

**18N50-MLQ**

Preliminary

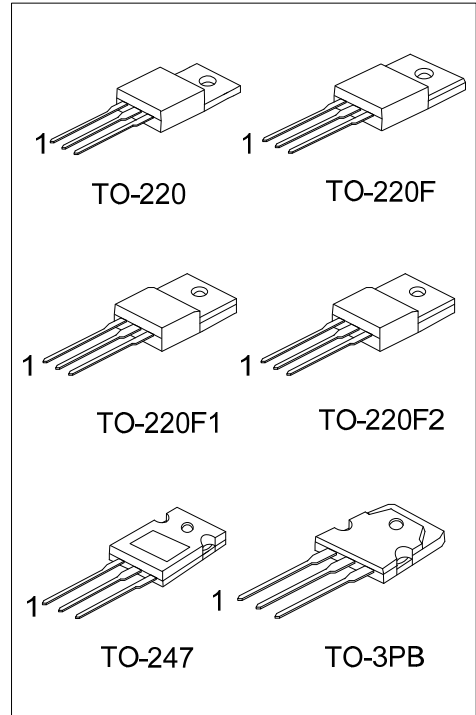
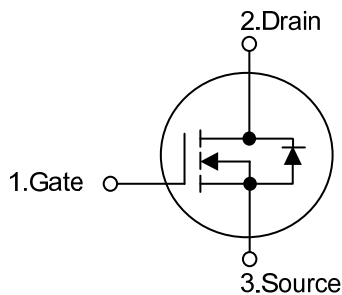
Power MOSFET

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

The UTC **18N50-MLQ** is a high voltage power MOSFET combines advanced planar MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} \leq 0.36 \Omega$ @ $V_{GS}=10V$, $I_D=9.0A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

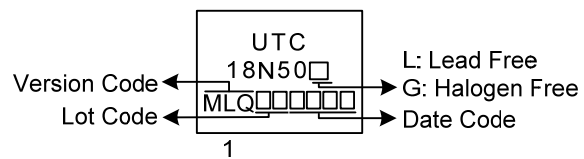
SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
18N50L-MLQ-TA3-T	18N50G-MLQ-TA3-T	TO-220	G	D	S	Tube
18N50L-MLQ-TF1-T	18N50G-MLQ-TF1-T	TO-220F1	G	D	S	Tube
18N50L-MLQ-TF2-T	18N50G-MLQ-TF2-T	TO-220F2	G	D	S	Tube
18N50L-MLQ-TF3-T	18N50G-MLQ-TF3-T	TO-220F	G	D	S	Tube
18N50L-MLQ-T3B-T	18N50G-MLQ-T3B-T	TO-3PB	G	D	S	Tube
18N50L-MLQ-T47-T	18N50G-MLQ-T47-T	TO-247	G	D	S	Tube

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

18N50G-MLQ-TA3-T	(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, T47: TO-247, T3B: TO-3PB (3) Version MLQ (4) G: Halogen Free and Lead Free, L: Lead Free
(1)Packing Type (2)Package Type (3)Version Code (4)Green Package	

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	± 30	V
Continuous Drain Current		I_D	18	A
Pulsed Drain Current (Note 2)		I_{DM}	36	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	216	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	16	V/ns
Power Dissipation	TO-220	P_D	185	W
	TO-220F/TO-220F1		41.5	W
	TO-220F2		41.5	W
	TO-247		240	W
	TO-3PB		200	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. $L = 30\text{mH}$, $I_{AS} = 3.8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 9.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-220F1/TO-220F2		62.5	$^{\circ}\text{C}/\text{W}$
	TO-247		50	$^{\circ}\text{C}/\text{W}$
	TO-3PB		40	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.67	$^{\circ}\text{C}/\text{W}$
	TO-220F/TO-220F1		3	$^{\circ}\text{C}/\text{W}$
	TO-220F2		3	$^{\circ}\text{C}/\text{W}$
	TO-247		0.52	$^{\circ}\text{C}/\text{W}$
	TO-3PB		0.625	$^{\circ}\text{C}/\text{W}$

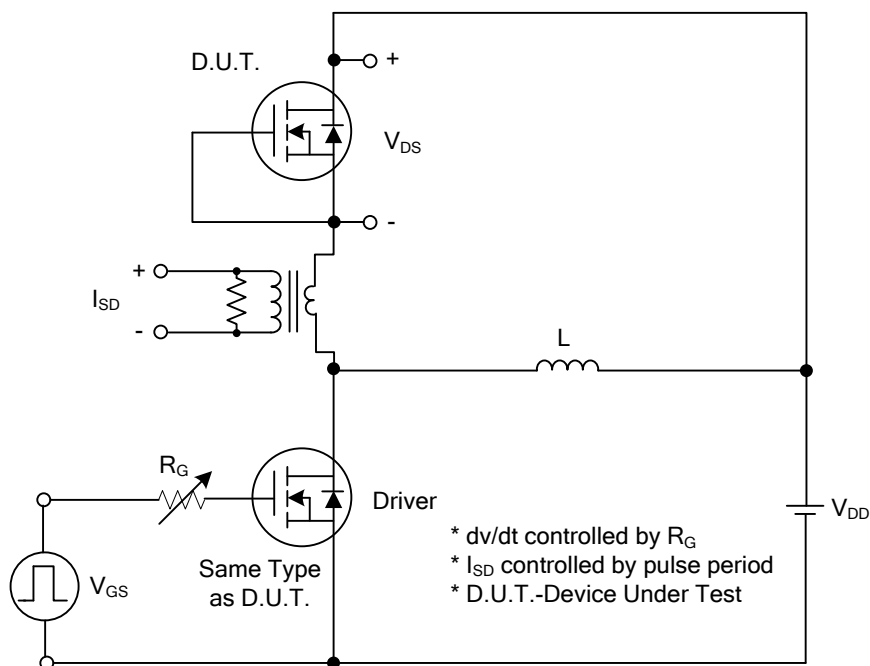
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	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	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =9.0A		0.30	0.36	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2750		pF
Output Capacitance		C _{OSS}			250		pF
Reverse Transfer Capacitance		C _{RSS}			14		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =400V, V _{GS} =10V, I _D =18A I _G =1mA (Note 1, 2)		64		nC
Gate-Source Charge		Q _{GS}			26		nC
Gate-Drain Charge		Q _{GD}			20		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =18A, R _G =25Ω (Note 1, 2)		44		ns
Turn-On Rise Time		t _R			28		ns
Turn-Off Delay Time		t _{D(OFF)}			120		ns
Turn-Off Fall Time		t _F			35		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				18	A
Maximum Body-Diode Pulsed Current		I _{SM}				36	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =18A , V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =18A , V _{GS} =0V		400		ns
Reverse Recovery Charge		Q _{rr}	di/dt=100A/μs		6.1		μC

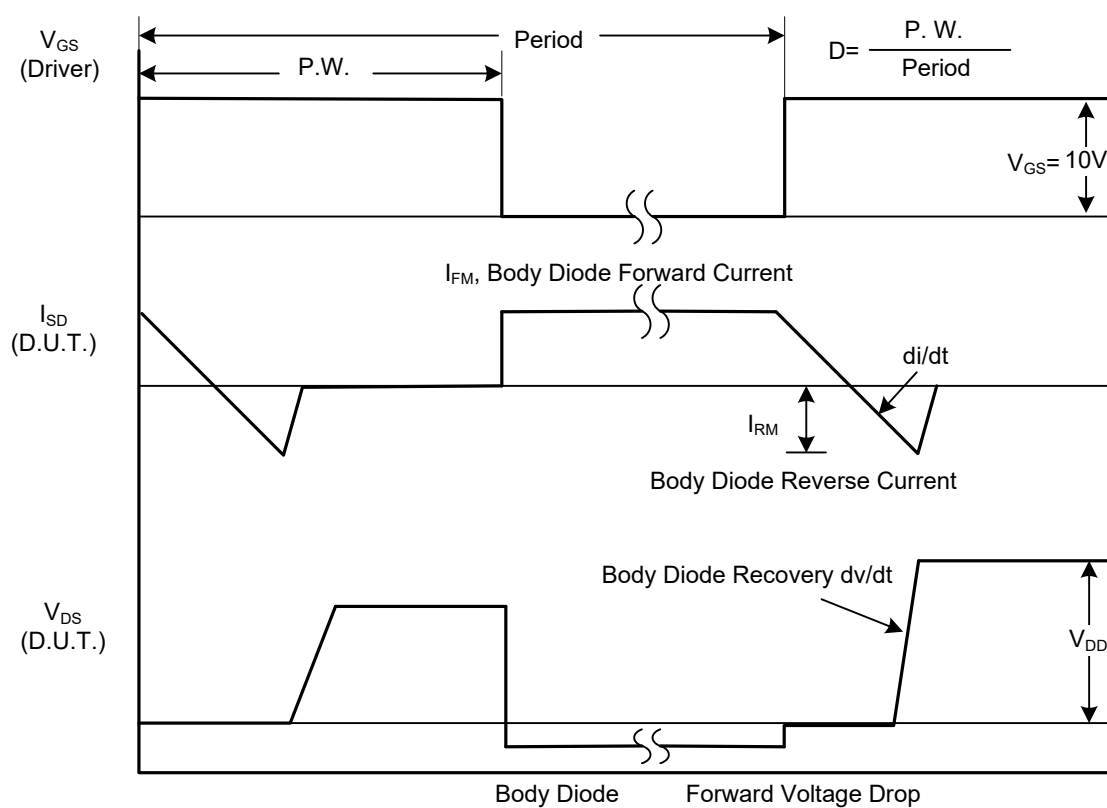
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

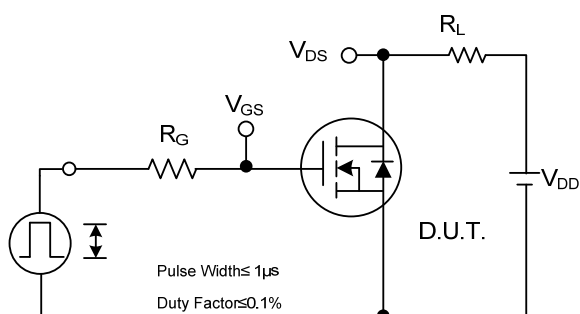


Peak Diode Recovery dv/dt Test Circuit

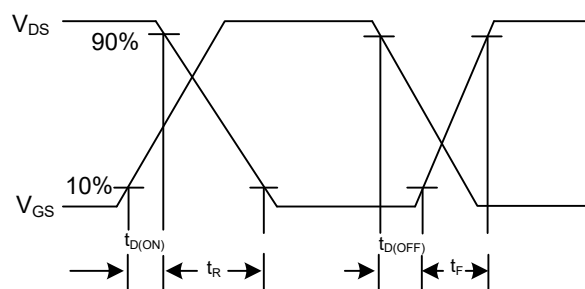


Peak Diode Recovery dv/dt Waveforms

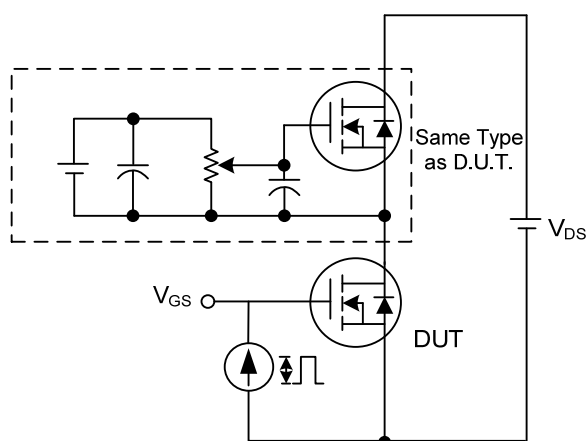
■ TEST CIRCUITS AND WAVEFORMS



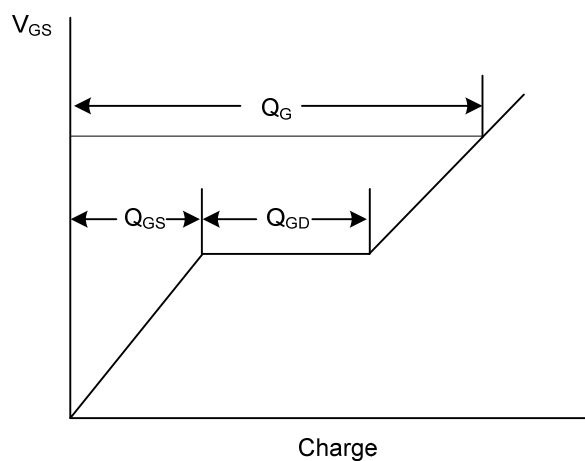
Switching Test Circuit



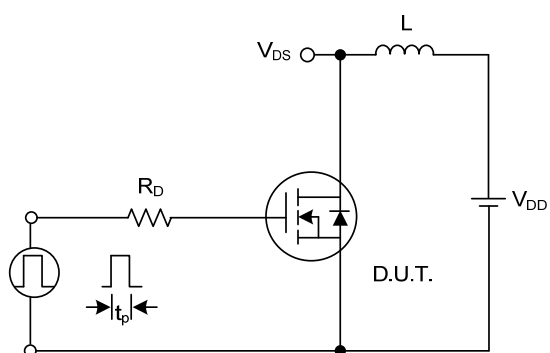
Switching Waveforms



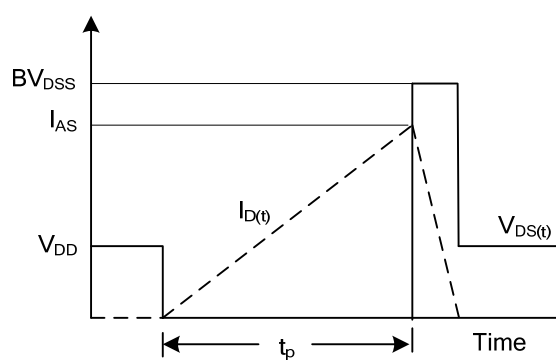
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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