



## 11N50-CB

Preliminary

Power MOSFET

### 11A, 500V N-CHANNEL POWER MOSFET

#### DESCRIPTION

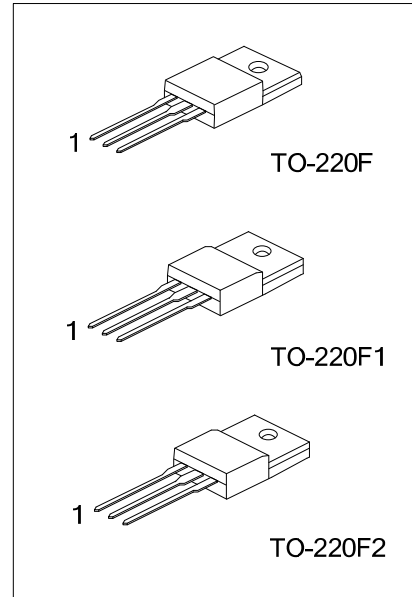
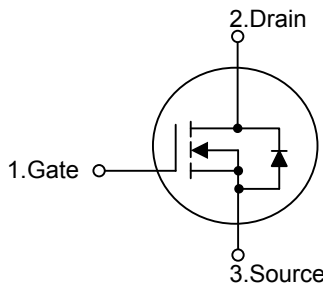
The **UTC 11N50-CB** is an N-channel enhancement mode power MOSFET. It uses UTC advanced planar stripe, DMOS technology to provide customers perfect switching performance, minimal on-state resistance. It also can withstand high energy pulse in the avalanche and commutation mode.

The **UTC 11N50-CB** is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

#### FEATURES

- \*  $R_{DS(ON)} < 0.55\Omega @ V_{GS} = 10V, I_D = 5.5A$
- \* Fast Switching
- \* With 100% Avalanche Tested

#### SYMBOL



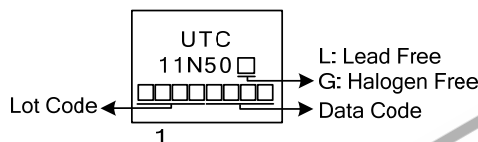
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
11N50L-TF1-T	11N50G-TF1-T	TO-220F1	G	D	S	Tube
11N50L-TF2-T	11N50G-TF2-T	TO-220F2	G	D	S	Tube
11N50L-TF3-T	11N50G-TF3-T	TO-220F	G	D	S	Tube

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

<p>11N50L-TF1-T</p>	<p>(1) T: Tube (2) TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F (3) L: Lead Free, G: Halogen Free and Lead Free</p>
---------------------	---

#### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	500	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	11	A
	Pulsed (Note 2)	$I_{DM}$	44	A
Avalanche Current (Note 2)		$I_{AR}$	4.5	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	101	mJ
Peak Diode Recovery $dv/dt$ (Note 4)		$dv/dt$	3.9	V/ns
Power Dissipation		$P_D$	48	W
Junction Temperature		$T_J$	150	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-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.  $L=10\text{mH}$ ,  $I_{AS}=4.5\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD}\leq 11\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	2.6	$^\circ\text{C}/\text{W}$

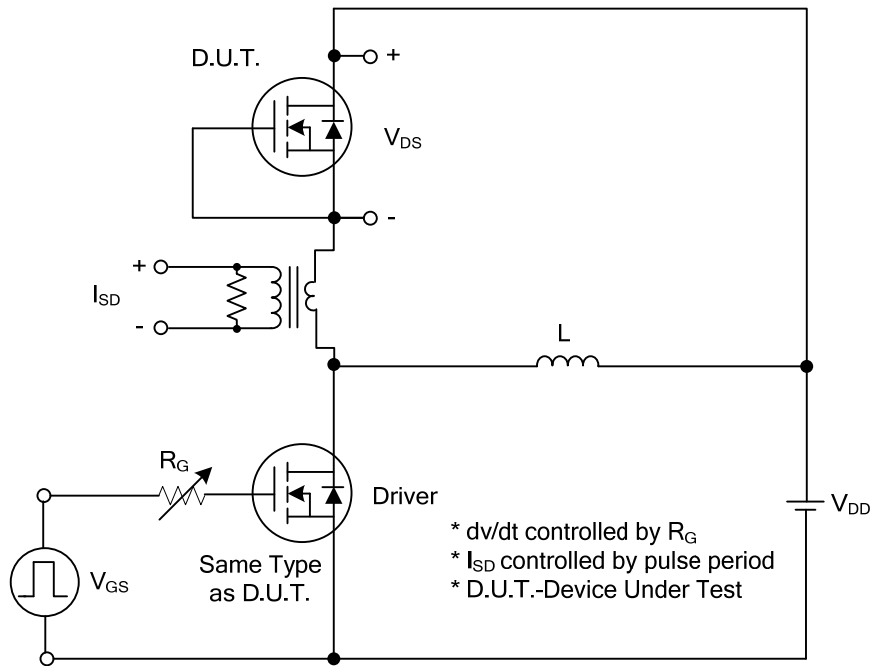
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}$ , $I_D=250\mu\text{A}$	500			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=500\text{V}$ , $V_{GS}=0\text{V}$			10	$\mu\text{A}$
Gate-Source Leakage Current	Forward	$I_{GSS}$			$\pm 100$	nA
	Reverse				-100	nA
		$V_{GS}=-30\text{V}$ , $V_{DS}=0\text{V}$				
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2.0		4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=5.5\text{A}$			0.55	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		1690		pF
Output Capacitance	$C_{OSS}$			150		pF
Reverse Transfer Capacitance	$C_{RSS}$			130		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=50\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=1.3\text{A}$ , $I_G=100\mu\text{A}$ (Note 1, 2)		37		nC
Gate to Source Charge	$Q_{GS}$			6		nC
Gate to Drain Charge	$Q_{GD}$			7		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=30\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=0.5\text{A}$ , $R_G=25\Omega$ (Note 1, 2)		73		ns
Rise Time	$t_R$			45		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			250		ns
Fall-Time	$t_F$			50		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				11	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				44	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_S=11\text{A}$ , $V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time (Note 1)	$t_{rr}$	$I_S=11\text{A}$ , $V_{GS}=0\text{V}$		310		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$di/dt=100\text{A}/\mu\text{s}$		2.23		$\mu\text{C}$

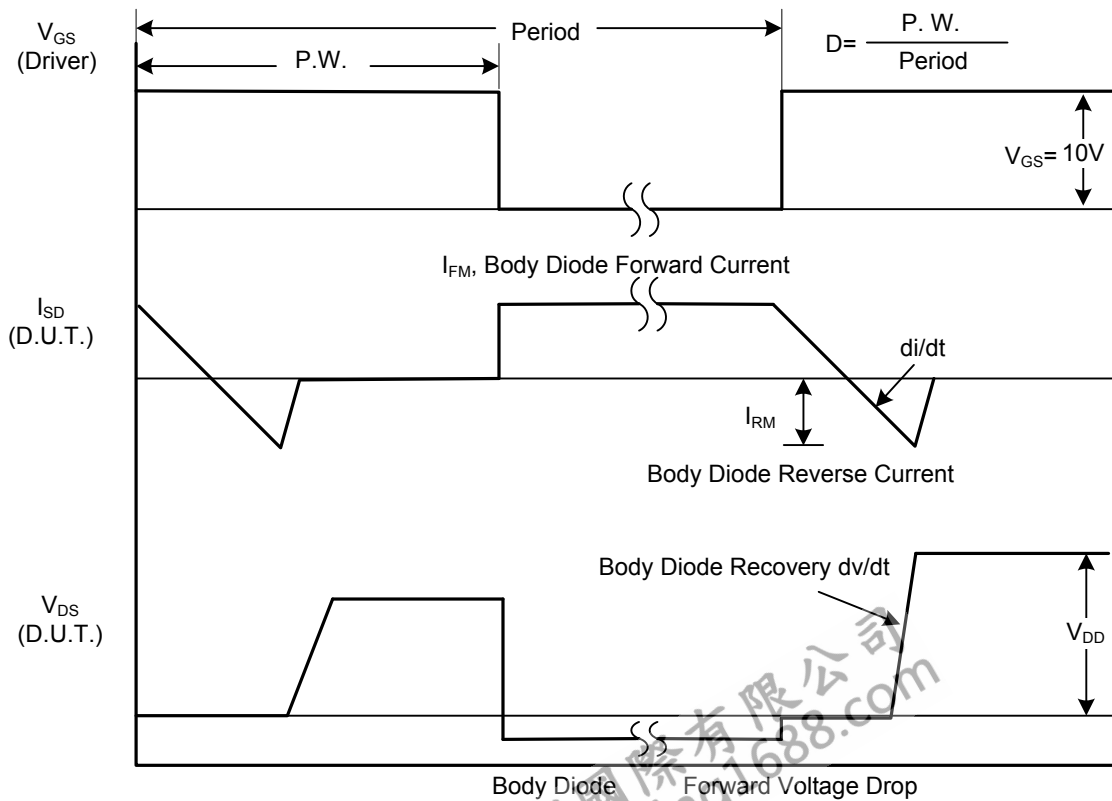
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

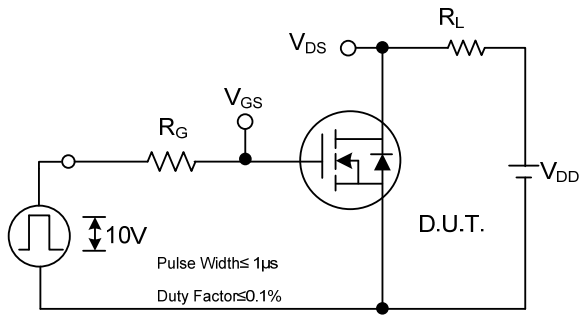


Peak Diode Recovery  $dv/dt$  Test Circuit

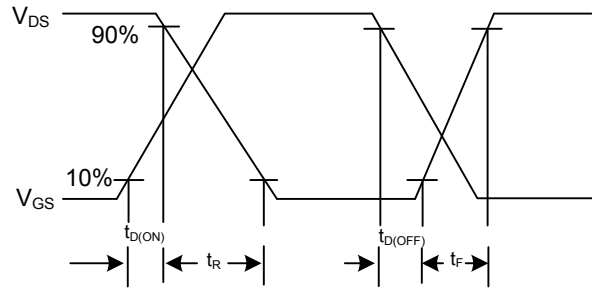


Peak Diode Recovery  $dv/dt$  Waveforms

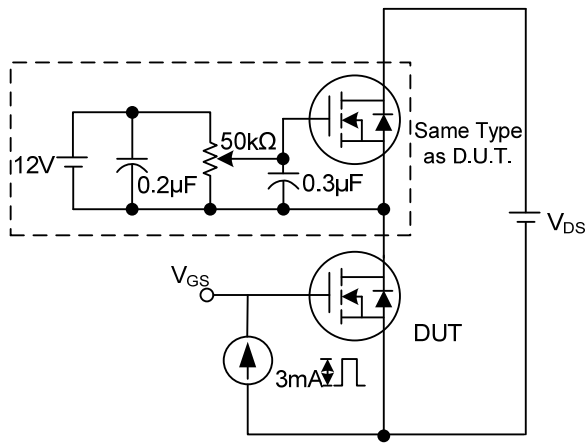
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



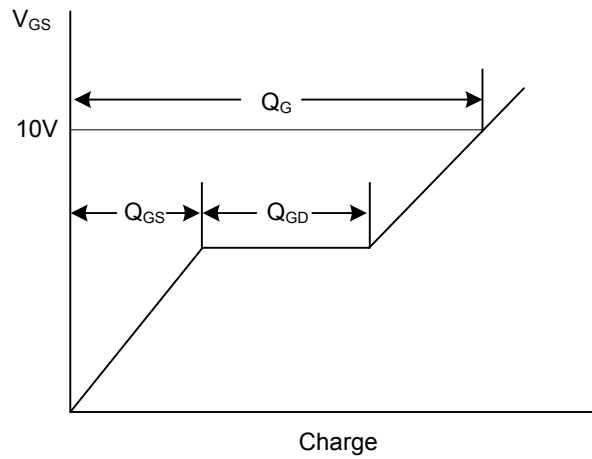
Switching Test Circuit



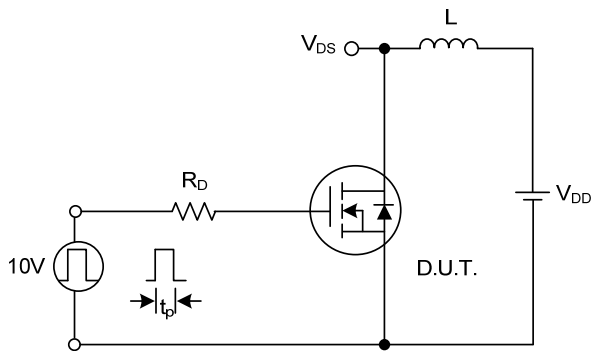
Switching Waveforms



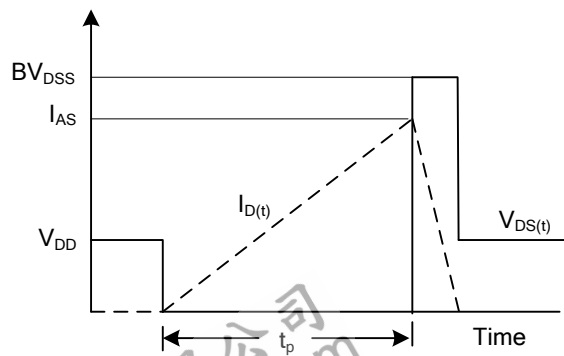
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.