

3N80Z

Power MOSFET

3A, 800V N-CHANNEL POWER MOSFET

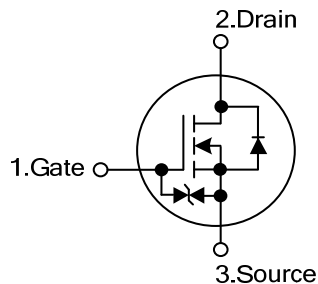
DESCRIPTION

The **3N80Z** 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

- * $R_{DS(ON)} < 4.2\Omega$ @ $V_{GS}=10V$, $I_D=1.5A$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

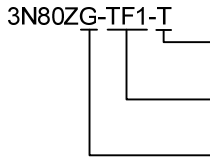
SYMBOL



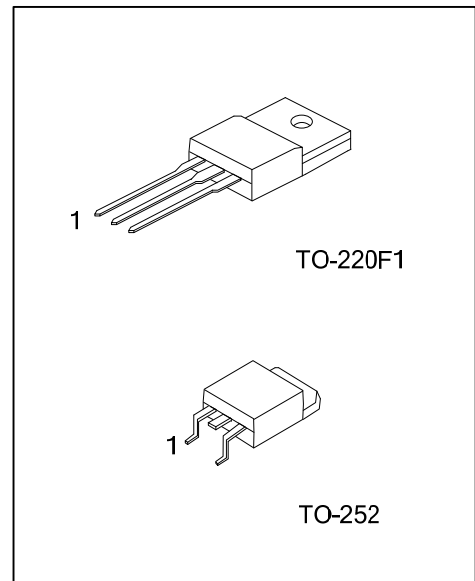
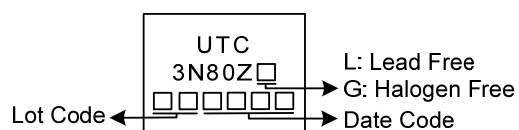
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
3N80ZL-TF1-T	3N80ZG-TF1-T	TO-220F1	G	D	S	Tube
3N80ZL-TN3-R	3N80ZG-TN3-R	TO-252	G	D	S	Tape Reel

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

	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type	(2) TF1: TO-220F1, TN3: TO-252
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage ($V_{GS}=0\text{V}$)	V_{DSS}	800	V
Gate-Source Voltage	V_{GSS}	± 20	V
Minimum Gate-Source Breakdown Voltage ($I_{GS}=\pm 1\text{mA}$)	BV_{GSO}	30	V
Continuous Drain Current	I_D	3.0	A
Pulsed Drain Current	I_{DM}	12	A
Avalanche Current (Note 2)	I_{AR}	4.0	A
Single Pulse Avalanche Energy (Note 3)	E_{AS}	150	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	3.1	V/ns
Power Dissipation	TO-220F1	P_D	25
	TO-252		50
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. $L=35\text{mH}$, $I_{AS}=3.0\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$.

4. $I_{SD}\leq 3.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F1	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220F1	θ_{JC}	5.0	$^{\circ}\text{C}/\text{W}$
	TO-252		2.5	$^{\circ}\text{C}/\text{W}$

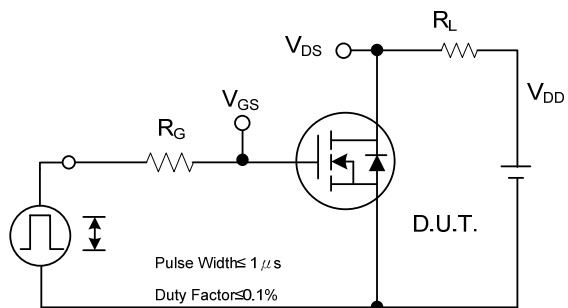
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	800			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =800V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		4.5	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =1.5A			4.2	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		625		pF
Output Capacitance	C _{OSS}			63		pF
Reverse Transfer Capacitance	C _{RSS}			9		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =100V, V _{GS} =10V, I _D =3.0A, I _G =1mA (Note 1, 2)		18.5		nC
Gate to Source Charge	Q _{GS}			5.4		nC
Gate to Drain Charge	Q _{GD}			5.7		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =3.0A, R _G =25Ω (Note 1, 2)		11.2		ns
Rise Time	t _R			20.2		ns
Turn-OFF Delay Time	t _{D(OFF)}			64		ns
Fall-Time	t _F			42.2		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _{SD}				3.0	A
Maximum Body-Diode Pulsed Current	I _{SDM}				12	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =3.0A ,V _{GS} =0V			1.6	V
Reverse Recovery Time	t _{rr}	I _S =3.0A, V _{GS} =0V,		380		ns
Reverse Recovery Charge	Q _{rr}	di _F /dt=100A/μs		3.48		μC

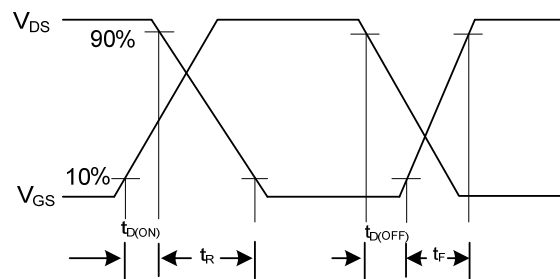
Notes: 1. Pulse width=300 μs , Duty cycle $\leq 1.5\%$

2. $C_{OSS(EQ)}$ is defined as constant equivalent capacitance giving the same charging time as C_{OSS} when V_{DS} increases from 0 to 80% V_{DSS} .

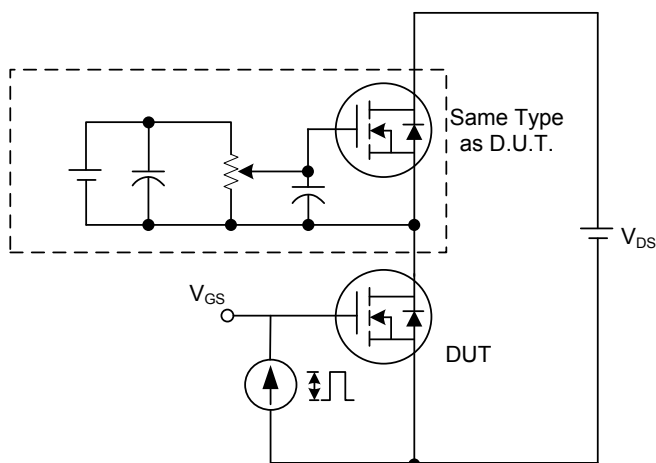
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



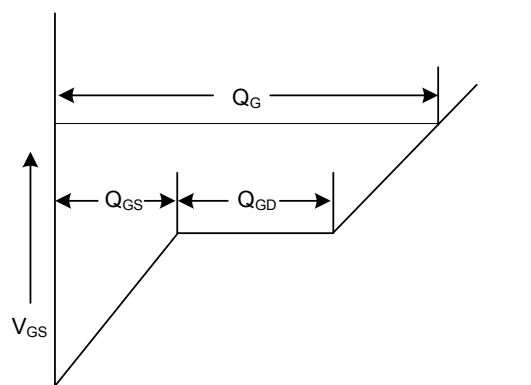
Switching Test Circuit



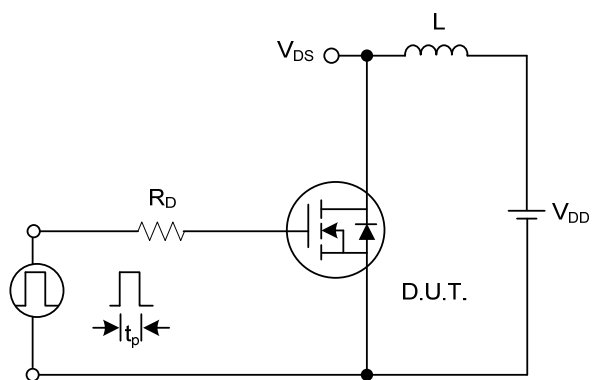
Switching Waveforms



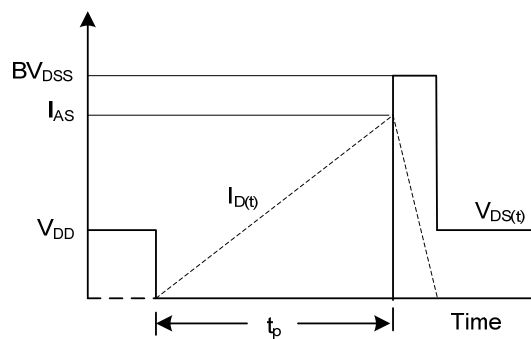
Gate Charge Test Circuit



Gate Charge Waveform

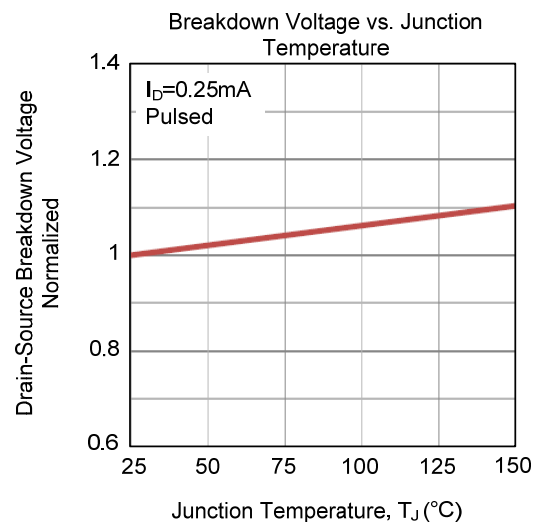
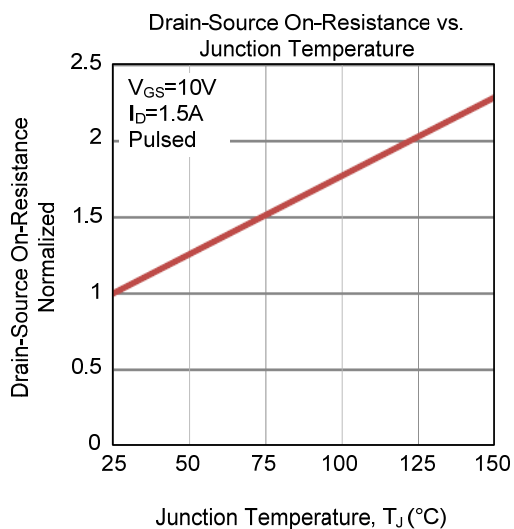
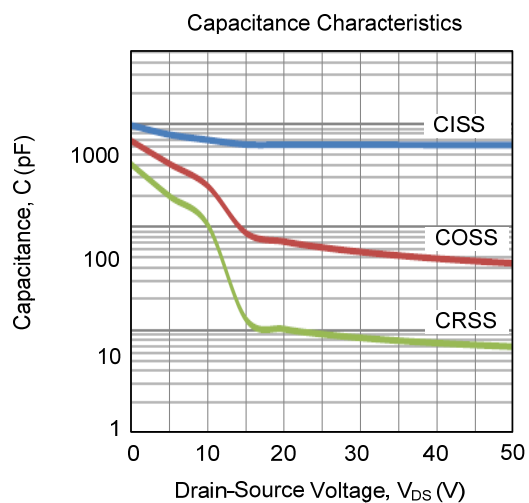
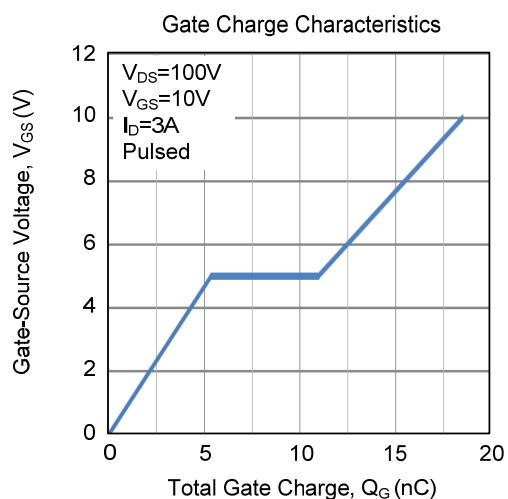
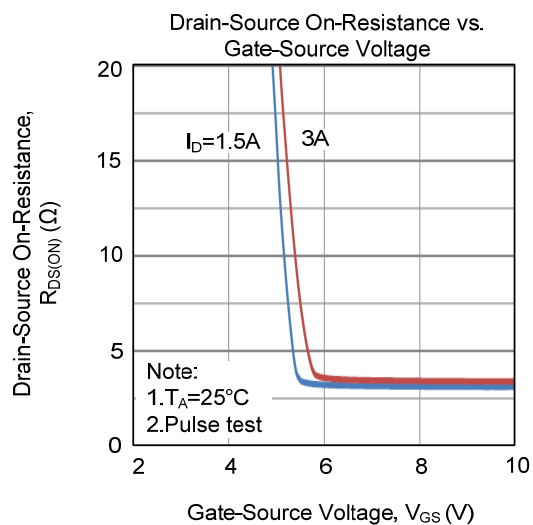
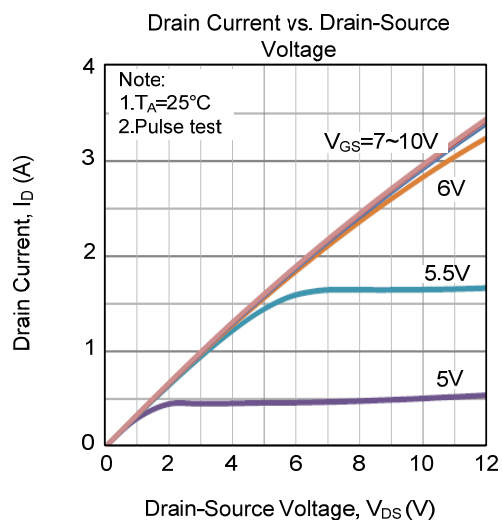


Unclamped Inductive Switching Test Circuit

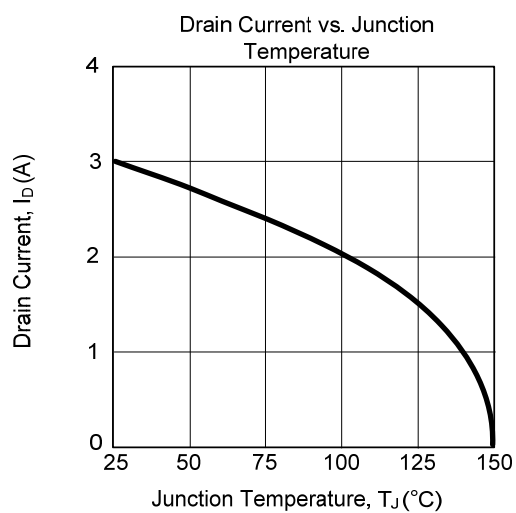
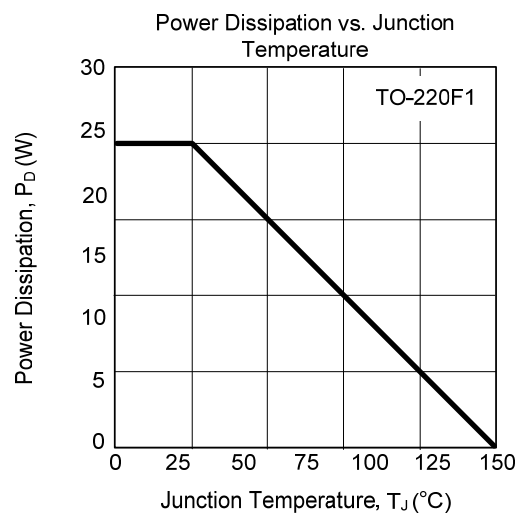
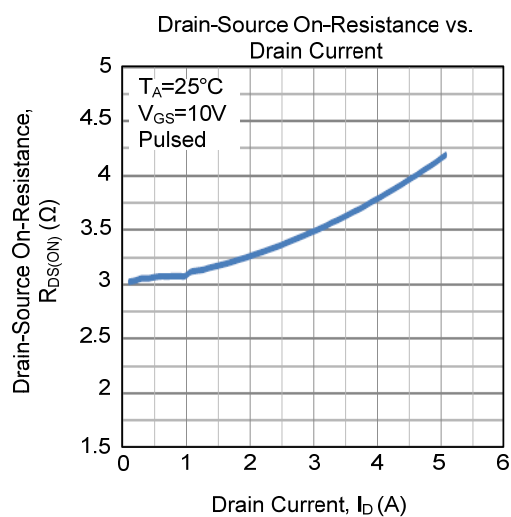
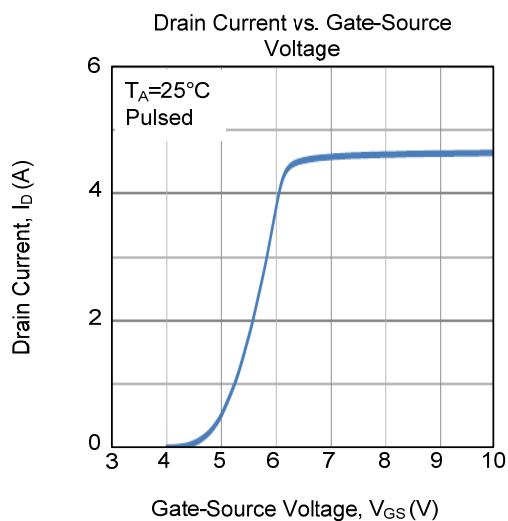
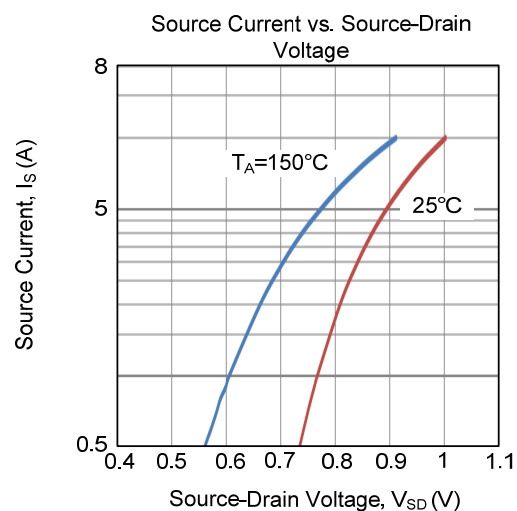
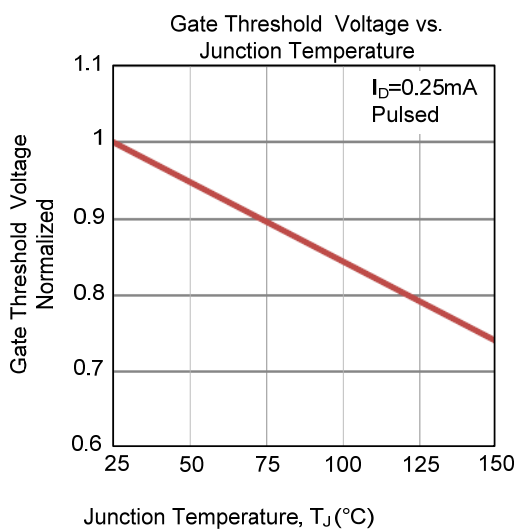


Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)

