



6N90-FC

Preliminary

Power MOSFET

**6A, 900V N-CHANNEL
POWER MOSFET**

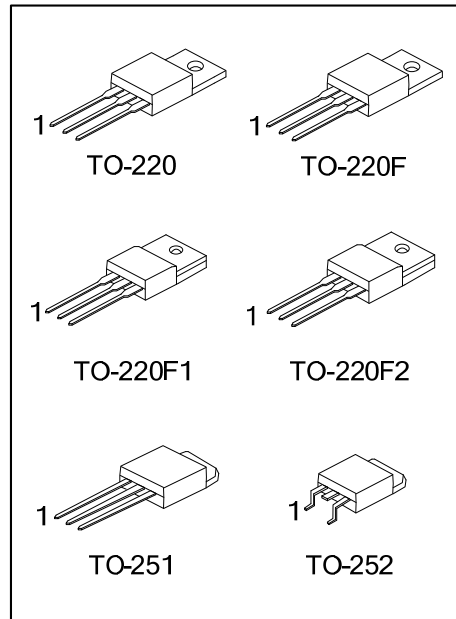
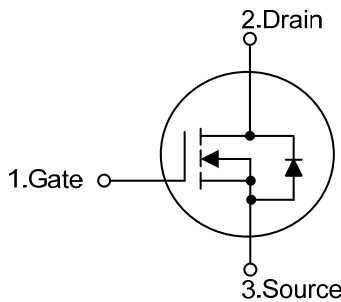
■ DESCRIPTION

The UTC **6N90-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

- * $R_{DS(ON)} \leq 2.8 \Omega @ V_{GS}=10V, I_D=3.0A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

■ SYMBOL



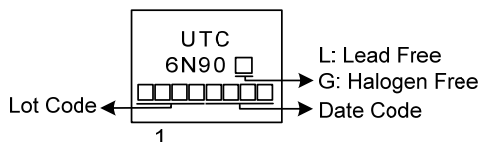
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
6N90L-TA3-T	6N90G-TA3-T	TO-220	G	D	S	Tube
6N90L-TF1-T	6N90G-TF1-T	TO-220F1	G	D	S	Tube
6N90L-TF2-T	6N90G-TF2-T	TO-220F2	G	D	S	Tube
6N90L-TF3-T	6N90G-TF3-T	TO-220F	G	D	S	Tube
6N90L-TM3-T	6N90G-TM3-T	TO-251	G	D	S	Tube
6N90L-TN3-R	6N90G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>6N90G-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2 TM3: TO-251, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ 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	6	A
Pulsed Drain Current (Note 2)	I_{DM}	12	A
Avalanche Energy (Note 3) Single Pulsed	E_{AS}	277	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	2.6	V/ns
Power Dissipation ($T_A=25^\circ\text{C}$)	TO-220	120	W
	TO-220F/TO-220F1	37	W
	TO-220F2		
	TO-251/TO-252	49	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. $L=30\text{mH}$, $I_{AS}=4.3\text{A}$, $V_{DD}=100\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 6.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
		110	$^\circ\text{C}/\text{W}$
		TO-251/TO-252	
Junction to Case	θ_{JC}	1.04	$^\circ\text{C}/\text{W}$
		3.37	$^\circ\text{C}/\text{W}$
		TO-220F2	
TO-251/TO-252	2.55 (Note)	$^\circ\text{C}/\text{W}$	

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

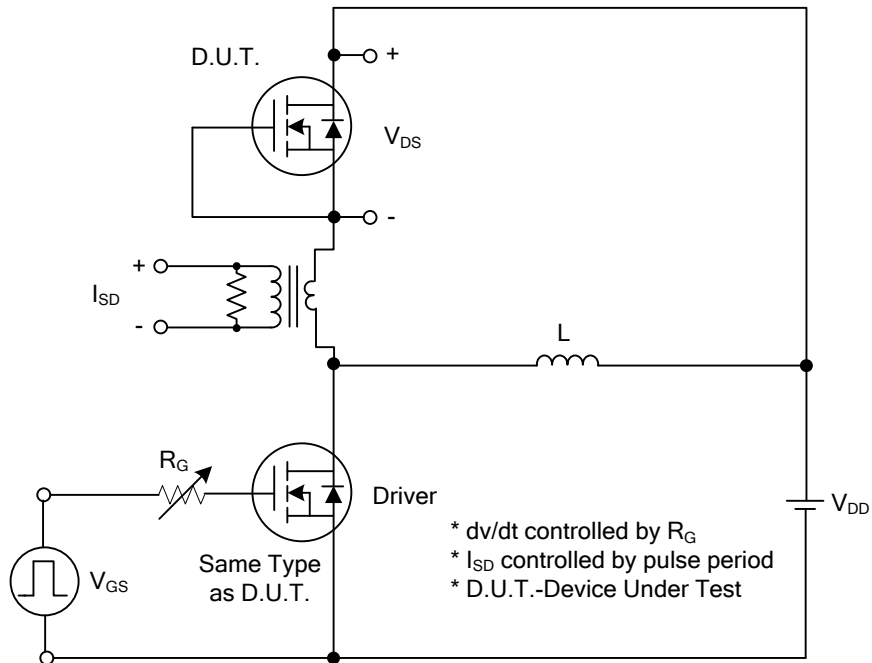
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	900			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 900V, V_{GS} = 0V$			10	μA
Gate-Source Leakage Current	Forward	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
	Reverse		$V_{GS} = -30V, V_{DS} = 0V$		-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 3.0A$			2.8	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$		860		pF
Output Capacitance	C_{OSS}			85		pF
Reverse Transfer Capacitance	C_{RSS}			2.1		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	$V_{DS} = 720V, V_{GS} = 10V,$ $I_D = 6A, I_G = 1mA$ (Note 1, 2)		15		nC
Gate-Source Charge	Q_{GS}			5.5		nC
Gate-Drain Charge	Q_{GD}			1.8		nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD} = 100V, V_{GS} = 10V, I_D = 6A,$ $R_G = 25\Omega$ (Note 1, 2)		8		ns
Turn-On Rise Time	t_R			15		ns
Turn-Off Delay Time	$t_{D(OFF)}$			17		ns
Turn-Off Fall Time	t_F			18		ns
DRAIN-SOURCE DIODE CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				6	A
Continuous Drain-Source Current	I_{SD}				12	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S = 6A, V_{GS} = 0V$			1.4	V
Reverse Recovery Time	t_{rr}	$I_F = 6A, di/dt = 100A/\mu s$		510		ns
Reverse Recovery Charge	Q_{rr}				10.3	

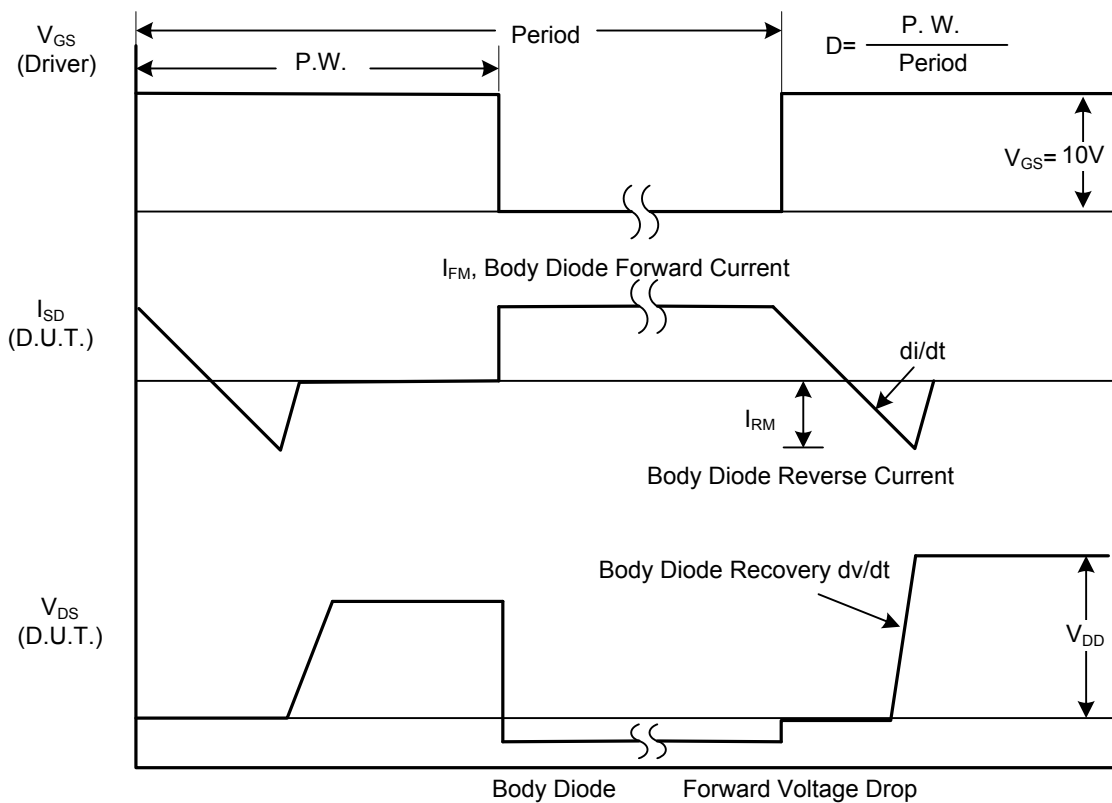
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

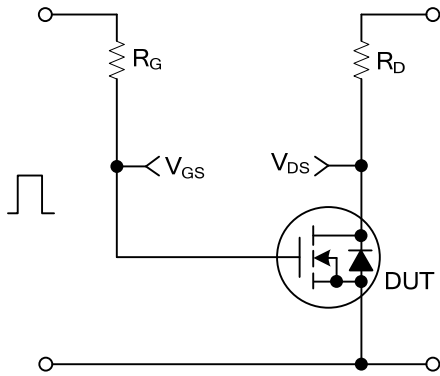


Peak Diode Recovery dv/dt Test Circuit

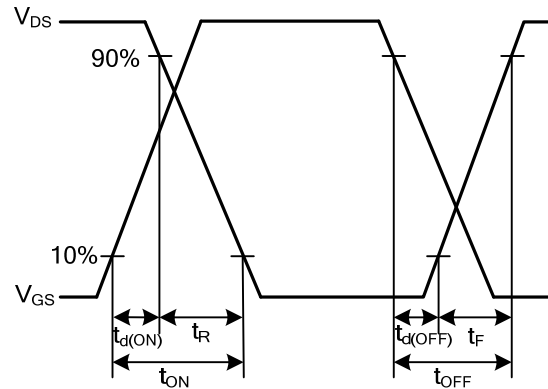


Peak Diode Recovery dv/dt Waveforms

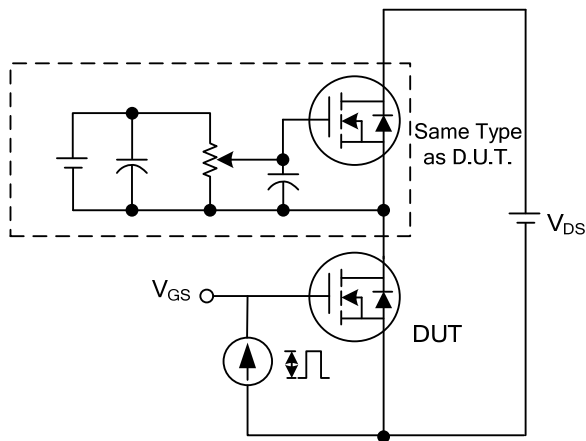
■ TEST CIRCUITS AND WAVEFORMS



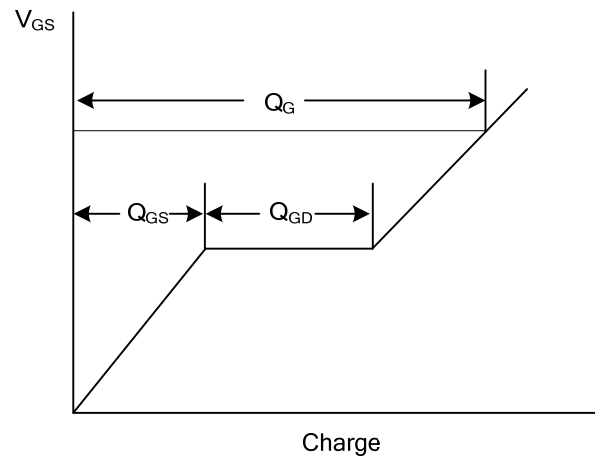
Switching Test Circuit



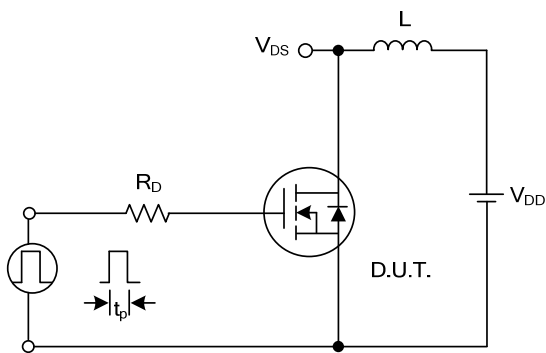
Switching Waveforms



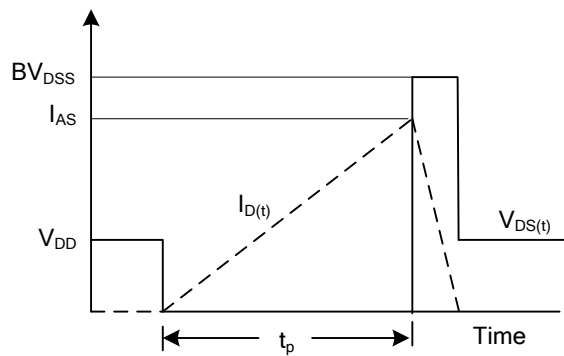
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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