

NJ7N65 POWER MOSFET



7.0A 650V N-CHANNEL POWER MOSFET

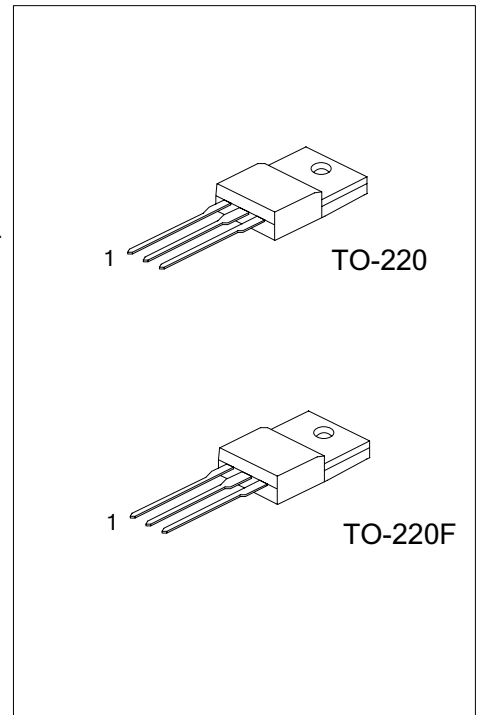
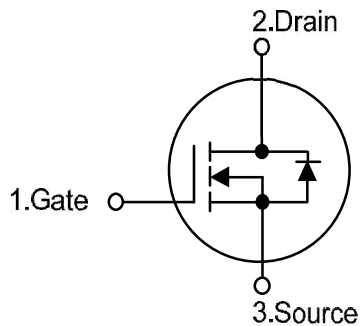
DESCRIPTION

The NJ7N65 is an N-channel mode power MOSFET using advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode. The NJ7N80 is universally applied in high efficiency switch mode power supply.

FEATURES

- * $V_{DS} = 650V$
- * $I_D = 7.0A$
- * $R_{DS(on)} = 1.8 \text{ ohm}@V_{GS} = 10V$
- * High switching speed
- * 100% avalanche tested

SYMBOL



ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
NJ7N65-LI	TO-220	G	D	S	Tape Box
NJ7N65-BL	TO-220	G	D	S	Bulk
NJ7N65F-LI	TO-220F	G	D	S	Tube

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

NJ7N65 POWER MOSFET

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	650	V
Gate-Source Voltage		V _{GSS}	±30	V
Avalanche Current (Note 2)		I _{AR}	7.4	A
Drain Current	Continuous	I _D	7.4	A
	Pulsed (Note 2)	I _{DM}	29.6	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	530	mJ
	Repetitive (Note 2)	E _{AR}	14.2	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220	P _D	142	W
	TO-220F		48	
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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 = 19.5mH, I_{AS} = 7.4A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

4. I_{SD} ≤ 7.4A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ _{JA}	62.5	°C/W
Junction to Case	TO-220	θ _{JC}	0.88	°C/W
	TO-220F		2.6	

NJ7N65 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}	V _{GS} = 0V, I _D = 250μA	650			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS} V _{GS} = 30V, V _{DS} = 0V			100	nA
	Reverse				-100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.67		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 3.7A	7N65	0.94	1.2	Ω
			7N65-F	0.94	1.2	
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0 MHz			1400	pF
Output Capacitance	C _{OSS}				180	pF
Reverse Transfer Capacitance	C _{RSS}			16	21	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 325V, I _D = 7.4A, R _G = 25Ω (Note 1, 2)			70	ns
Turn-On Rise Time	t _R				170	ns
Turn-Off Delay Time	t _{D(OFF)}				140	ns
Turn-Off Fall Time	t _F				130	ns
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =520V, I _D =7.4A, V _{GS} =10 V (Note 1, 2)		29	38	nC
Gate-Source Charge	Q _{GS}			7		nC
Gate-Drain Charge	Q _{GD}			14.5		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S = 7.4 A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I _S				7.4	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				29.6	A
Reverse Recovery Time	t _{rr}	V _{GS} = 0V, I _S = 7.4 A,		320		ns
Reverse Recovery Charge	Q _{RR}	dI _F / dt = 100A/μs (Note 1)		2.4		μC

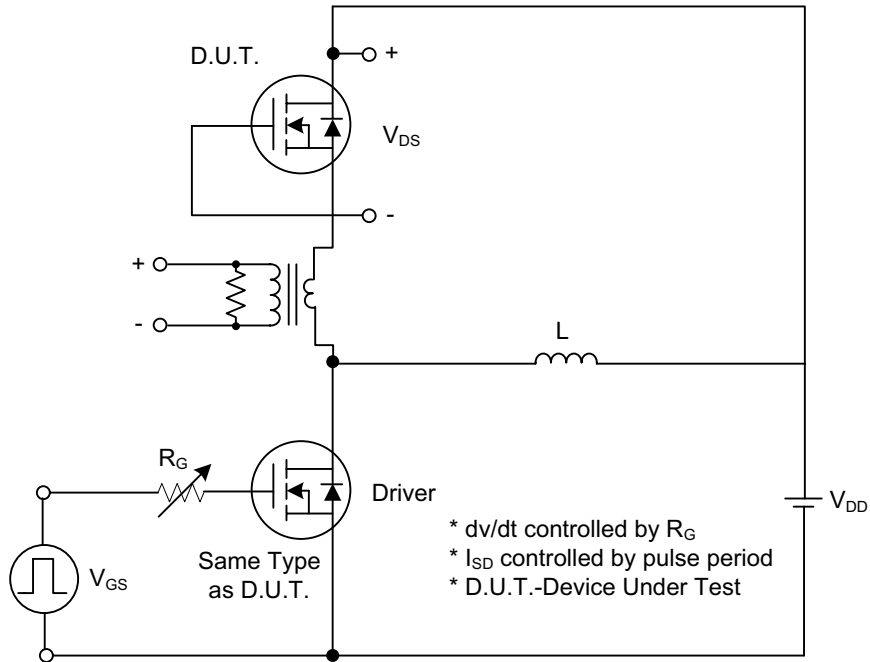
- Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

■ CLASSIFICATION OF R_{DS(ON)}

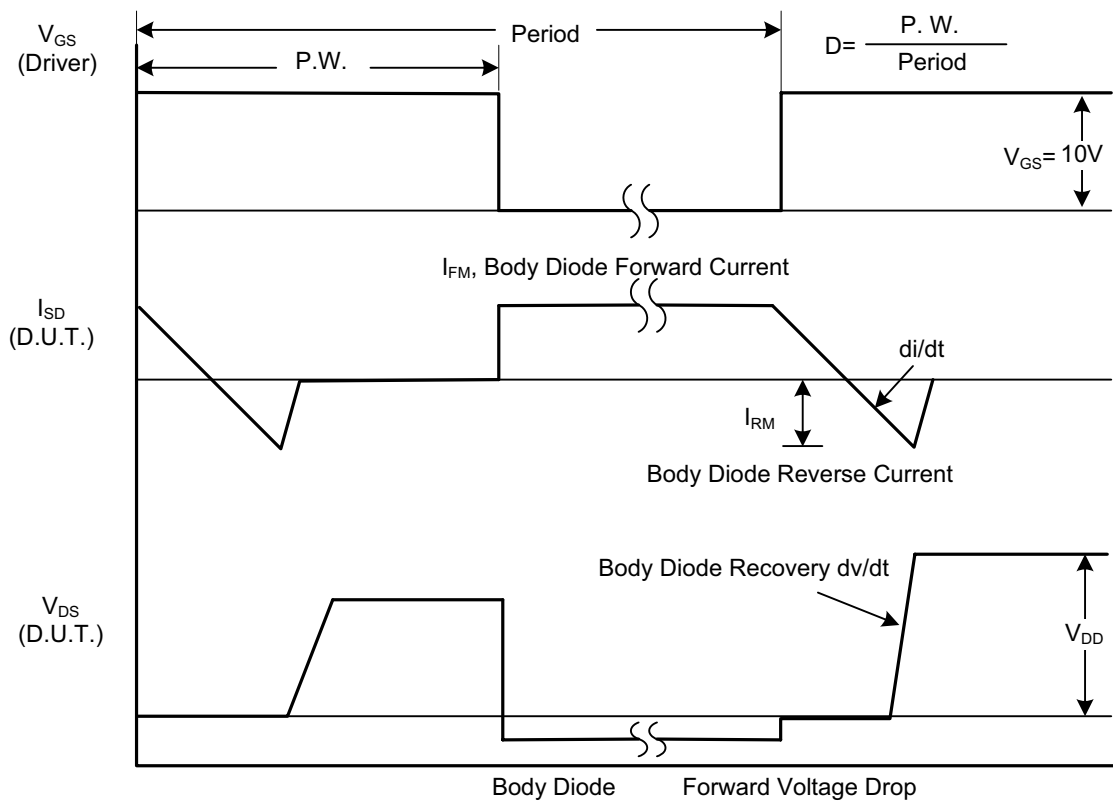
RANK	-	F
VALUE	1.2Ω	1.2Ω

NJ7N65 POWER MOSFET

■ TEST CIRCUITS AND WAVEFORMS



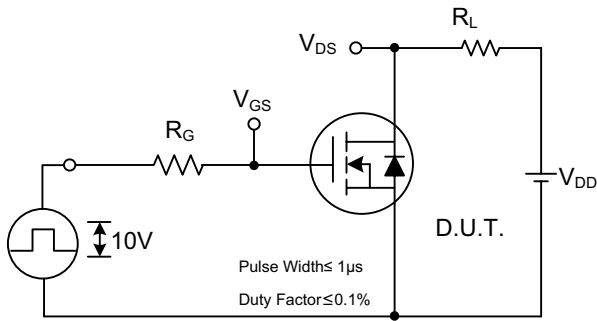
Peak Diode Recovery dv/dt Test Circuit



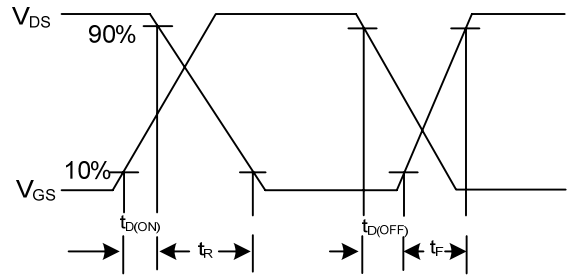
Peak Diode Recovery dv/dt Waveforms

NJ7N65 POWER MOSFET

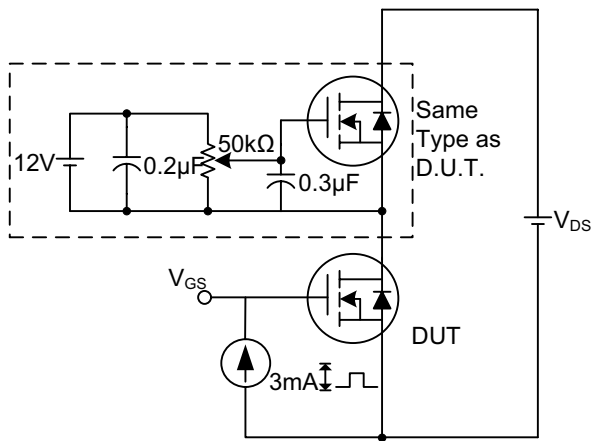
TEST CIRCUITS AND WAVEFORMS (Cont.)



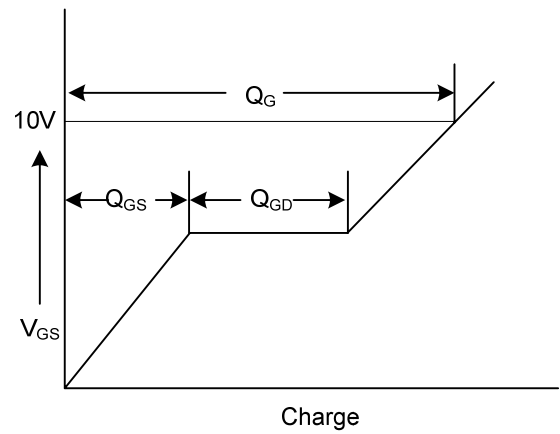
Switching Test Circuit



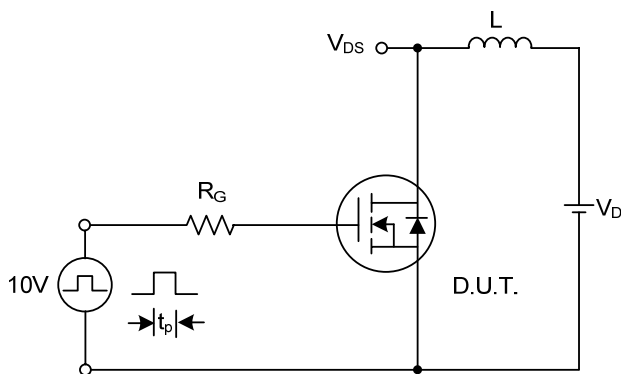
Switching Waveforms



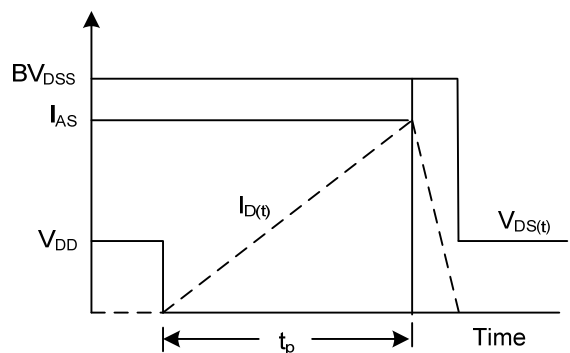
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

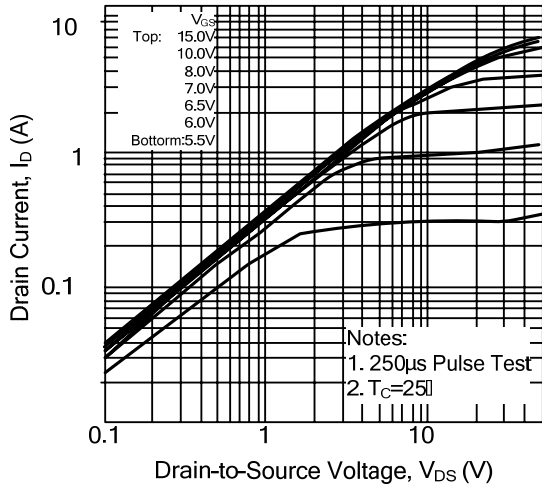


Unclamped Inductive Switching Waveforms

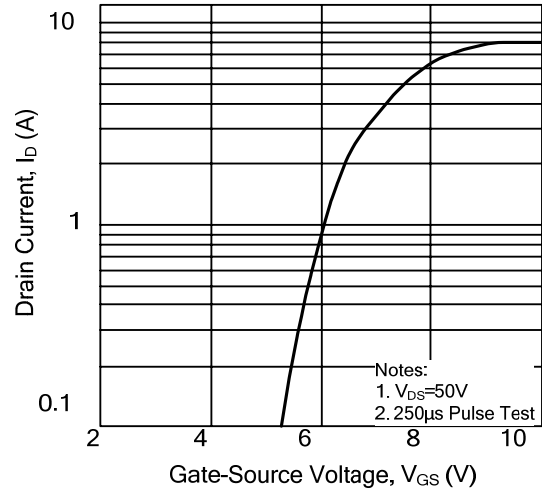
NJ7N65 POWER MOSFET

TYPICAL CHARACTERISTICS

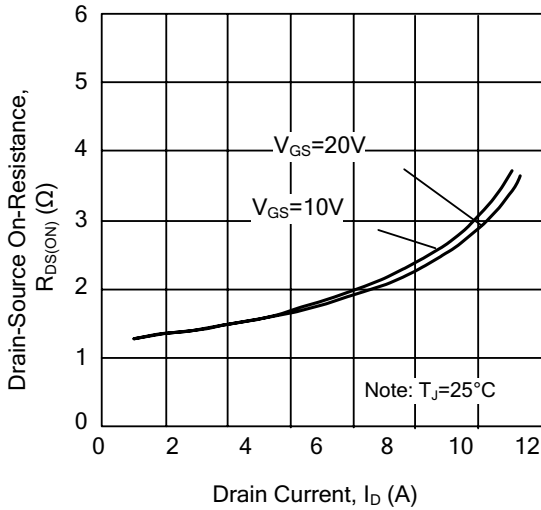
On-State Characteristics



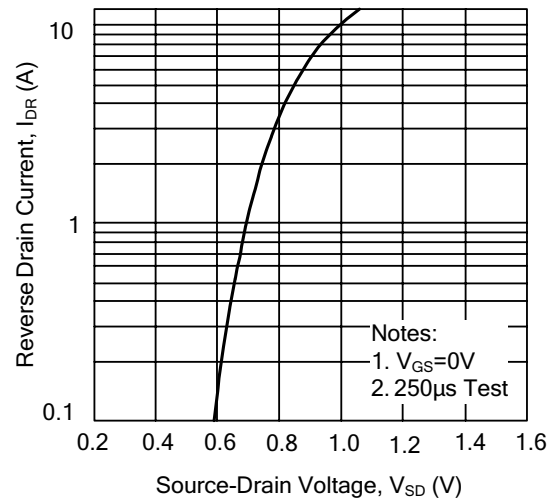
Transfer Characteristics



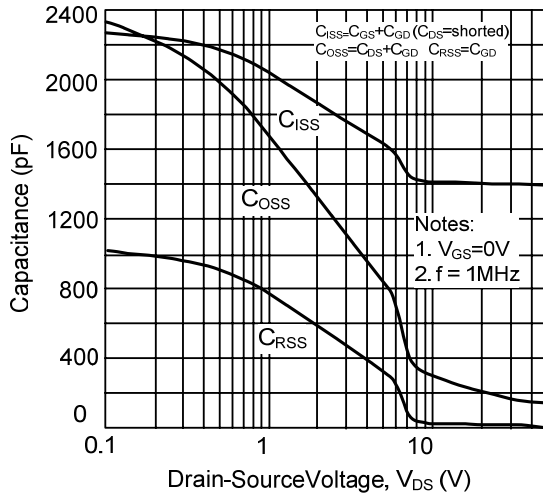
On-Resistance Variation vs. Drain Current and Gate Voltage



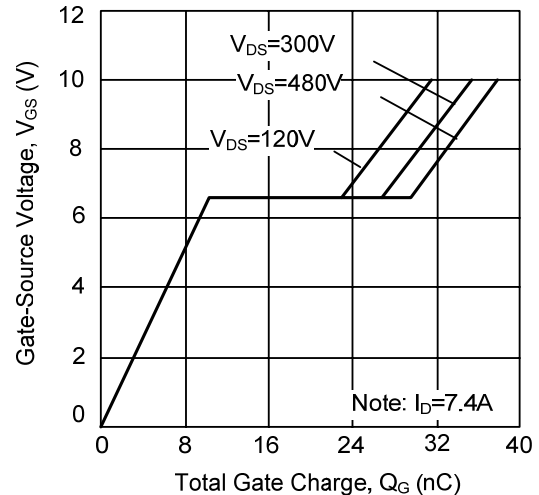
On State Current vs. Allowable Case Temperature



Capacitance Characteristics (Non-Repetitive)



Gate Charge Characteristics



NJ7N65 POWER MOSFET

■ TYPICAL CHARACTERISTICS(Cont.)

