



5N80Z

Preliminary

Power MOSFET

5.0A, 800V N-CHANNEL POWER MOSFET

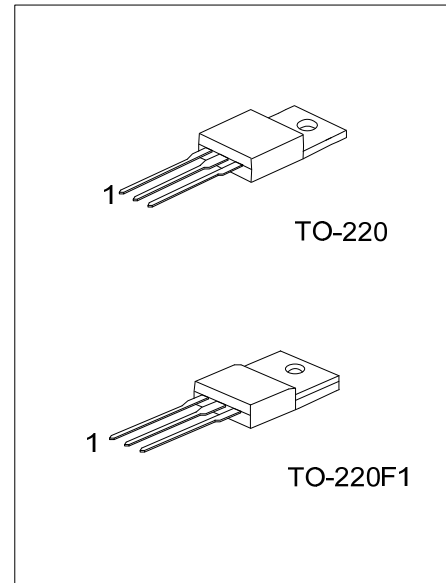
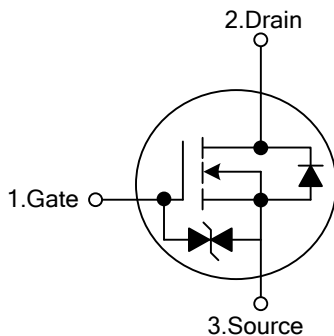
DESCRIPTION

The UTC **5N80Z** is a high voltage and high current power MOSFET, designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

FEATURES

- * $R_{DS(ON)} \leq 2.0 \Omega @ V_{GS} = 10V, I_D = 2.5A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



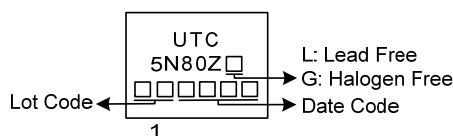
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
5N80ZL-TA3-T	5N80ZG-TA3-T	TO-220	G	D	S	Tube
5N80ZL-TF1-T	5N80ZG-TF1-T	TO-220F1	G	D	S	Tube

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

<p>5N80ZL-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ 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}	± 20	V
Avalanche Current (Note 2)		I_{AR}	5	A
Drain Current	Continuous	I_D	5	A
	Pulsed (Note 2)	I_{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	500	mJ
Power Dissipation	TO-220	P_D	125	W
	TO-220F1		40	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operating Temperature		T_{OPR}	-55 ~ +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. $L = 40\text{mH}$, $I_{AS} = 5.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	TO-220	θ_{JC}	1.0	$^\circ\text{C/W}$
	TO-220F1		3.12	$^\circ\text{C/W}$

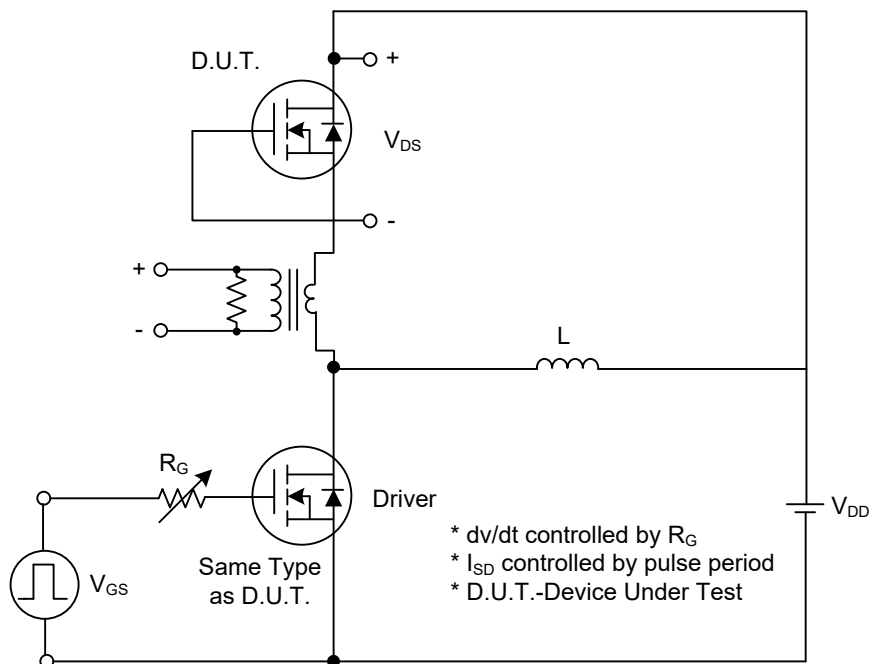
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	800			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =800V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}			5	μA
	Reverse					
		V _{GS} =-20V, V _{DS} =0V			-5	μA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.7		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		5.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.5A			2.0	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		860		pF
Output Capacitance	C _{OSS}			208		pF
Reverse Transfer Capacitance	C _{RSS}			13		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A (Note1,2)		32		nC
Gate-Source Charge	Q _{GS}			9		nC
Gate-Drain Charge	Q _{GD}			9.4		nC
Turn-On Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _G =25Ω (Note1,2)		80		ns
Turn-On Rise Time	t _R			115		ns
Turn-Off Delay Time	t _{D(OFF)}			155		ns
Turn-Off Fall Time	t _F			80		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =5.5A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I _S				5	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				20	A
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _S =5A,		450		ns
Reverse Recovery Charge	Q _{rr}	dI _F /dt=100A/μs(Note2)		5		μC

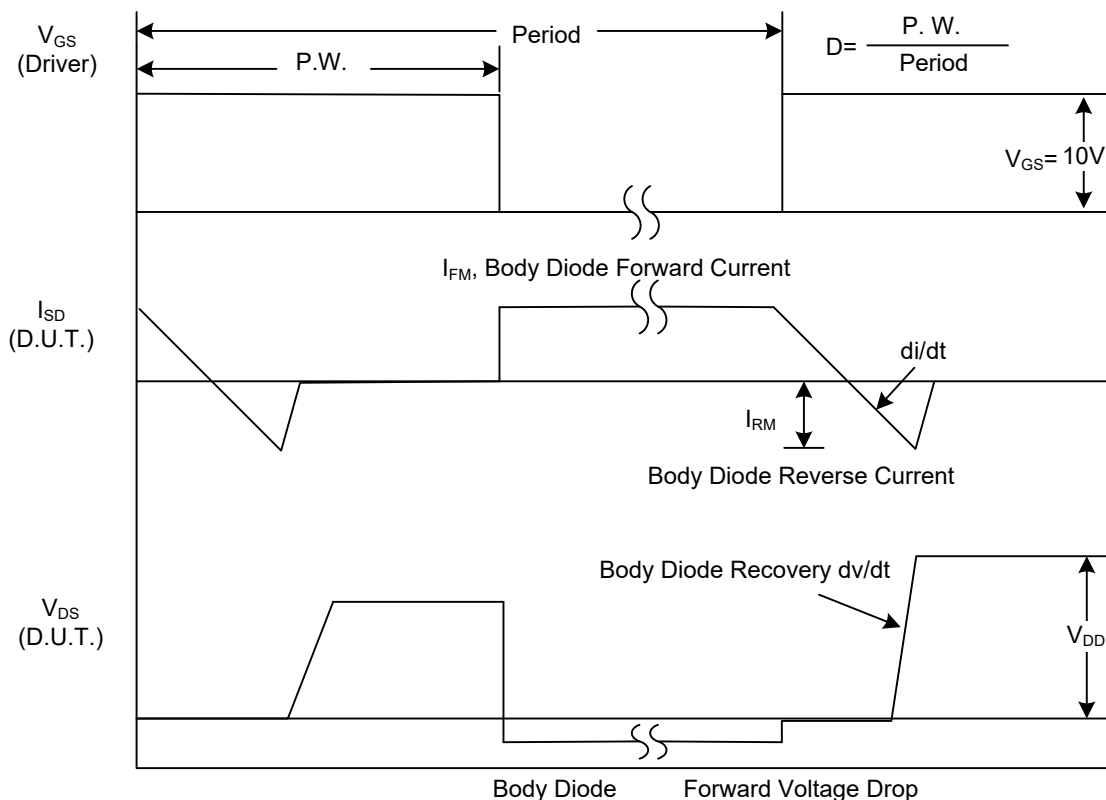
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

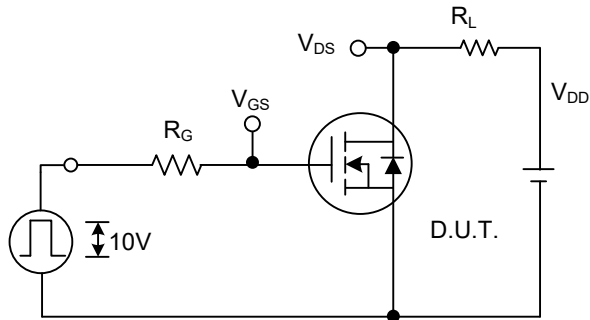


Peak Diode Recovery dv/dt Test Circuit

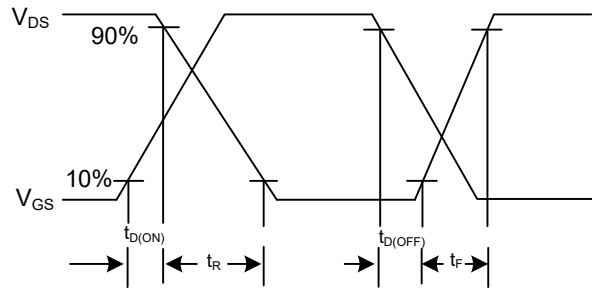


Peak Diode Recovery dv/dt Waveforms

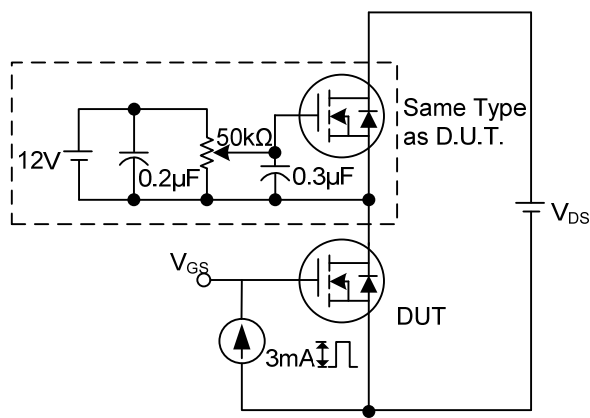
TEST CIRCUITS AND WAVEFORMS



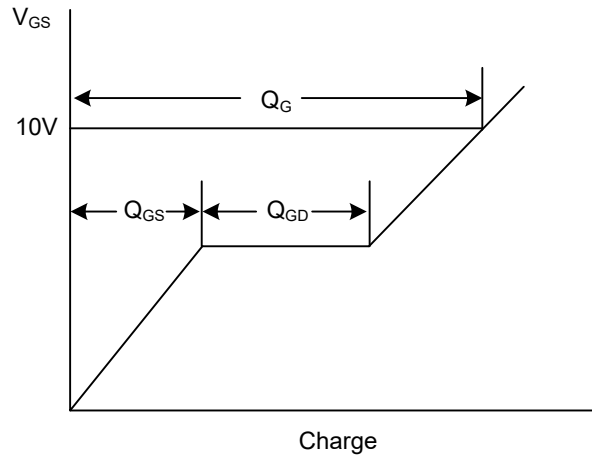
Switching Test Circuit



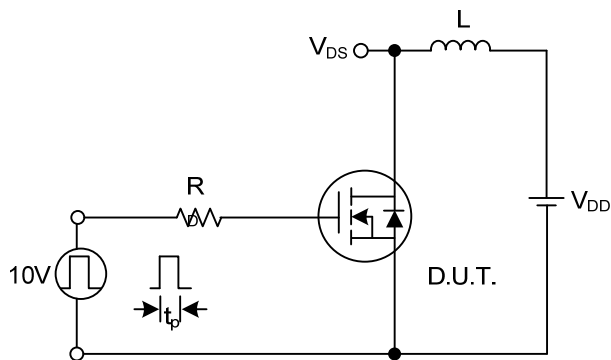
Switching Waveforms



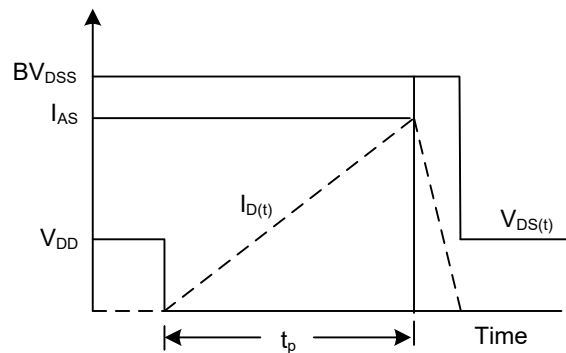
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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