



5N80

Preliminary

Power MOSFET

5A, 800V N-CHANNEL POWER MOSFET

DESCRIPTION

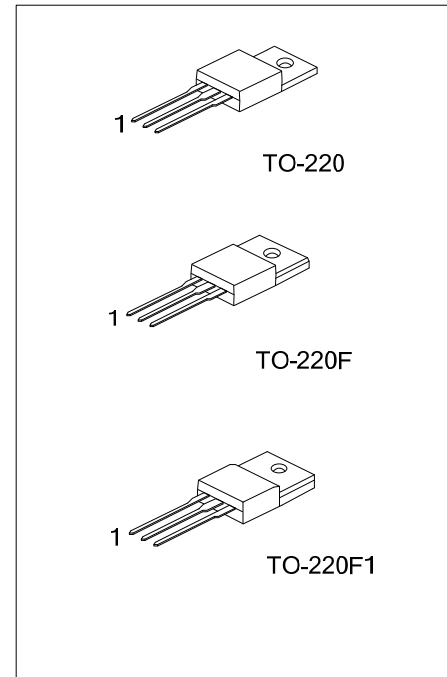
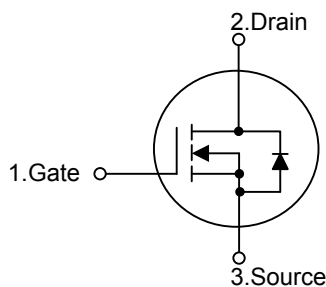
The UTC 5N80 is a N-channel enhancement mode power MOSFET. It use UTC advanced technology to provide avalanche rugged technology and low gate charge.

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

- * $R_{DS(ON)}$: 2.0 Ω (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

5N80L-TA3-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube (2) TA3: TO-220, TF1:TO-220F1, TF3: TO-220F (3) G: Halogen Free, L: Lead Free
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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
Power Dissipation	TO-220	P_D	125	W
	TO-220F /TO-220F1		40	
Derating Factor	TO-220		1	$\text{W}/^{\circ}\text{C}$
	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		θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1	$^{\circ}\text{C}/\text{W}$
	TO-220F /TO-220F1		3.12	

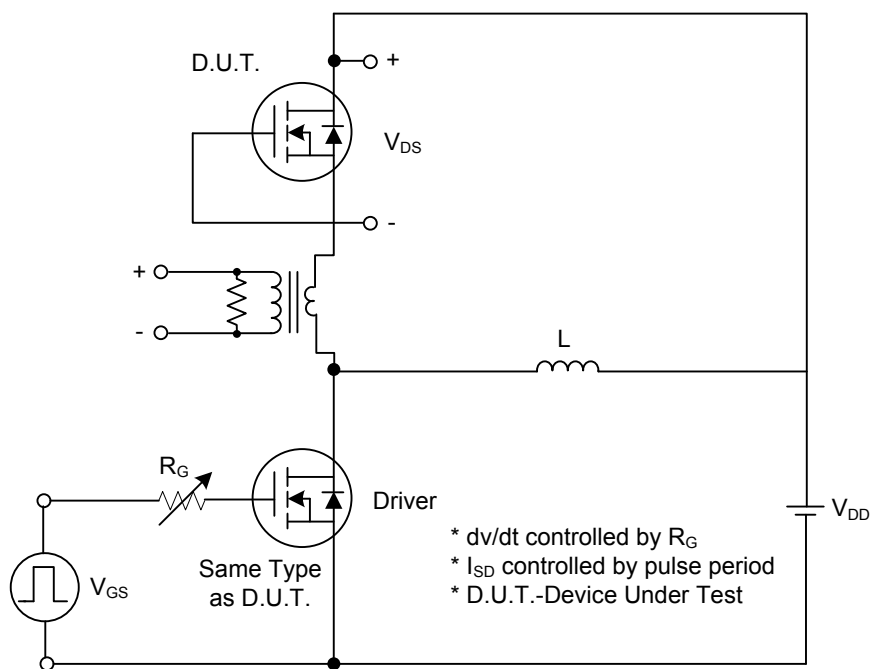
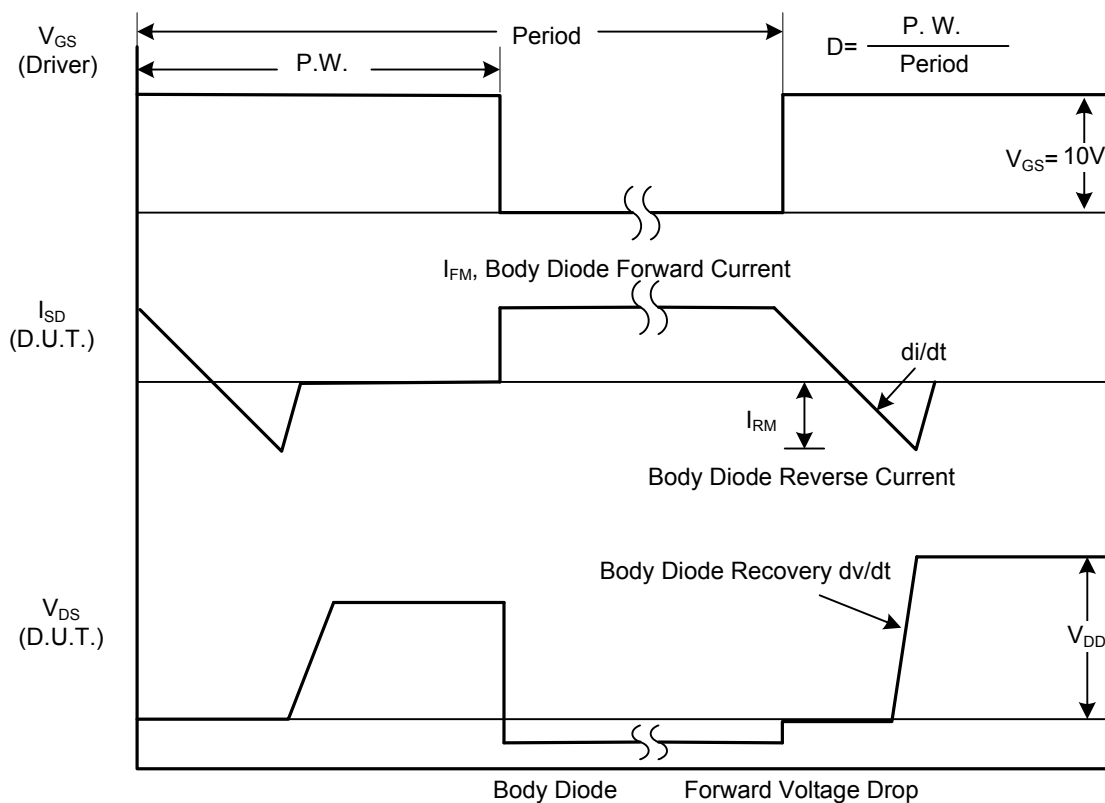
■ **ELECTRICAL CHARACTERISTICS** ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	800			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =800V, V _{GS} =-0V			25	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V			+100	nA
	Reverse		V _{GS} =-30V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3		5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =2.5A		2.0	2.5	Ω
			V _{GS} =10V, I _D =2.5A, T _C =100°C			4	
On State Drain Current		I _{D(ON)}	V _{DS} >I _{D(ON)} ×R _{DS(ON)} max, V _{GS} =10V	5			A
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		1190	1450	pF
Output Capacitance		C _{OSS}			165	200	pF
Reverse Transfer Capacitance		C _{RSS}			70	85	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DD} =500V, I _D =6A (Note 1, 2)		75	95	nC
Gate to Source Charge		Q _{GS}			9		nC
Gate to Drain Charge		Q _{GD}			33		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =400V, I _D =2.5A, R _G =50Ω		50	65	ns
Rise Time		t _R	V _{GS} =10V (Note 1, 2)		85	105	ns
Turn-OFF Delay Time		t _{D(OFF)}	V _{DD} =640V, I _D =5.5A, R _G =50Ω		120	150	ns
Fall-Time		t _F	V _{GS} =10V (Note 1, 2)		30	40	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	I _{SD} =5.5A, V _{GS} =0V			2	V
Reverse Recovery Time		t _{rr}	I _{SD} =5.5A, dI/dt=100A/μs, V _{DD} =80V, T _J =150°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

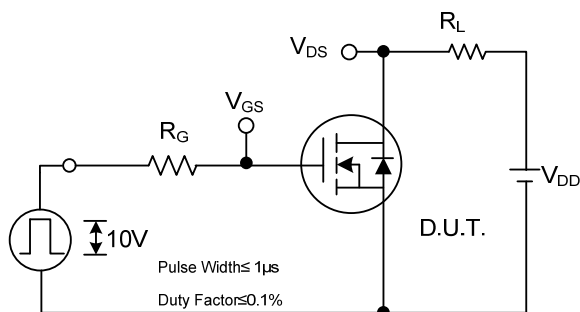
Notes: 1. Pulsed: Pulse duration=300 μs , duty cycle 1.5%.

2. Essentially independent of operating temperature

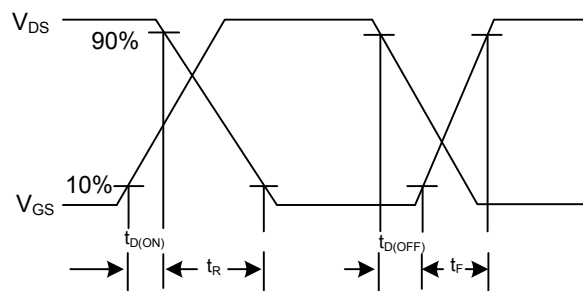
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test CircuitPeak Diode Recovery dv/dt Waveforms

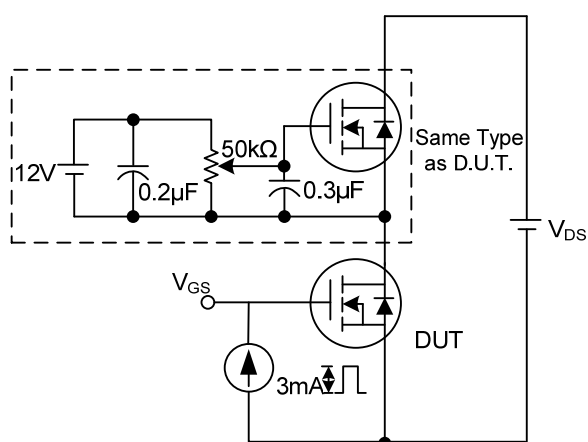
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



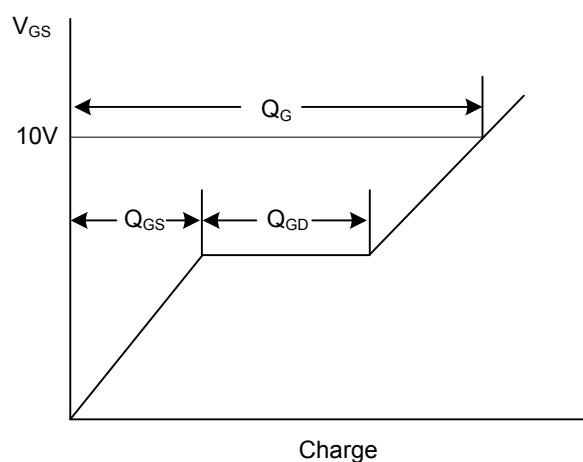
Switching Test Circuit



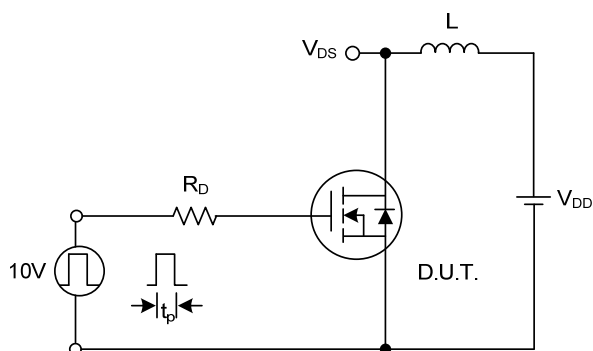
Switching Waveforms



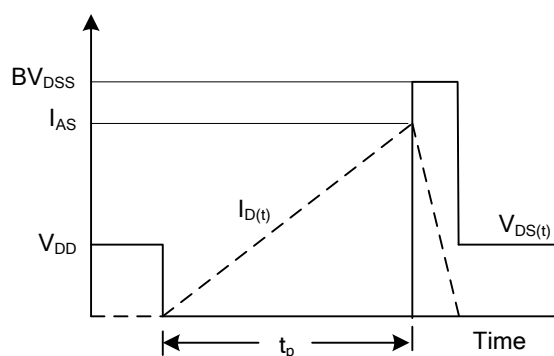
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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