



1N90-MK6

Preliminary

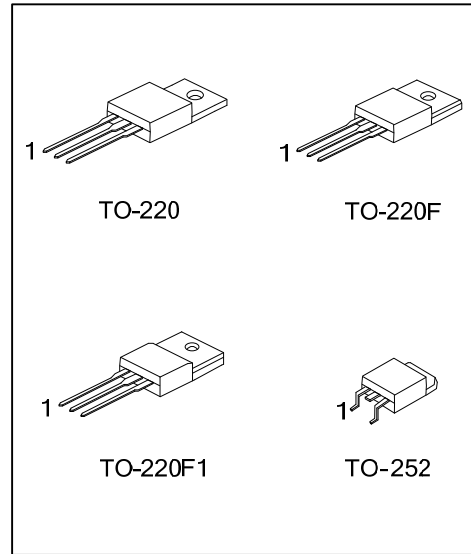
Power MOSFET

1.0A, 900V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **1N90-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.

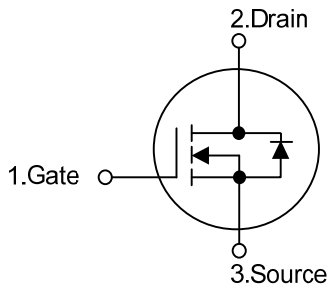
The UTC **1N90-MK6** is universally applied in active power factor correction, electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.



FEATURES

- * High switching speed
- * $R_{DS(ON)} < 16\Omega @ V_{GS}=10V, I_D=0.5A$
- * 100% avalanche tested
- * Improved dv/dt capability

SYMBOL



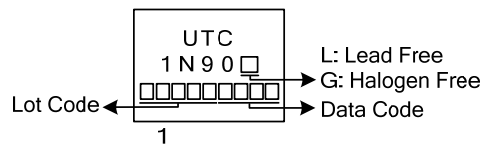
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
1N90L-TA3-T	1N90G-TA3-T	TO-220	G	D	S	Tube
1N90L-TF1-T	1N90G-TF1-T	TO-220F1	G	D	S	Tube
1N90L-TF3-T	1N90G-TF3-T	TO-220F	G	D	S	Tube
1N90L-TN3-T	1N90G-TN3-T	TO-252	G	D	S	Tube

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

<p>1N90L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F, TN3: TO-252 (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	$T_C=25^\circ\text{C}$	I_D	1.0	A
Pulsed Drain Current (Note 2)		I_{DM}	4.0	A
Single Pulse Avalanche Energy Rating (Note 3)		E_{AS}	48	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.7	V/ns
Power Dissipation	TO-220	P_D	40	W
	TO-220F/TO-220F1		23	W
	TO-252		28	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. $L = 150\text{mH}$, $I_{AS} = 0.8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 1.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1			
	TO-252			
Junction to Case	TO-220	θ_{JC}	3.13	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1			
	TO-252			

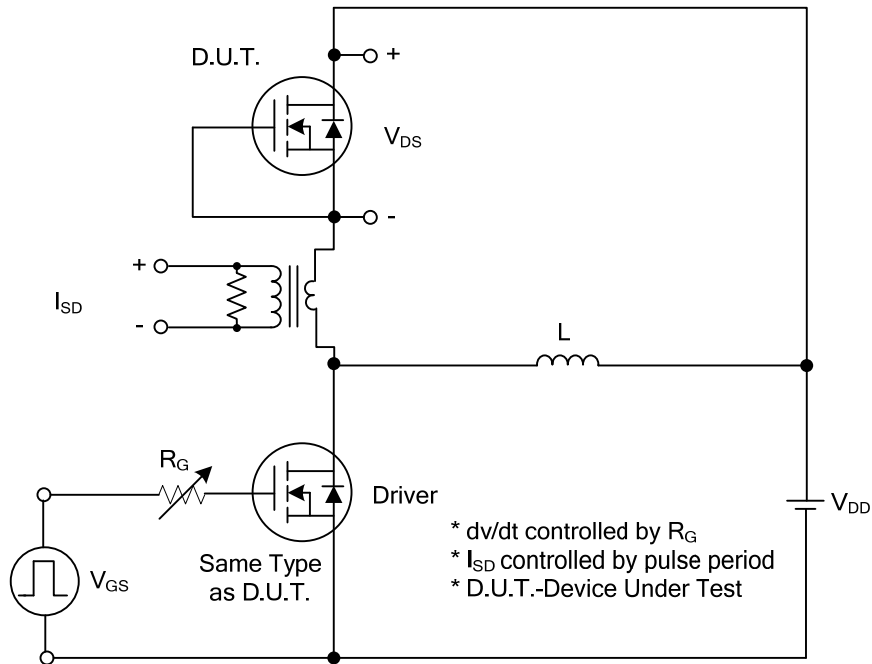
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	900			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS} V _{DS} =0V, V _{GS} =30V			100	nA
	Reverse	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	2.0		4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =0.5A			16	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		245		pF
Output Capacitance	C _{OSS}			30		pF
Reverse Transfer Capacitance	C _{RSS}			4		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A I _G =100μA (Note 1, 2)		16		nC
Gate-Source Charge	Q _{GS}			2.6		nC
Gate-Drain Charge	Q _{GD}			1		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		37		ns
Turn-ON Rise Time	t _R			10		ns
Turn-OFF Delay Time	t _{D(OFF)}			52		ns
Turn-OFF Fall Time	t _F			23		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V _{SD}	I _S =1.0A, V _{GS} =0V			1.0	V
Maximum Body-Diode Continuous Current	I _S				4.0	A
Maximum Body-Diode Pulsed Current	I _{SM}				1.4	A
Body Diode Reverse Recovery Time	t _{RR}	V _{GS} =0V, I _S =1.0A,		4.95		ns
Body Diode Reverse Recovery Charge	Q _{RR}	dI _F /dt=100A/μs (Note 1)		1.03		μC

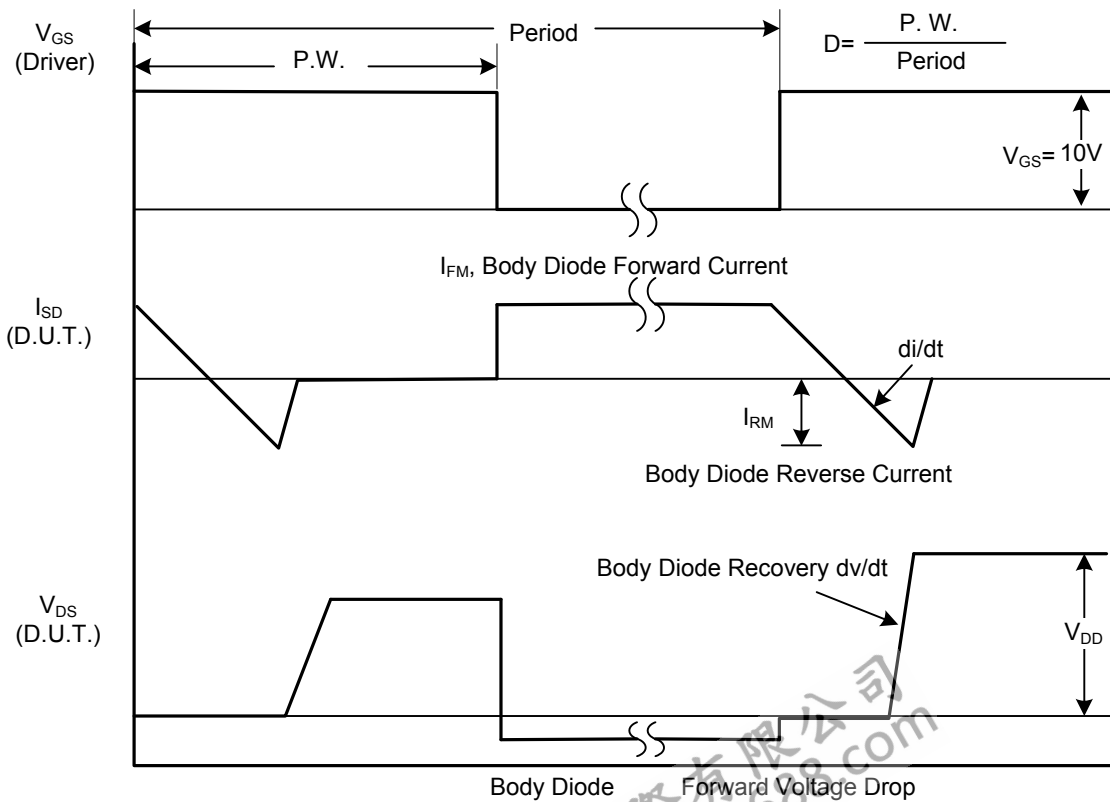
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

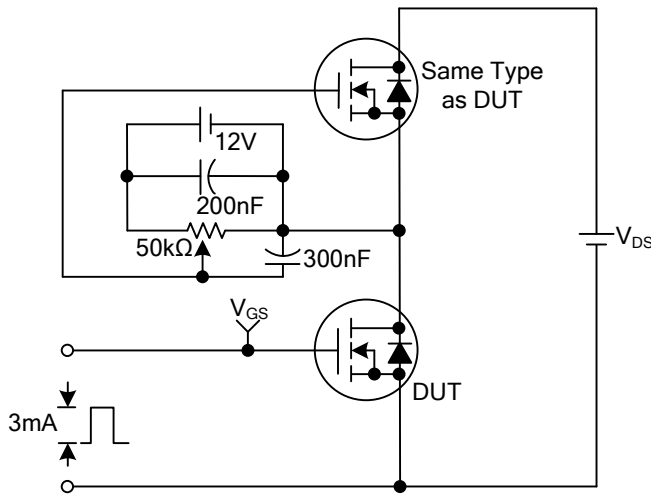


Peak Diode Recovery dv/dt Test Circuit

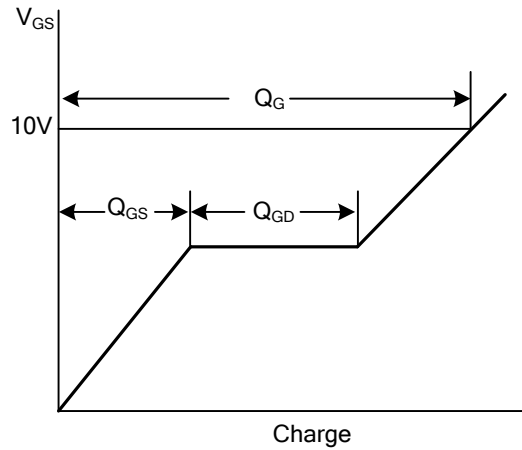


Peak Diode Recovery dv/dt Waveforms

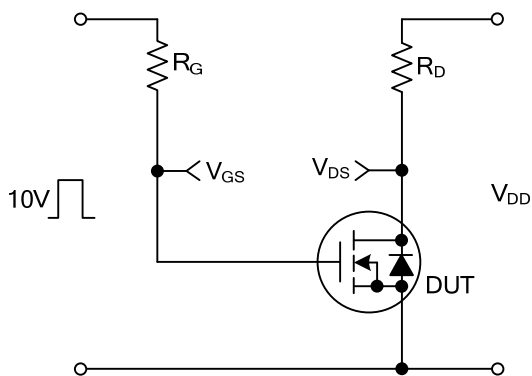
TEST CIRCUITS AND WAVEFORMS(Cont.)



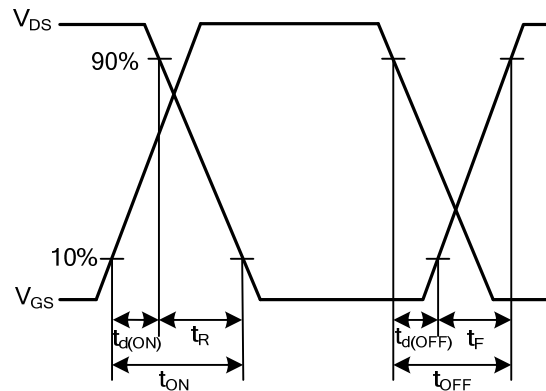
Gate Charge Test Circuit



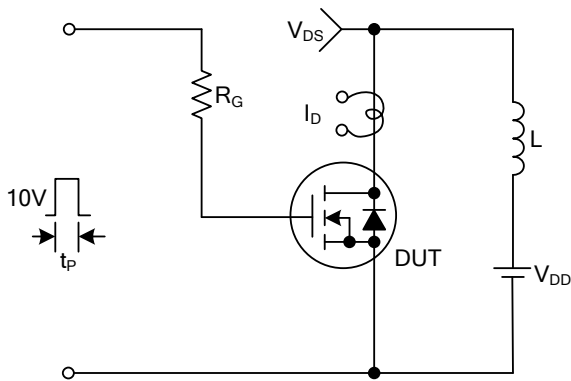
Gate Charge Waveforms



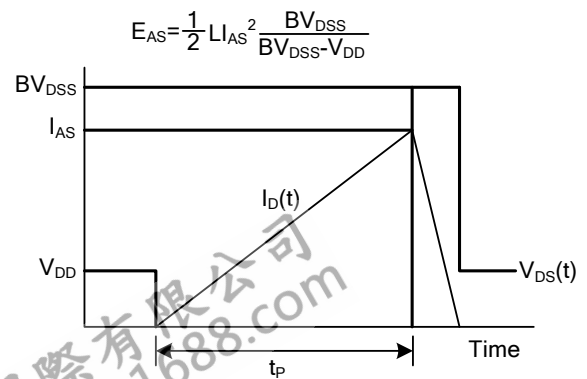
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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