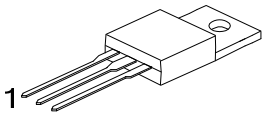
8 Amps, 900 Volts
N-CHANNEL POWER MOSFET



TO-220

■ DESCRIPTION

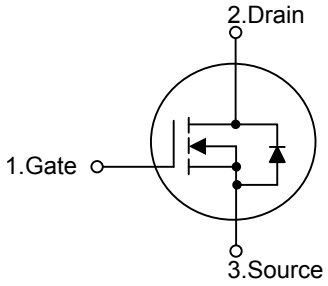
The FQP8N90C is an N-channel mode power MOSFET, using UTC's advanced technology to provide costumers planar stripe and DMOS technology. This technology allows a minimum on-state resistance, superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The FQP8N90C is generally applied in high efficiency switch mode power supplies.

■ FEATURES

* 8A, 900V, $R_{DS(ON)}$=1.55Ω @ V_{GS}=10V
* Fast Switching Speed
* 100% Avalanche Tested
* Improved dv/dt Capability

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
FQP8N90C	FQP8N90C	TO-220	G	S	D	Tube

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage	V_{DSS}	900	V
Gate to Source Voltage	V_{GSS}	±30	V
Continuous Drain Current (T_C=25°C)	I_D	8	A
Pulsed Drain Current (Note 1)	I_{DM}	25	A
Avalanche Current (Note 1)	I_{AR}	6.3	A
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	850	mJ
Repetitive Avalanche Energy (Note 1)	E_{AR}	17.1	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.0	V/ns
Total Power Dissipation (T_C=25°C)	P_D	147	W
Linear Derating Factor above T_C=25°C		1.17	W/°C
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=40mH, I_{AS}=6.3A, V_{DD}= 50V, R_G=25Ω, 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	θ_{JC}	0.85	°C/W

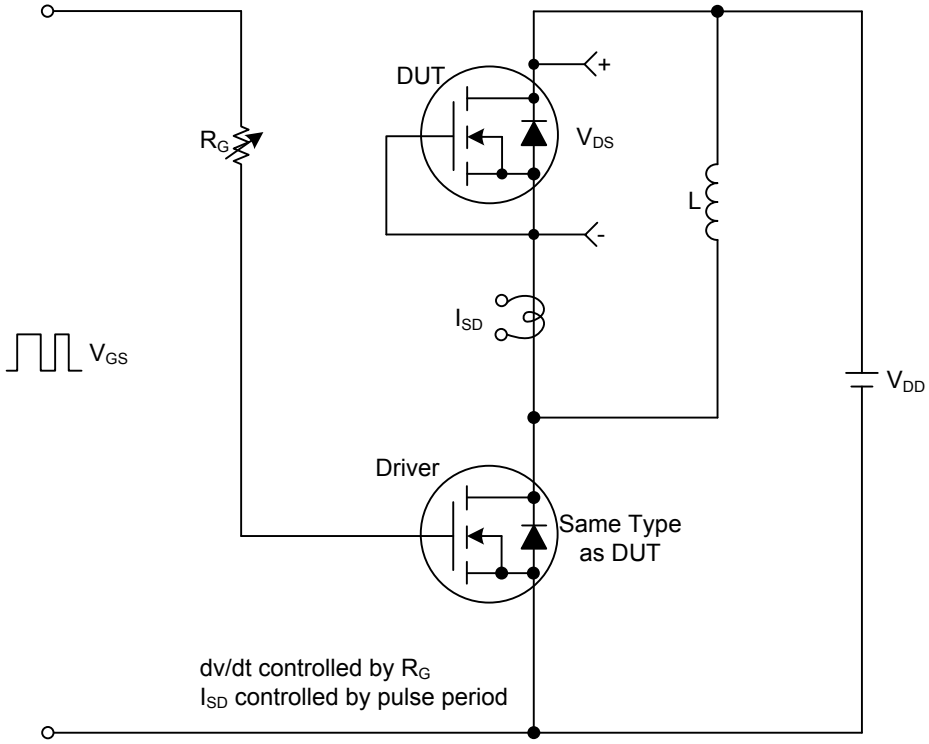
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

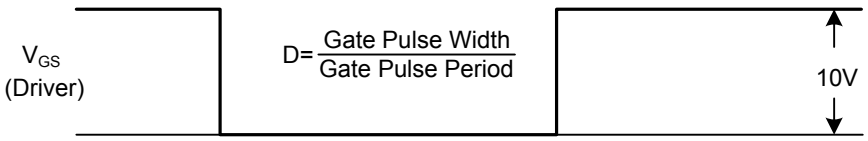
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	900			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25°C		0.95		V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=900V, V_{GS}=0V			10	μA
		V_{DS}=720V, T_C=125°C			100	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V ,V_{GS}=±30V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	3.0		5.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4A		940	1550	mΩ
Forward Transconductance (Note 1)	g_{FS}	V_{DS}=50V, I_D=4A[4]		5.5		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1.0MHz		1600	2080	pF
Output Capacitance	C_{OSS}			130	170	pF
Reverse Transfer Capacitance	C_{RSS}			12	15	pF
SWITCHING PARAMETERS (Note 1, Note 2)						
Total Gate Charge	Q_G	V_{DS}=720V, V_{GS}=10V, I_D=8A		35	45	nC
Gate-Source Charge	Q_{GS}			10		nC
Gate-Drain Charge	Q_{GD}			14		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=450V, I_D=8A, R_G=25Ω		40	90	ns
Turn-ON Rise Time	t_R			110	230	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			70	150	ns
Turn-OFF Fall Time	t_F			70	150	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				8	A
Maximum Body-Diode Pulsed Current	I_{SM}				25	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S =8A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time	t_{RR}	V_{GS}=0V, I_S=8A, dI_F/dt=100A/μs (Note 1)		530		ns
Body Diode Reverse Recovery Charge	Q_{RR}			5.8		μC

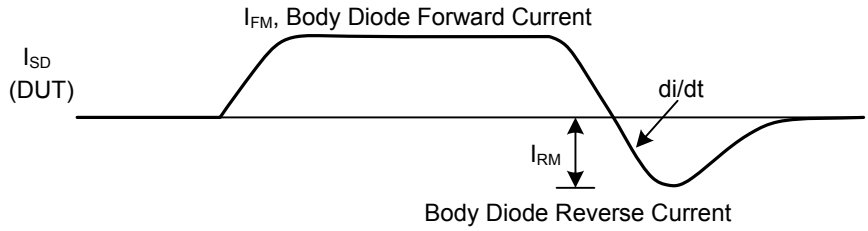
Note: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

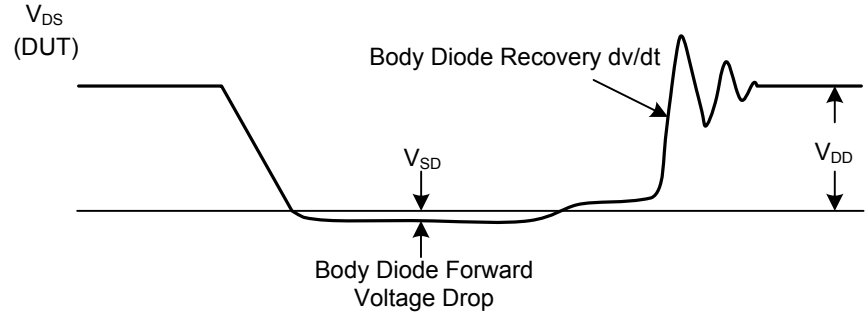
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms



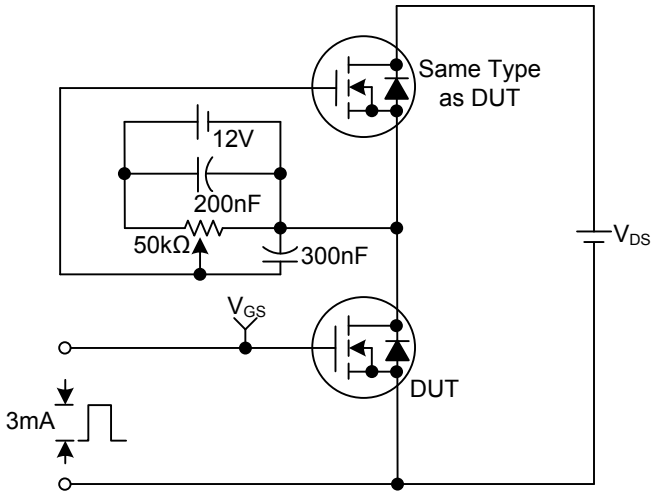




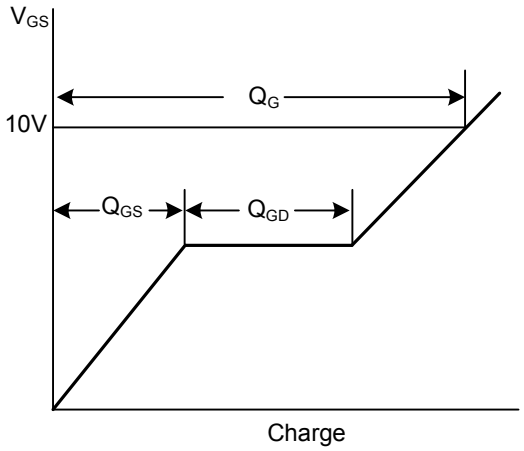


■ TEST CIRCUITS AND WAVEFORMS

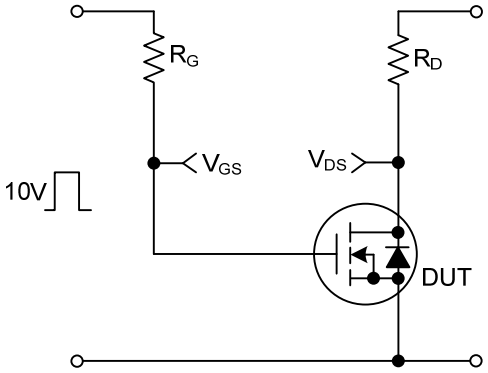
Gate Charge Test Circuit



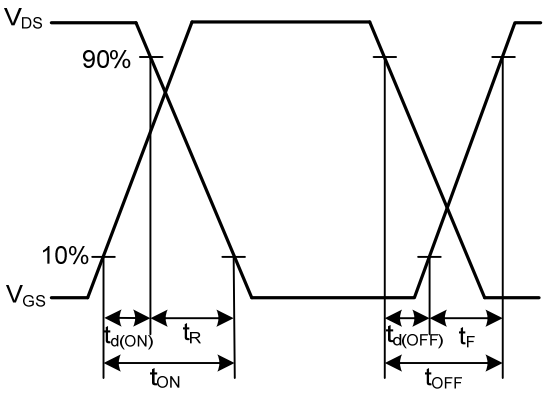
Gate Charge Waveforms



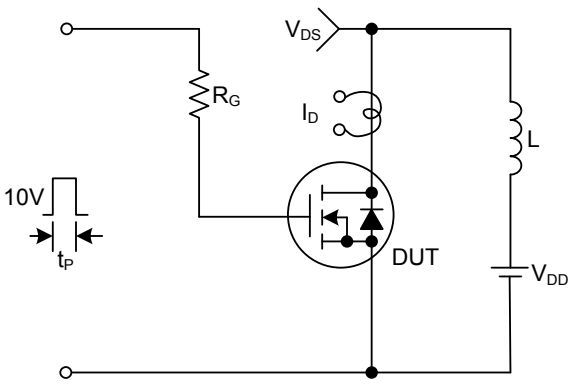
Resistive Switching Test Circuit

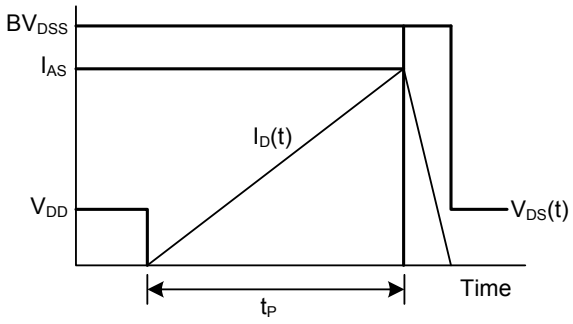


Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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