



# 5N80

**Power MOSFET**

## 5A, 800V N-CHANNEL POWER MOSFET

■ DESCRIPTION

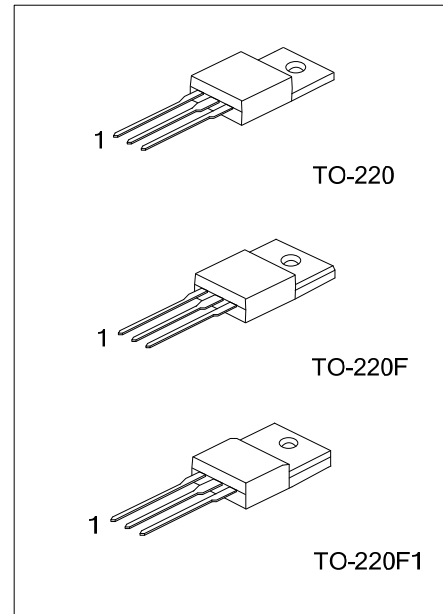
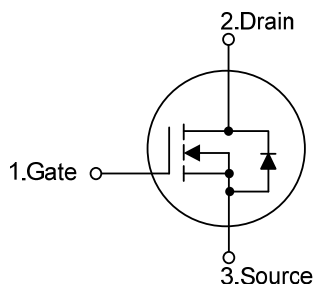
The UTC **5N80** is a N-channel enhancement mode power MOSFET. It use UTC advanced technology to provide avalanche rugged technology and low gate charge.

It can be applied in high current, high speed switching, switch mode power supplies (SMPS), consumer and industrial lighting, DC-AC inverters for welding equipment and uninterruptible power supply(UPS).

■ FEATURES

- \*  $R_{DS(ON)}$ : 2.0Ω (TYP.)
- \* Avalanche rugged technology
- \* Low input capacitance
- \* Low gate charge
- \* Application oriented characterization

■ SYMBOL



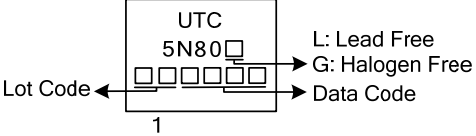
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
5N80L-TA3-T	5N80G-TA3-T	TO-220	G	D	S	Tube
5N80L-TF1-T	5N80G-TF1-T	TO-220F1	G	D	S	Tube
5N80L-TF3-T	5N80G-TF3-T	TO-220F	G	D	S	Tube

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

<p>5N80L-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220, TF1:TO-220F1, TF3: TO-220F</p> <p>(3) L: Lead Free, G: Halogen Free</p>
--	--

■ MARKING INFORMATION

PACKAGE	MARKING
<p>TO-220 TO-220F TO-220F1</p>	 <p>UTC 5N80 □ □ □ □ □ □ Lot Code ←      → Data Code 1 L: Lead Free G: Halogen Free</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{GS}=0$	$V_{DS}$	800	V
Gate-Source Voltage		$V_{GS}$	$\pm 30$	V
Drain-Gate Voltage	$R_{GS}=20\text{k}\Omega$	$V_{DGR}$	800	V
Drain Current (Continuous)	Continuous	$I_D$	5.5	A
	Pulsed (Note 2)	$I_{DM}$	20	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	320	mJ
Power Dissipation	TO-220	$P_D$	125	W
	TO-220F /TO-220F1		40	
Derating Factor	TO-220		1	W/ $^\circ\text{C}$
	TO-220F /TO-220F1		0.32	
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. Pulse width limited by safe operating area.

3. Starting  $T_J=25^\circ\text{C}$ ,  $I_D=I_{AR}$ ,  $V_{DD}=50\text{V}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	$\theta_{JC}$	1	$^\circ\text{C}/\text{W}$
	TO-220F /TO-220F1		3.12	

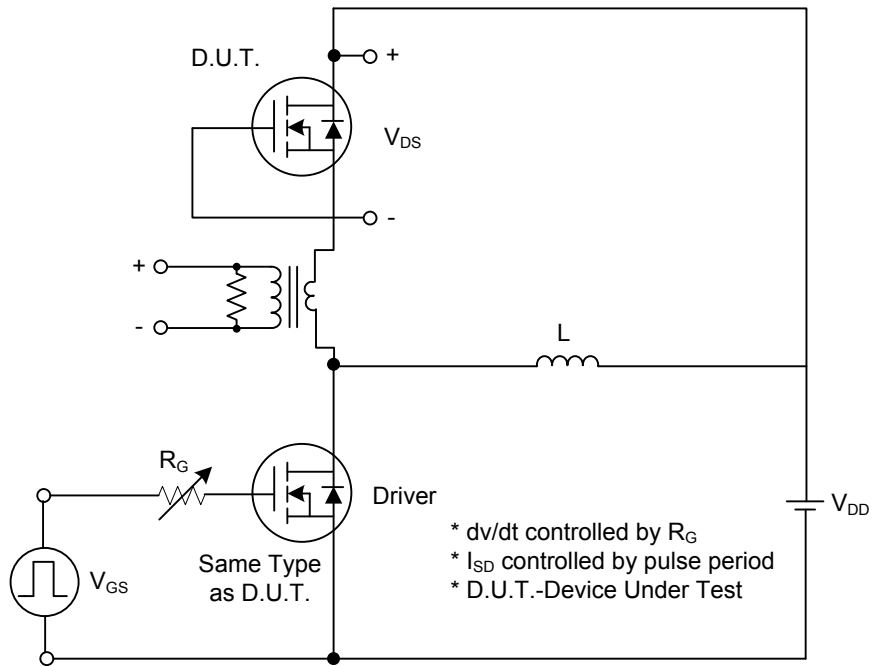
■ ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	800			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=800\text{V}$ , $V_{GS}=-0\text{V}$			25	$\mu\text{A}$
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$			+100	nA
	Reverse	$V_{GS}=-30\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	3		5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=2.5\text{A}$		1.8	2.5	$\Omega$
		$V_{GS}=10\text{V}$ , $I_D=2.5\text{A}$ , $T_C=100^\circ\text{C}$			4	
On State Drain Current	$I_{D(ON)}$	$V_{DS}>I_{D(ON)}\times R_{DS(ON)}\text{max}$ , $V_{GS}=10\text{V}$	5			A
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		900	1450	pF
Output Capacitance	$C_{OSS}$			100	200	pF
Reverse Transfer Capacitance	$C_{RSS}$			14	20	pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DD}=120\text{V}$ , $I_D=5\text{A}$ (Note 1, 2)		145	170	nC
Gate to Source Charge	$Q_{GS}$			11		nC
Gate to Drain Charge	$Q_{GD}$			27		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS}=30\text{V}$ , $I_D=1\text{A}$ , $R_G=50\Omega$ $V_{GS}=10\text{V}$ (Note 1, 2)		80	100	ns
Rise Time	$t_R$			135	150	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			240	260	ns
Fall-Time	$t_F$			120	140	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_{SD}=5.5\text{A}$ , $V_{GS}=0\text{V}$			2	V
Reverse Recovery Time	$t_{rr}$	$I_{SD}=5.5\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$ , $V_{DD}=80\text{V}$ , $T_J=150^\circ\text{C}$ (Note 1)		700		ns
Reverse Recovery Charge	$Q_{RR}$			7.7		nC
Reverse Recovery Current	$I_{RRM}$			22		A
Source-Drain Current	$I_{SD}$				5.5	A
Source-Drain Current (Pulsed) (Note 1)	$I_{SDM}$				20	A

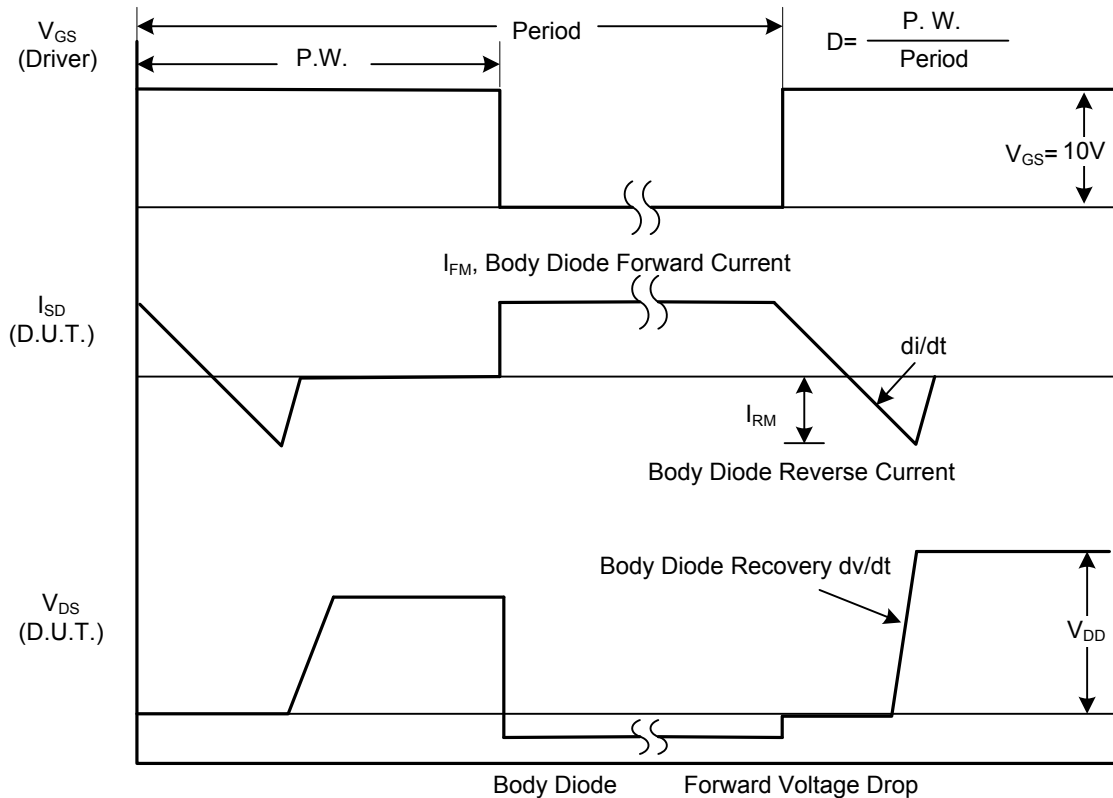
Notes: 1. Pulsed: Pulse duration=300 $\mu\text{s}$ , duty cycle 1.5%.

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

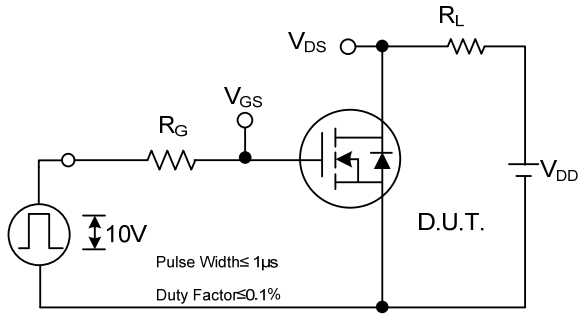


Peak Diode Recovery  $dv/dt$  Test Circuit

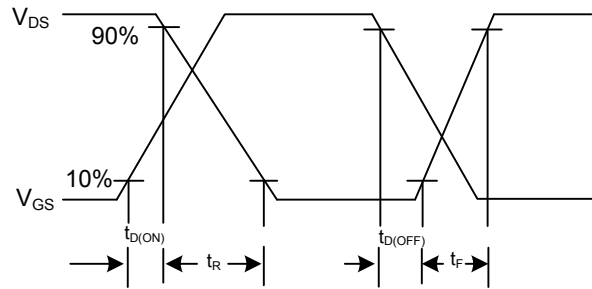


Peak Diode Recovery  $dv/dt$  Waveforms

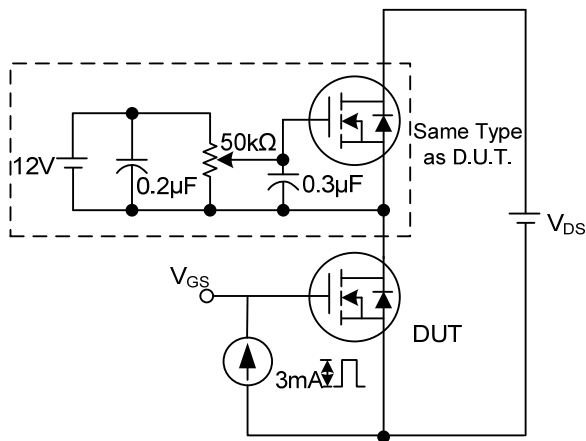
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



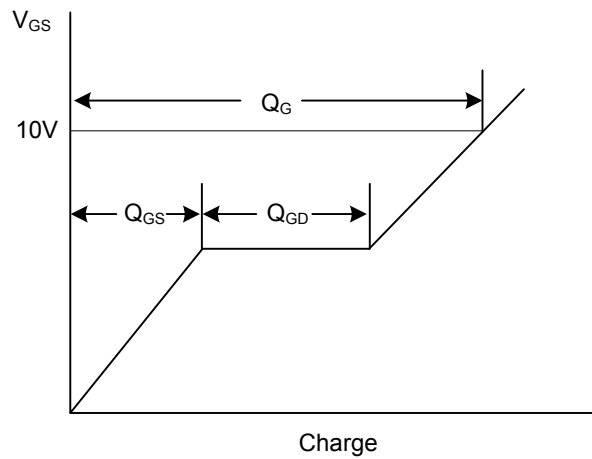
Switching Test Circuit



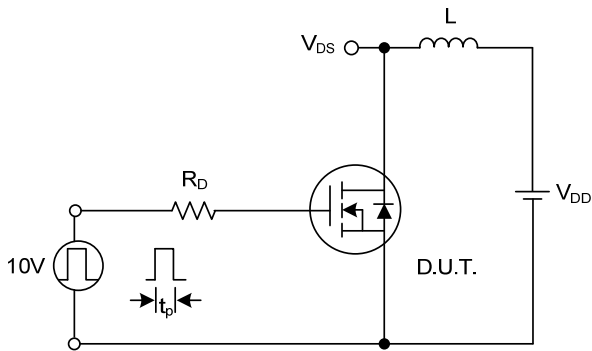
Switching Waveforms



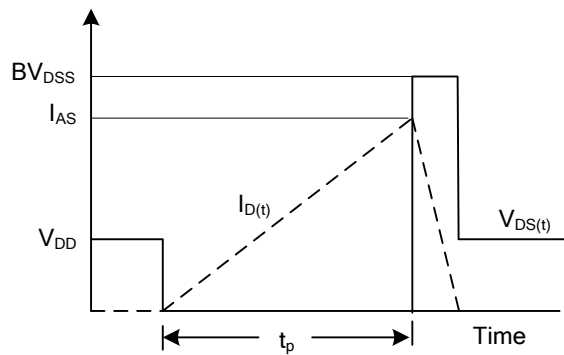
Gate Charge Test Circuit



Gate Charge Waveform

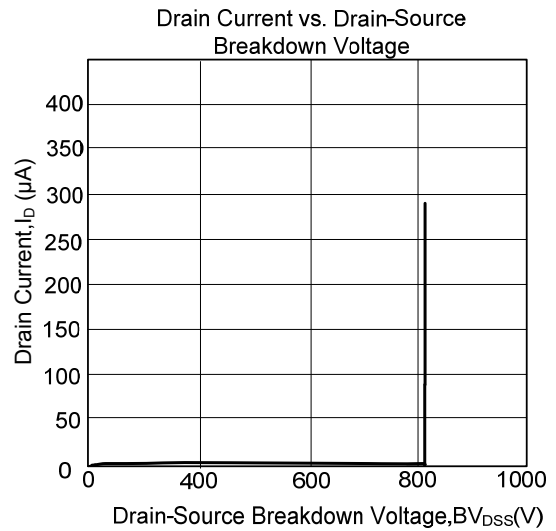
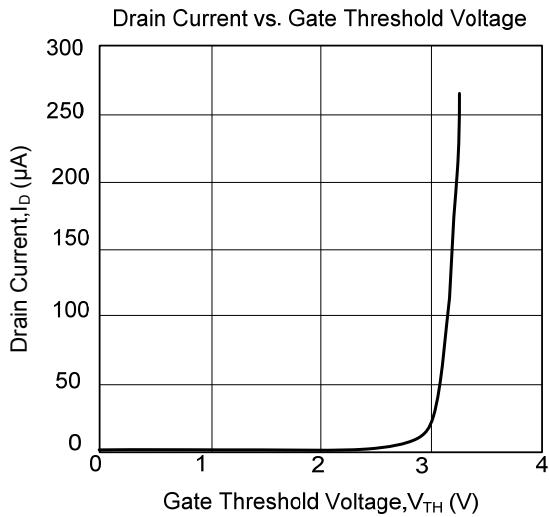
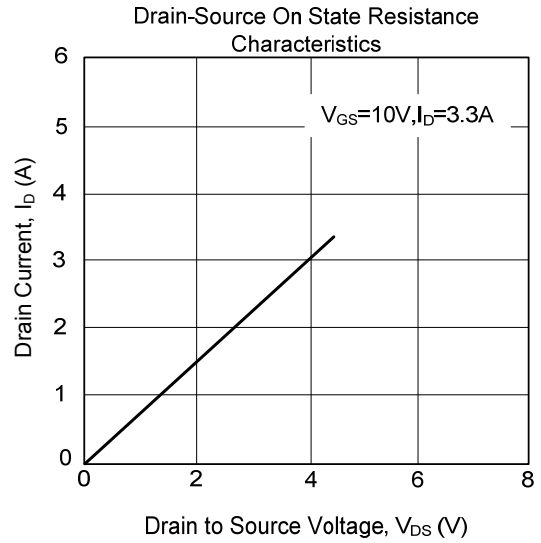
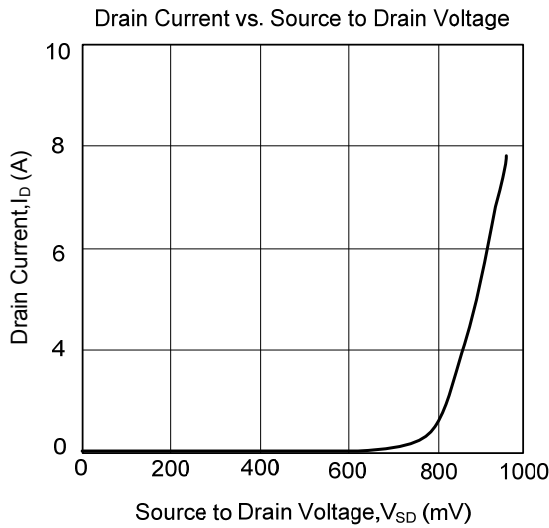


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching 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.