



5N80

Power MOSFET

5.0A, 800V N-CHANNEL POWER MOSFET

DESCRIPTION

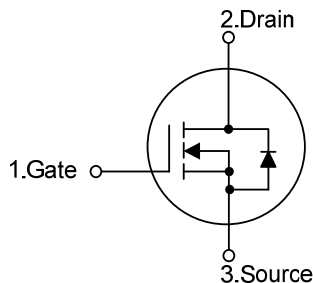
The UTC **5N80** is a N-channel enhancement mode power MOSFET. It use UTC advanced technology to provide avalanche rugged technology and low gate charge.

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

- * $R_{DS(ON)} < 2.5\Omega @ V_{GS}=10V, I_D=2.5A$
- * Avalanche rugged technology
- * Low input capacitance
- * Low gate charge
- * Application oriented characterization

SYMBOL

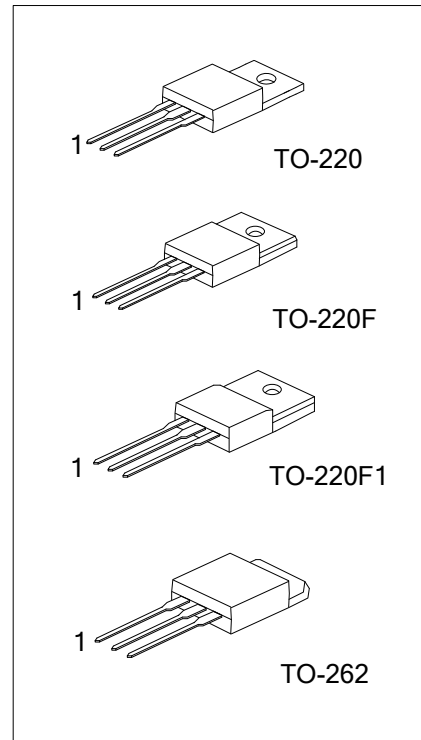


ORDERING INFORMATION

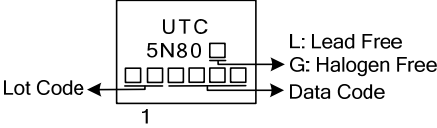
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
5N80L-TA3-T	5N80G-TA3-T	TO-220	G	D	S	Tube
5N80L-TF3-T	5N80G-TF3-T	TO-220F	G	D	S	Tube
5N80L-TF1-T	5N80G-TF1-T	TO-220F1	G	D	S	Tube
5N80L-T2Q-T	5N80G-T2Q-T	TO-262	G	D	S	Tube

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

<p>5N80L-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1 T2Q: TO-262 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING



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■ 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}	± 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
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.8	V/ns
Power Dissipation	TO-220/TO-262	P_D	125	W
	TO-220F/TO-220F1		40	
Derating Factor	TO-220/TO-262		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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L = 21\text{mH}$, $I_{AS} = 5.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 5.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-262	θ_{JC}	1	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		3.12	

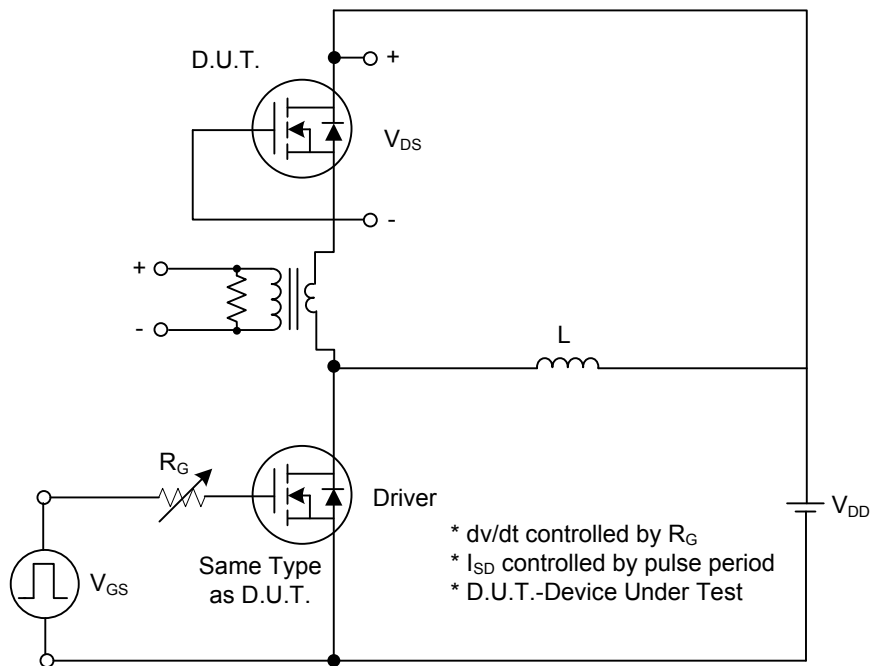
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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	μA
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$			+100	nA
	Reverse	$V_{GS}=-30\text{V}$			-100	nA
ON CHARACTERISTICS						
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	Ω
		$V_{GS}=10\text{V}$, $I_D=2.5\text{A}$, $T_C=100^\circ\text{C}$			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
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		900		pF
Output Capacitance	C_{OSS}			100		pF
Reverse Transfer Capacitance	C_{RSS}			14		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{GS}=10\text{V}$, $V_{DD}=50\text{V}$, $I_D=1.3\text{A}$ $I_G=100\mu\text{A}$ (Note 1, 2)		140		nC
Gate to Source Charge	Q_{GS}			10		nC
Gate to Drain Charge	Q_{GD}			20		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS}=30\text{V}$, $I_D=0.5\text{A}$, $R_G=25\Omega$ $V_{GS}=10\text{V}$ (Note 1, 2)		115		ns
Rise Time	t_R			190		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			500		ns
Fall-Time	t_F			170		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Source-Drain Current	I_{SD}				5.5	A
Source-Drain Current (Pulsed) (Note 1)	I_{SDM}				20	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_{SD}=5.0\text{A}$, $V_{GS}=0\text{V}$			2	V
Reverse Recovery Time	t_{rr}	$I_{SD}=5.0\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$, $V_{GS}=0\text{V}$		525		ns
Reverse Recovery Charge	Q_{RR}	(Note 1)		4.7		nC

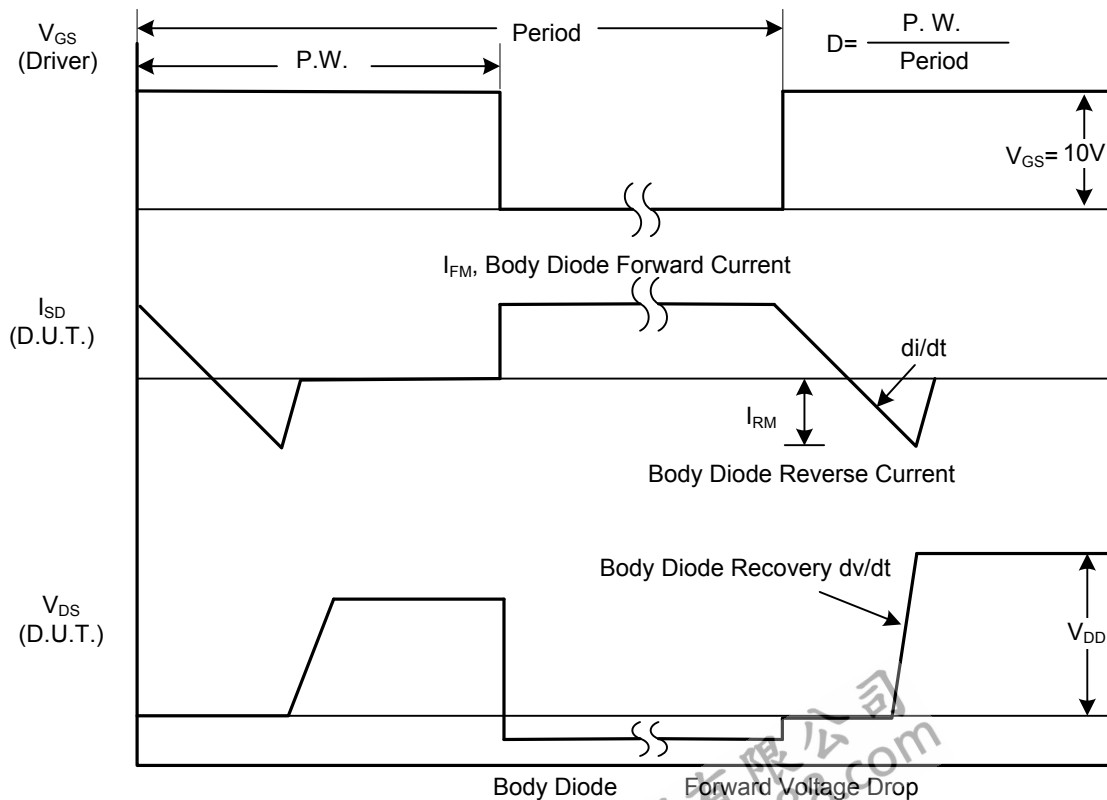
Notes: 1. Pulsed: Pulse duration=300 μs , duty cycle 1.5%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

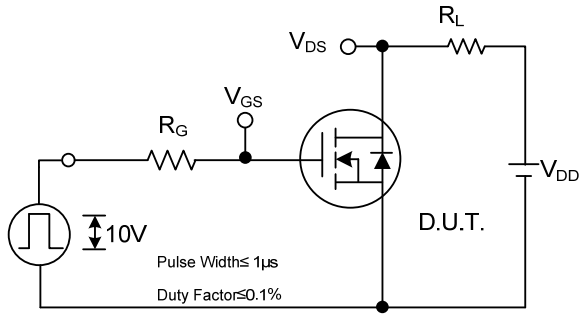


Peak Diode Recovery dv/dt Test Circuit

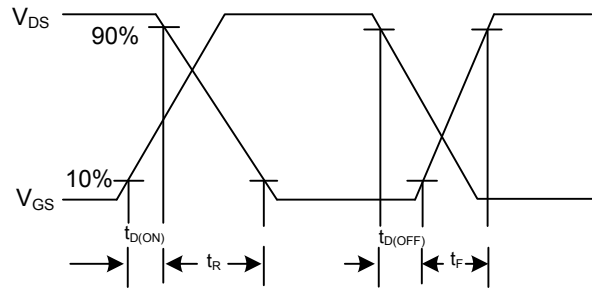


Peak Diode Recovery dv/dt Waveforms

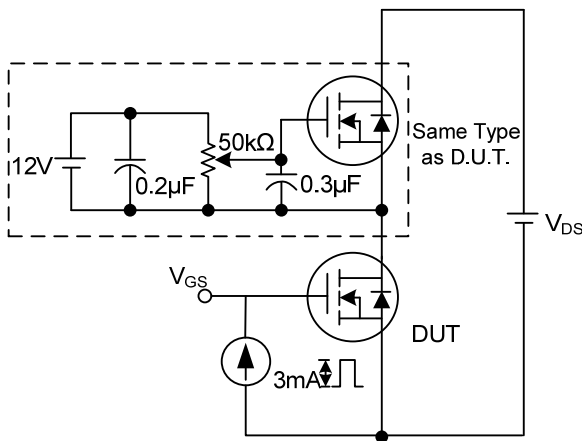
TEST CIRCUITS AND WAVEFORMS(Cont.)



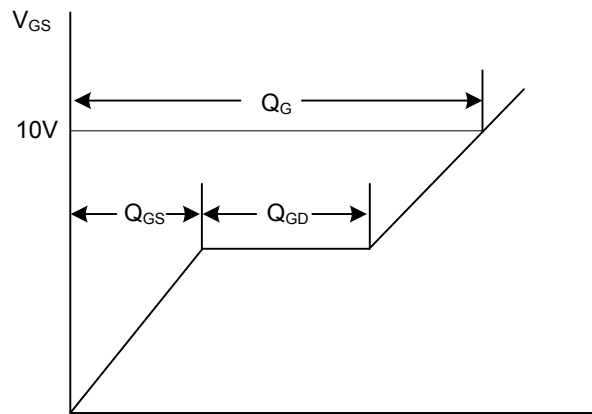
Switching Test Circuit



Switching Waveforms

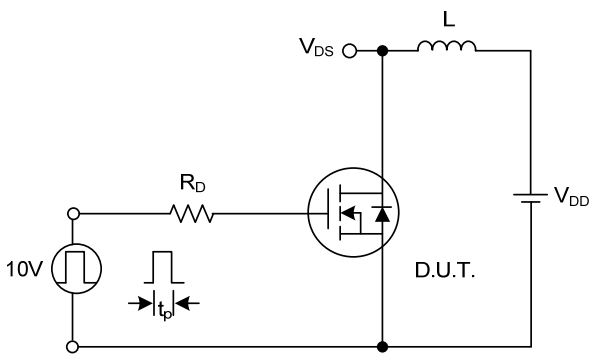


Gate Charge Test Circuit

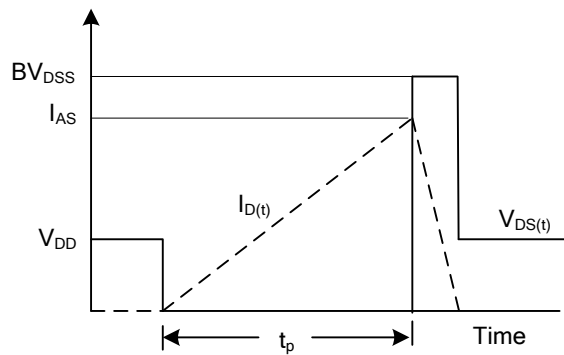


Charge

Gate Charge Waveform

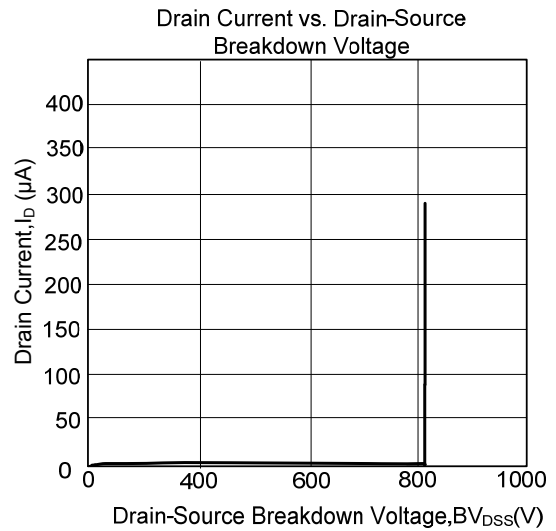
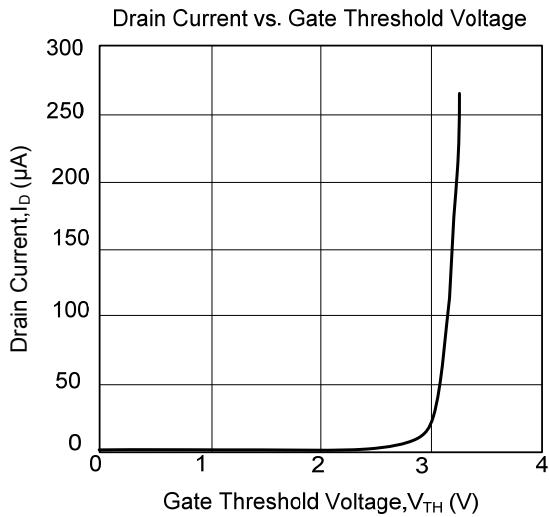
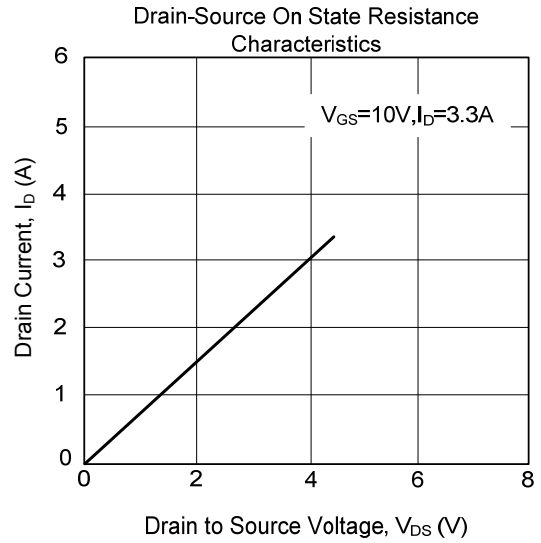
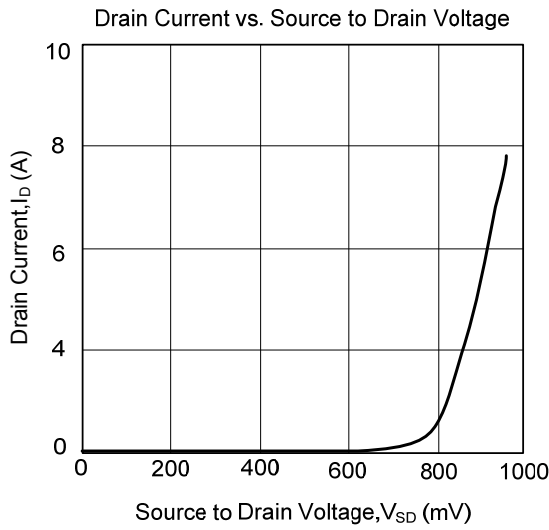


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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