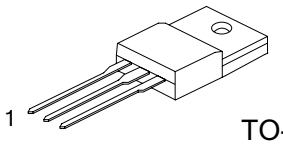
NJ8N80 POWER MOSFET

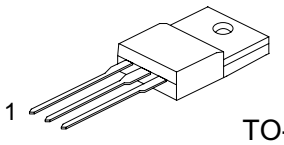
8.0A 800V N-CHANNEL POWER MOSFET

■ DESCRIPTION

The NJ8N80 is an N-channel mode power MOSFET, it uses advanced technology to provide costumers planar stripe and DMOS technology. This technology allows a minimum on-state resistance, superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode. The NJ8N80 is generally applied in high efficiency switch mode power supplies.



TO-220

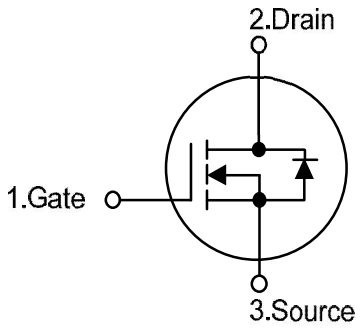


TO-220F

■ FEATURES

* V_{DS} = 800V ID = 8.0A
* ypically 35 nC Low Gate Charge
* $R_{DS(ON)}$ =1.45Ω@V_{GS} = 10V.
* Typically 13 pF Low CRSS
* Improved dv/dt Capability
* Fast switching capability
* Avalanche energy specified
* RoHS–Compliant Product

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
NJ8N80-LI	TO-220	G	D	S	Tape Box
NJ8N80-BL	TO-220	G	D	S	Bulk
NJ8N80F-LI	TO-220F	G	D	S	Tube

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

NJ8N80 POWER MOSFET

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current (Continuous) (T_C=25°C)		I_D	8	A
Drain Current (Pulsed) (Note 1)		I_{DM}	32	A
Avalanche Current (Note 1)		I_{AR}	8	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	850	mJ
Repetitive Avalanche Energy (Note 1)		E_{AR}	17.8	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Power Dissipation	TO-220	P_D	178	W
	TO-220F		59	
Linear Derating Factor above T_C=25°C	TO-220		1.43	W/°C
	TO-220F		0.47	
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 25mH, I_{AS} = 8A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ 8A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. 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

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	°C/W
Junction to Case	TO-220	θ_{JC}	0.7	°C/W
	TO-220F		2.1	

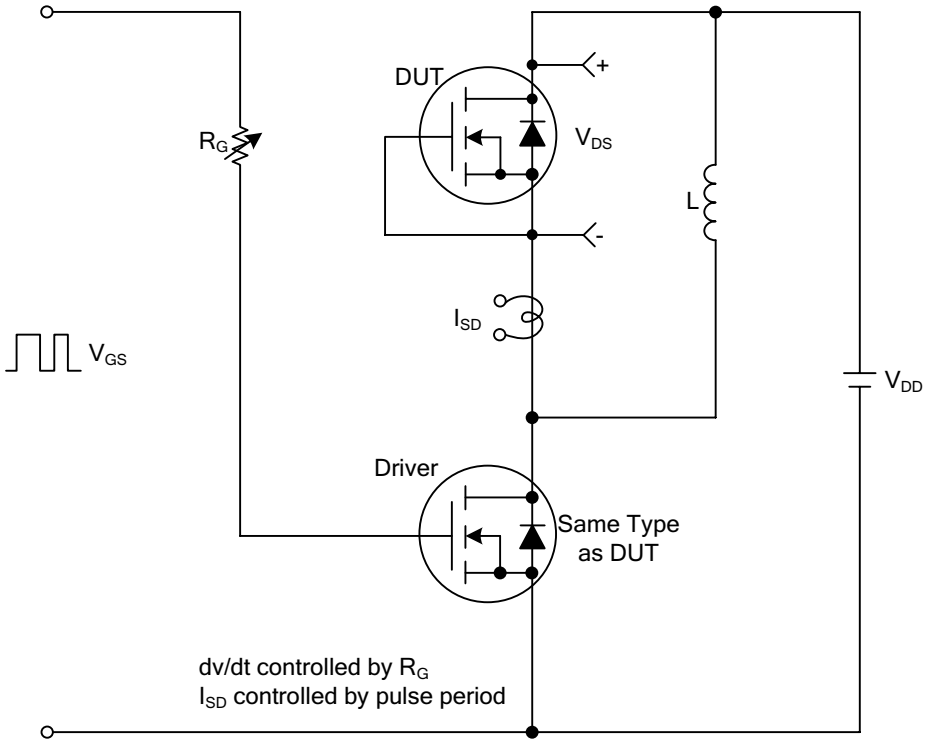
NJ8N80 POWER MOSFET

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

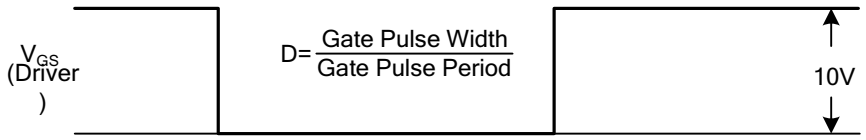
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	800			V
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=250μA		0.5		V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=800V, V_{GS}=0V			10	μA
		V_{DS}=640V, T_C=125°C			100	
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
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=4A		1.18	1.45	Ω
Forward Transconductance (Note 1)	g_{FS}	V_{DS}=50V, I_D=4A		5.6		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1580	2050	pF
Output Capacitance	C_{OSS}			135	175	pF
Reverse Transfer Capacitance	C_{RSS}			13	17	pF
SWITCHING PARAMETERS (Note 1, Note 2)						
Total Gate Charge	Q_G	V_{GS}=10V, V_{DS}=640V, I_D=8A		35	45	nC
Gate to Source Charge	Q_{GS}			10		nC
Gate to Drain Charge	Q_{GD}			14		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=400V, I_D=8A, R_G=25Ω		40	90	ns
Rise Time	t_R			110	230	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			65	140	ns
Fall-Time	t_F			70	150	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				8	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				32	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=8A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	I_S=8A, V_{GS}=0V, dI_F/dt=100A/μs		690		ns
Reverse Recovery Charge (Note 1)	Q_{RR}			8.2		μC

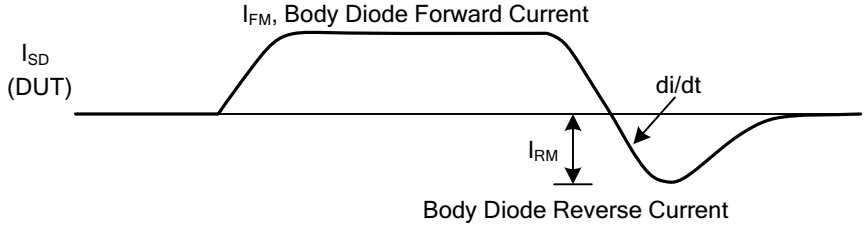
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

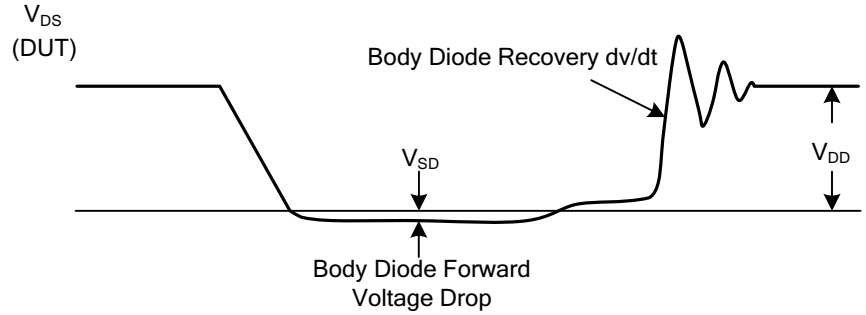
■ TEST CIRCUITS AND WAVEFORMS



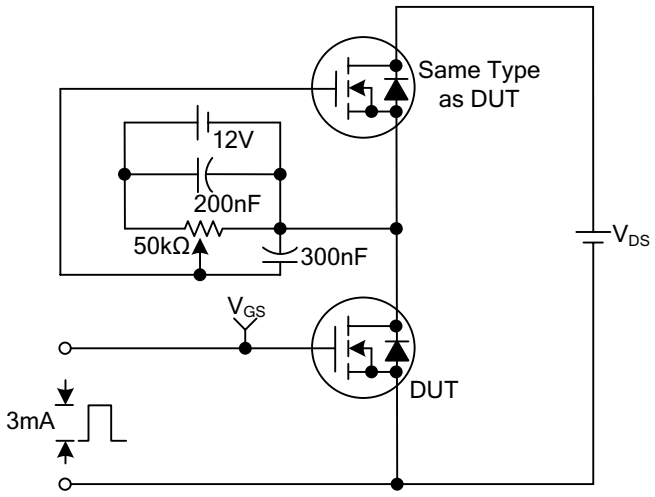
Peak Diode Recovery dv/dt Test Circuit & Waveforms



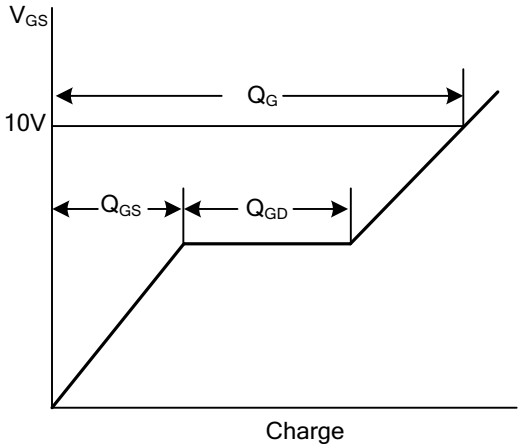




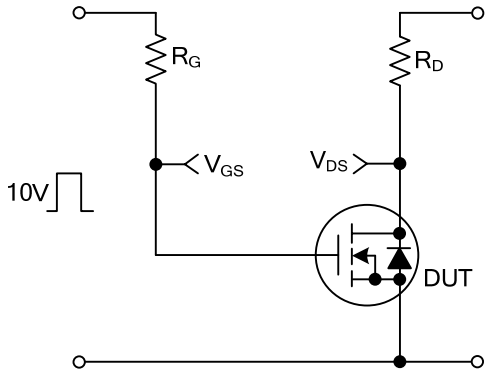
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



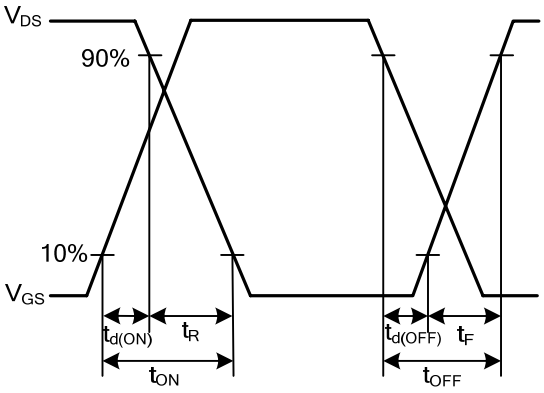
Gate Charge Test Circuit



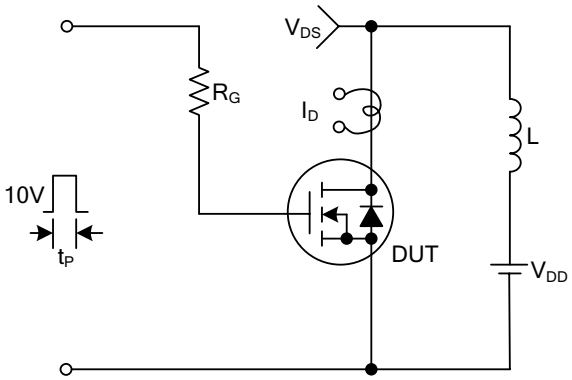
Gate Charge Waveforms



Resistive Switching Test Circuit

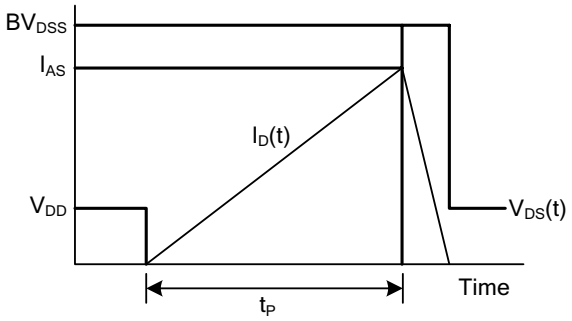


Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit

$$E_{AS}=\frac{1}{2}LI_{AS}^{2}\frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS