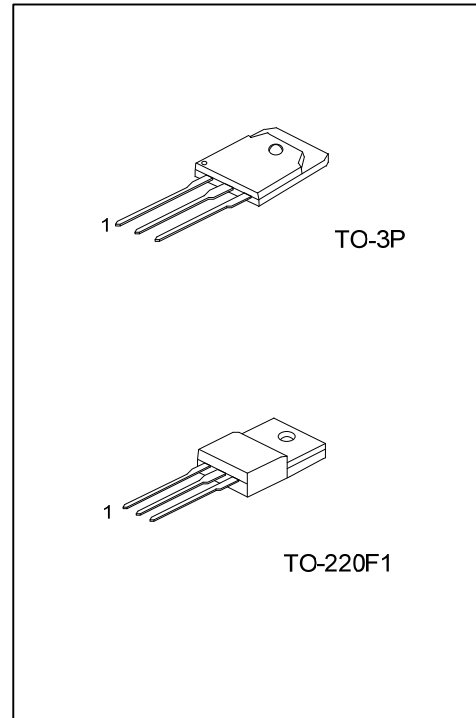
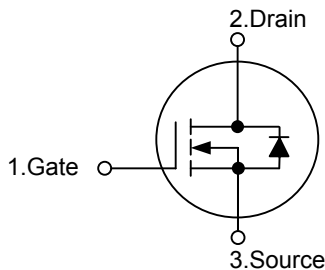
DESCRIPTION

The UTC **10N80** uses UTC's advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} = 1.1\Omega @ V_{GS} = 10V$
- * Ultra Low Gate Charge (Typical 45 nC)
- * Low Reverse Transfer Capacitance ($C_{RSS} = \text{Typical } 15\text{ pF}$)
- * 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	
10N80L-T3P-T	10N80G-T3P-T	TO-3P	G	D	S	Tube
10N80L-TF1-T	10N80G-TF1-T	TO-220F1	G	D	S	Tube

<p>10N80L-T3P-T</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) T3P: TO-3P, TF1: TO-220F1</p> <p>(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}	800	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)		I_D	10	A
Pulsed Drain Current (Note 2)		I_{DM}	40	A
Avalanche Current (Note 2)		I_{AR}	10	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	920	mJ
	Repetitive (Note 2)	E_{AR}	24	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation	TO-3P	P_D	240	W
	TO-220F1		36	
Linear Derating Factor above $T_C = 25^\circ\text{C}$	TO-3P		1.92	$^\circ\text{C}/\text{W}$
	TO-220F1		0.288	
Junction Temperature		T_J	150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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. $L=17.3\text{mH}$, $I_{AS}=10\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD} \leq 10\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-3P	θ_{JA}	40	$^\circ\text{C}/\text{W}$
	TO-220F1		62.5	
Junction to Case	TO-3P	θ_{JC}	0.52	$^\circ\text{C}/\text{W}$
	TO-220F1		3.47	

■ 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}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	800			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800\text{V}$, $V_{GS}=0\text{V}$			10	μA
		$V_{DS}=640\text{V}$, $T_C=125^\circ\text{C}$			100	
Gate-Body Leakage Current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 30\text{V}$			± 100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$, Referenced to 25°C		0.98		mV/ $^\circ\text{C}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	3.0		5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=5.0\text{A}$		0.93	1.1	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		2150	2800	pF
Output Capacitance	C_{OSS}		180	230		
Reverse Transfer Capacitance	C_{RSS}		15	20		
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=400\text{V}$, $I_D=10.0\text{A}$, $R_G=25\Omega$ (Note 1,2)		50	110	ns
Turn-ON Rise Time	t_R		130	270		
Turn-OFF Delay Time	$t_{D(OFF)}$		90	190		
Turn-OFF Fall-Time	t_F		80	170		
Total Gate Charge	Q_G	$V_{DS}=640\text{V}$, $V_{GS}=10\text{V}$, $I_D=10.0\text{A}$ (Note 1,2)		45	58	nC
Gate Source Charge	Q_{GS}		13.5			
Gate Drain Charge	Q_{GD}		17			

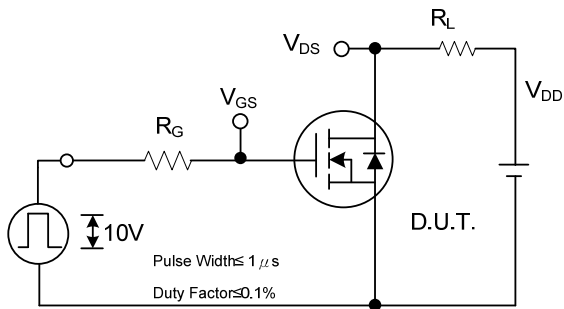
■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=10.0\text{ A}, V_{GS}=0\text{V}$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				10.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				40.0	
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_F/dt = 100\text{ A}/\mu\text{s},$		730		ns
Reverse Recovery Charge	Q_{RR}	$I_S = 10.0\text{ A (Note 1)}$		10.9		nC

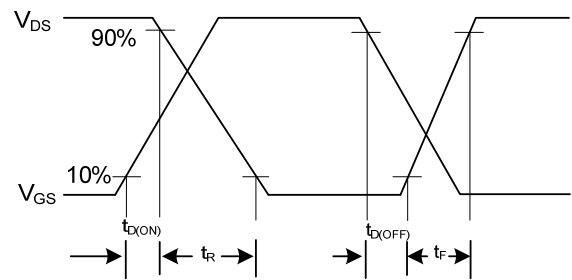
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

2. Independent of operating temperature.

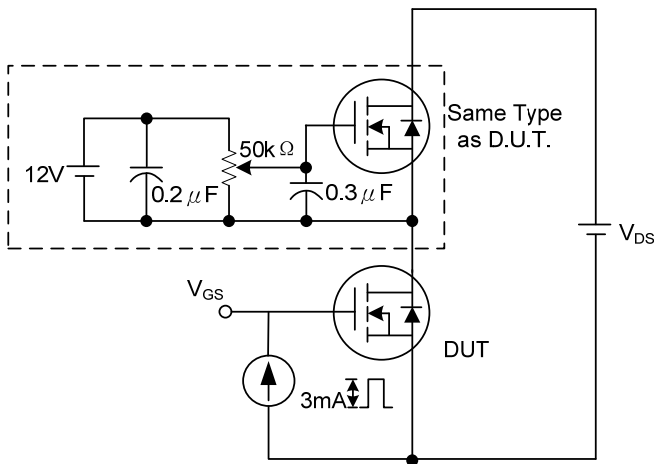
■ TEST CIRCUIT



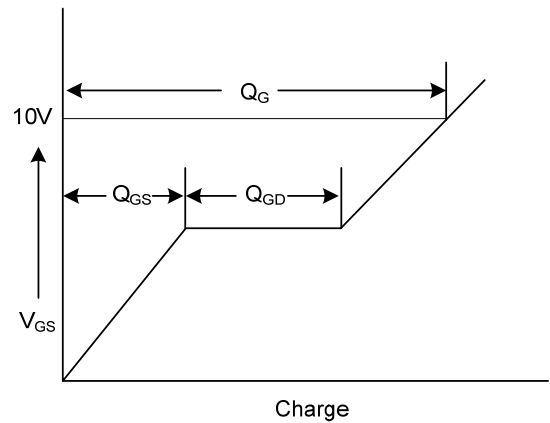
Switching Test Circuit



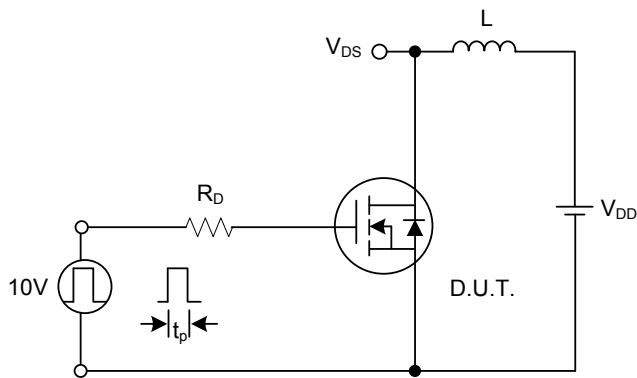
Switching Waveforms



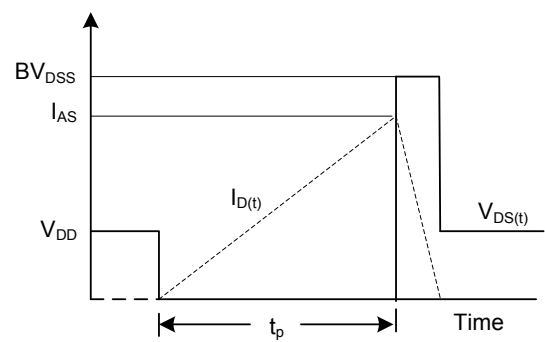
Gate Charge Test Circuit



Gate Charge Waveform

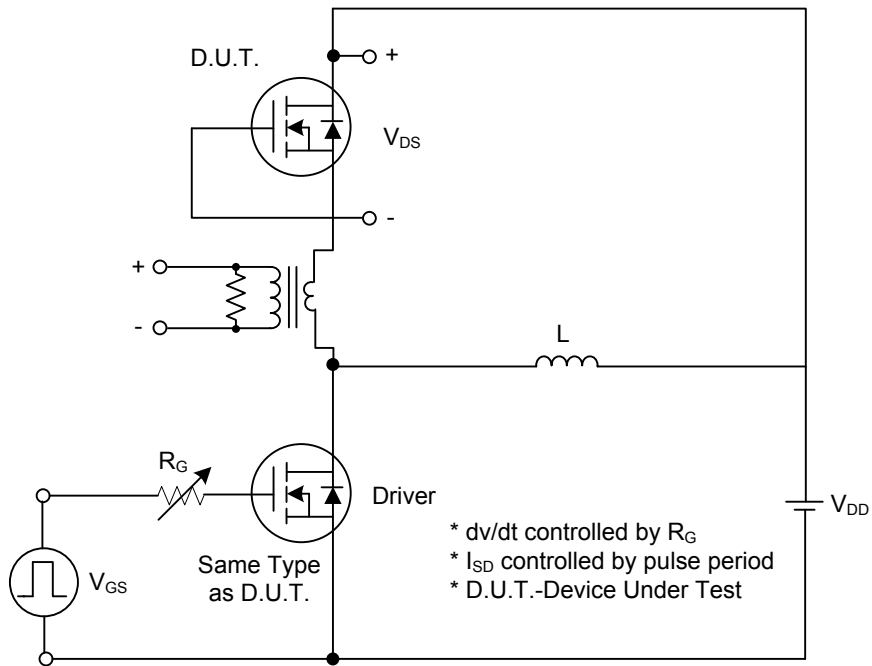


Unclamped Inductive Switching Test Circuit

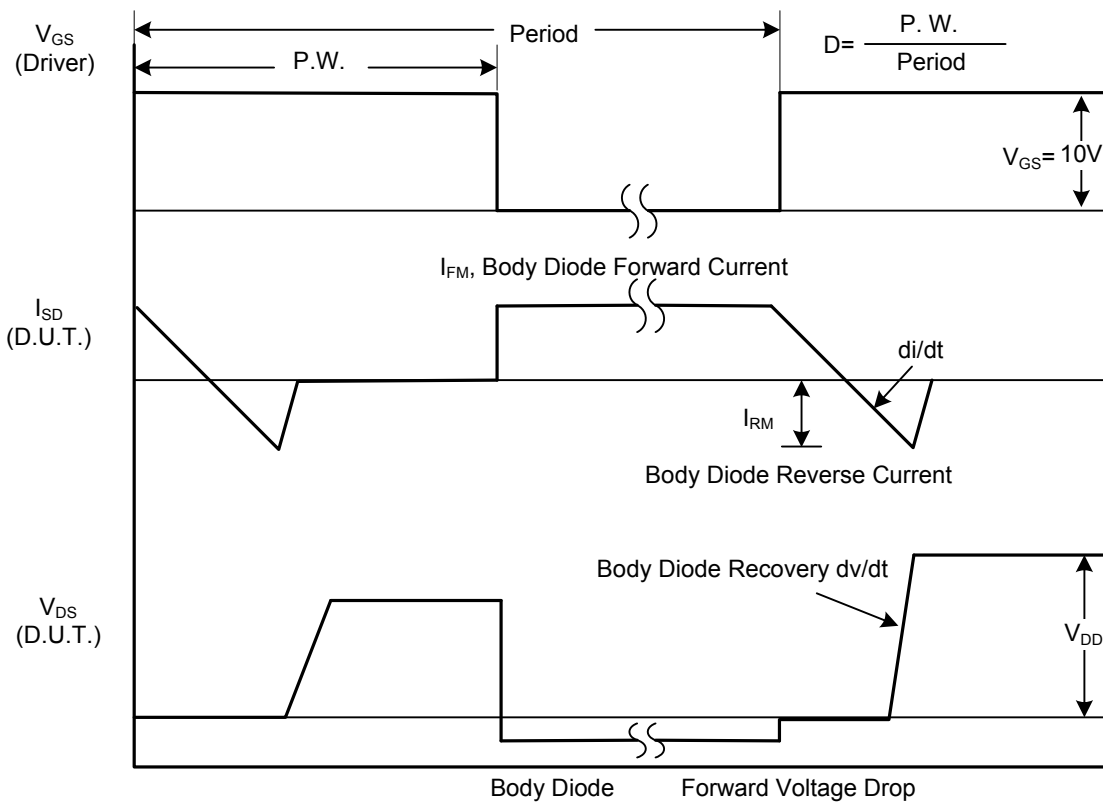


Unclamped Inductive Switching Waveforms

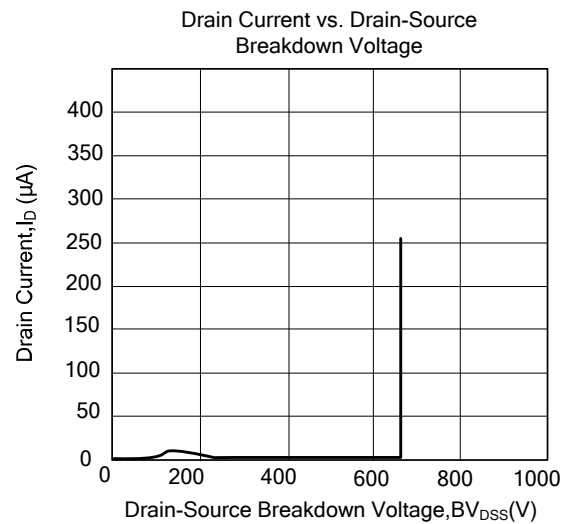
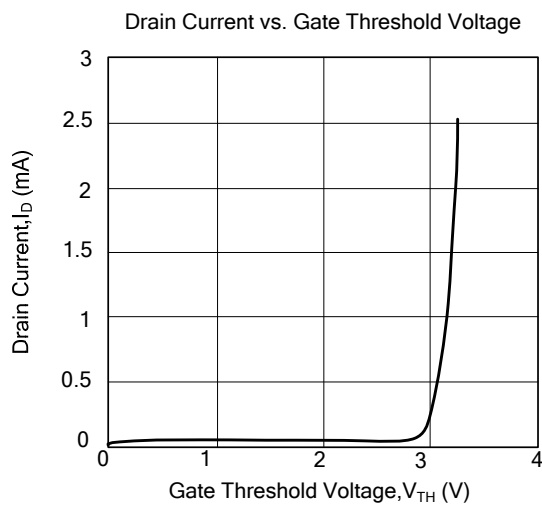
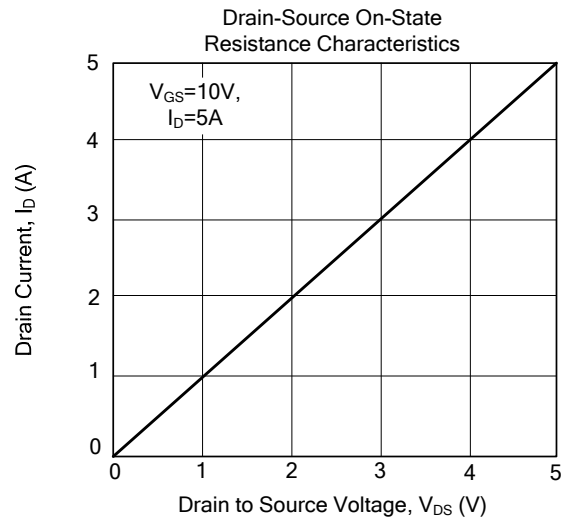
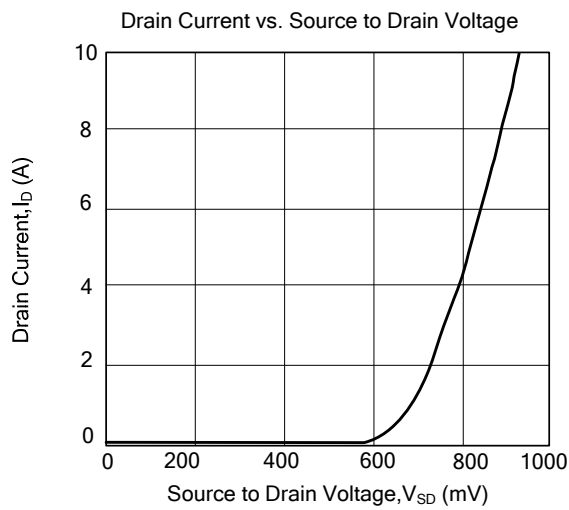
■ TEST CIRCUIT(Cont.)



Peak Diode Recovery dv/dt Test Circuit



TYPICAL CHARACTERISTICS



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