



10N90

Power MOSFET

10A, 900V N-CHANNEL POWER MOSFET

DESCRIPTION

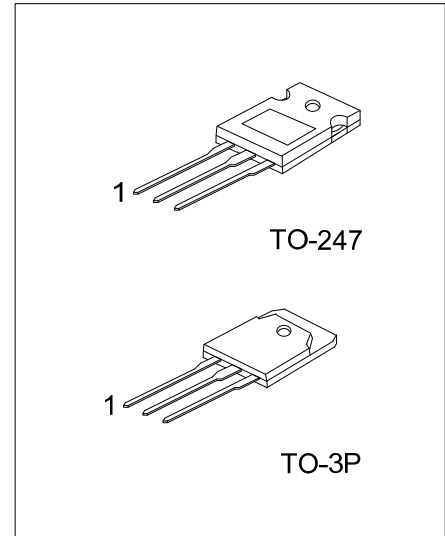
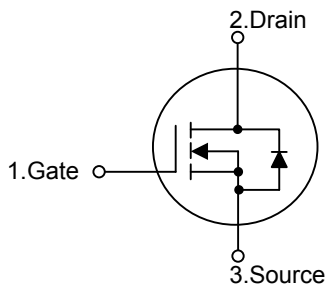
The UTC10N90 is a N-channel mode power MOSFET using UTC's advanced technology to provide costumers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC 10N90 is generally applied in high efficiency switch mode power supply.

FEATURES

- * $R_{DS(ON)} = 1.35\Omega @ V_{GS} = 10V$
- * Lower Leakage Current: $25\mu A$ (Max.) @ $V_{DS} = 900V$
- * Improved Gate Charge

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
10N90L-T3P-T	10N90G-T3P-T	TO-3P	G	D	S	Tube
10N90L-T47-T	10N90G-T47-T	TO-247	G	D	S	Tube

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

<p>10N90L-T3P-T</p>	<p>(1) T: Tube (2) T3P: TO-3P, T47: TO-247 (3) G: Halogen Free, L: Lead Free</p>
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■ 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
Drain Current	Continuous	I_D	10	A
	Pulsed (Note 2)	I_{DM}	40	A
Avalanche Current (Note 2)		I_{AR}	10	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	794	mJ
	Repetitive (Note 2)	E_{AR}	28	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.5	V/ns
Power Dissipation		P_D	183	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55~+150	$^\circ\text{C}$

Note: 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. $L = 15\text{mH}$, $I_{AS} = 10\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 27\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 10\text{A}$, $di/dt \leq 190\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test: Pulse width $\leq 250\mu\text{s}$, Duty cycle $\leq 2\%$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.68	$^\circ\text{C}/\text{W}$

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

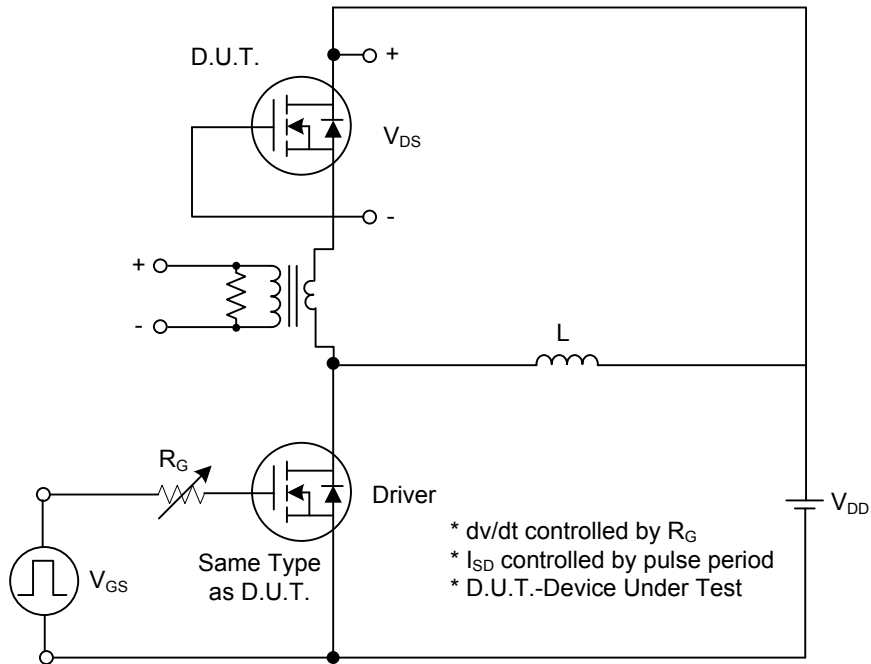
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	900			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$		1.11		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=900\text{V}$			25	μA
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$			100	nA
	Reverse	$V_{GS}=-30\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=5\text{A}$		1.15	1.35	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		2760	3580	pF
Output Capacitance	C_{OSS}			245	290	pF
Reverse Transfer Capacitance	C_{RSS}			105	125	pF

■ ELECTRICAL CHARACTERISTICS(Cont.)

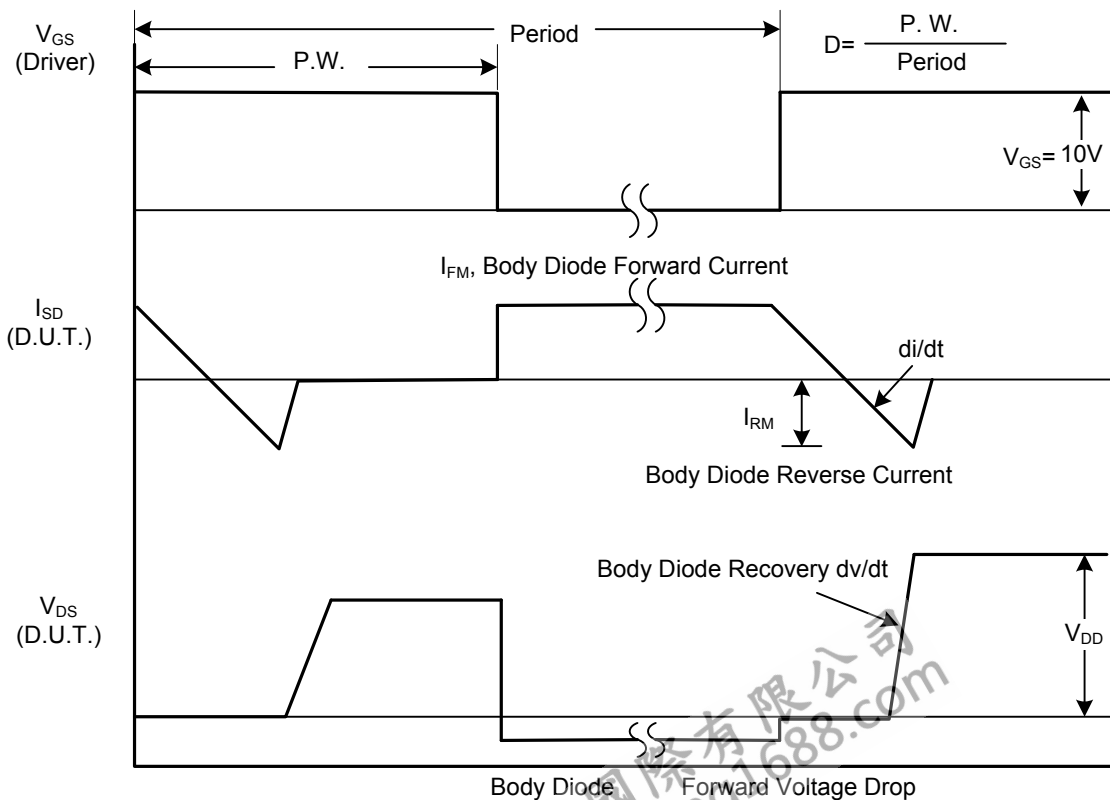
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{GS}=10V, V_{DS}=720V, I_D=10A$ (Note 1, 2)		127	165	nC
Gate to Source Charge	Q_{GS}			19.2		nC
Gate to Drain Charge	Q_{GD}			56.8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=450V, I_D=10A, R_G=9.6\Omega$ (Note 1, 2)		29	70	ns
Rise Time	t_R			54	20	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			161	330	ns
Fall-Time	t_F			47	105	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S	Integral Reverse Pn-Diode In The MOSFET			10	A
Maximum Body-Diode Pulsed Current (Note1)	I_{SM}				40	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=10A, V_{GS}=0V, T_J=25^\circ C$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=10A, dI_F/dt=100A/\mu s,$ $T_J=25^\circ C$ (Note 1)		690		ns
Body Diode Reverse Recovery Charge	Q_{RR}			11.94		μC

Note: 1. Pulse Test: Pulse width $\leq 250\mu s$, Duty cycle $\leq 2\%$
 2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

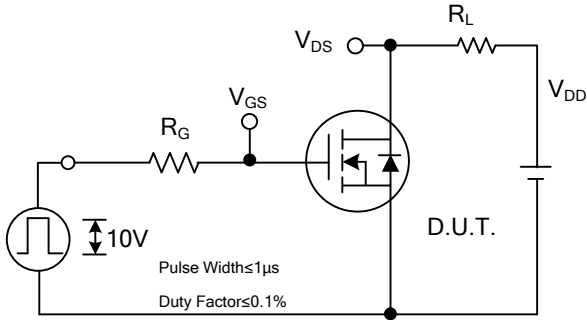


Peak Diode Recovery dv/dt Test Circuit

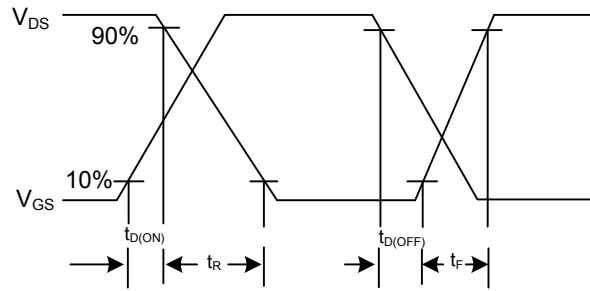


Peak Diode Recovery dv/dt Waveforms

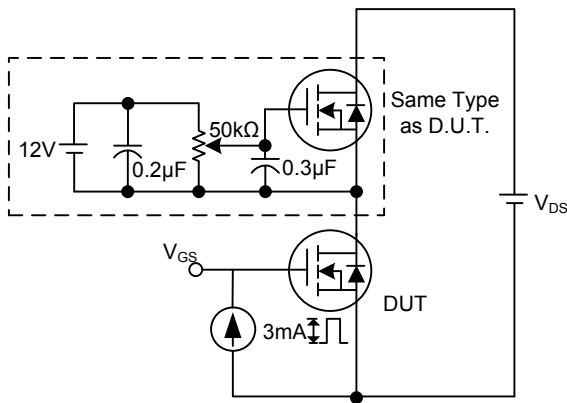
TEST CIRCUITS AND WAVEFORMS (Cont.)



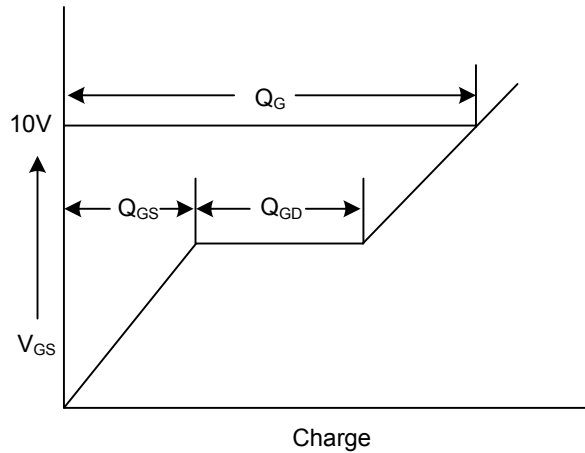
Switching Test Circuit



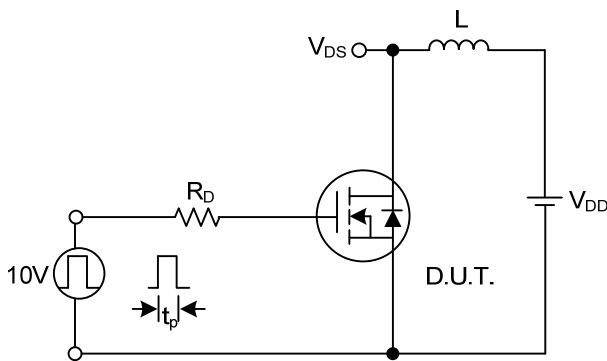
Switching Waveforms



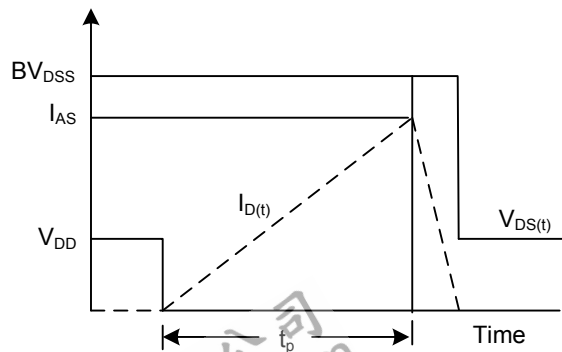
Gate Charge Test Circuit



Gate Charge Waveform



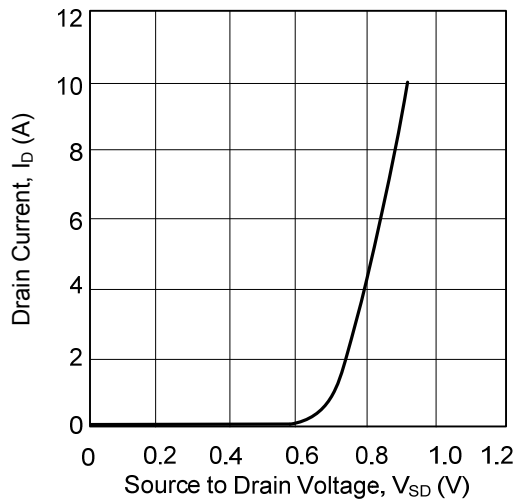
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

Drain Current vs. Source to Drain Voltage



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