



**F9N100-FC**

Preliminary

**POWER MOSFET**

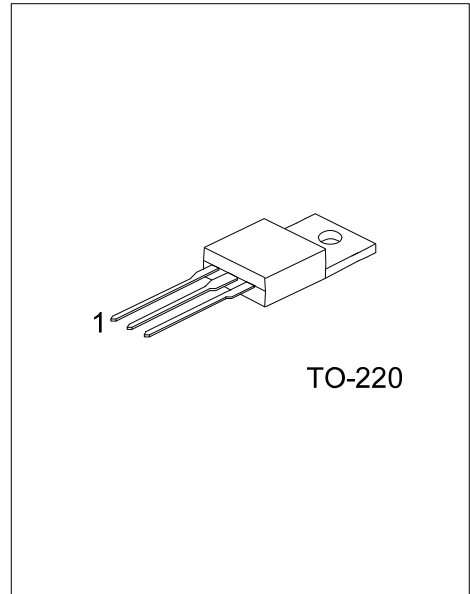
**9.0A, 1000V N-CHANNEL  
POWER MOSFET**

■ DESCRIPTION

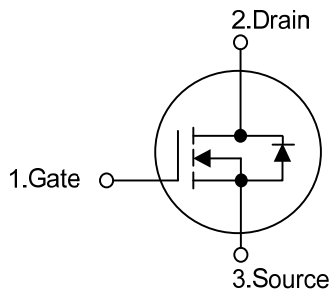
The UTC **F9N100-FC** N-Channel enhancement mode silicon gate power MOSFET with Fast Body Diode. is designed high voltage, high speed power switching applications such. such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics.

■ FEATURES

- \*  $R_{DS(ON)} \leq 2.2 \Omega @ V_{GS}=10V, I_D=4.5A$
- \* Fast body diode MOSFET technology
- \* Low switching losses due to reduced  $Q_{rr}$
- \* Fast Switching Speeds
- \* 100% avalanche tested
- \* Linear Transfer Characteristics
- \* High Input Impedance
- \* Avalanche energy tested



■ SYMBOL



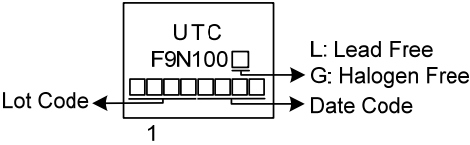
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
F9N100L-TA3-T	F9N100G-TA3-T	TO-220	G	D	S	Tube

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

<p>F9N100G-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220</p> <p>(3) G: Halogen Free and Lead Free L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	1000	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Drain Current	DC	$I_D$	9
	Pulsed (Note 2)	$I_{DM}$	18
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	375
Peak Diode Recovery dv/dt (Note 4)	dv/dt	5.4	V/ns
Power Dissipation	$P_D$	155	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-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.  $L=30\text{mH}$ ,  $I_{AS} = 5.0\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .

4.  $I_{SD} \leq 9.0\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$ .

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	0.8	$^\circ\text{C}/\text{W}$

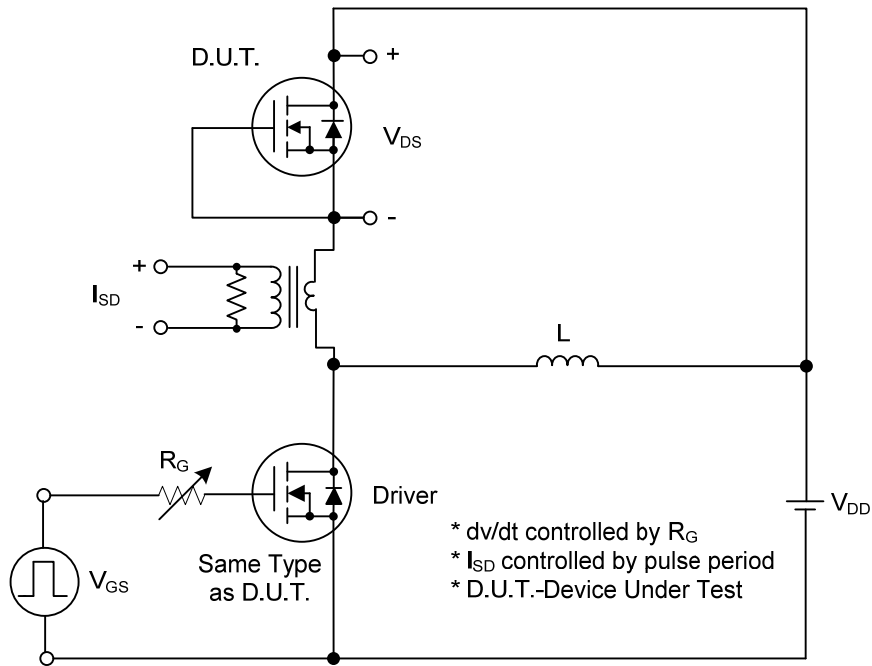
■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	1000			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =1000V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub> V <sub>GS</sub> =+30V, V <sub>DS</sub> =0V			+10	μA
	Reverse		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V			-10
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	3.0		5.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4.5A			2.2	Ω
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		2000		pF
Output Capacitance	C <sub>OSS</sub>			140		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			1.7		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =800V, V <sub>GS</sub> =10V, I <sub>D</sub> =9.0A (Note 1, 2)		49		nC
Gate to Source Charge	Q <sub>GS</sub>			18		nC
Gate to Drain Charge	Q <sub>GD</sub>			7		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =9.0A, R <sub>G</sub> =25Ω (Note 1, 2)		30		ns
Rise Time	t <sub>R</sub>			17		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			78		ns
Fall-Time	t <sub>F</sub>			36		ns
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				9	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				18	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> =9.0A, V <sub>GS</sub> =0V			1.4	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =9.0A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt = 100 A/μs		200		ns
Reverse Recovery Charge (Note 1)	Q <sub>rr</sub>				900	

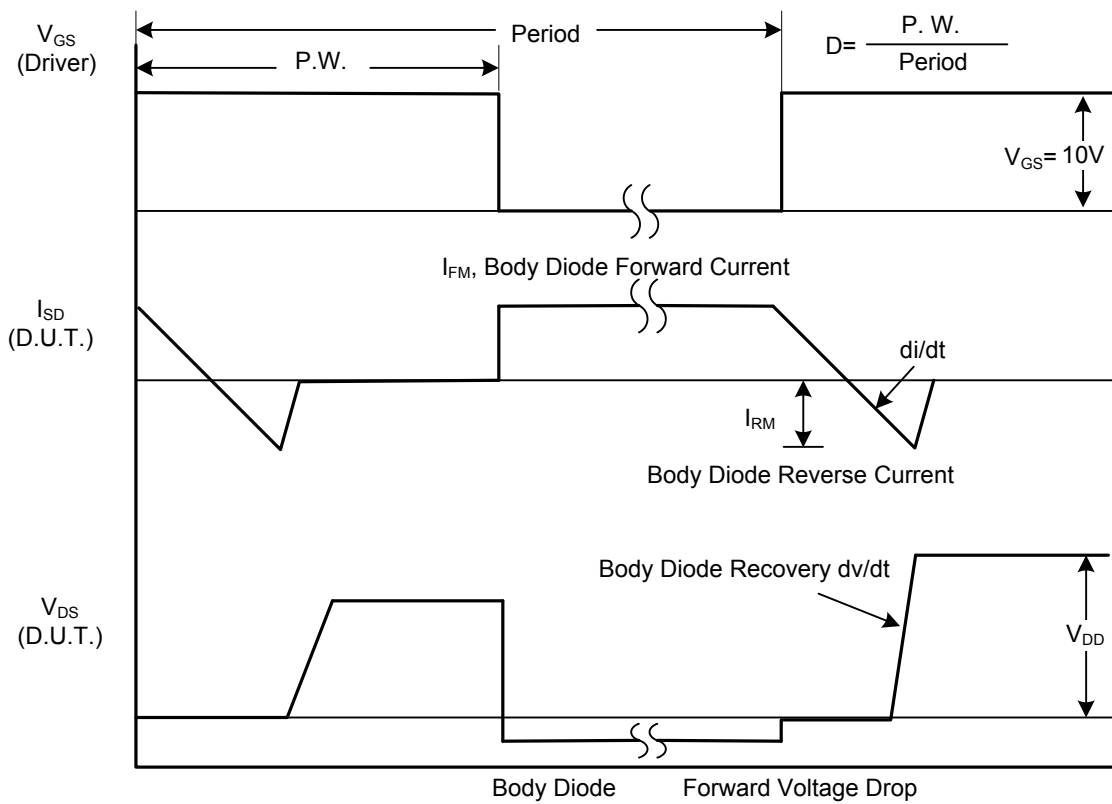
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

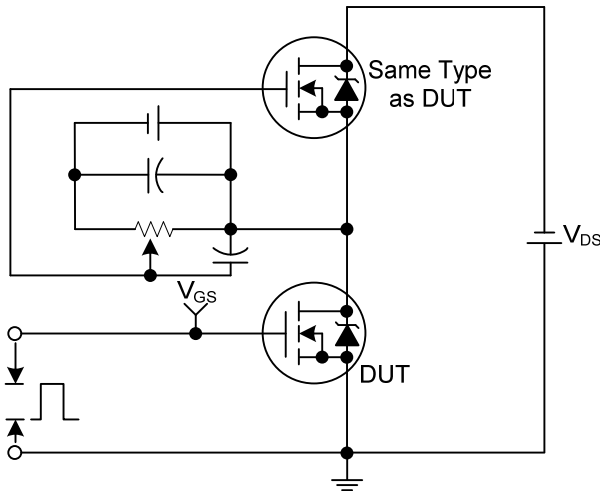


Peak Diode Recovery  $dv/dt$  Test Circuit

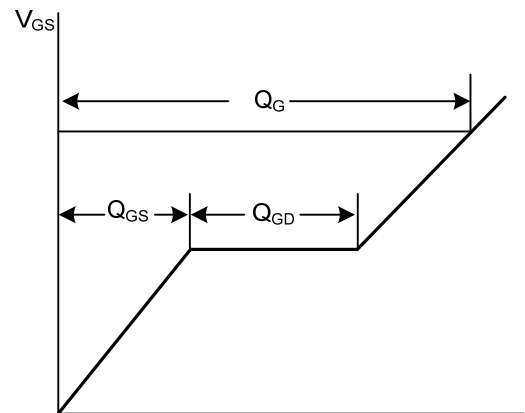


Peak Diode Recovery  $dv/dt$  Waveforms

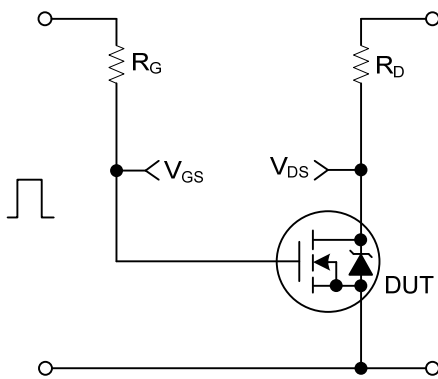
■ TEST CIRCUITS AND WAVEFORMS



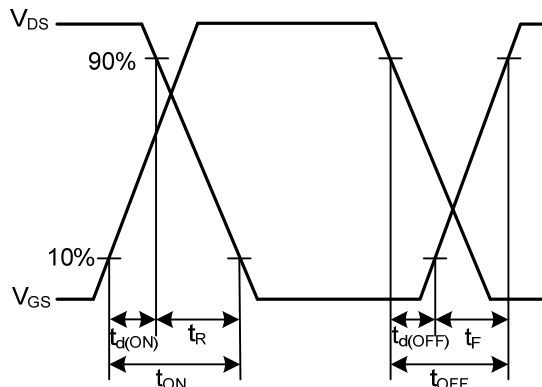
Gate Charge Test Circuit



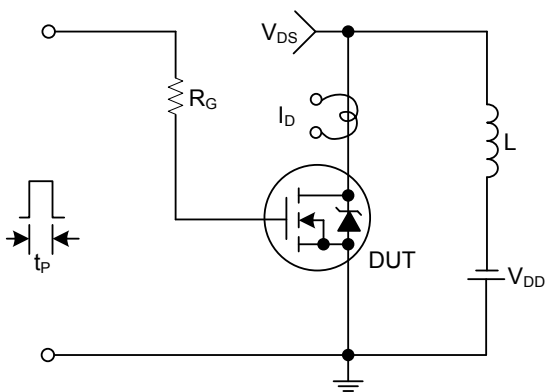
Gate Charge Waveforms



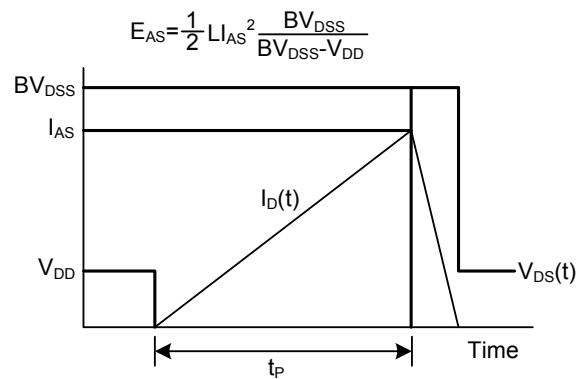
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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