



5N90-FCQ

Preliminary

Power MOSFET

5A, 900V N-CHANNEL POWER MOSFET

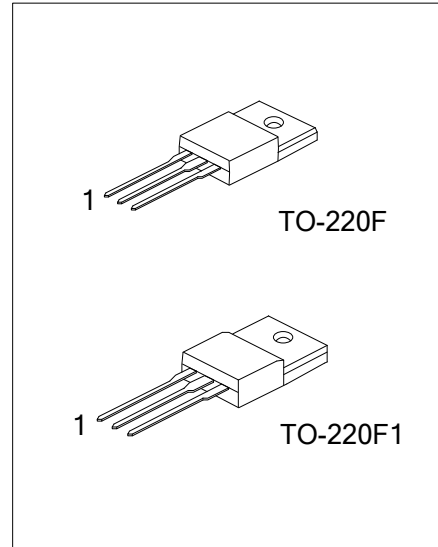
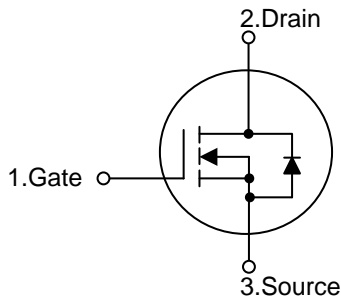
DESCRIPTION

The UTC 5N90-FCQ provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} \leq 3.7 \Omega @ V_{GS}=10V, I_D=2.5A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



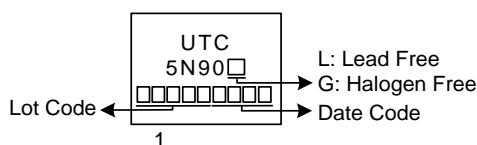
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
5N90L-TF1-T	5N90G-TF1-T	TO-220F1	G	D	S	Tube
5N90L-TF3-T	5N90G-TF3-T	TO-220F	G	D	S	Tube

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

	<p>(1) T: Tube</p> <p>(2) TF1: TO-220F1, TF3: TO-220F</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V _{DSS}	900	V
Gate-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current	I _D	5	A
Pulsed Drain Current (Note 2)	I _{DM}	10	A
Avalanche Energy (Note 3)	E _{AS}	194	mJ
Single Pulsed			
Peak Diode Recovery dv/dt (Note 4)	dv/dt	2.7	V/ns
Power Dissipation (T _A =25°C)	P _D	36	W
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=30mH, I_{AS}=3.6A, V_{DD}=100V, R_G=25 Ω, Starting T_J = 25°C

4. I_{SD}≤5.0A, di/dt≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ _{JA}	62.5	°C/W
Junction to Case	θ _{JC}	3.66	°C/W

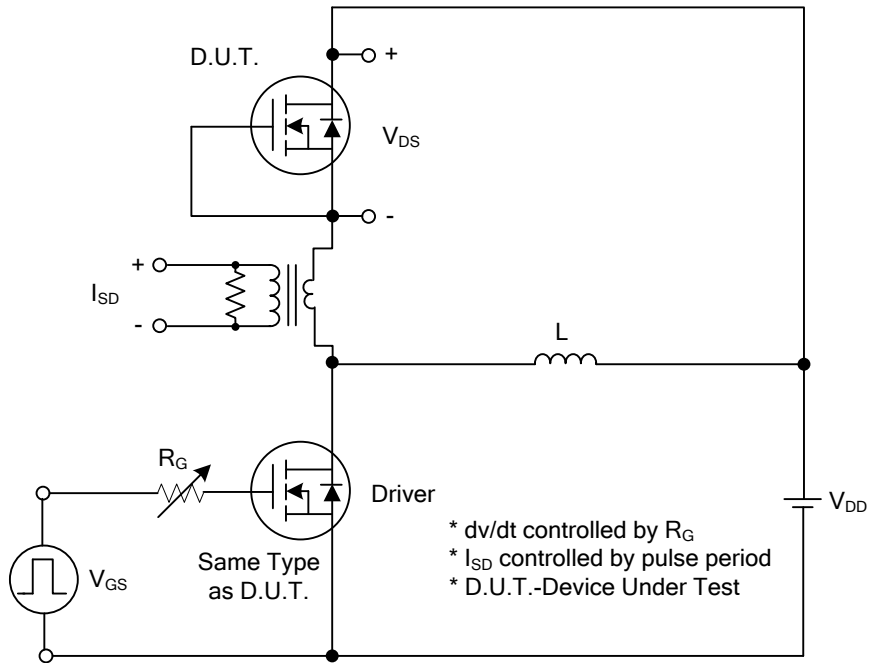
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	900			V	
Drain-Source Leakage Current	I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA	
Gate-Source Leakage Current	I _{GSS}	Forward			100	nA	
		Reverse			-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 =2.5A			3.7	Ω	
DYNAMIC CHARACTERISTICS							
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		722		pF	
Output Capacitance	C _{OSS}				67		pF
Reverse Transfer Capacitance	C _{RSS}				1.9		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge	Q _G	V _{DS} =720V, V _{GS} =10V, I _D =5A, I _C =1mA (Note 1, 2)		11.7		nC	
Gate-Source Charge	Q _{GS}				5.8		nC
Gate-Drain Charge	Q _{GD}				0.6		nC
Turn-On Delay Time	t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =5A, R _G =25Ω (Note 1, 2)		7.2		ns	
Turn-On Rise Time	t _R				15		ns
Turn-Off Delay Time	t _{D(OFF)}				13		ns
Turn-Off Fall Time	t _F				18		ns
DRAIN-SOURCE DIODE CHARACTERISTICS							
Maximum Body-Diode Continuous Current	I _S				5	A	
Continuous Drain-Source Current	I _{SD}				10	A	
Drain-Source Diode Forward Voltage	V _{SD}	I _S =5A, V _{GS} =0V			1.4	V	
Reverse Recovery Time	t _{rr}	I _F =5A, di/dt=100A/μs		460		ns	
Reverse Recovery Charge	Q _{rr}				8.4		μC

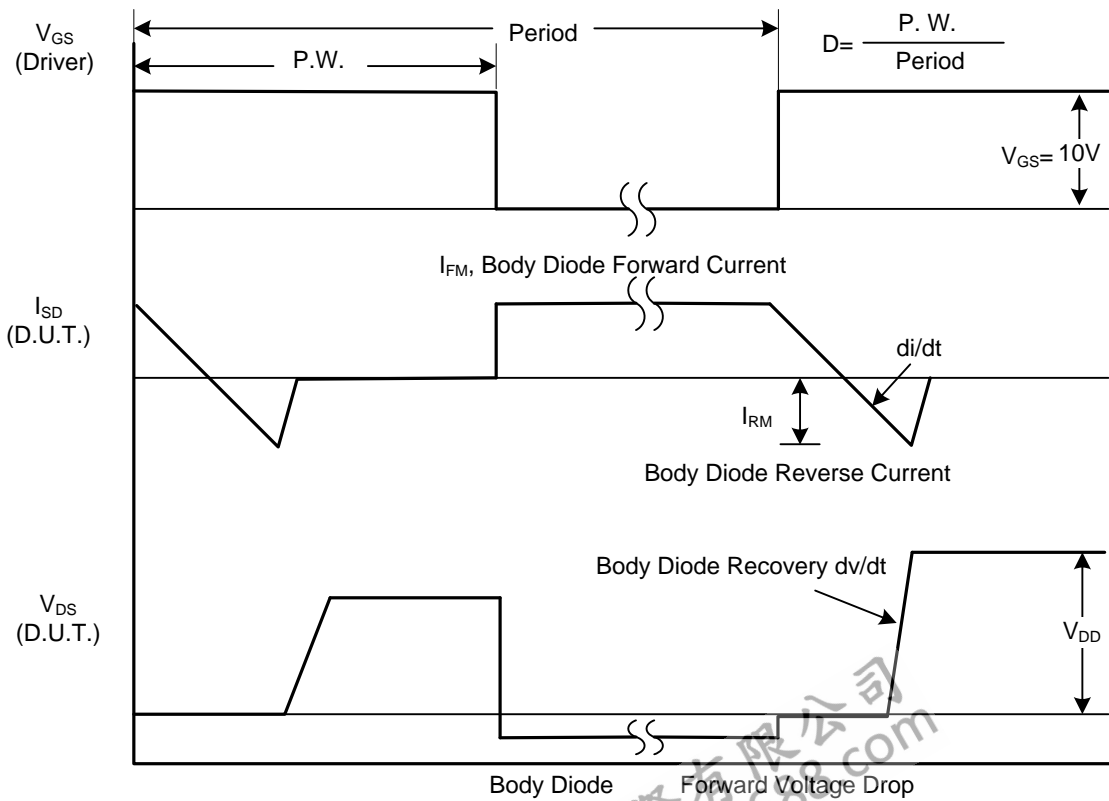
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

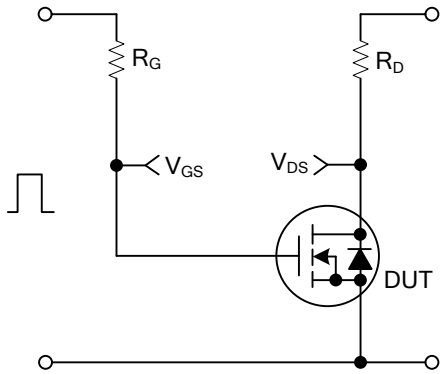


Peak Diode Recovery dv/dt Test Circuit

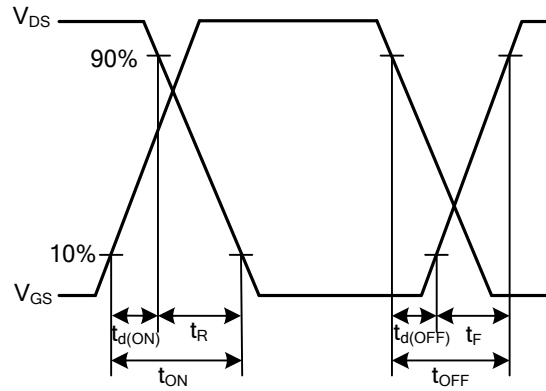


Peak Diode Recovery dv/dt Waveforms

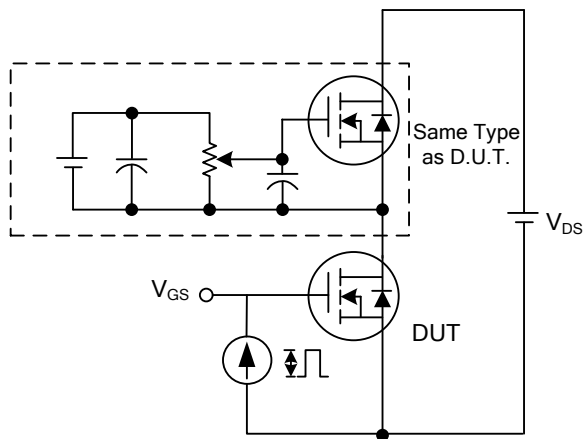
■ TEST CIRCUITS AND WAVEFORMS



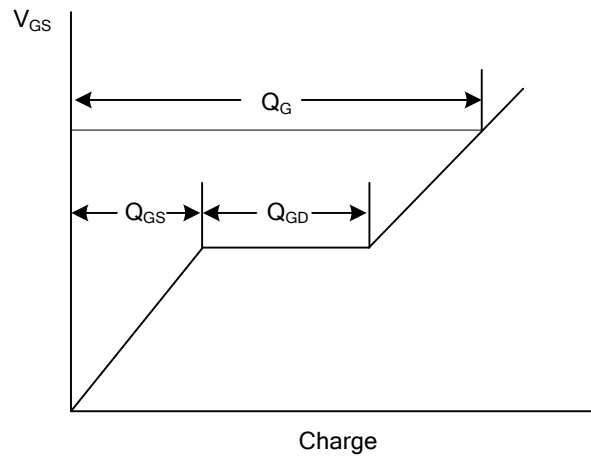
Switching Test Circuit



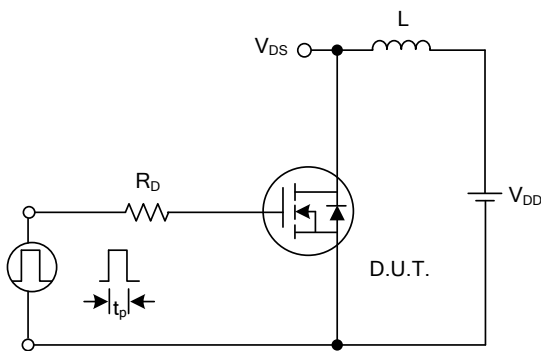
Switching Waveforms



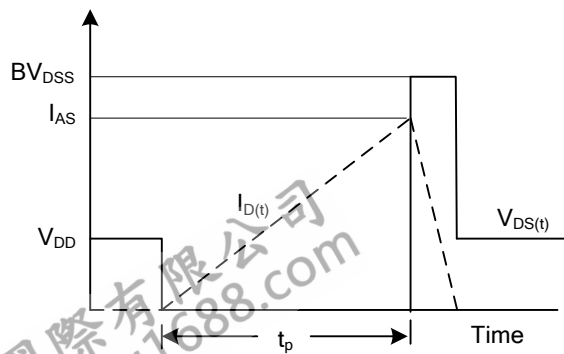
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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