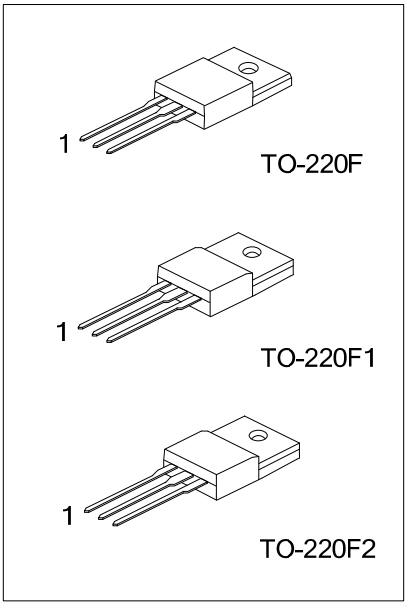
11A, 500V N-CHANNEL POWER MOSFET



■ DESCRIPTION

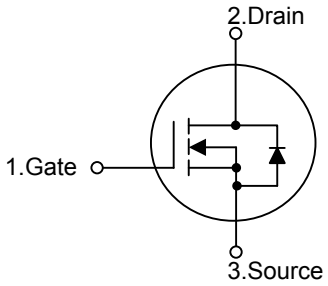
The **UTC 11N50-CB** is an N-channel enhancement mode power MOSFET. It uses UTC advanced planar stripe, DMOS technology to provide customers perfect switching performance, minimal on-state resistance. It also can withstand high energy pulse in the avalanche and commutation mode.

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

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

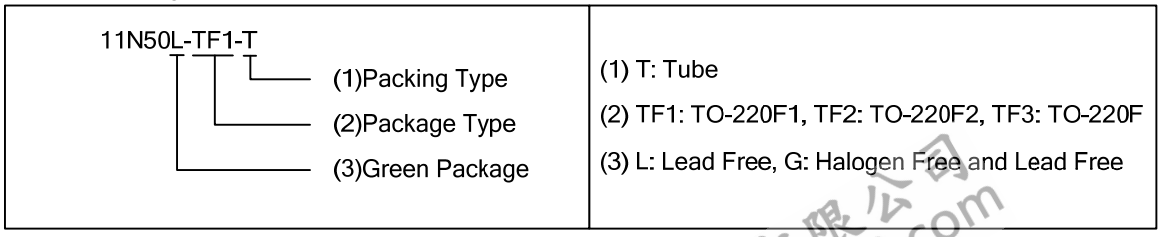
■ SYMBOL



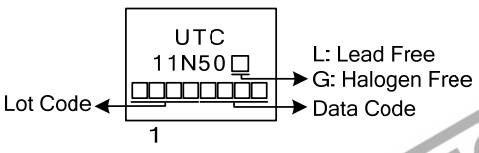
■ ORDERING INFORMATION

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



■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	±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	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°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=10mH, I_{AS}=4.5A, V_{DD}= 50V, R_G=25Ω, Starting T_J=25°C
4. I_{SD} ≤11A, di/dt ≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J=25°C

■ THERMAL DATA

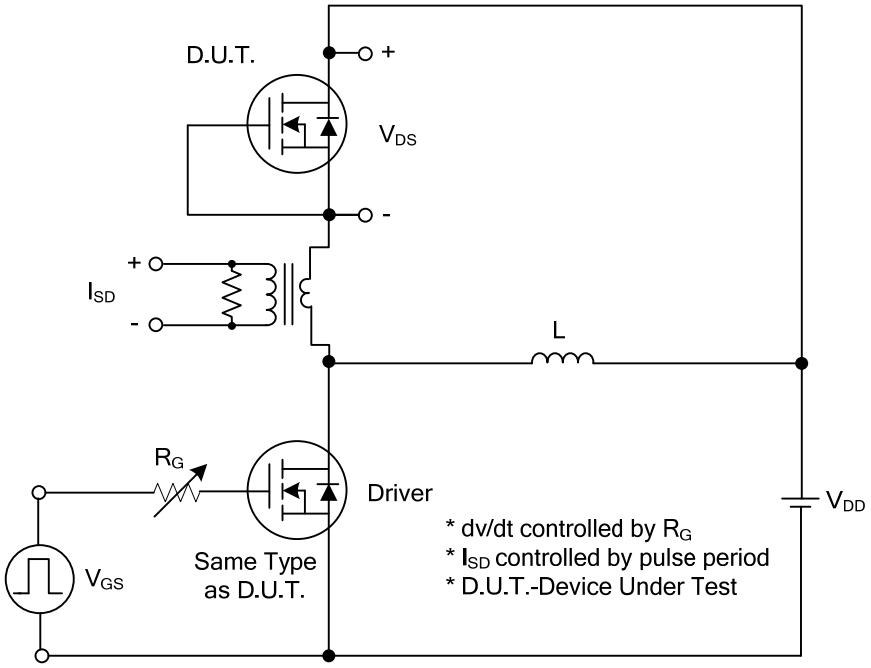
PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	2.6	°C/W

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

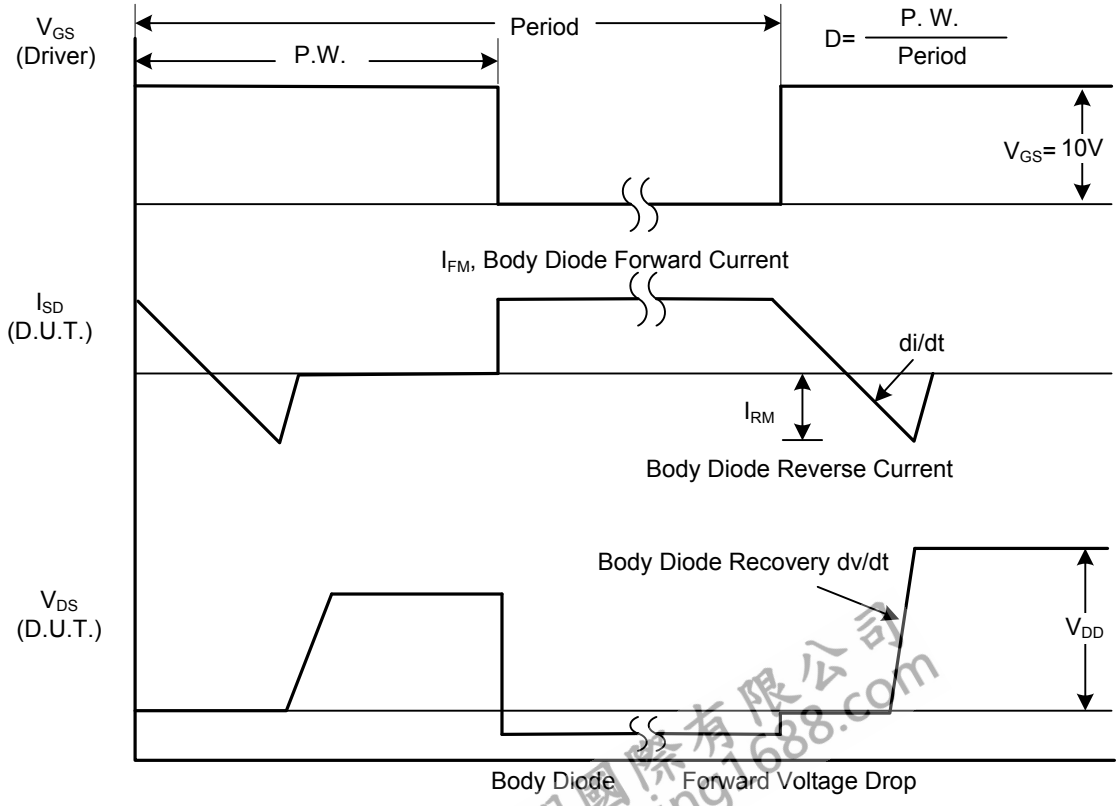
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	500			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=500V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{DS}=0V ,V_{GS}=±30V			±100	nA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}= V_{GS}, I_D=250μA	2.0		4.0	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=5.5A			0.55	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V,V_{DS}=25V, f=1.0MHz		1690		pF
Output Capacitance		C_{OSS}			150		pF
Reverse Transfer Capacitance		C_{RSS}			130		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=50V, V_{GS}=10V, I_D=1.3A , I_G=100μA (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}=30V, V_{GS}=10V, I_D=0.5A, R_G=25Ω (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
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
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 =11A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=11A, V_{GS}=0V,		310		ns
Body Diode Reverse Recovery Charge		Q_{rr}	dI_F/dt=100A/μs		2.23		μC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

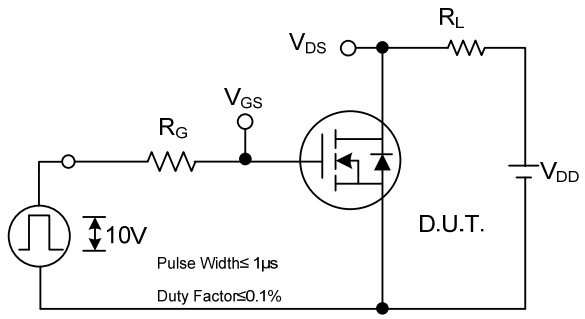


Peak Diode Recovery dv/dt Test Circuit

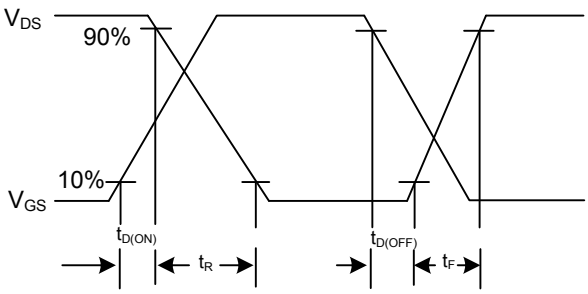


Peak Diode Recovery dv/dt Waveforms

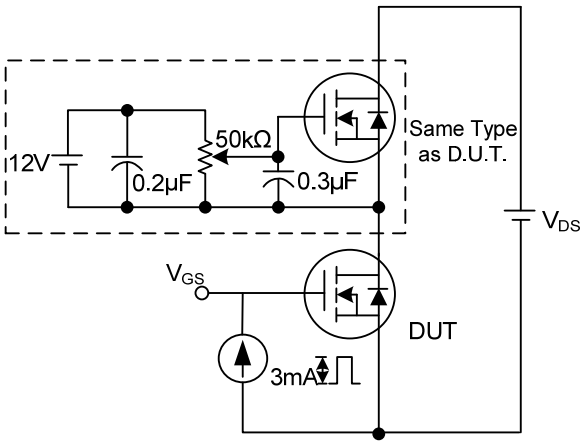
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



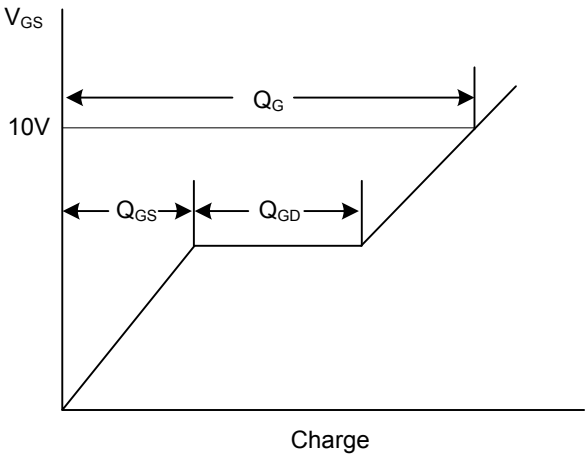
Switching Test Circuit



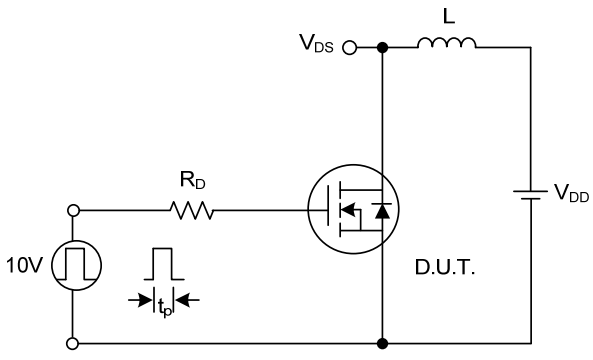
Switching Waveforms



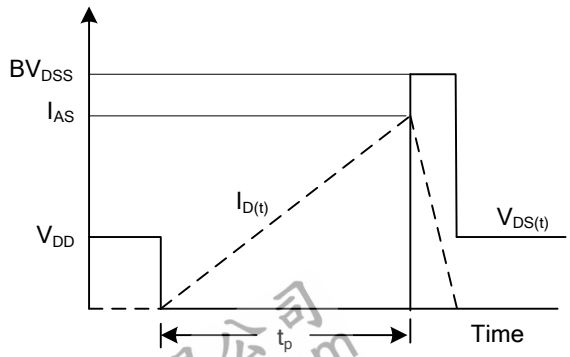
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms