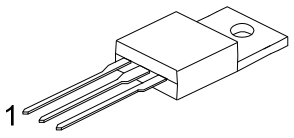
9.0A, 1000V N-CHANNEL POWER MOSFET



TO-220

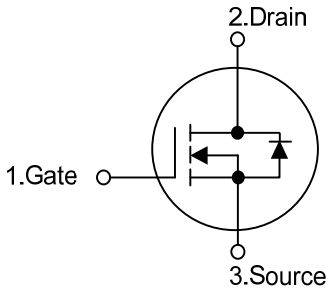
■ DESCRIPTION

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 Qrr
* Fast Switching Speeds
* 100% avalanche tested
* Linear Transfer Characteristics
* High Input Impedance
* Avalanche energy tested

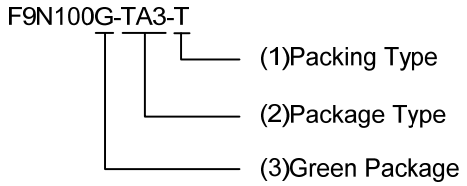
■ SYMBOL



■ 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

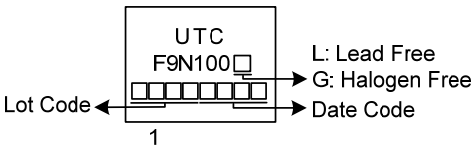


(1) T: Tube

(2) TA3: TO-220

(3) G: Halogen Free and Lead Free L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	1000	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	DC	I_D	9	A
	Pulsed (Note 2)	I_{DM}	18	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	375	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	5.4	V/ns
Power Dissipation		P_D	155	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		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=30mH, I_{AS} = 5.0A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C.
4. I_{SD} ≤ 9.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J=25°C.

■ THERMAL DATA

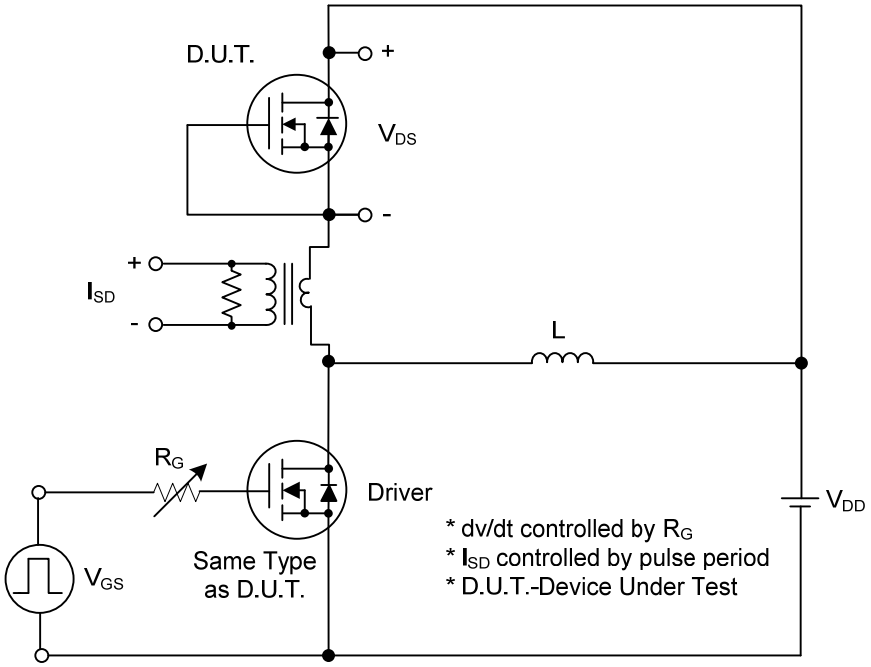
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	0.8	°C/W

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

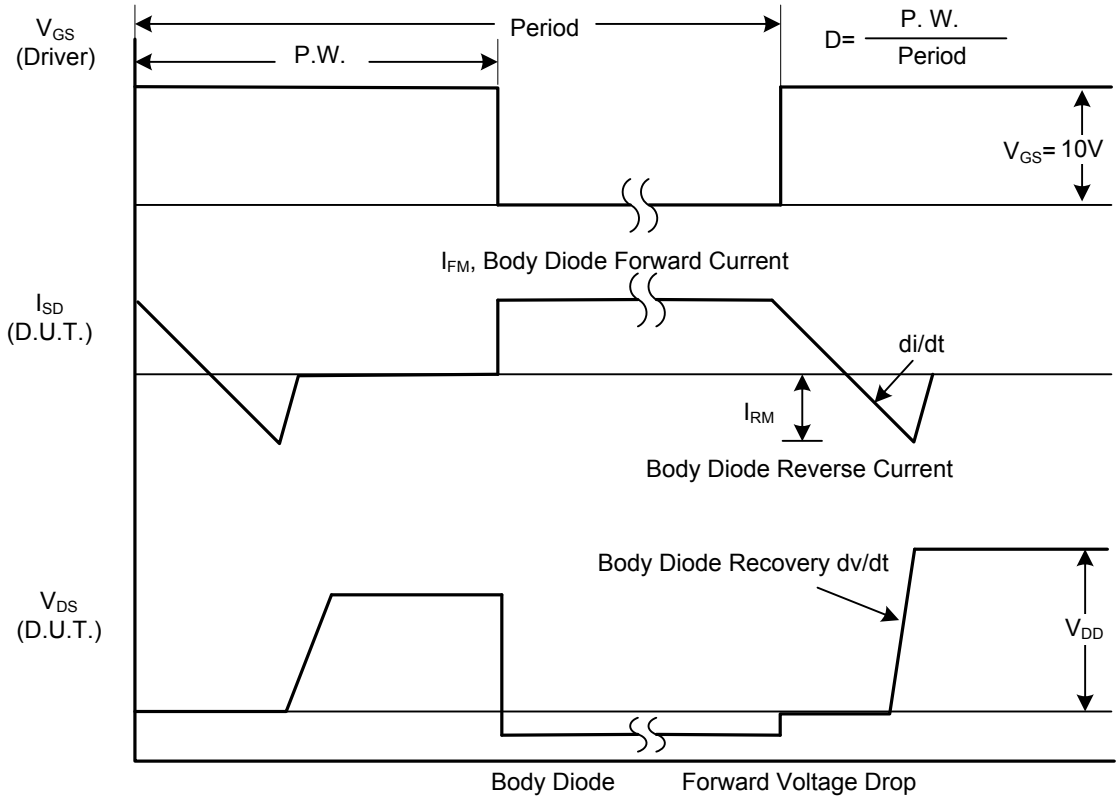
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	1000			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=1000V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V, V_{DS}=0V			+10	μA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-10	μA
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=4.5A			2.2	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		2000		pF
Output Capacitance		C_{OSS}			140		pF
Reverse Transfer Capacitance		C_{RSS}			1.7		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=800V, V_{GS}=10V, I_D=9.0A (Note 1, 2)		49		nC
Gate to Source Charge		Q_{GS}			18		nC
Gate to Drain Charge		Q_{GD}			7		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=100V, V_{GS}=10V, I_D=9.0A, R_G=25Ω (Note 1, 2)		30		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			78		ns
Fall-Time		t_F			36		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				9	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				18	A
Diode Forward Voltage		V_{SD}	I_F=9.0A, V_{GS}=0V			1.4	V
Reverse Recovery Time		t_{rr}	I_S=9.0A, V_{GS}=0V, dI_F/dt = 100 A/μs		200		ns
Reverse Recovery Charge (Note 1)		Q_{rr}			900		nC

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

■ TEST CIRCUITS AND WAVEFORMS

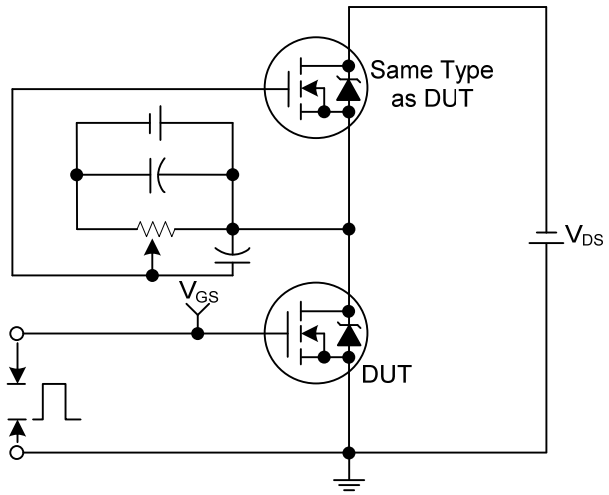


Peak Diode Recovery dv/dt Test Circuit

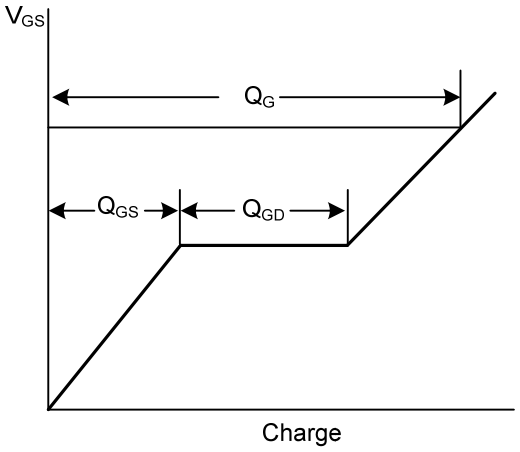


Peak Diode Recovery dv/dt Waveforms

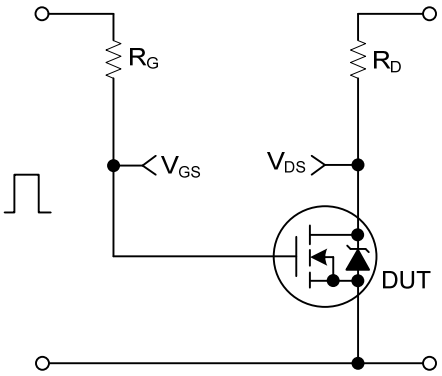
■ TEST CIRCUITS AND WAVEFORMS



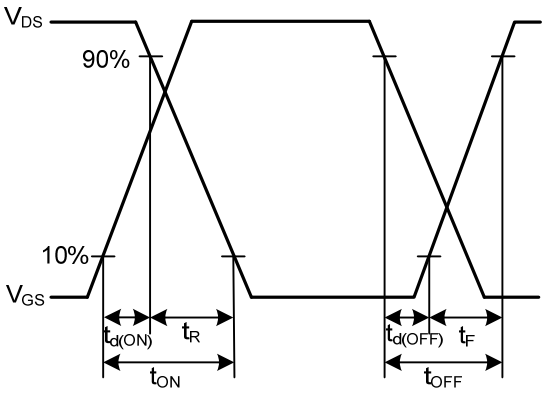
Gate Charge Test Circuit



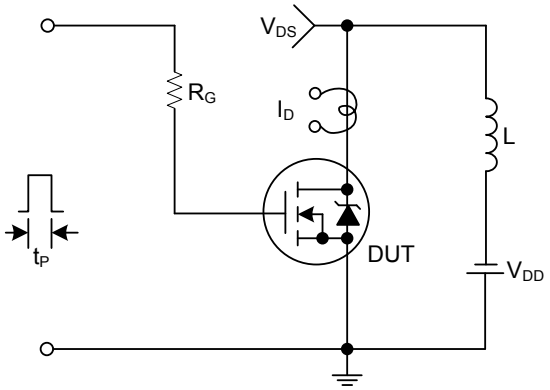
Gate Charge Waveforms



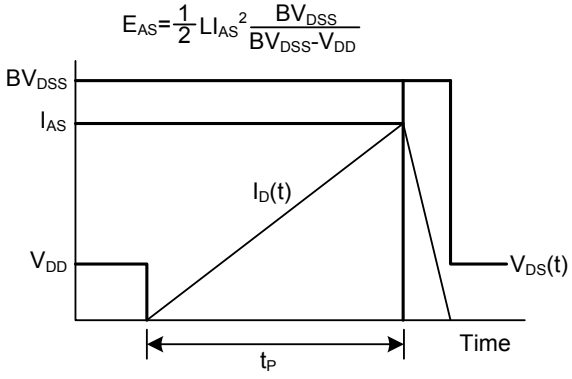
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms