



2N50-CB

Preliminary

Power MOSFET

2A, 500V N-CHANNEL POWER MOSFET

DESCRIPTION

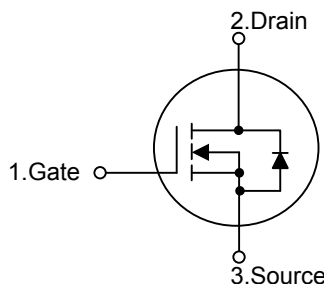
The UTC **2N50-CB** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **2N50-CB** is generally applied in high efficiency switch mode power supplies, active power factor correction and electronic lamp ballasts based on half bridge topology.

FEATURES

- * $R_{DS(ON)} < 5.0\Omega @ V_{GS}=10V, I_D=1.0A$
- * High switching speed
- * 100% avalanche tested

SYMBOL

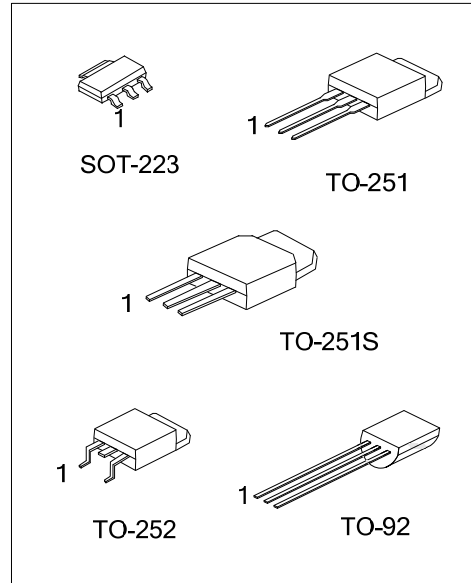


ORDERING INFORMATION

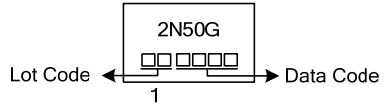
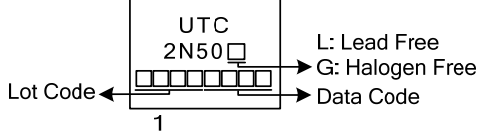
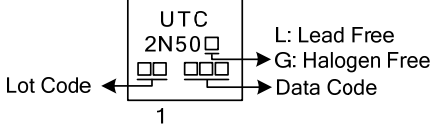
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
-	2N50G-AA3-R	SOT-223	G	D	S	Tape Reel
2N50L-TM3-T	2N50G-TM3-T	TO-251	G	D	S	Tube
2N50L-TMS-T	2N50G-TMS-T	TO-251S	G	D	S	Tube
2N50L-TN3-R	2N50G-TN3-R	TO-252	G	D	S	Tape Reel
2N50L-T92-B	2N50G-T92-B	TO-92	G	D	S	Tape Box
2N50L-T92-K	2N50G-T92-K	TO-92	G	D	S	Bulk

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

<p>2N50G-AA3-R</p>	<p>(1) B: Tape Box, K: Bulk, T: Tube, R: Tape Reel (2) AA3: SOT-223, TM3: TO-251, TMS: TO-251S TN3: TO-252, T92: TO-92 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
--------------------	---



MARKING

PACKAGE	MARKING
SOT-223	 <p>Diagram showing marking on a SOT-223 package. The marking includes '2N50G' at the top, a 'Lot Code' (represented by four squares) on the left, and a 'Data Code' (represented by four squares) on the right. A '1' is centered below the package.</p>
TO-251 / TO-251S / TO-252	 <p>Diagram showing marking on a TO-251 / TO-251S / TO-252 package. The marking includes 'UTC' and '2N50' at the top, a 'Lot Code' (represented by six squares) on the left, and a 'Data Code' (represented by six squares) on the right. To the right of the package, 'L: Lead Free' and 'G: Halogen Free' are indicated. A '1' is centered below the package.</p>
TO-92	 <p>Diagram showing marking on a TO-92 package. The marking includes 'UTC' and '2N50' at the top, a 'Lot Code' (represented by two squares) on the left, and a 'Data Code' (represented by two squares) on the right. To the right of the package, 'L: Lead Free' and 'G: Halogen Free' are indicated. A '1' is centered below the package.</p>



■ 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	I_D	2.0	A
	Pulsed (Note 2)	I_{DM}	8.0	A
Avalanche Current (Note 2)		I_{AR}	1.4	A
Avalanche Energy	Single Pulsed	E_{AS}	10	mJ
Power Dissipation	SOT-223	P_D	8.9	W
	TO-251/TO-251S		50	W
	TO-252			
	TO-92		1.42	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. Drain current limited by maximum junction temperature.
4. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.
5. $L=10\text{mH}$, $I_{AS}=1.4\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$.
6. $I_{SD}\leq 2.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	150	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S		110	$^\circ\text{C}/\text{W}$
	TO-252			
	TO-92		160	$^\circ\text{C}/\text{W}$
Junction to Case	SOT-223	θ_{JC}	14	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S		2.5	$^\circ\text{C}/\text{W}$
	TO-252			
	TO-92		88	$^\circ\text{C}/\text{W}$

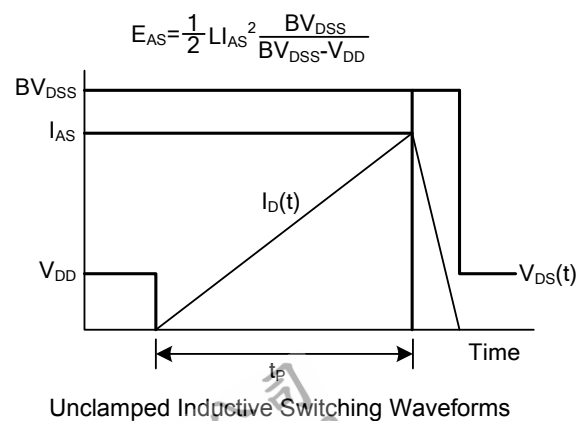
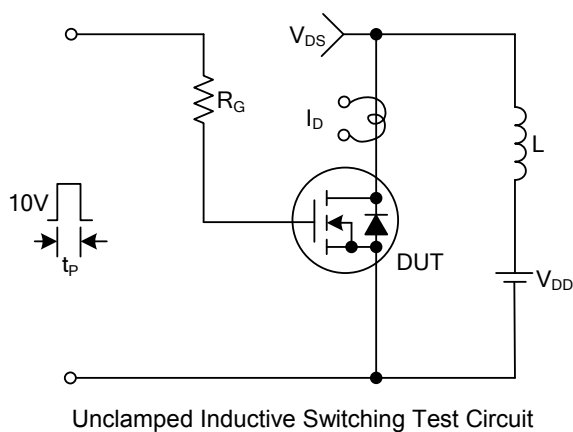
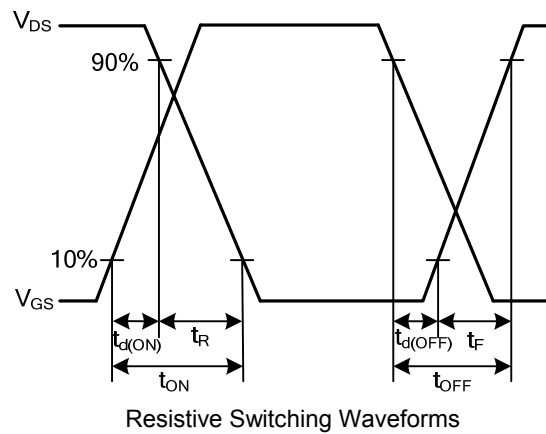
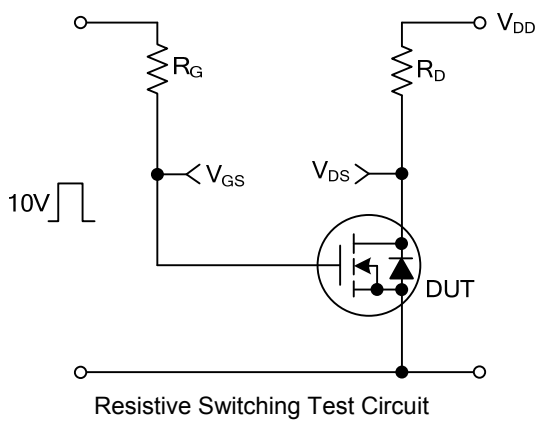
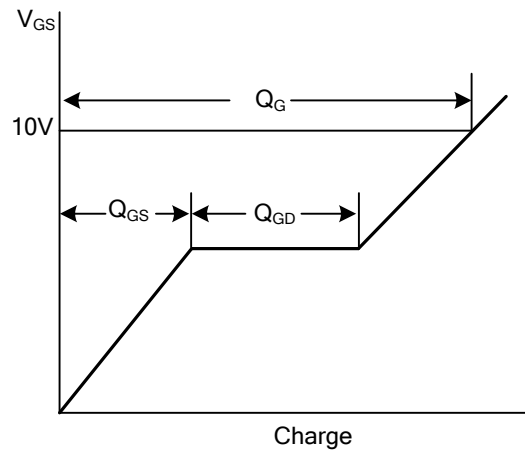
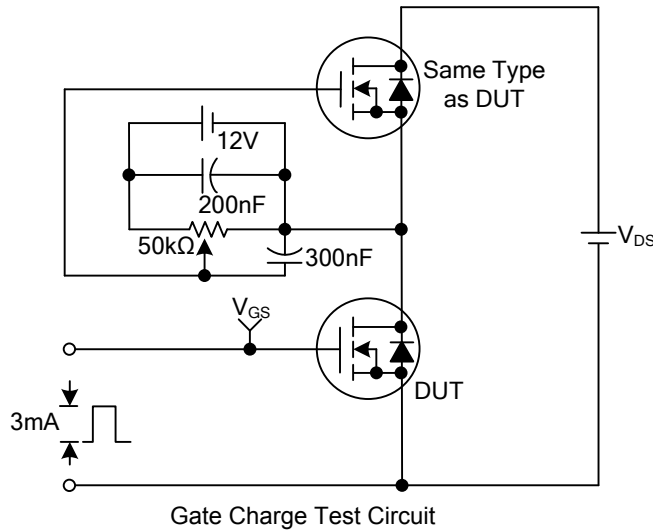
■ ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	500			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=1\text{A}$			5.0	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		153		pF
Output Capacitance	C_{OSS}			25.3		pF
Reverse Transfer Capacitance	C_{RSS}			4.7		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=1.3\text{A}$, $I_G=250\mu\text{A}$ (Note 1, 2)		12.6		nC
Gate to Source Charge	Q_{GS}			1.3		nC
Gate to Drain Charge	Q_{GD}			0.8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.5\text{A}$, $R_G=25\Omega$ (Note 1, 2)		26		ns
Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			62		ns
Fall-Time	t_F			25		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}	$I_S=2\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0\text{V}$, $I_S=2\text{A}$, $di/dt=100\text{A}/\mu\text{s}$		140		ns
Reverse Recovery Charge	Q_{rr}			0.48		μC

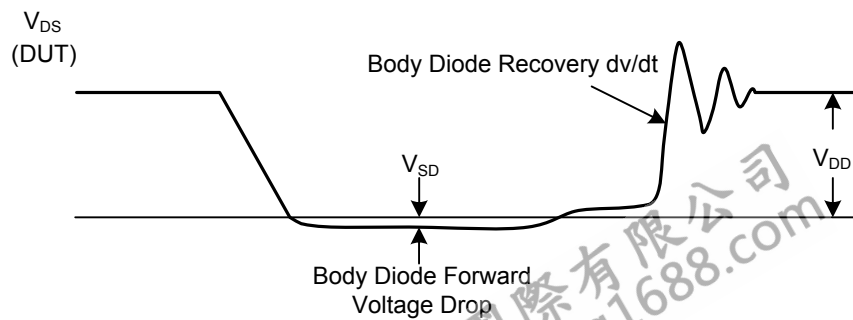
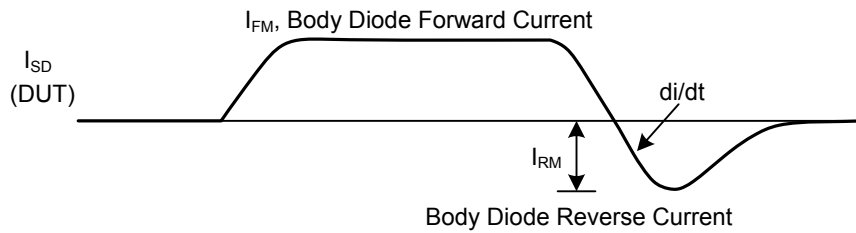
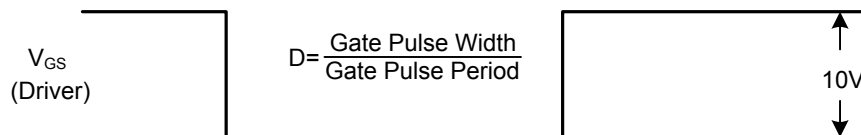
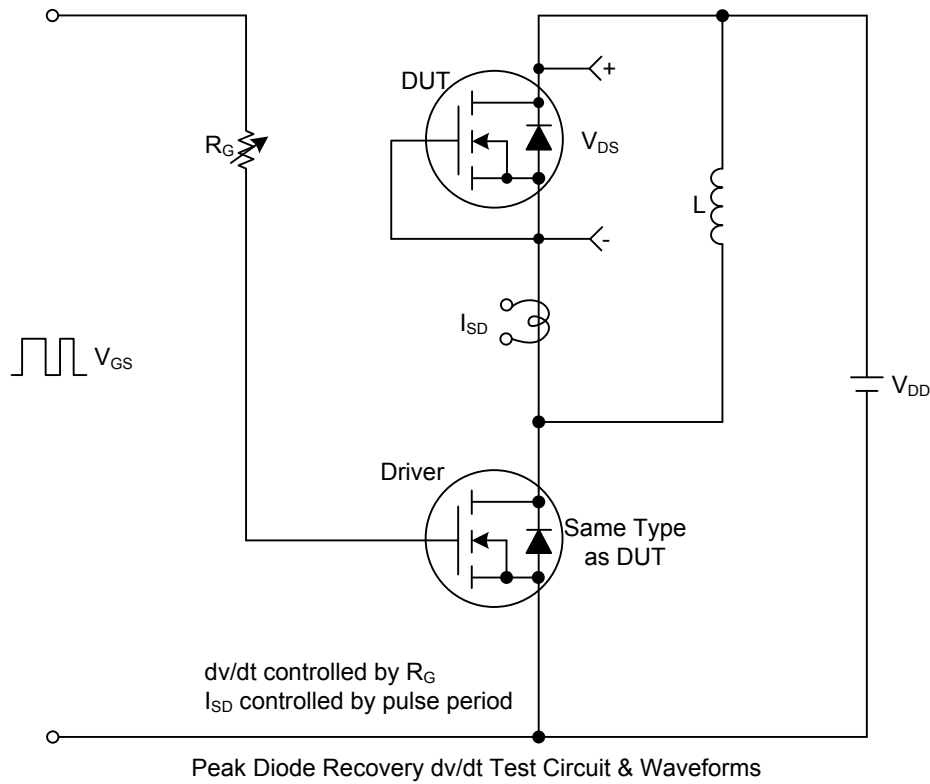
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



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.