

**05N90-FC**

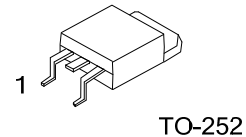
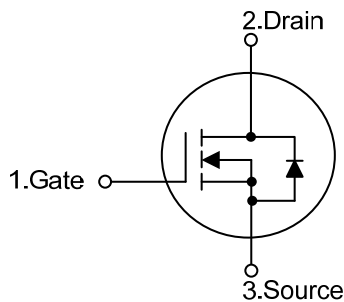
Preliminary

Power MOSFET**0.5A, 900V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **05N90-FC** 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

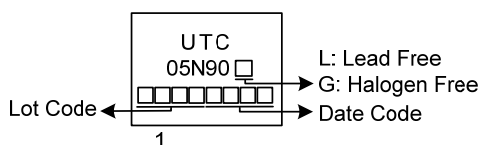
- * $R_{DS(ON)} \leq 18 \Omega$ @ $V_{GS}=10V$, $I_D=0.25A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

**SYMBOL****ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
05N90L-TN3-R	05N90G-TN3-R	TO-252	G	D	S	Tape Reel

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

05N90G-TN3-R	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) TN3: TO-252
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, 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	0.5	A
Pulsed Drain Current (Note 2)	I_{DM}	1	A
Avalanche Energy (Note 3) Single Pulsed	E_{AS}	18	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.2	V/ns
Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	38	W
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature	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. $L=30\text{mH}$, $I_{AS}=1.1\text{A}$, $V_{DD}=90\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 0.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	110	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	3.28 (Note)	$^{\circ}\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

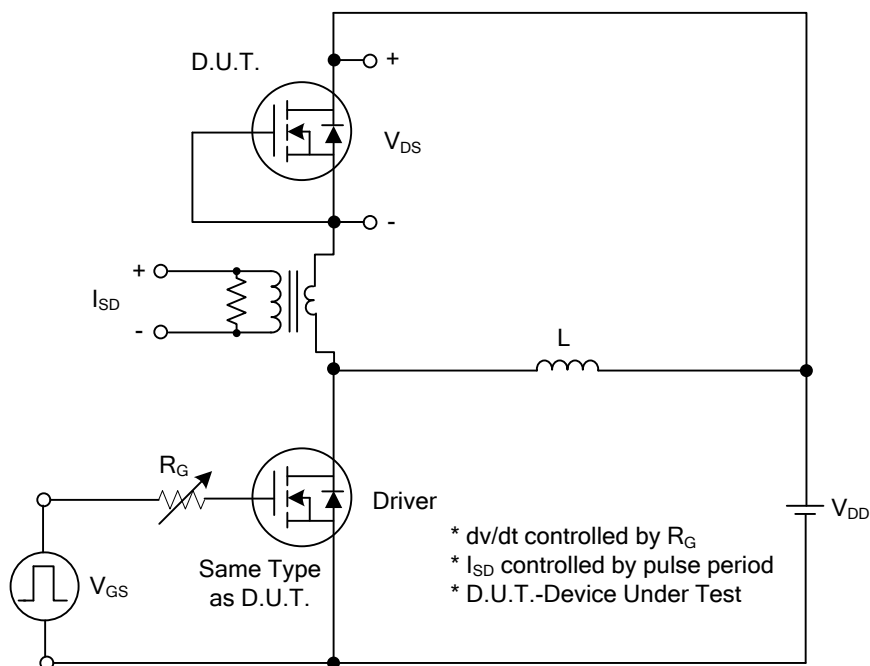
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

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	Forward	I _{GSS}	V _{GS} =30V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-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 =0.25A			18	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		140		pF
Output Capacitance		C _{OSS}			21		pF
Reverse Transfer Capacitance		C _{RSS}			2		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =720V, V _{GS} =10V, I _D =0.5A (Note 1, 2)		10		nC
Gate-Source Charge		Q _{GS}			4.4		nC
Gate-Drain Charge		Q _{GD}			2.2		nC
Turn-On Delay Time		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		6		ns
Turn-On Rise Time		t _R			17		ns
Turn-Off Delay Time		t _{D(OFF)}			9.6		ns
Turn-Off Fall Time		t _F			20		ns
DRAIN-SOURCE DIODE CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				0.5	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SD}				1	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =0.5A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _F =0.5A, di/dt=100A/μs		310		ns
Reverse Recovery Charge		Q _{rr}			630		nC

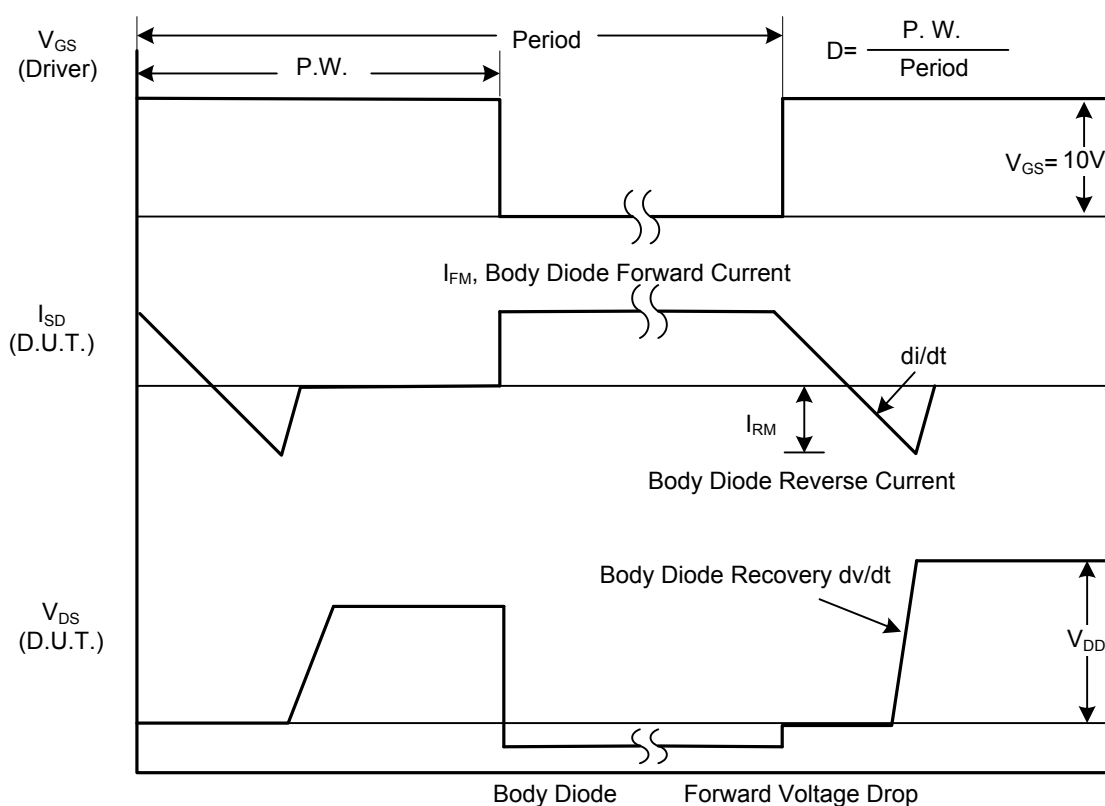
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

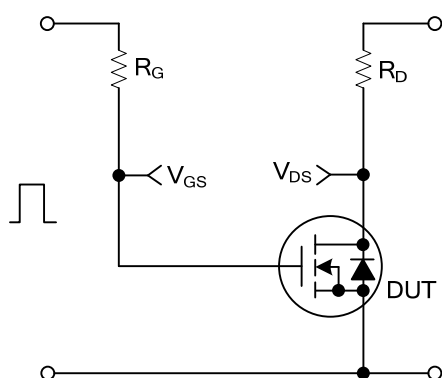


Peak Diode Recovery dv/dt Test Circuit

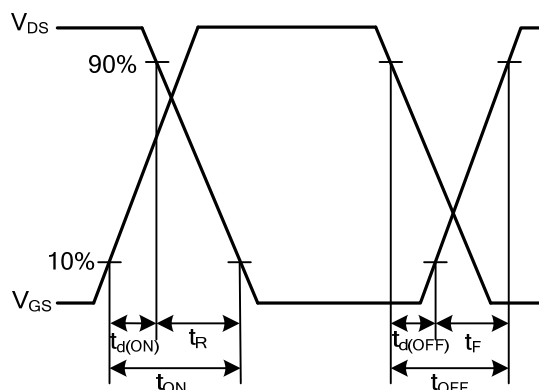


Peak Diode Recovery dv/dt Waveforms

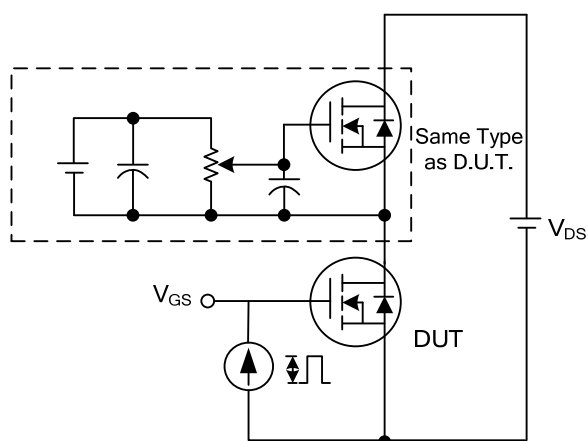
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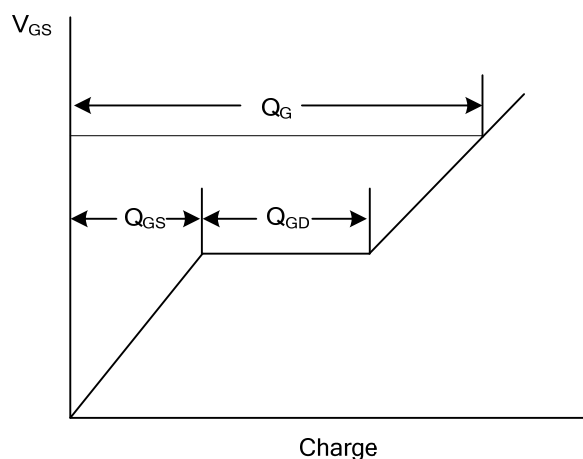
Switching Test Circuit



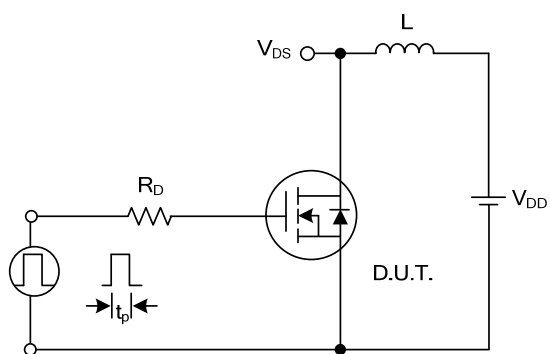
Switching Waveforms



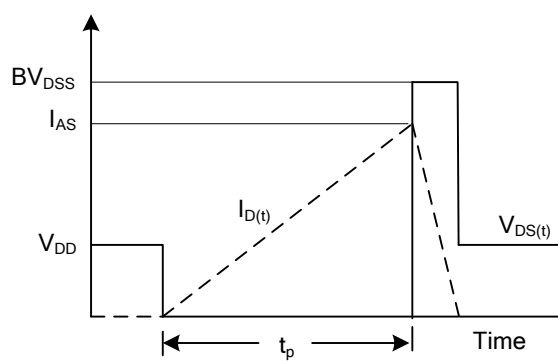
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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