



7N90-MK6

Preliminary

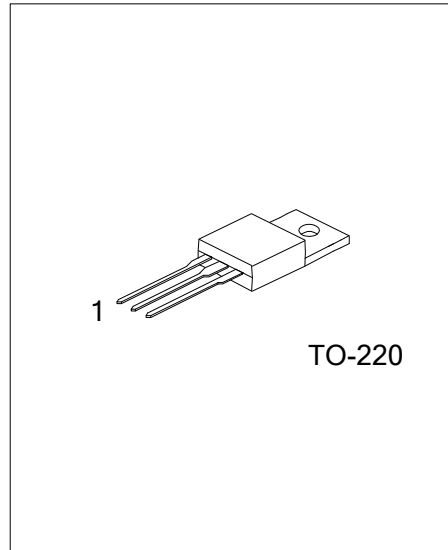
Power MOSFET

**7A, 900V N-CHANNEL
POWER MOSFET**

■ DESCRIPTION

The UTC **7N90-MK6** is an N-channel mode power MOSFET using UTC's advanced technology to provide costumers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

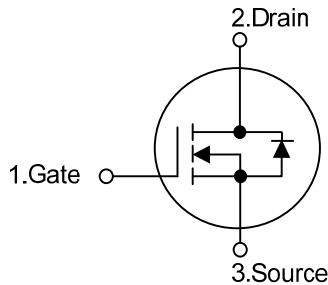
The UTC **7N90-MK6** is universally applied in active power factor correction, electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.



■ FEATURES

- * High switching speed
- * $R_{DS(ON)} < 2.2\Omega @ V_{GS}=10V, I_D=3.5A$
- * 100% avalanche tested
- * Improved dv/dt capability

■ SYMBOL



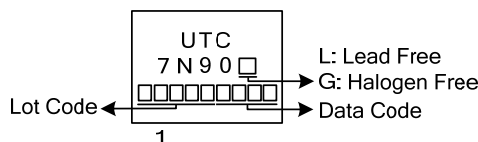
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N90L-TA3-T	7N90G-TA3-T	TO-220	G	D	S	Tube

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

<p>7N90L-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TA3: TO-220 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



■ 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	I_D	$T_C=25^\circ\text{C}$	7.0
		$T_C=100^\circ\text{C}$	4.4
Pulsed Drain Current (Note 2)	I_{DM}	28	A
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.0	V/ns
Power Dissipation	P_D	52	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. $I_{SD} \leq 7.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.4	$^\circ\text{C}/\text{W}$

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

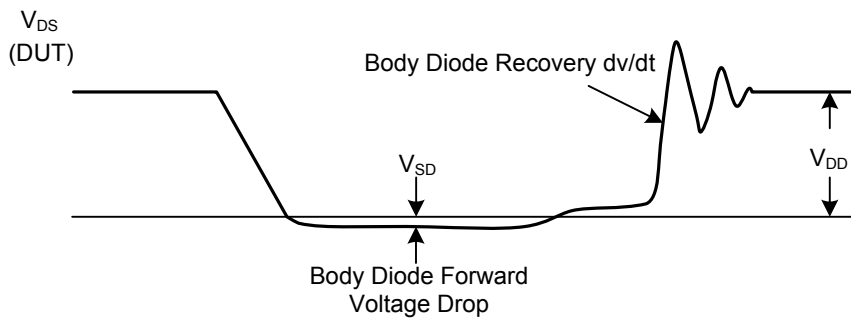
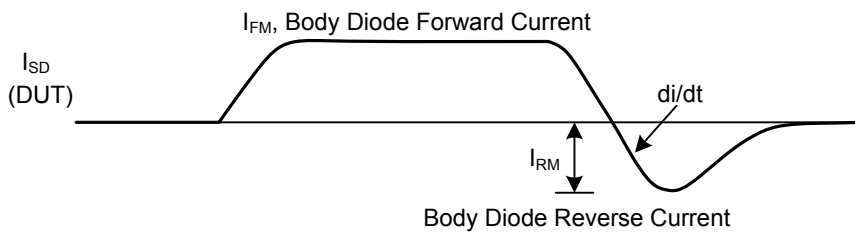
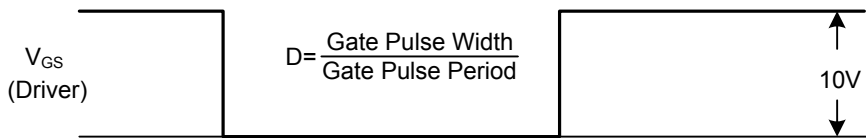
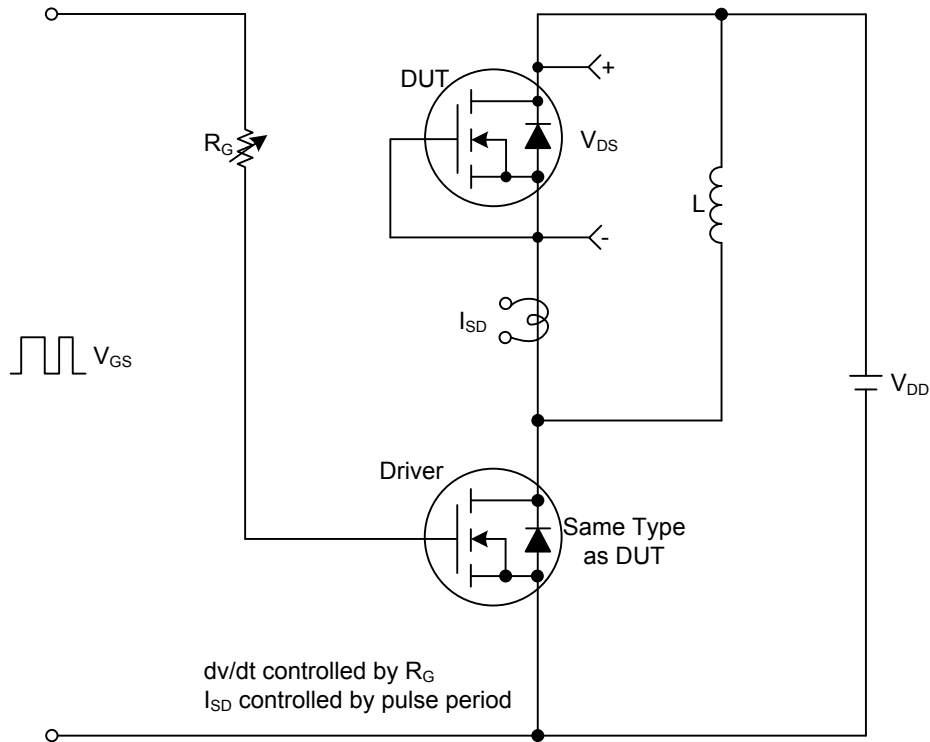
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	900			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$, Referenced to 25°C		0.96		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=900\text{V}$, $V_{GS}=0\text{V}$			10	μA
		$V_{DS}=720\text{V}$, $T_C=125^\circ\text{C}$			100	μA
Gate-Source Leakage Current	Forward	$V_{DS}=0\text{V}$, $V_{GS}=30\text{V}$			100	nA
	Reverse	$V_{DS}=0\text{V}$, $V_{GS}=-30\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	3.0		5.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=3.5\text{A}$		1.8	2.2	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		1450	1880	pF
Output Capacitance	C_{OSS}			115	140	pF
Reverse Transfer Capacitance	C_{RSS}			95	110	pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=30\text{V}$, $I_D=0.5\text{A}$, $R_G=25\Omega$ (Note 4,5)		90		ns
Turn-ON Rise Time	t_R			56		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			138		ns
Turn-OFF Fall Time	t_F			34		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				7	A
Maximum Body-Diode Pulsed Current	I_{SM}				28	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=7.0\text{A}$, $V_{GS}=0\text{V}$			1.4	V

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

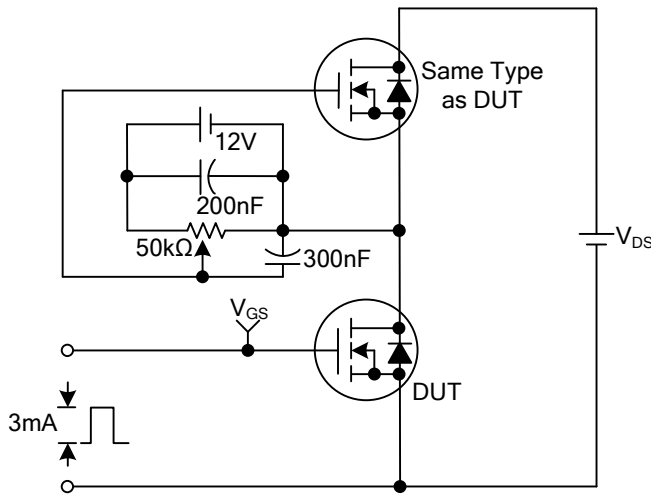
2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

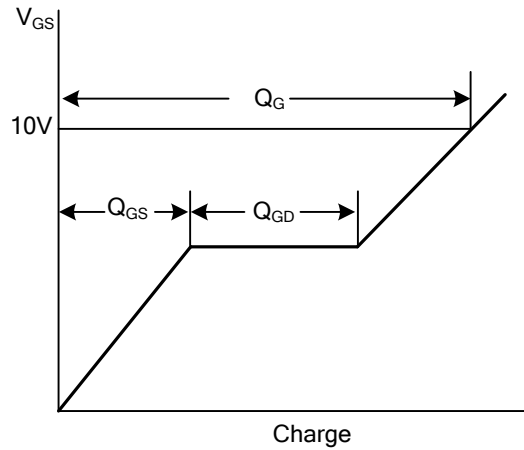
Peak Diode Recovery dv/dt Test Circuit & Waveforms



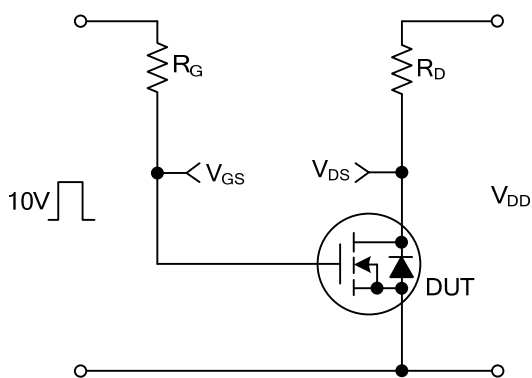
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



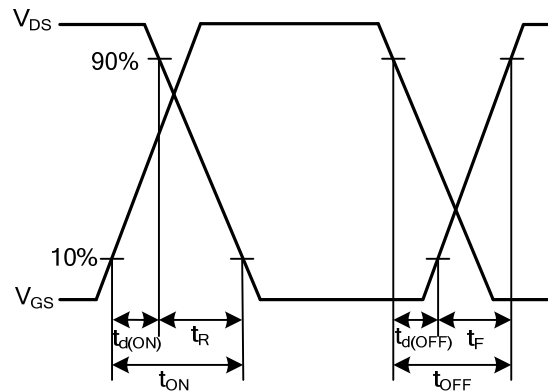
Gate Charge Test Circuit



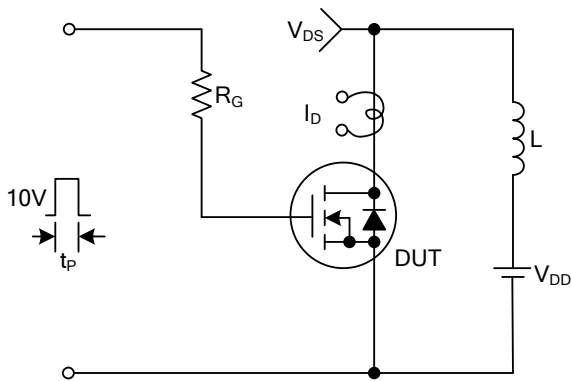
Gate Charge Waveforms



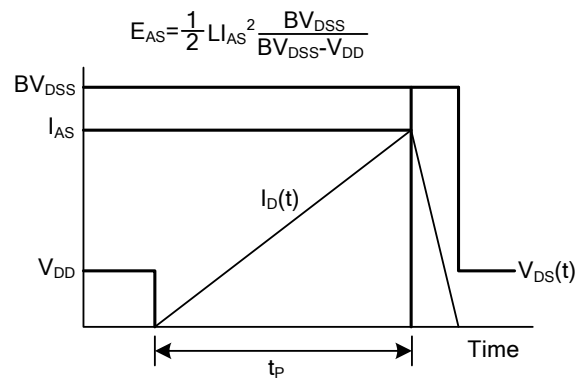
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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