

**2N50K-TA**

Preliminary

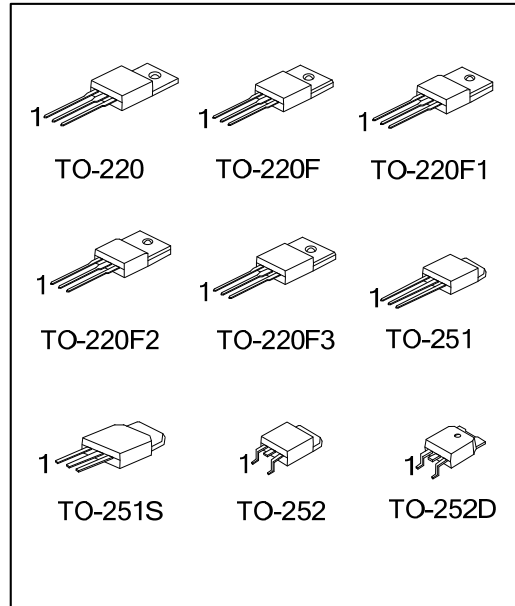
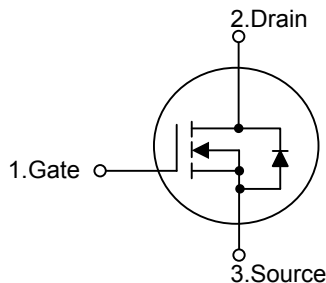
*Power MOSFET***2A, 500V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **2N50K-TA** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers 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 **2N50K-TA** is generally applied in high efficiency switch mode power supplies, active power factor correction and electronic lamp ballasts based on half bridge topology.

FEATURES

- * $R_{DS(ON)} < 4.9\Omega$ @ $V_{GS}=10V$, $I_D=1A$
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL

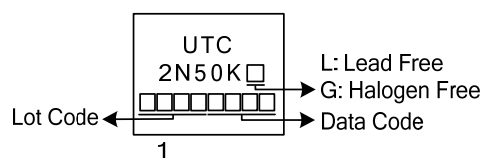
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N50KL-TA3-T	2N50KG-TA3-T	TO-220	G	D	S	Tube
2N50KL-TF3-T	2N50KG-TF3-T	TO-220F	G	D	S	Tube
2N50KL-TF1-T	2N50KG-TF1-T	TO-220F1	G	D	S	Tube
2N50KL-TF2-T	2N50KG-TF2-T	TO-220F2	G	D	S	Tube
2N50KL-TF3T-T	2N50KG-TF3T-T	TO-220F3	G	D	S	Tube
2N50KL-TM3-T	2N50KG-TM3-T	TO-251	G	D	S	Tube
2N50KL-TMS-T	2N50KG-TMS-T	TO-251S	G	D	S	Tube
2N50KL-TN3-R	2N50KG-TN3-R	TO-252	G	D	S	Tape Reel
2N50KL-TND-R	2N50KG-TND-R	TO-252D	G	D	S	Tape Reel

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

2N50KL-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TF3T: TO-220F3, TM3: TO-251, TMS: TO-251S, TN3: TO-252, TND: TO-252D (3) L: Lead Free, G: Halogen Free and Lead Free
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■ 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}	± 30	V
Drain Current	Continuous ($T_C=25^\circ\text{C}$)	I_D	2 (Note 3)	A
	Pulsed (Note 2)	I_{DM}	8 (Note 3)	A
Avalanche Current (Note 2)		I_{AR}	2	A
Avalanche Energy	Single Pulsed	E_{AS}	82	mJ
	Repetitive (Note 4)	E_{AR}	3.3	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220	P_D	52	W
	TO-220F/TO-220F1		23	
	TO-220F3		23.2	
	TO-220F2		50	
	TO-251/TO-251S		0.43	W/ $^\circ\text{C}$
	TO-252/TO-252D		0.18	
Derate above 25°C	TO-220		0.185	
	TO-220F/TO-220F1		0.4	
	TO-220F3			
	TO-220F2			
	TO-251/TO-251S			
	TO-252/TO-252D			
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. Drain current limited by maximum junction temperature

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

5. $L=41\text{mH}$, $I_{AS}=2.0\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

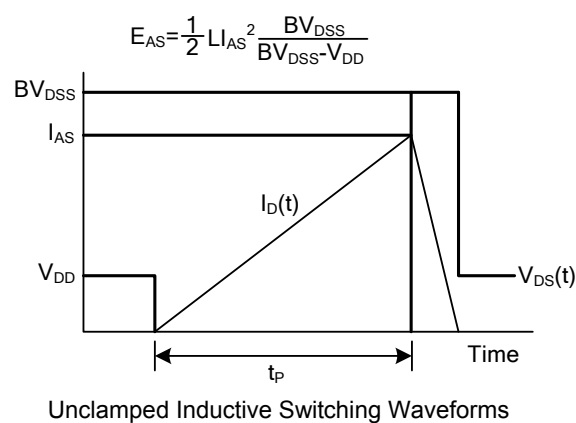
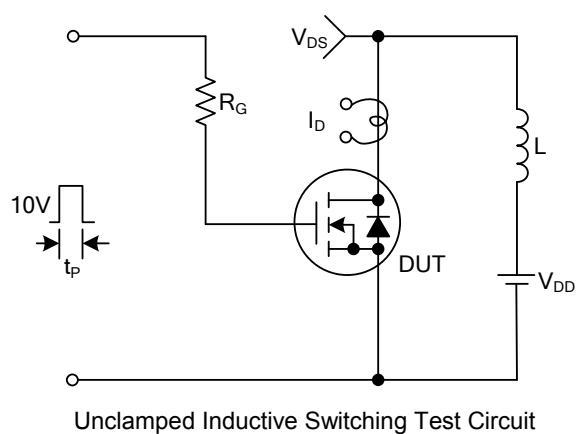
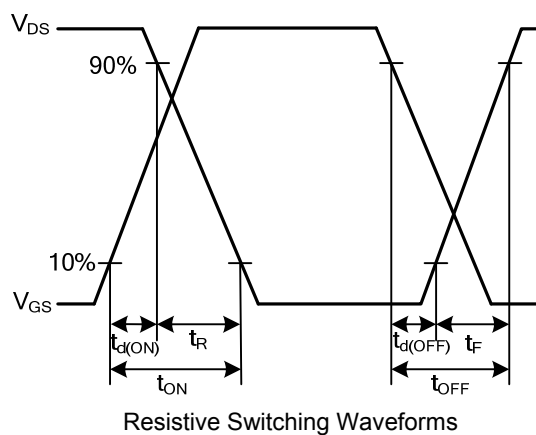
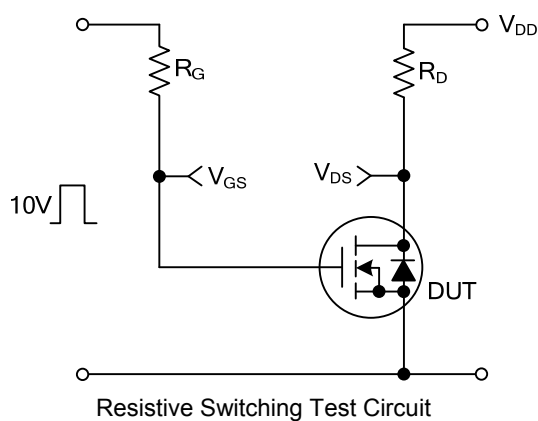
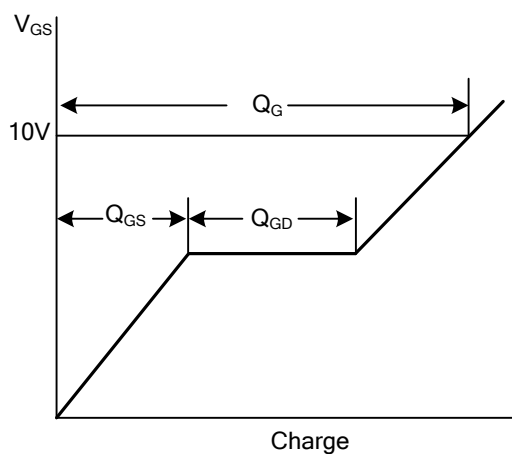
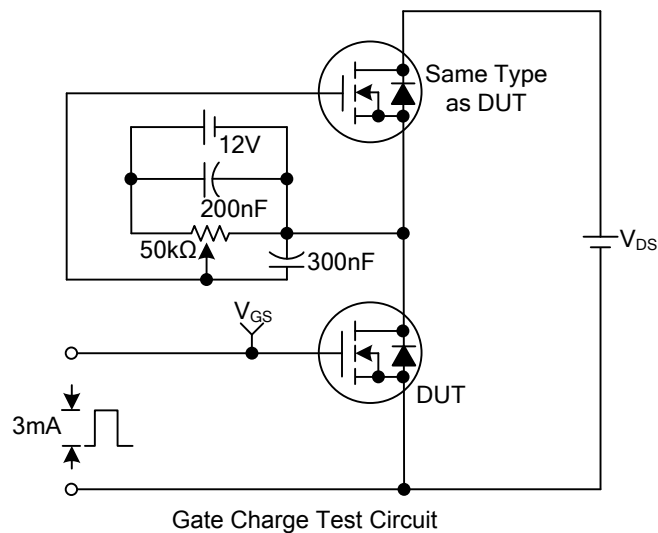
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-220F1/TO-220F2			
	TO-220F3			
	TO-251/TO-251S		110	
Junction to Case	TO-252/TO-252D	θ_{JC}	2.36	$^\circ\text{C/W}$
	TO-220		5.5	
	TO-220F/TO-220F1		5.4	
	TO-220F3			
	TO-220F2			
	TO-251/TO-251S		2.5	
	TO-252/TO-252D			

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

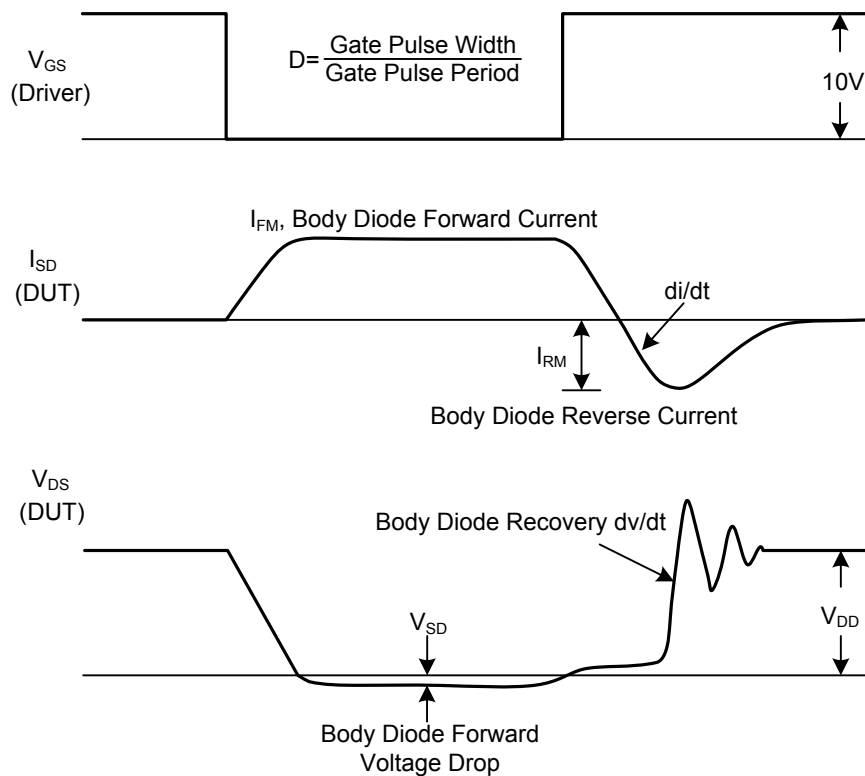
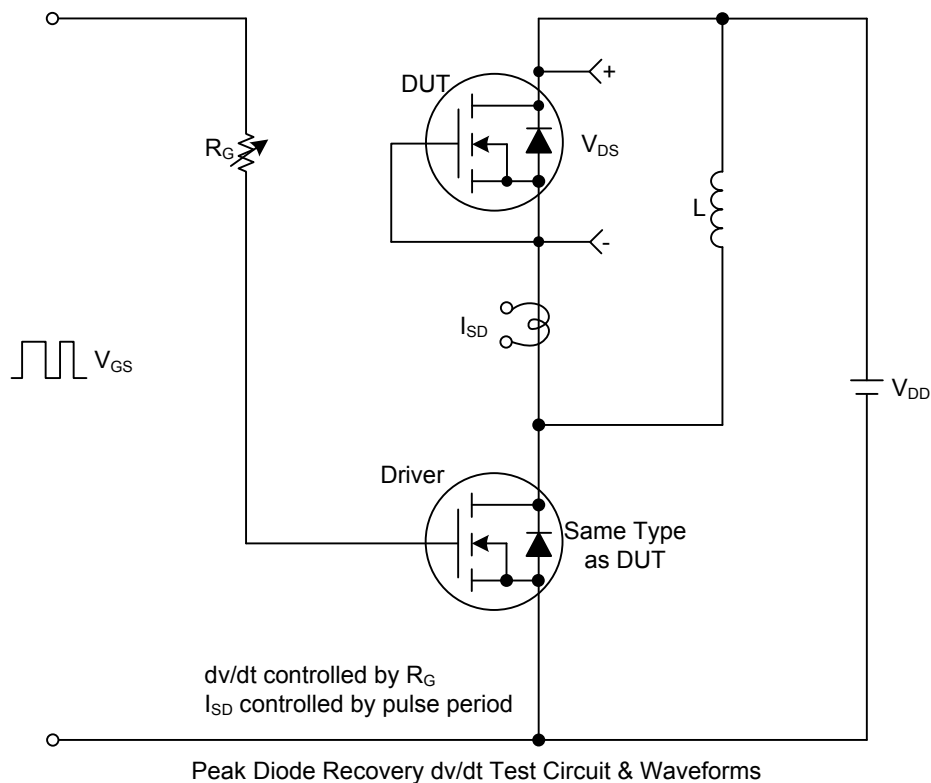
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V			25	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+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	3.0		5.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =1A		2.6	4.9	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		200		pF
Output Capacitance		C _{OSS}			39		pF
Reverse Transfer Capacitance		C _{RSS}			16		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =400V, I _D =2A (Note 1, 2)		12	25	nC
Gate to Source Charge		Q _{GS}			5.6	3	nC
Gate to Drain Charge		Q _{GD}			2	15	nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =250V, I _D =2A, R _G =25Ω (Note 1, 2)		20		ns
Rise Time		t _R			40		ns
Turn-OFF Delay Time		t _{D(OFF)}			84		ns
Fall-Time		t _F			38		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				2	A
Maximum Body-Diode Pulsed Current		I _{SM}				8	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =2A, V _{GS} =0V			1.2	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



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



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