

**18N50****Power MOSFET****18A, 500V N-CHANNEL
POWER MOSFET****DESCRIPTION**

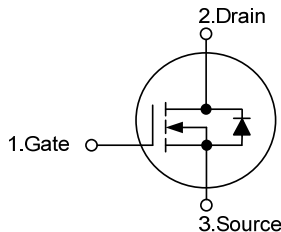
The UTC **18N50** is an N-channel enhancement mode power MOSFET using UTC's advanced planar stripe and DMOS technology to provide perfect performance.

This technology can withstand high energy pulse in the avalanche and commutation mode. It can provide minimum on-state resistance and high switching speed.

This device is generally applied in active power factor correction and high efficient switched mode power supplies.

FEATURES

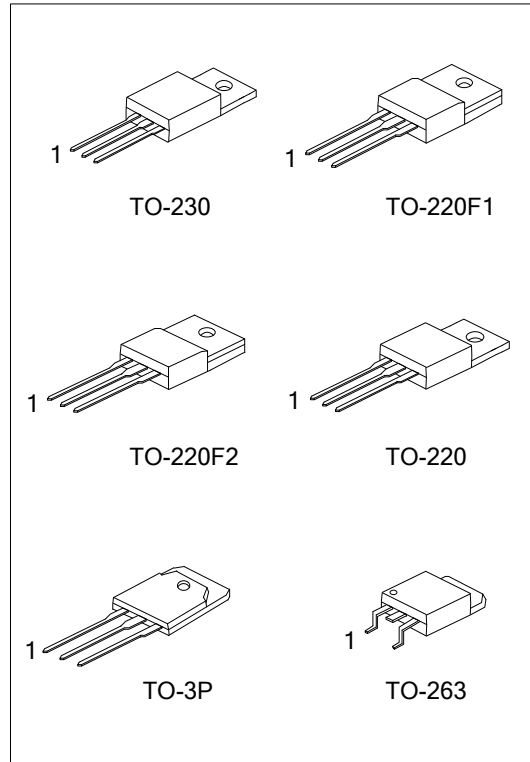
- * $R_{DS(ON)} = 0.32\Omega$ @ $V_{GS} = 10V$
- * High switching speed
- * Typically 45nC low gate charge
- * 100% avalanche tested
- * Typically 25pF low C_{RSS}
- * Improved dv/dt capability

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
18N50L-TC3-T	18N50G-TC3-T	TO-230	G	D	S	Tube
18N50L-TF1-T	18N50G-TF1-T	TO-220F1	G	D	S	Tube
18N50L-TF2-T	18N50G-TF2-T	TO-220F2	G	D	S	Tube
18N50L-TA3-T	18N50G-TA3-T	TO-220	G	D	S	Tube
18N50L-T3P-T	18N50G-T3P-T	TO-3P	G	D	S	Tube
18N50L-TQ2-T	18N50G-TQ2-T	TO-263	G	D	S	Tube
18N50L-TQ2-R	18N50G-TQ2-R	TO-263	G	D	S	Tape Reel

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

18N50L - TF1 - T (1) Packing Type (2) Package Type (3) Lead Free	(1) T: Tube, R: Tape Reel (2) TC3: TO-230, TF1: TO-220F1, TF2: TO-220F2, TA3: TO-220, T3P: TO-3P, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free
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■ **ABSOLUTE MAXIMUM RATINGS** (unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V_{DSS}	500	V
Gate to Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	18	A
	Pulsed (Note 2)	I_{DM}	72 (Note 5)	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	945	mJ
	Repetitive (Note 2)	E_{AR}	23.5	mJ
Avalanche Current (Note 2)		I_{AR}	18	A
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220F1	P_D	38.5	W
	TO-220F2		40.5	
	TO-220/TO-263		235	
	TO-230			
	TO-3P		277	
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. Repetitive Rating: Pulse width limited by maximum junction temperature

3. $L=5.2\text{mH}$, $I_{AS}=18\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

4. $I_{SD}\leq 18\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$

5. Drain current limited by maximum junction temperature

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1/TO-220F2	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-220/TO-263			
	TO-230/TO-3P			
Junction to Case	TO-220F1	θ_{JC}	3.3	$^{\circ}\text{C}/\text{W}$
	TO-220F2		3.0	
	TO-220/TO-263		0.53	
	TO-230			
	TO-3P		0.45	

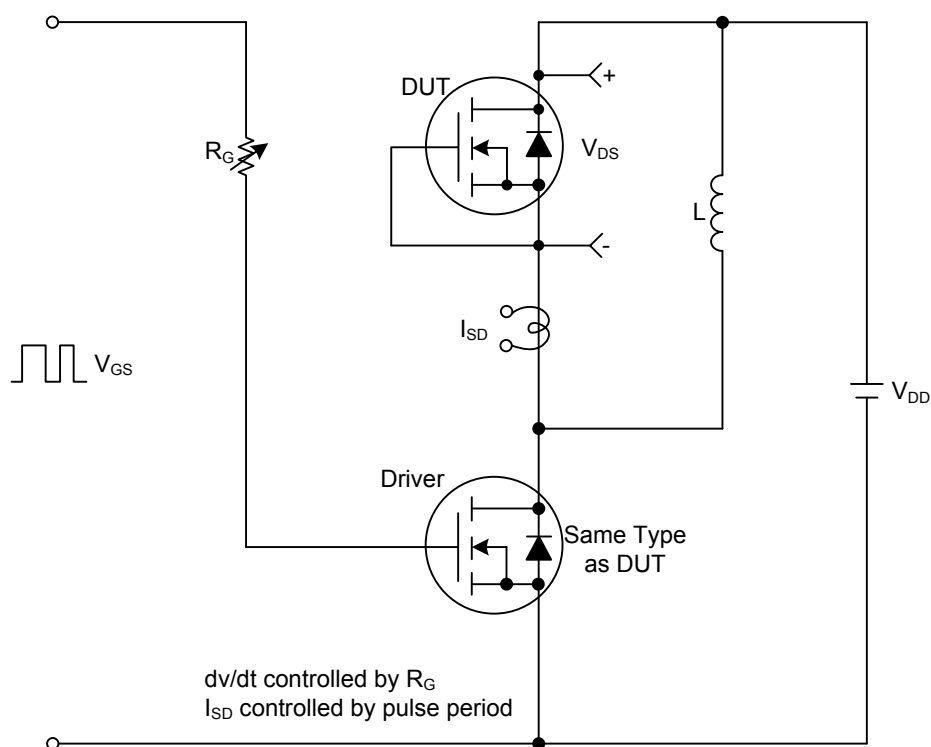
■ **ELECTRICAL CHARACTERISTICS** ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.5		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V			1	μA
			V _{DS} =400V, T _C =125°C			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} = 30 V, V _{DS} = 0 V			100	nA
	Reverse		V _{GS} = -30 V, V _{DS} = 0 V			-100	
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 =9A		0.24	0.32	Ω
Forward Transconductance		g _{FS}	V _{DS} =40V, I _D =9A (Note 1)		25		S
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2200	2860	pF
Output Capacitance		C _{OSS}			330	430	pF
Reverse Transfer Capacitance		C _{RSS}			25	40	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =400V, V _{GS} =10V, I _D =18A (Note 1,2)		45	60	nC
Gate-Source Charge		Q _{GS}			12.5		nC
Gate-Drain Charge		Q _{GD}			19		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =250V, I _D =18A, R _G =25Ω (Note 1,2)		55	120	ns
Turn-ON Rise Time		t _R			165	340	ns
Turn-OFF Delay Time		t _{D(OFF)}			95	200	ns
Turn-OFF Fall Time		t _F			90	190	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				18	A
Maximum Body-Diode Pulsed Current		I _{SM}				72	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S = 18A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	V _{GS} =0V, I _S =18A,		500		ns
Body Diode Reverse Recovery Charge		Q _{RR}	dl _F /dt=100A/μs (Note 1)		5.4		μC

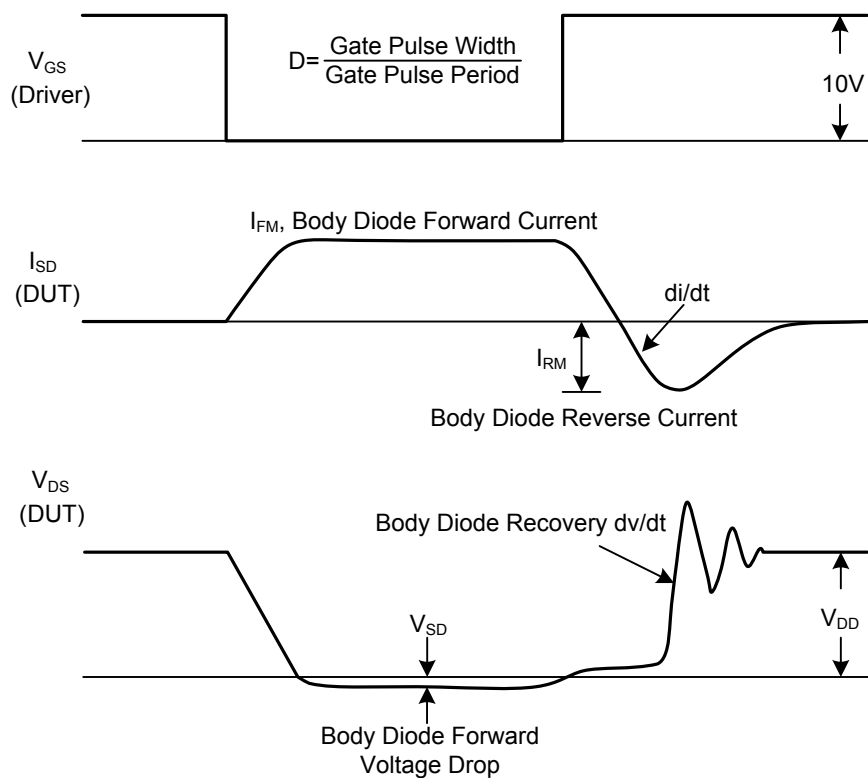
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

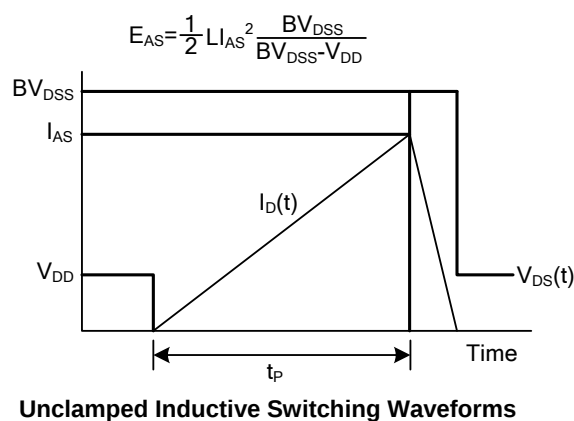
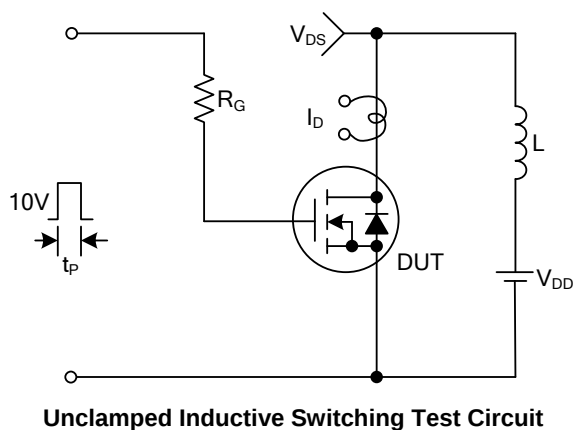
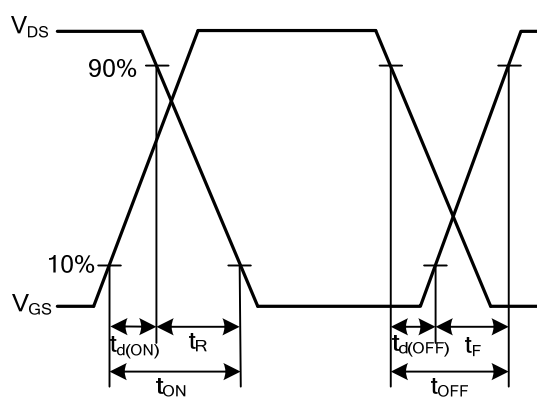
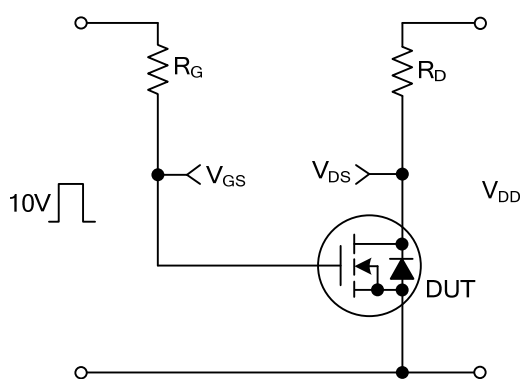
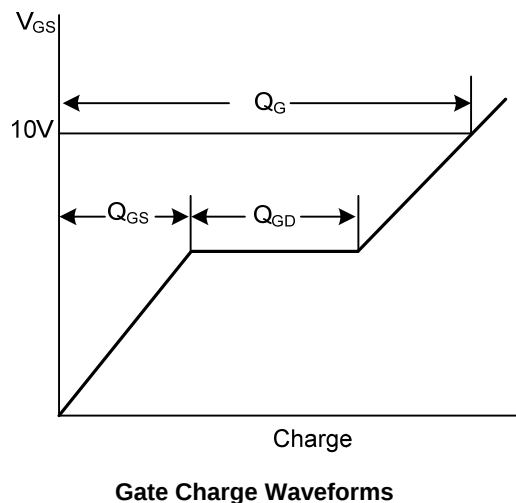
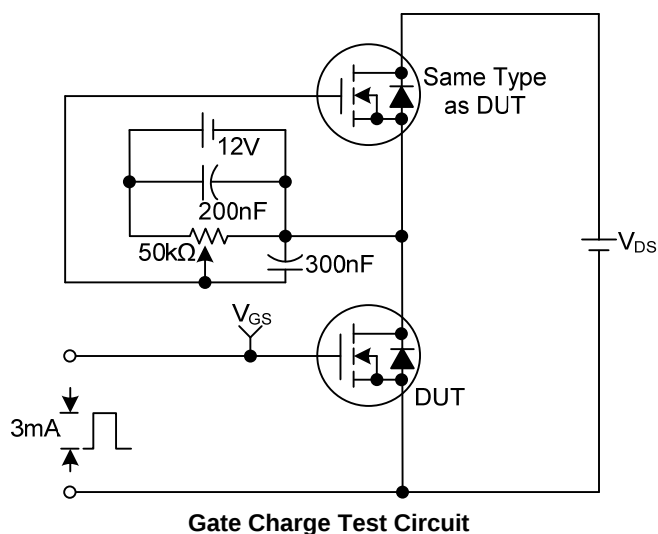
■ TEST CIRCUITS AND WAVEFORMS



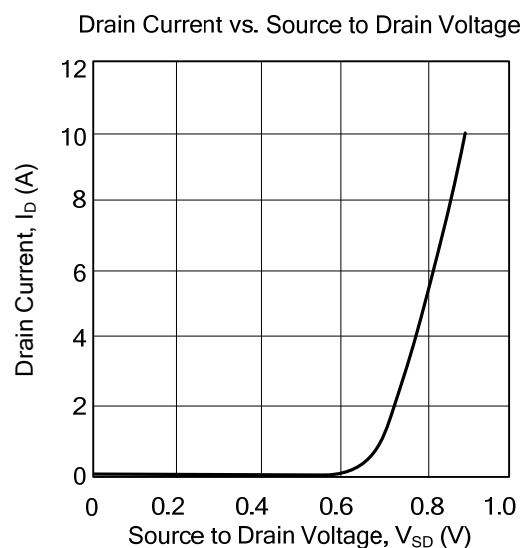
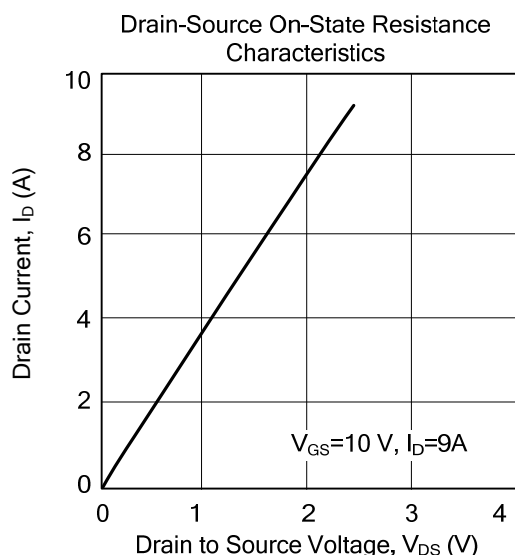
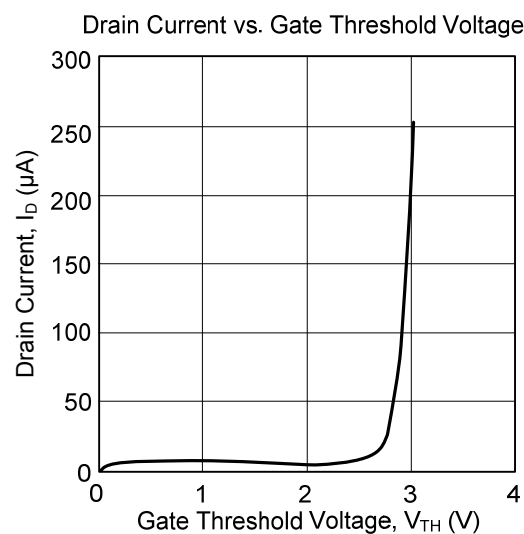
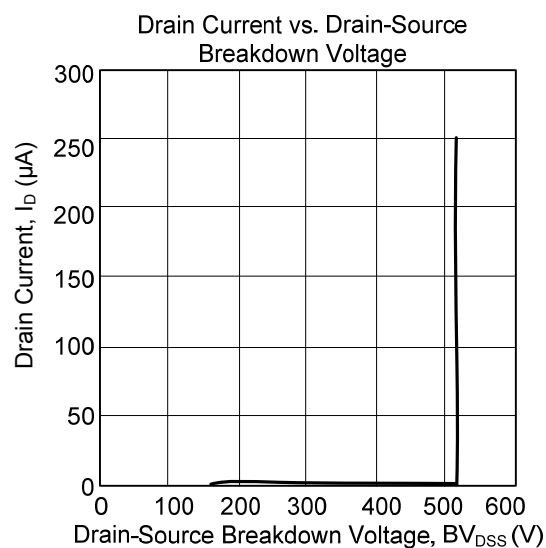
Peak Diode Recovery dv/dt Test Circuit & Waveforms



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



■ TYPICAL CHARACTERISTICS



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